

Under-burned, *salmon brick* is not acceptable under any building code for use in areas exposed to weather. Some codes, however, do permit unburned clay products such as *adobe brick*. Unless they are protected by a surface coating such as plaster, however, these sun-dried bricks are susceptible to severe moisture damage or disintegration. Commercially available adobe brick treated with emulsified asphalt has been tested and approved for use by some local authorities. Traditional blends of clay with straw or fiber reinforcing that have not been treated or certified must either be used in a completely sheltered location or receive a protective plaster or stucco coating.

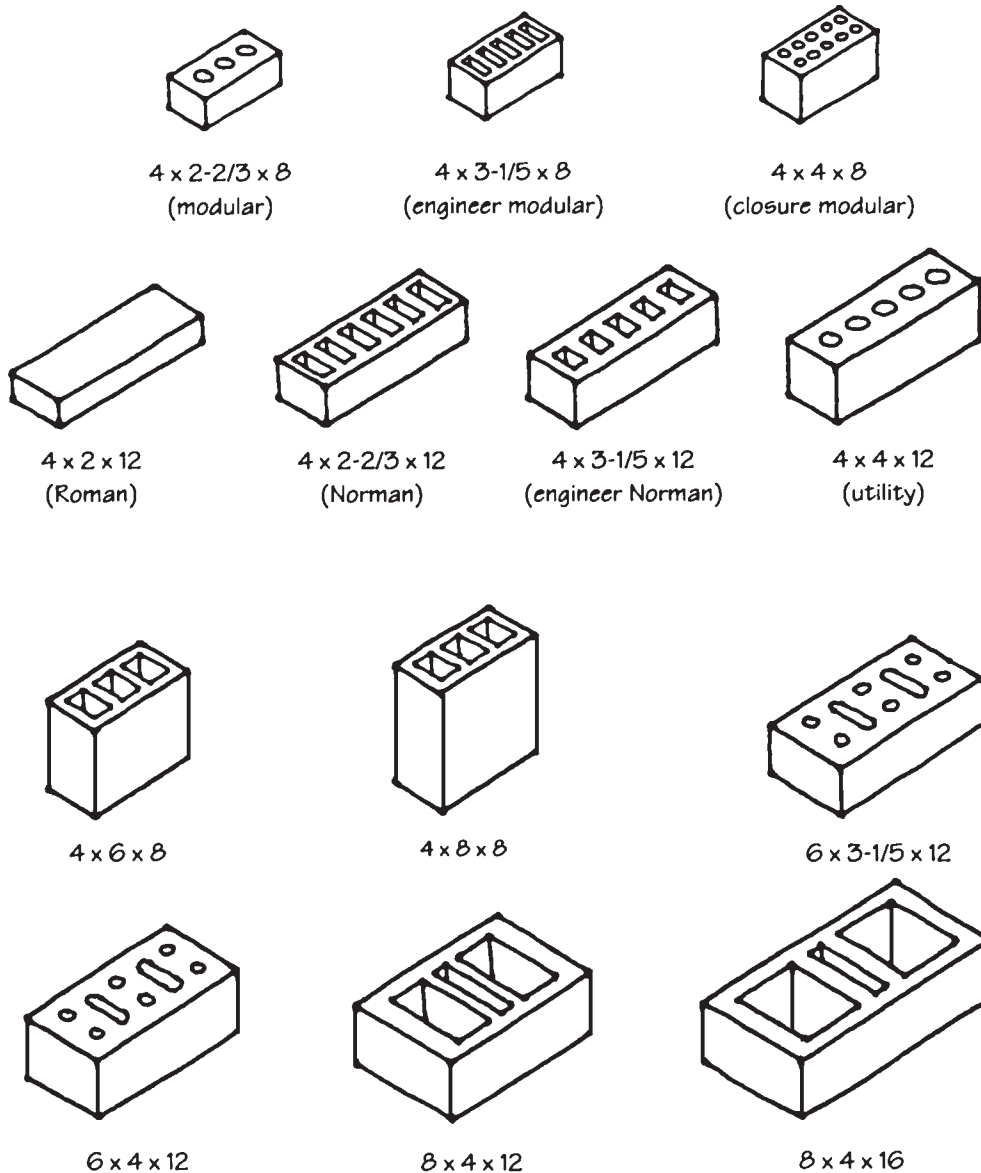
Over-burned *clinker brick* was more common when coal-fired periodic kilns were used. The units currently produced are made for special aesthetic effects, and should not be used in structural masonry or severe weathering exposures unless the masonry assemblage is tested for flexural strength and water permeance.

### 3.1.1 Sizes and Shapes

Masonry unit sizes and shapes have proliferated over the last 5000 years to meet various regional standards and design requirements throughout the world. Even within the United States, unit dimensions may vary from one area to the next and be further confused by different names for the same size of unit. At one time, there were only three commonly used brick sizes: “standard,” Norman, and Roman. Industry demand has increased that number substantially. Brick is now available in widths or bed depths ranging from 3 to 12 in., heights from 2 to 8 in., and lengths of up to 16 in. Production includes both non-modular and modular sizes conforming to the 4-in. grid system of structural and material coordination. Some typical units are illustrated in *Figs. 3-5 and 3-6*, which list several of the modular sizes, their recommended joint thicknesses, and coursing heights.

For clarity in specifying brick, units should be identified first by dimensions, then by name, and actual dimensions should be used, listed width  $\times$  height  $\times$  length. Nominal dimensions may vary from actual sizes by the thickness of mortar joint with which the unit was designed to be used. Firebrick, however, is laid without true mortar beds, and sizes given should always be actual dimensions. Mortar joint thicknesses are determined by the type and quality of the unit. In general, glazed brick is laid with a  $\frac{1}{4}$ -in. joint, face brick with a  $\frac{3}{8}$ - or  $\frac{1}{2}$ -in. joint, and building brick with a  $\frac{1}{2}$ -in. joint.

The bricks in *Fig. 3-5* show a variety of core designs. Although they are typical of commercially available products, the corings vary with the manufacturer, and are not necessarily typical for or limited to the particular size with which they are shown. These design modifications have been developed over the years to facilitate, among other things, ease of forming, ease of handling, and improved grip and mortar bond. The oldest pattern is an indentation or “frog” producible only by dry-press or soft-mud processes. Originally conceived as a scheme for reducing the weight of a solid unit, this depression provided a space for identification by early craftsmen, who would write the name of the reigning monarch during the time of construction. This practice has since aided archaeologists in dating ancient buildings. Still in use today, the frog is now often stamped with the name of the brick manufacturer or date of production. Extruded brick is with a series of holes cored through the unit which, for “solid brick” as defined by ASTM, may not exceed 25% of the area in the bearing plane (see *Fig. 3-7*). In addition to the cores, a  $\frac{3}{4} \times \frac{3}{4}$ -in. notch may be cut in one end of 6-in. brick to serve as a jamb unit. Roman brick is made in double form and broken into two units on the job site, leaving a rough, exposed edge.



Dimensions shown are nominal. Manufacturer's specified dimensions are usually 3/8" less than the nominal dimension.

**Figure 3-5** Examples of modular brick sizes.

The trend in development of different brick sizes has been toward modular coordination and toward slightly larger dimensions. Most contemporary masonry products, including clay tile and concrete block, are designed for connection at 8- or 16-in. course heights. For example, two courses of concrete block with mortar joints will equal 16 in. vertically, while three, five, or six courses of various size brick and two, three, or four courses of clay tile equal the same height. This permits horizontal mechanical connection between the facing and backup elements of a multi-wythe wall. "Standard" brick produced