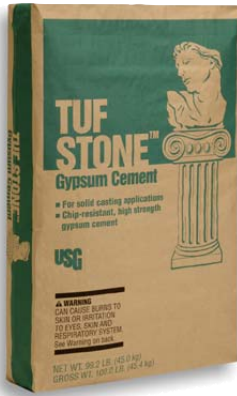


# TUF STONE™ Gypsum Cement



- Uniquely formulated with fibers to withstand three times the impact pressure of standard materials.
- Excellent resilience and chip resistance.
- Compatible with numerous color pigments.
- Designed for solid casting.
- Ideal for giftware applications.

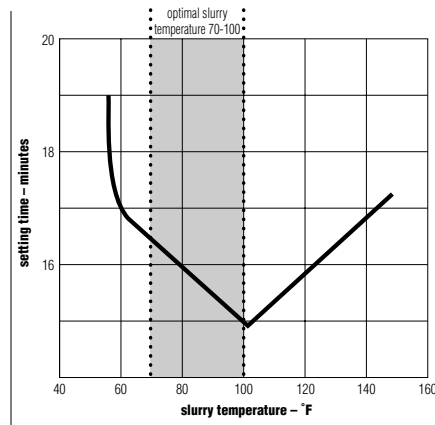
Technical Properties	English	Metric
Use Consistency (parts of water by weight per 100 parts plaster)	32	32
1 Hr. Compressive Strength	4,000 psi	27.6 MN/m <sup>2</sup>
Dry Compressive Strength	10,000 psi	69.0 MN/m <sup>2</sup>
Maximum Setting Expansion	0.240%	0.240%
Density Wet	122 lb/ft <sup>3</sup>	1.95 g/cm <sup>3</sup>
Dry	112 lb/ft <sup>3</sup>	1.79 g/cm <sup>3</sup>
Set Time (Machine Mix)*	25-30 min.	25-30 min.

\*Other set times may also be available. Call your sales representative for more information.

## General Directions and Guidelines

### Preparing the Mix

Use potable water at temperatures between 70 and 100 °F (21 and 38 °C). Since variations in slurry (TUF STONE™ Gypsum Cement and water mixture) temperature produce variations in setting time, it is important to keep both TUF STONE Gypsum Cement and water in a stable temperature environment prior to use. The higher the temperature of the slurry, the shorter the set time. See the graph below.



### Measuring

Weigh both TUF STONE Gypsum Cement and water at the recommended use consistency for each mix (see Technical Properties above). The water-to-TUF STONE Gypsum Cement ratio is critical because it governs all physical properties of the final cast piece.

### Soaking

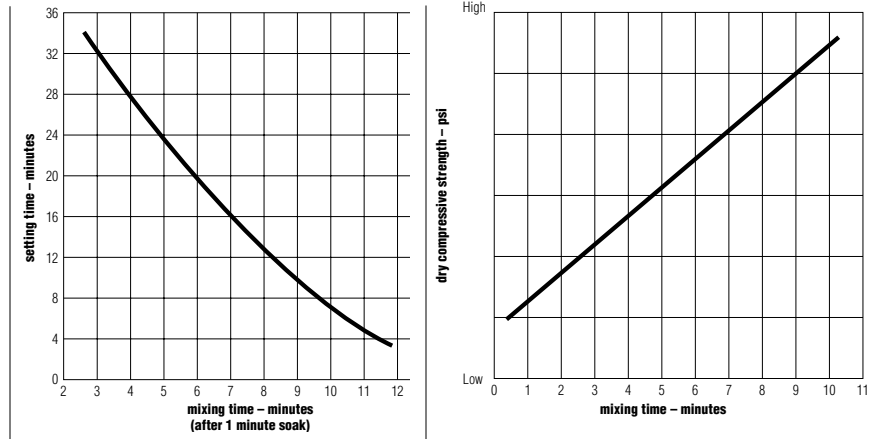
Sift or strew TUF STONE Gypsum Cement into water slowly and evenly. Do not drop handfuls of TUF STONE Gypsum Cement directly into the water. Allow soaking for 1-2 minutes. TUF STONE Gypsum Cement should be fully dispersed in the water prior to mixing. Small batches require less soaking than large batches. See bulletin IG503 for specific soaking instructions.

### Mixing

Properly mixing TUF STONE Gypsum Cement is the most important step to producing casts with maximum strength, hardness, and other important properties. Unlike other plasters and gypsum cements, TUF STONE Gypsum Cement cannot be mixed by hand and *must* be mixed mechanically. Additionally, TUF STONE Gypsum Cement can only be mixed by a batch process, not by a continuous process mixer. See IG503 for recommendations on proper bucket size, mixing blades, and mixing speeds which are essential to mixing TUF STONE Gypsum Cement properly via the mechanical/batch process.

**Mixing  
(continued)**

Longer mixing times result in higher cast strength and shorter setting times. The relationship between mixing time and both compressive strength and setting time is shown below.



**Pouring**

To prevent air entrainment and provide a uniform, smooth surface, careful pouring of the slurry is necessary. Agitation of the filled mold is a further step used to prevent air at or near the surface of the cast piece. Whenever possible, the slurry should be poured carefully in the deepest area so the slurry flows evenly across the surface of the mold.

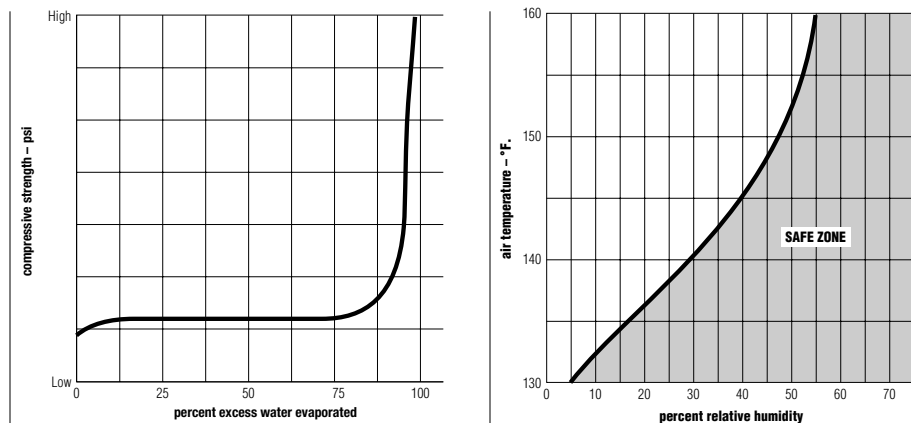
Pouring a large amount of slurry directly on the face of the mold may result in slight densification of the cast at the point where the slurry strikes the surface of the mold.

**Drying**

All casts should be dried as quickly as is safely possible after manufacture so that maximum physical properties can develop. Dry to a constant weight.

The best drying rooms or ovens provide (1) uniform and rapid circulation (minimum of 15-30 fps) of air with no "dead spots" having little or no air movement, (2) equal temperatures throughout the entire area, and (3) provisions for exhausting a portion of the air while replacing it with fresh air. High humidity surrounding the drying room or oven inhibits the efficiency of the drying because the air pulled into the room is incapable of picking up much moisture from the cast pieces.

The maximum temperature at which TUF STONE Gypsum Cement casts are safe from calcination is 120 °F (49 °C). With substantial free water in the cast piece, higher drying temperatures can be used without difficulty. As drying progresses, the temperature must be reduced to prevent calcination. The safe drying zone is in the shaded area of graph (below, right). Before removing casts from the dryer, the temperature should approach that of the area around the dryer to prevent thermal shock. See IG502 for more details on proper drying.



**Storage**

Keep in a dry, stable environment indoors. Do not stack more than 2 pallets high. Keep from drafts. Rotate stock.

**Warning**

When mixed with water, this material hardens and becomes very hot—sometimes quickly. DO NOT attempt to make a cast enclosing any part of the body using this material. Failure to follow these instructions can cause severe burns that may require surgical removal of affected tissue or amputation of limb. Dust can cause eye, skin,

nose, throat, or respiratory irritation. Avoid eye contact and inhalation of dust. Wear eye protection. If eye contact occurs, flush thoroughly with water. If dusty, wear a NIOSH/MSHA-approved respirator. Use proper ventilation to reduce dust exposure. Do not ingest. If ingested call physician. Product safety information: USA (800) 507-8899. **KEEP OUT OF REACH OF CHILDREN.**

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