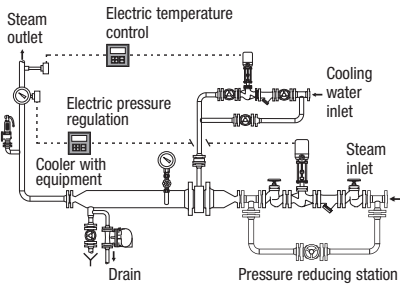
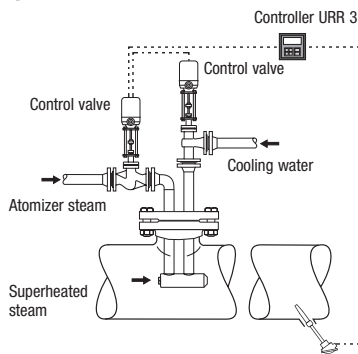


**System 1**



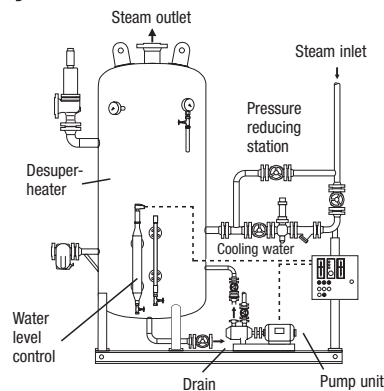
*Injection cooler with fixed jet orifices*

**System 2**



*Injection cooler with binary unit*

**System 3**



*Water-bath desuperheater*

**Application**

- Heating installations in all industries
- Heating of drying calenders in the paper industry
- Heating of boiling pans in the foodstuff industry
- Heating of cable presses
- Radiant panels for hardware production in the electrical industry
- Steam moistening plants in the textile industry

**System Description**

**System 1 Injection cooler with fixed jet orifices**

The cooling water is injected through special jet orifices. The amount is adjusted by a control valve mounted upstream of the desuperheater. The type and number of nozzles are dictated by the operating data. The internals of the pipe installed downstream of the equipment prevent temperature shocks at the external pipe.

**System 2 Injection cooler with binary unit**

Cooling water and atomizer steam are injected through a jet. The kinetic energy of the steam is used for atomizing the water. The atomizer-steam pressure has to be at least twice as high as the steam pressure. The cooling water can be "cold", since it is preheated by the atomizer steam.

**System 3 Water-bath desuperheater**

Superheated steam is injected into the water contained in the desuperheater. The heat of the superheated steam is given up to the water. The steam produced is conducted through steam separating units and reaches a steam content of more than 98 %.

**Criteria for System Selection**

1. What is the ratio between minimum and maximum steam quantity in the control range?
2. Is booster steam available at an appropriate pressure?
3. What is the pressure and the temperature of the available cooling water?
4. How close must the temperature of the desuperheated steam be to that of saturated steam?

**Questions concerning System Design**

1. Maximum steam flow at inlet?
2. Minimum steam flow at inlet?
3. Maximum service pressure?
4. Maximum temperature at inlet?
5. Standard temperature at inlet?
6. Temperature at outlet?
7. Saturated-steam temperature?
8. Temperature of injected cooling water?
9. Injected cooling-water flow?
10. Cooling-water pressure at cooler?
11. Pump pressure?
12. Design pressure?
13. Design temperature?
14. Length of installation?

**Technical Data**

		System 1	System 2	System 3
Pressure rating	[bar]	32	32	32
Maximum temperature	[°C]	450	450	390
Cooling water pressure above steam pressure	[bar]	5	> Steam	> Steam
Steam flowrate	[t/h]	100	100	15
Steam flow ratio		1 : 10	1 : 10	1 : 100
Set point above saturation temperature	[K]	5	3 – 5	–

Higher pressures, temperatures and steam flowrates available on request.