



CSM-C

Steam

Compact Clean Steam Generator

Description

The CSM-C range of compact clean steam generators has been designed to provide steriliser grade clean steam from suitably treated water using plant steam as the heating medium and can be supplied with or without an integral feedwater pre-heating and degassing system.

The CSM-C range of generators covers steam outputs from 165 kg/h up to 640 kg/h at 3 bar g and each unit comes complete and ready to produce clean steam once connected to the available services.

All pressure components fully comply with the European Pressure Equipment Directive 2014/68/EU.

The generator vessel and all surfaces in contact with generated clean steam or treated feedwater are manufactured in AISI 316L stainless steel.

The unit is supplied as standard (base model) packaged in a compact non-enclosed mild steel frame fitted with mounting feet. Other standard features include a mild steel control cabinet, pneumatic control valves fitted to the primary (plant) steam supply side and a manual blowdown valve fitted to the bottom of the generator vessel. Standard options are available at an extra cost and are listed in the Technical data section.

Details of these costs are available from Spirax Sarco on request.

Applications

The CSM-C is suitable for a wide range of sterilising, humidification and process applications within the Healthcare, Food and Beverage, Pharmaceutical, Biotechnology and Electronics industries.

Principal features:

- Produces clean steam for sterilising and humidification processes using standard plant steam
- Fully assembled skid-mounted system (transportable)
- Microprocessor steam and feedwater control
- All clean steam and feedwater wetted parts in AISI 316L stainless steel
- Produces clean steam in accordance with HTM 2031 standards
- Sample points (optional)



Pipework connections

Connection	Type	Size
Plant steam inlet	Flanged PN16	DN50
Clean steam	Flanged PN16	DN50
Condensate return outlet	Flanged PN16	DN50
Condensate line drain	Flanged PN16	DN15
Feedwater	Flanged PN16	DN15
Vessel drain/blowdown	Flanged PN16	DN25
Air supply	Push fit for nylon tube	8 mm diameter
Safety valve discharge	Flanged PN16	DN50
Safety valve drain	Welded tube	½" diameter
Pre-heat tank overflow	Screwed tube	¾" gas
Test point*	Tri-clamp	1"

*Optional

Versions and outputs

Unit	CSM-CB (with pre-heat tank)			
Plant steam pressure	6 bar g	7 bar g	8 bar g	9 bar g
Clean steam flowrate at 3 bar g (maximum)	165 kg/h	220 kg/h	270 kg/h	320 kg/h

Unit	CSM-CD (with pre-heat tank)			
Plant steam pressure	6 bar g	7 bar g	8 bar g	9 bar g
Clean steam flowrate at 3 bar g (maximum)	330 kg/h	440 kg/h	540 kg/h	640 kg/h

Notes:

- Flowrates and pressures stated are based on pre-heated water temperatures of 80°C and allow for pressure drops across the steam inlet control valve. Each unit can provide clean steam at different flowrates and pressures, please contact Spirax Sarco for any special requirements.
- Figures for units supplied without pre-heat tank are also available from Spirax Sarco on request.

Steam pressure / temperature limits

Primary side (plant steam)	Maximum operating pressure	10 bar g
	Maximum operating temperature	184 °C
	Test pressure	21.7 bar g
Secondary side (clean steam)	Maximum operating pressure	5 bar g
	Maximum operating temperature	159 °C
	Test pressure	12.7 bar g

Materials

Part	Material
Pre-heat tank	Stainless steel AISI 316L
Vessel shell	Stainless steel AISI 316L
Heating coils (u-tubes)	Stainless steel AISI 316L
Frame	Mild steel, painted
Plant steam pipework	Mild steel, painted
Clean steam pipework	Stainless steel AISI 316L
Condensate pipework	Mild steel, painted
Feedwater pipework	Stainless steel AISI 316L
Vessel drain/blowdown pipework	Mild steel, painted
Safety valve discharge pipework	Stainless steel AISI 316L
Pipework insulation covers	Fireproof synthetic fibre jacket
Pipework insulation	Glass fibre

Technical data

	Compressed air: A 6 bar g compressed air supply is required; where this is unavailable an optional compressor can be supplied with the unit at extra cost (see standard options).
Pneumatics	Compressed air flowrate (Nm ³ /h)
	Air supply 5 bar g max 30
	Air supply 10 bar g max 54
Electrical requirements	Power supply: 400 Vac 3-phase + Neutral - 50 Hz (10 A per phase). A fused isolator must be incorporated in the supply line as near as possible to the unit.
	Installed load: Maximum 1.5 kW (intermittent).
Feedwater quality	To meet the requirements of HTM 2031, the use of de-mineralised or reverse osmosis feedwater is recommended.
	It is advised that analysis of the feedwater is undertaken prior to installation and commissioning.
Clean steam condensate	Whilst not mandatory, the Table below gives a guide to recommended typical values for contaminants present within the clean steam condensate.
	Property Maximum value
	Ammonium 0.2 mg/l
	Heavy metals substitute 0.1 mg/l
	Chloride 0.5 mg/l
	Nitrate 0.2 mg/l
	Sulphate 0.5 mg/l
	Residue on evaporation 30 mg/l
	Phosphate 0.1 mg/l
	Silicate 0.1 mg/l
	Pyrogens (bacterial endotoxins) 0.25 EU/ml
Electrical conductivity at 25 °C 35 µS/cm	

Technical data continued on next page

Technical data (continued)

	The unit is PLC controlled to regulate generator clean steam outlet pressure, generator water level and pre-heat tank water temperature and level.
Control panel	The unit is provided with a colour touch screen visual display to show alarms and other monitored and controlled parameters. The unit is also equipped with pulse output for fault conditions or general power failure.

	Control panel <ul style="list-style-type: none">- Communication protocol interfaces:- Profibus DP, OPC 232 Ethernet, Can Open, Device Net, Asi Net, Modbus- Analogical retransmission- Software packages for remote supervision- Alarm notification via SMS and/or e-mail
Standard options	Other equipment/features <ul style="list-style-type: none">- TDS analysis with manual blowdown valve- External compressor- Electric control valves- Steam sampling valve (EN285/HTM2031)- Protective side cover panels in mild steel- Frame, control panel cabinet and protective side cover panels in stainless steel AISI 304L- Frame fitted with transportation (handling) wheels- Automatic bottom blowdown valve (generator vessel)- Manual or automatic clean steam outlet valve

Note: TDS analysis is advisable when feedwater electrical conductivity is > 15 µS/cm

Safety information, installation and maintenance

For full details including spares information, refer to the Installation and Maintenance Instructions supplied with the unit.

Typical specification

Spirax Sarco compact clean steam generator CSM-CD (with pre-heat tank), designed and built to produce 640 kg/h of clean steam at 3 bar g to HTM 2031 (dependant upon feedwater) when supplied with plant steam at 9 bar g.

All items are to be pre-assembled and mounted on to a compact frame and accompanied with PED certification.

How to order

Example: 1 off Spirax Sarco CSM-CD compact clean steam generator.

Please provide details of primary steam pressure, clean steam pressure, clean steam flowrate and feedwater system.

Ancillary items (to be used depending on installation):

- Blowdown vessel and system
- Clean steam check valves
- Clean steam isolation valves
- Primary steam isolation valves
- Feedwater isolation valves
- Condensate isolation valves
- Clean steam and primary steam trapsets

For other items that may be required, please contact Spirax Sarco.

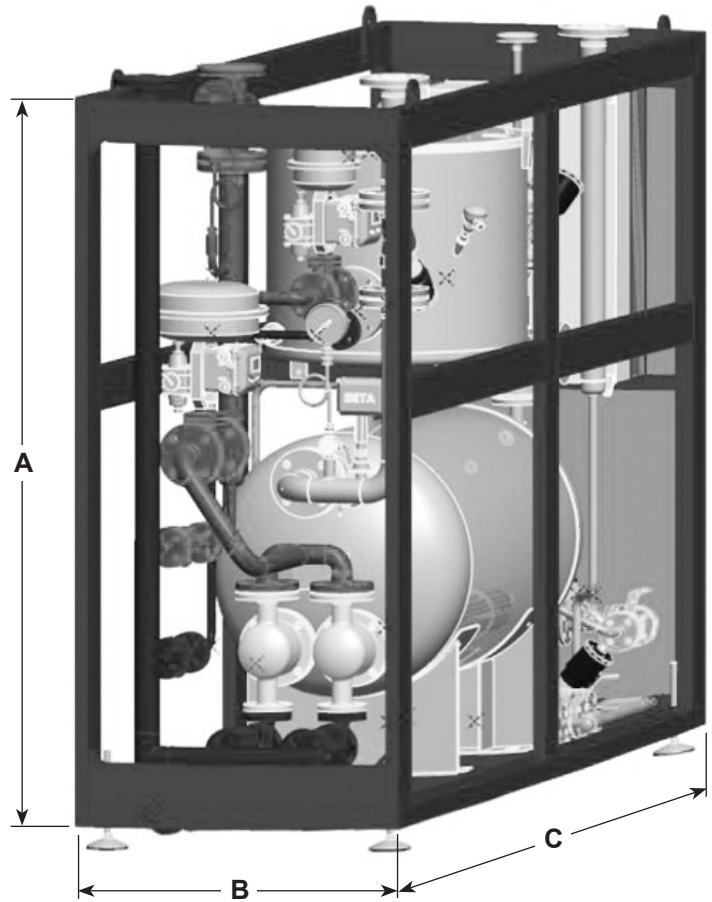
Dimensions/weights (approximate) in mm and kg

Top connections for:

- Plant steam
- Clean steam
- Safety valve vent
- Feedwater
- Condensate return

Unit	Dimensions (mm)			Weight (kg)	
	A	B	C	Dry	Wet
CSM-CA (without tank)	1880	790	2310	780	1340
CSM-CB (with tank)	1880	790	2310	800	1420
CSM-CC (without tank)	1880	790	2310	800	1400
CSM-CD (with tank)	1880	790	2310	850	1610

Please note: to allow for safe and comfortable working access, it is recommended that at least 1000 mm is kept clear of obstacles at the front and back of the unit.



Bottom connections for:

- Vessel drain/blowdown
- Safety valve drain
- Condensate line drain
- Air supply