Can unbonded caps be used for compression testing of concrete masonry units?

Capping is used on concrete masonry units and other concrete products to create a smooth, plane, and level surface for testing to determine compressive strength. ASTM C140, the test method that includes procedures for compression testing of concrete masonry units and related units, references ASTM Practice C1552 for capping of CMU. In this practice, the only acceptable capping materials are high-strength gypsum and sulfur capping material. Capping systems that do not bond to the unit to be tested are not mentioned.

An unbonded capping system is used quite frequently for testing of ready-mix concrete cylinders. This system consists of a neoprene cap and a steel containment ring. The ring keeps the neoprene from expanding laterally when a vertical force is placed on the specimen. Since CMU come in many shapes, sizes, and configurations, an unbonded capping system that provides containment is not practical. Therefore, a neoprene cap or a piece of fiberboard will deform laterally under pressure when used with CMU. This will impart lateral forces on the CMU, effectively lowering the measured compressive strength.

Therefore, for purposes of testing for determining compliance with product specifications, only high-strength gypsum or sulfur capping materials should be used. An unbonded capping system is sometimes used for in-plant quality control purposes. It is important to remember that when using unbonded caps for this purpose, measured strengths will likely be lower.

For more information on capping materials and testing concrete masonry, see NCMA TEK 18-1A Compressive Strength Evaluation of Concrete Masonry and TEK 18-2A Sampling and Testing Concrete Masonry Units. These and all other NCMA TEK are available free online on sponsoring NCMA member web sites.