

Technical specifications

Subject	Requirements on water quality for Heat Interface Units for District Heating systems
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General

This document describes the requirements on the qualities of circuit water (both district heating and central heating water) and drinking water, which flow through the Heat Interface Unit (HIU). The required water qualities are specified to ensure good working conditions for the HIU and to avoid corrosion problems, circulation problems and other undesirable effects.

To prevent corrosion and problems due to deposits, it is important that stagnant water for longer periods of time must be avoided.

Application

These requirements are applicable to HIU's which are used in district heating systems or in collective heating systems. It is not allowed to use the HIU's in open systems. The water qualities are specified for the following water types:

1. Circuit water (system water)
 - a) for closed systems with a maximum capacity of 500 litres
 - b) for closed systems with a capacity above 500 litres
2. Drinking water (potable water)

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1a) Closed circuit water systems – capacity max. 500 litres

For small closed heating systems, it is allowed to use drinking water (potable water) as circuit water. The circuit water must be de-aerated. It is recommended to place air separators and dirt traps in the system.

Better alternatives for circuit water is the use of:

- Demineralized water
- Partly demineralized water
- Softened water

It is allowed to use drinking water as suppletion water (make up water), with a maximum suppletion volume of 5% of the total capacity of the system, per year.

It is allowed to adjust the pH by adding sodium hydroxide (NaOH). pH adjustment by adding tribasic sodium phosphate (Na_3PO_4) is not recommended. Adding of ammonia (NH_3) is explicitly not allowed. Other additives like oxygen binding agents are not allowed.

The chemical composition of the circuit water must be within the following limits:

Composition	Value	Unit
Acidity [@ 25°C]	7,0 < 9,5	pH ₂₅
Alkalinity [HCO_3^-]	70 < 300	mg/l
Ammonium [NH_4^+]	< 2	mg/l
Carbon dioxide [CO_2]	< 5	mg/l
Chloride [Cl^-]	< 80	mg/l
Chlorine [Cl_2]	< 1	mg/l
Electrical conductivity [@ 25°C]	10 < 500	$\mu\text{S}_{25}/\text{cm}$
Hardness total	< 8,5	°dH
Hydrogen Sulfide	< 0,05	mg/l
Iron [Fe]	< 0,2	mg/l
Manganese	< 0,1	mg/l
Nitrate [NO_3^-]	< 100	mg/l
Oxygen [O_2]	< 0,005	mg/l
Particle size	< 0,5	mm
Sulphate [SO_4^{2-}]	< 70	mg/l

The allowed maximum temperature of the circuit water is 95°C.

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1b) Closed circuit water systems – capacity above 500 litres

The circuit water and suppletion (make up) water must be:

- demineralised
- degassed
- pH treated

The pH must be adjusted by adding sodium hydroxide (NaOH). pH adjustment by adding tribasic sodium phosphate (Na_3PO_4) is not recommended. Adding of ammonia (NH_3) is explicitly not allowed. Other additives like oxygen binding agents are not allowed.

The chemical composition of the circuit water must be within the following limits:

Composition	Value	Unit
Acidity [@ 25°C]	9,0 < 9,5	pH ₂₅
Alkalinity [HCO_3^-]	70 < 300	mg/l
Ammonium [NH_4^+]	< 2	mg/l
Carbon dioxide [CO_2]	< 5	mg/l
Chloride [Cl^-]	< 80	mg/l
Chlorine [Cl_2]	< 1	mg/l
Electrical conductivity [@ 25°C]	10 < 200	$\mu\text{S}_{25}/\text{cm}$
Hardness total	< 0,5	°dH
Hydrogen Sulfide	< 0,05	mg/l
Iron [Fe]	< 0,2	mg/l
Manganese	< 0,1	mg/l
Nitrate [NO_3^-]	< 100	mg/l
Oxygen [O_2]	< 0,005	mg/l
Particle size	< 0,5	mm
Sulphate [SO_4^{2-}]	< 70	mg/l

The allowed maximum temperature of the circuit water is 95°C

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2) Drinking water (potable water)

The chemical composition of the drinking water (potable water) must be according to local legislation. In addition on the local legislation, the chemical composition of the drinking water must be within the following limits:

Composition	Waarde	Eenheid
Acidity [@ 25°C]	7,0 < 9,5	pH ₂₅
Alkalinity [HCO ₃ ⁻]	70 < 300	mg/l
Ammonium [NH ₄ ⁺]	< 0,1	mg/l
Carbon dioxide [CO ₂]	< 5	mg/l
Chloride [Cl ⁻]	< 150	mg/l
Chlorine [Cl ₂]	< 1	mg/l
Electrical conductivity [@ 25°C]	10 < 500	μS ₂₅ /cm
Hardness total	< 8,5	°dH
Hydrogen Sulfide	< 0,05	mg/l
Iron [Fe]	< 0,2	mg/l
Manganese	< 0,1	mg/l
Nitrate [NO ₃ ⁻]	< 75	mg/l
Particle size	< 0,4	mm
Sulphate [SO ₄ ²⁻]	< 70	mg/l

The allowed maximum temperature of the potable water is 65°C.

Source list

Title	Author	Version
Recommendations water treatment and corrosion prevention	Eurowater	09-2015
Influence of water composition on corrosion resistance	SWEP	20-01-2010
Council directive 98/83/EC on the quality of water intended for human consumption	EC	03-11-1998
KEMA richtlijnen voor stadsverwarmingswater 33476-FPP 94-4055A	KEMA	10-10-1995
Aanbevelingen ter voorkoming van corrosie en ketelsteenvorming in water-voerende installaties – publikatie 13	ISSO	03-1983