

# MANUFACTURER SPOTLIGHT

## 2006

### *Flexible Fire Sprinkler Connections Satisfy New Seismic Code Requirements While Providing Superior Seismic Protection*

**B**ackground of New Code Requirements: More than 90% of the states in the U.S. are adopting the International Building Code (IBC) that addresses, among other things, the installation of fire sprinkler systems in seismic zones. Engineers need to be aware of these code requirements and how best to meet them. The code is intended to neutralize the probability of fire sprinkler systems being damaged and made inoperable by seismic activity, including ceiling movement that can shear sprinklerheads and/or disrupt the integrity of arm-over connections from the branch lines.

The IBC Code and Sprinkler Design in Suspended Ceilings: The IBC recognized the problem of head shear and has acted accordingly. The latest version of the IBC defers to ASCE 7 for the sprinkler/ceiling design in Seismic Design Categories (SDC) C and D, E & F. In Seismic Design Category C, suspended ceilings are to be designed and installed in accordance with Ceilings & Interior Systems Construction Association (CISCA) recommendations for Zones 0-2; and sprinklerheads and other penetrations shall have a minimum of 1/4-inch clearance on all sides. In Seismic Design Categories D, E & F, suspended ceilings are to be designed and installed in accordance

with CISCA recommendations for seismic Zones 3 and 4 with some additional requirements. Except where rigid braces are used to limit lateral deflections, sprinklerheads and other penetrations shall have a 2-inch oversized ring, sleeve, or adaptor through the ceiling to allow for free movement of at least 1 inch of ceiling movement in all horizontal directions.

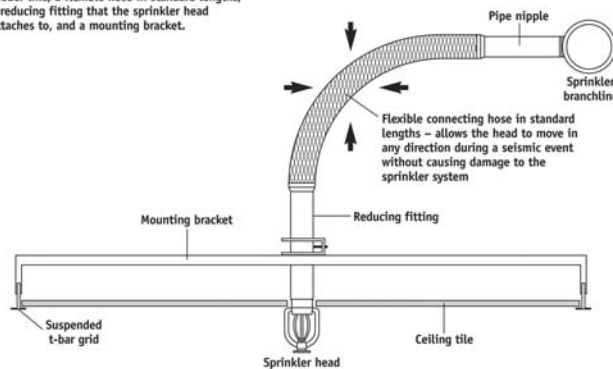
Structural Engineering Earthquake Simulation Laboratory located at the University at Buffalo using the International Code Council (ICC) testing standard "ICC AC-156 Seismic Qualification Testing of Nonstructural Components." This was the first time a sprinkler component has been seismically certified using accepted test criteria by the IBC. FlexHeads were installed in suspended ceilings meeting the code requirements for Seismic Design Category C and Seismic Design Categories D, E & F and were subjected to the highest accelerations determined for each Seismic Design Category. No damage to the fire sprinkler system or suspending ceiling system was observed, and the sprinklerheads remained in their intended location during all of the tests performed.

**A Little Flexibility Goes a Long Way:** Several years ago, the technology was adapted and listed for use

with suspended ceilings commonly found on commercial projects. Flexible fire connections offer consistent advantages over traditional hard-pipe arm-overs, especially in seismic areas. Flexible fire sprinkler connections allow an engineer to specify a product that provides simplified project management, faster occupancy, easier retrofits, and cost-effective code compliance.

#### Typical Flexible Sprinkler Connection

Typically, each unit consists of a threaded pipe nipple for connecting to the main or branch feeder line, a flexible hose in standard lengths, a reducing fitting that the sprinkler head attaches to, and a mounting bracket.



FlexHead Industries recently satisfactorily completed full scale seismic qualification testing at the Structural Engineering Earthquake Simulation Laboratory located at the University of Buffalo. Tests were conducted using the International Code Council (ICC) testing standard "ICC AC-156 Seismic Qualification Testing of Nonstructural Components". This is the first time a sprinkler component has been seismically certified using criteria accepted by the ICC.

**Flexible Sprinkler Connections Exceed IBC Code Requirements:** Flexible sprinkler connections provide characteristics that exceed the most stringent seismic code requirements. The flexibility of the hose allows the head to move with the ceiling in any direction during a seismic event without causing damage to the sprinkler system. FlexHead Industries recently satisfactorily completed full-scale seismic qualification testing at the