



## DESIGN TIPS – TECHNICAL BULLETIN #42 MORTARS

Selection of the correct grade of mortar is perhaps the most important factor in the performance of a masonry wall. The mortar must have sufficient strength, be durable, and resist rain penetration as much as possible and yet be flexible enough to accommodate slight movement within the wall.

Mortars used in the setting of Cast Stone should meet the requirements of ASTM C270, Type N mortars. These Portland cement/lime mortars consist of one part cement (ASTM C150), one part lime (ASTM C207) and six parts of clean, washed masonry sand (ASTM C144). They may also contain iron oxide coloring pigments (ASTM C979) up to 5% of the weight of the cement when pointing mortars are not used.

The 1/1/6 mixture provides good bond strength with desired weather resistance and moderate compressive strength relative to the stone when cured. The lime enhances the workability of the mortar while reducing shrinkage. The practice of wetting the head and bed joints of the stone will further protect against joint shrinkage.

Although Type N mortar is the standard used in Cast Stone (as well as many natural cut stone) applications, the proportions may be varied to suit specific applications.

Proper mixing is essential to good consistency. All materials are measured by volume. Sands should be placed in the spiral-blade or paddle type mixer first, followed by pigments (if required), pre-water, lime and cement, final water and 5-7 minutes of mixing time. Mortars unused after 90 minutes should be discarded.

Head joints in most hand set stones may be set with the usual wet consistency mortar used in setting brick and block. Stiffer mortar must be used when setting larger stones and shims are recommended for all pieces over 300 lbs. When setting, fill all dowel holes, anchor slots and similar building stone anchor pockets completely with mortar. Non-shrink grout or anchoring cement may be specified for dowel connections. Avoid placing mortar across a full bed of flashing. The stone needs a bond with the masonry wall below.

Only the ends of the lug windowsills and stair treads should be set in mortar. This prevents the stone from cracking due to loading and future settlement.

Rake all stone-to-stone joints to a depth of 3/4" for pointing later. Stone-to-brick joints are usually struck and tooled to a slight concave (See Technical Bulletin #44 on Pointing). Sponge all mortar smears from face of stone with water. Hardened, smeared mortar is difficult to remove from the surface of cast stone. Clean with commercial masonry cleaner such as SureKleen #600 or Vanitrol with water and a stiff fiber brush. Consult Cast Stone manufacturer first. Power washers should not be used to clean Cast Stone. See Technical Bulletin #39 on Cleaning.

The decision on whether to use mortar/pointed joints or sealant joints is a common one. All head joints at coping and joints at column covers, cornices, platforms, soffits, and in general, all stone sections with projecting profiles, exposed top joints or rigid suspension connections to the supporting structure should be "soft" sealant joints. After setting, prime the ends of the stones, insert properly sized backup rod and gun in sealant (See Technical Bulletin #43 on Sealants).