Technical Article – TBRA 0101

Installation Advice – Correct installation testing & trouble shooting

Testing

RA Tech UK Ltd encourages installer to test and verify the correct operation of our dry trap tundish at point of installation

Our Manufacturing instructions (MI's) detail the correct procedure. These can be found in the leaflet supplied with each product, however we feel it is important to enforce these instructions with the rationale for testing the products

In terms of verifying performance we believe that in every installation the downstream system must be shown to be able to cope with the flows expected from the safety relief valve on the application in question. This will typically be the trickle and full flow volumes from the valves. It is important to note the differing normal operation of the types of valves in use, there are two basic types

1. Pressure relief only (PRV)
2. Temperature and pressure relief (T/PRV)

Importantly, and in line with the EU Pressure Equipment Directive (PED) 2014/68/EU, pressure relief valves are designed to open gradually and proportionately. Only valves meeting the PED requirements should be fitted to factory supplied appliances such as boilers and unvented hot water cylinders.

As a manufacturer of a product that takes the water from such devices we have to ensure that best practice procedures are followed so that failure scenarios are tested

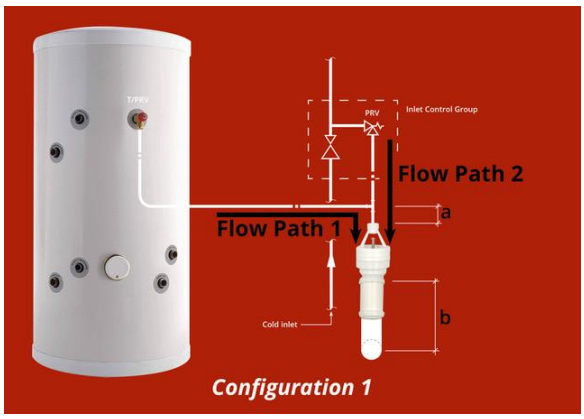
We therefore recommend and make it part of our MI's that all our hotun range products are tested after initial installation both for trickle and full flow capability (see our Technical bulletin video clip on our you tube channel and website www.hotun.co.uk

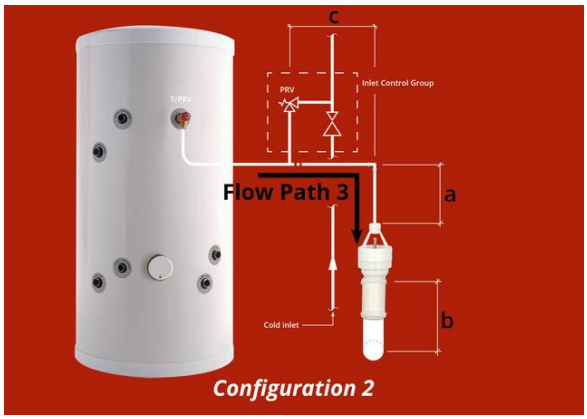
Trouble shooting

RA Tech was contacted by an installer who had experienced an issue when installing a hotun hiflo (HHW100C). Whilst the product worked perfectly well with the inlet control group PRV discharge was flowing at full volume (over 22LPM) when the T/PRV valve was operated the water did not flow as expected and the tundish was not able to operate as intended (please note that the rated flow of the hotun hiflo is 18LPM)

The installer also tested another tundish which exhibited the same issue. Initial thoughts turned to a possibility of a pipework flow dynamic issue and not a problem with the tundishes per se

We document the installers own video clip here together with the final pipework configuration layout and subsequent correct operation of the hotun hiflo tundish. here





The installer (Bruce Rothery Director/owner of HCS Halifax) initially put in his pipework depicted in diagram "configuration 1" (above) with the PRV from inlet control group (ICG) running (mostly) vertically down from the outlet into the top of the tundish, a distance of approximately 250mm (Flow path 2)

The discharge from the T&PRV from the cylinder however, came across from the cylinder at a much lower height and "t'd" into the vertical pipe immediately above the tundish (dimension "a" 30-40mm), necessitating that the water was forced to turn through 90deg immediately above and before entering the tundish (Flow path 1)

It was shown that the volume on this particular project was up at 22LPM and as high as 25LPM as measured on a weir gauge (bearing in mind that the actual volume discharge has so many variables what happens will be different from project to project)

Having closely observed the pattern of water flowing into the tundish in configuration 1, it was concluded that due to the close proximity of the "T" relative to the inlet to the tundish, the water, having to turn through 90Deg, became highly turbulent and was not entering the tundish in a suitable manner

The issue was resolved by slightly altering the pipework (as shown in diagram Configuration 2) The additional height or drop of pipework before entering the hotun tundish, allowed the water to sufficiently straighten out and flow normally, very much the same principal as a venturi or orifice plate.

Table 1

	As tested at a flow rate of 22-25 LPM			
Flow Path	a	b	c	Pass/Fail
1	35	200	N/A	×
2	35	200	N/A	✔
3	200	200	100	✔

Conclusions

It must be said that the issue of hydraulics and flow dynamics discharging into a tundish is governed by a few factors, those being, volume, velocity & rate of delivery from the D1 into the tundish but are separate to the factors that affect the ability of the water to flow away from the tundish and into the drain (D2). The two have

to work together but as we know that in this example the D2 can cope with the flow to drain we can isolate the D1 and make our conclusions accordingly and specific to the D1 pipework

The use of a “T” fitting forming the “elbow” or bend, may be a contributing factor to the turbulance (as opposed to the use of an actual elbow or swept bend at point of entry) and therefore defeated the normal operation of the tundish. Likewise, we are unable to conclude at what point (volume) the turbulence became “catastrophic” to the correct operation of the tundish

Therefore, and we must stress that each project tested according to our manufacturing procedures may have differing results. Suffice to say that on this particular project the normal operation of the hotun tundish was re-established by having 200mm of straight pipe above the hotun and the fitting used being a bend.

Would the flow turbulence be catastrophic at 18LPM with the branch “t’d” in as configuration 1 or with 100mm of straight pipe before the inlet?

We wanted to get to the solution that worked so we didn’t test other configurations and flow rates, if we replicated the installation on a test rig would that have yielded the same or different results than that experienced here on an actual site.

As a company, RA Tech UK Ltd, take the issue of the testing of our products very seriously, we have spent countless hours making sure the products perform to the specified ratings, we have our products independently tested to ensure an accredited body has verified that our products work as intended, but and this is a but that all manufacturers face, the behaviour of flow in an actual installation will vary from job to job.

It is therefore VITAL that our manufacturing instructions (MI’s) for the testing and verification of flow performance is carried out on each and every installation to ensure that the product will work properly when it is needed to.

As, Bruce has done here, he carried out the test and found that in one configuration the product did not work but by a simple change of pipework, all was ok.

As a company we will look to work with all our customers and if you experience a similar issue we will work with you and the benefit of that is that it will increase our knowledge base to make our products better in the future

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