Installation – Cable Bending Radii

Minimum Bending Radii Guidance is laid out in the various cable manufacturing standards, such as **BS5467**, **BS6622, BS7870-4.10** etc. Datasheets produced by the Prysmian Group will normally state the bending radius for the cable concerned on the datasheet too. It should be noted that these are minimums and wherever possible, larger bending radii should always be used.

The Power Distribution suite of cable standards, BS7870 has a specific Annex (A) in BS7870-1 which provides general recommendations for the selection and use of cables, providing useful guidance on cable installation. Each subsection, for example BS7870-4.10, also has its own specific Annex A which provides more explicit information for that cable type. Guidance for other cable standards, such as BS6622, BS5467 etc. can be found in the relevant Annex of those standards.

Whilst not applicable for LV cable design, for medium voltage installations there are two types of bending radius to consider.

The first is the **dynamic bending** radius. This is the minimum radius that the cable can be bent as it is being pulled in during installation and is the larger of the two bending radii.

A smaller bending radius, known as the **static bending** radius can be applied once the cable has been pulled in place (i.e. is in situ and there is no tension in the cable) for bending the cable(s) into joints and terminations.

It should be noted that when using these smaller, static bending radius, it is strongly advised that the bend is carefully controlled. This can be achieved through the use of a former.

It could be argued that the smaller bending radii could be used elsewhere in the cable route, other than at joints and terminations. The only caveat is the document from which the guidance is given (BS6622) does not state the lower bending radii can be used elsewhere to joints and terminations.

Table of Bending Radii Rules for MV Cable Types

MV Cable Type	Specifications	Dynamic	Static
S-C Armoured MV 6.6-33kV	BS6622, BS7835	15 x OD	12 x OD
M-C Armoured MV 6.6-33kV	BS6622, BS7835	12 x OD	10 x OD
S-C Unarmoured (CWS) 11-33kV	BS7870-4.10	20 x OD	15 x OD*
S-C Unarmoured (Pb sheath) 33kV	BS7870-4.11	20xOD	15 x OD*
3-C Unarmoured (CWS) 11kV	BS7870-4.20	15 x OD*	12 x OD*

*These values are taken from BS6622: 1999

Where pulling tensions are higher it may be necessary to increase the above bending radii values accordingly, particularly when considering the side wall pressures. We are unable to be specific about these increased values other than to say they should be higher than the above recommendations. Our High Voltage installation department advise that for 66kV cables and above it would be prudent to be of the order of 30 x D as a minimum.

If in doubt please seek the advice of experienced personnel in this area as this is not a service that the Prysmian Group can provide for medium voltage cables.

Table of Bending Radii Rules for LV Cable Types

LV Cable Type	Specifications	Dynamic	Static
Twin Flat & Earth	BS6004, BS7211	4 x OD*	
S-C insulated only (6491X, 6491B)	BS EN 50525-2-31	6 x OD	
S-C insulated & sheathed (6181Y)	BS6004	4 x OD	
S-C insulated & sheathed (BS7889)	BS7889	6 x OD**	
Armoured	BS5467, BS6724, BS7846	8 x OD***	
Multi-core screened cables	BS7629-1, BS8436	6 x OD	
Waveform Cable	BS7870-3.40 & 3.50	15 x OD****	10 x OD

* minor axis value should be used for calculation

** BS7889 states for cables <25mm OD, a smaller bending radius of 4 x OD is permissible

*** BS5467, BS6724 and BS7846 previously allowed 6 x OD for circular conductors, and 8 x OD for shaped conductors

**** the bending radius given in BS7870-3.40 & BS7870-3.50 incorrectly states 8 x OD. The values given in the table are historic and taken from SEI 09-9, the preceding cable standard for waveform