

Product Manual
for
NS 40:2079 Polyethylene Pipes for Water Supply

1.	Product	:	NS 40: 2079
	Title	:	Polyethylene Pipes for Water Supply
2.	Sampling Guidelines:		
a)	Raw material	:	a) Polyethylene resin/ pre-compounded black material – Clause 5.2 of NS 40 b) Carbon black master batch – Clause 5.3 of NS 40: 2079 c) Anti-oxidant – Clause 5.4 of NS 40: 2079
b)	Grouping guidelines	:	Please refer Annex A
c)	Sample Size	:	3 pieces of pipe of 1 m each for each size/pressure
2	Equipment to be calibrated		Please refer Annex B
3.	Scheme of Inspection and Testing	:	Please refer Annex C
4.	Scope of the License : Please refer Annex D		

ANNEX A
Grouping Guidelines

1. Polyethylene Pipes for Water Supply as per IS NS 40: 2079 are classified as follows:

Material Grades	PE 63, PE 80 and PE 100
Standard Dimension Ratio (SDR)	SDR 41, SDR 33, SDR 26, SDR 21, SDR 17, SDR 13.6, SDR 11, SDR 9, SDR 7.4 and SDR 6
Pressure Ratings	PN 2, PN 2.5, PN 3.2, PN 4, PN 5, PN 6, PN 8, PN 10, PN 12.5, PN 16 and PN 20
Sizes (Nominal Diameter)	DN 16 mm to DN 2500 mm

2. Considering the above, Polyethylene Pipes are categorized into following groups for the purpose of grant of license (GoL) and change in scope of license (CSoL):

Material Grade	Pressure Rating Group (PN)			Size Group DN (mm)				
	Group-A	Group-B	Group-C	Group-I	Group-II	Group-III	Group-IV	Group-V
PE 63	PN 2, PN 2.5, PN 3.2, PN 4	PN 5, PN 6, PN 8	-	16 to 180	200 to 500	560 to 1000	1200 to 2000	2250 & 2500
PE 80	PN 2.5, PN 3.2, PN 4	PN 5, PN 6, PN 8, PN 10	PN 12.5, PN 16, PN 20	16 to 180	200 to 500	560 to 1000	1200 to 2000	2250 & 2500
PE 100	PN 3.2, PN 4	PN 5, PN 6, PN 8, PN 10	PN 12.5, PN 16, PN 20	16 to 180	200 to 500	560 to 1000	1200 to 2000	2250 & 2500

3. For considering GoL/CSoL, testing shall be done as follows:
- a) Pipe with **highest pressure rating from each pressure rating group** (Group-A, Group-B and Group-C) shall be tested to cover pipes of all pressure ratings in that pressure rating group and manufactured from same material grade.
 - b) **Two pipes from each size group, preferably highest and lowest sizes**, shall be tested to cover pipes of all sizes in that size group.
4. The industry shall declare the varieties of Polyethylene Pipes intended to be covered in the License. The Scope of License may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.
5. During the operation of the License, NBSM shall ensure that all Pressure ratings, Material grades and Sizes covered in the License are tested in rotation, to the extent possible.

ANNEX B

List of Test Equipment to be Calibrated

The following major test equipment are required to be calibrated:

- Vernier caliper
- Pi Tape
- Micrometer
- Thermometer
- Pressure gauge
- Tensile tester
- Weighing Scale

ANNEX C

Scheme of Inspection and Testing

1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1 and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipment.

2. TEST RECORDS –The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. LABELLING AND MARKING – As per the requirements of NS 40:2079.

4. Control Unit – Pipes of same designation from a continuous extrusion run of one machine manufactured from same batch of raw material up to maximum of 48 h duration shall constitute one control unit.

5. LEVELS OF CONTROL - The tests as indicated in column 1 of Table 1 and the levels of control submitted by the manufacturer in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

5.1 All the production which conforms to the Standard and covered by the license should be marked with NS Mark.

6. REJECTIONS –Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of Nepal Standard Certification Mark Act, 2037 and its rules.

TABLE 1

(1)		(2)	(3)		
Test Details		Test equipment requirement R: required (or) O: Out sourcing permitted (or) C: Supplier Certificate permitted	Recommended Levels of Control		
Clause	Requirement		No. of Sample	Frequency	Remarks
5	Material	O/C	One	Each batch in a consignment	Can be outsourced from an accredited laboratory or a government laboratory
6.2	Colour	R	All	-	-
6.2.1	Identification strip	R	Ten	Each control unit	Samples shall be selected at random to cover entire production evenly as far as possible. In case failure of sample in any requirement, double the initial sample shall selected and tested, control unit shall be rejected in case of failure of retested samples.
7	Geometric Characteristics of Pipes (Visual appearance, Length/ Coiling and Dimensions)	R	Ten	Each control unit	
8.1.1	Internal Pressure Creep Rupture Test of Pipe (at 80 ° C for 48 h)	R	One	Each control unit	-

8.1.1	Internal Pressure Creep Rupture Test of Pipe (at 27 ° C for 100 h)	R	One	whenever there is any change in resin composition or method of manufacture.	The testing schedule shall be so arranged that during period of one year, pipe of the highest size from each pressure rating/SDR and each grade manufactured during the period shall be tested. In case of failure, marking shall be stopped immediately and NBSM shall be informed about failure. Corrective actions shall be taken and marking shall be resumed only after satisfactory testing of additional three samples.
8.1.1	Internal Pressure Creep Rupture Test of Pipe (at 80 ° C for 165 h)	O/R	One	whenever there is any change in resin composition or method of manufacture.	The testing schedule shall be so arranged that during period of two years, pipe of the highest size of each pressure rating/SDR and each grade manufactured during the period shall be tested. In case of failure marking shall be stopped immediately and NBSM shall be informed about failure. Corrective actions shall be taken and marking shall be resumed only after satisfactory testing of additional three samples.
8.1.1	Internal Pressure Creep Rupture Test of Pipe (at 80 ° C for 1000 h)	O/R	One	Once in two years or whenever there is any change in resin composition or method of manufacture.	

8.1.2	Internal Pressure Creep Rupture Test of Pipe Joints (at 80 ° C for 48 h)	R	Three	whenever there is any change in resin composition or method of manufacture.	
8.2	Longitudinal Reversion Test	R	One	Each control unit	-
8.3	Carbon Black Content and Dispersion	R	One	Each control unit	The sample shall be composite sample of minimum three pipes drawn at regular interval.
8.4	Melt Flow Rate	R	One	Each control unit	The sample shall be composite sample of minimum three pipes drawn at regular interval.
8.5	Oxidation Induction Time	R	One	Each control unit	-
8.6	Overall Migration	O	One	Once in six month or whenever there is any change in resin composition or method of manufacture.	
8.7	Density	R	One	Each control unit	

8.8	Tensile Strength for Butt-fusion	O	One	Only if the buyer needs a compliance	
8.9	Tensile Properties (Yield Strength & Elongation at Break)	R	One	Each control unit	
8.10	Slow Crack Growth Rate Test	O	One	whenever there is any change in resin composition or method of manufacture.	

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ANNEX- D

SCOPE OF LICENCE

“License is granted to use Standard Mark as per IS 4984: 2016 with the following scope:	
Name of the product	POLYETHYLENE PIPES FOR WATER SUPPLY
Pipe Designation (PE_ PN_ DN_ SDR_)	