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## HOW CAN THE BEARING AREA OF A CONCRETE MASONRY PRISM REMOVED FROM EXISTING CONSTRUCTION BE DETERMINED?

Prisms are saw-cut from existing concrete masonry for a variety of reasons, and correctly determining the compressive strength is essential to applying the test results. In order to calculate the compressive strength, the minimum bearing area for the prism must be determined. Because of varying mortar bedding options, it can at times be difficult to calculate the bearing area accurately.

Within ASTM C1314-11, *Standard Test Method for Compressive Strength of Masonry Prisms*, Section 8.2.2 states in part “Net area for prisms obtained from field-removed masonry specimens is considered to be minimum bearing area. If prisms are not of uniform length or width throughout the height of the specimen, or if mortar surfaces are not fully bedded, use professional judgment to determine the minimum bearing area that exists for the prism at whatever location this occurs.”

Further, Note 7 of C1314-11 states “While constructed prisms are required to be fully-bedded with mortar, prisms obtained from field-removed masonry specimens, particularly for hollow masonry, will often have only the face shells of the hollow units mortared. For such prisms, if any mortar on the top and bottom bearing surfaces of the prisms are removed to result in full bearing across the unit cross-section, the minimum cross-section will typically occur at an intermediate mortar bed joint. For face shell bedded sections, multiplying the measured length of the prism at the bed joint location by the sum of the face shell thicknesses can be an effective method for determining minimum net bearing area. Because the face shells of hollow units are often tapered, the thickness of the face shell above the mortar bed joint and below the mortar bed joint may differ. In such a case, use the least face shell thickness of the two in the calculation. Obtaining access to measure face shell thickness is often difficult or impossible. Measurements of

similar cross-sections from representative units or other parts of the prism is an option as is performing measurements after testing is performed. Refer to Test Methods C67 and C140 for recommended methods of measuring face shell thickness.”

While a method for accurately determining bearing area cannot cover all possible configurations, there are several there are some considerations that can be used to assist in determining the correct net area.

1. When prisms are solidly grouted – the net bearing area can be calculated as the length multiplied by the width of the prism.
2. When prisms are hollow with full mortar beds – the net bearing area can be determined by testing companion concrete masonry units with the same configuration in accordance with ASTM C140-11, *Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units*. It is important to remember that when this method is used for half-length prisms, the companion CMU must be saw-cut to the same configuration as well.
3. When prisms are hollow with face shell bedded mortar only – the net bearing area can be determined as the sum area of the face shells of the units used. The face shell thickness can be determined using the procedures contained in ASTM C140-11. Once the face shell thickness is known, the bearing area can be determined using the following equation:

$$\text{Net Bearing Area (in}^2\text{)} = 2 * (\text{FST} * \text{L})$$

Where:

FST = minimum face shell thickness, in.

L = minimum length of prism, in.

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