

<b>Technical Note</b>			<b>TN-020</b>
<b>Test:</b> All tests			<b>Test no.:</b> All
<b>Assumption:</b> Primary DP 50 kPa			<b>Assumption no:</b> 45
<b>Rev:</b> 01	<b>Date:</b> 10/11/2021	<b>Author:</b> Josu Aurrekoetxea	<b>Checked:</b> Christer Frennfelt

## 1. Introduction

Currently all HIUs are tested with 50 kPa of differential pressure (DP) in the primary side. This technical note will determine if 50 kPa DP on the primary side to perform all tests is adequate. The goal is to set a common DP that will be used to test all HIUs.

## 2. Considerations 1. HIU specified minimum DP

HIUs need a minimum DP to operate. In theory the HIU should be able to achieve its maximum power with that minimum DP on the primary side. This means that the manufacturers specify in their datasheet the minimum DP of the HIU and it is expected that the HIU will be able to get enough flow on the primary side to deliver the power specified by the manufacturer. Most of the HIU manufacturers specify a minimum DP between 35 kPa and 50 kPa (sometimes referred as pressure drop). Therefore, it is considered that 50 kPa bar would be enough DP for the majority of HIUs. This specified minimum DP does not always include the heat meter pressure drop and this should be added to achieve the real HIU minimum DP.

## 3. Consideration 2. Design of DHN

As detailed in Consideration 1 above, the majority of HIUs design operating conditions are at, or below, 50 kPa. If this value was increased it would require an increase in the DHN pump size and would increase the power consumption of the pump.

## 4. Consideration 3. Representativeness of DHN DP

DHN controls will always keep the DP at least at the minimum pressure but it is impossible to achieve the minimum pressure at all HIUs. While the HIUs located at the index points of the DHN will see approximately 50 kPa, the HIUs closer to the plantroom will see higher DP. During periods of small demand all HIUs will receive DP close to the set point at the index point. During peak demand periods the HIUs closer to the plantroom will get higher DPs. At higher DP the HIU will be able to achieve enough flow for its peak demands but higher DP might cause problems with control valve authority, valves forced to open or noise. For this reason, HIUs shall specify a pressure range including maximum and minimum DP.

## **5. Conclusions**

50 kPa is a good set point to see the HIU operating at a value within its operation range. It is an industry accepted value, and it can be considered a good industry standard to design future HIUs because it doesn't cause unnecessary system pump oversizing.

However, HIUs installed on site will be exposed to much bigger DP (depending on the size of the DHN) and constant 50kPa can be considered a comfortable steady value to achieve a good control that might not be representative of the HIU operation on site.

## **6. Recommendation**

Even though 50 kPa is a good value to test all HIUs it is recommended to analyse further the possibility of increasing the DP in future test and even consider variable DP to check the performance of HIUs in real life conditions.