

SUGGESTED MASTER SPECIFICATION

SECTION 03 15 13 WATERSTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Provision of waterstops embedded in concrete and spanning control, expansion, and/or construction joints to create a continuous diaphragm to prevent fluid migration.

1.02 REFERENCES

A. PVC WATERSTOP

1. Corps of Engineers: CRD-C 572-74
2. American Society for Testing Materials (ASTM)
3. Bureau of Reclamation: C-902
4. Canadian General Standards Board: 41-GP-35M Types 1 & 3

1.03 DELIVERY, STORAGE, AND HANDLING

A. Cover waterstops to protect from elements such as sun, dust, and oils

PART 2 PRODUCTS

2.01 PVC WATERSTOPS FOR EXPANSION JOINTS

A. Provide flexible PVC waterstop as manufactured by Durajoint, Type _____.

B. The PVC waterstop shall be extruded from an elastomeric plastic material of which the basic resin is prime virgin polyvinyl chloride.

C. Performance Requirements: Typical Test Method Value (CRD-C-572-74)

Tensile Strength 1700 psi CRD-C 573 - Ultimate Elongation 366% CRD-C 573 - Stiffness in Flexure 775 psi CRD-C 571 - Tear Resistance 380 lbs./in. ASTM D-624 - Ozone Resistance passed ASTM D-1149 - Low Temperature No - Cracking CRD-C 570 - Brittleness (-35°F) or Splitting - Accelerated Extraction CRD-C 572 - Ultimate Elongation 350% Par 7.1 - Tensile Strength 2000 psi Par 7.1 - Effects of Alkalies Loss in Weight CRD-C 572 - 0.10% Max. Par 7.2 Gain in Weight 0.25% Max.

2.03 ACCESSORIES

A. PVC Waterstops

1. Provide factory made waterstop fabrications for all changes of direction, intersections, and transitions leaving only straight butt joint splices for the field. All factory made splicing shall be made by Durajoint or approved equal.
2. Provide hog rings spaced at 12 inches on center along length of waterstop.
3. Provide Teflon coated thermostatically controlled waterstop splicing irons for field butt splices.

PART 3 EXECUTION

3.01 INSTALLATION

A. PVC Waterstop

1. Field butt splices shall be heat fused welded using a teflon covered thermostatically controlled waterstop splicing iron at approximately 380 degrees F. Follow approved manufacturer recommendations.
2. Lapping of waterstop, use of adhesives, or solvents shall not be allowed.
3. Center waterstop in joint and secure waterstop in correct position using hog rings spaced at 12" on centers along the length of the Waterstop and wire tie to adjacent reinforcing steel

MATERIAL SAFETY DATA SHEET



Durajoint[®]
Concrete Accessories

Manufacturer's Name: DuraJoint Division
Four Seasons Industries
10426 Industrial Drive
Garrettsville, Ohio 44231

Emergency Phone #: (888) 833-8308

Chemical Name: PVC Waterstop

Chemical Family: PVC

Formula: N/A

DOT Class: 55

Polymer CAS #: See Section 1 below

SECTION 1 – HAZARDOUS INGREDIENTS

Component	CAS#	%	TLV (Units)
Polyvinyl Chloride Resin	CAS# 9002-86-2	N/A	N/A
Phthalate Ester	CAS# 39393-37-8	N/A	N/A
Ground Inorganic Pigment	CAS# 1717-65-3	N/A	N/A

SECTION II - PHYSICAL DATA

Boiling Point (°F – ASTM D-86):	N/A	Specific Gravity (H ₂ O = 1):	1.36 @ 77°F / 77°F
Vapor pressure (mm Hg. @ 60° F – 100° F)	N/A	Melting Point:	300° F
Vapor Density (Air = 1)	N/A	Evaporation Rate (n-BuAc = 1)	N/A
Solubility in Water:	Insoluble	Appearance:	Grey solid material
Odor:	Practically odorless		
HMIS rating:	Health – 2	Flammability – 1	Reactivity - 0

SECTION III – FIRE & EXPLOSION HAZARD DATA

Flash Point:	N/A	Flammable Limits	Lel-N/A; Uel-N/A
Extinguishing Media:	Water		
Special Fire Fighting Procedures:	Self-contained breathing apparatus for fires in closed areas, such as a warehouse.		
Unusual Fire & Explosion Hazards:	When forced to burn, PVC will mainly contribute carbon monoxide, Carbon dioxide and hydrogen chloride in gases and smoke. Phosgene And chlorine is not combustible products.		

MATERIAL SAFETY DATA SHEET



PAGE 2

SECTION IV – HEALTH HAZARD DATA

Threshold Limit Value: N/A
Effects of Overexposure: N/A
Emergency & First Aid Procedures: Normal Cleanliness

SECTION V – REACTIVITY DATA

Stability: Stable
Conditions to avoid: N/A
Incompatibility: None known
Hazardous Decomposition Product: See Section IV
Hazardous Polymerization: Will not occur
Conditions to Avoid: N/A

SECTION VI – SPECIAL PROTECTION INFORMATION

Respiratory Protection: None likely to be needed. If dust is produced, wear approved dust mask.
Ventilation: Local exhaust – at fabrication operation and hot splicing.
Protective Gloves: Mechanical (General) - N/A
Normally none
Other Protective Equipment: See section IV
Work/Hygienic Practices: Practice reasonable care and cleanliness as a common sense safety precaution.

SECTION VII – SPECIAL PRECAUTIONS

Handling & Storage Precautions: Normal cleanliness. Do not store near heat or easily combustible and ignition source.
Other Precautions: Avoid breathing the smoke generated at hot fabrication.

SECTION VIII – ENVIRONMENTAL INFORMATION

Spill & Leak Procedures: Pick up and handle as any other material.
Waste Disposal Method: Re-use, sanitary landfill or incineration. If incineration is used, recognition should be made that carbon monoxide and hydrogen chloride are generated.

This information is furnished without warranty, express or implied, except that it is accurate to the best knowledge of Four Seasons Industries. The data on this sheet relates only to specific material designated herein. Four Seasons Industries assumes no legal responsibility for use or reliance upon this data.

Date Prepared: 5/30/01 Supercedes: 5/23/01

Durajoint[®] The Original PVC Waterstop Technical Data Sheet

1. Product Name: Durajoint[®] PVC Waterstop

2. Manufacturer:
Four Seasons Industries
10426 Industrial Drive
Garrettsville, OH 44321
Phone: (330) 527-4308
Toll-Free: (888) 833-8308
Fax: (330) 527-2440

3. Product Description: Durajoint is a product designed for use in concrete construction containing joints, one side of which is subject to hydrostatic pressure.

Durajoint is used as a barrier within the joint to prevent the passage of liquid through or across the joint. It is embedded in the concrete on both sides of the joint, spanning the joint. It is designed to accommodate lateral and transverse movement which can cause a joint to open, close or misalign.

4. Basic Uses: Durajoint is used in Portland concrete construction to prevent the flow of liquids through or across expansion joints and construction joints, particularly in on grade and below grade structures, where water has to be kept out – or kept in.

Some of the structures requiring the use of Durajoint or a similar product are basements, retaining walls, dams, locks, sewage treatment and water treatment plants, storage tanks, water reservoirs, canals, culverts, tunnels, elevator pits, roof and floor slabs, parking decks, bridge decks and abutments – and any other concrete structure requiring tight joints.

5. Composition and Material: Durajoint is extruded from an elastomeric plastic compound consisting of virgin polyvinyl chloride and additional resins, plasticizers and stabilizers to meet or exceed the requirements and performance criteria of the Corps of Engineers Specification CRD-C 572-74. An arctic grade is available on request to meet Ontario Hydro Standard M-264-81. Durajoint is chemically inert, contains no materials leachable by water, and is highly resistant to ozone and oxygen, and to waterborne chemicals.

Durajoint is fungus resistant, as tested against the specifications outlined in Military Standard 810B, Method 508. It will not fatigue with repeated flexing, and retains its strength and elasticity through a temperature range from as low as -35°F (-37.2°C) to a high of +175°F (+79.3°C).

TECHNICAL DATA TYPICAL VALUES (PVC) (CRD-C572-74)		
	Values	Test
Tensile Strength psi (MPa)	2050 (14.14)	CRD-C 573
Ultimate Elongation	366%	CRD-C 573
Stiffness in Flexure psi (MPa)	775 (5.54)	CRD-C 571
Low Temperature Brittleness @ -35°F (-37.2°C)	No cracking or splitting	CRD-C 570
Accelerated Extraction Ultimate Elongation	350%	CRD-C 572 Par 7.1
Tensile Strength psi (MPa)	2000 (13.79)	Par 7.1
Effect of Alkalis	Loss in weight 0.10% Max. Gain in weight 0.25%	CRD-C 572 Par 7.2

Values presented are typical and are not necessarily referenced to create specifications.

6. Color: Gray

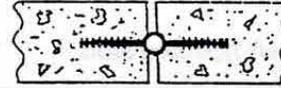
7. Waterstop Selection Guide:

a) Types of Joints

- **Working Joints** - Joints where a large amount of movement occurs.
- **Non-Working Joints** - Joints where little or no movement occurs.
- **Control Joints** - Joints which are purposely created planes of weakness to predetermine the location of cracks caused by contraction during the curing of concrete. Usually these joints have lateral movement.
- **Expansion or Isolation Joints** - Joints which separate or isolate abutting concrete structures, such as walls, slabs, columns or footings, protecting them from compressive forces which may develop by expansion, loads, or other movement due to settlement or configuration of the structure. The movement at these types of joints can be both lateral and transverse.
- **Construction Joints** - Joints placed at the interruptions in the placement of concrete.

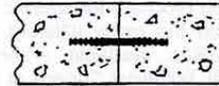
b) Types of Waterstop:

Ribbed Type with Centerbulb



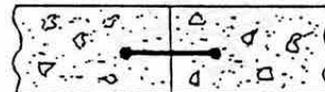
The most common and versatile type used. It is used in expansion, contraction and construction joints, particularly where a large amount of movement is expected. The greater the movement, the larger the bulb that should be used. The bulb works with both lateral and transverse movement, and the ribs provide better watertight sealing than do non-ribbed types.

Ribbed Type without Centerbulb



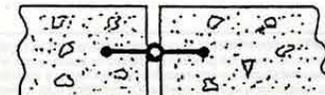
Used in construction joints where little or no movement is expected. Again, the bulb works with both lateral and transverse movement, and the ribs provide better watertight sealing than do non-ribbed types.

Dumbbell Type without Centerbulb



Primarily used in below-grade joints where little or no movement is anticipated, or in joints where predetermined lateral movement is 1" or less.

Dumbbell Type with Centerbulb



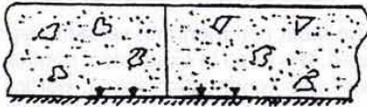
Used in selected applications where movement, even if transverse and longitudinal, must be accommodated.

Split Ribbed Type & Dumbbell



Used to eliminate split form work where desirable. Recommendations for the Ribbed and Dumbbell types given on the other side of this page apply.

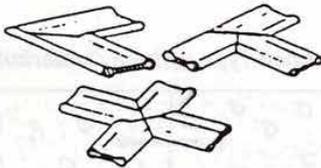
Baseal® Type Joint Seals



Designed for ongrade installation at the bottom of concrete slabs to prevent upward seepage of ground water through joints, or in thin slab construction, or to waterproof joints at wall/slab junctions.

After determining the type of DuraJoint Waterstop required for your construction purposes, consult either the DuraJoint PVC Waterstop brochure for specific information on the many different sizes and profiles available – or call DuraJoint Technical Service at (888) 833-8778.

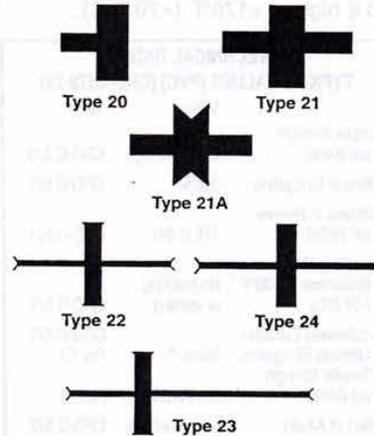
Factory Made Splices – Flat and vertical L's, T's and Crosses are available on request. When splicing in the field, use a thermostatically controlled heat iron.



Masonry Control Joints

PVC masonry control joint units are designed to be used with standard concrete blocks to provide a vertical joint of stress relief in concrete masonry walls, while providing ade-

quate strength. Control joint units are extruded from a specially formulated PVC compound in 4 linear foot lengths. **Type 20, Type 21 and Type 21A** are used both in block walls and brick veneer. They are used with less expensive joint fillers, and are ideal between columns and walls. **Type 22 and Type 24** are used in 6" and 8" block walls, and **Type 23** is used in block walls and brick veneer, with all five types providing protection against the penetration of foreign materials.



TYPICAL PHYSICAL PROPERTIES		
Tensile strength, psi	ASTM D-638	2060
Elongation, %	ASTM D-638	360
Specific Gravity	ASTM D-792	1.38
Hardness, Shore A	ASTM D-2240	75-85

8. Installation Techniques:

a) Preparation

Store DuraJoint under cover to protect from oil, dirt, and sun UV. Uncoil several days before using and lay flat to insure easy installation and fabrication.

b) Placement

Steel reinforcing bars and dowels must not interfere with proper positioning. Install in the center of the joint, with half of the width embedded in the concrete on each side of the joint.

In expansion joints, take care during the concrete placement to keep the centerbulb unembedded and in the center of the joint. Use hog rings crimped between the last two ribs or into the end bulbs on 12" centers and

thoroughly vibrate the concrete around the waterstop to ensure complete contact between the concrete and the waterstop.

Thoroughly clean all horizontal joints prior to the second pour so that foreign material does not interfere with full contact between the cement and the waterstop being embedded. Do not deflect the waterstop out of position when placing the concrete. Use a heavier waterstop profile when using large, heavy aggregate to prevent displacement of the waterstop.

When using the split type, the split of the leg is opened and nailed to the bulkhead between the last ribs, or beside the end bulbs on the Dumbbell type. When the forms are stripped the split legs are joined using a PVC solvent adhesive and placing hog rings every 12".

Factory Installed "Hog Rings"

Factory installed "hog rings" are available on selected sizes and shapes of DuraJoint Waterstop. "Hog rings" help to hold the waterstop in proper position during the placement of concrete by fastening the rings with wire to the rebar. "Hog rings" are made of galvanized metal, and are installed at 12 inch intervals during the extrusion process; however, any interval can be specified. For more information, call (888) 833-8778 (toll-free).

9. Application Cautions:

When placing concrete, be certain there is complete contact with the waterstop. Do not deflect the waterstop when making the second pour. When using split type, do not nail adjacent to the center bulb. Protect material from oil, dirt, and sun UV when storing before use.

10. Environmental and Safety Precautions: None

11. Packaging: Waterstop – 50 ft. per piece. Masonry Control Joint – #23 10 4' pcs/carton; all others 15 4' pcs/carton.

Storage: Protect from contamination and sun UV.

Shelf Life: Indefinite.

Freight Class: 55 – Roadway Paving Joint NMFC #35160.

DESCRIPTION Durajoint PVC Waterstop is a product designed for use in concrete construction containing joints, one side of which is subject to hydrostatic pressure. The material is gray in color. Durajoint is used as a barrier within the joint to prevent the passage of liquid through or across the joint. It is embedded in the concrete on both sides of the joint and spans the joint. It is designed to accommodate lateral and transverse movement which can cause a joint to open, close or misalign.

USE Durajoint is used in portland cement concrete construction to prevent the passage of water through expansion joints and construction joints, particularly in on grade and below grade structures, where water has to be kept out, or kept in.

COMPOSITION AND MATERIAL Durajoint is extruded from an elastomeric plastic compound consisting of virgin polyvinyl chloride and additional resins, plasticizers and stabilizers to meet or exceed the requirements and performance criteria of the Corps of

NOTE: Head pressure ratings are for reference only. Actual ability to resist head pressure depends on the quality of concrete and placement.

Ribbed Type with Centerbulb			
	APPROX. WT. LBS. L.M. FT.	HEAD OF WATER FT.	
Type 3 Type 3A Construction joints.	0.50 0.40	65	
Type 4 Construction joints. For higher heads of water or larger movement than Type 3.	0.89	100	
Type 4B Similar to Type 4, however tapered for economical but effective water stoppage.	0.70	100	
Type 5 Heavier duty than Type 4. Will resist displacement during concrete pour.	1.14	125	
Type 5A Similar to Type 5. Recommended for small dams and hydro projects.	1.65	125	
Type 5BR Extra heavy duty. Will also resist displacement during pour.	1.14	125	
Type 6 For large expansion joints in retaining walls or roof slabs.	1.07	150	
Type 7 For large heads of water - dams, major reservoirs, sewage plants or locks.	1.62	150+	
Type 7BR Use when extra movement in both shear and expansion is expected.	2.65	150+	
Type 7C Will accommodate extra movement in both expansion and shear.	2.24	150+	
Type 7D1 For larger heads of water - dams, reservoirs, sewage plants or locks with larger movement.	2.10	150+	

Ribbed Type with Centerbulb			
	APPROX. WT. LBS. L.M. FT.	HEAD OF WATER FT.	
Type 7F For large transverse and shear movements in major structures.	3.01	150+	
Type 8 For exceptionally high heads of water and application in major structures, dams, power houses, etc.	2.70	150+	
Type 9 Extra heavy duty for higher heads of water and will resist displacement during pour.	1.64	150	
Type 10 Will accommodate extra movement in both expansion and shear.	2.34	150	
Type 31 For extra high dams.	3.18	250+	
Type M3 Economical shape for use in expansion joints of 1" or less.	1.50	150	
Split Ribbed Type with Centerbulb			
Type 300 Same as Type 3 but has one split flange.	0.50	65	
Type 400 Same as Type 4 but has one split flange.	0.89	100	
Type 500 Same as Type 5 but has one split flange.	1.26	125	
Type 700 Same as Type 7 but has one split flange.	1.62	150+	
Type 3100 For extra high dams.	3.18	250+	
Dumbbell Type - Split without Centerbulb			
Type DB-200 For expansion joints 1/2" or less in width.	1.54	100	
Type DB-300 For expansion joints 1" or less in width.	2.21	100	

Engineers Specification CRD-C 572-74. An arctic grade is available on request to meet Ontario Hydro Standard M-264-81.

Durajoint is chemically inert, contains no materials leachable by water, and is highly resistant to ozone and oxygen, and to waterborne chemicals. It is fungus resistant, as tested against the specifications outlined in Military Standard 810B, Method 508, will not fatigue on repeated flexure, and retains its strength and elasticity through a temperature range from -35°F to +175°F.

TYPES OF JOINTS

- **Working Joints** – Large amount of movement occurs.
- **Non-Working Joints** – Little or no movement occurs.
- **Control Joints** – Purposely created planes of weakness to predetermine the location of cracks caused by contraction during the curing of concrete. Usually these joints have lateral movement.
- **Expansion or Isolation Joints** - Separates or isolates abutting concrete structures, such as walls, slabs, columns or footings. Movement can be both lateral and transverse.
- **Construction Joints** - Placed at the interruptions in the placement of concrete.

Ribbed Type without Centerbulb			
	APPROX. WT. LBS. LIN. FT.	HEAD OF WATER FT.	
Type 2 For construction joints.	0.39	65	
Type 11 Construction joints in foundation walls and footings where greater hydrostatic pressure is anticipated.	1.46	125	
Type 11A For deep embedment in construction and expansion joints where shear movement is not anticipated.	2.14	150	
Type 11B Durajoint flat ribbed waterstops are used in construction joints where little or no movement is expected. Found generally in below grade footings, walls and slabs.	0.83	100	
Type 11C	1.14	150	
Type 12 Construction joints in foundation walls and footings.	1.07	65	
Type 13 Construction joints in foundation walls and footings where greater hydrostatic pressure is anticipated.	1.59	125	
Type 14 For deep embedment in construction and expansion joints where shear movement is not anticipated.	2.24	150	
Type 15 Construction joints in foundation walls and footings.	1.29	125	
Post Applied Durajoint			
Type 18 Post Applied Durajoint was designed to attach new concrete structure to existing concrete. Providing watertight joint with limited movements. Kit includes: 10 ft piece type 18 2-10 ft steel bars 40 bolts & anchors	2.80	NA	

Dumbbell Type without Centerbulb			
	APPROX. WT. LBS. LIN. FT.	HEAD OF WATER FT.	
Type DB-1 For construction joints.	0.83	65	
Type DB-2 For expansion joints 1/2" or less in width.	1.53	100	
Type DB-3 For expansion joints 1" or less in width.	2.21	100	
Type DB-4 For expansion joints 1" or less in width.	2.34	100	
Type DB-5 For composition joints below grade where little or no movement is expected.	0.76	90	
Type DB-7 Same as Type DB-5 but will take higher head of water.	0.98	100	
Type DB-8 Economical shape for construction joints below grade.	0.50	65	
Dumbbell Type with Centerbulb			
Type DB-6 For expansion joints up to 1-1/2" in width. Will accommodate both transverse and longitudinal movements.	2.92	150	
Type DB-9 For expansion joints 1" or less in width.	2.10	100	
Type DB-10 For horizontal and vertical expansion joints where reinforcing steel does not allow use of 9" waterstop.	1.25	125	
Type DB-11 To be used in large pours with expected movements, floodwalls, large treatment plants.	3.65	150	

*Available in TPR - Durajoint Thermoplastic Rubber Waterstop

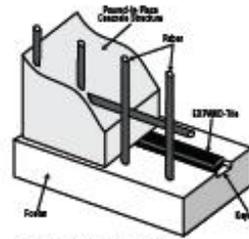
TYPES OF WATERSTOP

- **Ribbed with Centerbulb** – the most common and versatile type used. It is used in expansion, contraction and construction joints, particularly where a large amount of movement is expected. The greater the expected movement, the larger the bulb that should be used.
- **Ribbed w/o Centerbulb** – used in construction joints where little or no movement is expected. The ribs provide better watertight sealing than do non-ribbed types.

- **Dumbbell w/o Centerbulb** – primarily used in below-grade joints where little or no movement is anticipated.
- **Dumbbell with Centerbulb** – used for selected applications where movement, even if transverse or longitudinal, is present.
- **Split Ribbed and Dumbbell** – used to eliminate split form work.
- **Baseal® Type Joint Seals** – designed for ongrade installation at the bottom of concrete slabs to prevent upward seepage of ground water through joints, or in thin slab construction, or to waterproof joints at wall/slab junctions.

Special Shapes		
	APPROX. WT. LBS. L.N. FT.	HEAD OF WATER FT.
Type 16 Bridge deck joint to meet California State Hwy. Dept. specifications.	1.10	NA
Type 17 For greater embedment in construction joints or thin walls and slabs.	1.25	50
Type 27 For construction joints on highways and bridges.	0.78	NA
Type 28 For construction joints on highways and bridges.	1.00	NA
Type 29 Used to attach new concrete structure to existing concrete. Providing watertight construction joint with little or no movements.	0.82	NA
Type M1 Used as construction joint in thin walls and slabs.	0.58	NA
Type M2 Bridge and highway construction joints between deck and curbing or parapet abutments.	1.70	NA
Baseal® Type Joint Seals		
Type 60 For construction joints in slabs and walls.	0.80	
Type 60A For construction joints in slabs and walls.	0.80	
Type 61 Heavy duty for construction joints in slabs and walls.	1.51	
Type 62 Heavy duty for expansion joints.	1.64	
Type 66 Base seal for wall and slab construction joints.	0.83	

Hydrophilic Waterstop • EXPAND-Tite



Durajoint EXPAND-Tite is a flexible concrete construction joint waterstop that is easy to install in **non-moving joints**. It is composed of bentonite clay and butyl rubber to withhold its physical integrity after expanding.

EXPAND-Tite expands in a controlled fashion when exposed to moisture and will not expand beyond a point where the hydration process reduces the effectiveness of the waterstop.

When installing EXPAND-Tite the concrete surface needs to be dry and free of contamination. EXPAND-Tite Primer is also recommended before the placement of the waterstop.

Available in three sizes:

Part #EXP100
 3/4" x 1" x 16" roll (6 rolls/carton)
 - 100 linear ft./carton

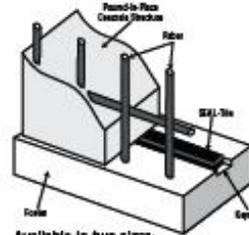
Part #EXP200
 3/8" x 3/4" x 25" roll (8 rolls/carton)
 - 200 linear ft./carton

Part #EXP150
 1/2" x 1-1/4" x 16" roll (6 rolls/carton)
 - 100 linear ft./carton

Typical Physical Properties

Description	Method	EXPAND-Tite
Color		Black
Specific Gravity	ASTM D-71	1.35±5
Hydrocarbon Content	ASTM D-4	47% min.
Volatile Matter	ASTM D-6	1% max
Penetration, cone @77°F, 150gm, 5 sec	ASTM D-217	40±5
Application Temp.	-10° to 125°F	(-22° to 52°C)
Service Temp.	-30° to 180°F	(-34° to 82°C)

Non-Hydrophilic Waterstop • SEAL-Tite



Durajoint SEAL-Tite is a flexible concrete construction joint waterstop that is easy to install. SEAL-Tite will not shrink, oxidize, or harden with age and is rugged in temperatures from 30°F to +200°F.

When installing SEAL-Tite the concrete surface needs to be clean, dry and free of contamination. SEAL-Tite Primer is also recommended when; installing on wet concrete, when temperatures are below 40°F, on in vertical joints

Available in two sizes:

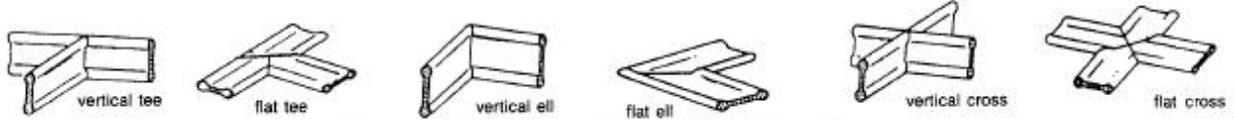
Part #SEA100
 3/4" x 1" x 16" roll (6 rolls/carton)
 - 100 linear ft./carton

Part #SEA200
 1" x 36" strips (30 strips/carton)
 - 90 linear ft./carton

Typical Physical Properties

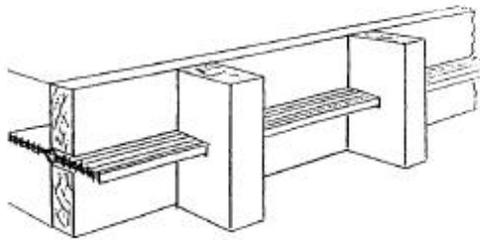
Description	Method	SEAL-Tite
Color		Black
Specific Gravity	ASTM D-71	1.15-1.50
Hydrocarbon Content	ASTM D-4	50% min.
Volatile Matter	ASTM D-6	2% max.
Penetration, cone @77°F, 150gm, 5 sec	ASTM D-217	50-100
Flash Point, C.O.C., °F	ASTM D92	350°F min.
Fire Point, C.O.C., °F	ASTM D92	375°F min.
Ductility, °F	ASTM D113	5.0 min.
Inert Mineral filler % by weight	AASHTO	30% min.

Factory Made Splices Available on Request

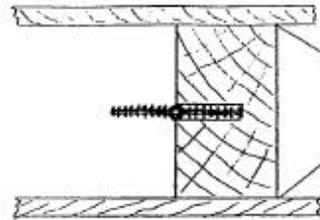


When splicing in the field, use a thermostatically controlled Splicing Iron

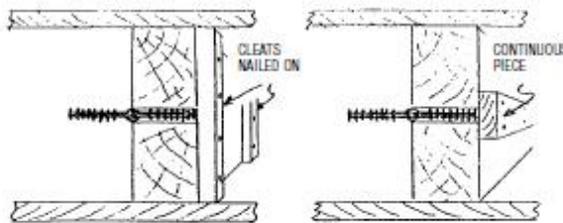
Suggested Form Construction Details for Waterstop Installation



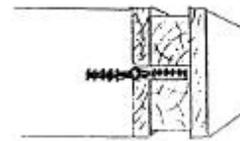
GROOVED CLEATS TO HOLD WATERSTOPS



GROOVE IN FORMWORK



DIVIDED FORMWORK



SPLIT PLANK FORM

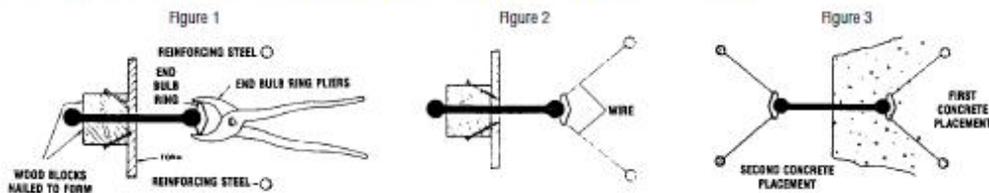
Waterstop Installation Using End Bulb Rings

Unless waterstops are supported to resist the weight of concrete, they may be bent or flattened and form a less effective water barrier.

This necessary support is easily created by using end bulb rings and wire to secure the waterstop to the reinforcing steel rebar.

When the waterstop is positioned in the split form, wooden blocks should be nailed to one side to hold the waterstop in place until the end bulb rings are in place on the other side of the form, and wiring from the end bulb rings to the rebar is completed.

Figure 1 below shows an end bulb ring clamped to the end bulb of the waterstop. Wires are then attached to the end bulb ring and secured to the rebar in Figure 2. Then, in Figure 3, the first concrete placement is complete and the end bulb ring and wiring are in place awaiting the second pour.



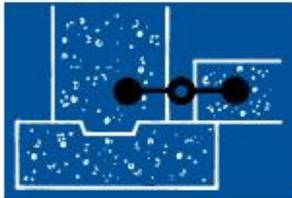
Typical Properties (PVC)

(CRD-C-572-74)

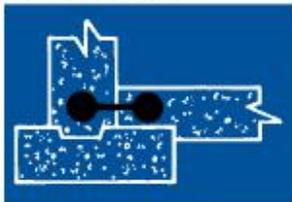
	Typical Value	Test Method
Tensile Strength	2050 psi	CRD-C 573
Ultimate Elongation	366%	CRD-C 573
Stiffness in Flexure	775 psi	CRD-C 571
Tear Resistance	380 lbs./in.	ASTM D-624
Ozone Resistance	passed	ASTM D-1149
Low Temperature Brittleness (-35°F)	No Cracking or Splitting	CRD-C 570
Accelerated Extraction		CRD-C 572
Ultimate Elongation	350%	Par 7.1
Tensile Strength	2000 psi	Par 7.1
Effects of Alkalies	Loss in Weight 0.10% Max. Gain in Weight 0.25% Max.	CRD-C 572 Par 7.2

Suggested Specification

All waterstop shall be Durajoint PVC Waterstop as manufactured by Durajoint. It shall be an extrusion of virgin polyvinyl chloride and additional resins, plasticizers and stabilizers which meet or exceed the requirements of the Corps of Engineers specifications. Types and dimensions of waterstop shall be those shown in the project specifications.



EXPANSION JOINTS

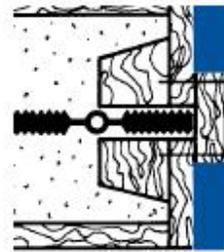


CONSTRUCTION JOINTS

How to make keyed split forms

2x4 lumber should be chamfered and ripped, and waterstop placed between the split sections. Center the waterstop at the edge of the 2x4.

Three pieces of lumber are required for the bulkhead, as shown in the drawing.



How to eliminate split forms

Use Durajoint split ribbed waterstop with centerbulb. Spread open split flange and staple or nail to bulkhead (1). After forms from the first pour have been removed, join split flange (2) using hog rings.



How to splice Durajoint PVC Waterstop

- PVC Waterstop is spliced by cutting the two ends to be joined so that they will butt smoothly together. Use a miter box, or overlap and cut through both pieces at once.
- Heat both ends to be joined, using an electric splicing iron, until the material melts. For best results, there should be about 1/8" of melted material at the end of each piece, but do not overheat to the point that the waterstop becomes a dark color.
- Press the melted edges firmly together and hold for 15 to 30 seconds until the material cools. Stress should not be put on the spliced joint until the waterstop has completely cooled.



Electrical Splicing Tools

2" x 14" Small Iron with Teflon Cover
6' Power Cord
Weight 3 Lbs.
UL Listed, 110V 600 Watts



4-1/2" x 14" Large Iron with Teflon Cover
6' Power Cord
Weight 6 Lbs.
110V 600 Watts



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DURAJOINT PVC WATERSTOP CHEMICAL RESISTANCE CHART

REAGENT	TEMPERATURE		REAGENT	TEMPERATURE	
	72° F	140° F		72° F	140° F
ACETIC ACID, TYPE I, GRADE I	NR	NR	NITRIC ACID, 30%, TYPE II	R	NR
ACETONE	NR	NR	NITRIC ACID, 60%, TYPE I	R	R
ALCOHOLS METHYL (BUTYL, PROPYL)	R	R	NITRIC ACID, 60%, TYPE II	R	NR
AMMONIUM HYDROXIDE, 28%	R	R	NITRIC ACID, 68%, TYPE I	R	NR
BEER	R	R	NITRIC ACID, 68%, TYPE II	NR	NR
BENZENE	NR	NR	OILS AND FATS	R	R
BUTYL ALCOHOL, TYPE I	R	R	OXYGEN	R	R
BUTYL ALCOHOL, TYPE II	R	NR	OZONE	R	R
CALCIUM CARBONATE	R	R	PARAFFIN, TYPE I	R	R
CALCIUM CHLORIDE	R	R	PHOSPHORIC ACID, 10%	R	R
CALCIUM HYDROXIDE	R	R	PHOSPHORIC ACID, 25%	R	R
CALCIUM NITRATE	R	R	PHOSPHORIC ACID, 50%	R	R
CARBON TETRACHLORIDE, TYPE I	R	NR	PHOSPHORIC ACID, 70%	R	R
CARBON TETRACHLORIDE, TYPE II	NR	NR	PHOSPHORIC ACID, 85%	R	R
CHLORINATED SOLVENTS	NR		POTASSIUM BICARBONATE	R	R
CHLORINE GAS (DRY)	NR	NR	POTASSIUM CHROMATE	R	R
CHLORINE GAS (WET)	NR	NR	POTASSIUM HYDROXIDE	R	R
CHLORINE WATER	R	R	SEA WATER	R	R
CHROMIC ACID, 10%	R	R	SEWERAGE	R	R
CHROMIC ACID, 50%	NR	NR	SODIUM BENZOATE	R	R
CITRIC ACID	R	R	SODIUM HYDROXIDE, 10%	R	R
CRUDE OIL, TYPE I	R	R	SODIUM HYDROXIDE, 30%	R	R
CRUDE OIL, TYPE II	R	NR	SODIUM HYDROXIDE, 50%	R	R
D. D. T. (SYLENE BASE)	NR	NR	SODIUM NITRATE	R	R
DETERGENTS	R	R	SODIUM NITRITE	R	R
DIESEL FUELS	R	R	STEARIC ACID	R	R
DISTILLED WATER	R	R	STODDARDS SOLVENT	NR	NR
ETHERS	NR	NR	SULFUR	R	R
ETHYL ALCOHOL, TYPE I	R	R	SULFURIC ACID, 3%	R	R
ETHYL ALCOHOL, TYPE II	R	NR	SULFURIC ACID, 10%	R	R
FATTY ACIDS	R	R	SULFURIC ACID, 20%	R	R
FORMIC ACID	R	NR	SULFURIC ACID, 33%	R	R
FRUCTOSE	R	R	SULFURIC ACID, 50%	R	R
GLYCERINE	R	R	SULFURIC ACID, 70%	R	R
HYDROCHLORIC ACID, 10%	R	R	SULFURIC ACID, 80%, TYPE I	R	R

DURAJOINT PVC WATERSTOP CHEMICAL RESISTANCE CHART (Page 2)

REAGENT	TEMPERATURE		REAGENT	TEMPERATURE	
	72° F	140° F		72° F	140° F
HYDROCHLORIC ACID, 30%	R	R	SULFURIC ACID, 80%, TYPE II	NR	NR
HYDROGEN PEROXIDE, 30%	R	R	SULFURIC ACID, 85%, TYPE I	R	R
HYDROGEN PEROXIDE, 50%	R	R	SULFURIC ACID, 85%, TYPE II	NR	NR
HYDROGEN PEROXIDE, 90%	R	R	SULFURIC ACID, 90%, TYPE I, GRADE 1	R	NR
KEROSENE (JET FUEL)	R	R	SULFURIC ACID, 90%, TYPE I, GRADE 2	NR	NR
KETONES	NR	NR	SULFURIC ACID, 95%, TYPE I, GRADE 1	R	NR
LINSEED OIL	R	R	SULFURIC ACID, 95%, TYPE I, GRADE 2	NR	NR
LUBRICATING OIL, ASTM #1	R	R	SULFURIC ACID, 95%, TYPE II	NR	NR
LUBRICATING OIL, ASTM #2	R	R	SULFURIC/NITRIC (50/50)	NR	NR

LUBRICATING OIL, ASTM #3, TYPE I	R	R	TALL OIL	R	R
LUBRICATING OIL, ASTM #3, TYPE II	R	NR	TOLUOL OR TOLUENE	NR	NR
MACHINE OIL	R	R	TRANSFORMER OIL	R	R
MAGNESIUM CHLORIDE	R	R	TRICHLOROETHYLENE	NR	NR
METHYL ALCOHOL	R	R	TRISODIUM PHOSPHATE	R	R
METHYL ETHYL KETONE	NR	NR	TURPENTINE, TYPE I	R	R
METHYL ISO-BUTYL KETONE	NR	NR	TURPENTINE, TYPE II	NR	NR
METHYLENE CHLORIDE	NR	NR	URINE	R	R
MINERAL OILS	R	R	VASELINE	NR	NR
NAPHTHA, TYPE I	R	R	VEGETABLE OIL	R	
NAPHTHA, TYPE II	R	NR	VINEGAR	R	R
NICOTINE	R	R	VINYL ACETATE	NR	NR
NICOTINE ACID	R	R	WATER SALT	R	R
NITRIC ACID, ANHYDROUS	NR	NR	WHISKEY	R	R
NITRIC ACID, 10%, TYPE I	R	R	WINES	R	R
NITRIC ACID, 10%, TYPE II	R	NR	XYLENE OR XYLOL	NR	NR
NITRIC ACID, 30%, TYPE I	R	R			

R=RECOMMENDED