LESSO® America

VALVE SERIES TECHNICAL MANUAL

NSF

LESSO AMERICA INC.

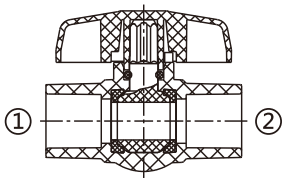
Contents

Column Header Information

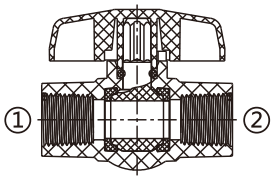
Each product column header label identifies the following product particulars:
Part Number: the number used to order the part.PN ending with B represents it with a UPC barcode.
Size: nominal diameter of pipe with which the fitting is to be used.
NOTE: Fittings may be same size (only one size designation) or reducing (multiple sizes designated).
Standard Pack (Std Pk) the quantity of parts packaged in an individual box or bag.
Master Carton (Mstr Ctn) the total quantity of parts contained in individual boxes or bags which are packaged together.

Methods Of Designating Inlets Of Fittings

PVC SCH40 VALVE SERISE



Compact Ball Valve
w/EPDM O-ring
(SOC × SOC)



Compact Ball Valve
w/EPDM O-ring
(FIPT × FIPT)

Introduction

The booklet presents technical informations referential to design, storage and installation of LESSO America PVC fittings.

The booklet just set out a referential advice or method of installation based on LESSO America's experiences and other publications such as Handbook of PVC Pipe Design and Construction (Issued by Uni-bell PVC Pipe Association).

Readers must decided by yourself whether any advice or recommended method or data should be taken or not. It is not our intention that the guide should assume the responsibility unless the engineer so directs the installer.

No representations, guarantees of warranties of any kind are made as to its accuracy, suitability for particular applications or results to be obtained therefrom. For verification of technical or additional information not contained herein, please contact LESSO America customer service departments.

Note: LESSO America PVC fittings are not for distribution or transportation of compressed air or gas, as well as not for test.

Referential Standards

NSF/ANSI 61 Drinking Water System Components - Health Effects

NSF/ANSI 14 Plastics Piping System Components and Related Materials

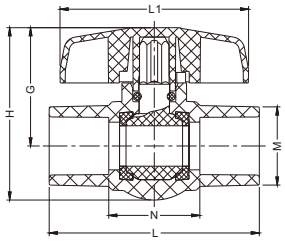
ASTM D 1784 Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

ASTM D 2466 Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fitting, Schedule 40

CSA B137.3 Rigid Polyvinylchloride (PVC) Pipe and Fitting for Pressure Applications

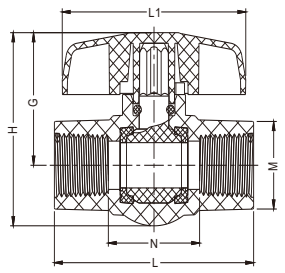
PVC SCH40 VALVE SERIES

Compact Ball Valve w/EPDM O-ring(SOC × SOC)



Part Number	Size	N	G	L	L1	H	M	Weight
4C1101-005B	1/2	1-11/32	1-23/32	3-1/16	2-3/4	2-17/32	1-5/32	0.171
4C1101-007B	3/4	1-9/16	2	3-11/32	3-1/16	2-15/16	1-13/32	0.257
4C1101-010B	1	1-7/8	2-9/32	3-15/16	3-15/16	3-13/32	1-11/16	0.418
4C1101-012B	1-1/4	2-7/32	2-19/32	4-11/32	4-3/32	3-29/32	2-1/16	0.634
4C1101-015B	1-1/2	2-5/16	2-13/16	5-1/8	4-11/32	4-9/32	2-5/16	0.838
4C1101-020B	2	2-7/8	3-5/32	5-29/32	5-5/16	4-31/32	2-13/16	1.375

Compact Ball Valve w/EPDM O-ring(FIPT × FIPT)



Part Number	Size	N	G	L	L1	H	M	Weight
4C2101-005B	1/2	1-3/8	1-23/32	3	2-3/4	2-17/32	1-5/32	0.179
4C2101-007B	3/4	1-19/32	2	3-9/32	3-1/16	2-15/16	1-13/32	0.262
4C2101-010B	1	1-31/32	2-9/32	3-27/32	3-15/16	3-13/32	1-11/16	0.430
4C2101-012B	1-1/4	2-9/32	2-19/32	4-7/32	4-3/32	3-29/32	2-1/32	0.647
4C2101-015B	1-1/2	2-13/32	2-13/16	4-29/32	4-11/32	4-9/32	2-5/16	0.859
4C2101-020B	2	3	3-5/32	5-23/32	5-5/16	4-31/32	2-25/32	1.410

Materials

LESSO fittings are made from PVC compounds which conforms ASTM D1784,Classification 12454.PVC is popular thermo plastic piping materials and has beenused successfuly for over 45 years in manyindustrial applications such as sanitary sewers and water transmission and distribution,also including sewer forcemains,recdaimed water,storm sewer,land and highway drainage,etc.

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SECTION I PRODUCT AND COMPANY INDENTIFICATION

Manufacturer: LESSO America Inc.

Address: 1010 Railroad Street, Corona, CA, 92882

Phone: (888)988-8839 or (951)547-6888

Fax: (951)547-6886

Trade Name: PVC, Polyvinyl Chloride **Chemical Name:** PVC/Acrylic Copolymer

SECTION II HAZARDOUS INGREDIENTS

Ingredient	CAS Reg. No.	Max. Percent	15 mg/m^3(total)*	ACGIH
Limestone	1317-65-3	17.5%	5 mg/m^3(respirable)*	10 mg/m^{3*}
Crystalline Silica	14808-60-7	0.4%	10 $mg/m^3 \div (2+\%SiO_2)$ -as respirable dust 30 $mg/m^3 \div (2+\%SiO_2)$ -as total dust	0.05 mg/m
Calcium Stearate	1592-23-0	1.1%	NE	(respirable)
Titanium Dioxide	13463-67-7	7.8%	15 mg/m^3	10 mg/m^3

Ingredients are considered hazardous under OSHA Hazard Communication Criteria, but are generally bound in the polymer matrix of the profile. Some release of ingredients may occur when subjected to processes such as sawing, sanding, or abrading. Release of silica particles by physical methods such as sawing during installations would not be expected to present significant exposures compared to established exposure limits, as airborne concentrations of total product dust would have to exceed 10 m^3g/m to exceed the TLV for crystalline silica. This also presumes all of the silica dust particles would be in the respirable dust size range.

* Exposure limits for calcium carbonate, the main constituent of limestone.

SECTION III HAZARDS IDENTIFICATION

Emergency Overview: None identified for product as purchased in plastic profiles in various colors.

Symptoms of Overexposure: None identified for product as purchased. Processing such as sawing, sanding, and abrasive applications that could release dust, or heating the product, could result in dust, vapor, or gas emissions that may cause eye, skin, or respiratory tract irritation.

Potential Health Effects: Dust from product may contain crystalline silica, a cause of silicosis and a substance identified as an occupational carcinogen; and linked to other health effects. Heating of the product could result in release of methacrylate monomer, which may also cause health effects such as skin sensitization in susceptible individuals, and with methyl sufficient exposure may affect kidneys, central nervous system, and liver. (See Section XI for additional health information).

Potential Environmental Effects: None identified. Material is not a RCRA Hazardous Waste.

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SECTION IV FIRST AID MEASURES

Eyes: Flush eyes with water for at least 15 minutes while lifting upper and lower eyelids. Seek medical attention if irritation or discomfort persists.

Skin Contact: Remove dust with soap and water. Obtain medical attention if irritation persists or allergic skin reaction occurs.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration or oxygen by trained personnel. Obtain immediate medical attention.

Ingestion: Treat supportatively and obtain medical attention as needed in the unlikely event ingestion is accomplished.
Medical Conditions Aggravated by Exposure:
Breathing process emissions may aggravate existing lung disease.

SECTION V FIRE FIGHTING INFORMATION

Flammable Properties: Flashpoint: Not Applicable
Flammable Limits: Not Applicable
Flammability: Product is a combustible plastic
Auto Ignition Temperature: 840˚F
Fire Fighting Guidelines:
Extinguishing Media: Water, Foam, or Dry Chemical ABC Extinguisher

Special Fire Fighting Procedures:
Firefighters should wear pressure demand self-contained breathing devices due to potentially hazardous thermal decomposition products.
Unusual Fire and Explosion Hazards:
In fire conditions may produce irritating or toxic vapors including hydrochloric acid, carbon monoxide, carbon dioxide, methyl methacrylate monomer, aldehydes, ammonia, hydrogen cyanide, hydrocarbons and other potential toxics dependent on specific conditions.

SECTION VI ACCIDENTAL RELEASE MEASURES

Spill and Clean up Procedure:
Not applicable to profile product. Dispose of waste in accordance with all federal, state/provincial, and local regulations.

SECTION VII HANDLING AND STORAGE

No specific safety precautions are necessary for the storage of materials. Keep product clear of walkways and floors to prevent tripping hazards.

Other Protective Measurers:
Should dusting occur from material handling or processing, dust accumulation and potential sources of ignition such as static discharge should be addressed by the user, to prevent fire or explosion from suspended, finely divided particles.

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SECTION VIII EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Effective local exhaust ventilation should be provided to capture dust generated during processes such as sanding or cutting, and to remove gas or vapor emissions from the work area should polymer breakdown begin from elevated temperatures.

Respiratory Protection: Respiratory Protection:Select respirators based on potential exposures if engineering controls are not sufficient to maintain airborne concentrations below applicable exposure limits. Utilize only NIOSH approved respirators, selected and used in accordance with the OSHA Respiratory Protection Standard (29 CFR 1910.134).

Eye/Skin Protection: When cutting, sanding, or processing with dust generation, wear safety glasses with side shields or goggles. General purpose work gloves are acceptable. Select personal protective equipment (PPE) based on adherence to PPE Hazard Assessment Certification as required by 29 CFR 1910.132 (d)(2).

SECTION IX PHYSICAL AND CHEMICAL DATA

Appearance: Solid plastic profiles in various colors Melting **Point:** Not Determined
Odor: No Specific Odor
Specific Gravity: 50 -80 g/cm^3
Water Solubility: Not Applicable
Vapor Density: Not Determined
Percent Volatile: Not Determined

SECTION X STABILITY AND REACTIVITY

Stability: Stable under normal conditions. Decomposition products under high heat or fire conditions may include hydrochloric acid, carbon monoxide, carbon dioxide, methyl methacrylate monomer, aldehydes, ammonia, hydrogen cyanide, hydrocarbons and other potential toxics dependent on specific conditions.

Conditions to Avoid: Temperatures above 350 degrees F.
Materials to Avoid: Oxidizers
Hazaardous Polymerization: Will not occur.

SECTION XI TOXICOLOGICAL INFORMATION

No product specific toxicological or environmental data available. Individual hazardous component information is provided as follows:

Crystalline Silica: Overexposure to respirable crystalline silic a can cause silicosis, a fibrosis (scarring) of the lung, and possibly other lung disease. Carcinogen Status: Yes - IARC Group 1, NTP known human carcinogen, ACGIH suspected human carcinogen, State of California as a substance (airborn e particles of respirable size) known to cause cancer. Some studies have shown increased risk of autoimmune system, kidney, and liver disease in silica-exposed workers.

Titanium Dioxide: May cause skin or respiratory irritation in some individuals; and may cause exacerbation of symptoms due to its irritant properties in persons with impaired pulmonary function, especially those with obstructive airway disease. Carcinogen Status: No.

Limestone: Composition is mainly calcium carbonate, a substance with ACGIH-TLV? and OSHA PEL exposure limits that are the same as for particulates without inherent toxicity concerns (i.e.- particulates not otherwise regulated, or specified). May cause eye, nose, throat, respiratory irritation; and may aggravate pre-existing respiratory conditions. Skin contact may aggravate existing dermatitis. Carcinogen Status: No.

Calcium Stearate: Individuals with hypercalcemia may be more susceptible to effects from excessive exposure to calcium compounds such as calcium carbonate and stearate. Carcinogen Status: No.

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SECTION XII: ECOLOGICAL INFORMATION

None identified for this polymer product. Product is expected to decompose very slowly in the natural environment.

SECTION XIII: DISPOSAL CONSIDERATIONS

Dispose or recycle this material in accordance with applicable federal, state/provincial, and local regulations. (See Section II for hazardous components). Identified components of product are not known to be hazardous waste in this profileing. Product has not been subjected to the RCRA EP Toxicity test.

SECTION XIV: TRANSPORTATION INFORMATION

This product is not a hazardous material for purposes of transportation under the U.S. Department of Transportation Table of Hazardous Materials, 49 CFR 172.101.

SECTION XV: REGULATORY INFORMATION

SARA Title III Information: SEC 311/312: An article as shipped and stored.

As conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this material. Information contained herein is believed to be true and accurate, but all statements or suggestions are made without warranty, express or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local laws and regulations remains the responsibility of the user.

Product Physical Characters

Joint Tightness-Join two pieces of pipe by mens of a fitting or socket in accordance with Practice D 2855 and using solvent cement as described in 7.5. Allow the joined unit to stand 24 h at room temperature .Subject the unit to an internal water pressure of 170 kPa(25 psi) at room temperature of 1 h, and examine the pipe,fitting,and joints for leakage.

Product Chemical Resistance Information

LESSO PVC fittings resist attack from a large amount of typical chemical. However, care must be taken to avoid contact with chemicals that are harmful to PVC, which will weaken or damage the system. Please consult with LESSO before using these PVC product with any questionable materials that are not listed in table

Chemical	73°F (23°c)	140°F (60°c)	Chemical	73°F (23°c)	140°F (60°c)
Acetaldehyde	N	N	Alcohol, methyl (methanol)	R	R
Acetaldehyde, aq 40%	C	N	Alcohol, propyl (1-propanol)	R	R
Acetic Acid, 25%	R	R	Alcohol, propargyl	R	R
Acetic Acid, 60%	R	N	Allyl Chloride	N	N
Acetic Acid, 85%	R	N	Aluminum Fluoride	R	N
Acetic Acid, glacial	R	N	Alums (except Aluminum Fluoride)	R	R
Acetic Acid, vapor	R	R	Ammonia, gas	R	R
Acetic Anhydride	N	N	Ammonia, liquid	N	N
Acetone	N	N	Ammonium Dichromate	R	N
Acetylene	N	N	Ammonium Salts (except Ammonium Dichromate)	R	R
Acetyl Chloride	N	N	Ammonium Fluoride, 10%	R	R
Acetylnitrile	N	N	Ammonium Fluoride, 25%	R	C
Acrylonitrile	N	N	Amyl Acetate	N	N
Acrylic Acid	N	N	Amyl Chloride	N	N
Adipic Acid	R	R	Aniline	N	N
Alcohol, allyl	R	C	Aniline Chlorohydrate	N	N
Alcohol, amyl	N	N	Aniline Hydrochloride	N	N
Alcohol, benzyl	N	N	Anthraquinone	R	R
Alcohol, butyl (n-butanol)	R	R	Anthraquinone Sulfonic Acid	R	R
Alcohol, diacetone	N	N	Antimony Trichloride	R	R
Alcohol, ethyl (ethanol)	R	R	Aqua Regia	C	N
Alcohol, hexyl (hexanol)	R	R	Arsenic Acid, 80%	R	R
Alcohol, isopropyl (2-propanol)	R	R	Aryl-sulfonic Acid	R	R

Chemical	73°F (23°c)	140°F (60°c)	Chemical	73°F (23°c)	140°F (60°c)
Barium Nitrate	R	N	Butyl Phenol	R	N
Barium Salts (except Barium Nitrate)	R	R	Butylene, Liquid	R	R
Beer	R	R	Butynediol	R	N
Beer Sugar Liquor	R	R	Butyric Acid	R	N
Benzaldehyde, 10%	R	N	Cadmium Cyanide	R	R
Benzene(benzol)	N	N	Calcium Bisulfide	N	N
Benzene Sulfonic Acid, 10%	R	R	Calcium Salts (except Calcium Bisulfide)	R	R
Benzene Sulfonic Acid, >10%	N	N	Calcium Hypochlorite, 30%	R	R
Benzoic Acid	R	R	Calcium Hydroxide	R	R
Black Liquor-paper	R	R	Calcium Nitrate	R	R
Bleach, 12% Active Chlorine	R	R	Calcium Oxide	R	R
Bleach, 5% Active Chlorine	R	R	Calcium Sulfate	R	R
Borax	R	R	Camphor	R	N
Boric Acid	R	R	Cane Sugar Liquors	R	R
Brine	R	R	Carbon Dioxide	R	R
Bromic Acid	R	R	Carbon Dioxide，aq	R	R
Bromine, Aq	R	R	Carbon Disulfide	N	N
Bromine, Liquid	N	N	Cardon Monoxide	R	R
Bromine, Gas, 25%	R	R	Carbitol	R	N
Bromobenzene	N	N	Carbon Tetrachloride	R	N
Bromotoluene	N	N	Carbonic Acid	R	R
Butadiene	R	R	Castor Oil	R	R
Butane	R	R	Caustic Potash (potassium Hydroxide), 50%	R	R
Butyl Acetate	N	N	Caustic Soda (sodium Hydroxide), <40%	R	R
Butyl Stearate	R	N	Cellosolve	R	N

Chemical	73°F (23°c)	140°F (60°c)	Chemical	73°F (23°c)	140°F (60°c)
Cellosolve acetate	R	N	Corn syrup	R	R
Chloral hydrate	R	R	Cottonseed oil	R	R
Chloramine，dilute	R	N	Creosote	N	N
Chloric acid，20%	R	R	Cresol, 90%	N	N
Chlorine ，gas，dry	C	N	Cresylic acid, 50%	R	R
Chlorine，gas，wet	N	N	Croton aldehyde	N	N
Chlorine，liquid	N	N	Crude oil, sour	R	R
Chlorine water	R	R	Cupric salts, aq	R	R
Chloroacetic acid，50%	R	R	Cyclohexane	N	N
Chloroacetyl chloride	R	N	Cyclohexanol	N	N
Chlorobenzene	N	N	Cyclohexanone	N	N
Chlorobenzyl chloride	N	N	Detergents, aq	R	R
Chloroform	N	N	Dextrin	R	R
Chloropicrin	N	N	Dextrose	R	R
Chlorosulfonic acid	R	N	Dibutoxyethyl phthalate	N	N
Chromic acid，10%	R	R	Dibutyl phthalate	N	N
Chromic acid，30%	R	R	Dibutyl sebacate	R	N
Chromic acid，40%	R	C	Dichlorobenzene	N	N
Chromic acid，50%	N	N	Dichloroethylene	N	N
Chromium potassium sulfate	R	N	Diesel fuels	R	R
Citric acid	R	R	Diethylamine	N	N
Coconut oil	R	R	Diethyl ether	R	N
Coffee	R	R	Diglycolic acid	R	R
Coke oven gas	R	R	Dimethyl formamide	N	N
Copper acetate	R	N	Dimethylamine	R	R
Copper salts, aq	R	R	Disodium phosphate	R	R
Corn oil	R	R	Dioxane-1,4	N	N

Chemical	73°F (23°c)	140°F (60°c)	Chemical	73°F (23°c)	140°F (60°c)
Ether	N	N	Glycerine (glycerol)	R	R
Ethyl ether	N	N	Glycolic acid	R	R
Ethyl halides	N	N	Grape sugar	R	R
Ethylene glycol	R	R	Green liquor, paper	R	R
Ethylene halides	N	N	Heptane	R	R
Ethylene oxide	N	N	Hexane	R	N
Fatty acids	R	R	Hexanol	R	R
Ferric salts	R	R	Hydraulic oil	R	N
Fish oil	R	R	Hydrazine	N	N
Fluorine, dry gas	R	N	Hydrobromic acid,20%	R	R
Fluorine, wet gas	R	N	Hydrochloric acid	R	R
Fluoroboric acid	R	R	Hydrocyanic acid	R	R
Fluorosilicic acid, 50%	R	R	Hydrofluoric acid,30%	R	N
Formaldehyde	R	R	Hydrofluoric acid,50%	R	N
Formic acid	R	N	Hydrofluoric acid,100%	N	N
Freon-F11, F12, F130, F14	R	R	Hydrofluorosilicic acid	R	R
Freon-F21, F22	N	N	Hydrogen	R	R
Fructose	R	R	Hydrogen cyanide	R	R
Furfural	N	N	Hydrogen fluoride	N	N
Gallic acid	R	R	Hydrogen peroxide.50%	R	R
Gas, coal, manufactured	N	N	Hydrogen peroxide,90%	R	R
Gas, natural, methane	R	R	Hydrogen phosphide	R	R
Gasoline	R	R	Hydrogen sulfide,aq	R	R
Gelatin	R	R	Hydrogen sulfide,dry	R	R
Glucose	R	R	Hydroquinone	R	R
Glue, animal	R	R	Hydroxylamine sulfate	R	R

Chemical	73°F (23°c)	140°F (60°c)	Chemical	73°F (23°c)	140°F (60°c)
Hypochlorous acid	R	R	Mercury	R	R
Iodine,aq,10%	N	N	Methane	R	R
Jet fuels,JP-4 and JP-5	R	R	Methoxyethyl oleate	R	N
Kerosene	R	R	Methyl acetate	N	N
Ketchup	R	N	Methyl amine	N	N
Ketones	N	N	Methyl bromide	N	N
Kraft paper liquor	R	R	Methyl cellosolve	N	N
Lactic acid,25%	R	R	Methyl chloride	N	N
Lactic acid,80%	R	N	Methyl chloroform	N	N
Lard oil	R	R	Methyl ethyl ketone	N	N
Lauric acid	R	R	Methyl isobutyl carbinol	N	N
Lauryl acetate	R	R	Methyl isobutyl ketone	N	N
Lauryl chloride	R	R	Methyl isopropyl ketone	N	N
Lead salts	R	R	Methyl methacrylate	R	N
Lime sulfur	R	N	Methyl sulfate	R	N
Linoleic acid	R	R	Methyl sulfauric acid	R	R
Linoleic oil	R	R	Methylene bromide	N	N
Linseed oil	R	R	Methylene chloride	N	N
Liqueurs	R	R	Methylene iodide	N	N
Lithium salts	R	R	Milk	R	R
Lubricating oils	R	R	Mineral oil	R	R
Magnesium salts	R	R	Molasses	R	R
Maleic acid	R	R	Monochloroacetic acid	R	R
Malic acid	R	R	Monochlorobenzene	N	N
Manganese sulfate	R	R	Monoethanolamine	N	N
Mercuric salts	R	R	Motor oil	R	R

Chemical	73°F (23°c)	140°F (60°c)	Chemical	73°F (23°c)	140°F (60°c)
Naphtha	R	R	Paraffin	R	R
Naphthalene	N	N	Pentane	C	C
Natural gas	R	R	Peracetic acid,40%	R	N
Nickel acetate	R	N	Perchloric acid,15%	R	N
Nickel salts	R	R	Perchloric acid,70%	R	N
Nicotine	R	R	Perchloroethylene	C	C
Nicotinic acid	R	R	Perphosphate	R	N
Nitric acid,0 to 40%	R	R	Phenol	R	N
Nitric acid,50%	R	C	Phenylhydrazine	N	N
Nitric acid,70%	R	N	Phosphoric acid	R	R
Nitric acid,100%	N	N	Phosphoric anhydride	R	N
Nitrobenzene	N	N	Phosphorus,red	R	N
Nitroglycerine	N	N	Phosphorus,yellow	R	N
Nitroglycol	N	N	Phosphorus pentoxide	R	N
Nitrous acid,10%	R	R	Phosphorus trichloride	N	N
Nitrous oxide,gas	R	N	Photographic chemicals,aq	R	R
Oleic acid	R	R	Phthalic acid	C	C
Oleum	N	N	Picric acid	N	N
Olive oil	R	R	Plating solutions,metal	R	R
Oxalic acid	R	R	Potash	R	R
Oxygen,gas	R	R	Potassium amyl xanthate	R	N
Ozone,gas	R	R	Potassium iodide	R	N
Palmitic acid,10%	R	R	Potassium salts (except potassium iodide)	R	R
Palmitic acid,70%	R	N	Potassium permanganate	R	R

NOTE: DO NOT USE OR TEST THE PRODUCTS IN THIS CATALOG WITH COMPRESSED AIR OR OTHER GASES.
FAILURE TO FOLLOW THIS WARNING CAN RESULT IN PERSONAL INJURY OR DAMAGE TO PROPERTY.

Chemical	73°F (23°c)	140°F (60°c)	Chemical	73°F (23°c)	140°F (60°c)
Potassium permanganate,25%	R	N	Sulfamic acid	N	N
Propane	R	R	Sulfate&sulfire liquors	R	R
Propylene dichloride	N	N	Sulfur	R	R
Propylene oxide	N	N	Sulfur dioxide,dry	R	R
Pyridine	N	N	Sulfur dioxide,wet	R	N
Pyrogallic acid	R	N	Sulfur trioxide,gas,dry	R	R
Rayon coagulating bath	R	R	Sulfur trioxide,wet	R	N
Salicylic acid	R	R	Sulfuric acid,up to 80%	R	R
Salicylaldehyde	N	N	Sulfuric acid,90 to 93%	R	N
Selenic acid,aq.	R	R	Sulfuric acid,94 to 100%	N	N
Silicic acid	R	R	Sulfurous acid	R	R
Silicone oil	R	N	Tall oil	R	R
Silver salts	R	R	Tannic acid	R	R
Soaps	R	R	Tanning liquors	R	R
Sodium chlorate	R	N	Tar	N	N
Sodium chlorite	N	N	Tartaric acid	R	R
Sodium hypochlorite	R	N	Terpineol	C	C
Sodium salts,aq (except sodium chlorate, sodium chlorite,and sodium hypochlorite)	R	R	Tetrachloroethane	C	C
Stannic chloride	R	R	Tetraehyl lead	R	N
Stannous chloride	R	R	Tetrahydrofuran	N	N
Starch	R	R	Tetralin	N	N
Stearic acid	R	R	Tetrasodium	R	R
Stoddard solvent	N	N	Thionyl chloride	N	N
Succinic acid	R	R	Thread cutting oils	R	N
Sugars,aq	R	R	Titanium tetrachloride	C	N

Chemical	73°F (23°c)	140°F (60°c)	Chemical	73°F (23°c)	140°F (60°c)
Tetralin	N	N	Urea	R	R
Tetrasodium	R	R	Urine	R	R
Thionyl chloride	N	N	Vaseline	N	N
Thread cutting oils	R	N	Vegetable oils	R	R
Titanium tetrachloride	C	N	Vinegar	R	R
Toluene	N	N	Vinyl acetate	N	N
Tomato juice	R	R	Water,deionized	R	R
Transformer oil	R	R	Water,distilled	R	R
Tributyl citrate	R	N	Water,salt	R	R
Tributyl phosphate	N	N	Whiskey	R	R
Trichloroaacetic acid	R	R	White liquor	R	R
Trichloroehylene	N	N	Wines	R	R
Triethanolamine	R	N	Xylene	N	N
Triethylamine	R	R	Zinc salts	R	R
Trimethyl propane	R	N			
Trisodium phosphate	R	R			
Turpentine	R	R			

*R=generally resistant;C=less resistant than R but still suitable for some conditions; N=not resistant

This table is meant to aid the designer in decisions as to transporting/conveyance of undiluted chemicals. Chemical resistance data are provided as a guide only. Information is based primarily on immersion of unstressed strips in chemicals and to a lesser degree on field experience.

Designing, Operating and Maintaining Piping Systems Using PVC Fittings Ron Bliesner, February 3, 1987

Handling and Storage

HANDLING

PVC fittings has excellent impact resistance under normal condition, but there is a slightly reduction on impact resistance when the ambient temperature fall below freezing. Attention must be paid to local insulating techniques and codes that require a particular method.

fittings must not fall or be thrown off the truck or into the trench, which perhaps leads to damage such as rupture, scatches, splits. Any damaged fittings must be discarded.

STORAGE

LESSO recommends that PVC fittings should be store in their original carton avoiding dirt or other potential damage and the carton have better be placed indoors. If storing outdoors, these products must be covered with a opaque materials such as canvas. At the same time, if package of fittings are covered, keep the air circulated against heat buildup in hot summer weather. Care should be taken that package of PVC fittings should be away from heat sources or moisture attack. If PVC fittings are subject to direct sunlight after installation, protection should be adopt with chemically compatible paint, uch as water based Latex.

Solvent cement has a definite shelf life. Each can or carton is clearly marked with a date of manufacture. Stock should be rotated that the oldest material must be used firstly. Do not allow solvent cement to be stored near the source of ignition, heat, sparks or open flame due to its flammability.

Solvent Cement Joint Procedure

1. PREPARATION
Prepare the necessary tools. Expose the pipe and fittings to the open air on the construction site for at least one hour. Take protective measurements on the connecting parts if the environments is extremely hot or extremely cold.

2. CUT THE PIPE
Use saw and miter box, wheel cutter or pipe cutter to cut the PVC pipe. These tools can make sure the cut is square. Protect pipe and fittings from serrated holding devices and abrasion.

3. REMOVE THE BURRS AND CHAMFER THE EDGES
Chamfer the cut ends to 10° to 15° and remove all the burrs from inside and outside of the pipe with a knife-edge, file, or deburring tool.

4. CLEAN THE PIPE AND FITTINGS
Wipe the joining surfaces by using clean, dry cloth or pager towel. Make sure all joining surfaces are free from dirt, dust, water and oil.

5. CHECK THE CLEANNESS OF THE JOINING SURFACES
Check the cleanness of the joining surfaces. Then mark the pipe end with a socket depth line.

6. USE THE APPROPRIATE APPLICATOR SIZE FOR THE JOINT
Use an applicator with at least ½ the size of pipe. Keep applicator in can when not in use.

7. APPLY SOLVENT CEMENT
Apply a moderate even coating of cement in the fittings socket completely covering the pipe joining surfaces only. Heavy or excessive applications of cement may become an obstruction inside of the piping. Quickly apply a heavy even coat of cement to the outside of the pipe. Make sure that the coated distance on the pipe is equal to the depth of the fittings socket.
Note: Don't let cement puddle inside fittings or run down inside the pipe.

Acceptable Solvent Cement Type

Pipe and Fitting System	Diameter (in.)	Solvent Cement Standard	Cement Color (common usage, check local code)	Description	Primer (common usage, check loacl code)
PVC DWV or SCH.40 Pressure PVC SDR 35 SEWER	1/2—4	ASTM D 2564	Clear	Regular or Medium-Bodied	Required ASTM F 656
PVC DWV or SCH.40 Pressure PVC SDR 35 SEWER	6—16	ASTM D 2564	Clear or Grey	Medium or Heavy-Bodied	Required ASTM F 656
SCH.80 Pressure	1/4—2	ASTM D 2564	Grey	Medium or Heavy-Bodied	Required ASTM F 656
SCH.80 Pressure	2 1/2—16	ASTM D 2564	Grey	Medium or Heavy-Bodied	IPS P-70 or Oatey Industrial Grade

Solvent Cement Joint Procedure

Estimates for usage of solvent cements special for PVC fittings are given in the list below. The column is just for reference. Actual usage in the field could vary due to wide ranges of installation conditions. You may follow accurate dosage according to solvent cement suppliers.

Nominal Pipe Size	Pint	Quart	Gallon
2"	20	40	160
3"	15	30	120
4"	10	20	80
6"	N/R	8	32
8"	N/R	N/R	N/R

8. ASSEMBLE IMMEDIATELY

Make the joint as quickly as possible after application of the cement and before the cement dries. While cement is still wet, insert the pipe into the fitting socket and twist 1/4 turn. Make sure that the pipe is inserted to the full depth of the socket and hold it for at least 30 seconds to avoid push-out.

9. REMOVE EXCESS CEMENT

Remove excess solvent cement from the exterior of the joint with a clean, dry cloth. Otherwise, the excessive solvent cement could permanently distort or weaken pipe.

10. DO NOT DISTURB DURING INITIAL SET PERIOD.

Do not attempt to disturb the pipe-fittings joint until after the cement has set; damage to joint and loss of fit may result. Should the cement dry partially before joint is made up, reapply cement before assembling.

Notes:

1. In case of conflicting solvent cementing instructions, the instruction of the cement manufacturer should be followed.
2. Some cements are not "one-step" and require prime before applied. The performance of applying prime is similar to procedure of applying cement. Please refers to the instructions from prime suppliers for detail.

Solvent Cement Joint Procedure

RECOMMENDED INITIAL SET TIME

Nominal Pipe Size	600-1000F/160-380C	400-600/50-16oC	00-400F/-180-50C
1/2" — 1-1/4"	15min	1hr	3hrs
1-1/2" — 2"	30min	2hrs	6hrs
3" — 8"	1hr	4hrs	12hrs

Note: Initial set schedule is the necessary time to allow before the joint can be carefully handled.
In damp or humid weather allow 50% more set time.

RECOMMENDED JOINT CURING TIME

Relative humidity 60% or less	Pipe size 1/2" to 1-1/4" (20 to 40mm)		Pipe size 1-1/2" to 2" (50 to 63mm)		Pipe size 3" to 8" (75 to 200mm)	
Temperature range during assembly and cure periods	Up to 160psi/ 11bar	160 to 370psi/ 11 to26 bar	Up to 160psi/ 11bar	160 to 370psi/ 11 to26 bar	Up to 160psi/ 11bar	160 to 370psi/ 11 to26 bar
600-1000F/ 160-380C	1hr	6hrs	2hrs	12hrs	6hrs	24hrs
400-600/ 50-16oC	2hrs	12hrs	4hrs	24hrs	12hrs	48hrs
00-400F/ -180-50C	8hrs	48hrs	16hrs	96hrs	48hrs	8days

Note: Joint cure schedule is the necessary time to allow before pressurizing system.
In damp or humid weather allow 50% more cure time.

The above data are based on laboratory tests and are intended as guidelines. For more specific information, contact should be made with cement manufacturer.

Special Consideration in Installation

TEMPERATURE CORRECTION FACTORS

Corrections must be made to derate all PVC fittings when operating temperatures are expected to exceed 73 degrees Fahrenheit. The working pressure is directly affected by temperature changes. The drop in pressure capacity can be calculated using table 3. Multiply the maximum working pressure by the temperature correction factor for a known temperature.

The chart below is to be used to determine recommended pressures. If you have any questions regarding your system, contact your architect or designer for proper system operations.

TEMPERATURE CORRECTION FACTORS:

Maximum Operation Temperature 0f(0c)	Derate Factor for Actual Working Pressure
73(23)	1
80(27)	0.88
90(32)	0.75
100(38)	0.62
110(43)	0.50
120(49)	0.40
130(54)	0.30
140(60)	0.22

Note: Maximum service temperature for PVC pipe is 140^{0}F.

EXAMPLE

The nominal operation pressure for 2" SCH40 fittings is 280 psi in 73^{0}F, if the ambient temperature for practical installation of PVC piping system is 110^{0}F, then the maximum operation pressure is original value multiplied by correction factors, i.e, the value is equal to 280×0.5=140psi.

PRESSURE SURGES

Definition:

Few piping systems are operated under "static" conditions for long periods of time. Hydraulic transient conditions or "surges" occur in every irrigation system. A pressure surge or "water hammer" is created any time the flowrate changes in a piping system. This may be caused by valve operation, pumps starting or stopping, line breaks or rapid escape of entrapped air.

Prevention Tips:

To limit the magnitude and frequency of pressure surges, system operators should use the following guidelines:

1. Operate the system to maintain pump flowrate as uniformly as possible. This will not only reduce hydraulic transient problems but will increase the life of the pumping unit.
2. Attempt to balance system flows so the sprinkler set changes are systematic within system subunits. Avoid changing from one main area of the system and back again in the operating program. Maintain sub-unit flows uniformly, if possible.
3. Run fewer sets for longer times. Hydraulically, it is easier on the system to run a given set as long as possible, provided runoff does not occur, or the moisture holding capacity of the soil is not exceeded. This will allow for fewer sets and, thereby, fewer opportunities for surges to occur.
4. Avoid operating too many sprinklers in one area of the system and elevating the operating velocities. Use the design guidelines to govern the number of sprinklers that may operate simultaneously on a given pipe segment or loop.

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Limited Warranty

Except as otherwise mandated by law, LESS0 America warrants to Buyer only that the Products directly manufactured by LESS0 America will be free from defects in material and workmanship for a period of three years from the date installation, Buyer agreesthat this warranty shall be effective so long as the Products are used solely for the normal purposes for which they are intended and in conformity with industry established engineering, installation, operating, and maintenance specifications, recommendations and instructions, Violation thereof shall void this warranty and relieve LESSO America from any obligation under this warranty.

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Printed in China