Superseded by PS 11-69

COMMERCIAL STANDARD CS255-63

Polyethylene (PE) Plastic Pipe (SDR-PR)

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

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U.S. DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

Office of Commodity Standards

EFFECTIVE DATE

Having been passed through the regular procedures of the Office of Commodity Standards (formerly the Commodity Standards Division, Office of Technical Services; transferred to the National Bureau of Standards July 1, 1963) and approved by the acceptors hereinafter listed, this Commercial Standard is issued by the U.S. Department of Commerce, effective July 1, 1963.

LUTHER H. HODGES, *Secretary.*

COMMERCIAL STANDARDS

Commercial Standards are developed by manufacturers, distributors, and users in cooperation with the Office of Commodity Standards of 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 Office of Commodity Standards the necessary data to be used as the basis for developing a standard of practice. The office 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 will be helpful in making any necessary adjustments. The regular procedure of the office 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 Office of Commodity Standards 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.

The initial printing of CS255–63 was made possible through the cooperation of the Plastics Pipe Institute, A Division of The Society of the Plastics Industry, Inc.

Polyethylene (PE) Plastic Pipe (SDR–PR)

[Effective July 1, 1963]

1. PURPOSE

1.1 The purpose of this Commercial Standard is (a) to establish, on a national basis, standard dimensions, water pressure ratings, and other significant quality requirements for polyethylene (PE) plastic pipe, (b) to inform producers, distributors, engineers, code officials, and users about some of the qualities of this product, (c) to assist buyers and vendors in obtaining and vending quality merchandise, and (d) to promote understanding concerning commercially available PE plastic pipe among all these groups.

2. SCOPE

2.1 The PE pipe covered in this Commercial Standard is made in standard thermoplastic pipe dimension ratios and is pressure rated for water. Included are criteria for classifying PE plastic pipe materials and PE plastic pipe, a system of nomenclature for PE plastic pipe, and requirements and methods of test for materials, workmanship, dimensions, pressure rating, sustained pressure, burst pressure, and environmental stress cracking. Methods of marking and practices for indicating compliance with this standard are also given.

3. DEFINITIONS

3.1 **General.**—Definitions are in accordance with Definitions of Terms Relating to Plastics (ASTM Designation: D883–62T) and abbreviations are in accordance with Abbreviations of Terms Relating to Plastics (ASTM Designation: D1600–60T), unless otherwise indicated. The abbreviation for polyethylene plastic is PE.

3.2 **Standard thermoplastic pipe dimension ratio (SDR).**—SDR is the ratio of pipe diameter to wall thickness. For PE pipe it is calculated by dividing the average inside diameter of the pipe in inches by the minimum wall thickness in inches. If the wall thickness calculated by this formula is less than 0.060 inch, it shall be arbitrarily increased to 0.060 inch. SDR values shall be rounded off to the nearest 0.5.

3.3 **Hydrostatic design stress.**—The estimated maximum tensile stress in the wall of the pipe in the circumferential orientation due to internal hydrostatic water pressure that can be applied continuously with a high degree of certainty that failure of the pipe will not occur.

3.4 **Pressure rating (PR).**—The estimated maximum pressure that water in the pipe can exert continuously with a high degree of certainty that failure of the pipe will not occur.

3.5 **Relation between standard dimension ratio, hydrostatic design stress and pressure rating.**—The following expression, commonly known as the ISO equation (see ISO R161–1960, Pipes of Plastic Materials for the Transport of Fluids), is used in this Commercial Standard to relate standard dimension ratio, hydrostatic design stress and pressure rating:

$$\frac{2S}{P}=SDR+1 \text{ or } \frac{2S}{P}=\frac{ID}{t}+1$$

where S=hydrostatic design stress, psi
P=pressure rating, psi
ID=average inside diameter, inches
t=minimum wall thickness, inches
SDR=standard thermoplastic pipe dimension ratio (ID/t for PE pipe)

3.6 **Standard thermoplastic pipe materials designation code.**—The pipe materials designation code shall consist of the abbreviation PE for the type of plastic, followed by the ASTM type and grade in Arabic numerals and the design stress in units of 100 psi with any decimal figures dropped. When the design stress code contains less than 2 figures, a cipher is used before the number. Thus a complete material code consists of 2 letters and 4 figures for PE plastic pipe materials. (See sec. 4.)

3.7 **ASTM.**—This abbreviation refers to standards issued by the American Society for Testing and Materials, 1916 Race Street, Philadelphia 3, Pa.

3.8 **PPI.**—This abbreviation refers to the Plastics Pipe Institute, a division of The Society of the Plastics Industry, Inc., 250 Park Avenue, New York, N.Y., 10017.

4. MATERIALS REQUIREMENTS

4.1 **General.**—PE plastics used to make pipe meeting the requirements of this standard are categorized by means of two criteria, namely, (a) short-term strength tests and (b) long-term strength tests.

4.2 **Basic materials.**—This standard covers PE pipe made from three PE plastics as defined in Specification for Polyethylene Molding and Extrusion Materials (ASTM Designation: D1248–60T) in which the requirements are based on short-term tests. These are Type II, Grade 3; Type III, Grade 2; and Type III, Grade 3.

4.3 **Hydrostatic design stresses.**—This standard covers PE pipe made from PE plastics as defined by two hydrostatic stresses assigned on the basis of long-term tests.[1] These hydrostatic design stresses are 500 and 630 psi for water at 23° C (73.4° F). These hydrostatic design stresses apply only to pipe meeting all the requirements of this Commercial Standard.[1]

4.4 **Pipe materials.**—This standard covers four polyethylene pipe materials as follows:

(1) Type II, Grade 3, with a hydrostatic design stress of 500 psi for water at 23° C (73.4° F), designated at PE2305.

(2) Type II, Grade 3, with a hydrostatic design stress of 630 psi for water at 23° C (73.4° F) designated as PE 2306.

(3) Type III, Grade 2, with a hydrostatic design stress of 630 psi for water at 23° C (73.4° F) designated as PE3206.

(4) Type III, Grade 3, with a hydrostatic design stress of 630 psi for water at 23° C (73.4° F), designated as PE3306.

[1] Information regarding the method of test and other criteria used in developing these hydrostatic design stresses may be obtained from the PPI.

4.5 **Compound.**—The PE plastic extrusion compound shall meet the requirements of either Type II, Grade 3, Class C material; Type III, Grade 2, Class C material or Type III, Grade 3, Class C material as described in ASTM D1248–60T.

4.6 **Rework material.**—Clean, rework material, generated from the manufacturer's own pipe production, may be used by the same manufacturer so long as the pipe produced is equal in quality to pipe extruded from virgin material.

5. PIPE CLASSIFICATION

5.1 **General.**—This Commercial Standard covers PE pipe made from four PE plastic pipe materials in four standard dimension ratios and three water pressure ratings.

5.2 **Standard thermoplastic pipe dimension ratios (SDR).**—This standard covers PE pipe in four standard dimension ratios, namely, 7, 9, 11.5, and 15. These are referred to as SDR7, SDR9, SDR11.5, and SDR15, respectively. The pressure rating is uniform for all nominal pipe sizes for a given PE pipe material and SDR (see Table 1).

5.3 **Pressure rating (PR).**—The pipe shall be rated for use with water at 23° C (73.4° F) at the maximum internal pressures shown in Table 1. Lower pressure ratings than those calculated in accordance with paragraph 3.5 may be recommended at the option of the pipe manufacturer, in which case the SDR shall be included in the marking. Experience of the industry indicates that PE pipe meeting the requirements of this standard gives satisfactory service under normal conditions for a long period at these pressure ratings.[1] The sustained pressure requirements (6.6) are related to these ratings through the slopes of the strength-time plots for these materials in pipe form.

6. REQUIREMENTS

6.1 **Workmanship.**—The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions or other defects. The pipe shall be as uniform as commercially practicable in color, opacity, density and other physical properties.

6.2 **Pipe dimensions and tolerances.**

6.2.1 **Inside diameters.**—The average inside diameters and tolerances shall be as shown in Table 2 when measured in accordance with paragraphs 7.4 and 7.4.1.

6.2.2 **Wall thickness.**—The wall thicknesses and tolerances shall be as shown in Table 3 when measured in accordance with paragraphs 7.4 and 7.4.2.

6.2.3 **Eccentricity.**—The eccentricity of the inside and outside circumferences of the pipe shall be within 12 percent when measured in accordance with paragraphs 7.4 and 7.4.3.

6.2.4 **Thickness of outer layer.**—For pipe produced by simultaneous multiple extrusion, that is, pipe containing two or more concentric layers, the outer layer shall be at least 0.020 inch thick.

6.3 **Bond.**—For pipe produced by simultaneous multiple extrusion, 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.

6.4 **Carbon black.**—The polyethylene pipe compound shall contain at least 2 percent carbon black when tested in accordance with paragraph 7.5. For pipe produced by simultaneous multiple extrusion, this requirement shall apply to the outer layer.[2]

6.5 **Density.**—The polyethylene base resin (unclored PE) in the pipe compound shall have a density in the range of 0.926 to 0.940 g/cm³ for pipe made from Type II, Grade 3 of ASTM D1248 and 0.941 to 0.965 g/cm³ for pipe made from Type III Grade 2 and Type III, Grade 3 of ASTM D1248 when determined in accordance with paragraph 7.6.

6.6 **Sustained pressure.**—The pipe shall not fail, balloon, burst, or weep as defined in Test for Time-to-Failure of Plastic Pipe Under Long-Term Hydrostatic Pressure (ASTM Designation: D1598–63T, Section 4) at the test pressures given in Table 4 when tested in accordance with paragraph 7.7.

6.7 **Burst pressure.**—The minimum burst pressure for PE plastic pipe shall be as given in Table 5, when determined in accordance with paragraph 7.8.

6.8 **Environmental stress cracking.**—There shall be no loss of pressure in the pipe when tested in accordance with paragraph 7.9.

6.9 **Approval for potable water.**—All pipe intended for use with potable water shall meet the specifications of the National Sanitation Foundation Testing Laboratories, Inc. or other accredited testing laboratories recognized by Public Health officials. These specifications require that the pipe shall be manufactured of virgin PE plastic, that no scrap material shall be used, and that it is satisfactory for transporting potable water.[3]

7. TEST METHODS

7.1 **Conditioning test specimens.**—The test specimens shall be conditioned at 23°±1° C (73.4°±1.8° F) and 50±2 percent relative humidity for not less than 48 hours prior to test in accordance with Procedure A in Standard Method of Conditioning Plastics and Electrical Insulating Materials for Testing (ASTM Designation: D618–58) for those tests where conditioning is required and in all cases of disagreement.

7.2 **Test conditions.**—Tests shall be conducted in the standard laboratory atmosphere of 23°±1° C (73.4°±1.8° F) and 50±2 percent relative humidity, unless otherwise specified in the test methods or in this Commercial Standard.

7.3 **Sampling.**—A sample of the pipe sufficient to determine conformance with this standard shall be taken at random.

7.4 **Dimensions.**—Any length of pipe may be used to determine the dimensions. Measurements shall be made in accordance with Method of Determining Dimensions of Thermoplastic Pipe (ASTM Designation: D2122–62T).

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[2] There is evidence that indicates that type, particle size, and dispersion quality of the carbon black does affect the weatherability of the pipe. The problem is being investigated and when reliable test methods are developed, requirements for weatherability, or other suitable requirements to cover this property, will be included in a revision of this Commercial Standard.

[3] Manufacturers should obtain information on conditions for approval from the National Sanitation Foundation Testing Laboratories, Inc., School of Public Health, University of Michigan, Ann Arbor, Michigan, or other accredited laboratory.

7.4.1 **Inside diameter.**—The inside diameter of the pipe shall be measured with a tapered plug gage in accordance with Section 5 of D2122–62T.

7.4.2 **Wall thickness.**—Micrometer measurements of the wall thickness shall be made in accordance with Section 4 of D2122–62T, to determine the maximum and minimum values. The wall thickness shall be measured at both ends of the pipe to the nearest 0.001 inch.

7.4.3 **Eccentricity.**—The measurements shall be made in a manner such that the maximum, A, and the minimum, B, wall thicknesses of each cross-section measured are obtained. The eccentricity, E, shall be calculated for each cross-section as follows:

$$E, \%, = \frac{A - B}{A} \times 100$$

The eccentricity shall not exceed 12 percent for any cross section measured.

7.5 **Carbon black.**—The carbon black content of the pipe, or of the outer layer of pipe produced by simultaneous multiple extrusion, shall be determined in duplicate in accordance with Method of Test for Carbon Black in Ethylene Plastics (ASTM Designation: D1603–58T).

7.6 **Density.**—The density of the pipe compound shall be determined in accordance with Method of Test for Density of Plastics by the Density-Gradient Technique (ASTM Designation: D1505–60T), using three specimens. The percent of carbon black by weight shall be determined in accordance with paragraph 7.5. The density of the PE base resin (uncolored PE) in the pipe compound shall be calculated as follows:

Density of resin in g/cm^3 = Density of pipe compound in g/cm^3 minus (0.0044 × % of carbon black by weight)

7.7 **Sustained pressure test.**—The test specimens shall be selected at random. Twelve specimens of pipe, each specimen at least 10 times the nominal diameter in length, but not less than 10 inches or more than three feet between end closures and containing the permanent marking on the pipe, shall be tested individually with water at two controlled temperatures under the pressures given in Table 4. Six specimens shall be tested at each temperature. The specimens shall be maintained at the pressures indicated for the appropriate temperature for a period of 1000 hours. Pressure shall be held as closely as possible, but within ±10 psi. Specimens shall be conditioned for at least 2 hours to within ±2° C (3.6° F) of the specified test temperatures. Test temperatures shall be maintained within ±2° C (3.6° F) of the specified temperature. The test shall be in accordance with Method of Test for Time-to-Failure of Plastic Pipe under Long-term Hydrostatic Pressure (ASTM Designation: D1598–63T), except that the pressure shall be maintained at the values given in Table 4 for 1000 hours. Failure of two of the six specimens tested at either temperature constitutes failure in the test. Failure of one of six specimens tested at either temperature is cause for re-test of six additional specimens at that temperature. Failure of one of six specimens tested at either temperature in re-test constitutes failure in the test. Failure of the pipe shall be as defined in ASTM D1598–63T, Section 4, namely:

7.7.1 **Failure.**—Any continuous loss of pressure resulting from the transmission of the test liquid through the body of the specimen under test.

7.7.2 **Ballooning.**—Any abnormal localized expansion of a pipe specimen while under internal hydraulic pressure.

7.7.3 **Bursting.**—Failure by a break in the pipe with immediate loss of test liquid and continued loss at essentially no pressure.

7.7.4 **Seepage or weeping.**—Failure that occurs through essentially microscopic breaks in the pipe wall, frequently only at or near the test pressure. At lower pressures the pipe may carry liquids without evidence of loss of the liquids.

7.8 **Burst pressure.**—The minimum burst pressure shall be determined with at least 5 specimens in accordance with Tentative Method for Short-Time Rupture of Thermoplastic Pipe, Tubing, and Fittings (ASTM Designation D1599–62T). The time of testing each specimen shall be between 60 and 90 seconds.[4]

7.9 **Environmental cracking test.**—Six randomly selected 10-inch-long specimens containing the permanent marking shall be used for this test. One end of each specimen shall be connected to a 400-psi pressure gauge and the other end shall be connected to an air or nitrogen supply through a suitable valve. The specimens shall be subjected to the pressures listed in Table 4 for 23°C. and then 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 shall be applied to compensate for the pressure lost during disconnection of the pressure source. The assembly shall be tested for leaks by immersion in water. Leaks shall be eliminated or nonleaking specimens substituted for those that leak. Care shall be taken to completely dry the test specimen after immersion. A coating of IGEPAL CO 630, obtained from the General Dyestuff Corp., shall be applied to the pipe surface with a brush. Care shall be taken to keep the IGEPAL at least one-half 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 coated pipe assembly shall be kept at room temperature for three hours and then examined. There shall be no loss of pressure in at least four of the six 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.

8. MARKING AND DECLARATION OF COMPLIANCE

8.1 **Marking.**—Marking on the pipe shall include the following, spaced at intervals of not more than five feet:

1. The nominal pipe size; (e.g., 2″).
2. The type of plastic pipe material in accordance with the designation code in paragraph 4.4 (e.g., PE2305).
3. The standard thermoplastic pipe dimension ratio in accordance with the designation code in paragraph 5.2 (e.g., SDR9), or the pressure rating in psi for water at 23° C (73.4° F) shown as the number followed by psi (e.g., 100 psi),

[4] The burst test, 7.8, may be made at other than the standard test temperature, 23° ± 2° C (73.4° ± 3.6° F), in which case the minimum pressure requirement shall be adjusted in accordance with the conversion factor or the equations given in Table 6. In case of disagreement, the standard test temperature shall be used.

except that when intended for pressure application the pressure rating shall be shown (e.g., 100 psi). When the indicated pressure rating is lower than that calculated in accordance with paragraph 3.5 (see par. 5.4), the SDR shall also be included in the marking code.

4. The Commercial Standard designation CS255–63 with which the pipe complies.
5. The manufacturer's name (or trade mark) and code. It shall also include the seal of approval (or "nSf" mark) of the National Sanitation Foundation, or of some other accredited laboratory, spaced at intervals specified by the accredited laboratory for pipe intended for transporting potable water.[5]

8.2 **Declaration of compliance.**—To assure the purchasers that the PE 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 PE plastic pipe conforms to all requirements[6] of Commercial Standard CS255–63 as developed by the trade under the Commodity Standards procedures, U.S. Department of Commerce.

TABLE 1. *Standard thermoplastic pipe dimension ratios (SDR) and water pressure ratings (PR) at 23° C (73.4° F) for PE plastic pipe*

Standard dimension ratio	PE pipe materials [1]		
	PE 3206 PE 3306	PE 2306	PE 2305
	Pressure rating, psi		
7	---	---	125
9	125	125	100
11.5	100	100	80
15	80	80	---
Pressure rating,	Standard dimension ratio		
psi			
125	9	9	7
100	11.5	11.5	9
80	15	15	11.5

[1] See pars. 3.6 and 4.4 for code designation.

[5] Manufacturers using the seal of approval (or "nSf" mark) of the National Sanitation Foundation Testing Laboratories, Inc. or other accredited laboratory must obtain prior authorization from the laboratory concerned.

[6] Insert minimum marking code as described in paragraph 8.1 plus any additional information the manufacturer wishes to add here.

TABLE 2. *Inside diameters and tolerances for PE plastic pipe*

Nominal pipe size	Average inside diameter	Tolerances
Inch	*Inch*	*Inch*
½	0.622	±0.010
¾	0.824	+0.010 −0.015
1	1.049	+0.010 −0.020
1¼	1.380	+0.010 −0.020
1½	1.610	+0.015 −0.020
2	2.067	+0.015 −0.020
2½	2.469	+0.015 −0.025
3	3.068	+0.015 −0.030
4	4.026	+0.015 −0.035
6	6.065	+0.020 −0.035

TABLE 3. *Wall thicknesses and tolerances for SDR plastic pipe*

Nominal pipe size	Wall thickness [1]							
	SDR15		SDR11.5 [2]		SDR9		SDR7	
	Minimum	Tolerance [3]	Minimum	Tolerance [3]	Minimum	Tolerance [3]	Minimum	Tolerance [3]
Inch	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*	*Inch*
½	0.060	+0.020	0.060	+0.020	0.069	+0.020	0.089	+0.020
¾	0.060	+0.020	0.072	+0.020	0.092	+0.020	0.118	+0.020
1	0.070	+0.020	0.091	+0.020	0.117	+0.020	0.150	+0.020
1¼	0.092	+0.020	0.120	+0.020	0.153	+0.020	0.197	+0.024
1½	0.107	+0.020	0.140	+0.020	0.179	+0.020	0.230	+0.028
2	0.138	+0.020	0.180	+0.022	0.230	+0.028	0.295	+0.035
2½	0.165	+0.020	0.215	+0.025	------	------	------	------
3	0.205	+0.025	0.267	+0.032	------	------	------	------
4	0.268	+0.032	0.350	+0.042	------	------	------	------
6	0.404	+0.048	0.527	+0.063	------	------	------	------

[1] The minimum is the least wall thickness of the pipe at any cross section. All tolerances are on the plus side of the minimum requirement.
[2] 2½- to 6-inch pipe with a pressure rating of 100 psi is not included.
[3] This is limited by the eccentricity requirements. See par. 6.2.3.

TABLE 4. *Sustained pressure test conditions for PE plastic pipe*

Standard dimension ratio	Pressure [1] required for test at —					
	37.8° C (100° F)			23° C (73.4° F)		
	PE3206 PE3306	PE2306	PE2305	PE3206 PE3306	PE2306	PE2305
	psi	*psi*	*psi*	*psi*	*psi*	*psi*
7	----------	----------	210	----------	----------	265
9	215	215	170	265	265	210
11.5	170	170	135	210	210	170
15	135	135	----------	165	165	----------

[1] The fiber stresses used to derive these test pressures are as follows:
At 37.8° C (100° F):
PE3206, PE3306, and PE2306 ..... 1070 psi
PE2305 ..... 850 psi
At 23° C (73.4° F):
PE3206, PE3306, and PE2306 ..... 1320 psi
PE2305 ..... 1050 psi

TABLE 5. *Burst pressure test conditions for water at 23° C (73.4 F) for PE plastic pipe*

Standard dimension ratio	Minimum burst pressure [1]		
	PE3206 PE3306	PE2306	PE2305
	psi	*psi*	*psi*
7			500
9	500	500	400
11.5	400	400	320
15	320	320	

[1] The fiber stresses used to derive these test pressures are as follows:
PE3206—2520 psi
PE3306—2520 psi
PE2306—2520 psi
PE2305—2000 psi

TABLE 6. *Conversion [1] of minimum burst pressures for PE plastic pipe in table 5 to equivalent minimum burst pressures at other temperatures*

Test temperature		Conversion factor, r
C	(F)	
10.0	(50)	1.18
12.9	(55)	1.14
15.6	(60)	1.10
18.3	(65)	1.06
21.1	(70)	1.03
23.0	(73.4)	1.00
23.9	(75)	0.98
26.7	(80)	0.92
29.4	(85)	0.87
32.2	(90)	0.81
35.0	(95)	0.75
37.8	(100)	0.70

[1] The equations relating temperature to the conversion factor are as follows:

Fahrenheit Scale

Above 73.4°, $T_F = 162 - 88.6r$
Below 73.4°, $T_F = 207 - 133.6r$

Centigrade Scale

Above 23.0°, $T_C = 72 - 49r$
Below 23.0°, $T_C = 95 - 72r$

When r is calculated it shall be rounded off to the nearest 0.01.

HISTORY OF PROJECT

On November 14, 1962 the Society of the Plastic Industry, Inc. requested the cooperation of the Division in establishing a Commercial Standard for Polyethylene (PE) Plastic Pipe (SDR-PR).

The projects were initiated by the Thermoplastics Pipe Division, now the Plastics Pipe Institute,[1] of the SPI in cooperation with their joint American Society for Testing and Materials subcommittee on plastic pipe.

[1] During the development of this project the name was changed from the Thermoplastic Pipe Division to the Plastics Pipe Institute, A Division of the SPI.

The drafts presented to the Division represented a consensus of the views of approximately 400 producers, raw material suppliers, users and members of National, Municipal and other code bodies as well as the views of the interested ASTM organization. All comments were considered in open meetings of the SPI and ASTM, and adjustments were made wherever practicable.

Following review of the proposals by the National Bureau of Standards, the Recommended Commercial Standards were widely circulated to industry on January 14, 1963, for consideration and acceptance. Sufficient acceptances were received to assure success of the standard. Accordingly, on May 10, 1963, the new edition, Commercial Standard CS255–63, was announced to become effective for new production on July 1, 1963.

Project Manager: C. G. Hemmer, Commodity Standards Division, Office of Technical Services, U.S. Department of Commerce.
Technical Advisor: Dr. G. M. Kline, Chief, Organic and Fibrous Materials Div., National Bureau of Standards.

STANDING COMMITTEE

In accordance with the established procedure for keeping recommendations abreast of current conditions and best industry practice, this program will be reviewed from time to time, and revised whenever necessary. For this purpose, a standing committee composed of representatives of the industry has been appointed. All comments and suggestions concerning the recommendation will be referred to the standing committee for consideration. This committee also serves as the medium through which the industry may be consulted, and through which the industry may in turn make known its views concerning the recommendations. The members of this committee are:

R. S. Tope, Yardley Plastics Co., 142 Parsons Ave., Columbus, Ohio (Chairman)
W. W. Clark, Carlon Products Corp., P.O. Box 133, Aurora, Ohio
Eugene C. Clemens, Cannelton Sewer Pipe Co., Cannelton, Ohio
W. H. Frizell, Jr., Soule Construction Co., Inc., P.O. Box 1550, Pensacola, Fla.
W. K. Klein, Joseph T. Ryerson & Son, Inc., P.O. Box 8000A, Chicago, Ill.
W. A. Knapp, A. Y. McDonald Mfg. Co., P.O. Box 508, Dubuque, Iowa
John J. Lainson, Western Plastics Corp., 1515 West Second St., Hastings, Nebr.
Stanley Murk, Allied Chemical Corp., Plastics Div., P.O. Box 365, Morristown, N.J.
H. W. Musick, Kerr-McGee Oil Industries, Inc., Kerr-McGee Building, Oklahoma City, Okla.
F. C. Whittaker, Bellingham Supply, Inc., P.O. Box 668, Bellingham, Wash.
Richard E. White, National Association of Plumbing-Heating-Cooling Contractors, 1016 20th Street, Washington, D.C.
Dr. Frank W. Reinhart, Director, Technical Div., Plastics Pipe Institute, 9918 Sutherland Road, Silver Spring, Md.

ACCEPTORS

The manufacturers, distributors, users and others listed below have individually indicated in writing their acceptance of this Commercial Standard prior to its publication. The acceptances indicate an intention to utilize the Standard as far as practicable, but reserve the right to depart from it as may be deemed desirable. The list is published to show the extent of recorded public support for the Standard, and should not be construed as indicating that all products made by the acceptors actually comply with its requirements.

Products that meet all requirements of the Standard may be identified as such by a certificate, grade mark, or label. Purchasers are encouraged to require such specific evidence of compliance, which may be given by the manufacturer whether or not he is listed as an acceptor.

ASSOCIATIONS

(General Support)

American Institute of Architects, Washington, D.C.
Central Supply Association, Chicago, Ill.
Indiana Farm Bureau Cooperative Association, Inc., Indianapolis, Ind.
National Association of Plumbing-Heating-Cooling Contractors, Washington, D.C.
Plastic Pipe Institute, A Division of the Society of the Plastic Industry, Inc., New York, N.Y.

FIRMS AND OTHER INTERESTS

ACF Industries, Inc., ACF Technical Center, St. Charles, Mo.
Allied Chemical Corporation, Plastics Div., New York, N.Y.
Alpha Plastics, Inc., Livingston, N.J.
Amco Plastic Pipe Co., San Leandro, Calif.
American Agricultural Chemical Co., New York, N.Y.
American Brass & Iron Foundry, Plastics Div., Newark, Calif.
American Cyanamid Co., Plastics & Resins Div., Wallingford, Conn.
American Hard Rubber Co., Division of Amerace Corp., Butler, N.J.
Anaconda American Brass Co., Waterbury, Conn.
Anderson, Ted D., Construction Co., Kokomo, Ind.
Arizona Plastic Extrusion Co., Phoenix, Ariz.
Armite Laboratories, Los Angeles, Calif.
Avisun Corp., Philadelphia, Pa.
Baldwin Extruded Products, Inc., Downey, Calif.
Barringham Plastics Ltd., Clarkson, Ontario, Canada
Beible's Pump & Supply, Emmaus, Pa.
Bellingham Supply, Inc., Bellingham, Wash.
Berg Construction Co., Inc., Juneau, Alaska
Better Lawns, Inc., Mineral Wells, Tex.
Busada Manufacturing Corp., Flushing, N.Y.

Camlet, J. Thomas, Architect & Engineer, Garfield, N.J.
Canadian General Electric Co., Ltd., Plastics Section, Cobourg, Ontario, Canada
Canadian Industries, Ltd., Plastics Div., Montreal, Quebec, Canada
Cannelton Sewer Pipe Co., Inc., Cannelton, Ind.
Cannon & Mullen, Architects, Salt Lake City, Utah
Carlon Products Corp., Aurora, Ohio
Celanese Polymer Co., Clark, N.J.
Celanese Polymer Co., Newark, N.J.
Commercial Solvents Corp., New York, N.Y.
Consolidated Pipe Co. of America, Stow, Ohio
Consolidated Supply Co., Portland, Ore.
Cooperative G.L.F. Exchange, Inc.—Farm Supplies Div., Ithaca, N.Y.
Cracker Asphalt Corp., Douglasville, Ga.
Crane Supply Co., Chicago, Ill.
Crescent Plastics, Inc., Evansville, Ind.
Crown-Line Plastics, Inc., Hamburg, Iowa

DeBell & Richardson, Inc., Hazardville, Conn.
Diversified Plastics, Inc., Memphis, Tenn.

Dixie Plastics Manufacturing Co., New Orleans, La.
Dolplex, Inc., Lake Park, Fla.
Dow Smith, Inc., Milwaukee, Wis.
du Pont, E. I., de Nemours & Co., Wilmington, Del.

Eastman Chemical Products, Inc., Kingsport, Tenn.
Eclipse Plastic Industries, Inc., Sarasota, Fla.
Electric Hose & Rubber Co., Wilmington, Del.
El Paso Natural Gas Products Co., El Paso, Tex.
Engineered Plastic Products Co., Spokane, Wash.

Federal Corp., Oklahoma City, Okla.
Fullerton Manufacturing Co., Fullerton, Calif.

GasprO, Ltd., Honolulu, Hawaii
Gering Plastics Co., A Dept. of Monsanto Chemical Co., Kenilworth, N.J.
Glamorgan Pipe & Foundry Co., Plastics Div., Lynchburg, Va.
Goldthwaite's of Texas, Inc., Fort Worth, Tex.
Goodall Rubber Co., Trenton, N.J.
Goodrich-Gulf Chemicals, Inc., Cleveland, Ohio
Grace, W. R. & Co., Polymer Chemicals Div., Clifton, N.J.

Halby Chemical Co., Inc., Wilmington, Del.
Hogner, P. R. L., Architect, Fort Lauderdale, Fla.

International Pipe and Ceramics Corp., East Orange, N.J.

Japan Cotton Co., Dallas, Tex.
Johnson Plastic Corp., Chagrin Falls, Ohio

King John and Associates, Cupertino, Calif.
Koppers Co., Inc., Plastics Div., Pittsburgh, Pa.
Kraloy/Chemtrol Co., Santa Ana, Calif.

Lasco Industries, Montebello, Calif.
Lindsay Bros., Inc., Milwaukee, Wis.
Loeb, Laurence M., Architect, White Plains, N.Y.

Marken Plastic Corp., Los Angeles, Calif.
McDonald, A. Y., Manufacturing Co., Dubuque, Iowa
McPherson Co., Architects-Engineers, Greenville, S.C. (General Support)
Meyer, F. & J., New York, N.Y.
Miller, Miller & Associates, Architects, Terre Haute, Ind.
Mitron Research & Development Corp., Waltham, Mass.

New Mexico State University, Physical Plant Dept., University Park, N. Mex.
Northwest Natural Gas Co., Portland, Oreg. (General Support)

Orangeburg Manufacturing Co., Div. of The Flintkote Co., New York, N.Y.

Palmer Supply Co., Seattle, Wash.
Palomar Refining and Oil Co., Bakersfield, Calif.
Parish, Archie G., Architect, St. Petersburg, Fla.
Patzig Testing Laboratories, Inc., Des Moines, Iowa
Perma-Pipe Corp., Middlesboro, Ky.
Perma Vinyl Corp., Miami, Fla.
Phillips Chemical Co., Bartlesville, Okla.
Plastex Co., Columbus, Ohio
Plastiline, Inc., Pompano Beach, Fla.
Plymouth Cordage Co., Plymouth, Mass.
Portco Corp., Paper & Plastic Div., Vancouver, Wash.
Portland General Electric Co., Portland, Oreg.

R & K Plastic Industries Co., IPF Div., Cleveland, Ohio
Raub Supply Co., Lancaster, Pa.
Republic Steel Corp., Cleveland, Ohio
Riverside Chemical Co., Inc., North Tonawanda, N.Y.
Rock Island Refining Corp., Indianapolis, Ind.
Ryerson, Joseph T. & Son, Inc., Chicago, Ill., and Service Centers at Boston, Mass.; Buffalo, N.Y.; Charlotte, N.C.; Cincinnati, Cleveland, Ohio; Dallas, Tex.; Detroit, Mich.; Emeryville, Calif.; Houston, Tex.; Indianapolis, Ind.; Jersey City, N.J.; Los Angeles, Calif.; Milwaukee, Wis.; Philadelphia, Pittsburgh, Pa.; St. Louis, Mo.; Seattle, Spokane, Wash.; Wallingford, Conn.

Schulman, A., Inc., Akron, Ohio
Scovill Manufacturing Co., Waterbury, Conn.
Sears, Roebuck & Co., Chicago, Ill.
Sedco Manufacturing Co., Inc., Miami, Fla.
Silver-Line Plastics, Ashville, N.C.
Skagit County, Public Utility District No. 1, Mount Vernon, Wash.
Skelly Oil Co., Tulsa, Okla.
Skyline Industries Sales, Inc., Titusville, Pa.
Skyline Plastic Pipe, Inc., Titusville, Pa.
Sloane Manufacturing Co., Div. Atlantic Research Corp., Sun Valley, Calif.
Soule Construction Co., Inc., Pensacola, Fla.
Southeast Distributing Co., Miami, Fla.
Southwestern Plastic Pipe Co., Phoenix, Ariz.
Southwestern Plastic Pipe Co., Mineral Wells, Tex.
Spencer Chemical Co., Kansas City, Mo.
Spencer Chemical Co., Orange, Tex.
Spiegel, Inc., Chicago, Ill.
Stauffer Chemical Co., Molded Products Div., Los Angeles, Calif.

Tampa Wholesale Plumbing Supply Corp., Tampa, Fla.
Texacon Industries, Inc., Kearny, N.J.
Triangle Conduit & Cable Co., Inc., New Brunswick, N.J.
Trubek Chemical Co., East Rutherford, N.J.

Union Carbide Plastics Co., Bound Brook, N.J.
Union Carbide Plastics Co., Div. Union Carbide Corp., New York, N.Y.
Union Malleable Manufacturing Co., Plastics Div., Ashland, Ohio
U.S. Industrial Chemicals Co., New York, N.Y.
University of Texas, School of Architecture, Austin, Tex.
Uyesaka Bros., Inc., Clovis, Calif.

Vogel, Willis A., Architect Consultant, Toledo, Ohio

Wade, R. M., & Co., Portland, Oreg.
Welch, Carroll E., Architect, Huntington, N.Y.
Western Plastics Corp., Hastings, Nebr.
Western Plastics Corp., Tacoma, Wash.
Woodward, Wight & Co., LTD., New Orleans, La.
Worthington Associates, Inc., Corvallis, Oreg.
Yardley Plastics Co., Columbus, Ohio

U.S. GOVERNMENT

General Services Administration, Standardization Div., Washington, D.C.
U.S. Department of Health, Education, and Welfare, Washington, D.C.
U.S. Department of the Interior, Washington, D.C.
U.S. Post Office Department, Procurement Div., Washington, D.C.
Veterans Administration, Washington, D.C.

ACCEPTANCE OF COMMERCIAL STANDARD

CS255-63 Polyethylene (PE) Plastic Pipe (SDR-PR)

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_____

Office of Commodity Standards
National Bureau of Standards
U.S. Department of Commerce
Washington, D.C. 20234

Gentlemen:

We believe that this Commercial Standard 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] other[1]

of this commodity.

We reserve the right to depart from the standard as we deem advisable.

We understand, of course, that only those articles 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 applicable words. 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 interest, 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 United States 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.

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