

Even though cables produced by Optical Cable Corporation are water tolerant without being water-blocked, some of our customers require water-blocking for outside plant cables. Water-blocking is very important to loose-tube cables, which have voids in and between the tubes, and loose-jacketed cables, which also allow large volumes of water to flow into the cable without effective water-blocking. These loose tubes and loose jackets act like water hoses sending water directly to the bare 250 μm coated fibers all along the length of the cable and allow enough water penetration to cause expansion problems upon freezing. An industry standard was developed (in GR-20-CORE) requiring loose-tube gel-filled cables to block water with no leakage for at least 24 hours from a 1-meter sample length of open-end cable, when exposed to 1-meter water head pressure. The test method is detailed in TIA-455-82B.

Optical Cable Corporation fiber optic cable designs eliminate both the loose-tube voids and the bare fibers by using water tolerant materials throughout, so water-blocking is usually not needed. Even the 900 μm fiber buffer is a fully outdoor rated water tolerant material, so the fiber itself is never exposed directly to water. Nevertheless, in response to some industry requirements for water-blocking of cables prompted by loose-tube designs, Optical Cable Corporation was the first company to manufacture a water-blocked fiber optic cable with no gel, having produced the first "WB" fiber optic cables in 1993. In 1995, a customer's specification required a cable to pass the TIA-455-82B water-block test for 72 hours, three times longer than the rating for the loose-tube gel-filled cables. The Optical Cable Corporation Core-Locked™ design with super-absorbent-polymer aramid yarn easily passed this 72-hour requirement and was purchased for the application. This particular cable passed TIA-455-82B tests for the full 136 hours tested, with water penetration of only 4 cm into the cable. In comparison, the normal requirement for loose-tube gel-filled cables in GR-20-CORE allows water penetration of one-meter length into the cable after exposure for 24 hours.

Several loose-tube cable manufacturers later introduced "dry water-blocked" designs to compete with numerous advantages of the Optical Cable Corporation gel-free designs. Most of these loose-tube cables have water swellable yarns and tapes around the loose tubes, but still use gel to fill the large voids inside the tubes. Some designs have a dry powder compound within the tube as well.

Q. What does "water-blocked" mean to these loose-tube cable manufacturers?

A. Apparently, it means that their "dry" loose-tube cables will retard the rate of water flow in the cable for about one hour. Manufacturer specifications for some well-known brands rate these cables for only one hour exposure to one-meter water head pressure, when tested to TIA-455-82B. When one loose-tube cable with dry powder compound within the tubes was exposed to the one-meter water head pressure test, fibers started emerging out of the open end of the cable after 15 minutes exposure. After one hour, all fibers had migrated six inches out of the cable end. The water-blockage system failed completely within two hours exposure time, when the powder within the tube broke loose, spewing fibers and water across the room!

Optical Cable Corporation's water-blocked fiber optic cables provide the best water protection system available by combining the inherent water tolerant features of tight-buffered and Core Locked™ tightbound cable with super-absorbent-polymer aramid yarn. This design provides superb water-blocking performance while retaining the termination cost advantages of totally gel-free and powder-free tight-buffered cable. Since no conventional cable design can truly be labeled "waterproofed", water tolerant is clearly the design approach of choice.