

Data Sheet: Sample Cooler

Sample coolers for safe sub-cooling and sampling of hot water and steam. Typical applications include district heating water, boiler feed water, boiler water, condensate, main steam, and exhaust steam. Other fluids, e. g. thermal oil, on request. Compact coolers are suitable for grab sampling, while high performance coolers are also suitable for continuous sampling.

type	080-250 C	080-500 C	125-300 H	125-400 H	125-600 H	
design	compact cooler		high performance cooler			
heat transfer surface area	0.07 m ²	0.14 m ²	0.21 m ²	0.29 m ²	0.43 m ²	
heat transfer rate (1)	≤ 3 kW	≤ 10 kW	≤ 35 kW	≤ 60 kW	≤ 90 kW	
sample mass flow (1)	liquid	≤ 30 kg/h	≤ 45 kg/h	≤ 75 kg/h	≤ 120 kg/h	≤ 150 kg/h
	steam	-	-	≤ 30 kg/h	≤ 60 kg/h	≤ 90 kg/h
cooling water volume flow, approx.	0.15 ... 1.75 m ³ /h		0.15 ... 3.5 m ³ /h			
cooling water pressure drop, approx.	0.001 ... 0.3 bar		0.001 ... 0.7 bar			
max. allowable pressure	pipe coil	40 bar		160 bar (on request: 300 bar)		
	shell	10 bar				
max. allowable temperature	pipe coil	200 °C	250 °C	550 °C		
	shell	110 °C				
volume	pipe coil	0.1 L	0.2 L	0.3 L	0.4 L	0.5 L
	shell	1.5 L	3 L	5 L	6 L	9 L
Directive 2014/68/EU (PED)	Art. 4, sect. 3. Sound engineering practice. The pressure equipment must not bear the CE-marking.					
connections	sample inlet	tube fitting d _o = 8 mm		butt weld end d _o = 14 mm		
	sample outlet	pipe d _o = 8 mm				
	cooling water inlet	threaded, female Rp ½"		threaded, female Rp ¾"		
	cooling water outlet	threaded, female Rp ¾"		threaded, female Rp ¾"		
	drain	-		threaded, female Rp ½"		
material	pipe coil	stainless steel 1.4571		stainless steel 1.4404 (on request: 1.4539)		
	shell	stainless steel 1.4541				
	flange, cover	-		stainless steel 1.4571		
	gasket	-		NBR composite		
	sample valves	stainless steel 1.4571				
	cooling water valves	stainless steel 1.4408				
empty mass, approx.	4 kg	7 kg	14 kg	17 kg	22 kg	

¹ For water and steam, depending on process data; detailed process design is available on request.

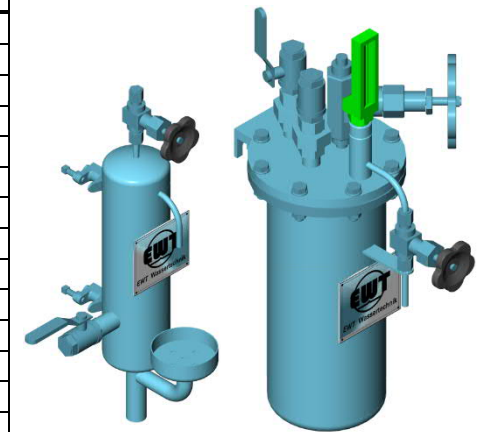
allowable cooling water chloride concentration (4,5):

sample inlet temperature	≤ 120 °C	≤ 200 °C	> 200 °C
allowable chloride concentration	< 200 mg/L	< 150 ... 30 mg/L	< 50 ... 10 mg/L

⁴ These limit values refer to natural, moderate TDS, neutral or weakly alkaline (7 ≤ pH ≤ 8.2), and non-deaerated cooling water, further assuming clean heat transfer surfaces, an approach temperature ≤ 5 K, a cooling water outlet temperature ≤ 50 °C, and pipe coil material 1.4571 or 1.4404.

In any other case, contact the manufacturer for further advice: Limit values may vary between >> 1000 mg/L with favourable conditions, and < 0.5 mg/L with unfavourable conditions.

⁵ Different limit values apply to aqueous solutions of antifreeze agents: typically, pH ≥ 8.2 and chloride concentration < 0.5 ... 50 mg/L, depending on specification and process data.



allowable cooling water quality:

turbidity	< 5 NTU
total suspended solids (TSS)	< 5 mg/L
pH (2)	4.5 ≤ pH < 10
water hardness (3)	< 2.5 mmol/L
	< 14 °dH
	< 250 ppm
chloride	see below
iron	< 0.2 mg/L
manganese	< 0.05 mg/L
free chlorine	< 0.5 mg/L

² Also see below remarks ⁴ and ⁵ regarding pH.

³ For sample inlet temperature ≤ 200 °C, coolant temp. increase ≤ 15 K, further cf. remark ⁴. Otherwise, use softened water or demineralized water as coolant.