



Recommendations for Incoming Inspection, Handling and Assembly of Glass Bulbs and Integrity Testing for Glass Bulb Sprinklers

Incoming Inspection Procedure

Norbulb glass bulbs are 100 % final inspected prior to packaging. The custom-made packaging protects the glass bulbs very well against rough handling during transport. We nevertheless recommend the sprinkler manufacturer to establish an incoming inspection system for glass bulbs suitable to verify the required performance properties prior to releasing them for production of sprinklers or other fire protection devices. These inspections and tests should comply with the latest applicable standards and comprise the following criteria:

- glass bulb dimensions in accordance with agreed drawings, integrity and shape
- glass bulb strength test using inserts with the recommended seat diameters and hardness
- operating temperature bath test with loose or assembled glass bulbs

Handling of Glass Bulbs

Glass bulbs are fragile and should therefore be handled with the necessary care in order not to damage them. The glass bulbs will operate when exposed to higher temperatures, they should not exceed their 'Highest Normal Ambient Temperature Allowed' during storage, transport or production. For further information please refer to our Material Safety Data Sheet.

Assembly of Glass Bulbs into Sprinklers

The seating area of Norbulb glass bulbs is almost spherical and allow a safe self-aligning assembly. The seating parts should be made of a soft material that can adapt to the glass bulb shape. The support holes should have the recommended seat diameters and must be free of burrs or dirt. Grease may be applied to the seating surfaces. A teflon coated belleville spring washer combined with the seating caps is the ideal configuration for glass bulbs in sprinklers. It forms a seal and flexible, shock absorbent element in one. In order to select the suitable glass bulb type, the correct assembly load must be determined with due diligence. Overloading of the bulb must be avoided.

After Assembly Glass Bulb Integrity Test for Sprinklers

It is recommended to carry out a glass bulb integrity test after sprinkler assembly. The purpose of this test is to detect defects of glass bulbs that might have occurred during their handling or assembly into the sprinkler. Possible defects are broken tips, which is the most likely defect, or probably larger or smaller cracks in the glass envelope.

There are several methods possible. The probably most effective method is the air bubble disappearance test. The glass bulbs are heated up to create internal pressure, causing the filling fluid to diffuse through the crack or tip opening. This can be detected by checking the size of the air bubble during or after a heat-up period. This test can be carried out in a water bath or in an air oven or with hot air nozzles.

Generally it has to be considered that the actual size of the air bubble is depending on various parameters i.e. the glass bulb type and nominal temperature, the momentary internal temperature and the internal volume of the individual glass bulb and the calibration temperature of the production lot. Therefore the method chosen should allow a sufficiently long heat-up period to deliver a clear result in case of a defect. The air bubble disappearance temperatures of each glass bulb type should not be exceeded.