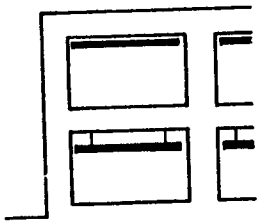
CEILINGS

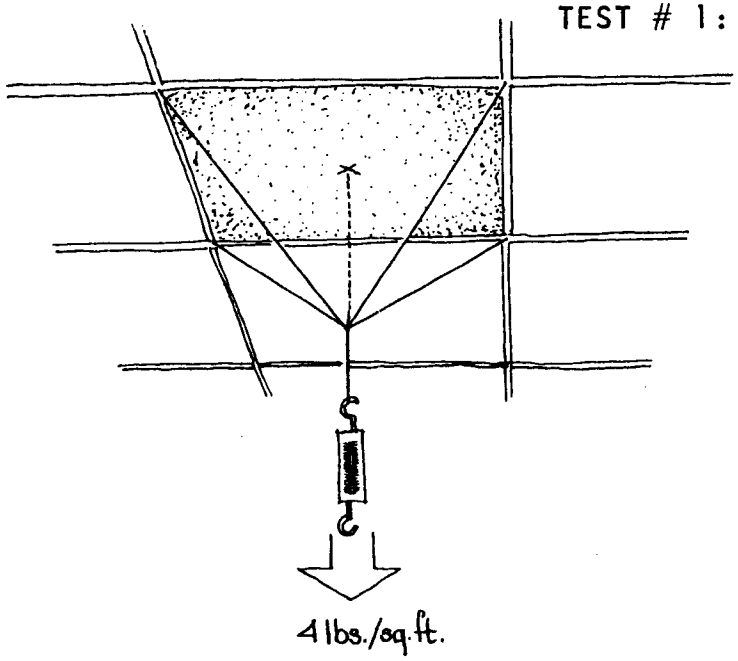
SUMMARY



The ceiling subsystem refers to the finished ceiling surface (i.e., that which is visible to the users of the building). As such, its satisfactory appearance is its primary function, and success or failure in this regard essentially derives from its initial design. This being the case, the principal concerns with the ceiling are that it retain its satisfactory appearance, that it be structurally sound, and that it not interfere with the normal activities of the space it encloses. The field tests in this area emphasize these primary objectives and are directed at conditions which cause deterioration in appearance and function.

PERFORMANCE OBJECTIVE: PROVIDE STABLE STRUCTURAL SUPPORT

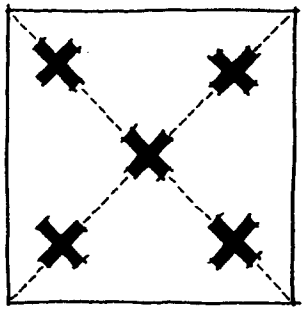
TEST # 1: Resistance to Loads



Test Method: Determine past performance, if possible. Test by constructing a simple apparatus consisting of a wire, run from each of the four corners of the ceiling grid, suspending a tension scale (see diagram). Apply downward pressure and observe any deflection which occurs as a result. The ceiling support system should be able to resist up to four pounds per square foot of ceiling area (see diagram). (Refers to suspended ceilings only.)

Measures: Deflection

- Record the pull in points, necessary to induce noticeable deflection (i.e., greater than 1/16 inch) in the ceiling grid.



TEST # 2: Parallel to Floor

Test Method: Determine past performance, if possible, Test, with a plumbline and a tape graduated to 1/16 inch, by measuring the floor to ceiling height at the one-fifth points of both room diagonals and at the crossing of the diagonals (see diagram). Record each height to 1/16 inch accuracy. Record and photograph.

Measures: Floor to ceiling distance

- Record differring in inches between the lowest and highest floor to ceiling distance
- Record inches deviation from the average floor to ceiling height

TEST # 3: Resistance to Ascending Forces

Test Method: Determine past performance, if possible. Test by slamming a door forcefully fifty times in succession, and observe, from a distance of two feet, any displacement or damage to the ceiling. Record and photograph.

Measures: Damage and displacement in ceiling

- Record type and extent of damage

PERFORMANCE OBJECTIVE: PROVIDE A PHYSICALLY DURABLE SURFACE

TEST # 4: Cohesive Strength

Test Method: Determine past performance, if possible. Test by observing, from a distance of one foot, all coatings on exposed areas of the ceiling (one observation per 100 square feet of ceiling area). Locate and record areas of possible problems.

Measures: Crumbling, flaking, breaking, discoloration

TEST # 5: Adhesive Strength

Test Method: Determine past performance, if possible. Test by observing the entire ceiling from eye level to determine if any area has been sagging or pulling away from its support system. Check to see if any tiles have been replaced. Record and photograph problems and problem areas.

Measures: Delamination

- Record as severe, moderate or slight

TEST # 6: Resistance to Impact

Test Method: Determine past performance, if possible. Test by gently tapping the ceiling with the end of a broom handle, observing any damage from a distance of two feet. Tap again, harder, and observe. Finally, give it a very hard poke and observe, the indentation caused by even the hardest impact should not be greater than 1/16 inch deep. Record and photograph any damage. (This test should be run only once for each type of ceiling material in use.)

Measures: Indentation

- Record depth to 1/16 inch

TEST # 7: Resistance to Scratching

Test Method: Determine past performance, if possible. Test by obtaining samples of each type ot ceiling material in use. Using 6B, 2B, and 2H pencil leads of medium sharpness, make a scratch in the surface with each, using a force not quite sufficient to break the lead point. Note the apparent depth of the resulting scratches and record. (This need be done only once for each type of ceiling material in use.)

Observe the ceiling from eye level, noting any scratches and the areas in which they occur. Record and photograph, if possible.

Measures: Scratching

- Record depth as heavy, medium or trace
- Record areas of scratching by extent, severity and location of damage

TEST # 8: Resistance to Water

Test Method: Determine past performance, if possible. Test by observing the entire ceiling from eye level. Note any staining or discoloration from elements, such as rust, that may be present in water. Record and photograph any damage, and indicate the probable source of the leakage.

Measures: Staining

- Record areas of staining by extent, severity and location of damage.

PERFORMANCE OBJECTIVE: PROVIDE A SAFE SURFACE

TEST # 9: Anthropometric Fit

Test Method: Determine past performance, if possible. Test by determining, through observation and from the results of Ceiling Test #2, that it is possible for the average person to walk under the ceiling without it or any other subsystem causing personal injury or presenting a potential danger. Record and photograph any potentially dangerous situations.

Measures: Ability to walk under the ceiling

- Minimum ceiling height: 6 feet, 8 inches

PERFORMANCE OBJECTIVE: PROVIDE SATISFACTORY APPEARANCE AND MAINTAINABILITY

TEST #10: Color Homogeneity

Test Method: Determine past performance, if possible. Test by scoring, on a sample of each type of material in use on the ceilings, a grid of 1/16 inch squares on an area of the surface 1/2 inch by 1/2 inch. Press and smooth on firmly a piece of 3M Company "Scotch" brand magic transparent tape over the scored lines and lift off sharply. Record the results, noting depth of color.

Observe the entire ceiling from eye level, noting any areas of flaking, peeling, any chips or dents, Record and photograph. Identify probable cause.

Measures: Depth of color on surface

- Linear depth to the nearest 1/32 inch, or as an approximate percentage of total thickness of ceiling material

Measures: Flaking and peeling

- Record the number of 1/16 inch squares that tear away during the testing procedure
- Record any damage observed by type, location, severity and extent

TEST #11: Resistance to Fading

Test Method: Determine past performance, if possible. Test by obtaining an unused sample of each material in use on the ceilings. Compare these samples with the installed ceiling for instances of fading. Record and photograph.

Measures: Fading

- Record as severe, moderate or slight

TEST #12: Resistance to Dust Accumulation

Test Method: Determine past performance, if possible. Test by examining the ceiling from eye level, noting any instances of trapped dirt or dust, especially around HVAC equipment and outlets, windows, doors, etc. Record and photograph.

Measures: Dust accumulation

- Record by location, extent and severity of damage

TEST #13: Cleanability

Test Method: Determine past performance, if possible. Test by washing a one foot square sample area of the ceiling surface with a mild detergent solution. Allow it to dry. From a distance of one foot, examine the cleaned surface for any cracking, splitting, spalling, blisters, delaminations or breaks in the surface. Record and photograph. Repeat test for each ceiling material.

Measures: Surface deterioration due to cleaning

- Record the type, extent and severity of damage

TEST #14: Access to Plenum

Test Method: Determine past performance, if possible. Test by removing the panels that provide access to the plenum. The opening provided must be large enough to permit access for servicing. Record the size of the panels and photograph.

Remove and replace the access panel twenty times. Examine from a distance of one foot, record and photograph any damage.

Measures: Accessibility

- Access panels should measure not less than 20 inches square.

Measures: Visual appearance

- Record any damage resulting from removing and replacing of the access panels by type, severity and extent of damage.

TEST #15: Accommodation for Out-of-System Hardware

Test Method: Determine past performance, if possible. Test by determining if the ceiling system is capable of accommodating other subsystems or out-of-system built elements in the typical enclosed space at all points where maintenance or adjustment of these built elements may be required. Record and photograph.

Measures: Adaptability to out-of-system hardware.

-Record as adequate or inadequate (and explain).

See interior wall notes P. C-6. The reports mentioned contain excellent documentation of performance and tests in the areas of interior walls, ceilings and floors.

SUMMARY OF CEILINGS PERFORMANCE TESTS

PERFORMANCE OBJECTIVE:	PROVIDE STABLE STRUCTURAL SUPPORT
TEST # 1:	Resistance to Loads
TEST # 2:	Parallel to Floor
TEST # 3:	Resistance to Ascending Forces
PERFORMANCE OBJECTIVE:	PROVIDE A PHYSICALLY DURABLE SURFACE
TEST # 4:	Cohesive Strength
TEST # 5:	Adhesive Strength
TEST # 6:	Resistance to Impact
TEST # 7:	Resistance to Scratching
TEST # 8:	Resistance to Water
PERFORMANCE OBJECTIVE:	PROVIDE A SAFE SURFACE
TEST # 9:	Anthropometric Fit
PERFORMANCE OBJECTIVE:	PROVIDE SATISFACTORY APPEARANCE AND MAINTAINABILITY
TEST #10:	Color Homogeneity
TEST #11:	Resistance to Fading
TEST #12:	Resistance to Dust Accumulation
TEST #13:	Cleanability
TEST #14:	Access to Plenum
TEST #15:	Accommodation for Out-of-System Hardware