



18-421/492 Product Data Sheet

NEQ-320 Heat-Shrinkable Nuclear Environmentally Qualified Adhesive Coated Thin Wall Tubing

Description

NEQ-320 is a specially designed, heat shrinkable tubing for insulation and environmental sealing of nuclear plant splicing applications up to and including 300 volts.

NEQ-320 is a thin wall tubing offering the advantages of integral adhesive lined construction with a shrink ratio up to 4:1.

The tubing is made from flame retardant, flexible polyolefin, lined with an internal layer of special thermoplastic adhesive.

The heat-shrinkable outer wall is selectively radiation cross-linked, while the adhesive maintains high flow and excellent adhesion characteristics.

Base material	Polyolefin
Color	Hot melt adhesive Black

Typical Properties

Physical	Value	Standard	Test Method
Shrink ratio	Up to 4:1		
Tensile strength	14 N/mm ² min. (2030psi)	-	IEC 60684-2-19
Elongation at break	450% min.	-	IEC 60684-2-19
Longitudinal change	-10% max.	-	IEC 60684-2-9
Concentricity	50% min.	-	IEC 60684-2-3
Secant Modulus	40 N/mm ² min. (5700psi)	-	IEC 60684-2-37
Relative Density	1.2 - 1.3 g/cm ³	-	IEC 60684-2-4
Sealing Efficiency	No openings	-	MIL-I-23053/4

Thermal	Value	Standard	Test Method
Continuous Operating Temperature	-55°C to +110°C	-	IEC 60684-2-37
Shrink Temperature	120°C min.		
Heat Shock		-	IEC 60684-2-6
Tensile strength	10 N/mm ² min. (1450psi)	-	IEC 60684-2-19
Elongation at break	200% min.	-	IEC 60684-2-19
Heat Aging		-	IEC 60684-2-39
Elongation at break	400% min.	-	IEC 60684-2-19
Low Temperature Flexibility	No cracking, detachment of coating or delamination	-	IEC 60684-2-14
Copper Corrosion	No corrosion	-	IEC 60684-2-33
Flammability	Self extinguishing	-	IEC 60684-2-26



18-421/492 Product Data Sheet

NEQ-320 Heat-Shrinkable Nuclear Environmentally Qualified Adhesive Coated Thin Wall Tubing

Electrical	Value	Standard	Test Method
Dielectric Strength	150 kV/cm	-	IEC 60684-2-21
Volume resistivity	1×10^{14} Ohm.cm	-	IEC 60684-2-23

Chemical	Value	Standard	Test Method
Chemical Resistance	Good	-	IEC 60684-2-36

Technical Information provided consists of typical product data and should not be used for specification purposes. Unless otherwise specified in the test method, all tests are performed at room temperature.

Documentation

Test methods are in accordance with IEC 60684 Part 2 International Standard and MIL-I-23053/4 Class 3 requirements.

Nuclear Environmental Qualification: Qualified life of 40 years at an operating temperature of 75°C, a total (normal plus accident) integrated radiation dose of 60 Megarads and subsequent successful performance during LOCA/MSLB exposure and flexing.

Qualification testing by RCM Technologies, Engineering Services Canada.

Reference Test reports documents:

09070-FTR-Rev.00, March 1995
 11020-QTR Rev.00, February 1997
 11020-AD1 Rev.00, February 1997
 11980-TPR Rev.00, January 1998
 1430-QTR Rev.00, February 2000
 Engineering Assessment Report 15110-EAR Rev. 01, August 2000

Product Guide - Table 1

Part Number	Expanded ID (min.)		Recovered ID (max.)		Total Recovered Wall Thickness (nominal)		Recovered Adhesive Wall Thickness (nominal)	
	inch	mm	inch	mm	inch	mm	inch	mm
NEQ-320-4/1	0.16	4.0	0.04	1.0	0.04	1.0	0.02	0.5
NEQ-320-8/2	0.31	8.0	0.08	2.0	0.04	1.0	0.02	0.5
NEQ-320-9/3	0.35	9.0	0.12	3.0	0.06	1.4	0.02	0.6
NEQ-320-12/4	0.47	12.0	0.16	4.0	0.07	1.8	0.03	0.8
NEQ-320-19/6	0.75	19.0	0.24	6.0	0.09	2.2	0.03	0.8
NEQ-320-24/8	0.95	24.0	0.31	8.0	0.10	2.5	0.04	1.0
NEQ-320-40/13	1.57	40.0	0.51	13.0	0.10	2.5	0.04	1.0

Tubing lengths are available per station/system design requirements.

Electrical Markets Division
 PO Box 5757
 London, Ont. N6A 4T1
 NEQ320.DOC/0108REV.7



18-421/492 Product Data Sheet

NEQ-320 Heat-Shrinkable Nuclear Environmentally Qualified Adhesive Coated Thin Wall Tubing

Storage

Under normal storage conditions (23°C @ 50% RH), the product will remain stable for a minimum of 10 years when the material is stored in its original container.

Ordering Information

The product is ordered by part number as specified in Table 1.

Example:

- To order NEQ-320 for a 5.0 mm diameter cable
 - select size 9/3, based on recovered ID of 3.0 - maximum tubing size that will shrink to minimum diameter, and a 5 inch or 127 mm length order NEQ-320-9/3-127.
(please reference application and installation instructions to ensure correct selection).

IMPORTANT NOTICE TO THE PURCHASER:

The following is made in lieu of all express or implied rights, warranties and conditions, statutory or otherwise:

Seller's and manufacturer's only obligations shall be to replace such quantity of the product proved to be defective.

Neither seller nor manufacturer shall be liable for any injury, loss or damage, direct or consequential arising out of the use of or the inability to use the product. Before using, user shall determine the suitability of the product for his intended use, and the user assumes all risk and liability whatsoever in connection therewith.

The foregoing may not be altered except by an agreement signed by the officers of seller and manufacturer.