

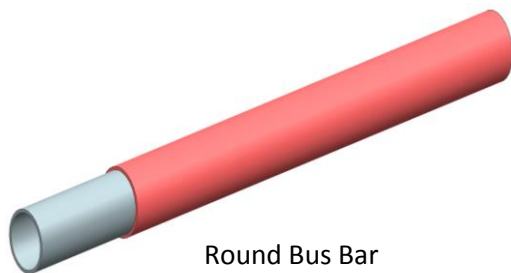


Heat Shrink Tubing for Bus Bar Insulation Data Sheet

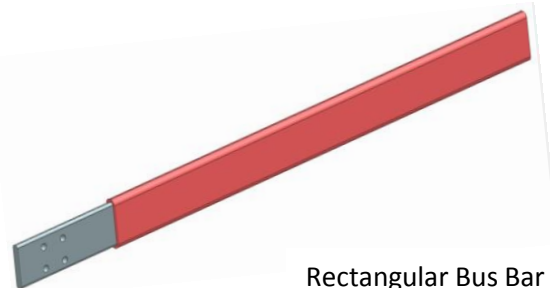
Product Description

The 3M heat shrinkable bus bar insulation tubing range is suitable for round and rectangular bus bars for upto 52 kV applications.

The tube is made of a special formulated heat shrinkable cross linked polyolefin based material providing excellent electrical insulation property for both indoor and outdoor environments. The tubing's which is of Reddish brown colour, has excellent electrical insulation, high resistance to splitting, good moisture resistance and excellent track resistance properties. The tubing shrinks upon application of heat from temperature of 120 – 150 deg C using gas torch in the field and in oven for large scale production, or heating in electric oven. The tubing provides insulation and protection against flash over and accidentally induced discharge. It provides adequate insulation in the places where space is constraint.



Round Bus Bar



Rectangular Bus Bar

Application

The use of 3M ATX tube provides protection of live bus bar from phase to phase to and phase to ground failures. By using ATX tubing's, equipment can be designed by reducing air spacing between bus bars. This will help in reduction of the switch gears equipment.

Typical Physical Properties

Sr. No.	Particulars		Typical Values*
1	Mechanical Properties (after thermal ageing at 120°C+/- 3°C for 500 hrs)	ISO R 37 Type 2	Tensile Strength - 8 (N/mm ²) Ultimate Elongation – 200%
2	Zero Halogen Acid Test	IEC 60754-2	pH 10, Conductivity (µS/mm) -4.3
3	Low temperature	ESI 09-13	No cracking after 4 hour at minus 20°C max.
4	Flame Retardance	BS 4066	After 1 minute burning, The sample has been wiped clean; the charred portion does not exceed 250 mm max.
5	Heat Shock	ESI 09-13	No splitting ,cracking, dripping or flowing after 30 min at 250 C min.
6	Density	ASTM D 792- 00	1.42
7	Water Absorption	ESI 09-13	0.5 max 24 hr @25 C 1.0 max 24hr @50 C

*All values are typical, based on several determination, and are not intended for specification purposes

Typical Electrical Properties

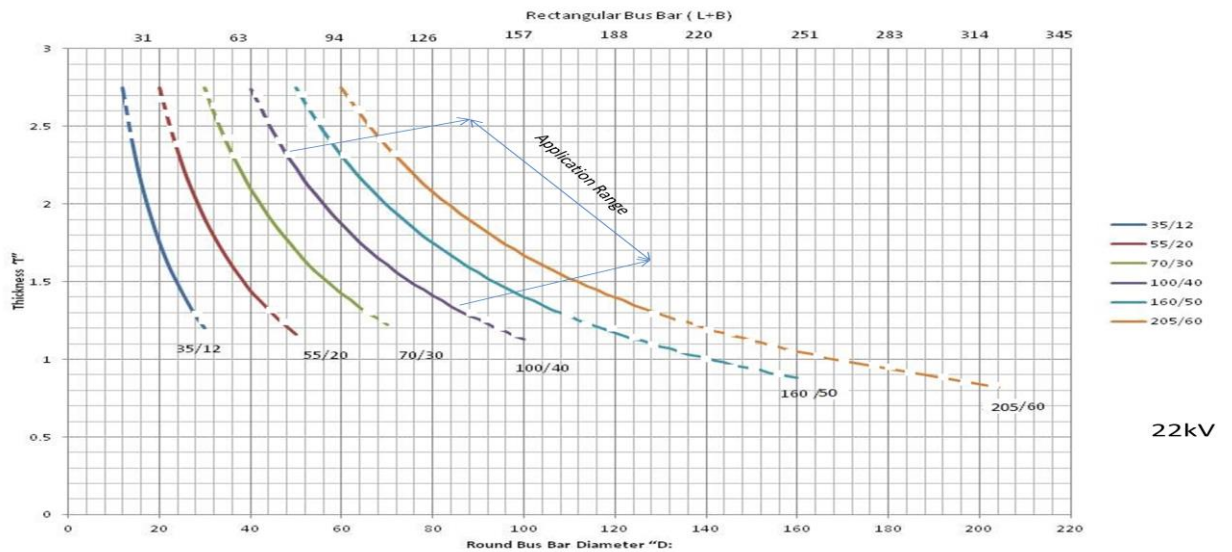
Sr. No.	Particulars		Typical Values*
1	Di electric Strength	IEC 243	12 MV/Meter Min
2	Volume Resistivity	ESI 09-13	10 [^] 10 Ω Meters
3	Tracking & Erosion	ASTM D 2303	2.50 kV for 1 hour , 2.75kV for 1 hour

Application Range –

The 3M heat shrinkable bus bar insulation tubing selection can be done based on the service voltage according to the below selection tables and charts.

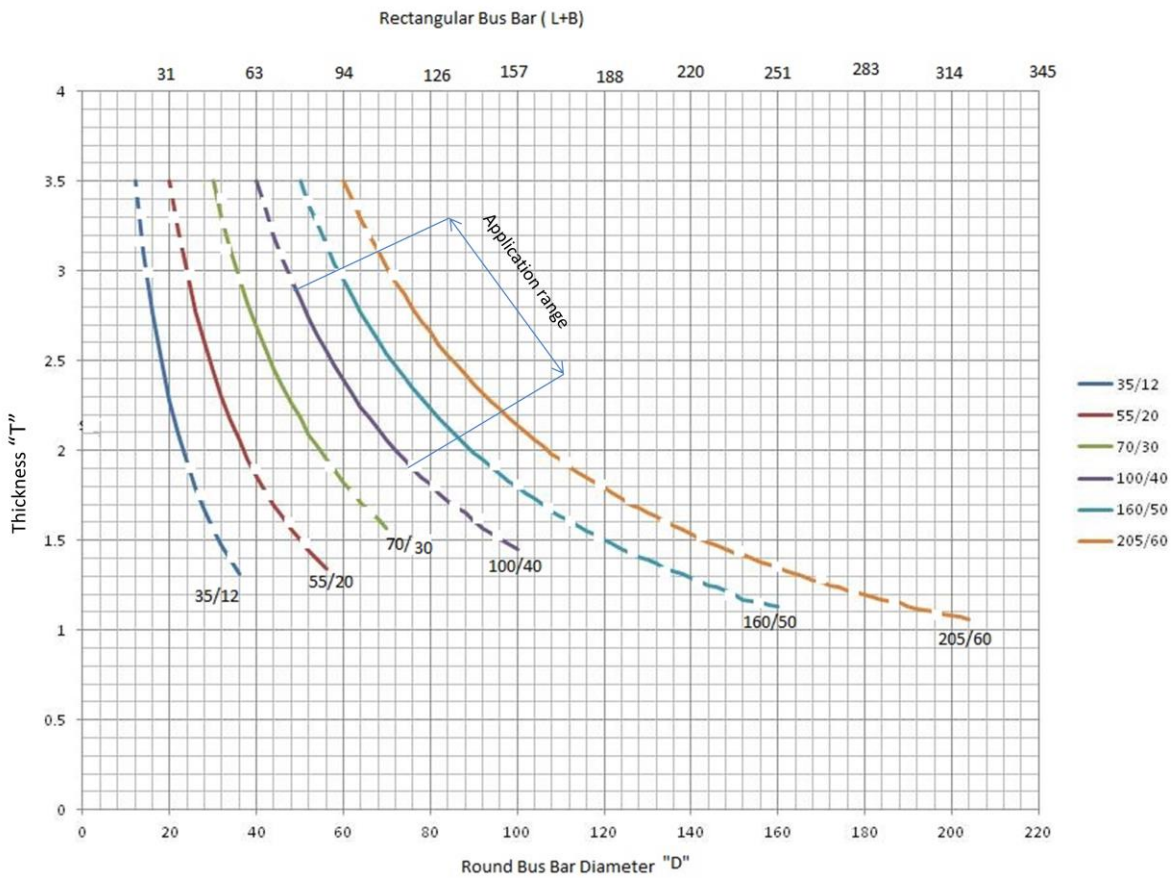
Tube Selection for upto 22 kV application (Fully recovered nom. thickness of 2.7mm)

Product Size	Application Range Round Bar		Application Range Rectangular Bar	
	Diameter (Min)	Diameter (Max)	(L+B) Min	(L+B) Max
3M ATX 35/12-BB-upto 22kV	14	24	19	42
3M ATX 55/20-BB-upto 22kV	24	44	37	69
3M ATX 70/30-BB-upto 22kV	36	64	54	100
3M ATX 100/40-BB-upto22kV	48	88	75	106
3M ATX 160/50-BB-upto 22kV	60	108	94	164
3M ATX 205/60-BB-upto 22kV	70	128	112	200



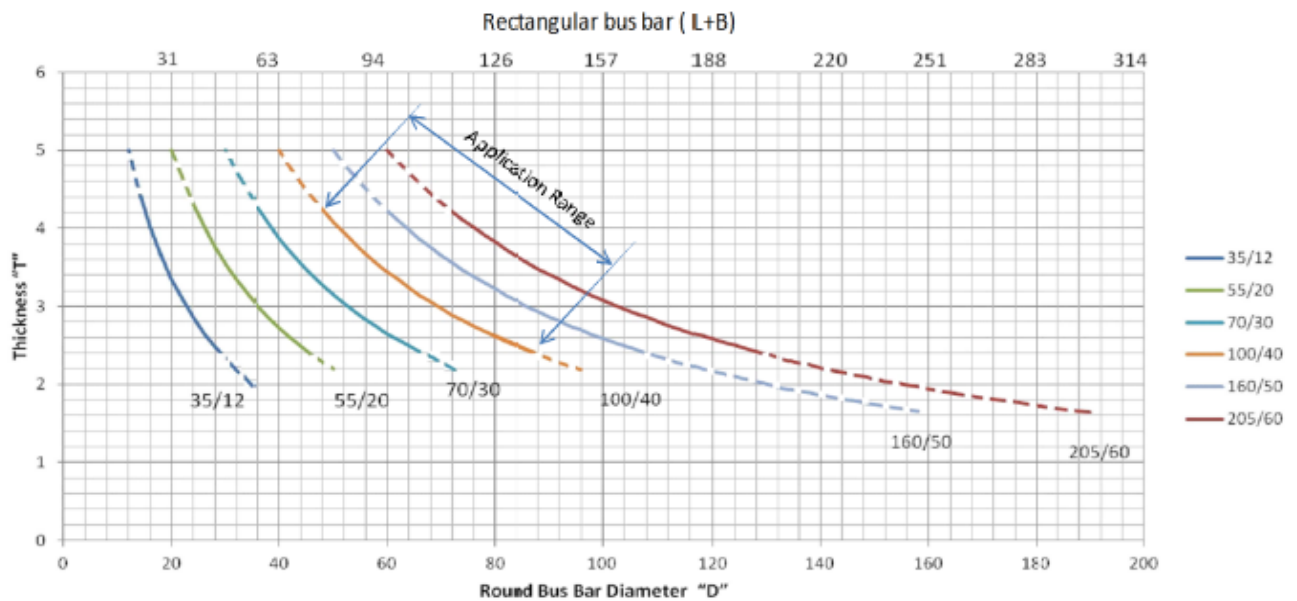
Tube Selection for upto 33 kV application (Fully recovered nom. thickness of 3.5mm)

Product Size	Application Range Round Bar		Application Range Rectangular Bar	
	Diameter (Min)	Diameter (Max)	(L+B) Min	(L+B) Max
3M ATX 35/12-BB-33kV	14	24	19	37
3M ATX 55/20-BB-33kV	24	38	37	63
3M ATX 70/30-BB-33kV	36	54	54	88
3M ATX 100/40-BB-33kV	48	72	75	120
3M ATX 160/50-BB-33kV	60	92	94	151
3M ATX 205/60-BB-33kV	70	108	112	169



Tube Selection for upto 52 kV application (Fully recovered nom. thickness of 5 mm)

Product Size	Application Range Round Bar		Application Range Rectangular Bar	
	Diameter (Min)	Diameter (Max)	(L+B) Min	(L+B) Max
3M ATX 35/12-BB-52kV	14	28	22	44
3M ATX 55/20-BB-52kV	24	46	38	72
3M ATX 70/30-BB-52kV	36	66	57	104
3M ATX 100/40-BB-52kV	48	90	75	141
3M ATX 160/50-BB-52kV	60	108	94	170
3M ATX 205/60-BB-52kV	70	129	113	201



General Guide lines

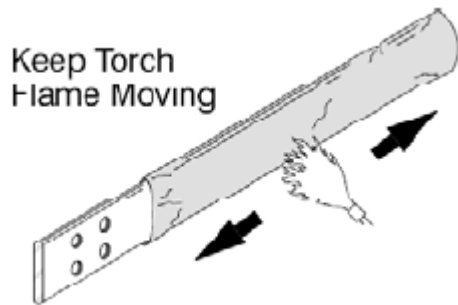
An instruction sheet is included in each package to provide the installer with the information required to properly install the 3M heat shrinkable bus bar. A brief summary of the installation for bus bar insulation tubes is outlined as follows-

- Step 1.** Clean bus bar to remove oxidized layer or dust.
- Step 2.** Measure the required length.
- Step 3.** Use a sharp Knife or razor to ensure a clean cut with no nicks.
- Step 4.** Preheating of bus bar is recommended.



Step 5. Use proper torch which produces a blue and yellow flame. Nozzle 6 no or higher is recommended.

Step 6. Slide the ATT in the required position of the bus bar. Shrink ATT edge first this will achieve a more uniform insulation thickness around the bar. By shrinking from one side to the other, chance to getting air voids and wrinkle are minimized. Also keeps torch flame moving to prevent burning of tube.



Caution: Be careful handling insulated bus bar while it is still hot. The heated tubing is soft and susceptible to physical damage.

Safety: Use caution and proper safety procedures when working with open flame and high temperature. This would include maintain a well ventilated work place.

Packaging – Tubes up to 100mm in supplied diameters are supplied in spools and the tubes having diameter bigger than 100m are supplied in cut lengths of maximum 1.2m.

Storage Condition - Indoor

For further information please contact the local **3M** representative.

Important Notice

Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use.

Warranty; Limited Remedy; Limited Liability. This product will be free from defects in material and manufacture as of the date of purchase. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. **Except where prohibited by law, 3M will not be liable for any loss or damage arising from this 3M product, whether direct, indirect, special, incidental or consequential regardless of the legal theory asserted.**

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