
WATER INDUSTRY SPECIFICATION

WIS 4-24-01
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UK Water Industry
Engineering and Operations Committee

Amendment to: SPECIFICATION FOR MECHANICAL FITTINGS AND JOINTS INCLUDING FLANGES FOR POLYETHYLENE PIPES FOR THE CONVEYANCE OF COLD POTABLE WATER FOR THE SIZE RANGE 90 TO 1000 INCLUSIVE MADE OF METAL OR PLASTICS OR A COMBINATION OF BOTH

This amendment has been prepared to extend the scope of WIS 4-24-01 to include mechanical fittings for use with polyethylene pipes to WIS 4-32-13 (HPPE pipes), and to take into account the revised pressure classes for MDPE pipes.

This amendment forms an integral part of the Specification and replaces elements of the original as indicated below.

General: Replace all references to WIS 4-32-03 with: "WIS 4-32-03 and/or WIS 4-32-13 as applicable".

1.1 Replace with "This specification specifies the materials and design details together with the testing requirements for mechanical fittings, including flanges, for use with polyethylene pipe complying with WIS 4-32-03 and/or WIS 4-32-13, in the size range 90 to 1000 inclusive.

The requirement for Type 1, 2 or 3 end-load resistance fittings for a particular application should be assessed by the water company."

1.2 Replace with "Fittings shall be designated by the nominal size of the pipe which they are to be used and the material for which they are intended to connect, e.g. MDPE or HPPE."

3.2 Delete.

3.3 Replace with "Materials shall comply with the relevant British Standard, or equivalent, where available. Where such materials are likely to come into contact with potable water, they shall meet the requirements of 5.2".

4.1 Replace with "Fittings to this specification shall be suitable for use with polyethylene pipe to WIS 4-32-03 and/or WIS 4-32-13 as applicable, at working pressures specified in these documents".

4.2 Replace with "Fittings shall be capable of being assembled and meeting the requirements of Clauses 5 and 6 of WIS 4-24-01 under the extremes of pipe dimensional tolerances specified in WIS 4-32-03 and/or WIS 4-32-13, as applicable".

4.3 Delete "FWR/WRc document FR 0028". Replace with "WIS 4-52-01".

Replace Table 2 with:

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Table 2

Time to Failure (h)	Minimum Pressure (bar)					
	MDPE		HPPE			
	SDR 11	SDR 17.6	SDR 11	SDR 17.6	SDR 26	SDR 33
100 - 1000	22	13.3	24.8	14.9	9.9	7.8
5000 - 10000	20	12.5	23.0	13.9	9.2	7.2

5.4.3 Third paragraph. Delete. Insert:

"(b) A test at the maximum rated working pressure of the pipes for 8 hours at a temperature of 20 (+2-1)°C."

6.2 Delete "a pressure of 16 bar...of 20(+2-1)°C". Insert "the relevant pressure from the table below:

SDR	11	17.6	26	33
MDPE (bar)	26.0	15.6	-	-
HPPE (bar)	30.0	18.1	12.0	9.4

8. First paragraph. Replace whole with: "Fittings and liners (where required) shall be marked legibly in the colours given below:

SDR	11	17.6	26	33
Fittings for MDPE pipe	dark blue	red	-	-
Fittings for HPPE pipe	black	red	yellow	orange

Insert:

"(g) material, i.e. MDPE/HPPE"

9.1 Replace whole with "Reference should be made to IGN 4-52-02 which covers the selection of appropriate coatings and the design, packaging and handling of coated products."

10.1 Delete reference to FR No. 0028.

To list of Water Industry Specifications, add:

WIS 4-32-13 Specification for blue higher performance polyethylene, HPPE/PE100, pressure pipes, nominal size 90 to 1000, for underground or protected use for the conveyance of water intended for human consumption. March 1993.

WIS 4-52-01 Specification for polymeric anti-corrosion (barrier) coatings. December 1992.

To list of Information and Guidance Notes, add:

IGN 4-01-02 delete "*"; replace with "Published March 1992."

IGN 4-52-02 The use of polymeric anti-corrosion (barrier) coatings. January 1993.

Tables 3a and 3b: Replace with Tables 3a-d given on Page 3 of this amendment.

Tables 4a and 4b: Replace with Tables 4a-d given on Page 4 of this amendment.

D.2 First paragraph. Add Note:

"Testing may be carried out in pairs, in which case 4 test pieces rather than the usual 3 will be evaluated".

Replace Note with:

"**Caution:** testing with **compressed** air can be dangerous and the test specimen must be vented of all air."

D.3 Delete "±1°C". Insert "(+2-1) °C

D.4 In definition of t₁, delete "i.e." "Insert" e.g."

Table 3a - Pull out test force at 80°C for Type 1 fittings for MDPE pipe

Nom Size	SDR 11	SDR 17.0	SDR 17.6	SDR 26	SDR 33
90	7.5	4.86	4.70	3.25	2.58
110	10.8	7.26	7.03	4.84	3.85
125	14.0	9.37	9.00	6.26	4.98
160	22.9	15.4	14.8	10.3	8.15
180	29.5	19.4	19.0	13.0	10.3
225	45.3	30.4	29.4	20.3	16.1
250	57.0	37.5	37.0	25.0	19.9
280	70.2	47.5	45.5	31.4	25.0
315	90.0	59.5	58.5	39.8	31.6
355	115.0	75.6	74.0	50.5	40.1
400	145.0	96.0	94.0	64.1	51.0
450	185.0	121	120.0	81.1	64.5
500	225.0	150	145.0	100	79.6
560	300.0	188	180.0	126	100
630	380.0	238	230.0	159	126
710	-	-	295.0	202	160
800	-	-	375.0	-	203
900	-	-	475.0	-	258
1000	-	-	585.0	-	-

Note: Some nominal sizes have been added to original table.

Table 3c - Pull out test force at 80°C for Type 1 fittings for HPPE pipe

Nom Size	SDR 11	SDR 17.0	SDR 17.6	SDR 26	SDR 33
90	9.19	6.16	5.96	-	-
110	13.7	9.20	8.97	-	-
125	17.7	11.9	11.5	-	-
160	29.0	19.4	18.8	13.1	-
180	36.8	24.6	23.8	16.4	-
225	57.5	38.5	37.2	25.6	-
250	70.8	47.5	46.0	31.7	-
280	88.8	59.6	57.7	39.6	-
315	112.5	75.4	73.0	50.3	-
355	143.1	95.8	92.4	63.7	51.5
400	181.7	122	117.6	80.8	65.5
450	230.2	154	149.2	102.2	82.6
500	284	190	183.2	126.1	101.8
560	355.1	238	229.9	158.2	128.2
630	449.8	-	291.3	200.5	161.8
710	-	-	369.7	255.0	206.0
800	-	-	469.4	323.2	260.8
900	-	-	593.4	411.1	330.6
1000	-	-	733.1	506.9	407.2

Table 3b - Pull out test force at 80°C for Type 2 fittings for MDPE pipe

Nom Size	SDR 11	SDR 17.0	SDR 17.6	SDR 26	SDR 33
90	4.0	3.03	2.41	2.00	1.61
110	6.66	4.52	3.61	2.98	2.40
125	8.0	5.84	5.0	3.84	3.10
160	14.1	9.56	7.63	6.30	5.08
180	16.0	12.1	11.0	7.98	6.42
225	27.9	18.9	15.1	12.5	10.0
250	31.0	23.3	21.0	15.4	12.4
280	43.2	29.3	23.4	19.3	15.5
315	50.0	37.1	32.0	24.4	20.0
355	63.0	47.1	41.0	31.0	25.0
400	80.0	59.7	52.0	39.4	31.7
450	102.0	75.6	66.0	49.9	40.1
500	124.0	93.4	80.0	61.6	50.0
560	165.0	117	99.0	77.3	62.2
630	208.0	148	126.0	97.8	78.7
710	-	188	162.0	124	100
800	-	239	206.0	158	127
900	-	-	261.0	200	161
1000	-	-	321.0	246	198

Note: Some nominal sizes have been added to original table.

Table 3d - Pull out test force at 80°C for Type 2 fittings for HPPE pipe

Nom Size	SDR 11	SDR 17.0	SDR 17.6	SDR 26	SDR 33
90	4.0	3.35	2.6	-	-
110	6.0	5.00	3.9	-	-
125	7.7	6.45	5.0	-	-
160	12.7	10.6	8.2	5.7	-
180	16.0	13.4	10.3	7.2	-
225	25.0	21.0	16.2	11.2	-
250	30.8	25.8	19.9	13.8	-
280	38.7	32.4	25.0	17.3	-
315	48.9	41.0	31.7	21.9	-
355	62.2	52.1	40.2	27.8	22.2
400	79.0	66.1	51.1	35.3	28.2
450	100.0	83.6	64.7	44.6	35.7
500	123.4	103	79.7	55.0	44.0
560	154.6	130	100.0	69.1	55.3
630	195.8	164	126.6	87.4	69.9
710	-	208	160.8	111.1	88.9
800	-	264	204.0	141.0	112.7
900	-	-	258.2	178.8	142.8
1000	-	-	318.8	220.7	176.1

Table 4a - Pull out test forces for Type 1 fittings for MDPE pipe

Nom Size	SDR 11	SDR 17.0	SDR 17.6	SDR 26	SDR 33
90	32.0	21.1	20.4	14.1	11.2
110	47.1	31.6	30.6	21.1	16.8
125	61.0	40.8	40.0	27.2	21.6
160	100	66.8	64.6	44.6	35.4
180	127.0	84.5	82.0	56.5	44.9
225	197	132	128	88.2	70.1
250	245.0	163	158	109	86.5
280		204	198	137	109
315	386.0		251	173	137
355	491.0		318	220	174
400	624.0		404	279	221
450	789.0		512	353	280
500	975.0		632		346
560	1221.0		792		
630	1547.0		1003		
710			1272		
800			1618		
900			2044		
1000			2525		

Note: Some nominal sizes have been added to original table.

Table 4c - Pull out test forces for Type 1 fittings for HPPE pipe

Nom Size	SDR 11	SDR 17.0	SDR 17.6	SDR 26	SDR 33
90	40.4	26.8	25.9		
110	59.7	40.0	39.0		
125	77.3	51.6	50.0		
160	126.7	84.6	82.0	56.9	
180	160.2	107	103.4	71.3	
225	250.2	167	162.1	111.1	
250	308.0	206	200.0	137.8	
280	386.0	259	250.7	172.0	
315	489.0		317.4	218.8	
355	622.2		401.8	277.1	223.9
400	790.0		511.2	351.3	284.7
450	1001.0		648.5	444.3	359.3
500	1234.4		796.8	548.3	442.7
560	1544.0		999.6	688.0	557.3
630	1955.7		1266.4	871.6	703.5
710	-		1607.2	1108.6	895.5
800	-		2040.7	1405.3	1134.1
900	-		2579.8	1787.3	1437.2
1000	-		3187.3	2204.1	1770.6

Table 4b - Pull out test forces for Type 2 fittings for MDPE pipe

Nom Size	SDR 11	SDR 17.0	SDR 17.6	SDR 26	SDR 33
90	18.0	13.2	10.5	8.68	6.98
110	28.9	19.7	15.7	13.0	10.4
125	34.0	25.4	22.0	16.7	13.5
160	61.2	41.6	33.2	27.4	22.1
180	70.0	52.6	45.0	34.7	28.0
225	121	82.2	65.6	54.2	43.6
250	135	101	87.0	67.0	53.9
280	188	127	102	84.0	67.6
315	212	161	138.0	106	85.5
355	270	205	175.0	135	109
400	343	260	222.0	171	138
450	433		280.0	216	175
500	535		346	268	215
560	670		434		270
630	849		550		
710	-		697		
800	-		886		
900	-		1121		
1000	-		1384		

Note: Some nominal sizes have been added to original table.

Table 4d - Pull out test forces for Type 2 fittings for HPPE pipe

Nom Size	SDR 11	SDR 17.0	SDR 17.6	SDR 26	SDR 33
90	17.4	14.5	11.2		
110	26.0	21.7	16.8		
125	33.6	28.1	21.7		
160	55.0	46.0	35.5	24.7	
180	69.6	58.2	44.9	31.1	
225	108.7	91.0	70.3	48.5	
250	134.0	112	86.7	60.0	
280	168.1	141	108.8	75.1	
315	212.8	178	137.7	95.2	
355	270.4	226	174.7	120.8	96.6
400	343.3	287	222.0	153.3	122.8
450	434.7		281.2	193.9	155.2
500	536.5		346.5	239.4	191.4
560	672.3		434.7	300.3	240.5
630	851.1		550.4	380.2	304.1
710	-		699.0	483.2	386.5
800	-		887.2	613.1	490.2
900	-		1122.4	777.4	620.8
1000	-		1386.1	959.4	765.7