COMMERCIAL STANDARD **CS 197-59**

Supersedes CS 197-57

Flexible Polyethylene Plastic Pipe

A recorded voluntary standard of the trade published by the U.S. Department of Commerce

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U.S. DEPARTMENT OF COMMERCE

LEWIS L. STRAUSS, Secretary

Issued by

OFFICE OF TECHNICAL SERVICES

Commodity Standards Division

With the cooperation of

NATIONAL BUREAU OF STANDARDS

COMMERCIAL STANDARDS

Commercial Standards are developed by manufacturers, distributors, and users in cooperation with the Commodity Standards Division of the Office of Technical Services, and with the National Bureau of Standards. Their purpose is to establish quality criteria, standard methods of test, rating, certification, and labeling of manufactured commodities, and to provide uniform bases for fair competition.

The adoption and use of a Commercial Standard is voluntary. However, when reference to a Commercial Standard is made in contracts, labels, invoices, or advertising literature, the provisions of the standard are enforcible through usual legal channels as a part of the sales contract.

Commercial Standards originate with the proponent industry. The sponsors may be manufacturers, distributors, or users of the specific product. One of these three elements of industry submits to the Commodity Standards Division the necessary data to be used as the basis for developing a standard of practice. The division, by means of assembled conferences or letter referenda, or both, assists the sponsor group in arriving at a tentative standard of practice and thereafter refers it to the other elements of the same industry for approval or for constructive criticism that will be helpful in making any necessary adjustments. The regular procedure of the division assures continuous servicing of each Commercial Standard through review and revision, whenever, in the opinion of the industry, changing conditions warrant such action.

SIMPLIFIED PRACTICE RECOMMENDATIONS

Under a similar procedure the Commodity Standards Division cooperates with industries in the establishment of Simplified Practice Recommendations. Their purpose is to eliminate avoidable waste through the establishment of standards of practice for sizes, dimensions, varieties, or other characteristics of specific products; to simplify packaging practices; and to establish simplified methods of performing specific tasks.

Flexible Polyethylene Plastic Pipe

(Third Edition)

[Effective March 1, 1959]

1. PURPOSE

1.1 The purpose of this Commercial Standard is to establish, on a national basis, standard dimensions and significant quality requirements for black, flexible polyethylene plastic pipe, for the information of producers, distributors, and users, and to promote understanding between buyers and sellers.

2. SCOPE

2.1 This Commercial Standard includes requirements for material, workmanship, dimensions, working pressure, field pressure, incremental pressure, sustained pressure, and environmental cracking for three series of wall thicknesses of flexible polyethylene plastic pipe, used principaly for conveying potable water. Flexible polyethylene plastic pipe covered by this Commercial Standard is intended to be used at temperatures not greater than 49° C. (120° F.). Methods of marking and indicating compliance with this standard are included.

3. PIPE CLASSIFICATIONS

Series 1. Dimensions shown in table 1.
Series 2. Dimensions shown in table 2.
Series 3. Dimensions shown in table 3.

4. REQUIREMENTS

4.1 *Material.*

4.1.1 *National sanitation foundation approval.*—All pipe shall meet the specifications of the National Sanitation Foundation. These specifications require that the pipe shall be manufactured of virgin polyethylene, that no scrap material has been used, and that it is satisfactory for potable water.[1]

4.1.2 *Carbon black.*—The polyethylene pipe extrusion compound shall contain at least 2% carbon black when tested in accordance with paragraph 5.3. For pipe produced by simultaneous multiple extrusion, the outer layer shall contain at least 2% carbon black.

4.1.3 *Density.*—The polyethylene plastic covered by this standard shall have a density of 0.940 g/cm^3 or less when determined in accordance with paragraph 5.4.

4.2 *Workmanship.*—The manufacture of the pipe shall be in accordance with good commercial practice so as to produce pipe meeting the requirements of this standard. Finished pipe shall be free from nicks, scratches, and other surface defects and blemishes.

[1] Manufacturers should obtain information on conditions for approval from the National Sanitation Foundation, School of Public Health, University of Michigan, Ann Arbor, Mich.

4.2.1 *Bond.*—For pipe produced by simultaneous multiple extrusion, that is, containing two or more concentric layers, the bond between the layers shall be strong and uniform. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly at any point.

4.3 *Dimensions, Tolerances, and Weights.*

4.3.1 *Dimensions and tolerances.*—The inside diameters, wall thicknesses, and tolerances for Series 1, 2, and 3 pipe shall conform to the values given in tables 1, 2, and 3, respectively, when determined in accordance with paragraph 5.5.

4.3.2 *Thickness of outer layer.*—For pipe produced by simultaneous multiple extrusion, the outer layer shall be at least 0.020 inch thick.

4.3.3 *Weights.*—The minimum weights for Series 1, 2, and 3 pipe shall conform to the minimum values given in tables 1, 2, and 3, respectively, when determined in accordance with paragraph 5.5.

TABLE 1. *Dimensions and tolerances for Series 1 flexible polyethylene pipe*

Nominal size	Inside diameter of pipe		Wall thickness of pipe		Weight of pipe [a]	
	Diameter	Tolerances	Thickness	Tolerance	Minimum	Nominal
Inches	*Inches*	*Inch*	*Inch*	*Inch*	*lb/100 ft*	*lb/100 ft*
½	0.622	+0.010, −0.010	0.109	±0.006	9.2	10.0
¾	0.824	+.010, −.015	.113	±.006	12.3	13.2
1	1.049	+.010, −.020	.133	±.007	18.2	19.7
1¼	1.380	+.010, −.020	.140	±.007	24.9	26.7
1½	1.610	+.015, −.020	.145	±.008	29.6	31.9
2	2.067	+.015, −.020	.154	±.008	40.1	42.9
2½	2.469	+.015, −.025	.203	±.009	64.1	68.0
3	3.068	+.015, −.030	.216	±.010	83.7	88.9
4	4.026	+.015, −.035	.237	±.012	118.8	126.6
6	6.065	+.020, −.035	.280	±.015	209.0	222.6

[a] Based on an extrusion compound with a density of 0.920 g/cm³.

TABLE 2. *Dimensions and tolerances for Series 2 flexible polyethylene pipe*

Nominal size	Inside diameter of pipe		Wall thickness of pipe		Weight of pipe [a]	
	Diameter	Tolerances	Thickness	Tolerance	Minimum	Nominal
Inches	*Inches*	*Inch*	*Inch*	*Inch*	*lb/100 ft*	*lb/100 ft*
½	0.622	+0.010, −0.010	0.080	±0.005	6.5	7.0
¾	0.824	+.010, −.015	.100	±.006	10.6	11.6
1	1.049	+.010, −.020	.125	±.007	17.0	18.4
1¼	1.380	+.010, −.020	.165	±.008	29.8	31.9
1½	1.610	+.015, −.020	.195	±.010	41.1	44.1
2	2.067	+.015, −.020	.250	±.013	67.8	72.6

[a] Based on an extrusion compound with a density of 0.920 g/cm³.

TABLE 3. *Dimensions and tolerances for Series 3 flexible polyethylene pipe*

Nominal size	Inside diameter of pipe		Wall thickness of pipe		Weight of pipe [a]	
	Diameter	Tolerances	Thickness	Tolerance	Minimum	Nominal
Inches	*Inches*	*Inch*	*Inch*	*Inch*	*lb/100 ft*	*lb/100 ft*
½	0.622	+0.010, −0.010	0.109	±0.006	9.2	10.0
¾	0.824	+.010, −.015	.143	±.008	16.0	17.3
1	1.049	+.010, −.020	.180	±.010	25.5	27.7
1¼	1.380	+.010, −.020	.240	±.011	45.6	48.7
1½	1.610	+.015, −.020	.280	±.013	62.1	66.3
2	2.067	+.015, −.020	.355	±.015	101.7	107.7

[a] Based on an extrusion compound with a density of 0.920 g/cm³.

4.4 *Working Pressure.*—The pipe shall be rated for working pressure in accordance with table 4. The working pressure is the maximum pressure that water in the pipe can exert continuously for a long period without failure of the pipe. Experience of the industry indicates that polyethylene pipe meeting this standard will give satisfactory service under normal conditions for a long period at the working pressures given in table 4.

TABLE 4. *Working pressures for various pipe sizes and series at 23° C. (73.4° F.)*

Nominal size	Working pressures at 23° C. (73.4° F.) [a]		
	Series 1	Series 2	Series 3
Inches	*p.s.i.*	*p.s.i.*	*p.s.i.*
½	100	75	100
¾	83	75	100
1	78	75	100
1¼	65	75	100
1½	59	75	100
2	50	75	100
2½	55	----------	----------
3	48	----------	----------
4	40	----------	----------
6	30	----------	----------

[a] These values are obtained by dividing the test requirements in table 8 by 2.47.

4.5 *Field Pressure.*—The pipe shall not fail, balloon, burst or weep (as defined in ASTM Designation: D 1598–58T, Section 4) when tested in accordance with par. 5.6. In addition there shall be no appreciable swelling when subjected to visual examination one hour after removal of the test pressure.

4.6 *Incremental Pressure.*—The pipe shall not fail, balloon, burst or weep (as defined in ASTM Designation: D 1598–58T, Section 4) when tested in accordance with par. 5.7.

4.7 *Sustained Pressure.*—The pipe shall not fail, balloon, burst or weep (as defined in ASTM Designation: D 1598–58T, Section 4) when tested in accordance with par. 5.8.

4.8 *Environmental Cracking.*—There shall be no loss of pressure in the pipe when tested in accordance with par. 5.9.

5. TEST METHODS

5.1 *Conditioning.*—The test specimens shall be conditioned in accordance with Procedure A in ASTM Designation: D 618–58T, Standard Method of Conditioning Plastics and Electrical Insulating Materials for Testing, and shall be tested under these conditions, unless otherwise specified. However, pipe shall not be tested until at least 24 hours after extrusion.

5.2 *Sampling.*—The sampling shall be as agreed upon by purchaser and seller.

5.3 *Carbon Black.*—The carbon black content of the pipe, or the outer layer of pipe produced by simultaneous multiple extrusion, shall be determined in accordance with ASTM Designation: D 1603–58T, Tentative Method of Test for Carbon Black in Ethylene Plastics.

5.4 *Density.*—The density of the material in the pipe shall be determined in accordance with ASTM Designation: D 1505–57T,

Tentative Method of Test for Measurement of Density of Plastics by the Density-Gradient Technique.

5.5 *Dimensions and Weights.*—Any measured length (not less than 12 inches) of pipe may be tested for dimensions and weight. Measurements shall be made at a temperature of 23° ±1° C. (73.4° ± 1.8° F.) using a micrometer with a spherical foot accurate to ±0.001 inch; a tapered plug gage accurate to ±1.0 percent of its taper and to ±0.001 inch of its outside diameter; and a balance accurate to ±1/10 of 1 percent.

5.6 *Field Pressure Test.*—Specimens of pipe shall be selected at random and tested with water for 8 hours, at the pressures listed in table 5, according to pipe classification, pipe size, and test temperature. Six specimens of pipe from one coil or length shall be tested, each specimen at least 10 times the nominal diameter in length, and containing the permanent marking (par. 6.1). Tests shall be conducted at ambient temperature and no prior conditioning of the specimens is required. The tests shall be made in accordance with ASTM Designation: D 1599-58T, Tentative Method of Test for Short-time Rupture Strength of Thermoplastic Pipe, Tubing and Fittings, except that the pressures shall be maintained at the values given in table 5 for 8 hours.

TABLE 5. *Field pressure test conditions*

Pipe classification	Pipe size	Pressure required for test at listed temperature range, °C. (°F.)				
		15.6–21.1 (60–70)	21.7–28.9 (71–84)	29.4–34.4 (85–94)	35.0–40.0 (95–104)	40.6–46.1 (105–115)
	Inches	*p.s.i.*	*p.s.i.*	*p.s.i.*	*p.s.i.*	*p.s.i.*
Series 1	½	128	110	94	81	69
	¾	106	91	78	67	57
	1	100	86	73	63	54
	1¼	83	72	61	53	45
	1½	75	65	55	48	41
	2	64	55	47	41	35
	2½	70	61	52	45	38
	3	61	53	45	39	33
	4	51	44	38	32	28
	6	38	33	28	24	21
Series 2	½	96	83	71	61	52
	¾	96	83	71	61	52
	1	96	83	71	61	52
	1¼	96	83	71	61	52
	1½	96	83	71	61	52
	2	96	83	71	61	52
Series 3	½	128	110	94	81	69
	¾	128	110	94	81	69
	1	128	110	94	81	69
	1¼	128	110	94	81	69
	1½	128	110	94	81	69
	2	128	110	94	81	69

5.7 *Incremental Pressure Test.*—The test specimens shall be selected at random. Six specimens of pipe from one coil or length, each specimen at least 10 times the nominal diameter in length, and containing the permanent marking (par. 6.1) on the pipe, shall be tested individually according to the schedule given in table 6. These tests shall be conducted with water at 23° ±2° C. (73.4° ±3° F.). Other temperatures may be used if the pressures are adjusted in accordance with table 7. Specimens shall be conditioned at the test temperature for at least 2 hours prior to testing. Before pressure

is applied, care shall be taken to remove all air from the pipe. The tests shall be made in accordance with ASTM Designation: D 1599–58T, Tentative Method of Test for Short-time Rupture Strength of Thermoplastic Pipe, Tubing and Fittings, except that the pressures shall be maintained at the values and time intervals given in table 6.

Pressures shall be held as closely as possible, but within ±10 p.s.i. to those listed in table 6. Pressure should be increased from one increment to the higher test increment as rapidly as practicable. Pressure may be supplied from any source capable of producing 500 p.s.i.

TABLE 6. *Incremental pressure test conditions.*

Conditions for pipe sizes ½″ to 2½″ tested at 23°±2° C. (73.4°±3° F.)

Pipe classification	Pipe size	First pressure increment Hold for 2 min.	Second pressure increment Hold for 1 min.	Third pressure increment Hold for 30 sec.	Fourth pressure increment Hold for 15 sec.	Fifth pressure increment Hold for 1 min.
	Inches	*p.s.i.*	*p.s.i.*	*p.s.i.*	*p.s.i.*	*p.s.i.*
Series 1	½	224	256	288	320	374
	¾	186	213	239	266	310
	1	175	200	225	250	292
	1¼	145	166	187	208	242
	1½	132	151	170	189	220
	2	112	128	144	160	187
	2½	123	141	158	176	206
Series 2	½	168	192	216	240	280
	¾	168	192	216	240	280
	1	168	192	216	240	280
	1¼	168	192	216	240	280
	1½	168	192	216	240	280
	2	168	192	216	240	280
Series 3	½	224	256	288	320	374
	¾	224	256	288	320	374
	1	224	256	288	320	374
	1¼	224	256	288	320	374
	1½	224	256	288	320	374
	2	224	256	288	320	374

Conditions for pipe sizes 3″ to 6″ tested at 23°±2° C. (73.4°±3° F.)

Pipe classification	Pipe size	First pressure increment Hold for 3 min.	Second pressure increment Hold for 2 min.	Third pressure increment Hold for 1 min.	Fourth pressure increment Hold for 30 sec.	Fifth pressure increment Hold for 1 min.
	Inches	*p.s.i.*	*p.s.i.*	*p.s.i.*	*p.s.i.*	*p.s.i.*
Series 1	3	107	123	138	154	179
	4	90	102	115	128	150
	6	67	77	86	96	112

TABLE 7. *Conversion of incremental pressure test conditions at 23° C. (73.4° F.) to test conditions at other temperatures*

Test temperature	Incremental pressure test conditions, percent of 23° C. (73.4° F.) test conditions
° C (° F)	
15.6 (60)	110
18.3 (65)	105
23.0 (73.4)	100
26.7 (80)	95
32.2 (90)	80
37.8 (100)	70
43.3 (110)	60
49.0 (120)	50

and maintaining this pressure as the pipe expands. A hand-operated pressure pump is satisfactory; however, greater satisfaction can be obtained with an air-operated water pump.[2]

5.8 *Sustained Pressure Test.*—The test specimens shall be selected at random. Twelve specimens of pipe from one coil or length, each specimen at least 10 times the nominal diameter in length, and containing the permanent marking (par. 6.1) shall be tested individually with water at two controlled temperatures under the pressures given in table 8; 6 specimens shall be tested at each temperature. The specimens shall be maintained at the pressures indicated for the appropriate temperature for a period of not less than 1,000 hours. Specimens shall be conditioned at the test temperature to within ±2° C. (±3° F.) for at least 2 hours in air or water before testing. The temperature of the water shall be within ±2° C. (±3° F.) of the specified test temperature. Care shall be taken to remove all air from the pipe before testing. The tests shall be made in accordance with ASTM Designation: D 1599–58T, Tentative Method of Test for Short-time Rupture Strength of Thermoplastic Pipe, Tubing and Fittings, except that the pressures shall be maintained at the values given in table 8 for 1,000 hours.

When 2 of the 6 specimens tested at either temperature fail, the pipe does not meet the requirements of this standard. When 1 of the 6 specimens tested at either temperature fails, retests shall be made. In retests, no specimen shall fail.

TABLE 8. *Sustained pressure test conditions*

Pipe classification	Pipe size	Pressure required for test	
		23° C. (73.4° F.)	37.8° C. (100° F.)
	Inches	*p.s.i.*	*p.s.i.*
Series 1	½	247	195
	¾	195	154
	1	192	152
	1¼	160	126
	1½	145	114
	2	123	97
	2½	134	106
	3	117	93
	4	100	79
	6	80	63
Series 2	½	185	146
	¾	185	146
	1	185	146
	1¼	185	146
	1½	185	146
	2	185	146
Series 3	½	247	195
	¾	247	195
	1	247	195
	1¼	247	195
	1½	247	195
	2	247	195

5.9 *Environmental Cracking Test.*—The test specimens shall be selected at random. Six 10-inch long specimens containing the permanent marking (par. 6.1) shall be cut from one coil or length for this test. One end of each specimen shall be connected to a 300-p.s.i. pressure gage and the other end shall be connected to an air supply through a suitable valve. The specimens shall be subjected to the

[2] A Sprague S–216–10 air-operated water pump, or equivalent, can be used conveniently.

pressures listed in table 9, the valve closed, and disconnected in such a manner that the pressure is retained in the specimen. Enough pressure in excess of the listed value must be applied to compensate for the pressure lost during disconnection of the pressure source. Air pressure or nitrogen pressure shall be used. The assembly shall be tested for leaks by immersion in water. Leaks shall be eliminated or nonleaking specimens substituted for those that leak. Care must be taken to completely dry the test specimen after immersion. A coating of IGEPAL CO 630 (Anatarox A–230), obtained from the General Dyestuff Corporation, shall be applied to the pipe surface with a brush. Care shall be taken to keep the IGEPAL at least ½ inch away from the clamps used on each end of the pipe. Fresh reagent shall be used for each test and care shall be taken to store reagent in closed containers because it is hygroscopic. The assembly shall be put aside at room temperature for 3 hours and then examined. There shall be no loss of pressure in at least 4 of the 6 specimens. Specimens that leak at a connection shall be discarded and retests made. Loss of pressure caused by expansion of the pipe shall not be cause for rejection.

TABLE 9. *Environmental cracking test conditions*

Pipe classification	Pipe size	Pressure required for test at listed temperature range, °C (° F)				
		15.6–21.1 (60–70)	21.7–28.9 (71–84)	29.4–34.4 (85–94)	35.0–40.0 (95–104)	40.6–46.1 (105–115)
	Inches	*p.s.i.*	*p.s.i.*	*p.s.i.*	*p.s.i.*	*p.s.i.*
Series 1	½	206	176	150	130	110
	¾	171	146	125	108	91
	1	161	137	117	101	86
	1¼	134	114	98	85	72
	1½	122	103	89	77	65
	2	103	88	75	65	55
	2½	113	97	83	72	61
	3	99	84	72	62	53
	4	82	70	60	52	44
	6	62	53	45	39	38
Series 2	½	155	133	114	98	83
	¾	155	133	114	98	83
	1	155	133	114	98	83
	1¼	155	133	114	98	83
	1½	155	133	114	98	83
	2	155	133	114	98	83
Series 3	½	206	176	150	130	110
	¾	206	176	150	130	110
	1	206	176	150	130	110
	1¼	206	176	150	130	110
	1½	206	176	150	130	110
	2	206	176	150	130	110

6. MARKING AND DECLARATION OF COMPLIANCE

6.1 *Marking.*—Marking shall show the size, series identification, working pressure, manufacturer's name or trade brand, and the designation CS197–59, spaced at intervals of not more than 20 feet. It shall also include the seal of approval, or the "nSf" mark, of the National Sanitation Foundation, spaced at intervals specified by the NSF regulations.[3]

[3] Manufacturers using the seal or "nSf" mark must obtain prior authorization from the National Sanitation Foundation.

502984--59——2

6.2 *Declaration of Compliance.*—In order that purchasers may be assured that the flexible polyethylene plastic pipe actually complies with all requirements of this Commercial Standard, it is recommended that manufacturers include the following statement in conjunction with their names and addresses on labels, invoices, sales literature, etc.:

> This black, flexible polyethylene plastic pipe conforms to all requirements of (Series 1), (Series 2), or (Series 3) polyethylene pipe set forth in Commercial Standard CS197–59, as developed by the trade under the procedure of the Commodity Standards Division, and issued by the U.S. Department of Commerce.

7. EFFECTIVE DATE

7.1 Having met all procedural requirements of the Commodity Standards Division, including approval by the acceptors hereinafter listed, this Commercial Standard was issued by the U.S. Department of Commerce, effective from March 1, 1959.

EDWIN W. ELY,
Chief, Commodity Standards Division.

HISTORY OF PROJECT

First edition.—On November 2, 1953, the Society of the Plastics Industry requested the establishment of a commercial standard for dimensions and tolerances for flexible standard wall polyethylene pipe, the purpose of which was to eliminate misunderstandings between buyers and sellers of polyethylene pipe and fittings as to the exact dimensions and tolerances. The request was accompanied by a draft of a proposed commercial standard developed by a committee of the Society.

The Commodity Standards Division submitted the proposed draft to a representative list of producers, distributors, and users, and to various departments of the Federal Government for comment. After the draft had been adjusted in accordance with the comments received, it was presented to the entire industry for acceptance on July 6, 1954. On September 15, the Commodity Standards Divisions announced that acceptances estimated to represent a satisfactory majority had been received, and that the Commercial Standard, to be designated CS197–54, would become effective October 15, 1954.

Second edition.—Subsequent to the establishment of CS197–54, the Society of the Plastics Industry developed dimensions and tolerances for two additional series of wall thicknesses, and submitted drafts to the Commodity Standards Division as bases for the establishment of commercial standards. While those drafts were under consideration the Thermoplastic Pipe Division of the Society proposed that a revision of CS197–54 be adopted, to include the two new series of wall thicknesses, and that quality requirements and methods of test be added.

Accordingly, on June 21, 1956, the Society of the Plastics Industry submitted a draft of the proposed revision. After adjustment of the proposal in accordance with comments from other interested organizations, a recommended commercial standard was circulated on January 25, 1957, to the entire industry for written acceptance. On March 15, the Commodity Standards Division announced that acceptances had been received representing a majority sufficient to warrant promulgation of the standard. Under the title "Flexible

Polyethylene Plastic Pipe, CS197–57," the second edition became effective April 15, 1957.

Third edition.—Under date of June 26, 1958 the Chairman of the Standing Committee submitted to the Commodity Standards Division proposals for revision of CS197–57 developed by the Thermoplastic Pipe Division of the Society of the Plastics Industry, Inc., and approved by the Standing Committee. The proposed revision included the addition of a sustained (1,000 hour) pressure test, addition of a fifth pressure increment to the incremental pressure (formerly called slow-burst) test, deletion of the quick-burst test, addition of a table of working pressures for the various series and sizes of pipe and the requirement that these working pressures be added to the marking requirement; it also made provision for pipe produced by simultaneous multiple extrusion with carbon black in the outer layer only; a density of 0.940 gm. per cu. cm. or less was specified for the extrusion material.

On August 8, 1958 the proposed revision was submitted to the industry for written acceptance. Acceptors were given an opportunity to vote on each item separately. All proposed changes and additions were approved by a numerical majority of acceptors. On February 6, 1959, acceptances having been received estimated to represent a satisfactory majority, the Commodity Standards Division announced the establishment of the revision, to be designated CS197–59, effective March 1, 1959.

Project Manager: H. A. Bonnet, Commodity Standards Division, Office of Technical Services.

Technical Adviser: Frank W. Reinhart, Plastics Section, Organic and Fibrous Materials Division, National Bureau of Standards.

STANDING COMMITTEE

The following individuals comprise the membership of the standing committee, which is to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Comments concerning the standard and suggestions for revision may be addressed to any member of the committee or to the Commodity Standards Division, Office of Technical Services, U.S. Department of Commerce, which acts as secretary for the committee.

Representing producers:

Walter Jacobson, Yardley Plastics Co., 138 Parsons Ave., Columbus 15, Ohio (chairman).

Richard S. Zimmerman, Plastex Co., Pipe Division, 402 Mount Vernon Ave., Columbus 3, Ohio.

Representing distributors:

Joseph Fesus, The Hardware & Supply Co., 475 South High St., Akron 11, Ohio.

Morris Stein, Torrington Supply, Inc., 125 Maple St., Waterbury, Conn.

J. R. Almand, Beck & Gregg Hardware Co., 217 Luckie St., Atlanta, Ga.

Representing users:

Albert N. Ragozzine, Hydraulic Engineering Co., Grove St., Shelton, Conn.

C. S. Perkins, Union Oil Company of California, 617 West Seventh St., Los Angeles 17, Calif.

Federal Housing Administration, Washington 25, D.C. (Non-voting Observer).

REFERENCES

The following publications were used in compiling this standard:

Provisional Specification for Polyethylene Pipe for Cold Water Service, Canadian Government Specification Board, Specification 41–GP–5P (January 1955).

Polyethylene Tube for Cold Water Service, British Standards Institution, British Standard Specification 1972:1953.

Proposed Method of Test for Environmental Stress-Cracking of Ethylene Plastics, American Society for Testing Materials proposal of March 15, 1955.

A Study of Plastic Pipe for Potable Water Supplies, Walter D. Tiedemann and Nicholas A. Milone. Published by the National Sanitation Foundation.

Cracking of Stressed Polyethylene, J. B. DeCoste, F. S. Malm, and V. T. Wallder, Bell Telephone Laboratories, Inc. In Industrial & Engineering Chemistry 43, No. 1.

Weathering Studies on Polyethylene, V. T. Wallder, W. J. Clarke, J. B. DeCoste, and J. B. Howard, Bell Telephone Laboratories, Inc. In Industrial & Engineering Chemistry 42, No. 11.

ACCEPTANCE OF COMMERCIAL STANDARD

If acceptance has not previously been filed, this sheet properly filled in, signed, and returned will provide for the recording of your organization as an acceptor of this Commercial Standard.

Date_____

Commodity Standards Division
Office of Technical Services
U.S. Department of Commerce
Washington 25, D.C.

Gentlemen:

We believe that Commercial Standard CS197-59 constitutes a useful standard of practice, and we individually plan to utilize it as far as practicable in the

production [1] distribution [1] purchase [1] testing [1]

of flexible polyethylene plastic pipe. We reserve the right to depart from it as we deem advisable.

We understand, of course, that only those products which actually comply with the standard in all respects can be identified or labeled as conforming thereto.

(Cut on this line)

Signature of authorized officer_____
(In ink)

(Kindly typewrite or print the following lines)

Name and title of above officer_____

Organization _____
(Fill in exactly as it should be listed)

Street address_____

City, zone, and State_____

[1] Underscore the one that applies. Please see that separate acceptances are filed for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interests, trade associations, trade papers, etc., desiring to record their general support, the words "General support" should be added after the signature.

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial Standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The U.S. Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices, and the like.

2. *The acceptor's responsibility.*—The purpose of Commercial Standards is to establish, for specific commodities, nationally recognized grades or consumer criteria, and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the standard where practicable in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function performed by the Department of Commerce in the voluntary establishment of Commercial Standards on a nationwide basis is fourfold: First, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users; and fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active valid opposition, the success of the project is announced. If, however, in the opinion of the standing committee or of the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.

ACCEPTORS

The organizations listed below have individually accepted this standard for use as far as practicable in the production, distribution, purchase, or testing of flexible polyethylene plastic pipe. In accepting the standard, they reserved the right to depart from it as they individually deem advisable. It is expected that products which actually comply with the requirements of this standard in all respects will be regularly identified or labeled as conforming thereto, and that purchasers will require such specific evidence of conformity.

ASSOCIATIONS
(General Support)

American Gas Association, New York, N.Y.

FIRMS AND OTHER INTERESTS

Aetna Engineering Co., Ashaway, R.I.
Alpha Plastics Inc., Livingston, N.J. (General Support)

Beck & Gregg Hardware Co., Atlanta, Ga.
Busada Manufacturing Corp., Maspeth, N.Y.

Carlon Products Corp., Cleveland, Ohio
Chesflex Div., St. Regis Paper Co., Yonkers, N.Y.
Coast-to-Coast Stores Central Organization, Inc., Minneapolis, Minn.
Colladay, Frank, Hardware Co., Hutchinson, Kans.
Crescent Plastics, Inc., Evansville, Ind.

Danser Hardware & Supply Co., Weston, W. Va.

Electric Hose & Rubber Co., Wilmington, Del.

Federal Pipe & Tank Co., Seattle, Wash.
Franklin Plastics, Inc., Franklin, Pa.

Goodall Rubber Co., Trenton, N.J.

Industrial Plastic Co., Metuchen, N.J.
Industrial Plastic Fittings Div., R & K Plastic Industries, Cleveland, Ohio

Jones, Ralph, Co., Inc., Siloam Springs, Ark. (General Support).

Kirn, John K., Marblehead, Mass.
Koppers Co., Inc., Plastics Div., Pittsburgh, Pa.
Kotter's Service, Rushville, Ill.

Lascopipe Division, Lynch Asbestos Co., Downey, Calif.

Marken Plastic Corp., Los Angeles, Calif.
Meyer, F. & J., New York, N.Y.
Monsanto Chemical Co., Springfield, Mass.

National Sanitation Foundation Testing Laboratory, Inc., University of Michigan, Ann Arbor, Mich.
National Tube Div., United States Steel Corp., Pittsburgh, Pa.

Perma-Pipe Corp., Middlesboro, Ky.
Plastic Process Co., Division of Monadnock Mills, Los Angeles, Calif.
Plastiline, Inc., White Plains, N.Y.
Portco Corp., Vancouver, Wash.
Prince Rubber Co., Inc., Buffalo, N.Y.
Pyramid Industries, Inc., Erie, Pa.

Quaker Rubber Division, H. K. Porter Co., (Delaware), Philadelphia, Pa.

Reliance Plastic & Chemical Corp., Paterson, N.J.
Republic Steel Corp., Cleveland, Ohio

Sears, Roebuck & Co., Chicago, Ill.
Skyline Industries Sales, Inc., Titusville, Pa.
Skyline Plastic Pipe, Inc., Titusville, Pa.
Southeast Distributing Co., Miami, Fla.
Southwestern Plastic Pipe Co., Mineral Wells, Tex.
Swanson Co., The, Phoenix, Ariz.

Tay Holbrook Inc., San Francisco, Calif.
Torrington Supply Co., Inc., Waterbury, Conn.
Triangle Conduit & Cable Co., Inc., New Brunswick, N.J.

U.S. Industrial Chemicals Co., New York, N.Y.

Western Plastics Corp., Hastings, Nebr.
Western Plastics Corp., Tacoma, Wash.
Worthington Co., The George, Cleveland, Ohio

Yardley Plastics Co., Columbus, Ohio.

OTHER COMMERCIAL STANDARDS

A list of all effective Commercial Standards may be obtained from the Commodity Standards Division, Office of Technical Services, U.S. Department of Commerce, Washington 25, D.C. These publications may be purchased at the prices indicated on the list, which also includes directions for ordering copies.

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