

Single FPS Station shown

Steam-Powered Condensate-Return Station FPS Station

Description

The GESTRA FPS Stations (Steam-Powered Condensate-Return Stations) are plug-in systems specifically designed to collect and pump hot condensate; commonly returned for use as boiler feedwater.

The FPS Station is available with either single, duplex or triplex pumps, mounted on a single base plate, that can be used for duty only or duty/stand-by applications.

Operated by steam, the FPS Station can be tailored to suit a wide range of condensate handling applications.

The standard pump (FPS Station) is manufactured from SG iron, although cast steel (FPS Station S) and stainless steel (FPS Station SS) versions are available on request as special order (ETO).

Please note:

1. Versions suitable for use with compressed air as the motive power and or other combinations are available as bespoke items. For further details contact your local GESTRA office or representative.
2. GESTRA FPS Stations are available in standard Single and Duplex sizes with EN flanged connections as shown in the following pages. Additionally, Triplex size (with capacity up to 18000kg/hr) as well as stations with ANSI/ASME flanged connections can be offered as special order (ETO).

Standards

The FPS Station fully complies with the requirements of the Pressure Equipment Directive (PED).

Please note that all the welding is in accordance with the requirements of PED.

Certification

This product is available with a declaration of conformity. For other certification requirements contact GESTRA.

Note: All certification/inspection requirements must be stated at the time of order placement. Retrospective certification/inspection may not be possible.

		Page
Single FPS Station	Sizes and pipe connections	3
	Materials	3
	Dimensions	4
Duplex FPS Station	Sizes and pipe connections	5
	Materials	5
	Dimensions	6

Approximate capacities

Unit size	Approximate maximum capacities (with 4 m lift) kg/h	
	Single FPS Station	Duplex FPS Station
DN25 (1")	1 300	
DN40 (1½")	2 000	4 000
DN50 (2")	4 000	8 000
DN80 x DN50 (3" x 2")	6 000	12 000

Note: Triplex size (with capacity up to 18000kg/hr) as well as stations with ANSI/ASME flanged connections can be offered as special order (ETO).

Pressure/temperature limits

Body design condition		PN16
Maximum receiver operating pressure		0.5 bar g
		FPS Station 13.8 bar g
Maximum motive inlet pressure (steam air or gas)		FPS Station S 13.8 bar g
		FPS Station SS 10.96 bar g
		FPS Station 16 bar g @ 120 °C
PMA	Maximum allowable pressure	FPS Station S 16 bar g @ 120 °C
		FPS Station SS 16 bar g @ 93 °C
		FPS Station 300 °C @ 12.8 bar g
TMA	Maximum allowable temperature	FPS Station S 300 °C @ 10.8 bar g
		FPS Station SS 300 °C @ 9.3 bar g
Minimum allowable temperature		0 °C
		FPS Station 13.8 bar g @ 198 °C
PMO	Maximum operating pressure	FPS Station S 13.8 bar g @ 198 °C
		FPS Station SS 10.96 bar g @ 188 °C
		FPS Station 198 °C @ 13.8 bar g
TMO	Maximum operating temperature	FPS Station S 198 °C @ 13.8 bar g
		FPS Station SS 188 °C @ 10.96 bar g
Minimum operating temperature		0 °C
Note: For lower operating temperatures consult GESTRA		
Designed for a maximum cold hydraulic test pressure of		24 bar g

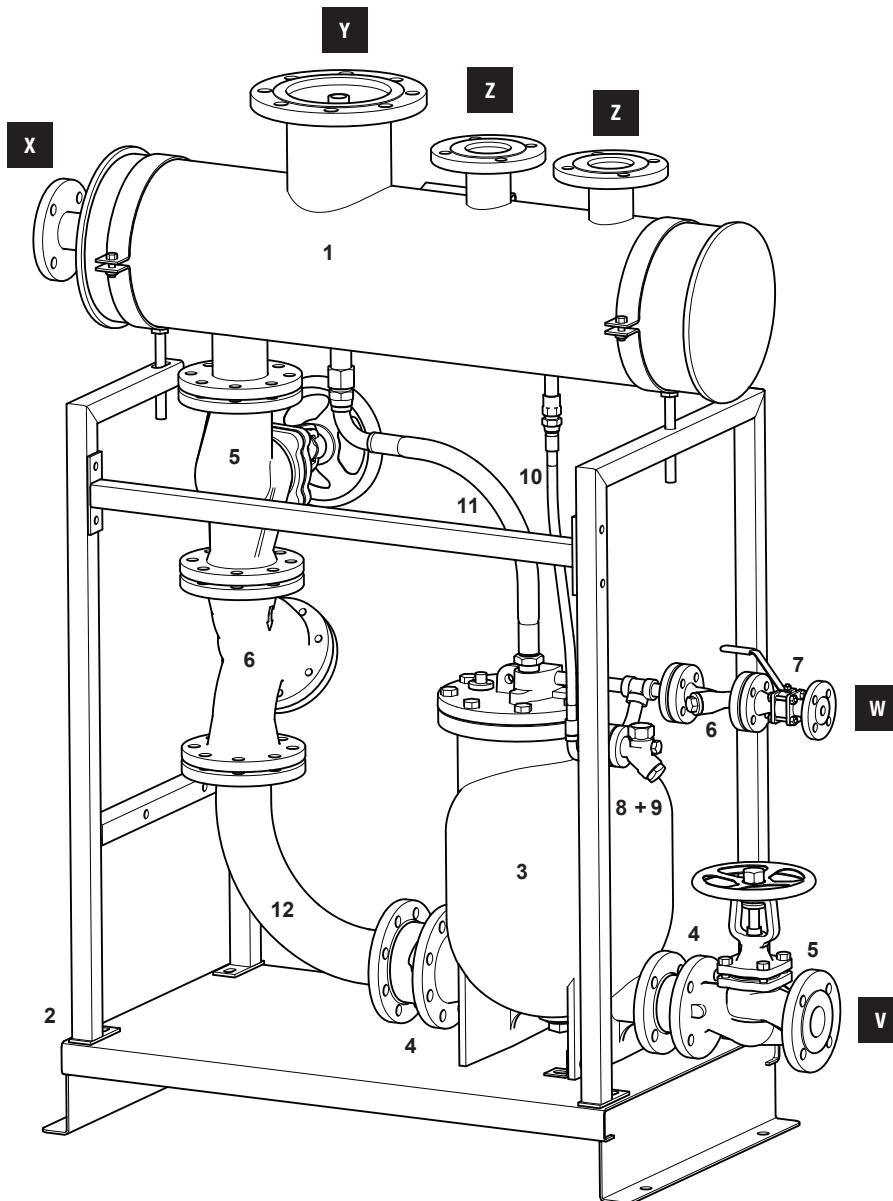
Single FPS Station

Sizes and pipe connections

Pump unit size	Pipe connection	V (Condensate out)	W (Motive)	X (Overflow)	Y (Vent)	Z (Inlet)
DN25 (1")	PN16	DN25	DN15	DN50 PN16	DN100	DN40
	ASME 150	1" ASME 150	½" ASME 150	2" ASME 150	4" ASME 150	1½" ASME 150
DN40 (1½")	PN16	DN40	DN15	DN50 PN16	DN100	DN40
	ASME 150	1½" ASME 150	½" ASME 150	2" ASME 150	4" ASME 150	1½" ASME 150
DN50 (2")	PN16	DN50	DN15	DN50 PN16	DN150	DN65
	ASME 150	2" ASME 150	½" ASME 150	2" ASME 150	6" ASME 150	2½" ASME 150
DN80 x DN50* (3" x 2")	PN16	DN50	DN15	DN50 PN16	DN150	DN65
	ASME 150	2" ASME 150	½" ASME 150	2" ASME 150	6" ASME 150	2½" ASME 150

* Pump unit has an inlet size of DN80, and an outlet size of DN50.

Note: ASME flanged versions are available as special order (ETO).



Materials

No	Part	Material
1	Receiver	Mild steel
2	Base plate and frame	Mild steel
3	Pump	SG iron
4	DCV10 check valve	Stainless steel
5	BSA2T isolation valve	SG iron
6	Fig 37 strainer	SG iron
7	M10S2 RB ball valve straight handle	Carbon steel
8	PC10 Quick-fit connector	Stainless steel
9	UTD30L thermodynamic steam trap	Stainless steel
10	Steam inlet drain trap flexible hose	Mild steel/ stainless steel
11	Exhaust flexible hose	Mild steel/ stainless steel
12	Pipework	Mild steel

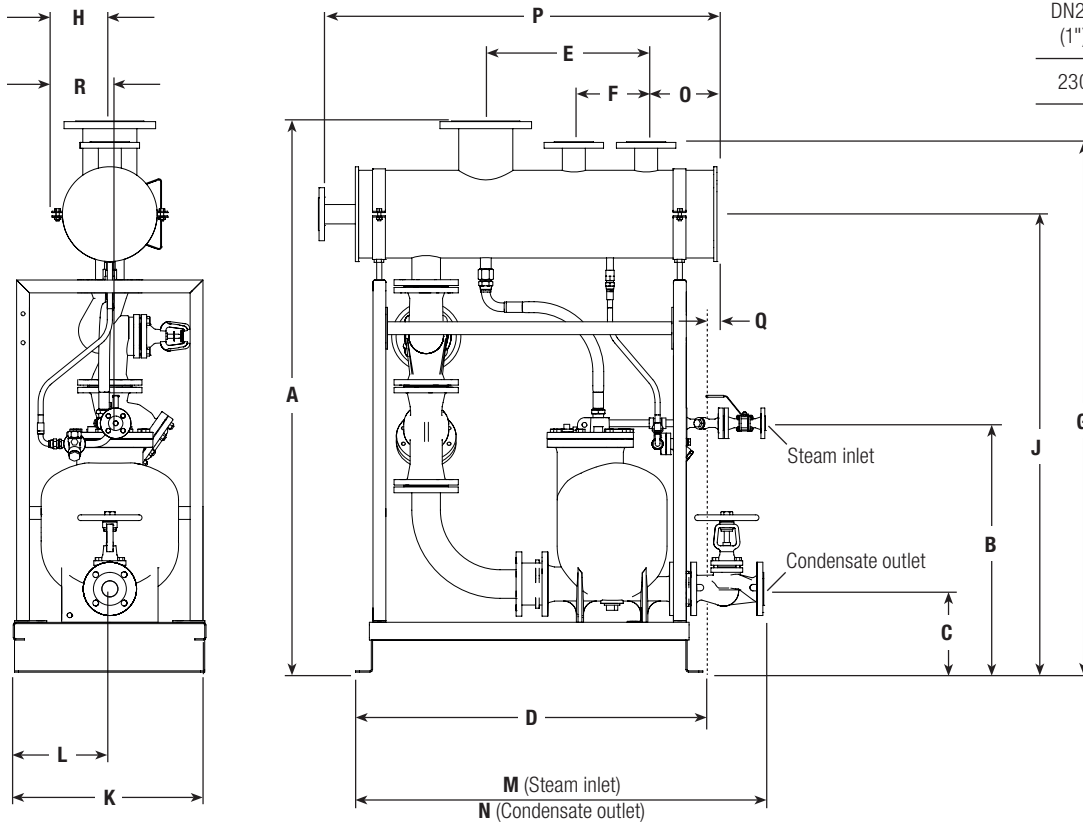
Single FPS Station

Dimensions (approximate) in mm

Unit size	Dimensions (mm)																			
	A	B	C	D	E	F	G	H	J	K	L	M		N		O	P	Q	R	
												PN16	ASME 150	PN16	ASME 150					
DN25 (1")	1380	645	223	1081	499	225	1316	300	1119	600	300	300	1158	1138	987	965	220	1240	42	318
DN40 (1½")	1401	665	235	1081	499	225	1337	300	1139	600	300	300	1158	1139	1036	1015	220	1240	42	318
DN50 (2")	1606	775	259	1081	499	225	1541	300	1316	600	300	300	1274	1254	1270	1257	220	1240	42	318
DN80 x DN50 (3" x 2")	1716	775	259	1081	499	225	1650	300	1425	600	300	300	1274	1255	1269	1261	220	1240	42	318

Weight (approximate) in kg

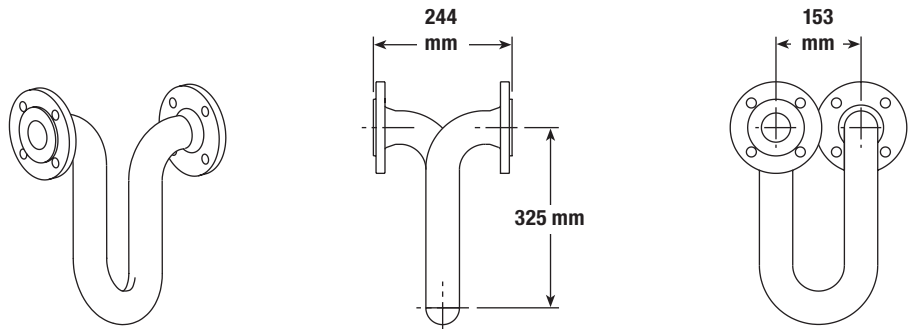
DN25 (1")	DN40 (1½")	DN50 (2")	DN80 x DN50 (3" x 2")
230	255	285	325



Recommended loop seal

A loop seal is recommended to be supplied and installed by customer.

Alternatively it can be supplied by GESTRA as a special order (ETO).

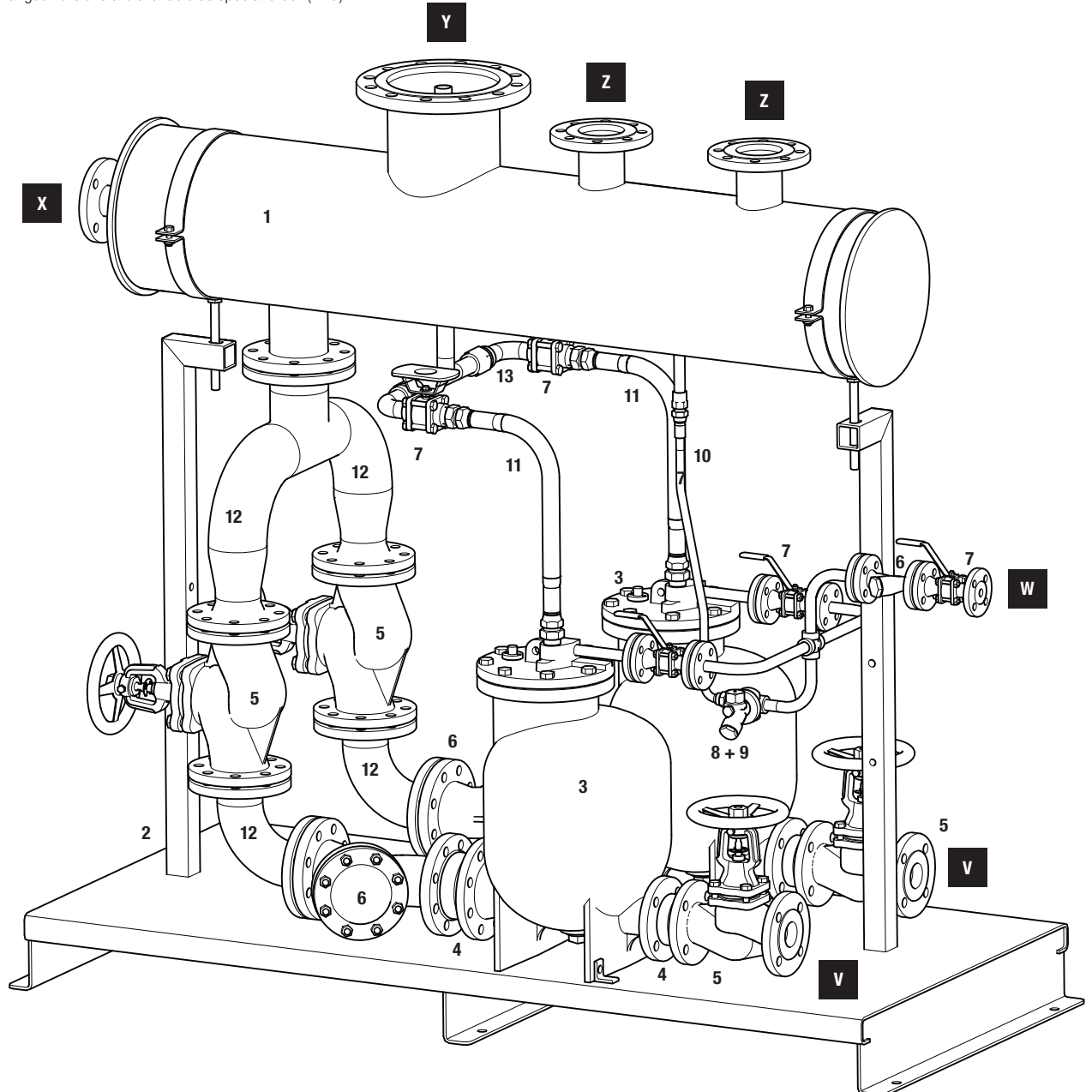


Duplex FPS Station

Sizes and pipe connections

Pump unit size	Pipe connection	V (Condensate out)	W (Motive)	X (Overflow)	Y (Vent)	Z (Inlet)
DN40 (1½")	PN16	DN40	DN15	DN50	DN150	DN50
	ASME 150	1½" ASME 150	½" ASME 150	2" ASME 150	6" ASME 150	2" ASME 150
DN50 (2")	PN16	DN50	DN15	DN50	DN200	DN65
	ASME 150	2" ASME 150	½" ASME 150	2" ASME 150	8" ASME 150	2½" ASME 150
DN80 x DN50 (3" x 2")	PN16	DN50	DN15	DN50	DN200	DN80
	ASME 150	2" ASME 150	½" ASME 150	2" ASME 150	8" ASME 150	3" ASME 150

Note: ASME flanged versions are available as special order (ETO).



Materials

No	Part	Material	No	Part	Material	No	Part	Material
1	Receiver	Mild steel	6	Fig 37 strainer	SG iron	10	Steam inlet flexible hose	Mild steel/ stainless steel
2	Base plate and frame	Mild steel	7	M10S2 RB ball valve with either oval or straight handle	Carbon steel	11	Exhaust flexible hose	Mild steel/ stainless steel
3	Pump	SG iron	8	PC10 Quick-fit connector	Stainless steel	12	Pipework	Mild steel
4	DCV10 check valve	Stainless steel	9	UTD30L thermodynamic steam trap	Stainless steel	13	DCV41 check valve	Stainless steel
5	BSA2T Isolation valve	SG iron						

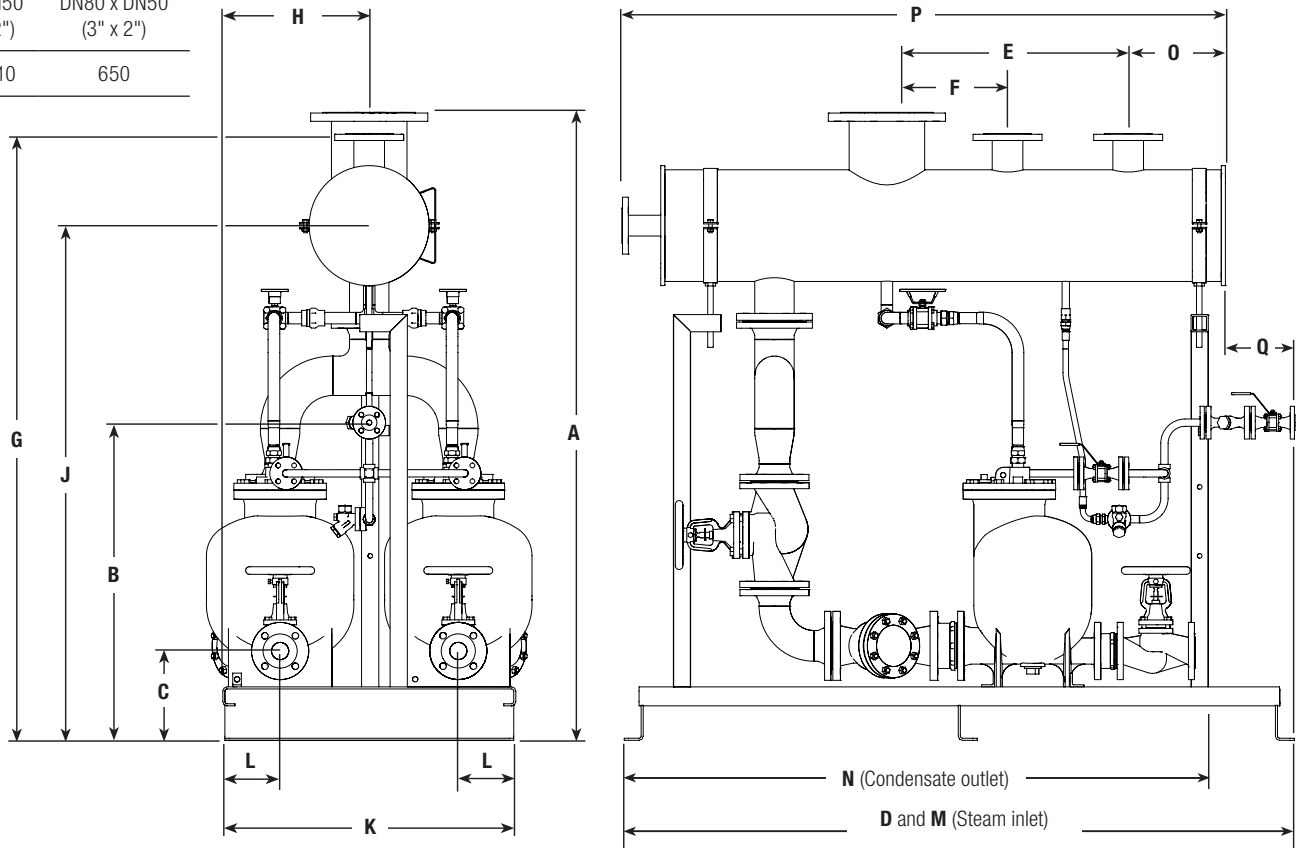
Duplex FPS Station

Dimensions (approximate) in mm

Unit size	Dimensions (mm)																	
	A	B	C	D	E	F	G	H	J	K	L	M		N		O	P	Q
													PN16	ASME 150	PN16	ASME 150		
DN40 (1½")	1504	820	236	1944	700	350	1454	425	1213	850	191	1816	N/A	1416	N/A	285	1496	328
DN50 (2")	1654	921	259	1944	700	350	1582	425	1316	850	172	1901	1870	1615	1603	287	1667	240
DN80 x DN50 (3" x 2")	1822	921	259	1944	700	350	1760	425	1493	850	167	1946	1940	1656	1694	282	1751	193

Weight (approximate) in kg

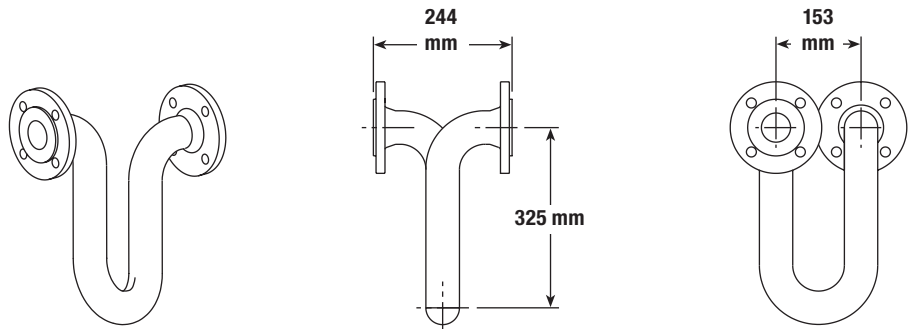
DN40 (1½")	DN50 (2")	DN80 x DN50 (3" x 2")
470	510	650



Recommended loop seal

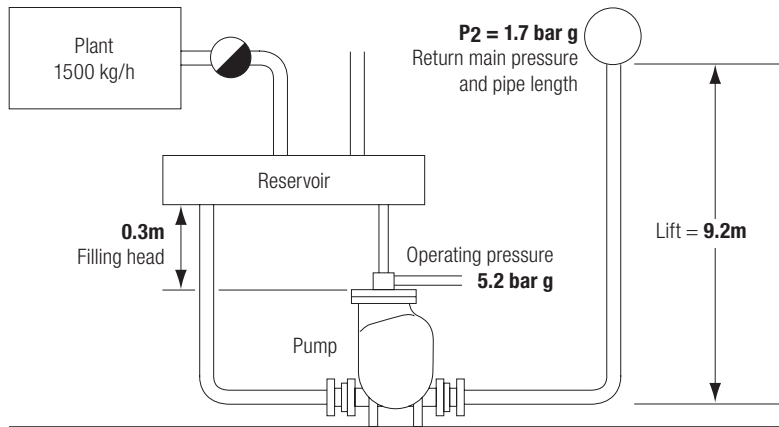
A loop seal is recommended to be supplied and installed by customer.

Alternatively it can be supplied by GESTRA as a special order (ETO).



How to size and select

Considering the inlet pressure, backpressure and filling head conditions, select the pump size which meets the capacity requirements of the application.



The known data

Condensate load **1500 kg/h**

Steam pressure available for operating pump **5.2 bar g**

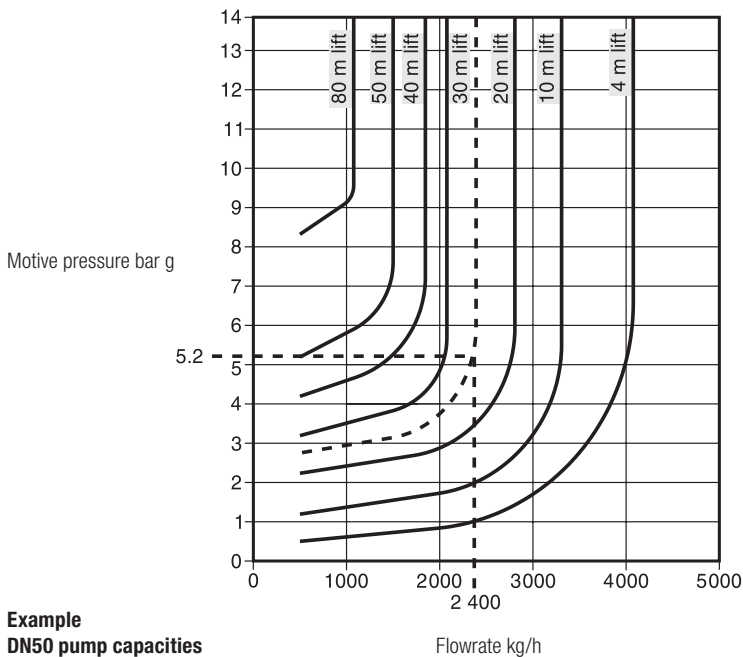
Vertical lift from pump to the return piping **9.2 m**

Pressure in the return piping (piping friction negligible) **1.7 bar g**

Filling head on the pump available **0.3 m**

Note: It is strongly recommended that the maximum motive/backpressure differential is between 2 - 4 bar g.

How to use the sizing chart



Example
DN50 pump capacities

Selection example

Firstly calculate the total effective lift against which condensate must be pumped.

Total effective lift is calculated by adding **vertical lift from the pump to return piping (9.2 m)** to the **pressure in the return piping (1.7 bar g)**.

To convert pressure in the return pipe into pressure head, divide it by the conversion factor of 0.0981:-

$$P_2 = 1.7 \text{ bar g} \div 0.0981 = 17.3 \text{ m Pressure head (lift)}$$

The total effective lift then becomes calculable :-

$$9.2 \text{ m} + 17.3 \text{ m}$$

The total effective lift is 26.5 m

Now that the total effective lift has been calculated, a pump can be selected by plotting the known data onto the graphs on page 8.

1. Plot a horizontal line from 5.2 bar g (Motive pressure).
2. Plot a line indicating 26.5 m lift.
3. From the point where the motive pressure line crosses the m lift line, drop a vertical line to the X axis.
4. Read the corresponding capacity (2400 kg/h).

The capacity charts shown are for single pumps. The capacities should be doubled or tripled to give the capacities of the duplex or triplex pumped packages.

Note:

The FPS Station packages are not supplied with a connecting condensate return manifold. Ideally each pump should have its own dedicated return line to a vented receiver or holding tank.

If the duplex pump returns are to be joined together to create a collective return line, care should be taken to ensure that it is adequately sized to accommodate the instantaneous discharge rate of all pumps discharging at the same time.

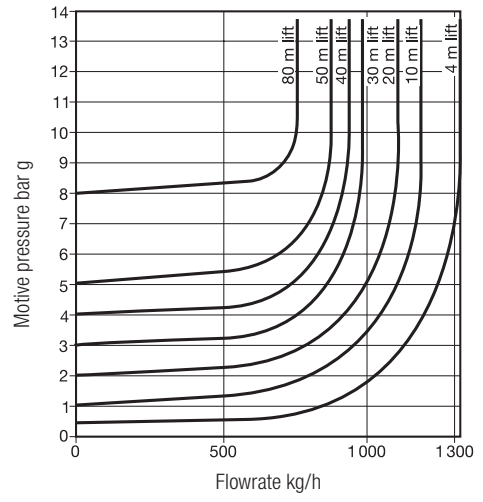
Failure to do this may result in reduced capacity of the packaged pump unit.

Capacities

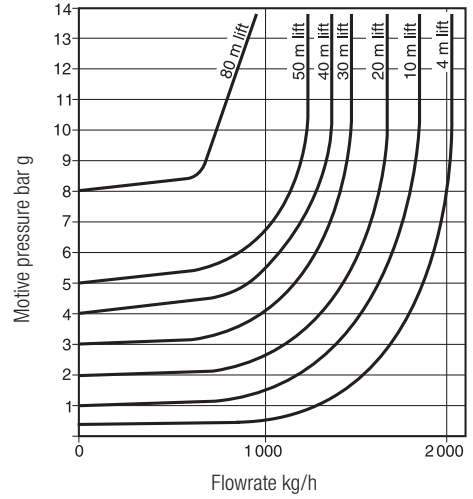
The capacity charts are based on a filling head of 0.3 m.

The lift lines represent the net effective lift (i.e. lift plus frictional resistance).

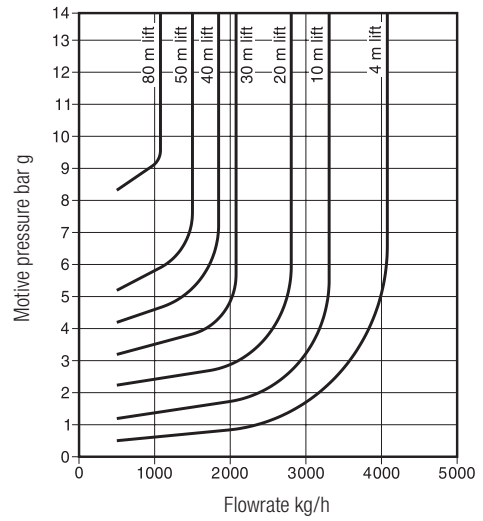
DN25 pump capacities



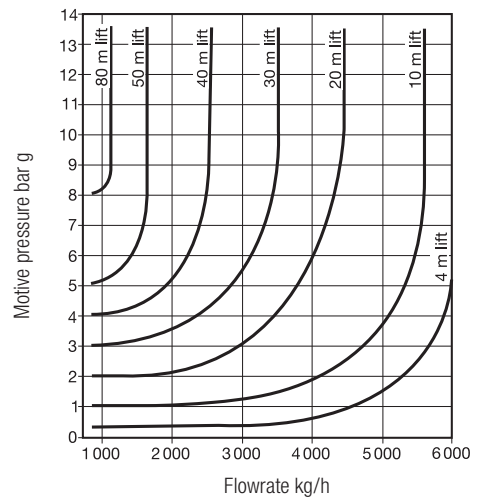
DN40 pump capacities



DN50 pump capacities



DN80 x DN50 pump capacities



Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions supplied with the unit.

Installation points to consider

As well as the returning condensate lines to and from the FPS Station, consideration should be taken to ensure that the receiver vent and overflow pipes can be fitted to the recommended guidelines. Details are shown within the installation and maintenance instructions.

Spare parts

For availability of spare parts contact GESTRA.

How to order

Example: 1 off GESTRA DN80 x DN50 Duplex FPS Station (Steam-Powered Condensate-Return Station).

How to specify

GESTRA FPS Station (Steam-Powered Condensate-Return Station) operated by steam to 13.8 bar g.

The complete system shall be supplied with a receiver designed to be compliant with the Pressure Equipment Directive (PED), and all welding in accordance with EN 287/288 BS EN Part 1 – 2004 and BS EN ISO 15614 Part 1 2004.

The whole system shall be supplied ready to fit with a base plate.

GESTRA AG

Münchener Straße 77, 28215 Bremen, Germany
Telefon +49 421 3503-0, Telefax +49 421 3503-393
E-mail info@de.gestra.com, Web www.gestra.com

