

**JOHNS-MANVILLE
TRANSITE® ELECTRICAL DUCTS
MATERIAL SPECIFICATION**

DS-928-65

J-M History
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1965

MATERIAL SPECIFICATION

TRANSITE® ELECTRICAL DUCTS

1. SCOPE

- 1.1 GENERAL: This specification designates the requirements for Johns-Manville Transite ducts manufactured for electrical services.

2. PRODUCT DESCRIPTION

- 2.1 TYPES: This specification covers two types of duct material, namely:

Transite Conduit - (Type II) - Intended for use without encasement in concrete.
Transite Korduct - (Type I) - Intended for use encased in concrete.

- 2.2 SIZES: - Transite Ducts shall have a circular cross-section and shall be of the following nominal inside diameters:

TYPE II - 2, 3, 3 1/2, 4, 5 and 6 inches.
TYPE I - 2, 3, 3 1/2, 4, 4 1/2, 5 and 6 inches.

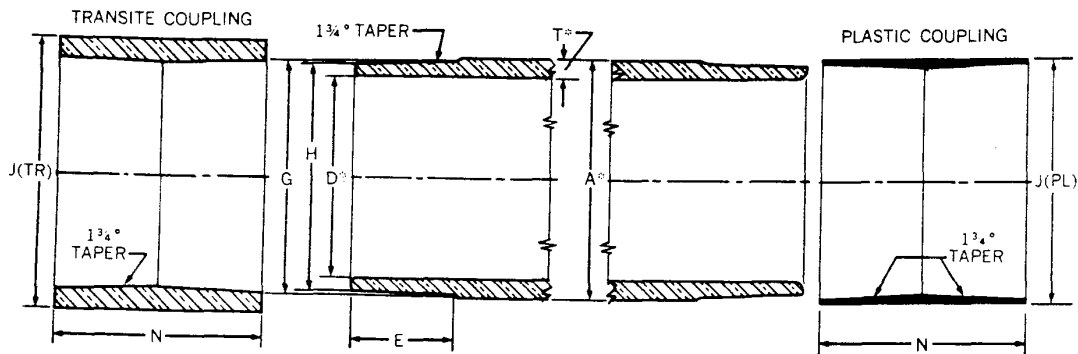
- 2.3 LENGTHS: The standard lengths for Transite Ducts shall be 10' except that the 2" size shall be 5'. A tolerance of plus or minus 1" shall be allowed on the standard length. A maximum of 15% of the total footage of any one size and type may be furnished, at the manufacturer's option, in random lengths. Random lengths shall be not less than 5' for all sizes except 2" which shall be not less than 3'. (Random lengths shall be classified in 6" increments allowing a minus tolerance of 1".) Short lengths are less than random minimum and shall be furnished only on request.
- 2.4 COUPLINGS: One coupling shall be furnished with each standard, random or short length of duct. It shall be suitable in size and design for the duct with which it is used. It shall be a J-M Plastic Coupling or a material of the same material as the duct.
- 2.5 FITTINGS: When furnished, adaptors, bends, or any other fittings shall be made of the same material as the duct. J-M Plastic straight adaptors are available in sizes 2", 3", 3 1/2", 4" for joining Transite Conduit (Type II) to Transite Korduct (Type I); Transite Conduit (Type II) to steel; Transite Korduct (Type I) to steel.
- 2.6 MATERIALS: Transite Ducts shall be composed of an intimate mixture of portland cement, or of portland blast furnace slag cement or of portland-pozzolana cement, silica and asbestos fiber and shall be free of organic substances.

3. DIMENSIONS

3.1 CONDUIT

- 3.11 DESCRIPTION: Transite Ducts shall conform to the dimensions given in Table I. The ends of each length shall be tapered to provide tight joints which allow no play when assembly is completed.

TABLE I - DIMENSIONS OF DUCT AND COUPLINGS

TRANSLITE CONDUIT (TYPE II)

SIZE	DIMENSIONS							
D*	A*	E	G	H	J (TR)	J (PL)	N	T*
inches								
2	2.70	1.75	2.58	2.49	3.33	2.73	3.50	.35
3	3.74	1.75	3.62	3.53	4.40	3.77	3.50	.37
3 1/2	4.24	1.75	4.12	4.03	4.92	4.27	3.50	.37
4	4.74	2.00	4.62	4.52	5.42	4.77	4.00	.37
5	5.80	2.00	5.68	5.58	6.56	5.83	4.00	.40
6	6.80	2.00	6.68	6.58	7.56	6.83	4.00	.40

Note: *Nominal Dimensions.

TRANSLITE KORDUCT (TYPE I)

SIZE	DIMENSIONS							
D*	A*	E	G	H	J (TR)	J (PL)	N	T*
inches								
2	2.50	1.00	2.45	2.40	3.21	2.60	2.00	.25
3	3.54	1.13	3.45	3.40	4.23	3.60	2.25	.27
3 1/2	4.04	1.13	3.95	3.90	4.75	4.10	2.25	.27
4	4.54	1.25	4.46	4.40	5.26	4.61	2.50	.27
4 1/2	5.04	1.25	4.96	4.90	5.84	5.11	2.50	.27
5	5.60	1.25	5.46	5.40	6.34	5.61	2.50	.30
6	6.60	1.25	6.46	6.40	7.34	6.61	2.50	.30

Note: *Nominal Dimensions.

3. DIMENSIONS (Continued)

3.12 BORE: The bore of the duct shall be smooth and free from obstructions, and straight as gauged by the ability of a mandrel, 36" in length and 1/4" less in diameter than the nominal inner diameter of the duct, to pass through it. All inside edges of duct shall be smooth.

3.13 INSIDE DIAMETER: The average inside diameter measured at the ends of the Transite Ducts shall be within 0.1" of the nominal diameter. The maximum difference between any two inside diameters of any one piece of conduit when measured at the ends shall not exceed 0.2".

3. DIMENSIONS (Continued)

3.14 STRAIGHTNESS: No length shall vary from straightness by more than 1/4" in a 10' length or 1/8" in a 5' length.

3.2 COUPLINGS:

3.21: DESCRIPTION: Each coupling shall conform to the dimensions listed in Table I.

3.3 FITTINGS:

3.31 DESCRIPTION: A ball having a diameter 1/4" smaller than the nominal size of the Transite Duct shall pass freely through each bend, sweep and curve segment.

4. PHYSICAL AND CHEMICAL PROPERTIES

4.1 CURING: The duct shall meet the requirements of the Malachite Green Test as specified in 5.22.

4.2 ABSORPTION: The water absorption at 24 hours shall be not more than 30% when the Transite Ducts are subjected to the test specified in 5.23.

4.3 FLEXURAL STRENGTH. Each length of Transite Duct shall have sufficient strength to support without failure the loads set forth in Table II when tested by the methods described in 5.25.

TABLE II - FLEXURAL STRENGTH

NOMINAL INSIDE DIAMETER, INCH	FREE SPAN OF FLEXURAL TEST SPECIMEN, INCH		MINIMUM TEST LOAD, LBS.		RATE OF LOAD APPLICATION LBS./MIN.	
	TYPE II	TYPE I	TYPE II	TYPE I	TYPE II	TYPE I
2	24	24	450	300	400	250
3	30	30	850	600	750	400
3 1/2	30	30	1100	750	750	500
4	30	30	1260	980	1000	500
4 1/2	--	42	--	900	--	500
5	48	48	1500	1100	1000	500
6	54	54	2000	1300	1000	750

4.4 CRUSHING STRENGTH: Transite Ducts shall have the crushing strength listed in Table III when tested in accordance with the method described in 5.26.

TABLE III - CRUSHING STRENGTH

NOMINAL INSIDE DIAMETER, INCH	MINIMUM CRUSHING LOAD/LBS.		RATE OF APPLICATION LBS./MIN.	
	TYPE II	TYPE I	TYPE II	TYPE I
2	1400	500	500	500
3	1200	500	500	500
3 1/2	1100	500	500	500
4	1200	500	500	500
4 1/2	--	500	--	500
5	900	500	500	500
6	800	500	500	500

4. PHYSICAL AND CHEMICAL PROPERTIES (Continued)

- 4.5 TIME-TEMPERATURE CRUSHING STRENGTH: Transite Ducts when tested as specified in 5.27 shall meet the following requirements: (all diameters referred to are the average of maximum diameters of two specimens; original diameter (X) is measured after immersion for 72 hours with no load; intermediate diameter (Y) is measured after 48 hours immersed under load; final diameter (Z) is measured after a second 48 hour cycle immersed under load) (1) to assure that pipe does not deform excessively, the total reduction in diameter (X minus Z) shall not exceed 5% of diameter X. (2) to assure that pipe does not become progressively soft, reduction from intermediate to final diameter (Y minus Z) shall not exceed 75% of reduction from original to intermediate diameter (X minus Y).
- 4.6 IMPACT STRENGTH: Transite Ducts shall withstand a 3 lb. weight dropped from the height of 15" for Transite Conduit (Type II) and 8" for Transite Korduct (Type I) when subject to the test specified in 5.28.

5. INSPECTION TESTS

- 5.1 INSPECTION PROCEDURE: All material furnished under this specification shall be inspected and tested for conformance to the requirements stated in previous sections. All samples for tests shall be conditioned for at least 18 hours at room temperature, prior to testing. When requested on his order, the purchaser may witness inspection and test procedures at his own expense. In lieu of this, he may request on his order that the manufacturer submit a certificate certifying the product meets the requirements of this specification. Before shipment, when requested on his order, one section of each size of duct shall be selected for test from each thousand pieces in a shipment.

5.2 CONDUIT:

- 5.21 DIMENSIONS: Before shipment, duct shall be inspected by the manufacturer for conformance to the dimensions specified in 3.11.

- 5.22 CURING REQUIREMENTS: A freshly broken edge of Transite Duct shall be wetted with two drops of Malachite Green solution so that an edge area 1" long, extending from face to face and without, is covered. A strong blue stain shall be evident over the wetted area and shall persist for an interval of at least 15 minutes.

NOTE: The Malachite Green solution shall be made by dissolving 0.1 gram of Malachite Green (pH indicator grade) in 100 ml. of distilled water.

- 5.23 ABSORPTION: Tests for this requirement shall be made on a specimen 12" in length cut from the sample duct. The specimen shall be dried in an oven at a temperature of approximately 220°F for 24 hours. After cooling to room temperature, the dry weight shall be determined to within 1/4%. It shall then be completely immersed in water at 64° to 75° for 24 hours. The specimen shall then be taken from the water, the surface water removed with a damp cloth and specimen weighed. The water absorption of any specimen as expressed in percentage increase in weight shall not exceed 30%.
- 5.24 STRENGTH TESTING EQUIPMENT: The machines used for the flexural, crushing and impact testing shall be substantial and rigid throughout, so that the application of the load shall not be affected appreciably by the deformation or yielding of any part of the machine.

5. INSPECTION TESTS (Continued)

5.25 FLEXURAL STRENGTH: (See 5.24) Two specimens shall be cut and tested from each sample duct. The specimens shall be mounted longitudinally on "V" blocks of steel or preferably wood, 5" long, 120° angle of "V", faces 2" x 5", and the load applied through a rectangular block 2" in width at the center of the span. Bearing surfaces should be rounded to a radius of approximately 1". The spans between the bearing surface of the supporting blocks shall be as given in Table II for the particular type of duct. The breaking loads, of each of the two specimens from each sample, shall not be less than those given in Table II for the particular type of duct.

5.26 CRUSHING STRENGTH: (See 5.24) The crushing strength shall be determined on two specimens 12" ($\pm 1/8$ ") in length cut from each sample duct. The specimen shall be placed longitudinally between two rigid flat wooden parallel plates in a crush testing machine. The upper wood plate shall be mounted on a swivel fitting to insure full contact with the specimen and shall apply the crushing load for its entire length. The load shall be applied at the rate specified in Table III for Transite Korduct (Type I) and Transite Conduit (Type II). No specimen shall fail at a load less than that specified in Table III. A specimen shall be considered to have failed upon first evidence that cracking has occurred if below the loads specified.

5.27 TIME-TEMPERATURE CRUSHING STRENGTH: The Time-Temperature Crushing Strength shall be determined on two pieces 3" ($\pm 1/8$ ") in length cut from each sample duct. The ends shall be cut square to $\pm 2^\circ$.

The specimens shall be submerged in water at 75°F ($\pm 5^\circ$ F) for 72 hours; then removed. Each end of each specimen shall be measured and the point of maximum inside diameter of each specimen shall be marked for future reference. The average of the two maximum diameters shall be recorded.

The pair of specimens shall be placed on a common horizontal base with their axes parallel, and the referenced maximum diameters placed in the vertical plane.

The specimens shall be immersed in water at 75°F ($\pm 5^\circ$ F) to a depth of at least 3/4 of the inside diameter. (At the manufacturer's option, the test may be run at temperatures higher than 75°F). The 3" long specimens shall be bridged with a single flat plate 1" thick. The second dimension of the flat plate shall be no less than 3-1/4" so that it extends beyond the 3" length of the specimens. The third dimension of the flat plate shall be such that it will extend at least 1/2" beyond the vertical center lines of the two specimens. The flat plate shall then be center loaded in an air temperature of 75°F ($\pm 5^\circ$ F) in such a way as to divide the total applied load equally to each specimen. 80% of the crushing strength in lbs. per ft. shown in Table III shall be applied using a dead-load method. Since the combined specimen lengths one-half foot, apply the 80% to one-half the load-per-foot shown in Table III.

The specimens shall remain loaded in the water for 48 hours when the water shall be drained. While still under load the vertical diameters of the specimens shall be measured and the water then replaced.

The load shall be continued for an additional 48 hours (total 96 hours) and the vertical diameter again measured and recorded while under load. Duct shall be able to withstand these test requirements which will be run periodically. Records of such tests shall be kept on hand at the manufacturing plant.

5. INSPECTION TESTS (Continued)

5.28 IMPACT TESTING: (See 5.24) A specimen cut from sample of Transite Duct 14" to 15" long shall be used for this test. A suitably guided 3 lb. steel cylinder, 1 1/2" in diameter and approximately 6" long with a 1/2" long cylindrical extension having a 9/16" diameter hemispherically shaped striking head, shall be dropped upon the crest of the specimen lying in a "V" notch of 120° on a firmly supported solid block 5" high, 6" wide, 16" long. Each specimen shall withstand a blow delivered at a point at least 6" from either end, at a height not less than that shown in 4.6 for Transite Duct without evidence of failure. The height of drop is measured from the bottom of striking head. Failure shall constitute any visible disturbance of the inner surface of the duct, including cracking.

5.29 RETESTS: If the strength of either of the two specimens tested for flexure or crushing strength fails to meet the requirements specified, twice the number of specimens that fail shall be selected by the inspector for retest. Failure of any one of these additional specimens to pass the retest will cause a lot, represented by the specimen, to be rejected.

6. MARKING

6.1 DUCT: Each standard length and each random length of duct shall be marked with the manufacturer's name, trade name "Transite", nominal size, type and date of manufacture.

7. SHIPMENT

7.1 PREPARATION: Transite Ducts and fittings shall be prepared for standard commercial shipment so as to assure acceptance by common or other carrier.

8. SPECIFICATION BY PURCHASER

8.1 GENERAL: When purchasing Transite Ducts under these specifications, the purchaser shall supplement them with the following specific requirements for each order of conduit.

8.2 LAYING LENGTH: The purchaser shall state the total laying length of each size and type of duct and fittings required.

8.3 INSPECTION & TESTS: When the purchaser wishes to witness the inspection and test conducted by the manufacturer, he shall so state on his order so that the manufacturer can notify the purchaser in ample time. All of his expenses incidental to this inspection shall be borne by the purchaser.

8.31 CERTIFICATE OF TEST: When the purchaser requires a certificate of test in lieu of witnessing the inspection and test procedures, he shall so state on his order.

9. PATENT RIGHTS

9.1 GENERAL: The manufacturer agrees to save harmless the purchaser, his officers and agents from all damages and claims arising from the infringement or alleged infringement of any patented right, for any materials covered by this specification and shall without cost or expense to the purchaser, his officers or agents defend any suits which may be brought against the purchaser by reason of actual or alleged infringement. The manufacturer also agrees to state in his bid that the materials covered by this specification do not infringe on any patent or patent rights.

AFFIDAVIT

STATE OF COLORADO)
) ss.
COUNTY OF ADAMS)

I, Margaret J. Baumgardner, being of full age and first duly sworn do hereby state:

1. I am not a party to this action. I have personal knowledge of the facts set forth in this affidavit, and if called as a witness, I could and would competently testify as to the truth of the matters set forth herein.

2. I am the Research Coordinator for the Claims Resolution Management Corporation ("CRMC"), a wholly owned subsidiary of the Manville Personal Injury Settlement Trust ("Trust"). The CRMC was created in December 1998 and is staffed by former Trust employees. On January 1, 1999, CRMC began providing claims resolution facility services to the Trust.

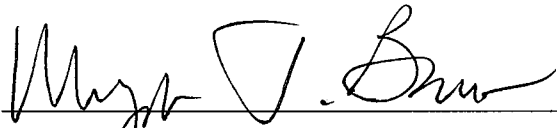
3. In this position, I manage the Asbestos Claims Research Facility ("Facility"), a document and records repository located at 3390 Peoria Street, Suite 304, Aurora, Colorado. The Facility contains the business records including but not limited to correspondence, memoranda, reports, records and data compilations ("record") of Manville Corporation or related entities ("Manville"), generally, as well as Manville records relevant to litigation of asbestos liability. The Trust has managed and operated the Facility from November 28, 1988, the date on which the Manville bankruptcy plan was consummated.

4. My experience and familiarity with the documents at the Facility began in 1983 while working for Manville. In my work as a paralegal for Manville, I assisted in locating, indexing and packing many of the records which became the foundation documents for the Facility. I continued to work for Manville until September 1987. From March 1988 to September 1988, I was hired to supervise and assist in the indexing of the first 20,000 boxes which were turned over to the Trust in November 1988. From September 1988 to January 1989, I assisted in the privilege review of documents to be given to the Trust. From November 1988 to April 1994, I worked for Freeborn & Peters and was put in charge of the Facility, managing all productions and "new" acquisitions. In September 1995, I was hired by the Trust to manage the Facility. In December 1998, I was hired by

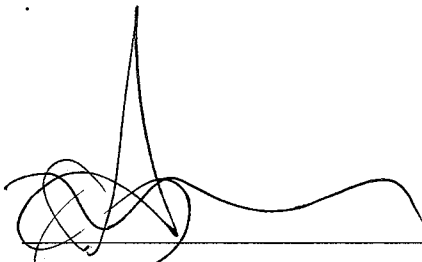
the CRMC to manage the Facility for the Trust. Accordingly, I am personally familiar with many of the records stored at the Facility, as well as how the records have been gathered.

5. To the best of my knowledge, information and belief, I certify that these records were made at or near the time by, or from information transmitted by, a person with knowledge, were kept in the course of the regularly conducted business activity of Manville, and it was the regular practice and the business activity of Manville to make the records.

6. Attached are documents found among the file and microfilm box collections at the Facility. These documents, bates labeled CRMC-SBGAB-ConduitPipe-000001 through CRMC-SBGAB-ConduitPipe-000092, are true and correct copies of documents found at the Facility.


Margaret J. Baumgardner

Subscribed and sworn to before
me this 16th day of May, 2014.


Notary Public

AMY W BENHAM
NOTARY PUBLIC
STATE OF COLORADO
MY COMMISSION EXPIRES 05-23-2016