



Affordable solution for temperature fluctuations

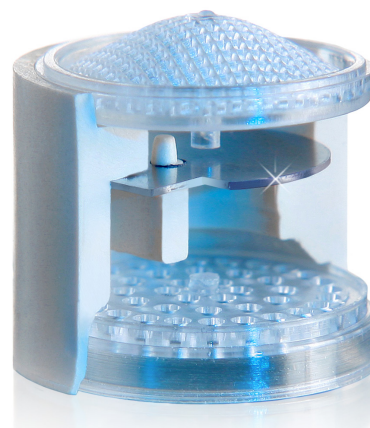
Showering without pressure fluctuations

Pressure fluctuations in the tap water system can affect thermostatic shower mixers. The resulting sudden temperature changes can be distressing and can even cause burns. A residential care centre in Grootegast, The Netherlands solved this problem by installing the pressure independent HL2024 Flow Controller in the bathrooms.

Text: Mari van Lieshout Photography: Industrie

This article is a translation of the original Dutch article that first appeared in E&W Installatietechniek in October 2018.

Fortunately, there were no real accidents, but it was certainly annoying. Residents and staff of Het Hooge Heem residential care centre increasingly raised the alarm because the water temperature in the bathrooms could vary greatly. The two wings of the four-storey Grootegast complex each have a hot tap-water system. Each apartment was affected by temperature fluctuations and changes in flow, but the closer it was to the water pressure boosting system, the more serious the problems became. The residents were particularly bothered when showering.



The actively regulating flow controller ensures a constant flow, resulting in a sharp reduction of temperature fluctuations at the tap.

Pressure fluctuations

Oeds Kuipers, director of the Kuipers Drinkwater Security consultancy, has an explanation for the pressure problem: 'The water meter, with or without a limiter fitted by the water company, has a maximum capacity. This capacity must be sufficient for the maximum instantaneous rate of flow of the system.'

In addition, the dimensioning of the installation must have been carried out properly', Kuipers analyses. 'During peak demand in a care facility, for example, it occurs in the morning and the pressure in the installation decreases. The pre-pressure of the water company may also vary.

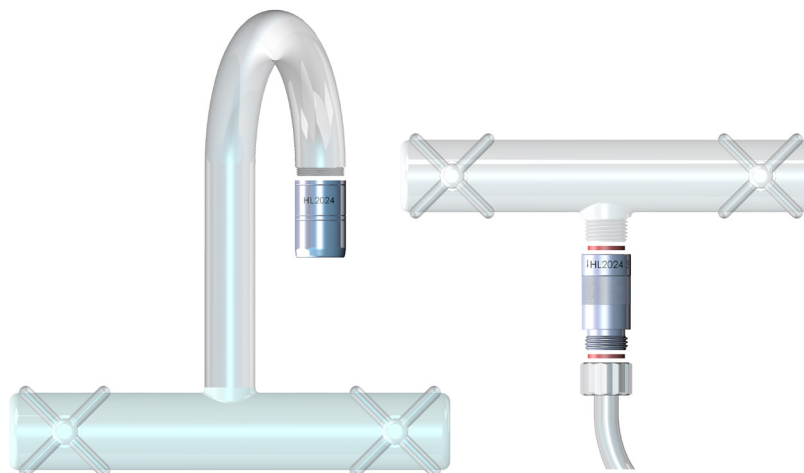
When the demand for hot water increases, extra water goes to the water heater. In this way, pressure is built up, which can reach more than 8 bar. So different pressures occur in the cold and hot water pipes', says Kuipers.

If plenty of hot tap water is also being used by the large kitchen equipment, the pressure fluctuations can be enormous. According to Kuipers, it is therefore often quite a challenge to design a tap water installation that can deliver the required performance under all circumstances.

'What made the problem of simultaneity even more difficult in the case of Het Hoohe Heem', he continues, 'was the connection with the Solar Energy Roof that supplied hot tap water. Also, if the dimensioning is too tight, water hammer may also occur when a tap is turned off, which in turn affects the water pressure elsewhere in the installation. However, it is unavoidable that when valves are opened and closed, pressure fluctuations occur in the system, however small and brief. Because small and large pressure differences in cold and hot result in varying flow rates, which in turn affect the thermostatic shower mixer, it cannot function optimally and the temperature is not adjusted quickly enough.'

Affordable solution

Adjusting the settings of the speed-controlled pumps of the pressure boosting system is not a solution to the problem in Het Hoohe Heem. A speed-controlled pump with the installation downstream from it will not react quickly and adequately enough to pressure fluctuations and pressure ripples. On the advice of Kuipers Drinkwater Security, it was decided to opt for the HL2024 technology (see www.hl2024.nl), supplied



The place where the HL2024 is mounted in the mixer or shower hose.

'Investing in flow controllers in a family is often recouped within six months.'

by Cenergist. 'It's an affordable solution,' says Kuipers. 'It is an investment of around seventy euros per thermostatic shower mixer, excluding installation. The actively regulating flow controller ensures a constant flow –

independent of the dynamic pressure, resulting in a sharp reduction of temperature fluctuations at the tap. The flow controller is mounted between the existing S coupling (hot and cold) and the thermostatic mixer tap.

At first glance, it appears to be a simple appendage, but it took many years of research and thousands of tests before the desired pressure independence could be guaranteed. It is the only flow limiter that has been certified to Kiwa BRL-K635 and is also equipped with the Kiwa Watermark.

After assembly the limiter works quickly and effectively, no adjustment is necessary. The innovation of this patented product lies in a combination of high-quality materials and a smart design.

Unique technology

'The results are achieved by a unique combination of high-quality stainless spring steel with a special engineering plastic. This ensures fast, accurate and long-lasting operation,' says Alexander van der Upwich of producer HGP International.

'In the production of the limiters we work with very small tolerances. This results in an accuracy comparable to the production of optical lenses. The HL2024 Flow Controllers provide a (virtually) constant and thus maximised flow of 5.0 l/min cold and 5.0 l/min warm at the inlets of the thermostat-controlled tap, independent of the dynamic pressure in the cold and hot pipe. Pressure fluctuations no longer lead to flow differences towards the thermostatic mixer, which drastically reduces temperature fluctuations. Moreover, offtake in the entire installation is more constant, which in turn results in a quieter operation of the system.'

While the temperature in the thermostatic mixers

Residential care director Lindeboom: 'Increased comfort and safety'

Het Hoohe Heem residential care centre in Grootegast has 66 care apartments and offers temporary and day-care facilities.

Since the installation of the HL2024 at the inlets to the shower taps, the complaints about significant temperature fluctuations during bathing have disappeared. 'The shower comfort, safety and level of comfort of our residents has increased. And all this without major modification of the installation. We are very happy with that,' says director Klaas Lindeboom.

'The residents and management are extremely satisfied.

The work in the apartments could be carried out in less than ten minutes and did not cause any nuisance. We now consume much less water and energy. And that fits in perfectly with the green aspirations of our care centre.'

of Het Hooge Heem could previously vary from 4 to 6°C, the fluctuations have now been reduced to less than 1°C, according to Van der Upwich. Many limiters from other suppliers contain an O-ring, which reacts differently to increasing and decreasing pressure. This type of limiter is usually less fast and accurate and, over time, its operation decreases further, resulting in too large flow differences.

Kiwa has demonstrated that functionality with the HL2024 is guaranteed for at least ten years.

Quick installation

The installation of the flow limiters was carried out by Nijboer Installatie Expertise from Marum. The installation of the products was fast and flawless according to owner Durk Nijboer. Within ten minutes my technicians at the Hooge Heem had fitted both inlets of the thermostatic taps with the limiters. The flow controller has a special threaded connection for a suitable connection to the mixer. In this version, the mixer ends up 22 mm further from the wall. This is not really a problem. The version of the S coupler with integrated flow controller is no longer visible after installation.

According to Van der Upwich, investing in flow controllers in a family is often recouped within six months. 'We have developed a calculation tool to determine the savings in terms of water consumption and energy.

The tool has been validated by the KWR Watercycle Research Institute.

A Dutch hotel chain, among others, had HL2024 Flow Controllers installed and the water consumption per guest fell by thirty litres per day. Incidentally, the savings do not only concern water and energy. Large

In England, HL2024 Flow Controllers save 75 billion litres of hot shower water each year.

Spring element made of high-precision spring steel.

The housing of the HL2024 is made of high quality synthetic material.

Two custom designed sieves protect the control mechanism of the HL2024 and ensure that no particles can remain in the flow unit.

Exploded view of the HL2024 Flow Controller

users are charged for the amount of water they discharge into the sewer system. For a hotel that manages to save thirty litres per guest, this can quickly result in savings of hundreds of euros in sewerage charges per year. Van der Upwich cites a specific example: 'In Amsterdam, sewerage charges increase excessively if more than 301 m³ of water is used per year. In that case a flow controller can quickly repay itself.'

England

It is worth noting that the product has been satisfactorily used in the United Kingdom for more than eight years, while Dutch installation contractors are unfamiliar with it. Van der Upwich: 'In England, the flow controller is used in showers in homes. More than 6 million HL2024 products were placed in a national energy saving campaign.

They are placed between the shower mixer and the shower hose, so that the pressure build-up does not take place in the hose. In England, they save 75 billion litres of hot shower water every year. The product seems relatively simple, but it isn't. The HL2024 has a wide range of applications. A flow controller placed upstream from the valve shut-off device prevents temperature fluctuations. If the HL2024 is installed downstream from the shut-off valve, this will ensure a constant lower flow and result in a considerable saving of water and energy.'

For example, a so-called 'Cradle' is available, with a maximum of three flow controllers placed in parallel. Multiple positions are also possible. In addition to many possibilities relating to the desired flow rate, the Cradle also offers very quick and easy maintenance. With 'in-line' (in the system) flow control, water flows can be optimally regulated and this limits the required pump capacity. Because if the flow rate on the ground floor is limited in a multi-level building, the pump for the upper floor needs to supply less energy and each occupant will receive the same amount of water. In addition, fewer pressure fluctuations will occur on the upper floors. <

Recommendations ST 35 study

UNETO-VNI and TVVL reported last year on the ST 35¹ study into the cause of temperature variations in mixers and shower mixers.

'Research was needed because it was a frequently heard practical problem and there were no design rules for it,' says Eric van der Blom, Sanitary Technology specialist at UNETO-VNI. The research showed that in order to limit temperature fluctuations, the size of the distribution pipes must be increased (max. 80 kPa pressure loss) and the service mains must have more pressure loss than the distribution pipes. 'However, things were never designed this way and this will be difficult to achieve in practice,' says Van der Blom. 'The use of pressure-independent flow limiters at the tapping points is actually the only and most cost-effective option for minimising temperature fluctuations in existing installations. But even with new installations, it remains a very good option.'

¹ Voorstudie ST 35, 'Beperken van drukschommelingen aan inlaten van douchemengkranen', commissioned by TVVL and UNETO-VNI, the Netherlands.