Appendix
### Agencies and Organizations

<table>
<thead>
<tr>
<th>Agency</th>
<th>Address</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACI</td>
<td>ACI International (American Concrete Institute) P.O. Box 9094 38800 Country Club Drive Farmington Hills, MI 48333</td>
<td>Phone: 248-848-3700 Fax: 248-848-3720 Website: <a href="http://www.aci-int.net/">http://www.aci-int.net/</a> E-mail: <a href="mailto:jtosca@aci-int.org">jtosca@aci-int.org</a></td>
</tr>
<tr>
<td>AGC</td>
<td>Associated General Contractors of America 333 John Carlyle Street Alexandria, VA 22314</td>
<td>Phone: 703-548-3118 Fax: 703-548-3119 Website: <a href="http://www.agc.org">http://www.agc.org</a> E-mail: <a href="mailto:info@agc.org">info@agc.org</a></td>
</tr>
<tr>
<td>AFPA</td>
<td>American Forest &amp; Paper Association 1111 19th Street NW, Suite 800 Washington, DC 20036</td>
<td>Phone: 202-463-2700 Fax: 202-463-2785 Website: <a href="http://www.afandpa.org">http://www.afandpa.org</a> E-mail: <a href="mailto:info@afandpa.org">info@afandpa.org</a></td>
</tr>
<tr>
<td>AIA</td>
<td>American Institute of Architects 1735 New York Avenue, N.W. Washington, DC 20006</td>
<td>Phone: 202-626-7300 Fax: 202-626-7587 Website: <a href="http://www.aiachn.org">http://www.aiachn.org</a> E-mail: <a href="mailto:aiaonline@aia.org">aiaonline@aia.org</a></td>
</tr>
<tr>
<td>A Ins. A</td>
<td>American Insurance Association 1130 Connecticut Ave., N.W. Washington, DC 20036</td>
<td>Phone: 202-828-7100 Fax: 202-293-1219 Website: <a href="http://www.aiadc.org">http://www.aiadc.org</a> E-mail: <a href="mailto:membership@aiadc.org">membership@aiadc.org</a></td>
</tr>
<tr>
<td>AIHA</td>
<td>American Industrial Hygiene Association 2700 Prosperity Avenue, Suite 250 Fairfax, VA 22031</td>
<td>Website: <a href="http://www.aiha.org">www.aiha.org</a></td>
</tr>
<tr>
<td>AISI</td>
<td>American Iron and Steel Institute 1101 17th Street, N.W. Washington, DC 20036</td>
<td>Phone: 202-452-7100 Fax: 202-463-6573 Website: <a href="http://www.steel.org">http://www.steel.org</a> E-mail: <a href="mailto:dwalson@steel.org">dwalson@steel.org</a></td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standards Institute 11 W. 42nd Street, 13th floor New York, NY 10036</td>
<td>Phone: 212-642-4900 Fax: 212-398-0023 Website: <a href="http://wwwansi.org">http://wwwansi.org</a> E-mail: <a href="mailto:ansionline@ansi.org">ansionline@ansi.org</a></td>
</tr>
<tr>
<td>APA</td>
<td>APA, The Engineered Wood Association (formerly: American Plywood Association) P.O. Box 11700 Tacoma, WA 98411</td>
<td>Phone: 253-565-6600 Fax: 253-565-7265 Website: <a href="http://www.apawood.org">http://www.apawood.org</a> E-mail: <a href="mailto:help@apawood.org">help@apawood.org</a></td>
</tr>
<tr>
<td>ASA</td>
<td>Acoustical Society of America 2 Huntington Quadrangle Suite 1N01 Melville, NY 11747-4502</td>
<td>Phone: 516-576-2360 Fax: 516-576-2377 Website: <a href="http://asa.aip.org">http://asa.aip.org</a> E-mail: <a href="mailto:asa@aip.org">asa@aip.org</a></td>
</tr>
<tr>
<td>ASC</td>
<td>Adhesive and Sealant Council, Inc. 7979 Old Georgetown Road Suite 500 Bethesda, MD 20814</td>
<td>Phone: 301-986-9700 Fax: 301-986-9795 Website: <a href="http://www.ascouncil.org">http://www.ascouncil.org</a> E-mail: <a href="mailto:malinda.armstrong@ascouncil.org">malinda.armstrong@ascouncil.org</a></td>
</tr>
<tr>
<td>Organization</td>
<td>Address</td>
<td>Phone</td>
</tr>
<tr>
<td>--------------</td>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>ASHRAE</td>
<td>1791 Tullie Circle, N.E. Atlanta, GA 30329</td>
<td>800-527-4723 or 404-636-8500</td>
</tr>
<tr>
<td>ASSE</td>
<td>1800 E. Oakton Street Des Plaines, IL 60018</td>
<td>800-380-7101</td>
</tr>
<tr>
<td>ASTM</td>
<td>100 Barr Harbor West Conshohocken, PA 19428-2959</td>
<td>610-832-9585</td>
</tr>
<tr>
<td>AWCI</td>
<td>803 West Broad Street, Suite 600 Falls Church, VA 22046</td>
<td>703-534-8300</td>
</tr>
<tr>
<td>BIA</td>
<td>11400 Commerce Park Drive Reston, VA 20191</td>
<td>703-620-0010</td>
</tr>
<tr>
<td>CAC</td>
<td>1500-60 Queen Street Ottawa, ON K1P 5Y7</td>
<td>613-236-9471</td>
</tr>
<tr>
<td>CCA</td>
<td>75 Albert Street, Suite 400 Ottawa, ON K1P 5E7</td>
<td>613-236-6455</td>
</tr>
<tr>
<td>CHBA</td>
<td>150 Laurier Avenue West Ottawa, ON K1P 5J4</td>
<td>613-230-3060</td>
</tr>
<tr>
<td>CISC</td>
<td>201 Consumers Road, Suite 300 North York, ON M2J 4G8</td>
<td>416-491-4552</td>
</tr>
<tr>
<td>CMHC</td>
<td>700 Montreal Road Ottawa, ON K1A OP7</td>
<td>613-748-2000</td>
</tr>
<tr>
<td>CSA</td>
<td>178 Rexdale Boulevard Etobicoke, ON M9W 1R3</td>
<td>416-747-4000</td>
</tr>
<tr>
<td>Organization</td>
<td>Address</td>
<td>Phone Numbers</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>----------------------------------------------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>CSI</td>
<td>Construction Specification Institute</td>
<td>Phone: 703-684-0300 or 800-689-2900</td>
</tr>
<tr>
<td>CSSBI</td>
<td>Canadian Sheet Steel Building Institute</td>
<td>Phone: 519-650-1285</td>
</tr>
<tr>
<td>CWC</td>
<td>Canadian Wood Council</td>
<td>Phone: 613-747-5544</td>
</tr>
<tr>
<td>DRCI</td>
<td>Drywall Finishing Council</td>
<td>Phone: 714-637-2770</td>
</tr>
<tr>
<td>EIMA</td>
<td>EIFS Industry Members Association</td>
<td>Phone: 770-968-7945</td>
</tr>
<tr>
<td>GA</td>
<td>Gypsum Association</td>
<td>Phone: 202-289-5440</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HUD</td>
<td>Department of Housing &amp; Urban Development</td>
<td>Phone: 202-708-0417</td>
</tr>
<tr>
<td></td>
<td>(U.S.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>451 Seventh Street, SW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Washington, DC 20410</td>
<td></td>
</tr>
<tr>
<td>ML/SFA</td>
<td>Metal Lath/Steel Framing Association</td>
<td></td>
</tr>
<tr>
<td></td>
<td>now a division of National Association of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Architectural Metal Manufacturers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(see NAAMM)</td>
<td></td>
</tr>
<tr>
<td>NAAMM</td>
<td>National Association of Architectural Metal</td>
<td>Phone: 312-332-0405</td>
</tr>
<tr>
<td></td>
<td>Manufacturers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 South Michigan Avenue</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Suite 1000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chicago, IL 60603</td>
<td></td>
</tr>
<tr>
<td>NAHB</td>
<td>National Association of Home Builders</td>
<td>Phone: 800-368-5242 or 202-822-0200</td>
</tr>
<tr>
<td></td>
<td>1201 15th Street NW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Washington, DC 20005-2800</td>
<td></td>
</tr>
<tr>
<td>NCMA</td>
<td>National Concrete Masonry Association</td>
<td>Phone: 703-713-1900</td>
</tr>
<tr>
<td></td>
<td>2302 Horse Pen Road</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Herndon, VA 20171-3499</td>
<td></td>
</tr>
<tr>
<td>NEMA</td>
<td>National Electrical Manufacturers Association</td>
<td>Phone: 703-841-3200</td>
</tr>
<tr>
<td></td>
<td>1300 North 17th Street, Suite 1847</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rosslyn, VA 22209</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td>Address</td>
<td>Phone</td>
</tr>
<tr>
<td>--------------</td>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>NFPA</td>
<td>National Fire Protection Association</td>
<td>1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269</td>
</tr>
<tr>
<td>NFoPA</td>
<td>National Forest Products Association</td>
<td>This organization is now American Forest &amp; Paper Association (see AFPA)</td>
</tr>
<tr>
<td>NLS</td>
<td>National Lime Association</td>
<td>200 North Glebe Road, Suite 800, Arlington, VA 22203</td>
</tr>
<tr>
<td>NRCC-IRC</td>
<td>National Research Council Canada-Institute For Research in Construction</td>
<td>1200 Montreal Road, Ottawa, ON K1A 0R6</td>
</tr>
<tr>
<td>NSC</td>
<td>National Safety Council</td>
<td>1121 Spring Drive, Itasca, IL 60143-3201</td>
</tr>
<tr>
<td>NTIS</td>
<td>National Technical Information Center</td>
<td>U.S. Department of Commerce (Technology Admin.), 5295 Port Royal Road, Springfield, VA 22161</td>
</tr>
<tr>
<td>PCA</td>
<td>Portland Cement Association</td>
<td>5420 Old Orchard Road, Skokie, IL 60077</td>
</tr>
<tr>
<td>PDCA</td>
<td>Painting and Decorating Contractors Of America</td>
<td>3913 Old Lee Highway, Suite 33B, Fairfax, VA 22030</td>
</tr>
<tr>
<td>RAIC</td>
<td>Royal Architectural Institute of Canada</td>
<td>330-55 Murray Street, Ottawa, ON K1N 5M3</td>
</tr>
<tr>
<td>Organization</td>
<td>Address</td>
<td>Phone</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>RAL</td>
<td>Riverbank Acoustical Laboratories</td>
<td>630-232-0104</td>
</tr>
<tr>
<td>SIPA</td>
<td>Structural Insulated Panel Association</td>
<td>253-858-7472</td>
</tr>
<tr>
<td>TCA</td>
<td>Tile Council of America, Inc.</td>
<td>864-646-8453</td>
</tr>
<tr>
<td>TPI</td>
<td>Truss Plate Institute</td>
<td>608-833-5900</td>
</tr>
<tr>
<td>UL</td>
<td>Underwriters Laboratories, Inc.</td>
<td>847-272-8800</td>
</tr>
<tr>
<td>ULC</td>
<td>Underwriters Laboratories of Canada</td>
<td>416-757-3611</td>
</tr>
<tr>
<td>WHI</td>
<td>Warnock Hersey International Inc.</td>
<td>925-432-7344</td>
</tr>
</tbody>
</table>
Rating Fire Endurance

**CAN/ULC S101 (ASTM E119, UL 263 and NFPA 251)**

This is the standard test for rating the fire resistance of columns, girders, beams, and wall-partition, floor-ceiling and roof-ceiling assemblies. It is published by four organizations, designated above, and is essentially the same for all four.

The test procedure consists of the fire endurance test for all assemblies (not individual products) and, in addition, a hose stream test for partition and wall assemblies. The test specimen assembly must meet the following requirements:

1. Structural elements subjected to the test must support the maximum design loads applied throughout the test period. Columns, beams, girders and structural decks must carry the load without failure.

   This test does not imply that the test specimen will be suitable for use after the exposure. Some specimens are so damaged after one hour of exposure that they would require replacement, even though they meet all of the requirements for a 4-hr. rating.

2. No openings may develop in an assembly that will permit flames or hot gases to penetrate and ignite combustibles on the other side.

3. An assembly must resist heat transmission so that temperatures on the side opposite the fire are maintained below designated values. The temperature of the unexposed surface is measured by thermocouples covered with dry refractory filter pads attached directly to the surface. In the case of walls and partitions, one thermocouple is located at the center of the assembly, one in center of each quarter-section, and the other four at the discretion of the testing authority.

   The integrity of walls and partitions is evaluated in the hose stream test that examines the construction's ability to resist disintegration under adverse conditions. The hose stream test subjects a duplicate sample to one-half of the indicated fire exposure (but not more than one hour), then immediately to a stream of water from a fire nozzle at a prescribed pressure and distance. This test evaluates the impact, erosion and cooling effects of a hose stream directed at the exposed surface. If there is a breakthrough on the unexposed side, sufficient to pass a stream of water, the result is test failure.

   The time-temperature curve used for the fire endurance test is shown on page 424. The temperature of the furnace is obtained from the average readings of nine thermocouples, symmetrically located, and placed 150 mm (6") from the exposed surface of walls and partitions, or 300 mm (12") from the exposed surface of floors, ceilings and columns.

### Conditions for Hose Stream Test

<table>
<thead>
<tr>
<th>Resistance Period</th>
<th>Water Pressure at Base of Nozzle</th>
<th>Duration of Application, Min. per 10 m² (100 ft²) Exposed Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 hr. and over</td>
<td>310 kPa 45 lbf/in²</td>
<td>6</td>
</tr>
<tr>
<td>4 hr. and over if less than 8 hrs.</td>
<td>310 kPa 45 lbf/in²</td>
<td>5</td>
</tr>
<tr>
<td>2 hr. and over if less than 4 hrs.</td>
<td>207 kPa 30 lbf/in²</td>
<td>2-1/2</td>
</tr>
<tr>
<td>1-1/2 hr. and over if less than 2 hr.</td>
<td>207 kPa 30 lbf/in²</td>
<td>1-1/2</td>
</tr>
<tr>
<td>1 hr. and over if less than 1-1/2 hr.</td>
<td>207 kPa 30 lbf/in²</td>
<td>1</td>
</tr>
<tr>
<td>Less than 1 hr., if desired</td>
<td>207 kPa 30 lbf/in²</td>
<td>1</td>
</tr>
</tbody>
</table>
Surface Burning Characteristics

The characteristics of interior finish materials that are related to fire protection are:

- ability to spread fire, and
- quantity of smoke developed when burning

Materials that have high flame spread and produce large quantities of smoke are considered undesirable, especially when used in areas where people assemble or are confined.

The flame spread test (Surface Burning Characteristics of Building Materials) is often referred to as the Steiner Tunnel Test, after its originator.

In the test, a 500 x 7620 mm (20" x 25") sample, forming the roof of a rectangular furnace, is subjected to a fire of controlled severity, placed 300 mm (12") from one end of the sample. Where the flame contacts the sample is considered to be 1370 mm (4-1/2") from the fire, so the test is actually conducted over 5940 mm (19-1/2") of the sample.
The time required for the flame to travel the 5790 mm (19') to the end of the sample, along with the smoke and heat produced, is compared with similar figures for red oak which is arbitrarily given the value of 100 for these three characteristics, and inorganic reinforced cement board which is given the value of 0.

Smoke developed is measured by means of a photoelectric cell connected to an ammeter which indicates changes in smoke density.

Obviously, the indices developed in the tunnel test are relative, but enough is known about the burning characteristics of materials to make these indices reliable for building code specifications.

In Canada, the building code prescribes maximum limits of flame spread and smoke developed of materials based on the materials actual results.

U.S. building codes divide materials into four classes, based on the Flame Spread Indices. The numbering and range of each class varies with the different codes, but they generally follow this pattern:

Class I (Class A)—0-25
Class II (Class B)—26-75
Class III (Class C)—76-200
Class IV (Class D)—over 200
### Surface Burning Characteristics (per CAN/ULC S102)

<table>
<thead>
<tr>
<th>Product</th>
<th>Flame Spread</th>
<th>Smoke Developed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHEETROCK Brand Gypsum Panels</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>SHEETROCK Brand Interior Gypsum Ceiling Board</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>SHEETROCK Brand Lay-In Ceiling Tile</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>SHEETROCK Brand Exterior Gypsum Ceiling Board</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>SHEETROCK Brand Gypsum Panels, Water-Resistant</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>SHEETROCK Brand TEXTONE Vinyl-Faced Gypsum Panels</td>
<td>≤ 25</td>
<td>≤ 50</td>
</tr>
<tr>
<td>Pumice</td>
<td>≤ 25</td>
<td>≤ 50</td>
</tr>
<tr>
<td>Moonstone</td>
<td>≤ 25</td>
<td>≤ 50</td>
</tr>
<tr>
<td>Burlap</td>
<td>≤ 25</td>
<td>≤ 50</td>
</tr>
<tr>
<td>Tweed</td>
<td>≤ 25</td>
<td>≤ 50</td>
</tr>
<tr>
<td>Granite</td>
<td>≤ 25</td>
<td>≤ 50</td>
</tr>
<tr>
<td>Academy</td>
<td>≤ 25</td>
<td>≤ 50</td>
</tr>
<tr>
<td>Trafalgar</td>
<td>≤ 25</td>
<td>≤ 50</td>
</tr>
<tr>
<td>Striae</td>
<td>≤ 25</td>
<td>≤ 50</td>
</tr>
<tr>
<td>Sonoma</td>
<td>≤ 25</td>
<td>≤ 50</td>
</tr>
<tr>
<td>Brushwork</td>
<td>≤ 25</td>
<td>≤ 50</td>
</tr>
<tr>
<td>THERMAFIBER Sound Attenuation Fire Blankets</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>DUROCK Cement Board, Underlayment and Exterior Cement Board</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>USG Brand Ceiling Panels</td>
<td>0.25</td>
<td>0.50</td>
</tr>
</tbody>
</table>
Determination of Sound Transmission Class (STC)

Testing for airborne sound transmission is performed under rigidly established procedures set up by the American Society for Testing and Materials (ASTM procedure E90-90). Several independent acoustical laboratories across the nation are qualified to perform the tests. Although all are presumably reliable and follow the ASTM procedure, the results tend to vary slightly. For this reason, test results from more than one laboratory should never be compared on an exact basis.

Tests are conducted on a sample assembly, at least 2.4 m x 2.4 m in size. The assembly is installed between two rooms constructed in such a way that sound transmitted between the rooms by paths other than through the assembly is insignificant. Background noise in the rooms is monitored to ensure it does not affect test results.

The sound source consists of an electronic device and loudspeaker which produce a continuous random noise covering a minimum frequency range of 125 to 4,000 Hz (Hertz—cycles per second). Note for comparison that human speech is approximately 125 to 8,000 Hz. Panel diffusers and/or rotating vanes are set up so noise is diffused and the sound level is measured at several microphone positions in each room. Readings are taken at sixteen 1/3-octave frequency-band intervals. Average sound levels in the receiving room are subtracted from the corresponding sound levels in the source room. The differences (sound levels of the actual transmission) are recorded as transmission-loss values (adjustments are made for test room absorption and test assembly size).
These transmission-loss values are then plotted on a frequency band-
sound pressure level graph and the resulting curve is compared to a
standard reference contour. The Sound Transmission Class (STC), as
defined by the rating procedure set forth in ASTM E413-87, is deter-
mined by adjusting the reference contour vertically until the decibel
(dB) total of all frequency bands on the test curve that are below the
reference contour does not exceed 32, and no point on the test curve
is more than 8 dB below the reference contour. Then, with the reference
contour adjusted to meet these standards, its transmission loss at 500
Hz (500 cycles per second) is taken as the STC (dropping dB unit).

An alternative procedure, frequently used for the measurement of
sound transmission loss under field conditions, is given in ASTM
Standard Test Method E336-90. This may be used to obtain a Field
Sound Transmission Class (FSTC).

Reproduced above is the graph of an actual sound transmission-loss
test of a drywall partition, Test No. USG-241-ST. The partition is rated
at STC 50 with the reference contour adjusted to meet the standards
outlined above. The deficiencies at 2,500 Hz and 3,150 Hz are 8, the
allowable maximum.

The total of all points below the criterion curve is 29, three points less
than the 32 allowed.
The reference contour itself is plotted to allow for subjective human response to sound pressure at the 16 frequency bands measured. Because the human ear is less sensitive to low-frequency sound pressure than to high frequencies, the reference contour has been adjusted to allow some additional noise at low frequencies. This avoids down-rating test results because of noise levels that are least objectionable to people. The ASTM test procedure explains the use of STC in the following excerpt from E413.

“These single-number ratings correlate in a general way with subjective impressions of sound transmission for speech, radio, television and similar sources of noise in offices and buildings. This classification method is not appropriate for sound sources with spectra significantly different from those sources listed above. Such sources include machinery, industrial processes, bowling alleys, power transformers, musical instruments, many music systems and transportation noises such as motor vehicles, aircraft and trains. For these sources, accurate assessment of sound transmission requires a detailed analysis in frequency bands.”

**Noise Reduction Coefficient (NRC)**

Noise Reduction Coefficient (NRC) is a measure of the sound absorption characteristics of an acoustical product. In accordance with the reverberation room test method, ASTM C423, panels are tested for sound absorption in the frequency range of 100 to 5000 hz. The actual NRC value is determined by averaging the sound absorption values in the four main frequency bands of 250, 500, 1000, and 2000 hz. These values represent the majority of the range of the human voice. The greater the NRC, the better the overall sound absorption of the acoustical material, providing a room that will have less reverberation and echo.

**Ceiling Attenuation Class (CAC)**

Ceiling Attenuation Class (CAC) is a numerical rating used to characterize sound traveling between two horizontally adjacent spaces sharing a common ceiling plenum. CAC is measured using test standard ASTM E1414. Sound is introduced into a room and measured in that room. Then the same sound is measured in the adjacent room (other side of the partition from where sound was introduced). The CAC value is calculated using sound measurements in both rooms. Any sound that could pass directly through the partition is already calculated and factored out. Higher CAC values indicate greater attenuation of sound into and through the plenum.

**Articulation Class (AC)**

Articulation Class (AC) is a single numerical rating used to identify the degree of transmitted speech intelligibility between office spaces. This rating is particularly useful for open plan offices. AC provides an indication of the degree to which occupants will be able to understand and/or be disturbed by conversation occurring elsewhere in the office space. AC is determined by following the test procedure outlined in standard ASTM E1111, which measures sound levels in a source...
Determination of Impact Insulation Class (IIC)

Impact sound originates when one body strikes another, such as in the case of footsteps, hammering and objects falling. Even though some of the sound energy is eventually conducted to the air, the sound is still classified as impact.

Impact sound travels through the structure with little loss of energy if the structure is continuous and rigid. Thus, tenants without enough heat can pound on a radiator and notify the superintendent (and all other tenants as well) of the situation.

Transmission of impact sound can be controlled by isolation, absorption and elimination of flanking paths, and offset by the introduction of masking sound. Limpness in the construction affects transmission of impact sound, but is difficult to introduce because of the structural requirements of the assembly.

Mass plays a secondary role in the isolation of impact sound. The benefit of mass in a sound-control construction is its resistance to being set into vibration. In retarding airborne sound, this is very effective because the sound energy is small. With impact sound, the energy is greater and is applied directly to the construction by the sound source with little energy loss. Thus, the mass of that surface is immediately set into motion. For this reason, concrete slab construction at 490 kg/m² (100 lb/ft²) is only slightly more effective in retarding impact sound than simple wood frame construction at 49 kg/m² (10 lb/ft²).

Although leaks in a floor-ceiling assembly must be sealed to stop transmission of the airborne sound associated with impact, they play little part in retarding the transmission of structure-borne sound.

Absorbing Impact Sound

The use of sound attenuation blankets is as effective in controlling impact sound as for airborne sound. Of course, unless the opposite surfaces of the assembly (floor and ceiling) are isolated or decoupled, sound travels through the connecting structure.

Structural Flanking Paths

One of the most frequent causes of sound performance failure in a floor-ceiling assembly is flanking paths. Impact sound produces high energy at the source. This energy follows any rigid connection between construction elements with little loss. For example, in a child’s tin-can telephone, sound travels better through the tight string stretched between the cans than through the surrounding air.

Some of the most common flanking paths are supplied by plumbing pipes, air ducts and electrical conduit rigidly connected between floor and ceiling. Continuous walls between floors, columns or any other continuous structural elements will act as flanking paths for impact sound. In fact, any rigid connection between the two diaphragms transmits impact sound.
**Determination of Impact Insulation Class**

Methods of Impact Rating

Assemblies designed to retard transmission of impact sound are tested for performance as prescribed by ASTM Standard Method E492-90. The floor-ceiling assembly is constructed between two isolated rooms, and microphones are positioned in the receiving room to record the pressure of transmitted sound.

The impact sound source is a standard tapping machine. It rests on the floor of the test assembly and drops hammers at a uniform rate and impact energy. The sound produced depends to a large extent on the floor surface material. Carpet and pad, for example, greatly improve IIC ratings. The transmitted sound is measured and recorded at several microphone locations and four locations of the tapping machine. Results are corrected to a standard absorption so that results from different laboratories may be compared.

These results, recorded at sixteen 1/3-octave bands, are plotted and compared with a standard reference contour in much the same manner as Sound Transmission Class determinations, except that deficiencies lie above the contour.

Impact sound rating methods were established by the U.S. Federal Housing Administration (now HUD). The earliest was a single-number rating system called Impact Noise Rating (INR) and published in FHA 750.

The current rating system is described in E989-89. To determine this Impact Insulation Class (IIC), the ISPL curve is plotted on a graph as shown above. The reference contour is then shifted to the lowest point where no point on the ISPL (Impact Sound Pressure Level) curve is more than 8 dB above it, and the sum of all ISPL deviations above it is no more than 32 dB. The location of the reference contour at 500 Hz is projected to the IIC scale, right of graph, to read IIC rating.

The IIC relates to STC ratings with respect to acceptability, and is a positive number. IIC values will usually be 51 points above the corresponding former INR values, but some deviations can occur. Tests must be analyzed individually against IIC criteria.
Abuse-Resistant Systems

Abuse resistance has grown in importance as designers have realized that it is often less expensive from a life-cycle cost perspective to address abuse resistance in critical areas in the initial project stage than to pay the high on-going costs of maintaining and repairing regular drywall partitions.

Defining Abuse Resistance: Abuse resistance may be defined as the ability of a system to resist three levels of damage: (1) Surface damage (from abrasion and/or indentation); (2) Penetration (through to the wall cavity from sharp or blunt impact); (3) Security breach (through the entire assembly from ballistics or forced entry). For more detailed information on abuse resistance, please see publication SA929, United States Gypsum Company Abuse Resistant Systems.

Categories of Abuse Resistance: Assemblies designed to have appropriate strength will lessen maintenance and repair costs. Five usage categories have been created by CGC to help you determine the appropriate level of abuse resistance needed. Each category is described below with minimum performance values that apply. All categories represent an improvement over standard interior partition construction.

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Performance Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1 Light duty</td>
<td>A basic upgrade to standard drywall. Provides improved resistance to incidental surface and impact damage.</td>
<td>Abrasion 15 cycles 3.8 mm (0.15 in.) Indentation 41 N•m (30 ft.-lbs.) Impact 163 N•m (120 ft.-lbs.)</td>
</tr>
<tr>
<td>Category 2 Moderate duty</td>
<td>Provides moderate resistance to incidental surface and impact damage from people and objects.</td>
<td>Abrasion 30 cycles 3.3 mm (0.13 in.) Indentation 54 N•m (40 ft.-lbs.) Impact 244 N•m (180 ft.-lbs.)</td>
</tr>
<tr>
<td>Category 3 Heavy duty</td>
<td>Provides resistance to intentional surface and impact abuse from people and objects.</td>
<td>Abrasion 100 cycles 2.5 mm (0.10 in.) Indentation 108 N•m (80 ft.-lbs.) Impact 285 N•m (210 ft.-lbs.)</td>
</tr>
<tr>
<td>Category 4 Extreme duty</td>
<td>Provides resistance to high levels of intentional surface and impact damage from hard objects.</td>
<td>Abrasion 500 cycles 2 mm (0.08 in.) Indentation 149 N•m (110 ft.-lbs.) Impact 408 N•m (300 ft.-lbs.)</td>
</tr>
<tr>
<td>Category 5 Security</td>
<td>For areas requiring forced entry and ballistic resistance.</td>
<td>Abrasion 1000 cycles N/A Indentation N/A Impact N/A</td>
</tr>
</tbody>
</table>
### Abuse-Resistant Systems By Category

The following table illustrates abuse-resistant systems for all categories or levels of abuse-resistance that apply to walls. Systems based on drywall, veneer plaster, conventional plaster, gypsum fiber and concrete masonry units (CMU) are described.

<table>
<thead>
<tr>
<th>System</th>
<th>Assembly</th>
<th>Surface Damage</th>
<th>Penetration</th>
<th>Fire Rating&lt;sup&gt;4&lt;/sup&gt;</th>
<th>Sound Rating&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Partition System</th>
<th>Cost Index&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Cost Value&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Indentation</td>
<td>Hard-Body&lt;sup&gt;2&lt;/sup&gt;</td>
<td>(Btu/Lb)</td>
<td>Weight&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depth (mm)</td>
<td>Depth (mm)</td>
<td>(Btu/Lb)</td>
<td>[ft.-lbs.]</td>
<td>Weight (lb)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Soft-Body&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Sound (STC)</td>
<td>Width (mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depth (mm)</td>
<td>Rating&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Depth (mm)</td>
<td>[in.]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Depth (mm)</td>
<td>Rating&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Weight (lb)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Depth (mm)</td>
<td>Rating&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Cost (psf)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Depth (mm)</td>
<td>Rating&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Applications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Category 1: Basic Upgrade to standard drywall. Provides some resistance to surface abuse and impact.

<table>
<thead>
<tr>
<th>System</th>
<th>Assembly</th>
<th>Surface Damage</th>
<th>Penetration</th>
<th>Fire Rating&lt;sup&gt;4&lt;/sup&gt;</th>
<th>Sound Rating&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Partition System</th>
<th>Cost Index&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Cost Value&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Indentation</td>
<td>Hard-Body&lt;sup&gt;2&lt;/sup&gt;</td>
<td>(Btu/Lb)</td>
<td>Weight&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depth (mm)</td>
<td>Depth (mm)</td>
<td>(Btu/Lb)</td>
<td>[ft.-lbs.]</td>
<td>Weight (lb)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Soft-Body&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Sound (STC)</td>
<td>Width (mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depth (mm)</td>
<td>Rating&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Depth (mm)</td>
<td>[in.]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Depth (mm)</td>
<td>Rating&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Weight (lb)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Depth (mm)</td>
<td>Rating&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Cost (psf)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Depth (mm)</td>
<td>Rating&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Applications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Light Duty**
  - **12.7 mm (1/2")**
    - FIBEROCK VHI Treatment (0.14)
    - 1-Coat IMPERIAL Base DIAMOND (0.12)
  - **15.9 mm (5/8")**
    - 1-Coat FIBEROCK AR Veneer (0.09)
    - 1-Coat IMPERIAL AR DIAMOND (0.09)

#### Category 2: Provides moderate resistance to incidental impact and abrasion from bodies and objects.

<table>
<thead>
<tr>
<th>System</th>
<th>Assembly</th>
<th>Surface Damage</th>
<th>Penetration</th>
<th>Fire Rating&lt;sup&gt;4&lt;/sup&gt;</th>
<th>Sound Rating&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Partition System</th>
<th>Cost Index&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Cost Value&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Indentation</td>
<td>Hard-Body&lt;sup&gt;2&lt;/sup&gt;</td>
<td>(Btu/Lb)</td>
<td>Weight&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depth (mm)</td>
<td>Depth (mm)</td>
<td>(Btu/Lb)</td>
<td>[ft.-lbs.]</td>
<td>Weight (lb)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Soft-Body&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Sound (STC)</td>
<td>Width (mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Depth (mm)</td>
<td>Rating&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Depth (mm)</td>
<td>[in.]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Depth (mm)</td>
<td>Rating&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Weight (lb)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Depth (mm)</td>
<td>Rating&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Cost (psf)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Abrasion</td>
<td>Depth (mm)</td>
<td>Rating&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Applications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Moderate Duty**
  - **15.9 mm (5/8")**
    - 2-Coat FIBEROCK VHI Treatment (0.09)
    - 2-Coat IMPERIAL AR Veneer (0.09)
    - 2-Coat IMPERIAL (0.08)
  - **203 mm (8")**
    - Hollow CMU

- **Heavy Duty**
  - **19 mm (3/4")**
    - 2-Coat ULTRACODE Veneer (0.09)
    - 3.4# Lath
    - 2-Coat IMPERIAL (0.08)

Note: “est.” indicates estimated value.

(1) See publication SA923 for specific fire rating information. (2) Weights and widths are based on completed systems (panels on both flanges of study). (3) Cost index base of 1.00 corresponds to single-layer Type X paper-faced gypsum panel each side of 92 mm (3-5/8"), 0.8 mm (20-ga.) steel framing, 400 mm (16") o.c., joint treatment only. (4) Minimum 92 mm (3-5/8"), 0.8 mm (20-ga.) steel framing at 400 mm (16") o.c. is recommended for abuse-resistant assemblies, and was used for the hard-body, soft-body and acoustical testing shown in this publication. Framing spacing of 600 mm (24") o.c. will likely reduce the impact resistance of an assembly, while framing of 300 mm (12") o.c. will likely improve the impact resistance. (5) Two-coat system consists of DOWCO Brand Veneer Basecoat Plaster and DOWCO Brand Interior Finish Plaster. (6) Two-coat system consists of DOWCO Brand Veneer Basecoat Plaster and IMPERIAL, Brand Finish Plaster. (7) Two-coat system consists of IMPERIAL, Brand Basecoat Plaster and IMPERIAL, Brand Finish Plaster.
Surface Damage Penetration Fire Sound (4) Partition System

<table>
<thead>
<tr>
<th>Assembly Substrate Finish</th>
<th>Abrasion Indentation</th>
<th>Penetration Hard-Body Irre (ft.-lbs.)</th>
<th>Sound Rating (STC)</th>
<th>Partition Width (in.)</th>
<th>System Weight/gal</th>
<th>Cost Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme Duty</td>
<td>15.9 mm (5/8&quot;) FIBEROCK VIII (2 layers)</td>
<td>1000</td>
<td>2.3 (0.09)</td>
<td>325 (240)</td>
<td>2 (7.8)</td>
<td>3.38</td>
</tr>
<tr>
<td>2-Coat Veneer</td>
<td>1000</td>
<td>2.3 (0.09)</td>
<td>325 (240)</td>
<td>&gt;407 (&gt;360) (6 impacts)</td>
<td>2</td>
<td>31 (est.)</td>
</tr>
<tr>
<td>STRUCTO-Base 9# Lath</td>
<td>1000</td>
<td>2 (0.08)</td>
<td>339 (250)</td>
<td>N/A</td>
<td>2</td>
<td>45 (est.)</td>
</tr>
<tr>
<td>203 mm (8&quot;) Core-Filled CMU</td>
<td>&gt;700</td>
<td>0.5 (0.016 est.)</td>
<td>&gt;339 (&gt;250) (23 impacts)</td>
<td>N/A</td>
<td>2</td>
<td>45 (est.)</td>
</tr>
<tr>
<td>Low-risk and youth detention, psychiatric wards, payroll rooms and loading areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Category 5

For areas requiring forced-entry and ballistic resistance

| Secure 12-Gauge STRUCTOCORE | 1-Coat Veneer, Veneer | 1000 | 0.6 (0.023) | >339 (>250) (50 impacts) | N/A | 2 | 45 | 89 (3-1/2) | 171 (35.0) |
| Secure 18-Gauge STRUCTOCORE | 1-Coat Veneer, Veneer | 1000 | 0.6 (0.023) | >339 (>250) (38 impacts) | N/A | 2 | 45 | 89 (3-1/2) | 171 (35.0) |
| Core-Filled CMU | >700 | 0.5 (0.016 est.) | >339 (>250) (23 impacts) | N/A | 2 | 56 | 203 (8) | 465 (95.0) |
| Government, military embassies and consulates, high-detention, bank vaults |

Note: “est.” indicates estimated value.

(1) See publication SA923 for specific fire rating information. (2) Weights and widths are based on completed systems (panels on both flanges of studs). (3) Cost index base of 1.00 corresponds to single-layer Type X paper-faced gypsum panel each side of 92 mm (3-5/8"), 0.8 mm (20-ga.) steel framing, 400 mm (16") c.c., joint treatment only. (4) Minimum 92 mm (3-5/8"), 0.8 mm (20-ga.) steel framing at 400 mm (16") c.c. is recommended for abuse-resistant assemblies, and was used for the hard-body, soft-body and acoustical testing shown in this publication. Framing spacing of 600 mm (24") c.c. will likely reduce the impact resistance of an assembly, while framing of 300 mm (12") c.c. will likely improve the impact resistance. (5) Two-coat system consists of Doxoco Brand Veneer Basecoat Plaster and Doxoco Brand Interior Finish Plaster. (6) Two-coat system consists of Doxoco Brand Veneer Basecoat Plaster and Imperial Finish Plaster. (7) Two-coat system consists of Imperial Brand Basecoat Plaster and Imperial. Brand Finish Plaster. (8) Two-coat system consists of Imperial Brand Basecoat Plaster and Imperial. Brand Finish Plaster.

Fixture Attachment-Drywall and Plaster Systems

Fixture Attachment Load Table

<table>
<thead>
<tr>
<th>Fastener Type</th>
<th>Size</th>
<th>Base Assembly</th>
<th>Allowable Withdrawal Resistance (N)</th>
<th>Allowable Shear Resistance (lbf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toggle bolt or hollow wall fastener</td>
<td>3.2</td>
<td>12.7 mm (1/2&quot;) gypsum base or panels</td>
<td>89</td>
<td>178</td>
</tr>
<tr>
<td></td>
<td>4.8</td>
<td>12.7 mm (1/2&quot;) gypsum base or panels</td>
<td>134</td>
<td>223</td>
</tr>
<tr>
<td></td>
<td>6.4</td>
<td>12.7 mm (1/2&quot;) gypsum base or panels</td>
<td>178</td>
<td>267</td>
</tr>
<tr>
<td></td>
<td>3.2</td>
<td>12.7 mm (1/2&quot;) gypsum base or panels</td>
<td>312</td>
<td>445</td>
</tr>
<tr>
<td></td>
<td>4.8</td>
<td>&amp; 25 ga. steel studs</td>
<td>356</td>
<td>556</td>
</tr>
<tr>
<td></td>
<td>6.4</td>
<td></td>
<td>690</td>
<td>779</td>
</tr>
<tr>
<td>No. 8 sheet metal screw</td>
<td>—</td>
<td>12.7 mm (1/2&quot;) gypsum base or panels</td>
<td>223</td>
<td>356</td>
</tr>
<tr>
<td>Tivo: S bugle head screw</td>
<td>—</td>
<td>25 ga. steel base</td>
<td>267</td>
<td>445</td>
</tr>
<tr>
<td>Tivo: S-12 bugle head screw</td>
<td>—</td>
<td>12.7 mm (1/2&quot;) gypsum base or panels</td>
<td>378</td>
<td>601</td>
</tr>
<tr>
<td>Tivo: S pan head screw</td>
<td>—</td>
<td>25 ga. steel to 25 ga. steel</td>
<td>312</td>
<td>534</td>
</tr>
<tr>
<td>two bolts welded to steel insert</td>
<td>4.8</td>
<td>grab bar attachment</td>
<td>779</td>
<td>890</td>
</tr>
<tr>
<td>bolt welded to 38 mm (1-1/2&quot;) channel</td>
<td>6.4</td>
<td>plumber's bracket or see drawing on page 132</td>
<td>890</td>
<td>1113</td>
</tr>
<tr>
<td>plug and screw</td>
<td>#6</td>
<td>metal or gypsum</td>
<td>45</td>
<td>178</td>
</tr>
<tr>
<td></td>
<td>#8</td>
<td>lath and plaster</td>
<td>89</td>
<td>222</td>
</tr>
<tr>
<td></td>
<td>#12</td>
<td>lath and plaster</td>
<td>133</td>
<td>267</td>
</tr>
<tr>
<td>Toggle bolt or hollow wall fastener</td>
<td>3.2</td>
<td>Metal or gypsum</td>
<td>334</td>
<td>222</td>
</tr>
<tr>
<td></td>
<td>4.8</td>
<td>lath and plaster</td>
<td>556</td>
<td>623</td>
</tr>
<tr>
<td></td>
<td>6.4</td>
<td></td>
<td>778</td>
<td>667</td>
</tr>
</tbody>
</table>

(1) Newton. (2) Plaster having compressive strength of at least 6.2 MPa (900 psi) was used to develop this data.
Drywall, Plaster and Acoustical Ceiling Installation Tolerances

Standards of acceptability for installation of framing, drywall panels and joint treatment vary in different parts of North America. Nevertheless, several organizations, including the Metal Lath/Steel Framing Association, Gypsum Association and American Society for Testing and Materials (ASTM), have published recommendations, standards and/or tolerances that may be required for a specific project.

Similarly, references for tolerances and quality in plasterwork and acoustical ceilings are available. References for tolerances and quality in plasterwork have been published by ASTM and Diehl’s “Manual of Lathing and Plastering.” For acoustical ceilings construction, see the appropriate ASTM standards (page 442) or “Code of Practices for Acoustical Ceiling System Installation” in the Ceilings and Interior Systems Construction Association (CISCA) Ceiling Systems Handbook.

Contractors and their customers should reach agreement before starting the project regarding which tolerance standards will be used to judge acceptability of the work.

Gypsum Board Screw Usage

The number of fasteners used to install gypsum board varies with framing spacing, screw spacing, panel orientation and panel size. The charts below show estimated screw usage per 100 m² (thousand square feet) of gypsum board for both horizontal and vertical board attachment. Allowance should be made for loss.

### Horizontal Board Attachment (Screws/100 m² (1000 ft²))

<table>
<thead>
<tr>
<th>Framing Spacing</th>
<th>Screw Spacing mm (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1220 x 2400 mm (4’ x 8’) Board</strong></td>
<td>200 (8)</td>
</tr>
<tr>
<td>200 mm (8&quot;)</td>
<td>3061 (2844)</td>
</tr>
<tr>
<td>300 mm (12&quot;)</td>
<td>2119 (1969)</td>
</tr>
<tr>
<td>400 mm (16&quot;)</td>
<td>1648 (1531)</td>
</tr>
<tr>
<td>600 mm (24&quot;)</td>
<td>1178 (1094)</td>
</tr>
<tr>
<td><strong>1220 x 3050 mm (4’ x 10’) Board</strong></td>
<td>200 mm (8&quot;)</td>
</tr>
<tr>
<td>300 mm (12&quot;)</td>
<td>2072 (1925)</td>
</tr>
<tr>
<td>400 mm (16&quot;)</td>
<td>1602 (1488)</td>
</tr>
<tr>
<td>600 mm (24&quot;)</td>
<td>1130 (1050)</td>
</tr>
<tr>
<td><strong>1220 x 3660 mm (4’ x 12’) Board</strong></td>
<td>200 mm (8&quot;)</td>
</tr>
<tr>
<td>300 mm (12&quot;)</td>
<td>2045 (1900)</td>
</tr>
<tr>
<td>400 mm (16&quot;)</td>
<td>1572 (1460)</td>
</tr>
<tr>
<td>600 mm (24&quot;)</td>
<td>1109 (1030)</td>
</tr>
<tr>
<td>Framing Spacing</td>
<td>Screw Spacing mm (Inches)</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td><strong>1220 x 2400 mm (4' x 8') Board</strong></td>
<td></td>
</tr>
<tr>
<td>200 mm (8&quot;)</td>
<td>3061 (2844) 2120 (1969) 1648 (1531) 1178 (1094)</td>
</tr>
<tr>
<td>300 mm (12&quot;)</td>
<td>2186 (2031) 1513 (1406) 1178 (1094) 841 (781)</td>
</tr>
<tr>
<td>400 mm (16&quot;)</td>
<td>1749 (1625) 1211 (1125) 942 (875) 673 (625)</td>
</tr>
<tr>
<td>600 mm (24&quot;)</td>
<td>1312 (1219) 908 (844) 706 (656) 505 (468)</td>
</tr>
<tr>
<td><strong>1220 x 3050 mm (4' x 10') Board</strong></td>
<td></td>
</tr>
<tr>
<td>200 mm (8&quot;)</td>
<td>3113 (2800) 2072 (1925) 1602 (1488) 1030 (1050)</td>
</tr>
<tr>
<td>300 mm (12&quot;)</td>
<td>2153 (2000) 1480 (1375) 1144 (1063) 807 (750)</td>
</tr>
<tr>
<td>400 mm (16&quot;)</td>
<td>1722 (1600) 1184 (1100) 915 (850) 646 (600)</td>
</tr>
<tr>
<td>600 mm (24&quot;)</td>
<td>1292 (1200) 888 (825) 687 (638) 484 (450)</td>
</tr>
<tr>
<td><strong>1220 x 3660 mm (4' x 12') Board</strong></td>
<td></td>
</tr>
<tr>
<td>200 mm (8&quot;)</td>
<td>2983 (2771) 2040 (1896) 1569 (1458) 1099 (1021)</td>
</tr>
<tr>
<td>300 mm (12&quot;)</td>
<td>2130 (1979) 1457 (1354) 1122 (1042) 785 (729)</td>
</tr>
<tr>
<td>400 mm (16&quot;)</td>
<td>1703 (1583) 1166 (1083) 897 (833) 628 (583)</td>
</tr>
<tr>
<td>600 mm (24&quot;)</td>
<td>1278 (1188) 875 (813) 673 (625) 461 (438)</td>
</tr>
</tbody>
</table>
Comparing Plaster Systems

The chart below compares conventional plaster and veneer plaster systems to help in selection for specific job applications.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Conventional Plaster</strong></td>
<td>Best system to attain a uniform, monolithic, blemish-free, smooth surface with excellent wear resistance.</td>
</tr>
</tbody>
</table>
| **2. IMPERIAL Brand Basecoat with selected finish shown below, “A” through “E”** | **Finish Plaster Rating**  
No. 1 Best—No. 4 Acceptable  
**Productivity**  
**Hardness**  
**Workability**  
**Ease to Achieve Smooth Surface** |
| A. IMPERIAL Brand Finish               | Ultimate in surface hardness and abrasion resistance. Easily textured. Low productivity and hard to achieve a completely smooth finish. |
| E. RED TOP Keenes Cement, Lime Putty and Sand | Unique, only truly retemperable material. Best choice for coloring or tinting large plaster wall areas. Ultimate choice for texturing. Can be floated for extended time period. Due to its unique nature, Keenes is not rated with above finishes. |
| **3. IMPERIAL Brand Finish (one-coat)** | Monolithic, smooth or textured appearance. Ultimate in surface hardness. Primarily intended for direct application to plaster base. Achieves high productivity due to compatibility with absorbent surface of plaster base. Ready for finishing in 48 hours with favorable drying conditions. Fast completion shortens construction time, brings in paying tenants faster, thus reducing interest paid on project construction loan. |
## Metric Terms and Metric Equivalents

### Basic Units

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Metric (SI) Unit</th>
<th>Symbol</th>
<th>Imperial equivalent (nom.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>millimeter</td>
<td>mm</td>
<td>0.039 in.</td>
</tr>
<tr>
<td></td>
<td>meter</td>
<td>m</td>
<td>3.281 ft.</td>
</tr>
<tr>
<td>Area</td>
<td>square meter</td>
<td>m²</td>
<td>10.764 ft²</td>
</tr>
<tr>
<td>Volume</td>
<td>cubic meter</td>
<td>m³</td>
<td>35.315 ft³</td>
</tr>
<tr>
<td>Volume (Fluid)</td>
<td>liter</td>
<td>L</td>
<td>35.195 oz.</td>
</tr>
<tr>
<td>Mass (Weight)</td>
<td>gram</td>
<td>g</td>
<td>0.035 oz.</td>
</tr>
<tr>
<td></td>
<td>kilogram</td>
<td>kg</td>
<td>2.204 lb.</td>
</tr>
<tr>
<td></td>
<td>tonne</td>
<td>t</td>
<td>2,204.600 lb.</td>
</tr>
<tr>
<td>Force</td>
<td>newton</td>
<td>N</td>
<td>0.225 lbf.</td>
</tr>
<tr>
<td>Temperature</td>
<td>kelvin</td>
<td>K</td>
<td>1.8ºF</td>
</tr>
<tr>
<td></td>
<td>degree celsius</td>
<td>ºC</td>
<td>1.8ºF</td>
</tr>
<tr>
<td>Temperature</td>
<td>celsius</td>
<td>ºC</td>
<td>(ºF-32)/5/9</td>
</tr>
<tr>
<td>Thermal Resistance</td>
<td>K•m²</td>
<td>W</td>
<td>5.679 ft•ºF</td>
</tr>
<tr>
<td>Heat Transfer</td>
<td>watt</td>
<td>W</td>
<td>3.412 Btu/hr.</td>
</tr>
<tr>
<td>Pressure</td>
<td>kilopascal</td>
<td>kPa</td>
<td>0.145 lbf/in² (psi)</td>
</tr>
<tr>
<td></td>
<td>pascal</td>
<td>Pa</td>
<td>20.885 lbf/ft² (psf)</td>
</tr>
</tbody>
</table>

(1) To convert imperial units to SI units, divide by imperial equivalent

### Prefixes (Order of Magnitude)

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Symbol</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>mega</td>
<td>M</td>
<td>10⁶</td>
</tr>
<tr>
<td>kilo</td>
<td>k</td>
<td>10³</td>
</tr>
<tr>
<td>centi¹⁵</td>
<td>c</td>
<td>10⁻²</td>
</tr>
<tr>
<td>milli</td>
<td>m</td>
<td>10⁻³</td>
</tr>
<tr>
<td>micro</td>
<td>µ(mu)</td>
<td>10⁻⁶</td>
</tr>
</tbody>
</table>

(1) Limited use only.
The table below provides metric equivalents for the dimensions of CGC products. "Soft" conversions merely apply a conversion factor that translates feet and inches (according to which the products were manufactured) into metric units; "hard" metric measurements are given for products actually manufactured in metric sizes.

### Metric Equivalents

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Conversion Type(1)</th>
<th>Ft./In.</th>
<th>mm(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SHEETROCK Brand Gypsum Panels</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thickness</td>
<td>Soft</td>
<td>1/4&quot;</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/8&quot;</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/2&quot;</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5/8&quot;</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/4&quot;</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1&quot;</td>
<td>25</td>
</tr>
<tr>
<td>Width</td>
<td>Hard</td>
<td>24&quot;</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48&quot;</td>
<td>1200</td>
</tr>
<tr>
<td>Length</td>
<td>Hard</td>
<td>8’</td>
<td>2400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10’</td>
<td>3000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12’</td>
<td>3600</td>
</tr>
<tr>
<td><strong>Steel Stud Framing</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thickness (gauge)</td>
<td>Soft</td>
<td>0.0179 (25)</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0270 (22)</td>
<td>0.69</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.0329 (20)</td>
<td>0.84</td>
</tr>
<tr>
<td>Depth</td>
<td>Soft</td>
<td>1-5/8&quot;</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-1/2&quot;</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-1/2&quot;</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-5/8&quot;</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4&quot;</td>
<td>102</td>
</tr>
<tr>
<td>Length</td>
<td>Hard</td>
<td>8’</td>
<td>2400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10’</td>
<td>3000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12’</td>
<td>3600</td>
</tr>
<tr>
<td><strong>THERMAFIBER Insulation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thickness</td>
<td>Soft</td>
<td>1”</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-1/2”</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2”</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3”</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4”</td>
<td>102</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6”</td>
<td>152</td>
</tr>
<tr>
<td>Width</td>
<td>Hard</td>
<td>16”</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24”</td>
<td>600</td>
</tr>
<tr>
<td>Length</td>
<td>Hard</td>
<td>48”</td>
<td>1200</td>
</tr>
</tbody>
</table>

(1) Conversion Type: "Soft" is metric relabeling with no physical change of dimension; "hard" is a physical change to the metric dimension shown. (2) Conversion factors: Inches X 25.4 = mm; Feet X 304.8 = mm.

**Notes:**
- Availability: Items above are not stocked in metric lengths or widths. Minimum quantity orders may be required. Lead time should be determined; upcharges may apply. Geographic availability may vary and should be verified for the project location.
- Lengths: Shown on SHEETROCK Brand Gypsum Panels and steel stud framing for illustration purposes only.
- Framing Spacing: 16" o.c. converts to 400 mm o.c.; 24" converts to 600 mm o.c.
The listings following contain existing standard specifications that apply to CGC materials described in this handbook. Where ASTM, local codes, etc., require product variance, consult your CGC representative.

### Specification Standards

<table>
<thead>
<tr>
<th>Product</th>
<th>ASTM Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plaster</strong></td>
<td></td>
</tr>
<tr>
<td>Red Top gypsum plaster</td>
<td>C28</td>
</tr>
<tr>
<td>Red Top two-purpose plaster</td>
<td>C28</td>
</tr>
<tr>
<td>Red Top wood fiber plaster</td>
<td>C28</td>
</tr>
<tr>
<td>Structo-Lite plaster</td>
<td>C28</td>
</tr>
<tr>
<td>Red Top gauging plaster</td>
<td>C28</td>
</tr>
<tr>
<td>Red Top keenes cement regular quick trowel</td>
<td>C61</td>
</tr>
<tr>
<td>Structo-Gauge plaster</td>
<td>C28</td>
</tr>
<tr>
<td>Structo-Base plaster</td>
<td>C28</td>
</tr>
<tr>
<td>Imperial plaster</td>
<td>C587</td>
</tr>
<tr>
<td>Diamond plaster</td>
<td>C587</td>
</tr>
<tr>
<td><strong>Gypsum Lathing</strong></td>
<td></td>
</tr>
<tr>
<td>Grand Prix plaster base 9.5 mm (3/8&quot;), 12.7 mm (1/2&quot;) and 15.9 mm (5/8&quot;)</td>
<td>C37, C588, C1396</td>
</tr>
<tr>
<td><strong>Lime</strong></td>
<td></td>
</tr>
<tr>
<td>Red Top single hydrated finish lime</td>
<td>C206 type N</td>
</tr>
<tr>
<td>Snowdrift double hydrated finish lime</td>
<td>C206 type S</td>
</tr>
<tr>
<td><strong>Gypsum Panels</strong></td>
<td></td>
</tr>
<tr>
<td>SHEETROCK Brand (plain) (foil-back)</td>
<td>C36 C1396</td>
</tr>
<tr>
<td>SHEETROCK Brand sq. edge</td>
<td>C36 C1396</td>
</tr>
<tr>
<td>SHEETROCK Brand tap. edge</td>
<td>C36 C1396</td>
</tr>
<tr>
<td>SHEETROCK Brand bev. edge</td>
<td>C36 C1396</td>
</tr>
<tr>
<td>5/8&quot; SHEETROCK Brand FIRECODE Core</td>
<td>C36 C1396</td>
</tr>
<tr>
<td>SHEETROCK Brand FIRECODE C core</td>
<td>C36 C1396</td>
</tr>
<tr>
<td>SHEETROCK vinyl-covered</td>
<td>C960 C1396</td>
</tr>
<tr>
<td>SHEETROCK Brand water-resistant</td>
<td>C630 C1396</td>
</tr>
<tr>
<td>SHEETROCK Brand gypsum coreboard panels</td>
<td>C442 C1396</td>
</tr>
<tr>
<td>SHEETROCK Brand shaft wall liner panels</td>
<td>C442 C1396</td>
</tr>
<tr>
<td>SHEETROCK Brand exterior gypsum ceiling board</td>
<td>C931 C1396</td>
</tr>
<tr>
<td>SHEETROCK Brand interior gypsum ceiling board</td>
<td>C1395 C1396</td>
</tr>
<tr>
<td>SHEETROCK Brand Humtek gypsum panels</td>
<td>C36 C1396</td>
</tr>
<tr>
<td>FIBEROCK Brand panels—abuse-resistant</td>
<td>C1278</td>
</tr>
<tr>
<td>FIBEROCK Brand panels—VHI abuse-resistant</td>
<td>C1278</td>
</tr>
<tr>
<td><strong>Cement Panels</strong></td>
<td></td>
</tr>
<tr>
<td>DUROCK Brand cement board</td>
<td>C1325 (ANSI A 118.9)</td>
</tr>
<tr>
<td>DUROCK Brand exterior cement board</td>
<td>C1186 (ANSI A 118.9)</td>
</tr>
<tr>
<td><strong>Sheathing</strong></td>
<td></td>
</tr>
<tr>
<td>GYPUK Brand gypsum sheathing treated core</td>
<td>C79 C1396</td>
</tr>
<tr>
<td>FIBEROCK Brand sheathing—Aqua-Tough</td>
<td>C1278</td>
</tr>
<tr>
<td><strong>Joint Treatment</strong></td>
<td></td>
</tr>
<tr>
<td>CGC, F1, CLASSIC, LiteLine joint compounds</td>
<td>C475</td>
</tr>
</tbody>
</table>
### Specification Standards (continued)

<table>
<thead>
<tr>
<th>Product</th>
<th>ASTM Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accessories</strong></td>
<td></td>
</tr>
<tr>
<td>Structural steel joists, runners</td>
<td>C645, C955, A568, A653, A792 (alum.-zinc coating), A591 (galv. coating)</td>
</tr>
<tr>
<td>25, 22 ga. studs, 25, 22 ga. runners</td>
<td>C645, A568 (steel), A653, A463 (alum. coating), A792 (alum.-zinc coating), A591 (galv. coating)</td>
</tr>
<tr>
<td>20 ga. studs, 20 ga. runners</td>
<td>C645, A568 (steel), A653 (galv. coating), A792 (alum.-zinc coating), A591 (galv. coating)</td>
</tr>
<tr>
<td>RC-1 resilient channels</td>
<td>A568 (steel), A525 (galv. coating), A792 (alum.-zinc coating)</td>
</tr>
<tr>
<td>Zinc Control Joints</td>
<td>C841</td>
</tr>
<tr>
<td>Dur-A-Bead corner bead</td>
<td>C1047</td>
</tr>
<tr>
<td>SHEETROCK Brand metal trims</td>
<td>C1047</td>
</tr>
<tr>
<td>Shaft wall/area separation wall studs</td>
<td>A653, A792 (alum.-zinc coating), A591 (galv. coating)</td>
</tr>
<tr>
<td>Drywall screws</td>
<td>C1002, C954</td>
</tr>
<tr>
<td>SHEETROCK Brand acoustical sealant</td>
<td>C834</td>
</tr>
<tr>
<td><strong>Acoustical Units—Prefabricated</strong></td>
<td></td>
</tr>
<tr>
<td>Cast ceiling panels</td>
<td>C423, C523, C635, E1264, C117, E1264</td>
</tr>
<tr>
<td>Water-felted ceiling panels</td>
<td></td>
</tr>
<tr>
<td><strong>Ceiling Suspension System</strong></td>
<td></td>
</tr>
<tr>
<td>Donn Grid</td>
<td>C635, C363, C645, C841, E580</td>
</tr>
<tr>
<td><strong>Mineral Fiber Insulation</strong></td>
<td></td>
</tr>
<tr>
<td>THERMAFIBER sound atten. fire blanket</td>
<td>C665</td>
</tr>
</tbody>
</table>
ASTM Application Standards

There are also standards for application of many of the products in this Handbook. See the specification standards listed below for more information.

<table>
<thead>
<tr>
<th>Application Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
</tr>
<tr>
<td>Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels</td>
</tr>
<tr>
<td>Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products</td>
</tr>
<tr>
<td>Specification for Application and Finishing of Gypsum Board</td>
</tr>
<tr>
<td>Specification for Installation of Interior Lathing and Furring</td>
</tr>
<tr>
<td>Specification for Application of Interior Gypsum Plaster</td>
</tr>
<tr>
<td>Specification for Application of Gypsum Veneer Plaster</td>
</tr>
<tr>
<td>Specification for Application of Gypsum Base to Receive Gypsum Veneer Plaster</td>
</tr>
<tr>
<td>Specification for Installation of Load-Bearing Steel Studs and Related Accessories</td>
</tr>
<tr>
<td>Specification for Application of Gypsum Sheathing</td>
</tr>
<tr>
<td>Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Moderate Seismic Restraint</td>
</tr>
</tbody>
</table>

ASTM Standards for Performance Specifications and Test Methods

<table>
<thead>
<tr>
<th>Performance Specifications and Test Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Fed. Spec. 209, Clean Room and Work Station Requirements for Controlled Environments, describes the method of establishing Clean Room Classification values.</td>
</tr>
</tbody>
</table>
ASTM E-413, Standard Classification for Rating Sound Insulation, provides criteria to establish Ceiling Attenuation Class (CAC) of an acoustical ceiling, similar to STC ratings for walls.

ASTM C-423, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method, describes the method of establishing Noise Reduction Coefficient (NRC) values.

ASTM C-635, Standard Specification for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings, provides classification criteria by load capacity, along with manufacturing tolerance, coating, and inspection criteria for suspension systems.

ASTM E-1110, Standard Classification for Determination of Articulation Class, provides criteria to establish ceiling Articulation Class (AC) of an acoustical ceiling, generally applies to open plan ceilings in lieu of a NRC rating.


ASTM E-1264, Standard Classification for Acoustical Ceiling Products, (Correlates with Federal Spec. SS-S-118 “Sound Controlling Acoustical Tiles and Panel”), provides general classification by type and form, acoustical rating qualification, light reflectance coefficient qualification, and surface burning fire classification of acoustical ceiling tiles and panels.


ASTM E-1433, Standard Guide for Selection of Standards on Environmental Acoustics, is intended to assist acoustical consultants, architects, specifiers and others in understanding ASTM standards in environmental acoustics, as referenced in E-413, E-1110, E-1264, etc.

## Products/UL Designations

The CGC products listed below are identified in the UL Fire Resistance Directory by the designations shown.

<table>
<thead>
<tr>
<th>UL Type Designation</th>
<th>Drywall, Cement Board and Plaster Board Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>SHEETROCK Brand Gypsum Panels</td>
</tr>
<tr>
<td>SCX</td>
<td>SHEETROCK Brand Gypsum Panels, FIRECODE Core (including HUMITEK and MH Panels)</td>
</tr>
<tr>
<td>C</td>
<td>SHEETROCK Brand Gypsum Panels, FIRECODE C Core</td>
</tr>
<tr>
<td>WRX</td>
<td>SHEETROCK Brand Gypsum Panels, FIRECODE Core, Water-Resistant</td>
</tr>
<tr>
<td>WRC</td>
<td>SHEETROCK Brand Gypsum Panels, FIRECODE C Core, Water-Resistant</td>
</tr>
<tr>
<td>AR</td>
<td>SHEETROCK Brand Abuse-Resistant Gypsum Panels</td>
</tr>
<tr>
<td>SLX</td>
<td>SHEETROCK Brand Gypsum Liner Panels</td>
</tr>
<tr>
<td>ULTRACODE</td>
<td>SHEETROCK Brand Gypsum Panels, ULTRACODE Core</td>
</tr>
<tr>
<td>SHX</td>
<td>SHEETROCK Brand Gypsum Sheathing, FIRECODE Core</td>
</tr>
<tr>
<td>FCV</td>
<td>SHEETROCK Brand Gypsum Panels, FIRECODE Core, Vinyl-Covered</td>
</tr>
<tr>
<td>FB</td>
<td>SHEETROCK Brand Formboard</td>
</tr>
<tr>
<td>FRX-G</td>
<td>FIBEROCK Brand Panels, all AQUA-TOUGH and abuse resistant</td>
</tr>
<tr>
<td>IPR</td>
<td>GRAND PREMIER Brand Plaster Base</td>
</tr>
<tr>
<td>IP-X1</td>
<td>GRAND PREMIER Brand Plaster Base (Type X)</td>
</tr>
<tr>
<td>IP-X2</td>
<td>GRAND PREMIER Brand Plaster Base (Type C)</td>
</tr>
<tr>
<td>IP-X3</td>
<td>GRAND PREMIER Brand Plaster Base, ULTRACODE Core</td>
</tr>
<tr>
<td>DUROCK</td>
<td>DUROCK Brand Cement Board</td>
</tr>
<tr>
<td>DUROCK Exterior</td>
<td>DUROCK Brand Exterior Cement Board</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UL Type Designation</th>
<th>Acoustical Tile and Panel Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC-CB</td>
<td>Gypsum Lay-In Ceiling Tile</td>
</tr>
<tr>
<td>AP or AP-1</td>
<td>ACOUSTONE Ceiling Product (SANDRIFT, FROST, GLACIER, BRO CLIMAPLUS, FISSURED Ceiling Panels)</td>
</tr>
<tr>
<td>GR</td>
<td>AURATONE FIRECODE Ceiling Product (Radar, Radar CLIMAPLUS, Fissured Ceiling Panel)</td>
</tr>
<tr>
<td>FR-83 or GR-1</td>
<td>AURATONE FIRECODE Ceiling Product (Illusion, Aspen, Radar, Fissured, Pebbled, Radar CLIMAPLUS, Ceiling Panels)</td>
</tr>
<tr>
<td>FR-81 or FR-83</td>
<td>AURATONE FIRECODE Ceiling Product (Rock Face CLIMAPLUS, Clean Room CLIMAPLUS Ceiling Panels)</td>
</tr>
<tr>
<td>FR-4</td>
<td>CERAMIC HERITAGE Ceiling Product (CERAMIC HERITAGE CLIMAPLUS Ceiling Panels)</td>
</tr>
<tr>
<td>FR-X1</td>
<td>X Technology FIRECODE Ceiling Product (ORION CLIMAPLUS, ECLIPSE CLIMAPLUS, MILLENIUM CLIMAPLUS (clay back) Ceiling Panels)</td>
</tr>
<tr>
<td>DXL</td>
<td>DONN 1 1/2&quot; Fire rated grid system components</td>
</tr>
</tbody>
</table>
## Permeance—CGC Products

### Moisture Vapor Permeance

**Product**

<table>
<thead>
<tr>
<th>Gypsum Panels</th>
<th>Finish</th>
<th>ng/Pa•s•m² (Perms)²³⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.5 mm (3/8&quot;) SHEETROCK Brand Regular</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) SHEETROCK Brand Regular</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) SHEETROCK Brand Regular</td>
<td>1-coat flat latex paint</td>
<td>1641 (28.3)</td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) SHEETROCK Brand Regular</td>
<td>2-coats flat latex paint</td>
<td>1647 (28.4)</td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) SHEETROCK Brand Regular</td>
<td>2-coats gloss enamel (oil)</td>
<td>58 (1.0)</td>
</tr>
<tr>
<td>15.9 mm (5/8&quot;) SHEETROCK Brand Regular</td>
<td></td>
<td>1542 (26.6)</td>
</tr>
<tr>
<td>15.9 mm (5/8&quot;) SHEETROCK Brand FIRECODE Core</td>
<td></td>
<td>1658 (28.6)</td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) SHEETROCK Brand FIRECODE C Core</td>
<td></td>
<td>1844 (31.8)</td>
</tr>
<tr>
<td>15.9 mm (5/8&quot;) SHEETROCK Brand FIRECODE C Core</td>
<td></td>
<td>1502 (25.9)</td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) SHEETROCK Brand Water-Resistant</td>
<td></td>
<td>1751 (30.2)</td>
</tr>
<tr>
<td>15.9 mm (5/8&quot;) SHEETROCK Brand Water-Resistant FIRECODE C Core, FIRECODE Core</td>
<td></td>
<td>1751 (30.2)</td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) SHEETROCK Brand HUMITEK gypsum panel</td>
<td></td>
<td>1751 (30.2)</td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) FIBEROCK Brand Abuse Resistant Panels</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>15.9 mm (5/8&quot;) FIBEROCK Brand Abuse Resistant Panels</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) SHEETROCK Vinyl-Faced</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pumice</td>
<td>&lt;58 (&lt;1)</td>
<td></td>
</tr>
<tr>
<td>Moonstone</td>
<td>&lt;58 (&lt;1)</td>
<td></td>
</tr>
<tr>
<td>Burlap</td>
<td>&lt;58 (&lt;1)</td>
<td></td>
</tr>
<tr>
<td>Granite</td>
<td>&lt;58 (&lt;1)</td>
<td></td>
</tr>
<tr>
<td>Tweed</td>
<td>&lt;58 (&lt;1)</td>
<td></td>
</tr>
<tr>
<td>Academy</td>
<td>&lt;58 (&lt;1)</td>
<td></td>
</tr>
<tr>
<td>Trafalgar</td>
<td>&lt;58 (&lt;1)</td>
<td></td>
</tr>
<tr>
<td>Striae</td>
<td>&lt;58 (&lt;1)</td>
<td></td>
</tr>
<tr>
<td>Sonoma</td>
<td>&lt;58 (&lt;1)</td>
<td></td>
</tr>
<tr>
<td>Brushwork</td>
<td>&lt;58 (&lt;1)</td>
<td></td>
</tr>
<tr>
<td>25 mm (1&quot;) SHEETROCK Brand Gypsum Liner Panel</td>
<td></td>
<td>1392 (24.0)</td>
</tr>
</tbody>
</table>

### Gypsum Base

<table>
<thead>
<tr>
<th>Gypsum Base</th>
<th>Finish</th>
<th>ng/Pa•s•m² (Perms)²³⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.7 mm (1/2&quot;) GRAND PAX Brand</td>
<td></td>
<td>1670 (28.8)</td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) GRAND PAX Brand</td>
<td>DIAMOND Brand Interior Finish Plaster</td>
<td>1415 (24.4)</td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) GRAND PAX Brand</td>
<td>1 coat IMPERIAL Finish Plaster</td>
<td>307 (5.3)</td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) GRAND PAX Brand</td>
<td>IMPERIAL Brand Basecoat/ IMPERIAL Brand Finish Plaster</td>
<td>464 (8.0)</td>
</tr>
<tr>
<td>15.9 mm (5/8&quot;) GRAND PAX Brand</td>
<td></td>
<td>1560 (26.9)</td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) GRAND PAX Brand FIRECODE C</td>
<td></td>
<td>1740 (30.0)</td>
</tr>
<tr>
<td>15.9 mm (5/8&quot;) GRAND PAX Brand FIRECODE C</td>
<td></td>
<td>1519 (26.2)</td>
</tr>
<tr>
<td>9.5 mm (3/8&quot;) gypsum base and 12.7 mm (1/2&quot;) gypsum plaster, metal lath and 19 mm (3/4&quot;) gypsum plaster</td>
<td></td>
<td>1160 (20.0)</td>
</tr>
</tbody>
</table>

### Gypsum Sheathing

<table>
<thead>
<tr>
<th>Gypsum Sheathing</th>
<th>Finish</th>
<th>ng/Pa•s•m² (Perms)²³⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.7 mm (1/2&quot;) GRAYLIVE Brand Gypsum Sheathing Treated Core</td>
<td></td>
<td>1351 (23.3)</td>
</tr>
<tr>
<td>12.7 mm (1/2&quot;) FIBEROCK Brand Sheathing AQUA-TOUGH</td>
<td></td>
<td>1624 (28)</td>
</tr>
<tr>
<td>15.9 mm (5/8&quot;) FIBEROCK Brand Sheathing AQUA-TOUGH</td>
<td></td>
<td>1450 (25)</td>
</tr>
</tbody>
</table>

---

(1) All foil-back products, less than 0.06 perms.
(2) All tests comply with ASTM E96 (desiccant method).
(3) Grain per sq. ft. per in. of water vapor pressure difference (grain/ft•h•in.-Hg) (grams/m²/24 hours).
(4) 57.4 ng/Pa•s•m² permeance is equivalent to the former one "Perm" (1 grain/ft•h•Hg•in.)
## Thermal Coefficients of Linear Expansion of Common Building Materials

Unrestrained $4^\circ$—$38^\circ$C. ($40^\circ$—$100^\circ$F)

<table>
<thead>
<tr>
<th>Material</th>
<th>Coefficient $x10^{-6}$/mm/mm/$^\circ$C</th>
<th>($x10^{-6}$/in/in/$^\circ$F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gypsum Panels and Bases</td>
<td>16.2</td>
<td>9.0</td>
</tr>
<tr>
<td>Gypsum Plaster (sanded 100:2, 100:3)</td>
<td>12.6</td>
<td>7.0</td>
</tr>
<tr>
<td>Wood Fiber Plaster (sanded 100:1)</td>
<td>14.4</td>
<td>8.0</td>
</tr>
<tr>
<td>STRUCTO-LITE Plaster</td>
<td>13.1</td>
<td>7.3</td>
</tr>
<tr>
<td>Aluminum, Wrought</td>
<td>23.0</td>
<td>12.8</td>
</tr>
<tr>
<td>Steel, Medium</td>
<td>12.1</td>
<td>6.7</td>
</tr>
<tr>
<td>Brick, Masonry</td>
<td>5.6</td>
<td>3.1</td>
</tr>
<tr>
<td>Cement, Portland</td>
<td>10.6</td>
<td>5.9</td>
</tr>
<tr>
<td>Concrete</td>
<td>14.2</td>
<td>7.9</td>
</tr>
<tr>
<td>Fir (parallel to fiber)</td>
<td>3.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Fir (perpendicular to fiber)</td>
<td>5.8</td>
<td>3.2</td>
</tr>
</tbody>
</table>

## Hygrometric Coefficients of Expansion (unrestrained)

<table>
<thead>
<tr>
<th>Material</th>
<th>mm/mm/% R.H.</th>
<th>Inches/Inch/% R.H. (5%—90% R.H.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gypsum Panels and Bases</td>
<td>$7.2 \times 10^{-6}$</td>
<td>$7.2 \times 10^{-6}$</td>
</tr>
<tr>
<td>Gypsum Plaster (sanded 100:2, 100:3)</td>
<td>$1.5 \times 10^{-6}$</td>
<td>$1.5 \times 10^{-6}$</td>
</tr>
<tr>
<td>Wood Fiber Plaster (sanded 100:1)</td>
<td>$2.8 \times 10^{-6}$</td>
<td>$2.8 \times 10^{-6}$</td>
</tr>
<tr>
<td>STRUCTO-LITE Plaster</td>
<td>$4.8 \times 10^{-6}$</td>
<td>$4.8 \times 10^{-6}$</td>
</tr>
<tr>
<td>Vermiculite Gypsum Plaster (sanded 100:2)</td>
<td>$3.8 \times 10^{-6}$</td>
<td>$3.8 \times 10^{-6}$</td>
</tr>
</tbody>
</table>
# Thermal Resistance Coefficients of Building and Insulating Materials

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Product</th>
<th>Density kg/m³</th>
<th>Density lb/ft³</th>
<th>Resistance (R-Value) K.m²/W</th>
<th>h.°F/Btu/hr.ft.²</th>
</tr>
</thead>
<tbody>
<tr>
<td>50.8-63.5</td>
<td>THERMAFIBER Mineral Fiber Insulation (SAFB)</td>
<td>48.1</td>
<td>2.5</td>
<td>1.23</td>
<td>7.7-9.3</td>
</tr>
<tr>
<td>76.2-88.9</td>
<td>THERMAFIBER Mineral Fiber Insulation (SAFB)</td>
<td>48.1</td>
<td>2.5</td>
<td>1.94</td>
<td>11.1-13.0</td>
</tr>
<tr>
<td>133.4-152.4</td>
<td>THERMAFIBER Mineral Fiber Insulation (SAFB)</td>
<td>48.1</td>
<td>2.5</td>
<td>3.35</td>
<td>19.4-22.2</td>
</tr>
<tr>
<td>25.4</td>
<td>Extruded Polystyrene Insulation</td>
<td>35.2</td>
<td>2.2</td>
<td>0.88</td>
<td>5.00</td>
</tr>
<tr>
<td>12.7</td>
<td>SHEETROCK Brand Gypsum Panels</td>
<td>690.2</td>
<td>43</td>
<td>0.08</td>
<td>0.45</td>
</tr>
<tr>
<td>15.9</td>
<td>SHEETROCK Brand Gypsum Panels</td>
<td>690.2</td>
<td>43</td>
<td>0.10</td>
<td>0.56</td>
</tr>
<tr>
<td>12.7</td>
<td>SHEETROCK Brand Gypsum Panels, FIRECODE C Core</td>
<td>800.9</td>
<td>50</td>
<td>0.08</td>
<td>0.45</td>
</tr>
<tr>
<td>15.9</td>
<td>SHEETROCK Brand Gypsum Panels, FIRECODE and FIRECODE C Core</td>
<td>800.9</td>
<td>50</td>
<td>0.10</td>
<td>0.56</td>
</tr>
<tr>
<td>12.7</td>
<td>FIBEROCK Brand Panels</td>
<td>850</td>
<td>53</td>
<td>0.08</td>
<td>0.5</td>
</tr>
<tr>
<td>15.9</td>
<td>FIBEROCK Brand Panels</td>
<td>850</td>
<td>53</td>
<td>0.08</td>
<td>0.5</td>
</tr>
<tr>
<td>12.7</td>
<td>SHEETROCK Brand HUMITEK Gypsum Panels</td>
<td>690</td>
<td>43</td>
<td>0.08</td>
<td>0.45</td>
</tr>
<tr>
<td>15.9</td>
<td>SHEETROCK Brand HUMITEK Gypsum Panels</td>
<td>690</td>
<td>43</td>
<td>0.10</td>
<td>0.56</td>
</tr>
<tr>
<td>12.7</td>
<td>GRAND PRIX Brand Veneer Plaster Base</td>
<td>690.2</td>
<td>43</td>
<td>0.08</td>
<td>0.45</td>
</tr>
<tr>
<td>15.9</td>
<td>GRAND PRIX Brand Veneer Plaster Base</td>
<td>690.2</td>
<td>43</td>
<td>0.10</td>
<td>0.56</td>
</tr>
<tr>
<td>12.7</td>
<td>GRAND PRIX Brand Veneer Plaster Base, FIRECODE C Core</td>
<td>800.9</td>
<td>50</td>
<td>0.08</td>
<td>0.45</td>
</tr>
<tr>
<td>15.9</td>
<td>GRAND PRIX Brand Veneer Plaster Base, FIRECODE and FIRECODE C Core</td>
<td>800.9</td>
<td>50</td>
<td>0.10</td>
<td>0.56</td>
</tr>
<tr>
<td>9.5</td>
<td>GRAND PRIX Plaster Base</td>
<td>800.9</td>
<td>50</td>
<td>0.08</td>
<td>0.32</td>
</tr>
<tr>
<td>12.7</td>
<td>GRAND PRIX Brand Gypsum Sheathing Treated Core</td>
<td>800.9</td>
<td>50</td>
<td>0.08</td>
<td>0.45</td>
</tr>
<tr>
<td>12.7</td>
<td>Sanded Plaster</td>
<td>1681.9</td>
<td>105</td>
<td>0.02</td>
<td>0.09</td>
</tr>
<tr>
<td>12.7</td>
<td>Plaster with Lightweight Aggregate</td>
<td>720.8</td>
<td>45</td>
<td>0.06</td>
<td>0.32</td>
</tr>
<tr>
<td>101.6</td>
<td>Common Brick</td>
<td>1922.2</td>
<td>120</td>
<td>0.14</td>
<td>0.80</td>
</tr>
<tr>
<td>12.7</td>
<td>DUROCK Brand Cement Board</td>
<td>1153.3</td>
<td>72</td>
<td>0.05</td>
<td>0.26</td>
</tr>
<tr>
<td>12.7</td>
<td>DUROCK Brand Exterior Cement Board</td>
<td>1153.3</td>
<td>72</td>
<td>0.05</td>
<td>0.26</td>
</tr>
<tr>
<td>101.6</td>
<td>Face Brick</td>
<td>2082.4</td>
<td>130</td>
<td>0.08</td>
<td>0.44</td>
</tr>
<tr>
<td>25.4</td>
<td>Portland Cement Stucco with Sand Aggregate</td>
<td>1858.1</td>
<td>116</td>
<td>0.04</td>
<td>0.20</td>
</tr>
<tr>
<td>101.6</td>
<td>Concrete Block, 3-oval Core, Cinder Aggregate</td>
<td>2032</td>
<td>8</td>
<td>0.30</td>
<td>1.72</td>
</tr>
<tr>
<td>304.8</td>
<td>Concrete Block, 3-oval Core, Cinder Aggregate</td>
<td>304.8</td>
<td>12</td>
<td>0.33</td>
<td>1.89</td>
</tr>
<tr>
<td>25.4</td>
<td>Plain Air Space, non-reflective</td>
<td>—</td>
<td>—</td>
<td>0.01</td>
<td>0.06</td>
</tr>
</tbody>
</table>

---

1. All factors based on data from 1981 ASHRAE Handbook of Fundamentals, Factors at 24°C (75°F), mean temperature. (2) Conditions: heat, flow horizontal; mean temperature 10°C (50°F); temperature differential -1°C (30°F); E (emissivity) 0.82.
USG/CGC Plant Locations

Legend

A  Gypsum Board
B  Joint Treatment and Textures
C  Gypsum Plasters
D  Cement Board Products
E  Acoustical Ceilings
F  Acoustical Suspension Systems and Specialty Products
G  Trim
H  Reload Distribution Centres
## Appendix

<table>
<thead>
<tr>
<th>A</th>
<th>Gypsum Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aliquippa, PA</td>
<td>New Orleans, LA</td>
</tr>
<tr>
<td>Baltimore, MD</td>
<td>Norfolk, VA</td>
</tr>
<tr>
<td>Boston, MA</td>
<td>Oakfield, NY</td>
</tr>
<tr>
<td>Bridgeport, AL</td>
<td>Plaster City, CA</td>
</tr>
<tr>
<td>Detroit, MI</td>
<td>Puebla, Mexico</td>
</tr>
<tr>
<td>East Chicago, IN</td>
<td>Ranier, OR</td>
</tr>
<tr>
<td>Empire, NV</td>
<td>Santa Fe Springs, CA</td>
</tr>
<tr>
<td>Fort Dodge, IA</td>
<td>Shoals, IN</td>
</tr>
<tr>
<td>Fremont, CA</td>
<td>Sigurd, UT</td>
</tr>
<tr>
<td>Galena Park, TX</td>
<td>Southard, OK</td>
</tr>
<tr>
<td>Gypsum, OH</td>
<td>Sperry, IA</td>
</tr>
<tr>
<td>Hagersville, Ontario</td>
<td>Stony Point, NY</td>
</tr>
<tr>
<td>Jacksonville, FL</td>
<td>Sweetwater, TX</td>
</tr>
<tr>
<td>Montreal, Quebec</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th>Joint Treatment and Textures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auburn, WA</td>
<td>Hagersville, Ontario</td>
</tr>
<tr>
<td>Bridgeport, AL</td>
<td>Jacksonville, FL</td>
</tr>
<tr>
<td>Calgary, Alberta</td>
<td>Montreal, Quebec</td>
</tr>
<tr>
<td>Chamblee, GA</td>
<td>Port Reading, NJ</td>
</tr>
<tr>
<td>Dallas, TX</td>
<td>Puebla, Mexico</td>
</tr>
<tr>
<td>East Chicago, IN</td>
<td>Sigurd, UT</td>
</tr>
<tr>
<td>Edmonton, Alberta</td>
<td>Surrey, British Columbia</td>
</tr>
<tr>
<td>Fort Dodge, IA</td>
<td>Tacoma, WA</td>
</tr>
<tr>
<td>Gypsum, OH</td>
<td>Torrance, CA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C</th>
<th>Gypsum Plasters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baltimore, MD</td>
<td>Norfolk, VA</td>
</tr>
<tr>
<td>Boston, MA</td>
<td>Phoenix, AZ</td>
</tr>
<tr>
<td>Detroit, MI</td>
<td>Plaster City, CA</td>
</tr>
<tr>
<td>Empire, NV</td>
<td>Shoals, IN</td>
</tr>
<tr>
<td>Fort Dodge, IA</td>
<td>Southard, OK</td>
</tr>
<tr>
<td>Gypsum, OH</td>
<td>Stony Point, NY</td>
</tr>
<tr>
<td>Jacksonville, FL</td>
<td>Sweetwater, TX</td>
</tr>
<tr>
<td>Montreal, Quebec</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D</th>
<th>Cement Board</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baltimore, MD</td>
<td>New Orleans, LA</td>
</tr>
<tr>
<td>Detroit, MI</td>
<td>Santa Fe Springs, CA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E</th>
<th>Acoustical Ceilings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloquet, MN</td>
<td>San Juan, Mexico</td>
</tr>
<tr>
<td>Greenville, MS</td>
<td>Walworth, WI</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>F</th>
<th>Acoustical Suspension Systems and Specialty Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oakville, Ontario</td>
<td>Cartersville, GA</td>
</tr>
<tr>
<td>Stockton, CA</td>
<td>Medina, OH</td>
</tr>
<tr>
<td>Westlake, OH</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G</th>
<th>Trim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auburn, WA</td>
<td>Wierton, WV</td>
</tr>
<tr>
<td>Cartersville, GA</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>H</th>
<th>Reload Distribution Centres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calgary, Alberta</td>
<td>Port Kells, British Columbia</td>
</tr>
<tr>
<td>Moncton, New Brunswick</td>
<td>Winnipeg, Manitoba</td>
</tr>
</tbody>
</table>
**CGC Literature**

Complete technical data on CGC products and systems can be found in the CGC Architectural Technical Literature series. Those folders applying to drywall, cement board, acoustical ceilings, insulation and plaster construction are listed below with their appropriate CSC numbers. Copies of literature are available through CGC sales offices.

<table>
<thead>
<tr>
<th>Folder No. &amp; Description</th>
<th>CSC No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td></td>
</tr>
<tr>
<td>SA100 Construction Selector</td>
<td></td>
</tr>
<tr>
<td>Suspension Systems</td>
<td></td>
</tr>
<tr>
<td>SC2000 C/FC/SC2014 Ceiling Systems</td>
<td>09120</td>
</tr>
<tr>
<td>Lath, Plaster</td>
<td></td>
</tr>
<tr>
<td>SA920 Plaster Systems</td>
<td>09210</td>
</tr>
<tr>
<td>Gypsum Drywall</td>
<td></td>
</tr>
<tr>
<td>SA923 Drywall/Steel-Framed Systems</td>
<td>09250</td>
</tr>
<tr>
<td>SA924 Drywall/Wood-Framed Systems</td>
<td>09250</td>
</tr>
<tr>
<td>SA925 CGC Area Separation Fire Wall/Party Wall Systems</td>
<td>09250</td>
</tr>
<tr>
<td>SA926 CGC Cavity Shaft Wall Systems</td>
<td>09250</td>
</tr>
<tr>
<td>SA927 Gypsum Panels &amp; Accessories</td>
<td>09250</td>
</tr>
<tr>
<td>Prefinished Panels</td>
<td></td>
</tr>
<tr>
<td>SA928 SHEETROCK TEXTONE Brand Vinyl-Faced Gypsum Panels</td>
<td>09720</td>
</tr>
<tr>
<td>Abuse-Resistant Systems</td>
<td></td>
</tr>
<tr>
<td>SA929 Abuse-Resistant Systems</td>
<td>09250</td>
</tr>
<tr>
<td>Tile Accessories</td>
<td></td>
</tr>
<tr>
<td>SA932 DUROCK Brand Cement Board Systems</td>
<td>09305</td>
</tr>
<tr>
<td>Finishing Materials</td>
<td></td>
</tr>
<tr>
<td>SA933 SHEETROCK Brand Textures and Finish Products</td>
<td>09940</td>
</tr>
<tr>
<td>Ceiling Systems</td>
<td></td>
</tr>
<tr>
<td>SC2000 Acoustical and Specialty Ceilings</td>
<td>09500</td>
</tr>
</tbody>
</table>
Glossary

Absorption The taking up and holding or dissipating of matter or energy, as a sponge takes up water. Absorption is the opposite of reflection. Porosity is a term that describes the absorption qualities of certain materials, such as wallboard paper.

Accelerator An additive that shortens the time for gypsum plasters or setting-type joint compounds to set.

Access Door A metal door that comes in various sizes and is framed into an acoustical ceiling to provide access to mechanical valves in the plenum. Some standard sizes are 300 x 300 mm (12” x 12”), 300 x 600 mm (12” x 24”), 300 x 450 mm (12” x 18”), 450 x 450 mm (18” x 18”), 600 x 600 mm (24” x 24”), and 600 x 900 mm (24” x 36”).

Access Tab A special spline with an exposed tab for making a (or any) particular tile in a concealed suspension system removable.

Acoustical Panels Normally a 600 x 600 mm (24” x 24”) or larger piece of prefinished material with various surface finishes installed in a suspension system to provide improved sound absorption qualities.

Acoustic Privacy Sound-control design with assemblies provided between two spaces for the purpose of preventing passage of airborne sound and dampening impact sound.

Acoustical Ceiling Sound-absorbing and/or sound attenuating modules held in a suspended grid. A system having highly effective sound-absorbing and/or sound attenuating qualities.

Acoustical Ceiling Board (Lay-In Panel) Acoustical material used in conjunction with a lay-in grid system, usually in 600 x 600 mm (24” x 24”) or larger panels.

Acoustical Consultant Trained professional in recommending solutions to sound problems and design facilities to meet specific sound criteria. Also acoustical engineer or acoustician.

Acoustical Sealant Special caulking material designed to seal gaps and cracks to reduce sound flanking in an assembly.

Acoustical Tile Normally a 300 x 300 mm (12” x 12”) or 300 x 600 mm (12” x 24”) piece of prefinished material with various surface finishes installed in a concealed suspension system or cemented to a ceiling or upper wall surface to provide sound absorption qualities.

Acoustics Science dealing with the production, control, transmission, reception and effects of sound, and the process of hearing. The acoustics of a room are those qualities that, together, determine its character with respect to distinct hearing.

Admixture Any substance added to a plaster component or plaster for the purpose of modifying its properties.

Aggregate Sand, gravel, crushed stone or other material that is a main constituent of portland cement concrete and aggregated gypsum plaster. Also, polystyrene, perlite and vermiculite particles used in texture finishes.

Airborne Sound Sound traveling through the medium of air.

All Purpose Joint Compound A compound formulated and manufactured to serve as a taping or finishing compound, or both.
**Ambient Light** The generally available, surrounding or pervading light in the area, coming from all sides, including outside light coming in through windows.

**ANSI** American National Standards Institute, a nonprofit, national technical association that publishes standards covering definitions, test methods, recommended practices and specifications of materials. Formerly American Standards Assn. (ASA) and United States of America Standards Institute (USASI).

**Anchor** Metal securing device embedded or driven into masonry, concrete, steel or wood.

**Anchor Bolt** Heavy, threaded bolt embedded in the foundation to secure sill to foundation wall or bottom plate of exterior wall to concrete floor slab.

**Annular Ring Nail** A deformed shank nail with improved holding qualities specially designed for use with gypsum board.

**Anti-Breathing Spline** Spline used to link tiles in a concealed tee installation and to prevent air infiltration.

**Area Separation Wall** Residential fire walls, usually with a 2- to 4-hour rating, designed to prevent spread of fire from an adjoining occupancy; extends from foundation to or through the roof. Identified by codes as either “fire wall,” “party wall” or “townhouse separation wall.”

**ARIDO** Association of Registered Interior Designers of Ontario.

**Articulation Class** A classification to rate the degree of speech recognition allowed to transmit through ceilings or partitions.

**ASTM** Formerly American Society for Testing and Materials, now ASTM International, a nonprofit, national technical society that publishes definitions, standards, test methods, recommended installation practices and specifications for materials.

**Attenuate** The act of resisting the passage of sound energy.

**Attenuation** In acoustics, the diluting or holding back of the energy of sound waves as they pass through a material. Materials are rated for their ability to prevent sounds from traveling through them (see Ceiling Attenuation Class, CAC).

**Back Blocking** A short piece of gypsum board adhesively laminated behind the joints between each framing member to reinforce the joint. Also, may be a method of attaching additional framing to support gypsum board where no framing is present.

**Back Cut** Cutting the border tile at a 45° angle to achieve the best possible fit, or that portion of a tile cut back above the kerf in a tile.

**Backup Strips** Pieces of wood nailed at the ceiling-sidewall corner to provide fastening for ends of plaster base or gypsum panels.

**Baffle** Usually called sound baffle and is a piece of acoustical material hung vertically from a structure for sound absorption. Baffles are normally used where it is not practical to install a complete acoustical ceiling.

**Balloon Frame** Method of framing outside walls in which studs extend the full length or height of the wall.
Bar Joist  Open-web, flat truss structural member used to support floor or roof structure. Web section is made from bar or rod stock, and chords are usually fabricated from "T" or angle sections.

Basecoat  The first layer or layers of plaster applied over a lath or other substrate. The first application is normally called a scratch coat and the second application is referred to as a brown coat.

Basecoat Floating  The finishing act of spreading, compacting and smoothing of the basecoat plaster to a reasonably true plane.

Batten  Narrow strip of wood, plastic, metal or gypsum board used to conceal an open joint.

Beam  Loadbearing member spanning a distance between supports.

Beam Clip  A clip that can be fastened to a steel beam to support a hanger wire or strap.

Bearing  Support area upon which something rests, such as the point on bearing walls where the weight of the floor joist or roof rafter bears.

Bed  To set firmly and permanently in place.

Bending  Bowing of a member that results when a load or loads are applied laterally between supports.

BESK  Refers to Ceiling tile that is bevel edged, with a standard kerf.

Board Foot (Bd. Ft.)  Volume of a piece of wood, nominal 1” x 12” x 1’. All lumber is sold by the board-foot measure.

Bond  The holding of acoustical tile in place, on a ceiling surface, with adhesive.

Bonding Agent  A material applied to a surface to improve the quality of the bond between it and the succeeding plaster application. For instance, monolithic concrete and cement board require the addition of a bonding agent before applying plaster.

Border Cut  Cut made on both ceiling panel and grid at the perimeter of the installation.

Borrowed Light  Refers to light from one area that helps to illuminate another area by a glass wall. Especially in schools, glass walls are installed between corridors and classrooms.

Brick Veneer  Non-loadbearing brick facing applied to a wall to give appearance of solid-brick construction; bricks are fastened to backup structure with metal ties embedded in mortar joints.

Bridging  Members attached between floor joists to distribute concentrated loads over more than one joist and to prevent rotation of the joist. Solid bridging consists of joist-depth lumber installed perpendicular to and between the joists. Cross-bridging consists of pairs of braces set in an “X” form between joists.

Brown Coat  The second coat in three-coat gypsum plaster application.

Building Construction Joint  A designed division of a building that allows movement of all component parts of the building, in any plane, which may be caused by thermal, seismic, wind loading or any other force. The construction of the separation is accomplished by one of the following methods: (1) manufactured devices suitable for this application, or (2) by field fabrication of suitable materials.
CAC  See Ceiling Attenuation Class.

Calcine  The process of heating a mineral to produce a change in the chemical composition of the mineral, ranging from the removal of chemically combined water through the reduction of the mineral to its oxide state.

Calcined Gypsum  A dry powder; primarily calcium sulfate hemihydrate, resulting from calcination of gypsum; cementitious base for production of most gypsum plasters: also called plaster of paris; sometimes called stucco.

Calcium Sulfate  The chemical compound CaSO₄.

Camber  Curvature built into a beam or truss to compensate for loads that will be encountered when in place and load is applied. The crown is placed upward. Insufficient camber results in unwanted deflection when the member is loaded.

Cant Beam  Beam with edges chamfered or beveled.

Cant Strip  Triangular section laid at the intersection of two surfaces to ease or eliminate effect of a sharp angle or projection.

Cap  The rolled covering on the flange of a T-Bar suspension system part. Cap is available in steel or aluminum, and in many colours.

Carrying Channel  Main supporting member of a suspended ceiling system to which furring members or channels attach.

Casement  Glazed sash or frame hung to open like a door.

Casing  The trim around windows, doors, columns or piers.

Ceiling Attenuation Class (CAC)  A sound rating developed especially for acoustical ceilings. The sound ratings are determined by AMA1-II ceiling sound transmission tests. Results were previously called CSTC value.

Ceiling Break  Any change in the elevation of a ceiling, such as occurs at the point where a soffit is installed.

Ceiling STC (CSTC)  Obsolete. See Ceiling Attenuation Class.

Ceiling Track  A channel used as a ceiling runner to set prefabricated steel studs for relocatable partitions or walls.

Cement Board  A factory-manufactured panel, 8 to 15.9 mm (5/16” to 5/8&quot;) thick, 813 to 1220 mm (32” to 48”) wide, and 914 to 3048 mm (3’ to 10’) long, made from aggregated and reinforced portland cement.

Center Line  A line indicating the midpoint of a surface in either direction. Used as a guide in starting a ceiling.

Chalk Line  Straight working line made by snapping a chalked cord stretched between two points, transferring chalk to work surface.

Channel (Molding)  A U- or C-shaped metal member sometimes used for suspending or trimming a suspended ceiling.

Chase Space  Space provided between the surfaces within a partition for electrical, plumbing and other services.

CISCA  Ceiling and Interior Systems Construction Association, 1500 Lincoln Highway, St. Charles, IL, U.S.A. 60174 (guide for basic installation of ceiling products).
Class A A fire classification for a product with a flame spread rating of no more than 25 and a smoke developed rating not exceeding 50, when tested in accordance with ASTM E84.

Cladding Gypsum panels, gypsum bases, gypsum sheathing, cement board, etc. applied to framing.

Clean Room An assembly room for precision products whose quality would be affected by dust, lint or airborne pathogens; usually has smooth room surfaces to prevent dust collection; air precipitators or filters keep dust, lint, etc. to a specified minimum level. Clean Room standards are set by Fed. Spec. 209E.

Coefficient of Thermal Conductance (C) Amount of heat (in Watts or Btu) that passes through a specific thickness of a material (either homogeneous or heterogeneous) W/m²•ºK (Btu per hr., per sq. ft., per ºF). Measured as temperature difference between surfaces. The “C” value of a homogeneous material equals the “k” value divided by the material thickness:

\[ C = \frac{k}{t} \]

where t = thickness of material in inches

It is impractical to determine a “k” value for some materials such as building paper or those only used or formed as a thin membrane, so only “C” values are given for them.

Coefficient of Thermal Conductivity (k) Convenient factor represents the amount of heat (in Watts or Btu) that passes by conduction through a 1” thickness of homogeneous material, W/m²•ºK (Btu per in., per sq. ft., per ºF). Measured as temperature difference between the two surfaces of the material.

Coefficient of Heat Transmission (U) Total amount of heat that passes through an assembly of materials, including air spaces and surface air films. Expressed in W/m²•ºK (Btu per hr., per sq. ft., per ºF) temperature difference between inside and outside air (beyond the surface air films). “U” values are often used to represent wall and ceiling assemblies, floors and windows.

Note: “k” and “C” values cannot simply be added to obtain “U” values. “U” can only be obtained by adding the thermal resistance (reciprocal of “C”) of individual items and dividing the total into 1.

Coefficient of Hygrometric Expansion See Hygrometric Expansion.

Coefficient of Thermal Expansion See Thermal Expansion.

Column Vertical loadbearing member.

Compression Force that presses particles of a body closer together.

Compression Post A ceiling system member used to stabilize an acoustical suspension system under seismic conditions.

Compression Strength Measures maximum unit resistance of a material to crushing load. Expressed as force per unit cross-sectional area.

Concave Edges curved away from the observer; cupped. Curved like the inside of a hollow ball.

Concealed Cross T or T-Bar A tee-shaped intermediate member used to support the acoustical tile in a Z-Bar or H and T system perpendicular to the Z or H member, supporting the tile in a concealed manner.
Concrete Footing Generally, the wide, lower part of a foundation wall that spreads the weight of the building over a larger area. Its width and thickness vary according to weight of building and type of soil on which building is erected.

Conduction, Thermal Transfer of heat from one part of a body to another part of that body, or to another in contact, without any movement of bodies involved. The hot handle of a skillet is an example. The heat travels from the bottom of the skillet to the handle by conduction.

Construction Joint A designed division of a building that allows movement of all component parts of the building in any plane, which may be caused by thermal, seismic, wind loading or any other force. Construction joints are sometimes confused with control joints.

Convection Process of heat carried from one point to another by movement of a liquid or a gas (i.e. air). Natural convection is caused by expansion of the liquid or gas when heated. Expansion reduces the density of the medium, causing it to rise above the cooler, more dense portions of the medium.

Gravity heating systems are examples of the profitable use of natural convection. The air, heated by the furnace, becomes less dense (consequently lighter) and rises, distributing heat to the various areas of the house without any type of blower. When a blower is used, the heat transfer method is called “forced convection.”

Convex Edges curved toward the observer; rounded. Curving outward like the surface of a sphere.

Core (of gypsum board) The hardened material filling the space between the face and back papers consisting substantially of rehydrated gypsum with additives.

Corner Brace Structural framing member used to resist diagonal loads that cause racking of walls and panels due to wind and seismic forces. May consist of a panel or diaphragm, or diagonal flat strap or rod. Bracing must function in both tension and compression. If brace only performs in tension, two diagonal tension members must be employed in opposing directions as “X” bracing.

Corner Cap Factory-formed cap that fits over the exterior of an outside corner.

Corner Post Timber or other member forming the corner of a frame. May be solid or built-up as a multi-piece member.

Creep Plastic flow or deformation of a material or a composite resulting from the sustained application of a force or load. Creep is typically greater at higher temperatures.

Creep Deflection Permanent deflection in a building system caused by deformation under a sustained force or load. An example of creep deflection is the sag in concrete floor slabs of a new building caused by sustained dead and live loads on the floor. This deformation or sag often causes partition cracking when the center of a partition span occurs near the area of greatest creep deflection. Creep deflection is a structural problem that decreases after a building stabilizes, one or two years after construction. Another cause of partition cracking, sometimes confused with that from creep deflection, is racking of structural
components. Partition cracking caused by racking as a result of thermal expansion and contraction or wind loads on the building must be treated in some way, such as by the use of control or expansion joints.

**Cripple** Short stud such as that used between a door or window header and the top plate.

**Critical Light** Strong, angular or harsh light that can show imperfections in reflecting surfaces. Most common sources are skylights, wall sconces and directed track lights such as those used in art galleries.

**Cross T or T-Bar** The intermediate exposed cross members that interlock with the main tee to complete a grid system.

**CSC** Construction Specifications Canada, Carlton Street, Toronto.

**Curtain Wall** Exterior wall of a building that is supported by the structure and carries no part of the vertical load except its own. Curtain walls must be designed to withstand wind loads and transfer them to the structure.

**Cycle (Acoustic)** One full repetition of a motion sequence during periodic vibration. Movement from zero to +1 back to zero to -1 back to zero. Frequency of vibration is expressed in Hertz (cycles per second see Frequency).

**Dead Load** Load on a building element contributed by the weight of the building materials.

**Decibel (dB)** Adopted for convenience in representing vastly different sound pressures. The sound pressure level (SPL) in decibels is 10 times the logarithm to the base 10 of the squared ratio of the sound pressure to a reference pressure of 20 micropascals. This reference pressure is considered the lowest value at 100 Hz that the ear can detect. For every 10 dB increase or decrease in SPL, a sound is generally judged to be about twice or half as loud as before the change.

**Decoupling** Separation of elements to reduce or eliminate the transfer of sound, heat or physical loads from one element to the other.

**Deflection** Displacement that occurs when a load is applied to a member or assembly. The dead load of the member or assembly itself causes some deflection as may occur in roofs or floors at mid-span. Under applied wind loads maximum deflection occurs at mid-height in partitions and walls.

**Deflection Limitation** Maximum allowable deflection is dictated by the bending limit of the finish material under the required design load (e.g., usually 240 Pa (5 psf) for interior partitions). Often expressed as ratio of span (L) divided by criterion factor (120, 180, 240, 360). For example, in a 3048 mm (10') or 3048 mm (120") high wall, allowable deflection under L/240 criterion equals 3048 mm/240 (120'/240) or 12.7 mm (1/2") maximum.

Selection of limiting heights and spans are frequently based on minimum code requirements and accepted industry practice as follows: (a) L/120 for gypsum panel surfaces and veneer plaster finish surfaces, (b) L/240 for conventional lath and plaster surfaces, (c) L/360 for mechanically attached marble or heavy stone to walls; however, support for its own weight should be from the floor or separate supports.
Although some building codes permit these deflections, more conservative criteria are frequently advised so that applied loads are not visible or esthetically unacceptable.

**Deformation** Change in shape of a body brought about by the application of a force internal or external. Internal forces may result from temperature, humidity or chemical changes. External forces from applied loads can also cause deformation.

**Density** The quantity per unit volume of a material; the mass of a substance per unit volume.

**Design Load** Combination of weight (dead load) and other applied forces (live loads) for which a building or part of a building is designed. Based on the worst possible combination of loads.

**Desulfo Gypsum** Calcium sulfate dihydrate (gypsum) produced as a byproduct of scrubbing industrial smoke stacks to meet environmental clean air standards. Also known as synthetic gypsum.

**Detail** Sections or parts of a structure drawn to a scale larger than the general plans to show shapes and dimensions.

**Dew Point** The temperature at which air becomes saturated with moisture and below which condensation occurs.

**Diaphragm** A thin body that separates two areas; in sound, the skin of a partition or ceiling which separates the room from the structural space in the center of the partition or ceiling assembly.

**Diffraction** The change in direction that occurs when a wave contacts a space, surface, or edge smaller than the wavelength.

**Diffuse** To spread out evenly and thus become less dense or concentrated.

**Diffuser** A circular or rectangular metal grille recessed in a ceiling for the passage of air from a ducted system. The flange of the diffuser covers the edge of the ceiling material. (See also Linear Air Diffuser.)

**Direct Lighting** Lighting aimed at objects or surfaces. Direct lighting mounted in ceilings de-emphasizes the ceiling surface and highlights horizontal surfaces, such as work surfaces and the floor. A combination of both direct and indirect illumination can produce a positive effect on the space and save money.

**Door Buck** Structural element of a door opening. May be the same element as the frame, if frame is structural, as in the case of heavy steel frames.

**Dot** A small lump of plaster placed on a surface (usually scarified basecoat) between grounds to assist the plasterer in obtaining the proper plaster thickness and aid in aligning the surface.

**Double-Hung Window** Window sash that slides vertically and is offset in a double track.

**Double-Up** Successive plaster coat application with no setting or drying time allowed between coats; usually associated with veneer plastering. The double-up coat is applied (from the same mix) to a scratch coat over gypsum base.

**Drip** Interruption or offset in an exterior horizontal surface, such as a soffit, immediately adjacent to the fascia. Designed to prevent the migration of water back along the surface.
Dry Line A string line drawn tight from two points and used as a guide in installing an acoustical ceiling to establish uniform length for hanger wires.

Drywall Generic term for interior surfacing material, such as gypsum panels, applied to framing using dry construction methods, e.g., mechanical fasteners or adhesive. See SHEETROCK Brand Gypsum Panels.

Echo A single reflection of sound that can be heard as a distinct repetition of the original sound.

Edge (of gypsum board) The paper-bound edge as manufactured.

Efflorescence A deposit of white, powdery, water-soluble salts on the surface of masonry or plaster. It is caused by the migration of the dissolved salts to the surface; also called “whiskering” or “salt petering.”

Egg-Crate Louver A polystyrene, acrylic, or metal open cell grid used to permit the circulation of air or the transmission of light from above the ceiling.

Elevation A drawing of any portion of a building (front, sides, or rear) to show how that portion will appear to the observer.

End (of gypsum board) The end perpendicular to the paper-bound edge as manufactured. The gypsum core is always exposed.

Energy The ability to perform work; in sound, the capacity to compress the conductor molecules.

Environmental Systems Grid systems that are made of materials that withstand a variety of corrosive conditions.

Excessive Reverberation Long persistence of sound in a highly reflective room.

Expanded Metal Sheet metal that has been slit and expanded to produce diamond or rib lath.

Expansion Joint See Building Construction Joint and Construction Joint.

Exterior Insulation and Finish Systems (EIFS) Exterior cladding assembly consisting of a polymer finish over a reinforcement adhered to foam plastic insulation that is fastened to masonry, concrete, building sheathing or directly to the structural framing. The sheathing may be cement board, gypsum sheathing or other acceptable substrate.

Extrapolate To project tested values, assuming a continuity of an established pattern, to obtain values beyond the limit of the test results. Not necessarily reliable.

F & T Ratings Flame-resistance and temperature ratings usually associated with “Through-Penetration” Testing. “F rating” or flame-resistance rating is the time period a firestop system remains in place during a ULC S115 and ASTM E814 fire test, but “T rating” is the time period it takes for the temperature on the unexposed surface, the firestop and the penetrating item to rise 163°C (325 °F) above the initial temperature.
**Factor of Safety** Ratio of the ultimate unit stress to the working or allowable stress.

**Fascia Board** Board fastened to the ends of the rafters or joists forming part of a cornice.

**Fast Track** Method that telescopes or overlaps traditional design-construction process. Overlapping phases as opposed to sequential phases is keynote of the concept.

**Fatigue** Condition of material under stress that has lost, to some degree, its power of resistance as a result of repeated application of stress, particularly if stress reversals occur as with positive and negative cyclical loading.

**Feather** The gradual thinning of joint compound from the thickness over the joint to the outer edge of a coat.

**Finish Coat** The final layer of plaster applied over a basecoat or other substrate.

**Finish Coat Floating** The finishing act of spreading, compacting and smoothing the finish coat plaster or stucco to a specified surface texture.

**Finishing Compound** (See Topping Compound).

**Fire Endurance** Measure of elapsed time during which an assembly continues to exhibit fire resistance under specified conditions of test and performance. As applied to elements of buildings, it shall be measured by the methods and to the criteria defined in ULC and ASTM Methods CAN/ULC S101 and E119, Fire Tests of Building Construction and Materials; CAN/ULC S104 and ASTM Methods E152, Fire Tests of Door Assemblies.

**Fireproof** Use of this term in reference to buildings is discouraged because few, if any, building materials can withstand extreme heat for an extended time without some effect. The term “fire-resistive” or “resistant” is more descriptive.

**Fire Resistance** Relative term, used with a numerical rating or modifying adjective to indicate the extent to which a material or structure resists the effect of fire.

**Fire-Resistive** Refers to properties or designs to resist effects of any fire to which a material or structure may be expected to be subjected.

**Fire-Retardant** Denotes substantially lower degree of fire resistance than “fire-resistive.” Often used to describe materials that are combustible but have been treated to retard ignition or spread of fire under conditions for which they were designed.

**Firestop** Obstruction in a cavity designed to resist the passage of flame, sometimes referred to as “fire blocking.”

**Firestop System** A system for protecting against the spread of fire through a penetration in a wall or floor where a pipe or other penetrant passes through a fire-rated system. A firestop is the specific construction using materials designed to fill the annular space around the penetrant for the purpose of preventing the passage of fire through the fire-resistant partition or floor/ceiling assembly.

**Fire Wall** Fire-resistant partition extending to or through the roof of a building to retard spread of fire. See Area Separation Wall.
Flame Spread  Index of the capacity of a material to spread fire under test conditions, as defined by CAN/ULC S102 and ASTM Standard E84. Materials are rated by comparison with the flame-spread index of red oak flooring assigned a value of 100 and inorganic reinforced cement board assigned a value of 0.

Flammable  Capability of a combustible material to ignite easily, burn intensely or have rapid rate of flame spread.

Flanking Paths  Paths by which sound travels around an element intended to impede it, usually some structural component that is continuous between rooms and rigid enough to transmit the sound. For example, a partition separating two rooms can be “flanked” by the floor, ceiling or walls surrounding the partition if they run uninterrupted from one room to the other. Ducts, conduits, openings, structural elements, rigid ties, etc., can be sound flanking paths. The acoustic effect of sound flanking paths is dependent on many factors.

Flashing  Strips of metal or waterproof material used to make joints waterproof, as in the joining of curtain wall panels.

Flexural Strength  The maximum load sustained by a standard specimen of a sheet material when subjected to a bending force.

Floor Plan  An architectural drawing showing the length and breadth of a building and the location of rooms, partitions, windows, doors, ceilings, etc. Each floor has a separate plan.

Footcandle  the measurement of light emitted over distance. One foot candle is the amount of direct light thrown by one international candle onto a surface one foot away and equal to one lumen per square foot. The metric version is lux. To convert footcandle (fc) to lux (lx) multiply by 10.76391.

Footing  Lower extremity of a foundation or loadbearing member that transmits load to load-bearing substrate.

Force  Amount of applied energy to cause motion, deformation or displacement and stress in a body.

Foundation  Component that transfers weight of building and occupants to the earth.

Framing Member  Stud, plate, track, joist, furring and other support to which a gypsum panel product, or metal plaster base is attached.

Frequency (Sound)  Number of complete vibrations or cycles or periodic motion per unit of time.

Furring  Member or means of supporting a finished surfacing material away from the structural wall or framing. Used to level uneven or damaged surfaces or to provide space between substrates. Also an element for mechanical or adhesive attachment of paneling.

Gable  Uppermost portion of the end wall of a building that comes to a triangular point under a sloping roof.

Galvanized  A generic term used to describe steel coated with zinc applied in a dipping or electroplating process.

Gasketed Grid  Ceiling suspension system that has foam rubber gasketing attached to the topside of the flanges. Used in clean room ceilings to seal the panels to grid interface.
Gauge  Thickness of steel. May be expressed by a number designation (24 Ga) or in thousandths of an inch (0.020).

Gauging Plaster  Combine with lime putty to provide setting properties, to increase dimensional stability during drying, and to provide initial surface hardness in lime finish coats.

Girder  Beam, especially a long, heavy one; the main beam supporting floor joists or other smaller beams.

Green  A term to describe freshly applied plaster that has set, but has not dried.

Grid Ceiling  An exposed grid ceiling is a direct hung suspension system. It uses main and cross tees with drop-in acoustical tile panels. Standard sizes are 2’ x 4’ and 2’ x 2’. It is also referred to as lay-in ceiling or tee-bar ceiling.

Grills  A metal opening in ceiling for delivery of air into the room, or to return the air into the plenum.

Ground  A piece of wood or metal attached to the framing or plaster base so that its exposed surface acts as a gauge to define the thickness of plaster to be applied. Also a term to denote plaster thickness. Also see Screed.

Grout  Gypsum or portland cement plaster used to fill crevices or to fill hollow metal frames.

Gusset  Wood or metal plate riveted, bolted, glued or pressed (wood trusses) over joints to transfer stresses between connected members.

Gypsum  The mineral consisting primarily of fully hydrated calcium sulfate, CaSO₄•2H₂O or calcium sulfate dihydrate.

Gypsum Fiber Panels  Gypsum panels with fiber reinforcement concentrated on each face of the panel. They are part of a new-technology series of panel products, called Fiberock® Brand Panels, which produce stronger, more abuse-resistant, water-resistant walls and ceilings than those produced with conventional drywall. There are variations for interior drywall applications in dry and wet areas, sheathing applications and flooring applications. Also, a very-high impact (VHI) product is further reinforced on the backside by a fiberglass mesh.

Gypsum Lath  A gypsum board used as the base for application of gypsum plaster.

Gypsum Molding Plaster  A calcined gypsum plaster used primarily for plaster casts or molds, sometimes used as a gauging plaster.

Gypsum Neat Plaster  A calcined gypsum plaster without aggregate; common usage is for gypsum plaster used for basecoats.

Gypsum Plaster  The generic name for a family of powdered cementitious products consisting primarily of calcined gypsum with additives to modify physical characteristics, and having the ability, when mixed with water, to produce a plastic mortar or slurry which can be formed to the desired shape by various methods and will subsequently set to a hard, rigid mass.

Gypsum Sheathing  A gypsum board used as a backing for exterior surface materials, manufactured with water-repellent paper and may be manufactured with a water-resistant core.
HUD Housing and Urban Development, a U.S. federal agency.

HVAC Heating, ventilating and air conditioning. (American Society of Heating, Refrigerating & Air Conditioning Engineers, Inc. “ASHRAE Guide is the technical reference source.)

Header Horizontal framing member across the ends of the joists. Also the member over a door or window opening in a wall.

Heat Form of energy thought to be characterized by the rate of vibration of the molecules of a substance. The hotter the substance, the faster the molecules vibrate. On the other hand, when there is no heat present it is thought the molecules will be at rest, which theoretically occurs at absolute zero, -273.2 °C (-459.7 °F or 0.0 K).

Heat Quantity (Btu) Common unit of measure of the quantity of heat is the British Thermal Unit (Btu). One Btu is the amount of heat required to raise 454 g (one pound) of water from 17.2 ° to 17.8 °C (63 ° to 64 °F) (1 Btu = 1055.06 J). This is about the amount of heat given off by one wooden match. A 454 g (pound) of coal can produce 13,000 Btu.

Heat Transfer Heat always flows toward a substance of lower temperature until the temperatures of the two substances equalize. It travels by one or more of three methods: conduction, convection or radiation.

Heel of Rafter Seat cut in a rafter that rests on the wall plate.

Hemihydrate The dry powder, calcium sulfate hemihydrate, resulting from calcination of CaSO₄•2H₂O, calcium sulfate dihydrate. See calcined gypsum.

Hertz The units of measure of sound frequency, named for Heinrich H. Hertz. One Hertz equals one cycle per second.

High Density Tile Acoustical tile with good attenuation and low sound absorption.

High Hat Fixture A small circular recessed light from 6” to 12” deep. Sometimes called a can fixture because it resembles a tin can. Larger High Hats may cause additional field labour for the acoustical contractor.

Hold Down Clip Mechanical fastener that snaps over the bulb of a grid system to hold ceiling panels in place.

Honeycomb Any substance having cells suggesting a mass of cells such as those built by the honeybee. Some hollow-core doors use the honeycomb principle in their construction.

Hot Dipped Galvanized Process to coat steel to offer environmental resistance to corrosion. Cold rolled steel is submerged (dipped) into a molten zinc bath. A heavy coating of zinc is applied to the steel substrate. Zinc coating thickness varies and is designated by a “G” series, such as G-60 or G-90.

Hydrate To chemically combine with water as in the hydration of calcined gypsum or slaking of quicklime. Also the product resulting from this combination.

Hygrometric Expansion All materials, particularly those of organic origin, expand and contract in relation to their moisture content, which varies with environment. The Hygrometric Coefficient of Expansion is expressed in mm/mm/% R.H. (”Inches Per Inch Per Percent Of Relative Humidity.”)
Example: gypsum board has a coefficient of $7.2 \times 10^{-6}$ mm/mm/% R.H. ($7.2 \times 10^{-6}$ in. per in per % R.H.). This means that with an increase in relative humidity of from 10% to 50%, a gypsum board wall 91 m (300 ft.) long will have an unrestrained linear expansion of 26.3 mm (1.0368 inches).

ISO International Standards Organization, an organization similar in nature to ASTM International, CSA, and ULC.

**Impact Insulation Class (IIC)** Single-number rating used to compare and evaluate the performance of floor-ceiling constructions in isolating impact noise. The advantages of this rating system are positive values and the correlation with Sound Transmission Class (STC) values-both providing approximately equal isolation at a particular value. The IIC rating is used by building agencies for specifying minimum sound-control performance of assemblies in residential construction.

**Impact Noise Rating (INR)** Obsolete rating system for floor-ceiling construction in isolating impact noise. INR ratings can be converted to approximate IIC ratings by adding 51 points; however, a variation of 1 or 2 points may occur.

**Incombustible** See Noncombustible.

**Indirect Lighting** Reflected light. For ceilings, this is typically light from luminaires distributed upward. A combination of both direct and indirect illumination can produce a positive effect on the space and save money.

**Industrial Construction** Construction of residential or commercial structures in a factory environment. Includes HUD-Code manufactured homes as well as residential and commercial modular construction.

**Insulation (Thermal)** Any material that measurably retards heat transfer. There is wide variation in the insulating value of different materials. A material having a low density (weight/volume) will usually be a good thermal insulator.

**Integral Splice** Connects the mains or tees together and is formed from the base metal of the components.

**Interpolate** To estimate untested values that fall between tested values.

**Isolation** Separation of elements to reduce or eliminate the transfer of sound, heat, or physical loads from one element to the other. (See Decoupling.)

**Jamb** One of the finished upright sides of a door or window frame.

**Jamb Stud** Wood or metal stud adjacent to the door jamb.

**Joint Tape** A type of paper, fabric or glass mesh commonly used with joint compounds to reinforce the joints between adjacent gypsum boards.

**Joist** Small beam that supports part of the floor, ceiling or roof of a building.

**Joist Hanger** Metal shape formed for hanging on the main beam to provide support for the end of a joist.

**Keene’s Cement** An anhydrous gypsum plaster characterized by a low mixing water requirement and special setting properties, primarily used with lime to produce hard, dense finish coats. Complete name is Red Top Keenes Cement.
Kerf A slit cut into the midpoint of the edge of tiles. This kerf permits the tile to be inserted onto the flange of various types of suspension runners. Splines are also inserted in tile kerfs when additional support is needed in lieu of a runner. Thickness and depth of kerfs are industry standards.

Key The grip or mechanical bond of one coat of plaster to another coat, or to a plaster base. It may be accomplished physically by the penetration of wet mortar or crystals into paper fibers, perforations, scoring irregularities, or by the embedment of the lath.

Klin-Dried Lumber Lumber that has been dried and seasoned with carefully controlled heat in a kiln.

Label Service (ULC) Program allowing a manufacturer to place Underwriters Laboratories of Canada labels on its products that have met ULC requirements. A ULC representative visits the manufacturing location to obtain samples of the products for testing by ULC. In some cases, samples are also purchased on the open market for testing. The public is thereby assured that products bearing the ULC label continually meet ULC specifications.

Lamination Placing a layer of gypsum board over another gypsum board or over another substrate using an adhesive product for attachment.

Laser Level A mechanical device whose primary function is to establish level or plumb lines on a construction site with an extreme degree of precision. In acoustical ceiling installations it uses a high-intensity light beam that rotates in a level plane. See Tool Chapter for more information.

Lath A metal or gypsum (or wood in the past) material applied separately to a structure to serve as a base for plaster.

Lay-In Panel Any panel designed to be supported by an accessible suspension system.

Leaks (Sound) Small openings at electrical boxes and plumbing, cracks around doors, loose-fitting trim and closures all create leaks that allow sound to pass through, reducing the acoustical isolation of a wall, floor or ceiling system.

Ledger Strip Strip fastened to the bottom edge of a flush girder to help support the floor joists.

Life-Cycle Costing Selection of the most economical material and systems based on initial costs, maintenance costs and operating costs for the life of the building.

Light Reflectance (LR) Light reflectance of a surface is its property of reflecting light. The measure of light reflectance is that fraction of the specified incident light, which is reflected by the surface. (Defined in ASTM E 1477).

Limiting Height Maximum height for design and construction of a partition or wall without exceeding the structural capacity or allowable deflection under given design loads.

Linear Metal Ceiling Aluminum or steel panels usually 4” wide and continuous in appearance. It is suspended on main runners that are notched to accept the snap-on panel.

Lintel Horizontal member spanning an opening such as a window or door. Also referred to as a Header.
Live Load  Part of the total load on structural members that is not a permanent part of the structure. May be variable, as in the case of loads contributed by the occupancy, and wind and snow loads.

Load  Force provided by weight, external or environmental sources such as wind, water and temperature, or other sources of energy.

Load-Bearing Partition  A partition designed to support a portion of the building structure.

Loudness  Subjective response to sound pressure, but not linearly related thereto. A sound with twice the pressure is not twice as loud. See Decibel.

Louver  Opening with slanted fins (to keep out rain and snow) used to ventilate attics, crawl spaces and wall openings.

Lumen  A standard unit of light emission measurement. Generally speaking, one lumen is the amount of light emitted by one candle. More strictly defined, a lumen is the unit of measure for the flow of light through a unit solid angle from a uniform point source of one international candle.

Luminaire  A complete lighting unit, consisting of a lamp or lamps together with parts designed to distribute the light, to position and protect the lamps and to connect to the power source.

Main Runner  The heaviest horizontal weight-carrying member, supported by hangers in a suspended ceiling, to which the cross tees are attached.

Main T or T-Bar  The weight-supporting member of an exposed suspension system or grid.

Mass  Property of a body that resists acceleration and produces the effect of inertia. The weight of a body is the result of the pull of gravity on the body’s mass.

Mechanical Bonds  The attachment created when plaster penetrates, into or through, the substrate, or envelops irregularities in the surface of the substrate.

Metal-Framing  Metal-framed partitions commonly used for fire-rated construction around columns and at beams. Also a commonly used method of framing partitions in commercial construction.

Metal Furring  A light gauge framework of strips fastened to 1-1/8” channels or bar joint. There are various shapes, for example: H-shape, U-shape, Z-shape and T-shape.

Metal Pan  Any steel or aluminum ceiling panel that either lays into or snaps into a grid system.

Metal Pan Hold-Down Spacer  A light gauge channel that fits between a metal pan border cut and the molding to force the pan to lay flat on the molding.

Metal Stud  Prefabricated horizontal metal member used as the supporting element in a partition system.

Metric Terms  Metric units shown as equivalents in this handbook are from the International System of Units in use throughout the world, as
established by the General Conference of Weights and Measures in 1960. Their use here complies with the Metric Conversion Act of 1975, which committed the United States to a coordinated voluntary conversion to the metric system of measurement.

Refer to the pages 438-439 in Appendix for metric units and conversion factors applicable to subjects covered in this handbook. For additional information, refer to ASTM E380-76, Standard for Metric Practice.

**Miter** Joint formed by two pieces of material cut to meet at an angle.

**Modular Building** A structure intended for residential or commercial use that is at least partially completed in a factory complying with state or local code requirements.

**Module** (1) In architecture, a selected unit of measure used as a basis for building layout; (2) In industrialized housing, a three-dimensional section of a building, factory-built, shipped as a unit and interconnected with other modules to form the complete building. Single-family units factory-built in two halves are usually referred to as “sectionals.”

**Modulus of Elasticity** (E) Ratio between stress and unit deformation, a measure of the stiffness of a material.

**Moment of Inertia** (I) Calculated numerical relationship (expressed in cm$^4$ (in.$^4$)) of the resistance to bending of a member, a function of the cross-sectional shape and size. A measure of the stiffness of a member based on its shape. Larger moments of inertia indicate greater resistance to bending for a given material.

**Mortar** A mixture of gypsum plaster or portland cement with aggregate or hydrate lime, or both, and water to produce a trowelable fluidity.

**Moulding** Narrow decorative strip applied to a surface.

**Mud** Slang term for joint compound.

**Mud Pan** Rectangular, angle-sided pan, shaped like bread pan, used by joint finisher to handle portions of joint compound. Straight-cut lip of pan assures that taping knife can be regularly cleaned.

**Mullion** Vertical bar or division in a window frame separating two or more panes.

**Muntin** Horizontal bar or division in a window frame separating multiple panes or lights.

**Music/Machinery Transmission Class** (MTC) Rating developed by U.S. Gypsum Company to isolate music and machinery/mechanical equipment noise or any sound with a substantial portion of low frequency energy. This rating system is not currently in common use.

**NFPA** National Fire Protection Association. An international technical society that disseminates fire prevention, fire fighting and fire protection information. NFPA technical standards include the National Electrical Code which is widely adopted.

**NFoPA** National Forest Products Association.

**Nail Pop** The protrusion of the nail usually attributed to the shrinkage of or use of improperly cured wood framing.

**Neutral Axis** The plane through a member (at the geometric center of the section in symmetrical members) where the fibers are neither under tensile nor compressive stress.
Noise Reduction Coefficient (NRC) Arithmetic average of sound absorption coefficients at 250, 500, 1000 and 2000 Hz.

Nominal Term indicating that the full measurement is not used; usually slightly less than the full net measurement, as with 2” x 4” studs that have an actual size when dry of 1-1/2” x 3-1/2”.

Non-Bearing Partition A partition that is not designated to support the weight of a floor, wall, or roof.

Non-Breathing Spline A fiber or metal strip inserted into the kerf of a tile to eliminate the passage of air through the joint between two tiles in a concealed suspension system.

Noncombustible Those materials that pass CAN/ULC S114 Test for Determination of Non-Combustibility in Building Materials.

Non-Sag Ceiling Panel A ceiling panel that resists sagging and warping, such as our ClimapPlus™ panels.

Octave Interval between two sounds having a basic frequency ratio of two. The formula is 2^n times the frequency, where n is the desired octave interval. The octave band frequency given in sound test results is usually the band center frequency, thus the 1000 Hz octave band encompasses frequencies from 707 Hz to 1414 Hz (n=± 1/2). The 1000 Hz one-third octave band encompasses frequencies from 891 Hz to 1122 Hz (n = ± 1/6).

Parapet Wall Extension of an exterior wall above and/or through the roof surface.

Penny (d) Suffix designating the size of nails, such as 6d (penny) nail, originally indicating the price, in English pence, per 100 nails. Does not designate a constant length or size, and will vary by type (e.g., common and box nails).

Performance Specification States how a building element must perform as opposed to describing equipment, products or systems by name.

Perimeter Relief A gap left around the perimeter of a wall, floor or ceiling membrane, such that it will not be in direct contact with the membrane of adjoining assemblies. This gap is normally caulked with acoustical sealant.

Perm A unit of measurement of Water Vapor Permanence (ASTN E96). Also, see Permeance.

Permeance (water vapor) The ratio of the rate of water vapor transmission (WVT) through a material or assembly between its two parallel surfaces to the vapor pressure differential between the surfaces. Metric unit of measuring is the metric perm, ng/Pa•s•m²; British unit, 1 grain/h x ft.² x in. Hg.

Permeability The property of a porous material that permits a fluid (or gas) to pass through it; in construction, commonly refers to water vapor permeability of a sheet material or assembly and is defined as water vapor permeance per unit thickness. Metric unit of measurement, metric perms per centimeter of thickness. Also, see Permeance.

Photographing See Shadowing.

Pilaster Projecting, square column or stiffener forming part of a wall.

Pillar Column supporting a structure.
Pink Noise Random noise with a continuous frequency spectrum with equal power per constant percentage band width (see Noise, White Noise, Random Noise).

Pitch of Roof Slope of a surface, generally expressed in measured units of vertical rise per horizontal distance, such as “4-in-12 pitch.”

Plaster Base Gypsum panel with specially treated face paper to serve as a stable backing for plaster applications. Two types of plaster base are available; one type is usually 9.5 mm (3/8-in.) thick, 406 mm (16 in.) wide and 1220 mm (4 feet) long and is used for conventional (thick) coat plastering. The other is typically 12.7 mm (1/2-in.) or 15.9 mm (5/8-in.) thick and 1220 mm (4 feet) wide (lengths vary) and is used for veneer plaster system applications.

Plaster Bonder See Bonding Agent.

Plate “Top” plate is the horizontal member fastened to the top of the studs or wall on which the rafters, joists or trusses rest; “sole” plate is positioned at bottom of studs or wall.

Platform Floor surface raised above the ground or floor level.

Platform Framing Technique of framing where walls can be built and tilted-up on a platform floor, and in multi-story construction are erected sequentially from one platform to another. Also known as “Western” framing.

Plenum Chamber in which the pressure of the air is higher (as in a forced-air furnace system) than that of the surrounding air. Frequently a description of the space above a suspended ceiling.

Plenum Barrier Vertical surface framed from the structure above to the finished ceiling and sealed to prevent the passage of air.

Pop Rivet A small gauge metal fastener used to fasten T-Bars to molding or to fasten any two light gauge metal pieces together. The rivets are installed with a hand-operated pliers-type tool called a pop rivet gun through a pre-drilled hole.

Porosity The propensity of certain materials, such as wallboard paper, to absorb water.

Portland Cement Hydraulic cement produced by pulverizing clinker consisting essentially of hydraulic calcium silicates, usually containing one or more forms of calcium sulfate as an interground addition.

Prescriptive Specification Traditional procedure used on building projects to describe by name products, equipment or systems to be used.

Primer A thin paint or glue size material sprayed or rolled onto concrete to ensure that the cemented acoustical tile will properly hold or bond to the concrete.

Punching The space of the holes on the main tee to receive a cross tee in a grid system.

Purlin Horizontal member in a roof supporting common rafters, such as at the break in a gambrel roof. Also, horizontal structural member perpendicular to main beams in a flat roof.

Racking Forcing out of plumb of structural components, usually by wind, seismic stress or thermal expansion or contraction.
Radiation Transfer of heat energy through space by wave motion. Although the radiant energy of heat is transmitted through space, no heat is present until this energy strikes and is absorbed by an object. Not all of the radiant heat energy is absorbed; some is reflected to travel in a new direction until it strikes another object. The amount reflected depends on the nature of the surface that the energy strikes. This fact explains the principle of insulating foil and other similar products that depend on reflection of radiant heat for their insulating value.

Radiant heat travels in straight lines in all directions at about the speed of light. In radiant heating systems, heat is often radiated down from the ceiling. As it strikes objects in the room, some is absorbed and some reflected to other objects. The heat that is absorbed warms the object, which, in turn, warms the surrounding air by conduction. This warmed air sets up gentle convection currents that circulate throughout the room.

Rafter That member forming the slanting frame of a roof or top chord of a truss. Also known as hip, jack or valley rafter depending on its location and use.

Rafter Tail That part of a rafter that extends beyond the wall plate—the overhang.

Random Noise A noise whose magnitude and/or frequency cannot be predicted precisely at any given time. A rough approximation of random noise is the noise from a jet engine or the static heard on a radio between stations (see Noise, White Noise, Pink Noise).

Ready-Mixed Plaster A calcined gypsum plaster with aggregate added during manufacture. Ready-mixed plaster is a powder product that requires the addition of water.

Recessed Light Any lighting fixture located above the ceiling line.

Recessed Troffer Light A light fixture recessed into the ceiling displacing acoustical tile.

Reflected Heat See Radiation.

Reflected Plan A plan of an upper surface, such as a ceiling projected downward.

Reflected Sound Sound that has struck a surface and “bounced off.” Sound reflects at the same angle as light reflects in a mirror; the angle of incidence equals the angle of reflection.

Large curved surfaces tend to focus (concave) or diffuse (convex) the sound when reflected. However, when the radius of the reflecting surface is less than the wavelength of the sound, this does not hold true. Thus, a rough textured surface has little effect on diffusion of sound.

Reflective Insulation Material that reflects and thus retards the flow of radiant heat. The most common type of reflective insulation is aluminum foil. The effectiveness of reflective barriers is diminished by the accumulation of dirt and by surface oxidation.

Relative Humidity The ratio of actual water vapor pressure to the saturation water vapor pressure at the same temperature, expressed as a percentage.
Resilient Hanger A type of hanger with rubber or fiberglass insulator ensuring no metal-to-metal contact. It affords maximum protection against sound transmission. This is also called a sound isolation hanger.

Retarder An admixture used to delay the setting action of plasters or other cementitious materials.

Reverberation Persistence of sound after the source stops. When one hears the 10th, 20th, 50th, 100th, etc., reflection of a sound, one hears reverberation.

Reverberation Time Essentially the number of seconds it takes a loud sound to decay to inaudibility after the source stops. Strictly, the time required for a sound to decay 60 dB in level.

Ridge Peak of a roof where the roof surfaces meet at an angle. Also may refer to the framing member that runs along the ridge and supports the rafters.

Rise Measurement in height of an object; the amount it rises. The converse is “fall.”

Riser Vertical face of a step supporting the tread in a staircase.

Room Finish Schedule The section of a set of blueprints showing what type of ceiling is to be installed, the height of the ceiling, etc.

Rough Framing Structural elements of a building or the process of assembling elements to form a supporting structure where finish appearance is not critical.

Sabin Measure of sound absorption of a surface, equivalent to 0.093 m² (1 sq. ft.) of a perfectly absorptive surface.

Safing Firestop material in the space between floor slab and curtain wall in multi-story construction.

Safing Off Installation of fire safety insulation around floor perimeters, between floor slab and spandrel panels. Insulation helps retain integrity of fire resistance ratings.

Scab Small piece or block of wood that bridges several members or provides a connection or fastening between them.

Screed To level or straighten a plaster coat application with a rod, darby or other similar tool. Also, as a noun, see Ground. Screeds are made from basecoat plaster; they are created between plaster dots or grounds.

Scribe To cut and fit acoustical tile neatly to a wall or vertical surface.

Scrubbable Able to be scrubbed without compromising finish integrity. Measured by Gardner Scrubbability Test ASTM D 2486.

Section A drawing of a portion of a building cut lengthwise to show it from another dimension. Sections are indicated by means of cutting plane lines.

Section Modulus (S) Numerical relationship, expressed in cm³ (in.³), of the resistance to stress of a member. It is equal to the moment of inertia divided by the perpendicular distance from the neutral axis to the extremity of the member.

Seismic Load The force produced on a structural mass owing to its acceleration, induced by an earthquake.
**Semi-Concealed Installation System** Installation system in which tile is kerfed in one direction, exposing the grid on the other two sides.

**Set** The hardening and hydration of a gypsum plaster or setting-type joint compound. See Setting Time.

**Setting Time** The elapsed time required for a gypsum plaster or setting-type joint compound to attain a specified hardness and strength after mixing with water.

**Shadow Molding** A W-shaped molding that produces a reveal or space between the ceiling and the wall when fastened to the wall.

**Shaft Wall** Fire-resistant wall that isolates the elevator, stairwell and vertical mechanical chase in high-rise construction. This wall must withstand the fluctuating (positive and negative) air-pressure loads created by elevators or air distribution systems.

**Shadowing** An undesirable condition where the joint finish shows through the surface decoration.

**Shear** Force that tends to slide or rupture one part of a body from another part of the body or from attached objects.

**Sheathing** Plywood, gypsum, wood fiber, expanded plastic or composition boards encasing walls, ceilings, floors and roofs of framed buildings. May be structural or non-structural, thermal-insulating or non-insulating, fire-resistant or combustible.

**SHEETROCK** Leading brand of gypsum panel for interior wall and ceiling surfaces, developed and improved by United States Gypsum Company. There is only one SHEETROCK Brand Gypsum Panel.

**Shoring** Temporary member placed to support part of a building during construction, repair or alteration; also may support the walls of an excavation.

**Sill** Horizontal member at the bottom of door or window frames to provide support and closure.

**Sill Plate** Horizontal member laid directly on a foundation on which the framework of a building is erected.

**Slab** Flat (although sometimes ribbed on the underside) reinforced concrete element of a building that provides the base for the floor or roofing materials.

**Slip Molding** A light gauge channel used to cover the exposed edge of cemented acoustical tile panels.

**Smoke Developed** The ratio of the smoke emitted by a burning material to the smoke emitted by a red oak standard material as determined by CAN/ULC S102M.

**Soffit** Undersurface of a projection or opening; bottom of a cornice between the fascia board and the outside of the building; underside of a stair, floor or lintel.

**Sole Plate** See Plate.

**Sound Absorption** Conversion of acoustic or sound energy to another form of energy, usually heat.
**Sound Attenuation** The reduction of sound energy as it passes through a conductor, resulting from the conductor’s resistance to the transmission.

**Sound Barrier** A material installed in a plenum or partition to prevent the passage of sound from one area to another. Sound-deadening board and lead sheet or special insulations make good sound barriers.

**Sound Insulation, Isolation** Use of building materials or constructions that will reduce or resist the transmission of sound.

**Sound Intensity** Amount of sound power per unit area.

**Sound Isolation Hanger** See Resilient Hanger.

**Sound Pressure Level (SPL)** Expressed in decibels, the SPL is 20 times the logarithm to the base 10 of the ratio of the sound pressure to a reference pressure of 20 micropascals. See Decibel.

**Sound Transmission** The transfer of sound energy from one place to another, through air, structure or other conductor. Unwanted sound in a room may be the result of sound transmission from sources outside the room. The degree to which this sound transmission is acceptable depends on the quantity and source of the sound and the use of the adjacent space. Sound transmitted at a level below the receiving room ambient level would be acceptable.

**Sound Transmission Class (STC)** Single-number rating for evaluating the effectiveness of a construction in isolating audible airborne sound transmission across 16 frequencies. Higher numbers indicate more effectiveness. Tested per ASTM E90.

**Spacer Bar/Channel** A bar with notches at each end that hook over two main T’s in a concealed support system to space and stabilize them.

**Span** Distance between supports, usually a beam or joist.

**Spandrel Beam** Horizontal member, spanning between exterior columns, that supports the floor or roof.

**Spandrel Wall** Exterior wall panel, usually between columns, that extends from the window opening on one floor to one on the next floor.

**Speed of Sound** Speed of sound in air varies with atmospheric pressure and temperature, but is the same at all frequencies. For most architectural work, the speed of sound should be taken as 344 m/second (1,130 ft./second).

**Splayed Hangers** Hangers installed at an angle rather than perpendicular to the support grid or channel.

**Splicers** Small metal pieces used to fasten two ceiling components together.

**Split Line** The elevation of the bottom of the 1-1/8” channel in a suspended acoustical ceiling.

**Square Edge** An acoustical tile is considered square-edge material when the edge of the tile is not beveled; it creates a hairline joint when installed. Drywall panels also may have square edges; however, drywall edges are typically tapered.

**Stile** Vertical outside member in a piece of mill work, as a door or sash.

**Stirrup** Hanger to support the end of the joist at the beam.
Stop Strip of wood fastened to the jambs and head of a door or window frame against which the door or window closes.

Strain Unit deformation in a body that results from stress.

Stress Unit resistance of a body to an outside force that tends to deform the body by tension, compression or shear.

Stringer Heavy horizontal timber supporting other members of the frame in a wood or brick structure; a support also for steps.

Structure-Borne Sound Sound energy imparted directly to and transmitted by solid materials; such as building structures.

Strut Slender structural element that resists compressive forces acting lengthwise.

Stucco
1. A mixture of portland cement and aggregate designed for use on exterior surfaces or interior surfaces exposed to high levels of moisture. May also contain hydrated lime to improve working characteristics.
2. A gypsum plaster mix including aggregate for use on interior surfaces.
3. Calcined gypsum used to produce plaster, gypsum wallboard and related products. This terminology is specific to the gypsum processing industry.

Stud Vertical load-bearing or non-load bearing framing member.

Subfloor Rough or structural floor placed directly on the floor joists or beams to which the finished floor is applied. As with resilient flooring, an underlayment may be required between subfloor and finished floor.

Substrate Underlying material to which a finish is applied or by which it is supported.

Surface Burning Characteristic Rating of interior and surface finish material providing indexes for flame spread and smoke developed, based on testing conducted according to CAN/ULC S102M.

Suspended Ceiling A ceiling that is hung from the structure with wire hangers.

Synthetic Gypsum A chemical product, consisting primarily of calcium sulfate dehydrate (CaSO₄·2H₂O) resulting primarily from an industrial process. Also, see Desulfo Gypsum.

Take-Up The loss of water of a plaster into the absorptive substrate during application, as evidenced by a moderate stiffening of the plaster coat.

Tapered Edge An edge formation of gypsum board which provides a shallow depression at the paper-bound edge to receive joint reinforcement. Typical edge on drywall panels; edges may also be square.

Taping Compound (Sometimes called embedding compound.) A compound specifically formulated and manufactured for use in embedding of joint reinforcing tape at gypsum board joints.

Task Lighting Lighting directed to a specific work surface or area to provide illumination for tasks.

Temperature Measurement of the intensity (not quantity) of heat. The Fahrenheit (°F) scale places the freezing point of water at 32° and the
boiling point at 212º. The Centigrade or Celsius (ºC) scale, used by most countries and in scientific work, places the freezing point of water at 0º and the boiling point at 100º. On the Kelvin (K) scale, the unit of measurement equals the Celsius degree and measurement begins at absolute zero 0º (-273ºC).

**Tensile Strength** Maximum tensile stress that can be developed in a given material under axial tensile loading. Also the measure of a material's ability to withstand stretching.

**Tension** Force that tends to pull the particles of a body apart.

**Thermal Expansion** All materials expand and contract to some extent with changes in temperature. The Thermal Coefficient of Linear Expansion is expressed mm/mm/ºC [Inches Per Inch Per Degree Fahrenheit]. Example: gypsum board has a coefficient of 16.2 x 10^-6 mm/mm/ºC (0.0 x 10^-6 in. per in. per °F). This means that with an increase in temperature of 50 Fº, a gypsum board wall 30 m (100 ft.) in length will have an unrestrained linear expansion of 13.7 mm (0.54”). The expansion characteristics of some other building materials are more pronounced; a 50 Fº temperature increase would produce expansion in a 30 m (100’) length of approx. 19 mm (3/4”) in aluminum, 9.5 mm (3/8”) in steel and 12.7 mm (1/2”) in concrete.

**Thermal Resistance (R)** Resistance of a material or assembly to the flow of heat. It is the reciprocal of the heat transfer coefficient: 
\[
\frac{1}{C} \text{ or } \frac{1}{U}
\]

For insulating purposes, low “C” and “U” values and high “R” values are the most desirable.

**Threshold** Raised member at the floor within the door jamb. Its purpose is to provide a divider between dissimilar flooring materials or serve as a thermal, sound or water barrier.

**Through Penetrations** An opening through a fire-resistive partition or floor/ceiling assembly caused by the need to have a penetrating item pass through it. Through penetrations usually require the use of a firestop system to protect against the spread of fire through the opening.

**Through Penetration Firestop** A system for sealing through-penetrations in fire-resistant floors, walls and ceilings.

**Tie Wire** 16 to 18-gauge galvanized wire used to fasten two pieces of metal furring together.

**Tile** Ceiling product of exact, not nominal size, usually 12” x 12”.

**Time-Temperature Curve** Rate of rise of temperature in a fire-testing furnace.

**Toenail** Method of fastening two boards or studs together as in a “T” by driving nails into the board that forms the stem of the “T” at an angle so they enter the other board and cross each other.

**Tongue-and-Groove Joint** Joint where the projection or “tongue” of one member engages the mating groove of the adjacent member to minimize relative deflection and air infiltration; widely used in sheathing, flooring and paneling. Tongues may be in “V,” round or square shapes.

**Topping Compound** A compound specifically formulated and manufactured for use over taping or all purpose compounds to provide a
smooth and level surface for the application of decoration.

**Translucent Ceiling** A ceiling with polystyrene, acrylic, or plastic lay-in panels that allow the light to pass through from fixtures above the ceiling, but obstruct ordinary vision to the plenum above.

**Transmission Loss (TL)** Essentially the amount, in decibels, by which sound power is attenuated (decreased) by passing from one side of a structure to the other. TL is independent of the rooms on each side of the structure and theoretically independent of the area and edge conditions of the structure.

**Tread** Horizontal plane or surface of a stair step.

**Trimmer** Double joists or rafters framing the opening of a stairway well, dormer opening, etc.

**Truss** Open, lightweight framework of members, usually designed to replace a large beam where spans are great.

**“U” Factor** Coefficient of heat transfer, “U” equals 1 divided by (hence, the reciprocal of) the total of the resistances of the various materials, air spaces and surface air films in an assembly. See Thermal Resistance.

**ULC** Underwriters Laboratories of Canada—not-for-profit laboratory operated for the purpose of testing devices, systems and materials as to their relation to life, fire and casualty hazards in the interest of public safety.

**Vapor Retarder** Material used to retard the flow of water vapor through walls and other spaces where this vapor may condense at a lower temperature.

**Veneer Plaster** Calcined gypsum plaster specially formulated to provide specific workability, strength, hardness and abrasion resistance characteristics when applied in thin coats (1.6 to 2.4 mm (1/16” to 3/32”) nom.) over veneer gypsum base or other approved base. The term thin-coat plaster is sometimes used in reference to veneer plaster.

**Washable** Able to be cleaned with a damp sponge or cloth. See Scrubbable.

**Water-Absorption** The amount of water absorbed by a material under specified test conditions commonly expressed as weight percent of the test specimen.

**Water Level** A hose with a glass pipe inserted in both ends used in leveling ceilings. A transparent hose without glass ends may be used.

**Water-Repellent Paper** Gypsum board paper surfacing which has been formulated or treated to resist water penetration.

**Water Vapor Transmission** The rate of water vapor flow, under steady specified conditions, through a unit area of a material, between its two parallel surfaces and normal to the surfaces. Metric unit of measurement is ng/Pa•s•m². Also, see Permeance.

**Wavelength (Sound)** Wave is one complete cycle of sound vibration passing through a medium (such as air) from compression through rarefaction and back to compression again. The physical length of this cycle is termed the wavelength. Wavelengths in air vary from about 17.5 mm (11/16”) for
a 20,000-cycle per sec. (See Frequency) sound, to approximately 17.2 m (56-1/2") for a 20-cycle per sec. sound (the two approximate extremes of human hearing sensitivity). There are waves outside of this range, but generally, they cannot be heard by humans.

**Weep Hole** Small aperture at the base of an exterior wall cavity intended to drain out trapped moisture.

**Wet Sand** To smooth a finished joint with a small-celled wet sponge. A preferred method to reduce dust created in the dry sanding method.

**White Noise** Random noise with a continuous frequency spectrum and with equal power per unit band width (see Noise, Pink Noise, Random Noise).

**WHI** Warnock Hersey International, an independent fire-testing laboratory.

**Wood-Fibered Plaster** A calcined gypsum plaster containing shredded or ground wood fiber added during manufacture.
Key Word Index

A

Abuse Resistance 2, 231, 325, 432

Abuse Resistant

Systems by Category 432
Ceiling Panels
Drywall Panels 8
Plaster Base 214
Veneer Plaster

Over Duronx Brand Cement Board 214
Over Fierock Brand Panels 214
Plaster 231

Accelerator, Plaster 235, 253
Use with Basecoats 254, 366
Use with Finish Coats 366

Accessories, Framing and Furring

Breakaway Clip 31
Channels 32, 228
Framing & Furring 32, 228
Angles 32, 228
Furring Channels, Clips 33, 228
Brackets 33, 229
Tie Wire 33, 229
Job Inspection 337

Accessories, Trim 22, 161, 200
Corner Reinforcement 22, 161, 200
Metal Trim 25, 164, 201
Control Joints 27, 165, 201
Application, All Types 161-167, 200-203, 250

Acoustic Spray Machines 408

Acoustical Caulking 183
For Stress Relief 331

Acoustical Sealant, SHEETROCK Brand
Application 104, 107, 187, 263, 305
Job Inspection 339, 341

Acoustical Suspension Ceilings 267

Acrylic Additive 236

Additives, Plaster 236, 260

Adhesive Attachment 96

Double-Layer Lamination 96, 108

General Directions 103
Predecorated Panels 115
Ceramic Tile Installation 153
Job Inspection 340
Tools Available 399

Adhesive Cartridge,
Preparation for Use 104

Adhesive Gun, Application 103

Adhesives, SHEETROCK Brand 45
Double-Layer Lamination 92, 108
General Application 103, 109
Attachment to Masonry 114
Predecorated Panel Attachment 115

Adhesives

Commercial Application 103
Construction 103
Drywall Stud 103
Laminating 108
Liquid Contact 111, 116
Vinyl Foam Tape 105, 116

Agencies and Associations,
Building Industry 418

Agencies, Safety 387

Aggregates 251
Finish 254

Gauging Plaster 256
Finish Lime 257
Prepared Finishes 258
Additives 260
Replastering 260

Aggregated Plaster Finishes 251
Proportioning 251
Application Problems 364
Coefficients of Expansion, Thermal Resistance 446

Aggregated Texture

Finishes 50, 51, 52
Application 189
Problems, Prevention 364
<table>
<thead>
<tr>
<th>Back-Blocking Application 107</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backer Board, Tile 140</td>
</tr>
<tr>
<td>Backing Board with Predecorated Panels 116</td>
</tr>
<tr>
<td>Banjo, Joint Treatment Tool 402</td>
</tr>
<tr>
<td>Basecoat Plasters</td>
</tr>
<tr>
<td>IMPERIAL Brand Veneer 59</td>
</tr>
<tr>
<td>DIAMOND Brand Veneer 60</td>
</tr>
<tr>
<td>Application 210, 211, 212, 260</td>
</tr>
<tr>
<td>RED TOP Gypsum,</td>
</tr>
<tr>
<td>Two-Purpose 231</td>
</tr>
<tr>
<td>Wood Fiber 231</td>
</tr>
<tr>
<td>STRUCTO-LITE, STRUCTO-BASE 249</td>
</tr>
<tr>
<td>Bead, Corner and Casing 22, 161, 200, 223</td>
</tr>
</tbody>
</table>

| Agitator, Power-Applications 188 |
| Air Barriers 320                |
| Air Handling System Guide 288   |
| Airborne Sound Transmission, Testing 427 |
| Alemite Loader Pump 399         |
| All-Purpose Joint Compounds 50  |
| All Purpose Texture Finish 50   |
| Application 189                |
| Alum Solution Treatment        |
| Use with Veneer Base 209, 235-236, 360 |
| Use as Accelerator 235         |
| Use with Plasters 235          |
| Anchors, Door Frame 88, 261    |
| Angle Brackets 266             |
| Angle Float, Plow and Sander Tools 404 |
| Angle Trowel 403               |
| Angles, Metal 32               |
| Installation 315               |
| Angles, Interior               |
| Floating Installation 333      |
| Cracking Problems 355, 360     |
| Annular Ring Nail, GWB-54 43   |
| Application Problems 333       |
| Appearance Factors, General 325|
| Applicator Tools, Joint Treatment 402 |
| Arches, Installation 136       |
| Area Separation Walls/Firewalls Components 30 |
| Rated Systems and Installation 304 |
| Articulation Class 429         |
| Asphalt Felt, No. 15 15, 70    |
| Associations and Agencies, Building Industry 418 |
| ASTM                            |
| Performance Requirements 325   |
| Test Procedures 423            |
| Designations, CGC Products 440 |
| Application Standards 442      |
| Standards for Performance 442  |
| Attachment, Adhesive 95        |
| Double-Layer Lamination 95, 108|
| General Directions 103         |
| Predecorated Panels 116        |
| Job Inspection 339             |
| Tools Available 399            |
| Attachment Methods             |
| Gypsum Boards 95               |
| Fixtures and Cabinets 131, 264 |
| Conventional Plaster Bases 245 |
| Attachment, Nail 43, 100, 102, 116, 122, 125, 130, 147, 244, 246 |
| Job Inspection 339             |
| Installation Defects Correction 344, 351, 352, 353 |
| Tools Available 398            |
| Attachment Screw 37, 99, 125, 130, 135, 137, 147, 244, 56 |
| Job Inspection 339             |
| Installation Defects, Correction 352, 353 |
| Tools Available 398            |
| Attachment, Staple             |
| Base Layer Boards 100           |
| Spacing 101                     |
| Corner Bead 163, 200            |
| Metal Trim 165, 201             |
| Control Joints 166, 202         |
| Cement Board 143               |
| Gypsum Plaster Base 244, 246    |
| Tools Available 398            |
| Autoclaved Finish Limes 257, 258|
| Automatic Tools — Joint Treatment |
| Veneer and Texturing 403, 406, 408 |
| Cleaning 168                   |
| Application 173                |
Application 161, 200, 223
Fill Coating and Finishing 161, 161, 200
Use as Grounds 250
Cracking and Blemishing Correction 345, 354, 366
Bead, Flexible Metal Corner 24
Application 162
Beads, Adhesive 103
Beam Construction
Rated Systems 316
Beams, Fireproofing 316
Bending, Gypsum Board 134
Bending Stress 65
Bit Tips, Screwgun 39
Blankets, Sound and Insulating 36
Ceiling Weight Limits 4, 67
Spec Standards 36
Installation 127
Use in Rated Systems 303, 307, 310
Surface Burning Characteristics 424
Coefficients of Thermal Resistance 447
Blemishes
Veneer Surfaces 361
Plaster Surfaces 369
Blistering
Drywall Joint Tape 353
Veneer Bases 361
Plaster Finishes 370
Block, Concrete Plaster Base 245
Plastering Problems 366
Coefficients of Thermal Resistance 447
Blue Board—see Gypsum Base, Veneer
Bolts, Fixture 132, 266
Bond Failure
Causes, General 344
Veneer Finishes 360
Texture Finishes 364
Plaster Finishes 373
Bonding Agent 236
Boxes, Electrical
Acoustical Caulking 131, 183
Cutting Board Openings 131
Provision in Resurfacing 193
Bracing Angles, Steel 315
Brackets
Adjustable Wall Furring 229
Channel Brackets, Systems 317
Angle Brackets 266
Breakaway Clip, CGC Aluminum 31
Brick Masonry
As Plaster Base 245
Plastering Problems 367
Coefficients of Expansion,
Thermal Resistance 447
Browning Rod 403
Bulk-Type Hand Gun 399
Butterfly Patch 348
Cabinets, Attachment 133, 264
Cable Heat Ceilings
Gypsum Base 11
Perimeter Relief 128
Application 212
Calcination Process, Gypsum ix, 230
California Patch 348
Cartridge-Type Caulking Gun 399
Casing Beads 40, 223
Use as Grounds 250
Catalyst, IMPERIAL Brand Veneer Finish, Application 208
Caulking
Acrylic Caulk, Waterproof 90
Application for Sound Ratings
Plaster Systems 263
Equipment Available 399
Tub Caulk 120
Electrical Fixture 264
Cavity Shaft Walls
Components 30
Installation 311
Ceiling Board, SHEETROCK Brand
Exterior Gypsum 8
Application 105, 123
Joint Treatment 175
Surface Burning Characteristics 424
Ceiling Board, SHEETROCK Brand
- Interior Gypsum 8
- Application 105, 122, 385
- Surface Burning Characteristics 424

Ceiling Drive-In Trim
- Application 118
- Ceiling Texture 50, 187
- Patch 55, 193

Ceiling, Furred 71

Ceilings
- Suspension System 72
- Exterior Soffits 8, 124
- Insulation Weight Limits 67, 321
- Furred, Steel Framing 243
- Suspended, Steel Grillage 72, 243
- Interior Soffits 137
- Radiant Heat Systems 212
- Redecorating 215
- Rated Systems, Drywall and Veneer 301
- Installation Safety 385

Ceilings, Acoustical 268
(See also Acoustical Suspension ceilings)

Ceiling Attenuation Class (CAC) 276, 296, 429

Ceiling Sag
- Limitations 67
- Precautions 321
- Remedies 321, 349

Cement Board
- DUROCK Brand Cement Board 140
- Limitations 141, 144
- DUROCK Brand Underlayment 141
- DUROCK Brand Exterior Cement Board 141
- Typical Physical Properties 142
- Job Preparation 143
- Design Considerations 143
- Interior Application 145
- Wall Shields and Floor Protectors 151
- Abuse-resistant Walls 153
- Problems, Remedies 362
- Centering Lath, Floor and Roof 222
- Ceramic Tile Base Water-Resistant Gypsum Panels 7, 119
- DUROCK Brand Cement Board 147, 151
- DUROCK Brand Underlayment 147, 150, 151

Certification, Test Data, CGC Systems 336

CGC
- Plant Locations 448, 449
- Literature 450

C-H Studs, Steel 30
- Installation 304, 309

Channels
- Z-Furring 33
- Cold-Rolled 32, 228
- RC-1 Resilient 32
- Metal Furring 33, 228
- For Fixture Attachment 131, 264
- Statistics 441

Chase Wall, Steel Framing
- Installation 71

Circular Cutting Tool 396
- Method of Use 99

Clamps 394

Clay Tile Plaster Base 245
- Plastering Problems 367

Clean Room Ceiling Panels 18

Cleanup, Job
- Planning, Plaster Work 238
- Inspection, Plaster Work 341

Clinch-On Tool, Corner Bead
- Bead Application 163

Clips
- Aluminum Breakaway 31
- Metal Furring Channel 33
- Drywall Repair 55

Coarse-Texture Finishes 51, 53
- Application 220, 255

Coatings, Concrete 55
- Application 182
- Finishing Problems 367

Coefficients of Building Materials
- Thermal and Hygrometric Expansion 446
- Thermal Resistance 447

Cold-Rolled Channels 32, 228

Columns
- Perimeter Relief 128
- Fireproofing 316

COMPASSO Trim 21
Complaint Procedure, CGC Products 336

Components, Structural
  Steel Studs and Runners 28, 228
  Cavity Shaft Wall Components 31
  Area Separation Wall Components 31
  Double Wall Components 31
  Angles, Channels, Brackets,
    Clips, Tie Wire 33, 34, 228
  Job Inspection 338

Compounds
  Joint Compounds 45
  Concrete Coatings 55
  Bituminous Waterproofing 246
  Concrete Block Plaster Base 245
  Plastering Problems 340
  Coefficients of Thermal Expansion 446

Concrete Coatings 55, 208
  Application 182, 208
  Finishing Problems 367

Concrete Fastening System
  Runner Installation 68

Concrete, Monolithic
  Radiant Heat Ceiling 213
  Use as Plaster Base 245
  Effect on Cracking 329
  Coefficients of Expansion 446

Condensation, Prevention of 325

Construction Adhesive 45
  Application 103

Construction Designs, Ceiling 284

Contact Adhesive, Liquid 116
  Application 111

Control Joints 27, 144, 225
  Limitations 27, 226
  Specifications 248
  For Door Frames 86, 247
  For Multifloor Walls 107
  Application 165, 249
  Fire-Rated 165
  Max. Spacing 167, 203
  For Exterior Soffits 166
  Plaster 247

Coreboard, Gypsum 13
  Specifications 15

Specification Standards 440

Corner Bead 22, 223
  Specifications 227
  Application 161, 200
  Fill Coating and Finishing 170
  Use with Concrete 182
  Correction of Blemishes 361
  Plaster Conventional 223

Corner Construction
  Cladding 130
    Floating Interior Angle 333
    Framing 85

Corner Finishing Tools 406

Corner Roller, Finisher 402
  Application 171

Cornerite, Metal Reinforcement 224
  Prevention of Plastering Problems 369

Cost Analysis, Benefit-or Life-Cycle 324

Counter Tops, Ceramic Tile
  DUROCK Brand Cement Board 150
  DUROCK Brand Underlayment 150

Cover Coat Concrete Finishing
  Compound 55
  Application 182

Coverage Data
  Gypsum Board Nails 44
  Adhesives 45, 103
  Joint Compounds 55, 93
  Joint Reinforcing Tapes 56
  Veneer Finishes 60
  Texture Finishes 53
  Screws 93, 435
  Laminating Adhesives 45, 93
  Basecoat Plaster 232
  Gauged-Lime Finishes 233

Cracking, Wall and Ceiling
  In High-Rise Structures 332
  Cause, Remedy, Prevention Drywall
    Construction 344, 347, 354
  Veneer Construction 361
  Plaster Construction 367-369

Creased THERMAFIBER Sound
  Insulation Systems 127, 303

Crimper, Stud 393
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>398, 400</td>
<td>Drills, Electric</td>
</tr>
<tr>
<td>362</td>
<td>Drying Conditions</td>
</tr>
<tr>
<td>371</td>
<td>Veneer Finishes</td>
</tr>
<tr>
<td>176</td>
<td>Conventional Plasters</td>
</tr>
<tr>
<td>339</td>
<td>Drying Times, Joint Compound</td>
</tr>
<tr>
<td>344, 358</td>
<td>Drywall and Veneer Systems</td>
</tr>
<tr>
<td>190</td>
<td>Job Inspection</td>
</tr>
<tr>
<td>190</td>
<td>Problems, Remedies</td>
</tr>
<tr>
<td>344</td>
<td>Drywall Colored Texture Finish</td>
</tr>
<tr>
<td>95, 97</td>
<td>Drywall Panel Application</td>
</tr>
<tr>
<td>106</td>
<td>General Recommendations</td>
</tr>
<tr>
<td>115</td>
<td>Installation</td>
</tr>
<tr>
<td>119</td>
<td>Predecorated Panels</td>
</tr>
<tr>
<td>122</td>
<td>Water-Resistant Panels</td>
</tr>
<tr>
<td>123</td>
<td>Interior Ceiling Board</td>
</tr>
<tr>
<td>130</td>
<td>Exterior Ceiling Board</td>
</tr>
<tr>
<td>134</td>
<td>Floating Interior Angles</td>
</tr>
<tr>
<td>137</td>
<td>Curved Surfaces</td>
</tr>
<tr>
<td>168</td>
<td>Interior Softits</td>
</tr>
<tr>
<td>190</td>
<td>Joint Treatment</td>
</tr>
<tr>
<td>190</td>
<td>Resurfacing</td>
</tr>
<tr>
<td>339</td>
<td>Job Inspection</td>
</tr>
<tr>
<td>344</td>
<td>Installation Defects and Remedies</td>
</tr>
<tr>
<td>335</td>
<td>Tolerances</td>
</tr>
<tr>
<td>45</td>
<td>Drywall Stud Adhesive</td>
</tr>
<tr>
<td>103</td>
<td>Application</td>
</tr>
<tr>
<td>54</td>
<td>Drywall Surfacer, SHEETROCK Brand Texture</td>
</tr>
<tr>
<td>189</td>
<td>Application</td>
</tr>
<tr>
<td>19</td>
<td>Drywall Suspension Systems, CGC</td>
</tr>
<tr>
<td>19</td>
<td>System</td>
</tr>
<tr>
<td>20, 21</td>
<td>Components</td>
</tr>
<tr>
<td>76</td>
<td>Installation</td>
</tr>
<tr>
<td>126</td>
<td>24</td>
</tr>
<tr>
<td>163</td>
<td>Dur-A-Bead Corner Bead</td>
</tr>
<tr>
<td>140</td>
<td>Reinforcement</td>
</tr>
<tr>
<td>145</td>
<td>Application</td>
</tr>
<tr>
<td>141</td>
<td>DUROCK Brand Cement Board</td>
</tr>
<tr>
<td>147, 150</td>
<td>Application</td>
</tr>
<tr>
<td>325</td>
<td>Durability Factors, General</td>
</tr>
<tr>
<td>369</td>
<td>Efflorescence in Masonry</td>
</tr>
<tr>
<td>369</td>
<td>Electric Radiant Heat Ceiling Systems</td>
</tr>
<tr>
<td>238</td>
<td>(see Radiant Heat Ceilings)</td>
</tr>
<tr>
<td>238</td>
<td>Electrical and Mechanical Services</td>
</tr>
<tr>
<td>65</td>
<td>Framing Preparation</td>
</tr>
<tr>
<td>263</td>
<td>Acoustical Caulking</td>
</tr>
<tr>
<td>131</td>
<td>Cutting Board Openings</td>
</tr>
<tr>
<td>385</td>
<td>Electrical Safety</td>
</tr>
<tr>
<td>118</td>
<td>End Cap Mouldings</td>
</tr>
<tr>
<td>328</td>
<td>Application</td>
</tr>
<tr>
<td>93</td>
<td>Environmental Conditions</td>
</tr>
<tr>
<td>93</td>
<td>Gypsum Drywall Products</td>
</tr>
<tr>
<td>93</td>
<td>Veneer Plaster Products</td>
</tr>
<tr>
<td>144</td>
<td>Cement Board Products</td>
</tr>
<tr>
<td>238</td>
<td>Lath and Plaster Products</td>
</tr>
<tr>
<td>446</td>
<td>For Good Results</td>
</tr>
<tr>
<td>388</td>
<td>EPA</td>
</tr>
<tr>
<td>168</td>
<td>Equipment, Use and Care of Drywall Joint Treatment</td>
</tr>
<tr>
<td>238</td>
<td>Plaster Construction</td>
</tr>
<tr>
<td>335</td>
<td>Selection Factors</td>
</tr>
<tr>
<td>393-415</td>
<td>Types Available</td>
</tr>
<tr>
<td>93</td>
<td>Estimating Materials</td>
</tr>
<tr>
<td>31</td>
<td>Gypsum Drywall Construction</td>
</tr>
<tr>
<td>31</td>
<td>Veneer Plaster Construction</td>
</tr>
<tr>
<td>143</td>
<td>Cement Board Construction</td>
</tr>
<tr>
<td>226</td>
<td>Conventional Plaster Construction</td>
</tr>
<tr>
<td>309</td>
<td>E-Studs, Steel</td>
</tr>
<tr>
<td>226</td>
<td>Installation</td>
</tr>
<tr>
<td>330, 331</td>
<td>Expansion Joint, Double-V</td>
</tr>
<tr>
<td>446</td>
<td>Expansion, Thermal and Hygrometric Coefficients of Building Materials</td>
</tr>
<tr>
<td>175</td>
<td>Exterior Gypsum Ceiling Board</td>
</tr>
<tr>
<td>175</td>
<td>Joint Treatment</td>
</tr>
<tr>
<td>123</td>
<td>Application</td>
</tr>
<tr>
<td>426</td>
<td>Surface Burning Characteristics</td>
</tr>
</tbody>
</table>
Exterior Wall Furring 241
Extruders, Pail and Drum, Adhesives 399

Fasteners
- Screws 37, 228
- Nails 43
- Adhesives 45
  - Application, Gypsum Drywall 99
  - Application, Veneer Plaster 99
  - Spacing, Veneer Base 101
  - Spacing, Gypsum Board 101
  - Spacing with Adhesives 101, 103
  - Spotting and Finishing 170
  - Application, Cement Board 147, 148, 150, 151
  - Application, Plaster Systems 246
  - Job Inspection 339
  - Installation Defects, Remedies 351, 352
  - Application Tool 397, 398
  - Specification Standards 441

Feather Edge 404
Felt, Asphalt, No. 15 15, 70, 143
FIBEROCK Brand Gypsum Panels 8, 215, 433-434
  - Regular 8
  - VHI 8
  - Water Resistant 7
  - Cutting 98
FIBEROCK Brand Sheathing 14
FIBEROCK Brand Underlayment 17
Field Cracking, Gypsum Board 344, 347
Field Sound Transmission Class (FSTC) 427
Fine-Texture Finishes 50, 52, 53, 187-190, 209, 254

Finish Plasters
- Veneer Finishes 58
  - Veneer Finish Application 198, 209
  - Radiant Heat Application 212
  - Gauging and Finish Limes 256, 257
  - Gauging/Lime Application 255, 257, 258
  - Specification Standards 440
  - Conventional Plaster finish 254, 258
  - Colored, Textured Finish 190, 204

Finishes, Texture 50
  - Textures 50

Application 187
  - Installation Problems, Remedies 364
  - Colored, Textured Finish 190, 204

Finishes, Veneer
- IMPERIAL Brand Basecoat Plaster 59
- IMPERIAL Brand Finish Plaster 59
- DIAMOND Brand Basecoat Plaster 60
- DIAMOND Brand Interior Finish 60
  - Application, One-and Two Coat 199, 207, 208
  - Mixing and Proportioning 206
    - Chalkboard Installation 209
  - Job Inspection 339
  - Application Problems, Remedies 358
  - Specification Standards 440
  - Colored, Textured Finish 215

Finishing and Decorating Tips
  - Drywall Joint Treatment 177

Finishing, Levels of Gypsum Board 156-160
Finishing Tools, Drywall Joint Treatment 401
Fire Containment Products 36
Fire and Sound Test Data
  - General 295, 423, 427
  - Surface Burning Characteristics, CGC Products 424-426

FIRECODE and FIRECODE C, SHEETROCK Brand Gypsum Panels
  - Use in Rated Systems 297
  - Specification Standards 440
  - Permeance Values 445

FIRECODE C, IMPERIAL Brand Gypsum Base
  - Use in Rated Systems 297
  - Permeance Values 445

FIRECODE, Type X
  - Gypsum Panels 5
  - Gypsum Sheathing 13

Fireproofing, Beams and Columns 317-320
Fire-Rated Assemblies
  - Acoustical Ceilings 282, 284
    - Typical Fire Systems 297, 325

Eye Protection 381
Fire-Resistance Ratings
  Acoustical Ceilings 282
  General Considerations 296, 325, 304
  Fire-Endurance Rating Procedure 423

Fire Safety Insulating Blankets 36

Fire Taping 157

Fire Test Procedure 282

Firewalls/Area Separation Walls 30-32

First Coat, SHEETROCK Brand 53
  Application 178

Fixture Attachment Load Data 133, 146, 434

Fixture Installation 131, 146, 264

Fixture Protection, Light 76

Flashing 320

Flanking Paths, Sound 430

Flexible Metal Corner Tape, SHEETROCK Brand
  Reinforcement 23
  Application 162

Float Finishes, Plaster 255
  Application Problems 371

Floating
  Interior Angle Application 130, 224

Floats, Plaster and Angle 404

Floor/Ceiling Assemblies
  Wood Frame 316
  Sound Control 316
  Noncombustible 316

Floor, Fluted or Cellular Steel 319

Floor Protector
  DUR-OCK Brand Cement Board 151

Floor Systems, Steel Joist 317

Floor Systems, Wood Joist 316
  DUR-OCK Brand Cement Board Application 147

Foam Insulation Application
  Rigid 33, 79
  Foaming Plaster Mix 358

Fog-and-Spatter Finish
  Textures 52
  Application 190

Foil-Back Gypsum Board
  SHEETROCK Brand Panels 6
  GRAND PRIX Brand Base 11
  Specification Standards 440

Fractured Surfaces, Drywall 347

Frame Spacing
  Gypsum Drywall, General 65, 67
  Veneer Plaster, General 65, 67
  Drywall, Direct Application 67
  Gypsum Drywall, Resilient 68
  Veneer Plaster, Resilient 68
  Cable Heat Ceilings 68
  Texture Finishes 68, 187
  Veneer Plaster, Direct Application 67
  Water-Resistant Gypsum Panels 119
  Cement Board 141, 145
  Gypsum and Metal Lath 240, 243, 244
  Plastered Ceilings-Hangers, Runners,
    Channels, Cross-Furring 244
  Furred Ceilings, Plaster 243
  Suspended Ceilings, Plaster 243

Frames, Steel Door Installation
  Gypsum Drywall Partitions 86
  Plastered Partitions 281

Framing Installation
  Gypsum Drywall Construction 64
  Veneer Plaster Construction 64
  General Requirements; Loads, Deflection,
    Frame Spacing, Insulation and Services 64
  Wood Framing 65
  Steel Framing 68
  Resilient, Steel Frame 70
  Partition Corners 85
  Cement Board Construction 145
  Door and Window Openings 86, 261
  Lath and Plaster Construction 240
  Wood and Steel Framing 240
  Reinforcing 241
  Job Inspection 338
  Misalignment Causes, Corrections 66

Framing Components 28

Framing, Steel Partition
  Channel Stud Systems 68
  Interior Limiting Heights 69
  Installation 68
  Resilient Channel System 68
  Chase Wall 71
  Misalignment 351

Framing Tools 392
Appendix

Framing, Wood
- General Requirements 65
- Misalignment Causes, Correction 66, 349

Free-Standing Furring 81

Fungus 346, 384

Fungus Hazard 384

Fungicide Hazard 384

Furring
- Z-Furring Channel 33, 81
- Metal Furring Channels and Clips 33, 79, 228
- Adjustable Bracket 229
- Steel-Framed Ceilings 71, 243, 317
- Metal Wall Furring 242
- Wood Wall Furring 83, 242
- Board Application 105, 242
- Perimeter Relief 129, 263

G

Gauged Lime-Putty Finishes
- With IMPERIAL Brand Veneer 208
- Finish Lime Products 234
- Mixing, Application 256
- Application Problems 368, 370
- Mixing Equipment 401
- Specification Standards 440

Gauging Plasters 256

Glitter Gun, Texturing 407

Glossary 451

Gross Variations 357

GRAND PRIX Brand Gypsum Base 9
- FIRECODE, FIRECODE “C” Foil-Back 12
- Frame Spacing 67
- Chalkboard Installation 208
- Specification Standards 440
- Permeance Values 445

GRAND PRIX Plaster Base 220

GRAND PRIX Finish Lime
- Mixing, Application 256
- Spec Standards 440

Grillage, Suspended Ceiling
- Installation 73, 243
- Rated Assemblies 316
- Job Inspection 338

Grout, Latex Fortified 143
- Ceramic Tile Application 153

Grounds, Application
- Veneer Finishes 200
- Plastering 223, 227
- Job Inspection 341

Grouting, Door Frames 89, 261

Guns, Texture Machine 408, 411

Gyp-Lap Sheathing 14

Z-Furring Channel 33, 81
Metal Furring Channels and Clips 33, 79, 228
Adjustable Bracket 229
Steel-Framed Ceilings 71, 243, 317
Metal Wall Furring 242
Wood Wall Furring 83, 242
Board Application 105, 242
Perimeter Relief 129, 263

Gypsum Association 380
Gypsum Base—for conventional plaster applications, see Plaster Base

Gypsum Base, Veneer 9
- Advantages 10
- Limitations 10
- Types 11
- Specifications 13
- Handling and Storage 94, 380
- Installation 95, 97, 106
- Environmental Conditions 95
- Specification Standards 440
- Permeance Values 445

Gypsum Construction
- General Systems ix
- Advantages x

Gypsum Coreboard,
- Specifications 15
- Specification Standards 440

Gypsum Liner Panels,
- SHEETROCK Brand 13
- Specifications 15
- Installation 306, 309, 313, 315
- Specification Standards 440
- Permeance Values 445

Gypsum Mining and Processing ix, 230

Gypsum Panel Products 2
- Advantages 2
- Limitations 3
- Types 5
- Specifications 9
- Predecorated Panels 15
- Handling and Storage 94, 380
- Environmental Conditions 95
Application 97
Storage 327, 380
Installation Problems, Remedies 345
Surface Burning Characteristics 424
Specification Standards 440
Permeance Values 445
Coefficients of Expansion, Thermal Resistance 447
Gypsum Plaster Products 230
Basecoat Plasters 231
Gauging Plasters 233
Finish Limes 234
Prepared Finishes 234
Special Plasters, Additives 235
Application 249, 255
Specification Standards 440
Coefficients of Expansion, Thermal Resistance 447
Gypsum Sheathing
Regular, Firecode Type X 12
Limitations 14
Specifications 15
Application 122
Specification Standards 440
Permeance Values 445
Coefficients of Thermal Resistance 447

Hacksaw, Fine-Toothed, Application 166, 202
Hammers
  Application, Drywall 100, 397
  Lather’s Hatchet 397
Hand Tools, Joint Treatment 401
  Cleaning 168
  Application 168
Handling and Storage of Materials
  Gypsum Drywall Products 94
  Veneer Plaster Products 94
  Lath and Plaster Products 239
  General Considerations 327
  Job Inspection 337
  Safety 380
Hanger and Tie Wire 33
  Support Area Limits 244
  Specification Standards 440
Hatchet, Lather’s 397
Hawk, Application Tool 401
Header Sections
  Installation 86, 262
Health Hazards 383
  Silica 383
  Mold, Mildew, Fungus 384
Hearth, Cement Board 152
Heating, Ventilation & Air Conditioning 287
Heights, Limiting

Importance of, General 324
High Crowns, Joints 355
Hoisting Equipment, Planning Use of 238
Holding Power, Nails and Screws 333
Hollow Wall Fasteners 132, 265
Hook-Bill Knife 396
Hopper, Convertible 402
Hopper Guns, Texturing 411
Hose Stream Test 423
Hoses, Texture Machine 411
Hot Patch 348
H-Stud, Steel 30
  Installation 306
Humidity Precautions
  Gypsum Drywall Application 95
  Veneer Plaster Application 200
  Cement Board Application 144
  Conventional Plaster Application 239
  General Considerations 325, 328
Hydrate, Single or Double,
  Finish Limes 234
  Specification Standards 440
Hygrometric Expansion
  General Factors 331
  Coefficients of Building Materials 446
Appendix

Impact (Sound) Insulation Class
- IIC Ratings 296, 316, 317
- Testing Procedure 430

IMPERIAL Brand Joint Reinforcing Tape 57
- Application, Arches 136
- Joint Treatment 200

IMPERIAL Brand Finish Plaster 234

IMPERIAL Brand Veneer Plasters 22, 59
- Mixing and Application 206
- Chalkboard Installation 208
- Specification Standards 440

IMPERIAL Brand Plaster Finish (conventional) 258

Insulation, Rigid Foam 79, 81
- Coefficients of Thermal Resistance 447

Joint Banding 176, 358

Joint Compounds
- General 45, 50
- SHEETROCK Brand Setting-Type for Laminating 45, 95, 109, 114, 117, 316
- SHEETROCK Brand Ready-Mixed 47
- SHEETROCK Brand Setting-Type Powder 49
- Mixing 109
- Selection Factors 50

SHEETROCK Brand Setting-Type for Filling Masonry 56, 114, 182
- SHEETROCK Brand Powder for Texturing 50
- SHEETROCK Brand Ready-Mixed for Laminating 45
- Texturing 52
- SHEETROCK Brand Setting-Type for Veneer Plaster Systems 86, 95, 110, 114, 200
- SHEETROCK Brand Setting-Type for Door Frames 86, 88
- SHEETROCK Brand Setting-Type for Back-Blocking 107
- SHEETROCK Brand Ready-Mixed for Concrete Finishing 57, 114
- Mixing Directions 168
- Hand Tool Application 170
- Mechanical Tool Application 173
- SHEETROCK Brand Setting-Type for One-Day Finishing 174
- SHEETROCK Brand Setting-Type for Exterior Ceilings 125, 175
Drying Times 176
Specification Standards 440
Joint Deformation (Ridging)
SHEETROCK Brand SW Edge Gypsum Panels 5
Back-Blocking System 107
Lumber Shrinkage Factors 333
Cause, Remedy, Prevention 344, 347, 354, 356, 360
Joint Reinforcing Tapes 56
Application 136
Exterior Ceiling Treatment 175
Application, Drywall 170, 173, 174
Application, Veneer 200, 204, 207
Application, Cement Board 143, 153
Joint Treatment
Compounds 45
Reinforcing Tapes 56, 143
Application, Drywall Construction 168
Application, Skim Coating 176
Joint, Control 27, 144, 225
Specifications 227
Limitations 226
For Door Frames 88, 261
Application 165, 201
Fire Rated 165, 202
Max. Spacing 226, 248
For Exterior Sofitts 124
Acoustical Caulking 183
For Stress Relief 331
Joists, Steel 71, 317
Joists, Wood 106, 316
J-Runners, Steel 31
Specifications 32

K
Keenes Cement-Lime Finish
With IMPERIAL Brand Veneer 59, 208
Mixing, Application 208
Specification Standards 440
Keyhole Saw, Application 99, 131, 396
Knife, Hook-Bill 396
Knife, Utility 395
Use in Cutting 98
Knives, Joint Finishing 402

L
Ladder Safety 386
Laminated Gypsum Base Partitions
System Installation 108, 112
Laminating Gypsum Panel Partitions 316
System Installation 108, 113
Laminating Adhesive, Ssheetrock Brand 45
Double-Layer Application 96, 108, 112
Lamination, Sheet and Strip
Application Methods 109, 110
Use in Rated Systems 316
Tools Available 413
Laser Alignment Tool 392
Lath, Gypsum and Metal 220, 221
Specifications, Gypsum Lath 220
Paper-Back 222
Specifications, Metal Lath 222
Framing Components 228
Application 245
Job Inspection 341
Application, Veneer Construction 200
Application, Cement Board 153, 154
Job Inspection 340
Problems, Remedies 353-357, 360
Lath, Control 27, 144, 225
Specifications 227
Limitations 226
For Door Frames 88, 261
Application 165, 201
Fire Rated 165, 202
Max. Spacing 226, 248
For Exterior Sofitts 124
Acoustical Caulking 183
For Stress Relief 331
Lather's Hatchet 397
Layout, Partition 68
Levels of Gypsum Board Finishing 156
Levels of Paint Finish 159-160
Lifter, Gypsum Board 397, 398
Lifting Safety 381
Light Fixture Protection 76
Light-Reflection Factors, General 277, 326
Lime-Putty Finishes, Gauged
With IMPERIAL Brand Veneer 208
With Gauging Plasters and Keenes Cement 256
Finish Lime Products 251
Mixing, Application 256-257
Application Problems 373, 375
Mixing Equipment 401
Specification Standards 440
Appendix

Limitations
- Gypsum Panel Products 3
- Foil-Back Gypsum Panels 6
- Water-Resistant Gypsum Panels 7
- Gypsum Base Products 10
- Gypsum Sheathing 14
- Vinyl-Faced Panels 15
- Control Joints 165, 201
- RC-1 Resilient Channels 32
- Joint Compounds 45
- Concrete Coatings 55
- Texture Finishes 187
- Cement Board 141
- Plaster Bases 221
- Trim Accessories, Plaster 223
- Finish Plasters 256

Importance of, General 324
- Liner Panels, Gypsum 13
  - Specifications 15
  - Installation 306, 309, 311, 315
  - Specification Standards 440
  - Permeance Values 445
- Liquid Contact Adhesive Application 111
- Load Data
  - Drywall and Veneer Construction, General 64
  - Fixture Attachment 131
  - Lath and Plaster Construction
    - Fixture Attachment 264
  - Loader Pump, Alemite Caulking 399
- Lumber Shrinkage 333

Machine Application
- Joint Compounds 173
- Veneer Finishes 208
- Spray Textures 188, 208
- Finish Plasters 255, 258, 259
- Equipment Available 405, 408

Machine Mixing
- Joint Compounds 168
- Veneer Finishes 206
- Texture Finishes 188-189
- Conventional Plasters 251, 258
- Finish Limes 258
- Equipment Available 401

Magnetic Spirit Level 394

Maintenance Factors, General 327

Masking Sound 430

Masonry Walls
- Single-Layer Board Application 114
- Use of Plaster Base 246
- Plastering Problems 368

Material Safety Data Sheets 378

Measuring, Gypsum Board 97
- Tools Available 395

Mechanical, Electrical Services
- Framing Preparation 65
- Cutting Board Openings 131
- Acoustical Caulking 183, 186, 263

Mechanical Tools, Joint
- Treatment 405
- Cleaning 168
- Application 173

Metal Angles 32, 33
- Installation 69, 315

Metal Furring Channels 33, 228
- Installation 71, 72, 79, 243
- Limiting Span 72

Metal Lath
- Features 221
- Types, Limitations 222
- Application 245, 246
- Use in Ceiling Systems 246, 317
- Use in Partitions, Furring 246
- Use in Replastering 260
- Use in Door Frames 261
- Specification Standards 441

Metal Trim 25
- Application 164, 200
- For Exterior Soffits 124

Metric Terms—SI Units and Conversion Factors 438, 439

Mildew 346, 384

Mildewcide Hazard 384

Mineral Fiber Insulation 127

Mixing Conventional Plasters
- Basecoats 251
- Finish Plasters 256
Gauging Plasters 254
Finish Lime 257
Cement-Stucco Finishes 260
Paddle-Type and Drum Mixers 400
Mixing Equipment 400
Paddles, Veneer Plasters 206, 400
Section of, General 335
Paddles, Joint Compound and Textures 400
Mixing Joint Compounds
For Adhesive Lamination 109, 110
For Joint Treatment 168
Mixing Devices 400
Mixing Texture Finishes 188-190
Problems, Remedies 363
Mixing Paddles 400, 408
Mixing Conventional Plasters 251-260

Moisture
Damage to Materials 325, 329, 345, 346
Content of Lumber 333
Mold, Mildew Hazard 384
Mortar, Latex Fortified 143
Ceramic Tile Application 153
Mold 346, 384
Mouldings
For SHEETROCK Brand Vinyl-Faced Panels 17
Application 117, 165
Painting 118
Movement, Structural, Effects of 329
Mud Pans and Rollers 401, 407
Multilayer Application
Gypsum Drywall, Steel Frame 113
Veneer Plaster, Steel Frame 113

N
Nail Pops 333, 352
Nails, Gypsum Board 43
Selector Guide 44
Application Methods 95, 100, 101, 246
Spacing 101, 246
Selection Factors 333
Installation Defects, Correction 351
Nippers, End Cut 392
Noise Reduction Coefficient (NRC) 276, 296, 429

Noise, Structurally Generated 332
Non-Asbestos Finishing Products
Joint Compounds 45
Texture Finishes 50
Noncombustible Floor/Ceiling Systems 317
Nozzles
Adhesive Cartridge 104
Texture Equipment 411

O
One-Coat Veneer Finish,
Application 200, 207, 209
Frame Spacing 67
One-Day Finishing, SHEETROCK Brand Joint System 174
Openings, Door and Window, Framing 86, 261

“Orange Peel” Texture Finishes 52, 190
Outlet Boxes
Cutting Board Openings 99
Acoustical Caulking 183
Provision in Resurfacing 192
Paddles, Mixing 400
Paint Finish, Levels 159-160
Paint Products
   SHEETROCK Brand First Coat 50
   Ceiling Texture 52
   For Finishing Mouldings 118
   Over SHEETROCK Brand Water-Resistant Panels 120
   With Texture Finishes 190
   For Surface Problems 366
Painting, Veneer Plaster 212
Palette Safety 381
Panel Adhesive 45
Panels, Predecorated 15
   Installation 108, 114, 115, 131, 193
   Specification Standards 440
   Surface Burning Characteristics 424
   Permeance Values 445
Paper-Faced Bead, Trim 22, 161
Paper-Back Metal Lath 222
Parallel Application, Gypsum Board 96
Partition Layout 68
Partitions, Multilayer, Steel Frame 113
Party Walls 304
   Fixture Attachment 264
Patch and Repair Products 55
Performance Requirements, General 325
Perimeter Isolation
   Gypsum Drywall Assemblies 128
   Veneer Plaster Assemblies 128
   Acoustical Caulking 185, 263
   General Considerations 330
Perlite Aggregate
   In Texture Finishes 52
   In Basecoat Plasters 231
   Specification Standards 440
Permeance Values, Moisture Vapor 445
Perpendicular Application, Gypsum Board 96
Photographing, Joint 158, 176, 358
Picture Hooks 264
Pigmented Finish Plaster 215
Planning Procedures, General
   Gypsum Drywall Application 92
   Veneer Plaster Application 92
   Cement Board Application 143
   Conventional Plaster Application 245
Plant Locations, CGC 448, 449
Plaster
   Burn Safety 382
Plaster Application
   Planning 238
   Job Conditions 239
   Reinforcement 241
   Furring 241
   Frame Spacing 243
   Attachment 245
   Control Joints 247
   Basecoat 249
   Base Compatibility 249
   Grounds 250
   Mixing 251
   Setting Time 252
Plaster Base
   GRAND PRIX Plaster Base 220
   Features 220
   Limitations 221
   Types 221
   Specifications 221
   Handling and Storage 239, 380
   Environmental Conditions 239
   Frame Spacing 240
   Installation 106, 241-247
   Inspection 341
   Specification Standards 440
Plaster Bases (Other)
   Metal Lath 221
   Masonry 246
Plaster Systems, Conventional
   Job Inspection 341, 342
   Problems, Remedies 366
Plasters, Basecoat
   IMPERIAL Brand Veneer 59
   DIAMOND Brand Veneer 60
   Mixing, Application 206, 251
QUALITY, PRODUCT 336

“QUALITY” GAUGING FORMULATIONS 233

Quick Set Plasters
Gauging 233

BASECOATS 252

APPLICATION PROBLEMS 359, 374
Appendix

R-Value (see Thermal Resistance)

Racking Stresses in Buildings 330

Radiant Heat Ceilings
  Radiant Heat Plasters 60
  Frame Spacing 68
  Perimeter Relief 128
  Application 212

Radiant Heat Plasters 212
  Mixing, Proportioning 214
  Application 213

Rasps, Gypsum Board 397

Ratings, Fire and Sound Test 295, 297
  Testing Principles and Procedures 423, 427

RC-1 Resilient Channel 32
  Frame Spacing 70
  Over Steel Framing 70
  Over Wood Framing 83
  Installation, Partitions 83
  Installation, Ceilings 84
  Specification Standards 441

Ready-Mixed Joint Compounds,
  SHEETROCK Brand 47
    Conventional 49
      Lightweight 47
      Uses in Texturing 52
      Use as Adhesive 96, 109
      Mixing Directions 110
      Hand Tool Application 170
      Mechanical Tool Application 173
      Drying Times 176
      Skim Coating 176
      Finishing Concrete 182
  
Red Top Plasters
  Grouting, Door Frames 89, 261
  Gypsum Plaster 231
  Two-Purpose Plaster 231
  Gauging Plaster 233
  Keenes Cement 233
  Finish Lime 234, 258
  Prepared Finish 234
  Mixing, Basecoats 251
  Mixing and Application, Gauging and
    Lime 256, 258

Specification Standards 440

Redecorating
  Texture 194
  Paint 195
  CGC Decorative Finish 215

Reinforcing Tape, Corner 23
  Application 164

Reinforcing Tapes, Joint 56
  Joint Treatment, Drywall 170, 173
  Exterior Ceiling Treatment 175
  Joint Treatment, Veneer 200, 204
  Joint Treatment, Cement Board 143, 153, 154

Relief Joints 331

Replastering Old Surfaces 260

Resilient Walls and Ceilings
  RC-1 Resilient Channel 32
  Frame Spacing 68
  Application, Steel Frame 70
  Gypsum Drywall Installation 83
  Veneer Plaster Installation 83
  Application, Wood Frame 83, 111
  Fixture Attachment 133
  Rated Systems 302

Resurfacing
  With Gypsum Board 192
  With Texture Finishes 192
  With Veneer Plaster 215
  With Replastering 260
  Decorative Interior Finish 215

Retarder, Plaster 235, 252
  Use with Basecoats 252, 369
  Use with Finish Coats 259, 369

Riblath Metal Lath 223
  Application 245
  Specification Standards 440

Ridging, Joint, Correction of
  SHEETROCK Brand SW Edge Gypsum Panels 5
  Back-Blocking System 107
  Lumber Shrinkage Factors 333
  Cause, Remedy, Prevention 356, 361

Rivet Tool 395
GRAND PRIX Plaster Bases 220

Installation 245, 246, 247
Specification Standards 440
Coefficients of Thermal Resistance 447

Rod, Pencil and Mild Steel 244
Router, Electric 396

Runners, Steel 28, 228
Specifications 29
J-Runners 31
J-Struts 31
Angles 32
C-Runners 31, 32
Installation 68, 71, 306, 308, 311, 313

Safety 377
Panel Handling 379
Forklift 379
Stacking 380
Storage Conditions 380
Lifting 381
Pallets 381
Eye 381
Ceiling Installation 385
Tool 385
Scaffold 386
Ladder 386
Agencies 387
Information Services 387

Safing Insulation, THERMAFIBER Specification Standards 441

Sagging, Gypsum Board 4, 67, 187, 321, 345, 349
Sand-Finish Interior Textures 52, 53, 211, 255, 258
Sanding, Joints 172, 358
Sanders—Hand and Pole 403
Saws
Keyhole, Application 99, 131, 396
Hacksaw, Application 117, 166, 202
Circular Saw 393
Chop Saw 393
Band Saw 393
Cut-Off Saw 393
Utility Saw 396
Drywall Saw 396
Safety 386
Scaffolds, Portable 414
Scaffold Safety 386
Scarfifier 405
Scrapers, Floor 414
Screeds, Plaster 224, 250
Screw Guns, Electric 398

Screws 37
Selector Guide 38
DUROC Brand Wood and Steel 38, 142
Basic Types 40
Bit Tips 39
Specifications 41
Applications 42
Attachment Methods 95, 247
Application 99, 243, 247
Spacing 101, 105, 244, 247
Plaster Base Attachment 228
Installation Defects, Correction 352
Specification Standards 441

Screws, Sheet Metal 266
Screw Usage, Gypsum Board 435
Sealant SHEETROCK Brand Acoustical 107, 183
Security Walls STRUCTOCORE Security Wall System 230

Seismic Forces
Suspended Ceilings 286
Effects of 330
Selection of Materials, General Considerations 324
Self-Furring Metal Lath 222
Application 245, 247
Use to Prevent Cracking 367

Separation Wall Components 30
Cavity Wall Components 31
Solid Wall Components 31
Specifications 32
Breakaway Clip 31
Installation 304

Services, Mechanical and Electrical, Framing Preparation 65
Set Retarders 235, 252
Appendix

Setting Qualities
Basecoat Plasters 252
Setting-Type (SHEETROCK Brand) Joint Compounds 174
Gauging Plasters 257
Veneer Finishes 359

Setting Time
Plaster 252, 374
Joint Compounds 374

Shadowing, Exterior Wall and Ceiling Installation Precautions 80
Cause, Remedy, Prevention 358

Shaft Walls
Components 30
Rated Systems 311
Installation 312

Shear Tools
Channel Stud Shear 392

Sheathing, Gypsum
GYP-LAP 14
Limitations 14
Specifications 15
Applications 122
Specification Standards 440
Permeance Values 445
Coefficients of Thermal Resistance 447

Sheet Lamination 109

SHEETROCK Brand Adhesives 45
Double-Layer Lamination 93, 108
General Application 103
Attachment to Masonry 114
Predecorated Panel Attachment 115

SHEETROCK Brand Bead and Trim
(see Corner Bead, Trim Accessories)

SHEETROCK Brand First Coat 53
Application 178

SHEETROCK Brand Gypsum Panels
Regular Type, Regular 54" 5
SW Type 5
FIRECODE, FIRECODE "C" Type 5
Flexible 5
ULTRACODE Type 6
Foil-Back Type 6
Water-Resistant Type 7
Exterior Ceiling Board 8
Interior Ceiling Panels 8

Abuse-Resistant Panels 8
Specifications 9
Application over Insulation 4
Application, Water-Resistant Panels 119
Use in Rated Systems 297
Use as Air Barrier 320
Surface Burning Characteristics 426
Specification Standards 440
Permeance Values 445
Coefficients of Thermal Resistance 447

SHEETROCK Brand Gypsum Panels
Liner Panels 13
Sheathing 13
Vinyl faced 15
Lay-In Ceiling 18

SHEETROCK Brand Joint Tape 56, 170
SHEETROCK Brand Joint Treatment Reinforcement 56
Application, Arches 136
Embedding and Finishing 170, 200
Exterior Ceiling Treatment 175
Veneer Joint Treatment 200

SHEETROCK Brand Lay-In Ceiling Tile 18
Installation 126

SHEETROCK Brand Setting-Type Joint Compounds
For Laminating 45, 96, 109
For Joint Finishing 49
For Concrete Coating 56
For Door Frames 86, 88
For Back-Blocking 108
For Filling Masonry 114, 182
Mixing Directions 168
Application Guide 174
Hand Tool Application 174
Exterior Ceiling Application 175
Specification Standards 440

Shield, Spray 412

Shrinkage
Lumber 66, 333, 352
Joint Treatment 356
Cracks, Plaster 367
Silica Hazards 383

Sill Sections, Installation 86

Single-Layer Application
Drywall, Frame Spacing 67
Veneer, Frame Spacing 67
Spray-Applied Textures 68
Application Methods
Gypsum Drywall 95
Veneer Plaster 95
Gypsum Board over Wood Framing 105
Resilient Wood Frame Systems 95, 111
Resilient Steel Frame Systems 70, 95
Cement Board 147, 148, 150, 151
Direct to Masonry Walls 114
Rated Drywall and Veneer Systems 297

Single Nailing 95, 100
Skim Coating, Joint Treatment 176
Skip-Troweling Techniques, DIAMOND Brand
Interior Finish 210
Slaking and Soaking Problems, Lime 369
Slicker 404
Slow Set Plasters
Gauging 233
Basecoat 252
Application Problems 359, 372
Snips, Metal 392

SNOWDRIFT Finish Lime 234
Mixing, Application 255, 258
Soffits, Exterior
Gypsum Ceiling Board 8
Joint Compound 47
Installation 124
Joint Treatment 175

Soffits, Interior
Installation, Braced and Unbraced 137
Rated Assemblies 317

SHEETROCK Brand Texture 50, 188
Wall and Ceiling Spray Texture 52, 189
Wall and Ceiling Texture (RUFF TEX) 51, 189
Wall and Ceiling Texture (Multipurpose) 52
Texture12 Wall and Ceiling Spray Texture 52, 189
Soft, Weak Surface
Veneer Finishes 362
Plaster Finishes 372

Solid Separation Walls
Components 31
Rated Systems and Installation 304

Sound Absorbing Plaster Finish 276
Sound Attenuation Blankets,
THERMAFIBER 36
Use in Rated Systems 298, 299, 303
Surface Burning Characteristics 426
Specification Standards 441

Sound Control Considerations
Sound Control Systems 276, 303
General 276, 296, 325
Structural Factors 332
Testing Procedures 427

Sound Control Products 35, 268
Sound Resistance Test Data
General 295, 427
High Performance Sound Control Partitions 303

Sound Transmission Class (STC)
 Ratings 296, 427
Testing Procedure 427

Spacing, Fastener
Gypsum Drywall Constructions 101
Veneer Plaster Constructions 101
With Use of Adhesives 101, 105
Cement Board Constructions 147, 148, 151
GRAND PRIX Plaster Base 244, 246
Importance of, General 324
Job Inspection 340

Spacing, Frame
Gypsum Drywall, General 65, 67
Veneer Plaster, General 65, 67
Drywall, Direct Application 67
Gypsum Drywall, Resilient 67
Veneer Plaster, Resilient 67
Texture Finishes 67, 187
Veneer, Direct Application 67
Water-Resistant Gypsum Panels 119
Cement Boards 145, 148, 150
Gypsum and Metal Lath 244
Furred Ceilings, Plaster 243
Suspended Ceilings, Plaster 243
Plastered Ceilings—Hangers, Runners,
Channels, Cross-Furring 244
Importance of, General 324
Job Inspection 338

Spans, Limiting
Metal Furring Members 72
Steel Stud Ceilings System 72
Importance of, General 324
Spatter-Finish Textures 52
 Application 189, 190

Specification Standards, Federal and ASTM 440

Splicing Procedure
 Steel Studs 70
 Metal Furring Channels 71
 RC-1 Resilient Channels 83
 Control Joints 166, 202
 Steel C-Runners 310

Spray-Applied Textures 52
 Texture/Compound Selector 53
 Frame Spacing 67, 187
 With Veneer Finishes 208
 In Cable Heat Ceiling 213
 Mixing, Application 188-189
 Finish Plasters 255
 Problems, Prevention 364

Spray Equipment
 Applications 189, 207
 Selection of, General 336
 Hand Texture 407
 Drywall Texturing 408
 Universal Machines 408
 Hoses, Guns, Nozzles 411
 Spray Shield 412
 Problems, Remedies 364

Spray Texture Finish 52
 Application 189

Spreaders, Joint Compound and Adhesive 413

Stacking Panels 380

Stains, Veneer and Plaster Surface 362, 370, 372

Standards
 Fire-resistance Rating 296
 Specification, Federal and ASTM 440
 Slotted Shelf 266
 Sound Control 296
 Acoustical Ceilings 276

Staple Attachment
 Base Layer Boards 100
 Spacing 101
 Corner Bead 163, 200
 Metal Trim 164, 201
 Control Joints 166, 202
 Cement Board 143, 147, 148, 151
 Gypsum Plaster Base 244, 247
 Tools Available 398

Star Gauging Plaster 233
 Mixing, Application 256-257

Starved Joints, Drywall 356

Steel Door Frame Installation 86, 261

Steel Framing
 Component 28
 Specifications 29

Steel-Framed Chase Wall Installation 71

Steel-Framed Partitions Channel Stud System 68
 Door Frame Installation 86, 261
 Gypsum Drywall Application 112
 Veneer Plaster Application 112
 Multilayer Assemblies 113
 Blanket Installation 127
 Fixture Attachment 131, 264
 Acoustical Caulking 107, 183, 264
 Fastener Attachment, Plaster Systems 246
 Rated Assemblies, Drywall and Veneer 299
 Misalignment Causes, Correction 351

Steel Joist Float Systems 316

Steel Rule 395

Steel Stud—Inkwell Brand Veneer Partition
 Blanket Installation 127
 Fixture Attachment 131
 Chalkboard Installation 208
 Acoustical Caulking 183
 Rated Assemblies 299

Steel Studs and Runners 28, 228
 Specifications 29
 C-H and E-Studs, J-Runners 30
 Partition Installation 68, 240
 Resilient Channel Installation 70
 Chase Wall Installation 71
 Use in Furred Ceilings 71
 Use in Wall Furring 79, 241
 Use in Door, Window Openings 86
 Use in Curved Surfaces 135
 Use in Soffits 137
 Use in Rated Systems 299
 Specification Standards 441

Steiner Tunnel Test 424

Stillts, Applicator 414

Storage and Handling of Materials
 Gypsum Drywall Products 94
 Veneer Plaster Products 94
 Cement Board Products 144
Tack Claw 397

TAPCON Anchor 41

Tape, Durock Brand 143

Tape, Insulating, Uses 90

Tape, SHEETROCK Brand Flexible Metal Corner 23, 162

Application 162

Tape, Joint Reinforcing 56

Application, Arches 137

Joint Treatment, Drywall 170, 173

Exterior Ceiling Treatment 175

Joint Treatment, Veneer 200

Joint Treatment, Cement Board 143, 153, 154

Tape, Steel Power, Use in Measuring 97, 395

Tape, Vinyl Foam Application 105, 116

Tapered Edges, Types 5

Taping Compounds, Joint 45

Mixing, Application 168

Taping Tools—Dispensers, Creaser, Knives 401, 402

Temperatures, Working

Gypsum Drywall Application 95

Veneer Plaster Application 95, 200

Cement Board Application 143

Lath and Plaster Application 239

Basecoat Plastering 253

General Data 325, 328

Test Values, Fire and Sound Definitions and Abbreviations 206, 285, 423, 427, 429, 430

Rated Wood Stud Partitions 297

Rated Steel Stud Partitions 299

Rated Wood Floor/Ceilings 301

Rated Steel Floor/Ceilings 302

Sound Control Partitions 303

Area Separation Walls 304

Cavity Shaft Walls 311

Vent Shaft 315

Wood Frame Floor/Ceilings 316

Sound Control Floor/Ceilings 316

Noncombustible Floor/Ceilings 316

Beam Fire Protection 317

Column Fire Protection 320

Testing Laboratories and Methods 282, 295, 423-431

Texture Finishes

Powder Textures 50, 188

Ready-Mixed Textures 52, 190

Selector Guide 53

Spray-Applied, Frame Spacing 67, 187

DIAMOND Brand Interior Finish 206, 209

IMPERIAL Brand Veneer Finish 207, 208

Application, Each Type 187-189

Finish Plasters 254

Installation Problems, Remedies 364

Texture Finish Patterns

Spatter 190

Orange Peel 190, 191

Knock-Down 191

Skip-Trowel 191

Stipple 191

Crow's Foot 192

Swirl 192

Roller and other 192

Texture, Plaster Finish 209

Texturing Equipment

Hand Equipment 407

Spray Machines 189, 190, 408

Hoses, Guns, Nozzles 189, 411

THERMAFIBER Blankets, Sound

Attenuation, Fire and Thermal 36

Ceiling Weight Limits 4, 67

Specifications 36

Installation 127

Use in Rated Systems 298, 299, 303, 304, 306, 308, 310

Surface Burning Characteristics 426

Specification Standards 441

Coefficients of Thermal Resistance 447

Thermal Expansion

General Factors 330

Coefficients of Building Materials 446

Thermal Resistance

Insulating and Sound Blankets 36

Coefficients, Building and Insulating Materials 447

Three-Coat Finish, Plaster

Standard Basecoats 250

Basecoat Application 249

Replastering 260
U

UL Designations for Products 444

Universal Spray Machines 408

Uneven Surfaces, Gypsum Board 345, 349

V

Vapor Retarders

Foil-Back Gypsum Panels 6
Foil-Back IMPERIAL Brand Base 12
General Considerations 144, 320, 326
Coefficients of Thermal Resistance 447

Vapor Permeance Values SHEETROCK Brand Panels
Shaft Wall Liner, IMPERIAL Brand Bases 445

Veneer Application

General Recommendations 198
Joint Treatment 200
Application of Finish 198, 207, 209
Drying Conditions 200
Grounds 200
Mixing and Proportioning 206
Chalkboards 208
Appendix

Rated Assemblies 297
Job Inspection 340
Problems, Remedies 358

Veneer Finishes
General 58
Coverage 60, 61
IMPERIAL Brand Basecoat Plaster 59, 208
IMPERIAL Brand Finish Plaster 59, 207
DIAMOND Brand Basecoat Plaster 60
DIAMOND Brand Interior Finish 60
Application, One-and Two-Coat 199, 207, 208
Mixing and Proportioning 206
Chalkboard Installation 208
Job Inspection 340
Application Problems, Remedies 358
Specification Standards 440

Veneer Gypsum Base—see Gypsum Base, Veneer

Veneer Systems
Job Inspection 341
Problems, Remedies 358

W
Wall and Ceiling Spray Texture (RUFF TEX), SHEETROCK Brand 51, 189
Wall and Ceiling Texture, SHEETROCK Brand Ready-to-Use 52, 184
Wallboard (see Gypsum Panels)
Wallcovering Primer 179
Wall Shield, UL-Listed
DUROCK Brand Cement Board 151
Water Infiltration 320
Water Level 394
Water Vapor Transmission 320
Water-Moisture Control 325
Waterproofing Compounds and Coatings Bituminous 246
Water-Resistant Gypsum Panels 7
Specifications 9
Application 119
Specification Standards 440
Permeance Values 445
Weather Precautions, Application
Joint Treatment 168
Veneer Finishes 198-200
Plasters 238, 257, 369
Weights, Wall and Ceiling
Conventional Plaster Systems 260

Vent Shaft System, Rated
Assembly and Installation 316

Ventilation Requirements
Gypsum Drywall Application 4, 95
Exterior Soffits 124
Texture Finishes 187-189
Lath and Plaster Application 239
Veneer Plaster Application 95
General Considerations 329

Vermiculite-Aggregated Gypsum Plaster, Coefficient of Expansion 446

Vertical Application, Gypsum Board 96, 316

Vinyl-Faced Gypsum Panels 15
Specifications 17
Installation 116, 131
Surface Burning Characteristics 424
Specification Standards 440
Permeance Values 445

Vinyl Foam Tape Application 105, 116

Wet Sanding 173

Wind and Seismic Forces, Effects of 330

Window Openings, Framing 86
Wire, Tie and Hanger 33, 229

Wood Fiber Plaster, RED TOP 231
Mixing, Application 251
Specification Standards 440
Coefficients of Expansion 446

Wood-Framed Partitions/Ceilings
Gypsum Drywall Application 105
Veneer Base Application 105
Blanket Installation 127
Fixture Attachment 131
Cement Board Application 145
Lath Attachment 247
Rated Assemblies, Drywall and Veneer 297, 299, 301, 302, 316
Misalignment Causes, Correction 349

Wood Framing Requirements 65, 124, 333

Wood-Joist Construction 316

Wood Lath, Repair or Replacement 260

Workability Problems
Veneer Finishes 359
Plaster Finishes 374

Workmanship, General Factors 335
Z-Furring Insulating Blankets
(see Fire Safety Insulating Blankets)
Z-Furring Systems
  Z-Furring Channels 33

Insulating Blankets 36, 81
Erection 81
With Masonry Walls 114
Alphabetical Index to Tables

A  
ASTM Application Standards 442
ASTM Standards for Performance Specifications and Test Methods 442-443
Abuse-Resistant Systems by Category 433-434
Agencies and Organizations 418-422
Application Guide—Setting-Type Joint Compounds 174

B  
Basecoat Plaster (Over Metal Lath) 249
Basecoat Plasters for Conventional Plaster Systems 249
Braced Soffit Design Maximum Dimensions 138

C  
Categories of Abuse Resistance 432
Ceiling Panel Types and Manufacturing Processes 270-273
Cement Board Sizes and Packaging 140
CGC Literature 450
CGC Plant Locations 448-449
Checklist for Drywall Problems 345
Comparing Plaster Systems 437
Conditions for Hose Stream Test 423
Coverage—Adhesives for Lamination 93
Coverage and Technical Data—Gypsum Basecoat Plasters 232
Coverage—DuPont Brand Basecoat 60
Coverage—Dublcan Brand Interior Finish Plaster 60
Coverage—Finish Plasters 235
Coverage—Imperial Brand Basecoat and Finishes 60
Coverage—Laminating Adhesives 45

D  
Drying Time—Joint Compound Under Tape 176
Drywall Problems Checklist 345
Durock Brand Cement Board—Typical Physical Properties 142

F  
Finishing Level Matrix 159
Finish Plasters for Conventional Plaster Systems 254
Fire-Rated Ceilings 284-286
Fixture Attachment—Drywall and Plaster Systems 434
Fixture Attachment Load Data—Drywall and Veneer Plaster Construction 131, 434
Fixture Attachment Load Table—Cement Board 146
Frame and Fastener Spacing—Gyp Plx Plaster Base 244
Frame Spacing—Gypsum Base 240
Frame Spacing—Textured Gypsum Panel Ceilings 187

G  
Gauging Plasters—Technical Data 257
Gypsum Board Screw Usage—Horizontal Board Attachment 435
Gypsum Board Screw Usage—Vertical Board Attachment 436

H  
Horizontal Board Attachment (Screws) 435
Hygrometric Coefficients of Expansion (Unrestrained) 446
I
Interior Framing Limiting Heights 69

L
Limiting Span—Metal Furring Members 72
Limiting Span—Steel Stud Ceiling System 75

M
Maximum Aggregate Quantity—Gypsum Plasters 252
Maximum Fastener Spacing—Constructions Using Drywall, Gypsum Base and Similar Products 101-102
Maximum Frame Spacing—Drywall Construction 67
Maximum Frame Spacing—Metal Lath 244
Maximum Frame Spacing—Veneer Plaster Construction 67
Maximum Spacing—Control Joints 167, 203
Maximum Spacing—Cross-Furring Members 245
Maximum Spacing—Main Runner—Carrying Channels 244
Maximum Spacing—SHEETROCK Brand Control Joints for Interior Plaster Assemblies 226, 248
Metal Lath Selector 223
Metric Terms and Metric Equivalents 438
Metric Conversion 439
Minimum Bending Radii of Dry Gypsum Board 134
Minimum Bending Radii of Wetted Gypsum Board 135
Minimum Radii of SHEETROCK Brand 6.4 mm (1/4”) Flexible Gypsum Panels 134

P
Permeance—CGC Products 445
Products/UL Designations 444
Plaster Product Compatibility Selector 249

S
Selector Guide for Gypsum Board Nails 44
Selector Guide for Screws 38-43
Sound Control Guidelines for Air Handling Systems 288
Special Plasters—Approximate Yield 235
Specifications—Area Separation Wall & Shaft Wall Components 32
Specifications—Gypsum Bases 13
Specifications—Gypsum Panel Products 9
Specifications—Liner and Sheathing Products 15
Specifications—Plaster Base 221
Specifications—SHEETROCK Brand Joint Compounds 55
Specifications—SHEETROCK Brand Lay-In Ceiling Tile 19
Specifications—SHEETROCK Brand Vinyl-Faced Panel Vinyl 16
Specification Standards 440-441
Specifications—Structural Accessories 230
Specifications—THERMAFIBER Blankets 36
Specifications—Typical Plaster Trim Accessories 227
Stucco Proportions (Job-Mixed) 260
Support Area—Hangers 244
Surface Burning Characteristics (Per CAN/ULC S102) 426
Appendix | 507

T
Texture/Compound Selector 53
Thermal Coefficients of Linear Expansion of Common Building Materials 446
Thermal Resistance Coefficients of Building and Insulating Materials (R-Values) 447
Thickness—Area Separation, Shaft Wall and Furring Components 31
Typical Steel Thickness—Steel Studs and Runners 29

U
UL Designations for CGC Products 444

V
Vapor Permeance Values for CGC Corporation Products 445
Veneer Plaster Product Compatibility Selector 206
Vertical Board Attachment (Screws) 436
CGC Inc.
To contact your local CGC sales office or representative, call toll-free:
888-206-1110 (Atlantic);
800-361-1310 (Quebec);
800-387-7920 (Ontario);
800-663-1055 (Western);
or see the CGC website (http://www.cgcinc.com).

Industrial Division
Information about products from the Industrial Division of CGC Inc. can be obtained by calling: 800-387-2690
or see the Industrial Gypsum Division website (http://igd.com).

Additional Copies
To purchase your copy of the CGC Gypsum Construction Handbook, please see the CGC web site (www.cgcinc.com) for more information.