SECTION _____
FLOW METERING WEIRS

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes all FRP Flow Metering Weirs required for the complete installation of the work.

1.02 REFERENCES

A. Design, and fabricate FRP Flow Metering Weirs and materials in accordance with manufacturer's recommended procedures and the following codes and standards:

1.	ASTM A193	-	Stainless Steel Anchor Bolts
2.	ASTM A276	-	Stainless Steel Bars
3.	ASTM B584	-	Alloy 865 Manganese Bronze
4.	ASTM D256	-	Izod Impact Strength
5.	ASTM D570	-	Water Absorption Rate
6.	ASTM D638	-	Tensile Strength
7.	ASTM D648	-	Heat Deflection Temperature
8.	ASTM D695	-	Compressive Properties of Rigid Plastic
9.	ASTM D696	-	Coefficient of Linear Expansion
10.	ASTM D790	-	Flexural Properties
11.	ASTM D792	-	Density and Specific Gravity at 23^0 C
12.	ASTM D1056	-	Polymer Grade
13.	ASTM D2583	-	Indentation Hardness
14.	ASTM D2584	-	Resin, Glass & Filler Content
15.	AWWA C-563	-	Fabricated Composite Slide Gates
16.	AWWA C-540	-	Power Actuating Devices - Sluice Gates
17.	ISO1438/1-1980	-	Open Channel Flow Measurement
18.	NSF-61	-	Potable Water

B. Composition of the FRP Flow Metering Weir laminate shall be in accordance with the recommendations shown in the Quality Assurance Report for Reinforced Thermoset Plastic (RTP) Corrosion Resistant Equipment prepared under the sponsorship of the Society of the Plastics Industry, Inc. (SPI), and the Material Technology Institute (MTI) of the Chemical Process Industry for "Hand Lay-UP Laminates," and shall meet the specifications for Type I, Grade 10 laminates shown in Appendix M-1 of said report.

C. Manufacturer shall be experienced in the design and manufacture of specific FRP Flow Metering Weirs and accessories for a minimum period of 20 years.
D. Manufacturer must provide warranty for 25 years against corrosion.

1.03 SUBMITTALS

A. Submit the following for acceptance:
1. Approval Drawings
a. Showing all critical dimensions.
b. Showing principal parts and materials.
2. Spare parts list (when applicable).

1.04 DELIVERY, STORAGE AND HANDLING

A. Ship all Flow Metering Weirs and accessories with suitable packaging to protect products from damage.
B. Protect corners and protruding accessories from damage.

PART 2 PRODUCTS

2.01 MATERIALS

A. Flow Metering Weir shall be:
1. Engineered composite fiberglass reinforced plastic (FRP), when necessary with sandwich construction completely encapsulating an internal structure.
a. Molded to create a seamless corrosion barrier impervious to moisture.
b. Internal Core Foam (when applicable): 2lb (0.9kg) polyisocyanurate closed cell rigid foam.

2.02 FRP FLOW METERING WEIRS

A. Acceptable Manufacturers:
1. Plasti-Fab Inc
a. Shall be model number FMW_____ *(width x length).*
2. Or approved equal. Pre-approved by Engineer at least 10 business days prior to bid date.
a. Manufacturer must have a qualified Engineer on staff with at least 5 years experience with FRP Flow Metering Weirs.

2.03 DESIGN CRITERIA

A. Composition of the Flow Metering Weir laminate shall be in accordance with the recommendations shown in the Quality Assurance Report for Reinforced Thermostat Plastic (RTP) Corrosion Resistant Equipment prepared under the sponsorship the Society of the Plastics Industry, Inc. (SPI) and the Material Technology Institute of the Chemical Process Industries, Inc. (MTI) for “Hand Lay-up Laminates” and shall meet the specifications for Type 1, Grade 10 laminates shown in Appendix M-1 of said report.
1. Visual inspection for defects shall be made without the aid of magnification and defects shall be classified as to type and level as shown in Table 1 of ANSI/ASTM D2563-0, approved 1977, (or any subsequent revision). Allowable surface tolerances are as follows:

DEFECTS	ALLOWABLE TOLERANCE
Cracks Crazing	None

Blisters Chips Pits Dry Spots Fish Eyes Burned Areas Entrapped Air	
Wrinkles and solid blisters, not to exceed 1/8”	Maximum Deviation: 10% of thickness
Surface porosity (pinholes or pores in the laminate surface)	None
Exposed Glass Exposure of cut edges	None
Scratches	None more than .002” deep (.05mm)
Foreign Matter	None

A. Maximum Fiber Stress
   1. Ultimate or yield, whichever applies, does not exceed 2.5 times the working stress.

B. Deflection
   1. Deflection across the Flow Metering Weir width shall be limited to: L/360 or ¼” (6mm), whichever is less, at the maximum operating head.

C. Head Pressure
   1. Flow Metering Weir shall be designed for a maximum head pressure of: _____ *inches / millimeters.*

D. Flow Metering Weir Size
   1. Flow Metering Weir Width: _____ *inches / millimeters.*
   2. Flow Metering Weir Height: _____ *inches / millimeters.*

E. Surface Conditions
   1. All Flow Metering Weirs shall be flat and level.
   2. Warpage throughout the entire Flow Metering Weir shall not produce a crown of more than 1/16” (1.6mm) in any direction.

2.04 CONSTRUCTION

A. Flow Metering Weir Body
   1. The Flow Metering Weir shall be manufactured of reinforced thermoset plastic construction for superior structural stability.
   2. Flow Metering Weir shall be molded in one piece ¼” (6mm) solid FRP, or when applicable with a minimum thickness of l” (25mm) 2lb/ft^3 (0.9kg/0.28m^3) polyurethane foam encapsulated between l/8” (3mm) FRP skins.
   3. The resin and gelcoat shall be UV inhibited
   4. The exterior surfaces shall be finished with a premium grade gelcoat for superior protection against weathering and discoloration.
   5. The surface shall be resin rich to a depth of .010 inches to .020 inches (.25 - .51mm) and reinforced with C-glass and/or polymeric fiber surfacing material.
   6. The surface shall be free of exposed reinforcing fibers.
   7. The composition of these layers shall be approximately 95% (by weight) resin. The remaining laminate shall be made up of copolymer composite and reinforcing fibers in a form, orientation and position to meet the mechanical requirements.

8. Foam core material when used must be 100% resistant to decay and attack by fungus and bacteria and be resistant to hydrocarbons.
9. The exterior surface finish shall be smooth to allow easy access for cleaning and maintenance.
10. The V-Notch shall be precisely molded with a sharp upstream edge with a depth of _____ *inches / millimeters*. The notch shall be beveled 1/16" (1.6mm) with a downstream chamfer of 45^0 / 60^0.
11. Mounting
    a. *There shall be a pre-drilled bolting flange on sides and bottom for mounting to the wall surface.*

    b. *There shall be an embedded / surface / in-channel mounting style guide frame made of FRP / T-304L / T-316L / PREN ___ super duplex stainless steel.*

12. Anchor bolts, when applicable, shall be *FRP / T-304L / T-316L / PREN ___ super duplex stainless steel*.

B. *Flow Metering Weir Accessory Examples:*

1. *FRP Head Gage.*
2. *Remote Stilling Well.*
3. *T-304L / T-316L stainless steel lifting eyes.*
4. *Aluminum / T-304L / T-316L lifting handles.*
5. *Grip slots.*
6. *Seals / wall gasket.*
7. *Weir Box*
    a. *Width: _____ inches / millimeters.*

    b. *Length: _____ inches / millimeters.*

    c. *Height _____ inches / millimeters.*

    d. *Standard Features:*

        1) *Energy absorbing basins.*
        2) *Pipe stubs with neoprene boots and stainless steel bands.*
        3) *Head gage in 100ths of a foot and centimeters.*
        4) *Two vial bubble level.*
        5) *Stilling wells – integral or detached.*

    e. *Customization Options:*

        1) *T-304 adjustable stainless steel ultrasonic mounting bracket.*
        2) *Pressure probe cavity with lift out bracket.*
        3) *Stainless steel sample pipe 3/8" (9.5mm)OD with molded side cavity.*
        4) *Stainless steel bubbler pipe 1/4"(6mm) OD with molded side cavity.*
        5) *Temperature probe bracket.*
        6) *pH probe cavity with stainless steel lift out bracket.*
        7) *Top grating or solid cover.*

2.05 PHYSICAL PROPERTIES

A. Structural characteristics for a 1/8" (3mm) glass mat laminate shall meet the following minimum physical properties:

Tensile strength	15,000 psi (1034 ksc)
Flexural Modulus	1,000,000 psi (70307 ksc)
Flexural Strength	20,000 psi (1406 ksc)
Compressive Strength	22,000 psi (1547 ksc)
Impact Strength	9.0 ft-lbs/in. (1.24 kgf.m/25mm)
Water absorption	0.13% (in 24 hours)

B. Seals (when applicable): Extruded Virgin Neoprene Seals shall have the following physical characteristics:

Specific Gravity	1.25
Hardness	55 – 65 Shore A Durometer
Tensile Strength	1500 psi min. (0.07ksc)
Elongation	300%
Low temperature brittleness	- 40°

PART 3 EXECUTION

3.01 INSTALLATION

A. Thoroughly remove all shipping materials prior to setting in place.

B. Install per manufactures instructions.

END OF SECTION