

barnova

INNOVATIVE PRESSURE COMPETENCE

TECHNOCAT

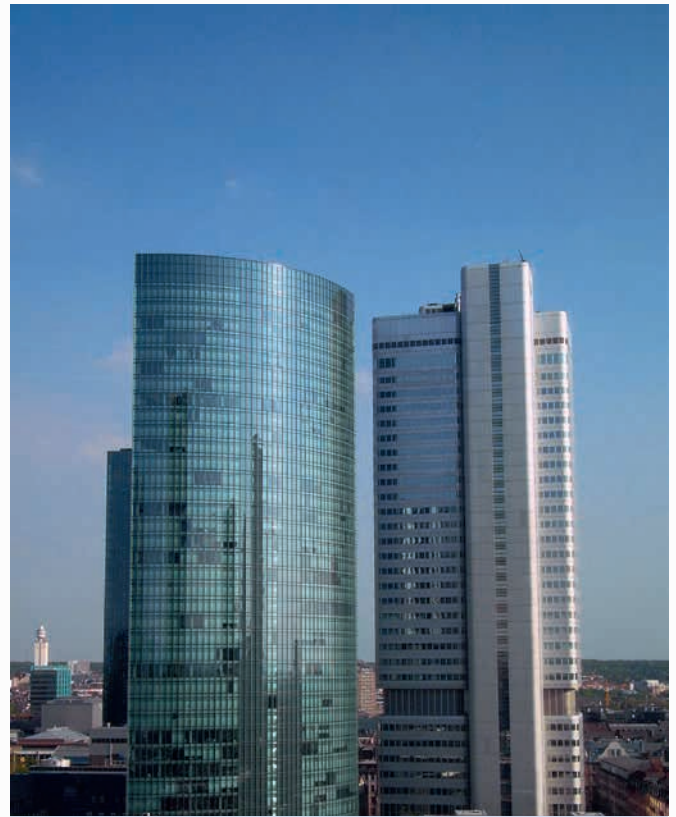
TC/TC mobil

- ✓ Deaeration
- ✓ Constant pressure
- ✓ Make-up feed
- ✓ Temperature measurement
- ✓ Oxygen measurement
- ✓ pH measurement
- ✓ Conductivity measurement
- ✓ Improving water quality



Pressure holding technology

Degassing technology



📍 Skyper Frankfurt

- 1 x TECHNOMAT NOVA 3 – 3.500
- 2 x TECHNOMAT NOVA 7 „S“ – 400
- 1 x TECHNOMAT NOVA 3 – 400
- 2 x TECHNOCAT 4

Various membrane expansion vessels from
150 litres to 2000 litres



Benefit!

Remain flexible
with TECHNOCAT mobil!

Barnova TECHNOCAT

The deaeration station that shows what it can do!

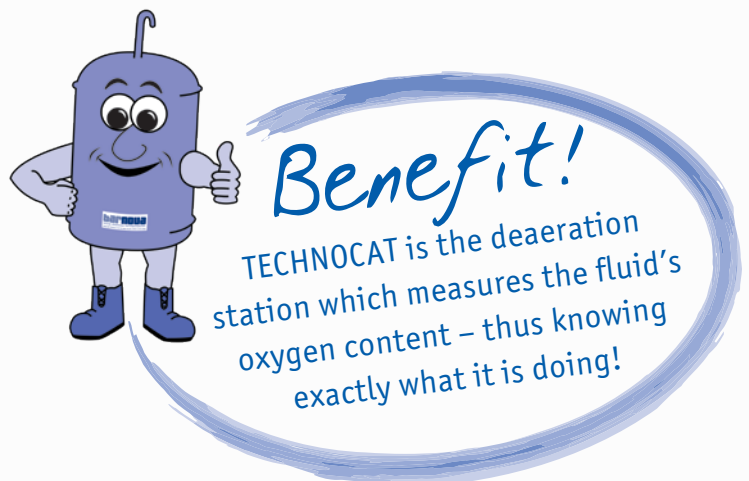
As a fully automatic vacuum degassing system, Technocat solves the air and pressure problems in heating and cooling circuits when using pressurised TECHNOFLEX HN/HT membrane expansion vessels.

The degassing, pressurising and makeup functions plus the measurement and evaluation of all parameters provide unique control over the condition of the medium and the operating states.

Barnova TECHNOCAT

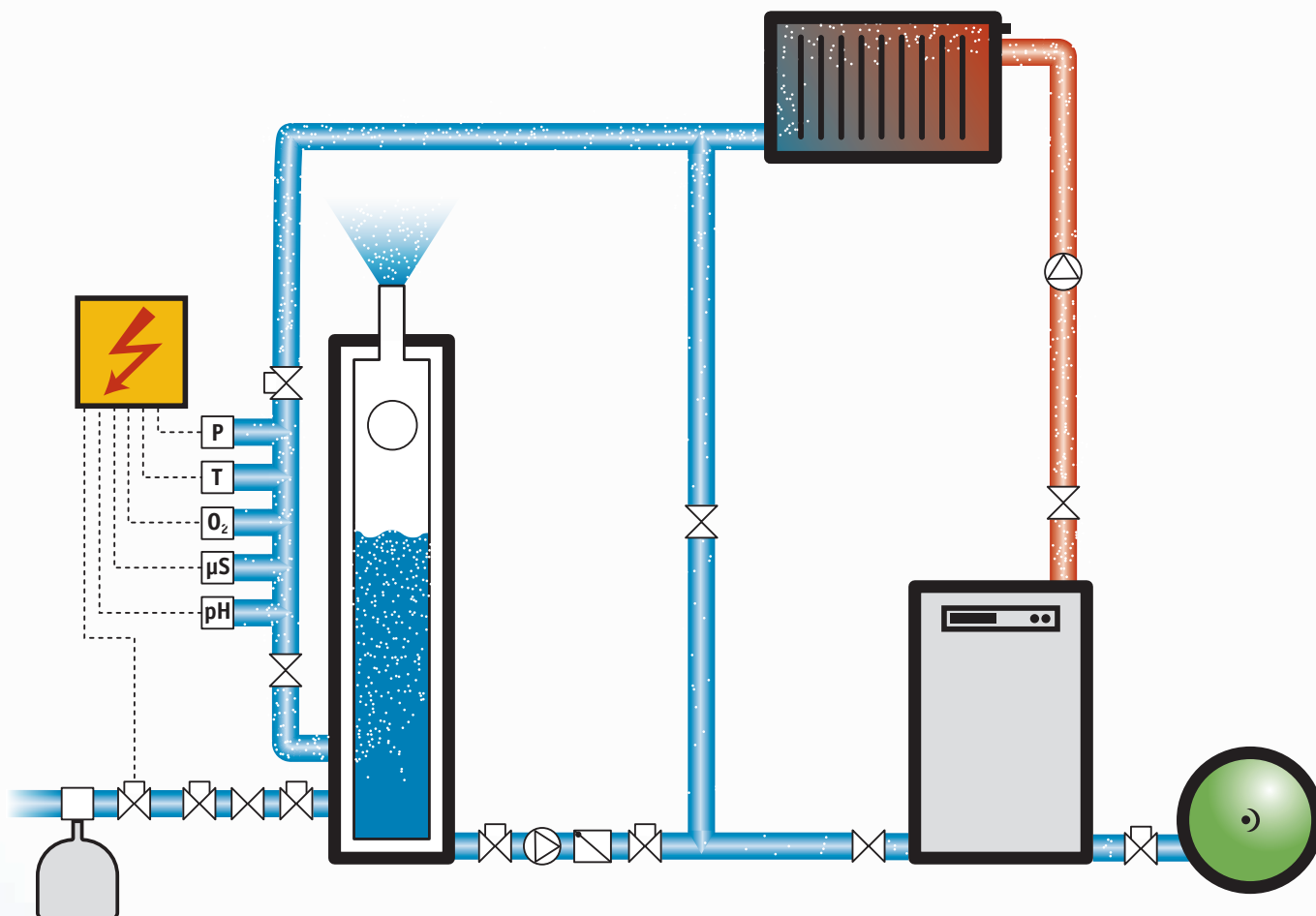
- ✓ Deaerates system and refilling water in a controlled manner!
- ✓ Back feeds refilling water in a controlled manner
- ✓ Keeps the pressure in the system constant
- ✓ Makes possible operating temperatures up to 95°C
- ✓ Monitors in conjunction with the multi-language Barnova SPS control system:
 - Membrane rupture
 - pH and conductivity
 - Temperature and oxygen content of the system retaining water
 - Operating states with both time and date particulars
 - Warning and malfunction notifications
- ✓ Remote monitoring and control through use of intelligent hardware

In short: "How can air problems be dealt without any manual venting?" **By using the Barnova TECHNOMAT and the complete solutions!**



The Barnova Technocat Principle

featuring high deaeration efficiency



**Interaction of intelligent components –
from the very beginning:**

TECHNOCAT → Füll → WE → TECHNOFLEX

The Barnova WE water softener meets the VDI 2035 requirements. The Technomat Füll or Füll K make-up feed ensures that the minimum operating pressure in the system stays constant and that the initial pressure in the membrane expansion vessel is not fallen short of. In this way, the vessel offsets any water and capacity losses, which deaeration and leaks could be responsible for, in a

quantity-controlled manner. The vacuum column deaerates the make-up feed water at each and every make-up feed operation.



Benefit!

By design, TECHNOCAT's vacuum degassing system prevents dirt-induced malfunctions.

Tip:

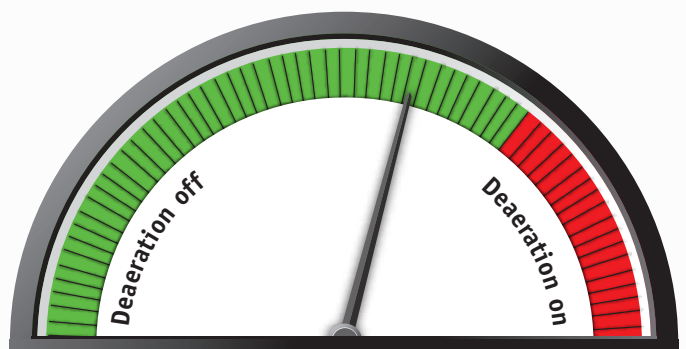
The interaction of the innovative products significantly reduces corrosion and heat loss.
The ideal way to save energy and money!



For deaeration, the vacuum column is completely filled with system water. On the deaeration process being switched on - under the interval or continuous deaeration cycle - the pump extracts water from the vacuum column thus forming a vacuum (negative pressure) in the column.

In the process, gases bound up in the system water are liberated and discharged via the vent valve once system water flows in and switches off the pump. This operation is repeated for as long as interval or constant deaeration lasts. Continuous temperature monitoring ensures there is no damage and thus no repair costs.

The revolutionary oxygen measurement in mg/l is the Barnova Technocat's No. 1 innovation. Deaeration is only activated once the pre-set value is exceeded. This stops the fluid becoming so corrosive from uncontrolled deaeration that it seeks to again become saturated with gases.



Specifications

Type

TECHNOCAT with CE Marking, constructed and tested in accordance with EU Pressure Equipment Directive 2014/68/EU.

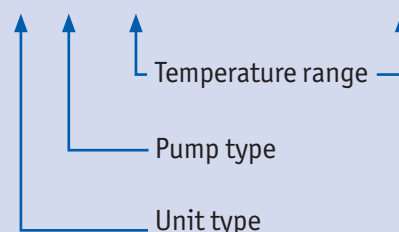
Electromagnetic compatibility in accordance with Regulation 2014/30/EU based on standards EN 61326-1:2013-07 and EN 61439-1:2012-06.

Requirement of Low Voltage Directive 2014/35/EU based on standard EN 61010-1:2011-07/BGV A2.

Electrical equipment in accordance with VDE 0116-1:2023-02 and EN 50156-1.

Barnova TECHNOCAT

TC3-70 to TC9-95



Fields of application

- Hot water heating systems in keeping with DIN EN 12828
- Cooling circuits with water mixtures up to a 50% glycol share

Electronic particulars and operating parameters

Unit	TC3-70/ TC3-95	TC4-70/ TC4-95	TC6-70/ TC6-95	TC7-70/ TC7-95	TC8-70/ TC8-95	TC9-70/ TC9-95
KW	0.55/0.75	0.55/0.75	0.75 / 0.95	0.95 / 1.10	1.10 / 1.10	1.10/1.50
A	3.50/3.70	3.50/3.70	4.10/4.50	5.90 / 6.10	7.85 / 8.10	6.50/6.50
Max. permitted operating positive pressure (bar)	10	10	10	10	10	10
Operating pressure (bar)	1,8	2,2	4,6	5,2	6,0	9,0
Max. permitted operating temperature (°C)	70 / 95	70 / 95	70 / 95	70 / 95	70 / 95	70 / 95
Max. permitted supply temperature (°C)	120	120	120	120	120	120
Max. permitted ambient temperature (°C)	0-45	0-45	0-45	0-45	0-45	0-45
Noise level (approx. dB)	55	55	55	60	60	<70
Degree of protection	IP54	IP54	IP54	IP54	IP54	IP54
Electr. connection	230 V / 50 Hz	230 V / 50 Hz	230 V / 50 Hz	230 V / 50 Hz	230 V / 50 Hz	230 V / 50 Hz



- 1: Cap ball valve
- 2: Cap ball valve with integrated non-return valve
- 3: Pump
- 4: Pressure transmitter
- 5: Regulating valve
- 6: System separator with integrated mudflap
- 7: Solenoid valve (water make-up)
- 8: Water meter / Contact water meter

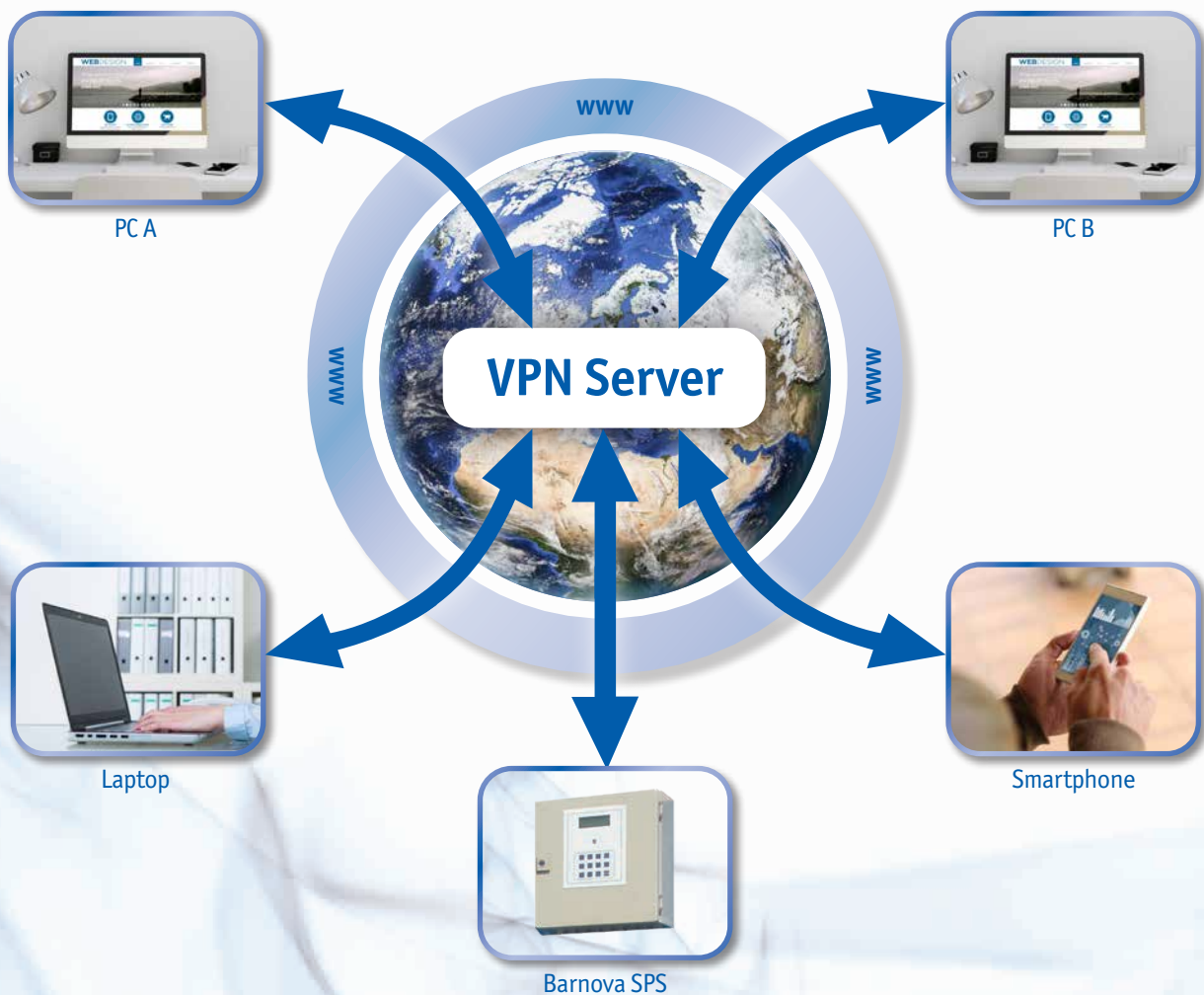
- 9: Drainage
- 10: Vacuum column
- 11: Water shortage switch (optional)
- 12: Manometer
- 13: Vacuum vent valve
- 14: Oxygen measurement
- 15: Temperature measurement
- 16: Control cabinet

VPN-M2M-NETWORKS

The Barnova VPN solution for remote monitoring, remote control, networking and alarms

With the VPN-M2M-NETWORK you are directly connected to the Barnova SPS. This makes it possible not only to view operating states, warnings and malfunctions, but also to intervene directly. Diagnoses, reconfiguration and resetting parameters can all be done from the convenience of your own home.

- ✓ Multi-client system, user groups scalable to any level
- ✓ Highest security standards through certificate-based VPN connections and firewall
- ✓ Low investment and operating costs
- ✓ Reduction of travel and personnel costs
- ✓ Troubleshooting and issue resolution 24/7
- ✓ Automatic notification of warnings and/or malfunctions



Barnova remote control, remote monitoring webshots

Überblick

Druckhalteanlage barnova gmbh
Version: 5.40
Anlagennummer: 1622102
Herstellnummer: DS 169201286

barnova gmbh
Servicenummern #
Tel1: 02754/21251-0
Tel2: 0171/1961237

Datum: 01.08.16
Zeit: 13:37

Start/Stop der Dauerentgasung
Start-Zeit: 14:25
Restzeit: 01:00

Normalbetrieb:
Messwerte
Systemdruck: 2.7 bar
Niveau: 47 %
Pumpe P1: Automatik
Pumpe P2: Aus
Entgasung GAS: 1
Überströmer US1: OFF
Überströmer US2: OFF
Keine Störung
Laufzeit Pumpe 1: 20 h
Laufzeit Pumpe 2: 21 h
Restlaufzeit: 30 m
Wasserzähler: 31 L

Sensoren
Temperatur: 45 °C
Sauerstoff: 0.9 mg/l
pH-Wert: 8.7
Leitfähigkeit: 40 uS
Drucksensor 1: ./ bar
Drucksensor 2: ./ bar
Niveausensor 1: ./ %
Niveausensor 2: ./ %

Erweiterungsmodul (NICHT vorhanden)
Relaiszustände
R4: ./ R5: ./ R6: ./ R7: ./ R8: ./ R9: ./
Eingänge
IN5: ./ IN6: ./ IN7: ./ IN8: ./ IN9: ./ IN10: ./

Operator

statische Höhe: 20 m | Min.Druck: 2.1 bar | Max.Druck: 3.3 bar | maximal:

Grundlastpumpe:

Schaltpunkte:
Einschalt: 2.3 bar
Ausschalt: 2.5 bar

Verzögerung:
Einschalt: 3 Sek.
Ausschalt: 5 Sek.

Spitzenlastpumpe: (sofern 2 Pumpen vorhanden)

Schaltpunkte:
Einschalt: ./ bar
Ausschalt: ./ bar

Verzögerung:
Einschalt: ./ Sek.
Ausschalt: ./ Sek.

Entgasung:
Ansprech-Druck: 2.5 bar
Abströmzeit: 10 Sek.
Entgasungszeit: 5 min
Freigabe: 1 = uhrzeitabhängig
von 08:00 bis 16:00

Nachspeisung:
Normalbetrieb
Ein: 20 % Aus: 30 %
min. ./ % max. ./ %
Zeit: 60 min
Nachspeisung frei bei Überströmer: 1 = ja

Klimabetrieb:
Ein: 000 %
Aus: ./ %
Zeit: ./ min

Abspeisung:
Einschalt: 000 %
Ausschalt: ./ %

Schaltdrücke der elektrischen Überströmer:
Einschalt U1: 3.0 bar Ausschalt U1: 2.8 bar
Einschalt U2: ./ bar Ausschalt U2: ./ bar

Communication modules

Modbus RTU/TCP; Profibus/Profinet; Bacnet

Professionally controlling the water quality in hot water heating systems in accordance with EN 12828, VDI guideline 2035, EN 1717 and EN 1988-100

In most cases, untreated/drinking water is inappropriate for refilling your heating system!

Its properties limit the extent to which untreated raw/drinking water can be used to fill/top up your heating system. The quality of the water you use to top up your heating system has a decisive influence on stone formation, calcification and corrosion. Hard and/or corrosive water will shorten the service life of heat generators, heat exchangers and the entire heating system, resulting in heat loss, malfunctions and reduced efficiency.

The substances dissolved in raw/drinking water are divided into cations and anions.

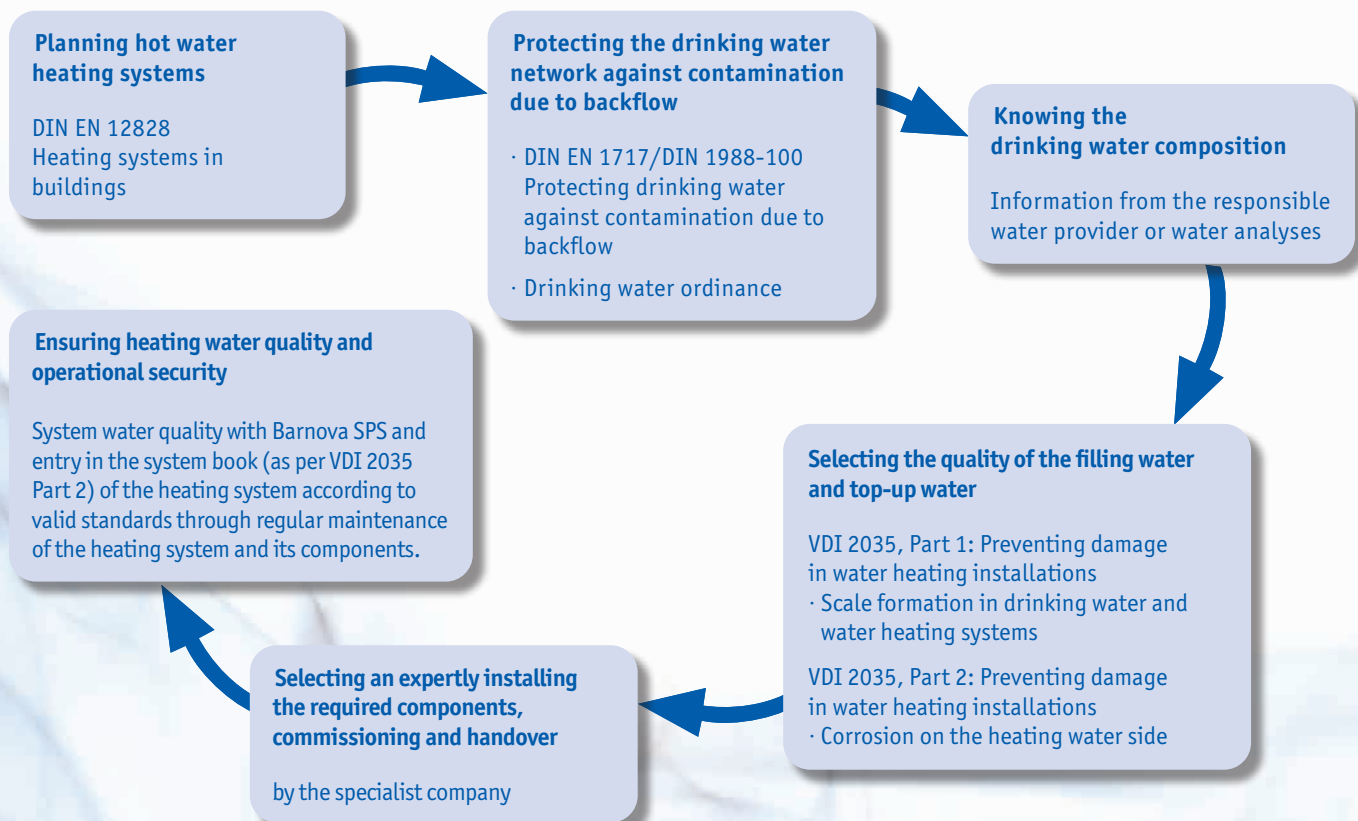
Cations are positively charged ions and are referred to as hardness components or carbonate hardness. Magnesium and calcium cations are mainly responsible for stone formation and calcification.

Anions are negatively charged ions and are known as neutral salts or non-carbonate hardness. Chloride, sulphate and nitrate anions are mainly responsible for corrosion.

Sheet 1 describes the prevention of stone formation and calcification. Sheet 2 describes the prevention of corrosion.

Standard-compliant steps – from planning to operation

Drinking water is not the same as heating water



Guideline Values

Improving water quality, avoiding breakdowns

The water quality in heating systems has a significant impact on operational security and efficiency. Poor water quality leads to breakdowns and system damage through deposits and corrosion. Our experience from numerous cases has shown that water quality is not a focus and therefore does not fulfil the respective requirements. Associated with this in many cases are difficulties having warranty claims granted by boiler manufacturers.

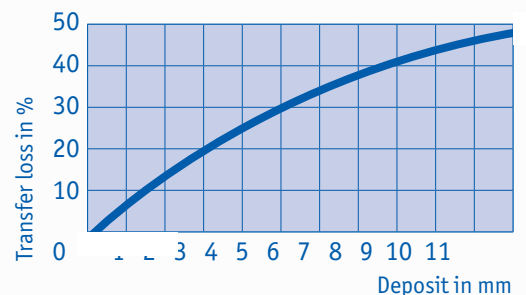
The rules define limits for the pH value, hardness, conductivity and oxygen content. **These parameters** have a significant impact on whether deposits, breakdowns and corrosion occur in a system. These values differ depending on whether the system is operated with high or low salt content. The pH value range to be maintained, by contrast, depends heavily on the boiler material. For example, the use of aluminium materials require maintaining a very tight pH value range (8.2 to 8.5). Therefore, in many cases, the low salt option is preferable, but due to the wide range of factors that could have an impact, we recommend a **technical consultation with our heating water experts for your individual application.**

Water quality requirements are defined in:

- VDI 2035
- AGFW worksheet ("Arbeitsblatt") FW 510
- the requirements of the boiler manufacturers



Just 3 mm of deposits lead to heat loss of 20%



Overview of guideline values

Requirements for the operational mode of the heating network	Low salt content		High salt content
Conductivity at 25 °C (µS/cm)	10 - 30	30 - 100	100 - 1500
Appearance	clear, free of suspended substances		
pH value at 25 °C	9.0 - 10.0*	9.0 - 10.5*	9.0 - 10.5*
Oxygen (mg/l)	< 0.1	< 0.05	< 0.02
Hardness (mmol/l)	< 0.02**	< 0.02**	< 0.02**

* does not apply to the use of aluminium materials (pH 8.2–8.5);

** Amounts to 0.11 dH° > Source: AGFW worksheet FW 510. VDI 2035

PLC control programme

Standard display

Power On

- Display

TechnoCAT
Version X.XX

Standard operation

Use the < and > buttons to move up and down the menu items.

Press **B** to switch between menu items.

Continuing with **B**

- Display of operating parameters

Pressure: 00.0 bar
P: A MV: A

Continuing with **B**

- Display of the temperature and oxygen content

Temperature: °C
Oxygen: mg/l

Continuing with **B**

- Display water meter

Pressure: 00.0 bar
WZ: 01234

Continuing with **B**

- Change to Parameter menu
- Change to the Parameter menu with >

Continuing with **B**

- Change to Service menu
- Change to the Service menu with >

Continuing with **B**

- Display of the service phone numbers

Tel 1: XXXXX
Time, Date

Continuing with **B**

- Display TECHNOCAT and version

TechnoCAT
Version X.XX

Press **B** to return to the start menu.

Parameter menu

- press **B** to go to a menu item
- press > to go to the next parameter of a menu item
- press < to go to the previous parameter of a menu item
- Input password

Password ?
001

Continuing with **B**

- Input language

Language:
1:German
2:English
3:Norwegian
4:Swedish
5:Danish

Continuing with **B**

- Input – Minimum operating pressure

Min-Pressure PSt
01.5 bar

Continuing with **B**

- Input – Maximum pressure

Max-Pressure PSU
03.0 bar

Continuing with **B**

- Input – Switch-on pressure

Switch-on pressure
01.7 bar

Continuing with **B**

- Input – Switch-off pressure

Switch-off pressure
01.7 bar

Continuing with **B**

- Input – Actual time

Time + Date
10:16 01/03/25

Continuing with **B**

- Input – Actual day

Day
Friday

Press **B** to return to the start menu.

Service menu (Password-protected)

Contains all the relevant data set at the factory and documented in the test and acceptance inspection record.

Memory menu (passwortgeschützt)

All alterations in the Parameter menu as well as warning and alarm notifications with time and date display are documented here; the same applies to the data logger which saves all the operating states.



Tip:

Detailed information in the installation and operating instructions

Selection

Selection and ordering particulars

The optimum use of the Technocat TC3-70 - TC9-95 deaeration stations is to be selected as a function of the p₀ minimum operating pressure, the unit's rated thermal output and the V_n nominal capacity of the membrane expansion vessel.

In the process, the minimum operating pressure (0.2 bar above st. height) determines the required pumping pressure.

The nominal capacity of the membrane expansion vessel is determined by the water content of the unit and the corresponding operating temperatures.

Thermal output	kW
Safety temperature STB	°C
Supply temperature	°C
Return temperature	°C
Static height	m
Response pressure of safety valve	bar

Calculation of the pumping capacity (Q volumetric flow)

Heating systems: Output (kW) x 0.85 $\frac{I}{\text{h kW}} = \frac{I}{h}$

Cooling systems: Output (kW) x 0.35 $\frac{I}{\text{h kW}} = \frac{I}{h}$

bar TOOL



Tip:
Proportioning and design
programme on
www.barnova.de

barnova bar TOOL
INNOVATIVE DRUCKKOMPETENZ

Temperatur Drücke Auslegungskriterien **System/Netz** Anforderungen Zubehör Kommunikationmodule Ergebnis

System/Netz

Art der Heizanlagen	Anteil (%)	Leistung (kW)	Vorlauf (°C)	Rücklauf (°C)	Wasserinhalt (ltr)
Konvektoren	0.0	0.0	75.0	55.0	0.0
Lüftungsanlagen	20.0	40.0	75.0	55.0	440.0
Plattenheizkörper	80.0	160.0	75.0	55.0	2.040.0
Radiatoren	0.0	0.0	75.0	55.0	0.0
Flächenheizung	0.0	0.0	75.0	55.0	0.0
Heizflächenleistung installiert		200.0 kW			Fernleitungen 1.952.0 ltr.
Restwärmeleistung Wärmeerzeuger		200.0 kW			Sonstiges 0.0 ltr.
					Anlage 2.496.0 ltr.
					Wärmeerzeuger 400.0 ltr.
					Gesamtinhalt 4.848.0 ltr.

< zurück weiter >

Proportioning of the membrane expansion vessel

V_a = Water content of the unit

V_e = Expansion volume

V_v = Water reservoir

V_n = Nominal capacity
membrane expansion vessel

p_e = Final pressure

p_0 = Initial pressure

p_{st} = Static height

p_{sv} = Response pressure of the safety
valve

d_{pa} = Operating differential pressure

p_d = Evaporating pressure

Water content of the Unit V_a with approximate values (Ltr./KW)

Heating systems	Supply temperature				
	70°C	80°C	90°C	100°C	110°C
Convectors	9.5	7.5	6.0	5.0	4.0
Ventilating systems	12.5	10.0	8.0	6.5	5.5
Panel-type radiators	14.5	11.0	9.0	7.5	6.5
Radiators	22.0	17.0	13.5	11.0	9.5

Expansion coefficient

Expansion factors n in % and the evaporating pressure pD in bar positive pressure								
°C	n	pD	°C	n	pD	°C	n	pD
20	0.14	-	60	1.68	-	105	4.74	0.21
30	0.40	-	70	2.25	-	110	5.16	0.50
40	0.75	-	80	2.89	-	115	5.59	0.70
50	1.18	-	90	3.58	-	120	6.03	1.00
55	1.42	-	100	4.34	-	130	6.97	1.70

Example of calculation:

kW = 950

STB = 105°C

VL = 110°C

RL = 80°C

Static height = 35 m

SV = 5 bar

V_a not known

100% radiators

$$V_e = 5.16 \frac{(9.5 \times 950)}{100} = 465.69 \text{ Ltr.}$$

$$V_v = \frac{(9.5 \times 950)}{100} = 90.25 \text{ Ltr.}$$

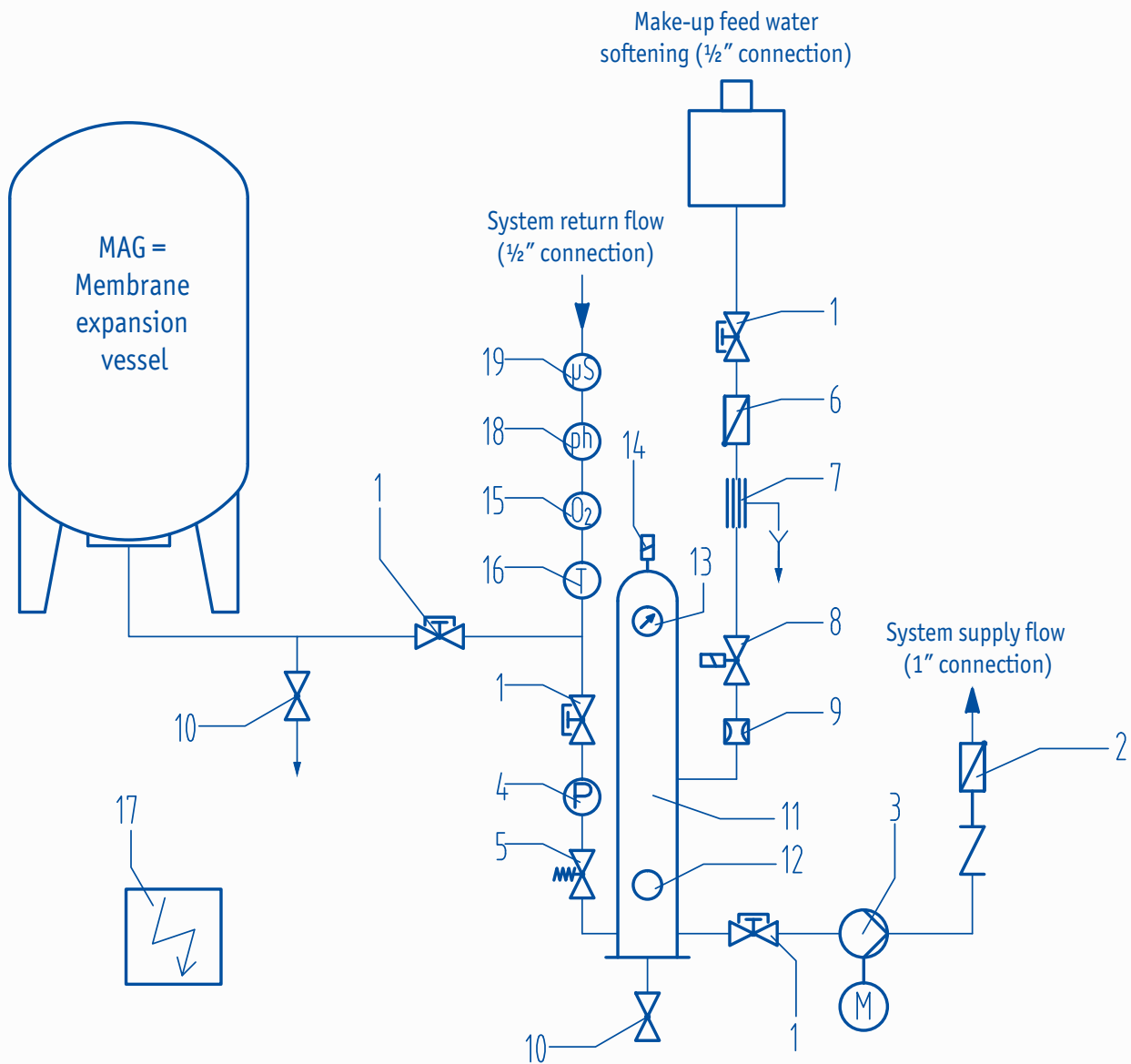
$$V_n = (465.69 + 90.25) \frac{(4.5 + 1)}{0.9} = 3,397.41 \text{ Ltr.}$$

Chosen: **TECHNOFLEX HT 3500**

TECHNOCAT 6/95

TECHNOFLEX TS 100

Flow sheet TECHNOCAT



- | | |
|--|---|
| 1: Capped ball valve | 10: Draining outlet |
| 2: Capped ball valve with integrated return flow stopper | 11: Vacuum column |
| 3: Pump | 12: Water shortage switch (optional) |
| 4: Pressure transducer | 13: Pressure gauge |
| 5: Regulating valve | 14: Vacuum vent valve |
| 6: Dirt trap | 15: Oxygen measurement point |
| 7: System disconnecter | 16: Temperature measurement point |
| 8: Solenoid valve (make-up feed) | 17: Control cabinet |
| 9: Water meter/Contact water meter | 18: pH measurement (optional) |
| | 19: Conductivity measurement (optional) |



INNOVATIVE PRESSURE COMPETENCE

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