# PERFORMANCE: demountable partitions

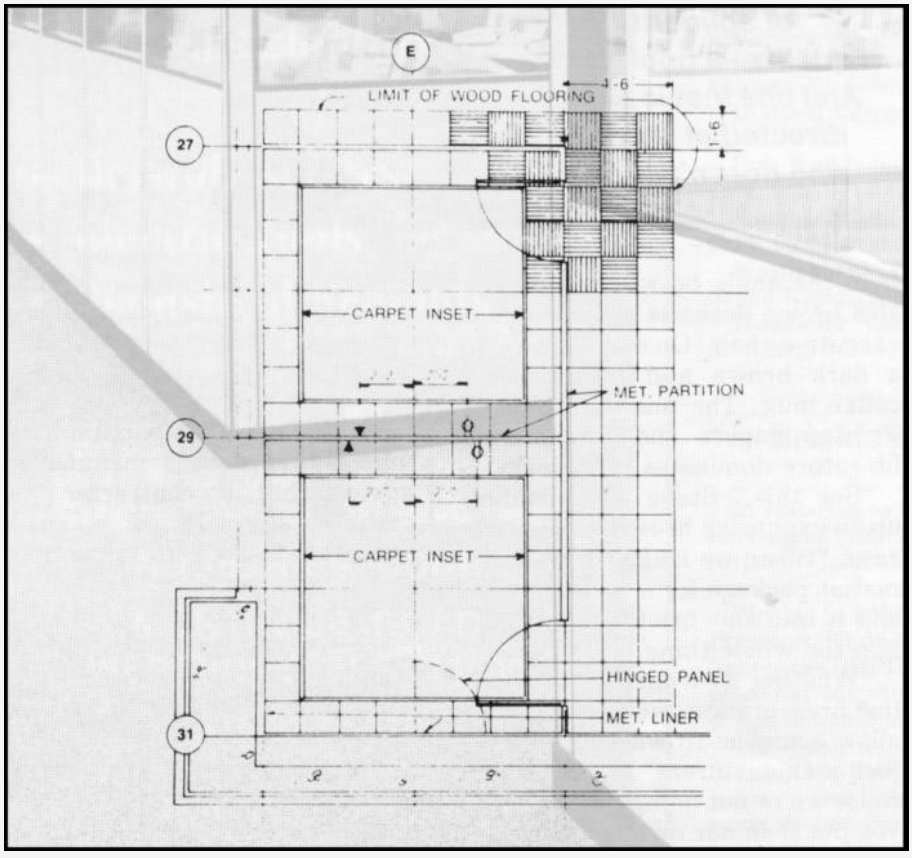
## Full Scale Prototypes Have Demonstrated Their Value When Bidding "Pure" Performance Specifications

**By Michael J. Kodaras**

Specifications that do not describe and detail the construction of a partition but instead specify how it must perform and what tests it must pass are here to stay. The recent success of this type specification written for the Social Security Payment Centers to be built in Philadelphia, Chicago and near San Francisco is strongly indicative that the "pure" performance specification will appear, especially in large government sponsored projects.

Essential to the "pure" performance specification is a full scale prototype, also called a mock-up, of a complete section of the building including all interior components—floor, partitions, ceiling, lighting and air distribution system, desks and other furnishings. In experiences with mock-ups it has been proven conclusively that mistakes made on 900 square feet of office space are much less costly than on 500,000 to 2,000,000 square feet. However, equally important, a mock-up can illustrate to the owners and employees what their offices will look like much more vividly than conventional drawings, specifications and manufacturers' literature.

Since a performance specification and mock-up for demountable partitions requires more than normal collaboration and communication between the manufacturer and the interior systems contractor; a number of questions arise that relate to the bidding, mock-up installation and testing of the demountable partitions.




**Q. What is the difference between a "pure" performance specification and conventional specifications with performance requirements?**

A: The "pure" specification emphasizes objectives and goals, user comforts and efficiencies without reference to a particular manufacturer, construction or material. It includes very specific descriptions of tests that the partition must undergo and minimum acceptable performances. Conventional specifications usually start with a specification of minimum construction and material requirements, then list several "approved" products and their manufacturers. To achieve an "open" bid posture, the specs may use an "or approved equal" clause and a statement that an acoustical laboratory rating of STC 40 (or some similar value) must accompany the submittal by the manufacturer. A "pure" performance specification does not need such a statement because it is not written around the product of any one manufacturer.

**Q: Where is the mock-up installed?**

A: A nearby office or loft building, or a completed and enclosed area of the building under construction are all suitable locations for the mock-up. The location should be convenient to the owner, architect, contractor and subcontractors. It should be enclosed from the weather, and heated. If possible, the location should not have a higher noise level than that which will prevail in the completed building.

Continued on page 21

Continued from page 10

**Q: What is the size of the mock-up?**

A: The drawing shows a typical mock-up for a large philanthropical foundation building in New York City. It consists of two private offices using a total floor area of 450 square feet. The mock-up for the Social Security Administration Payment Centers used 900 square feet of space with additional areas for material storage, air conditioning equipment, etc.

In addition to performance testing, the mock-up usually serves many other purposes. The architect will probably ask the owner or main occupant of the building to closely inspect the office environment. Determination of adequate lighting, pleasing colors, furniture arrangement, temperature, air movement are all possible in the mock-up. For example, the color of the carpeting may not blend with the partition color under the type of lighting used. This is inexpensive to change in the mock-up but may be disastrous if required to be changed in the completed building.

**Q: Will the demountable partition manufacturer's transmission loss test be repeated in the mock-up?**

A: A partition is tested in the laboratory in accordance with ASTM E90, "Airborne Sound Transmission Loss of Building Partitions". This test is conducted in such a manner as to accurately evaluate only one component of an interior system. The purpose of the mock-up is to evaluate, subjectively and by measurement, the acoustical separation provided by all the sound barriers between offices under working conditions. The acoustical separation, which may be called the speech privacy enjoyed by the occupants of the various offices, depends upon the voice levels that will be used, background noise levels from air conditioning systems, outside traffic, interior activities and other noise sources as well as the sound paths between the two offices.

The mock-up will therefore first be subjectively evaluated, then tested to determine the noise reduction provided by all the sound barriers installed between the two spaces. If this noise reduction meets the performance specifications, no further acoustical

Continued on next page

Continued from page 21

separation tests are required. If it fails, however, tests of the individual components must be made. These tests are usually conducted in accordance with ASTM E336, "Airborne Sound Insulation in Buildings". This testing procedure can disclose, for example, whether the suspended acoustical ceiling is installed in the same way it was tested in the laboratory when it was rated for ceiling attenuation factor, or whether the flush troffers (used for return air) provide a flanking sound path over the partition. Other flanking paths may be cracks between the intersection of the suspended ceiling and the partition track, through the partition closure where it meets the window mullion, through the convector or induction unit cover, and so on. Many easily corrected flanking sound paths are discovered in the mock-up. If left undiscovered, they would be exceedingly costly to correct at a later time.

**Q: What can be done if the demountable partition is at fault in the noise reduction tests?**

A: Again, it will be much less expensive to improve the acoustical properties of the demountable partition before installation than to have to go back after several miles of partition have been installed. For example, a thin plastic foam sealing strip may be satisfactory for laboratory tests under ideal flat and level floor conditions. The actual building floor, however, may have irregularities that exceed the sealing capabilities of the plastic foam strip used in the laboratory test. The substitution of a thicker or higher density gasket at the floor channel is not very expensive providing the partition does not have to be dismantled to install a new gasket. Small changes of this type can substantially improve the partition performance. Packing the cap and base of a demountable partition with rockwool can improve the Sound Transmission Class (STC) by 3 to 5 dB; inserting fiberglass inside the partition panels can achieve improvements of 3 to 7 STC points.

**Q: What other performance tests are conducted?**

A: Several non-acoustical tests may be required. The Social Security Payment Centers specifications required tests of the demountable partition's resistance to impact and resistance to horizontal loads as well as acoustical performance.

**Q: How are these other tests conducted?**

A: Briefly, the test for resistance to impact provides that a door located in the center of a 30 ft. long partition be slammed with a force of 17 foot-pounds. To pass, the partition shall not have a displacement exceeding 1/8" during the test nor have a residual deflection in excess of that permitted by the specifications. The test for resistance to horizontal loads consists of resisting a uniformly distributed horizontal load of 10 pounds a square foot applied to the surface of the partition.

In conclusion, the evidence clearly indicates that the use of a performance specification and mock-up of the interior components results in benefits to the owner that are far in excess of the cost. The GSA projects also demonstrate benefits to the manufacturers and installation contractors in addition to the award of sizeable contracts. The ceiling panel manufacturer developed an outstanding acoustical ceiling panel and a new application of his base product in reducing noise transmission between the partition and the ceiling as well as developments in the area of energy conservation. The architects, engineers, interior systems contractors and manufacturers developed new concepts and designs that will pay off in profitable product designs and installation procedures for many years to come.