



CHARACTERISTICS of RAILWAY ROLLING STOCK CABLE

The Railway industry, considered as one of the most important public transportation method, is concerned with the movement of people and goods. Therefore a high level of safety shall be achieved in the railway and underground environments. For this reason, the cables for use in the mentioned environment shall minimise the risk to the people and improve the safety in general. Below 4 characteristics form the basis of requirements for the rolling stock cables.

Flame Retardance

The flame retardancy is especially important in the public sector, such as public transportation. The flame-retardant cables are therefore required in the railway and underground industry.

Flame retardance testing is carried out in one of 2 ways:

1. Testing carrying out on a single vertically arranged cable
2. Testing carrying on bunched cable

For testing on single vertical cable, the latter shall be tested in accordance with EN 50265-2-1. For flame test on bunched cable, the cable shall be tested in accordance with EN 50266-2-4 and EN 50305. In this test, a cable specimen, consisting of number of 3.5m lengths of cables are fixed to a vertical ladder tray where they are applied with a flame from a gas burner for a specified times under controlled air flow. Following completion of the flame retardance test, maximum charring must not exceed a stipulated level.

Smoke Emission

In the event of fire, the produced smoke amount need to be limited so as to minimize the loss of visibility and will make it less difficult to localise the source of fire and to reduce evacuation time.

For smoke emission testing, the tests shall be in accordance with EN61034 and EN50268. The light transmission of the smoke is then measured. The following table shows the minimum percentages of light transmission depending on hazard level:

Category 1	no requirement
Category 2 and 3	60%
Category 4	70%

For EN50264 rolling stock cable, it only applicable to 70% minimum percentages of light transmission.





Halogen Free

Halogen free materials are used for both insulation and jacket. The halogen free compounds are developed not only aiming at protecting the environment, but also at enhancing fire safety needs, fire damage prevention needs and higher application use temperatures.

Samples of insulation, inner sheath, sheath shall be tested in accordance with EN50264 and EN50306. The maximum evolution of HCl, minimum pH, maximum conductivity and maximum fluorine content shall be in accordance with the requirements given in the mentioned standards.

Toxicity

Toxicity index (ITC) is calculated following analysis and titration of combustion gases. All cable materials shall be tested in accordance with EN 50305,9.2. The toxicity index shall not exceed 3.

If the toxicity index of any of the non extruded elements is higher than 3 and the combined mass of the these elements (fillers, tapes and binders) does not exceed 5% of the total weight of combustible materials in the cable, then the whole cable shall not exceed the weighted toxicity (ITC') of 3.

For hazard levels given in EN 45545-1, depended on the rolling stock and the infrastructure, the required toxicity indices are displayed in the following table:

Hazard level	Toxicity index (ITC)	
	Insulation and S1 sheath	EM101-104 and S2 sheath
1	Not specified	Not specified
2 & 3	10 (max.)	5 (max.)
4	6 (max.)	3 (max.)

