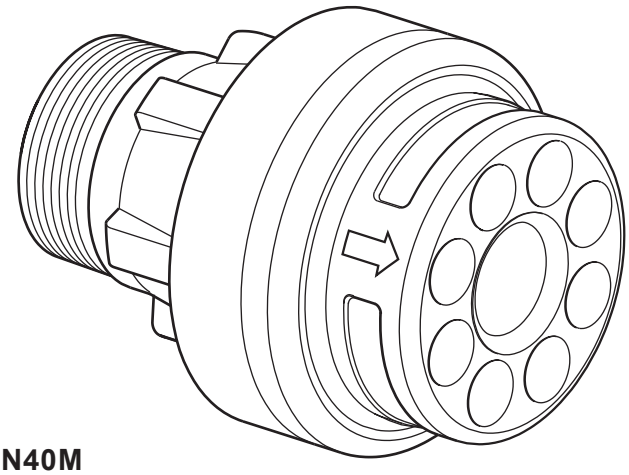
IN15, IN25M and IN40M Steam Injectors

Description

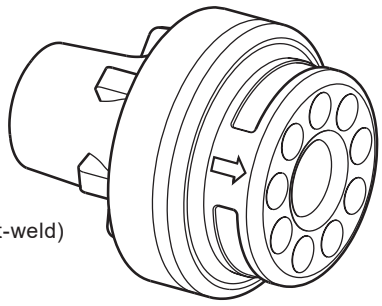
Spirax Sarco steam injectors use steam to raise the temperature of water or other liquids. They work by using a jet of steam to draw in the liquid through radial ports, mix it, and distribute the heated liquid throughout the tank or vessel. The circulation induced by the injector ensures thorough mixing and avoids temperature stratification. Three sizes of injector are available to suit a wide range of flowrates.
The smallest, the IN15, has a male and female thread for direct mounting to a tank wall from the outside, or to pipework within the tank. The IN25M and IN40M are available with either male thread or butt-weld connection and are fitted to pipework in the tank, or to a tank wall connection.
For higher capacities, two or more injectors may be mounted in parallel.

Principal features:

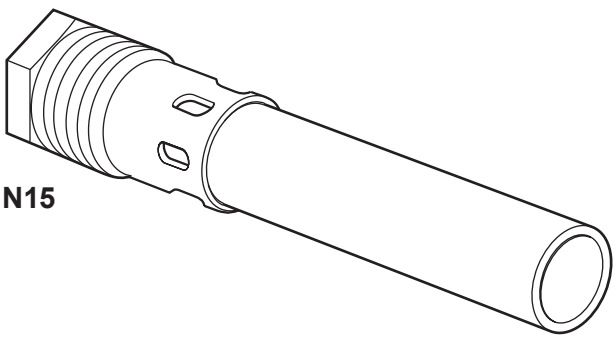
- All stainless steel.
- Ideal for boiler feedtank heating and de-aeration.
- For efficient steam heating of water and other fluids.
- Heats, mixes and circulates - no moving parts.
- Compact design - minimises noise and vibration.



IN40M
(available screwed or butt-weld)



IN25M
(available screwed or butt-weld)



IN15

Pressure/temperature limits

Body design rating	PN25
Minimum operating pressure	0.5 bar g (7.3 psi g)
Maximum saturated steam condition	17 bar g @ 207 °C (247 psi g @ 405 F)
Maximum heated liquid temperature (tank/vessel vented to atmosphere)	90 °C (194 °F)

Materials

Austenitic stainless steel ASTM A351 CF3M.

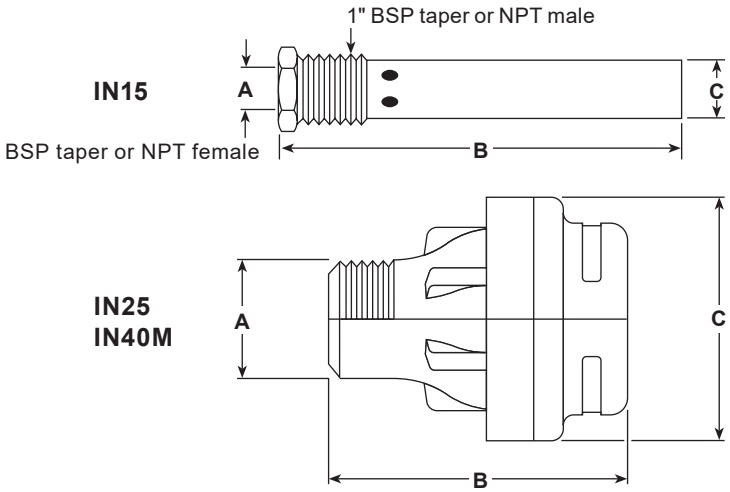
Available types

The IN15 is supplied with a ½" female and 1" male thread, available in BSPT or NPT.

Options for the larger injectors are shown below:

	IN25M	IN40M
BSPT male	1"	1½"
NPT male	1"	1½"
Butt-weld	1" Schedule 80	1½" Schedule 80

Dimensions/weights (approximate) in mm (inches) and kg (lbs)



Type	A	B		C		Weight	
IN15	½"	205	(8.1")	28	(1.1")	0.4	(0.88)
IN25M	1"	84	(3.3")	71	(2.8")	0.8	(1.8)
IN40M	1½"	115	(4.5")	88	(3.5")	1.6	(3.5)

How to order

Example: 1 off Spirax Sarco IN25M steam injector having a 1" BSPT screwed connection.

Safety information, installation and maintenance

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

Important

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

Installation note

The injectors are installed at a low level in a tank, ideally along the centre line, and discharging horizontally along the length. Pipework may be routed inside or outside the tank. In all cases, steam supply pipework must be firmly anchored to prevent vibration and stress in the tank wall. We recommend the use of a suitable thread locking compound on all threaded connections.

Use the same size pipe as the injector, i.e. 25 mm (1") pipe for IN25M.

Pipe sizes for multiple injector installations are as follows:-

No. of injectors	Type	Minimum pipe size
2	IN15	20 mm (0.79")
2	IN40M	65 mm (2.6")
3	IN40M	80 mm (3.1")

Allow a minimum of 150 mm (5.9") between the injector(s) and the sides and bottom of the tank, and as much as possible between the injector outlet and the end of the tank.

See the IMI for the minimum limits. Space multiple injectors equally across the tank width.

Capacity - selecting a steam injector

The choice of steam injector depends on the flowrate of steam required to heat the liquid. The table below shows steam injector capacities in kg/h (lb/h) of injected steam when heating tanks are vented to atmosphere, and are up to 3 metres (9.8 feet) deep. The choice of control valve can affect the steam capacity.

For higher capacities use two or more injectors in parallel.

Injector type		IN15		IN25M		IN40M	
System pressure bar g (psi g)		Saturated steam capacity kg/h (lbs)					
0.5	**(7.3)**	11	(24)	75	(165)	222	(489)
1	**(14.5)**	20	(44)	135	(298)	400	(882)
2	**(29)**	48	(106)	175	(386)	580	(1279)
3	**(43.5)**	66	(146)	280	(617)	805	(1775)
4	**(58)**	84	(185)	350	(772)	970	(2138)
5	**(72.5)**	102	(225)	410	(904)	1125	(2480)
6	**(87)**	120	(265)	500	(1102)	1295	(2855)
7	**(102)**	138	(304)	580	(1279)	1445	(3186)
8	**(116)**	156	(344)	640	(1411)	1620	(3571)
9	**(131)**	174	(384)	700	(1543)	1820	(4012)
10	**(145)**	192	(423)	765	(1687)	1950	(4299)
11	**(160)**	210	(463)	830	(1830)	2250	(4960)
12	**(174)**	228	(503)	900	(1984)	2370	(5225)
13	**(189)**	246	(542)	975	(2150)	2595	(5721)
14	**(203)**	264	(582)	1045	(2304)	2710	(5975)
15	**(218)**	282	(622)	1095	(2414)	2815	(6206)
16	**(232)**	300	(661)	1170	(2579)	3065	(6757)
17	**(247)**	318	(701)	1225	(2701)	3200	(7055)

System examples

The tables below give steam capacities for some typical injector/valve/controller combinations for tanks vented to atmospheric pressure. Intermediate values may be obtained by linear interpolation.
For alternatives or special applications refer to specific Spirax Sarco literature or contact our sales engineers.
The tables below are examples only, and the valve/controller combinations shown may not be available in all markets.
Note: Steam pressure at the injector will be much reduced and proper injection and mixing may not occur if a smaller valve (or larger injector) is fitted.

Self-acting control system examples

Injector type	**IN15**		**IN25M**	**IN40M**		
Number off	1	2	1	1	2	3
Valve type/size	BX6 DN15 (½")	SB DN15 (½")	SB DN20 (¾")	KB51 DN25 (1")	KC51 DN40 (1½")	KC51 DN50 (2")
Valve Kv	1.65	2.58	3.81	9.8	16.48	34.0
Controller type	Self-acting control with 2 m (6.6 ft) capillary Range 1. -20 °C to 110 °C (-4 F to 230 F)			Self-acting control with 2 m (6.6 ft) capillary Range 2. 40 °C to 105 °C (104 F to 221 F)		
Steam supply pressure bar g (psi g)	**System saturated steam capacity kg/h (lb/h)**					
2 (29)	47 (104)	82 (181)	110 (243)	350 (772)	580	1150 (2540)
4 (58)	78 (172)	140 (309)	200 (441)	550 (1213)	1000 (2205)	1750 (3858)
6 (87)	109 (240)	195 (430)	280 (617)	750 (1653)	1400 (3086)	2525 (5567)
8 (116)	142 (313)	236 (520)	360 (794)	1000 (2205)	1750 (3858)	3200 (7055)
10 (145)	171 (377)	310 (683)	450 (992)	1200 (2646)	2075 (4575)	3800 (8378)
12 (174)	201 (443)	365 (805)			2500 (5512)	4500 (9921)
13 (189)	218 (481)	393 (866)			2675 (5897)	5000 (11023)

Electric or pneumatic control system examples

Injector type	IN15		IN25	IN40M		
Number off	1	2	1	1	2	3
Valve type/ size	KE71/KE73 DN15 (½")	KE71/KE73 DN15 (½")	KE71/KE73 DN15 (½")	KE71/KE73 DN25 (1")	KE71/KE73 DN32 (1¼")	KE71/KE73 DN50 (2")
Valve Kv	1.6	4	4	10	16	36
Steam supply pressure bar g (psi g)	**System saturated steam capacity kg/h**					
2 (29)	47 (104)	96 (212)	110 (243)	350 (772)	580	1150 (2540)
4 (58)	78 (172)	168 (370)	200 (441)	550 (1213)	1100 (2425)	1750 (3858)
6 (87)	109 (240)	240 (529)	280 (617)	750 (1653)	1400 (3086)	2525 (5567)
8 (116)	142 (313)	312 (688)	360 (794)	1000 (2205)	1750 (3858)	*
10 (145)	171 (377)	384 (847)	450 (992)	1200 (2646)	2075 (4575)	*
12 (174)	201 (443)	456 (1005)	650 (1433)	1650 (3638)	*	*
13 (189)	218 (481)	492 (1085)	750 (1653)	1750 (3858)	*	*

The information given in the tables is empirical and must not be used for critical applications. Use PN5123 or EL5601 actuator, EP5 positioner (PN), SX65 controller (available with mA output for PN actuator, or VMD output for EL actuator), EL2270 sensor or pocket, and MP2 regulator.

*** Consult your local Spirax Sarco sales engineer for information.**