

Optical Fiber Cable Fire Resistance Ratings

Article 770 of the National Electrical Code (NEC), also known as NFPA 70, covers requirements for optical fiber cables. The NEC requires that cables used in premises, both commercial and residential, be “listed for the purpose” by a Nationally Recognized Test Laboratory (NRTL, pronounced “nurtle”). Other countries have similar requirements. UL (Underwriters Laboratories Inc.) is the most recognized listing agency in the US. UL 444 is the overall specification used to identify the requirements for listed communications cables. Many of the fire resistance test procedures called out in UL 444 are written by UL. However, other laboratories, such as ITS (Intertek Testing Services) and CSA (Canadian Standards Association), can also provide listing compliance to the NEC.

Four levels of fire resistance are specified for both nonconductive and conductive cables. These are outlined below, from most stringent to least. The ratings are hierarchical, i.e., from a fire resistance standpoint, a higher rating can be substituted for any lower rating, but not vice versa (OFNG and OFN are interchangeable for NEC purposes). Also, nonconductive may be substituted for conductive, but not vice versa.

Furthermore, according to the Canadian Standards Association (CSA) specification CSAC22.2 No. 214 Appendix A, substitutions are allowed as detailed in the CSA Equivalent column below. Again, it is important to remember that the ratings are hierarchical, i.e., from a fire resistance standpoint, an OFNR can be substituted for an FT4, but not vice versa.

NEC MARKING	CSA EQUIVALENT	COMMON TERM	TEST	COMMENTS
OFNP/OFCP	FT6	Nonconductive/conductive optical fiber plenum cable	NFPA 262	Cable must have resistance to flame spread and reduced smoke generating properties. These cables are approved for placement in air handling ducts and chambers (plenums) without the use of fireproof conduit. The purpose of the rating is to lessen the transmission of fire and visible smoke to unaffected parts of the building. Toxic or corrosive elements of the smoke are not measured.
OFNR/OFCR	n/a	Nonconductive/conductive optical fiber riser cable	UL1666	Cable must not transmit flame from one floor to another when placed vertically in a building shaft (riser)
OFNG/OFCG	FT4	Nonconductive/conductive optical fiber general-purpose cable	CSA C22.2 No. 0.3-M (Vertical Tray)	Cable may not transmit flame for more than 4 ft, 11 in. It shall not penetrate floors or ceilings, i.e., may only be used within a single floor.
OFN/OFC	n/a	Nonconductive/conductive optical fiber general-purpose cable	UL 1685 (Vertical Tray) or CSA C22.2 No. 0.3-M	Cable may not transmit flame to the top of the tray. It shall not penetrate floors or ceilings, i.e., may only be used within a single floor.