FOAM MIXERS

Positive displacement

The precise makeup of water and foaming agent to feed monitors and nozzles in fire fighting systems is of fundamental importance for the efficient performance of the same.
In the past this process has been performed mainly through system based onto the Venturi effect, which allows for sinplicity of construction and an acceptable performance, and used both in mobile and fixed systems like bladder tanks and automatic balanced pressure mixing systems.

When used in fixed systems the typical problems of the Ventury concept (sensitivity to pressure drops between mixer and monitors/nozzles) have often added up to problems connected to the system design.
As an example balanced pressure system require the foam agent to be supplied under pressure and therefore an electric line for a pump, while bladder tanks have forcibly a limit to the quantity of foam agent available this beeing a huge problem for those systems supposed or required from the circumstances to remain operative for extended time periods.

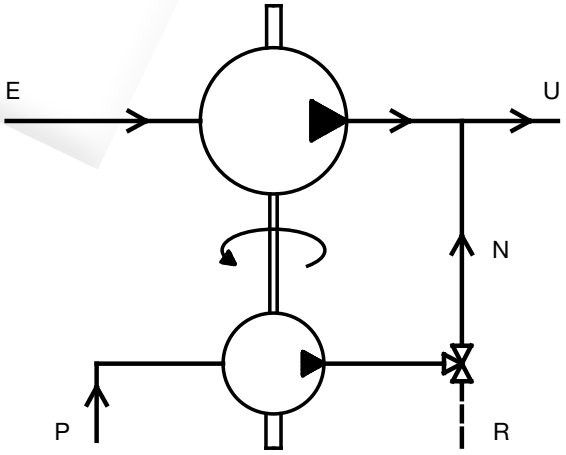
In recent years a more sophisticated concept has been developed, allowing for the make up of foam mix witha precise and constant percentage, while assuring the possibility to feed foam agent for indefinite periods of time, actually dependent only from the quantity of foam agent available.
These systems are based upon the use of volumetric pumps, that is pumps which push forward a precise quantity of liquid for each shaft revolution, and use a specific characteristics of those pump which are reversible machines this meaning they can be put in operation from a motor pumping liquid, or the can be made to turn from a liquid flowing through them and work as a motor using part of the energy of the liquid flowing through to supply mechanical energy and put another pump in operation.

It is then possible to use two volumetric pumps, whose capacity has the same percentage mix required, and use the larger one as a motor while being flown through from the water directed to the monitors to puth the smaller one in operation to pickup foam agent from a tank and inject the right percentage inside the output pipe of the first : this process does not require any other energy.
The concept was first applied on large machines consisting of two screw pumps, delivering large flows of foam mix in oil refineries and oil stock plants, with totally satisfactory performances and excellent servive life.
These machines, our URW models have noticable capacities and dimensions and require careful servicing from well trained personnel, which is possible in large dimension plants.

One of the best advantages of these machines is that, by the concept itself, they assure a precise mixing percentage over an extended range of capacities and this fits very well the requirements of smaller systems for general purpose applications.
This has led to the design of smaller size machines, always consisting of two cpupled volumetric pumps albeit of simpler design ans smaller dimensions.
In these machines the motive pump is generally a rotary blade pump, while the foam agent pump maybe a gear or a piston pump the latter allowing a variable percentage mix when possible to exclude one or more of the plungers.

The operating princliple is very simple and shown in the diagram below:

E	Main water inlet
U	main foam outlet
P	Foam agent pickup
N	Foam agent injection into main water line
R	Foam agent bypass for machine testing



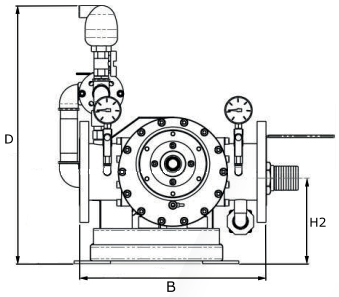
SDM employs experienced engineers in this sector, and offers a unique product range covering all application range, for both large machines based onto screw pumps and smaller machines working out of a rotary blade pump, as shown in the following pages.

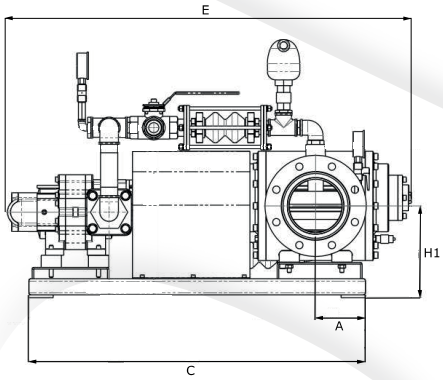
URY
Foam mixers built on the principle of a double volumetric pump was first introduced on large üplants like oil refineries or stocking fields, but was afterwards applied to different fields and on smaller plants thanks to the simplicity of use and dependable performances.
SDM manufactures a range of hese smaller mixers, with the URY series, whose performances are shown in the table below.

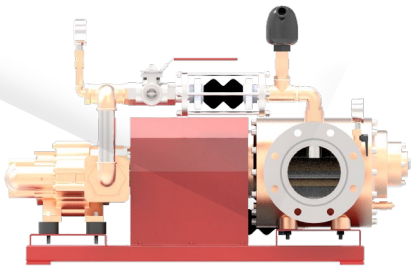
These machines are available with two different layouts, offering different performances for the foam agent pickup pump:
- Standard system, using a fixed capacity gear pump, with capacity range 1:5
- Optional system, with a variable capacity piston pump, with capacity range 1:10

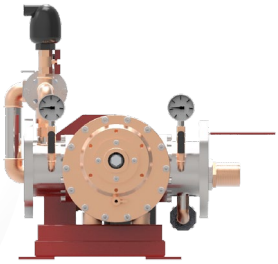
URY mixers, tanks to their limited dimensions and weight can easily be assembled onto a trailer and coupled to a foam agent tank for local use in emergency on large dimensions plants.

URY mixers are delivered complete with three-way valve for foam agent reciclying when the system is tested and pressure reading manometers at inlet and outlet of main water line.









Materials

Rotary vane pump	Body and rotor	Bronze
	Blades	Nylon
	Other parts	AISI 316 stainless steel
Gear pump	All parts	Cast iron
Piping, all bolts		Stainless steel AISI 316
Frame	All parts	Epoxy painted carbon ateel

Code	Capacity	Suction and discharge flange water			Foam inlet size	Dimensions (mm)						
	Lpm	DN	PN	150		A	B	C	D	E	H1	H2
URY A025 T5 XY	500 - 2500	100	16	4”	1 ½”	123	460	830	640	987	227	212
URY B025 T5 XY	250 - 2500	100	16	4”	1 ½”	123	460	830	640	987	227	212
URY A040 T5 XY	800 - 4000	125	16	5”	1 ½”	123	460	830	640	987	227	212
URY B040 T5 XY	400 - 4000	125	16	5”	1 ½”	123	460	830	640	987	227	212
URY A060 T5 XY	1200 - 6000	150	16	6”	2”							
URY B060 T5 XY	600 - 6000	150	16	6”	2”							
URY A080 T5 XY	1600 - 8000	200	16	8”	2 ½”							
URY B080 T5 XY	800 - 8000	200	16	8”	2 ½”							
URY A100 T5 XY	2000 - 10000	250	16	10”	3”							
URY B100 T5 XY	1000 - 10000	250	16	10”	3”							
URY A120 T5 XY	2500 - 12000	300	16	12”	4”							
URY B120 T5 XY	1200 - 12000	300	16	12”	4”							

SDM order code:
Ex.: URY **A**025 T5 **XY**

A = Pump type	**X** = Flange type	**Y** = Mixing %
A = Gear pump	**A** = ANSI	**3** = 3%
B = Plunger pump	**B** = UNI	**6** = 6%

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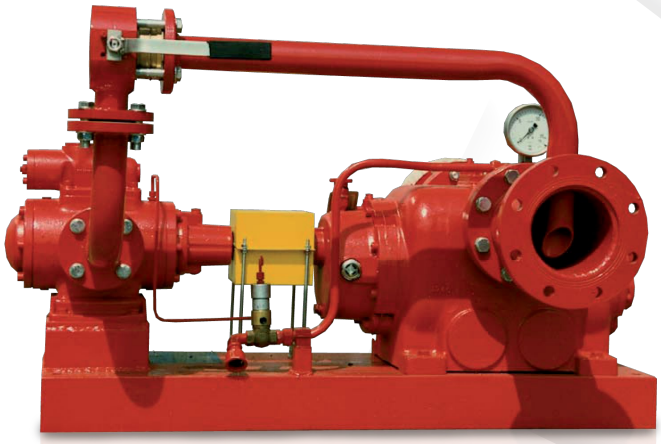
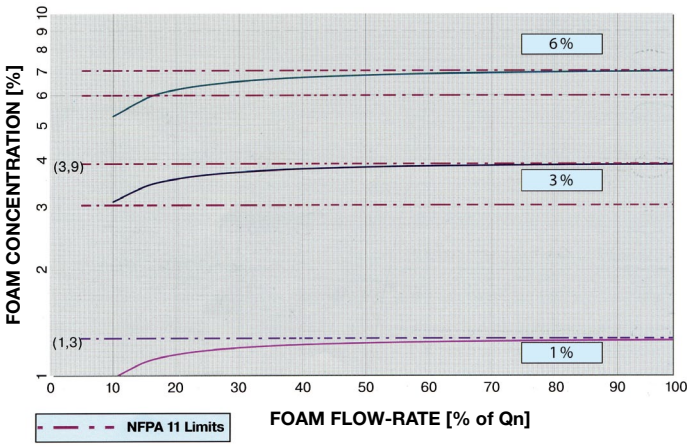


Typical performance



This is the most modern and precise type of proportioning equipment for large stationary systems, where it is required to maintain a stock of foaming agent available.

These machines have been developed to overcome limitations and disadvantages coming from the operation of bladder tanks, that is the following:

- Limited operation time, once used the foaming agent in the bladder tank the tank needs refilling
- Limited range of precise proportioning, typically lower than 1:5 in capacity range
- Costly and complicated maintenance, especially if tank placed inside a building

The machine concept is very simple, consisting in two volumetric (screw) pumps, the bigger one working as a motor makes use of the main water line pressure to rotate the smaller one, which injects the foaming agent under pressure into the main water line.
With this design the machine is self-powered and does not need any kind of additional energy.
A three way valve allows for the foam agent being injected in the main water line or alternatively being sent back to the foam agent tank when testing the system.

The mechanical (elastic) coupling between the two machines, which pump a precise liquid volume at each turn, assures a constant and precise proportioning for any given capacity value, in an operating range well over 1:10, which is unparalleled in the whole world market.

The sturdiness of the system and the very strong design of screw pumps assure the highest reliability year over year, even when the system is tested in operation every month.
In addition these machines assure the following advantages:

- System can work for unlimited time, foaming agent being supplied from any atmospheric pressure container, like trucks or even 200 litre barrels
- System works fine even at very little load, e.g. using one only monitor out of a group
- In a large plant one only foam agent stock can be built in a central location serving all systems
- Workers can supply foam agent away from the fire area, with lower risks
- The system is compliant with NFPA 11
- The machine can work with sea water

Materials

The materials used are resistant to the most common foam agents and allow the machine to be flushed with sweet water after testing.

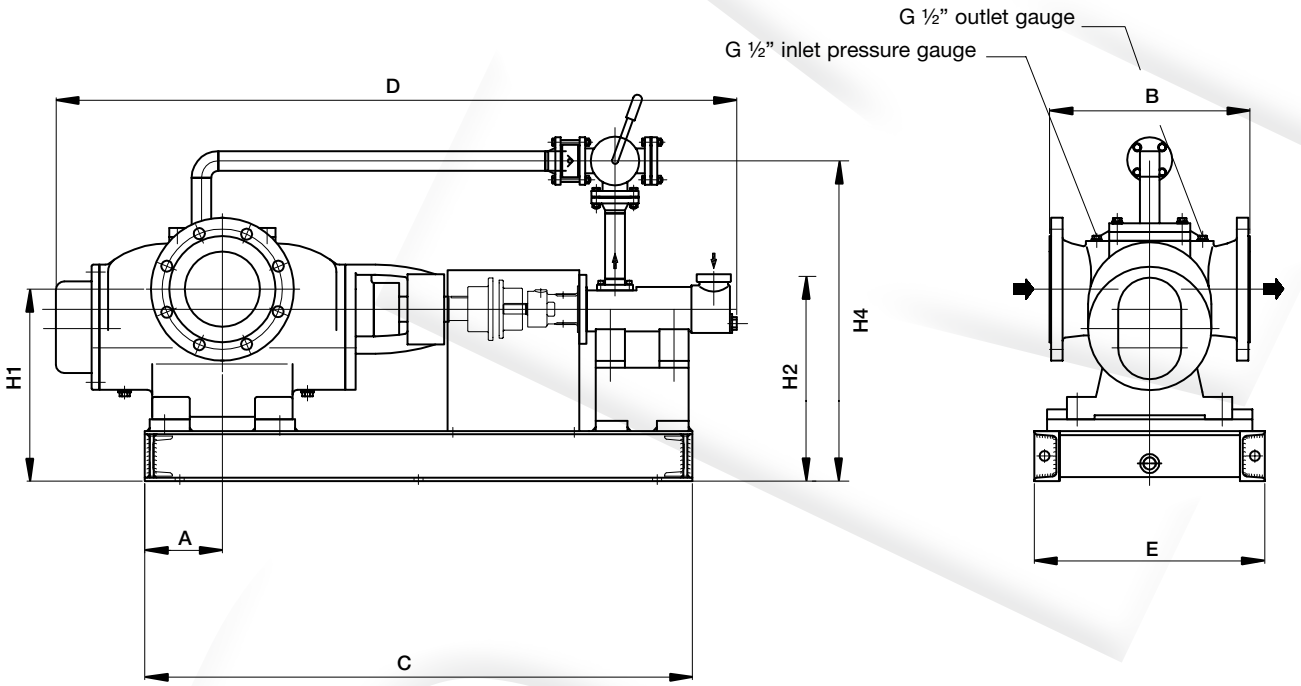
Drive motor

Body	Epoxy coated cast iron / Full bronze on small sizes
Idle rotor	Bronze
Drive rotor	Cr Stainless steel

Injection pump

Body	Cast iron GG25 with internal Teflon / Graphite coating
Rotors	Cr Stainless steel

Data for information purpose only
Not valid for construction



Code	Pump Size *	Pump Dimensions								Suction and Discharge Flange Water			Suction Flange Foamer	
		A	B	C	D	E	H1	H2	H4	DN	PN	150	RS	DN
URW 1203 G4SE	120.3	370	320	892	1115	170	316	358	574	100	16	4“	SAE 1 ¼”	32
URW 1206 G4SE	120.6	370	320	925	1155	170	316	358	574	100	16	4“	SAE 1 ¼”	32
URW 1503 G4SE	150.3	420	370	994	1249	195	371	403	615	125	16	5“	SAE 1 ¼”	32
URW 1506 G4SE	150.6	420	370	1071	1310	195	371	403	615	125	16	5“	SAE 1 ½”	40
URW 2403 G4SE	240.3	420	400	1079	1350	215	383	423	615	150	16	6“	SAE 1 ¼”	32
URW 2406 G4SE	240.6	420	400	1215	1476	215	383	433	615	150	16	6“	SAE 2”	50
URW 3003 G4SE	300.3	460	440	1222	1449	230	423	443	700	150	16	6“	SAE 1 ½”	40
URW 3006 G4SE	300.6	460	440	1281	1564	230	423	453	700	150	16	6“	SAE 2”	50
URW 3603 G4SE	360.3	460	460	1311	1604	250	423	468	820	200	16	8“	SAE 2”	50
URW 3606 G4SE	360.6	460	460	1330	1674	250	423	478	820	200	16	8“	SAE 2 ½”	65
URW 4503 G4SE	450.3	500	480	1401	1720	265	458	503	820	200	16	8“	SAE 2”	50
URW 4506 G4SE	450.6	500	480	1420	1790	265	458	513	820	200	16	8“	SAE 2 ½”	65
URW 6003 G4SE	600.3	550	520	1484	1887	280	483	553	850	250	16	10“	SAE 2 ½”	65
URW 6006 G4SE	600.6	550	520	1556	1955	280	483	563	850	250	16	10“	SAE 3”	80
URW 7503 G4SE	750.3	550	550	1500	1914	280	478	568	850	300	16	12“	SAE 2 ½”	65
URW 7506 G4SE	750.6	550	550	1662	2067	280	478	593	850	300	16	12“	SAE 4”	100
URW 9003 G4SE	900.3	680	740	1657	2104	320	633	688	880	300	16	12“	SAE 2 ½”	65
URW 9006 G4SE	900.6	680	740	1819	2257	320	633	703	880	300	16	12“	SAE 4”	100

* ***Pump size***
The pump size figure shows both the maximum capacity and the mix percentage, eg:
120.3 = maximum capacity 120 cubic metres per hour (minimum capacity 12 cubic metres per hour) and mix percentage 3%