

DECLARATION

OF

SPECIFICATION

ENTITLED

POLYETHYLENE PIPE TYPE 32

AS

THE IRISH STANDARD SPECIFICATION FOR
POLYETHYLENE PIPE TYPE 32

The Institute for Industrial Research and Standards in exercise of the power conferred by section 20 of the Industrial Research and Standards Act, 1961 (No. 20 of 1961), and with the consent of the Minister for Industry, Commerce and Energy, hereby declares as follows:

1. This instrument may be cited as the Standard Specification (Polyethylene Pipe Type 32) Declaration, 1977.
2. (1) The Specification set forth in the Schedule to this declaration is hereby declared to be the standard specification for Polyethylene Pipe Type 32.

(2) The said standard specification may be cited as Irish Standard 134: 1977 or as I.S. 134: 1977.
3. (1) The Standard Specification (Polyethylene Pipe 425 Type) Declaration, 1965, is hereby revoked.

(2) Reference in any other standard specification to the Instrument hereby revoked and to Irish Standard 134: 1965, thereby prescribed, shall be construed, respectively, as references to this Instrument and to Irish Standard 134: 1977.

SCHEDULE

Polyethylene Pipe Type 32

1. SCOPE

1.1 This specification applies to black polyethylene pipe type 32 for use in cold water services and in flush, overflow, warning and waste pipe applications.

The type designation, 32, is an indication of the recommended maximum working stress for the material in bars, at 20°C when in pipe form. This stress has been used as the basis for calculating minimum wall thicknesses.

2. CLASSIFICATION

2.1 Polyethylene pipe shall be classified by gauge as follows:

(a) *Normal gauge pipe*. Suitable for connection by means other than screw threading.

(b) *Heavy gauge pipe*. Suitable for screw threading and for connection by other means.

3. COMPOSITION

3.1 The extrusion compound shall be manufactured from a mixture of polyethylene, carbon black and antioxidant conforming to the requirements of British Standard 1972 published by the British Standards Institution, 2 Park Street, London W1A 2BS, and the material in the extruded pipe shall conform to the requirements for pipe material given in that standard.

4. DIMENSIONS

4.1 Pipe dimensions shall be designated by the nominal size as given in Tables 1 and 2.

4.2 The outside diameters and wall thicknesses of pipes shall be as given in Tables 1 and 2.

5. METHOD OF MEASURING DIMENSIONS

5.1 The outside diameter shall be the average of two measurements taken at right angles round the pipe.

5.2 The wall thickness shall be measured with a ball-ended or barrel-ended micrometer.

6. LENGTHS

6.1 Pipes shall normally be supplied in coils of 50 m, 100 m or 150 m. A tolerance of $+0.8\%$ on coiled length is permissible.

6.2 Other lengths, including straight lengths, may be supplied by agreement between the purchaser and manufacturer.

7. PHYSICAL CHARACTERISTICS

7.1 **Freedom from defects.** The internal and external surfaces of the pipe shall be smooth, clean and reasonably free from grooves and other defects.

7.2 **Heat reversion.** When tested by the method described in Appendix A at no point round the pipe shall the length change by more than 3% .

8. MECHANICAL CHARACTERISTICS

8.1 **Hydraulic pressure resistance.**

8.1.1 *Proof Test.* When tested by the method described in Appendix B.1 the pipe shall withstand the appropriate pressure set out in Table 3 without localized swelling, leakage or weeping.

8.1.2 *Batch test.* When tested by the method described in Appendix B.2 the pipe shall withstand the appropriate pressure set out in Table 4 without localized swelling, leakage or weeping.

8.2 **Tensile strength.** When tested by the method described in Appendix C the pipe shall have a tensile strength of not less than 9.7 MN/m^2 and an elongation at break of not less than 350% .

TABLE 1
Dimensions - Normal Gauge Pipe

Nominal size in.	Outside diameter mm		Wall thickness mm	
	min.	max.	min.	max.
1/4 3/8 1/2 3/4 1 1 1/4 1 1/2 2	16.95	17.30	2.30	2.60
	24.95	25.40	3.10	3.50
	31.25	31.75	3.10	3.50
	37.50	38.10	3.10	3.50
	43.80	44.45	3.50	3.90
	60.00	60.85	4.65	5.20

TABLE 2
Dimensions - Heavy Gauge Pipe

Nominal size in.	Outside diameter mm		Wall thickness mm	
	min.	max.	min.	max.
1/4 3/8 1/2 3/4 1 1 1/4 1 1/2 2	13.50	13.85	3.50	3.95
	16.95	17.30	3.75	4.20
	20.70	21.10	4.30	4.85
	27.05	27.45	4.30	4.85
	33.85	34.25	4.30	4.85
	42.00	42.65	5.05	5.60
	47.95	48.65	5.35	5.90

TABLE 3
Proof Test Pressures

Nominal size in.	Test pressure (bars)	
	Normal gauge pipe	Heavy gauge pipe
1/4 3/8 1/2 3/4 1	—	39.3
	—	31.7
	17.9	29.0
	15.9	20.7
	12.4	16.6
1 1/4 1 1/2 2	10.3	15.9
	9.7	14.5
	9.7	—

TABLE 4
Batch Test Pressures

Nominal size in.	Test pressure (bars)	
	Normal gauge pipe	Heavy gauge pipe
1/4 3/8 1/2 3/4 1 1 1/4 1 1/2 2	—	59.0
	—	47.6
	26.9	43.4
	23.8	31.0
	18.6	24.8
	15.5	23.8
	14.5	21.7
2	14.5	—

9. SAMPLING

9.1 **Heat reversion test.** Three representative samples shall be chosen at random from every batch or from every 1000 m of pipe whichever is less. A batch shall be deemed to have failed if any test specimen fails.

9.2 **Hydraulic resistance – proof test.** Every coil shall comply with the requirements of this test. (See Clause 8.1).

9.3 **Hydraulic resistance – batch test.** Three representative samples shall be chosen at random from every batch or from every 1000 m of pipe whichever is less. A batch shall be deemed to have failed if any test specimen fails.

9.4 **Tensile test.** Three representative samples shall be chosen at random from every batch or from every 1000 m of pipe whichever is less. Should one of the test specimens fail a further six samples shall be selected at random from the same batch and shall be tested. A batch shall be deemed to have failed if any of these further six samples fails.

10. PACKING

10.1 If the pipe is to be coiled this shall be done at a temperature of less than 30°C. The internal diameter of the coil shall not be less than 24 times the mean outside diameter of the pipe with a minimum of 0.6 m.

10.2 The ends of the pipe shall be plugged or covered.

11. MARKING

11.1 All pipes shall be indelibly and legibly marked at intervals of not more than 3 m with the following:

- (a) the manufacturer's name or mark,
- (b) the inscription I.S. 134: 1977,
- (c) the class of pipe,
- (d) the nominal size or outside diameter of the pipe.

11.2 The marking shall be in the following colours:

Normal gauge: Red

Heavy gauge: Blue

Note: Adhesive labels alone shall not suffice.

APPENDIX A

HEAT REVERSION TEST

A.1 **Apparatus.** The apparatus shall consist of a thermostatically controlled bath which maintains the temperature throughout the heat transfer medium at $100 \pm 2^\circ\text{C}$.

The heat transfer medium may be water, a mineral oil free from aromatic hydrocarbons or polyethylene glycol.

A.2 **Test specimen.** The test specimen shall consist of a piece of pipe 150 ± 20 mm long. Two circumferential marks shall be scribed on the specimen 100 mm apart and at equal distances from the two ends.

A.3 **Procedure.** The test specimen shall be suspended in the heat transfer medium by one end in such a way that both marks are completely immersed. Care should be taken that the specimen does not contact the sides or bottom of the bath.

The specimen shall remain immersed in the bath for 30 minutes. It shall then be removed, laid on its side and allowed to cool to room temperature. The distance between the two scribed marks shall be measured along the surface of the pipe and the percentage change in length shall be calculated.

A.4 **Number of tests.** The number of tests shall be as required in Clause 9.1.

APPENDIX B

RESISTANCE TO HYDRAULIC PRESSURE

B.1 **Proof test.**

B.1.1 **Test specimen.** Full coils of pipe shall be subjected to this test.

B.1.2 **Procedure.** Each coil of pipe shall be subjected to the appropriate pressure given in Table 3. The pressure shall be applied at room temperature and shall be maintained for a period of not less than 2 minutes. The pipe shall be examined for signs of localized swelling, weeping or leakage.

B.2 Batch test.

B.2.1 *Test specimen.* The test specimen shall consist of a length of pipe not less than 10 times the outside diameter of the pipe cut from a sample of the pipe (See Clause 9.3).

B.2.2. *Procedure.* The test specimen shall be subjected to the appropriate test pressure given in Table 4. The pressure shall be applied at a temperature of $20 \pm 2^{\circ}\text{C}$ and shall be maintained for a period of not less than 2 minutes. It shall be examined for signs of leakage, weeping or localized swelling.

B.2.3 *Number of tests.* The number of tests shall be as required in Clause 9.3.

APPENDIX C

TENSILE TEST

C.1 **Test specimen.** The test specimen shall be cut from the pipe sample (See Clause 9.4) and shall be of the profile of the dumbbell shown in Fig. 301.9 of British Standard 2782 "Methods of testing plastics".

The edges of the test specimen shall be smooth and free from defects. Reference marks shall be marked on the test specimen perpendicular to its longitudinal axis 25 mm apart and symmetrically placed.

C.2 **Procedure.** The test shall be carried out at a temperature of $20 \pm 2^{\circ}\text{C}$ (the specimen having been conditioned at this temperature for not less than 2 hours immediately before testing. The mean thickness of the waisted part of the specimen shall be determined to the nearest 0.05 mm. Between 15 and 20 mm of the ends of the specimen shall be held in the grips and it shall be mounted in the tensile testing machine in axial alignment with the direction of pull. It shall be loaded by separating the grips at a substantially constant rate of 450 ± 75 mm/min until it breaks. The load at break and the distance between the reference marks at break shall be noted. The tensile strength at break and the elongation at break expressed as a percentage of the original distance between the reference marks shall be calculated.

C.3 **Number of tests.** The number of tests shall be as required in Clause 9.4.

TABLE 5
Weight, Working Pressures – Normal Gauge Pipe

Nominal size in.	Approximate weight kg/50 m	Working pressure	
		bars	m head
1/2	5.2	9.0	91
3/4	10.4	7.9	81
1	13.4	6.2	64
1 1/4	16.4	5.2	52
1 1/2	21.6	4.8	49
2	39.4	4.8	49

TABLE 6
Weight, Working Pressures – Heavy Gauge Pipe

Nominal size in.	Approximate weight kg/50 m	Working pressure	
		bars	m head
1/2	5.2	19.7	201
3/8	8.2	15.9	160
1/2	11.2	14.5	146
3/4	15.6	10.3	107
1	20.2	8.3	84
1 1/4	28.3	7.9	81
1 1/2	34.6	7.2	72

(e) **Jointing.** There are many fittings available for use with polyethylene pipe and users are advised to seek the guidance of manufacturers as to the most suitable for use in a particular application. It is not possible to joint polyethylene pipes by solvent cementing.

(f) **Threading.** Heavy gauge pipe is suitable for threading to British Standard 21: 1973 "Pipe threads for tubes and fittings where pressure-tight joints are made on the threads".

(g) **Protection of metal fittings.** Where metal fittings are used in circumstances where the metal may be liable to external corrosion, such fittings should be protected by wrapping them with polyethylene adhesive tape. Other adhesive wrapping tapes which may embody substances injurious to polyethylene should be avoided.

(h) **Bending.** 1) *Cold bending:* Small diameter polyethylene pipes have a degree of flexibility such that a substantial radius may be set up within a length of pipe without heating or forming. An inside radius of not less than 12 times the outside diameter of the pipe is permissible. It is advisable that cold bended pipe should be secured.