Design services for hydronic HVAC systems

Welcome to the Danfoss Design Support Center, where innovation meets expertise. Our experienced team empowers HVAC professionals with design solutions and consultancy services, from energy consumption comparisons to tailored system recommendations. Explore our offerings and see how we can elevate your project to new heights.

Welcome to the Danfoss Design Support Center

Our team of dedicated specialists is here to support your HVAC projects, from initial design to final implementation. We provide expert consultancy and detailed analysis to help you create energy-efficient, high-performance solutions.

This catalogue shows some of the many services we offer to ensure your projects turn out for the best.
There are five topics, each with indication of the provided design inputs, our services applied, and the design output we delivered.

Index

1. Hydronic calculation chilled water system

Why hydronic calculation for chilled water system?

Hydronic calculation is essential for designing efficient chilled water systems, ensuring optimal energy distribution, correct equipment sizing, system reliability, and regulatory compliance. It prevents operational issues, enhances performance, and supports energy savings throughout the HVAC system's lifecycle.

Design input

- System schematic diagram
- Piping layout
- Equipment schedules

Our services

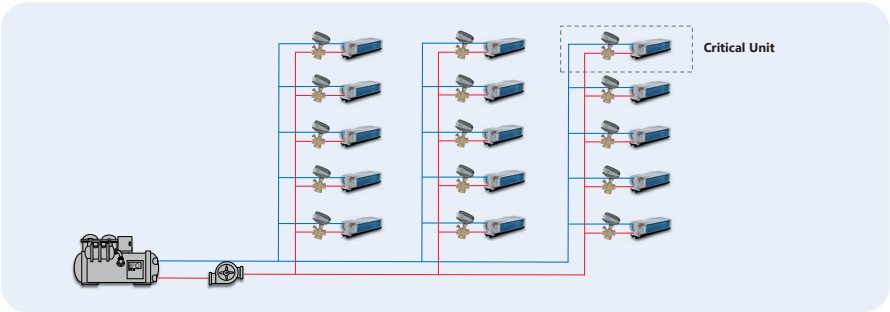
- Review design input
- Model the chilled water system
- Simulate various calculation scenarios
- Analyzing results:
  - system pressure drop
  - improvement opportunities
- Provide design output

Design output

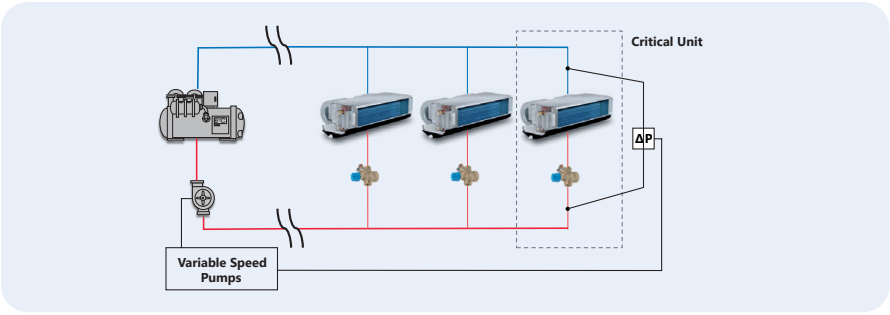
- Critical unit location
- Overall pump head calculation
- Recommended ΔP sensor location
- Bill of quantity (BOQ)
  (Include product specifications and settings)

Chilled water system example

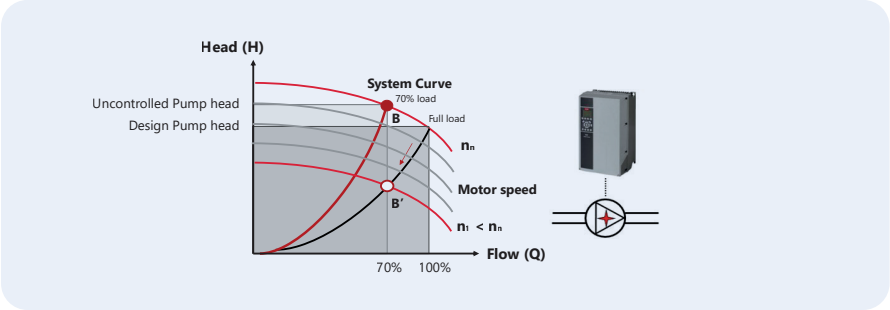
Identify critical unit location



Identify Δp sensor location



Optimizing pump performance



Enhanced overall system efficiency through optimized pump head, resulting in significant energy savings during partial load operation.

2. Hydronic calculation heating system

Why hydronic calculation for heating system?

Hydronic calculation for heating systems ensures efficient heat distribution and proper sizing of components, including pipes, pumps, and terminal units like radiators, fan coil units, and convectors. It enhances energy efficiency, system reliability, comfort, and compliance with design standards.

Design input

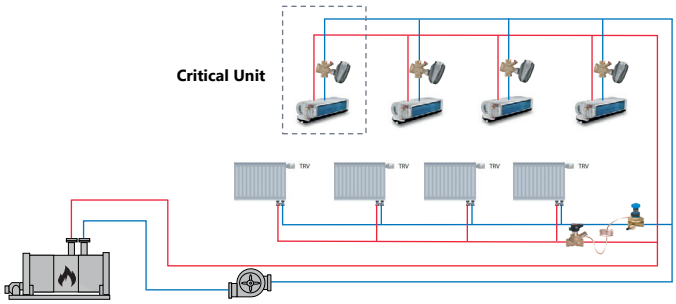
- Heating system schematic diagram
- Piping layout
- Equipment schedules

Heating system example

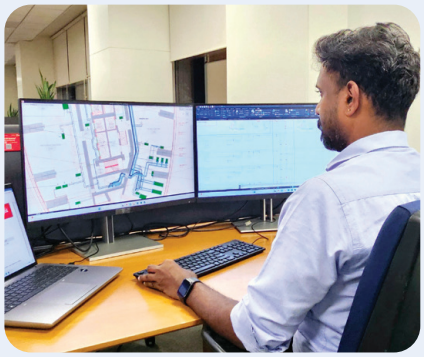
Our services

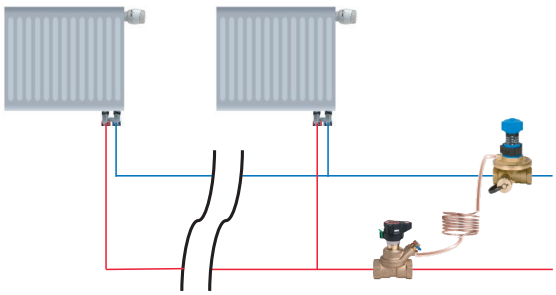
- Review design input
- Model the heating system
- Run hydronic calculation
- Calculate valves settings and valve sizing
- Provide design output

Identify critical unit location



Identify the setting of differential pressure controller





Design output

- Critical unit location
- Overall pump head calculation
- Bill of quantity (BOQ) (Include product specifications and settings)

Optimized balancing solution for complex heating systems

1 Heating system with fan coil unit and radiator

2 Heating system with fan coil unit, Radiator, and floor heating

3 Heating system with flat station, radiator, and floor heating

3. Energy saving calculation

Design input
- System schematic diagram
- Piping layout
- Equipment details of heat source, pumps, AHUs & FCUs

**Providing more field data could improve the accuracy of calculation result, e.g.: annual chilled water power consumption

Our services
- Review existing system input and equipment specifications
- Analyze performance data of the current HVAC system
- Analysis based on standard load profile
- Calculate potential energy savings for pumps, chillers, and room control systems

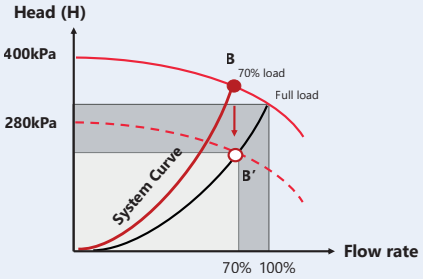
Design output
- Potential savings for heat source, pumps & room temperature control
- Provide calculated ROI and payback time
- Energy saving calculation report

Why energy saving calculation?

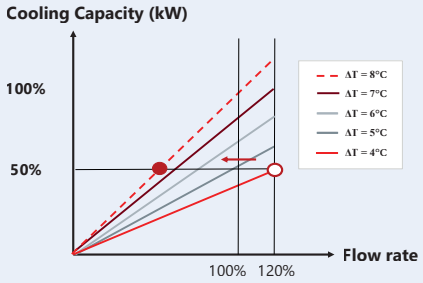
Energy savings calculations are crucial for estimating the potential improvements in efficiency when transitioning from conventional control methods to advanced balancing solutions with variable speed drives. The calculation provides data-driven justification for upgrades, ensuring cost-effective decisions that enhance system performance and support long-term operational and energy savings.

Energy saving example

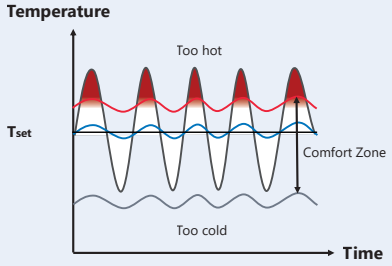
Potential savings from overflow in chilled water pumps



Potential savings with optimum ΔT in chillers



Potential savings with more stable room temperature control



4. Hydronic floor heating design calculation

Why hydronic floor heating design calculation?

Hydronic floor heating design calculations ensure efficient and uniform heat distribution by accurately determining the heating loops capacities, floor surface temperature, pipe layout and spacing, water flow rate, and pressure drop. All are critical for achieving optimal thermal comfort and system performance.

Design input

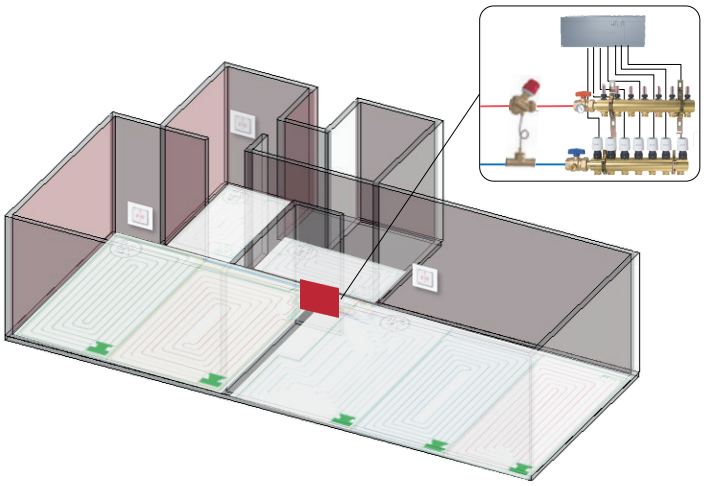
- Architectural building plans
- Room heat losses and target indoor temperature
- Position of manifolds
- Floor coverings
- Pipe type and laying pattern

Our services

- Review design input
- Design hydronic floor heating system
- Calculate pressure drop and pipe length
- Optimize supply water temperature
- Recommend loop arrangement with specified pipe length and pipe spacing
- Provide design output

Hydronic floor heating example

Floor heating design



Design output

- System drawing
- Calculation result
- Bill of quantity (BOQ)

Example table of results

Manifold: A1
Secondary side temp. (Heating): 40,0 / 34,1 °C
Mass flow rate: 558,1 kg/h
Min. required differential pressure: 17,51 kPa

No.	To T.U.	L	Pipe diameter	Pipe spc.	Obtained heating output	m	Δp	Valve preset (R)
		m		cm	W	kg / h	kPa	20
1	A1-4-1-1	32,7	16x2,0	20	473	82,8	2,2	2,50
2	A1-2-1-1	25,1	16x2,0	20	309	59,4	1,0	1,50
3	A1-3-1-1	25,2	16x2,0	15	116	54,0	0,8	1,50
4	A1-1-1-1	94,7	16x2,0	20 / 10	769	122,0	12,7	N
5	A1-1-1-2	94,9	16x2,0	20 / 10	755	114,0	11,3	5,50
6	A1-5-1-1	42,4	16x2,0	15	343	84,3	3,0	3,00
7	A1-6-1-1	23,4	16x2,0	20	190	41,6	0,4	1,00

5. Flat stations design

Why flat stations design?

Flat station calculations are essential for ensuring seamless integration with heating systems and domestic hot water systems. The calculation used to determine appropriate pipe sizing with diversity factors, as well as to establish the required heat source capacity, buffer tank volume, and the system's maximum flow rates and pressure drops.

Design input

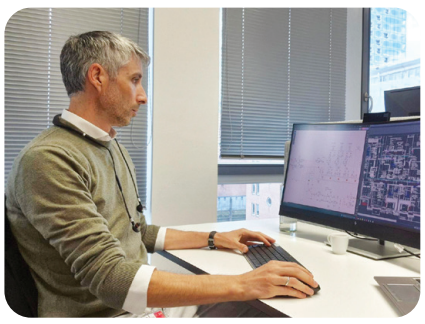
- Heat capacities of DHW, FHH, Radiator heating
- System layout
- Design temperatures
- Heat source type

Our services

- Review design input
- Selection of Flat station type
- Calculating pipe network, heat source and buffer tank
- Provide design output report

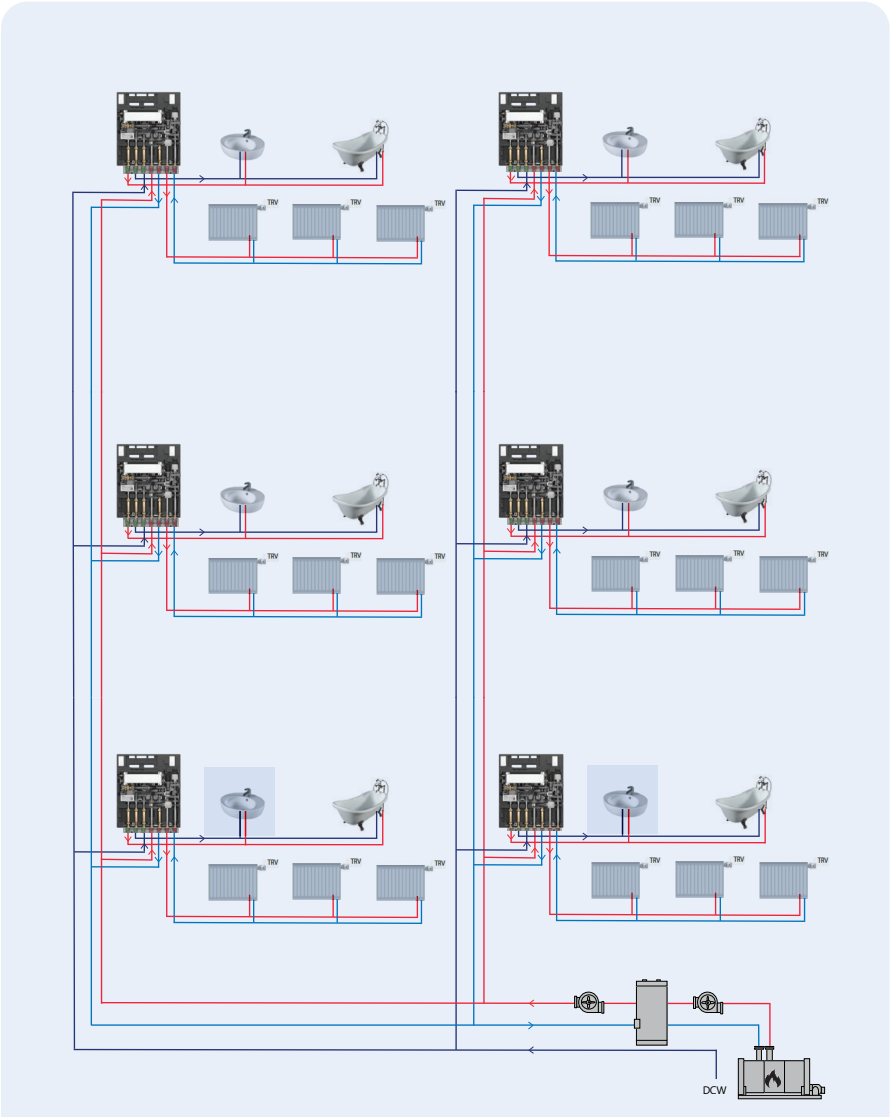
Design output

- Scheme of the system
- Pipe sizes for the
- system considering the diversity factor
- Calculated heat source, buffer tank capacity, and pump



Flat stations example

Flat station selection



How to Utilize our Design Services

Engaging with our Design Support Center is a straightforward process designed to provide your project with the expert support it needs, right from the start.

Service request (via Sales representative) → Input review and clarification → Design optimization → Delivery output

Ready to ensure your next project is a success? Contact your local sales representative to get started. www.danfoss.com/en/contact-us/.

We look forward to helping you build the future of climate-friendly HVAC solutions.

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Danfoss A/S
Climate Solutions
danfoss.com
+45 7488 2222

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