

spirax sarco

Steam Injectors IN15, IN25M, IN40M

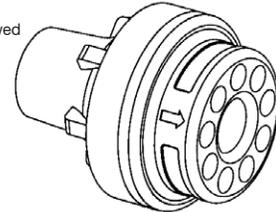
Steam Injectors Type IN are:

- All stainless steel
- Ideal for boiler feedtank heating of water and other fluids
- Heats, mixes and circulates - no moving parts
- Compact design - minimizes noise and vibration

Model	IN15	IN25M	IN40M
Sizes	1/2"	1"	1-1/2"
Connections	NPT	NPT male & Butt-weld	
Construction	Austenitic Stainless Steel grade 316L		

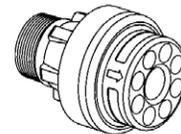
IN40M

(available screwed or butt-weld)

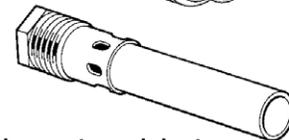


IN25M

(available screwed or butt-weld)



IN15



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 vessel. The circulation induced by the injector ensures thorough mixing and avoids temperature stratification. Three sizes of injectors are available to suit a wide range of applications.

The smallest, the IN15, has a male and a female thread for direct mounting to a tank wall from the outside, or to pipework within the tank.

The IN25M and IN40M are available in male thread or butt-weld form 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.

Limiting Operating Conditions

Body Design Rating

350 psig (PN25)

Maximum Saturated Steam Conditions

250 psig at 400°F

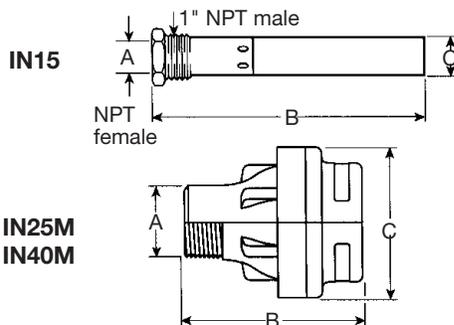
(17 barg 207°C)

Maximum Heated Liquid Temperature

190°F (90°C)

Available Types

Steam injectors for horizontal installation are available as type IN15, IN25M and IN40M. The choice of injector depends on the flowrate of steam required to heat the liquid. The IN15 can be fitted to the end of the steam supply pipework or directly through the tank weld using a female threaded connection.



Capacities -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 lb/h of injected steam when heating tanks are vented to atmosphere, and are up to 10 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	
	Saturated steam capacity lb/h			
Recommended steam pressures for quiet operation	15	44	297	880
	30	105	385	1226
	45	145	616	1771
	60	185	770	2134
	75	224	920	2475
	90	264	1100	2849
	105	303	1276	3179
	120	343	1408	3564
	135	382	1540	4004
	150	422	1683	4290
	165	462	1826	4950
	180	501	1980	5214
	195	541	2145	5709
	210	580	2299	5962
	225	620	2409	6193
240	661	2574	6743	
255	699	2697	7040	

Intermediate values may be obtained by linear interpolation. For higher capacities use 2 or more injectors in parallel.

$$* \text{ Steam pressure at inlet of injector} = \text{Steam supply pressure to control valve} - \text{Pressure drop across control valve}$$

C_v values

Injector type	IN15	IN25M	IN40M
C _v	1.81	10.7	16.9

Sample Specification

Steam injectors shall be all 316L stainless steel, with radial inlet ports and full length discharge nozzle.

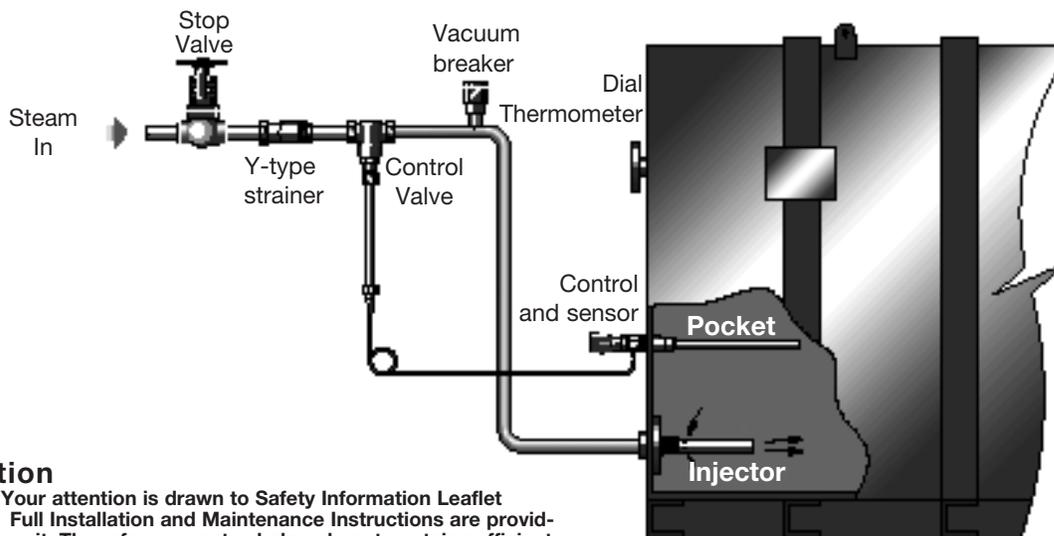
Dimensions (approximate) in inches and (millimeters)				
Type	A	B	C	Weight (lb kg)
IN15	1/2"	8.2 (205)	1.1 28	.8 (.4)
IN25M	1"	3.4 (84)	2.8 (71)	2.0 (.8)
IN40M	1-1/2"	4.6 (115)	3.5 (88)	3.2 (1.6)

Local regulation may restrict the use of this product below the conditions quoted. Limiting conditions refer to standard connections only.

In the interests of development and improvement of the product, we reserve the right to change the specification. TI-10-1430-US 07.16

Steam Injectors IN15, IN25M, IN40M

Self-Acting Control System



IN15 shown

Installation

WARNING:- Your attention is drawn to Safety Information Leaflet IM GCM-10. Full Installation and Maintenance Instructions are provided with each unit. The reference notes below do not contain sufficient information to install the product safely, and any attempt to do so may be hazardous.

The injectors are installed at a low level in a tank, ideally along the center line, and discharging horizontally along the length. Pipework may be routed inside or outside 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. 1" pipe for IN25M. Pipe sizes for multiple injector installations are as follows:-

No. of injectors	Type	Minimum Pipe Size
2	IN15	3/4"
2	IN40M	2-1/2"
3	IN40M	3"

Allow a minimum of 6" between the injector(s) and the sides and bottom of the tank, and as much length as possible between the injector outlet and the end of the tank. See IMI for minimum limits. Space multiple injectors equally across the tank width.

Injector package	INS10	INS20	INS30	INS40	INS50	INS60	INS70	INS80
Valve type & size	BX6 1/2	SB 1/2	SB 3/4	KB51 1	KB51 1-1/4	KC51 1-1/2	KB51 2	KC51 2
Valve C _v	1.92	3.0	4.5	11.4	19.2	19.2	39.6	39.6

Controller type	128 with 13' capillary. Range 1 – 0 to 230°F				121 with 13' capillary. Range 2 – 105 to 225°F			
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Injector type	IN15	IN15	IN25M	IN40M	IN40M	IN40M	IN40M	IN40M
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Number of Injectors	1	2	1	1	2	2	3	3
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Steam supply pressure psig	Saturated steam capacity lb/h							
	20	75	140	170	565	915	915	1850
30	105	180	245	710	1175	1175	2330	2330
40	130	220	310	855	1435	1435	2805	2805
50	150	270	365	990	1695	1695	3285	3285
60	175	310	425	1140	1955	1955	3760	3760
70	200	350	485	1285	2215	2215	4235	4235
80	225	395	545	1430	2475	2475	4825	4825
90	245	440	600	1575	2700	2700	5195	5195
100	285	485	660	1715	2995	2995	5675	5675
120	320	530	780	2005	3510	3510	-	6625
140	360	660	900	2295	-	4035	-	7580
160	400	740	-	-	-	4550	-	8535
180	430	820	-	-	-	5075	-	9490
200	470	900	-	-	-	5670	-	10445

Each INS system also includes a valve size model 10 ball valve and type CT strainer, a stainless steel well, and VB14 vacuum breaker. Full technical details for each of the products contained in the INS systems are available upon request.

Type INS Steam Injector Systems

The IN injectors are also available as part of a steam injection system, type INS. The table to the left covers eight preferred INS steam injection systems available from Spirax Sarco.

Estimating Steam Flow by Calculation

The following formulas can be used to calculate an approximate steam load:

For general heating applications -

$$Q = \frac{W \times C_p \times \Delta T}{1000 \times t}$$

For boiler feedtanks -

$$Q = \frac{G \times \Delta T}{1000}$$

Q = Steam load (lb/h)

W = Mass of liquid (lb)

G = Feedwater flow rate (lb/h) Note: 1 Boiler hp = 34.5 lb/h

C_p = Specific heat of liquid (Btu/lb°F)

ΔT = Temperature rise (°F)

t = heating time (hours)

Sample Specification

Steam Injector system shall include an isolation valve, Y type strainer, self acting control system with stainless steel well, vacuum breaker and 316L grade stainless steel injector.

Installation

Spirax Sarco steam injectors are designed to operate with the minimum of noise provided installation is correct. For full details refer to the Installation and Maintenance Instructions supplied with the product.

Maintenance

Injectors require no maintenance. We recommend an annual inspection of the steam supply pipework and injector to check that the fittings are securely fastened. All other system components should be maintained in accordance with the relevant Installation and Maintenance Instructions which are available upon request.

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