



Engineering
Solutions

Shop Drawing
Review

Project: Echelon

Date: 1-17-18

Submittal# Water 2

By: MJS

☒ APPROVED

☐ REJECTED

☐ APPROVED AS NOTED

construction managers

general contractors

design builders

SUBMITTAL REVIEW

Project # 417 The Residences at Echelon

Date: January 11, 2018

Submittal Number: 33 1000 01 b
Water Backflow Structures
Sump pit added per Matt Schlicht's suggestion

Sequence Number: 26

Subcontractor: KAT Excavation
Bart Fisher

Submit To: NSPJ Architects
Tim Hauschild

SUBMITTAL FOR APPROVAL

Job Name/No: 417 The Residences at Echelon

☒ REVIEWED ☐ REVISE & RESUBMIT
☐ REVIEWED& NOTED ☐ REJECTED

Submittal received for general compliance with the Contract Documents. Contractor's review does not relieve sub/vendor of responsibility for dimension, quantities, accuracy or completion of submittals or from any responsibilities required by terms and conditions of Subcontract/PO with Luke Draily Construction Co., Inc.. Sub/Vendors shall follow all manufacturer installation instructions. Installing contractor shall be responsible to coordinate with trades for hookup, supports, routing, etc.

By: JDW Date: _____

Previously approved 8/17/17 without
sump pit - this is revised with sump pit

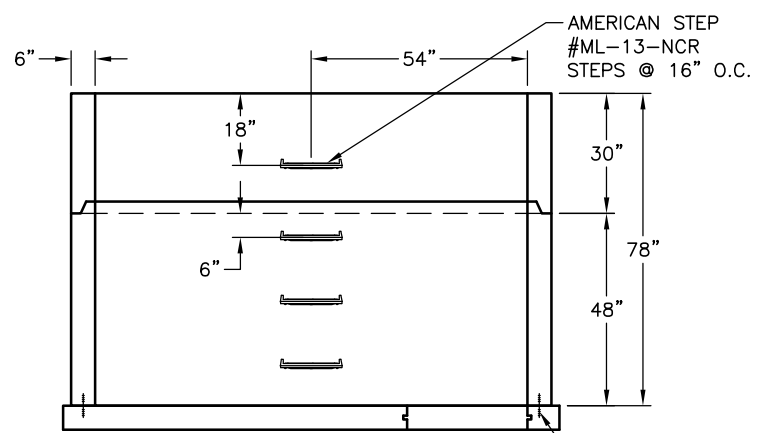
T:\V7-1300 KAT - THE RESIDENCE AT ECHOLON - PRIVATE (SANITARY)\THE RESIDENCE AT ECHOLON (BACKFLOW).DWG

REVISIONS

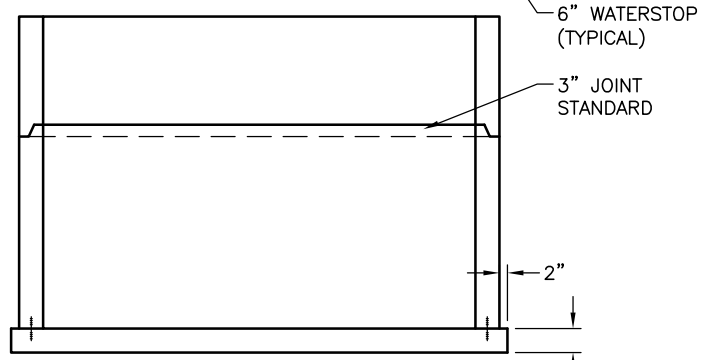
REV.	DATE	BY	DESCRIPTION

- SHIP WITH BOX:
- (1) EJ V5620 FRAME
 - (1) EJ V5720 GRATE
 - (1) CASE OF JOINT SEALER

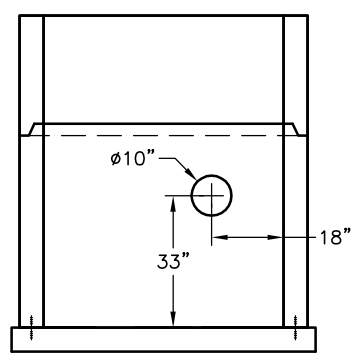
TOP SLAB REINFORCING	
#5 @ 6" O.C.E.W. WITH #5 DIAGONALS AROUND CASTING 1 1/2" CLEAR BOTTOM	
UNIT WEIGHTS	(LBS)
TOP SLAB	5,926
TOP SECTION	5,555
MID SECTION 2	
MID SECTION 1	
BASE SECTION	8,773
BASE SLAB	4,848
TOTAL BASE WT	13,620



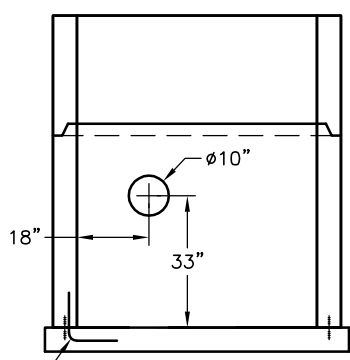
SECTION A-A



SECTION B-B

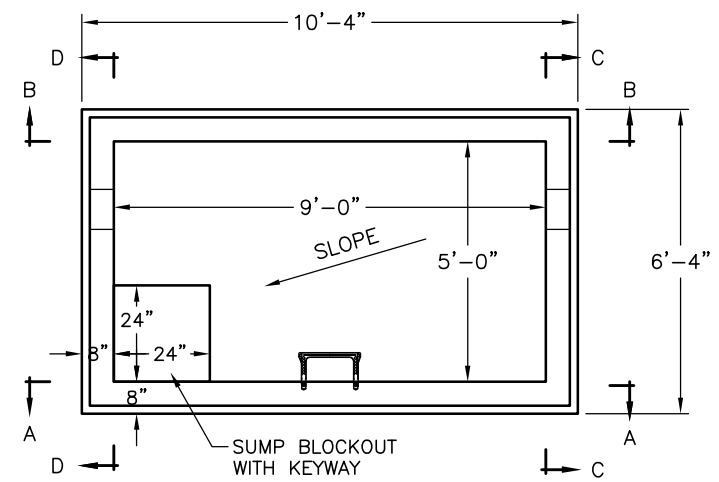


SECTION D-D

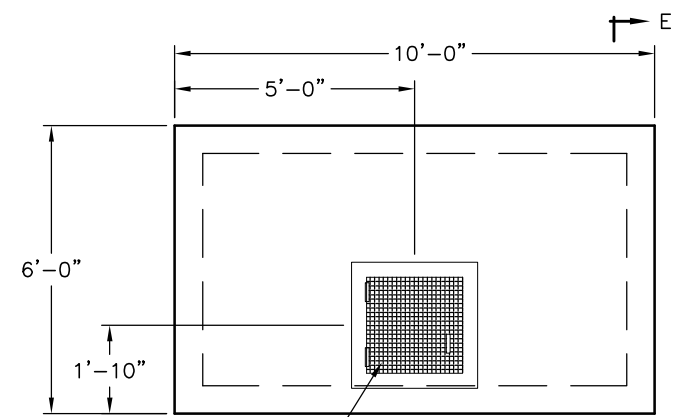


SECTION C-C

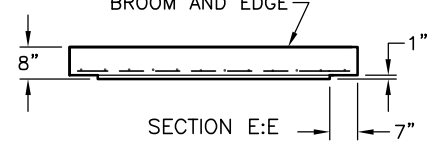
#4 DOWELS @ 12" O.C.
TYPICAL



PLAN - STRUCTURE



PLAN - TOP SLAB



SECTION E-E

NOTES:
CEMENT TO BE PER ASTM C-150
REINFORCING TO BE PER ASTM A-615 GRADE 60
CONCRETE TO BE AIR ENTRAINED 4000 PSI @ 28 DAYS MINIMUM

BARBOUR CONCRETE COMPANY

21421 E. TRUMAN ROAD
INDEPENDENCE, MO 64056

(816) 796-3344
FAX (816) 796-3518

WALL REINFORCING:	BASE REINFORCING:
PER DRAWING R1-A #4 @ 12" O.C.E.W.	#4 @ 6" O.C.E.W.

KAT EXCAVATION
THE RESIDENCES AT ECHOLON
LEE'S SUMMIT, MO

STRUCTURE		DESCRIPTION		
LS-BF8-01		LEE'S SUMMIT 8" BACKFLOW VAULT		
DRAWN MB	DATE 08/15/17	SCALE NTS	MIX DESIGN 4000 PSI	BCWO NUMBER 17-1300
CHECKED N/A	DATE N/A	INSPECTION N/A	SHT 1 OF 1	

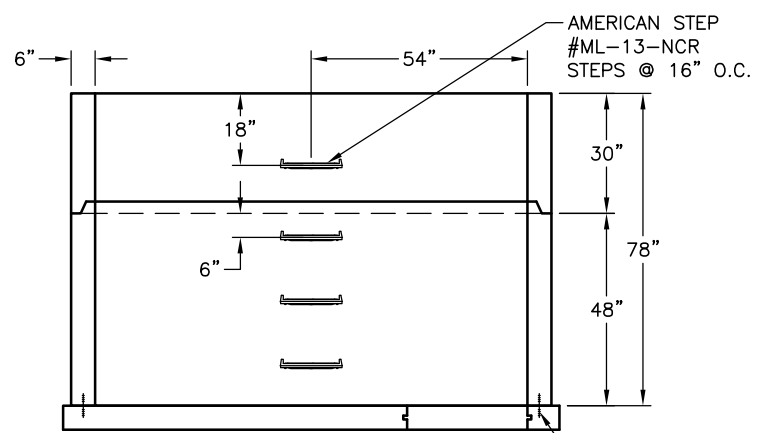
T:\V7-1300 KAT - THE RESIDENCE AT ECHOLON - PRIVATE (SANITARY)\THE RESIDENCE AT ECHOLON (BACKFLOW).DWG

REVISIONS

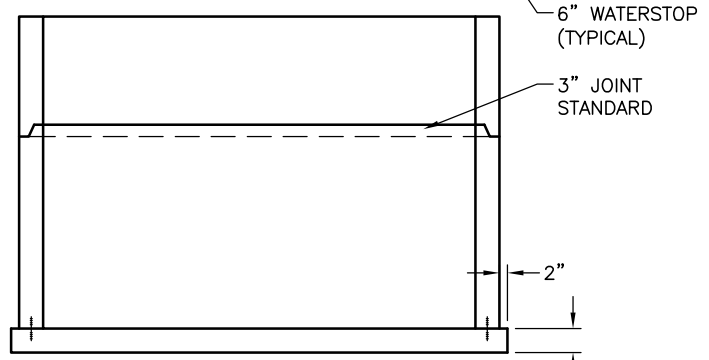
REV.	DATE	BY	DESCRIPTION

- SHIP WITH BOX:
- (1) EJ V5620 FRAME
 - (1) EJ V5720 GRATE
 - (1) CASE OF JOINT SEALER

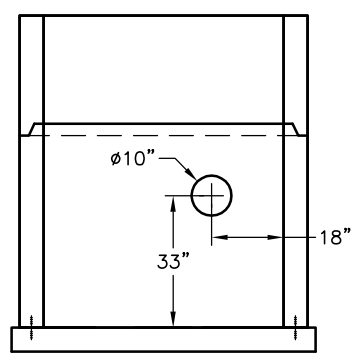
TOP SLAB REINFORCING	
#5 @ 6" O.C.E.W. WITH #5 DIAGONALS AROUND CASTING 1 1/2" CLEAR BOTTOM	
UNIT WEIGHTS	(LBS)
TOP SLAB	5,926
TOP SECTION	5,555
MID SECTION 2	
MID SECTION 1	
BASE SECTION	8,773
BASE SLAB	4,848
TOTAL BASE WT	13,620



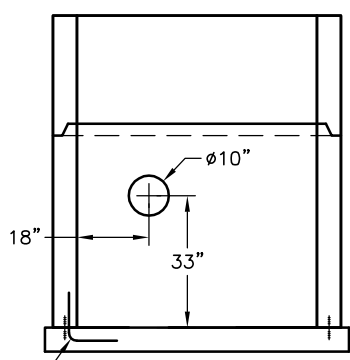
SECTION A-A



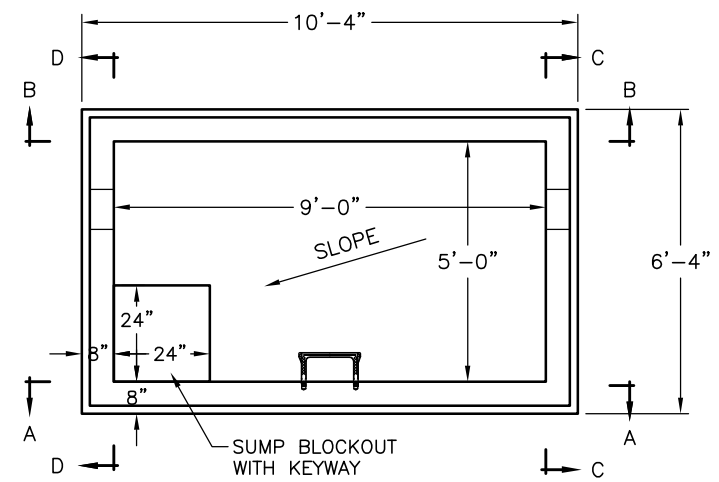
SECTION B-B



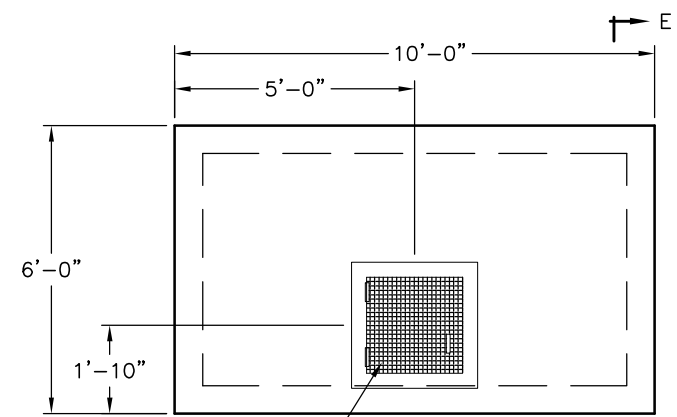
SECTION D-D



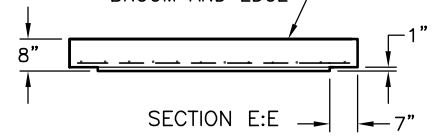
SECTION C-C
#4 DOWELS @ 12" O.C.
TYPICAL



PLAN - STRUCTURE



PLAN - TOP SLAB
BROOM AND EDGE



SECTION E-E

NOTES:
CEMENT TO BE PER ASTM C-150
REINFORCING TO BE PER ASTM A-615 GRADE 60
CONCRETE TO BE AIR ENTRAINED 4000 PSI @ 28 DAYS MINIMUM

BARBOUR CONCRETE COMPANY

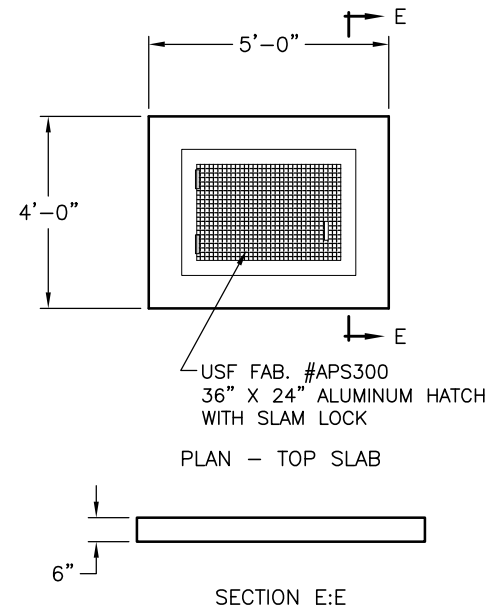
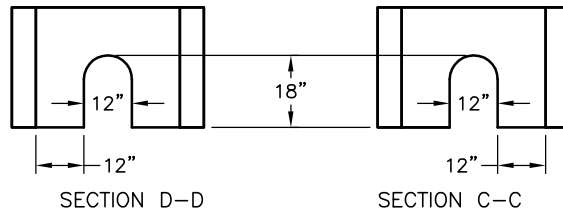
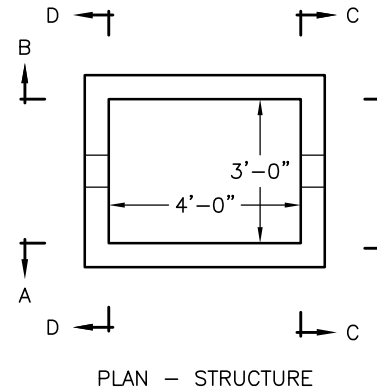
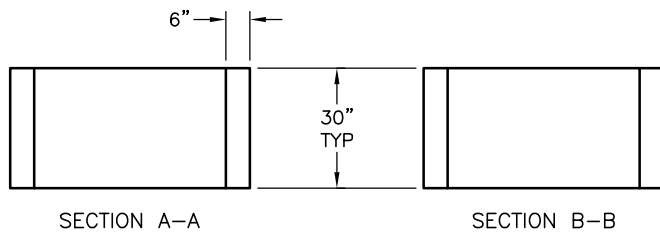
21421 E. TRUMAN ROAD
INDEPENDENCE, MO 64056

(816) 796-3344
FAX (816) 796-3518

WALL REINFORCING:	BASE REINFORCING:
PER DRAWING R1-A #4 @ 12" O.C.E.W.	#4 @ 6" O.C.E.W.

KAT EXCAVATION
THE RESIDENCES AT ECHOLON
LEE'S SUMMIT, MO

STRUCTURE		DESCRIPTION		
LS-BF8-02		LEE'S SUMMIT 8" BACKFLOW VAULT		
DRAWN MB	DATE 08/15/17	SCALE NTS	MIX DESIGN 4000 PSI	BCWO NUMBER 17-1300
CHECKED N/A	DATE N/A	INSPECTION N/A	SHT 1 OF 1	



NOTE:
BOX IS DESIGNED PER ENGINEER DETAIL. CONTRACTOR TO VERIFY SIZE OF
STRUCTURE. BARBOUR IS NOT RESPONSIBLE FOR MISSED SIZED STRUCTURE
DUE TO NOT FOLLOWING ANY CITY STANDARD. STRUCTURE TO NOT BE USED
IN TRAFFIC.

SHIP WITH BOX:
(1) CASE OF
JOINT SEALER

TOP SLAB REINFORCING	
#5 @ 6" O.C.E.W. WITH #5 DIAGONALS AROUND CASTING 1 1/2" CLEAR BOTTOM	
UNIT WEIGHTS	(LBS)
TOP SLAB	1,481
TOP SECTION	
MID SECTION 2	
MID SECTION 1	
BASE SECTION	2,757
BASE SLAB	
TOTAL BASE WT	

NOTES:
CEMENT TO BE PER ASTM C-150
REINFORCING TO BE PER ASTM A-615 GRADE 60
CONCRETE TO BE AIR ENTRAINED 4000 PSI @ 28 DAYS MINIMUM

BARBOUR CONCRETE COMPANY
21421 E. TRUMAN ROAD (816) 796-3344
INDEPENDENCE, MO 64056 FAX (816) 796-3518

WALL REINFORCING:
PER DRAWING R1-A
#4 @ 12" O.C.E.W.

BASE REINFORCING:
#4 @ 6" O.C.E.W.

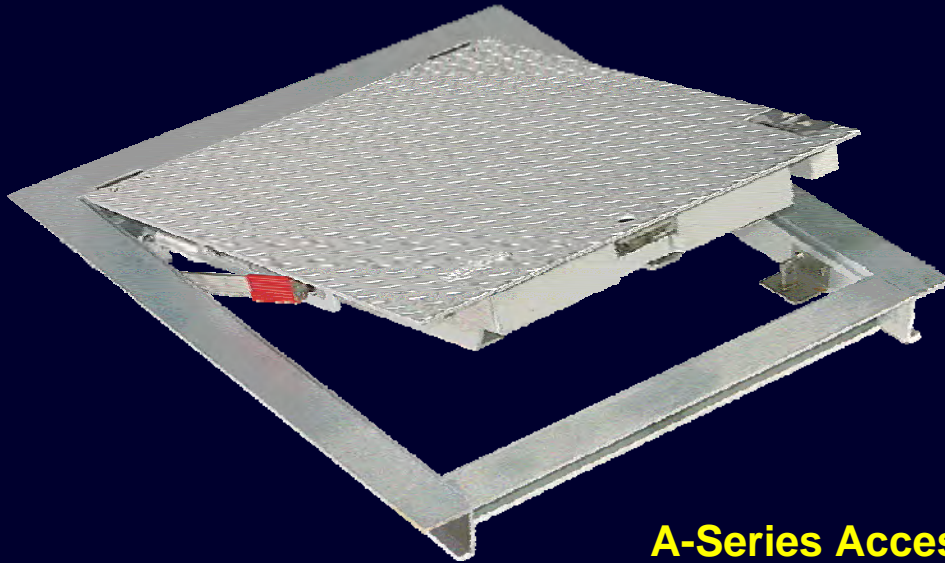
KAT EXCAVATION
THE RESIDENCES AT ECHELON
LEE'S SUMMIT, MO

STRUCTURE		DESCRIPTION		
LS-MV4		LEE'S SUMMIT 4" METER VAULT		
DRAWN MB	DATE 08/15/17	SCALE NTS	MIX DESIGN 4000 PSI	BCWO NUMBER
CHECKED N/A	DATE N/A	INSPECTION N/A	SHT 1 OF 1	17-1300

PLOT DATE: 1/3/2018

T:\V7-1300 KAT - THE RESIDENCE AT ECHELON - PRIVATE (SANITARY)\THE RESIDENCE AT ECHELON (BACKFLOW).DWG

GENERAL PURPOSE



A-Series Access Hatches

Angle Frame, Aluminum, Pedestrian or H-20 Vehicle Load Ratings, Single, Double and Multiple Covers. Model AHS shown with Optional Recessed Padlock Hasp.



Specify A-Series angle frame access hatches as the economical, quality solution for sidewalk, floor and utility applications where rainwater control is not a requirement.

*Options include
hinged safety grate*



Manufacturing a complete line of engineered metal products for the construction industry, we set the standard for quality, service and innovation. For product specifications and details, visit:

www.usffab.com

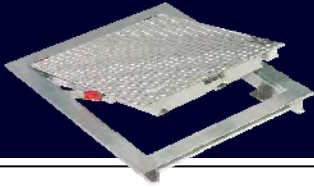


Manufacturing in the USA since 1916

U.S.F. Fabrication, Inc., Hialeah, Florida USA 1-800-258-6873 Fax: 305-882-1577 service@usffab.com
Outside USA & Canada: 1-305-364-8221 Fax: 1-305-512-7721 export@usffab.com

A-SERIES GENERAL PURPOSE HATCHES

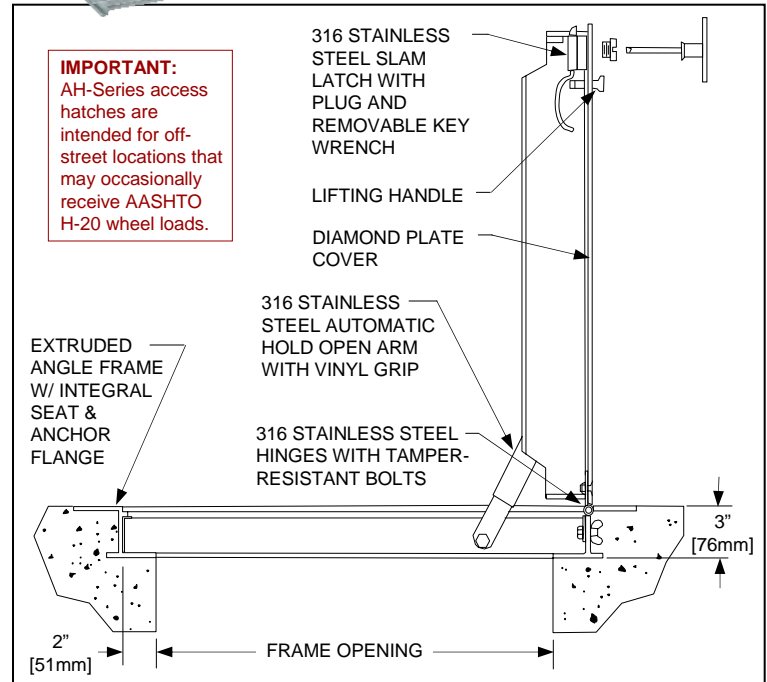
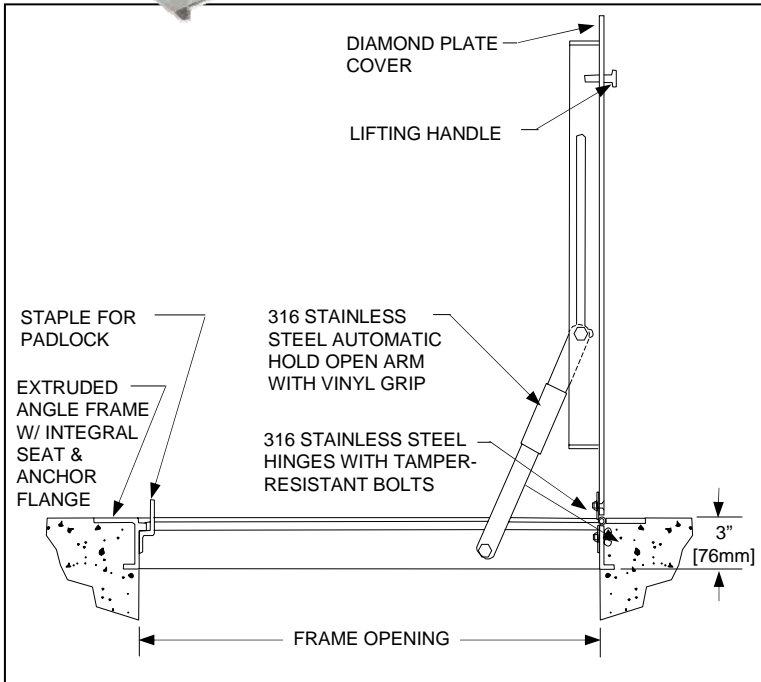
Angle Frame, Aluminum



Model APS & APD
Pedestrian Load Rating



Model AHS & AHD
H-20 Vehicle Load Rating



SPECIFICATIONS

The access hatch shall be Model (select from chart) as manufactured by U.S.F. Fabrication, Inc., Hialeah, Florida with the size being specified on the plans.

Cover: Cover shall be aluminum diamond plate (see chart for plate thickness and load rating). Cover shall be equipped with a flush lifting handle and 316 stainless steel hold-open arm with red vinyl grip that automatically locks the cover in the 90 degree open position.

Frame: Frame shall be extruded aluminum with an integral seat and continuous anchor flange on all four sides.

Hinges: 316 stainless steel hinges with 316 stainless steel tamper-resistant bolts/locknuts.

Latch: AP hatches shall include a staple for user-supplied padlock. AH hatches shall include a 316 stainless steel slam latch with plug and removable key wrench.

Finish: Cover and frame shall be mill finish aluminum. Hardware shall be 316 stainless steel. An adhesive backed vinyl material that protects the product during shipping and installation shall cover the entire top of the frame and cover.

Installation: Installation shall be in accordance with the manufacturer's instructions.

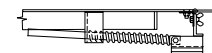
Warranty: The hatch shall be manufactured in the United States. Manufacturer shall guarantee against defects in materials and workmanship for a period of ten [10] years.

STANDARD SIZES (Custom sizes and load ratings available. Steel units also available.)

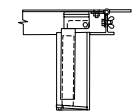
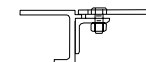
Single Cover	Model APS150 150 PSF Load Rating 3/16" [5mm] Cover	Model APS300 300 PSF Load Rating 1/4" [6mm] Cover	Model AHS H-20 Load Rating 1/4" [6mm] Cover
FRAME OPENING Width x Hinge Side In. [mm]	WEIGHT Lbs. [KG]		
24 x 24 [610 x 610]	33 [15]	42 [19]	59 [27]
24 x 30 [610 x 762]	39 [18]	49 [22]	n/a
24 x 36 [610 x 914]	43 [20]	55 [25]	82 [37]
30 x 30 [762 x 762]	45 [20]	57 [26]	82 [37]
30 x 36 [762 x 914]	50 [23]	64 [29]	96 [44]
30 x 48 [762 x 1219]	62 [28]	80 [36]	124 [56]
36 x 36 [914 x 914]	57 [26]	73 [33]	113 [51]
36 x 48 [914 x 1219]	71 [32]	92 [42]	n/a
42 x 42 [1067 x 1067]	73 [33]	94 [43]	n/a

Double Cover	Model APD150 150 PSF Load Rating 3/16" [5mm] Cover	Model APD300 300 PSF Load Rating 1/4" [6mm] Cover	Model AHD H-20 Load Rating 1/4" [6mm] Cover
FRAME OPENING Width x Hinge Side In. [mm]	WEIGHT Lbs. [KG]		
30 x 48 [762 x 1219]	69 [31]	86 [39]	133 [60]
30 x 54 [762 x 1372]	75 [34]	94 [43]	153 [69]
36 x 48 [914 x 1219]	78 [35]	98 [44]	157 [71]
36 x 60 [914 x 1524]	92 [42]	117 [53]	192 [87]
42 x 48 [1067 x 1219]	87 [39]	110 [50]	191 [87]
48 x 48 [1219 x 1219]	96 [44]	123 [56]	213 [97]
48 x 54 [1219 x 1372]	107 [49]	133 [60]	249 [113]
48 x 72 [1219 x 1829]	133 [60]	170 [77]	310 [141]
60 x 60 [1524 x 1524]	140 [64]	177 [80]	377 [171]

OPTIONS

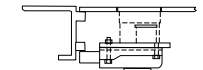
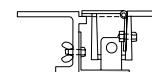


Horizontal Springs
(open or enclosed)



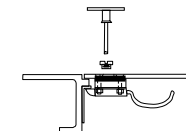
Bolt-on Vertical Springs
(open or enclosed)

Bolt Lock
(hex or tamper proof)



Recessed Cylinder Lock
(with threaded lid)

Recessed Padlock Staple



Slam Latch (stainless,
standard on all H-20 models)



Nut Rail
(with sliding nuts)



Frame Skirt to match slab thickness for easy precasting



**Hinged
Safety
Grate**

Additional Options:

- Bituminous Paint
- Anodized Finish
- Slip Resistant Surface bonded to Cover Plate
- Insulation under Cover
- Safety Chains and Posts



PRODUCT NUMBER

45620010

CATALOG NUMBER

V-5620

FRAME

LOAD RATING

HEAVY DUTY

COATING

UNDIPPED

MATERIAL SPECIFICATION

FRAME — GRAY IRON
ASTM A48 CL35B

OPEN AREA
N/A

√ DESIGNATES MACHINED
SURFACE

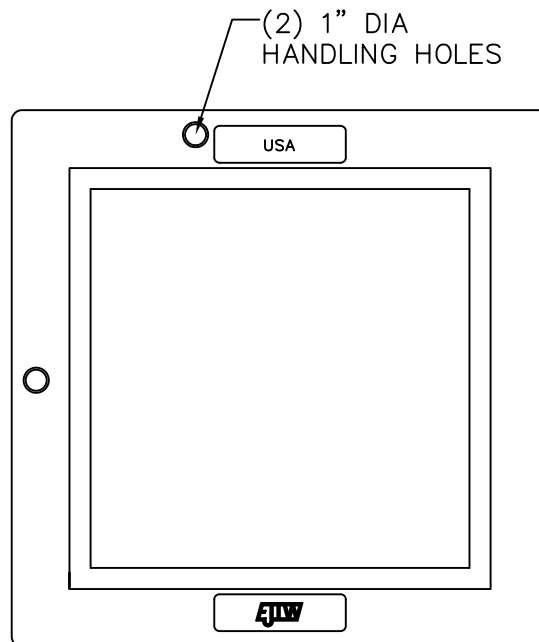
DRAWN
SBB

DATE
02/13/04

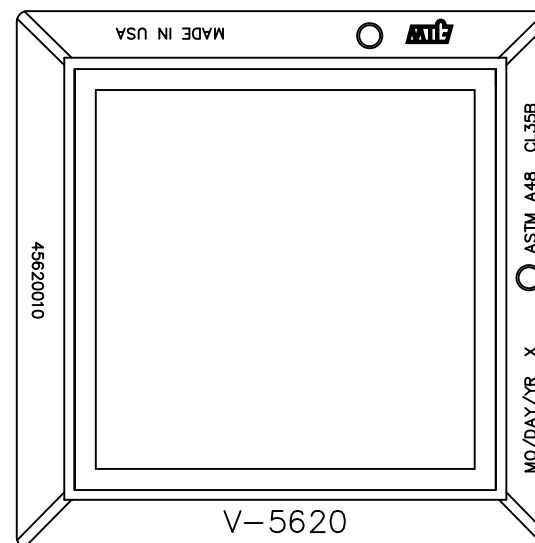
LAST REVISED
SBB

DATE
07/06/09

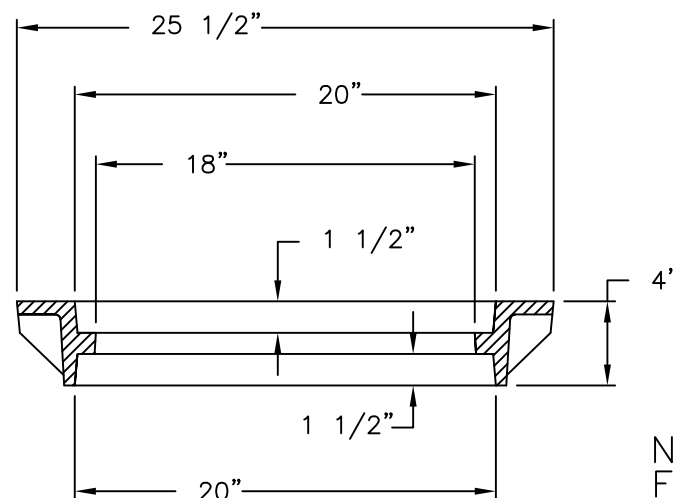
REFERENCE INFORMATION



FRAME TOP FLANGE VIEW

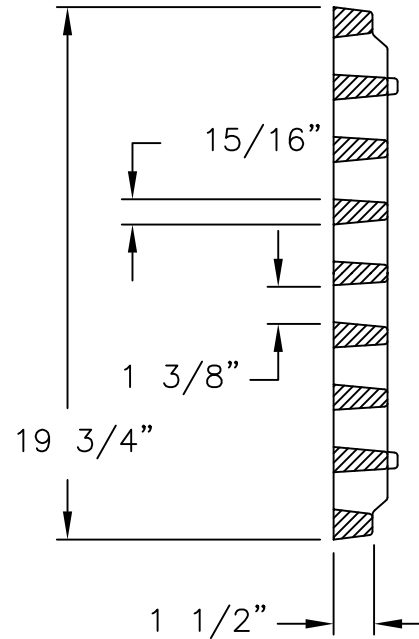
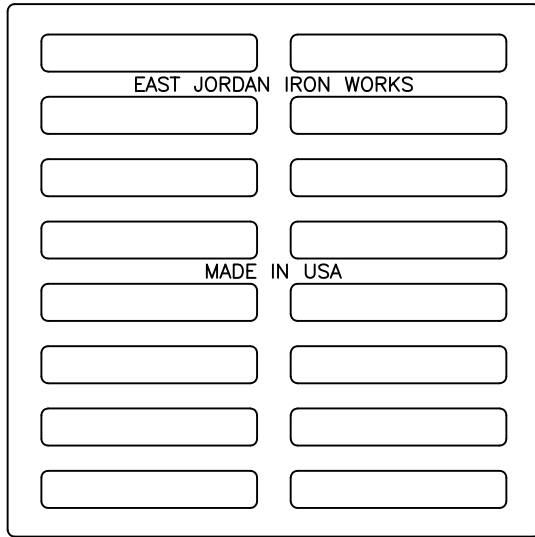


FRAME BOTTOM FLANGE VIEW

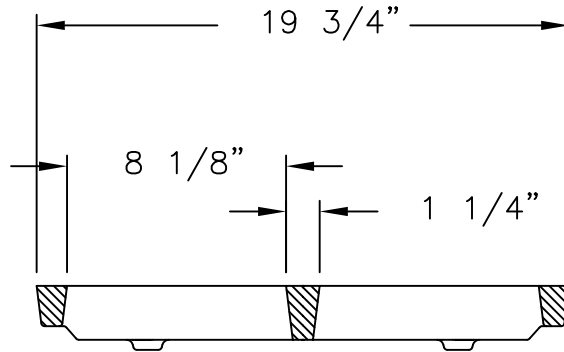


FRAME SECTION

NOTE:
FRAME IS REVERSIBLE AND CAN
BE INSTALLED AS A BOTTOM FLANGE
UNIT.



GRATE SECTION



GRATE SECTION

EJIW EAST JORDAN
IRON WORKS EST.1883

800-626-4653
www.ejiw.com
MADE IN USA

PRODUCT NUMBER

45720030

CATALOG NUMBER

V5720

**CATCH BASIN
GRATE**

LOAD RATING

HEAVY DUTY

COATING

UNDIPPED

MATERIAL SPECIFICATION

GRATE - GRAY IRON
ASTM A48 CL35B

OPEN AREA

175 SQ.INCHES

√ DESIGNATES MACHINED
SURFACE

DRAWN

DEW

DATE

10/10/06

LAST REVISED

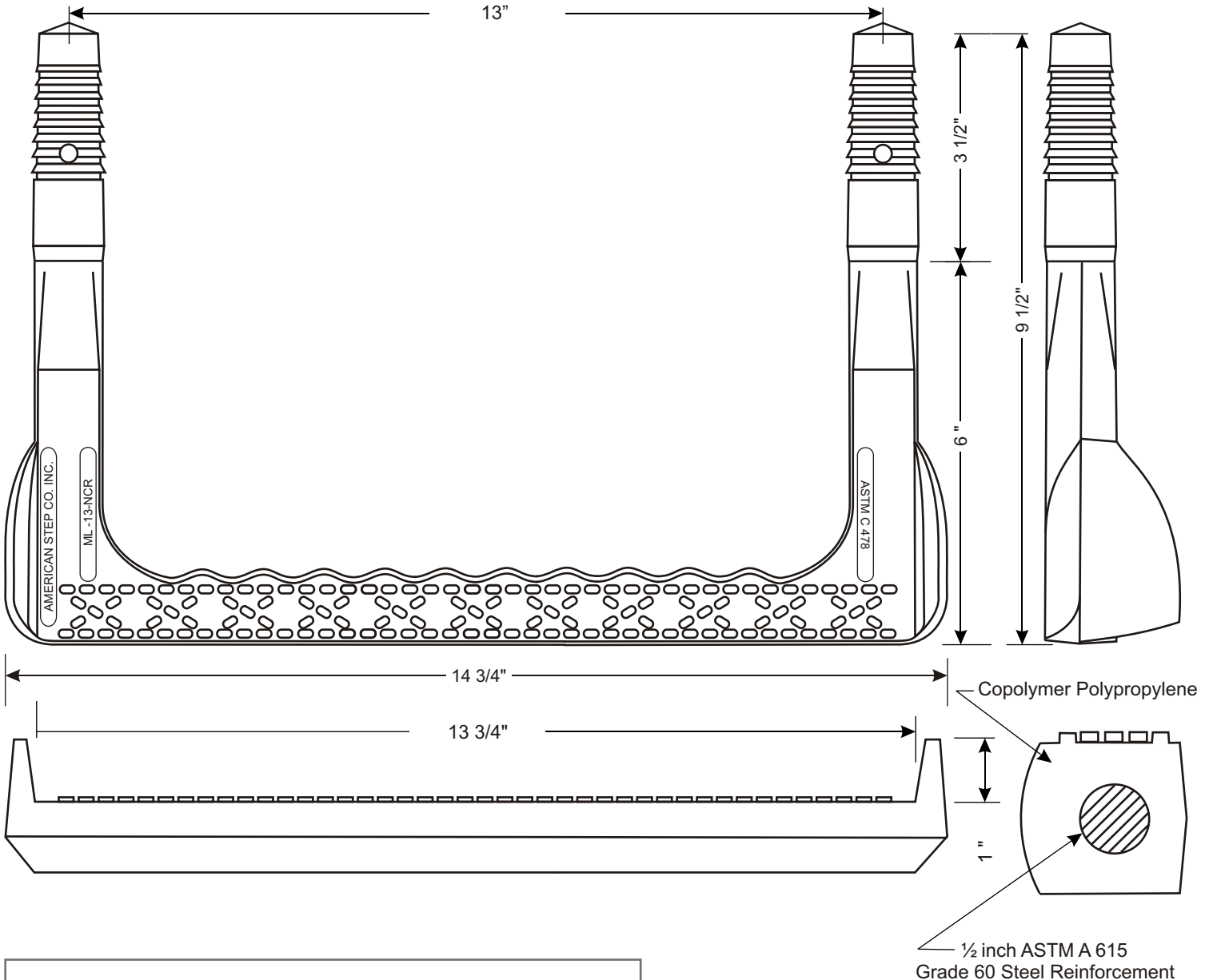
GAD

DATE

05/20/09

REFERENCE INFORMATION

ML-13-NCR



ML-13-NCR

Mechanical Lock Installation Methods
Minimum Concrete Strength Must Be 3000 psi.

Preformed Holes

Two preformed holes on 13" centers
Holes must be parallel
Diameter of holes are 1.1" tapering to 7/8" in 3 1/2" of depth

Drilled Holes

Drill two 1" holes on 13" centers with a minimum depth of 3 3/4"
Use 1" masonry bit for drilling.
Holes must be parallel.

Drive step with sledge hammer until both legs are completely seated

*This step meets or exceeds ASTM C 478 and OSHA Standards
when properly installed.*



American Step Company, Inc.
P.O. Box 137
830 East Broadway
Griffin, GA 30224-0137

800-988-STEP
770-467-9844 (OFFICE)
770-467-8011 (FAX)



Durajoint[®]
Waterstop
“The Original”



Preco[®]
Forming Accessories



PROVIDING PERFORMANCE PRODUCTS TO THE CONCRETE INDUSTRY FOR OVER 60 YEARS

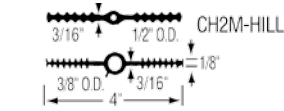
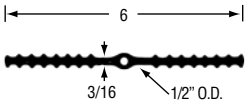
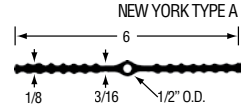
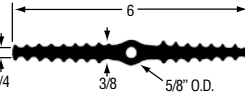
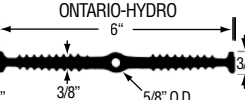
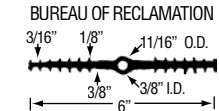
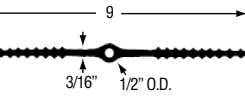
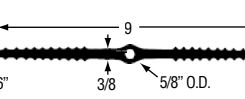
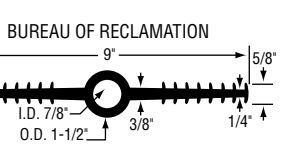
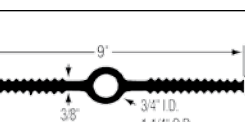
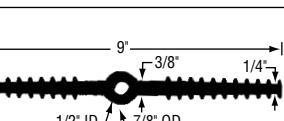
Durajoint[®]
Concrete Accessories

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

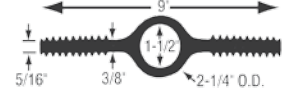
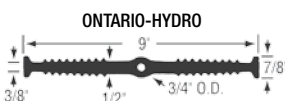
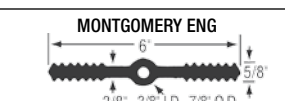
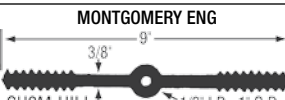
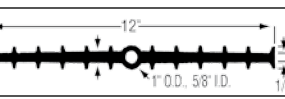

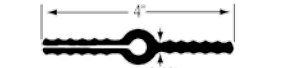

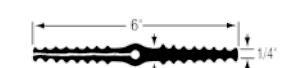
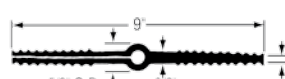
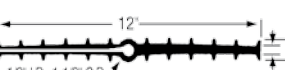
COMPOSITION AND MATERIAL Durajoint PVC Waterstop is extruded from an elastomeric plastic compound consisting of virgin polyvinyl chloride and additional resins, plasticizers and stabilizers to meet or exceed the requirements and performance criteria of the Corps of Engineers Specification CRC-C 572-74. Durajoint PVC Arctic Grade Waterstop is available to meet Ontario Hydro Standard M-264-81.

RIBBED TYPE WITH CENTERBULB

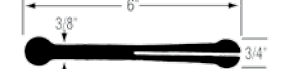
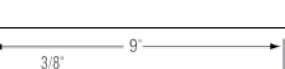


	HEAD OF WATER FT.	
Type 3 Type 3A Construction joints.	65	
Type 4 Construction joints. For higher heads of water or larger movement than Type 3.	100	
Type 4B Similar to Type 4, however tapered for economical but effective water stoppage.	100	
Type 5 Heavier duty than Type 4. Will resist displacement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

RIBBED TYPE WITH CENTERBULB

	HEAD OF WATER FT.	
Type 7F For large transverse and shear movements in major structures.	150+	
Type 8 For exceptionally high heads of water and application in major structures, dams, power houses, etc.	150+	
Type 9 Extra heavy duty for higher heads of water and will resist displacement during pour.	150	
Type 10 Will accommodate extra movement in both expansion and shear.	150	
Type 31 For extra high dams.	250+	
Type M3 Economical shape for use in expansion joints of 1 inch or less.	150	
SPLIT RIBBED TYPE WITH CENTERBULB		
Type 300 Same as Type 3 but has one split flange.	65	
Type 400 Same as Type 4 but has one split flange.	100	
Type 500 Same as Type 5 but has one split flange.	125	
Type 700 Same as Type 7 but has one split flange.	150+	
Type 3100 For extra high dams.	250+	

DUMBBELL TYPE–SPLIT WITHOUT CENTERBULB

Type DB-200 For expansion joints 1/2 inch or less in width.	100	
Type DB-300 For expansion joints 1 inch or less in width.	100	

TYPE OF JOINTS

Working Joints – Large amount of movement occurs.

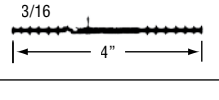
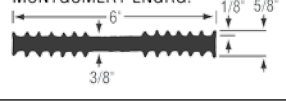
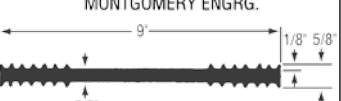
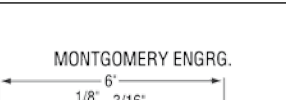
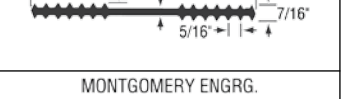
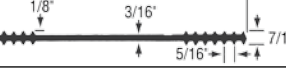

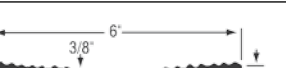

Non-Working Joints – Little or no movement occurs.

Control Joints – Purposely created planes of weakness to predetermine the location of a crack during the curing and contraction of concrete.

Expansion or Isolation Joint – Separates or isolates abutting concrete structures such as slabs, walls, or footings.

Construction Joints – Placed at the interruption in the placement of concrete.

RIBBED TYPE WITHOUT CENTERBULB

	HEAD OF WATER FT.	
Type 2 For construction joints.	65	
Type 11 Construction joints in foundation walls and footings where greater hydrostatic pressure is anticipated.	125	
Type 11A For deep embedment in construction and expansion joints where shear movement is not anticipated.	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.	100	
Type 11C	150	
Type 12 Construction joints in foundation walls and footings.	65	
Type 13 Construction joints in foundation walls and footings where greater hydrostatic pressure is anticipated.	125	
Type 14 For deep embedment in construction and expansion joints where shear movement is not anticipated.	150	
Type 15 Construction joints in foundation walls and footings.	125	

** Please note –
In addition to PVC, all profiles are also
available in TPER (chemical resistant)
and Arctic Grade*

TYPES OF WATERSTOP

Ribbed w/ Centerbulb (RCB) – Most common and versatile type of waterstop. Used in expansion, contraction, and construction joints where a large amount of movement is expected. The greater amount of expected movement, the larger the centerbulb should be. Ribbed profiles provide better watertight sealing than non-ribbed profiles.

Ribbed w/o Centerbulb (RF) – Joints where little or no movement is expected.

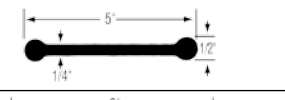

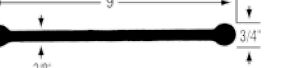

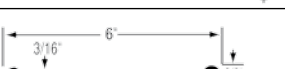
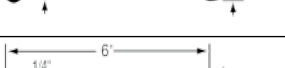

Dumbbell w/o Centerbulb (DB) – Below-grade joints where little or no movement anticipated.

Dumbbell w/ Centerbulb (DCB) – Selected application where movement will be present.

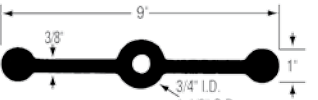
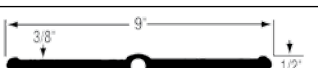
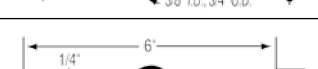

Split Ribbed and Dumbbell – To eliminate split form work.

Baseal® Type Joint Seals – For on grade installation at the bottom of concrete slabs to prevent upward seepage of ground water through joints, or to waterproof joints at wall/slab junctions.

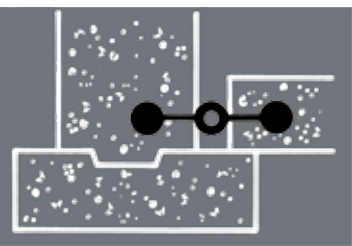
DUMBBELL TYPE WITHOUT CENTERBULB

	HEAD OF WATER FT.	
Type DB-1 For construction joints.	65	
Type DB-2 For expansion joints 1/2 inch or less in width.	100	
Type DB-3 For expansion joints 1 inch or less in width.	100	
Type DB-4 For expansion joints 1 inch or less in width.	100	
Type DB-5 For composition joints below grade where little or no movement is expected.	90	
Type DB-7 Same as Type DB-5 but will take higher head of water.	100	
Type DB-8 Economical shape for construction joints below grade.	65	

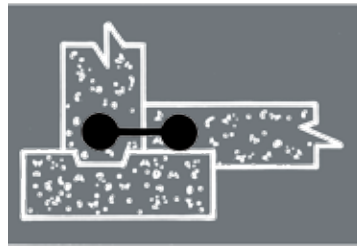
DUMBBELL TYPE WITH CENTERBULB

Type DB-6 For expansion joints up to 1-1/2 inch in width. Will accommodate both transverse and longitudinal movements.	150	
Type DB-9 For expansion joints 1 inch or less in width.	100	
Type DB-10 For horizontal and vertical expansion joints where reinforcing steel does not allow use of 9 inch waterstop.	125	
Type DB-11 To be used in large pours with expected movements, floodwalls, large treatment plants.	150	

EXPANSION JOINTS



CONSTRUCTION JOINTS



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



Water Test – EQ Basin
ECS – Cleveland, OH

When failure is not an option, always use...



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and



Preco®
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