- Fully Integrated Foam Proportioning Package
- Fully Customizable Flow, Control, Size, Materials, Power, Valves, Drivers, etc.
- Landbased And Marine Suitable
- NFPA Compliant
- UL Listed Components

Description

Balanced Pressure (BP) Proportioning Systems are the most common type of foam proportioning systems because of their versatility and accuracy. National Foam BP systems are skid mounted fixed units which are capable of providing foam protection to all types of hazards on land and are also excellent for various marine applications. Skid mounting allows the complete proportioning system to be assembled on a common base ready for installation into the customer's water supply main.

National Foam Balanced Pressure Proportioning Systems are manufactured to satisfy NFPA requirements using UL Listed foam proportioning devices as noted in the Technical Data section of this data sheet.

BP Proportioning Systems automatically and accurately proportion foam concentrate over the entire flow range of the ratio controller, regardless of pressure, and without manual adjustments. Proper proportioning is achieved automatically by maintaining identical water and foam concentrate pressures at the respective inlets to the ratio controller. Foam concentrate is supplied to the ratio controller by a positive-displacement type foam concentrate pump and a diaphragm balancing valve that automatically adjusts the foam concentrate pressure to correspond to the water pressure. A duplex gauge monitors balancing of the foam concentrate and water pressures at the ratio controller. The duplex gauge also allows the system to be manually balanced in the event of diaphragm valve failure by utilizing a manually operated valve in the foam concentrate by-pass piping.

Features

- May be used with either fresh or salt water
- Direction of flow through proportioner can easily be changed in the field prior to installation of field piping
- Compact design provides a small footprint
- Can add most options except standby pump without changing footprint
- Designed to easily accept a variety of options for custom configuration
- Assembled with grooved fittings and flush-in/flush-out connections for ease of service
- Accurate foam concentrate proportioning over flow range regardless of pressure
- All foam concentrate valves, pipe and fittings are selected for compatibility with all types of foam concentrates, and superior corrosion resistance in the installation environment
- All manual valves are full port ball valves, which provide low friction loss characteristics
- All manual valves are the locking type, in accordance with NFPA requirements for valve supervision,





and have identification labels on the handles

- Foam concentrate supply can be replenished while the system is in operation
- Pump valving designed to provide the ability to test relief valves and pump output with external equipment

Applications

- Tank Farms
- Loading Racks
- Hangers
- Warehouses, Drum Storage Facilities
- Tankers, Chemical Carriers
- Fireboats
- Helipads, Helidecks
- Offshore Drilling Rigs
- Docks, Piers
- High Expansion Systems

Technical Specifications

The skid-mounted balanced pressure proportioning system shall be a complete self-contained unit designed to proportion foam concentrate with fresh or salt water at the required percentage of concentration over the entire flow range of the ratio controller. All foam proportioning components and piping shall be securely mounted on a steel epoxy coated base complete with foundation anchor boltholes and provision for handling with a forklift. Skid shall include all necessary piping, valves, and fittings to comprise a complete foam proportioning unit, and shall be designed to provide a compact unit with a small footprint.



Technical Specifications (cont.)

The proportioning package shall have positive-displacement gear-type а foam concentrate pump with external relief valve, and 3/60/460 V ODP motor mounted on a structural steel base. Pump shall have a brass body with brass liners, stainless steel shaft, bronze rotors, teflon lip seals, and bearing alloy SAE 5200 ball bearings. Motor shall be sized with sufficient horsepower to provide rated output, with relief valve full open, without overloading the motor. Each motor driven pump shall be provided with a UL Listed NFPA 20 Nema 2 fire pump controller. Pumps shall have a full voltage across-the-line start fire pump controller as standard. Controller shall be pre-wired to pump. All foam concentrate piping shall be brass or stainless steel for compatibility with all types of foam concentrates, superior corrosion resistance, and reduction of sedimentation due to corrosion. The suction piping shall contain a Y-type or basket strainer with 1/8" perforated stainless steel screen. In addition, a compound gauge shall be provided in the suction line, downstream of the strainer, to monitor potential blockage during operation, as well as, pressure during flushing procedures. All manual valves shall be brass or bronze full port ball valves (which provide low friction loss characteristics), and shall have locking handles in accordance with NFPA requirements for valve supervision. All manual valves shall have function identification labels on the handles. A check valve shall be installed in the foam concentrate discharge line to the ratio controller for backflow prevention.

A bronze wafer-style ratio controller (modified venturi proportioner), which is designed to fit inside schedule 40

pipe and between two 150 lb flat-face flanges of the same nominal pipe size as the proportioner, shall be provided. A backpressure control type diaphragm valve shall be provided to automatically adjust the foam concentrate pressure to correspond to the water pressure. Balancing is accomplished by sensing the water and foam concentrate pressures at the inlet to the ratio controller and adjusting the diaphragm valve opening to control the excess foam concentrate flow back to the concentrate storage tank. Pressure sensing lines from the water supply line and the foam concentrate sensing connection to the diaphragm valve, monitor both the water and the foam concentrate pressures. The diaphragm valve shall be provided with a block valve and a bypass loop with manually operated valve, which can be used to manually adjust the pressure in the event of diaphragm valve failure. A duplex gauge shall be provided to verify proper balance of the foam concentrate and water pressures at the ratio controller and to allow the system to be manually balanced. Flush-in/flush-out connections (11/2" NH) shall be provided for ease of service. All field connections, with the exception of the water supply and foam solution discharge, shall be 150 lb F.F. flanged flush with the edge of the skid base.

Direction of flow through the proportioner shall be simple to change in the field without piping modifications, prior to installation of field piping. In addition, the skid unit design shall allow for close proximity remote mounting of the ratio controller. Skid unit design shall allow a variety of options to be added for custom configuration without changing footprint of the package. This would include additional ratio controllers, actuated discharge valves, etc. The only standard options that would change the footprint are an additional foam concentrate pump or a special pump driver such as a diesel engine or water motor. See Options Chart page 6.

Technical Data with Approvals and Listings

Base:Epoxy Coated Carbon Steel.
Piping:• Brass, Schedule 40, Screwed and Grooved fittings.
Stainless Steel, Schedule 40, Screwed and/or Welded and Grooved fittings.
Ratio
Controller:UL listed. Brass body with stainless steel hardware.
Manual
Valves:Full port ball valve with locking handle, bronze or 300 series stainless steel body.
Pump:UL Listed and FM Approved Positive-displacement, gear-type, with external relief valve. Brass body with brass liners, stainless steel shaft, bronze rotors, teflon lip seals, and bearing alloy SAE 5200 ball bearings.
Motor:UL Listed. ODP, 3/60/460V.
Controller:UL Listed. NFPA 20 controller, full voltage across the line start, NEMA 2 enclosure.
Diaphragm
Valve:UL Listed. Brass body with stainless steel internals, reinforced Buna-N diaphragm.
Working
Pressure:200 PSI (13.8 bars)
Finish:Red high solids epoxy finish.



VALVE DESCRIPTION					
Ref.	Description	Normal Position			
A	Fm. Conc. Tank Return	Open			
В	Fm. Conc. Tank Suction	Open			
С	Manual Fm. Conc. Bypass Valve	Closed			
D	Fm. Conc. Discharge Valve	Open			
L	Fm. Conc. Discharge to Diaphragm Valve	Open			
S	Flush-In Connection	Closed			
Т	Flush-Out Connection	Closed			
U	Strainer Flush-Out	Closed			



PIPING, VALVES, AND FLEXIBLE CONNECTIONS BETWEEN TANK AND SKID ARE BY OTHERS.

P & ID FOR STANDARD BALANCED PRESSURE PROPORTIONING PUMP SKID



"R'

"K"

NOTES:

- 1. All field connections, with the exception of the water/foam solution connection at the ratio controller, shall be flush with the edge of the base plate.
- 2. NF recommends a clear distance of 2 ft (609mm) on the pump end and 3 ft (914mm) on the drive end be allowed by the installer to facilitate service/removal of the pump and motor.
- 3. A minimum of five pipe diameters of straight unobstructed pipe are required upstream and downstream of each ratio controller.
- 4. To facilitate future service/removal of RCW ratio controller, installer should provide a spool piece upstream of the controller. See below for minimum spool piece lengths (See Detail B).

Ratio	Minimum Spool				
Controller	Length				
3"					
4"	10" (254)				
6"	12" (305)				
8"					

- 5. Module size is based on largest RCW.
- 6. Drawing dimensions, pump and motor capacities noted are for 3% systems. Contact National Foam Engineering Dept. for details on 6% systems and options.
- 7. Charts 1 & 2: (M) - Proportioning to mid-range
 - (F) Proportioning over full-range
- 8. Pump suction and return to tank field connections will be 150 lb FF flanges, as shown for the brass piped skids. Grooved victaulic connections will be used for the carbon steel piped skids. See Detail C.

NOTE: GRAY AREAS INDICATE OPTIONAL RATIO CONTROLLER





DETAIL A 2" RCT RATIO CONTROLLER 2" MALE NPT X 2" MALE NPT



DETAIL B RATIO CONTROLLER INSTALLATION 3" - 8"



DETAIL C SUCTION AND RETURN FIFLD CONNECTIONS CARBON STEEL PIPED SKIDS



SKID PAK TIE DOWNS



CHART 1 - BALANCED PRESSURE PROPORTIONING SKID DIMENSIONAL CHART - 3% PROPORTIONING (SEE NOTES 6 AND 7)																
R.C. Size	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"	"L"	"M"	"P"	"Q"	"R"	"S"	"U"
2	32-5/8	25	19-1/4	10	22	44	1-1/2	2	2	33-9/16	33-13/16	9	2-1/4	72	4-1/2	48
(51)	(453)	(635)	(489)	(254)	(559)	(1118)	(38)	(51)	(51)	(852)	(859)	(229)	(57)	(1829)	(114)	(1219)
3	32-5/8	25	19-1/4	10	22	44	1-1/2	2	3	33-9/16	33-13/16	2-7/8	1-11/16	72	4-1/2	50
(76)	(453)	(635)	(489)	(254)	(559)	(1118)	(38)	(51)	(89)	(852)	(859)	(73)	(43)	(1829)	(114)	(1270)
4	32-5/8	27	20-3/4	11	24	48	1-1/2	2	4	33-9/16	33-13/16	3-3/16	1-31/32	72	5-1/2	51-1/2
(102)	(453)	(686)	(527)	(279)	(610)	(1219)	(38)	(51)	(102)	(852)	(859)	(81)	(50)	(1829)	140	(1308)
6 (M)	32-5/8	27	20-3/4	11	24	48	1-1/2	2	6	33-9/16	33-13/16	4	2-3/8	72	6-1/2	53
(152)	(453)	(686)	(527)	(279)	(610)	(1219)	(38)	(51)	(152)	(852)	(859)	(102)	(60)	(1829)	(165)	(1346)
6 (F)	44-1/8	29	20-1/2	11-5/8	24	52	1-1/2	2-1/2	6	45-1/16	45-9/16	4	2-3/8	72	6-1/2	65
(152)	(1121)	(737)	(521)	(295)	(610)	(1321)	(38)	(64)	(152)	(1145)	(1157)	(102)	(60)	(1829)	(165)	(1651)
8 (M)	44-1/8	29	20-1/2	11-5/8	24	52	1-1/2	2-1/2	8	45-1/16	45-9/16	4-1/4	2-1/2	72	7-1/2	67-5/16
(203)	(1121)	(737)	(521)	(295)	(610)	(1321)	(38)	(64)	(203)	(1145)	(1157)	(108)	(64)	(1829)	(191)	(1710)
8 (F)	46-1/2	36	23-3/4	14	29-1/2	60	2	3	8	47-7/16	48-1/4	4-1/4	2-1/2	72	7-1/2	67-5/16
(203)	(1181)	(914)	(603)	(356)	(749)	(1524)	(51)	(89)	(203)	(1205)	(1226)	(108)	(64)	(1829)	(191)	(1710)

CHART 2 - (3%) RATIO CONTROLLER/PUMP/MOTOR CHART (SEE NOTES 6 & 7)						
Ratio Controller Size in (mm)	*(3%) Ratio Controller Solution Flow gpm (lpm)	Pump Capacity @ 200 psi gpm (lpm)	Motor Horsepower hp (kW)			
2	25 - 260	20	7-1/2			
(51)	(95 - 984)	(76)	(5.6)			
3	70 - 730	20	7-1/2			
(76)	(265 - 2763)	(76)	(5.6)			
4	60 - 1606	50	15			
(102)	(227 - 6079)	(189)	(11)			
6	106 - 3298	90	30			
(152)	(401 - 12484)	(341)	(22)			
8	760 - 5308	175	60			
(203)	(2877 - 20093)	(662)	(45)			

*Represents the overall flow range for all foam concentrates listed with respective ratio controller.

Refer to UL directory for specific flow range for each foam concentrate.



OPTIONS CHART						
Category	Standard	Optional Selection				
Working Pressure	200 psi (13.8 bar)	250 psi (17.2 bar)				
Special Finishes	Epoxy Coated - Red	Per Customer Requirements, All Colors				
Piping Materials	Brass	Stainless Steel 304 or 316, 90/10 CuNI				
Customer Connection Points	All Flanged	Flanged/Grooved, Threaded				
Pumps (Positive-Displacement)	Bronze Gear-Type	N/A				
Pump Drivers	Electric Motor	Diesel Engine w/ Fuel Tank, Water Motor				
Electric Motor Enclosures	ODP	TEFC, EX Proof, IEEE				
Electric Motor Voltages	3/60/460 VAC	3/60/230 VAC, 3/50/380 VAC, 3/50/415 VAC				
Pump Controller Types	Full Voltage	Full Voltage, Industrial Starter				
Pump Controller Accessories	None	Transfer Switches, Purge Systems, Releasing Panels				
Pump Controller Enclosures	Nema 2	Nema 4, Nema 4X, Ex Proof (Industrial Starters Only)				
Reserve Pump - Any Style	No	Yes				
Ratio Controller	Wafer Style	Flanged Style				
Ratio Controller Size (2, 3, 4, 6, 8")	Any Based on Pump Size	2, 3, 4, 6, 8 or Loose for Remote Mount				
Ratio Controller Proportioning %	3%	6%, 2%, 1%-6% Metering Valve				
Additional Ratio Controllers	No	Yes				
Valve Types	Full Port Ball Valves w/ Lockable Handles	Globe, Gate, Butterfly				
Valve Actuation	Manual	Electric, Pneumatic, Water Powered				
Valve Supervision	Visual/Lockable	Tamper Switches				
Performance Supervision	Yes (NFPA)	Pressure Switches, Flow Meters, Transducers				
Inlet and Discharge Piping Spools	No	Yes				
Integral Foam Concentrate Tank	No	Yes				
Custom Designs to Customer Specs	No	Yes				
Additional Pumps	No	Yes				
Additional Motor Controllers	No	Yes-w/Automatic Transfer and Lockout				
CSA Special Inspection	No	Yes				

NOTE: Available options may change skid dimensions and weights

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