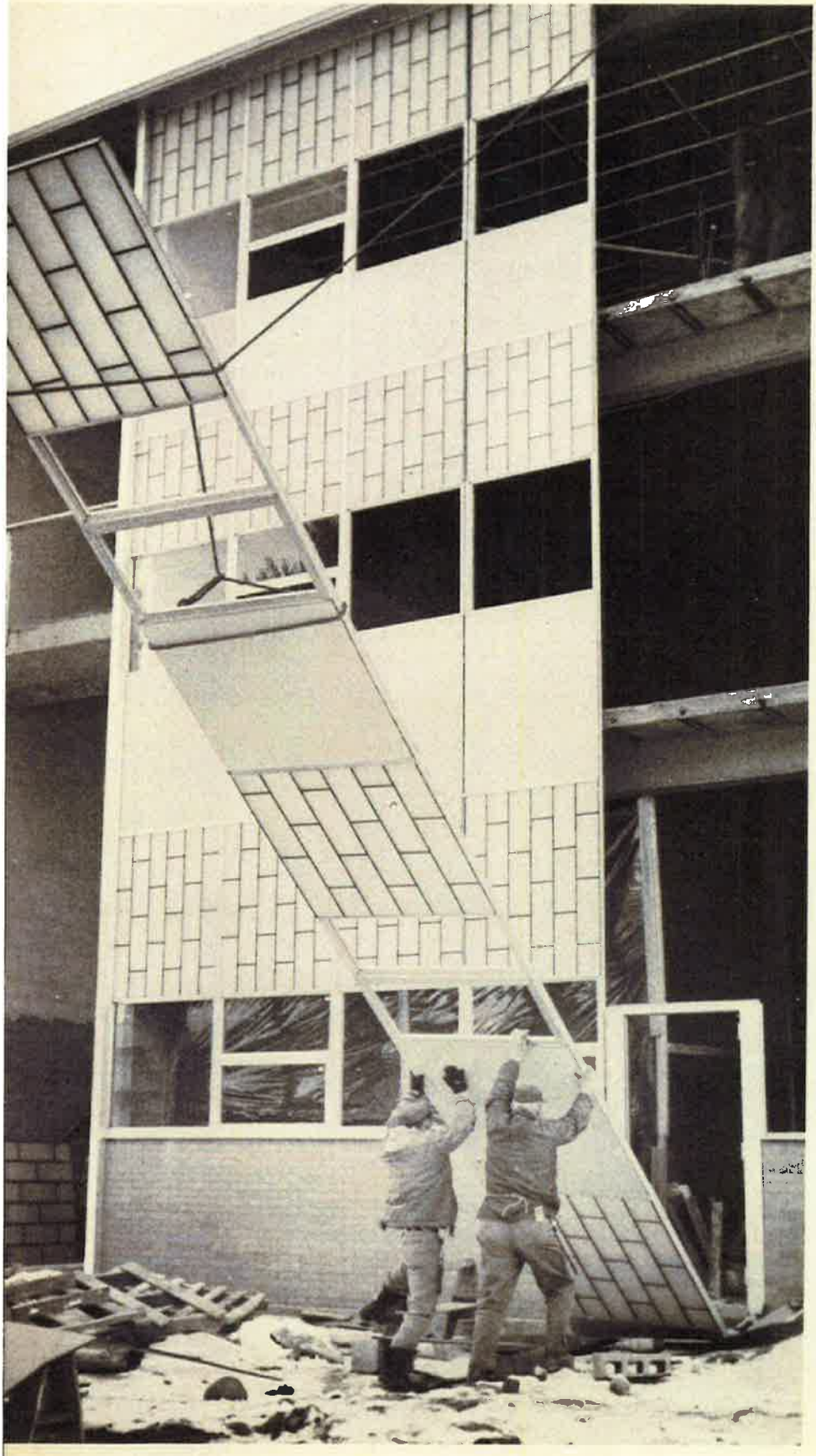


Curtain walls add variety and speed to commercial jobs

Curtain-wall speed lies in the use of prefab systems like the three-story panel at left or the knocked-down steel grid system at lower right.

The curtain wall—by definition a non-loadbearing enclosure—comes in a wide range of systems because it can be made of virtually any combination of non-structural materials that meet insulation, wind-load and aesthetic requirements.

Systems range from foam-core panels set in grids to coated plywood nailed to structural framing, materials from tinted insulating glass to gypsumboard.

Packaged curtain walls help simplify planning and construction work by incorporating pre-engineered fastening systems. Grid frameworks, for example, are snapped together by means of splines, interlocking serrations or key-and-slot joints. And glass or other infill panels are often secured in the grids by pressure from an inserted gasket rather than by conventional fasteners or stops.

Curtain walls can be constructed to meet any design specifications, including low thermal U-values that exceed electric heating requirements, subtly modulated natural lighting and even rigid humidity control. Double-coated solar insulating glass, for example, is used in data-processing centers to maintain 60% relative humidity in equipment rooms on 0°F winter days.

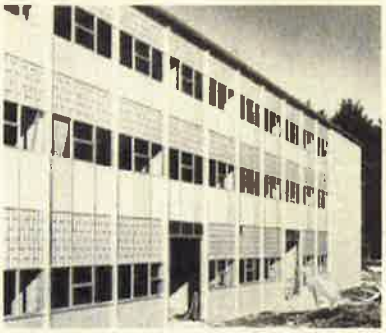
But curtain walls can also limit design. A packaged grid system, for instance, affects a designer's choice of heating and cooling equipment because it provides no vertical chase for piping. And packaged curtain walls are not necessarily an inexpensive way to build. A modest foam-core steel panel costs more than $2 a sq. ft. installed. And some systems cost considerably more than precast concrete or masonry cavity walls.

A sampling of curtain-wall systems starts at the top of the next page.

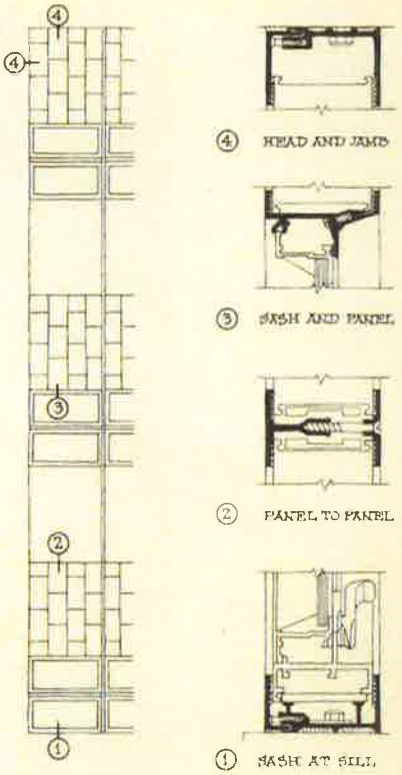
THREE-STORY PANEL for a plastic curtain wall weighs only 265 lbs. *(details, top right)*

Translucent plastic walls come in king-size panels

Plastic panel



Plastic-enclosed school



Plastic curtain-wall panels can be prefabricated in multistory sizes because they weigh so little. For example, the three-story New Hampshire high school shown above was enclosed with 34′-high panels that workmen were able to carry by hand and tilt into place with block and tackle (*photo at left*). The panels, weighing only 265 lbs. apiece, helped hold building costs to $16.25 a sq. ft.

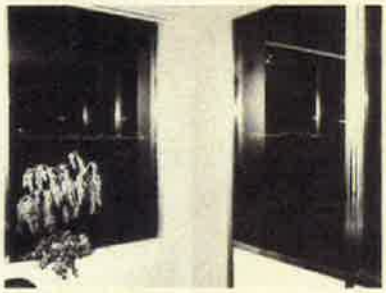
Despite their light weight and translucence, plastic curtain walls can be excellent thermal insulators. The style shown above has a U factor of .27, better than most masonry walls. It combines two types of infill panels in an aluminum I-beam grid: 1) translucent acrylic-modified fiberglass and 2) opaque porcelain enamel.

Windows are also included in the panel, but about 28% of the building's natural light is transmitted by the plastic sections.

Panels are clamped together by inserting self-tapping, stainless-steel screws into two-piece aluminum extrusions (*right*). Joints are weather-sealed with tape between serrations. Kalwall, Manchester, N.H. *Circle 260 on Reader Service card*

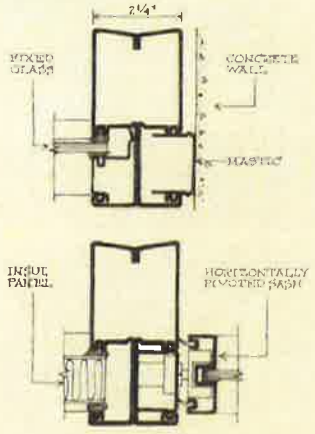
Stainless-steel grids lock together without exposed fasteners

New construction



Interior window trim

Remodeling



Vertical mullions in this steel-grid system have one anchor point at each floor. Sections are inserted on top of one another as the gridwork rises, and horizontal members are attached to them with spring-grip retaining clips. The joints between vertical and horizontal members are sealed with non-drying mastic. The entire grid system consists of seven basic shapes.

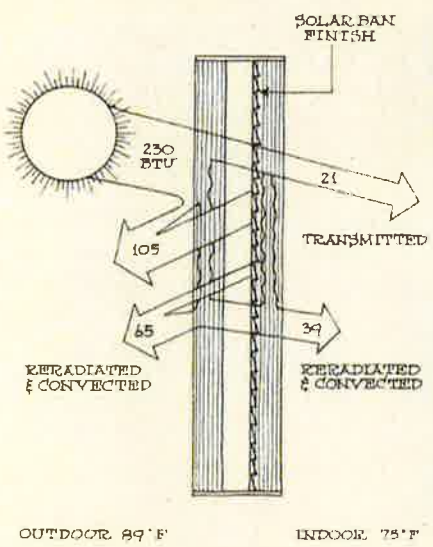
Glass and infill panels—inserted from inside or outside the building—are set in flush glazing reglets, sealed against weather by gaskets and locked in place by applying trimwork. Future movement due to temperature changes is minimal because of stainless steel's low coefficient of expansion.

Windows and doors are included in this totally engineered system, and mullions are available in three depths: 3½", 4½" and 5½". Windows pivot horizontally a full 360° to simplify outside cleaning, and the window framework contains a built-in drainage control.

Grid designs may be varied by combining mullions of different depths and by specifying a steel other than stainless. The manufacturer makes the system available in steel that weathers to a dark russet color. U.S. Steel, Pittsburgh. *Circle 261 on Reader Service card*

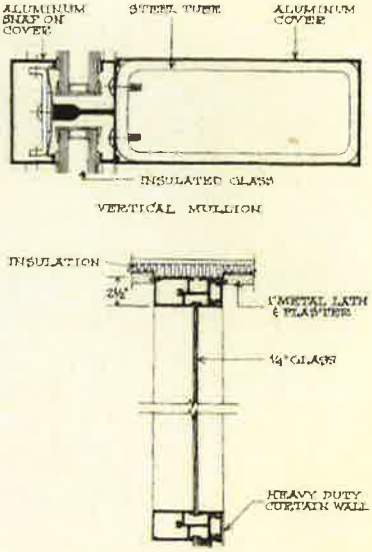
continued

Solar glass offers design flexibility and fuel savings



Mirror-like entryway

Offset sun screen



Double glazing coated with tinted metallic oxide not only reduces heating and cooling loads but also permits a wide range of brightness control.

A typical unit with coating on one glass surface inside the air space may have an insulating U factor as low as .35 —compared with .55 for regular insulating glass—and can limit visible light transmission to about one-fourth that of the base glass. On an 89° F day, for example, enough solar heat is turned back by the glass to cause a 14° F temperature drop (*drawing, above left*). Insulation value and brightness control are increased by applying coatings to two glass surfaces instead of one and by using thicker glass.

Reflective coatings—available in tints of green, gray and bronze—also produce interesting visual effects. They reflect sky and surroundings like mirrors (*top photo*). And they can be combined with matching-color gridworks—bronze-tinted glass with gold anodized mullions, for example. Another design option: Areas of glass panels can be fired with ceramic colors to create opaque spandrels. Pittsburgh Plate Glass, Pittsburgh. *Circle 263 on Reader Service card*

Aggregate-coated plywood facades are nailed on like sheathing

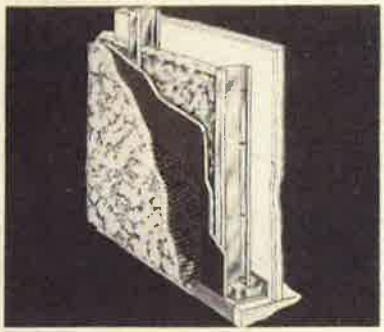
Aggregate-surfaced medical building

Plywood panels with a stone aggregate finish come in 4'x8' and 4'x10' panels that are face-nailed directly to structural framing. They can be cut in the field and applied as full-height wall sections, spandrels under windows (*photo*) and fascias.

The surface—marble and quartz chips embedded in epoxy—weatherproofs the plywood so effectively that it can be used as roofing. Different textures are possible through variations of the chips' size and color.

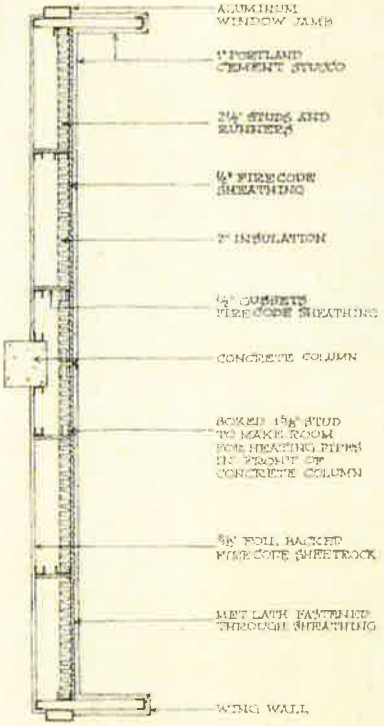
Besides offering a masonry-type finish for the cost of frame construction, the material has maintenance advantages. Dirt is virtually invisible, depending on the coarseness of texture, so the need for exterior cleaning is minimized. Sanspray, New York City. *Circle 262 on Reader Service card*

Screwed-on gypsumboard hangs from non-loadbearing metal studs



Gypsum and stucco wall

Gypsum-walled dormitory



Gypsumboard curtain walls are made in the field from standard gypsum panels and metal studs. To speed up installation at a 13-story University of Illinois dormitory (*above*), Tishman Research Corp. and U.S. Gypsum developed a system for prefabbing the walls in 5'x8' panels at the job site.

The walls—subassembled with templates at each floor—were made of ½" fire-resistant gypsum sheathing screwed to 2½" metal studs, which were attached to metal floor and ceiling channels. Self-furring metal lath was attached to the sheathing so the building exterior could be finished with spray-on stucco (*cutaway, above*). And an interior wall of 1⅝" metal studs and ⅝" foil-backed gypsumboard was attached to the curtain wall with screwed-on gypsumboard gussets (*section, right*) after 2" blankets of mineral-wool insulation had been applied.

Unlike other curtain-wall systems, this one provides a chase for piping heating and cooling to convectors under windows. U.S. Gypsum, Chicago. *Circle 264 on Reader Service card*

Zipper gasketing combines fastening and sealing

Gasket/grid package

Zipping tool

Gasket positioning

Gasket curtain wall

An H-shaped gasket of solid neoprene is both weatherstripping and structural connector when combined with special aluminum grid framing (*above left*). It holds, and hermetically seals, glass and wall panels ¼" to 1" thick without stops or fasteners.

Gasketing is cut to length—a manufacturer's chart assures proper sizing—and sealed in place with a special power tool (*center photo*). The tool inserts a strip that forces the lips of the gasket against both sides of glass or panels.

The gasketing can be placed inside the grid so that only the aluminum mullions show outside, or it can be placed outside for visual contrast with the aluminum. Two gasket designs are available: 1) a single-gasket mullion for producing a thin sight line and 2) a double-gasket mullion to emphasize mullion width for contrast.

Mullions are split and head members telescope to accommodate thermal expansion and contraction.

Thermal breaks in the framing members—the neoprene gaskets themselves or rigid vinyl strips—prevent condensation on inside metal surfaces. Drainage vents in the mullions prevent leakage. Kawneer, Niles, Mich. *Circle 265 on Reader Service card*