

## ***Technical Information***

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### **MIXING & PLACING GUIDELINES FOR BASIC RAM-CAST MIXES**

#### **Storage:**

1. Below 70 °F (20°C), the bonding mechanisms of ramming and casting mixes set very slowly.
2. Store in a dry area under cover. Bring material to 70° - 90° F (21° to 32°C) at least 72 hours prior to use.

#### **Water:**

1. Water must be clean, fresh, potable.
2. Refer to the data sheet for the correct amount of mixing water. Using 1% too much water can reduce strength 20%.
3. Hot water in cold temperatures and ice water in warm temperatures can play a minor role in controlling mix temperature.

#### **Mixing:**

1. All tools and equipment must be clean, especially mixers.
2. Ram Cast Mixes require mixing in paddle or high-intensity mixers.
3. Ram Cast Mixes can not be properly mixed by hand.

#### **Sequence:**

1. Do not mix more material than can be placed within 20-30 minutes of mixing.
2. Water addition should be controlled by weighing or accurate volume measurement.
3. Add material to mixer.
4. Make sure mixer will deliver an adequate quantity of evenly mixed material at a continuous, steady rate. This will help assure that previously placed material has not set up and will knit well with fresh material.
5. Mix at least 4 minutes
6. Recommended wet mix temperature is 70°-90 °F (21° to 32°C).

#### **Working Time:**

1. During hot weather, install the material as rapidly as possible after mixing.

#### **Forms:**

1. Forms must be sturdy and securely anchored to resist horizontal pressure from ramming or the hydrostatic head from casting and joints must be sealed tight.
2. Steel or wooden forms can be used. When wooden forms are used; presoak or seal to prevent water loss from the castable.
3. Forms should be coated with a parting material. Forms should be heated in cold weather because a cold form will draw heat from the castable mix.



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### Casting:

1. High speed concrete internal vibrators capable of a frequency of 10,000 to 12,000 vpm are recommended to densify the castable mix
2. Withdraw the vibrator slowly after densification to avoid ratholes.
3. Be careful not to over vibrate. Stop when small bubbles no longer appear on the surface.
4. P-165AF COARSE and P-98AF require extensive vibration and are designed to be tolerant of what would be considered "over vibration" in order to achieve maximum density. PERMASTAR 95 is sensitive to over vibration.

### Ramming:

1. Use a pneumatic rammer with a flat, steel head with about 12 square inches of surface.
2. Compact only 4"-5" of loose fill material at a time and roughen the compacted surface adding another layer. This will help assure good bonding between layers.
3. Concentrate on a three-foot square area for each rammer in operation. (3 foot by 3 foot area.)
4. Ram first in one direction until the three-foot square area has been covered and then ram at right angles to the original direction across the same area. This will give the highest density.

With basic ram-cast mixes, avoid prolonged heating between 120°-212°F (50°-100°C) after installing.