engineered for cunning performance

FRV

The Flow Regulating Valve

As simple as they are revolutionary. Balancing radiators in a heating system seems like it should be simple, yet it is difficult, time-consuming and often pretty inaccurate. No more!

Correct balancing helps keep running costs down, and improves comfort by ensuring there is consistent warmth in every room of the home.

- Quickly, easily and effectively balance radiators, ensuring each room gets the correct amount of heat
- Say goodbye to some rads that get too hot, and others that never do.
- Perfect for use with heat pumps, especially with open loop, weather compensated systems.
- Great for conventional gas, oil and biomass boilers, in both new and existing systems.
- Keep the TRVs if you want because the FRV only takes the place of the lockshield.
- 15mm compression fitting, with an extra seal between the FRV and radiator.

Instructions - existing systems

Calculate Flow Requirement - work out the Delta T room>radiator; subtract the room temperature from the mean water temperature (MWT) in the radiator. E.g. if the radiator has a flow of 46° and a return of 41°, then the MWT is 43°. If the desired room temperature is 20°C, then the Delta T room>radiator is 23°C (43 - 20). Measure the surface area of the radiator, and then multiply that by the last column in the FRV table (l/min/m²). This is the flow rate required for that radiator. Note it down. Add all radiator flow rates together to work out the total flow required.

Apply Tolerance - Add 15% to the total for tolerance.

Valve Adjustment - Fully open all FRVs for maximum flow through each radiator.

Set Pump to Constant Speed - Configure the pump to operate at a constant flow.

We recommend using a flow meter for speed and accuracy.

If you DO NOT HAVE a Flow Meter then:

Set the Pump to Maximum Speed.
Balance Radiators - Begin balancing the system from the radiator nearest to the heat source. Refer to your previously calculated flow rates for each radiator. Gradually adjust each valve to achieve the correct flow rate before moving on to the next radiator.
Repeat if Necessary - If the radiators at the end of the system receive excessive flow or overheat, turn the pump speed down, and repeat the balancing process (step 2) starting again from the first radiator.

If you HAVE a Flow Meter;

Set the Pump Speed - To achieve your previously calculated total flow rate.
Balance Radiators - Begin balancing the system from the radiator nearest to the heat source. Refer to your previously calculated flow rates for each radiator. **Hold the black section of the flow meter and turn to adjust.** Adjust each valve to achieve the correct flow rate before moving on to the next radiator.
Fine-Tune - Recheck and adjust pump and radiator flows as needed.

Secure Settings - Fit red locking rings and covers once flows are correct.
Potentially reset the Pump - for systems that rely on dynamic pump settings.

Delta T Flow	Delta T room-radiator	l/min/m²	
5	20	1.3	Typical Delta T range for heat pumps
5	25	1.7	
5	30	2.2	
5	35	2.7	
5	40	3.2	
5	50	4.3	
7	20	0.9	
7	25	1.2	
7	30	1.6	
7	35	1.9	
7	40	2.3	
7	50	3.1	
15	20	0.4	Typical Delta T range for conventional boilers - gas, oil, biomass
15	25	0.6	
15	30	0.7	
15	35	0.9	
15	40	1.1	
15	50	1.4	
20	20	0.3	
20	25	0.4	
20	30	0.6	
20	35	0.7	
20	40	0.8	
20	50	1.1	

Too Low Flow? - *Check for* faults. If none use a bigger pump, or accept higher Delta T.

⚠ Changing Delta T affects efficiency.

You may need higher radiator outputs, or a higher flow temperature. Restart balancing if Delta T or flow temperature is changed.

Keep It Efficient - *Aim for only the required flow. Excess flow wastes energy and causes noise.*

Fit, set, forget

Instructions - New systems

For new heating systems a room-by-room heat loss calculation should have been carried out. The radiators for each room are then sized according to their output at the design flow temperature. There should then be a list of the radiator outputs to work from - for example there is when you use Heat Punk software. To convert the heat output of a radiator to the required flow rate is a simple task. Simply take the heat output of the radiator in kW, and then multiply by the right factor as shown below to work out the required flow rate in litres/minute. Now follow the balancing method as detailed above.

Heating appliance dT	Flow Factor
5	2.9
7	2.0
10	1.4
15	1.0
20	0.7

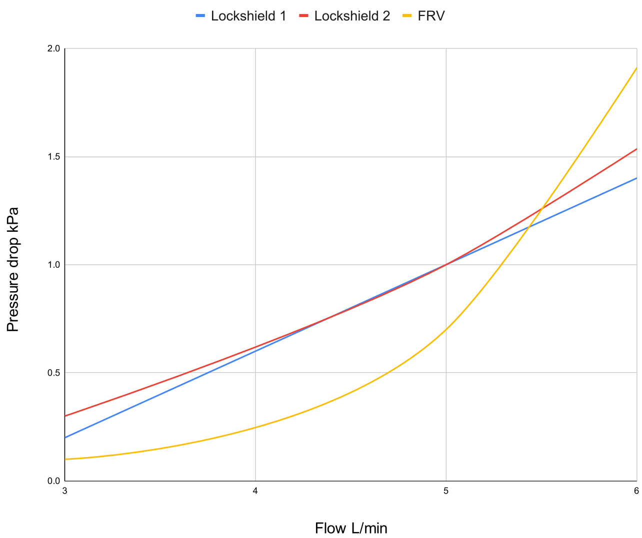
For a system powered by a heat pump the dT is typically 5, so the factor to use is 2.9. As a practical example, if a radiator had a required output of 1.2kW, then the flow rate that it should be set for balancing would be:

1.2 x 2.9 = 3.48 l/min

Even when you have a list of flow rates from heating design software, these flow factors are a helpful way to do quick on-site sanity-checks, to make sure you are in the right ballpark.

Pressure Drop

Using an FRV valve is unlikely to increase the pressure drop in the vast majority of domestic radiator systems. In fact it's more likely that they will result in a reduced pressure drop compared to using lockshields.



Pressure drop through an FRV valve was measured, against two leading brands of lockshield. Up to around 5.5 l/min pressure drop through the FRV was lower. Above this flow rate the pressure drop increased slightly, however, 5.5 l/min equals 1.93 kW at dT5, and 5.8 kW at dT 15. The majority of radiators will require a lower flow than this, in which case the pressure drop will be lower than when using a lockshield.

FRVs are rated to 10bar working pressure, and have been stress tested to 20bar.

Fit, set, forget