



Standard Classification for Chemical Resistance of Poly(Vinyl Chloride) (PVC) Homopolymer and Copolymer Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds¹

This standard is issued under the fixed designation D 5260; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This classification covers the method for determining and classifying the resistance of poly(vinyl chloride) (PVC) homopolymer and copolymer compounds, and chlorinated poly(vinyl chloride) (CPVC) compounds in chemicals by simple immersion testing of unstressed specimens.

1.2 This classification is applicable to any PVC or CPVC compound as defined in Specifications D 1784, D 3915, D 4216, D 4396, or D 4551.

1.3 The values stated in SI units are to be regarded as standard.

1.4 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of this standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—There are no ISO standards covering the subject matter of this classification.

2. Referenced Documents

2.1 ASTM Standards:²

D 543 Test Method for Resistance of Plastics to Chemical Reagents

D 883 Terminology Relating to Plastics

D 1600 Terminology for Abbreviated Terms Relating to Plastics

¹ This classification is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

D 1784 Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

D 3915 Specification for Poly(Vinyl Chloride) (PVC) and Related Plastic Pipe and Fittings Compounds for Pressure Applications

D 4216 Specification for Rigid Poly(Vinyl Chloride) (PVC) and Related Plastic Building Products Compounds

D 4396 Specification for Rigid Poly(Vinyl Chloride) (PVC) and Related Plastic Compounds for Nonpressure Piping Products

D 4551 Specification for Poly(Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane

3. Terminology

3.1 Definitions and Abbreviations:

3.1.1 Definitions are in accordance with Terminology D 883 and abbreviations with Terminology D 1600 unless otherwise indicated.

4. Significance and Use

4.1 Reference this chemical resistance classification for any PVC/CPVC material compound specification wherein a level of resistance to specific chemicals is required for satisfactory product performance.

4.2 Listing of a chemical in the annex does not imply PVC/CPVC compatibility or resistance to the chemical. Some of the chemicals listed could be deleterious to a specific compound, causing radical changes in the physical properties. Resistance to these chemicals is not intended to be a practical requirement in a specification.

4.3 For resistance to mixtures of chemicals, it is suggested that the blend be tested rather than accepting the resistance of the individual chemicals because of a possible solvency enhancement of the combined chemicals.

4.4 The specimens tested in this classification are unstressed. When service conditions include stress or other factors, or both, test chemical resistance of the PVC/CPVC compound under actual service conditions.

*A Summary of Changes section appears at the end of this standard.

5. Basis of Classification

5.1 The chemical resistance of a PVC or CPVC compound is composed of the cell classifications specified from Table 1. For example, the resistance of PVC to 25 % acetic acid at ambient temperature would be written as a cell classification of A05231:

	Class
Chemical (acetic acid from annex)	A05
Concentration of 25 %	2
Temperature of 23°C	3
Resistance	1

NOTE 2—The cell-type format provides the means of classifying chemical resistance. This type of format is subject to possible misapplication in classifying a chemical resistance that is unobtainable with commercially available materials. Consult the manufacturer regarding this classification.

6. Performance Requirements

6.1 The chemical resistance shall be for a compound that meets the physical property and processing requirements of the application.

7. Sampling

7.1 A batch or lot shall be considered as a unit of manufacture and is permitted to consist of a blend of two or more production runs of material.

7.2 Sample using a statistically acceptable procedure.

8. Test Methods

8.1 Determine the chemical resistance of a compound following the procedure of Test Method D 543 except the exposure period shall be for 30 days. Note the chemical, concentration, test temperature, and resistance in accordance with 8.1.1-8.1.4. This data is compiled in Table 1 and comprises the six digits of the chemical resistance cell.

8.1.1 The test chemical is designated from the alphanumeric list of chemicals in the annex. This alphanumeric designation is the first three digits of the chemical resistance cell.

8.1.2 The concentration of the chemical from row two of Table 1 is designated as the fourth digit of the chemical resistance cell.

8.1.3 The test temperature from row three of Table 1 is designated as the fifth number of the chemical resistance cell.

8.1.4 The resistance of a compound from row four of Table 1 is designated as the sixth number of the chemical resistance cell. Grade a compound for its resistance to the testing of 8.1.1-8.1.3 as follows:

	Resistant	Marginally Resistant	Non-Resistant
Linear Swelling	0 %	<5 %	>5 %
Change in Weight	<1 %	<10 %	>10 %
Change in Shore Hardness	no change	<5 units	>5 units

9. Inspection

9.1 Inspection of the product shall be agreed upon between the purchaser and the supplier as part of the purchase contract.

10. Rejection and Rehearing

10.1 Product that fails to conform to the requirements of this classification shall not be certified as meeting the requirements of this classification. Report rejection to the producer or supplier promptly and in writing. In case of dissatisfaction with the results of the test, the producer or supplier is permitted to make claim for a rehearing.

11. Keywords

11.1 chemical resistance; chlorinated poly(vinyl chloride) polymers; poly(vinyl chloride) copolymers; poly(vinyl chloride) polymers

TABLE 1 Chemical Resistance of a Compound

Designation Order Number	Property and Unit	Cell Limits							
		0	1	2	3	4	5	6	7
1 to 3	chemical	use number of chemical from annex							
4	concentration, %	unspecified	0 to 19	20 to 39	40 to 59	60 to 79	80 to 99	100	
5	temperature, °C	unspecified	<0	0 to 19	20 to 39	40 to 59	60 to 79	80 to 100	>100
6	resistance	unspecified	R	MR	NR				

ANNEX
(Mandatory Information)
A1. ALPHANUMERICAL LIST OF CHEMICALS

Acetaldehyde	A01	Ammonia Bifluoride	A19
Acetamide	A02	Ammonium Carbonate	A20
Acetate Solvent	A03	Ammonium Casenite	A21
Acetic Acid, Glacial	A04	Ammonium Chloride	A22
Acetic Acid	A05	Ammonium Hydroxide	A23
Acetic Anhydride	A06	Ammonium Nitrate	A24
Acetone	A07	Ammonium Oxalate	A25
Acetylene	A08	Ammonium Persulfate	A26
Acrylonitrile	A09	Ammonium Phosphate, Dibasic	A27
Aluminum Chloride	A10	Ammonium Phosphate, Monobasic	A28
Aluminum Fluoride	A11	Ammonium Phosphate, Tribasic	A29
Aluminum Hydroxide	A12	Ammonium Sulfate	A30
Aluminum Potassium Sulfate	A13	Ammonium Thio-Sulfate	A31
Aluminum Sulfate	A14	Amyl Acetate	A32
Amines	A15	Amyl Alcohol	A33
Ammonia, Anhydrous	A16	Amyl Chloride	A34
Ammonia, Liquid	A17	Aniline	A35
Ammonia, Nitrate	A18	Aqua Regia (80 % HCl/20 % H ₂ SO ₄)	A36
		Arsenic Acid	A37

Barium Carbonate	B01	Benzyl Alcohol	B14
Barium Chloride	B02	Borax (Sodium Borate)	B15
Barium Cyanide	B03	Boric Acid	B16
Barium Hydroxide	B04	Brewery Slop	B17
Barium Nitrate	B05	Bromine	B18
Barium Sulfate	B06	Butadiene	B19
Barium Sulfide	B07	Butane	B20
Beer	B08	Butter	B21
Beet Sugar Liquids	B09	Buttermilk	B22
Benzaldehyde	B10	Butyl Acetate	B23
Benzene	B11	Butyl Alcohol	B24
Benzoic Acid	B12	Butylene	B25
Benzol	B13	Butyric Acid	B26

Calcium Bisulfide	C01	Chlorobenzene (mono)	C20
Calcium Carbonate	C02	Chloroform	C21
Calcium Chloride	C03	Chlorosulfuric Acid	C22
Calcium Hydroxide	C04	Chlorox (bleach)	C23
Calcium Hypochlorite	C05	Chocolate Syrup	C24
Calcium Sulfate	C06	Chromic Acid	C25
Calgon	C07	Cider	C26
Cane Juice	C08	Citric Acid	C27
Carbolic Acid.....(See Phenol).....		Coffee	C28
Carbon Bisulfide	C09	Copper Chloride	C29
Carbon Dioxide	C10	Copper Cyanide	C30
Carbon Disulfide	C11	Copper Fluorborate	C31
Carbon Monoxide	C12	Copper Nitrate	C32
Carbon Tetrachloride	C13	Copper Sulfate	C33
Carbonated Water	C14	Cream	C34
Carbonic Acid	C15	Cresols	C35
Catsup	C16	Cresylic Acid	C36
Chloroacetic Acid	C17	Cyclohexane	C37
Chlorinated Glue	C18	Cyanic Acid	C38
Chlorine, Anhydrous Liquid	C19		

Detergents	D01	Diethylene Glycol	D04
Diethylene	D02	Diphenyl Oxide	D05
Diacetone Alcohol	D03	Dyes	D06
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Epsom Salts...(See Magnesium Sulfate)		Ethyl Chloride	E06
Ethane	E01	Ethyl Sulfate	E07
Ethanolamine	E02	Ethylene Chloride	E08
Ether	E03	Ethylene Dichloride	E09
Ethyl Acetate	E04	Ethylene Glycol	E10
Ethyl Alcohol	E05	Ethylene Oxide	E11
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Fatty Acids	F01	Freon 22	F13
Ferric Chloride	F02	Freon 113	F14
Ferric Nitrate	F03	Freon T.F.	F15
Ferric Sulfate	F04	Fruit Juice	F16
Ferrous Chloride	F05	Fuel Oil #1	F17
Ferrous Sulfate	F06	Fuel Oil #2	F18
Fluorboric Acid	F07	Fuel Oil #3	F19
Fluosilicic Acid	F08	Fuel Oil #5A	F20
Formaldehyde	F09	Fuel Oil #5B	F21
Formic Acid	F10	Fuel Oil #6	F22
Freon 11	F11	Furan Resin	F23
Freon 12 (wet)	F12	Furfural	F24
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Gasoline (unleaded)	G01	Glycerine	G06
Gasoline (unleaded premium)	G02	Glycolic Acid	G07
Gelatin	G03	Gold Monocyanide	G08
Glucose	G04	Grape Juice	G09
Glue, P.V.A.	G05	Grease	G10
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Heptane	H01	Hydrochloric Acid	H09
Hexane	H02	Hydrocyanic Acid	H10
Hexyl Alcohol	H03	Hydrofluoric Acid	H11
Honey	H04	Hydrofluosilicic Acid	H12
Hydraulic Oil (Petroleum)	H05	Hydrogen Peroxide	H13
Hydraulic Oil (Synthetic)	H06	Hydrogen Sulfide, Aqueous	H14
Hydrazine	H07	Hydroxyacetic Acid	H15
Hydrobromic Acid	H08		
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Ink	I01	Isopropyl Acetate	I05
Iodine	I02	Isopropyl Ether	I06
Isobutyl Alcohol	I03	Isotane	I07
Isopropyl Alcohol	I04		
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JP 3 Jet Fuel	J01	JP 5 Jet Fuel	J03
JP 4 Jet Fuel	J02		
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Kerosene	K01		
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Lacquers	L01	Lead Sulfamate	L06
Lactic Acid	L02	Ligroin	L07
Lard	L03	Lime	L08
Latex	L04	Lubricants	L09
Lead Acetate	L05		
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Magnesium Carbonate	M01	Methyl Acrylate	M17

Magnesium Chloride	M02	Methyl Alcohol	M18
Magnesium Hydroxide	M03	Methyl Bromide	M19
Magnesium Nitrate	M04	Methyl Butyl Ketone	M20
Magnesium Oxide	M05	Methyl Cellosolve	M21
Magnesium Sulfate	M06	Methyl Chloride	M22
Maleic Acid	M07	Methyl Dichloride	M23
Maleic Anhydride	M08	Methyl Ethyl Ketone	M24
Mash	M09	Methyl Isobutyl Ketone	M25
Mayonnaise	M10	Methyl Isopropyl Ketone	M26
Melamine	M11	Methyl Methacrylate	M27
Mercuric Chloride	M12	Methylamine	M28
Mercuric Cyanide	M13	Methylene Chloride	M29
Mercury	M14	Milk	M30
Methyl Acetate	M15	Mineral Oil	M31
Methyl Acetone	M16	Molasses	M32
		Mustard	M33

Naptha	N01	Nickel Sulfate	N04
Napthalene	N02	Nitric Acid	N05
Nickel Chloride	N03	Nitrobenzene	N06

Oils:		Oils:	
Anise	O01	Olive	O15
Bay	O02	Orange	O16
Bone	O03	Palm	O17
Castor	O04	Peanut	O18
Cinnamon	O05	Peppermint	O19
Citric	O06	Pine	O20
Clove	O07	Rape Seed	O21
Coconut	O08	Rosin	O22
Cod Liver	O09	Sesame Seed	O23
Corn	O10	Soybean	O24
Cotton Seed	O11	Sperm	O25
Ginger	O12	Oleic Acid	O26
Lemon	O13	Oleum	O27
Linseed	O14	Oxalic Acid	O28

Paraffin	P01	Potash	P23
Pentane	P02	Potassium Bicarbonate	P24
Perchloroethylene	P03	Potassium Bromide	P25
Petrolatum	P04	Potassium Carbonate	P26
Phenol	P05	Potassium Chlorate	P27
Phosphoric Acid	P06	Potassium Chloride	P28
Photographic Developer	P07	Potassium Chromate	P29
Plating Solution:			
Antimony	P08	Potassium Cyanide	P30
Arsenic	P09	Potassium Dichromate	P31
Brass	P10	Potassium Hydroxide	P32
Bronze	P11	Potassium Nitrate	P33
Cadmium	P12	Potassium Permanganate	P34
Chrome	P13	Potassium Sulfate	P35
Copper	P14	Propane (liquified)	P36
Gold	P15	Propyl Alcohol	P37
Indium	P16	Propylene Glycol	P38
Iron	P17	Pyridene	P39
Lead	P18	Pyrogallic Acid	P40
Nickel	P19		
Silver	P20		
Tin	P21		
Zinc	P22		

Rosins	R01	Rust Inhibitors	R03
Rum	R02		

Salad Dressing	S01	Sodium Polyphosphate, monobasic	S26
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D 5260 – 04

Sea Water	S02	Sodium Polyphosphate, dibasic	S27
Shellac (bleached)	S03	Sodium Polyphosphate, tribasic	S28
Shellac (orange)	S04	Sodium Silicate	S29
Silicone	S05	Sodium Sulfate	S30
Silver Bromide	S06	Sodium Sulfide	S31
Silver Nitrate	S07	Sodium Tetraborate	S32
Soap Solutions	S08	Sodium Thiosulfate	S33
Sodium Acetate	S09	Sorgum	S34
Sodium Aluminate	S10	Soy Sauce	S35
Sodium Bicarbonate	S11	Stannic Chloride	S36
Sodium Bisulfate	S12	Stannic Fluoborate	S37
Sodium Bisulfite	S13	Starch	S38
Sodium Carbonate	S14	Stearic Acid	S39
Sodium Chlorate	S15	Stoddard Solvent	S40
Sodium Chloride	S16	Styrene	S41
Sodium Chromate	S17	Sugar (liquids)	S42
Sodium Cyanide	S18	Sulfate Liquors	S43
Sodium Hydroxide	S19	Sulfur Chloride	S44
Sodium Hypochlorite	S20	Sulfur Dioxide	S45
Sodium Metaphosphate	S21	Sulfur Trioxide	S46
Sodium Metasilicate	S22	Sulfuric Acid	S47
Sodium Nitrate	S23	Sulfurous Acid	S48
Sodium Perborate	S24	Syrup	S49
Sodium Peroxide	S25		
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Tallow	T01	Tomato Juice	T08
Tannic Acid	T02	Trichloroethane	T09
Tanning Liquors	T03	Trichloroethylene	T10
Tartaric Acid	T04	Trichloropropane	T11
Tetrachloroethane	T05	Tricresylphosphate	T12
Tetrahydrofuran	T06	Triethylamine	T13
Toluene	T07	Turpentine	T14
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Urine	U01		
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Vegetable Juice	V01	Vinegar	V02
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Water, Distilled	W01	Whey	W06
Water, Fresh	W02	Whiskey	W07
Water, Mine, Acid	W03	Wine	W08
Water, Salt	W04	White Liquor (pulp mill)	W09
Weed Killers	W05	White Water (pulp mill)	W10
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Xylene	X01		
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Zinc Chloride	Z01	Zinc Sulfate	Z03
Zinc Hydrosulfite	Z02		

SUMMARY OF CHANGES

This section identifies the location of selected changes to this classification. For the convenience of the user, Committee D20 has highlighted those changes that impact the use of this classification. This section also includes descriptions of the changes or reasons for the changes, or both.

D 5260 - 04:

- (1) Removed references to D 1898 and D 3679.
- (2) Revised for use of permissive language.

D 5260 - 97:

- (1) Added ISO equivalency statement (Note 1).
- (2) Added explanation of notes and footnotes (1.4).

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