



TI-P023-59
CMGT Issue 6

CS10-1

Stainless Steel Clean Steam Separator

Description

The CS10-1 clean steam separator has been designed in full accordance with the ASME BPE guide to overcome the issues of removing entrained moisture from clean and pure steam systems. It has also been designed with the feature of a removable baffle plate, allowing the unit to be fully inspected prior to installation and to facilitate system internal inspection.

Standard surface finish

Internal	0.5 µm (20 µin) Ra maximum/SF5 - as outlined in ASME BPE, with all welds ground and electropolished.
External	1.6 µm (63 µin) Ra maximum, with a satin bead blast finish.

Standards

This product has been designed in accordance with the ASME BPE guide.
It also complies with the requirements of the EU Pressure Equipment Directive/UK Pressure Equipment (Safety) Regulations.
All polymers used comply with FDA regulation CFR 21 part 177 section 2600.
½", ¾" and 1" sizes are available with USP class VI.

Certification

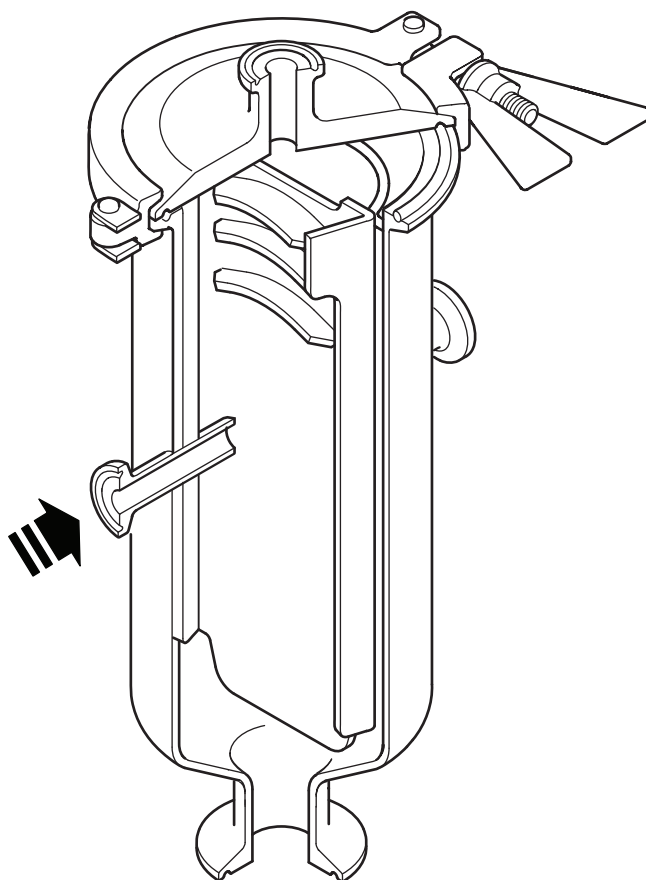
This product is available with the following certification:

- EN 10204 3.1 material certifications.
- Certificates of conformities.
- Passivation certificates.
- Welding certificates.
- Internal surface finish certificate.

Note: All certification/inspection requirements must be stated at the time of order placement.

Packaging

Packaging for this product is conducted in a clean environment, segregated from other non stainless steel products, and in accordance with ASME BPE for optimum protection and cleanliness; Connections of the product are fitted with protective caps before being sealed in a plastic bag.

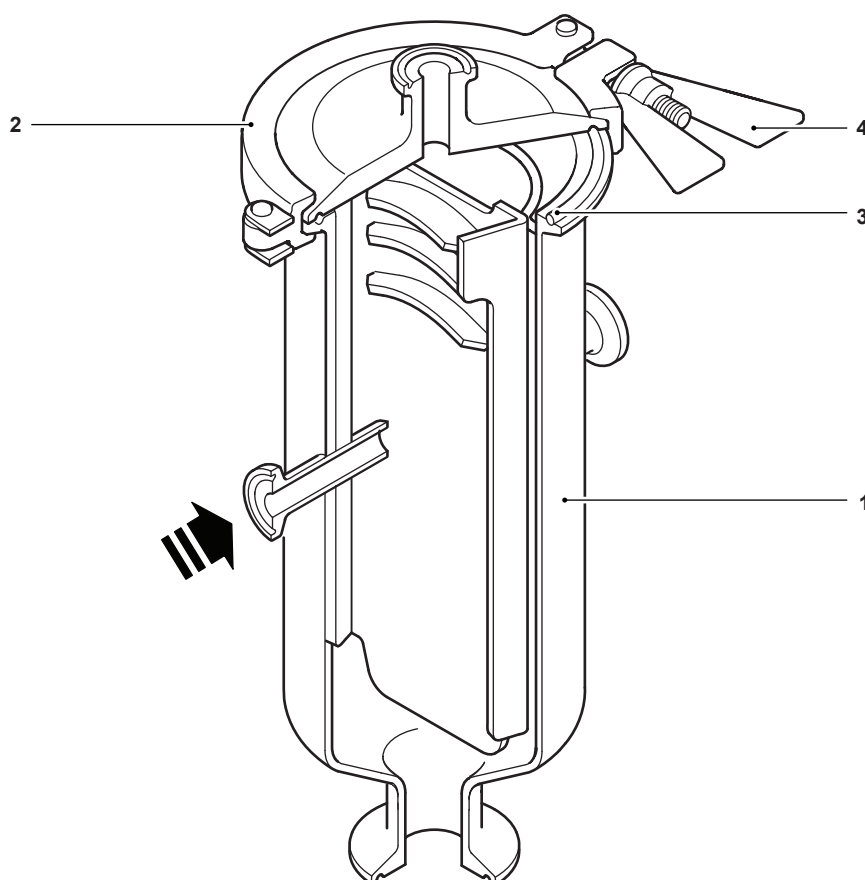


Sizes and pipe connections

	1/2", 3/4", 1", 1 1/2" and 2"
	Sanitary clamp ASME BPE (Sanitary Clamp) or
Steam inlet and outlet pipe	DIN 32676 upon request.
	Extended tube weld ends (ETO) ASME BPE or
	DIN 11850 upon request.
Drain	1" ASME BPE (Sanitary Clamp)
Vent	1/2" ASME BPE (Sanitary Clamp)

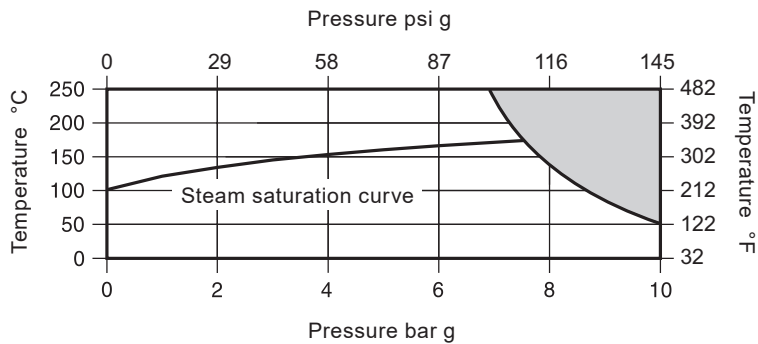
Note: Other connections are available upon request.

Materials



No.	Part	Material	
1	Body	Fabricated stainless steel	1.4404 316L
			1.4404 316L
			1.4404 316L
2	Cover + Baffle	Fabricated stainless steel	1.4404 316L
			1.4404 316L
3	Seal	Viton	
4	Clamp	Stainless steel	AISI 316

Pressure/temperature limits (ISO 6552)



 The product **must not** be used in this region.

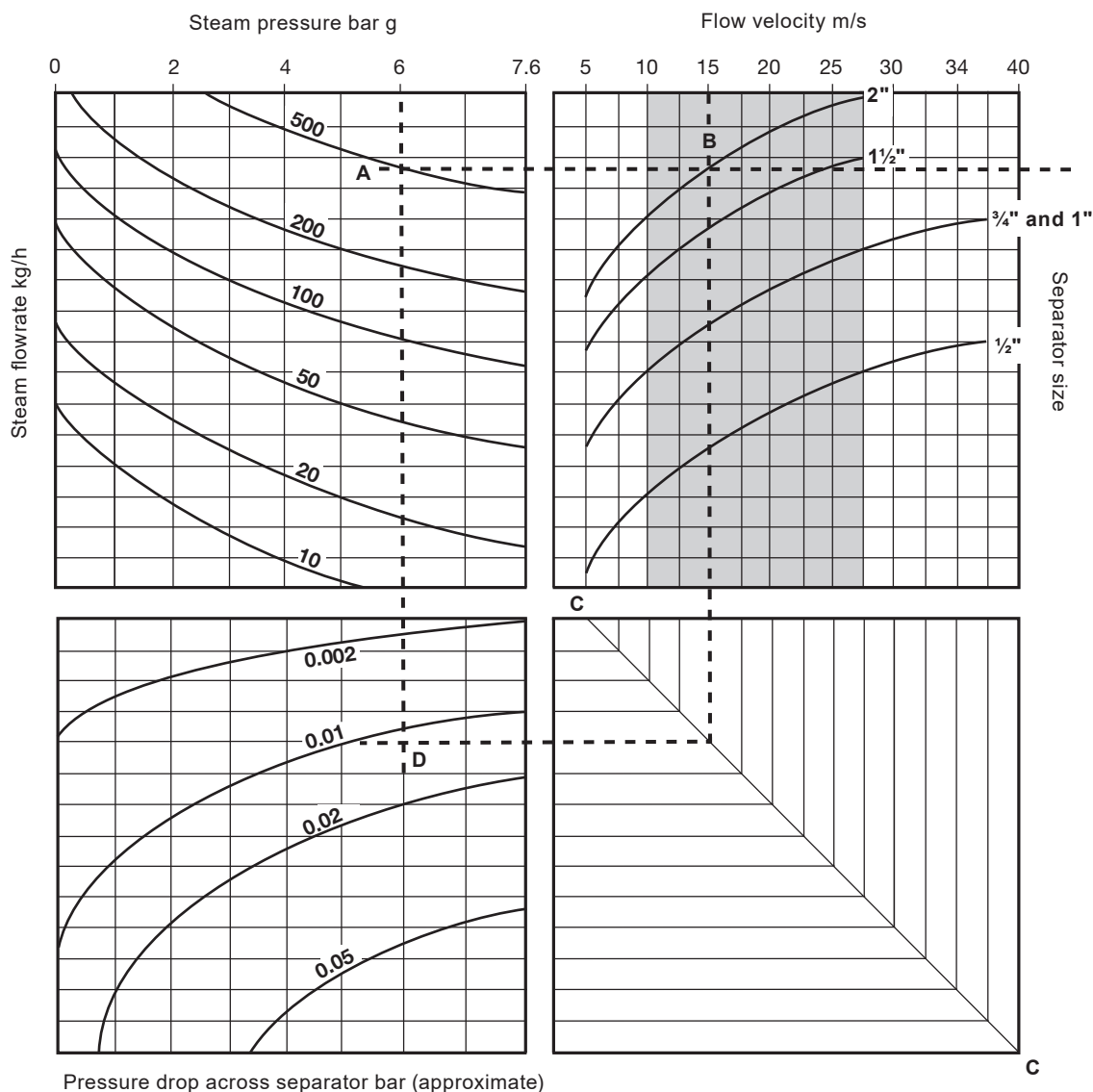
Note: For hygienic/sanitary clamp ends the maximum pressure /temperature may be restricted by the gasket or sanitary clamp used. Please consult Spirax Sarco.

Body design conditions			PN10
PMA	Maximum allowable pressure	10 bar g @ 50 °C	145 psi g @ 122 °F
TMA	Maximum allowable temperature	250 °C	482 °F
Minimum allowable temperature		-10 °C	14 °F
PMO	Maximum operating pressure for saturated steam service	7.6 bar g	110 psi g
TMO	Maximum operating temperature	250 °C @ 6.8 bar g	482 °F @ 99 psi g
Minimum operating temperature		0 °C	32 °F
Designed for a maximum cold hydraulic test pressure of		15 bar g	218 psi g

Steam sizing example - kg/h, bar g and m/s

The steam sizing example below has been based on imperial O/D tubing delivering 500 kg/h of steam at 6 bar g.

1. **Plot point A** where the steam pressure and flowrate cross, e.g. 6 bar g @ 500 kg/h: Draw a horizontal line.
2. **Select line size.** Any separator curve that is bisected by this line at a velocity **below 27 m/s** will operate at near 100% efficiency. For this example choose a 2" (DN50) separator, point B.
3. **Ascertain velocity.** Line velocity for any size can be determined by drawing a vertical line upwards from the point of intersection. From point B in this example the line crosses the velocity axis at 15 m/s.
Note: a velocity correction factor needs to be applied - Please refer to the correction factor table below.
For this example the velocity correction factor is 1.22 for a 2" imperial O/D tube therefore the velocity in this example would be 18.3 m/s.
4. **Pressure drop.** Where the line extended from point B crosses the line C – C, plot a horizontal line. Now drop a vertical line from point A. The point of intersection, D, is the pressure drop across the separator, i.e. approximately 0.012 bar.
5. **Separators should be selected on the basis of the best compromise between line size, velocity and pressure drop for each application.**

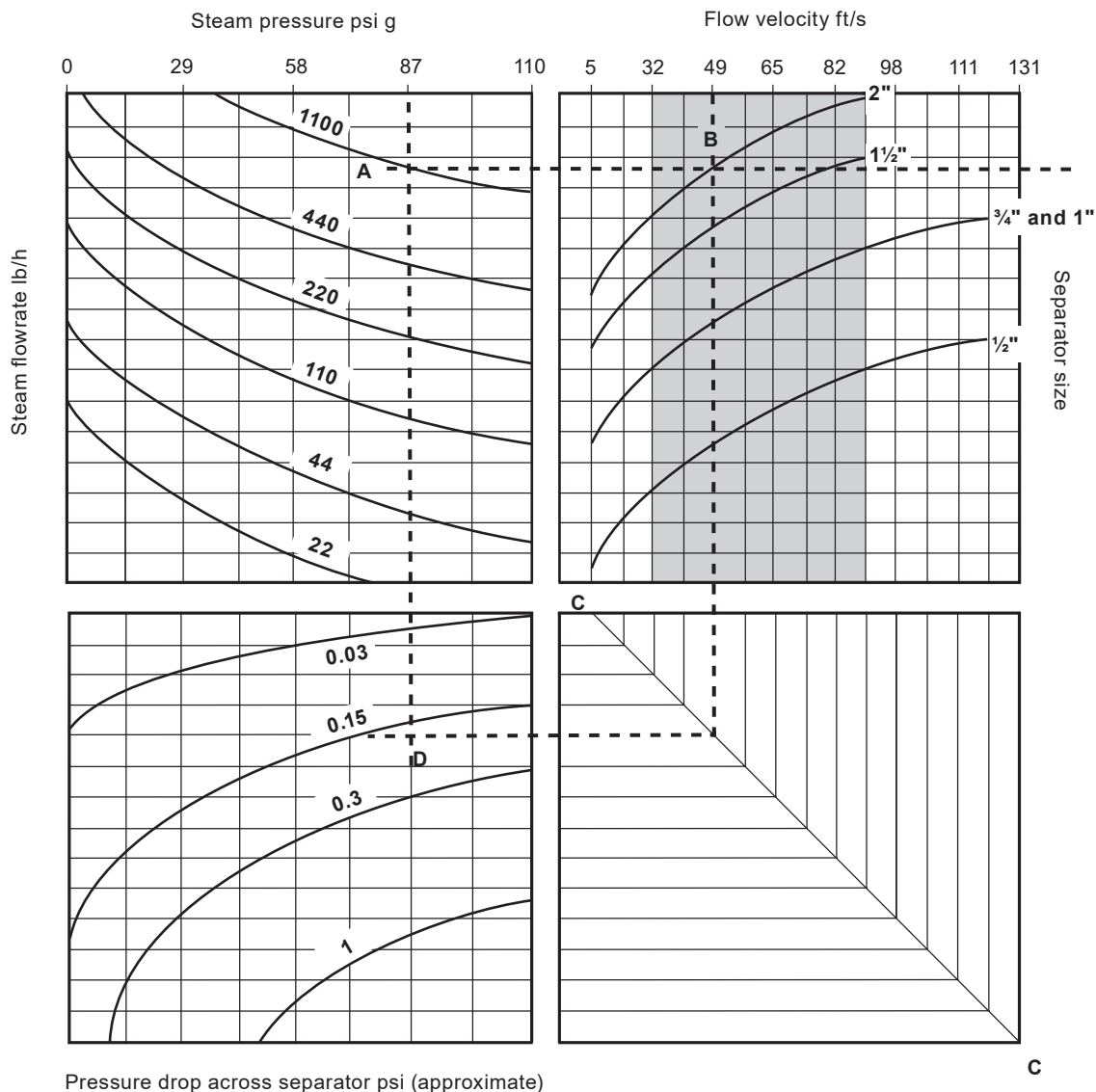


Separator size			1/2"	3/4"	1"	1 1/2"	2"
Velocity correction factor table	Schedule 40 pipe	I/D (mm)	15.80	21.00	26.60	40.90	52.50
		Factor	1.00	1.00	1.00	1.00	1.00
	Imperial O/D tubing	I/D (mm)	9.40	15.75	22.10	34.80	47.50
		Factor	2.83	1.45	1.45	1.38	1.22
	Hybrid DIN 11850 pipe	I/D (mm)	15.00	19.00	25.00	37.00	49.00
		Factor	1.11	1.13	1.13	1.22	1.15

Steam sizing example - lb/h, psi g and ft/s

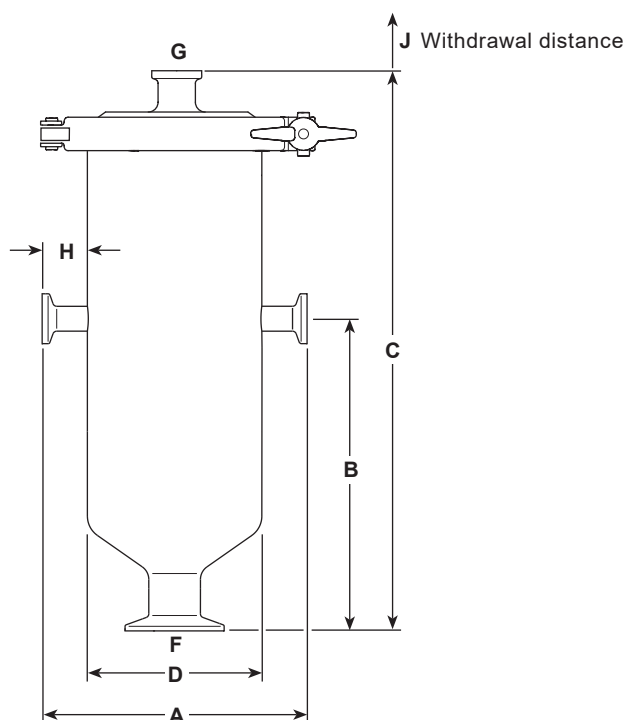
The steam sizing example below has been based on imperial O/D tubing delivering 1100 lb/h of steam at 87 psi g.

1. **Plot point A** where the steam pressure and flowrate cross, e.g. 87 psi g @ 1100 lb/h: Draw a horizontal line.
2. **Select line size.** Any separator curve that is bisected by this line at a velocity **below 27 m/s** will operate at near 100% efficiency. For this example choose a 2" (DN50) separator, point B.
3. **Ascertain velocity.** Line velocity for any size can be determined by drawing a vertical line upwards from the point of intersection. From point B in this example the line crosses the velocity axis at 49 ft/s.
Note: a velocity correction factor needs to be applied - Please refer to the correction factor table below.
For this example the velocity correction factor is 1.22 for a 2" imperial O/D tube therefore the velocity in this example would be 18.3 m/s.
4. **Pressure drop.** Where the line extended from point B crosses the line C – C, plot a horizontal line. Now drop a vertical line from point A. The point of intersection, D, is the pressure drop across the separator, i.e. approximately 0.17 psi.
5. **Separators should be selected on the basis of the best compromise between line size, velocity and pressure drop for each application.**



Separator size			1/2"	3/4"	1"	1 1/2"	2"
Velocity correction factor table	Schedule 40 pipe	I/D (in)	0.62	0.83	1.05	1.61	2.07
		Factor	1.00	1.00	1.00	1.00	1.00
	Imperial O/D tubing	I/D (in)	0.37	0.62	0.87	1.37	1.87
		Factor	2.83	1.45	1.45	1.38	1.22
	Hybrid DIN 11850 pipe	I/D (in)	0.59	0.75	0.98	1.46	1.93
		Factor	1.11	1.13	1.13	1.22	1.15

Dimensions, weights and volume (approximate) mm (inches), kg (lb) and litres (gallons)



Steam inlet/outlet size	A	B	C	D	F (drain)	G (vent)	H	J	Weights	Volume
½"	135 (5.3)	158 (6.2)	287 (11.3)	88.9 (3.5)	1"	½"	23 (0.9)	215 (8.5)	3.0 (6.6)	1.2 (0.3)
¾"	160 (6.3)	177 (7.0)	370 (14.6)	114.3 (4.5)				290 (11.4)	5.0 (11.0)	2.5 (0.7)
1"							27 (1.1)	400 (15.7)	9.2 (20.3)	5.5 (1.5)
1½"	195 (7.7)	210 (8.3)	482 (19.0)	141.3 (5.6)						
2"			532 (21.0)					450 (17.7)	10.0 (22.0)	6.3 (1.7)

Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions (IM-P023-60) supplied with the product.

Installation note: The CS10-1 is designed for installation in horizontal lines. Check arrow for correct orientation.

Note: The body and internals must be handled carefully to ensure that the surface finishes are not damaged.

How to order

Example: 1 off 2" Spirax Sarco CS10-1 stainless steel clean steam separator with removable baffle plate. Sanitary clamp connections to ASME BPE, internal surface finish of 0.5 µm complete with material certification to EN 10204 3.1.

Spare parts

Available spares

Seal	3
Clamp	4

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and type of separator.

Example: 1 off Seal for a Spirax Sarco 1½" CS10-1 stainless steel clean steam separator.

