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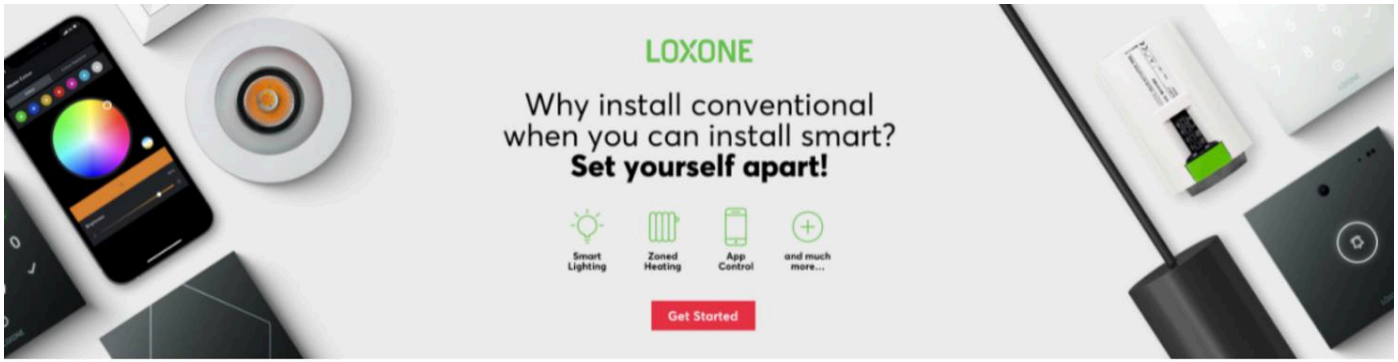


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# MATERIAL MATTERS WHEN CHOOSING A TRV – A GUIDE FOR INSTALLERS

Posted on April 12, 2021 by Dan Cash

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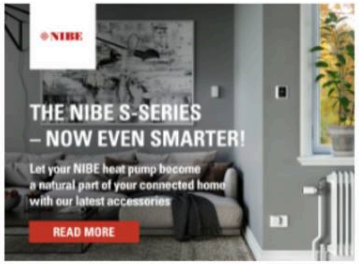

Gareth Ash, Marketing Manager at Danfoss, explains why the

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Gareth Ash, Marketing Manager at Danfoss, explains why the **material used in a TRV sensor is key to helping installers make a more informed product choice.**

Properly selected and installed, TRVs are proven to provide accurate temperature control in individual rooms, reducing heating costs and enhancing comfort. Fitting TRVs prevents the unnecessary – and expensive – overheating of empty rooms, whilst ensuring that occupied rooms are comfortably warm. Having this level of control can really help households reduce their heating bills and their carbon emissions. It's not surprising, therefore, that TRVs are one of the most widely used heating controls. However, not all TRVs are the same. Knowing the main differences between the various products on the market, particularly the material used in the sensor, will help installers avoid potentially costly call-backs if the TRVs they've fitted don't perform as promised.

## Basic concept

As every professional heating installer will know, TRVs work by sensing the air temperature around them and regulating the flow of water through the radiator to which they are fitted. Inside each TRV head is a sensor containing a material which expands as the room temperature warms up and contracts when it cools down.

The sensor is connected to a valve seat inside the body that opens as the sensor contracts and closes as the sensor expands to allow more or less water through. Whilst this concept is in itself very effective, the material used inside the sensor will affect the TRV's overall performance and accuracy. This is because different materials have different thermal properties, initially and over time. According to basic scientific principles, the weight and density of the material used to fill the sensor has a direct impact on the time it takes for the TRV to respond to a change in room temperature.

A lighter filling will expand and contract more quickly than a heavier material like wax, for example, which is used in some products. Needless to say, a TRV that offers a faster response to a change in ambient temperature means improved comfort and energy savings for end-users.

## Sensor materials

As explained, the speed of reaction to a change in room temperature will depend on the material used by the sensor. On average, response times for the different types of modern TRV sensor are:

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sensor are:

- Electronic: 1 minute
- Gas: 10 minutes
- Liquid: 22 minutes
- Wax: 40 minutes

These figures clearly demonstrate the significant variation in response times and we believe this difference is something installers should be aware of when selecting TRVs for their customers.

Apart from a slower reaction time to a temperature change, the wax used in a TRV sensor has, in many cases, a tendency to change consistency over time. This is primarily due to the crystalline composition of wax. The crystals become bigger with constant expansion and contraction.

This makes the wax harder and heavier so it needs a higher temperature to react. Whilst this process may take up to a year, during that time the end-user will find they are having to increase their temperature settings in order to achieve the same level of comfort. Making this incremental adjustment over time can make a big difference to heating costs and may ultimately negate the potential energy savings of installing TRVs.

Lighter than a wax filling, using liquid in a sensor will offer greater accuracy and a faster response. In addition to this benefit, the composition of liquid means that, unlike wax, it is less likely to deteriorate over time. As a result, this type of sensor delivers more consistent performance over the life of the product – a major selling point for installers and end-users alike.

## Comprehensive range

When selecting TRVs, installers can be assured that no Danfoss TRV has a wax-filled sensor. Our comprehensive range covers a wide variety of products to suit different needs. For example, the recently launched RAS-B$^2$ Danfoss Dynamic Valve has a liquid-filled sensor and features a differential pressure controller to enable fast and simple hydronic balancing.

We have also developed an advanced TRV range with gas-filled sensors such as the RA 2000, which offers an impressive 10-minute response time and is purpose-designed by Danfoss for quick and easy installation and user control. Last, but by no means least, is the Danfoss Eco, a standalone smart thermostat that works with Bluetooth technology, which ensures the

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that works with Bluetooth technology, which ensures the optimal response to ambient temperature change.

**So, to sum up, we know that** TRVs are proven to help households save energy and improve comfort, but in order to maximise these benefits it is important to know what's inside the sensor. By knowing the different materials used in these products installers can make a more informed choice for their customer and help maintain the TRV's rightful reputation as a cost-effective, energy saving heating control. If there is any doubt, **installers can always check out the various options on manufacturers' websites or just ask their supplier's advice before buying.** For more information visit www.danfoss.com.

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