



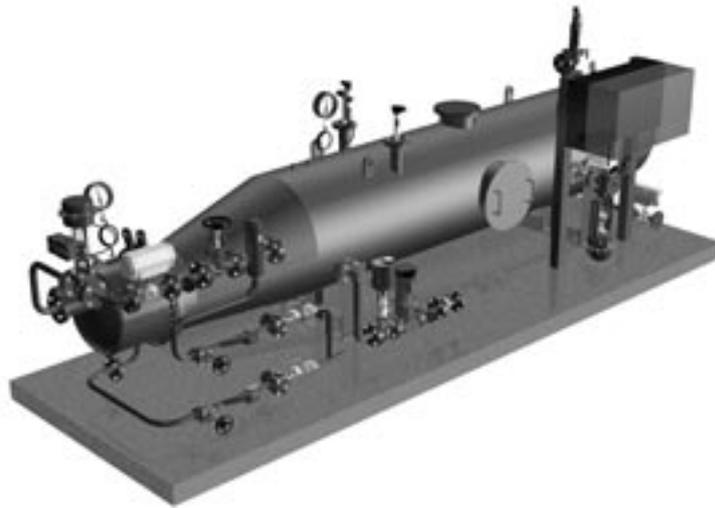
Cert. No. LRQ 0963008

ISO 9001

spirax sarco

TI-P486-03
 CH Issue 1

GVK Series (Steam-to-Steam) Clean Steam Generators



Description

Unfired clean steam generators with 'U' type extractable tube bundle and tank with 'kettle' type conical end.

The standard version is with the secondary side (clean steam side) completely in AISI 316 stainless steel, only the distributor (the cylindrical head is easily removable for maintenance) is in carbon steel.

Tubes are expanded on the tube sheet; on request welded tubes are available.

Pickling is the standard surfaces finishing.

The primary fluid (tube side) can be plant steam or superheated water; thermal oil is also usable.

The feedwater must be contamination free as more as possible, especially the specified ones for the application considered.

The pre-heating and deaeration of the feedwater is also suggested.

The quality of the generated steam depends on the complete generation system, not only on the generator; key factors are:

- Feedwater quality.
- Generation process (type of generator, materials, design).
- Efficiency of the steam drying system (reduction of the liquid entrainment).
- Management of the blowdown system (continuous/not continuous purging).
- Equipment.
- Distribution of the clean steam.

The best solution is defined by the single application.

The GVK generators are inclusive of all the connections for control and safety equipment necessary for the correct working of the system.

Design and manufacturing are in accordance to 'Raccolta VSR Revisione 1995 Edizione 99' code and to the Pressure Equipment Directive 97/23/CE - GVK Series, clean steam generators are **CE** marked.

The categorization is made considering only fluids from Group 2 (not dangerous fluids), according to Section 3.1 of the directive 97/23/CE.

GVK standard series models

There are standard available models as displayed on the selection table on page 5. However, special units can be designed for the specific requirements of a given process application. Please contact Spirax Sarco for further information.

Materials

Distributor (cylindrical head)	Carbon steel
Tube side flanges	Carbon steel
Tube sheet	Stainless steel AISI 316
Gaskets	Enforced graphite
Tube bundle	Stainless steel AISI 316
Tank	Stainless steel AISI 316
Shell side flanges	Stainless steel AISI 316
Saddles	Carbon steel
Ringbolts	Stainless steel AISI 316
Insulation (optional)	Rock wool + cover in stainless steel 304

Pressure/temperature limits

	Pressure (bar)	Temperature (°C)
Tube side	7	200
	12	220
	6	300
Shell side	7	200
	12	220

Connections

The clean steam outlet and safety valve connections (B2 and C1 - C2) will be selected on the basis of the working conditions.

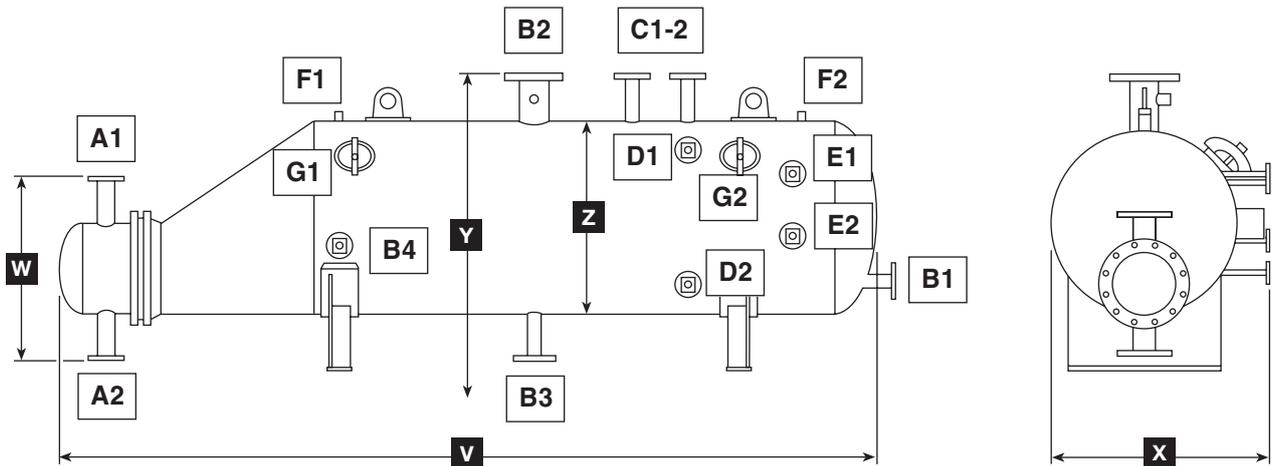
Connection	Description	Type
A1 - A2	Primary side inlet / outlet	Flanges UNI PN40
B1	Feedwater inlet	Flange UNI 2278/2229 PN16
B2	Clean Steam outlet	Flange UNI 2278/2229 PN16
B3	Blowdown (not continuous)	Flange UNI 6084/2229 PN40
B4	Purging (continuous blowdown for TDS control)	Flange UNI 6084/2229 PN40
C1 - C2*	Safety valve	Flange UNI 6084/2229 PN40
D1 - D2	Level indicator	Flange UNI 6084/2229 PN40
E1 - E2	Level control	Flange UNI 6084/2229 PN40
F1	Pressure gauge	Sleeve 1/2" gas
F2	Pressure indicator	Sleeve 1/2" gas
G1 - G2	Inspection opening	Inspection holes or hand passage

* **Please note:** A second safety valve can be supplied on request.

Model	A1-A2	B1	B2	B3	B4	C1-C2	D1-D2	E1-E2	F1-F2
GVK400	DN40	DN25	DN25÷125	DN25	DN20	DN25÷50	DN20	DN25	Holes Ø 1½"
GVK500	DN50	DN25	DN32÷150	DN25	DN20	DN25÷65	DN20	DN25	Hand passages 100 x 150 mm
GVK600	DN65	DN25	DN40÷200	DN25	DN20	DN25÷80	DN20	DN25	Hand passages 100 x 150 mm
GVK700	DN80	DN32	DN40÷200	DN25	DN20	DN25÷100	DN20	DN25	Hand passages 100 x 150 mm
GVK800	DN100	DN40	DN50÷250	DN25	DN20	DN25÷100	DN20	DN25	Hand passages 100 x 150 mm

Dimensions (approximate) in mm and weights in kg

Model	Y	V	X	Z	W	Weight Empty/Full of water	
						7 bar	12 bar
GVK401	750	2450	650	400	424	155/390	190/425
GVK402		3000				190/490	230/530
GVK403		3200				215/540	260/585
GVK501	850	2600	750	500	460	235/435	285/485
GVK502		3100				255/590	310/785
GVK503		3350				270/775	330/835
GVK601	970	2800	875	625	580	320/985	390/1050
GVK602		3300				380/1150	460/1230
GVK603		3570				410/1350	500/1440
GVK604		4300				445/1585	540/1680
GVK702	1050	3400	950	700	564	445/1310	510/1375
GVK703		3650				485/1560	560/1635
GVK704		4400				540/1870	620/1950
GVK802	1150	3600	1050	800	616	705/2050	810/2155
GVK803		3600				755/2350	870/2465
GVK804		4600				820/2680	940/2800



Dimensions (approximate in mm) and standard production* (in kg/h)
For the 'CSMK' which is the packaged system including a heat exchanger.

Model	Height	Width	Length	Standard Production
CSMK401	1 600	1 400	2 900	315
CSMK402	1 600	1 400	3 400	390
CSMK403	1 600	1 400	3 700	440
CSMK501	1 700	1 500	3 000	585
CSMK502	1 700	1 500	3 500	730
CSMK503	1 700	1 500	3 800	830
CSMK601	1 900	1 700	3 300	1 100
CSMK602	1 900	1 700	3 800	1 365
CSMK603	1 900	1 700	4 000	1 540
CSMK604	1 900	1 700	4 750	2 015
CSMK702	2 050	1 800	3 900	2 155
CSMK703	2 050	1 800	4 150	2 420
CSMK704	2 050	1 800	4 900	3 150
CSMK802	2 250	1 900	4 000	3 100
CSMK803	2 250	1 900	4 200	3 500
CSMK804	2 250	1 900	5 000	4 550

* Standard production is referred to as the following conditions:

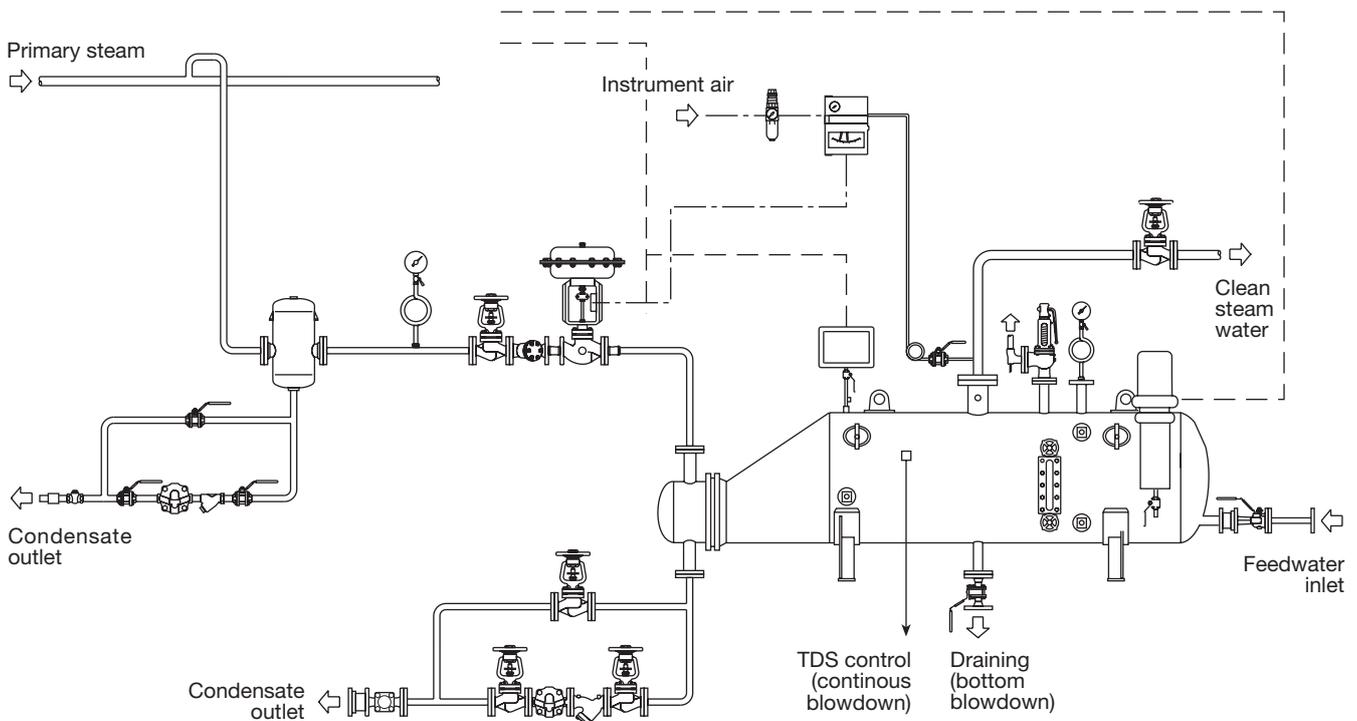
- Primary steam pressure: 9 bar g after the control valve;
- Clean steam pressure: 3 bar g;
- Feedwater inlet temperature: 85°C

Engineering drawings, including holding down details, will be provided after ordering 'for approval' and as 'final certified' (as built).

Control and operation

The generator can be controlled and regulated by either an electronic or a pneumatic control system.

The typical application shown illustrates a possible solution using a pneumatic control system



Safety information, installation and maintenance

For full details see the installation and maintenance instructions supplied with the unit.

Sizing and selection

Spirax Sarco has developed integrated thermal modelling, sizing and selection software to select, optimise and equip the correct unit. Trained technicians are available at your local Spirax Sarco company to ensure the correct solution. Because of Spirax Sarco's expertise and wide range of products we can provide complete clean steam solutions, advising on the most suitable control system and ancillary equipment for the unit.

Use the chart below to size steam-to-steam, clean steam generators which are available up to 6750 kg/h as standard.

Non-standard units are available to special order. Using superheated water or thermal oil as the primary supply and for case-by-case verifications, contact Spirax Sarco. Our technicians will suggest the correct solution that precisely matches your application needs.

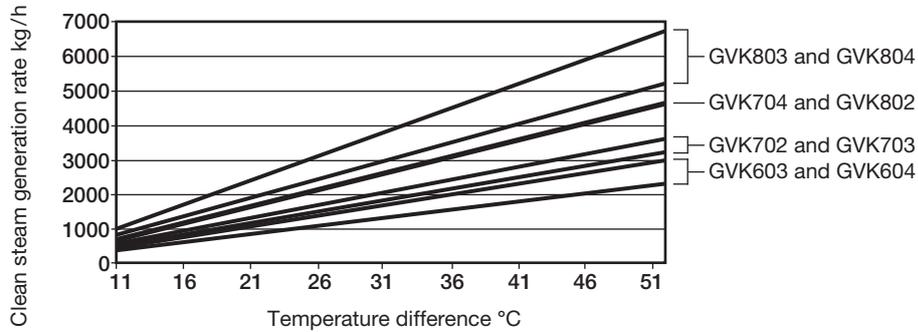


Fig. 1

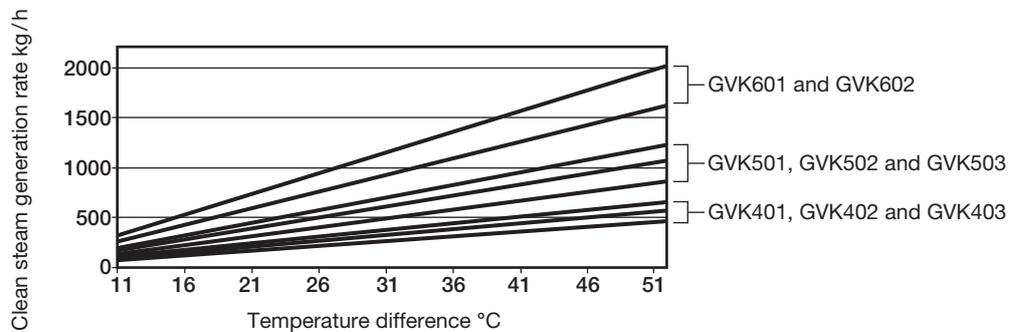


Fig. 2

How to size:

- Check the effective difference of temperature between primary steam (after the control valve) and clean steam generated.
- Check the feedwater inlet temperature and find the relevant corrective factor on Figure 3. Multiply it by the real clean steam flowrate (lines refer to a feedwater temperature of 85°C, variations from this condition will vary the production of the unit)
- On Figure 1 or Figure 2, draw a vertical line upwards from the effective difference of temperature (on the x-axis) to intersect the modified clean steam flowrate (on the y-axis).
- Choose the nearest model above the point of intersection on Figure 1 or Figure 2.

Corrective factor graphic for feedwater inlet temperature

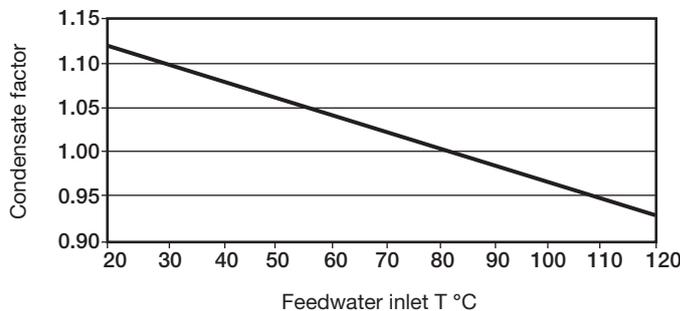


Fig. 3

Example: to generate 1000 kg/h of steam at 3 bar g (144°C) with primary steam at 7 bar g (171°C) after the control valve; with a feedwater temperature of 25°C:

- Temperature difference between 171°C and 144°C: 27°C
- From Figure 3. 25°C feedwater temperature means 1.11 as corrective factor
- The corrected clean steam flow is $1000 \times 1.11 = 1110$ kg/h
- On Figure 1 or Figure 2, draw a vertical line upwards from 27°C on the temperature difference scale to intersect 1110 kg/h on the generation rate line – the choice is between GVK602 and GVK603.

Select the model **GVK 603**

How to select

Clean steam generator	GVK = New unfired clean steam generator series	GVK
	40 = 400mm	
	50 = 500 mm	
Tank diameter	60 = 600 mm	40
	70 = 700 mm	
	80 = 800 mm	
Tube bundle nominal length	1 = 1 ÷ 4	1
	6 = 6 bar	
Design pressure tube side	7 = 7 bar	12
	12 = 12 bar	
Design pressure shell side	7 = 7 bar	7
	12 = 12 bar	

Selection example: **GVK** **40** **1** – **12** / **7**

How to order example:

1 off Spirax Sarco GVK401-12/7 clean steam generator.