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Manufacturers' index for Product Reports 1984

Names and addresses of companies whose products and literature appear in the editorial section of Product Reports, pages 39-216, are alphabetically listed below; following the company names are Reader Service Numbers. The Index to Advertising appears on page 251.

A
Atelier International, Ltd., 482
Atmosphere, Inc., 242
Auto-trol Technology Corp., 26
Autopoq Corp., 422
Aydon Controls, 34
Azrock Floor Products, 282

Acorn Wire and Iron Works, Inc., 408
Acoustics Development Corp., 397
ACTION Inc., 424
Adden Furniture, Inc., 467, 529
ADT, 652
Advant Lifts, Inc., 410, 425
Advance Transformer Co., 709
Advanced Color Technology Inc., 58
AEP/SPAN, 148
Agati Manufacturing, Inc., 437
Aiphone Intercom Systems, 721
Air-Tech Industries, Inc., 5, 57
Alcan Building Products, 105
Algoma Hardwoods, Inc., 231
All-Steel Inc., 528, 541, 553
AllianceWall Corp., 197
Allied Fibers & Plastics Co., 337
Allmetal, Inc., 244
Alma Desk Co., The, 475
Am-Finn Sauna Co., 564
AMCO Engineering Co., 15
American Ceramics, 347
American General Corporation, 117
American Glass Light Co., The, 665
American Hydrotech, Inc., 185
American Institute of Timber Construction, 136, 138
American Locker Security Systems, Inc., 379
American Olean Tile Co., 306, 314
American Plywood Assn., 139, 140
American-Standard, 620
American Wood Council, 137
AMSCO/American Sterilizer Co., 423
Amsterdam Corp., 299
Andco Industries Corp., 395, 407
Andersen Corp., 212, 228
Anderson Hardware Floors, 336
Appropriate Technology Corp., 540
ARCAD, 48
Architectural Aluminum Manufacturers Assn., 257
Architectural Area Lighting, subs. Kidco, Inc., 674
Architectural Sign Inc., 294, 406
ARCO Chemical Co., div. Atlantic Richfield Co., 183
Arena Dome Assoc., 568
Arstokraft, 502
Armstrong World Industries, Inc., 276, 297, 312, 324, 369
Arrington Computer Graphics, 16, 54
Artistic Brass, div. NI Industries, Inc., 606
Artograph, Inc., 417
ASC Pacific, Inc., 184
Atelier International Lighting, 695

Atelier International, Ltd., 482
Atmosphere, Inc., 242
Auto-trol Technology Corp., 26
Autopoq Corp., 422
Aydon Controls, 34
Azrock Floor Products, 282

B
B&B America, div. Stendig International, 442
Babeck & Wilcox Co., Insulating Products Div., 637
Badische Corp., 335, 347
Ball Zinc Products Div., 164, 187
Bally Case & Cooler, Inc., 151
Baltimore Aircell Co., Inc. subs.
Merek & Co., Inc., 649
Bausch & Lomb Interactive Graphics, 22
Bell & Howell Automated Systems Div., 588
Benchmark Doors Div., General Products Co., Inc., 290
Best Manufacturing Co., 366
Beyelerian Limited, 511
Bieffeplast USA, 343, 455
Bigelow-Sanford, Inc., 284, 293, 311
Bielefield, 59
Bilo Co., The, 197
BLU-RAY, Inc., 30
Borick Washroom Equipment, Inc., 395
Bogen Div., Lear Siegler, Inc., 672, 676, 715
Bomanite Corp., 65, 72
Bradley Corp., 385, 630, 648
Brand-Rex Co., Telecommunications Div., 708
Brandt International, Inc., 69
Bryton International Collection, 472
Broadcast & Related Products/3M, 661
Brueeton Industries, 473
Brunei, 20, 29
Buchtel, 186
Burke Co., The, 90, 91
Burnby Corp., 656
Burns & Russell Co., The, 98, 101

C
Cabot, Inc., Samuel, 359
CADAM Inc., 3
California Cooperage, 577
California Redwood Assn., 127, 141, 143
Canam Hambro, div. Canam Steel Corp., 109
Capaul, div. Acoustilizer Corp., 361
Capri Lighting, 680
Carlisle SynTec Systems, 167
Carolina Seating Co., div. U.S. Furniture Industries, 564
Caselli Furniture, Inc., 468
Caterpillar Engine Div., 635
Ceco Corp., The, 93, 272
Ceramic Radiant Heat, 370
Certainteed Corp., 159
Cervito Kitchens, Inc., 420
Challis Stairways, Inc., 128
Champion International Corp., 132

Charrette Corp., 488
Charterpak, Ltd., 100
Chessler-Robocom Corp., 6
Chicago Faucet Co., The, 618
Chief Industries, Inc., Building Systems Div., 188
City I Designs, Inc., 507
Claridge Products & Equipment, Inc., 363, 405
Clayburn Industries Ltd., 115
Cold Spring Granite Co., 102
Coleman Co., Inc., The, 619
Colorado Electro Optics, Inc., div. Linear Corp., 690
Columbia Cascade Timber Co., 63
Columbia Lighting, Inc., subs.
U.S. Industries, 720
Computer Applications Corp., 7
Computer Devices, Inc., 41
Concrete Reinforcing Steel Institute, 86
Congooleum Corp., Resilient Floor Div., 322
Concrete Corp., 111
Consoliverse, Inc., 655
Consoweld Corp., 124, 134
Construction Specifications
Contempo Furniture Div., Fisher Scientific Co., 526
Continental Instruments, 666
Contract Lighting Systems, div. TSIO Designs Inc., 681
Convex Corp., 304, 384, 501, 552
Coppes Napanee, 449
Corbin Div., Enhardt Hardware Group, 211
Cota Industries, Inc., 170
Couristan, Inc., 281, 300

Creative Glassworks
International, Inc., 234
Crystal Tips Ice Products, 413
Cumberland Furniture Corp., 466, 527
Cumberland Woodcraft Co., Inc., 477
Cupples Products Div., H.H. Robertson Co., 245
Cy Mann Designs Ltd., 495

D + W Inc., 28
Da-Lite Screen Co., Inc., 706
DACOR Corp., 414
DATA TECHnology, Inc., 18
Datapoint Corp., 24
Dataprint Corp., 43
Decoysities, 319, 346
Design Logic, Inc., 50
Design Selections International, 460, 486
DesignNetwork International, div. Xtroron Corp., 49
DesigninX Fabrics, Inc., 489, 512
Desoto, Inc., 558
DeVAC, Inc., 247
Diazi Co., Inc., 32
Digital Equipment Corp., 450
DISCO Aluminum Products Co., div. Circle "S" Industries, 246
Dornex Corp., 539, 551
Donghia Textiles, 434
Donn Corp., 302, 404
Dow Chemical Co., The, 161, 189
Manufacturers

N
Nanik, div. Wausau Metals Corp., 227
National Fire Protection Assn., 631
National Partitions & Interiors, 555, 573
National Products Div.—Potter Industries, 352
National Woodwork
Manufacturers Assn., 269
Naturescapes, 342
Neenah Foundry Co., 68
Neo-Ray Products Inc., 668
New England Lock & Hardware Co., 220
Nixalite of America, 83
Nora Flooring, 291
Norco Windows, Inc., 236, 258
Nord Co., E.A., 219, 253
NuTone Div., Scovill Inc., 165, 200, 267

O
Oee-Industries Inc., 21
O’Keefe’s, Inc., 175
Otis Elevator Co., 584, 589, 595, 601
Owens-Corning Fiberglas Corp., 163
Ozalid Corp., 19

P
Pace Collection, The, 436
Pacific Lumber Co., The, 122, 133
Paddock Pool Equipment Co., Inc., 571
Panel Concepts, Inc., 451
Panefold, Inc., 223, 376
Parker Co., The Charles, 362, 377
Pass & Seymour Inc., Wiring Device Div., 714
Patscraft Mills, Inc., 353
Peachtree Doors Inc., 237
Peerless Electric Co., 691
Pella Rolscreen Co., 209, 217, 222, 241
Pellerin Milnor Corp., 431
PermaGrain Products, Inc., 320, 329
Philips Fibers Corp., subs.
Philips Petroleum Co., 201
Phillipsburg Div., Bell & Howell, 40
Piemme of the Americas Ltd., 288, 341
Pittsburgh Corning Corp., 254
Plan Hold Corp., 35
Plaskolite, Inc., Commercial Div., 259
Playfield Industries, Inc., 561
Plymouth Booths, 478
Poggenpohl USA Corp., 496
Porter Carpet Mills, Inc., 533
Portland Cement Assn., 85, 89, 94
Potlatch Corp., 130
PPG Industries—Coatings and Resins Div., 328
Prestressed Concrete Institute, 88
Preway Inc., 367
Prime Computer, Inc., 56
Project Software & Development, Inc., 57
Proudfoot Co., Inc., The, 99
P.S. Decor, div. Photographic Specialties, 545
Pyrotronics, 643

R
R-Way, 520
Raceway Components, Inc., 658
Rally Rails, div. Rally Enterprises Inc., 73
Ralph Wilson Plastics Co., 145
Rambusch, 673
Rauland-Borg Corp., 684, 701
R.C.A. Rubber Co., an Ohio Corp., 340
Recreonics Corp., 566
Republic Powdered Metals, Inc., 294
Reynolds Metals Co., 202
Rhoflex Div., Teltex Inc., 176
Ricoh of America, Inc., 23
Rixson-Firemark Div., 238, 261
Robbins, Inc., 296
Robertson Co., H.H., 380
Robertson Co., H.H., Western Architectural Systems Div., 239
Roofing Systems, J.P. Stevens & Co., Inc., 146
Roppe Rubber Corp., 280, 351
Rosemount Office Systems Inc., 443
Royal Business Machines, Inc., 60
Rubber & Plastics Compound Co., Inc., 200
Rush-Hampton Industries, Inc., 642
Russwin Div., Emhart Hardware Group, 230

S
Sansspray Corp., 156
Scheirich Co., H.J., 479
Schindler Haughton Elevator Corp., 583, 594
Schlage Lock Co., 226
Scope Furniture Ltd., 464
Scottsmen Ice Systems, 432
Security Engineering, Inc., 214, 223
Sedgwick Lifts, Inc., 582, 593
Seton Name Plate Corp., 368
Shackertown Corp., 166
Shakespeare Electric Utility Products Group, 81
Sherwin-Williams, Chemical Coatings Div., 327
Sigma Design, Inc., 33
Simplex Ceiling Corp., 339
Simplex Security Systems, Inc., 270
Simplicity Engineering Co., 581
Simpson Timber Co./Door Div., 232, 263
Siplast, 169
Sitecraft by Rosenwachs, Inc., 74
Slant/Fin Corp., 629
Slater Electric Inc., 688
Sloan Valve Co., 621
Smith Metal Arts, 498, 531
Solar Industries, Inc., 560, 570
Solar Power Corp., 565
Solomon Grind-Chem Service, Inc., 97
Sonneborn Building Products, Rexnord Chemical Products, Inc., 87
Spacesaver Corp., 532, 544
Spec’built—Specification Built Corp., 519
Spring City Electrical Manufacturing Co., 80
Square D Co., 689, 712
Stanley Hardware, div. The Stanley Works, 221
Star Manufacturing Co., 205
Stark Ceramics, Inc., 110
Stecklace Inc., 8, 55, 485, 543
Stendig, subs. Stendig
International, 513
Sterling Gas-Fired Heating Equipment, 641
Sterling Radiator, 628
Stern Lighting Systems Inc., 670, 700
Stebel Eltron North America, 713
Stow/Davis Furniture Co., 452
Stretch Forming Corp., 120
Summagraphics Corp., 42
Sun-Dar-Co, 262
Sunar Hausermann, 440, 518
Sunroc/Western Co., 610
Super Sky Products, Inc., 177
Synergy Methods, Inc., 157
Syncom Corp., 96

T
TAB Products Co., 463
Tandem Fabrics, dist. by Gifford Inc., 474
Tate Architectural Products, Inc., 369
Teledyne Post, 45
Tecmor, 569, 572
Terak Corp., 38
Thermal Concepts, Inc., 640
Thermal Technology Corp. of Aspen, Inc., 305
Thomas & Betts, 711
Thomas Industries Inc., 671
Thonet, 458, 484, 484
3M/Broadcast & Related Products, 661
Tielsa Kitchens/Contemporary Systems, Inc., 493
TimberForm Div., Columbia
Cascade Timber Co., 77
Theme Co., Inc., 360
Translogic Products, 589, 592, 596
Tradic, 46
Tropical Industrial Coatings, Inc., 178
True Joint Corp., 125, 129
Tuf-Cell Corp., 433
Tuohy Furniture Corp., 515
Tyler Elevator Products Inc., 579

U
Ulrich Planfiling Equipment Corp., 39
Unistrut Building Systems—div. GTE Products Corp., 104
United States Ceramic Tile Co., 236
United States Gypsum Co., 82
United Technologies—Carrier Air Conditioning, 622
U.S. Borax, 398
U.S. Elevator, subs. Cubic Corp., 591

V
Vanguard Plastics Inc., 604, 639
Vecta Contract, 510
Velux-America Inc., 179
Vent-Axia Inc., 626
VENTARAMA Skylight Corp., 153
Vestmont Store Co., The, 386
Vetonite, Inc., 95
Viertex, div. L.E. Carpenter & Co., 322
Villeroi & Boch (U.S.A.), Inc., 326, 638
VIP Enterprises, Inc., 147
Visual Products and Supply Corp., 5
VIP, 336
V’Soske, 446

W
W & W Glass Products, Ltd., 265
Wade Div., Tyler Pipe, 616
Walker Div., Butler Manufacturing Co., 679
Walker Systems, Inc., 530
Wasco Products, Inc., 158
Watpro Corp., 180
Watson Bowman Assoc., Inc., 181
Waupaca Elevator Co., Inc., 578
Wausau Tile, Inc., 76, 155
Webb Manufacturing, Inc., 213
Western Wood Products Assn., 131
Western Wood Structures, Inc., 64, 567
Westinghouse Elevator Co., div. Westinghouse Electric Corp., 590
Wheelock Signals, Inc., 698
Wide-Lite Corp., 694, 710
Wilson Corp., The J.G., 250
Windsor Door, div. The Ceco Corp., 264
Winona Industries, Inc., 287
Woodbridge Ornamental Iron Co., 116
Woodform Div., Columbia
Cascade Timber Co., 707
Wright Line Inc., 542

X
Xerox Corp., 1

Z
Zazzere S.A.S. c/o Watercolors Inc., 613
Zero International, Inc., 225
Louisiana legislation sets new preservation models

A new bill introduced in Congress would require the appointment of a supervising architect at an executive level within the General Services Administration and would assign priority in GSA renovation, acquisition or leasing to buildings with historical, architectural or cultural significance.

The Public Buildings Act of 1963 (S. 452), introduced by Senators Daniel F. Moynihan and Robert T. Stafford, is designed to "preserve and enhance the nation's legacy of architectural excellence." A companion bill is coming out of the House Public Works and Transportation committee.

Writing each member of the Senate Environment and Public Works Committee in support of the Senate bill, AIA President Robert Broshar said that appointing a supervising architect would ensure that "a broad range of aesthetic and economic concerns are given full consideration in design decisions and are not overridden by bureaucratic expedience." Peter Hoffman, World News, Washington, D.C.

Uniform conservation law picks up support

Model legislation designed to simplify and encourage the preservation of open land and historic buildings through receipt of tax-deductible contributions or purchase of development rights by nonprofit organizations has been adopted by Arkansas, Nevada and Wisconsin and has been considered by six other state legislatures in the past year. Fashioned in 1981 by the National Conference of Commissioners on Uniform State Laws (a group of some 300 representatives selected from their legal communities by each of the 50 states), the law is seen as a way of achieving local deals of preservation without undue burden on tax dollars or the problems of mandatory public action. It follows in the wake of similar legislation already adopted by, for instance, New York, and has added advantage of being easily understood from state to state because of its uniform nature. The easements would exist in perpetuity in accordance with the requirements of the IRS for full tax advantages unless otherwise specified in the transfer agreement. Contact Jacque Walsh of the Uniform Law Commissioners at 445 N. Michigan, Chicago, Ill. 60611.

Business

NIBS fund drive showing success

The National Institute of Building Sciences announced that it has collected more than a third of the target of $750,000 in its first year of a fund drive to assure its continuing activities in the research, development and regulation of building products and techniques. Started in 1978 with congressional authorization to "encourage a more rational building regulatory environment," the Institute had been funded by Federal seed money, independent contracts and membership dues, and must now strengthen its private-sector support.

For further information about the Institute or its fund drive, contact NIBS at 1015 Fifteenth N.W., Washington, D.C. 20005

Course on avoiding liability claims offered

A one-day program will be presented in various cities throughout the United States during the first half of the year by Victor O. Schinerner and Company, Inc. It includes a workshop on contracts in which legal and professional liability experts describe in detail the areas to be aware and wary of in architects' and engineers' service contracts. For registration information on this and other professional liability courses, contact Diane Lash at Schinerner and Company (302-688-2850).

The drawing above is one of several hypothetical proposals (this one is by architects Labouisse and Waggoner) funded by the NEA and sponsored by New Orleans Preservation to study alternatives for infill in historic districts.
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Computers: CAD versus CAD

Two computer experts from SOM argue that computer-aided drafting production is OK, but design creativity is the future

By Douglas F. Stoker and Nicholas H. Weingarten

While the computer is generally acknowledged to be a benefactor to numerous fields, it has inflicted upon the English language a plethora of confusing, contradictory and frequently meaningless acronyms. Such is the case with the term CAD, which has come to assume the two completely different and mutually exclusive identities of computer-aided design and computer-aided drafting, because of the very different process that they involve.

The first accepted use of the term CAD is unknown, but it most likely referred to computer-aided design. Only more recently has CAD come to mean computer-aided drafting as well. This ambiguity has been promoted by manufacturers and architects who either confuse drafting with design, or hope to capitalize on someone else's failure to recognize and understand the differences between the two.

The production of two-dimensional working drawings should never be confused with the derivation of the design itself. Drafting is a deterministic procedure which may be computerized with relative ease. Design requires a flexible and ever-changing set of tools to identify and manipulate the abstract relationships between a project's components.

Computer-aided drafting is only a facet of the meaning of CAD

The proponents of computer-aided drafting have focused much attention on productivity in order to justify the high cost of computer technology in the design environment. Such analyses are aided by the fact that computer-aided drafting is one of the few activities that can be directly compared to a manual task while producing a nearly identical product. The cost effectiveness can therefore be estimated without raising subjective questions about quality or uniqueness.

This view is a narrow one, even from a profit motive point of view. A theoretical reduction in the time required to construct a working drawing, and the implied reduction in its cost, can impact only the cash outflow of an office. It will not bring new work into the firm, unless clients can be persuaded that such technology is of mutual benefit.

Three arguments in favor of computer-aided drafting are typically put forth by the suppliers of such products:

First, it is said that reduced overhead can be passed on to the client in the form of reduced fees. This does not take into account that an architect utilizing computer-aided drafting equipment incurs many increased costs. Besides the initial purchase price of the system, there are the training costs to improve productivity, the maintenance charges to keep the system running, the increased salaries for labor to operate it and the professional staff needed to manage it. These additional costs have forced many buyers of large systems to run them for three shifts per day to recover their expenses.

Second, it is stated that the use of computer-aided drafting will result in higher quality and more accurate working drawings. Fewer construction errors will therefore occur, resulting in a less expensive building for the client. An argument can be made that better design standards and more careful construction management would more directly impact the cost of any project. Poor design and inadequate attention to details cannot be compensated for by more accurate drawings and shorter production schedules.

Finally, there is the argument that reducing the time used for the production of construction documents will allow greater time to be devoted to the design phases of a project. Even if this statement were true, which it is not, it would suggest that a firm should invest large amounts of time and money to automate its draftspersons who make five dollars per hour, so that its senior designers who make twenty dollars per hour can spend more time on each project.

This is tantamount to giving a $50,000 pencil to the most inexperienced, least important person in the firm.

Computer-aided design is the real area to spark new services and quality

Greater productivity neither creates a new product nor increases the quality of an existing one. As professionals, we should be using the computer to explore new services and to generate new ideas, not solely to speed up the existing process of architectural drafting. In contrast, a good computer-aided design system, used by trained professionals, can have a direct impact on the central issues of design. The benefits are not just reduced time or lower overhead, but an over-all increase in the quality of the design.

This improvement, while difficult to demonstrate, is becoming an increasingly important asset in the market for architectural services. In such an environment, it will be an advantage to be able to improve the quality and control of its work, not the accuracy of its drawings, that will attract new clients.

Unfortunately there are no systems currently on the market that provide totally appropriate tools for architectural design. This shortcoming is often attributed to the difficulty in quantifying or formalizing the architectural design process. One limitation stems from the false impression that turnkey drafting suppliers that architectural design procedures parallel those of other design professionals.

This has led manufacturers to introduce architectural systems that would be adaptable by the disciplines initially developed for other disciplines. Some, for instance, provide architects with tools originally designed for mapping and process piping. Others are derived from electronics or machine-part design systems. To put these products in perspective, we must examine the three major components of any computer-aided design system; its graphics capabilities, its database structures and its applications programs.

Graphics capabilities and color are still problems in design applications

Only in architecture is the visual presentation of a design problem so closely linked with its solution. The very method we use to interact with our drawings determines the result of the process. This manifests itself in several general areas.

First, the number of components in an architectural solution is larger than in most other design disciplines. Contextual backgrounds alone may require many thousands of lines. Accurate facade descriptions may encompass over 100,000 elements ranging in size from hundreds of feet to fractions of an inch.

This difference between an architectural project's sheer size and its smallest tolerance is two or three orders of magnitude (100 to 1,000 times) larger than problems in other professions. Few systems except the very
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largest are prepared to display these ranges and amounts of data that architects have traditionally manipulated on tracing paper.

The application and use of color is critical to architectural design, separating it from other design fields. In other design disciplines color is divided into very few categories. Its purpose is to differentiate between layers or elements on a display screen or drawing. In architectural design it is necessary for the effective rendering of surface and void. Techniques such as smooth shading and shadow casting, requiring large numbers of colors, are crucial to the architectural design process and the communication of spatial concepts. These capabilities are of only secondary interest to other design professions.

A drafting system needs only present 8 or 16 colors at a time to the user. An effective architectural design system, however, may require a palette of over four million. Turnkey drafting systems available today do not offer the range of color and the image-making capabilities that the average architect can achieve with a box of felt-tip markers.

The variety of ways in which architects view their designs is also a unique aspect of their profession. Few other designers rely so heavily upon perspective and axonometric projections. The example of “architectural” or “view-camera” perspective is particularly unique to the architectural environment. Flexible axonometric systems and the ability to display interior perspective views are also important.

These techniques, while possibly irrelevant to other design disciplines, are at the heart of the architectural design process. Systems on the market today do not support these aids as well as a skilled hand and a roll of yellow tracing paper.

Broad database structures to accept abstract, unorganized data are another problem

The organization of data employed by an architect during the design process is very different than that used by other professionals. Its structure may be characterized as broad, encompassing many types of data with relatively few copies of each type. A building may be composed of many thousands of loosely related, generic elements such as stairs, windows, beams, ductwork, carpeting, sprinklers, chairs, etc. There are few copies of each element, usually numbering in the tens or hundreds.

Many other design disciplines, by contrast, use data structures that are deep in nature, with large numbers of elements divided into very few categories. An electronics engineer, for instance, may use only a few different types of circuits, repeating many of them thousands of times on a single chip.

These deep databases have an a-priori structure based upon previously assembled expertise in a narrow field. It is no accident that the expert systems available today are organized around such narrow, deep bodies of knowledge. They are far easier to program and are more closely aligned with the procedures of the expert user in their particular field. Databases for structural analysis or elevator design fall into this category.

A database for architects may contain subsets of information organized in this fashion, but it must also be prepared to accept the abstract, unorganized data of the architectural design process. These broad databases have no predefined organization or structure. They become the repository for whatever information is deemed appropriate by their users. They must allow for any discovered relationship or link, even between dissimilar types of data.

The relationship between a desk and an elevator, for example, may be only that the owner of the desk is included in the population figure used to determine the elevator cab size. Another linkage may specify that the cab doors be wide enough to allow the desk to be moved in by elevator. Such abstract, ambiguous and occasionally contradictory information is a typical component of the design process. It is the selection and prioritization of these overlapping criteria that make design an individual and intuitive process.

Broad database systems are not as imaginary as one might suppose. The standard office filing cabinet and the designer's desk, strewn with program notes, cardboard models and scraps of paper are common examples. Both of these devices perform amazingly well in structuring random, ill-defined data for access by many individuals engaged in many different activities.

Their contents can be quickly assessed and mentally reordnered to suit particular tasks. Retrieval and sorting methods for these devices may be as diverse as the color of the paper upon which the information is printed, or its position in a pile of other papers. Drafting system databases cannot provide the equivalent degrees of freedom and flexibility.

Applications programs to integrate graphic and nongraphic data are needed

In most design fields, including architecture, the creative process is enhanced by a series of specific analyses and design tools. In architecture, however, these programs span a broader range of disciplines. A thorough architectural design system must support a full set of engineering analyses (structural, mechanical, electrical and civil), programs for the design of special components (elevators, solar shading devices, transportation networks, etc.) and a series of more general problem-solving systems (facade design, core layout, architectural programming, etc.) to facilitate true interactive design. A design system for architects would not only provide these capabilities but integrate them with the graphic and nongraphic data in the system.

It is the issue of integration that separates architecture from other design disciplines. Only in architectural design does the process revolve around so many professionals defining individual abstractions of a central design concept. These discipline-dependent models are each manipulated by a set of procedures unique to their particular professions. It is the recombination of these "spin-off" models with the central concept that causes such problems with turnkey computer systems.

The problem is heightened by the inability of most managerial structures to normally control these "subprocesses." A proper architectural design system must therefore include project management software in addition to the standard set of disciplinary design programs.

This software includes manpower projections, client bill-back programs and advanced plotting packages. Most turnkey systems overlook these features in favor of concentrating development on specific engineering applications.

We must not think of CAD just in terms of cost benefits but stress creativity. It may be that more sympathetic systems for architects do not exist because of the manner in which their use is justified. A cost-benefit analysis cannot be easily applied to a computer-aided design system, even if it can be proven that such a system would enhance a firm's creative capabilities. In the end, this raises a question that architects and their clients have always avoided: What is the value of good design? Were the cost of computer aids minimal, their use for drafting would get far less emphasis. Were the value of good design more quantifiable, few expenses would be spared to realize it.

The current confusion over the meaning of CAD only highlights the confusion over the role of the architectural profession. Does it produce designs or drawings? Does it provide a service or produce a product? Can architects really focus on the automation of their drawings while abandoning the opportunities that computers can give in the pursuit of their ideas?
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<table>
<thead>
<tr>
<th>Material</th>
<th>Cost Instl (per sq. ft)</th>
<th>Taper Wear Factor</th>
<th>Flame Spread</th>
<th>Smoke Density</th>
<th>Mfg to ASTM C-126</th>
<th>Minimum Compressive Strength*</th>
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<tr>
<td>SGFT</td>
<td>$6.90</td>
<td>less than 15 @ 1000 g 1000 cycles</td>
<td>0</td>
<td>0</td>
<td>Yes</td>
<td>1500 psi</td>
</tr>
<tr>
<td>&quot;Glazed&quot; Concrete Masonry Unit (CMU)</td>
<td>7.10</td>
<td>less than 130 @ 1000 g 500 cycles</td>
<td>under 25</td>
<td>under 50</td>
<td>No</td>
<td>600 psi</td>
</tr>
<tr>
<td>Ceramic Tile/CMU</td>
<td>6.90-8.12</td>
<td>varies</td>
<td>under 25</td>
<td>0</td>
<td>No</td>
<td>600 psi</td>
</tr>
<tr>
<td>Epoxy Painted CMU</td>
<td>up to 6.83</td>
<td>needs repainting</td>
<td>varies</td>
<td>varies</td>
<td>No</td>
<td>600 psi</td>
</tr>
<tr>
<td>Epoxy Painted Drywall/CMU</td>
<td>4.05-9.36</td>
<td>needs repainting</td>
<td>varies</td>
<td>varies</td>
<td>No</td>
<td>600 psi</td>
</tr>
</tbody>
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ARCHITECTURAL RECORD
A capital idea

The Architectural League has issued a call for entries to its third annual national competition for young architects who are ten years or less out of school. Winning entries will be presented at a series of four evening seminars to be held this spring in New York. For further information write or call The Architectural League, 457 Madison Avenue, New York, N.Y. 10022 (212/733-1722).

The City of Columbus, Indiana and the Irwin Sweeney Miller Foundation have announced a national competition for the design of a 200-car surface parking lot in downtown Columbus. The deadline for entry is April 1, 1984. For further information contact Theodore Liebman, AIA, Liebman Ellis Melting, 330 West 42nd Street, New York, N.Y. 10036.

Harvard announces Loeb Fellows

The Harvard Graduate School of Design has named 12 recipients in its Loeb Fellowship program in Advanced Environmental Studies. Currently in its thirteenth year, the annual program offers leading mid-career designers and planners the opportunity for full- or part-time study at the school while maintaining their outside professional commitments. Loeb Fellows for 1983-84 include Ellen Beasley, a preservation planning consultant from Galveston; Rifat Chadirji, an architect from Iraq; Constance Eiseman, project manager for Westway Park in New York; Glenn Garrison, an architect from New York; Wendy Milner Herrett, a district ranger for the U.S. Forest Service in Meeker, Colorado; Michael Jacobs, redevelopment director at the Boston Housing Authority; Charlotte B. Kahn, executive director of Boston Urban Gardener; Jane Lids, an architectural photographer from Palo Alto; Philip A. Morris, executive editor of Southern Living magazine; Shanker M. Pradhan, town planner of Kathmandu, Nepal; Michael Pyatok, an architect from Berkeley; and James Vasell, an architect for the Georgia Power Company.

Reprepare for an Adirondack camp

Situated on the last remaining parcel of privately owned riverfront land in the District of Columbia, Washington Harbour is a mixed-use development near Georgetown that comprises offices, retail space, and 38 luxury condominium apartments. The 725,000-square-foot project lies opposite Theodore Roosevelt Island and occupies the site of a former concrete batching plant (aerial photograph right). Architects Arthur Cotton Moore/Associates have produced a brick and limestone complex with classically inspired design details and radiating pedestrian malls that refer both to the architecture of familiar Washington monuments and to the city's 18th-century street plan. Two curving residential arms, arranged asymmetrically, form a colonnade that embraces an elliptical pool, while a riverfront promenade connects the new buildings with existing walking and bicycle lanes running along the Potomac to the nearby Watergate and Kennedy Center complexes.

Responding to the rare appearance of a preservation-related issue on the public ballot, the residents of New York State have approved an amendment to the state constitution that will help save Camp Sagamore, the turn-of-the-century enclave of 25 rustic buildings near Raquette Lake in the Adirondacks. The legislature-passed amendment was necessary because 11 outbuildings in the complex are situated on ten acres of state-owned land that is part of the Adirondack Forest Preserve, a vast wilderness tract mandated by an 1894 law to remain "forever wild." The New York Constitution requires that any buildings within the preserve may not be used or repaired—a provision that effectively calls for the demolition by neglect of several camps in the region.

The amendment authorizes a land swap between the state, which owns the outbuildings, and the not-for-profit Sagamore Institute, which owns the main structures at Sagamore and operates them as a year-round educational center. In exchange for the endangered buildings, the Institute will donate a 245-acre parcel to the state that will be added to the forest preserve. Although the amendment had bipartisan support from numerous preservation, environmental, and economic development groups throughout New York, it was mildly opposed by some officials at the Sierra Club, who are normally strong advocates of preservation but feared that this particular measure might set a precedent and weaken the constitutional protection of the forest preserve.
HOW ALUMINUM KEEPS DOWN THE COST OF KEEPING UP THE DEVONSHIRE.

Savings start with the Devonshire building's 230,000 square feet of low-maintenance aluminum exterior panels that make it a standout on Boston's skyline. They're coated with a new fluoropolymer finish in a shade of gray that matches across the entire facade.

Savings continue with 7,000 thermalized aluminum windows that reduce the likelihood of condensation, and reduce heating and cooling costs.

Exterior balconies on the 36 residential floors that rise above the seven commercial floors of the Devonshire have sliding access doors and railings of aluminum for its durable and attractive finish with a minimum of maintenance.

Aluminum gives architects other opportunities to build-in operational and maintenance economies. For example, aluminum modular flooring systems to reduce the cost and disruption of installing and changing underfloor wiring and conduit. Aluminum ceiling systems for a rich choice of colors, styles and finishes as well as easy access to overhead lighting and wiring. Even aluminum-louver solar control systems on windows to help control heat gain and reduce costs of cooling.


MAKE IT WITH ALUMINUM
Postscript: Designer’s Saturday

It seems only fitting that a report on Designer’s Saturday, the slightly misnamed three-day period in October when 49 manufacturers of residential and contract furnishings throw open the doors of their New York show rooms, appear in this RECORD product issue. While many of the new "nuts-and-bolts" items reviewed on the following pages are of primary importance to architects planning a building from the ground up, the proliferation of office and residential renovations has led some architects to the indoor domains once reserved exclusively for interior designers. Besides, the sensory experience of the latest CAD or HVAC system still cannot compete with the look and feel of a new leather lounge chair.

Following the trend developed over the last few years, Designer’s Saturday 1983 was a happy combination of the frivolous and the serious. Heavy rains that had plagued the city earlier in the week gave way on Friday to glorious summer weather. East Side strollers carrying shopping bags emblazoned with the unlikely logos of Artemide, Brueton, and Jack Lenor Larson mingled with those conveying the more expected Bloomingdale’s and Altman’s. Red-and-white balloons bearing the Harvey Prober label were sighted along Second Avenue. In the show rooms foodied with furniture for visitors’ attention. At least three manufacturers—Howe, Stendig, and All Steel—distributed hot dogs beneath striped umbrellas. Knoll had colored popcorn, while 1CP’s buffet featured fried chicken. GP Furniture Systems set up a makeshift Viennese pastry café, complete with a classical string quartet. One could literally eat one’s way from 32nd to 63rd Street and back.

Amid the festive atmosphere in the show rooms and at evening receptions held at the Asia Society and the Metropolitan Museum of Art, there was a good deal of thoughtful discussion, especially regarding the direction that corporate design will follow in the wake of the technological changes currently affecting all levels of office operations. The well-attended Facilities Management Day seminar on Thursday at the McGraw-Hill Building featured Michael Clevenger, planning programs manager for the real estate division of Xerox, who referred to the need for corporations to address the problem of “an alien technology overlaid on existing hostile environments.” Flexibility to accommodate automation and worker relocation is key, noted Clevenger, and to illustrate the point he showed a short video tape of the complete dismantling and reconstruction of two hardwall offices and adjoining secretarial workstations carried out in the time span of an hour. James Morgan, national director of project consulting at Cushman & Wakefield, dealt with the threat of dehumanization in the electronic office but in the end concluded that there seems to be a “quiet revolution” of users taking control of corporate design projects. The increasing application of portable workstations, he added, is leading to a lessening of “status differentials” in offices in favor of a more egalitarian environment.

If the overriding concerns of Facilities Management Day were flexibility, adaptability, and productivity, the Friday evening program at the Fashion Institute of Technology, entitled Meet the Press, offered a considerably wider overview of the latest trends in interior design by six magazine and newspaper editors. Douglas Brenner of Architectural Record reviewed some of the magazine’s featured interiors for 1983 to demonstrate ways that architects use the interior commission as a laboratory to test out innovative design ideas. Edie Cohen of Interior Design reported on the Milan Furniture Fair, where she observed a renewed emphasis on quality, inventiveness, and flexibility. Anne Falluchi of Facilities Design & Management discussed the functional and esthetic considerations that went into the design of two recent corporate projects—the W.C. Decker Engineering Building for Corning Glass by Davis Brody & Associates and the Western Home Office of Prudential Insurance by Albert C. Martin & Associates. Suzanne Slemin of The New York Times told of the factors that lead to coverage of an architect’s work in the Home Section of her newspaper—and the impact that inclusion can have on a professional’s career. Pillar Viladas of Progressive Architecture spoke of “a new modernism” in interior design that features historical allusions appearing in more and more abstract form, while Beverly Russell of Interiors called the marriage of function and esthetics in corporate design “high tech/high touch.”

High tech/high touch: that pretty well sums up the qualities that characterize many of the products unveiled at Designer’s Saturday show rooms. The ubiquitous system workstation, shown in updated versions that accommodate computer keyboards and terminals, is increasingly being offered with elegant wood finishes—especially mahogany—and fabric panels in soft postmodernist colors. Although office seating by such companies as Haworth and Prober is also being continually refined for the comfort of those sitting at word processors, manufacturers are showing the ergonomically correct chairs in an unprecedented array of fabrics, materials, textures, and colors. Even Buckminster Fuller’s cable-suspended, six-sided Fishbowl hook storage unit, introduced by Thom, combines the high tech of the designer’s synergetic and dymaxion theories with the smooth tactility of a glossy “ultrasonic chrome” paint job. Whether one is drawn to the sleek efficiency of a Westinghouse workstation or the traditional lute of a Helikon desk, the overwhelming success of this year’s Designer’s Saturday and the generally high standards of the products on display clearly confirm the viability of New York as a design center and of the $4.2 billion contract market as a whole. The big question on everyone’s mind was not the continuance of the city as a mecca for the interior design business, but how the future Designer’s Saturdays would remain at various sites in Manhattan or under one roof at the proposed International Design Center across the East River in Queens. Although a presentation by IDC president Emmett L. Dineen indicated that the prospects for convert two million square feet of former industrial space into show rooms is advancing toward a 1985 opening, there seemed to be no consensus among the design community on the extent to which the companies will abandon their centrally located, if cramped, quarters in Manhattan for the wide open spaces of Long Island City. If IDC announcements of preliminary lease-signings are any indication, manufacturers seem more willing at this time to make the shift to the Queens site than residential firms, which will depend more heavily on walk-in business. A clearer picture of IDC’s long-range prospects should emerge over the next several months. P.M.S.
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Battery Park City: A new residential skyline for downtown New York

In 1968 the New York State Legislature established the Battery Park City Authority as a public benefit corporation with the mandate to develop a new residential and commercial community on 92 acres of Hudson River landfill in lower Manhattan. A master plan drawn up in 1970 by Cooper, Eckstut & Associates calls for 14,000 units of privately developed rental, cooperative, and condominium housing situated to the north and south of the six million-square-foot World Financial Center, a four-building commercial complex currently under construction that was designed by Cesar Pelli & Associates (see RECORD, July 1983, pp. 110-113). In addition to offices and housing, the plan stipulates that 30 per cent of the entire site be given over to public parks, plazas, and a riverfront esplanade. Work completed to date includes the 1,712-unit Gateway Plaza apartment development and a quarter-mile segment of the esplanade.

The latest and perhaps most eagerly anticipated phase of Battery Park City was recently unveiled to the public by Authority officials. Called Rector Place, the new residential complex comprises 2,000 apartments and town houses in 12 buildings that have been designed by some of the city's most prominent architectural firms. Unlike Gateway Plaza, which was conceived prior to the completion of the 1970 master plan, the new buildings have to conform to rather detailed design guidelines, unusual in New York, that seek to avoid the "project" look of many large-scale developments—"a conscious rejection," in the Authority's words, "of the 'urban renewal' approach to city planning adopted by architects of the Modern period."

The guidelines specifically call for an extension of the city's historic grid street system into the area and require that the new buildings be grouped around Rector Park, a two-acre green space designed by Innocenti-Weibel in joint venture with Vollmer Associates (model and site plan above). In order to reinforce the feeling of a typical city street, the plan provides for a continuous building wall at the edge of the property lines with no open plazas. Ground floors are to be residential around the park, while commercial frontage will be within arcades on cross streets and along South End Avenue, the community's "Main Street." Each building must have a two-story stone base, and the preferred material on the upper floors is earth-toned brick. Metal-and-glass curtain walls are prohibited.

Most unusual are the Authority's guidelines for "articulated rooftops" and "expression lines" on all 12 structures. Upper floors "must be consciously designed to create a special and interesting effect that will complement the skyline of lower Manhattan." Taller buildings, moreover, are required to have cornices, or some change in window configuration or corner detail, at intervals between 60 to 85 feet and between 110 to 135 feet—a provision aimed at reducing the apparent scale of the facades and unifying the street wall.
Working within the framework of the Authority's guidelines, eight architects have come up with an assemblage of buildings that range in height from six to 44 stories. If the results appear on paper as a hybrid of the qualities that characterize such older, well-established New York City neighborhoods as the Upper West Side and Gramercy Park, it is no accident: The formulators of the master plan purposely tried to emulate the diversified architectural ambience of these areas and apply past lessons to a new residential community. Although the architects' models and renderings illustrated here reveal the visual potential of this concept, how well Rector Place ultimately succeeds as a unified ensemble will not be known until late-1986, the development's scheduled completion date.

7. Bond Ryder James, Architects, 9-story condominium apartments.

Note: photograph numbers correspond to building locations on site plan.
ARCHITECTURAL RECORD invited a group of architects, engineers and energy consultants to discuss how well energy conservation is doing in older buildings—how the “arithmetic” is working out, what new techniques and processes are needed, how skillful professionals are at predicting results for the client. And the key to success (one more time) seems to be effective architect-engineer-owner collaboration—starting on Day 1.

The Round Table began with this general premise, generally accepted: Energy conservation is now an integral and important part of the design of almost every new building, and, as a result, energy usage is much less than it is in comparable buildings designed only 10 years ago. As engineer Jack Beech said: “If the automobile industry had done as well as we did, today’s Cadillacs would be getting 35 or 40 miles to the gallon.”

So the opening questions were: “Is the same kind of progress in energy conservation being made in older buildings being restored, recycled, retrofitted?” And, related: “Is there the same enthusiasm and commitment to energy conservation that we saw a few years ago?” Engineer Beech: “I’m not sure that enthusiasm is the right word. Engineers and architects have certainly felt a commitment to doing a good job of energy conservation. But the majority of owners—especially of office buildings where the operating expenses are borne by the tenants—have been reluctant to spend the necessary up-front costs, no matter how small a percentage of first cost, if they couldn’t get an awfully fast payback.”

Architect Earl Flansburgh: “In some respects, energy conservation has lost its ‘premier’ status. But it remains as a major consideration in the mind of every good architect and engineer. Take solar collectors as one example. For a while we were putting them on every roof and thought of them as a solution to everyone’s problem. Now, at least in the Northeast, we still use them extensively for hot water but don’t try to use them for heating. And we’ve begun to understand that older buildings may actually be fairly energy efficient—many of them have thick stone or masonry walls and fairly small window areas. That’s a good beginning.”

“The answer to your question about progress in existing buildings compared with new buildings has to be mixed,” said engineer Larry Spielvogel. “There are some existing buildings whose performance is equal or superior to new buildings being built today, but the majority still need a lot of work. I see the big hang-up as the lack of skilled operating personnel. Except in those few cases where the operation of a building is critical, such as a hotel or hospital, the people who operate the building don’t have much more status than a custodian or janitor. The efficient operation of a building needs much more emphasis and importance placed on it by management.”

Architect Flansburgh agreed: “Five or six years ago we embraced some fairly complicated energy conservation systems, and it’s now clear that few owners are willing to hire qualified technical personnel to run them. The people running some fairly sophisticated systems are not just treated as custodians—they indeed may be the custodian, and the end result is simply that the systems don’t run as efficiently as everyone was led to believe.”

“One other change in attitude: Five years ago, we were enthusiastic about making everything as tight and efficient as we knew how. Today, we don’t make all windows that we replace in existing buildings triple glazing because we can now analyze with great accuracy and swiftness on our computers how much energy conservation we need. Guidelines are beginning to take the place of thorough analysis. That means we may fail to address problems of infiltration, which are critical in some older buildings. Or take lighting. We now have all kinds of state codes and standards, but they don’t really take into account the effect of the darker colors that are now in fashion. Fifteen years ago, when you gave everybody 100 footcandles, color didn’t matter. So energy conservation as we now see it, I think, isn’t just a design engineering problem—it spills over into operation, into esthetics, and into all the special and particular problems associated with older buildings.”

How about owner attitudes?
As in so many first-cost decisions, it seems to depend on the type of owner
Steve Pewtrel, senior operations engineer of the Prudential Center management department, introduced some client/tenant thinking: “It’s probably more difficult to make progress in conserving energy in retrofit buildings. When you design a new building, you can study the cost feasibility of alternative solutions and make life-cycle analyses, whereas in a retrofit building you tend to think in terms of payback on improving or upgrading existing systems. You can’t afford to ignore what is there now, and that affects efficiency.

“Even in those office buildings where operating costs are passed along to the tenants, don’t underestimate the owner’s stake. For one thing, if you keep your operating costs down, you can keep your rents down—your property is more competitive. Further, we’ve found tenants receptive to the idea of sharing the first costs of an energy retrofit. We’ve been going back to tenants and showing them engineering analyses of the energy savings of a retrofit. If they agree with the analysis, we modify the lease so that they agree to participate in the first cost and later reap the benefits of reduced operating-cost escalation.”

Spielvogel: “More and more owners are doing just that; and more and more tenants are proving receptive.”

Engineer John Altieri: “Among owners, we find that the degree of enthusiasm for and receptivity to energy conservation depends on who they are. Universities are the most interested and concerned—in most situations are willing to buy energy conservation systems and retrofits if they are well engineered and offer a reasonable payback period. We find the major corporations who build a lot—like Bell Telephone or IBM—are still very enthusiastic about using and applying energy conservation systems in existing as well as new buildings. We find museums coming to us for energy retrofit. Granted, there seems to be less interest among owners of speculative office buildings, but with those net-net leases that Mr. Pewtrel spoke of, tenants are willing to participate in the first costs of energy retrofits in return for lower operating costs. And we find that leasing agents are more and more insisting on quality-engineered buildings even for speculative tenant situations. We find that effective mechanical systems and effective lighting systems are right on top of the heap of what owners want—because they realize that their tenants are becoming more sophisticated and the owners need to be competitive.”

Engineer Sidney Greenleaf: “Especially in existing buildings, you have to be careful not to be over-enthusiastic and over-engineer the job. Most owners have found that they can with relatively small expenditure accomplish a great deal of the total potential in energy conservation. To make my point: In 1975 or ’76, the state of Massachusetts established a program to do energy conservation at state universities and colleges. As those things go, it took several years for those programs to be
financed. We were given one of the universities to work on. We did a very complete computer study, and were predicting an immense amount of money to be saved—I don't remember the exact numbers—with the expenditure of about $750,000 in retrofit costs. During the time that we were working on the project, the university hired a maintenance man—not an engineer, a technician—who had been laid off from one of the local industrial plants. Without mentioning it to us, he went out and put in about 200 timeclocks at $35 apiece, shut a few fresh-air dampers—and accomplished about 85 per cent of the total savings we were predicting. The moral: Never forget that in existing buildings you can sometimes get the biggest part of your energy savings by giving a screwdriver to the right man.

Tage Carlson, manager of the Energy Research and Insulation Products Laboratories of Owens-Corning Fiberglas, pointed to some elements of energy conservation that cannot be applied in existing buildings: "There is no way you can move the building around to orient it better for the sun. There is usually little you can do on the exterior in terms of preventing solar gain or allowing solar energy in because seldom can you justify changing the window openings. These kinds of problems are compounded in historic buildings. There's seldom an acceptable way of running new ducts, or putting more insulation in those lovely vaulted ceilings, or replacing small-pane windows with reasonably tight double-glazed fenestration. On the other hand, look at the changes in lighting systems, the new control systems, the more efficient mechanical systems that we have today that didn't even exist 10 or 12 years ago. I think the idea that energy conservation has lost its glamour is unimportant; what is important is that energy conservation has become part of our day-to-day thinking and habit."

Engineer Gary Vanderweil: "I agree. If energy conservation has lost its cutting edge, it is because the new products and systems we needed came out in the '70s and have been diffused into our every-day design technology; codes were changed and have been diffused; energy rates escalated rapidly in the '70s and we have diffused them into the economic system and have gotten used to them.

"As to how far we are progressing with energy conservation in older buildings: As others have said, it depends on the job. We do quite a few 'gut' jobs on older buildings, and on that kind of rehab the entire range of energy conservation opportunities in the mechanical and electrical areas are available, though the opportunity to make changes in the skin or envelope of the building is usually quite limited. The energy-conservation retrofit of post-World-War II buildings is really a different ball game entirely. For one thing, it is much harder to work in a building that is occupied. And the economics are tougher—all the owner wants to know is how much it will cost and what's the payback period. In both cases, it's harder to conserve energy than it is with the design of a new building, where you can orient the building correctly, design the skin of the building to allow natural light, use better insulation and window systems, design in heat storage—indeed, use the full menu of engineering techniques."

Lighting engineer Sy Shemitz: "There's lots more progress to be made, perhaps especially in lighting. We have to get leaner, think more, be more creative. Sure, you can save energy by cutting fixtures from two lamps to one or from four lamps to two, and by changing ballasts. But those kinds of quick fixes aren't the answer. You walk into most places that are 'saving energy' and they are flat, uninteresting, boring places. The wattage is down (along with visual acuity) and the only exciting thing is that somebody has stuck a lamp on a desk that has a little bit of brightness and glitter and creates a little bit of shadow.

"If we want to save energy without that terrible loss in the quality of the working environment, we have got to think in terms of lighting selectively rather than by the square foot. When we do, we will create more interesting environments and renew the support for energy conservation. These techniques are not something you can apply with a wash; they have to be applied with a fine point, and it takes skill, dedication, and enthusiasm. I believe there are endless things we can do to save energy in any building, be it old or new, and we haven't even scratched the surface...

Architect Ted Stahl: "I think there is a kind of cultural status we are trying to find: Where are we in this field of energy conservation? Where does it fit? Energy conservation compared to what?

"I agree that it depends on the client, and it depends on the building type. University clients find it very easy to deal with what they see as a sort of technical course of action: hire a consultant, look at alternative systems, evaluate them, and decide what to do. They find it very difficult to look at other places where there is wholesale waste—such as underutilized buildings where the solution lies not in engineering but in scheduling and internal management.

"I think the important thing in keeping energy conservation in perspective is to make sure that common sense is the first thing you try. Sometimes it's hard for people to get away from the idea of understanding where the effort ought to go. For some clients, it's easier to justify a sophisticated program than it is to upgrade their own internal thinking and personnel."

Architect Peter Forbes: "I think with the ascendency of common sense, energy conservation has taken its rightful place as one of the many important things to bear in mind when designing a building. There was a period when you would have thought there was no other consideration, which was a bit like designing around the invention of the flush toilet. Or maybe architects who knew something about energy conservation were looking for a way to sell services. But I think we are back to realizing that the quality of the space, with all its different considerations, is what we are after. Some of those considerations are lighting and heat and ventilation, but some are proportion and massing and color.

"I would agree that you have two very different animals in the old building compared with the not-so-old building. Buildings built in the 19th century were built to last for 100 years; I don't think we assume most buildings built since World War II are going to have to last that long. And in that change of thinking, I think there are vast implications for how efficient that building can and should be made."

The Round Table was asked:
To what extent is the arithmetic of energy conservation working out?
Larry Spielvogel argued that "owners' attitudes towards energy conservation are tempered substantially by credibility—many owners are reluctant to look at what appear to be viable energy-conservation techniques because they have been oversold left and right, not only by their professionals but also by a lot of vendors. Too many promises and predictions for various energy goodies have not come through. The Department of Energy has just released its evaluation of the School and Hospital Grant Program in which we taxpayers have invested several hundred
million dollars to date, and while the facts do show that energy consumption has been reduced as a result, I believe the majority of those reductions have come about not because of the money invested in hardware but because the building owners became aware of energy conservation and have done better in terms of operating and maintaining those buildings.

"And while we’re considering the arithmetic of energy conservation, the costs versus the paybacks, I’d like to temper the enthusiasm many people have for BTUs per square foot. That is a good measure and indicator of a building’s performance—but is not as important to building owners as dollars per square foot.

"Life-cycle cost is another good indicator, but not necessarily a good criterion. Everybody talks about life-cycle costing, but rarely is it truly employed. Even in government buildings where life-cycle cost analysis is required, the owner says, ‘Yes, use life-cycle costing—but don’t exceed the budget.’"

Engineer Boggarm Sfty: “If time is spent by the architect and engineer, it is possible to design buildings that are architecturally, electrically, and mechanically innovative. The first cost may be higher, but, increasingly, third-party financial institutions are willing to invest money in those first costs in return for the tax credits.”

Energy consultant John Cook: “My company works solely with investment people in energy conservation. Since 1973, we have done an average of 40 buildings a year, all retrofit. Every one of those projects has been done with third-party financing from banks and investors. I personally have taken a risk reinvesting some of my company’s earnings in these projects. Statistically, the average payback period ranges from 2.19 to 2.2 years, and the longest was something over five years. The arithmetic does work, because energy-conservation projects can be financed third-party, shared savings, joint venture. As energy consultants, we don’t engineer buildings or design them, but we may well select the engineer and architect—and make sure they are paid a fee sufficient to do a really thorough job of energy-efficient design. And then we as consultants take complete responsibility for the results. . . .

“I sat as the representative for the building owners and managers (and Gary Vanderweil was on the same committee) as the state of Massachusetts considered its energy code. We found that there are a lot of vested interests involved in energy conservation, and people are constantly complaining that if you invoke this kind of standard or that kind of standard it is going to affect my business—as a masonry contractor or glass contractor or architect or engineer. The cooperation, the institutional changes, that are necessary to handle a diminishing energy supply are matters of communication and of fact. Every existing building and every building in design should be looked at as an oil well—do we dig the oil well or do we save the oil by good design?”

Frank Hendrikan of Boston Edison spoke of energy-conservation arithmetic from the utility’s point of view: “The rate structure of a utility can really affect what’s ‘efficient’ from an energy conservation point of view. It’s a mistake not to pay attention to the incentives and penalties imposed by the utility—an energy-conservation plan appropriate for a building served by Green Mountain Power or Utah Power may not be effective at all for the Boston Edison system. For example: We are a summer-peaking utility, the only one in New England. That means that under our rate structure, the energy we sell for space heating is as price-competitive as we can make it. So designing in heat storage is not nearly as cost-efficient as stored cooling, since you are buying electricity for air conditioning at a high peak rate cost during the summer. That’s just one example, but I think it makes the point that you should be knowledgeable about rate structures in your area and take into consideration what the utility has to offer in terms of operating expertise.”

Architect Peter Forbes: “Let me speak for the small firm doing small buildings. In our role as the only architect in Southwest Harbor, Maine, we’re dealing with clients who are unsophisticated and enormously skeptical of anything told them by anybody who wasn’t born there. We did, for example, the Southwest Harbor Town Office Building, an adaptive reuse of a public school building. The town was only willing to go ahead with the project because the people figured they could pay back the cost of renovation/reuse by the following year because they wouldn’t have to pay any rent for the space. They wouldn’t buy the idea of spending any money on hardware or systems to save energy. I didn’t argue too much, but simply by designing in good use of natural light and effective insulation, we’re getting an eight-year payback. Further, in situations like that, I’m skeptical of sophisticated systems because they do break down, and when they do there is nobody to fix them. Maintenance there is done by one of the volunteer firemen. My client is happy because he likes the way the building looks and because it is paying off in half the time he thought it would; all I used was an application of common sense and knowledge of the site and the client and the program. As I’ve listened to this discussion, I’ve been disturbed by the isolation of the notion of energy conservation from the general notion of architecture. I don’t think you can separate the two because then either the tail will wag the dog or you will get into enormously conflicting ideas and aspirations.”

The problem, some panelists argued, is not just with the tools, but with accurate prediction of results.

Said engineer Sid Greenleaf: “After 10 years of struggling to save energy, I’d have to say we’re still woefully short of tools for predicting results. In 1973, when the crunch came, the government started throwing money at the situation, especially at demonstration projects. But today, owners and architects and engineers have to make decisions and then stand pretty much on their own. I don’t think we have the tools to make those decisions. Over the years our office has spent a lot of time going back to basic transient heat-flow equations and feeding those basics into the computer—trying to develop programs we can make decisions from. But after 10 years we don’t really have the matrix we need to do the work. We have plenty of engineering talent at firms like Peabody -Orr and Partners and FPP—but they don’t make any attempt to integrate their data for over-all systems analysis. The government and the AIA have funded a lot of research in this field, and they haven’t come up with the tools. We engineers are pretty much on our own, and if we get results that are within a reasonable percentage of our projections, we’re extremely happy.”

Engineer Gary Vanderweil: “The arithmetic is difficult, for a number of reasons. For one thing, when an engineer is called for the retrofit type of job, we often find that the owner has already done many of the most cost-effective things—like taking out half the lighting. This means that the remaining energy conservation opportunities have less attractive payback periods. I also believe that owners tend to judge the incremental investment for energy saving more harshly than they budget other alternative investments. We have worked with two of the energy-investment firms—third-party investors—with the last few months and
both are very emphatic that they are looking for payback periods of three years or less. That seems to be a very good investment indeed—if you can get it. I would invest my hard-earned savings for payback periods like that. Finally, I agree with Sid Greenleaf's contention that the analytical tools for predicting payback have not kept pace. But I do think experienced engineers can come pretty close. In the kinds of buildings we deal with every day—such as office buildings that are lighting-intensive and power-intensive, and laboratory buildings that are ventilation-intensive—we can usually predict annual energy use within 10 per cent, on the back of an envelope."

Architect Pat Morse of Anderson-Notter-Feingold argued that major savings can be assembled from a lot of little savings: "It's one thing to talk about sophisticated systems on major projects. But there are still a lot of building owners with run-of-the-mill buildings that are looking for ways to save money for themselves. We have the advantage with existing buildings of being able to make before-and-after comparisons. When you make an improvement, you can fairly quickly get a good reading on energy usage and cost. For a simple example, take the room we're meeting in [in the Algonquin Club, a 19th-century building on Boston's Commonwealth Avenue]. Think of the number of approaches available to energy saving just in this room, which is just one part of the building. The lights are all on, at midday—because the sun has been pouring in, we've been opening and closing the drapes—and we've turned off the room air conditioning because the unit is too noisy. I'm sure you could find a historic precedent for awnings on a building like this, and I can imagine blinds and interior storm sash installed in such a way that the small-paned windows would look as nice as they do now. It would probably be difficult to add insulation without destroying the paneling in the room—but there might be a cavity in the wall where you could slip in material to cut heat loss. It's almost certain you could install a centralized cooling system and make a pipe system through to small terminal units."

"On another scale: I designed and built our house about 12 years ago—and we made it all-electric to hold down first costs and because we all knew then that nuclear energy would be the least expensive form of energy available. You can imagine what happened to our electric rates about five years ago, and since then we have gone through a program of energy conservation. We have an active solar domestic hot-water system, we've gone to quadruple glazing of some openings, we have quite sophisticated thermal shades on the south-facing glass, and we have a five-kilowatt windmill, so we are even into cogeneration. Last year it produced 10,000 kilowatts and I am looking for it to pay for itself in 15 years—which maybe is not so good an investment. At any rate, it pays to keep making improvements until you say to yourself that one more improvement is not going to make enough difference in your utility costs to justify itself. These incremental improvements are extremely effective, in a house or a building being rehabbed, in areas like New England where you have such high rates to begin with that the payoff is fast. I think you simply have to take each building as its own case—and then apply the common-sense approach."

Tage Carlson: "I agree that the analytical tools for predicting savings are not what they should be. We are just beginning to fully understand how the envelopes of residential structures perform over time—and a house is very easy to understand compared to a large nonresidential building. And in older houses, as well, as older buildings in general—most of which are quite small—it is difficult to understand what you have to begin with, what condition the building is in. How do you know where you are to start so you can measure the effect of what you have done? My point is that when you are trying to tell a client what kinds of benefits he is going to see from various retrofit techniques, you are still on shaky ground. It is very, very difficult."

Engineer Jack Beech: "The trouble with making predictions about energy use is that things change along the line. Example: We worked on the design of a building and went through sophisticated engineering calculations on energy use. We had an independent consultant verify our calculations and he came within five per cent of our figures—and on that basis we gave the owner some pretty strong assurances of what his savings would be. After the building was designed, it was fitted with CRTs on almost every desk, and all our figures are out the window. We are using far more power than we said we would, and for a while everyone thought we should add refrigeration. I suggested we wait until we got through last summer, which was one of the hottest on record in New York. In fact, we were never fully loaded on refrigeration. You'd think the owner would be deliriously happy because his building coasted through that long hot summer, but in fact he's not too happy because he now thinks he spent too much money on refrigeration up front."

"The point is that energy usage calculations are tough enough in theory; in practice they are very very difficult. With the tools available today, I don't really have confidence in telling the owner that you are going to be saving so many dollars—better, so many BTUs—if you do this or that."

Some panelists wondered out loud whether a restructurization of the professions—and of attitudes—is needed. Architect Tad Stahl: "In listening to John Cook's comments on third-party investors and his role as energy consultant/entrepreneur, I wonder once again about the traditional operation of the professions. Architects have problems of fees, problems of scope of services, and, most importantly, problems of structuring the team to respond to what is needed. I have restructured my own practice to deal with those problems, and it's now much more of a consulting practice than it is a traditional A/E practice. Unless we get architects and engineers and operating people and contractors and subcontractors and the product and equipment manufacturers and the financial people to truly collaborate and understand each other, and allow themselves to fit into a new scenario, I don't think we are going to have the necessary flexibility and achieve the level of confidence and respect to respond to today's kinds of design problems."

Consultant John Cook: "I'm sorry to say that I think too many buildings going up today are not being built by professionals in the true sense of the word and are being impacted primarily by finance and risk—by the construction business. The building contractor should not be the guy making the decisions. You architects and engineers make your studies and write your reports and then I walk into a meeting and find that the decisions are made with respect to financing and risk-taking. To me, energy conservation—whether it be for retrofit or new construction—is a risk-taking business. How much is it going to cost and how quickly will it pay off? Well, the questions are broader than that. Recently, I attended a seminar here in Boston put on by the Swedish government. They talked about waste energy and district heating and combined power and heating systems—and I came away with the feeling that all of the people

Architectural Record December 1983 33
involved in building in that country work together. We have a lot of good technology in this country, and the people who know how to apply it. We have enormous people resources—in architecture, in building, in planning, in economics, in finance—and we need to understand how to make that system work better.”

The biggest need, said the Round Table, is better and earlier communications

Said architect Flansburgh: “I don’t really think we need different systems, products, equipment to conserve energy in older buildings than we do in new buildings. The systems design may be very different—for example, in an historic building you are less likely to design a central air system because you don’t want to spoil those lovely ceilings with ducts. No, I don’t think we need new or different technology—I think we need new and different ways of working with each other.

“Generally what happens is that the architect designs a building and then gets the engineers involved. Engineers always say they want to get involved earlier—but if we get together on the first day, maybe with only a site plan but not a line on paper, and ask the engineer what he would do, you don’t get an answer. Well, yes you do. It may not come out in a single sentence, but what you get in effect is ‘Call me back when you have the building designed.’ And why is that?

“The reason there is not more working together is that our educational systems are not linked and because the two professions haven’t really tried very hard to work together. Instead they tend to work within their own boundaries—this is my territory and that’s your territory. [Engineer] Gary Vanderweil made a very interesting point at lunch: ‘If you think the architects are badly trained in terms of engineering, what do you think the engineers know about architecture?’ Answer: ‘Zip.’

With retrofitting of older buildings—including energy conservation—we badly need better cooperation and understanding among the design professions. We have got to do a better job because we are going to have trouble making it to the year 2000 with the energy system we have now. That is a societal problem, but I think the best way to solve it is to get a lot more communication and understanding among the design professionals, the owners, and lenders, and that means involving not just the people like us who run the firms but the people who deal with the problems every day.”

Engineer Jack Beech: “I think it’s impractical to talk about the architect and engineer getting together from the very inception. I have dealt with a few hundred architects and a few thousand projects, and if you ask me what I think on that Day 1, I will tell you to build a windowless bunker. That will be very energy conserving, but it wouldn’t be at all what you architects have in mind. I’d rather have the architects come up with a number of designs, sketch designs, that we can comment on.

“The person you need up front—is the time you call in the engineers—is a contractor or professional cost estimator who can verify the dollar costs of what you are proposing as architect. Too often, we end up way over budget, and then comes cut, cut, cut; and too often what goes is the first costs for energy conservation.

“Of course, a lot depends on the reception of the owner to the idea of investing in lower operating costs. Enlightened, engineering-oriented owners experienced in building and operating are a pleasure to deal with; on the other hand are the speculators who have to be assured they will use practically no energy and get practically an instant payback before they will go ahead with energy-efficient design.

“Finally, whether you are dealing with an enlightened owner or one of those instant-payback owners, you can’t ignore the general economy or the marketplace at the moment when you are trying to design in energy efficiency. For the last year and a half, with interest rates high and money tough to get, your good intentions tend to get sidetracked.”

Architect Flansburgh went back to the question of working together from the beginning of the project: “We as professionals have a lot of intellectual horsepower, and if we shared more of it, it would work very well. The responsibility for running the project is the architects, and if the architect believes that there ought to be better communication, then the responsibility for setting it up ought to be the architect’s. Jack Beech says he’d rather wait for sketch designs and comment on them. Well, I’d still rather start communicating—working together—on Day 1, because before you can start a design you have to sort out the pieces, the ideas, that count. Especially in retrofit design, you have to sort out priorities. The sequences of things that have to happen are different than with new buildings. The decisions, the alternatives are different. I’d like to be talking over those decisions and alternatives with my engineers from the very start.”

Said architect Peter Forbes: “I’d also like to respond to Jack Beech’s comment on architects and mechanical engineers not communicating with each other at the earliest stages. An architect might be reluctant to reduce the amount of glass in a building, for instance, if he is well into design. But he would be foolish to disregard such a suggestion if it was made by a thoughtful engineer at the inception of a project. In dealing with structural engineers, we architects learn early the implications of column size and slab thickness. We don’t seem to have the same kind of general understanding of the implications of what goes into the mechanical systems. I think that the architectural profession is enormously receptive to sitting down with the mechanical engineer at the inception of a project—if the mechanical engineer is prepared to operate at that early stage and if also he gives a damn about how the building is going to look.”

Sy Shemitz: “There are, of course, an increasing number of universities that are stressing the need for a marriage of architecture and engineering. The two schools used to work much more closely than they do now at most universities—maybe we’re talking about remarriage.”

Jack Beech: “A footnote comment on costs. I have found the big costs in energy conservation are not primarily the mechanical systems—except for controls, which we have gone overboard on in the last 10 years. But my records show that an energy-efficient building has a lot more money in the skin and high-efficiency fixtures than in high-efficiency heating and cooling.”

“Nonetheless,” Flansburgh persisted, “how would you suggest that architects take advantage of the engineering knowledge that you have—that affects the mechanical system input, or lighting? How do we get that information so that we can use it in our designs?”

Answered Beech: “I’m not saying that we’re standing off and are unwilling to give you any insights you want. But I’d argue that a lot of things we have to say, a lot of suggestions we might make from an energy point of view, are unacceptable to the architect. I am an engineer who believes that the architect should have dominion over the entire project—he knows what the owner wants, he knows what he wants to create. And many
times, at least in our market, when the architect gets a project, he has already conceived of a building and probably sold the owner on that concept. If the architect really changes his mind— for instance, on the basis of some energy conservation thinking we have—the owner is likely to be up in arms over the ‘changes.’”

Peter Forbes: “Maybe in the New York market you have to make such a presentation of a building to a client before you have it completely in mind. But in general I think the architect can make a more powerful and persuasive pitch to the potential client if he has spoken to the engineer ahead of time.”

Sy Shemitz: “I find increasingly that leading architects in that New York market are bringing me in as part of the pitch to a potential client. Our job is to talk about the kinds of things we can do, the kinds of concepts we have—and increasingly we are talking not just from the point of view of lighting in general, but highly efficient lighting.”

Engineer Sid Greenleaf: “I argue for early communication between the architect and all the engineers—structural, mechanical, lighting—because they are all part of a very specific team that is trying to create something special for the owner. This information will be used by the architect if it is given to him in usable form.

“Like more and more engineering offices, we have developed computer programs that can analyze the factors involved in energy-efficiency—the orientation of the building, its massing, its proportions, the amount of glazing, the setback of the glass, the use of skylights or atriums, and so on and on. These things can all be programmed. As soon as the architect puts the first line on paper, we can feed in alternatives; rotate the building on the site, raise or lower it, change the glazing percentages, or simulate shading. We can explore all the trade-offs of architectural design. If you want to increase the glass area and not set it back for shading, you pay a certain price for it. Systems like this can really help the architect unless he has already made up his mind about a particular design and is unwilling to change it, and they certainly give you and the architect credibility with the owner. This doesn’t mean that the architect has to go along with every device that will conserve energy; it just shows what price you are paying in energy dollars to go either side of what you might call optimum.”

John Altieri: “We can indeed offer the architect priorities. We tend to look at the major energy users in any building type, and attack those major users in selecting our system designs. In our practice, after studying a lot of office building situations, we find that 50 percent of the power is used in lighting, about 30 percent in running the plant, another 17 percent in computer load, about 2½ percent in elevator usage. So one of the first areas we attack is lighting, and one of the things we do regularly is regulate voltage so that we can control not only the average demand, the average usage, but also peak demand.

“We also look at lighting control. Last night, as we all have done, I looked out of my hotel room and saw half of the lights in office buildings still on at 9:30—obviously and absolutely unnecessary. Computer-controlled lighting control is therefore an obvious way to reduce energy usage—though you don’t hear the utilities pushing to cut that use because it’s after-hours and off peak.

“Since the plant itself is such a big user—again, 30 percent by our reckoning—we always look at heat reclamation and the transfer of heat from the central part of the building to the exterior.

“We are also pushing energy-control systems. We think that matching system capacity to load is something that has been neglected by consulting engineers for a long time. And we find we are moving away from the big central-air-conditioning systems in the direction of unitized control. We’re also separating the ventilation load requirements from the environmental control systems. This is the means we can properly control the amount of outside air we take into the spaces—and save a lot of energy.”

“There’s only one trouble, and we’ve talked about it before,” said Sid Greenleaf. “We engineers have those tools and techniques in our mind when we get to looking for ways to save energy. When we are on the job, we have the tools. But by then it is often too late. The architect has already determined the general shape of the building and its orientation and insulation and glazing and roof system. I don’t doubt for a minute that we can design highly efficient systems, sets of systems, after the architectural design is set. It’s predicting and setting priorities before that that interest me the most.”

Do we need more new techniques and more new products to do a better job of energy conservation?

Said Larry Spielvogel: “I think the answer is no, and yes. I think as far as the basic principles and systems and properties of materials are concerned, we’re pretty far along. The big weakness, as some have suggested, is the ability and judgment of the professional using those design tools to establish what’s going to go on in a building. For a simple example, if we were going to estimate energy consumption in this room, how would we begin to judge or estimate how many hours lights would be on, how many hours the windows would be open, how many hours the air conditioning would be running? Those are not technical problems: Those are professional judgments—well, maybe they’re just guessing—and that’s a serious weakness in predicting energy usage no matter how good our systems analyses are.

“I’d have to disagree with Earl Flansburgh about the need and desirability for more products and materials in this field of energy conservation. I think we’re beginning to see a dramatic increase in the number of new products and manufacturers serving the need for energy efficiency—probably more in the past five years than in the 20 years before that. Now these may not be the kinds of products that corporate planners like, which lend themselves to mass production. Rather, they tend to be specialized products that are developed in three-car garages. Even I, who tend to be pretty conservative, have taken some chances with these new products whenever I see the potential for a major benefit without too great a cost risk.”

Sid Greenleaf: “What do we need for the future? In order to fit the necessary mechanical equipment into rehabilitated buildings—especially historic buildings that you don’t want to spoil in the process—there is a need for miniaturization of existing types of equipment—equipment that can be localized, that is quiet, that is unobtrusive. Another need is the ability to move energy from one point to another more efficiently. For instance, the interiors of most buildings need cooling year-round; the perimeters need heating or cooling depending on season. With our present technology, you can’t control the interior of a building and transport that energy to the outside where it’s needed. We use heat pumps to do it now, but that is not really efficient.

“So I think we do need new equipment for energy conservation and rehabilitation. We can’t expect the manufacturers to do the
necessary research and development without a market, or in advance of a market. Supporting this kind of R&D would be a good place to apply some sort of subsidy."

Engineer Bogarm Setty: "While in general the techniques for energy conservation are the same in rehabilitated buildings as in new design, I think innovative systems can be achieved. For instance, we are doing a retrofit job on an industrial type of facility. In the end we found we had a lot of excess cooling and chilling capacity—which we used in a new building on the site at a saving of over $1 million in mechanical equipment. That's just one example..."

Near the end of the Round Table, each panellist commented on what had seemed most important

John Altieri: "A final comment on architect/engineer collaboration: I try to wear an architect's hat all the time, and I just can't conceive of not being part of the conceptual design of a building. We affect the design of many buildings—and I mean the architectural design, not the engineering design. During the schematic design phase, we do schematic design drawings right along with the architect."

"In terms of the techniques for conserving energy in retrofit buildings, we see the development of new control systems as most important. Control of heat transfer and movement throughout the building will, I think, become more important. So will techniques for energy transfer. We need to be able to adjust the operation of all the systems in a building—including the air-handling systems, the pumping systems, the refrigeration systems, and the lighting—to match usage to the real need. You wouldn't run your car engine at 7,500 rpm just so you can meet the occasional need for a burst of speed..."

Tage Carlson of Owens-Corning Fiberglas: "As the representative of a manufacturer, I think that you architects and engineers need to be more involved in evaluating products and equipment. Lots of claims are made that are not substantiated.

"One thing we haven't talked about is the comfort and productivity of the people working in the buildings we rehabilitate or retrofit. When we are worrying about whether or not to spend money on energy conservation, we must remember that those costs—indeed, all first costs—are minor compared to the cost of paying the people who work there. A couple of percentage points off productivity because of inadequate air conditioning or lighting—comfort-related considerations—can easily wipe out the 'savings' from skimping on good environmental control."

John Cook: "Since we are talking today about rehabilitation, I'd like to say my final word on rehabilitation of low- and moderate-income housing. One of the reasons that more such housing is not being built, and that many projects are being abandoned, is that energy costs are running up to 35 per cent of the income of the people who are living in that housing. Yet the subsidies for energy usage in that housing is in many cases higher than subsidies used to build it in the first place. One of the criteria that I have suggested to the Boston Housing Authority for the rehabilitation of a big project is that they select a development team that will address the problem of making that housing energy-efficient. There is a great deal of money coming to the states as a result of some of the overcharges on fuel, and if it can take some of that money and put it into housing programs, we can all direct our talents to a level of society that is being bypassed."

Steve Fettwell: "Two final points on the arithmetic of energy conservation: 1) If an energy conservation technique is not acceptable to the tenants, then the payback isn't there because it won't be used. Example: the owner being told he can do duty cycling in a building and finding that his tenants won't accept the fans going down because they can't hear the air conditioning.

2) Architects and engineers can design the most efficient systems, but if the operating people are not maintaining or operating the system correctly, the savings go out the window."

Sid Greenleaf: "In the end, I don't think we've done nearly enough about energy conservation, and I'm concerned about what would happen if the energy crunch came upon us again. It wouldn't take much—a little more trouble in the Middle East, for example—to put us right back in 1974. And over these last 10 years, I don't think that very much of substance has happened. There have not been really great steps forward in products and materials as a result of the manufacturers' research and development. You may disagree with me on specifics, but it seems to me that research and development is not accelerating, but dropping off."

Frank Hendrigan of Boston Edison: "I'd like to re-emphasize that there are many ways any utility can be of real assistance to the design community—if we can be made a part of the communication you've been talking about all day. For one thing, we have records on 100,000 commercial customers and half a million residential customers—energy usage records going back to the time the building was constructed. That has to be worth something in terms of predicting energy usage, or the savings from energy-conservation measures. Further, as a utility, we're continually being romanced by purveyors of conservation and load-management techniques. I can think of no better clearing house for that kind of material than your local utility. But you are in the best position to make a judgment on how we and other utilities can work with you—we are ready to do what we can to contribute."

Chuck Ince of the AIA Foundation, and one-time assistant commissioner of the Department of Energy: "I'd agree that in the last five years the DOE has not really provided us with any new techniques or opportunities. Maybe it's because if they really solve the problems, they would have to go out of business.

"The point I would like to stress is that we really need better evaluation of total performance with respect to client objectives; stressing efficiency, not necessarily savings; and stressing that energy redesign need not reduce comfort. We need to make a long-term commitment to building performance. We need better postoccupancy evaluation, with careful monitoring of performance, better maintenance of equipment and better training of operating personnel.

"I think the techniques for energy conservation are not necessarily different for a new building and for retrofit and recycling—the design effort and approach should be pretty much the same.

"Finally, I would agree that we really have a major gap in our training of architects and training of engineers. The problem is at the faculty level as well as the student level and it's not going to change until both architects and engineers get more involved in the gap between the educational environment and the practicing professional."

Architect Dan Meus: "I think the innovations that have developed in the past 10 years have come from the engineering side. Most of the savings in energy usage that have come from the architects' side are the use of techniques that we learned back in school. We're simply using them more and using them
more effectively now. I very much agree that a closer relationship between architect and engineer is essential to effective energy conservation."

Architect Pat Morse: "My summation is along the same lines. As architects and engineers, we can never forget that our first premise of practice is to be good designers. It's our job to integrate esthetics, which is mostly the responsibility of the architect, with technical design, which relies heavily on engineering input.

"If I remember the numbers right from attending the AIA energy workshops, if decisions haven't been made on energy-conservation techniques during schematic design, you have lost 30 per cent of your opportunities. By the time you have finished design development, you have probably passed 75 per cent of your opportunities. After that, you are pretty much limited to material and equipment substitutions. The things that are really going to save energy come pretty early in the design process. The need for early decision is heightened in an existing building undergoing rehabilitation because so many decisions are made for you—the building is already in place, the fabric is there, the bearing walls are there, there are existing systems in place. The need for a closely knit team working together from the start is heightened."

Boggarm Setty: "I am for the team approach, which is surely the best way to assure the best design for energy conservation. I am for the common-sense approach, though I would emphasize that common sense can be applied to some very sophisticated systems, including sophisticated solar-collector design. I would argue that whatever energy conservation systems are applied to a building, the bottom line should be that the owner gets the same initial cost as he would get in any conventional building. Again, this does not mean that sophisticated systems are not justified: In a California state office building we designed, we have concentrated solar collectors, ice storage tanks, and high-temperature hot-water storage. The cost of those mechanical systems is equal to conventional mechanical systems built in that area of the country. I think that control-system technology is developing so quickly that architects and engineers alike need education before they even try to apply the new systems. Finally, I would urge the manufacturers to develop the expertise of technical selling—as new products and systems come out, the manufacturers must at the same time have good technical back-up to assist the engineer in his design."

Sy Shemitz: "Four points. One, individual metering. We had a subtenant in Rockefeller Center insist on a separate check meter and on paying his electrical energy costs based on what he actually consumed. He has a great payback on his investment in energy-saving lighting equipment. This is an idea whose time has come. Second, the fee structure of the engineer. Too many projects are let on a percentage basis of the cost of projects rather than on the kind of work that energy-conservative design requires. Too often more work—the kinds of investigations that should be made—mean less building cost and less fee—which means things get out of whack very quickly. Three, I would like to support the little vendor. We conservative engineers tend to talk about reliable sources, large companies that we can fall back on to take responsibility. But if we take that attitude all the time, we are not going to get the kind of research and development in the building field that we have experienced in the electronics field, say, where small companies have stuck their necks out. We professionals should have the talent to evaluate with intelligence these young chance-takers. Finally, I would not be a responsible lighting consultant if I did not mention—in the midst of all this talk about energy conservation—the impact of lighting on your ability to see and the contribution lighting can make to mood and atmosphere and the environment in our buildings."

Larry Spielvogel: "To predict the performance of any particular energy-conservative design, we don't need research—we need application performance data, which can be obtained very simply and very readily by simple measurement, either in your client's building or in the manufacturer's laboratory. Simply using the results of that measured data along with all the parameters of the building should enable the professional to design for good performance. I worship at the meter. That's what tells the truth about performance. On every building where energy conservation work is being done, we probably ought to have one meter for every thousand dollars per year of energy consumption—a meter on every air-conditioning unit and every motor-control center and every major piece of equipment. The cost of the meter is insignificant. You can't begin to know how much energy you can save until you know how much you are using. Logs are another valuable tool. Every mechanical equipment room has a closet filled with energy usage records that no one even looks at, and if the logbooks are intelligently designed and reviewed by someone who is knowledgeable about the building and its systems, a tremendous amount of invaluable information can be gained to modify the operating and maintenance instructions and, often, to make possible dramatic improvements in performance."

Tad Stahl: "Energy conservation in buildings being rehabilitated or recycled for new use is important because rehabilitation and recycling are important. Our older buildings have something special that our modern ones don't; they have qualities that appeal to the general public. So making them work, making them efficient, making them cheaper to operate, increases their worth and importance to all of us...."

Gary Vanderweil: "Many of the 19th-century buildings we have been involved with have really been energy conserving in their own right because they were designed with thick granite or masonry walls, moderate opacities of glass, courtyards that encouraged natural ventilation and daylighting. With that as a start, we've been able to make tremendous strides—the buildings we are rehabbing today are far, far more efficient than those we worked on 10 years ago. And there is plenty of room for more advancement—especially in equipment efficiency and lighting."

And architect Bruce Campbell Graham had the last word: "I think the most important thing to remember is that the energy crisis is still with us. We've done a good job of conserving energy in new and old buildings alike, we're meeting all the new codes and standards. But all the threats are still there. New sources of energy still seem a long way off. We might have to go back to coal—but that raises serious problems of pollution that we cannot and will not be permitted to ignore. Even if oil supplies prove reliable and steady, the problems of energy supply and pollution are not going to go away. So the need for energy conservation is as pressing and important as it ever was."

And so ended the Round Table. A tale, it seems, of continued accomplishment and commitment. A reaffirmation of an old truth: What is needed more than new techniques and new technology is the right consultant with the right expertise at the right time. And a strong statement that energy conservation is as important in rehabilitating older buildings as it is in designing new buildings, and as important as it was when the energy crisis first burst upon us some 10 years ago.

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The manufacturer as part of the team

During the Round Table on energy conservation that appears in this issue, the panelists devoted a good deal of discussion to architect-engineer collaboration. Some engineers thought that the most useful role for the engineer was to comment on the architect's preliminary design—to suggest alternatives and to put price tags on the design choices made by the architect. Most of the architects and most of the engineers opted for an earlier and more activist kind of collaboration, working together from Day 1, on the grounds—as architect Peter Forbes put it—that "an architect might be reluctant to reduce the amount of glass in a building, for instance, if he were well into design, but would be foolish to disregard such a suggestion if it was made by a thoughtful engineer at the inception of a project."

Since we have just completed several months of work on this Product Reports issue, I am reminded that more of the same kind of collaboration might usefully take place between architect and manufacturer. For one thing, this annual issue serves as a good reminder of the enormous input and contribution that the manufacturers and suppliers of building products and materials and furniture make to the process of creating architecture. On the pages that follow are hundreds of product- and material-use ideas—and, through the catalog offerings, hundreds of pages of technical information—that can inform an architect's choices at each stage of the design process.

I don't need to tell architects (or manufacturers) that—the collaboration between architect and manufacturer is (and needs to be) somewhat different than the collaboration between architect and engineer. From the manufacturers, we hear too many complaints that architects never are willing to take the time to see a manufacturer's representative, and are much too quick to give up a spec under cost pressure. From the architects, we hear too many complaints that when they do ask for information on a product or material the technical information is too thin, or that when they do see a technical representative he very often doesn't have the information that the architect needs and sometimes doesn't know where or how to get it.

I think there is too much talk on such generalizations from both sides. The truth is that architects need to know what is available in the marketplace on a continuing basis. For one thing, they need to know what is new. For another thing, there is a new class every year—young architectural graduates and interns to whom the marketplace is a brand new candy box.

We hope this issue meets that need to know, and serves as a reminder of that input and contribution that the manufacturers make to the profession. And of the enormous need for collaboration between architect and manufacturer in the difficult course of the design process.

As in the past, this year's Product Reports is organized on the 16-division UCI format. Page numbers for each division are listed in the Table of Contents, page 3. More information on any product or literature item in this issue can be easily obtained by writing the item numbers on the Reader Service cards on pages 29 and 253. Companies whose products appear in this issue are indexed on pages 6-8; advertisers are listed on pages 251 and 252. W.W.
1 Drawing copier
The large document handler of the 7080 Engineering Printing System accepts 8-inch drawings and makes C-size prints, which can be fed into the main document handler to produce A-to C-size prints. Prints can be stapled, sorted and Z-folded automatically. Xerox Corp., Rochester, NY.

2 Electric eraser
The 2800 electric eraser removes both graphite and ink from drafting paper and coated film. The 2800 uses white vinyl strips for removing graphite or film lead and yellow vinyl strips made with erasing fluid for dissolving ink. Koh-I-Noor Rapidograph, Inc., Blooming, NJ.

3 3D CAD software
CDAI is described as a “high-function, general purpose design drafting package.” It features 2-D and 3-D capability and can separate plans into details, which can then be magnified. It functions on a mainframe computer or as a stand-alone system. CDAI, Inc., Burbank, CA.

4 Project management
The Harvard Project Manager software package runs on IBM and compatible personal computers and requires no extra hardware. It displays projects in bar charts showing the progress of each task or in “roadmaps” of tasks, milestones and subprojects. Harvard Software, Inc., Harvard, MA.

5 Automatic typesetting
The VPS Keyboard Converter makes possible high-speed typesetting with any Kroy or 3-M machine. It features a visual display and a memory that holds 5,500 characters. Copy can be reviewed and changes made before printing. Visual Products and Supply Corp., Cleveland, OH.

6 CAD software
The Robographics CAD.1 is designed for use with the Apple II+ or IIe. It produces graphics and technical drawings. Finished drawings are stored in library diskettes. No computer knowledge is needed to operate the system. Chessell-Robocom Corp., Newtown, PA.

7 Cost accounting software
Cost-Acumen is a cost accounting and project management software package that uses a microcomputer or word processor to monitor and control operating costs and expedite invoicing. It is claimed to spot cost overruns before they occur. Computer Applications Corp., Memphis, TN.

8 Facility planning
A 3-D rendering of an open plan office can be created with the Design program. The program was developed for Intergraph hardware and software to aid in interior design and facility management and has a special data base of symbols for the company’s products. Steelcase, Inc., Grand Rapids, MI.

9 Flatbed plotter
The Model 78 high-speed plotter can plot areas from 3 by 6 ft to 6 by 24 ft. It comes with a 4-pan head for ballpoint, wet ink or scribe plotting. A 24-position pencil head, pressurized ink head and cutter head are also available. Gerber Scientific Instrument Co., South Windsor, CT.

10 Project accounting
BusinessPower is a turnkey computer system that ties project management to general accounting with a package said to emulate the AIA’s “Standardized Accounting for Architects.” Feasibility study and cost estimating packages are also available. General Binding Corp., Northbrook, IL.

11 CAD workstation
The GRAPHNET Computer Integrated Design workstation has a 1024 byte memory, a 24Mb Winchester disk and a 15-in. printer/plotter. A variety of integrated software packages assists designers in space and equipment planning and layered working drawings. Graphic Horizons, Inc., Boston, MA.

12 Matting
Transfix matting equipment seals a flat printed or photographic image, behind clear or matte acrylic. The image is bonded to acrylic in a single cold rolling operation to result in a rigid, permanently sealed product. Chartpak, Leeds, MA.
13 Drafting grids
Concept Grids, used as underlay guides, include 1-, 2- and 3-point perspectives, layouts, interior and exterior views, paralines and an orthographic. Each is 10 by 15 in. and will fit transparent and opaque drawing projectors. There are 16 grids in all. Kleidon & Associates, Inc., Akron, OH.

14 Drafting machine
The Model-606 drafting machine has a 5 min angle digital display. Other features include a reset, recall and memory keys, a head float mechanism and a movable horizontal brake control. When not in use, the head may be rotated out of the way. Mutoh Industries, Ltd., Tokyo, Japan.

15 Electronic enclosures
Consoles and desk-top cabinets have black frames and textured blue panels. Desks have white writing surfaces. Console panels range from 21 to 78 ¾ in. high and are 19 in. wide. Desks are 26 or 30 in. high and come 24-, 45- or 72-in. wide. AMCO Engineering Co., Schiller Park, IL.

16 Stand-alone system
The Touch 'N Draw II has 5 hardware components: a keyboard, a terminal screen, a graphics control station, a digitizing tablet and an 8-pen, E-size plotter. Software includes architectural CAD, cost estimating and facilities management. Arrigoni Computer Graphics, Los Gatos, CA.

17 Microfilm recorder
The 35mm Micrographics EBR records drawings on roll film for 35mm aperture cards from vector and raster digital data inputs. It may be used with main-frame computers, with CAD systems or alone with its own magnetic tape input and minicomputer controller. Image Graphics, Inc., Fairfield, CT.

18 Digitizer/plotter
The DP4000 allows an operator to digitize information and plot back on the same surface. With a digitizing area of 42 by 60 in. and a plot area of 40 by 60 in., the DP4000 is said to take up less floor space than a conventional digitizer and plotter. DATA TECHNOLOGY, Inc., Woburn, MA.

19 Diazo printer
The Print VAC 600 prints sheets up to 47½ in. wide. It offers a system that removes ammonia fumes from prints, an automatic print separator and non-vent operation. An enclosed compartment holds a 50-yd roll; 2 light-tight shelves offer sheet storage. Ozalid Corp., Mahwah, NJ.

20 Drawing copier
The PD788 requires no venting. It features 7 fluorescent lamps for on-off operation, a 7-in. printing cylinder to minimize distortion, and automatic separation of original and copy. It accommodates two 50-yd rolls and a mobile taboret stores sheets. Bruni, Itasca, IL.

21 Microfilm system
The 3760 Enlarger/Printer accepts aperture cards, 16 and 35mm roll film and microfiche. Prints from 8½ by 11 in. to 24 by 36 in. may be made from either positive or negative film. Magnification is variable from 1-5X. Oce-Industries, Inc., Chicago, IL.

22 CAD system
ProDraft hardware includes a menu tablet with hand-held cursor, a plotter that handles A to D size drawings, and a minicomputer-based control with a Winchester disk drive. Menus include residential, commercial and renovation. Bausch & Lomb Interactive Graphics, Austin, TX.

23 Low-volume copiers
The FT3020 and FT3030 are low-volume dry toner copiers, which feature illuminated touch sensor controls and bypass feed tables to permit copies on a wide range of paper sizes. The FT3030 also has 3-level reduction and 2-level enlargement capacities. Ricoh of America, Inc., Fairfield, CT.

24 Disk-diskette system
The 3665 entry level system includes a 10MB Winchester disk with 1MB back-up diskette, a processor, 128K memory, serial port for a printer or a terminal, and an ASCII local area network interface. An additional 128K of memory can be added. Datapoint Corp., San Antonio, TX.
25 Stand-alone systems
The TS 1602G and TS 1602GH 16-bit computers both use a graphics processor and a 32K bit map memory RAM for graphics capabilities. Keyboards have keys that manipulate cross-hair cursors to implement pan, zoom and rubberband functions. Elden Computer Systems, Charleston, WV.

26 Graphics workstation
The Advanced Graphics Workstation II includes a stand-alone, 32-bit processor and an ARCIS virtual memory operating system and uses either Series 5000 or Series 7000 graphics software. Its keyboard features a touch-pad cursor. Auto-Trol Technology Corp., Denver, CO.

27 Stand-alone CAD
The CADlasyt 300 Series features 32-bit parallel processing with 7 sub-systems. Each unit supports 16MB of memory. Each sub-system has its own program and data storage facility. The system is compatible with IDRAW graphics software. Information Displays, Inc., Armonk, NY.

28 Drafting table
Der Kunstler Tisch (The Artist Table) has a solid steel base and a 29- by 41-in. particle board top with a white laminate surface. The top tilts from 0 to 90 deg and adjusts in height from 29 to 47 in. for users in sitting or standing positions. D + W, Inc., Elkhart, IN.

29 CAD
The ARCADE computer system is said to handle almost all phases of architectural projects, both business and design. It includes a 68000 processor, 1.75Mb of memory, a monitor and a 24- by 36-in. 8-pen plotter. It can be used alone or in a network of 12 stations. Bruning, Itasca, IL.

20 Fluorescent whiteprinter
The Model 522 prints up to 40 ft per min. Features include a 52-in. printing throat and front or rear print delivery. A light-tight cabinet stores 24- by 36-in. cut stock; a roll stock cabinet is optional. A vapor eliminating system removes ammonia fumes from prints. BLU-RAY, Inc., Essex, CT.

21 Graphics workstation
The Interact workstation has more than 3/4MB of memory. Two 19-in. screens display drawings. Display operations include dynamic pan, continuous zoom and real-time rotation of 3-dimensional elements. Screens and work surfaces are adjustable. Intergraph Corp., Huntsville, AL.

32 Diazo copiers
Both the Professional Automatic and the Professional Manual copiers feature 4 super diazo fluorescent lamps, which allow printing up to 30 ft per min. An ammonia odor control and a stacking tray, which takes prints up to 30 by 42 in., are standard features. Diaxit Co., Inc., Youngsville, NC.

33 CAD workstation
The Sigma III, which works independently or in a network, features graphics display, communications display and any mix of a touch menu, keyboard or graphics tablet. Other components are a processor, disk, tape and plotter, printer or digitizer. Sigma Design, Inc., Englewood, CO.

34 Turnkey CAD
The stand-alone AYCAD Series 100 includes graphics software, a 30Mb Winchester disk drive, a color raster monitor, an ASCII keyboard with a calculator pad and a 30- by 48-in. digitizer table. Pen plotters and video screen plot units are optional. Aydin Controls, Ft. Washington, PA.

35 Drafting table
The 370 Drafting Table has a steel frame with a baked enamel finish and laminate top. Top feature 90-deg tilt adjustments and come in 3 sizes. A locking tool drawer has a tray large enough for a 12-in. scale; a plan drawer has a hood to keep plans flat. Plan Hold Corp., Irvine, CA.

36 Cost estimating software
The Galaxy software package, designed for construction cost estimating, adapts to this company's microcomputer and to IBM's Datamaster and Personal Computer. It provides unit prices, extended costs and total costs for all building components. R.S. Means Co., Inc., Kingston, MA.
Office Equipment
Product literature

37 CAD training
Management and staff training that comes with the purchase of a CEADS-CADD turnkey drafting system is described in a 4-page color brochure. System hardware is made by Hewlett-Packard and software is provided and maintained by this manufacturer. Holguin & Associates, Inc., El Paso, TX.

38 Color graphics display
A 4-page color brochure describes and illustrates the 8600 color graphics display system. Hardware, optional equipment, software (including CAD), and applications are described, while photos show typical displays. Terak Corp., Scottsdale, AZ.

39 Drawing storage
Cabinets for storing both rolled drawings and flat sheets are covered in an 8-page color brochure. Charts list options of tube slots and sizes. A cut-away diagram illustrates cabinet features. Two models of lofting boards are also shown. Ulrich Planfiling Equipment Corp., Lakewood, NY.

40 Automatic mail delivery
A 20-page color brochure covers the Mailmobile, an automatic mail delivery system. Comparisons with messenger costs, a delivery system layout, a diagram of vehicle features and photographs of installations are included. Phillipsburg Div., Bell & Howell, Zeeland, MI.

41 Portable computer
The DOT portable computer is a 16-bit microprocessor, dual floppy diskette storage, video display and a built-in printer. Available software includes word processing, accounting and financial analysis. Computer Devices, Inc., Burlington, MA.

42 CAD
A packet of literature covers the Series 8000 CAD systems. Among the features illustrated and described are a menu and cursor system controlling a range of complex geometric functions, available type fonts and sizes, and software packages. Summagraphics Corp., Fairfield, CT.

43 Drafting supplies
A 1983 drafting supply catalog features brand-name drafting, print and plotter supplies and drafting furniture and equipment. Some products are illustrated. Prices are included. Dataprint Corp., San Mateo, CA.

44 Architectural graphic aids
A 56-page color catalog features dry transfer sheets of symbols and illustrations, including foliation, titles, scales, figures, vehicles, furniture and fixtures. Sheets are offered in a size of 7¼ by 9¼ in. Letraset USA, Paramus, NJ.

45 Plotter media
Samples of vellum, drafting films and translucent bond are included in a packet of literature covering media for drum-type, flat-bed and electrographic plotters. Media are described, and tables list specific types and dimensions for respective plotters. Teledyne Post, Des Plaines, IL.

46 CAD report
CAD in Construction—Problems or Profits is a report reprinted from the ASCE '82 Conference proceedings. It covers the use of CAD in construction, from selection through installation and training. Managing the use of a CAD system once it is installed is also covered. Tricad, Milpitas, CA.

47 Graphics library software
A 4-page brochure describes the A/E Graphic Symbols Library, which contains symbols in categories such as site, electrical, mechanical and materials. Items covered are listed and some examples shown. Interactive Graphics Services Co., Inc., Indianapolis, IN.

48 CAD software
A packet of literature describes the Architectural Interactive Design System. Sample floor plans, elevations, renderings and axonometrics produced by the system are illustrated. The software described is compatible with VAX general purpose computer hardware. ARCAD, Los Angeles, CA.
49 Interior design
Reference books on interiors products and services include volumes on corporate buyers of design services, open plans and filing and storage. References also come in software, which operates on the IBM Personal Computer. DesignNetwork International, Div. of Xetron Corp., Chicago, IL.

50 Computer service
A 4-page brochure describes a service bureau that provides graphics processing, database management, text processing and systems analysis. Each capability is described, and sample printouts of drawings and tables are illustrated. Design Logic, Inc., Oakland, CA.

51 CAD workstation
The 1600 I/D workstation is featured in a 4-page color brochure. Systems with which it is compatible, including the ANVIL-4000, are listed, and overlays, which can be used with its interactive graphics tablet are described. Specifications are included. IMLAC Corp., Needham, MA.

52 Drafting table
The Futura-Matic 7/C, with electronic elevation and tilt control, is featured in a 6-page color brochure. Photos show features, such as 8-wire grounded outlets, adjustable floor levelers and available surfaces and finishes. Tables come in 5 sizes. Mayline Co., Inc., Sheboygan, WI.

53 Slide storage
Several models of slide storage cabinets and accessories as well as light tables are illustrated in photos in a 20-page color brochure. Diagrams showing options are accompanied by lists of dimensions. Prices are also listed. Elden Enterprises, Inc., Charleston, WV.

54 CAD
Sample drawings produced by the Touch 'N Draw II CAD system and a diagram of the system’s functions throughout a project are included in a 4-page color brochure. Text describes these functions, which include drawing floor plans and sections and cost estimating. Arrigonni Computer Graphics, Los Gatos, CA.

55 Lighting plans
A 4-page color brochure describes a computer program that assists a designer in visualizing a lighting plan. Photos show sample graphics of light distribution based on individual specifications. Renderings from any angle are also available. Steelcase, Inc., Grand Rapids, MI.

56 CAD workstation
A 4-page bulletin describes the PW200 series interactive graphics workstation, which has 2-dimensional design and 3-dimensional solid modeling capabilities. It includes a 32-bit graphics processor with 1Mb of memory and a 68Mb Winchester disk. Prime Computer, Inc., Natick, MA.

57 Project control
A 4-page color brochure introduces Project 2/ Project management software for Digital Equipment’s VAX-11/730 minicomputer. System components are shown, and monthly rental costs are listed. Project Software & Development, Inc., Cambridge, MA.

58 Ink jet printing
A 4-page color brochure, which includes a construction diagram and specifications, describes the capabilities of the Chromajet ACT II color ink jet printer. The printer uses 125 color shades and can print on film for overhead projection. Advanced Color Technology, Inc., Chelmsford, MA.

59 Specifications
Standardspec, a master specification system for general construction, comes in hard copy or can be converted to word processing systems. It conforms to the CSI Manual of Practice and the 1983 CSI Masterformat. Construction Specifications Service, Chicago, IL.

60 High-volume copier
Speed and reduction capabilities are among the features of the 155R high-volume, non-stop copier covered in a 4-page color brochure. Information on its automatic document feeder and specifications are also included. Royal Business Machines, Inc., Windsor, CT.
For the draftsman, the more erasable a drafting paper, the better. For fifty years, Clearprint 1000H vellum has proven itself the best, time after time. That’s how 1000H became the industry standard—and only Clearprint makes it.

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A brochure on ProDraft is included in Sweet's 1984 Catalog, Section 19.

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61 Planters
The AE3900 Series is a group of high-fired stoneware planters. They are available in 15- and 20-in. diameters and come in 7 colors. Unglazed colors and white are available for quick shipment. Forms & Surfaces, Santa Barbara, CA.

62 Site furnishings
The CornerForm line of benches, planters and a receptacle features shaped, laminated corner pieces. Items come with redwood or mahogany slats and have button head socketed screws. Benches have brown powder-coated steel or polished chrome legs. Landscape Structures, Inc., Delano, MN.

63 Outdoor lights
Woodform Lighting is a series of California redwood fixtures that come in wall- and post-mount and bollard styles. Fixtures come in several models and take high-pressure sodium, fluorescent and incandescent luminaires. Columbia Cascade Timber Co., Portland, OR.

64 Wood bridges
Glamor bridges can be manufactured in different shapes, including curved girders and arches, and bridge components can be prefabricated to allow assembly by semi-skilled labor. Glamor is not affected by de-icing salts. Western Wood Structures, Inc., Tulalip, OR.

65 Porous pavement
Grasscrete is a reinforced poured-in-place concrete grid with holes that can be seeded. It forms load-bearing lawns for parking areas while allowing drainage and erosion control and is claimed to meet zoning requirements for parking and green space in urban areas. Bomanite Corp., Palo Alto, CA.

66 Tree grates

67 Site furniture
System 200 features modular geometric forms in granite and marble that can be combined with a selection of wood bench slabs to form site furniture for large spaces. Bench slabs come in redwood, oak, teak or white fir. Forms & Surfaces, Santa Barbara, CA.

68 Tree grates
Decorative cast-iron tree grates are designed for use in paved areas where trees are a part of the landscape plan. Grates are available in over 65 shapes, sizes and styles. Special sizes and styles can be custom manufactured. Neenah Foundry Co., Neenah, WI.

69 Bike racks
Ribbon Racks are of 1-piece tubular steel construction and are said to use 50 per cent less space than other designs. Installation is by-in-ground anchoring or optional flange mounting. Brandir International, Inc., New York, NY.

70 Modular bench
The Olympia 2-seat benches, designed by Heinz Wirth, are made of tubular steel and wire mesh and are finished with a synthetic coating in white or green. They can be linked to form straight or curved seating; curved seating can face inside and/or outside. Kroin Inc., Cambridge, MA.

71 Planters
Precast concrete reservoir planters feature wicks, attached to a porous membrane, that lead from the reservoir to transfer moisture throughout the soil ball. Planters are available in several sizes in both square and round shapes. Form Products Div. Wausau Tile, Inc., Wausau, WI.

72 Paving
Bomacros is a finish that creates patterns and textures over concrete paving surfaces. Textures include slate, used brick and roughsawn wood. The finish is available in a wide range of colors. Bomanite Corp., Palo Alto, CA.
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Circle 1007 on information card.
97 Colored mortar
Finely milled iron oxide pigments are added to mortar to complement or accentuate the colors of brick, stone and colored block units. Mortars are for exterior and interior commercial and residential use. Solomon Grind-Chem Service, Inc., Springfield, IL.

98 Rib-faced block
Spectra-Glaze Rib concrete face blocks feature either vertical or horizontal ribs. Blocks are available in 60 standard colors in all standard shapes. Corner and trim pieces are also available. The Burns & Russell Co. (licensor to manufacturers), Baltimore, MD.

99 Reinforceable masonry
The Soundblox acoustical masonry unit features an inner core construction for vertical reinforcing and utility runs. Cavities accommodate re-bars, grout, vertical conduits or insulating material. The Proudfoot Co., Inc, Greenwich, CT.

101 Acoustical glazed block
Spectra-Glaze/Soundblox are acoustical concrete blocks with a permanent, glazed finish. The blocks come in 60 standard colors in all standard shapes. Corner and trim pieces are also available. The Burns & Russell Co. (licensor to manufacturers), Baltimore, MD.

102 Granite anchor
The 31 Anchor Application is a factory-made slot that allows a granite panel to be anchored to the support system from its back surface rather than from its edge. This design is said to provide a more positive anchor, preventing it from slipping out. Cold Spring Granite Co., Cold Spring, MN.

103 Stucco
Dur-O-Fibar is a ½-in. long alkali-resistant glass fiber made to be used with Portland Cement Plaster (stucco). The fibers are designed to improve the physical properties of stucco while controlling random cracking. Dur-O-Wal, Inc., Northbrook, IL.

104 Concrete insert
The P3753, used in curtain wall applications, has a hot dip galvanized Continuous Channel for easy bolt alignment and is said to eliminate the welding required for curtain wall attachments. Recommended loading is 5,000 lb. Unistrut Building Systems, Div. of GTE Products Corp., Wayne, MI.

105 Aluminum siding
Cedarwood siding features a multi-toned random wood grain pattern. It is available in 4 colors/ways in what is claimed to be a low gloss, low chalk, fade resistant finish. The siding also features this manufacturer's positive lock system. Aican Building Products, Warren, OH.

106 Metal laminates
Lamitex metals come with polyurethane-based protective finishes of etched brass and pewter and polished brass and chrome. They are claimed to be scratch resistant and stain and burn proof. Applications include paneling, counter tops and trim. Harry Lunstead Designs, Inc., Kent, WA.

107 Ladder extension
LadderUP is a spring balanced safety post that attaches to fixed ladders. It is raised to provide a hand hold when going through a roof hatch or a floor or pit door. It is available in black enamel or hot dip galvanized finishes and adjusts to various rung sizes. The Bilco Co., New Haven, CT.

108 Stairs
Architectural Stair Systems feature open risers, steel stringers and balusters and oak treads, rails and newell posts; other woods may be specially ordered. Treads are 1½ or 2 in. thick and are nased on 3 sides. Mylen Industries, Inc., Peekskill, NY.

109 Steel joists
The LH Series steel joist is designed for use in long-span applications of composite steel and concrete floor construction systems. It features a double top chord, an open web of light channels and a new range of heavier bottom chord angles. Canam Hambro Div. of Canam Steel Corp., Needham Heights, MA.
Georgia Marble... for Elegance & the Test of Time

An exclusive address in Chicago, Watertower Place stands out as a landmark of excellence in all respects. Not only is it an office building, it also has a luxury hotel, condominiums, and a mall with department stores as well as specialty shops of all kinds.

Georgia Marble® was chosen as the material for the exterior of Watertower Place. The architects combined the dark veining of Mezzotint with a lighter quarry range of Cherokee®, achieving a balance that is visually pleasing and distinctive in design. Marble will add prestige to any structure, and Georgia Marble® adds that extra feature . . . Permanence.
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And we've shaped our line to give you the variety you need, too. Eight distinctive glazes and nine unglazed colors in four sizes.
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<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Description</th>
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<tbody>
<tr>
<td>110</td>
<td>Facing tiles and brick</td>
<td>A 12-page color catalog covers a line of structural glazed facing tile and brick. Special sections cover acoustical tiles and a lower-priced series. Details illustrate typical wall sections. Specifications, colors, shapes and sizes are included. Stark Ceramics, Inc., Canton, OH.</td>
</tr>
<tr>
<td>111</td>
<td>Surface bonding</td>
<td>Exterior and interior installations of Structural Skin surface bonding for concrete block walls are shown in a 6-page color brochure. Textures achieved with the material are shown in detail. Information on code compliance and tables listing allowable design stresses are included. Conproco Corp., Manchester, NH.</td>
</tr>
<tr>
<td>112</td>
<td>Masonry veneer anchors</td>
<td>A page of literature features product data and application information for 2 types of steel stud masonry veneer anchors, the Adjustable Speed Set and the Adjustable Loop. Installations of each anchor type are shown in section details. Dur-O-Wal, Inc., Northbrook, IL.</td>
</tr>
<tr>
<td>113</td>
<td>Masonry wall fillers</td>
<td>A product data sheet covers Rapid Soft-Joint, which accommodates vertical movements in brick-clad framed buildings, and Rapid Expansion Joint, a vertical joint filler that accommodates horizontal expansion in brick. Details are included. Dur-O-Wall, Inc., Northbrook, IL.</td>
</tr>
<tr>
<td>114</td>
<td>Rebar positioners</td>
<td>A product information sheet describes rebar positioners and anchor bolt templates. Applications for each product are described. Dur-O-Wal, Inc., Northbrook, IL.</td>
</tr>
<tr>
<td>115</td>
<td>Brick</td>
<td>A 30-page booklet features the Giant brick system. Bricks in a multitude of shapes and sizes are shown along with dimensions and physical data. An extensive set of construction details and specifications is also included. Clayburn Industries Ltd., Burnaby, B.C., Canada</td>
</tr>
<tr>
<td>116</td>
<td>Custom stairways</td>
<td>Photos show a number of installations of spiral and custom stairways in an 8-page color brochure. Diagrams show different types of risers and platforms. Suggested specifications are included. Woodbridge Ornamental Iron Co., Chicago, IL.</td>
</tr>
<tr>
<td>117</td>
<td>Stairs</td>
<td>Both metal and wood spiral and circular stairs are featured in a 12-page color catalog. Photos show installations and details of construction. Tables of dimensions and specifications are included. American General Products, Inc., Ypsilanti, MI.</td>
</tr>
<tr>
<td>118</td>
<td>Metal grating</td>
<td>Wire cloth, perforated and expanded metal and bar, grip strut and open grip gratings are included in a 48-page catalog. Details illustrate product construction and tables list available dimensions and load-bearing capacities. McNichols Co., Tampa, FL.</td>
</tr>
<tr>
<td>119</td>
<td>Ornamental iron</td>
<td>Cast iron and wrought iron railings and columns are shown in photos and line drawings and described in a 15-page brochure. End fittings, base plates, rail supports and ornamental accessories are included along with tables listing dimensions. Logan Co., a Figgie International Co., Louisville, KY.</td>
</tr>
<tr>
<td>120</td>
<td>Curving aluminum</td>
<td>Curving Metal for Architectural Applications is a 4-page color catalog that features photos of curved aluminum glazing installations. The method used to curve the glazing sections is described, and details show those sections which can be curved. Stretch Forming Corp., Fountain Valley, CA.</td>
</tr>
<tr>
<td>121</td>
<td>Space frames</td>
<td>The design, fabrication and erection of steel space frames are shown and described in a 22-page color brochure. Photos show a variety of frame installations. Clear-span tables for standard, heavy and light loads are included. Jarvis Steel &amp; Lumber Co., Inc., Baltimore, MD.</td>
</tr>
</tbody>
</table>
Elwin G. Smith asks:
Who needs fat paint?

Some companies in the curtainwall industry apply color coatings as thick as six to eight mils or more to metal wall panels. The theory, of course, is that extra thickness gives extra protection.

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There's a new option for design flexibility from Robertson: Formawall® flat metal wall panels have been redesigned for horizontal use - in addition to traditional vertical installation.

Now you can design horizontally in lengths up to 30 feet - in 24" to 30"-high modules - in our standard 2" thickness. Use our foam core insulated Formawall 1000 and select from long-life stucco-embossed finishes such as Vitralume® (a superb porcelainized finish at new competitive prices), Versacor®, Durasil® or PVF2. Or utilize Formawall 2000 with a honeycomb core and baked enamel finishes - and choose smooth or stucco-embossed.

In either case, you'll take advantage of this latest Robertson innovation: we've eliminated the customary weather-exposed sealants at all horizontal joints, so we can now provide a bolder, deeper shadow line.

The horizontal look: another new concept in walls from Robertson, designed to make your building come to life.

For further details on horizontal or vertical Formawall applications, call or write H. H. Robertson Company, Department AR-12A, 400 Holiday Drive, Pittsburgh, PA 15220. Phone: (412) 928-7522.

Horizontal Formawall Typical Joint Details

Circle 1034 on inquiry card
It took not one, not two, but three steel design concepts to make the building of Four Allen Center, Houston, possible.

And it was a difficult challenge for the designers. The extremely narrow tower, an elongated rectangle with semi-circular ends, had a height-to-width ratio in excess of 6.85, and the constraint of a central sheer truss core depth of only 25.75 ft. In hurricane-prone Houston, that meant a unique approach was required.

As it evolved, the architect and engineer combined existing concepts and molded them into one structural system:

1. an innovative hybrid framing method consisting of a four-celled bundled “frame tube” system.

2. the perimeter frame was assembled from two-story high “tree column” modules located at 15 ft. on center around the building perimeter in order to cope with high strength and serviceability requirements.

3. cross frames that subdivided the plan into its four-celled grid were formed by horizontal “tree beam” modules interacting with diagonal trusses in the shallow center-core area.

And although the tree beam concept introduced six vertical stub columns — added at midspan to moderately heavy horizontal wind girders — in the lease area of most floors, they in actuality caused only a minimal loss of spatial flexibility.

The resulting new building, Four Allen Center Tower, not only provides space planning flexibility and exciting panoramic views, but also proves that when steel is used, it always adds up right.

For more information, contact a USS Construction Representative through your nearest U.S. Steel sales office. Or write for our Building Report on Four Allen Center (ADUSS 27-8470-01) to Box 86 (C-1835), Pittsburgh, PA 15230.

LOCATION:

• Central business district, Houston, Texas, south of Antioch Park.

STRUCTURAL STEEL:

<table>
<thead>
<tr>
<th>Steel Grade</th>
<th>Tons</th>
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<tr>
<td>ASTM A588</td>
<td>1,288</td>
</tr>
<tr>
<td>ASTM A572-42</td>
<td>142</td>
</tr>
<tr>
<td>ASTM A572-50</td>
<td>4,666</td>
</tr>
<tr>
<td>ASTM A36</td>
<td>13,165</td>
</tr>
</tbody>
</table>

TOTAL 19,261 tons

DESIGN FEATURES:

• Overall dimensions 109.4 ft. by 259.4 ft.
• 50 levels above grade and 2 levels below grade.
• Gross area 1.44 million sq. ft.
• Rentable area 1.20 million sq. ft.

6 Wood & Plastics

122 Redwood paneling
PALCO LOC paneling comes in a ¾-in.-thick tongue-and-groove pattern in widths of 4, 5, 6 and 8 in. It is finger-jointed with waterproof glue and offers a choice of surfaces, with a saw texture on one side and a smooth texture on the other. The Pacific Lumber Co., San Francisco, CA.

123 Insulating glazing
Lalex profiled sheet is a double-walled extruded sheet recommended for applications where increased insulation and impact strength are needed. Its dead air space design results in an R-value of 1.54 and a U-value of 0.65. General Electric Co., Plastics Operations, Pittsfield, MA.

124 Woodgrain laminate edge
Almond and Chamois Woodmate are postforming laminates that integrate 3½-in. woodgrain edges with 2 different laminate surfaces. While they can be used on all edge profiles, they are recommended for use on waterfall or 180 deg. wraps. Consoweld Corp., Wisconsin Rapids, WI.

125 Laminated beams
Rough-sawn MICRO-LAM beams come in depths of 9½, 11¾ and 14¾ in. Two 4¼-in. beams provide the 3½-in. width necessary to match wall framing and eliminate shimming. They are accepted for structural use by all major building code agencies. Trus Joist Corp., Boise, ID.

126 Space-saving stairs
Wood stairs with a 56-deg angle of inclination are 24 in. wide and feature alternating 10-in. treads and high, close handrails. They are computer designed and custom-built of oak with fir stringers. Available heights are from 4 to 12 ft. Lapeyre Stair, Inc., New Orleans, LA.

127 Rustic wood sidings
Tight knots and streaks are features of redwood sapwood siding. Rustic sidings come in 3 patterns: bevel, channel and tongue-and-groove. All are air-seasoned for minimum checking, warping or cupping. California Redwood Association, Mill Valley, CA.

128 Spiral stairs
Hardwood spiral stairs come in standard and custom designs. Railings, newels and balusters may be turned in custom designs as well. Stairs come up to 12 ft high without a landing. They can be shipped either assembled or knocked down and are field finished, Challis Stairways, Inc., Sandy, UT.

129 Open-web truss
The TULX truss is suitable for flat or sloped roof as well as floor applications. High-strength structural lumber in the high-stress areas of each chord provides up to 20 per cent more load-bearing capacity. The web is made of tubular steel. Trus Joist Corp., Boise, ID.

130 Cedar siding
Bitterroot is the name given to this kiln-dried inland red cedar siding, which features a 1½-in.-thick butt in a Dolly Varden or level pattern. Siding comes in 6-, 8- and 10-in. widths with 2 saw kerfs on the back of each piece. Potlatch Corp., San Francisco, CA.

131 Span computer
A pocket-sized span computer features design-value tables for use in selecting sizes and grades of wood for joists, rafters and beams. Western Wood Products Association, Portland, OR.

132 Knotty pine paneling
Pine Crest 2 paneling is smooth on one side and rough-sawn on the other. It is cut in 8-ft lengths, tongue-and-groove, may be finished in shellac, lacquer, varnish or stain, and may be applied vertically, horizontally or diagonally. Champion International Corp., Stamford, CT.

133 Flooring
Interior and exterior flooring for use on subfloors or directly over joists is manufactured from 1- by 4-in. tongue-and-groove kiln-dried vertical grain Douglas Fir. It is finger-jointed and glued with waterproof adhesive. The Pacific Lumber Co., San Francisco, CA.
APA systems can save you money on construction, from foundations to roofing. So, if you've got designs on cutting costs, start by cutting this coupon. And mail it to: American Plywood Association, P.O. Box 11700, Tacoma, WA 98411.

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3. Non-Residential Roof Systems
4. All-Weather Wood Foundations
5. Fire-Rated Systems
6. Noise-Rated Systems
7. Concrete Forms

Product Guides
8. 303 Plywood Siding
9. Panel Care & Installation
10. Grades & Specifications
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12. Pressure-Preserved Plywood
13. HDO/MDO Plywood
14. Publications Index

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P.O. Box 400, Dept. AR, Winlock, WA 98596 (206) 785-3501
Wood & Plastics
Product literature

134 Laminates
The DuraBeauty line of high-pressure laminates is featured in an 8-page color brochure. As shown, the line includes laminates in solid colors, wood grains, patterns and marbles. New introductions to the line are highlighted and specifications are included. Consoweld Corp., Wisconsin Rapids, WI.

135 Lumber
An 8-page color brochure describes grades and applications of lumber from a number of wood species. Charts listing typical lumber product classifications and nominal sizes for softwood lumber as well as information on pressure-treated lumber are included. Georgia-Pacific Corp., Atlanta, GA.

136 Laminated wood beams
An 8-page color brochure, Glulam Beams for Residential/Light Commercial Construction, contains photos and details of installations. Span tables and design values are included, as well as a table of conversions from steel or solid sawn timber to glulam. American Institute of Timber Construction, Englewood, CO.

137 Wood design guide
Four building classifications have been added to the Code Conforming Wood Design Guide: institutional, storage, residential and educational. Allowable heights and areas under each code for sprinklered and unsprinklered buildings in each category are described and listed in tables. American Wood Council, Washington, DC.

138 Laminated timber
A guide for designing with structural glued laminated timber (glulam) includes stress tables, standard sizes, typical connection details and information on specifying by stress values. American Institute of Timber Construction, Englewood, CO.

139 Plywood design
Plywood panel floor, wall and roof construction are covered in an extensive guide. Section details show methods of construction, and tables list recommended shear and loads. Information on specifying and building requirements is included. American Plywood Association, Tacoma, WA.

140 Performance-rated panels
Composition, testing criteria, span ratings and code recognition of structural wood panels are covered in a 12-page brochure. Plywood, composite, waferboard, oriented strand board and structural particleboard are shown in photos and described. American Plywood Association, Tacoma, WA.

141 Redwood lumber
An 8-page color brochure features photos of interior and exterior commercial and residential installations of redwood lumber. Also shown and described are 5 grades of heartwood and sapwood. California Redwood Association, Mill Valley, CA.

142 Fiberglass grating
Fiberglass gratings, stair treads and elevated floor systems are illustrated and described in a 16-page brochure. Product composition and composition, fire- and impact-resistance are described. Clips, fasteners, nuts and threaded rods are also covered. Fibergrate Corp., Dallas, TX.

143 Redwood construction
Two specification and application booklets contain information on grades, sizes and characteristics of redwood products for siding, interior and landscaping designs. Details of a number of siding pattern installations are included. California Redwood Association, Mill Valley, CA.

144 Wood treatments
Several pressure treatments for wood are described and illustrated in a 12-page color brochure. A selection chart covers the uses, advantages and limitations of each type of treatment. Photographs of treated wood installations are included. Koppers Co., Inc., Pittsburgh, PA.

145 Surfacing
A color brochure features Primelone, a collection of tambours and grooved architectural surfacing. Included in 21 surfaces are high-gloss, solid-color laminates, brushed and polished metalies, woodgrain and millstone pattern laminates and natural oak. Ralph Wilson Plastics Co., Temple, TX.
7 Thermal & Moisture Protection

146 Roofing
Hi-Tuff single-ply roofing features a scrim-reinforced membrane, which is mechanically fastened to the roof deck, and hot-air welded seams. Roofing is Factory Mutual approved for wind resistance and carries a UL Class A fire rating. Roofing Systems, J.P. Stevens & Co., Inc., East Hampton, MA.

147 Sealants
#8000 Ter-Polymer Sealants are elastomeric emulsion acrylics said to resist heat, cold, ultraviolet radiation, salt water and chemical pollutants. They are used for precast or poured-in-place concrete, window and door frames and perimeter areas. VIP Enterprises, Inc., Miami, FL.

148 Metal roofing
Steel and aluminum roll-formed roofings are available in 16 different profiles and 14 colors. Designed for both new construction and retrofit, they are installed with concealed clip fasteners and can be applied over rigid insulation and concrete or plywood decks. AEP/SPAN, Dallas, TX.

149 Fiberglass roof
The Woodlands roof shingle carries UL approval for the use of staples as well as a UL Class A fire rating. Shingles feature Seal-O-Matic adhesive strips to secure them in place. They come in a variety of colors. The Manville Corp., Manville Building Materials Div., Denver, CO.

150 Thin granite panels
Granite panels for outdoor applications come in 1/4 in. thick with a polished or honed finish, or 1/2 in. thick with a thermal-flamed or diamond-sawn finish. Panels may be installed by a tile setter using latex thin-set mortars without anchors. Marble Technics, Ltd., New York, NY.

151 Pre-engineered panels
The building shown is made of 2-in.-thick insulated panels designed for special purpose buildings standing up to 10 ft 6 in. high. Panels come in galvanized steel, aluminum with a stucco finish and galvanized steel covered with white polyester. Bally Case and Cooler, Inc., Bally, PA.

152 Cedar-faced plywood siding
Western Red Cedar-faced plywood siding and paneling is 1/4 in. thick, 4 in. wide and comes in 8-, 9- and 10-ft lengths. Veneers comply with the APA 303 Specialty Siding Natural Rustic Grade. Panels come ungrooved or grooved vertically in a choice of patterns. Evans Products Co., Fortland, OR.

153 Skylight
The Lo-Dome skylight is approximately 3 in. high. It features a double-insulated dome of lexiglass, which is claimed to be shatterproof and weighs less than glass. The skylight comes in fixed or venting models in a number of sizes. Ventarama Skylight Corp., Hicksville, NY.

154 Roofing shingles
Classic Slate roofing shingles are manufactured of mineral fiber to be more uniform in strength and half the weight of natural slate. They carry a UL Class A fire rating and come in black, gray, green and red. International Building Products, Inc., New Orleans, LA.

155 Pavers
Terra-Stone pavers are designed to protect substrates from traffic and allow local access to substrates for repairs. Typical applications include new or rehab roofs and roof decks, concourses and plazas. A variety of colors and textures are available. Wausau Tile, Inc., Wausau, WI.

156 Composite stone panels
Minerit is a non-asbestos substrate, which is combined with a natural stone face to form a new line of composite stone panels. The bonding agent is Hycon 75 epoxy resin. Panels are approximately 5/8 in. thick, 4 ft wide and 8 or 10 ft long. Sansspray Corp., Santa Clara, CA.

157 Exterior wall finishes
Stone Caste and Sand Caste are natural stone finishes for wall systems made of insulation board, fiberglass reinforcing fabric, and a synthetic plaster and cement base coat. Finishes come in several colors and can be used on new or retrofit construction. Synergy Methods, Inc., Cranston, RI.
158 Skylights
A commercial extruded aluminum tubular skylighting system allows rafters to be spaced up to 54 in. apart; straight lean-to spans can reach 25 ft and arched can span up to 50 ft. Snap-in retainers for inner nonsealed glass or wire screen are available. Wasco Products, Inc., Sanford, ME.

159 Spray-on insulation
CertaSpray is a fiberglass insulation particularly suited to irregular or hard-to-reach areas. When it is sprayed to a 5-in.-thickness it yields a rating of R-20. It has a Class 1 fire rating, SRC ratings up to 56 and SRC ratings up to 1.10. Certainteed Corp., Valley Forge, PA.

160 Concrete roof tiles
Earth-toned concrete barrel roof tiles are colored with Bayferrox iron oxide pigments made by Mobay Chemical. They carry a Class A fire rating and are said to require little maintenance and to resist fading. Gory Associated Industries, Inc., North Miami, FL.

161 Roof insulation boards
Insulation boards are composed of a 3/8-in. layer of factory applied, latex modified concrete mortar bonded to boards of Styrofoam. The boards create a ballasted roofing system that weighs 4.5 lb/sf. The Dow Chemical Co., Midland, MI.

162 Skylights
Kalucurve skylight panels are 24 in. thick, come in standard widths of 4 and 5 ft and in lengths up to 20 ft along the arc. Light transmission ranges from 3 to 83 per cent. Panels carry U values from .15 to .40. Kalwall Corp., Manchester, NH.

163 Shingles
Class A rated Classic Plus glass fiber roofing shingles are claimed to last up to 1/2 longer than comparably-priced organic products. They are said to resist curling, blistering and buckling. Shingles are available in 7 colors. Owens-Corning Fiberglas Corp., Toledo, OH.

164 Zinc roof
Microsline 80 textured panels form a watertight roof system, which weathers to a gray patina. The system installs over solid sheathing or lath and is claimed not to stain adjacent materials. Ball Zinc Products Div., Greeneville, TN.

165 Roof fan
A roof fan for attics delivers 1250 CFM with a 1/2 HP motor. Housed in zinc-coated steel with a baked enamel finish, the unit is 22 in. in diameter and 9 in. high. Its automatic thermostat is preset at 110 deg and adjusts from 70 to 150 deg. Nutone Div., Scovill Inc., Cincinnati, OH.

166 Cedar shingles
Fancy Cut cedar shingles are made of #1 grade Western red cedar. They each measure 5 by 18 in., have a vertical grain and are knot free. Shingles are available in 9 shapes, including round, square, hexagonal and octagonal. Shakertown Corp., Winlock, WA.

167 Roofing system
The system offered by this company features a single-ply membrane, insulation panels, a fastening system for metal, wood and concrete decks, molded EPDM pipe flashings and counter-flashing. The system is said to fit virtually any roof design. Carlisle SynTec Systems, Carlisle, PA.

168 Skylights
Solar Deck acrylic skylights for walkway covers and canopies come in 6-, 8- and 10-ft modules and can be used singly or in continuous patterns. They are produced in pyramidal, gambrel and bubble shapes and may be tinted to an architect's specifications. Mapes Industries, Inc., Lincoln, NE.

169 Roof surfacing
Trafloc is a protective surfacing for roof traffic areas. It is composed of chopped rubber particles and synthetic binders, is 310 mil thick and comes in rolls. It can be cut to sizes needed and is applied with hot asphalt or rubber-based adhesives. Siplast, Arkadelphia, AR.
7 Thermal & Moisture Protection
Product literature

170 Exterior insulation
Two solid-state insulation systems are featured in a 20-page color brochure. Details of system components, installation procedures and the fabrication of insulation panels are illustrated. Physical data, insulation values and specifications are listed. Cota Industries, Inc., Des Moines, IA.

176 Bitumen roofing
The Rhoflex roofing system, an asphalt-based polymer-modified bitumen with polyester, is described in a brochure. It can be installed on almost all surfaces without adhesives, coatings or stones and can be used for repair, flashing and general waterproofing. Rhoflex Div. of Teltex Inc., North Branford, CT.

171 Roof drains
Roof drains, sumps, scuppers and flexible bellows are illustrated and described in a 4-page brochure. Section details with labeled components and dimensions are included for each model. Information on installation and specifications are also included. W.P. Hickman Co., Asheville, NC.

177 Skylights
Photos of skylight installations in a 28-page color booklet illustrate designs that may be achieved with this company's products. Details show basic construction methods for single-slope, pyramid, ridge, dome and vault skylights. Specifications are included. Super Sky Products, Inc., Mequon, WI.

172 Aggregate panels
Installations of stone aggregate panels and the 6 colors in which they are available are shown in photos in a 4-page color brochure. Typical construction details show joints and moldings. INSUL/CRETE Co., Inc., McFarland, WI.

178 Roofing sheet
Tropaseal modified bitumen roofing sheet is described in a 4-page brochure. Each of the 3 layers of the sheet is described, while photos show a variety of applications. Technical data are listed. Tropical Industrial Coatings, Inc., Brunswick, OH.

173 Waterproof membrane
A membrane that provides thin, load-bearing, watertight construction is featured in a 4-page color brochure. Photos show installation procedures and finished projects. A detail illustrates the use of the membrane with ceramic tile over a concrete slab. Laticrete International, Inc., Bethany, CT.

179 Roof windows
Photos show installations of roof windows, awnings, blinds and safety features in a 24-page color brochure. A graph compares air infiltration with this company's windows to that of standard prime and thermal windows. Flashing types, technical data and sizes are included. Velux-America Inc., Greenwood, SC.

174 Metal roofing
Stile galvanized steel roofing, made to look like clay tile, is featured in an 8-page color brochure. Product data and installation instructions are included. Roof system components and available colors are illustrated. Fire ratings and specifications are listed. Metal Sales Manufacturing Corp., Louisville, KY.

180 Single-ply roofing
Flugon single-ply loose-laid, ballasted, mechanically fastened and fully adhered roofing systems are featured in a 4-page color brochure. Installation techniques and physical data are included for each system. The brochure also describes this company's quality control procedures. Watpro Corp., Mansaquin, NJ.

175 Residential skylights
An 8-page color brochure features several photos showing installations of residential skylights in a wide variety of sizes and styles. Accompanying the photos is a description of different ways skylights can function in design. O'Keeffe's, Inc., San Francisco, CA.

181 Bridge/parking surface
The Wabo-Imperndeck, a waterproofing membrane/wearing course system for bridge decks and parking structures, is covered in a 4-page brochure. A diagram shows the paving layer sequence of the system, and installation procedures are described. Watson Bowman Associates, Inc., Amherst, NY.
182 Roofing products
Compositions, coverage rates and applications of a series of commercial and industrial built-up roofing products are described in a 32-page catalog. Included are roofing membranes, coatings, adhesives and insulations. Evans Products Co./Permaglas Div., Corvallis OR.

183 Roofing insulation
Design guidelines for systems using expanded polystyrene RPS insulation are covered in a 10-page color brochure. Details show the use of RPS with single-ply membranes and built-up systems over metal and concrete decks. Tables list physical properties. ARCO Chemical Co., Div. of Atlantic Richfield, Philadelphia, PA.

184 Cladding
Wall, roof and liner panels for industrial and commercial applications are covered in an 8-page color brochure. Diagrams with dimensions are featured, with tables listing live loads per square foot. Photos of installations, specifications and a chart of standard colors are included. ASC Pacific, Inc., Carson, CA.

185 Roof membrane
The Hydrosel WVDM sheet-rubber roof membrane for new construction and re-roofing is featured in a 4-page color brochure. Four different methods of application are illustrated and described. Physical properties are listed. American Hydrotech, Inc., Chicago, IL.

186 Panel system
Keratin prefabricated, tile-clad panels are featured in a 24-page color booklet. Details show panel composition and joints. Punched-window, spandrel and formed-wall panels are shown in details with dimensions and renderings. Specifications and seismic information are included. Buchtal, Atlanta, GA.

187 Metal roofing
The use of Microzinc 70 and 80 sheet metals in sloped roofing systems is shown and described in an 8-page color brochure. Details and specifications of factory-formed roof systems and accessories using the metals are featured. Photos show commercial and residential installations. Ball Zine Products Div., Greenville, TN.

188 Standing-seam roofs
The energy efficiency and ease of installation of Chief LTC self-seaming standing-seam roof systems are described in a 4-page color brochure. Section details illustrate panel installation, and diagrams show dimensions. Specifications are included. Chief Industries, Inc., Building Systems Div., Grand Island, NE.

189 Exterior wall insulation
A 4-page color brochure covers insulated finishing systems featuring Styrofoam brand insulation and polymer modified cement. Charts show comparisons to molded bead polystyrene insulation for moisture resistance and R-value retention. A section detail illustrates installation. The Dow Chemical Co., Midland, MI.

190 Retrofit insulation
An 8-page color brochure describes how the Outsulation wall insulation and finish system is used to retrofit old buildings. It also describes Revestit, a sandy textured latex acrylic coating for use over Outsulation, concrete, stucco, brick, cement or cement building boards. Dryvit Systems, Inc., West Warwick, RI.

191 Built-up roofing
An 86-page manual features built-up roofing applications and specifications. Section details illustrate components of various roof systems and a chart lists comparative insulation thicknesses for obtaining required “C” and “R” factors. Evans Products Co./Permaglas Div., Corvallis OR.

192 Roofing system
The composition of Geocem Elastomer FR Coating, which is designed to protect urethane foam insulation systems, and urethane foam are described in a 4-page color brochure. The physical properties of Geocem and short-form application specifications are listed. Geocel Coating Systems, Inc., Elkhart, IN.

193 Roof shingles
Self-sealing asphalt roof shingles are illustrated in photos of residential installations in a 12-page color brochure. The 7 colors in which they are available are also illustrated, and their weather- and fire-resistance is described. GAF Corp., New York, NY.

Architectural Record December 1983 77
194 Metal roofing systems
Metal roofing and mansard systems are featured in a 12-page color brochure. Details with dimensions show components, framing and flashing. Information on materials and coatings and a finish color chart are included. Engineered Components, Inc., Stafford, TX.

195 Skylights
Photos show installations of a variety of skylights in a 24-page color booklet. Diagrams show unit shapes, and details are included for both tubular aluminum and all-metal framed skylights. Roll-away and ventilating models are also covered. Fisher Skylights, Inc., West Nyack, NY.

196 Ceiling insulation
A 6-page color foldout brochure describes SuperPly, a suspended ceiling insulation system with an insulating value of up to R-44. System properties, components, applications and installation procedures are all covered. The Manville Corp., Manville Building Materials Div., Denver, CO.

197 Exterior steel panels
Exterior panels made of steel and finished in porcelain enamel are covered in an 8-page brochure. Sections on veneer and insulated panels include construction guides, wind load charts and specifications. AllianceWall Corp., Atlanta, GA.

198 Rubber roofing
A spec sheet on Whaleskin/81 fire retardant rubber roofing includes section details for plywood, metal and concrete decks. Both systems are UL Class A rated. Kelly Energy Systems, Inc., Waterbury, CT.

199 Roof insulation
Exeltherm Xtra roof insulation with fire resistant properties is described in a 4-page brochure. Charts list physical properties and thermal performance data. A detail shows a steel deck application, and suggested application procedures are listed. Koppers Co., Inc., Pittsburgh, PA.

200 Exhaust fans
Exhaust fans with and without light fixtures are illustrated and described in a 20-page color catalog. Diagrams and photos show typical installations. A guide helps to determine the minimum CFM rating required in an area. NuTone Div., Scovill Inc., Cincinnati, OH.

201 Roofing fabric
An information kit on Ryon nonwoven fabric includes a page on cold applied systems, one for stone separator mats and one on slip sheet applications. Information on functions, properties and applications is included. Phillips Fibers Corp., Greenville, SC.

202 Steel panels
An 8-page color brochure features steel commercial roofing and siding panels. Load/span data for 9 panel designs and for insulated walls is listed. Design criteria, suggested specifications and a chart of standard colors are included as well. Reynolds Metals Co., Eastman, GA.

203 Roofing
An 8-page brochure describes single-ply membrane roofing for ballasted and unballasted installations. Details, photos of installation procedures and charts of test values and applications for two different membranes are all included. Rubber & Plastics Compound Co., Inc., Long Island City, NY.

204 Single-ply roofing
Photos show installation procedures of GeoFlex PIR roofing in a 24-page booklet. Reroofing specifications include applications and maintenance. Several section details of gutters, drains, flashings and more are included. Republic Powdered Metals, Inc., Medina, OH.

205 Wall system
A 4-page brochure features technical data on the StarCFW steel wall system. Sections and details illustrate typical installation, and tables list maximum total uniform loads. Information on color finishes and specifications are included. Star Manufacturing Co., Oklahoma City, OK.
the originator and world’s leading producer of synthetic resin coatings and exterior insulation systems.

* phone collect for the new **sto** PRODUCTS & SYSTEMS BROCHURE

...these **sto** advantages are unequalled:

* **sto** has a world-wide reputation for research & development.
* **sto** originated synthetic resin coatings in Europe 30 years ago.
* **sto** coatings offer the widest choice of color and texture in the industry.
* **sto** exterior insulation systems only with **sto** adhesives and **sto** 100% synthetic resin coatings can meet all of your exterior insulation needs.

specify **sto** or equal

Damora

Circle 1123
A new freedom of design is made possible for low and mid-rise construction by Inryco Curtain Walls. Sweeping curves, sculptured surfaces, subtle or striking colors, matte or glossy finishes—as you want them.

Send for more information in Catalog 13-1. Write INRYCO, Inc., Suite 4033, P.O. Box 393, Milwaukee, WI 53201.
Fourteen years ago, the initial application of the Veterans Administration Building System emphasizing interstitial service space was incorporated into the design of Saddleback Hospital in Laguna Hills, California.

The concept of interstitial service space has since influenced the design of hospitals, both VA and private, here in the United States and abroad. And its application has also been incorporated into the design of non-hospital structures, such as hotels and laboratories, that could benefit from the system.

The key to all interstitial service space applications has been the accessibility of services for construction, maintenance, repair, and change. The service zone has therefore been constructed with an over-all working platform which doubles as the ceiling subsystem in functional areas of the structure. This service ceiling provides a working platform, an acoustic and thermal block, support for partitions, and a fire retardant. With the added capability of being cut and patched with hand tools, the service ceiling allows easy penetration and closure for duct openings and pipe connections.

With interstitial design the question of increased cost was a consideration. The building itself would necessarily be somewhat larger and the cubage would be higher because of the interstitial space. But trade-offs in cost can be anticipated.

The service ceilings constructed for the 300,000 sq. ft. Froedtert Memorial Lutheran Hospital in Milwaukee, Wisconsin, allowed work to go on simultaneously in interstitial and functional floors. Rather than having to erect scaffolding to install utility and air conditioning runs – causing an interruption of continued work in the functional floor areas – the service ceilings supported men and materials during installation. After completion of the hospital, operational maintenance in the interstitial service areas is being conducted without disturbing patient care activities on the floors below.

According to a study by the VA, the additional cost of interstitial design is totally offset by savings in construction expenses.

Contractors interviewed say the system can cut construction time by as much as 20% and also save 15 to 20% on labor costs of mechanical installation. They say fewer coordination drawings are necessary, more trades can work simultaneously, and fewer change orders are processed.

The VA hospital in Loma Linda, California, for example, came in two months ahead of schedule with labor costs cut by 25%. Service ceilings went in fast with gypsum pours reaching 5,000 sq. ft. per day.

The service ceiling assembly most often specified – over 6 million sq. ft. – consists of Keydeck® Truss Tee subpurlins and Keydeck® Reinforcing Mesh manufactured by Keystone Steel & Wire. Formboard and poured gypsum or U.S.G. Span-Rock® gypsum planks complete the assembly.

Keydeck Truss Tees are welded beneath, or between main structural beams for support, while Keydeck Reinforcing Mesh adds strength and uniform structural soundness to the poured gypsum.

The open web design of Keydeck Truss Tees allows the subpurlins to be strongly embeded into the gypsum concrete resulting in a greater load carrying capacity and minimum deflection.

Keydeck Reinforcing Mesh meets ASTM tensile, bending, and coating requirements; and conforms to Federal Specifications. The resulting service ceiling assembly is fire resistant, provides increased insulation capabilities, and helps control noise.

Additional information and detailed literature about Keydeck service ceiling components along with a complimentary truss deflection calculator can be obtained by writing the Construction Products Manager at Keystone Steel & Wire Company, 7000 S. W. Adams, Peoria, Illinois 61641. A toll free telephone service is also available for inquiries: 800-447-6444 (in Illinois call 800-322-2632).

Froedtert Memorial Lutheran Hospital Milwaukee, Wisconsin

Architect: A joint venture of Stone, Marraccini & Patterson and Brust-Zimmerman

Construction manager: A joint venture of Findorff and Hutter

Service ceiling components manufacturer: Keystone Steel & Wire Company

Service ceiling fabricator: Anning-Johnson Company

Keystone Steel & Wire Company

Circle 1037 on inquiry card
We're not impressed.

Manville Fesco® Board roof insulation board has long been a favorite with specifiers and installers. For several reasons.

Thermal efficiency for one. Then there's dimensional stability. Still another is its rigid composition. Its ability to resist compression. To provide a sound, solid substrate for the new built-up roof.

And Fesco Board solves another problem important to the decision to re-roof. It is ideal for correcting slope as well as adding insulation to existing roofs. Fesco Board can be easily applied in multiple layers to build up low spots or to achieve desired R-values with no "shorts" or through joints.

Then, by using an ordinary power lawn rake, Fesco Board can be shaved or tapered to remove irregularities and to achieve positive slope to drain.

Find out more about Manville Fesco Board, the versatile problem-solver, performance-proven in almost 30 years of on-the-roof service. For details, consult Sweet's or contact Bart Roggensack, Manville Roofing Systems Division, Ken-Caryl Ranch, Denver, Colorado 80217. (303) 978-2781.

Manville

Circle 1038 on inquiry card
This fireproofing passes UL fire tests.
Is that enough?

Sprayed-Fiber Fireproofing
No, it's not enough!

Structural steel fireproofing is the first line of defense in protecting a building and its occupants should a fire occur. It can only perform this critical task if it remains in place during construction and building occupancy.

Compliance with building codes and specifications requires UL fire ratings. But, UL fire tests don't tell the whole story. They only evaluate the capability of a material to provide fire resistance under ideal laboratory conditions. They can not evaluate other important characteristics which predict long term effectiveness.

As the photo at left shows, soft, friable materials with poor adhesion are unable to resist normal job-site abuse. The result can be loss of fire protection capability.

There is now a way to insure long term fireproofing reliability—fireproofing specification performance standards. Code bodies, government officials and fireproofing manufacturers, working together, have developed test procedures which provide a basis for establishing standards for fireproofing to insure in-place performance. Use of these standards for fireproofing will reduce the risk of specifying unreliable and inadequate structural fire protection materials.

The new tests measure the ability of fireproofing to resist damage by hammers and ladders (impact, abrasion and penetration resistance); to adhere to steel (bond strength) and to resist flaking and dusting (air erosion). All these standards are critical to insure proper selection and performance of all fireproofing materials.

By incorporating these performance standards into your fireproofing specification you can be assured that owners will receive quality fire protection materials with reliability for the life of the building.

**Fireproofing Performance Standards**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Performance Standard</th>
<th>Test Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact Penetration</td>
<td>6 cm³ maximum</td>
<td>City of San Francisco</td>
</tr>
<tr>
<td>Abrasion Resistance</td>
<td>22 cm³ maximum</td>
<td>City of San Francisco</td>
</tr>
<tr>
<td>Compression</td>
<td>500 lbs/ft² minimum</td>
<td>ASTM E-761-80/Grace</td>
</tr>
<tr>
<td>Bond Strength</td>
<td>200 lbs/ft² minimum</td>
<td>ASTM E-736-80/Grace</td>
</tr>
<tr>
<td>Air Erosion</td>
<td>.025 gm/ft² maximum</td>
<td>ASTM E-859-82/GSA</td>
</tr>
</tbody>
</table>

For further information or test results, contact W. R. Grace & Co., Construction Products Division, 62 Whittemore Avenue, Cambridge, MA 02140, (617) 876-1400.
Carlisle introduces America's first mechanically attached single-ply roof that doesn't penetrate the membrane.

It's here...M.A.R.S. Design NP™ (Mechanically Attached Roofing System—Non-Penetrating). This is the ultimate single-ply roof system, combining the lightweight advantage of adhered systems with the low cost holding power of ballasted systems. But with a plus! It also offers the economical advantage of mechanically attached systems without penetrating the membrane!

Used in Europe for nearly a decade, this innovative system will save you time, money, materials and weight.

Fast, easy installation.
Carlisle’s performance-proven Sure-Seal™ membrane is held in place by simple three-part assemblies. These are a snap to install...as easy as one, two, three. No special equipment. Even in marginal weather. A small crew of Carlisle approved applicators can install an entire roof in record time.

Flexible design.
Go right over failing built-up roofs and those that can't support much weight. The system fastens to most substrates and can even be moved to another location.

Best of all, it's from Carlisle.
Trust Carlisle to bring you the best and most innovative roofing systems. We promise single-source responsibility, trained professional applicators and over 20 years experience. Best of all, we offer a watertight warranty of up to 15 years.

For more information on our snap-on roof, call toll-free, (800) 233-0551, in PA (800) 932-4626. Call today, this is one snap decision your roof...and budget...will never regret!

The roof that's requested by name

Sure-Seal, M.A.R.S. Design NP and Carlisle are trademarks of Carlisle Corporation.
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Call toll-free, 800-233-0551
In PA, 800-932-4626

Circle 1040 on inquiry card
We believe in quality.

When we introduced the concept of an exterior insulation and finish system to the United States in 1969, we had to prove the System could perform better than traditional materials.

And so our commitment to stringent testing and quality control was born.

We began with a proven formula for our Finish coat and cementitious adhesive.

We know there is no substitute for the performance level of a 100% pure acrylic co-polymer product.

Valuable properties such as flexibility, fade-resistance, alkali-stability, moisture-resistance and wet adhesion are lost when substitutes are added.

And add to this, our special impact system, Panzer® Mesh, and you have all the ingredients for a building that will live up to the high standard you set.

Demanding fire and structural testing goes beyond code minimums.

The Dryvit System is recognized by all three model code agencies: ICBO, BOCA, SBCCI.

We've subjected our System further to Pull Scale Fire Tests with 1500 and 1250 pound fire sources as well as the Factory Mutual Corner Test.

Positive and negative wind load testing has been conducted on full scale wall assemblies in accordance with ASTM E530 procedures.

Dryvit performs even under demanding conditions.

Dryvit retrofit gives office building a fashionable Art Deco facade.

5500 Yale Street, Englewood, Colorado, was a precast concrete eyesore before architects Ginsler and Associates designed this retrofit. Taking advantage of Dryvit's design flexibility and the expertise of the applicator, they were able to incorporate aesthetic relief. Bands of 1½" x 7" Dryvit Insulation Board create flowing lines, adding drama to the balconies.

Gardner Student Center serves as entrance gate to the University of Akron, Ohio.

Believe it or not, a road goes through this building. Karl R. Rohrer & Associates, architects, turned to Dryvit to accomplish the archways and soffits their design required. Dryvit's impact system, employing Panzer® Mesh, was used in high traffic areas. Also gained: a cost-effective, energy-efficient building that blends beautifully with the campus.

Over 40,000 buildings stand as proof of our performance.

Over 30 years of Dryvit experience in this country and Europe offer peace of mind to the developer and architect specifying Dryvit.

Call or write for information.

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DRYVIT SYSTEM, INC., One Energy Way
P.O. Box 1014, West Warwick, RI 02893

Plant Locations:
West Warwick, RI; Tulsa, OK; Columbus, GA; Woodlake, CA

Face-saving retrofit adds insulation to St. Paul's Housing for the Elderly.

Detroit, Michigan, winters had taken their toll of this 12-story uninsulated building.

Smith Associates, Inc., the architects, chose Dryvit Outsulation to solve their problems. In addition to adding needed insulation, the Dryvit retrofit provided an attractive weather-resistant surface. Occupants now enjoy a better level of comfort while the building's appearance upgrades the entire area.

Trust Our Proven Performance.
It's the Dryvit Difference.

Circle 1041 on inquiry card

Architectural Record December 1983 87
A Waterproofing System Doesn't Have to Look Good to Work...But Ours Does.

For the Maxwell House Hotel in Nashville, Tennessee, two coats of VIP 7300 Ter-Polymer Waterproof Coating (a low-texture grade) were roller-applied. The color chosen was one of VIP's standard colors. Custom colors are also available. Prior to the application of VIP 7300, VIP 5100, a textured buttering grade ter-polymer sealant was used to fill the larger cracks. A total surface area of 65,000 sq. ft. was involved.

VIP Ter-Polymer Coatings offer a waterproofing system that is available in a wide range of textures and colors to provide the effect, as well as the effectiveness, you want.

A combination of unique resins has given VIP Coatings exceptional flexibility to bridge hairline cracks and long-lasting reliability.

Easy to apply, non-chalking, mildew resistant and excellent color retention are just a few more of the outstanding advantages that will make that building and you look very good.

For more information contact:
VIP Enterprises, Inc.
Dept. AR-1283
9690 NW 41st Street, Suite 1/Miami, Florida 33178/(305) 592-6045
National WATS: (800) 327-7479/Florida WATS: (800) 432-4616

Flexible Solutions to Concrete Problems.

Circle 1042 on inquiry card

©1983 VIP
The new Robertson Total Performance Roofing System saves energy, stays weathertight and lasts beautifully!

Keeping roof overhead down—both initial and life cycle costs—is the whole idea behind the new TPR System.

"U" values as low as 0.050 (R = 20)
The Total Performance Roof is especially designed for maximum insulation—and minimum heat transfer. This outstanding thermal performance is based on full-scale tested values, not on "calculated" numbers, which can be inaccurate by as much as 100%.

<table>
<thead>
<tr>
<th>TPR Insulation</th>
<th>Tested &quot;U&quot; Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; glass fiber w/sub-girt</td>
<td>0.050</td>
</tr>
<tr>
<td>2&quot; rigid foam w/sub-girt</td>
<td>0.055</td>
</tr>
<tr>
<td>4&quot; glass fiber w/sub-girt</td>
<td>0.076</td>
</tr>
<tr>
<td>4&quot; glass fiber w/o sub-girt</td>
<td>0.082</td>
</tr>
</tbody>
</table>

*Winter conditions, heat flow up, 15 mph wind outside, still air inside.

Weathertightness from thermal responsiveness
A roof's temperature can vary 150°F or more, inducing enormous stress on the total roof system and ultimately causing leakage. That's why Robertson's Total Performance Roof System is secured with hidden clips that are thermally responsive to temperature-induced roof movement. The clips allow the panels to literally "float" as the roof responds to the thermal loadings, and still hold firmly against wind uplift and live load forces.

With the Robertson subgirt and clip system, roof panels snap quickly and easily into place—and stay there. In fact, all components have been tested and carry the highest wind uplift rating available from Underwriters' Laboratories—Class 90.

The beauty of total performance
In new construction, or when retrofitting on versatile sub-girts right over an old roof, the Robertson TPR System looks as good as it works. The 12" module, highlighted by clean ribs that add strong shadow lines, can enhance the appearance of any building...and its bottom line.

The Versacor® protective coating system was specifically developed to stand up under the world's most severe acid rain conditions—and it has, for over 15 years. (For less severe environments, 1 mil finish coats are also available over the Versacor base coat.)

Protection nine mils deep
Six mils of modified polyester...on top of the three mil flexibilized epoxy base coat...on both sides of rugged hot-dipped galvanized steel. Available in 17 standard colors, the Robertson Versacor® protective coating system is our single source for total performance.

Robertson can do it all, from design and engineering, to manufacture, through installation...all backed by over 75 years' experience. Get complete details from H. H. Robertson Company, Dept. AR-128 400 Holiday Drive, Pittsburgh, PA 15220. Telephone 412-928-7508.

Sheraton Hotel, Seattle, Washington Architect: John Graham Company General Contractor: Howard S. Wright Construction Company

Circle 1043 on inquiry card
Durock
the new tile backer board

before.
Water soaks through to soften walls.
Tile loosens and falls off. Unsightly!

after.
Tile stays put beautifully with
water-compatible Durock cement
backer board.

Won't deteriorate when exposed to water!
It's the no-call-back backer to specify
for your new construction and for remodeling ceramic tile
walls and floors. Durock is Durable
Rocklike portland cement reinforced with glass fiber.
Lighter, easier to install than any competitive
cement board. * Available through ceramic tile distributors.
Or write us at 101 S. Wacker Dr., Chicago, IL 60606, Dept. AR-1283

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United States Gypsum
Building America

Circle 1044 on inquiry card
Nothing tops a Hi-Tuff® roof.
Introducing the first non-penetrating mechanically-anchored system that truly meets the demands of single-ply.

FasTrac.* Firestone's new single-ply fastening system that you'll like for what it does. And, for what it doesn't do.

FasTrac doesn't require sheet penetration. Ballast. Substrate adhesives. Time-consuming batten strip hand sealing. And, FasTrac doesn't increase labor costs. In fact, it can even reduce them.

FasTrac does go down easy. Retaining tracks are screw-fastened to the roof substrate. The EPDM sheets are easily layed over the strips. Then, insert strips are rolled-in to tuck and lock the EPDM sheets to the roof.

Get on the right track. Use Firestone's new FasTrac system on your next job. It's a better way for a better roof.

*Patents Pending

The specially designed FasTracker™ tool tucks the EPDM sheets down, and locks the insert strips into the track.
In 1961, FOAMGLAS® cellular glass insulation was installed on Yale’s Beinecke Library. The roofing system consisted of a 2-ply vapor barrier, FOAMGLAS® Insulation and a 4-ply built-up roof with a double layer of marble chips. Recently, it was discovered that water had penetrated the roof at its perimeter for years. But when the roofing was torn off, it was also found that none of the water had penetrated the FOAMGLAS® insulation.

This meant that for 21 years, even after the leak began, FOAMGLAS® insulation continued to provide constant insulating value. That’s because FOAMGLAS® insulation’s closed-cell, cellular glass structure totally resists moisture in liquid or vapor form. Other insulating materials do absorb moisture which, in turn, destroys their insulating capability.

When it came to selecting insulation for the re-roof, a Tapered FOAMGLAS® Roof Insulation System was specified. Now, Beinecke Library’s roof provides constant insulating value, plus the Tapered System drains water off the roof fast. This eliminates ponding which was a direct cause of the old roofing system’s failure.

For more information contact Marketing Department FB-3, Pittsburgh Corning Corporation. In the U.S.A., 800 Presque Isle Drive, Pittsburgh, PA 15239, Tel: (412) 327-6100. In Canada, 5075 Yonge Street, Willowdale, Ontario M2N 6C6, Tel: (416) 222-8084.

Circle 1047 on inquiry card
TOP THIS.
GRACE ROOFING SYSTEMS.
VERSATILITY AND PERFORMANCE TO TOP THEM ALL.

From single-ply membranes to high-performance insulation, Grace Roofing Systems provide new dimensions in versatility and the highest standards of performance.

Whether you require a roof for a new state-of-the-art structure or a conventional retrofit, Grace offers an unsurpassed combination of design flexibility and product excellence built on five decades of specialized research and experience. Grace representatives offer unparalleled technical assistance in selecting and designing a system that's a perfect fit for your roofing needs.

Grace Roofing Systems are meeting the industry's most exacting design requirements and are delivering dependable service under a demanding battery of climates. Backed by some of the strongest warranties in the field, Grace Roofing Systems are installed by a nationwide network of Grace-approved applicators.

For full facts on how to top them all, call the Sweet's Buyline. Or, dial us directly at (617) 876-1400, ext. 3186. Grace Construction Products, 62 Whitemore Ave., Cambridge, MA 02140.

Circle 1048 on inquiry card
"18 years' service and still counting. That's the performance record of single-ply roofing of Hypalon."

—John Breitenstein, DuPont

"Single-ply roofing membranes of DuPont HYPALON synthetic rubber have been weathering everything under the sun for the past 18 years," says John Breitenstein, Programs Manager. "That's because HYPALON is a high-performance rubber with durability benefits that meet the most demanding roof requirements."

A single-ply membrane of HYPALON is installed quickly and easily. Since it is thermoplastic when put down, seams are as strong and reliable as the membrane. The membrane gradually cures in place to produce an integral, tough, strong elastomeric roofing surface.

Roofing membranes of HYPALON also offer:
- Reflective white color for energy efficiency.
- Resistance to flame propagation.
- Excellent resistance to oils, chemicals and pollutants.
- Excellent resistance to ozone and UV rays.
- Serviceability over a temperature range from −40°C (−40°F) to 93°C (200°F).
- Colorability for a range of aesthetic designs.

Specify HYPALON—made only by DuPont—for durable, low-maintenance roofing membranes. Call toll free, 800-441-7111, ext. 44, for further information. Or for free literature, write: DuPont Company, Room X-40097, Wilmington, DE 19898.

*DuPont manufactures HYPALON, not single-ply roofing membranes or systems.
Outstanding structural integrity.

On every project, whether it's high rise, small or the unusual, you need a window system you can trust.
At Wausau Metals, we believe structural integrity is so important we go beyond recommended AAMA quality standards. We design window and curtain wall systems for you that will perform beautifully, under the most extreme conditions, years and years after your project is completed.
Our own certified test lab, supervised by experts in testing and trouble shooting, maintains these strict standards.
It's another reason why more and more architects across the country are putting their trust in Wausau for high performance window and curtain wall systems.
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Madison Plaza • Chicago, Illinois
Skidmore Owings & Merrill Chicago, Illinois
Window wall and curtain wall by Wausau Metals.
What Do These Prestigious Buildings Have In Common?

FORDHAM UNIVERSITY

SEALED WITH POLYSULFIDE 1965

Lincoln Square of Fordham University
New York, NY
Architect: The Perkins & Will Partnership

CARPENTER CENTER, HARVARD UNIV.

SEALED WITH POLYSULFIDE 1963

Carpenter Center For The Visual Arts
Harvard University
Cambridge, Massachusetts
Architect: Le Corbusier

UNITED AIRLINES HEADQUARTERS

SEALED WITH POLYSULFIDE 1966

United Airlines Headquarters
Libertyville, Illinois

To find out about other prestigious buildings that have been sealed for more than 15 years with Morton Thiokol LP polysulfide base sealant, send for your copy of, "It All Started Here".

Morton Thiokol, Inc.
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SUREWALL® SBC Insulation System

When you choose the SUREWALL® SBC Insulation System, we want to be sure that everything is done right. After all, we’ve designed every element of this complete exterior insulation, weather-proofing and finish system to assure that nothing is left to chance. So we thoroughly train applicators from selected plastering contractors to install the system. And, frankly, we don’t want an applicator installing our system unless he’s certified by the SUREWALL Producers Council.

Our Certified Applicators are skilled at installing the economical SUREWALL SBC Insulation System either on new construction or on almost any kind of surface on a building that’s to be renovated and modernized.

They’re experts in the use of every part of our system: SUREWALL® Surface Bonding Cement, Expanded Polystyrene Insulation Board, and the special SUREWALL® Adhesives, Fastening Clip, Joint Reinforcement Tape and Trim Accessories.

In fact, our Certified Applicators are an important reason why we can give you a four-year warranty.

For a brochure explaining the SUREWALL SBC Insulation System, see Sweet’s 9:10:Bon or write to the SUREWALL® Producers Council, P.O. Box 241148, Charlotte, N.C. 28224. Or call 704-525-1621.

We’ll give you the inside story on outside insulation.

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OUR CERTIFIED APPLICATORS GIVE YOU THE INSIDE TRACK ON OUTSIDE INSULATION.

SUREWALL® is a registered trademark of the W. R. Grace Company, Charlotte, N.C., and Best Concrete Products Company, Atlanta, Ga.
New CertaSpray.

The spray-on fiber glass that lets you insulate up to R-20.

A fiber glass spray insulation for complete design flexibility. Sidewalls on high-rise projects. Ceilings on clear-span structures. Over beams and joists, into cracks, around corners and onto the next area.

CertaSpray® has an R-value of R-4 per inch and can be applied up to 5" thick on vertical surfaces, up to 3 1/2" overhead in one application. It covers walls and ceilings completely, without thermal breaks. It's noncombustible and U.L. listed.

CertaSpray's noise reduction characteristics are outstanding: as little as 2" carry the highest NRC rating. In addition, CertaSpray reflects up to 90% of available light and can help lower lighting requirements.

It won't absorb moisture. It won't corrode pipes. It won't bunch, shift, flake or crack. And it won't disappoint you.

For free information and specifications on new CertaSpray, write CertainTeed, Dept. AR-12, P.O. Box 860, Valley Forge, PA 19482.

Certainteed
How is Johns-Manville celebrating 125 years of designing better roofing?

Designer125.

For a century and a quarter, we’ve been making better roofing. And making roofing better.

Example: Shingles with a self-sealing adhesive strip was a Johns-Manville innovation.

Another: Shingles built with fiber glass for extra long life—and Class A fire resistance—were perfected by Johns-Manville.

And now, to celebrate 125 years of designing better roofing, we introduce Designer125.

Architects tell us that the thing about Designer125 that strikes the eye right off is the rustic look, the look of slate or wood shakes.

Designer125 affords you the opportunity to give a roof texture and warmth—at a very affordable price.

For the eye appeal of a much more expensive roof, specify Designer125.

Johns-Manville fiber glass roofing shingles are sold exclusively by Manville Building Materials Marketing Division, Box 5108, Denver, CO 80217.

For a full line catalog, see Sweet’s General Building and Light Residential files under 7.7/Mam.

For more information, see your local Manville Sales Representative. Or write to Ken Hunter, Merchandising Manager, at the address above.

Johns-Manville

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Ful-O-Mite™ IDF
the exterior insulation system from H.B. Fuller that sets new performance standards.

Ful-O-Mite IDF is the most beautiful way we know to beat the heat of summer and the chill of winter.

As reported by independent laboratories, Ful-O-Mite™ IDF* is equal to or surpasses leading competitive exterior insulation decorative finishes in all tested areas, including strength and durability.* It withstands impact and has the flexibility to accommodate building movement. The system stands up to airborne pollutants and salt spray. The Ful-O-Mite IDF exterior insulation system forms a solid barrier against weather's worst; keeping winter's freezing temperatures and summer's scorching heat outside... where they belong, maintaining an interior atmos-
phere which is both comfortable and cost efficient.

Ful-O-Mite is not only beautiful to look at, it offers greater maintenance economy, both in time and material cost. H.B. Fuller is not only the manufacturer of Ful-O-Mite IDF; we are also the manufacturer of the resin latex raw material specifically designed for our product. In our finish coat, this latex promotes a tougher, harder cure, increasing the finished product's weather resistance. This same raw material provides a longer "working time" allowing the installing contractor to achieve the texture desired.

Our primer coat of Ful-O-Mite IDF has excellent initial tack, the ability to grab and hold on... eliminating the need for baseboard support when installing the EPS foam board. And, embedding the reinforcing fiberglass mesh is made easier too! Both the primer and finish coats offer freeze/thaw stability in the pail and in their cured states.

At H.B. Fuller, developing our own resin raw materials is just part of our commitment to providing our customers quality, consistency and compatibility within the bonding system.

If you'd like to have all of the facts regarding Ful-O-Mite IDF, write to: H.B. Fuller Attn: Ful-O-Mite IDF, Department M, 315 South Hicks Road, Palatine, IL 60067 or call (800) 323-7407 or if in Illinois, call (312) 358-9500 and request a free copy of the test results.

*Insulation Decorative Finish  *Based on competitive published data
206 Wood windows
Regal Ponderosa pine windows include double-hung, casement, awning, stationary and combination models. They feature insulating glass with primary butyl rubber seals and secondary polysulfide seals. Frames come in brown or white. MW Manufacturers, Rocky Mount, VA.

207 Bay window
The sash, frame and seat board of the Sun Bay are of Ponderosa pine. The unit comes in bare wood, primed or pre-finished, with double glazing, or single or tripane insulating glass. Other options include interior pre-finishing in walnut, fruitwood, maple or white. Marvin Windows, Warroad, MN.

208 Integral blind windows
Windows with integral blinds feature steel exterior construction and interior aluminum access panels. They have machine-groove-mounted weatherstripping and carry a U value of .41. For ventilation they can be combined with vents. Hope’s Architectural Products, Inc., Jamestown, NY.

209 French door
A line of traditional French doors features aluminum-clad wood construction and double-glass insulation. Doors come with both panels swinging inward or with one panel stationary and the other, hinged at the center, operable. Pella Rolscreen Co., Pella, IA.

210 Double-hung windows
Frames and sashes of these windows are clad in .060 aluminum, and windows are claimed to have an air infiltration rate of .12. Optional Heat Mirror film gives them an R value of 3.7 and a U value of .27. Sashes tilt in and are removable. Hurd Millwork, Co., Medford, WI.

211 Security bolt lockset
The 700 Series lever-handle cylindrical lockset works in a ¾-in. throw latch position and can be extended to a 1-in. bolt position. It is made of cast bronze and stainless steel with internal mechanisms of hardened steel. It fits a 161 cut-out. Corbin Div./Emhart Hardware Group, Berlin, CT.

212 Gliding patio doors
The 5-ft. Perma-Shield patio door can be used to replace worn out gliding doors without involving major carpentry. It also can be used for new construction. It is sheathed in rigid vinyl and comes with 1-in. dual pane or triple pane insulating glass. Andersen Corp., Bayport, MN.

213 Half-round windows
Seamless molded polyurethane half-round windows feature either standard wooden grilles or 3leded insert options. They come in 2 sizes in brick mold and slimline styles to match double-hung windows as well as in casement styles. Webb Manufacturing, Inc., Conneaut, OH.

214 Electric lock
Factory prewired with crimp connectors, the 1316S fail secure lock has a ¾ by ¾ in. throw automatic deadbolt. A manual override option accepts any standard mortise cylinder and may be released from either or both sides of a door. Security Engineering, Inc., Bristol, CT.

215 Glass wall system
The Reglit Profile Glass wall system provides translucent areas without intermediate supporting members. Its glass unit has a channel profile that is available in a number of widths and installation and performance options. Forms & Surfaces, Santa Barbara, CA.

216 Door opener
The pneumatically operated Auto-Equalizer is designed to automatically open doors for handicapped users. Doors are held open for up to 30 seconds, and the timing cycle is field adjustable. LCN Closers, Princeton, IL.

217 Reflective blinds
Type E Shmakode blinds feature slats coated with a gold tone that reflects heat. Unlike low-emissivity films, Shmakode’s tilting slats allow light control. They may be installed between the double panes in this manufacturer’s windows and patio doors. Pella Rolscreen Co., Pella, IA.
219 Wood door
The Morning Sun is made of Western hemlock and features a circular leaded glass inset of clear and feathery glue chip glass. The door is 1 3/8 in. thick and measures 3 ft by 6 ft 8 in. The glass is 25 1/4 in. in diameter. A decorative molding kit is optional. E.A. Nord Co., Everett, WA.

220 Horizontal deadbolts
The Model 530 has a solid brass barstock single cylinder outside and a Hines 5-pin mechanism and thumb knob inside. The bolt has a 1-in. throw. The steel pin and ring on the cylinder face are designed to prevent drilling. New England Lock & Hardware Co., South Norwalk, CT.

221 Pressure-sensitive gaskets
Double Guard gaskets for application to painted or plain steel, aluminum and wood are UL listed for metal and wood fire door assemblies. They restrict thermal, light and sound infiltration, but do not impair door closure. Stanley Hardware, Div. of The Stanley Works, New Britain, CT.

222 Window series
The Clad Monumental window series consists of wood and aluminum commercial windows. Four types of units are available: inswinging casement, hopper, top-hinged inswing and fixed. All units are custom-sized and come with 13 standard glazing options. Pella Rolscreen Co., Pella, IA.

223 Room dividers
Carvedor room dividers feature 6-in.-wide panels that are hinged together and hang from overhead aluminum tracks. Dividers come in heights up to 12 ft, with panels available in oak, walnut, birch and mahogany veneers and plastic laminates. Panelfold, Inc., Miami, FL.

224 Garden window
A window for plants has an aluminum frame with a baked enamel finish as well as a bronze tempered glass top and a plywood floor. Other features include adjustable slatted wood shelves and side vents. Dual glazing and front vents are optional. T.M. Cobb Co., Irvine, CA.

225 Door seal
The #485 Compress-O-Matic for door perimeter applications has an elliptically shaped neoprene seal. In addition, the device features a flap that creates a positive seal where uneven surfaces are encountered. Zero International, Inc., Bronx, NY.

226 Interchangeable locks
A new cylinder core, #23-030, is interchangeable with several of this company’s cylindrical and mortise locks and deadbolts. It is removed with a control key; a spring-loaded locking pin allows a new core to be inserted by hand without a control key. Schlage Lock Co., San Francisco, CA.

227 Window system
The Secondary System installs over existing windows to create double-paneled windows with Venetian blinds between panes. Unit frames feature knobs to control the tilt of the blinds and continuous bulb neoprene weather stripping for airtight seals. Nanik, Div. of Wausau Metals Corp., Wausau, WI.

228 Magnetic lock
The FM 62 Series of electromagnetic locks features 1,200 lb of holding force. Locks install on door and frame surfaces and allow locking of doors on both sides. Their steel housing accommodates all anodized finishes. Rixson-Firemark Div., Conrac Corp., Franklin Park, IL.

229 Special shape windows
Round Top (shown) and a variety of other special shapes and sizes of windows are available in laminated Ponderosa pine. Windows feature 1/4-in. or 1-in. insulated glass or triple glazing. A starburst or similar design is available with authentic divided lites. Marvin Windows, Warroad, MN.
Lockset
The 900 Series is a security bolt cylindrical lockset that functions both as a ¼-in. throw latch and as a 1-in. throw dead bolt. It is made of cast bronze and stainless steel and comes in both straight- and return-lever designs. Russwin Div./Emhart Hardware Group, Berlin, CT.

Door system
The Superfire door system consists of a 4-ply stile edge for attaching mortised butts and a reinforcement system for attaching surface-mounted hardware. The latter consists of ½-in. plywood sandwiched between noncombustible material. Algoma Hardwoods, Inc., Algoma, WI.

Interior doors
Chateau interior doors are made of vertical grain Douglas fir or Western hemlock. They come in widths of 2 ft 6 in., 2 ft 8 in., and 3 ft. Their standard height is 6 ft 8 in. but 7-ft heights are available on special order. Simpson Timber Co./Door Div., Seattle, WA.

Electromagnetic lock
The M3000 lock, less than 1½ in. wide, permits retrofitting without jamb modifications. It has 650 lb of direct holding force and draws less than ¼ Aamp at 12 or 24 Volts. Options include time delay and door and power status reporting. Security Engineering, Inc., Bristol, CT.

Stained glass
Stained glass windows, screens, ceilings, etc. are made with a technique that creates an almost invisible bond rather than with leaded bonding, offering flexibility in design and better light penetration. Creative Glassworks Inc., Fairfield, IA.

Between-glass blinds
This between-glass blinds system features a magnetically controlled tilt mechanism. It fits most double-glazed windows with a minimum dead air space of ¼-in. Blind slats are available in horizontal or vertical styles and in 5 color combinations. Hunter Douglas, Inc., Owensboro, KY.

Replacement windows
The Norclad line of aluminum clad slide-by windows is sized to replace existing aluminum units without reframing. Designed to be energy efficient, windows are made of wood and aluminum and have aluminum clad frames and sashes. Norco Windows, Inc., Hawkins, WI.

Doorpulls
HD800 Series doorpulls are made of matte black neoprene molded over a rigid brass core. Straight and offset versions are available; both models come with 9-in. c.c. bolt spacing. Forms & Surfaces, Santa Barbara, CA.

Sidelights
Insulated galvanized steel sidelights are pre-formed and pre-painted. To strengthen door/ sidelight units, they are installed with 10 heavy-duty steel screws. They come in 12- and 14-in. widths. Benchmark Doors Div., General Products Co., Inc., Fredericksburg, VA.

Arch window
The aluminum-clad Circlehead window uses ½-in. of insulating glass. Its frame fits standard 4½-in. wall construction without requiring curved extension molds. Snap-out wood windowpane dividers are optional. Fella Rolscreen Co., Pella, IA.
Doors & Windows
Product literature

242 Rolling doors
A 28-page catalog contains details and specifications for rolling service doors, fire doors, shutters and grilles. An insulated series of rolling doors called Evermaster is included. Photos show typical installations. Motor operators are also shown and described. Atlas Door Corp., Edison, NJ.

244 Pre-anodized aluminum
A 4-page color brochure features Color-in permanent bronze pre-anodized aluminum. Several installations are shown in photos, and the process of making this product is contrasted with other types of anodizing. Allmetal, Inc., Bensenville, IL.

245 Curtain walls
A 20-page color brochure highlights the use of stainless steel as an element or as an accent in aluminum curtain walls. Several case studies of buildings around the country include photos and details of curtain wall installations. Cupples Products Div., H.H. Robertson Co., St. Louis, MO.

246 Thermal windows
A 1983 catalog covers aluminum windows with built-in blinds. Photos and line drawings illustrate each series. Section details, tables listing performance data and specifications are included. DISCO Aluminum Products Co., Inc., Div. of Circle S Industries, Inc., Selma, AL.

247 Replacement windows
Thermal windows, which may be custom fit to replace windows in old buildings, are described and illustrated in a 4-page brochure. Performance data and section details are included. DeVAC, Inc., Minneapolis, MN.

248 Windows and patio doors
A 16-page brochure features extruded aluminum cladding over wood for residential and light commercial windows and patio doors. Auxiliary frames for trapezoids, octagons and ¼ and ½ circle windows are included. Sizes are listed. Eagle Manufacturing Co., Dubuque, IA.

249 Curtain walls
Photos and details of the Ferrowall system are covered in a color brochure. The system combines a non-combustible, insulated assembly with standard or silicone glazing. Panels come in custom colors of smooth or textured porcelain enamel on steel. Ferro Enameling Co., Oakland, CA.

250 Rolling doors and grilles
Horizontal and vertical rolling doors and grilles are featured in a 24-page brochure. Details and technical backup charts and text are included for each model. Pass window units and small rolling-front storage containers are also shown and described. The J.G. Wilson Corp., Norfolk, VA.

251 Roll doors
A 6-page color foldout brochure features rolling doors for loading dock applications claimed to reduce energy losses and forklift damage by opening and closing in just 8 seconds. Photos and specifications are included. Kelley Co., Inc., Milwaukee, WI.

252 Mullions
The Seamless Mullion II with an optional concealed vent and a U value of .90 is described and illustrated in a 4-page color brochure. Photos show installations, and details show various mullion features. Kawneer Co., Niles, MI.

253 Patio door
The Solarium Door, made of Western Hemlock with a solid oak sill, is featured in a 6-page color foldout brochure. Photos show door hardware, typical installations and installation procedures. Specifications include details of door components. E.A. Nord Co., Everett, WA.
254 Glass block
Interior and exterior curved and straight installations of glass block are shown in a 16-page color brochure. Several types, including a solar reflective series, are shown and described. Physical properties and accessories are also included. Pittsburgh Corning Corp., Pittsburgh, PA.

255 Insulated doors
Thermacore industrial doors are featured in a 20-page brochure. Details and diagrams show door composition, the seal system and balancing as well as roller and corner brackets, end caps, locks and trussing. Track systems for different headrooms are diagrammed. Insoport Industries, Inc., Williamsport, PA.

256 Rolling doors
Rolling doors, fire doors, shutters and grilles are featured in a 24-page catalog. Diagrams and details illustrate door and grille construction and mounting. Power operators are also illustrated and described. Suggested specifications are included. Kinneair, Div. of Harsco Corp., Columbus, OH.

257 Sloped glazing
Guidelines for sloped glazing are described in an 8-page brochure. Among the aspects covered are design and performance considerations, glass and plastic glazing. Architectural Aluminum Manufacturers Association, Chicago, IL.

258 Wood patio doors
A cut-away drawing highlights the components of Nor-Clad aluminum patio doors in a 4-page color brochure. Elements, such as aluminum extruded frame exteriors and wood interiors are described and shown again in close-up photos. Diagrams showing available sizes and details are included. Norco Windows, Inc., Hawkins, WI.

259 Magnetic storm windows
Flex-Tite magnetic interior storm windows are illustrated and described in a 4-page color brochure. Section details show installations on flat and contoured moldings as well as window system components. U-values and specifications are listed. Plaskolite, Inc., Commercial Div., Columbus, OH.

260 Glass entrances
Aradex swinging and sliding doors, storefronts, window walls and curtain walls are illustrated and described in a 28-page catalog. Photos of installations and section details are included with specifications. H.H. Robertson Co., Western Architectural Systems Div., City of Industry, CA.

261 Concealed closers
The 600 Series of exterior and interior overhead concealed closers is covered in a new brochure. As described, they are designed for medium-traffic doors weighing up to 300 lb and fit 1 1/4" by 4-in. aluminum frames. The brochure lists optional accessories. Rixson-Firemark Div., Conrac Corp., Franklin Park, IL.

262 Doors
A line of hardwood doors and sidelights is featured in a 16-page color brochure. Photos show several installations. A selection guide illustrates a wide variety of available designs both with and without windows. Details showing basic door sections and specifications are included. Sun-Dor-Co, Wichita, KS.

263 Carved wood doors
Carved entry doors and bifolds made of Douglas fir or western hemlock are featured in a 4-page color brochure. Also covered is the Centurion series of 20-min fire-rated wood doors. Standard sizes and grades are listed and available panel designs are shown. Simpson Timber Co./Door Div., Seattle, WA.

264 Sectional doors
Upward-acting sectional doors and operators for commercial and industrial applications are featured in a 20-page catalog. Insulated steel and combination doors are included, as well as special designs with removable posts for clear span applications. Windsor Door, Div. of The Ceco Corp., Little Rock, AR.

265 Glass curtain wall
A packet of literature features GlasWal, a vertical low-rise glass curtain wall, which requires no exposed metal framing. Design techniques are described. An elevation and section details of a base, joint, head and typical patch as well as specifications are included. W&W Glass Products, Ltd., Spring Valley, NY.
266 Curtain walls
Exterior steel panels in 16 varieties are part of a curtain wall system, based on a steel stud framework, which is featured in an 8-page color brochure. Photos show several installations. Technical data and applications are described. Inryco, Inc., Milwaukee, WI.

267 Glass
Float, reflective, insulating, safety and acoustical glass are featured in a 24-page color brochure. Photos showing installations and tables of performance data and sizes are included. Glazing details and sloped glazing applications are described. Specifications are included. Guardian Industries Corp., Carleton, MI.

268 Casement window systems
Thermal casement windows with options of built-in blinds, locks and limited opening for ventilation are featured in a 6-page color brochure. Photos, section details and charts of thermal and acoustical performance are included. Kawneer Co., Niles, MI.

269 Passive solar design
A 16-page brochure tells how to use windows and patio doors in passive solar design. Diagrams and charts illustrate sections on choosing materials and collecting, controlling and storing solar energy. National Woodwork Manufacturers Association, Park Ridge, IL.

270 Push-button locks
A product data sheet features push-button locks for wood and metal applications. Photos show typical installations and details with dimensions accompany installation data. Simplex Security Systems, Inc., Collinsville, CT.

271 Entrance hardware
Brightly colored mail slots, doorbell buttons, numerals, door pulls and levers, all made of nylon, are featured in a 6-page color foldout brochure. Products are shown in photos and in details with dimensions. Hewi, Inc., Allendale, NJ.

272 Steel doors
This manufacturer's line of commercial steel doors, including fire doors, is featured in a 32-page color catalog. Sections on doors, frames, hardware and an applications chart are included. All doors are available in 13 baked enamel colors. The Ceco Corp., Oak Brook, IL.

273 Tempered glass
The manufacturing process, uses—including sloped glazing and skylights—and installation of tempered glass are described in an 8-page color brochure. Photos show residential and commercial applications. Reference materials and specifications are listed. Glass Tempering Association, Topeka, KS.

274 Flat glass
Installations of Solakleen passive solar glass and Bronze Glass for solar control are shown in an 8-page color brochure. Tables list technical data and charts show performance comparisons to other glazing systems. Applications are described. General Glass International Corp., New Rochelle, NY.

275 Laminated glass
A 1984 brochure covers this manufacturer's laminated and insulated glass products. The brochure includes solar energy performance data and information on beveling and mitering. Globe Amerada Glass Co., Elk Grove Village, IL.

276 Sliding glass doors
Windbreaker doors for high-rise commercial buildings, designed to withstand hurricane-force winds, are featured in a 6-page color foldout brochure. Photos show typical installations. Specifications and section details are included. Howmet Aluminum Corp., Architectural Products Div., Terrell, TX.

277 Butt glazing system
The Polarpaine I/S system, designed for structures using insulating glass units, is described in a new brochure. The system can be installed around outside or inside corners of any angle and needs no interior vertical supports. Hordis Brothers, Inc., Pennsauken, NJ.
Glass-terpiece

The beautiful new Collin Creek mall in Dallas' suburban Plano area is another evidence of Naturalite's expertise in glass skylights. The 28,000 square foot system of Lean-To and Structural Pyramid skylights was designed and installed by Naturalite in less than four months and utilizes energy-conserving mirrored glass. The fast-track installation was delivered on budget and on time. The mall was opened in mid-1981. Federated Realty, Cincinnati, is the owner-builder-developer. General contractor, Walker Const. Company, Fort Worth. Tx. Architects, R.T.K.L. Associates, Inc., Baltimore.

Whatever your design calls for, Naturalite can execute it beautifully in acrylic, glass or polycarbonates. And, we are equipped to install larger custom applications almost anywhere. See Sweets insert 7.81Na or contact the factory. Naturalite, America's largest skylight company. Your single source for skylights.

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For information call: Jim Wozniak, VP. Arch. Design (Toll Free) 1-800-527-4018

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To provide a safe and comfortable environment, modern buildings hide their critical building equipment and facilities in the ceiling. Wiring, heating and cooling ducts, sprinklers, water pipes and gas lines are only some of the building services that require periodic inspection and sufficient access for maintenance where necessary. Hi-Hatch is an easy and efficient access for behind the ceiling inspections. Keeps the ceiling free from damage and soiling.

Hi-Hatch's many features:
- Good for all type of ceilings and match any ceiling materials.
- Easy installation in new and old buildings.
- No damage and soiling to the ceiling from repeated inspections.
- Easy and smooth opening and closing of hatch.
- Aluminum alloy extrusion with white and dark brown coating.

Hi-Hatch is the solution to the inspection problems in servicing behind the ceiling.

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NBM Inc.

Circle 1057 on inquiry card
At Sargent, attention to design comes naturally.

Beauty joins form and function in nature to create perfection. So it is with Sargent, where designers work closely with craftsmen to please the eye and provide the protection, performance and durability you demand.

Proof: Sargent Mortise Locks enhance both the design and security of any door. Small wonder they've been the first choice of generations of architects (and specifiers) for aesthetics and peace-of-mind.

Look to Sargent, where attention to design is second nature.

SARGENT
Division of Kidde Inc.
KIDDE
Sargent, New Haven, Connecticut 06511
Sargent (Canada)

Circle 1058 on inquiry card
How Laminated Glass handles noisy neighbors at Crystal City.

To keep noisy neighbors like cars, trains—and 150 jet takeoffs from nearby Washington D.C. National Airport—from disturbing Crystal City tenants, laminated glass with a Saflex® polyvinyl butyral interlayer by Monsanto was the ideal, cost-efficient solution.

The Saflex interlayer is only 0.030-inch thick—but it is the key sound-reducing component, thanks to its acoustical damping characteristics. In fact, laminated glass alone stops noise more effectively than monolithic or air-spaced glass. And using laminated glass in an insulated, air-spaced configuration further improves acoustical and thermal performance.

Tests identified peak dBA levels of 76-79 at Crystal City. Design criteria called for an STC performance of 37-40. The final configuration for 55,000 sq. ft. of windows is detailed in the illustration:

And laminated glass was more cost-efficient than other sound control glass configurations. According to J. Scott Ogden, vice president of Charles E. Smith Building Corporation, "We found that laminated glass was the most cost-effective way to solve the sound problem. We got the best design at an economical cost and solved the problem without overkill!"

So, while the jets and trains haul people all over the world, Crystal City tenants can enjoy a peaceful, quiet world of their own.

If you need to quiet noisy neighbors too, write us for a list of suppliers. Monsanto Polymer Products Company, Dept. 804, 800 N. Lindbergh Blvd., St. Louis, Missouri 63167.

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BY WHICH OTHERS
ARE MEASURED.

Reliable Benchmark
Secura-Fit™
Remodeling
Door and Frame

The Golden Gate—since 1937 the ultimate in engineering reliability. The bridge, with its imposing steel towers, remains incomparable in the magnificence of its setting.

Benchmark has engineered this same reliability into the Secura-Fit™ door and frame system. The remodeling unit has fast become the distinctive new entryway for thousands of homes. Secura-Fit is pre-hung in its steel door frame and is ready to slip into the entrance, where it beautifully engages itself in enhancing the surroundings.

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In the success of a new commercial building, the glass can carry as much weight as the foundation.

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The right glass company can give you the edge on every count, too. And PPG does. Starting with your initial contact with our architectural representatives.

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Experience in beginning-to-end service that enhances the value of our glass significantly. From field experience to experience in the details of technical service, quality assurance, and new product development that's made PPG the world's leading glass supplier.

We can help build your success, too. For details on the right glass, see Sweet's 8.26a/Pp. For the right support, contact your PPG architectural representative.

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the last detail.
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Hurd encases the exterior of the frame and sash with the heaviest, most weather-resistant cladding on the market. Where some use light roll-form, vinyl, or even paint—Hurd takes no shortcuts. We use extrusions—the very best.

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The remarkable, 2 mil thick sheet of colorless, Heat Mirror™ film we suspend and seal between two panes of insulating glass boosts the R-Value to more than double the 2.0 average achieved by most windows.

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Don't let drafty doors waste energy dollars

The Inryco® Telescoping Door reduces air leakage for long range savings!

Air infiltration through vehicle door perimeters wastes energy—can add hundreds of dollars per door per year to a building's operating costs.

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For full details, see our Catalog 36-1 in Sweet's, section 8.8/In. or write for a copy: Special Products Group—Milcor Division; INRYCO, Inc.; Dept.M-4033; P.O. Box 393; Milwaukee, WI 53201.

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Thank goodness this ad only runs once a year.

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But our lawyer advises us that once a year, in your best interest as well as ours, we run an ad about the Andersen® and Windowalls® trademarks.

You see, they've been our signs of quality for many years and some companies may try to trade on them.

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And from your standpoint that can be very misleading.

Our trademarks shouldn't be used for anything other than identifying our products. Because only Andersen makes Windowalls® brand windows, roof windows and gliding patio doors.

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Provide positive protection against fire and smoke with LCN Sentronic®

Containing fire and smoke within a limited area is one of the most effective ways of minimizing danger to life and property. The capability to do this is absolutely essential in hospitals, nursing homes, schools and other public buildings.

The LCN line of Sentronic Closer/Holders for fire and smoke barrier doors provides a key part of this containment capability. Sentronics are designed to control doors and to close them automatically when and if fire strikes.

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LCN Closers, Princeton, IL 61356.
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Construction Manager: Schul & Associates, Chicago, Illinois

Because the Sears Roebuck Company insists that only the best available construction products be specified for their own building — they chose Raynor S-24 Steel Doors for their new Chicago Distribution Center.

Why? Because the construction team responsible for the building reviewed and tested all the alternatives . . . and decided on Raynor. The next time you're looking for a top quality door, large or small, look to Raynor.

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Once you start using VELUX roof windows, it’s difficult to stop.

With over 40 years experience specializing in roof windows and working closely with architects around the world, we’ve learned a thing or two. In terms of design, function, ease of installation, weather tightness and the availability of a complete program of options, including special glazings, you could not ask for more. Economically priced from about $200 to $500, they conform to all major building codes and may be used in passive solar applications.

VELUX. The world leader in roof windows and skylights!

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There's a word for a folding fire door with a 1½ hour UL fire rating! ... Revolutionary!

WON-DOOR FIRE GUARD
Think of the problem-solving implications!

The beauty, simplicity, and versatility of a horizontal folding fire door that folds neatly into the wall... combined with the incredible fire and smoke stopping abilities of a fire barrier with these credentials:

- UL LISTED (both 1 and 1½ hour fire ratings)
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- ICBO RECOGNIZED (see research report #3890)
- CALIFORNIA STATE FIRE MARSHAL LISTED & APPROVED
- RECOGNIZED BY MANY STATE AND LOCAL GOVERNMENTS
- SPECIAL TAX INCENTIVES SUCH AS CAL. STATE SENATE BILL #460 WHICH PROVIDES SIGNIFICANT TAX SAVINGS FOR THEIR INSTALLATION
- SPECIAL RAPID DEPRECIATION ALLOWANCES
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The Won-Door Fire Guard Doors are the only folding fire barriers to meet the new code requirements for elevator lobby separation.

With the optional Fire Guard System, all doors on all floors of a multistory building may be programmed to close automatically 24-hours per day on a 12-volt fail-safe back-up DC power supply activated by any smoke alarm in the building. The doors quickly isolate the fire and separate all elevator lobby areas (as required by code) from the rest of the building.

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1) Requires no floor track! Yet blocks smoke and fumes!
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4) Optional "Crash bar" handle for the handicapped requires just a light bump to open, permits passage, then recores automatically.
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When Heery and Heery Architects in Atlanta, Georgia wanted assistance in designing and budgeting an all glass curtainwall for the corporate headquarters of the Georgia Power Company, they called Bruce Engineering Company. Because of high public exposure, the curtainwall had to be both thermally efficient and economical. Because of the aesthetic requirements, the curtainwall had to utilize four side structural silicone factory glazing, thus providing "flush" exterior appearance. Bruce Engineering helped achieve all of these criteria from concept to finished product.
In a land where people spend their lives in one house, they don't skimp on the windows.

Which is why, in Europe vinyl windows have been preferred for years. There, people value how vinyl's weatherability outshines wood. How it never rots. Or warps. Or needs painting.

They also value how it saves energy. And when fuel costs are nearly two times those in America, energy savings are something to value.

Now this technology is available in America.

But to make sure you are getting windows of the highest quality, make sure you're getting vinyl of the highest quality. Like Conoco's RP-200.

Just ask for our pamphlet at your window supplier or write Conoco.

You'll find out why, in the land of tradition, traditional window materials are ancient history.
The good, the bad, and the ugly.
The safe, the secure, and the beautiful.

Kawneer Panic Guard® with Paneline®

Life Safety Codes. Building Security. Aesthetic Appeal. By themselves, there are answers for each of these entrance questions. But put these requirements together and the problems are multiplied. Effective Life Safety compliance may mean diminished security. And until now, aesthetic appeal has always been lost in the shuffle of performance compromises.

Kawneer Entrances with Panic Guard and Paneline are the answer no matter what the question is. The integrally-designed push panel responds quickly and easily to pressure for fast emergency exit. This same design also prevents chaining and blocking of the entrance, something that happens all too often in the interest of security of conventional panic exit device doors.

And speaking of security, Kawneer Panic Guard ingeniously defeats the intrusion of wires or coat hangers. The patented astragall bar design blocks insertion of devices to release the exit mechanism while continuous stops at the jamb and threshold prevent foreign object entry at these points. The recessed lock cylinder, which is also protected by the pull handles, prevents lock removal by tongs, pipe wrenches, or other burglary tools. And, Kawneer Sealair® weathering in the frame and an exclusive adjustable weathering between the door leafs help make the entrance secure against the elements, too.

The aesthetic appeal of Paneline virtually speaks for itself. The contemporary styling complements any entrance and optional matching panels can be specified for vestibule doors along with fixed rails for sidelights and centerlites.

Kawneer Entrances with Panic Guard and Paneline. They are proof that you can have the good without having to accept the bad and the ugly, too.

For additional information, write: The Kawneer Company, Dept. C, 1105 North Front Street, Niles, MI 49120.

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Why have this...

Allmetal is the leading manufacturer of air spacer and muntin bar for insulating glass and decorative design applications.

when you can have Color-In*

We believe your interest in form and function create a delicate balance which we strive to maintain through our engineered solutions to specific problems...

Test results reveal no appreciable heat build-up, no fading and resistance to ultraviolet light in assembled units utilizing Color-In bronze spacer. No effects on spacer, sealant or glass temperature levels were found. Test results available, contact Allmetal.

Flexible corner keys and air spacer remove the 90° restriction, meaning the practical uses of IG units are considerably increased. Whether in window, wall, skylight, dome or other application, Allmetal components yield performance.

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**Finishes**

278 Vinyl flooring

*Medintech* is 6-ft-wide vinyl flooring, which may be heat-welded at the seams and flashed to prevent the accumulation of dirt and moisture. Flooring comes in 9 colorways in a jaspé design. Armstrong World Industries, Inc., Lancaster, PA.

279 Parquet flooring

*Bros* solid oak parquet flooring, light brown in tone, is designed for commercial and residential use. It comes in 12-in. squares and is backed with either wood or foam. The foam backing serves both to control noise and to insulate. Hartco, Inc., Oneida, TN.

280 Raised rubber tiles

Rubber tiles with a raised square design are claimed to be slip resistant, reduce noise and be easy to maintain. Tiles, cove bases, stair treads and accessories are all available in 10 colors. Roppe Rubber Corp., Fostoria, OH.

281 Carpet

*Burber-knit* features a knitted loop pile construction with a blend of 7 natural wool fibers. It is available in 6 different colors. Couristan, Inc., New York, NY.

282 Vinyl floor tiles

*Genera Marble* resilient composition floor tiles feature chips of translucent vinyl containing fine particles of marble. Tiles are suitable for heavy traffic applications. They measure 12 in. square and come in 10 colorways. Azrock Floor Products, San Antonio, TX.

283 Carpet

*Perrault* is a commercial *Kara-loc* woven carpet, which features alternating rows of cut and looped *Atron* nylon yarns. It is part of the "Walker Group Designs" of coordinated architectural furnishings. Karastan Rug Mills, Div. of Fieldcrest Mills, Inc., New York, NY.

284 Woven carpet

*Cubes* is 1 of 4 woven designs in this manufacturer's *Corporate Concepts* collection, a grouping of *Atron XL* carpets styled to complement each other. This design is available in 10 colorways. Bigelow-Sanford, Inc., Greenville, SC.

285 Carpets

*Soft Rock* is the name of a series of wool carpets designed to relate to hard floor and wall surfacing materials, such as marble, terrazzo and stone. Ten standard designs, as well as custom designs, are available. Edward Fields, Inc., New York, NY.

286 Stair treads

The *Mazzi-Tread* features a reinforced nose and front cleats co-extruded from *Vythene*, a PVC/polyurethane alloy. Treads come in a 2-tone design for increased visibility and are available in 6 color combinations. Mercer Plastics Co., Inc., Newark, NJ.

287 Tambours

The *FlexTech Series* of tambours can be used on walls and ceilings, as decorative moldings and as furniture surfacings. The series comes in several materials, including solid red oak, red oak veneer, aluminum, acrylic, brass and vinyl. Winona Industries, Inc., Winona, MN.

288 Bathrooms

The *Total Look* is the name for a series of coordinated tiles, furniture, fabric and accessories designed by Athos Pratesi. Ceramic 8- by 8-in. tiles and fabrics come in 4 patterns. All furniture is made of solid wood. Pienme of the Americas Ltd., New York, NY.

289 Hand-painted tiles

Italian ceramic tiles are hand-painted and grouped to form murals. Several designs are available, including bouquets and forest scenes. Tiles come in 2 sizes: 5 by 10 in. or 8 in. square. Gabbianelli, dist. by Hastings Tile, New York, NY.
290 Interior finishes

Intones are textured acrylic finishes containing aggregates and integral color; custom colors are available. Finishes can be applied to drywall or cement board and can be used for new construction or renovation. They are claimed to be chip resistant. Dryvit System, Inc., West Warwick, RI.

291 Rubber flooring

Noragaspart rubber flooring tiles are 29.37 in. square. They feature a raised rounded corner square pattern and come in 5 standard colors; other colors are available for orders over 500 square meters. Tiles come with either smooth or studded backings. Nora Flooring, Madison, IN.

292 Acrylic/oak flooring

Camdeon is a light-colored oak flooring that is claimed to be more durable than regular oak flooring due to its being saturated with both acrylate and stain. It comes in 12-in. squares with either a wood or a foam backing. Hartco, Inc., Oneida, TN.

293 Woven carpet

Quartet is a woven design made from Atron XL yarns. It is 1 of 3 designs in this manufacturer's Weavepoint II grouping and it comes in 9 standard colorways, as well as in custom colors. Bigelow-Sanford, Inc., Greenville, SC.

294 Open cell ceiling

SpaceCube is an aluminum louvered ceiling that hangs in a standard 2- by 4-ft lay-in grid but provides a visual plane that conceals the normal plenum cutter. It may be used wall-to-wall or to highlight specific areas within a space. Integrated Ceilings, Inc., Los Angeles, CA.

295 Rubber studded floors

Rubber tiles are designed for use in any commercial, industrial or residential application. They may be self-coved without heating or special treatment. They measure 36-in.-square and come in 11 colors; custom colors are available. Endura, Div. of The Bittrite Corp., Chelsea, MA.

296 Hardwood flooring

The Pioneer Plank flooring pattern is created with a combination of 3 plank widths in random lengths. Planks are prefinished ¾-in. oak available in 2 tones. Walnut plugs are optional. Robbins, Inc., Cincinnati, OH.

297 Acoestical ceilings

Glass Look is a 2- by 2-ft lay-in acoestical ceiling panel with a clear mirror surface. Three colors are available: silver, bronze and gold. Typical applications include lobbies, executive suites and conference rooms. Armstrong World Industries, Inc., Lancaster, PA.

298 Wall and floor tiles

Prestige glazed wall tiles in 6 colors and Regency single-fired floor tiles in 6 colors are coordinated to form unified designs. Wall tiles come in 4½-in. and 6-in. squares and floor tiles come in 8-in.-square and 4- by 8-in. sizes. United States Ceramic Tile Co., East Sparta, OH.

299 Tile color system

VIVA is a vitreous ceramic tile color system based on 56 natural shades; 40 in glazed and 16 in. unglazed tiles. Tiles come in squares, rectangles and triangles, as well as in strips, all with grooved surfaces. Amsterdam Corp., New York, NY.

300 Carpet

Bedouin Grid is woven of a yarn that is a blend of 55 per cent wool and 45 per cent acrylic. The design is available in a 12-ft width and comes in 4 colorways. Couristan, Inc., New York, NY.

301 Display wall panels

Displayall is a slotted wall panel system that features T-shaped grooves in industrial quality fiberboard. Panel finishes include wood veneers and laminates. Trim strips designed to match or accent panels are also available. Masonite Corp., Commercial Div., Dover, OH.
302 Ceiling grid system
The Thinline grid system comes in a ¾-in.-wide white profile with a ¼ in. recess. The system features a standard grid assembly design and accepts standard NEMA “G” type light fixtures and air delivery units. Donn Corp., Westlake, OH.

303 Concrete surfacer
The PERMA-LOCK concrete surfacer is said to require only a few hours to cure and needs no surface preparation, acid etching, scarifying or blast cleaning. In addition, it can be applied to damp surfaces. High Performance Coatings Div., Porter Paint Co., Louisville, KY.

304 Acoustical panels
Silent Accents are acoustical panels designed for mounting on metal file cabinets, columns and any other noise-reflecting surface. They measure 2 by 4 ft or 2 by 6 ft, feature adhesive strips for mounting and come in nine fabric colors. Conwed Corp., St. Paul, MN.

305 Insulating shade
The thermal SuperShade consists of 3 layers of fabric. It comes with a head-case, bead chain drive and cleat. The case is 3½ in. by 4½ in. and tracks are 1½ in. by 1½ in. Shades come in 5 earth-tone colors. Thermal Technology Corp. of Aspen, Inc., Broomfield, CO.

306 Glazed tiles
Dimensions tiles come in 6 pale pastel shades and are designed for wall and counter installations. They measure 4½ in. square and are ⅛ in. thick. Color coordinated grout and 4 matching trim shapes are available. American Olean Tile Co., Lansdale, PA.

307 Floor covering
Heavy-duty 12-in.-square carpet tiles feature wide-rib surfaces of 100 percent continuous filament nylon fibers fused to cord-reinforced rubber. Tiles come in ¼”- or ⅛”-in. thicknesses. Three earth-tone colorways are available. The R.C. Musson Rubber Co., Akron, OH.

308 Broadloom
Federal is a broadloom carpet with a 100 percent wool face, 8 rows per in. and 216 pitch. It is 12 ft wide and 48 oz face weight per square yd. A velvet construction is woven through the carpet back for durability. The carpet is available in 6 colors. Eurotex, Philadelphia, PA.

309 Carpet
The Pastel Berber Collection is available in 8 colorways in 6 different qualities, including a patterned cut pile. It comes in either all-wool or wool blends in widths up to 12 ft and is suitable for both residential and contract application. Ernest Treganowan, Inc., New York, NY.

310 Tiles
Cayonstone tiles feature slip-resistant surfaces and are made for heavy-duty areas, such as food services and swimming pools. They come in modular systems to form patterns and are available in 7 colors and 4- by 8-in. and 8-in.-square sizes. Marazzi USA, Inc., Sunnyvale, TX.

311 Carpets
Domino is 1 of 3 woven designs in this manufacturer's Weavepoint II grouping. It is made of Atron XL yarns and comes in 9 standard colors, as well as in custom colors. The carpet may be ordered in both large and small quantities. Bigelow-Sanford, Inc., Greenville, SC.

312 Ceiling system
The standard Trimlok System features a 2-ft-by-2-ft module, incorporating integral air distribution and a number of lay-in acoustical panel options. To ease installation, the system includes only main runners and cross tees. Armstrong World Industries, Inc., Lancaster, PA.

313 Carpets
The MICRO series consists of 4 contract carpets that are all woven through the back using Zaftron 500 2X nylon yarns from Badische Corp. Carpet designs feature cut and uncut square and check patterns and velvet textures. A wide variety of colors is available. Gulistan Carpets by J.P. Stevens, Aberdeen, NC.
314 Pavers
Ultra Pavers for commercial and residential use are made of heavy-duty rated ceramic tile with a matte glaze and are claimed to be stain and acid resistant. They come in 4 sizes and are 1/2 in. thick. They are available in 6 colors. American Olean Tile Co., Lansdale, PA.

315 Tiles
The Atrium Series of porcelain unglazed ceramic tiles includes both smooth and slip-resistant tread surfaces. Tiles measure 6 by 6 in. and come in 6 colors. They may be used on both floors and walls. Impo Glastile, Inc., Markham, IL.

316 Tiles
Creme de la Creme is the name of a line of tiles that is suitable for countertops, walls and light-duty floors. Tiles come in 6-in.-square and 6- by 3-in. sizes and have a semi-matte glaze. A variety of trim pieces is available. Huntington/Pacific Ceramics, Inc., Corona, CA.

317 Vinyl tile
Hi-Tech vinyl tile comes in 4 patterns and 4 colors in slab sizes of 2 by 3 ft and 2 by 4 ft. Designed for commercial applications, it is installed with a water-soluble adhesive and is claimed to conform to subfloor irregularities without cracking. GMT/Contract Vinyl Tile, Bronx, NY.

318 Flooring
Longquad resilient sheet flooring comes in 6 colors and can be coved and welded for seamless installation. It is available in 6- by 60-ft rolls. Vinyl wall coverings that match 3 of the flooring colors are also available. Lone Seal, Inc., Torrance, CA.

319 Downward access ceiling
System G is a concealed suspension system for an acoustical ceiling, which requires little clearance. Panels hinge down for easy access. Grid sections can be removed individually. Panels and grids come in a variety of shapes, sizes, and finishes. Decoustics, Toronto, Canada.

320 Brick flooring
PermaBrick is a 1/4-in.-thick acrylic-permeated brick, which is claimed to be 60 per cent stronger than required by ANSI standards. It is said to be water and stain resistant and is designed for both indoor and outdoor application. PermaGrain Products, Inc., Media, PA.

321 Wall panels
Durasan vinyl-surfaced wall panels come in 37 colors and patterns. Panel cores are gypsum or fire shield and are 1/2 to 3/4 in. thick. The panels measure 4 ft wide and from 8 to 12 ft long and feature wrapped edges. Gold Bond Building Products, Charlotte, NC.

322 Wallcoverings
Vicrile is a collection of Class A fire-rated "type 1" wallcoverings for light commercial use. It includes 31 patterns in 500 colorways and 3 weight categories: 10½, 13 and 19 oz/yd. Victex, Div. of L.E. Carpenter & Co., Wharton, NJ.

323 Vinyl flooring
Seascapes is one of the manufacturer's Flora-Ever commercial vinyl floors. It is available in 6 colorways. To reduce the number of floor seams and cut installation costs, it is available in both 9- and 12-ft widths. Congoleum Corp., Resilient Floor Div., Kearny, NJ.

324 Wood ceiling panel
Woodcote 2-ft-by-2-ft tegular ceiling panels are made of walnut or light oak veneers applied over mineral fiber substrates. Panels install in conventional metallic suspension grids. Armstrong World Industries, Inc., Lancaster, PA.

325 Wallcoverings
Mexican Stain is a natural fiber wall covering collection that carries a Class A flame spread rating and NFRC 45 to 65. The collection features a wide variety of textures, colors and weights. Merida Meridian, Inc., Syracuse, NY.
326 Ceramic tiles
Glazed and unglazed vitreous tiles and glazed nonvitreous tiles are shown in pictures of installations in a 28-page color brochure. Available tile shapes and colors are shown in close-up photos. Applications for each series are listed. Villeroy & Boch (U.S.A.), Inc., Pine Brook, NJ.

327 High-solids enamel
Permaclad 2500, a baking enamel for metals, designed for application by any spray system, is featured in an 8-page color brochure. A discussion of its VOC compliance and a chart of test comparisons are included. Sherwin-Williams, Chemical Coatings Div., Chicago, IL.

328 Aluminum coatings
Compositions and applications of each of 4 coatings for aluminum panels and extrusions—Polyeron III, Duracron, Duranar and Flexanar—are described in a 4-page color guide. The 38 colors in which they are available are shown in samples. PPG Industries, Coatings and Resins Div., Pittsburgh, PA.

329 Wood flooring
A product sampler of GenusWood II hardwood flooring includes 12 species. In addition, a selection of pre-assembled panels is shown in 3 patterns. Flooring is bonded in vinyl and is designed for either residential or contract application. PermaGrain Products, Inc., Media, PA.

330 Tiles
Several series of vitreous and nonvitreous floor and wall tiles are featured in a 16-page color brochure. Tiles are shown in installation shots and close-ups. Tile dimensions and trim and angle shapes are shown in diagrams. A table lists series characteristics. Monarch Tile Manufacturing, Inc., San Angelo, TX.

331 Wallcoverings
A catalog features the TexturWorks Collection of sisal, coco and wool wallcoverings, which are manufactured in Belgium and Mexico. The collection carries Class A flame ratings throughout and NBCS from .45 to .65. Merida Meridian, Inc., Syracuse, NY.

332 Wilton carpets
Several different designs, as well as installations, of Wilton carpets are illustrated in an 8-page color brochure. Carpet yarn and construction and custom designs, such as corporate logos, are described. Lees Carpets, Valley Forge, PA.

333 Concrete sealant
Colorseal-Concrete, a one-coat stain and seal system for stucco, concrete block and poured and precast concrete wall surfaces, is featured in a 4-page color brochure. Available colors and photos of installations before and after are included. Technical data is listed. Hydrozo Coatings Co., Lincoln, NE.

334 Nylon carpet
Information on performance, installation and maintenance of carpets made with Antron nylon is included in a 16-page specification guide. Results of tests comparing this product to other nylon are illustrated and described. Photos show several Antron carpet installations. DuPont Co., Wilmington, DE.

335 Nylon carpet yarn
Zebran 560 ZK yarn with solution-dyed colors and antimicrobial protection is featured in an 8-page color brochure. Its pentagonal 6-hole fiber structure, claimed to refract light for a softer look and to facilitate cleaning, is shown and described. Badische Corp., Williamsburg, VA.

336 Hardwood floors
Oak plank and parquet floors are described and illustrated in a 4-page color brochure. A section detail illustrates the flooring's blind nailing pocket, and installation is described. Tables list available plank and tile sizes and finishes. Anderson Hardwood Floors, Clinton, SC.

337 Nylon
The Allied Fiber Report on the evolution of nylon includes an explanation of the difference between nylon 6 and nylon 6.6. Also covered are antimicrobial systems, heavier denier fiber and fiber for computer room carpets. Allied Fibers & Plastics Co., New York, NY.
338 Vinyl flooring
Conductile static-conductive vinyl flooring is featured in an 8-page color brochure. Flooring properties and applications, such as computer rooms, are described. Information on installation and maintenance and specifications is also included. VPI, Sheboygan, WI.

339 Suspended ceiling
A page of literature features Specular mirror ceiling tiles, which may be hung from either concealed or exposed suspension systems. Five available finishes are listed. A photograph and section drawing of typical installations are included. Simplex Ceiling Corp., Hoboken, NJ.

340 Rubber flooring
Specifications for rubber sheet and tile flooring and stair treads are listed in a 12-page color brochure. Rubber studded tiles and treads are also featured. Photos showing installations and diagrams with dimensions are included. Maintenance procedures are described. R.C.A. Rubber Co., an Ohio Corp., Akron, OH.

341 Tiles
An 18-page color catalog covers both Kerastone monocottura tiles and this manufacturer's lines of double-fired tiles. Photos show installations, and close-ups show individual tiles. Symbols indicate tile application and acid and weather resistance. Dimensions are listed. Piemme of the Americas Ltd., New York, NY.

342 Photo murals
A 14-page color brochure illustrates 12 different photo murals available from this manufacturer. All murals are of nature scenes; 4 of the scenes can be repeated indefinitely to cover any wall length. The murals are washable and stain resistant. Naturescapes, Milwaukee, WI.

343 Quarry pavers
A 4-page color brochure describes the use of thermal mass in passive solar design. A section drawing shows quarry pavers and the sequence and make-up of underlying layers in a heat sink. Photos show paver installations and the 5 colors in which they are available. Mid-State Tile Co., Lexington, NC.

344 Wood ceiling
A product data sheet features the Marlite Brand linear wood ceiling system. Types of installation and available wood species are described. Photos of installations are included. Masonite Corp., Commercial Div., Dover, OH.

345 Vinyl tiles
A 1988 color catalog illustrates commercial installations of several series of solid vinyl tiles. Available tile colorways and patterns as well as the available colors in vinyl wall bases are shown in close-up photos. Kentile Floors, Inc., Brooklyn, NY.

346 Acoustical panels
Acoustical panel systems for ceilings, walls and baffles are featured in a 16-page color brochure. Variations in panel types, configurations, finishes and mounting systems are illustrated in several photos of installations. Decoacoustics, Redvale, Ontario.

347 Carpets
Carpet Selection for Health Care Facilities is an 18-page color brochure that includes information on Zeftron 500 ZX solution dyed nylon yarns. Photos show installations, and tables list suggested traffic classifications and methods of removing 50 different types of stains. Badische Corp., Williamsburg, VA.

348 Tiles
Landmark unglazed tiles, designed for exterior and interior residential and commercial applications, are featured in a 6-page color foldout brochure. Available colors are shown, and available sizes are listed. Performance standards and specifications are also listed. American Ceramics, Washington, PA.

349 Cut pile carpet
A 4-page color brochure describes a fiber technology that permits the use of continuous filament nylon in cut pile carpet. Antron cf, the resultant 4-hole filament claimed to be soil and wear resistant, is shown in close-up photos and diagrams. DuPont Co., Wilmington, DE.
350 Coating
Uni-Bond, an oil-modified alkyd coating for use on structural steel, bar joists, hangers, hvac conduit and decking, is described in a 4-page color brochure. Photos show installations, and performance data is listed. Thremec Co., Inc., Kansas City, MO.

351 Cove bases and corners
Rubber cove bases and corners are illustrated and described in a color foldout brochure. Diagrams show 4 available cove designs and 3 available inside and outside corner designs. A chart of available colors and specifications is included. Roppe Rubber Corp., Fostoria, OH.

352 Tambours
Hardwood, wood veneer, cork and aluminum tambour wallcoverings in 9 series are featured in a 4-page color brochure. Photos show installations, and diagrams illustrate tambour slat profiles. Dimensions of slats are listed. National Products Div., Potter Industries, Louisville, KY.

353 Contract carpets
A 16-page color catalog is filled with photos of contract carpet designs and installations. A table lists fiber content, traffic class, backings and technical data for each of the designs featured. Patcraft Mills, Inc., Dalton, GA.

354 Moldings
Screeds, trims and moldings for plaster and drywall are shown in section details and described in an 8-page brochure. Both vented and nonvented types are covered. Specifications and a color chart are included. MM Systems Corp., Tucker, GA.

355 Floor treatment
Chemglaze polyurethane coatings for concrete floors, which are said to be abrasion- and chemical-resistant, are featured in a new brochure. Applications for both new and existing concrete are described. Lord Chemical Products Group, Erie, PA.

356 Hardwood floors
Several series of hardwood floor designs, including parquet, plank and strip, are shown in installation photos and described in a 12-page color brochure. Diagrams and dimensions are included as well as information on installation and maintenance. Kentucky Wood Floors, Inc., Louisville, KY.

357 Water-repellent coatings
Clear coatings for masonry, concrete and wood surfaces are featured in a 4-page brochure. Technical data, applications and a product selection chart are included. Specifications are listed. Hydrozo Coatings Co., Lincoln, NE.

358 Acid-resistant primer
A new brochure features Koropor ARP, an acid-resistant primer for use on galvanized steel and any other metal substrate. As described, the primer is made from a combination of acid-resistant resins and corrosion-inhibiting pigments. DeSoto, Inc., Des Plaines, IL.

359 Stains
Photos showing typical applications of interior and exterior stains are featured in a 16-page color booklet. The booklet also includes a guide to staining that offers information on color selection, application and maintenance. Samuel Cabot, Inc., Boston, MA.

360 Acoustical wall panels
Photos show typical installations of several series of Soundsock acoustical wall panels. Dimensions, flame spread ratings and insulation values are listed with each series. Charts list sound absorption coefficients. Armstrong World Industries, Inc., Lancaster, PA.

361 Acoustical products
SoftTec acoustical reveal-edge ceiling and wall panels, as well as baffles, are featured in an 8-page color brochure. Product construction, NIC ratings, sizes and finishes are described. Specifications are included. Capaup, Div. of Acoustiflex Corp., Plainfield, IL.
Mt. Washington Observatory
White Mountains, New Hampshire

Even the world's worst weather can't penetrate the Thoroseal® armor protecting Mt. Washington Observatory.

Bitter weather here is an almost daily fact of life. The mountain recorded the highest wind in history (231 mph).

But Mt. Washington Observatory is more than concrete; it is concrete sealed for life with Thoroseal. Thoroseal is unique. It bonds with and becomes part of the concrete, allowing it to breathe.

The exterior beauty, too, of Thoroseal is not superficial, but impregnable, timeless.

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ALLIANCEWALL PORCELAIN ENAMEL ON STEEL.
GOODBYE, OLD PAINT.

The attractive interior walls you plan today... will stay that way. For years to come. AllianceWall panels never need painting, because the porcelain enamel color is actually fused to the steel. Creating a hard, smooth surface. You can choose from more than 50 vivid and neutral colors. Beautiful by any standards. And made to stay that way. Contact us soon to see how we can help you plan your next interior. Porcelain enamel on steel— for one-time color, easy maintenance and lasting beauty.
Donn makes "premium" practical.

Donn Thinline™ ceiling grid system gives you the look of a premium, tailored ceiling for a lot less than you expect. The Thinline System uses standard, square edge, 2' x 2' or 2' x 4' acoustical panels instead of expensive reveal edge panels. That alone can save you 20%. Get the look of fine architectural detailing for less with the Thinline ceiling grid system. Donn makes a premium ceiling look practical.

Donn makes sense.

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Hartco solid oak meets the code in critical fire areas.

Hartco Acrylic Impregnated Solid Oak Parquet flooring with wood back meets the requirement for a Class B Flame Spread Rating (ASTM E-84) and a Class I Rating from the Radiant Panel Test. Now you can specify the warmth and beauty of Hartco Solid Oak in projects where fire retardant materials are required. Hartco oak flooring can beautify projects such as hospitals, nursing homes, child care facilities, hotels.

No premium price. Wood back Hartco Acrylic Impregnated Solid Oak Parquet is immediately available through your local Hartco distributor. No special order. No premium price. The Fire Rated material is now a Hartco standard. Not an expensive option.

Best cost per foot. Hartco Solid Oak Parquet may cost a little more than other floor materials. But ease of installation and maintenance combined with exceptional durability make it a superior, cost-efficient floor in the long run. When your design calls for a natural, beautiful, long-wearing floor in a fire sensitive area, specify Hartco Acrylic Impregnated Solid Oak Parquet. It meets the fire rating standards beautifully.


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The Quality Wood Flooring
You can really get "burned" with substitute products that cost more than ceramic tile!

Why are so many floor and wall products available in "tile" patterns? Obvious! Genuine ceramic tile has an almost universal appeal. For ages, the inherent natural beauty and low maintenance durability of ceramic tile have made it the preferred product. But in every comparison, the imitators can't stand the heat...they can char or ignite and some emit dangerous toxic fumes when burned.

Genuine ceramic tile won't dent, fade, rot, peel, blister, warp, splinter or ever need waxing. For everyone who wants the real tile look but thinks it's too costly, let's compare total costs...the substitutes lose again -- by significant margins. Recent studies show that genuine ceramic tile costs less.* Perhaps these are the reasons why the United States is entering the "ceramic era"...value, performance and product integrity will be the real buying influences.

Write Summitville Tiles, Summitville, OH 43962, for your copy of "Life Cycle Cost Study."

Don't Get Burned by Quarry Tile Imitations!
FINALLY.
CLASS I ANODIZING
IN A WIDER RANGE
OF COLORS.

Amchem's remarkable P3 almecolor™ system can create a range of electrolytic colors from pale champagne to a midnight black. And every shade and hue in between. P3 almecolor permits anodizers to achieve Class I specifications with every color. So now you have a greater choice than ever before. Best of all, any P3 almecolor shade you pick is reproducible. Time, after time, after time. There's minimal batch to batch variation. And P3 almecolor™ electrolytic coloring is useable with every frequently specified aluminum alloy.

Where do you find a source for this consistently impressive new electrolytic coloring process? By calling us at Amchem. Even though we don't anodize aluminum, we market chemicals and technology to color it. So we're a good source for a good anodizer who's close to where you work.

For a free package of information on P3 almecolor™ and a list of the anodizers who use it, write or call Amchem Products, Inc., 19002. (215) 628-1000.

Circle 1087 on inquiry card
In hotels: Carpets of Antron® perform with style.

*Du Pont registered trademark. Du Pont makes fibers, not carpets.
When The Beverly Wilshire and The Waldorf-Astoria—as well as many of America's other leading hotels—"roll out the red carpet," that carpet is DuPont ANTRON®.

Only ANTRON nylon can bring your most exciting designs to life in so many styles and colors and textures. More than any other single carpet fiber.

Carpet of ANTRON has the stamina to stand up to the pounding of hundreds of thousands of feet. And luggage carts and laundry carts and serving carts. And still look good.

And in restaurant and bar areas, carpet of ANTRON can take almost anything the staff—or guests—dish out.

In short, carpet of DuPont ANTRON projects a look of luxury, while providing the soil, stain and wear-resistance that means lasting beauty with easy maintenance.

That's performance with style. And that's what makes DuPont ANTRON the most specified commercial carpet fiber in America.

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New USG Acoustical-Plus spray texture absorbs sound, resists fire.

Another U.S.G. first! A multi-function spray texture finish, specially-formulated to meet today's concrete ceiling needs - old or new! New USG Acoustical-Plus Spray Texture is in a class by itself. Sound-rated .40 at 1/2" thickness. Class A Flame Spread rating. And an aesthetically pleasing difference in appearance. You'll find USG Acoustical-Plus Texture elegantly suited for commercial, institutional, high rise apartments and retrofit construction.

- Call your U.S.G. Representative. Or write to us at 101 S. Wacker Dr., Chicago, IL 60606, Dept. AR1283

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BUILDING AMERICA

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362 Shower seat
The slats in a folding shower seat are made of Colorism, an integrally colored solid material consisting of polymer resins. The seat also features a stainless steel frame, support braces, hinges and bolts. Slats come in 5 colors. The Charles Parker Co., Meriden, CT.

363 Presentation cabinet
A 4- by 4-ft wood cabinet contains a tack board, a white porcelain enamel writing surface and an optional 40- by 40-in. projection screen or fluorescent light. The cabinet is 3½ in. deep and comes in oak or walnut. Claridge Products & Equipment, Inc., Los Angeles, CA.

364 Tissue roll holders
Designed by Arne Jacobsen and selected for The Design Collection at the Museum of Modern Art in New York, these kitchen and bathroom tissue roll holders are made of brass and come in 10 epoxy colors, polished brass or chrome. Kroll Inc., Cambridge, MA.

365 Soap dispensers
Models B-111 and B-112 soap dispensers feature corrosion-proof liquid valves designed to prevent leaking and clogging. Large tank openings allow for quick and easy filling and, to prevent vandalism, hinged stainless steel tops can be locked. Bobrick Washroom Equipment, Inc., Los Angeles, CA.

366 Directories
A line of directories is available with square or radius corners on frames of solid oak, walnut or any other hardwood. They also come with glass and Lexan frames. Directories are 2 in. deep and are custom made to match furnishings. Best Manufacturing Co., Kansas City, MO.

367 Fireplace
The Energy Mixxer features an air-flow design that takes air in through the hottest parts of the firebox. Louvers above the heat return panel force air out into a room. The fireplace comes with sliding glass doors framed in antique brass. Preway, Inc., Wisconsin Rapids, WI.

368 Pipe markers
Opti-Code pipe markers are made of pressure-sensitive vinyl and have letter heights and colors and background colors that comply with ANSI and OSHA standards. Special markers with symbols, foreign languages or custom color coding systems may be ordered. Seton Name Plate Corp., New Haven, CT.

369 Access floor system
ConCore floors consist of 24-in.-square steel panels filled with a cementitious material. The system is designed to support rolling loads, such as automated mail carts, and is claimed to be acoustically superior to other systems. Tate Architectural Products, Inc., Jessup, MD.

370 Ceramic tile stoves
The design of 4 models of wood- and coal-burning ceramic tile stoves features a cast iron firechamber surrounded by thick ceramic tile sections with an air space in between to allow for primary and secondary combustion. Stoves come in 8 different colors. Ceramic Radiant Heat, Lochmere, NH.

371 Shades
Sunpleat shades come in translucent, opaque and opaque metalized woven polyester. Shades feature a flush-mounted cord locking system. Shade fabrics are available in widths up to 60 in. and in a wide variety of colors. Hunter Douglas, Inc., Maywood, NJ.

372 Automated daylighting
A daylighting system combines exterior movable louvers and electronic controls to respond automatically to the sun's position, thermostat readings and changing light conditions. The system is claimed to cut lighting costs by up to 70 per cent. The Moore Co., Marceline, MO.

373 Vertical blinds
Bali Classics vertical blinds feature vanes made of aluminum, PVC, laminates and a variety of fabrics. Blinds are available in widths from 24 to 186 in. and lengths from 36 to 144 in. They come in a wide selection of colors. Marathon Carey-McFall Co., Houston, TX.
374 Roll-down shutters
Solar roll-down shutters come in naturally finished Douglas fir or extruded aluminum. They are lockable and meet South Florida Building Code requirements for hurricane protection. Shutters are available with electrically operated cranks. ELR Enterprises, Inc., Miami, FL.

375 Fireplace insert
The UL-listed Accents insert is designed to turn a fireplace into a heating system without ruining esthetic appeal. It is available in 3 sizes with 3 door styles. Available door inserts include clear and etched ceramic glass and cast iron. Majestic Co., an American Standard Co., Huntington, IN.

376 Operable walls
Modulux Series 800 operable walls feature 14-gauge steel frames welded to 14-, 20- or 24-gauge steel faces. They are faced in wood veneers or laminates and come in heights from 8 to 48 ft. Walls carry acoustical ratings to STC 54. Panelfold, Inc., Miami, FL.

377 Wash station
The Handi-Wash is an all-in-one surface-mounted unit for washing. It is made of type 304 stainless steel with 3 push buttons on the front panel, each for soap, water, and warm air. Water and air are controlled by an adjustable timer. The Charles Parker Co., Meriden, CT.

378 Vinyl louvers
Hanging solid vinyl louvers serve as vertical blinds; they are suspended from tracks, and each louver rotates 180 deg. They are said to be more effective in reducing heat loss than horizontal blinds because they can be closed more tightly. LouverDrape, Inc., Santa Monica, CA.

379 Small article lockers
Aluminum Mini-Check lockers have stainless steel locking mechanisms that are coin and key operated. Units of 12 measure 24 by 19% by 7½ in. Accessories include 2 spare lock cylinders and 6 masonry mounting anchors per module. American Locker Security Systems, Inc., Jamestown, NY.

380 Access flooring
The panels of this access flooring system are available in sizes up to 60 by 60 in. They have laminated aluminum honeycomb cores and are supported by adjustable pedestal heads. A 4-by-4-ft panel weighs 45 lb. H.H. Robertson Co., Pittsburgh, PA.

381 Lockers
Val-Tec steel lockers, finished in baked enamel, feature reinforced shelves and recessed handle and padlock hasps. Double-paneled doors have offset inner and outer louvers for indirect ventilation. Nylon catches keep doors from slamming. Lyon Metal Products, Inc., Aurora, IL.

382 Towel rings/brackets/bars
Towel bars, rings, and brackets are made of brass and come in 10 epoxy colors, polished brass or chrome. They were designed by Arne Jacobsen and were selected for the Design Collection at the Museum of Modern Art in New York. Kroin Inc., Cambridge, MA.

383 Vertical draperies
Flexatex vertical draperies come in a variety of wool, acrylic, PVC and aluminum vanes. They can be used as room dividers and are said to be suitable for oddly shaped windows, angles or arches. Hunter Douglas, Inc., Maywood, NJ.

384 Acoustical panels
The Group 1000 acoustical panel is available with an optional electrified base (shown). Freestanding panels come curved or straight and are available in a variety of sizes and a wide range of colors. Conwed Corp., St. Paul, MN.

385 Dispenser
The Model 580 Series includes units that have dual-roll toilet tissue dispensers, toilet seat cover dispensers and flip-type ashtrays. They feature 1-piece heavy-gauge stainless steel doors with tumbler locks. Bradley Corp., Menomonee Falls, WI.
10 Specialties
Product literature

386 Fireplace/stove
A 12-page brochure features the Fireplace/Stove, a stove unit on wheels, which fits snugly into a fireplace. Section details illustrate the stove’s design and function. Photos of installations and specifications are included. The Vermont Stove Co., Shelburne, VT.

387 Automatic blinds
A 4-page brochure describes custom, computer-controlled operating systems for blinds and shutters. As described, controls may be programmed to respond to storm warnings, to sunlight sensors and to the time of day. Multronic-Zurich AG, Dist. by Swiss Blinds, Inc., DesPlaines, IL.

388 Daylighting
The Mark III automated daylighting system, with modular louvered units and manual or automatic operation, is featured in a 16-page brochure. Details show louver and electric actuator designs. Operation with other building controls is described. The Moore Co., Marceline, MO.

389 Heat-circulating fireplace
The Energy Circulator fireplace is featured in an 8-page brochure. Drawings show how it circulates heat and how it is installed. Photos show typical installations. An accessory and chimney component selection guide is included. Majestic Co., an American Standard Co., Huntington, IN.

390 Lockers
Lockers made of %-in. high-density industrial flakeboard and surfaced in vinyl and high-pressure laminates are featured in a 20-page color brochure. Photos show installations and individual units. Locker door and installation specifications are included. P.S. Hurlbut, Inc., Santa Clara, CA.

391 Shower doors
Several installations of sliding and swinging shower doors are shown in photos and described in a 12-page color brochure. Detail photos show track systems, adjustable pivot jambs and available finishes. Howmet Aluminum Corp., Architectural Products Div., Terrell, TX.

392 Operable walls
Photos show several models of 2 different types of steel operable walls in a 12-page color brochure. Graphs show acoustical properties and details show suspension, seals and head construction. Design options are also illustrated. Specifications are listed. EMCO, Inc., Lenexa, KS.

393 Access flooring
The S-Floor, a stringerless elevated modular slab access flooring system, is described and illustrated in an 8-page color brochure. Specifications feature assembly details, including ramps, which list flooring components. Innocrete Systems, Inc., a subsidiary of Construction Specialties, Inc., Cranford, NJ.

394 Interior signs
Interior sign systems for offices, including directories, tackboards and poster holders, are illustrated in a 4-page color brochure. Installations of each type of sign available are shown. Architectural Signing, Inc., Marina Del Rey, CA.

395 Sign systems
Several series of illuminated and nonilluminated post/panel signs are shown in section details and described in a 12-page brochure. Photos showing installations, tables of available dimensions and mounting configurations and information on specifying are included. Andco Industries Corp., Greensboro, NC.

396 Washroom accessories
A 40-page catalog includes dispensers, receptacles, grab bars and cabinets. Diagrams with dimensions accompany descriptions of each model shown. Accessories, such as soap dishes, towel bars and coat hooks are also shown and described. A & J Washroom Accessories, Peekskill, NY.

397 Barrier-free phone booths
A 4-page color brochure covers 4 models of barrier-free phone booths, all of which feature a vandalproof mounting system. Details with dimensions and photos illustrate each model and the mounting system. Specifications are included. Acoustics Development Corp., Northbrook, IL.
398 Soap dispenser
Built-in and surface-mounted liquid and powdered soap dispensers are featured in a 4-page brochure. Photos and diagrams with dimensions illustrate available models. Specifications are included. U.S. Borax, Los Angeles, CA.

399 Signage

400 Soap dispenser
A product data sheet features the 327 surface-mounted stainless steel lotion/soap dispenser. A diagram illustrates dimensions. Technical data include information on construction and installation. McKinney, a subsidiary of Kidde, Inc., Scranton, PA.

401 Operable panels
A page of literature features Series 310 system of operable panels with multidirectional carrier assembly. A photo shows a typical installation, and a diagram shows a typical floor plan. A reference guide gives panel dimensions and weights. Kwik-Wall Co., Springfield, IL.

402 Blinds
Photos show residential installations of Flexiculum window blinds and room dividing blinds throughout a 16-page color brochure. Materials and colors in which blinds are available are illustrated. Hunter Douglas, Inc., Maywood, NJ.

403 Fireplace
Photos show components and installations of a convective and radiant heating fireplace in a 4-page color brochure. A cut-away drawing illustrates fireplace construction, and diagrams give dimensions. Options of bifold glass doors and an outside air kit are also shown. Heatilator, Inc., Mt. Pleasant, IA.

404 Access flooring
Liskey computer room and general office access flooring systems are described and illustrated in a 16-page color brochure. Tables list respective design loads and grid systems. Sections show support system details. Specifications are included. Donn Corp., Westlake, OH.

405 Chalkboards
Chalkboards, bulletin boards and projection screens are among the items shown and described in a 72-page color catalog. Lecterns and display cases are also featured. Construction, prices and available sizes are listed for all models. Claridge Products & Equipment, Inc., Harrison, AR.

406 Signs
Exterior and interior illuminated and nonilluminated signs are featured in an extensive color catalog. Information is included on typography, symbols and specifications. Available colors and finishes are illustrated. Architectural Signing Inc., Marina Del Rey, CA.

407 Graphics
Unigraphics, computer-generated graphics produced on vinyl or reflective film, are described and illustrated in an 8-page brochure. Available type faces and symbols are shown and colors are listed. Application instructions are included. Andeco Industries Corp., Greensboro, NC.

408 Folding gates
Several types of single and double folding gates, including portable models, are shown in line drawings in a 16-page brochure. Details show locks, track mounting, gate construction and installation. Specifications are included. Acorn Wire and Iron Works, Inc., Chicago, IL.

409 Display structures
Tubular steel structural systems for displays, exhibits, store fixtures and furniture are illustrated and described in a 4-page brochure. Photos show typical applications as well as system components. Accessories, such as casters, adjustable legs and lights are also featured. Abstracta Structures, Inc., New York, NY.
Poured slab floors have been doing a great job for a long time. They're strong and feel solid underfoot. But, the “eighties office” imposes new demands. Changing computer terminals, open plans and their need to be easily re-configured often exceed the scope of traditional slab floors. And, raceways, flat wire systems and the like are partial solutions at best. You just can’t hide air handling ducts or pipe conduits under a carpet!

Enter Innocrete's S-Floor. Now architects and owners alike can specify a floor system which combines the solid feel of a poured slab with the total accessibility of a stringerless, raised modular floor. It's S-floor, and please don’t confuse it with products adapted from computer flooring. S-Floor will not creep, rattle, shake or become deformed under normal rolling loads.*

S-Floor's remarkable properties: exceptional strength, yet dramatically lower weight than concrete are the result of intensive research and space-age materials. Beginning with the Innocrete compound, two foot square panels are formed into mini-slabs, each with an engineered reinforcing steel-grid network. Panels are then torque fastened into the floor system resulting in a stable mass you have to walk on to believe. Of course, one or several panels may be removed at any time without disturbing the system's integrity.

Since S-Floor helps prevent premature building obsolescence many users predict it can quickly pay for itself.

So if total flexibility is for you, look into S-Floor's elevated modular slab. Call or write for literature or samples, without obligation, of course.

*Independent lab test report available.
Our better fit begins with our better fitness program.

You can’t get a better fit with any other tile! VPI solid vinyl tile is Micro-squared, a VPI exclusive that gives you tighter fitting floors with a virtually seamless appearance.

Vertical edges are cut perpendicular to the surface, too. And gauge is precision controlled to eliminate high edges and assure a smooth, continuous surface. No other tile manufacturer goes to such lengths to make sure you get the very best flooring results.

And VPI solid vinyl tile shows its quality year after year. It keeps its good looks under hard use, and even abuse. It resists indentations and shrugs off most common chemical spills. Its resiliency makes it easy on the legs. And it stays attractive with routine washing and spray buffing.

VPI solid vinyl tile. Micro-squared to fit, manufactured to keep looking fit. Available in 12” x 12” tiles and a variety of handsome colors and patterns. For information write VPI, 3123 South 9th Street, P.O. Box 451, Sheboygan, WI 53081. Or call 414-458-4664.

VPI FLOOR PRODUCTS

Circle 1091 on inquiry card
Forget everything you thought you knew about floor-to-ceiling wall panels!

Especially if you associate "movable" with skilled labor, dust and debris, permanent attachments and personnel disruption.

Introducing Spacesetter III; a unique, completely portable floor-to-ceiling wall panel unlike anything else available.

With Spacesetter III portable panels you can anticipate the inevitable changes in personnel and equipment that come with growth and success. You'll keep your options open for tomorrow without sacrificing the privacy and sound control you need today. When your office layout begins to become uncomfortable or inefficient, Spacesetter III can be relocated simply and quickly without affecting the daily routine.

Meet the challenge of planning for the present and the future. Spacesetter III panels enable you to relocate permanent-looking floor-to-ceiling walls whenever and wherever you need them. They're available with all the options you're ever likely to need, including doors, windows, transoms and electrical circuits. Changes of any type can be absorbed in hours instead of days without loss of comfort, efficiency and morale.

Get a whole new perspective on portable panels with Spacesetter III. For more information, contact the company that's first in walls that move. Write Modernfold, Box 310, New Castle, Indiana 47362. Or call (317) 529-1450. In Canada, write P.O. Box 399 - Station E, Toronto, Ontario, M6H9Z9, Telex: 27-2285.

Modernfold
An American-Standard Company

Circle 1092 on inquiry card
Aurora Quik-Lok...The Shelving Concept That Grows With You.

The key to effective use of storage space is flexibility. Question is, can your specified storage system be reconfigured to meet the client's growing needs? Aurora's solution is Quik-Lok...the freshest idea in shelving in the last 25 years. And its so simple—3 components (1) uprights; (2) shelf supports and (3) shelving panels are available in a wide range of sizes...ready to be configured to any storage criteria. No hardware is needed for assembly, so units can be rearranged or relocated...fast. Office, commercial, warehouse, industrial...Quik-Lok works. Create storage spaces that work for you and let your imagination grow with Quik-Lok.

Aurora Steel Products, 580 South Lake Street, Aurora, IL 60507, Tel: (312) 892-7696

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Sheer Elegance.

Panelfold introduces Moduflex® Series 800... a new generation of high performance, all-steel operable walls. New four inch thick panels engineered to offer total flexibility in space planning for executive suites... for hotel/resort conference centers... for megaconvention centers. Featuring outstanding acoustical qualities with sound control to STC 54 and sound absorption to NRC .90. A wide choice of panel surfaces that wrap around the vertical edges for a sheer look that will satisfy the most discriminating tastes.

A steel operable wall that outperforms most permanent walls.

Moduflex®
SERIES 800
New from Panelfold®

Panelfold, Inc. PO Box 680130 Miami, Florida 33168 (305) 688-3501 Telex 52 3173

Circle 1094 on inquiry card
Scanamurals® make walls work.

Depending on your imagination, a 3M Scanamural® wall can project anything from a Caterpillar coming on strong, like this one at the Wheeler Machine Co. in Salt Lake City, to a peaceful panorama of a mountainside. It enables you to add vistas, depth, mood, history, corporate identity and excitement to virtually any dimension you design or remodel. Walls several stories high, long hallways, curved walls, even moveable office partitions come alive with Scanamurals.

But behind the showmanship is common sense. The Scanamural process actually computer-generates the color image using durable, fade-resistant pigmented paints. A Scanamural can be made from original art, photo, transparency, oil painting or litho print. Depending on your choice of substrate—canvas, vinyl, carpet or polyester—you can even make a Scanamural graffiti resistant, fire retardant, sound absorbing, washable and anti-fungal. Beauty is as beauty does.

Find out more about Scanamurals. For more information, and the name of the Scanamural dealer nearest you, call (612) 778-5605. Or write 3M Architectural Murals Department, 3M Center, St. Paul, MN 55144.

3M hears you...

3M

Circle 1095 on inquiry card
Spacesaver understands the value of space... and commends its intelligent and creative use. By recapturing wasted non-productive aisles, we double storage capacity without increasing the original space... or save 50% of space with the same storage density.

Spacesaver is the leading manufacturer of high-density mobile storage systems in North America. Ongoing investments in superior engineering, advanced "state-of-the-art" electronics and dedicated personnel continuously yield innovative products that excel in the marketplace. Coupled with a life-long commitment to quality, Spacesaver assures distinctive high-density mobile storage systems in appearance, reliability and performance.

Spacesaver Corporation, 1450 Janesville Avenue, Ft. Atkinson, WI 53538 Tel: (414) 563-5546

Circle 1096 on inquiry card
Daylighting vs solar shading

"... the lowest life cycle cost and energy use were obtained with daylighting coupled with clear glazing and exterior sun-control blinds," according to a study of life cycle costs and energy use analyzing various solar control and daylighting options on high rise office buildings, commissioned by the Department of Energy.

Consider these facts which affect office building operating costs:

**FACT:** 50% of the energy bill in a typical office is for artificial lighting.

**FACT:** 50% of office cooling energy is required just to remove heat generated by the artificial lighting.

**FACT:** 25–50% of the normally required tons of perimeter air conditioning can be eliminated by using Baumann Exsotrol™ blinds.

**FACT:** 50% of a commercial building’s electric bill represents “peak demand”—the 30 minute period in the year when the most electricity is used.

**Solar control—outside blinds, “7 times better” . . . HUD***

The most effective way to stop solar heat gain is to block the sun before it strikes the glass. Exterior blinds are 7 times more effective for cooling than interior window treatments. Clear glazing and Baumann Exsotrol blinds have a shading coefficient of 0.14—more protection from radiant and conductive heat than any tinted or reflective glazing and interior blind combination.

**Daylighting—clear glass 10 times better**

Clear glazing transmits 10 times more visible light than the best reflective glazing. With the blinds in their working position, every slat is a light shelf. Work stations 20 ft. from windows maintain an illumination level of 200–500 lux. Workstations near windows remain cool and glare free. Baumann blinds provide diffused “northlight” quality light on all elevations.

Using clear glazing alone as the daylighting concept only reshuffles the energy use ratio. Daylighting concepts are optimized when combined with Baumann Exsotrol blinds.

Flexibility—accept or reject the sun

Flexibility is the reason Baumann Exsotrol blinds are the most effective solar control product in the market today.

Just before the sun strikes the glass, the blinds can be lowered and adjusted to the proper angle to give 100% solar protection while allowing natural daylight to enter. The raising, lowering and adjustment of the blind slats may be motorized or manual. Motorized blinds can be computer controlled to respond to sun, wind, rain, time of day and weekend occupancy.

Having dark glass on a building is like wearing sun glasses 24 hours a day. Unlike fixed shading systems (including dark glass) Baumann Exsotrol blinds can be completely retracted when not needed on cloudy days, or when the sun is shining on other elevations. Blinds can be retracted on sunny winter weekends when solar gain is desirable, during window washing or window replacement.

Perfect protection for all seasons

Unlike overhangs, setbacks or fixed louvers, Baumann Exsotrol blinds provide 100% shading of the glass, regardless of season or elevation.

Overhangs are designed primarily for protection against the south summer noon sun. They are impractical on east and west elevations, and ineffective against the glare and heat of low sun angles during fall, winter and spring.

**Baumann blinds save more than they cost**

- Eliminate up to 50% of perimeter air conditioning.
- Eliminate need for costly special glazing.
- Eliminate need for most interior window treatments.
- Reduce perimeter lighting requirements.
- Lower “peak demand” and total electrical operating costs for the life of the building.
- Provide excellent hurricane protection.
- When programmed as movable insulation, help stop winter nighttime heat loss.

Send for additional information. Also available from Baumann: rolling shutters and European Style awnings.

**IF YOUR BUILDING HAS WINDOWS, IT NEEDS BAUMANN BLINDS.**

Baumann, Inc., Box 160
Barrington, IL 60010
1-800-247-8368 in IL (312) 526-7755

10.24/Bau

Above, weekend overtime workers in various offices use local override controls to open own blinds to enjoy natural daylighting.

Large selection of colors offers alternative to dull, unattractive buildings and the sameness of standard dark glass vision bands.

*Report LBL-12398 of DOE contract W-7405-ENG-48 with Lawrence Berkeley Laboratory.

**Exsotrol = EXterior SOLar control**

***U.S. Department of Housing and Urban Development publication, "In the Bank or Up the Chimney?"**

Circle 1097 on inquiry card
410 Dock lifts
The 6000 Series has 3 models: a 6- by 8-ft, 5,000-lb-capacity unit for manual pallet jack loads; a 6- by 10-ft, 8,000-lb-capacity unit for small powered equipment loads; and a 6- by 12-ft, 12,000-lb-capacity unit for fork truck loads. Advance Lifts, Inc., St. Charles, IL.

411 Ironing center
Sized to be recessed between studs, an ironing board cabinet features a piano-hinged door and a 42- or 48-in. ironing board as well as an iron storage shelf and an electrical outlet with an automatic timer and signal light. Board height is adjustable. Iron-A-Way, Inc., Morton, IL.

412 Drum packer
A 10-ft 2-in.-high drum packer is capable of compressing many types of material, including contaminated wastes, into a 55 gal. drum. It has a 10 hp motor, weighs 2265 lb and handles drums measuring 35 in. high, 23 in. in diameter. Maren Engineering Corp., South Holland, IL.

413 Ice cube maker
The C-065 model ice cube maker provides 625 lb of cubes in 24 hours. It is available with stainless steel exterior panels and comes with air-cooled, water-cooled or remote condensers. Crystal Pipe Ice Products, Minneapolis, MN.

414 Drop-in range/oven
A modular drop-in range/oven with surface ventilation for island installation features a 2-speed blower with a 520-cfm capacity. A number of stainless steel cooktop modules are available for barbecue, canteen and rotisserie. Self-cleaning is standard. Ducor Corp., Pasadena, CA.

415 Industrial load transporter
A computer-controlled unit load transporter is designed for industrial assembly and automated material handling applications. Steering orders are transmitted through an in-floor guidepath. Codes in the floor define locations. Eaton-Kenaway, a subsidiary of Eaton Corp., Salt Lake City, UT.

416 Laboratory fume hood
Protector Series hoods are of molded 1-piece fiberglass construction with epoxy-coated steel exteriors. Options include add-air or bypass models, explosion-proof models with or without service fixtures and integral or remote motor/blower models. Labconco Corp., Kansas City, MO.

417 Opaque projector
The AG100 projects horizontally from 2 to 20 times enlargement and, with a stand accessory, it will reduce 60 per cent and enlarge up to 3 times vertically. A copy cover holds copy flat to assure accurate projection. Artograph, Inc., Minneapolis, MN.

418 Microwave/electric oven
The Trinome Model DDO 880 is a microwave and electric double wall oven. Both the lower electric oven and the combination oven feature slow-cook operation, self-cleaning and lift-off doors. Modern Maid, Topion, PA.

419 Drive-in teller station
The carrier opening of the Trans-Vista 2000 is at the top of the unit to accommodate customers in any size vehicle. The unit, housed in structural polystyrene, is 16 in. wide and fits into a 24-in.-wide island. Mosler, an American Standard Co., Hamilton, OH.

420 Compact kitchen
A compact kitchen includes a stove and a double-door unit housing a refrigerator and a zero-degrees freezer. The refrigerator/freezer unit is surfaced in hardwood veneer. Cervitor Kitchens, Inc., South El Monte, CA.

421 Fold-out table cabinet
The Houdi-Cabinet stores a 42-in.-long butcher-block-style table, which folds down and out. The cabinet also features pantry shelves. The entire unit can be recessed between the studs in a wall or surface-mounted. Iron-A-Way, Inc., Morton, IL.
11 Equipment
Product literature

422 Hydraulic dock loader
The PDQ portable powered dock loader, said to raise or lower in 9 seconds, is outlined in a 4-page brochure. Photos and a diagram illustrate dock components. Dimensions are listed. Autoquip Corp., Guthrie, OK.

423 Laboratory furniture
A 10-page color brochure features the wescell line of modular laboratory cabinets and work surfaces. Photos show installations and components and illustrate design features, such as rounded corners, and the bright colors in which the system is available. AMSCO/American Sterilizer Co., Erie, PA.

424 Drive-in teller alert
A page of literature describes an alert system that signals the approach of a car to a drive-in teller station by sounding a chime. An optional counter, which records the number of customers, and a carrier activator are also described. Actron, Inc., Elk Grove Village, IL.

425 Dock lifts
Standard features of the three Series 6000 Superdocks are covered in an 8-page color brochure. Internal cylinder stops, aluminum handrails and ramps and options of canopies and dock lights are illustrated and described. Specifications are included. Advance Lifts, Inc., St. Charles, IL.

426 Car wash systems
A 4-page brochure features 3 different car wash systems. Systems are shown in photos as well as in diagrams with dimensions. Guidelines for determining the system needed are included. Hanna Industries, Portland, OR.

427 Auditorium screens
A guide features specification requirements for auditorium and institutional projection screens. Details with dimensions show installation options. A description of a low voltage system and a solution claimed to eliminate keystoning are included. Knox Manufacturing, Wood Dale, IL.

428 Appliances
A 52-page color catalog covers refrigerators, ranges, laundry equipment, dishwashers, air conditioners and dehumidifiers. Photos show individual models and detail appliance features. Tables list capacities and diagrams give dimensions. Kelvinator Appliance Co., Pittsburgh, PA.

429 Laboratory fume hoods
A 16-page color brochure features the Protector Series of fume hoods. Photos show the different models available and a section drawing shows hood components. Diagrams with dimensions, tables listing performance data and specifications are included. Labconco Corp., Kansas City, MO.

430 Vault doors
A packet of literature features product data sheets on 5 different vault doors. Each sheet includes a photo of a typical installation, diagrams with dimensions and information on locks. Other features, such as hinges, right- and left-hand swings and ventilation, are described. Mosier, an American Standard Co., Hamilton, OH.

431 Washer-extractors
A 6-page brochure features Hydro-Cushion open pocket extractors with capacities from 200 to 700 lb. Stationary, tilt-to-unload, and tilt-to-load/unload models are covered. Photos show washers and components, such as timers. Specifications are included. Pellerin Milnor Corp., Kenner, LA.

432 Ice systems
Several different models of ice cubers and flakers are featured in an 8-page brochure. Photos show each model along with lists of capacities and construction materials. Product selection charts include dimensions and technical data. Scotsman Ice Systems, Albert Lea, MN.

433 Dock seals and shelters
A 6-page color foldout brochure features truck seals and shelters and rail shelters. Photos show several installations, and drawings show standard equipment and options. A product selection chart, color chart and specifications are included. Tuf-Seal Corp., Muskego, WI.
12 Furnishings

434 Textiles
Merrimack is a mohair and worsted wool blend with a steam finish. The weave, a variation of a classic cord, is a combination of vertical and diagonal cords. The fabric is available in 8 colors in a width of 54 in. Donghia Textiles, New York, NY.

435 Rolling taboret
The Boby C is a rolling taboret designed by Joe Colombo. It features 3-in.-deep drawers, large oblong accessors, modular shelving and 5 Kent casters. It is available with 2, 4 or 6 drawers in a 21- or 30-in. height and comes in a choice of 5 colors. Bieffeplast USA, New York, NY.

436 Conference table
The #7231 modular octagonal conference table is part of the Meteora Saddle Leather Series, which includes desks, chairs and cabinets. All are covered in 3-mm-thick saddle leather. Conference tables are available in several sizes. The Pace Collection, Inc., New York, NY.

437 Tables and chairs
The Petro Set includes black tables and chairs with red and yellow detailing and finished in polyurethane enamel. The table shown is 42-in.-square and 29 in. high. Occasional tables are 18- and 24-in.-square and are 16 in. high. Agati Manufacturing, Inc., Chicago, IL.

438 Fabrics
The Shibusa collection of 39 cotton fabrics with soft glazed finishes features 4 designs. They come in neutral colorways, sometimes accented with metallics. Five coordinated printed voiles are also available. Lee Jofa, New York, NY.

439 Modular furnishings
The Concourse System is made of 3 basic forms, which adapt as seating units, planters or tables. The system, composed of wood and fiberglass, is designed to coordinate with related display cases, receptacles and directories. Landscape Forms, Inc., Kalamazoo, MI.

440 Office furniture
The components of the Cameron Group are modular: wood and plastic laminate tops, natural or painted wood bases, and natural or painted wood or steel pedestals which are interchangeable. Wire raceways are accessed from end panels or longitudinally from runoffs. Sunar Hauserman, Cleveland, OH.

441 Office furniture
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442 Cabinets
The Quadrante system of cabinets and bookcases features frames in light glossy or matte or dark gray anodized aluminum. Polyester center drawer panels come in 4 colors. Doors come in clear, frosted or cobalt-blue glass. B&B America, Div. of Stendig International, New York, NY.

443 Workstation
The Pass-Thru-Panel is claimed to accommodate computer terminals of all sizes. Work surfaces are 26 in. high and have enough room for turntables with terminals and keyboard surfaces. Rosemount Office Systems, Inc., Lakeville, MN.

444 Tables
Gwathmey Siegel's DeMenil tables come in rounds, squares and rectangles in cocktail and dining heights. Legs penetrate tops to create patterns. Tables come in combinations of cherry, mahogany, walnut or natural-, ebony- or rosewood-stained ash veneers and solid woods ICF, Inc., New York, NY.

445 Office chairs
Magnaum GS seating features pneumatic seat height control. Seats tilt 1 deg for every 3 deg of back tilt. Seats and backs can be locked in any position or allowed to move with body movements. Chairs come with polished aluminum or powder epoxy frames. Cramer Inc., Kansas City, KS.
446 Rug
Described by the manufacturer as "an exploration of color and texture," an alteration of loop line and cut pile creates a continuous wave pattern in *Water Reflections*. All of this company's rugs are 100 per cent wool.

V. Sooke, New York, NY.

447 Credenza
The *Avatar* wall-mounted credenza comes in walnut or mahogany with tambour doors and a variety of tops and reveals. Interior options include shelves, box drawers, file drawer bins and dividers. Hardwood House, Inc., Rochester, NY.

448 Seating
Additions to the 20/20 series designed by Norman Cherner include a guest chair, 3-seat lounge and swivel chair, each with a molded 5-in. radius shell and flared arms. The swivel base comes in chrome, bronze and solid oak, mahogany, ash, cherry or walnut. Modern Mode, Inc., Oakland, CA.

449 Cabinets
*Cambridge* cabinets are available in oak, maple or cherry in a variety of stain or enamel finishes. Design features include a swinging spice rack, beverage storage drawers, a pull-out chopping block and adjustable sliding trays. Coppes Napanee, Napanee, IN.

450 Desk
A computer workstation desk is made of injection molded polyurethane structural foam with a wood grain texture. The material used is claimed to provide high dielectric strength and thermal and acoustical insulation. Digital Equipment Corp., Maynard, MA.

451 Open plan office system
*System 2Plus* features bi-level power distribution with access to as many as 89 duplex receptacles from a single power source, and up to 12 25-pair communications cables. Computer support includes deep shelves, turntables and printer stands. Panel Concepts, Inc., Santa Ana, CA.

452 Panel system
Evective Elements 1 features a welded steel frame that houses power distribution and supports acoustical material and veneer or fabric surfaces. A leveling bar permits continuous panel contact with the floor. Wire management at the working level is also available. Stow/Davis Furniture Co., Grand Rapids, MI.

453 Task chair
Diffrient task and operational chairs have been updated by the addition of new functions. Fingertip controls tilt the back or lock it into an upright position, and the back height can be adjusted up and down by the user while in a sitting position. Knoll International, New York, NY.

454 Color system
A color system, which involves a palette of light, medium and dark tones in fabrics, finishes and textures, is designed to lend individuality to each station of an open office plan. Thirty-eight new colors in 8 new fabrics increase the range of design options. Herman Miller, Inc., Zeeland, MI.

455 Seats
Designed by Rodney Kinsman, molded metal tractor seats come in counter and table heights and feature loop bases said to be extremely stable. The counter model features rubber-clad footrests. Seats are finished in mirror chrome or a choice of baked enamel colors. Bieffeplast USA, New York, NY.

456 Computer office system
The *DataBord* 920 features a hand crank with which a user can adjust worksurface height while seated. Keyboard and VDT surfaces adjust from 23 to 30 in. All surfaces are finished in oak or beech veneers. Frames are steel or aluminum finished in baked enamel. Krueger, Green Bay, WI.

457 Seating
The *Profile Rounder Group* includes 1-, 2- and 3-seat models, all with solid red oak frames, radiused corners and rounded edges. Upholstered frames are removable. All units are 30 in. high by 31 in. deep. Seat height is 16 in. and arm height is 23 in. Adden Furniture, Inc., Lowell, MA.
Seating
CRT Communications Task

Seating was designed for this manufacturer by Robert Arnowitz and Bernard Katzanek. Chairs come with or without arms and are available in operational and management sizes. Thonet, York, PA.

Chair
The Art Moderne side chair, part of this manufacturer's Avatar Collection, is available with a right- or a left-facing back. It comes in 3 aniline finishes and 18 lacquer finishes, as well as custom colors. IPF International, Paterson, NJ.

Chair
The Regina chair features a leather seat and an extruded aluminum frame. The frame is available either covered in leather in a choice of 5 colors or finished in anodized black, gun metal, bronze or epoxy gray. Design Selections International, New York, NY.

Fabric
Designed for both traditional and contemporary applications, Rayure Palatine is a light upholstery fabric which is made of 60 percent cotton and 40 percent rayon. It is available in 24 colors and comes in a width of 51 in. Manuel Canovas, Inc., New York, NY.

Executive office units
A collection of mahogany desks, cabinets, pedestals, lateral files, and wardrobes is designed to form a variety of office configurations. Panels are upholstered in complementary fabrics. Chrome or mahogany raceways conceal power and communication lines. The Gunlocke Co., Wayland, NY.

Computer stand
The Humaanetics computer stand keyboard and VDT surfaces can be raised or lowered at the same time or independently. The keyboard surface slides 6 in. horizontally and the VDT surface tilts 10 deg both up and down. Modesty panels are a standard feature. TAB Products Co., Palo Alto, CA.

Ovoid collection
The Ovoid Collection includes a sofa, a chair, and an ottoman. Each has a frame, made of kiln-dried ash, that is double-dowelled and glued and then shaped to the line of the design. Scope Furniture Ltd., New York, NY.

Office furniture system
The TFS system features beveled solid walnut tops, wood raceway covers, bronze pulls for drawer and door faces and a central locking system. Panels, which are glazed or come in wood and fabric combinations, come in heights up to 84 in. Airex, Div. of Kimball International, Jasper, IN.

Chair
The Bevel Chair has an oak frame finished in a choice of natural, walnut or cordovan stains. Seat and back upholstery may be chosen from a variety of fabrics and leathers. The chair stands 31 in. high, is 21 in. wide and 20 in. deep. Cumberland Furniture Corp., New York, NY.

Chair group
The Rubber Chair Group features tubular steel frames and polypropylene back rails encased in EPDM rubber tubing. Seat options include stained wood, black plastic-coated wood and upholstered cushions. Seat units are removable on-site. Metropolitan Furniture Corp., South San Francisco, CA.

Chair
The Penelope chair, designed by Charles Pollock, features a frame comprised of an 18-ft-long rod of chromium-plated tempered steel curvied to form legs, arms and back and seat support. The seating shell is resin-finished woven steel wire net. Castelli Furniture, Inc., Bohemia, NY.

Computer support furniture
Network, a computer workstation system, features 22- and 66-in. rectangular storage shells. System work surfaces come in 24- and 30-in. depths and lengths of 36 and 60 in. Finishes are available in 6 colors. Kimball Office Furniture Co., Div. of Kimball International, Jasper, IN.
470 Fabric
Applause is a 100 per cent cotton velvet. It comes in 12 bright colors and 8 neutrals in a width of 54 in. It is treated for stain, crush and soil resistance and is designed for contract and residential application. Gretchen Bellinger, Inc., New York, NY.

471 Side chairs
The Zeta Collection features cantilevered chairs with or without arms and a sled base chair with arms. Chairs come in rift-sawn oak or American Black Walnut veneers. Fabric is from this manufacturer’s collection. Lehigh-Leopold, Div. of Litton Business Systems, Burlington, IA.

472 Sofa
The Allegro sofa is 31 in. high, 64 in. long and has a seat height of 16 in. It has a frame of molded plywood and hardwood and comes upholstered in a choice of fabrics and leathers. Brayton International Collection, High Point, NC.

473 Table
The Zephyr Table, designed by J. Wade Beam, is a polished stainless steel column truncated at a 45 deg angle. It stands 31 in. high and features seamless welding. Brueton Industries, Springfield Gardens, NY.

474 Fabric
Bagpipe is one of 90 fabrics in this manufacturer’s Software Panel Fabric collection. It is a combination of wool, worsted and nylon and comes in a width of 72 in. It weighs approximately 81 oz/yd and carries a Class A flame spread rating. Tandem Fabrics, dist. by Gilford Inc., New York, NY.

475 Chairs
The 1001 Series, designed by O.J. Holohan, features upholstered arms as well as solid wood open arms. Swivel and side chairs are designed to be used with open plan furniture. Four models are available in oak or walnut. The Alma Desk Co., High Point, NC.

476 Armchair
The Enviro chair features a frame of steel tubing which comes chrome-plated or finished in white, black, green, red or brown epoxy. The 1-piece seat and back is also made of steel and comes upholstered in any of this manufacturer’s materials. Lowenstein, Inc., Fort Lauderdale, FL.

477 Carved wood ornaments
Solid kiln-dried oak or poplar carvings are based on original Victorian designs. They may be used as corbels, located under soffits, under mantles, as corner brackets or as shelf supports. Cumberland Woodcraft Co., Inc., Carlisle, PA.

478 Correctional seating
Four-person cluster seating features 1-piece construction with reinforced seats and tabletops on welded tubular steel frames. Steel floor glides are adjustable. Frames are finished in black enamel and tabletops and seats come in 4 colors with a slate finish. Plymouth Booths, Kenyon, MN.

479 Kitchen cabinets
Garden Court Impasto cabinets are surfaced in almond-colored laminate and feature hand-finished oak trim, which serves both as an accent and as drawer and cabinet pulls. Cabinet shelves are adjustable, and drawers are mounted on ball bearing rollers. H. J. Scheirich Co., Louisville, KY.

480 Sofas
Banco, designed by Pat Hoffman, has a steel and marine plywood panel structure covered in the same soft leather as the reversible cushions. Banco comes in 2-, 3- or 4-seat versions and as a chair. Cushions and decks may also be covered in fabric. ICP, Inc., New York, NY.

481 Mobile pedestals
Mobile pedestals are available in 2 depths of 20 or 30 in. and 2 widths of 15 or 19 in. They feature 6-in. drawers for regular-sized media, and 15-in. drawers for either side-by-side or front-to-back rdp printout filing. Harter Corp., Sturgis, MI.
482 Seating
Torso seating includes an armchair, chaise longue and sofa, each with exposed steel legs—extensions of welded frames—and polyurethane and Dacron padding. Back and seat upholstery may be contrasting fabrics or leathers. Atelier International, Ltd., New York, NY.

483 Woven area rugs
1600 Series Tasteeel area rugs are made of natural prefelted white wool interwoven with neutral or pastel-colored sisal. Rugs range in size from 2 ft 3 in. by 4 ft 7 in. to 9 ft by 12 ft. Merida Meridian, Inc., Syracuse, NY.

484 Table and chairs
The Interlock conference table and stacking chair collection is designed by Warren Snodgrass. Natural or painted wood tables feature oval tubular metal frames. Chairs feature sled bases and arms with or without arm pads. Thonet, York, PA.

485 Upholstery fabrics
The Countertop Collection includes 3 new fabrics. Hampstead, a crepe weave of 80 per cent worsted wool, 20 per cent nylon, comes in 12 colors, as does the 100 per cent wool Galway. And Balloon Tree, a tweed made of 96 per cent wool, 4 per cent nylon, comes in 8 colors. Steelcase, Inc., Grand Rapids, MI.

486 Chair
The frame of the Cantha S chair is made of tubular aluminum in a choice of 4 epoxy color or 5 anodized finishes. Seat trim and backs are black-stained or natural ash in a matte urethane finish. Seats are caned or upholstered in any of a variety of fabrics. Design Selections International, New York, NY.

487 Chair
The Bitch Chair comes in many versions: with or without arms, ganged or used alone in a slightly lower model. Seats and backs come in woven steel, leather or canvas. Metal frames are in polished or satin chrome or a choice of 4 enamel colors. Harvey Probber, Inc., New York, NY.

488 Wood flat files
Flat file cabinets have 5 drawers and are made of kiln-dried oak with mortise and tenon joints. Drawers have hardboard bottoms and 4-in. protective hoods at the rear. Drawer pulls are chrome-plated solid brass. The finish is clear conversion vinyl. Charrette Corp., Woburn, MA.

489 Drapery fabrics
Classic Woodens is a collection of 100 per cent wool drapery fabrics in coordinated solid and stripe patterns. Weaves include a wool challis and a striped pattern formed by textural weave changes. DesignTex Fabrics, Inc., Woodside, NY.

490 Modular tables
The J600/601 Modular Table Series features connectors that may be tightened by hand. Tabletops are surfaced in veneers and plastic laminates. They are supported by T-bases, which come in chrome or 17 colors. Kinetics Furniture, Rexdale, Ontario.

491 Wood cabinets
The Chadwood line features solid oak drawer fronts and door frames and red oak facing on 3-ply door panels. Cabinets have adjustable shelves, brass hardware and nylon drawer rollers. The line is face framed with solid kiln-dried rails. Kitchen Kompact, Inc., Jeffersonville, IN.

492 Table
The Propeller Table has a twisted heavy bar stock steel base. The table comes in a variety of square and rectangular sizes and is available in oak, walnut and mahogany in a variety of veneer patterns. Mueller Furniture Corp., Grand Rapids, MI.

493 Kitchens
Polo kitchen cabinets feature plastic laminate surfaces with vertical rounded edges and rounded grooves. They are available in white, beige or gray-blue with white porcelain knobs, white laminate interiors and white baseboards. Tielsa Kitchens/Contemporary Systems, Inc., Woburn, MA.
494 Office seating
MGT seating, designed for this manufacturer by Don Petitt, features frames of molded plywood. Chairs come with or without arms and have either 4 legs or 5-star pedestal bases with double casters. Thonet, York, PA.

495 Wardrobe
The Nouveau wardrobe system features components in widths of 20 and 40 in. and heights of 84½ and 94½ in. Wardrobes have interior fittings claimed to meet any storage need. They are available in mahogany, cherry or 10 lacquer finishes. Cy Mann Designs Ltd., New York, NY.

496 Kitchen/bath cabinets
Laquered Profile Front cabinets feature white panels with blue-gray inlays in the frame and handles. Surfaces have a matte finish. Cabinet features include a swing-out waste bin unit and pull-out bottle cupboards. Poggenpohl USA Corp., Teaneck, NJ.

497 Top access file
Putty-colored textured steel files with plastic laminate tops feature access from the top and will store letter and legal file folders, computer printouts and magnetic media in any combination. Marvel Metal Products Co., Chicago, IL.

498 Desk clock
A folding desk clock is an addition to the Radius Two Collection of desk accessories, designed by William Sklaroff. Clocks feature liquid crystal displays and are available in 6 metal finishes. Smith Metal Arts, Buffalo, NY.

499 Fabric
The Shibumi Collection, reproductions of Japanese cloths, consists of hand-woven refined and coarse cottons. The collection includes both muted and bright colors. Cloths are woven to form stripes of colors and textures. Groundworks, Inc., New York, NY.

500 Seating
The 820 Series designed by Lewis Epstein includes a bentwood chaise longue and a bentwood lounge chair. Both come in a choice of cherry or ash with a selection of 3 finishes. Heller Contract, Div. of The Heller Co., Inc., Newton, MA.

501 Workstation
The System 2 workstation features furniture made of Sapele African mahogany. The system includes a variety of credenza and drawer configurations. Design features include recessed drawer pulls and radius edges. Conved Corp., St. Paul, MN.

502 Swing-out pantry
A pantry cabinet has a top section with two 10¾-in.- deep adjustable shelves. The bottom section has 2 swing-out shelves and, behind them, 4 adjustable 6-in.-deep shelves. Door shelves are 4 in. deep. Several styles are available. Aristokraft, Jasper, IN.

503 Stacking chair
The Sultana stacking side chair features expanded steel seats and backs, which come in red, black or white. The frame is chrome-plated solid bar stock. Chairs are 18 in. wide, 19 in. deep, 29½ in. high and have a seat height of 18 in. Loewenstein, Inc., Fort Lauderdale, FL.

504 Bench
A bench designed by Marcel Beck comes in 6 frame colors. It is part of this company's Institutional/Healthcare line. Safety features include fire-retardant foam cushions and nonskid adjustable glides. Carolina Seating Co., Div. of U.S. Furniture Industries, High Point, NC.

505 Fabrics
The Imprimatur System offers combinations of 16 base color fabrics, 5 patterns and 6 print colors. Fabrics are 70 per cent wool and 30 per cent nylon and come in a 70-in. width. Custom colors are available. JG Furniture Systems, Div. of Burlington Industries, Quakertown, PA.
506 Office seating
SystemSeating II ergonomic chairs feature seamless 1-piece fabric upholstery. Task, side and conference chairs are included, some with seat and back height adjustments and some with swivel-tilt posture devices. Chairs are available in 7 textures and 77 colors. Haworth, Inc., Holland, MI.

507 Coffee table
A coffee table designed by Warren Platner has a base of laminated bentwood in white oak, walnut or colored maple. Tops are available in glass, wood or leather with a wood edge. The table measures 42 in. in diameter and stands 14¼ in. high. C I Designs, Inc., Medford, MA.

508 Computer office furniture
Additions to the Zapp System include 73-in. work surfaces and 37-in. overheads. Storage components are 18 in. deep and have adjustable shelves in 13- and 18-in. depths. Unit surfaces come in mahogany veneer in 3 finishes, laminate or Techgrain. Knoll International, New York, NY.

509 Desk
The Georgian Collection 9000 Series desk stands 30½ in. high, is 68 in. long and 34 in. wide. It is made of solid mahogany and mahogany veneers. Design features include 2 kneehole locking devices and writing panels in the top drawers of each end. Kittinger Co., Buffalo, NY.

510 Lounge chair and ottoman
The Wilkhahn FS executive lounge chair and ottoman, designed by Franck and Sauer, are upholstered in leather. The chair features a tension controlled tilt and swivels on a base with glides. Base finish options include polished aluminum and bronze. Vecta Contract, Grand Prairie, TX.

511 Chair
The Grilli arm or side chair, designed by Simonit, is of beechwood construction. It is available in a variety of wood stains and finishes. An upholstered back version is also available. Beylerian Limited, New York, NY.

512 Health-care fabrics
The EnviroTex collection is made of 100 per cent Fireproof Polyester, which fulfills all flame retardance requirements and is washable at 160 deg. The collection includes 102/104-in.-wide knitted fabrics and 72-in.-wide woven fabrics. DesignTex Fabrics, Inc., Woodside, NY.

513 Chairs and tables
An armchair has an upholstered seat and a solid beech frame in a natural finish or a choice of 6 colors. Square and rectangular tables have beech frames and tops of ash veneer with beech stepped, rounded and tapered edges. Stendig, Subsidiary of Stendig International, New York, NY.

514 Office furniture
The 9800 Series of desks, tables, credenzas and files features a full panel design in oak solids and veneers. End panels have reveal lines on outside and inside faces; tops have centered reveal lines. Series components accommodate CRT equipment. Myrtle Desk Co., High Point, NC.

515 Shelving
The Executive Shelving Group is available in heights of 28, 42 and 72 in.; depths are 12 and 16 in. Shelves are adjustable in 1-in. increments. Modules are 36 in. on center. Shelf surfaces are oak, walnut or mahogany veneers; edges are in matching solid woods. Tuohy Furniture Corp., Chatfield, MN.

516 Chairs
The Westport Collection features frames of solid oak, cherry, mahogany, walnut or ash. Seats and backs are upholstered. Armed chairs come with 2 back variations: cut-out corners below the arms, or an inner panel of 2 vertical concave wood frame elements. Modern Mode, Inc., Oakland, CA.

517 Chairs
The frame of the Lisberg Chair is made of laminated oak. The seat and back feature a steel-reinforced molded plastic inner shell. The upholstery, foam and inner shell are bonded together. Chairs come with or without arms in standard and stacking models. Executive Office Concepts, Compton, CA.
Furnishings Product literature

518 Furnishings
An extensive color catalog features office furniture collections, textiles and objects created by such notable designers as the Vignellis, Douglas Ball, Niels Diffrient and Don Petitt. Photos show collections in show rooms and in actual installations. Sunar Hauserman, Cleveland, OH.

519 Custom-built furniture
An 8-page color brochure features custom-designed furniture claimed to be offered at mass-production prices. Capabilities and processes are described and illustrated in photos. A number of installations are also shown. Spec'built—Specification Built Corp., Carlstadt, NJ.

520 Stacking chair
Photos illustrate the Skagen stacking chair in a 4-page color brochure. Diagrams with dimensions show chairs both with and without arms. A dolly and a cart designed for transporting stacked chairs are shown. A close-up photo shows the optional ganging device. R-Way, Sheboygan, WI.

521 Kitchen cabinets
Photos show installations of several styles of solid oak and Formica laminate-surfaced kitchen cabinets in a 12-page color brochure. Close-up photos show design details, such as self-closing hinges, slide-out trays and adjustable shelves. Optional accessories are also shown. Merillat Industries, Inc., Adrian, MI.

522 Seating
Focus 1 chairs, with arms and pedestals in a choice of woods and sculpted urethane foam shells, are featured in a 12-page color brochure. Each of the operational and management chairs and a stool are shown in photos and diagrams. Kimball Office Furniture Co., Div. of Kimball International, Jasper, IN.

523 Computer furniture
Furniture modules with metal bases and cantilevered laminate surfaces are featured in a 4-page color brochure. Items covered include mobile and stationary printer stands and shared terminal workstations with turntables. Diagrams with dimensions are included. James Systems Div., James Metal Products Co., Chicago, IL.

524 Office furniture
Option Two, a system that features basic components detailed in either contemporary or traditional styles, is described and illustrated in a 20-page color brochure. Desks, pedestals, tables and credenzas in oak or mahogany are illustrated in each of the two styles. Sizes are listed. Hiebert, Carson, CA.

525 Pre-wired panels
TriCircuit EK-A open plan power panels are featured in a 12-page color brochure. Installation details show panels that contain 3 separate 20-amp circuits within base raceways to provide 60-amp capacity per panel. Sections show panel construction. Haworth, Inc., Holland, MI.

526 Laboratory furniture
An extensive catalog features Chromatic laboratory furniture, made of heavy-gauge steel finished in modified acrylic and available in seven tones of 5 bright colors. Also covered in photos and diagrams are wood and laminate furniture and safety equipment. Contempra Furniture Div., Fisher Scientific Co., Indiana, PA.

527 Round reception desks
Diagrams with dimensions and photos of 4 different configurations of Series 12 modular wood reception desks are featured in a 4-page color brochure. Desks, which stand 32 in. high, are available in walnut or oak. Cumberland Furniture Corp., New York, NY.

528 Open office panels
A diagram shows the structural components of 8000 Series panels in an 8-page color brochure. Configurations with both fabric-covered and glazed curved and straight panels are shown in photos. Dimensions of acoustical and nonacoustical panels with and without power raceways are listed. All-Steel Inc., Aurora, IL.

529 Lounge seating
A 4-page color brochure features the Profile Series of chairs, 2- and 3-seat sofas and coffee and end tables. All pieces have frames made of red oak. Photos show each item as well as samples of the 4 available finishes. Aiden Furniture, Inc., Lowell, MA.
530 Picture-hanging devices
A 6-page color brochure describes and illustrates picture hooks, hanger rods, clips and holders. Photos show installations, and line drawings show individual devices and installation details. Technical data are included. Walker Systems, Inc., Duluth, MN.

531 Desk accessories
The Radius One and Radius Two series of desk accessories are featured in a 58-page catalog. Photos illustrate individual items and design features, available colors, dimensions and prices are listed. Construction materials are described and specifications listed. Smith Metal Arts, Buffalo, NY.

532 High-density storage
A 30-page color brochure illustrated with photos and drawings covers 15 aspects of high-density mobile storage and filing systems, including floor loading, safety, security and architectural constraints. Case studies are described. Spacesaver Corp., Fort Atkinson, WI.

533 Carpets
A reference manual includes specifications for over 30 carpet styles. Also included is information on building code requirements and flammability. A chart lists methods of removing several different types of stains from both wool and synthetics. Porter Carpet Mills, Inc., Cartersville, GA.

534 Wood cabinets
A 4-page color brochure features a line of kitchen cabinet and vanity styles. Detailed elevations show all units, dimensions and trim. Construction and finishes are described. Specifications are listed. Kitchen Kompact, Inc., Jeffersonville, IN.

535 Open plan furniture
An 8-page color brochure features the IOP open plan system. Detail photos show panel hinges, wire management, storage and task lighting. Photos of typical workstations show furniture fabric and wood combinations. JG Furniture Systems, Div. of Burlington Industries, Quakertown, PA.

536 Open office delivery
A 16-page color brochure describes IPA-SIX, a plan by which this company offers over 75 per cent of its systems configurations with 6 weeks' delivery. System components are illustrated in photos and isometrics with dimensions. Panel fabric color options are shown. Specifications are listed. Hiebert, Carson, CA.

537 Open office system
The UniGroup open office furniture system is featured in a 26-page color brochure, which includes illustrations of work spaces created from user studies. Other open plan elements from this company, such as lighting, prewired panels and filing, are also covered. Haworth, Inc., Holland, MI.

538 Seating
The Omni and Ultra series of ergonomic chairs are shown and described in a 6-page color brochure. Features such as pneumatic adjustments and double casters on 5-prong bases are highlighted. A desk chair and a drafting stool are also covered. Product data and a color chart are included. Sun Flax, New York, NY.

539 Desks and credenzas
A 6-page foldout brochure features the Radius/Square executive furniture collection designed by Robert DeFuccio. Photos show details of wood desks, such as recessed wood drawer pulls and a stationery drawer with adjustable slide-out shelves. Domore Corp., Elkhart, IN.

540 Insulating window shades
Two styles of insulating shades are featured in an 8-page color brochure. Photos show several installations and diagrams show installation details and shade composition. Insulating values, a color chart and specifications are included. Appropriate Technology Corp., Brattleboro, VT.

541 Open office system
An open office system of panels and workstations as well as reception lounge furniture is illustrated and described in an 18-page color brochure. Photos show a wide variety of office configurations and options, such as shared workstations and open or closed filing. All-Steel, Inc., Aurora, IL.
542 EDP media filing
Open and closed mobile and stationary filing systems for EDP printouts, tapes and disk packs are featured in a color catalog. Photos of items are accompanied by tables listing product descriptions and unit prices. Computer station work surfaces and accessories are also covered. Wright Line Inc., Worcester, MA.

543 Keyboard shelf
The Ultronic 9000 articulated keyboard shelf is featured in a 4-page color brochure. As described, the metal shelf has a 6 1/2-in. vertical adjustment and a 5-in. horizontal adjustment and can be rotated up to 30 deg. Steelcase, Inc., Grand Rapids, MI.

544 Museum storage
A space-planning guide uses schematics of installations to demonstrate how museum storage capacity can be increased 100 per cent with the use of manual or automatic mobile storage systems. Case studies discuss storing materials from rock specimens to historical costumes. Spacesaver Corp., Fort Atkinson, WI.

545 Photographic murals
A 12-page brochure features selections from The Past Tense Collection of photographic images. Pictures may be color toned, enlarged, laminated and installed. Clients’ photos may be produced to specifications as well. P.S. Decor, Div. of Photographic Specialties, Minneapolis, MN.

546 Computer furniture
Workstations and storage accessories are featured in a 16-page color catalog. Design features, such as steel frames, cantilevered surfaces and a wire control system are described and shown in detail. Marvel Metal Products Co., Chicago, IL.

547 Movable filing
A 20-page brochure features Kompakt, a high-density movable filing system. The brochure includes diagrams, applications and specifications and covers new construction, floor loads and office interior arrangements. Kardex Systems, Inc., Marietta, OH.

548 Tables
A brochure features the Cherner Group of tables, which comes in fixed, folding or flip-top versions. Table surface materials include oak veneer and Natural Oak or Almond Formica. Table shapes are rectangles, squares and circles in a number of sizes. Howe Furniture Corp., New York, NY.

549 Open office system
An extensive color brochure features the IPA system of glazed or wood-capped fabric acoustical panels and wood furniture for the open office. Office furniture, filing and storage and secretarial workstations as well as wire management and locking systems are shown in photos and described. Hiebert, Carson, CA.

550 Filing and storage
Photos of installations show a wide variety of file cabinets in a 34-page color brochure. Diagrams show file drawer capacities. Drawings show drawer suspension and standard units and configurations. Lists of available dimensions are included. GF Furniture Systems, Inc., Youngstown, OH.

551 Office furniture
A 6-page foldout brochure features the S8 Office series of desks, tables, credenzas and mobile pedestals. Photos illustrate design features, such as a drop leaf hinged to a desk to convert it to a conference table. Pedestals are shown in 3 models with and without casters. Domore Corp., Elkhart, IN.

552 Open office system
System 2, a furniture system that combines wood and fabric, is covered in a 10-page color brochure. System features, such as shared CRT workstations with terminal turntables, task lighting and acoustical panels, are described and shown in photos. Overhead storage and file drawers are also covered. Conwed Corp., St. Paul, MN.

553 Filing systems
Photos of installations of open and closed filing systems are featured in an 8-page color brochure. Systems include vertical and lateral files, panel-mounted storage, EDP filing units and suspended and independent pedestals. An insert includes diagrams and dimensions of each unit. All-Steel Inc., Aurora, IL.
Thoughtful planning and Haworth open office systems provided it. Computer designers Trilogy Systems Corporation wanted their new headquarters to emphasize high technology, while affording intelligent solutions for growth. The project architects and designers created a contemporary open plan approach with standardized Haworth work stations that are easily reconfigured.

Haworth's comprehensive offering of UniTek™ Electronic Support componentry plus the electrical distribution capabilities of TriCircuit ERA-1™ panels best accommodated Trilogy's widely applied office electronics. The result—an intelligent, aesthetically pleasing, systems solution.

Send for the "Haworth Case Study Package" today: Haworth Inc., One Haworth Center, Holland, MI 49423 U.S.A.
NEW KIRSCH VERTICALS
MADE OF TRIANTI® FIBER GLASS.
COME TOUCH OUR SOFT
TEXTURED YARNS.

The feeling is remarkable. The yarn is Trianti. It's a new generation of multi-strand, textured fiber glass yarn from PPG Industries. And it has just allowed Kirsch designers to create a wider range of patterns—from open designs to heavy homespun—but all soft to the touch. These new Kirsch vertical blinds give you more choice in control of sunlight, and each has been treated with a soil release, so dust shakes loose or whisks away with a vacuum brush. Firesafe? A given with fiber glass. Colorfast, too.

Contact your Kirsch representative to see current color choices and new patterns. And touch PPG's soft new fiber glass yarns.

PPG Industries, Inc., One PPG Place, Pittsburgh, PA 15272.

Circle 1099 on inquiry card
HIEBERT

You've met Hiebert's IPA!
Now meet IPA-SIX!

IPA-SIX is Hiebert's commitment to ship you over 75% of systems configurations most often ordered... in six weeks or less...and with universal components!

Other Advantages?
Besides the obvious advantages of being able to obtain an almost endless selection of configurations or clusters of stations on a six week basis, remember:

- Growing companies can count on an orderly supply of systems furniture on an ongoing basis.
- Large corporate users can standardize on IPA-SIX parts and use this program as if it were their own warehouse or "attic stock."
- All accounts can count on a large selection of free standing furniture and seating to blend in to their systems requirements, most of these items also being available on a six week basis.

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Manufacturing Facilities: California, North Carolina, Pennsylvania
Showrooms: Dallas, Houston, Kansas City,
Minneapolis, Los Angeles, San Francisco,
Chicago, Philadelphia, St. Louis, and Washington, D.C.
DIVISION, HON INDUSTRIES
Circle 1100 on inquiry card
Systems with a Commitment to Choice and Performance

SunarHauserman boasts more systems to divide space effectively than any one in the marketplace—ceiling to floor, wall to wall and many in between.

Elements which link SunarHauserman Systems are the S Drawers.

And all are compatible one with another. Skillfully detailed, they work well together but avoid unnecessary regimentation. Designer Glynn Brown sums it up: “The appeal to the client is performance—the Race® system’s capacity for physical change and wire handling that no other system has.”

What’s true of the wire and space management Race System, designed by Douglas Ball, is also true of Douglas Ball’s post/panel PAS System and his Douglas Group of desks and enclosures in wood. His Uniwall and S Drawer storage systems are another of the unifying links in all his system designs. And now, the recently introduced Cameron Group, is Ball’s design response to the continuing necessity and place in the world of office work, for the free-standing desk with attendant work and storage units. The electrical and communication raceways are accessed from end panels or longitudinally on runoffs.

The Cameron Group combines Ball’s design skill and knowledge of production in wood and metal with the company’s manufacturing and engineering capability in both. The details, finishes, and colors of Cameron are designed to fit with Race®, with Design Option™ Wall and Panel Systems. The latter is the first system to offer virtually unlimited choice: full-height walls, panels and post/panels. These systems have modular, interchangeable components—worktops, drawers, storage units in a wide selection of material, fabric, and finish.

And the Electronic Support Furniture, introduced in Chicago this year, is design-engineered to work smoothly with Design Option™ post/panel or full-height walls as well as with sophisticated electronic equipment. It consists of free-standing elements, combined with connecting tops—in almost unending ways—for data entry and retrieval, systems analysis, programming—in fact, any function of the electronic workplace.

All systems reflect quality, care, and commitment from SunarHauserman people—from designers, engineers, installers and servicemen. Full-height walls, low walls, panels and pads—all are movable, with unique visual and functional features designed into them. The systems work together for a total environment that fits usual and unusual needs of office, manufacturing facility, or institution. With their special perspective,
based on decades of experience in the production of responsive product, Sunar-Hauserman is expert in environments which support business goals. They have an obligation to choice and performance.

For more details may we send you our brochure SunarHauserman: A Structure for the future?

SunarHauserman, Inc.
5711 Grant Avenue, Cleveland, OH 44105

SunarHauserman, Ltd.
One Sunshine Avenue, Waterloo, Ontario, Canada N2J 4K5

Are you on our Leading Edge mailing list? If not please write on your letterhead.

Circle 1101 on inquiry card
Behind every chair you’ll find its best feature.

SystemSeating by Haworth is deep in options and innovative tradition. As fundamentally versatile as the office interior systems that bear the Haworth name, SystemSeating can be tailored to every task and situation. Scaled for today’s open office interior systems environment, engineered for the human anatomy, SystemSeating represents a broad, visually consistent seating offering with distinctive options in performance, construction and cost. All in a vast selection of colors, fabrics, textures and finishes that you can mix and match to meet any seating situation. All backed by one, good family name.

Send for the "SystemSeating Package" today: Haworth Inc., One Haworth Center, Holland, MI 49423 U.S.A.

Circle 1102 on inquiry card
You create flexible space.
We create flexible tables.

When one of our many flip-top or folding tables is being flipped or folded, it's helping change the nature of your space in minutes. Any other time, of course, it's doing what a table gets paid to do. And just how solidly it sits and feels while performing its traditional duties is something that interests our engineers no end. In fact, their stability standards are very high. Just think of the Rock of Gibraltar on a hinge.

HOWE, 155 East 56, N.Y., N.Y. 10022 (212) 826-0280
554 Audiometric booth
The Eckoustic Model AB-200/EC booth for testing hearing is 25 1/2 in. deep and comes preassembled. Typical noise reduction is claimed by the manufacturer to be 36 dB at 500 Hz, 46 dB at 1000 Hz, and 52 dB at 2000 Hz. Eckel Industries, Inc., Eckoustic Div., Cambridge, MA.

555 Instant computer rooms
Self-contained computer room units come in any size. They are designed to provide thermal and sound insulation and to keep computer areas dust-free. Units are available with independently controlled lighting. National Partitions & Interiors, Hialeah, FL.

556 Restroom buildings
Both permanent restroom buildings and ones that can be relocated feature 2-pint flush vacuum toilets. The systems, which need only electricity and water to operate, feature vacuum holding tanks and require no sewers. Envirovac, Inc., Rockford, IL.

557 Fabric structures
Ten Star tension membrane structures are 40 to 120 ft wide and 20 to 30 ft long. They are supported by arches that are stabilized by bias cable net bracing. Exterior and interior linings meet NFPA 701 for flammability. Air-Tech Industries, Inc., East Rutherford, NJ.

558 Arena dasher panels
Rinkmaster Fiberglass II panels for hockey rinks and soccer arenas weigh 80 lb per 8-ft section. They are made of fiberglass bonded to wood frames with 2-in.-square plated steel tubing supports and 8-in. reinforced steel mounting plates. Holmsten Ice Rinks, Inc., St. Paul, MN.

559 Radiant floor heating
A radiant floor heating system uses EPDM tubing embedded in Gyp-Crete floor underlayment. Warm water flows through the tubing to radiate heat through the thermal mass. Components include manifolds, a water heater and a control panel. HydRadiant, Inc., Div. of Gyp-Crete Corp., Hamel, MN.

560 Solar collectors
Trismine medium temperature solar collectors for commercial applications feature advanced absorber plates with integral selective surfaces, reinforced aluminum housings and modular mounting systems. Sizes are 4 by 12 ft, 4 by 8 ft and 3 by 8 ft. Solar Industries, Inc., Manasquan, NJ.

561 Swimming pool decks
Foilian is a glasslike surface designed for commercial pool deck applications. It is made of a 11,400 denier Polyfilm yarn system and a vinyl backing, and it is claimed to be unaffected by exposure to the sun and water. Playfield Industries, Inc., Chatsworth, GA.

562 Ceiling/lighting system
The Aspect system incorporates standard sizes of luminaires without breaking the ceiling plane. It features an open cellular ceiling, into which downlighting units fit in square cells and accent lights and wall washers in rectangular cells. Intalite Louvers and Ceilings Inc., Northbrook, IL.

563 Synthetic soccer surface
Varsity is an indoor/outdoor surface with grasslike fibers and 2 secondary backings. One backing is a vinyl coat that locks tufts of fiber into the primary backing. The second is a high-density vinyl foam. Surface units are 6 or 12 ft wide and 80 ft long. Holmsten Ice Rinks, Inc., St. Paul, MN.

564 Saunas
Custom made Executive saunas in sizes from 4 by 4 by 7 ft to 9 by 12 by 7 ft feature solid redwood interiors and finished plywood exteriors. They have stainless steel heaters, which produce both dry heat up to 180 deg and rock steam. Rocks are included. Am-Finn Sauna Co., Valley Forge, PA.

565 Generating kit
A solar-powered electric generating kit designed for residential application furnishes 12 volts DC current. Components include a photovoltaic power module, electronic controls and 3 high-efficiency fluorescent lights. Solar Power Corp., Woburn, MA.
CREATE A LASTING IMPRESSION
WITH ODC'S ENGINEERED SILICONE FABRICS

ODC's capabilities go far beyond fabric coating. We provide design, engineering, fabrication, and installation of tension and air-supported structures. Contact us for specific information about our pre-engineered structures and custom design and engineering services. Refer to Sweet's 43.1/ODC or call Sweet's BUYLINE®.
A futuristic look using Hunter Douglas Luxalon linear ceiling graces the Detroit Science Center. The colors are produced with carefully planned lighting.
YOU'LL BE AMAZED WHAT YOU CAN DO WITH HUNTER DOUGLAS ARCHITECTURAL PRODUCTS

Hunter Douglas began simply manufacturing and coating aluminum strip. But today we do much more.
We worked with the metal every day, finding out its needs and its abilities, much as a potter learns the strength and beauty hidden within his clay.
Our growth into engineering and manufacturing culminates today in one of the most complete lines of architectural products available in the United States. Or in the world.

The Commerce Court in Toronto is comfortably lit with one of the world's largest banks of blinds, made by Hunter Douglas. They're electrically operated.

YOU CAN INSTALL A BETTER WINDOW

The Thermostop coating isn't the only innovation we've come up with for turning blinds into energy saving devices. We've also developed the next generation of between-glass blinds.
The Hunter Douglas Flexalum magnetically operated between-glass blind is the first that can be installed in hermetically sealed as well as regular double-glazed windows.
The key is in our magnetic operator, which doesn't require a mechanical transfer. It also allows easy retrofitting in non-hermetically sealed double-glazed windows.

YOU CAN TURN YOUR IDEAS INTO A CEILING

We introduced linear aluminum ceilings in the United States. More important, we still offer a wider range of carriers, making the Hunter Douglas linear aluminum ceiling the most versatile system available. Our ceilings fit your ideas instead of the other way around.
We also have a wide range of colors and finishes for indoor and outdoor use. Luxalon® linear ceiling is versatile. And, frankly, it can be very good looking. You'll find our products in some of North America's most exclusive shopping malls, fashionable stores, and grandest office buildings.

Hunter Douglas specializes in the development of corporate design programs made easily and inexpensively in the wide range of styles and colors available through the Luxalon facade package. Custom colors are also available.

YOU CAN BE SURE OF WHAT YOU'RE GETTING

This is just the beginning. After fifty years in the business of making aluminum functional and durable, we're making it beautiful.
You'll find Hunter Douglas' mark in architectural design and planning in 85 different countries.
In the area of architectural products, we make everything from sun louvres to ceilings, to facades to window coverings; we are, in fact, the largest producer of venetian blinds components in the world.
Find out more. Contact your Hunter Douglas representative, or Hunter Douglas Architectural Products, 87 Route 17, Maywood, New Jersey 07607, 1-800-631-7274.

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Architectural Record December 1983 191
KPS. A MOST EXTRAORDINARY DEVELOPMENT IN PRE-FABRICATED BUILDING SKIN SYSTEMS.

KPS (Keraion® Panel System) is the end result of two major technological advances. That of the manufacture of the world's most advanced ceramic tile, Keraion... and that of the unparalleled bonding characteristics of structural silicone.

Affording the designer a wide choice of grid modularity, color, texture and design flexibility, KPS technology incorporates the most desirable facade properties: lightweight (7.2psf), economical, excellent insulation values, resiliently bonded skin allowing movement capability, frost-proof and non-fading and test results that will satisfy the architectural connoisseur.

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Suite 450
5780 Peachtree Dunwoody Rd., NE
Atlanta, Georgia 30342
Telephone: (404) 256-0999

Circle 1106 on inquiry card
Levolor color-T-grid introduces style and color to ceilings on slim budgets.

For pennies more per square foot than you'd pay for ordinary T-grid ceilings, you can specify the new Levolor color T-grid Suspension System. And color-T-grid can be perfectly color-coordinated with Levolor Linear Ceilings and famous Levolor Blinds to create exciting drama. Color T-grid comes in over 100 matching Levolor designer colors and finishes.

A slim budget is no longer an obstacle. Levolor color-T-grid makes ceilings with flair affordable.

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Let Your Imagination Soar with Helios

Break away from routine corners and walls by designing a Helios Soft Shell Structure. Discover the endless possibilities of working with soft fluid lines. Combine translucent texture with vibrant colors. But best of all, bring in natural open-air feeling into your environmental statement.

with flexibility, practicality and economy...

Creativity doesn't exclude professional practicality. Helios tensioned membrane structures offer realistic and economical solutions to a variety of structural applications, from vast arenas—like the one shown here from Canada's Wonderland in Toronto—to totally enclosed structures.

With Helios Industries behind you, your creative freedom is virtually limitless. They'll translate your design into a tangible full scale structure. Or their in-house design team can work with you to create the most people-pleasing and practical solution to your project.

So, if your imagination is ready to take off, contact the people at Helios Industries.
Helios Industries, Inc.
20303 Mack Street
Hayward, California 94545, U.S.A.
Telephone (415) 887-4800
Telex 176226

Circle 1108 on inquiry card

HELIOS INDUSTRIES INC.
Soft Shell Structures
13 Special Construction Product literature

566 Swimming pools
The Swimming Pool Buyer's Guide and Operations Handbook features stainless steel perimeter systems, acoustical panels and other commercial swimming pool equipment. Technical data, drawings and sections on conserving energy and filtration are included. Reereonics Corp., Indianapolis, IN.

572 Clear-span domes
Three types of aluminum clear-span domes are illustrated in photos of installations in a 12-page color brochure. Spans, functions and benefits of the domes are described. Drawings detail dome frame joint construction. Temcor, Torrance, CA.

567 Domes
A brochure and specification sheet cover VARAX domes, which can span a 40-ft playsheld or an 800-ft major sports stadium. Specifications include general data and information on materials and installation. Western Wood Structures, Inc., Tualatin, OR.

573 Modular offices
A new brochure features modular in-plant offices for industrial applications. As described, the modular system is based on 4-by-8-ft panels that are 3 in. thick. Panels come in solid versions or with windows or doors, all of which are reusable and interchangeable. National Partition & Interiors, Hialeah, FL.

568 Domed arenas
A 6-page color brochure on multi-use domed arena design features a pop-up 3-dimensional page to illustrate this company's design solution. The financing of building and maintenance costs is discussed in detail. Arena Dome Associates, Tualatin, OR.

574 Acoustical floors
An underlayment that reduces sound transmission through hard flooring is featured in a 4-page color brochure. Section details show installation components. Applications are described and a table of physical properties and specifications are listed. Laticrete International, Inc., Bethany, CT.

569 Clear clear spans
Cryostopon domes of all-aluminum geodesic and space truss configurations with clear acrylic glazing are covered in an 8-page color brochure. Photos show installations while dome structural data, functions and benefits are described. A drawing details dome frame joint construction. Temcor, Torrance, CA.

575 Passive solar structures
Photos showing residential and commercial installations of greenhouses and solarium structures as well as automatic shading devices are featured in a 32-page color brochure. Diagrams illustrate system construction and function. Four Seasons Solar Products Corp., Farmingdale, NY.

570 Solar collectors
A packet of literature includes product data sheets for 3 models of solar collectors. Diagrams with dimensions, details of mounting systems and panel construction, performance charts and technical data are included. Diagrams of solar-heated water systems are also shown. Solar Industries, Inc., Manasquan, NJ.

576 Waste vacuum collection
Vacuum collection systems for both permanent and portable restroom facilities, which reduce water consumption and waste volume, are featured in a 4-page brochure. Diagrams illustrate system construction and function. Envirovac Inc., Rockford, IL.

571 Pool system
The SCES system, designed to maintain "fast" water during swimming competitions, is featured in a new brochure. As described, the stainless steel perimeter recirculator quells turbulence while the overflow system returns water in pace with the rate of overflow. Paddock Pool Equipment Co., Inc., Rock Hill, SC.

577 Hot tubs and saunas
Spas, hot tubs and saunas are featured in a 56-page color catalog. Photos of installations accompany descriptions of each model. A combined hot tub and spa, called a Spatub, is highlighted. Accessories, including roll-tops and decks, are also covered. California Cooperage, San Luis Obispo, CA.
More architects specify The Intelligent Elevator.

U.S. ELEVATOR MICROPROCESSORS FOR EVERY TYPE OF ELEVATOR.

U.S. Elevator created it, a microprocessor-control installation so intelligent that it can command every facet of your entire elevator system. Allowing more creative design solutions to modern construction problems.

It's no wonder that we've built more microprocessor-controlled elevators than any other company. Machine room space is significantly reduced. Traffic is speeded with quicker response times, flight times, priority service. Operating costs are reduced, with instant computer printout analysis to prove it. In addition, this is the only microprocessor system with a Remote Performance Monitor which can communicate over a phone line to the service office. Trouble spots can then be immediately identified and corrected.

Whatever type of building you design, whatever elevator application you specify, we can provide the right microprocessor-control system at the right price. Gearless or geared and even hydraulic elevators...all systems will benefit from our most sophisticated third generation of microprocessor-control systems.

MORE RELIABILITY, LESS COST.

U.S. Elevator microprocessors are more reliable and less costly to maintain. They operate the elevator system more efficiently so passengers (and building owners) are more satisfied. They are programmable, so if traffic patterns change, the system can be quickly adjusted to compensate. And because we are the most experienced in building microprocessor-controlled elevators, we are also the most experienced in servicing them.


U.S. ELEVATOR

A member of the Cubic Corporation family of companies

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Conveying Systems
Product literature

578 Custom elevators
Elevators for residential application are featured in a 4-page color brochure. Photos show 3 available cab designs. Diagrams highlight the components of the lift mechanism and show the total lift design. Specifications are included. Waupaca Elevator Co., Inc., Waupaca, WI.

584 Low-rise elevator
The LRV hydraulic elevator is featured in a 6-page color brochure. Photos illustrate elevator installations and details, while a diagram shows a typical hoistway arrangement. Available interior panel laminate finishes are shown. Otis Elevator Co., Farmington, CT.

579 Elevator cabs
Several designs of elevator cabs and entrances are illustrated in photos of installations in an 8-page color brochure. Section details show the construction of various cab components and cab lighting options. Tyler Elevator Products, Inc., Cleveland, OH.

585 Hydraulic elevators
Premanufactured oil hydraulic elevators are featured in a new brochure. Loose-leaf inserts for each of 8 styles, including one for hospital applications, show plans and optional equipment and list specifications. Montgomery Elevator Co., Moline, IL.

580 Vertical conveyors
Diagrams of typical building plans and sequences of operation for 3 different models of Record®/dtf selective vertical conveyors illustrate a 30-page brochure. A table lists system features, and photos show component parts. Fiberglass trays are shown with lists of their dimensions. Translogic Corp., Denver, CO.

586 Materials handling
ToteStacker, a computerized system for automatically delivering parts to appropriate stations on an assembly line, is featured in a 6-page color brochure. Diagrams and photos of installations are included with descriptions of system hardware, installation and operation. Litton UHS, Florence, KY.

581 Table top conveyors
Photos of the manufacturing process and installations of Seco table top conveyors illustrate a 6-page color foldout brochure. Standard features, such as interfaced connections with associated equipment and steel shafting, and optional features are listed. Simplomatic Engineering Co., Lynchburg, VA.

587 Elevators
Hydraulic, traction and freight elevators for low- and mid-rise buildings are covered in an 8-page color brochure. Drawings of system installations and technical data are included. Also shown in photos and diagrams are various opening and cab designs. General Elevator Corp., Orlando, FL.

582 Residential elevators
Two models of residential elevators are described in a 4-page brochure. A drawing illustrates and a table lists each model's cab dimensions. Specifications are included. Sedgwick Lifts, Inc., Poughkeepsie, NY.

588 Mail delivery
The Mailmobile, a battery driven automatically guided delivery vehicle, is covered in a 6-page brochure. Product features and installation data, as well as specifications, are listed. Bell & Howell Automated Systems Div., Zeeland, MI.

583 Elevator drive system
A 6-page color brochure details the benefits of the Dynatron elevator drive system. As described, the system uses a single-speed AC motor and is best suited to low- to mid-rise office or apartment buildings or garages. Schindler Haughton Elevator Corp., Toledo, OH.

589 Elevators
Hydraulic and geared elevator systems for low-, mid- and high-rise buildings are featured in a 24-page design and planning guide. Diagrams and details show system arrangements and tables list hoistway dimensions. Hospital elevators and escalators are also covered. Otis Elevator Co., Farmington, CT.
590 Elevator performance
A 4-page color brochure serves as a checklist for use in evaluating the performance of existing elevator systems. It is composed of 10 questions designed to diagnose typical problems that may be remedied by modernization. Westinghouse Elevator Co., Div. of Westinghouse Electric Corp., Short Hills, N.J.

591 Geared traction
Presidential Series geared traction elevators with microprocessor controls are covered in a 4-page brochure. Model capacities and speeds, a drawing of a typical system and cab finishes, ceiling options and fixtures are featured. U.S. Elevator, member of the Cubic Corp. family of companies, San Diego, CA.

592 Electric track conveyor
Simacon VT, a mini electric car system for vertical or horizontal transport of materials, is featured in a 24-page brochure. Typical system layouts, stations and track construction are shown in drawings. Photos show component parts. Architectural details and data are included. Translogic Corp., Denver, CO.

593 Lifts and dumbwaiters
Drum and traction dumbwaiters and parcel lifts are featured in an 8-page brochure. Information on applications, features and modifications and specifications are included. Section details show installations and door options. Sedgwick Lifts, Inc., Poughkeepsie, NY.

594 High-rise elevators
A 16-page color brochure details the Miconic V elevator control system for high-rise buildings. The operation of the traffic handling system is explained along with information on drive controls and installation. Schindler Haughton Elevator Corp., Toledo, OH.

595 Elevator schedule planning
A packet of literature covers OTISPLAN, a computerized planning program that evaluates data, such as traffic patterns, on a proposed installation and selects optimum elevator configurations. As described, printouts list results in numerical, chart and graph form. Otis Elevator Co., Farmington, CT.

596 Pneumatic tubes
Series 30 computerized tube systems are featured in a 22-page brochure. Component parts, including carriers, transfer units, blowers and controls, are illustrated in photos and diagrams and described. Sample control center computer screen displays are also shown and described. Translogic Corp., Denver, CO.

597 Dumbwaiters
An illustrated planning guide shows elevations and plan views for counter- and floor-loading lift systems. Systems covered include heavy-duty, high-speed traction, moderate-speed traction, electric drum drive and letter lifts. Montgomery Elevator Co., Moline, IL.

598 Dumbwaiter
A page of literature illustrates and describes the Homewaiter 75 dumbwaiter. Photos show 2 views of an installation, and text describes design features and construction. Section details with dimensions illustrate system components. Inclinator Co. of America, Harrisburg, PA.

599 Conveying solutions
Seven typical cases in which this company's material handling system solved handling problems are listed in a 4-page bulletin, which also describes how the negative pressure pneumatic system operates. Eastern Cyclone Industries, Inc., Fairfield, NJ.

600 Traction elevators
A new brochure features standard traction elevators. Cabs, doors, openings, fixtures and controls are illustrated. Specifications for each of 8 models, including one for hospital applications, show standard and optional features. Montgomery Elevator Co., Moline, IL.

601 Mid-rise elevator
A mid-rise elevator system with variable frequency drive control is featured in a 16-page color brochure. Graphs show energy consumption and flight time comparisons with conventional systems. Photos show components and a diagram shows a typical hoistway. Otis Elevator Co., Farmington, CT.
A “living” building that adapts to its environment.

ELEVATORS BY DOVER

From night to day, season to season, the dynamic skin of the Hooker Chemical Center is in a constant state of change. The exterior consists of two glass walls about four feet apart, with louvers between these walls that open and close, adjusting automatically to outside light. The result is an extraordinary energy consumption less than half that of a conventional structure. This energy-efficient building is served by four Dover Traction Elevators. For more information on Dover Elevators for all types of buildings, write Dover Corporation, Elevator Division, P.O. Box 2177, Memphis, Tennessee 38101.

Hooker Chemical Center
Niagara Falls, New York

ARCHITECT:
Cannon Design Inc.

GENERAL CONTRACTOR:
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Dover Elevators sold and installed by Dover Elevator Co., Buffalo, N.Y.
Oasis® makes ice a solution, not a problem.

When the coil or tank ices up on ordinary water coolers, you can have a problem. It can be as annoying as no water from the bubbler. Or as damaging as a burst water line.

Oasis water coolers, however, use a patented "ice bank" design to put that ice to work. The system allows us to intentionally create just enough ice to help cool the water. But not enough to stop the water flow or damage the system.

This carefully controlled ice buildup results in a constant supply of cool, refreshing water.

Our unique cold water storage tank design also results in longer life for the entire system. In any location an Oasis water cooler has far fewer compressor starts than ordinary coolers. And that means less wear and tear on the thermostat, overload relay and compressor.

Of course it costs more to build this kind of cooling system. But if we built it any other way, it wouldn't be an Oasis. And the cold fact is, you don't need the problems that could present. Get full details in the Sweet's or Hutton Files. Or write: Ebco Manufacturing Co., 265 N. Hamilton Road, Columbus, Ohio 43213.

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Selected for The Design Collection, MoMA.

Uncompromising design and quality are reflected in this all brass modular plumbing system for the kitchen, lavatory and bath. Represented here by a variety of wall-mounted fixtures and accessories finished in 10 epoxy colors, polished brass or chrome. Part of a series available exclusively from Kroin.

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You can credit Haws for today's stylish and sturdy drinking fountains. We invented them. And we've been the leading developer of water dispensing equipment ever since.

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Look to Haws for precision engineered drinking fountains to meet any plumbing specifications. We're the Original. We're the Source. Haws.

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What's so different about this metering faucet?

It works!

The Bradley 90-75

Until Bradley designed the 90-75, savings from metering faucets seldom outweighed the headaches.

Faucets that turn off too quickly or stay on too long, sprays that either splash or dribble, maintenance that never seems to end — the Bradley 90-75 has eliminated these headaches once and for all. It works!

Unlike many faucet designs that severely restrict an orifice to vary their metering cycles, the 90-75 utilizes a generously sized bypass orifice and variable piston stroke. The orifice is protected from waterborne sediment by two filters, one at the stop and one within the cartridge. This unique configuration assures consistent timing — at water pressures from 20 to 100 psi.

All working parts, including the flow control, are contained in a compact cartridge. Because it's hidden inside the faucet, the cartridge can't be removed by vandals. Yet if maintenance is ever needed, a new cartridge can be popped into place in seconds — just about as easily as you'd change a flashlight battery.

The 90-75 keeps a reliable rose spray pattern, thanks to a unique self-cleaning feature. Every time the faucet is turned on, water pressure forces a rubber diaphragm inside the spray former to "flex" off any mineral deposits. So the nonsplash action stays nonsplash.

Easy to adjust, the 90-75 can be set for cycles from 5 to 20 seconds by turning a screw — without turning off the water.

And because it's so easy to activate, the 90-75 meets all barrier-free codes.

These are just a few of the ways our 90-75 meters water better. Find out the rest by returning the coupon, by calling 1-414-251-6000, or by contacting your Bradley Representative.

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☐ Send me the comprehensive Bradley brochure with acetate overlays showing exactly how the 90-75 gets the job done better.

☐ Have a Bradley representative call to show me how the 90-75 works better.

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Suddenly... everything else seems old heat.

THERMOPANEL! A complete pre-assembled radiation and valve system featuring an exclusive self-contained thermostat.

A breakthrough from Sweden, giving new aesthetics to form—new energy consciousness to function—new flexibility to design!

It's the future, and it's beautiful...offering advantages welcomed by every thoughtful architect. Faithful to the Swedish tradition of excellence, Thermopanel introduces a new stancard of hydronic radiation quality. Its economy of installation (saves a full day of labor) plus its aesthetic refinements and high performance characteristics will influence heat planning for years to come.

Delivers high output... smaller and fewer Thermopanel units outperform conventional types. Used as 'modulars', they combine easily to meet any heating requirement—and provide a ready solution to difficult space challenges.

Each one its own zone... the non-electric thermostat (accurate to ½°) allows every area to be individually regulated for comfort and energy savings of 20% to 30%!

Enduring trouble-free operation... silently, without soiling walls. Performance, versatility, a clean streamlined profile, everything to make Thermopanel ideal for a broad diversity of architectural concepts and projects—homes to apartment and office buildings to industrial structures. In every way, the superior choice an architect can be proud to specify!

Thermopanel is 11 7/8" high, comes in nine lengths from 15 3/4" to 110 1/4" in both single and double widths: a total of 18 sizes, providing a wide range of capacities.

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Visu-Temp shows, controls tub/shower temperature. For residential, commercial, and health care applications. Safetymix Visu-Temp is the ideal pressure-balancing mixing valve to specify. Its visible, integral thermometer and color-coded valve plate take the guesswork out of bathing temperatures. And its patented pressure-balancing design (which you can't see) maintains the preselected temperature, when pressure disturbances occur in the system.

For a closer look, circle the number below or contact Symmons Industries, Inc., 31 Brooks Drive, Braintree, MA 02184 (617) 848-2250.
As Project Director for Seattle's new 28-story, 575-room Madison Hotel, Denny Onslow of the R.C. Hedreen Company needed to select a heating and cooling system. He wanted a self-contained system with zonal flexibility, a system that was energy efficient, practical to install and aesthetically pleasing. He knew that a standard packaged terminal heat pump would meet the first two requirements.

However, although standard heat pumps are often specified for single and even some multi-story projects, they present a problem that has plagued high-rise construction for years—winter condensate. In the past, the problem could only be solved by installing an expensive interior drain system or an unattractive exterior system to handle condensate runoff.

Onslow found that General Electric offers a more practical solution: the Zoneline® IV Packaged Terminal Heat Pump with ICR—Internal Condensate Removal. ICR minimizes winter condensate by redirecting it back into the room, producing a pleasant, humidifying effect.

The Zoneline IV Heat Pump, with the exclusive ICR option, provides zonal flexibility, energy efficiency and virtually eliminates the condensate problem. For these reasons, as well as his previous positive experience with Zoneline units, their ease of maintenance and GE product service, Denny Onslow selected the Zoneline IV with ICR for The Madison Hotel • Seattle.

Today, the hotel contains a heating and cooling system that combines state-of-the-art technology with solid-state electronics—electronics that make the Zoneline IV one of the most energy efficient and reliable units in the industry today. The Zoneline IV offers energy management interface, temperature limiting, freeze sentinel and a solid-state compressor protection circuit, to name just a few of its standard features. And simple styling, coupled with sophisticated electronic touch controls, makes the Zoneline IV with ICR a handsome addition to any room on any level.

To get the whole Zoneline story, write J.A. Michelsen, Manager Contract Marketing, General Electric, AP4-130, Louisville, KY 40225.

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GENERAL ELECTRIC

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**16 Electrical**

**Talking exit signs**
Microprocessor-controlled signs that broadcast in synthesized speech operate during power failures. Multimessage units feature combinations of 4 messages and a public address function. Multilanguage units broadcast the word “exit” in 3 languages from a selection of 11. Exit-U, Inc., Easton, CT.

**Floor lamp**
The Float floor lamp stands 58 in. high. It features an adjustable arm. The arm and stem are chrome; the base and reflector come in white or black. The lamp accepts a 50W, 12 volt tungsten halogen bulb. Lighting Associates, Inc., New York, NY.

**Alarm systems**
The Focus 53 can provide 5 separate alarm systems and 24-hour electronic surveillance with 1 control unit. It also can connect to a central computerized station that will monitor the system continuously and relay problems to police or fire stations. ADT, New York, NY.

**Floodlighting**
The Stylvania Metalarc 750W lamp, designed for recreation and sports lighting, carries a lumens per watt rating of 110 and has an average rated life of 5,000 hours. It has a clear bulb with a mogul screw base and operates in the base-up position. GTE Lighting Products, Danvers, MA.

**Underfloor wire system**
**Multi-Zone** is a steel trench system with compartments for regular power, dedicated power, phone and electronic cable and removable steel covers. It is designed to provide wiring for checkout counters with scanning devices and cash registers. Midland-Ross, Electrical Products Div., Pittsburgh, PA.

**Ambient lighting**
**Starr** freestanding cylindrical units are designed to maximize low-angle light distribution and minimize overhead brightness in open offices. The fixture shown is 15 in. in diameter. Other shapes, sizes and mounting options are available. LAM, Inc., Wakefield, MA.

**Fire-rated aftersets**
A fire-rated afterset, which provides access to power and communications wiring from the cellular portion of the deck, is claimed to eliminate or reduce the need for spray-on fireproofing in concrete decks. Raceway Components, Inc., Nutley, NJ.

**Entry control**
The Model 44-40 access control system has a memory for up to 40 tenants and 10 digital keyboard codes. It features a removable printed circuit board, stainless steel face plate, door release light and variable strike time of up to 99 sec. Marlee Electronics Corp., Culver City, CA.

**Automatic thermostat**
The T33 Micro Electronic Thermostat automatically adjusts building temperatures at selected times. Slide selectors set times for up to 4 temperature changes per day. Models for heating only or for heating/cooling are available. Johnson Controls, Inc., Control Products Div., Oak Brook, IL.

**Intercom**
The D-39 Patracom links 6 points and accepts external music and automatic messages. It mounts on a pedestal, table or wall and connects to hand sets and stations for internal communication. Stations may be reached individually or all at once. Broadcast & Related Products/3M, St. Paul, MN.
662 Track lighting
The 3000 series of duo-circuit track and fixtures is claimed to be the smallest single- or double-track available. It measures 1/4 in. high by 1/8 in. wide. The series features a patented "twist clip" mounting designed to reduce installation time. Inlite Corp., Berkeley, CA.

663 Task lights
The UL-listed STC-3S twin task light contains two 14W U-shaped fluorescent lamps, one on each side of a single housing. The light has a 10-in. cord and may be mounted on steel shelves, shelves with a return flange and wood shelves. Halo Lighting Div., McGraw-Edison Co., Elk Grove Village, IL.

664 Low-voltage fluorescents
Accent One is a low-voltage addition to the Focus One series of fluorescent fixtures. The series of round, square, and round rotatable extruded aluminum units with stems or adjustable cables comes in anodized, painted or high-polish finishes. Gardco Lighting, San Leandro, CA.

665 Light fixture
The 215-WM wall-mounted dome can be aimed up or down. It is 25 in. high, has a clear glass ribbed dome measuring 15 in. in diameter. It comes in any color or finish and in several sizes and shapes. It is also available in vandalproof materials. The American Glass Light Co., New York, NY.

666 Access control
The CardAccess 150 system features a microcomputer with programming capability and data memory storage. Its console has a printer, will monitor up to 10,000 card holders, 64 doors and 512 alarm points and provides 16 access levels and 8 time zones. Continental Instruments, Westbury, NY.

667 Accent lighting
The 85 Series of low-voltage units consists of compact high-intensity PAR-36 pinspots, which produce brilliant narrow shafts of light to illuminate individual objects and displays. They are available with a variety of finishes and types of mounting. Lighting Services, Inc., New York, NY.

668 Light tapes
Bare Bud Tape highlighting and accents come on pressure-sensitive flexible flat-wire tapes. Four different lamp shapes are available on 2- or 3-in. centers. Tapes are powered by a Class II UL-approved transformers. Neo-Ray Products, Inc., Brooklyn, NY.

669 Vandalproof lighting
The Protector series of HP4 lighting fixtures features a choice of 35, 50 or 70W lamps. The lamps are protected by cast aluminum housings with polycarbonate refractors. Two styles of fixtures are available for wall or ceiling mountings. Renall Manufacturing Co., Chicago, IL.

670 Task light
An addition to the Inlite HID lighting system is a task light that comes in a choice of 7, 9 or 13W. Options include under-cabinet mounting, 8-pivot mounting to drawing boards, and a desk lamp model. Lamps come in 3 different baked acrylic colors. Sternen Lighting Systems, Inc., Winsted, MN.

671 Chandelier
The 6-light Deauville chandelier features handblown etched glass shades. The fixtures are 17 in. high and measure 25 1/4 in. in diameter. They will take candelabra base lamps up to 60W. Thomas Industries, Inc., Louisville, KY.

672 Amplifiers
The C10B and C30B 10 and 20 watt amplifiers have 2 microphone connections and provide for a 500/400-ohm line matching transformer for paging or background music. A thermostat in the transformer protects against overloads. Bogen Div., Lear Siegler, Inc., Paramus, NJ.

673 Wall sconce
The Model TF-360 aluminum wall urn features louvers that allow the passage of 80 per cent of upward light. It is 10 1/4 in. high with a projection of 10 1/4 in. It takes a 150 or 300W flood or spot and comes in brushed aluminum, matte white or custom color finishes. Rambusch, New York, NY.
674 Area lighting
The RLM Look is a series of area lighting luminaires and ornamental poles available in a variety of glossy acrylic enamel finishes. The fixtures accept HID lamps. Architectural Area Lighting/subsidiary of Kidde, Inc., Santa Fe Springs, CA.

675 Emergency exit lights
An emergency power pack for this manufacturer's Warrior exit lights illuminates both the sign face and the floor below for more than 90 min. When power is on the pack recharge. The pack includes a system test switch. Halo Lighting Div., McGraw-Edison Co., Elk Grove Village, IL.

678 Outdoor light fixture
An addition to this manufacturer's Sidelite series of outdoor fixtures, the polycarbonate edition features a 1-piece front housing and a back housing made of cast aluminum. It accepts both high- and low-pressure sodium and mercury vapor lamps. ITT Outdoor Lighting, Southaven, MS.

679 Raceway fitting
Compatible with this company's raceway systems, the Source II services wire distribution of any 2 types of wiring, including communications, power and data. The fitting installs flush with the floor to maintain the uncluttered look of an open office. Walker Div. of Butler Manufacturing Co., Parkersburg, WV.

680 Recessed ambient lighting
The Mirror Light is a low-voltage recessed fixture, which uses a mirror to create even wall wash illumination high up on a wall. It may also be used for lighting floor and wall displays and can be installed in any of this manufacturer's LV100, LV300 or LV5E housings. Capri Lighting, Los Angeles, CA.

681 Fluorescent lighting
The Series 400 features fixtures in black or white textured polyurethane enamel. They come with two or four 40W rapid-start lamps and have specular chrome louvers at the bottom. Open tops provide ambient light. Contract Lighting Systems, Div. of TSAO Designs, Inc., New Canaan, CT.

682 Linear lighting
Mod II and SuperMod II 6- and 8-in. wide modules feature continuous, uninterrupted baffles. Fixtures are made of steel and have joints with splines and gasketed ends to assure alignment. They come in recessed, surface and pendant models in 16 color finishes. Lilecontrol Corp., Hanson, MA.

683 Floodlight
UL-approved incandescent and HID Low Level Floodlights are designed to light pathways, courtyards and stairways. They feature cast aluminum housings and, where walls or planters are not available for mounting, may be embedded in concrete pedestals. Kim Lighting, Inc., City of Industry, CA.

684 Digital clocks
Secondary clocks for commercial and institutional application feature 1.8-in.-high digital displays and come in surface-, flush-, or double-faced mountings for ceilings or walls. They may be used with this company's master program clocks or operate alone. Rauland-Borg Corp., Chicago, IL.

685 Luminaires
Form Ten luminaires feature permanently sealed spun aluminum housings with silicone gaskets, extruded aluminum arms, concealed hinges and spring-loaded latches. They come in bronze or black enamel finishes and will accept 40W lamps to 400W. Gardo Lighting, San Leandro, CA.
686 Building automation
The UL-listed 1/85/20 computerized control system integrates control of energy consumption, building security, and fire-safety functions for buildings ranging in size from 50,000 to 200,000 square feet. It may be used for any of the functions individually as well. Johnson Controls, Inc., Milwaukee, WI.

687 Linear lighting
The LiteTrax system features 2- by 2-in. aluminum extrusions in brass, chrome, or satin finishes. Six lengths and a variety of corner connectors and fittings are available with medium screw base sockets on 6- or 12-in. centers. The system accepts 25-60W 120 volt lamps. Litenlab Corp., New York, NY.

688 Ceiling-mounted luminaire
The Systems 80 ceiling-mounted luminaire provides indirect HID lighting. The ballast and upper support of the unit are mounted on a metal pan, which spans the ceiling grid. The fixture may be adjusted to hang anywhere between 2 and 8 ft below the ceiling. Slater Electric Inc., Glen Cove, NY.

689 Time-program clock
The FCC-approved and UL-listed Master Time-Program Clock controls up to 6 zone devices. Any of the zones may also be manually activated. A key pad sets time and programs (bells, lights, music, etc.) and runs tests. The system will run 7 days on battery back-up power. Dukane Corp., St. Charles, IL.

690 Security lighting
The UL-listed 120 volt LightWatch II is an automatic outdoor lighting control that uses passive infrared sensors to detect rapid temperature changes within its field. The system includes an adjustable timing delay circuit. Colorado Electro Optics, Inc., Div. of Linear Corp., Boulder, CO.

691 Fluorescent light
When mounted at 10 ft or higher, the 6-in. tubular Narrow Up and Down Light is said to provide a soft ambient light. Its widespread up light produces a wash on the ceiling and reduces contrasts. The fixture may also serve as a corridor light. Peerless Electric Co., Berkeley, CA.

692 Desk lamp
The 16-in.-high Bellissima is a solid brass lamp with its shade attached to a clutch, which slides vertically and rotates around its stem. The shade features a universal swivel. The lamp comes in polished brass or chrome or "California" brass. Koch & Lowy, Inc., Long Island City, NY.

693 Exit signs
UL-listed exit signs, designed for flat wall, ceiling or extended wall mounting, operate at 10 volts. They are made of molded flame-retardant resin, have 6-in. stenciled letters and come with either a single or a double face. McPhilben Lighting Div., Emerson Electric Co., Melville, NY.

694 Light-sensor system
The SmartCell lighting control system includes low-voltage light sensors and a control module that may be connected to 120 or 277 volt circuits. The system supplements daylight with just enough artificial illumination to attain selected light levels. Wide-Lite Corp., San Marcos, TX.

695 Wall lamp
The Giovi wall lamp has a snap-on reflector and produces a combination of indirect upward, reflected downward and ambient light. The UL-listed lamp is 11 in. in diameter and 6 1/2 in. deep and has a white enameled metal housing. Atelier International Lighting, New York, NY.

696 Security light
The Odel light takes 35W to 50W T5 lamps. Ceiling and wall brackets and ballast housings are made of black fiberglass reinforced polyester. The industrial reflector shown is one of a number of available assemblies. General Electric Co., Lighting Systems Department, Hendersonville, NC.

697 Pendant light fixture
A pendant light fixture designed by Vico Magistretti features a white hemispheric globe. It measures 20 in. in diameter and is designed to take a 50W low-voltage tungsten halogen lamp. Lighting Associates, Inc., New York, NY.
698 Telephone signals
Strobe lights, horns, bells, chimes and combinations for commercial and industrial applications are covered in an 8-page brochure. Telephone ringing relays and explosion proof bells are also included. Devices are shown in photos and features, and operating voltages are listed. Wheelock Signals, Inc., Long Branch, NJ.

699 Motor-control centers
Model 4 motor-control-center units, bus barriers and bus bars, wire troughs and wire termination are shown in photos and described in a 16-page color brochure. Center features are listed, and structures in 2 arrangements and 2 depths are illustrated and described. Square D Co., Peru, IN.

700 HID lighting
A 12-page color brochure featuring this company's HID task and ambient lighting fixtures discusses the quantity, quality and operation costs of different types of lighting. Such factors as intensity, uniformity, glare and reflections are illustrated. Sterner Lighting Systems, Inc., Winsted, MN.

701 Hospital communications
A 6-page foldout brochure features the Responder III, a microprocessor-based system with bedside, emergency and staff stations and corridor and zone lights. Functions of the control station are described in detail. Installation and maintenance are also covered. Rauland-Borg Corp., Chicago, IL.

702 Entry-control systems
Entraguard systems for both buildings and parking lots are featured in a 12-page color brochure. System units are shown in photos and described. Optional printers, cassette recorders and mounting systems are also featured. Specifications are listed. Marlee Electronics Corp. Culver City, CA.

703 Switches and receptacles
Rocker switches, receptacles, wallplates and dimmers are shown and described in a 6-page color brochure. Selection charts for each product line include sizes and finishes. Leviton Manufacturing Co., Inc., Little Neck, NY.

704 Light track
A 4-page color brochure features the 2000 series light track components, adaptor, mounting system and lamp fixtures. Photographs and diagrams with dimensions are included. Inlite Corp., Berkeley, CA.

705 Display lighting
A 4-page brochure features 10 types of Sylvania tungsten halogen rim-mounted lamps for applications such as stores, galleries and restaurants. Energy-saving performance curves are shown for each lamp, along with tables of design and operating data. GTE Lighting Products, Danvers, MA.

706 Projection screens
An 8-page brochure covers a line of projection screens that includes models for recessed ceiling installation. Photos and diagrams illustrate each model. Methods of installation are also shown. Size charts and specifications are included. Da-Lite Screen Co., Inc., Warsaw, IN.

707 Site lighting
California redwood bollard-, wall- and post-mounted lighting series are featured in a 36-page color catalog. Drawings with dimensions and diagrams of light patterns are included for each model. Mounting details and photos of installations are also shown. WoodForm Div., Columbia Cascade Timber Co., Portland, OR.

708 Undercarpet wiring
TeloLife undercarpet telephone and data-distribution cable systems are featured in an 8-page color brochure. Photos illustrate installation procedures and highlight system components. Specifications are listed. Brand-Rex Co., Telecommunications Div., Willimantic, CT.

709 Lamp ballasts
A 24-page catalog covering this company's line of fluorescent lamp ballasts includes a section on the Mark III ballasts for P40 and 800 mA rapid-start and P96 Stimline energy-saving lamps. Lamp and electrical data and wiring diagrams are included for the entire line. Advance Transformer Co., Chicago, IL.
710 HD floodlights
A 32-page color catalog features this company's line of HD floodlights for marine, Class 1, Division 2 hazardous locations and heavy industrial applications. Information on fixture temperatures, ballasts and special coatings is included. Dimensions and specifications are listed. Wide-Lite Corp., San Marcos, TX.

711 Undercarpet wiring
A 4-page color brochure features the UL- and NEC-approved Versa-Trak undercarpet wiring system for power, telephones and data. Photos illustrate system components and a diagram shows a typical layout. Thomas & Betts, Raritan, NJ.

712 Lay-in wireway
An 8-page color bulletin features the SQUARE-Duct combination of both a hinge- and a screw-cover system in the same assembly. Photos show components and installation procedures. A typical layout is diagrammed, and charts list dimensions. Square D Co, Palatine, IL.

713 Electric thermal storage
Electric storage heaters for contract and residential applications are featured in an 8-page color brochure. Heater components and operation are shown in diagrams and photos and described. System controls are also described and specifications are listed. Stiebel Eltron North America, Westwood, MA.

714 Wall plates
Stainless steel and plastic wall plates in over 50 colors and finishes are featured in a 4-page color brochure. Finishes include brass, copper, chrome, gold, silver and aluminum. Pass & Seymour Inc., Wiring Device Div., Syracuse, NY.

715 Sound equipment
A 20-page catalog features amplifiers, speakers, microphones, receivers, specialized audio equipment and accessories. Typical applications range from stadiums and airports to small stores, schools and clinics. Bogen Div., Lear Siegler, Inc., Paramus, NJ.

716 Vandalproof lighting
A 4-page brochure describes and illustrates the Defender series, which features cast aluminum housings and polycarbonate refractors. Specifications include details with dimensions and data for asymmetric and symmetric lighting patterns. Kenall Manufacturing Co., Chicago, IL.

717 Fire alarm and security
Sentara 324, a microcomputer controlled system, is covered in a 12-page brochure. The system's video display terminal, printer and software are shown in photos. How it works is extensively described and illustrated in diagrams. Honeywell Commercial Div., Minneapolis, MN.

718 Raceway distribution
The EPC system, an in-floor system with 3 separate cellular raceways to carry electronics, power and communications lines in one unit, is featured in a 4-page brochure. A diagram shows how the system is constructed and details show a typical layout and module configurations. Epic Metals Corp., Rankin, PA.

719 Emergency lighting
The EZ-4R recessed emergency lighting unit is featured in a 4-page color brochure. Photos show a typical installation and a close-up view that highlights construction details. Operation and installation are described. A diagram of the fixture includes dimensions. Dual-Lite, Inc., Newtown, CT.

720 Security lighting
A packet of literature features data sheets on extruded aluminum and steel luminaires for maximum-, medium- and minimum-security installations. Section details, diagrams of typical layouts and specifications are included. Columbia Lighting, Inc., subsidiary of U.S. Industries, Spokane, WA.

721 Intercom systems
A brochure illustrates and describes features, functions and installation specifications for a line of intercom systems. The brochure includes 27 different systems, which cover a range of capacities from 2 to 128 stations. Aiphone Intercom Systems, Bellevue, WA.
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<tr>
<td>Wind-driven Rain Test (ASTM E 514)</td>
<td>Reduction of Leakage</td>
</tr>
<tr>
<td>Brick Wall</td>
<td>98.3%</td>
</tr>
<tr>
<td>Concrete Block Wall</td>
<td>96.6%</td>
</tr>
<tr>
<td>Moisture Vapor Transmission rate</td>
<td>37.5%</td>
</tr>
<tr>
<td>Weatherometer (2500 hrs.)</td>
<td>96.3% Repellancy</td>
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A


Airports—King Abdul-Aziz International Airport, Hajj Terminal, Jeddah, Saudi Arabia; Skidmore, Owings & Merrill, archs.—Sept.-2 1983, BTS, pp. 84-85.

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### Advertising Index

<table>
<thead>
<tr>
<th>A</th>
<th>AllianceWall Corp., 149 (G)</th>
<th>All-Metal, Inc., 140</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aluminum Association, 24</td>
<td>Anchem Products, Inc., 135</td>
</tr>
<tr>
<td></td>
<td>American Express Co., 22</td>
<td>American Glass Association, 5, 26-27</td>
</tr>
<tr>
<td></td>
<td>American Stainless, 71</td>
<td>American Stair Glider Co., 226 (G)</td>
</tr>
<tr>
<td></td>
<td>AMP/ASI Division, 218-219 (G-D)</td>
<td>Andersen Corp., 118, 130-131 (G-L)</td>
</tr>
<tr>
<td></td>
<td>Architectural Area Lighting, 215</td>
<td>Architectural Complements, 57, 235 (G)</td>
</tr>
<tr>
<td></td>
<td>Armor Elevator Co., Inc., 1cv III</td>
<td>Armstrong, Cov II-1 (G-I-D-E)</td>
</tr>
<tr>
<td></td>
<td>Atlas Door Co., 224 (G-I)</td>
<td>Aurora Steel Products, 164 (G-D)</td>
</tr>
<tr>
<td>B</td>
<td>Baumann, Inc., 168 (G)</td>
<td>Bausch &amp; Lomb, 49</td>
</tr>
<tr>
<td></td>
<td>Blasing Granite, 16-17</td>
<td>Bonsal Co., W.R., 99 (G)</td>
</tr>
<tr>
<td></td>
<td>Bradley Corporation, 297 (G-I-D-I)</td>
<td>Bruce Engineering, 134 (G)</td>
</tr>
<tr>
<td></td>
<td>Bushelton USA (G-D)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carlisle Corp., 8 (G-E-I)</td>
<td>Certainteed, 100 (G-L-I-E-I)</td>
</tr>
<tr>
<td></td>
<td>Certification Board of Colorado, 225a</td>
<td>Clearprint Paper Co., 45</td>
</tr>
<tr>
<td></td>
<td>CNA Insurance, 48</td>
<td>Cold Spring Granite Co., 233 (G)</td>
</tr>
<tr>
<td></td>
<td>Columbia Lighting, Inc., Subs. US</td>
<td>Computervision, 46-47</td>
</tr>
<tr>
<td></td>
<td>Industries, 222</td>
<td>Conoco Chemicals Co., 135</td>
</tr>
<tr>
<td></td>
<td>Crown Metal Mfg. Co., 234</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Dataprint, 235</td>
<td>DeSoto, Inc., 65</td>
</tr>
<tr>
<td></td>
<td>Dover Corporation, 150 (G)</td>
<td>Dover Corp., Elevator Div., 199 (G)</td>
</tr>
<tr>
<td></td>
<td>Dryvit Systems, Inc., 87 (G)</td>
<td>Dupont Co., Hyaplan, 96</td>
</tr>
<tr>
<td></td>
<td>Dupont-DuPont Fibers, 154-155</td>
<td>(G-L-D-E-I)</td>
</tr>
<tr>
<td>E</td>
<td>Eagle Manufacturing Co., 227</td>
<td>Ebco Mfg. Co., 204 (G-I-E)</td>
</tr>
<tr>
<td>F</td>
<td>Firestone Industrial Products, 92</td>
<td>Flexidriv Systems, 236 (G)</td>
</tr>
<tr>
<td></td>
<td>Flexwall Systems, 236 (G)</td>
<td>Vollansbee Steel Corp., 66 (G)</td>
</tr>
<tr>
<td></td>
<td>Fuller, H.B., 162 (G)</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>General Electric Co., Air Conditioning Div., (G-I-I)</td>
<td>General Elevator, 225b, 225D</td>
</tr>
<tr>
<td></td>
<td>General Products Co., 113 (G)</td>
<td>Georgia Marble Co., 61 (G)</td>
</tr>
<tr>
<td></td>
<td>Grace &amp; Co., W.R., 84-85, 94-95 (G-I)</td>
<td>Gyp-Crete Corp., 249 (G-L)</td>
</tr>
<tr>
<td>H</td>
<td>Hartco, 151 (G-I-D)</td>
<td>Haworth, Inc., 181, 156</td>
</tr>
<tr>
<td></td>
<td>Hawkins Drinking Fauceet Co., 206 (G)</td>
<td>Helix Industries, Inc., 154 (G)</td>
</tr>
<tr>
<td></td>
<td>Hiebert, Inc., 183</td>
<td>Holmest Ice Rinks, Inc., 213</td>
</tr>
<tr>
<td></td>
<td>Hoffmann Windows, 125 (G)</td>
<td>Hoffman Furnace Corporation, 187</td>
</tr>
<tr>
<td></td>
<td>Hunter Douglas Architectural Products, 190-191 (G-D)</td>
<td>Huntington/Pacific Ceramics, Inc., 62 (G)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hydrozoid Coatings Co., 225 (G-E)</td>
</tr>
<tr>
<td>I</td>
<td>Innov-e-te Systems, Inc., 161</td>
<td>Inyeco, Inc., 80-81, 117 (G-I)</td>
</tr>
<tr>
<td></td>
<td>Isop, Inc., 232 (G-I)</td>
<td>J</td>
</tr>
<tr>
<td></td>
<td>Jason Industrial Co., 225 (G)</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>Kaebeen Company, Inc., 138-139 (G)</td>
<td>Kemmer Mfg., 223</td>
</tr>
<tr>
<td></td>
<td>Ketchem, G.M., 248</td>
<td>Keystone Group, 82 (G-E-L)</td>
</tr>
<tr>
<td></td>
<td>Koh-I-Now Rapidograph, Inc., 50-51</td>
<td>Kroin, 57, 205 (G)</td>
</tr>
<tr>
<td>L</td>
<td>LCN Closers Div. of Schlage Lock Co., 119 (G-L-I)</td>
<td>LeVeloet Lorenzsen, Inc., 191 (G)</td>
</tr>
<tr>
<td></td>
<td>Lightning Services, Inc., 232</td>
<td>Lite-Lab Graphics Div., 248</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
<td></td>
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<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>ODC, Inc., 189</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Panasonic, 38</td>
<td>Penfield, Inc., 165 (G-L)</td>
</tr>
<tr>
<td></td>
<td>Pawling Rubber Corp., 227 (G-I-E)</td>
<td>Peerless Electric Co., 217</td>
</tr>
<tr>
<td></td>
<td>Polka Robeson Co., 136-137 (G-L-D)</td>
<td>Phillips Eindhoven, 14B-14C</td>
</tr>
<tr>
<td></td>
<td>Phillips Fiber Corp., 225B-25c (E)</td>
<td>Pittsburgh Corning Corp., 93, 126-127</td>
</tr>
<tr>
<td></td>
<td>Plan Hold Corp., 237</td>
<td>(G-I-E)</td>
</tr>
<tr>
<td></td>
<td>PPG Industries, Inc., Glass, 114-115</td>
<td>Phyrecon Corporation, 236</td>
</tr>
<tr>
<td>S</td>
<td>Sanders Associates, Inc., 54</td>
<td>Serpent &amp; Co., 222</td>
</tr>
<tr>
<td></td>
<td>Schrader Haughton Elevator Corp., 12</td>
<td>Shiel氐 Lock Co., 124 (G-L)</td>
</tr>
<tr>
<td></td>
<td>Schlage Lock Corp., 72 (G-L)</td>
<td>Shakertown Corp., 72 (G-L-I)</td>
</tr>
<tr>
<td></td>
<td>Simplex Ceiling Corp., 225 (G-E)</td>
<td>Smith, Ethel G. Div. Cyclops Corp., 64 (G-I)</td>
</tr>
<tr>
<td></td>
<td>Smith, John G. Div. Cyclops Corp., 64</td>
<td>Southwall Corp., 129 (G)</td>
</tr>
<tr>
<td></td>
<td>Southwestern Bell Telephone Co., 225c, 225c</td>
<td>Southwestern Bell Telephone Co., 225c, 225c</td>
</tr>
<tr>
<td></td>
<td>Spacesaver Corp., 167 (G)</td>
<td>Sark Ceramics, Inc., 225a, 225c</td>
</tr>
<tr>
<td></td>
<td>Stevens &amp; Co., Inc., J.P., 91 (G-I)</td>
<td>So Industries, 79 (G-I)</td>
</tr>
<tr>
<td></td>
<td>Stonestown-Tiles, Inc., 132 (G)</td>
<td>Summitville Stonetile, Inc., 225a</td>
</tr>
<tr>
<td></td>
<td>Sun &amp; Co., H.F., 164</td>
<td>Sun System Prefabricated Solar Greenhouses, 232 (G)</td>
</tr>
<tr>
<td></td>
<td>Symons Industries, Inc., 209</td>
<td></td>
</tr>
</tbody>
</table>
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