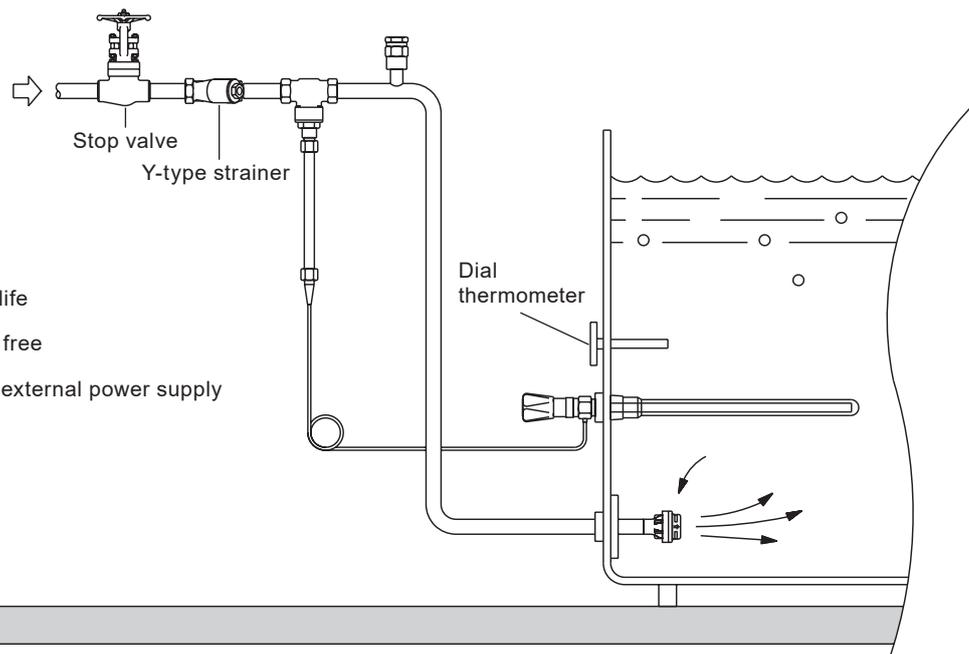


## INS Direct Steam Injection Heating Systems

A complete system for boiler feedtank, hot water storage and other industrial process heating requirements.



### Principal features:

- Stainless steel injector for long life
- No moving parts - maintenance free
- Self-acting system requiring no external power supply
- Efficient and economic heating

### Description

Spirax Sarco INS direct steam injection heating systems are designed to inject steam into tanks of water or process liquor to ensure quiet and efficient heating of the tank contents. The injector draws in cold liquid, mixes it with the steam within the injector nozzle and distributes the hot liquid throughout the tank. In many applications the circulation induced by the injector is an advantage ensuring thorough mixing and avoiding temperature stratification.

### Available system types

INS15, INS20, INS25, INS40, INS50, INS65 and INS80, screwed BSP (BS 21 parallel) or NPT.

The injectors are for horizontal installation.

The selection of a system depends on the flowrate of steam required to heat the tank contents and the steam supply pressure to the control valve.

### Boiler feedtank applications

Oxygen must be removed from boiler water if corrosion is to be prevented. Oxygen can be removed in two ways, either by the use of oxygen scavenging chemicals or by thermal de-aeration.

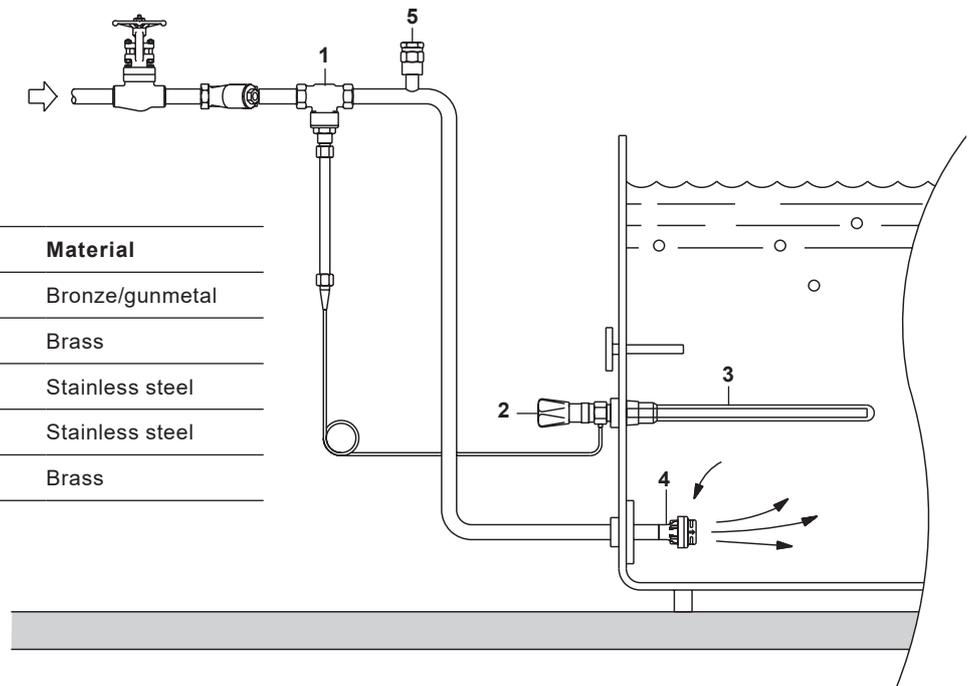
The dissolved oxygen content of water:

- At 20 °C is 9 ppm
- At 60 °C is 5 ppm
- At 90 °C is just under 2 ppm.

By heating the boiler feedwater typically to 85 - 90 °C to remove most of the oxygen, and using oxygen scavenging chemicals in the feedline after the tank, the use of chemicals can be reduced by up to 75%. Additionally, boiler efficiency may be increased since blowdown requirements may be lowered. The fitting of a dial thermometer on the tank is recommended and is available from Spirax Sarco.

## System components

No.	Part	Material
1	Control valve	Bronze/gunmetal
2	Controller and sensor	Brass
3	Sensor pocket	Stainless steel
4	Horizontal injector	Stainless steel
5	Vacuum breaker	Brass



## Capacities

System capacities in kg/h of injected steam when heating tanks vented to atmospheric pressure.

System type		INS15	INS20	INS25	INS40	INS50	INS65	INS80
Control valve Size		½" BSP	¾" BSP	1" BSP	1½" BSP	2" BSP	2½" BSP	3" BSP
Steam supply pressure		Capacities in kg/h of saturated steam						
bar g	psi g							
2	29	87	110	350	580	1 150	2 500	3 700
3	44	120	160	425	750	1 400	3 350	4 900
4	58	150	200	550	1 000	1 750	4 200	6 000
5	73	180	240	650	1 150	2 100	5 000	7 200
6	87	215	280	750	1 400	2 525	5 800	8 400
6.9	100	237	316	840	1 535	2 800	6 500	9 450
7	102	240	320	850	1 550	2 950	6 600	9 550
8	116	275	360	1 000	1 750	3 200	7 400	10 700
8.2	118	278	370	1 020	1 780	3 280	7 550	10 950
9	131	290	410	1 100	1 900	3 600	8 200	11 850
10	145	315	450	1 200	2 075	3 800	9 000	13 000
10.3	150	325	460	1 230	2 135	3 920	-	-
11	160	350	-	-	2 275	4 200	-	-
12	174	375	-	-	2 500	4 500	-	-
13	189	400	-	-	2 675	5 000	-	-

Where steam supply pressures are higher consider the use of a pressure reducing valve or alternatively, the use of a combined pressure reducing and temperature control valve. Please consult Spirax Sarco for a suitable type.

## Equipment details

**Note:** All equipment is available screwed BSP. For options of NPT or API connections refer to relevant literature.

System type	Control valve*	Controller type	Range	Sensor pocket	Steam injector	Vacuum breaker
INS15	SB ½"	SA128 with 2 m capillary	Range 1 -20 to 110 °C	Stainless steel - 1" to suit SA128	1 x IN25M - 1"	VB14 - ½"
INS20	SB ¾"	SA128 with 2 m capillary	Range 1 -20 to 110 °C	Stainless steel - 1" to suit SA128	1 x IN25M - 1"	VB14 - ½"
INS25	KB51 1"	SA128 with 2 m capillary	Range 1 -20 to 110 °C	Stainless steel - 1" to suit SA128	1 x IN40M - 1½"	VB14 - ½"
INS40	KC51 1½"	SA121 with 2 m capillary	Range 2 40 to 105 °C	Stainless steel - 1" to suit SA121	2 x IN40M - 1½"	VB14 - ½"
INS50	KC51 2"	SA121 with 2 m capillary	Range 2 40 to 105 °C	Stainless steel - 1" to suit SA121	3 x IN40M - 1½"	VB14 - ½"
INS65	NS 2½"	SA121 with 2 m capillary	Range 2 40 to 105 °C	Stainless steel - 1" to suit SA121	5 x IN40M - 1½"	VB14 - ½"
INS80	NS 3"	SA121 with 2 m capillary	Range 2 40 to 105 °C	Stainless steel - 1" to suit SA121	7 x IN40M - 1½"	VB14 - ½"

\* SB control valve is bronze, single seat, normally open, direct acting.

KB51 and KC51 control valves are bronze, single seat, normally open, bellows balanced, direct acting.

NS control valve is gunmetal, double seat, normally open, stainless steel trim, direct acting.

A Y-type strainer is recommended upstream of the control valve. The Y-type strainer should normally be the same size as the steam supply pipeline. Consider a Spirax Sarco brass/bronze Fig 12 strainer.

An isolating valve is recommended upstream of the Y-type strainer.

Consider the use of an M10 Spirax Sarco carbon steel ball valve or a HV3 bronze stop valve.

## Safety information, installation and maintenance

This document does not contain sufficient information to install the system safely. See the relevant Installation and Maintenance Instructions supplied with the system components.

### Safety note

Your attention is drawn to Safety Information Leaflet IM-GCM-10.

### Installation note

Spirax Sarco direct steam injection heating systems are designed to operate with the minimum of noise provided the installation is correct.

## How to order

**Example:** 1 off Spirax Sarco INS15, ½" screwed BSP, direct steam injection heating system.