Fontaine

SERIES 40
DOWNWARD-OPENING WEIR GATES

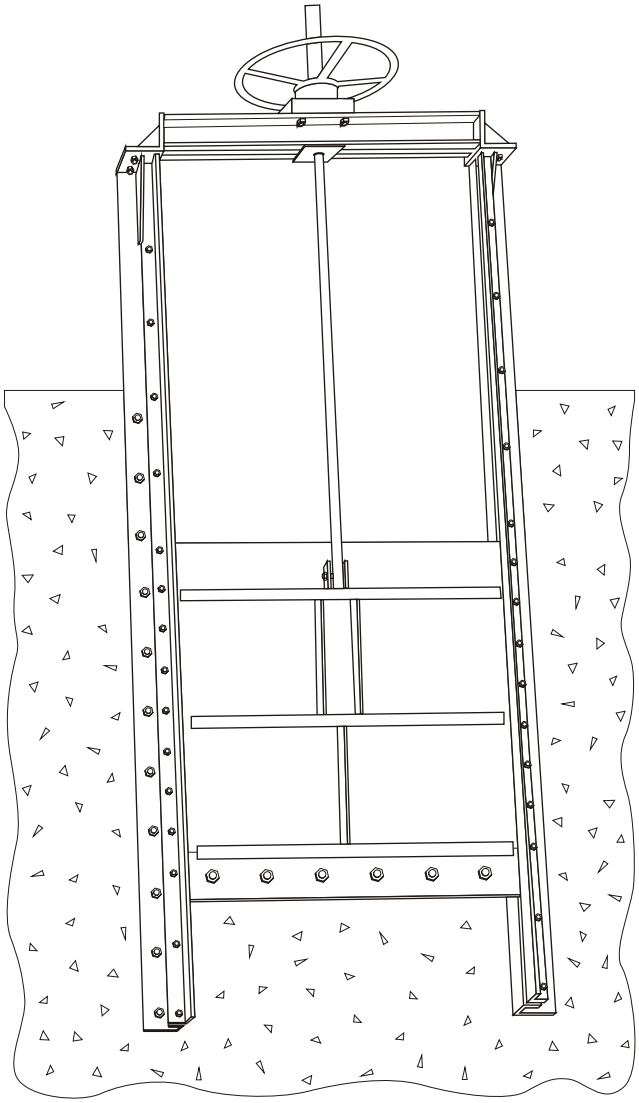
Can be supplied in a multitude of shapes
The self adjusting sealing system allows precise flow measurement
Low-maintenance
***

General Description

The Fontaine SERIES 40 weir gate is used to control flows in different applications by opening downwards and allowing water flow over the stainless steel plate. The SERIES 40 sealing system design is similar to that of the SERIES 20.

Stainless Steel Construction

Because of its stainless steel construction, the SERIES 40 has high corrosion and erosion resistance, and can be operated many years with a minimum maintenance. Stainless steel allows the weir to be fabricated in a multitude of shapes to measure precise flows. The most common shapes used for measuring flows are the rectangular weir, the 90 degree V-notch weir, the Cipoletti weir, and the Sutro weir.



AWWA Standards

SERIES 40 gates are built to meet or exceed AWWA C513 standards pertaining to the design safety factors, stem and stem couplings, stem guides positioning, manual lifting devices, and leakage. As specified in the AWWA standard, all Fontaine SERIES 40 weir gates are tested for operation before shipping.

No.	Part	Material
1	Frame	Stainless steel ASTM A-240 Type 304L or 316L
2	Guides, side seals	Ultra high molecular weight polyethylene (UHMWPE) ASTM D-4020
3	Compression cord	Nitrile ASTM D-2000 M6BG 708, A14, B14, E014, E034
5	Slide	Stainless steel ASTM A-240 Type 304L or 316L
6	Bottom seal	Ultra high molecular weight polyethylene (UHMWPE) ASTM D-4020

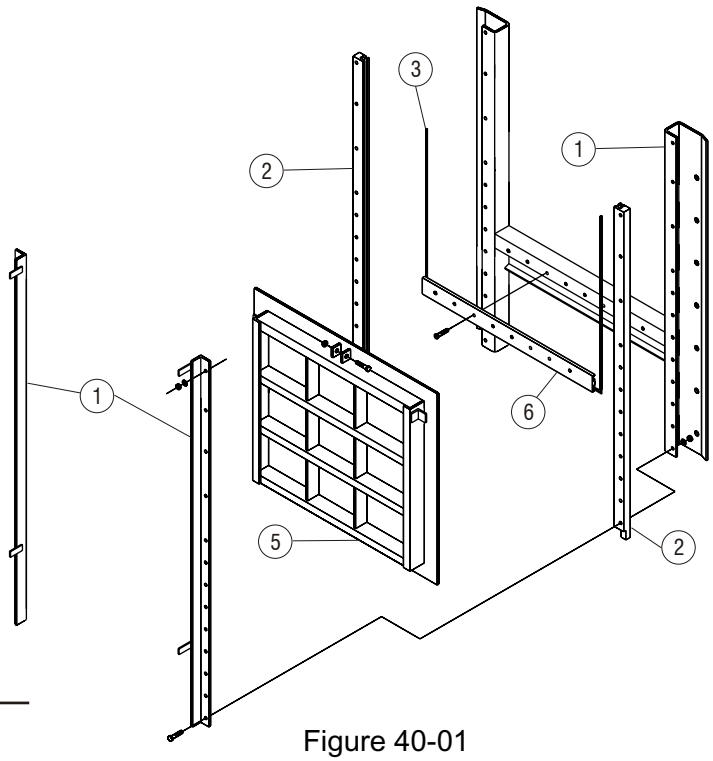
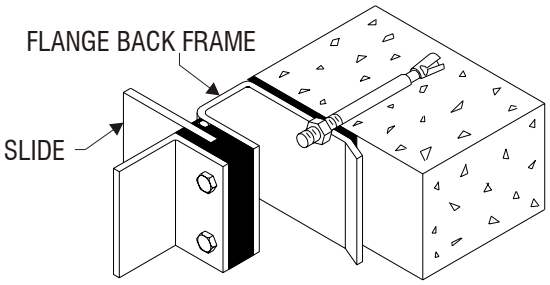


Figure 40-01
Exploded view of a Series 40

Flange Back Frame

The stainless steel frame on the SERIES 40 is a flange back type (Detail 40-01) available in open or self-contained configurations, providing a solid one-piece gate. The rigidity provided by the frame makes it easier to handle in transportation and installation, with less risk of distortion. The flange can be modified in order for the gate to be installed on many applications.



Detail 40-01
Flange back frame

Reinforced Slide

The slide consists of a stainless steel plate reinforced with horizontal members welded to the plate, making it a solid one-piece slide. It can be fabricated in various shapes to control and calculate the flow of water.

UHMWPE Seals (U.S. and Canadian Patents)

The side and bottom seals (Detail 40-02, 03) are the same as on the SERIES 20, allowing no metal-to-metal contact. They are made of a self-lubricating ultra high molecular weight polyethylene (UHMWPE). With a friction coefficient of less than 0.2, the seals make the gate easier to operate even after a long period of inactivity. The self-adjusting quality is obtained by a continuous compression cord which guarantees a perfectly watertight seal between the slide and the frame in both seating and unseating conditions. The bottom seal (Detail 40-03) is a UHMWPE piece with continuous compression cord, allowing contact between the slide and seal at all times.

Mountings

Figure 40-02 shows the most common Series 40 mounting (for more mounting details, refer to "Mountings" in the “Introduction” section).

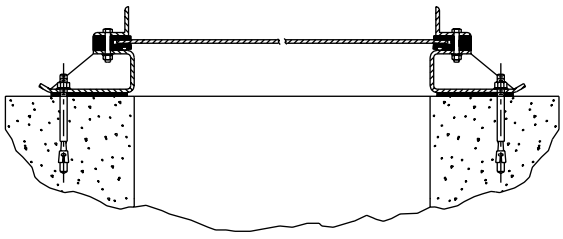
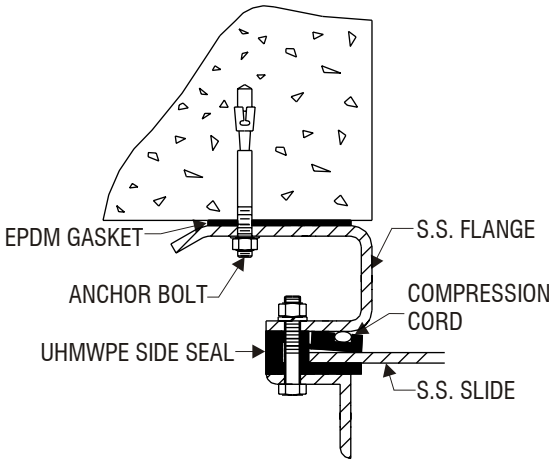
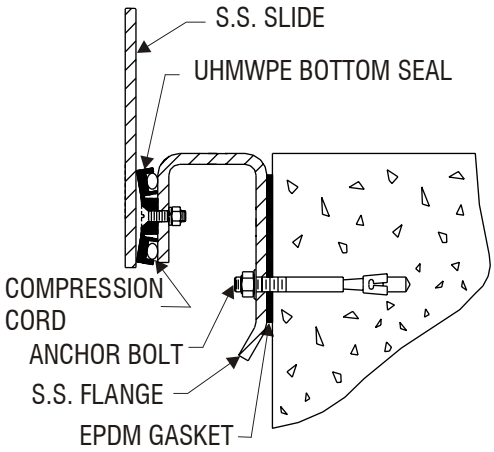


Figure 40-02
Directly on a concrete wall
(CW)



Detail 40-02
Section “A-A” of the side frame



Detail 40-03
Section “B-B” of the bottom frame

(Details 40-02, 03 refer to figures 40-08 , 09, 10, 11 on pages 5, 6, 7 and 8)

Calibrated Gauge

Figure 40-03 shows the installation of a calibrated gauge necessary for flow calculation. The calibrated gauge is available in any units.

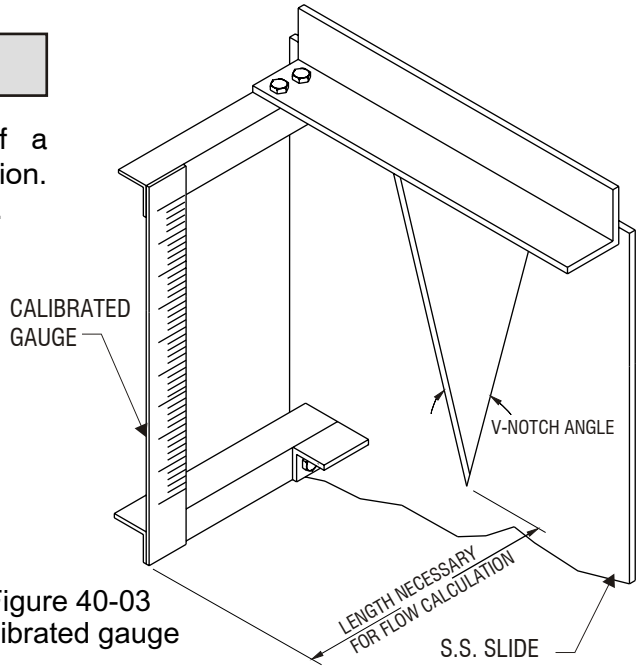


Figure 40-03
Calibrated gauge

Weir Types

Figures 40-04 through 40-06 show a few examples of the different weir shapes possible.

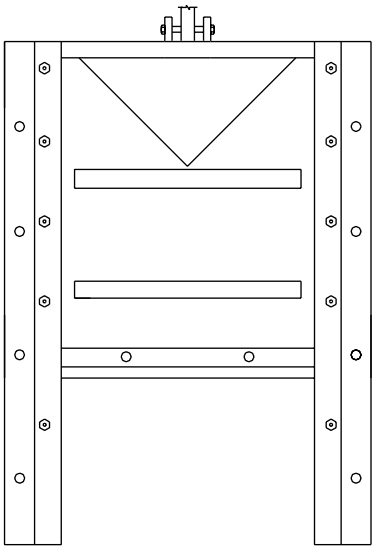


Figure 40-04
90 degree V-NOTCH

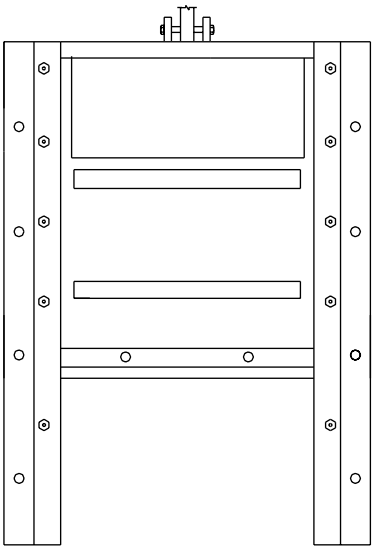


Figure 40-05
Rectangular weir

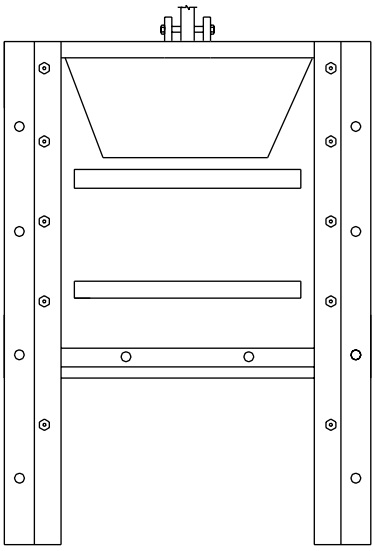


Figure 40-06
Cipoletti weir

Frame and Stem Configurations

Figures 40-07 through 40-10 show the most common frame and stem configurations.

Model 404

Concrete wall mounted (CW) with pedestal-mounted gear box and crank operator (MNEP) Rising stem (RS1)

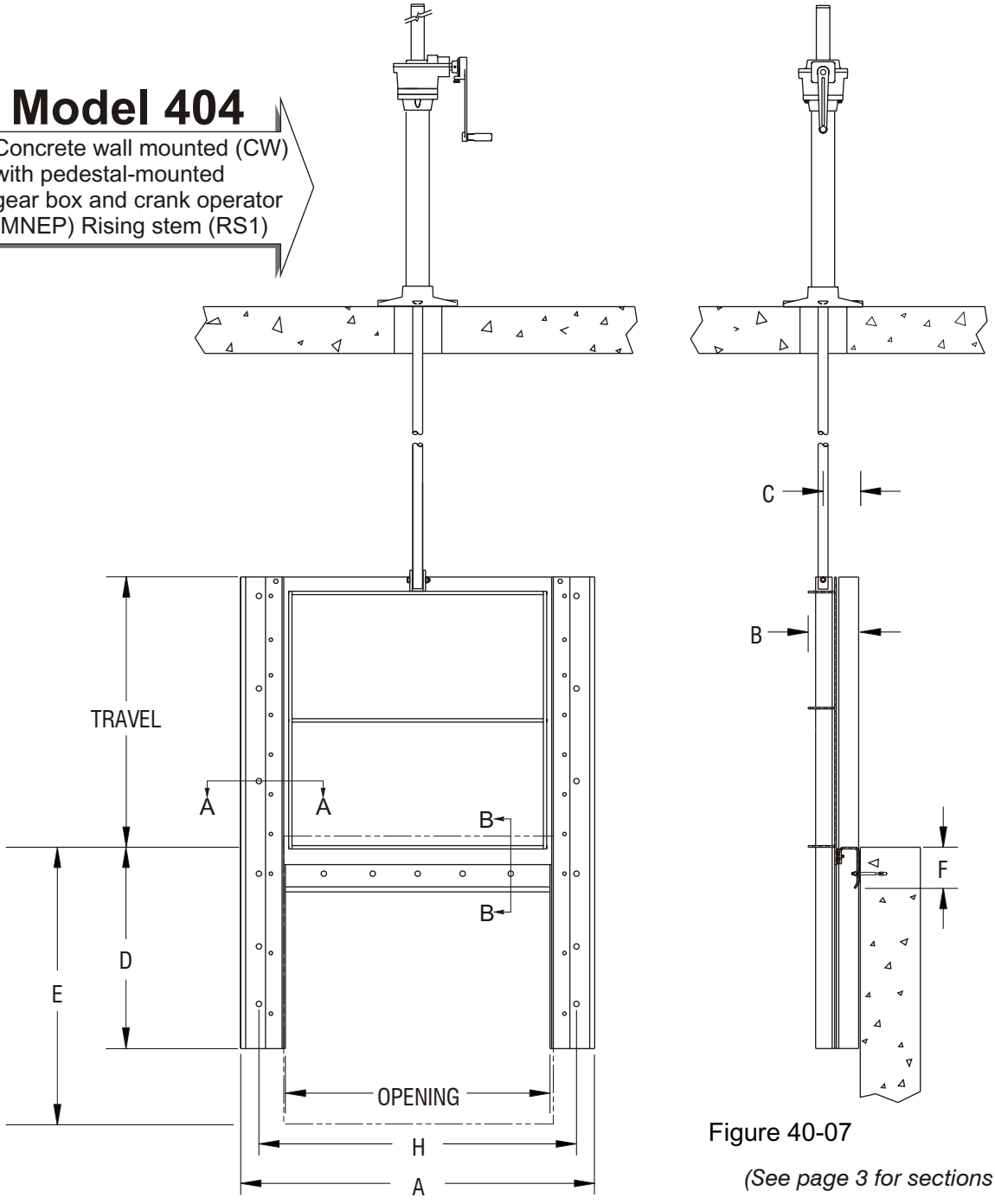


Figure 40-07

(See page 3 for sections A, B)

Frame and Stem Configurations

Model 403

Concrete wall-mounted (CW)
with yoke-mounted
gearbox and crank (MNE)
Rising stem (RS2)

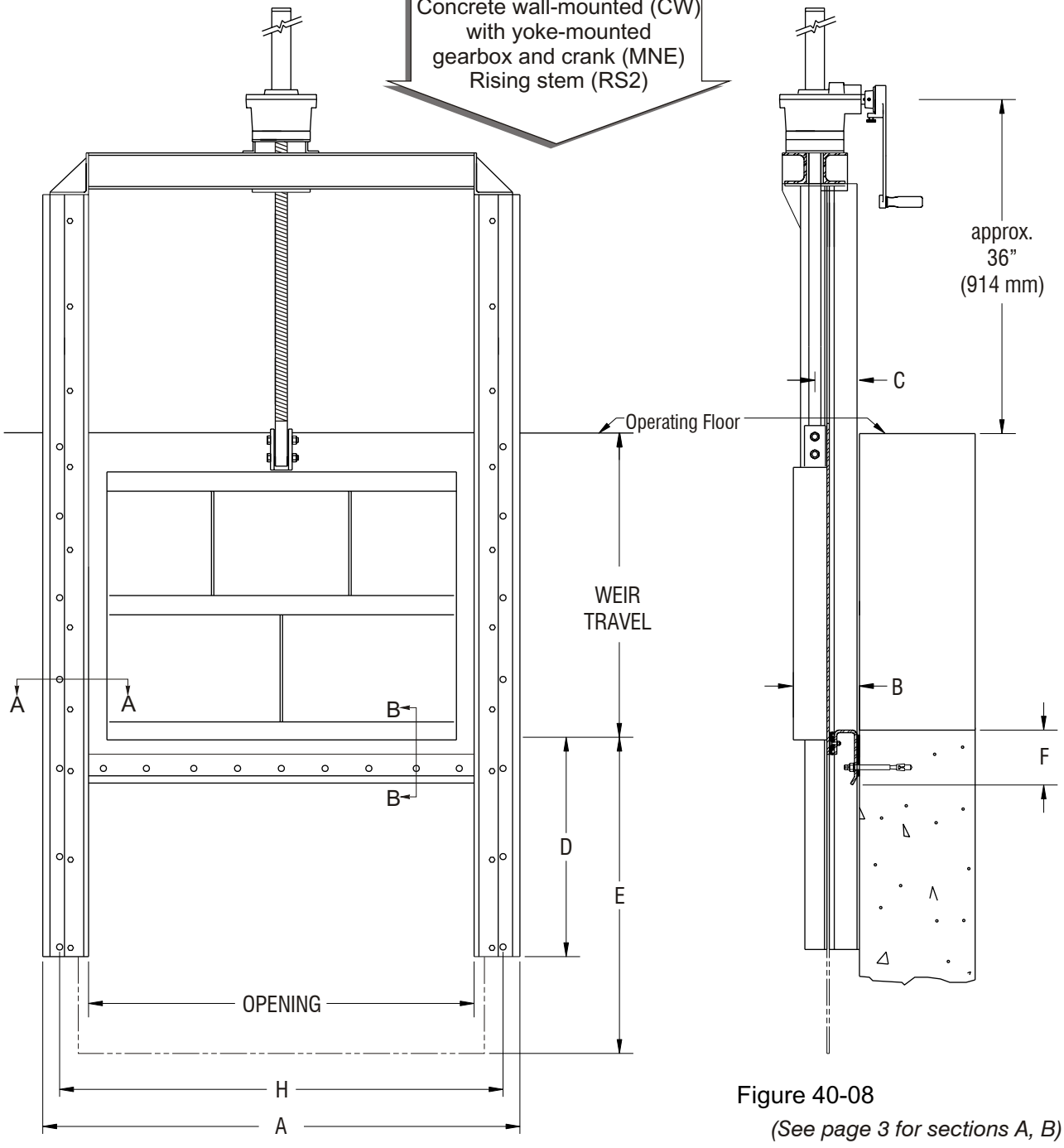


Figure 40-08

(See page 3 for sections A, B)

Frame and Stem Configurations

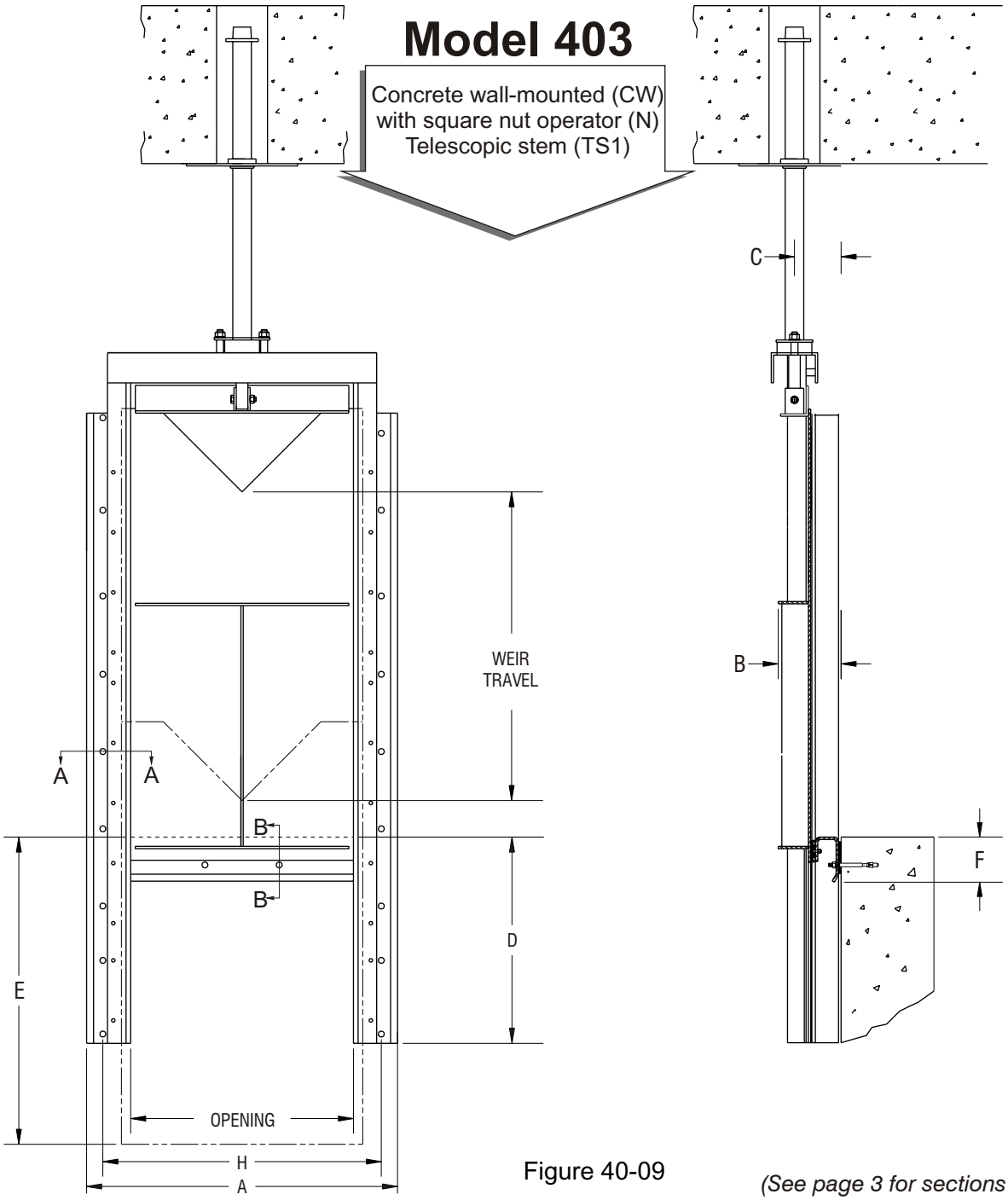


Figure 40-09

(See page 3 for sections A, B)

Frame and Stem Configurations

Figure 40-10 shows a dual stem arrangement for wide weirs.

Model 403

Concrete wall-mounted (CW)
with dual gearbox and crank arrangement (D-MNE)
Dual rising stem (RS2)

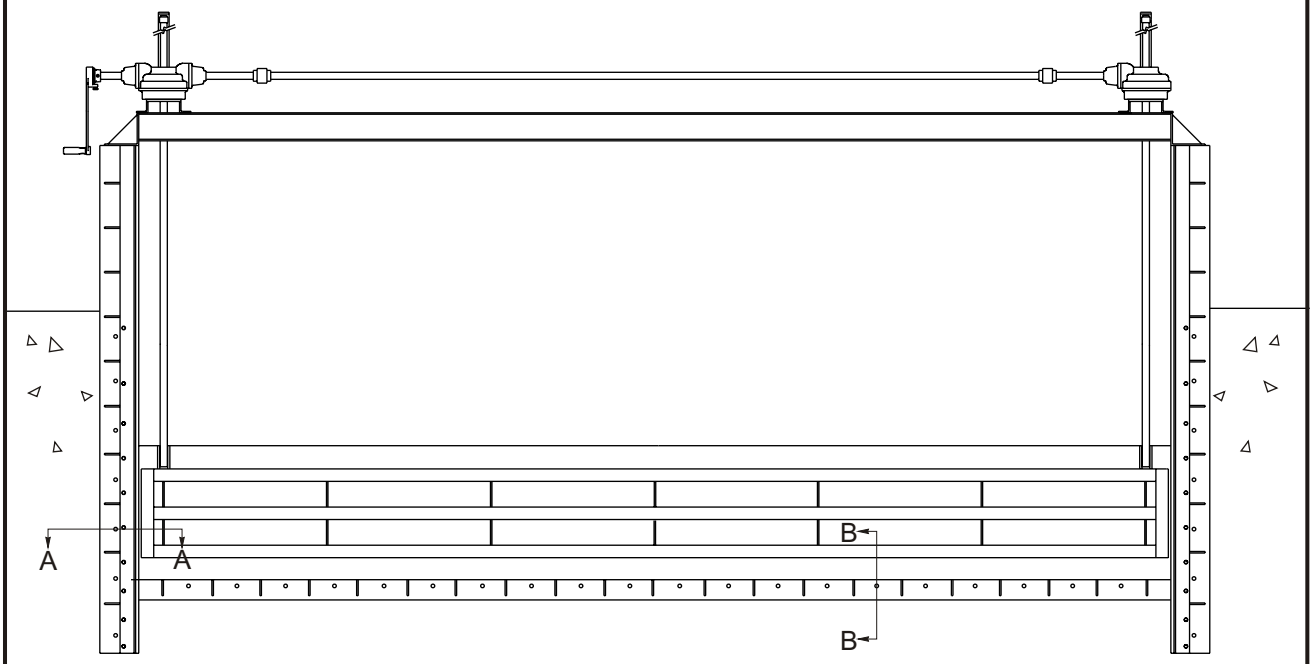


Figure 40-10

(See page 3 for sections A, B)

Fontaine

SERIES 40
DOWNWARD-OPENING WEIR GATES

Dimensional Chart*

FOR STANDARD CONCRETE WALL MOUNTED GATES (**CW**)

Gate size (**) inches / mm	A	B	C		D	E	F	H
			Rising stem	Non-rising stem				
6 x 6	15 1/2	6	4 3/4	4 3/4	6 1/2	8 1/2	4 3/4	12
150 x 150	392	152	121	121	164	214	121	303
8 x 8	17 1/2	6	4 3/4	4 3/4	7 7/8	10 1/2	4 3/4	14
200 x 200	442	152	121	121	197	264	121	353
10 x 10	19 1/2	6	4 3/4	4 3/4	9 1/8	12 1/2	4 3/4	16
250 x 250	491	152	121	121	231	314	121	402
12 x 12	21 1/2	6	4 3/4	4 3/4	10 1/2	14 1/2	4 3/4	18
300 x 300	541	152	121	121	264	364	121	452
14 x 14	23 1/2	6	4 3/4	4 3/4	11 7/8	16 1/2	4 3/4	20
350 x 350	591	152	121	121	297	414	121	502
15 x 15	24 1/2	6	4 3/4	4 3/4	12 1/2	17 1/2	4 3/4	21
16 x 16	25 1/2	6	4 3/4	4 3/4	13 1/8	18 1/2	4 3/4	22
400 x 400	642	152	121	121	331	464	121	553
18 x 18	27 1/2	6	4 3/4	4 3/4	14 1/2	20 1/2	4 3/4	24
450 x 450	692	152	121	121	364	514	121	603
20 x 20	29 1/2	6	4 3/4	4 3/4	15 7/8	22 1/2	4 3/4	26
500 x 500	741	152	121	121	397	564	121	652
21 x 21	30 1/2	6	4 3/4	4 3/4	16 1/2	23 1/2	4 3/4	27
22 x 22	31 1/2	6	4 3/4	4 3/4	17 1/8	24 1/2	4 3/4	28
550 x 550	791	152	121	121	431	614	121	702
24 x 24	33 1/2	6	4 3/4	4 3/4	18 1/2	26 1/2	4 3/4	30
600 x 600	841	152	121	121	464	664	121	752
26 x 26	35 1/2	6	4 3/4	4 3/4	19 7/8	28 1/2	4 3/4	32
650 x 650	892	152	121	121	497	714	121	803
28 x 28	37 1/2	6	4 3/4	4 3/4	21 1/8	30 1/2	4 3/4	34
700 x 700	942	152	121	121	531	764	121	853
30 x 30	39 1/2	6	4 3/4	4 3/4	22 1/2	32 1/2	4 3/4	36
750 x 750	991	152	121	121	564	814	121	902
32 x 32	41 1/2	6	4 3/4	4 3/4	23 7/8	34 1/2	4 3/4	38
800 x 800	1041	152	121	121	597	864	121	952
34 x 34	43 1/2	6	4 3/4	4 3/4	25 1/8	36 1/2	4 3/4	40
850 x 850	1091	152	121	121	631	914	121	1002
36 x 36	45 1/2	6	4 3/4	4 3/4	26 1/2	38 1/2	4 3/4	42
900 x 900	1142	152	121	121	664	964	121	1053
38 x 38	47 1/2	7 1/4	4 3/4	5 1/4	27 7/8	40 1/2	4 3/4	44
950 x 950	1192	184	121	133	697	1014	121	1103

(*) These dimensions are for information only. Do not use for installation or submittal purposes.
(**) Fontaine Gates are also available for rectangular openings and in sizes other than those specified in this chart.

Fontaine

SERIES 40
DOWNWARD-OPENING WEIR GATES

Dimensional Chart*

CONT'D FOR STANDARD
CONCRETE WALL MOUNTED GATES (**CW**)

Gate size (**) inches / mm	A	B	C		D	E	F	H
			Rising stem	Non-rising stem				
40 x 40	49 1/2	7 1/4	4 3/4	5 1/4	29 1/4	42 1/2	4 3/4	46
1000 x 1000	1241	184	121	133	731	1064	121	1152
42 x 42	51 1/2	7 1/4	4 3/4	5 1/4	30 1/2	44 1/2	4 3/4	48
1050 x 1050	1291	184	121	133	764	1114	121	1202
44 x 44	53 1/2	7 1/4	4 3/4	5 1/4	31 7/8	46 1/2	4 3/4	50
1100 x 1100	1341	184	121	133	797	1164	121	1252
46 x 46	55 1/2	7 1/4	4 3/4	5 1/4	33 1/8	48 1/2	4 3/4	52
1150 x 1150	1392	184	121	133	831	1214	121	1303
48 x 48	57 1/2	7 1/4	4 3/4	5 1/4	34 1/2	50 1/2	4 3/4	54
1200 x 1200	1441	184	121	133	864	1264	121	1352
50 x 50	59 1/2	7 1/4	5	5 1/2	35 7/8	52 1/2	4 3/4	56
1250 x 1250	1491	184	127	140	897	1314	121	1402
54 x 54	63 1/2	7 1/4	5	5 1/2	38 1/2	56 1/2	4 3/4	60
1400 x 1400	1641	184	127	140	997	1464	121	1552
60 x 60	69 1/2	7 3/4	5	5 1/2	42 1/2	62 1/2	4 3/4	66
1500 x 1500	1741	197	127	140	1064	1564	121	1652
66 x 66	75 1/2	7 3/4	5	5 1/2	46 1/2	68 1/2	4 3/4	72
1700 x 1700	1942	197	127	140	1197	1764	121	1853
72 x 72	81 1/2	7 3/4	5	5 1/2	50 1/2	74 1/2	4 3/4	78
1800 x 1800	2041	197	127	140	1264	1864	121	1952
78 x 78	90 1/2	8 1/2	5 3/4	***	54 5/8	80 5/8	6 1/4	86
2000 x 2000	2318	216	146		1397	2064	159	2203
84 x 84	96 1/2	8 3/4	5 3/4	***	58 5/8	86 5/8	6 1/4	92
2100 x 2100	2417	222	146		1464	2164	159	2303
90 x 90	102 1/2	10	5 3/4	***	62 5/8	92 5/8	6 1/4	98
2300 x 2300	2618	254	146		1597	2364	159	2503
96 x 96	108 1/2	11	6	***	66 5/8	98 5/8	6 1/4	104
2400 x 2400	2718	279	152		1664	2464	159	2604
102 x 102	114 1/2	11	6	***	70 5/8	104 5/8	6 1/4	110
2600 x 2600	2917	279	152		1797	2664	159	2803
108 x 108	120 1/2	12	6	***	74 5/8	110 5/8	6 1/4	116
2700 x 2700	3018	305	152		1864	2764	159	2903
114 x 114	126 1/2	12 1/2	6 1/8	***	78 5/8	116 5/8	6 1/4	122
2900 x 2900	3217	318	156		1997	2964	159	3103
120 x 120	132 1/2	12 1/2	6 1/4	***	82 5/8	122 5/8	6 1/4	128
3000 x 3000	3318	318	159		2064	3064	159	3203

(*) These dimensions are for information only. Do not use for installation or submittal purposes.
(**) Fontaine Gates are also available for rectangular openings and in sizes other than those specified in this chart.
(***) Please contact manufacturer for further details.

Typical Specifications

1. GENERAL CONDITIONS

1.1. SCOPE. This section covers Stainless Steel Downward Opening Weir Gates and operators.

1.2. GENERAL. The equipment provided under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the drawings, specifications, engineering data, instructions and recommendations of the equipment manufacturer unless exceptions are noted by the engineer.

Gates and operators shall be supplied with all the necessary parts and accessories indicated on the drawings, specified or otherwise required for a complete, properly operating installation and shall be the latest standard product of a manufacturer regularly engaged in the production of water control gates.

Weir gates supplied under this section shall be Series 40 Stainless Steel Downward Opening Weir Gates as manufactured by H.Fontaine Ltd.

1.3. GOVERNING STANDARDS. Except as modified or supplemented herein, all gates and operators shall conform to the applicable requirements of AWWA C513, latest edition.

1.4. QUALITY ASSURANCE

1.4.1. The manufacturer shall have experience in the production of substantially similar equipment, and shall show evidence of satisfactory operation in at least 50 installations. The manufacturer's shop welds, welding procedures and welders shall be qualified and certified in accordance with the requirement of the latest edition of ASME, Section IX.

1.4.2. Weir gates shall be shop inspected for operation before shipping.

1.4.3. The manufacturer shall be ISO 9001 : 2000 certified.

1.5. SUBMITTALS. The manufacturer shall submit, for approval by the purchaser, drawings showing the principal dimensions, general construction and materials used in the gate and lift mechanism.

2. PERFORMANCE

2.1. LEAKAGE. Weir gates shall be substantially watertight under the design head conditions. Leakage shall not exceed 0.05 U.S. gallon per minute per foot (0.60 l/min per meter) of seal periphery under the design seating head and 0.1 U.S. gallon per minute per foot (1.25 l/min per meter) of seal periphery for the design unseating head.

2.2. DESIGN HEAD. Weir gates shall be designed to withstand the design head (maximum design head shall be taken as the height of the slide unless otherwise shown in the schedule).

2.3. SEAL PERFORMANCE TEST. The weir gate's sealing system should have been tested through a cycle test in an abrasive environment and should show that the leakage requirements are still obtained after 25,000 cycles with a minimum deterioration.

3. PRODUCT

3.1. WEIR GATES

3.1.1. GENERAL DESIGN. Weir gates shall be either self-contained or non self-contained, and of the rising stem or non-rising stem configuration, as indicated on the gate schedule.

3.1.3. FRAME. The gate frame shall be constructed of structural members or formed plate welded to form a rigid one-piece frame. The frame shall be of the flange back design, suitable for mounting on a concrete wall (CW). The guide slot shall be made of UHMWPE (ultra high molecular weight polyethylene).

3.1.4. SLIDE. The slide shall consist of a flat plate reinforced with formed plates or structural members to limit its deflection to 1/720 of the gate's span under the design head.

3.1.5 GUIDES AND SEALS. The guides shall be made of UHMWPE (ultra high molecular weight polyethylene) and shall be of such length as to retain and support at least two thirds (2/3) of the vertical height of the slide in the fully open position.

The bottom and side seals shall be made of UHMWPE (ultra high molecular weight polyethylene) of the self adjusting type. A continuous compression cord shall ensure contact between the UHMWPE guide and the gate in all positions. The sealing system shall maintain efficient sealing in any position of the slide and let the water flow only in the open part of the gate.

Seals shall maintain the specified leakage rate in both seating and unseating conditions.

3.2. OPERATORSAND STEM

3.2.1. STEM AND COUPLINGS. The operating stem shall be of stainless steel designed to transmit in compression at least two (2) times the rated output of the operating manual mechanism with a 40 lbs (178 N) effort on the crank or handwheel.

The stem shall have a slenderness ratio (L/r) less than 200. The threaded portion of the stem shall have machine cut threads of the Acme type.

Where a hydraulic, pneumatic or electric operator is used, the stem design force shall not be less than 1.25 times the output thrust of the hydraulic or pneumatic cylinder, with a pressure equal to the maximum working pressure of the supply or 1.25 times the output thrust of the electric motor in the stalled condition.

3.2.1.1. For stems in more than one piece and with a diameter of 1 ¾ inches (45 mm) and larger, the different sections shall be joined together by solid bronze couplings. Stems with a diameter smaller than 1 ¾ inches, shall be pinned to an extension tube.

The couplings shall be grooved and keyed and shall be of greater strength than the stem.

3.2.1.2. Gates having width equal to or greater than two times their height shall be provided with two lifting mechanisms connected by a tandem shaft.

3.2.2. STEM GUIDES. Stem guides shall be fabricated from type 304L (or 316L) stainless steel. The guide shall be equipped with an UHMWPE bushing. Guides shall be adjustable and shall be spaced in accordance with the manufacturer's recommendation. The L/r ratio shall not be greater than 200.

3.2.3. STEM COVER. Rising stem gates shall be provided with a clear polycarbonate stem cover. The stem cover shall have a cap and condensation vents as well as a clear mylar position indicating tape. The tape shall be field applied to the stem cover after the gate has been installed and positioned.

3.2.4. LIFTING MECHANISM. Manual operators of the types listed in the schedule shall be provided by the gate manufacturer.

All bearings and gears shall be totally enclosed in a weather tight housing. The pinion shaft of crank-operated mechanisms shall be constructed of stainless steel and supported by roller or needle bearings.

Each manual operator shall be designed to operate the gate under the maximum specified seating and unseating heads by using a maximum effort of 40 lbs (178 N) on the crank or handwheel, and shall be able to withstand, without damage, an effort of 80 lbs (356 N).

The crank shall be removable and fitted with a corrosion resistant rotating handle. The maximum crank radius shall be 15 inches (381 mm) and the maximum handwheel diameter shall be 24 inches (610 mm).

3.2.5. YOKE. Self-contained gates shall be provided with a yoke made of structural members or formed plates. The maximum deflection shall be 1/360 of the gate's span.

4. MATERIALS

Part	Material
Frame, yoke, stem guides, slide, stem extension	Stainless steel ASTM A-240 Type 304L or 316L
Guides, side and bottom seals, stem guide liner	Ultra high molecular weight polyethylene (UHMWPE) ASTM D-4020
Compression cord	Nitrile ASTM D-2000 M6BG 708, A14, B14, E014, E034
Threaded stem	Stainless steel ASTM A-276 Type 303 MX or 316
Fasteners	ASTM F593 and F594 GR1 for type 304 and GR2 for type 316
Pedestal, handwheel, crank	Tenzaloy aluminum
Gasket (between frame and wall)	EPDM ASTM 1056
Stem cover	Polycarbonate ASTM D-3935
Lift nut, couplings	Manganese bronze ASTM B584 UNS-C86500

5. SCHEDULE

Gate Identification		
Gate Type		
Size Width x Height		
Operating Floor Elevation		
Invert Elevation		
Head (Seating / Unseating)		
Mounting		

Gate Type: Open or self-contained

Mounting: CW - Mounted concrete wall

6. EXECUTION

6.1. INSTALLATION. Gates and appurtenances shall be handled and installed in accordance with the manufacturer's recommendations.

6.2. FIELD TESTS

6.2.1. Following the completion of each gate installation, the gates shall be operated through at least two complete open/close cycles. If an electric or hydraulic operator is used, limit switches shall be adjusted following the manufacturer's instructions.

6.2.2. Gates should be checked for leakage by the contractor (refer to the "Performance" section for approval criteria).