T6-CENTRALLY CONNECTED RADIATOR.

Heat emission
The specification was verified in accordance with DIN EN 442 at The Technical University, Stuttgart (Registration at WSP-Cert Product Certification Centre, Stuttgart), under the numbers:

Type 11 VM	0445
Type 21 VM-S	0447
Type 22 VM	0448
Type 33VM	0449

and in accordance with OENORM (Austrian standard) EN 442 at the Technological Commercial Museum, Vienna.

Material
T6-CENTRALLY CONNECTED RADIATORS are made of cold-rolled sheet steel, and in accordance with EN 442-1, with a stylish and robust fluting with ribs at 40 mm intervals.

Equipment
Each T6-CENTRAL CONNECTION RADIATOR is equipped with an integrated T-valve set, and suitable for double-pipe and single-pipe systems with a single-pipe manifold; it comes with a fitted valve top with a pre-set k_v-value, a protective cap and welded suspension brackets on the back. The drain plug and the pivoting special vent plug, as well as the dummy plug are fitted with seals. All types of radiator are equipped with a detachable top cover and two closed side panels.

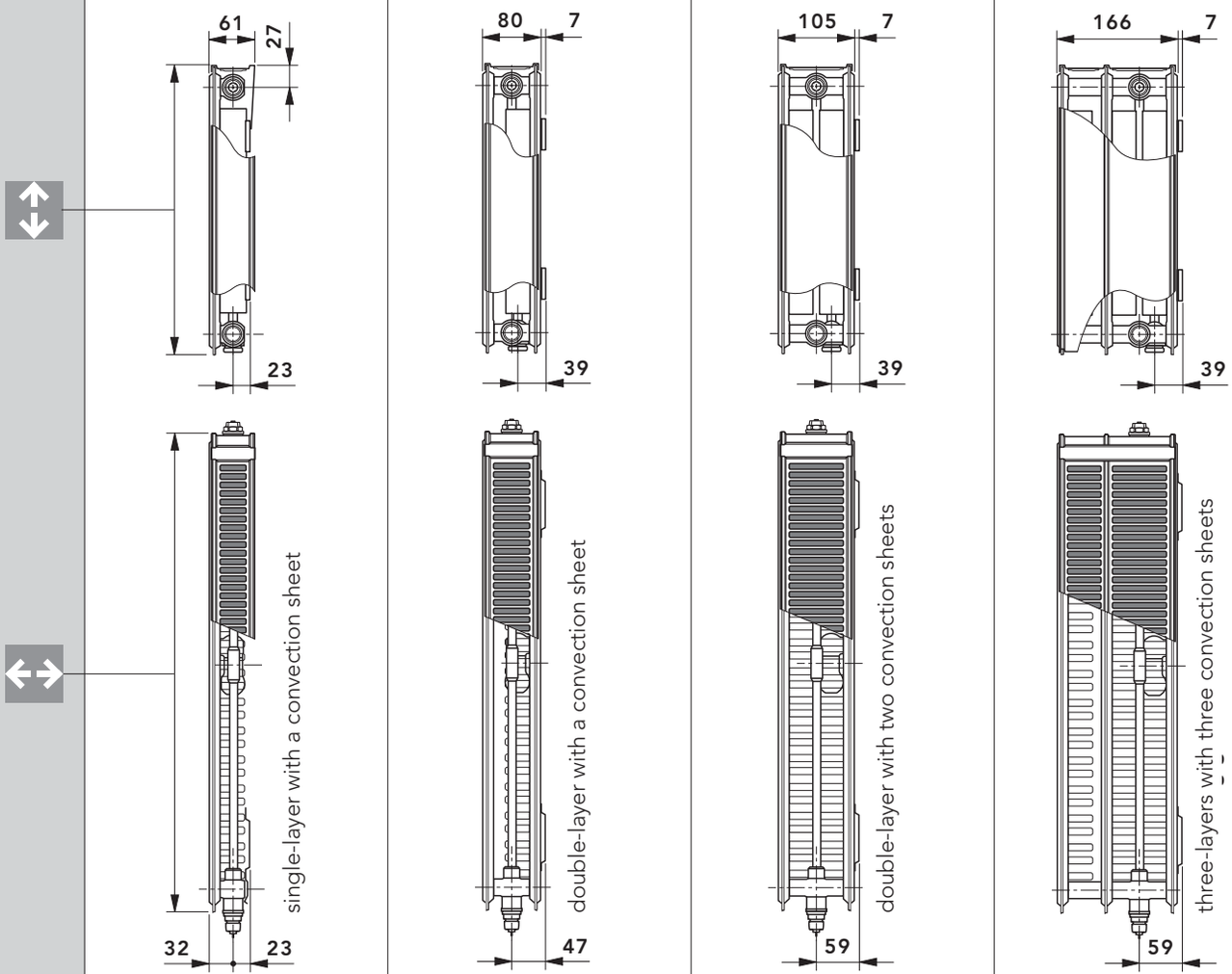
Paint coating
1. Undercoating in accordance with DIN 55900 part 1, stoved at 190° C.
2. Finish in accordance with DIN 55900 part 2, in standard colour 9016 (on request available in many standard colours and sanitary-ware colours at an extra charge), applied electrostatically in a modern powder coating facility. This especially resistant coating is stoved at an object temperature of 210° C.

Packaging
1. Cardboard packaging
2. Edge protection
3. Shrink foil

T6-CENTRALLY CONNECTED RADIATOR

Overview of models

Overview of models



Type	11 VM					21 VM-S					22 VM					33 VM				
Height [mm]	300	400	500	600	900	300	400	500	600	900	300	400	500	600	900	300	400	500	600	900
Length [mm]	up to 2400		up to 2600		up to 2000	up to 2400		up to 3000		up to 2000	up to 3000				up to 2000	up to 3000	up to 2200			up to 1800
Steps	all overall length starting with 400 mm available in steps of 200 mm, additionally 520, 720, 920, 1120 and 1320 mm																			

Guarantee statements are available to download at **www.vogelundnoot.com/download**

Description and delivery equipment

The T6-CENTRALLY CONNECTED RADIATOR, with its welded-in set of T-shaped valves, sets new standards in the field of centre-connection technology. Besides its elegant appearance, the T6-CENTRALLY CONNECTED RADIATOR grabs the attention because of its unique patented features. It is suitable for all purposes and easy for the heating engineer to install. It also has many other striking advantages, as listed below:

T6-CENTRALLY CONNECTED COMPLETE RADIATORS -
wall bracket fastenings make this a flexible solution

VARIABLE CONNECTIONS -
the built-in valve and its thermostat head can be switched from the right to the left-hand side – with no need to turn the radiator and without crossing over the supply and return.

VARIABLE TYPES -
with all multi-layered radiators the distance between the connection and the wall is standardised (this also applies to all single-layered radiators, if a special angle fish-plate is used).

VARIABLE SIZES -
you are free to choose the overall radiator length and height at any time, and even subsequently change your mind.

PERFECT PRE-ASSEMBLY -
fitting pre-installation piping and system testing are possible even without having the radiators there.

Consequently T6-CENTRALLY CONNECTED RADIATOR truly serves to solve your problems. To round off all the advantages mentioned before, the versatility of the T6-CENTRALLY CONNECTED RADIATOR regarding style and colouring offers a wide scope for design. By using the removable, unique and colourful decor-clips you can give individuality, also subsequently.

The T6-CENTRALLY CONNECTED RADIATOR is - with its welded in set of T-shaped valves - suitable for double-pipe installations as well as single-pipe installations, using a single-pipe manifold.

Additionally to the central connection from the bottom, the sophisticated design makes possible other connections used at compact radiators, such as the single-sided and two-sided connection. **Radiators are delivered ready for double-pipe installation and with a factory-adjusted k_v-setting, appropriate to the radiator output.**

For district heating installations with a big difference between water supply and return temperature, a valve unit that allows a precise and stepless adjustment is available on request.

By using universal supply and return connections, commercially available pipes (external thread 3/4") made of copper, steel, plastic or alloy, can be connected; the corresponding accessories and the commercially obtainable shut-off valve have to be used.

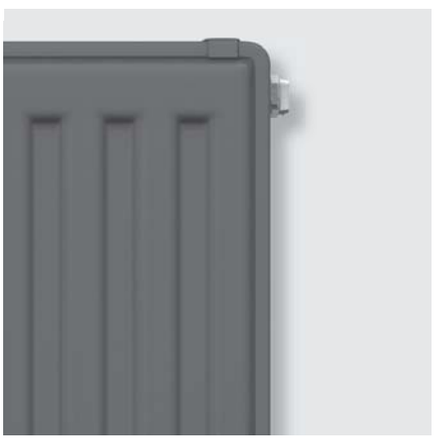
The following thermostat heads can be directly fitted at the radiator: „RA 2000" and „RAW" by Danfoss, „VK" by Heimeier, „D" by Herz, „thera DA" by MNG, as well as „UNI XD" by Oventrop. The radiator will be delivered with a protective cap.

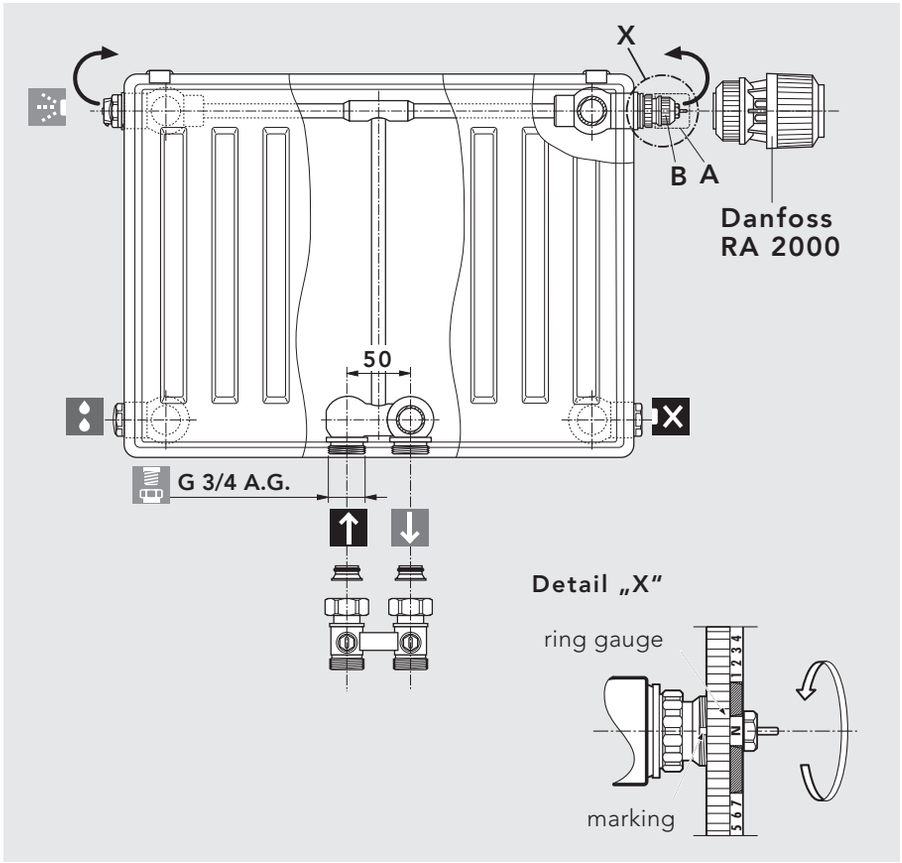
The operation parameters are specified with a positive operating pressure of 10 bar and an operating temperature of 110° C. With single-pipe installations, a cycle's maximum radiator power of about 10 kW at $\Delta T=T_1-T_2=20$ K (at T_1 = 90° C) has to be taken into account.

Thus the T6-CENTRALLY CONNECTED RADIATOR has to be regarded as revolutionary for the new generation of centrally-connected radiators. With this type of radiator - with its ideal functioning of the whole radiator-valve unit, its superb heating output, compared with the motivation to install thermostat heads, saving heating energy becomes evident.

Our valve radiators' connections (external thread G 3/4") comply in construction and tolerance with the specifications, in accordance with DIN V 3838. If conically sealed drain cocks are used (single-pipe and double-pipe operation), where an adjustment of tolerance of distance to the centre is not possible, we must repudiate liability for any damage connected to this.

Therefore we recommend to use only flat sealed drain cocks, or drain cocks where an adjustment of tolerance of the distance to the centre is possible.





Setting instructions:
VOGEL&NOOT valve radiators are factory-fitted for double-pipe installations. Each individual radiator is fitted with a pre-adjusted valve insert, appropriate to the radiator output. The pre-set k_v-value is also marked in colour on the front surface.

Please note:
Should customised adjustments be required, the pre-set kv-values can be altered as needed.
Swapping the right-hand side built-in valve to the left-hand side is no problem at all at any time.
Radiator are delivered with protective caps. After removing the protective cap (pos. A) the following thermostat heads can be fitted directly to the built-in valve (pos. B): **"RA 2000", "RAW" by Danfoss, "VK" by Heimeier, "D" by Herz, "thera DA" by MNG and "UNI XD" by Oventrop.**

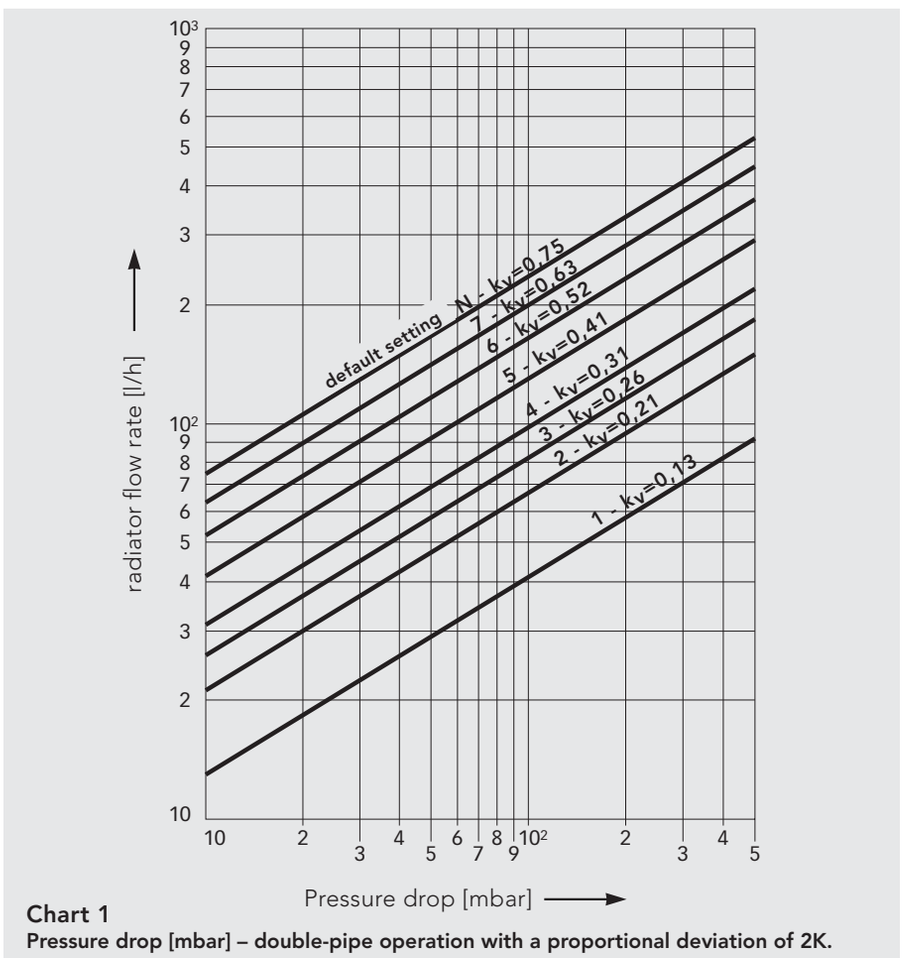
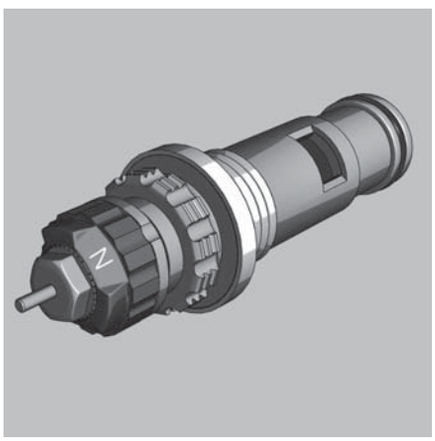


Chart 1
Pressure drop [mbar] – double-pipe operation with a proportional deviation of 2K.



k_v-value chart					
Pre-setting	1,1	3,9	5,2	6,5	N
kv-value up to	0,13	0,30	0,42	0,56	0,72
Colour of the adjustment ring	white	black	green	blue	red

Of course it is also possible to change the pre-adjusted valve setting when the equipment is operating at pressure.

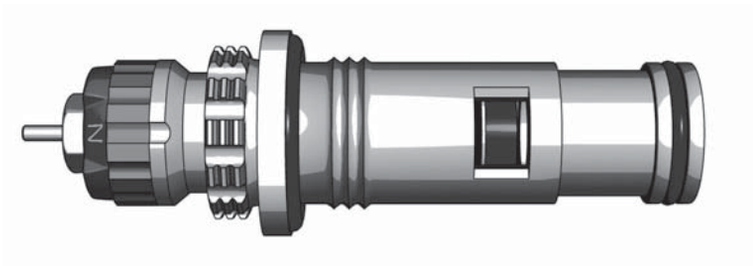
Hydraulic calibration

The hydraulic calibration of the heat emission system has two essential effects: saving on energy costs and CO_2 reduction. It ensures that all radiators receive the required flow rate of heating water. This is the only way that optimal heat output performance be achieved, guaranteeing thermal comfort, with economical and ecologically responsible operation.

Any radiator requires a specific flow rate of heating water, according to its position in the distribution system. The circulation pump serves to distribute heat in all rooms equally and in accordance with the required ambient temperature. Yet, in most systems the warm heating water flows back along the line of least resistance, which is usually through the radiator located next to the circulation pump.

This means that the radiators furthest from the circulation pump are inadequately supplied with heating water, whereas the nearest are oversupplied! Very often the reason why rooms are inadequately heated or overheated is attributed to either an under-size pump or heating sources that are too weak. However, larger pumps, high supply temperatures and heating controls make the negative effects worse: lack of comfort and high energy costs, as well as higher CO_2 emissions and more noise.

The only effective remedy for this is hydraulic calibration, with the appropriate k_v-value, pre-adjusted by the factory. This makes the resistance of all the radiators in the distribution system similar, and they get an optimal rate of heating water flow.



Factory pre-adjustment

VOGEL&NOOT valve radiators are already factory-fitted with pre-set and adjustable valve inserts, appropriate to the heat output. The valve inserts fitted as standard allow for 8 main k_v-value settings and 7 intermediate settings.
The factory-adjusted k_v-value settings include 5 of 15 possible settings, and are calculated for standard heating systems with a pressure difference of 100 mbar.

Advantages of the valve inserts in VOGEL&NOOT valve radiators

Continuously opening and infinitely variable control apron

- Finer adjustment
- Reliable operation
- More easily cleaned valve inserts

Colour-coded valves

- Set k_v-value immediately visible

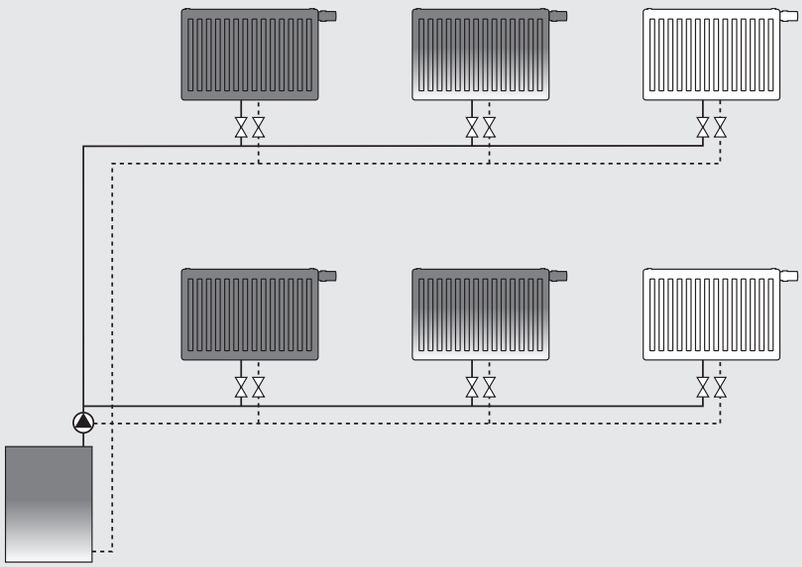
The advantages of factory-adjusted valve settings

- Optimal hydraulic calibration for buildings with operational areas up to 1,000m2
- Better energy evaluation of buildings (DIN EN 18599)
- Credits for the Energy Passport
- Saves time and costs for heating planners, installers and plumbers
- Up to 6% energy saving, after hydraulic calibration
- Up to 20% less energy needed for circulation pump

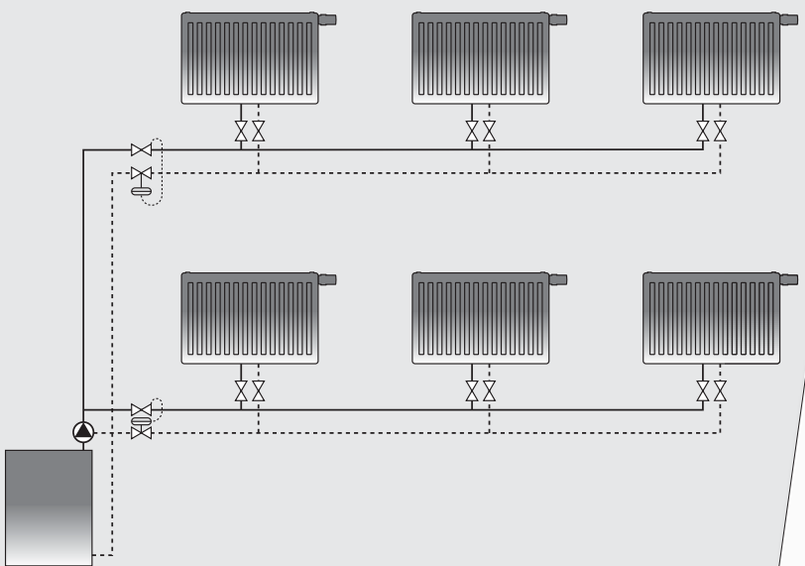
The advantages of hydraulic calibration

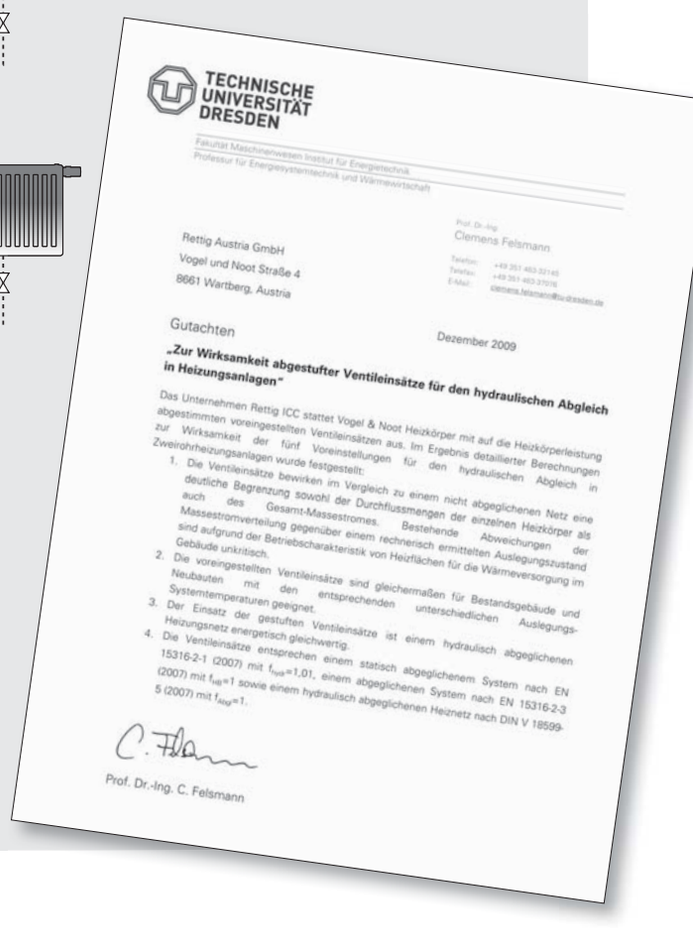
- Up to 6% energy saving
- CO_2 reduction
- Increased comfort
- Complies with Energy-Efficiency regulations

A system without hydraulic calibration



A system with hydraulic calibration





TECHNISCHE UNIVERSITÄT DRESDEN

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Gutachten

Dezember 2009

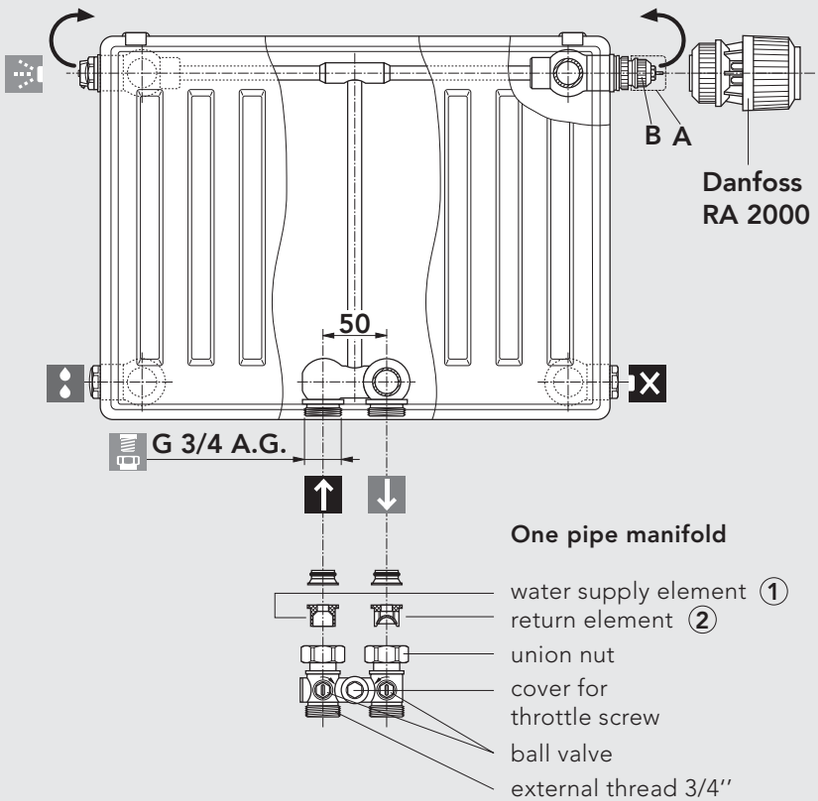
„Zur Wirksamkeit abgestufter Ventileinsätze für den hydraulischen Abgleich in Heizungsanlagen"

Das Unternehmen Rettig ICC stattet Vogel & Noot Heizkörper mit auf die Heizkörperleistung abgestimmten voreingestellten Ventileinsätzen aus. Im Ergebnis detaillierter Berechnungen zur Wirksamkeit der fünf Voreinstellungen für den hydraulischen Abgleich in Zweirohrheizungsanlagen wurde festgestellt:

1. Die Ventileinsätze bewirken im Vergleich zu einem nicht abgeglichenen Netz eine deutliche Begrenzung sowohl der Durchflussmengen der einzelnen Heizkörper als auch des Gesamt-Massestromes. Bestehende Abweichungen der Massestromverteilung gegenüber einem rechnerisch ermittelten Auslegungszustand sind aufgrund der Betriebscharakteristik von Heizflächen für die Wärmeversorgung im Gebäude unkritisch.
2. Die voreingestellten Ventileinsätze sind gleichermaßen für Bestandsgebäude und Neubauten mit den entsprechenden unterschiedlichen Auslegungs-Systemtemperaturen geeignet.
3. Der Einsatz der gestuften Ventileinsätze ist einem hydraulisch abgeglichenen Heizungsnetz energetisch gleichwertig.
4. Die Ventileinsätze entsprechen einem statisch abgeglichenem System nach EN 15316-2-1 (2007) mit f_{hyd}=1,01, einem abgeglichenen System nach EN 15316-2-3 (2007) mit f_{hyd}=1 sowie einem hydraulisch abgeglichenen Heiznetz nach DIN V 18599-5 (2007) mit f_{hyd}=1.

Prof. Dr.-Ing. C. Felsmann

Single-pipe operation - Factory-adjusted built-in valve



In single-pipe operation, setting the built-in valve on N.

The radiator will be delivered with a protective cap. After removing the protective cap (item A) the following thermostat heads can be installed directly onto the built-in valve (item B): **„RA 2000" and „RAW" by Danfoss, „VK" by Heimeier, „theraDA" by MNG, as well as „UNI XD" by Oventrop.**

Caution:
During the installation take care that the return element ② has been installed at the water return, and the supply element ① at the water supply.

Changing the built-in valve from the right- to the left-hand side can easily be done at any time.

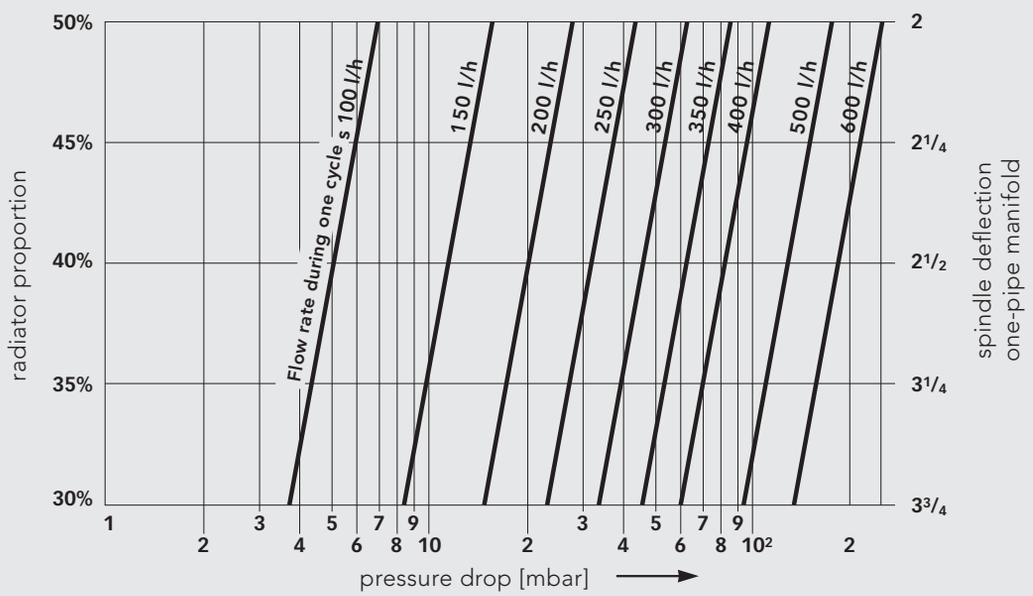


Chart 2
pressure drop [mbar] - single-pipe operation with a proportional deviation of 2K.

Default setting:

radiator proportion 30%: 3,75 revolutions *

radiator proportion 35%: 3,25 revolutions *

radiator proportion 40%: 2,50 revolutions *

radiator proportion 45%: 2,25 revolutions *

radiator proportion 50%: 2,00 revolutions *

*...when starting, turn the bypass spindle of the one-pipe manifold **to the right** as far as it will go.

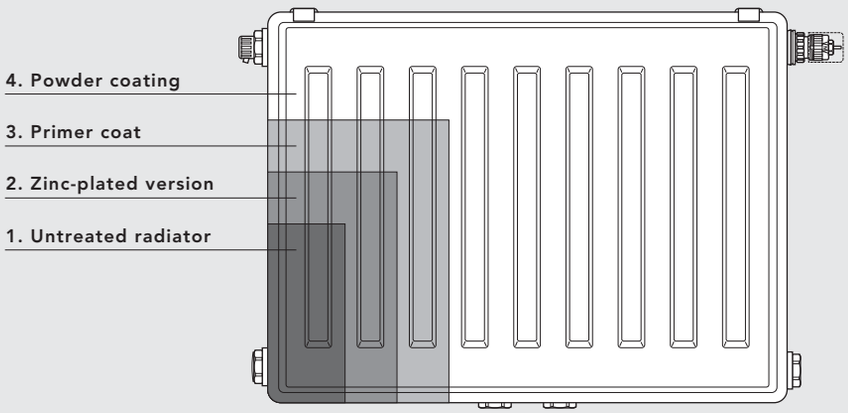
Of course it is also possible to change the pre-adjusted valve setting when the equipment is operating at pressure.

Please take into account the maximum power per cycle (regarding single-pipe installations) of about 10 kW
$\Delta T = T_1 - T_2 = 20$ K (at $T_1 = 90$ °C).

T6-CENTRALLY CONNECTED RADIATOR

Zinc-plated version /Connection modes - double-pipe system

Zinc-plated version - COMPACT RADIATORS and T6 CENTRAL CONNECTION RADIATORS



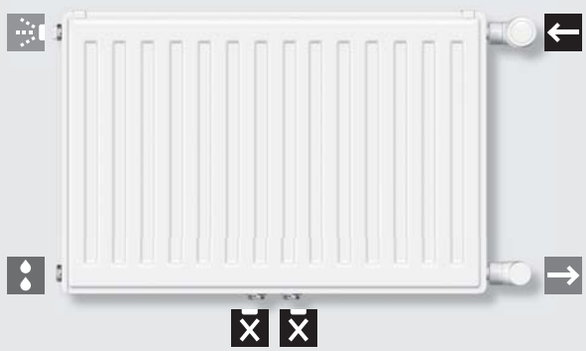
In areas of use that require higher corrosion protection, in rooms with aggressive surroundings and/or humid atmosphere (such as in indoor-swimming pools, saunas, public toilets, &c) we recommend using a zinc-plated version of our COMPACT RADIATORS and T6 CENTRAL CONNECTION RADIATORS. These radiators are galvanised, before the primer coat and powder coating is applied.
Prior to ordering radiators for these areas of use you should get information about the planned location for installing the radiator and in accordance to this, define its limits of use.

With zinc-plated radiators attention should be paid to special ordering and delivery instructions:

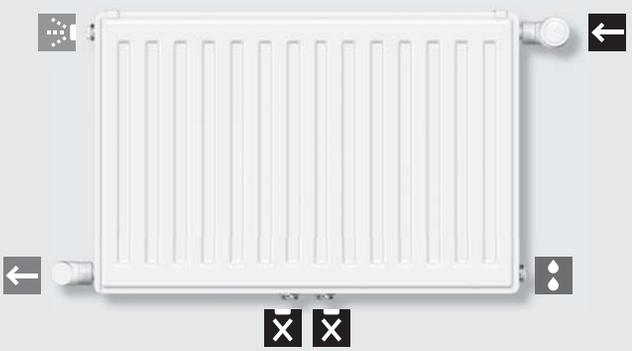
- All models of the series COMPACT RADIATORS and T6 CENTRAL CONNECTION RADIATORS are available
- Production is available only by special request.
- Radiators that have already been manufactured and delivered cannot be returned.
- The delivery period for this radiator is 4 - 6 weeks.
- The production is carried out for an additional charge to the currently recommended retail price.
- Our general warranty conditions apply.

Connection modes - double-pipe system

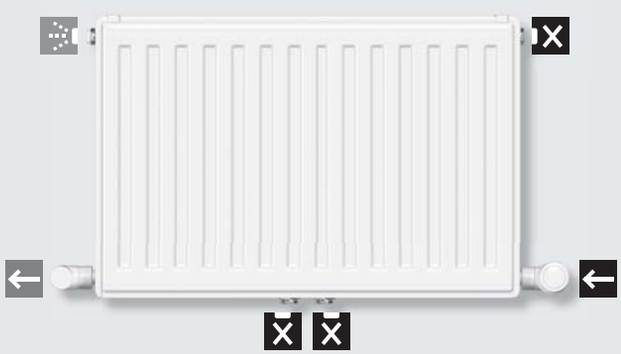
A:Single-sided connection



B: Connection both sides



C: Connection on top **Warning: Lower performance**



Caution:
When using the T6-CENTRALLY CONNECTED RADIATOR as a **compact radiator**, the 3/4" screwing caps made of plastic have to be replaced by nickel-plated brass caps (accessory). Available under the item number: AZ0PL000C0002000. Additionally the plastic part of the special vent plug has to be removed.

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