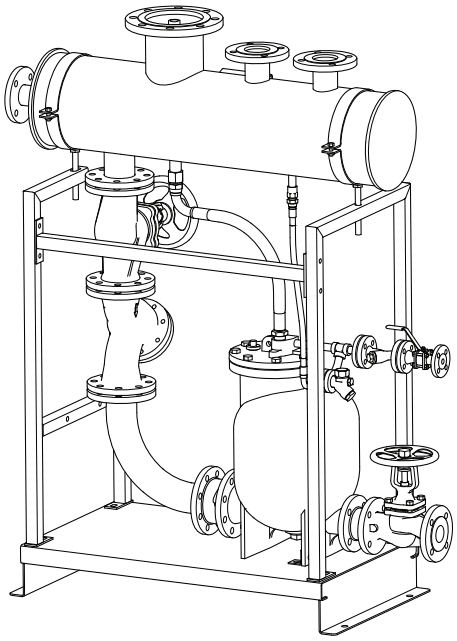


Single FPS Station shown

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 availabe 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")	1300	
DN40 (1½")	2000	4000
DN50 (2")	4000	8000
DN80 x DN50 (3" x 2")	6000	12000

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

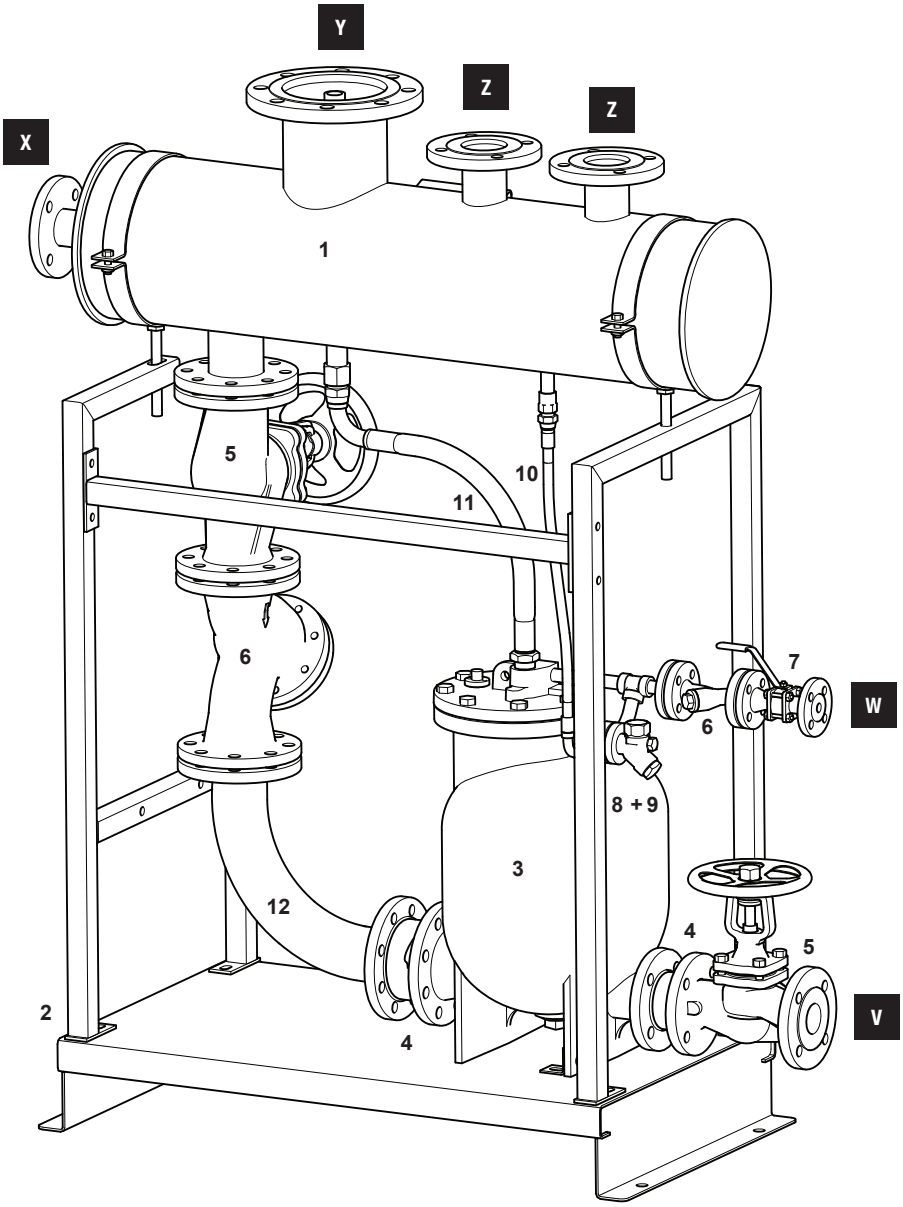
Single FPS Station

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

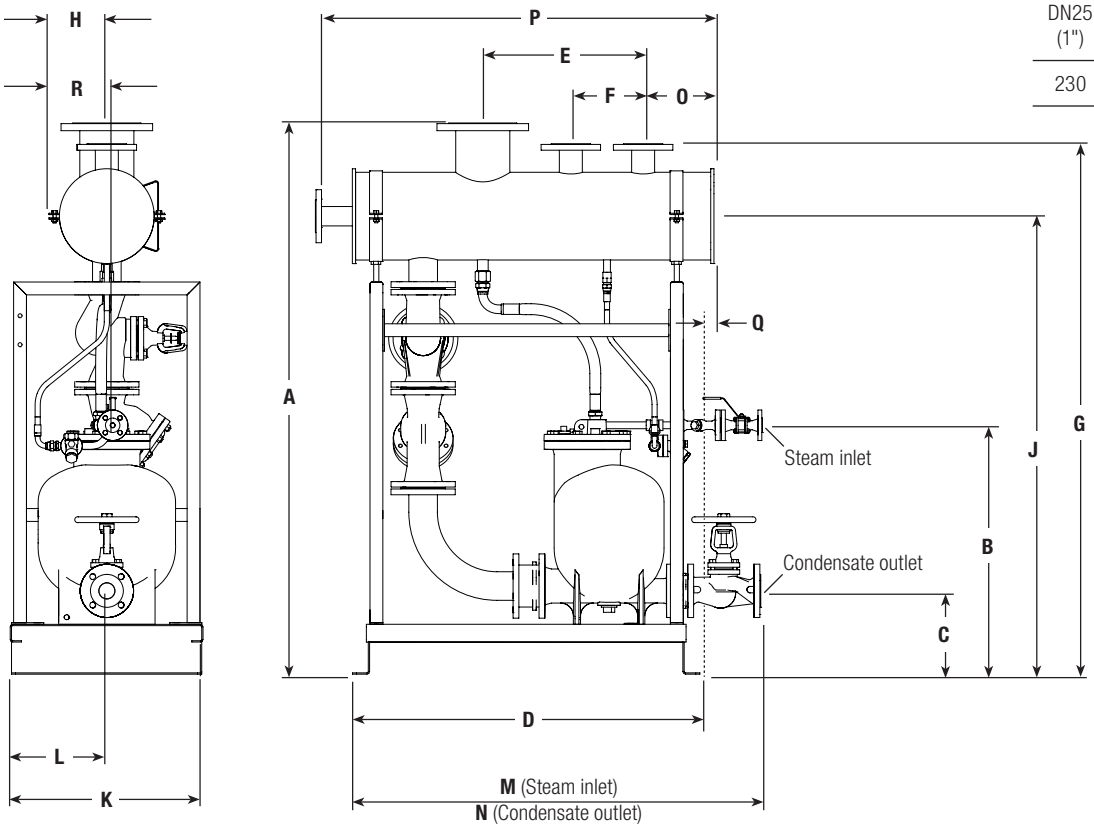
Single FPS Station

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")	1 380	645	223	1 081	499	225	1 316	300	1 119	600	300	1 158	1 138	987	965	220	1 240	42	318
DN40 (1½")	1 401	665	235	1 081	499	225	1 337	300	1 139	600	300	1 158	1 139	1 036	1 015	220	1 240	42	318
DN50 (2")	1 606	775	259	1 081	499	225	1 541	300	1 316	600	300	1 274	1 254	1 270	1 257	220	1 240	42	318
DN80 x DN50 (3" x 2")	1 716	775	259	1 081	499	225	1 650	300	1 425	600	300	1 274	1 255	1 269	1 261	220	1 240	42	318

Weight (approximate) in kg

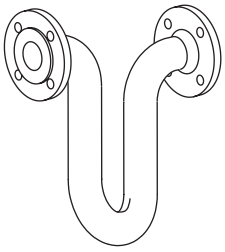
DN25 (1")	DN40 (1½")	DN50 (2")	DN80 x DN50 (3" x 2")
230	255	285	325

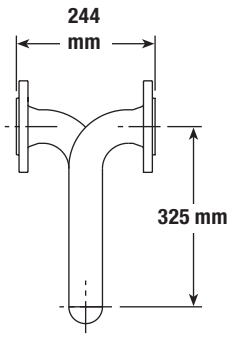


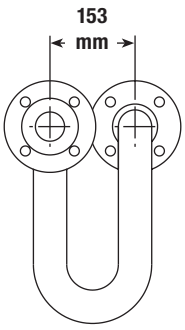
Recommended loop seal

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

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





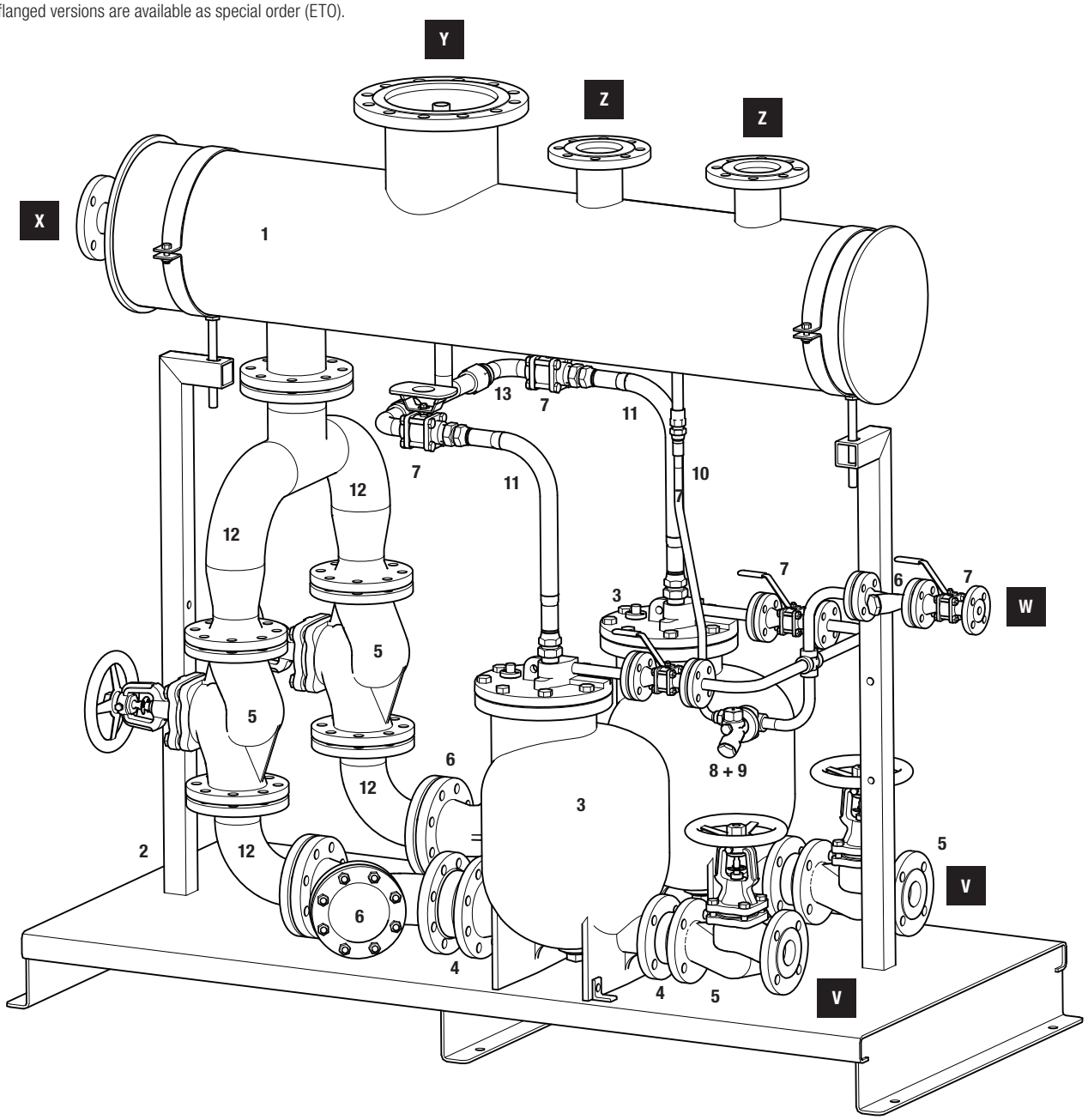


Duplex FPS Station

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
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

No	Part	Material
6	Fig 37 strainer	SG iron
7	M10S2 RB ball valve with either oval or straight handle	Carbon steel
8	PC10 Quick-fit connector	Stainless steel
9	UTD30L thermodynamic steam trap	Stainless steel

No	Part	Material
10	Steam inlet flexible hose	Mild steel/ stainless steel
11	Exhaust flexible hose	Mild steel/ stainless steel
12	Pipework	Mild steel
13	DCV41 check valve	Stainless steel

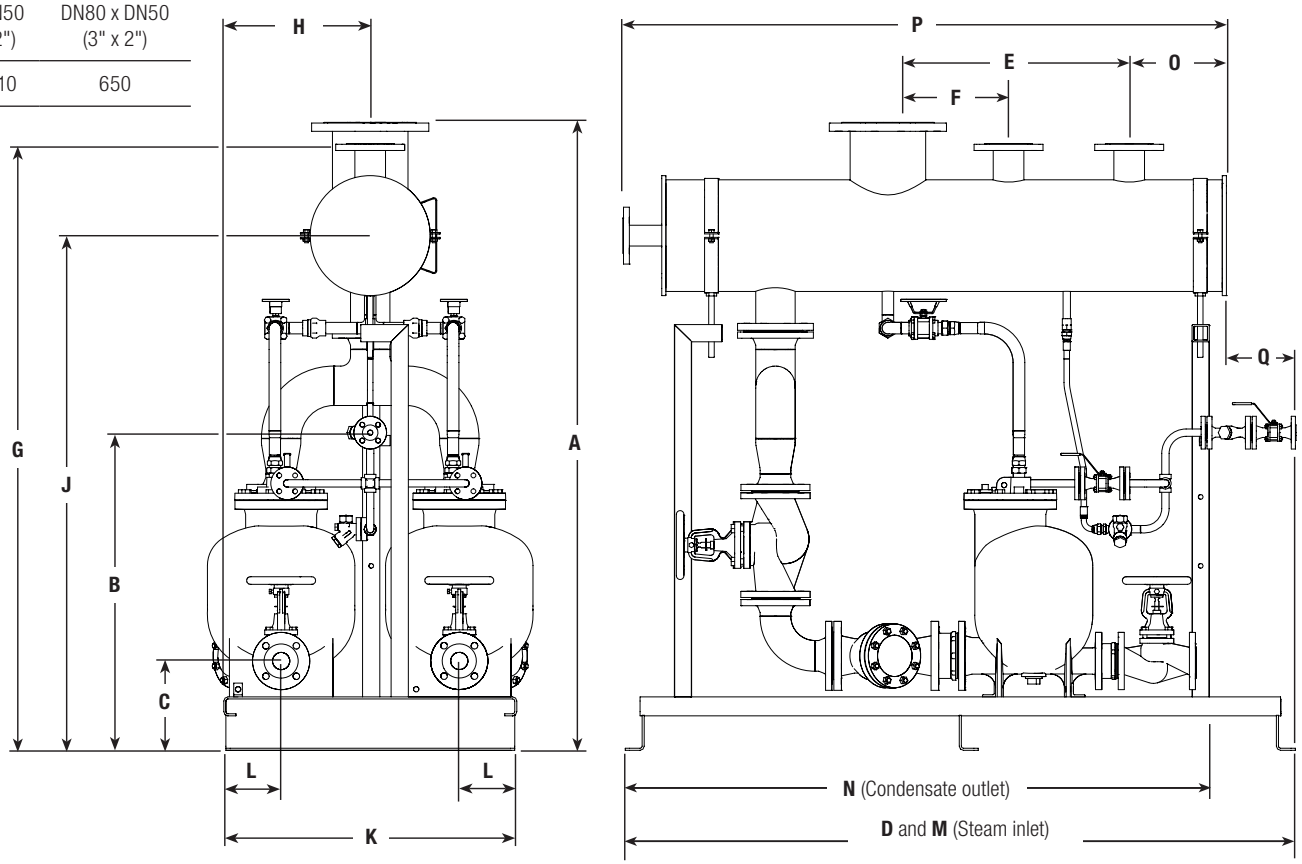
Duplex FPS Station

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")	1 504	820	236	1944	700	350	1 454	425	1213	850	191	1816	N/A	1416	N/A	285	1 496	328
DN50 (2")	1 654	921	259	1944	700	350	1 582	425	1316	850	172	1901	1870	1615	1603	287	1 667	240
DN80 x DN50 (3" x 2")	1 822	921	259	1944	700	350	1 760	425	1493	850	167	1946	1940	1656	1694	282	1 751	193

Weight (approximate) in kg

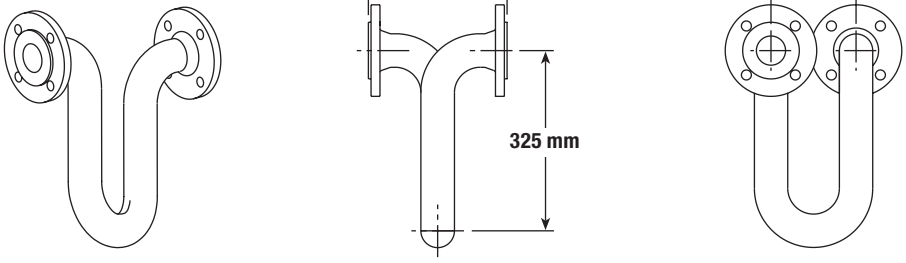
DN40 (1½")	DN50 (2")	DN80 x DN50 (3" x 2")
470	510	650



Recommended loop seal

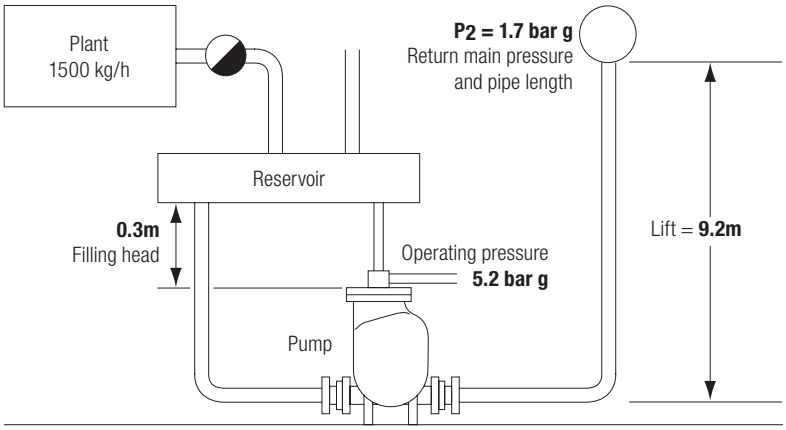
A loop seal is recommended to be supplied and installed by customer.

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

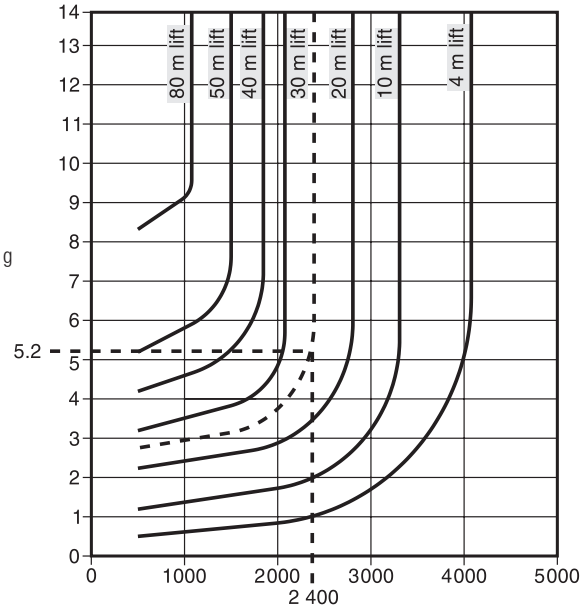


How to size and select

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



How to use the sizing chart



Example
DN50 pump capacities

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.

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 bar g ÷ 0.098 1 = 17.3 m Pressure head (lift)
The total effective lift then becomes calculable :-

9.2 m + 17.3 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.

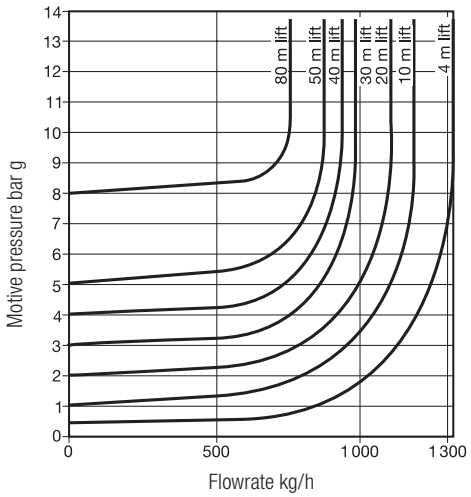
Failure to do this may result in reduced capacity of the packaged pump unit.

Capacities

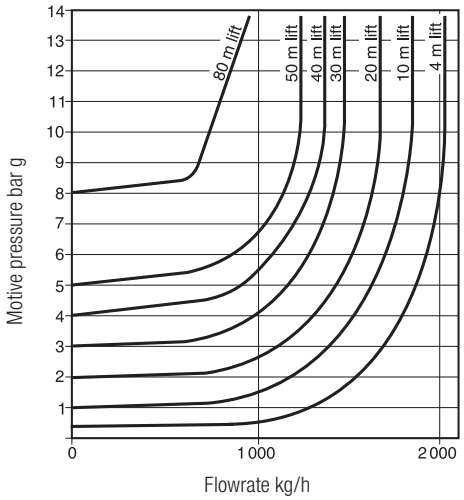
The capacity charts are based on a filling head of 0.3 m.

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

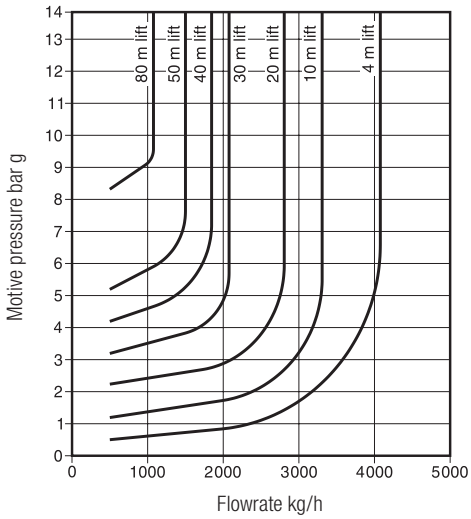
DN25 pump capacities



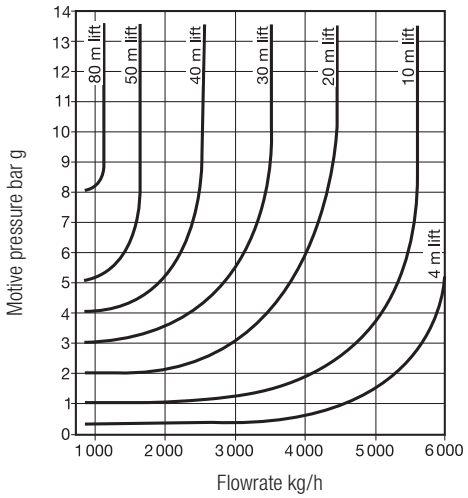
DN40 pump capacities



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.

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