

GEM® TRAP FITTING AND MAINTENANCE INSTRUCTIONS

+10 YEAR PERFORMANCE GUARANTEE

# IMPORTANT INSTRUCTIONS



STORE PERSON,  
PLEASE KEEP THIS LEAFLET  
WITH TRAPS FOR INSTALLER



# GEM® TRAP FITTING & MAINTENANCE INSTRUCTIONS

**IMPORTANT** – Please read these instructions before fitting any traps. The following pages describe how each type of GEM® Trap should be installed. If you are unsure or have any questions please contact your local representative – Details on [www.thermalenergy.com](http://www.thermalenergy.com)

## INFORMATION APPLYING TO ALL GEM® TRAPS:

- All traps have individual serial numbers or batch numbers
- All traps are "tailor-made", with the exception of the Quartz trap
- All traps must be fitted in the correct allocated positions – see enclosed Delivery Trap Schedule

(If you are unsure of each trap's location, please contact Thermal Energy International or your local representative.

## INSTALLATION OF ALL GEM® TRAPS

- Preferably, all traps should be fitted vertically, discharging downwards; however, GEM® Traps may be installed in any orientation except discharging vertically upwards.
- All traps must be installed in accordance with HSE regulations and codes of practice for pressurised systems. If you are in any doubt, please call TEI.
- The pressure and temperature rating of the GEM® Trap must exceed that of the application.
- Trap bodies or pipeline connectors must be assembled with the flow arrow in direction of flow (steam to condensate).
- Lock off two isolating valves upstream of the trap before commencing installation.
- Isolating valves should be fitted on inlet and outlet pipework adjacent to GEM® Traps. Non-return valves should be fitted downstream of traps to prevent condensate back flow to equipment which is not constantly in use. If condensate discharges to drain, non-return valves are not required.
- The use of jointing compounds on union seats is NOT recommended. If required to help the seal of unions, a thin film of copper grease or graphite anti-seize paste can be applied.
- Diffusers are not required and should not be fitted when GEM® Traps are discharging to atmosphere.

## INSULATION AND IDENTIFICATION

- To reduce sensible heat loss from the trap bodies and increase safety, TEI recommends the use of insulation bags. Tailor made insulation bags for 15 mm, 20 mm and 25 mm Sapphire GEM® Traps supplied as standard. All bags have identification labels and are:
  - ATEX certified for use in explosive environments.
  - Suitable for use in the food industry.
- Please ensure GEM® Trap body markings are clearly visible.
- If GEM® insulation bags are not used, we recommend the use of separate labels or tags.

## MAINTENANCE OF ALL GEM® TRAPS

**GEM® Traps have no moving parts to wear out or fail, therefore require minimal maintenance, but it is advisable to:**

- Perform temperature checks across traps after installation. Your area engineer can assist you with this. See table on overleaf for expected temperatures.
  - Carry out an annual inspection with periodic cleaning of strainers and trap bodies as required.
  - Use new gaskets every time the seal is broken.
- It is imperative that the correct GEM® gaskets are used – contact TEI for spare parts.

## TRAP SIZING AND COMMISSIONING

All steam traps, regardless of make, type or size require accurate sizing. As part of the GEM® Trap's product support and 10 year performance guarantee, TEI will provide sizing services for all traps. Where possible, TEI's Area Engineers will conduct performance checks and provide free replacement traps/trap bodies in the unlikely event of sizing problems, whatever the cause.

## TEMPERATURE TESTING

Table showing typical temperatures found during temperature testing of correctly operating steam traps with an infra red thermometer. (For guidance only – ensure measurements are taken on black/dark surface)

Steam/Condensate Pressure		Saturated Steam Temperature °C	Typical temperature range for surface measurement °C
Bar (g)	PSI (g)		
0	0	100	90 to 105
1	15	120	110 to 125
2	30	134	123 to 139
3	43	144	134 to 149
4	60	152	142 to 157
5	72	159	149 to 164
6	87	165	155 to 169
7	100	171	160 to 175
8	116	175	165 to 180
9	130	180	170 to 185
10	145	184	174 to 189
11	160	188	178 to 193
12	174	192	182 to 197
13	188	195	185 to 200
14	203	198	188 to 203
15	217	201	191 to 206
16	230	204	196 to 209

## 10 YEAR PERFORMANCE GUARANTEE

All GEM® Steam Traps are guaranteed against wear or loss of performance for a period of 10 years from date of purchase.

Conditions:

1. All GEM® Steam Traps, must be fitted in their correct positions as indicated on delivery schedule.
2. GEM® Traps must be fitted in accordance with our installation instructions by a competent person and according to standard practice.
3. The steam system water should be suitably treated to avoid corrosion and system clogging.
4. This guarantee refers to the trapping performance of all GEM® Traps and does not relate to standard components such as strainers, mesh baskets, unions or gaskets, nor does it include superheated steam conditions.

# SAPPHIRE GEM® TRAPS WITH SCREWED STRAINER & UNIONS

Pressure Rating:	15mm	17.2 bar (250 psi)	400°C
	20mm	17.2 bar (250 psi)	400°C
	25mm	17.2 bar (250 psi)	400°C
	40mm	10.3 bar (150 psi)	185°C
	50mm	10.3 bar (150 psi)	185°C

Please note that 40mm and 50mm Sapphire Traps are not supplied with a strainer and are available with either a female or male union upstream of the trap. Ensure strainer, unions and trap body are assembled as shown.

When assembling the male union on to strainer outlet a suitable threading compound or tape should be used.

NOTE: Excess compound may block the GEM® Trap; ensure flow is not obstructed.

Body threads are factory sprayed with PTFE to prevent the possibility of binding.

Repeated disassembly will remove the PTFE coating. In such instances use PTFE spray (available from TEI) to recoat trap body threads.

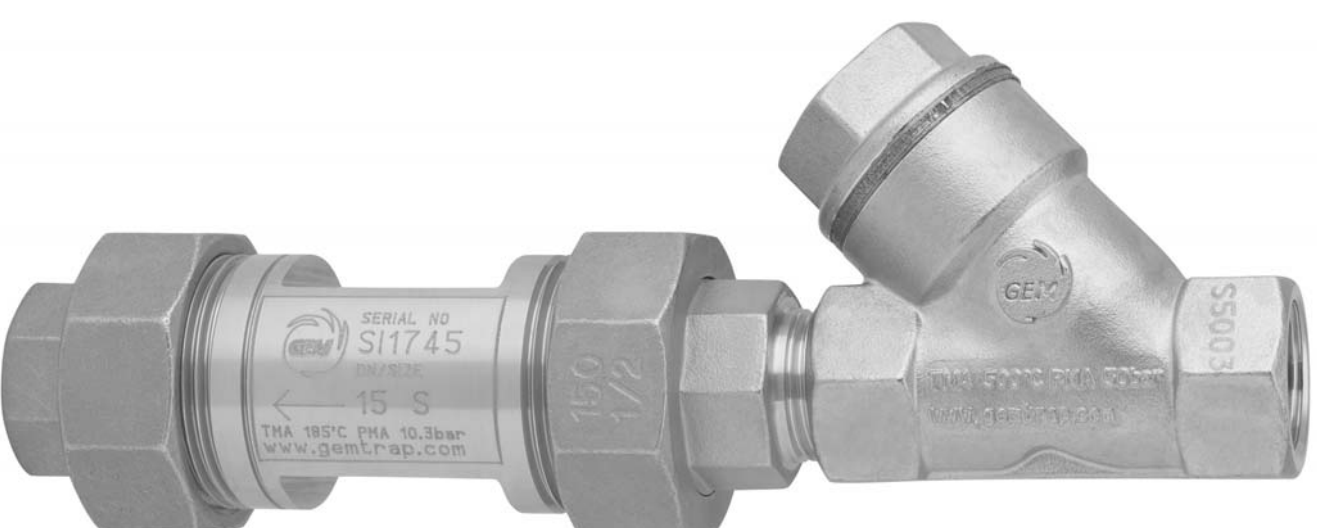
TEI does not recommend the use of PTFE tape on the union collar threads or trap body threads.

Ensure all unions are fully tightened before opening isolating valves – trap sets are only assembled by hand before delivery. GEM® strainers are supplied fitted with Graphite coated stainless steel gaskets on the basket caps and are factory assembled hand tight plus an additional half turn. In the unlikely event of leakage from strainer cap or unions carefully tighten cap or collars.



## RECOMMENDED STRAIGHT LENGTH AFTER TRAP

Flow rate	Length (m)
up to 1,000 Kg/hr	0.5
up to 2,000 Kg/hr	1.0
up to 3,000 Kg/hr	1.5
> 3,000 Kg/hr	2.0



## RUBY GEM® TRAPS FOR FLANGED PIPE WORK

Rating: 100 bar (1450 psi) 500°C

Flange and bolt specifications must be adequate for the pressure of the steam system; the fitter is responsible for checking they are correctly rated for the working pressures.

### ASSEMBLY

The head of the Ruby is sandwiched between inlet and outlet flanges and so is suitable for all common flange specifications including PN and ANSI flanges.

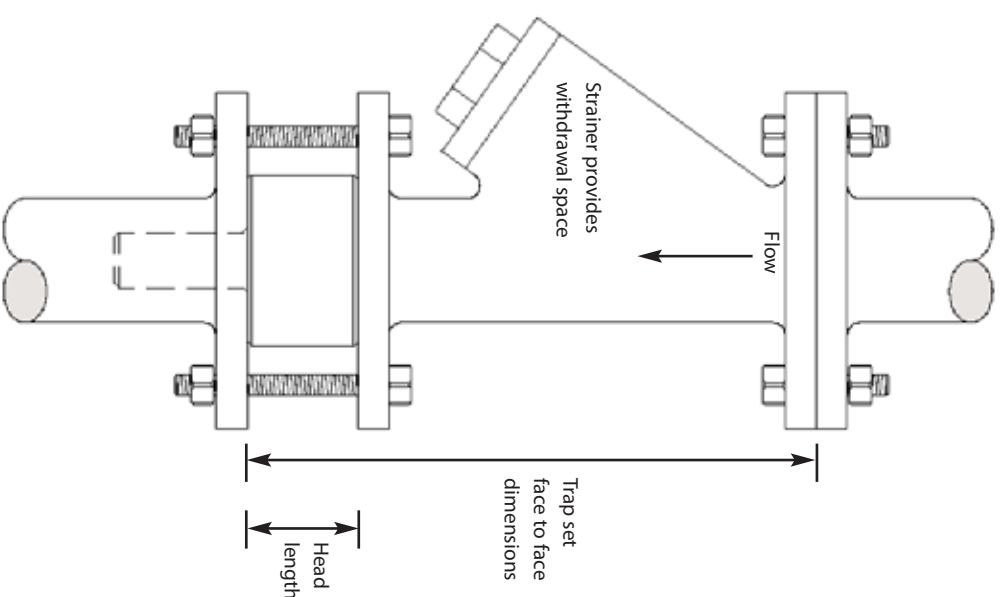
Good practice recommends that a strainer is fitted upstream of all traps. On low capacity applications (such as drip legs, trace heating and process loads less than 100kg/h) a 40 mesh strainer must be fitted immediately upstream of Ruby Traps without integral filters. Ensure either the inlet or outlet pipework can be removed to allow sufficient space for trap removal.

On high capacity applications allow for a straight section of pipe before elbows or bends on trap discharge to prevent possible erosion. See table below for guidance

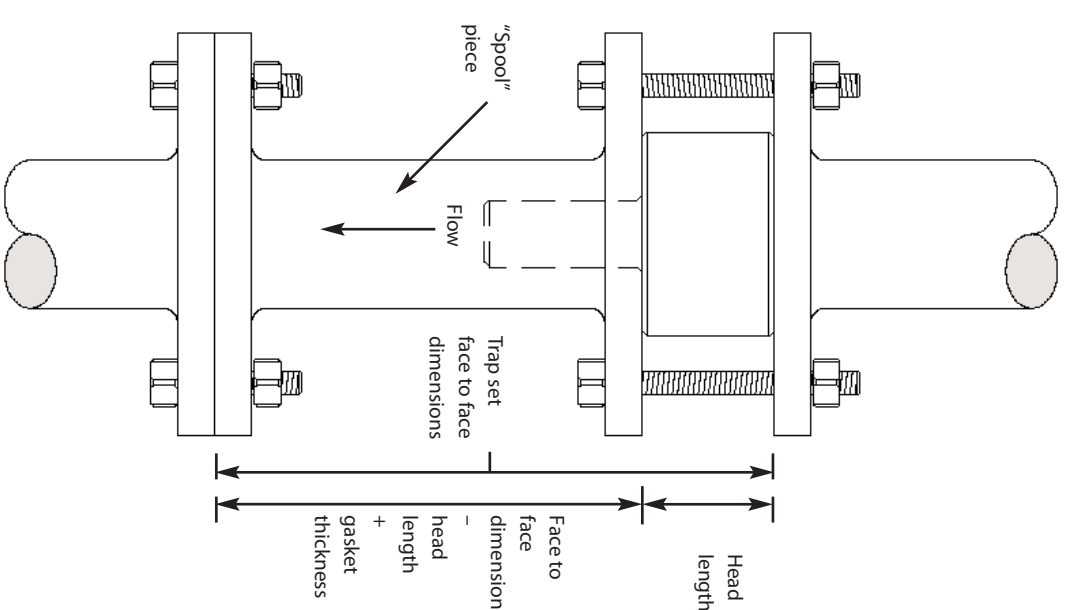
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RUBY TRAP ASSEMBLY -  
WITH SEPARATE STRAINER



RUBY FILTER TRAP ASSEMBLY -  
WITH INTEGRAL STRAINER



# EMERALD TRAPS FOR BOLT ON "QUICK FIT" PIPELINE CONNECTORS

Rating: 100 bar (1450 psi) 500°C

**Existing Connector:**

If a universal pipeline connector is already fitted, installation simply requires the GEM® Trap connector to be bolted to the connector (see opposite). Ensure that the existing connector is installed in an acceptable orientation (see below). A new GEM® gasket should always be fitted between the connector and GEM® Trap (see below).

**New Connector:**

Pipeline connectors should be installed with the grooved mating surface facing upwards. It is also acceptable to install the connector with the mating face on the side of the pipework in the vertical plane, but not underneath the pipework.

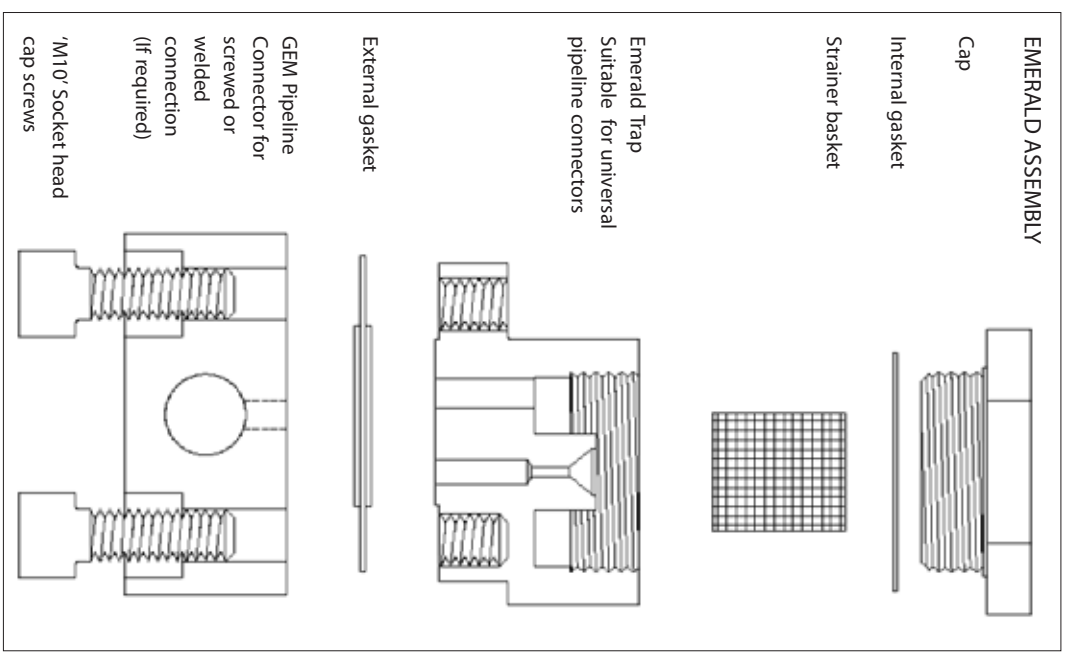
**Cap:**

The Emerald Trap Cap is pre-assembled fully tightened. If leakage occurs when the steam is turned on, immediately tighten the cap or screws as required until leakage stops. Replacement GEM® graphite coated stainless steel cap gaskets should be assembled hand tight plus an additional half turn, or until a seal is formed.

To avoid cap 'binding' to body Graphite Anti Seize paste is factory applied to Cap threads. If the Cap is repeatedly removed and refitted small amounts of paste should be reapplied. Anti-Seize paste is available from TEI.

**Trap Fitting:**

The trap body should be bolted onto the mating face of the connector with the external graphite plate gasket sandwiched in between. The bolts should be hand tight plus an additional half turn, or until a seal is formed.



## QUARTZ GEM® TRAPS FOR REPETITIVE MINIMAL LOAD APPLICATIONS

Rating: 100 bar (1450psi) 500°C

NOTE: This trap is an 'off the shelf' trap designed for minimal loads, e.g. drip legs and trace heating lines. It is not tailor made by TEI for each application – so performance temperature checking should be performed after installation. See table on page 3.

Condensate duties should be determined by performing bucket tests with TEI engineers for generic sizing purposes.

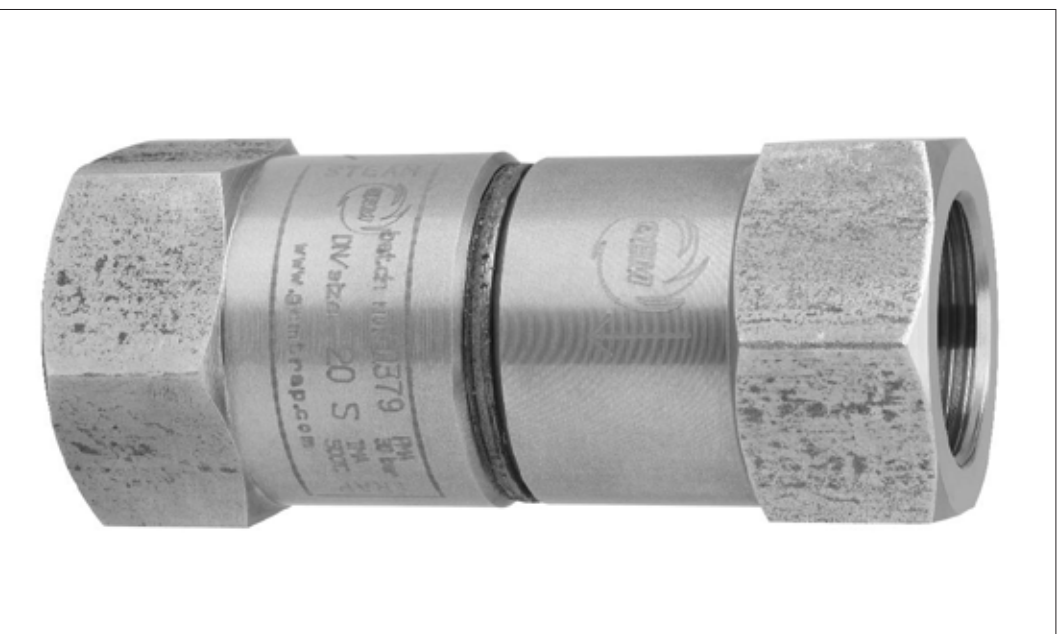
Quartz traps are supplied pre-assembled. Before fitting to inlet pipe, ensure the mesh filter is fitted and the inlet is fully tightened on to main body of the trap.

Graphite faced 'METACAM' 316 Stainless Core gaskets are factory fitted. After a maintenance inspection/cleaning ensure new gaskets are correctly fitted and tightened to torque of 50 N/m before re-assembly (contact TEI for spares).

After screwing feed pipe into the trap inlet, ensure the trap body and inlet are tightened to give a metal to metal seal.

To avoid binding of the thread, PTFE spray is factory applied to the external thread of the trap body. Repeated inspection may wear off the PTFE coating, which should be reapplied with PTFE spray (available from TEI.)

Where the trap outlet is piped into a condensate return, a union should be installed to facilitate future removal and inspection.



## TOPAZ GEM® TRAPS FOR CLEAN STEAM SYSTEMS

Rating: 10 bar (145 psi) 200°C

Ensure flange patterns are identical and assemble using 'Triclover' or 'Dockweiler' clamps.

Ensure trap is installed with its flow arrow in the direction of flow. Strainers are not required for traps installed in a clean steam system.





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