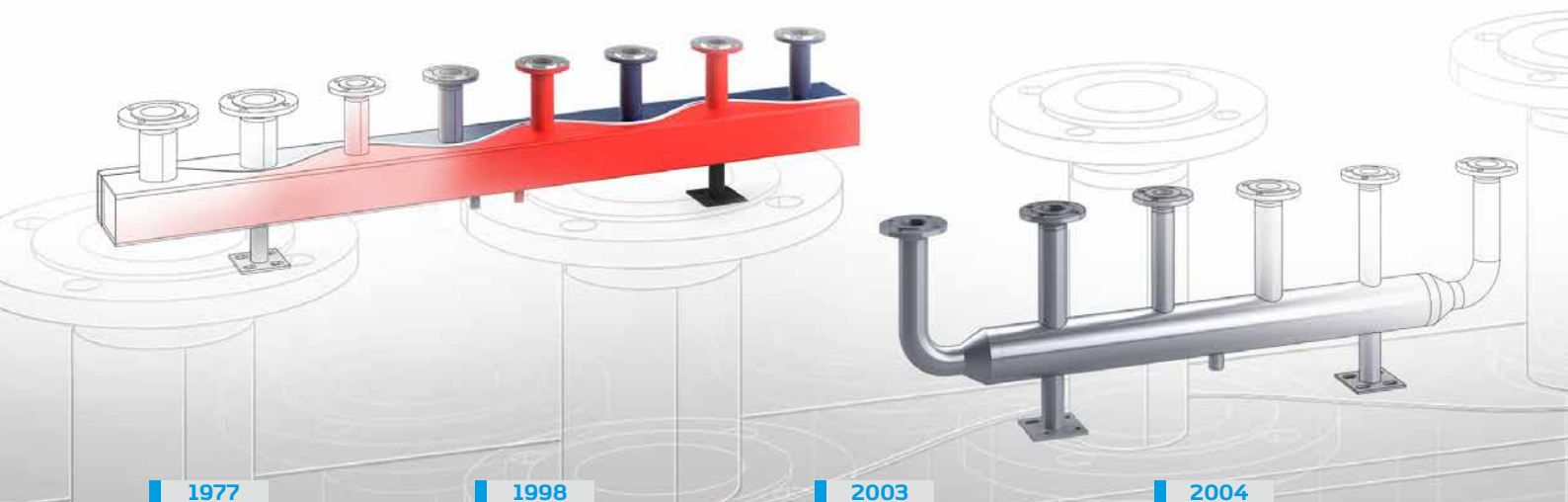


## Manifolds



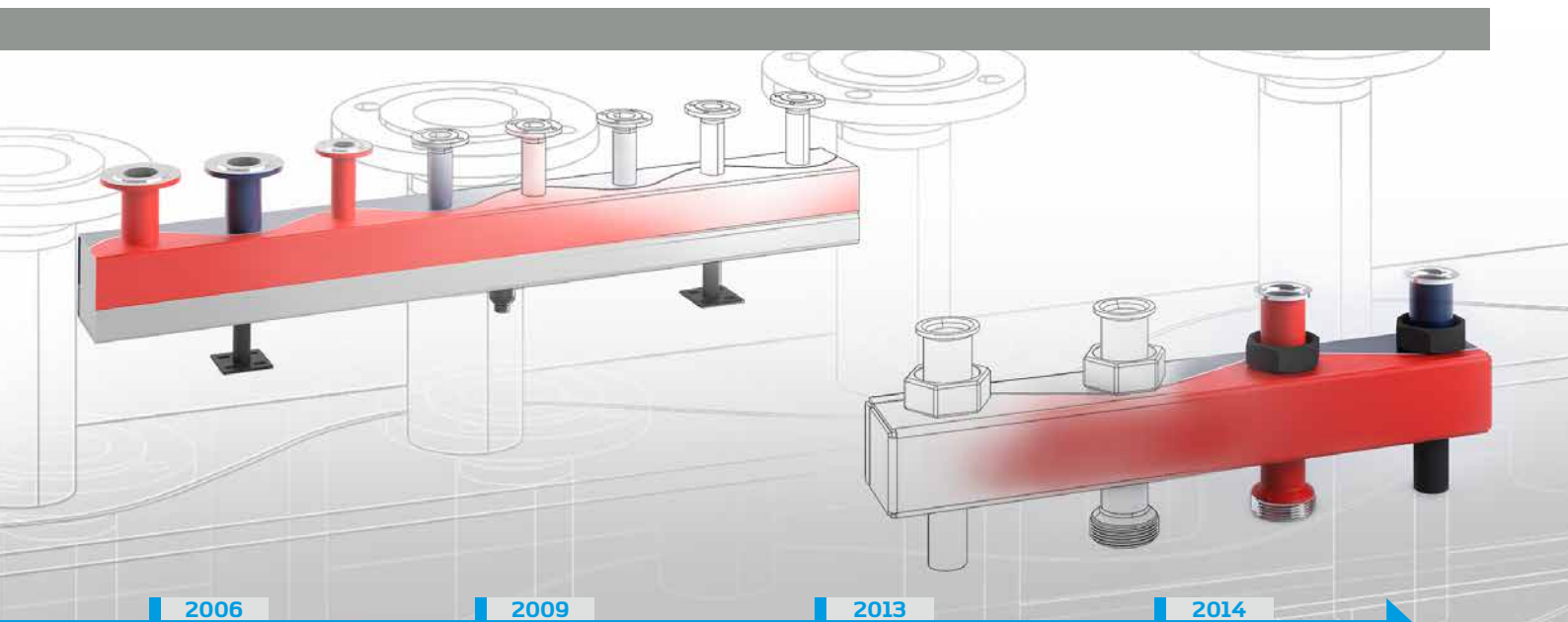
SINUS compact manifold inception  
and patent application

Cascades – a pioneering achievement

LegioNixx product development

ProfiFixx product innovation

Topic	Page
<b>1. Introduction</b>	
Innovative and individual	3
<b>2. The Sinus principle</b>	4
Laminar flow, cavitation, heat transfer, numerical simulation, field test	5
<b>3. Small manifolds</b>	
Small manifolds	6
Multi-zone manifolds	7
<b>4. Compact manifolds</b>	
Standardised and variable	8
Thermally separated compact manifolds	9
Special construction methods	10
Compact & dual-chamber with 90° bends	11
<b>5. HydroFixx</b>	
Manifolds with integrated hydraulic separator	12
<b>6. Single-chamber manifolds</b>	
Manifolds with cylindrical profile, manifolds with rectangular profile	14
<b>7. Stainless steel manifolds</b>	
LegioNixx drinking water manifold, service water manifolds	15



2006

HydroFixx – a pioneering achievement

2009

An innovation in manifold assembly: Robotic laser production

2013

¼ million small manifolds

2014

ProSinus Productconfigurator

## 1. Introduction

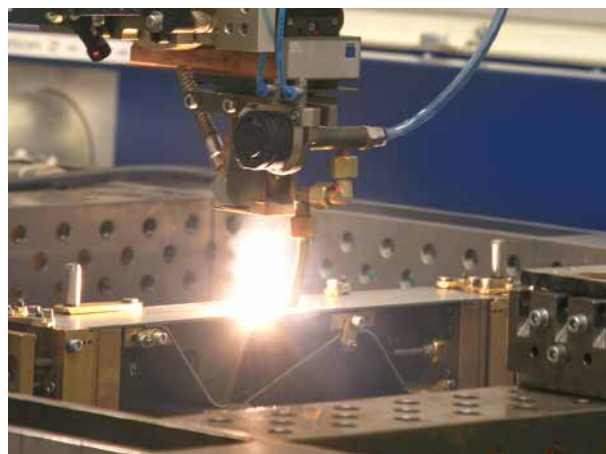
### Innovative and individual

In the almost 40-year history of Sinusverteiler, one thing has become quite clear: Our success is first and foremost the result of careful observation of the market. At the beginning, the market wanted standard heating manifolds for use in heating systems; today, it wants custom-made system solutions that can be optimally adjusted to the rather specific requirements of modern heating systems and cooling plants. From cascades to hydraulic units and the HydroFixx – many intelligent products that proved to be pioneering in the field of

manifold technology have been produced through our passion for technology and customer proximity. Recent years have seen further innovative solutions, such as the multi-zone manifold or the maintenance box. Manifold technology is where our company's core expertise lies. Both plant manufacturers and technical planners will find in us a partner that offers high-quality solutions – especially when faced with unusual requirements.

### For good reason

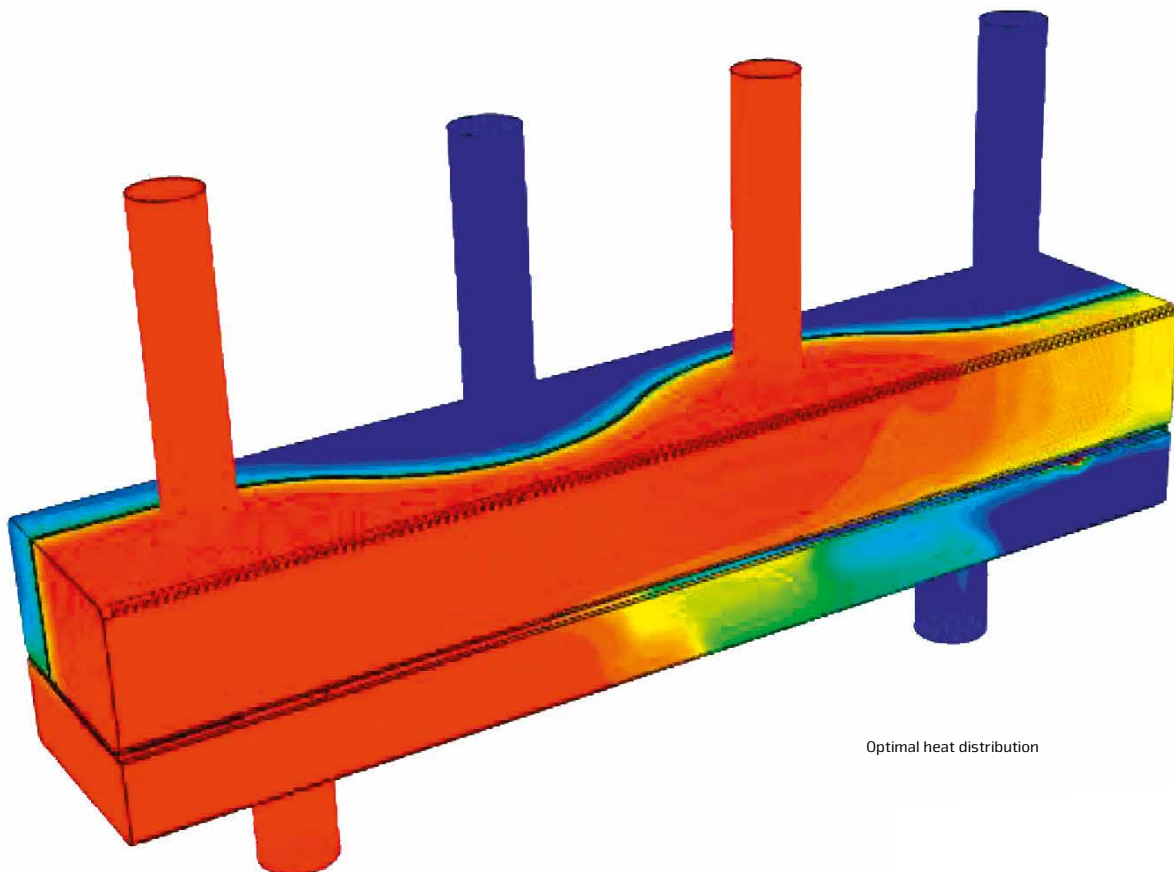
- Almost 40 years of experience and innovation
- The highest quality standards
- Global representation
- Competent consultation and project management
- Custom manufacturing
- Product configuration using cutting edge technology
- Fast and flexible delivery



## 2. The Sinus principle

Manifolds with the sinusoidal curve are the hallmark of Sinus. This curve which runs through the centre of the manifold allows the flow and return chambers to be arranged in alignment with one another, meaning that the manifold offers a space-saving unit for the increasingly compact modern central heating systems. The unique design also offers the advantage that – with the right configuration – the flow ratios lie in the

laminar range, keeping the pressure losses and heat transfer to a minimum. On account of the primarily laminar flow and the low flow velocities, thermal separation can generally be omitted in normal heating systems (spread: 15 K).



Optimal heat distribution

### Laminar flow

Is the movement of a fluid or gas, whereby there is no turbulence (eddying) in the flow pattern.

### Cavitation

Is the formation and dissolution of steam bubbles in liquids, occurring when the static pressure falls below the evaporating pressure of the liquid. If the steam bubbles flow with the liquid into areas of higher pressure, the bubbles collapse. The collapsing of these steam bubbles brings about extreme pressure and temperature peaks.

### Pressure loss

Is a pressure difference resulting from friction inside pipelines. This has considerable influence on the pump design when performing the pipeline calculation. In the case of Sinus manifolds, the pressure loss is always kept as low as possible across the entire manifold body – provided it is correctly dimensioned.

### Heat transfer

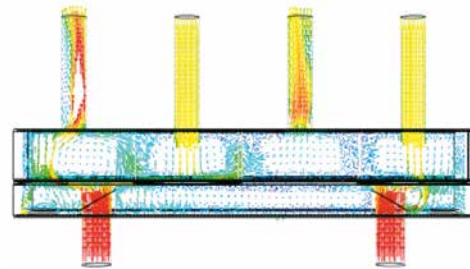
Is the transport of thermal energy as the result of a temperature difference exceeding at least one thermodynamic system boundary. This transported energy is referred to as heat and is a process variable. The heat is transferred towards colder areas. This results in heat equalisation across system boundaries.

### Numeric simulation

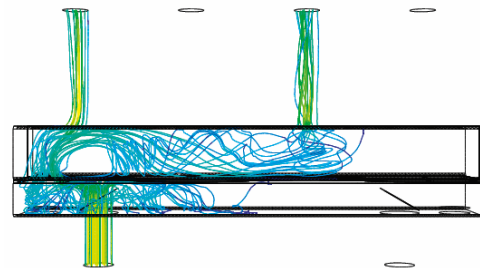
After the theoretical calculation, in many cases numerical simulations of the flow behaviour of the components are performed. Following a positive result from the theoretical tests, the field test phase takes place. Sinusverteiler now also has its own hydraulic test stands.

### Field test

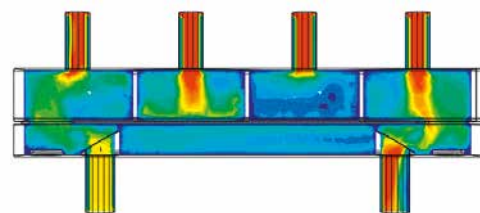
Is the final test performed by a manufacturer prior to the planned pilot series, with a view to testing the product quality under real conditions.



Velocity vectors  
in a section through the centre

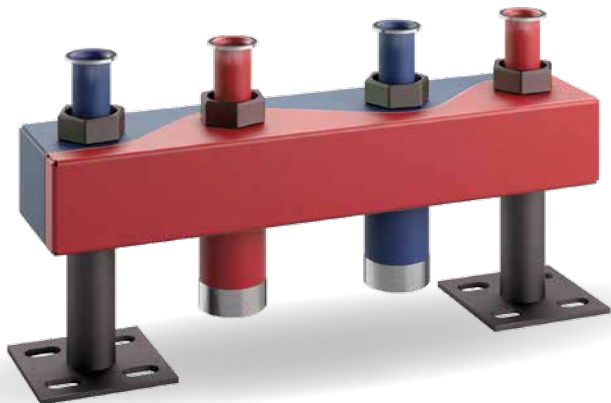


Flow lines originating  
from the flow nozzle



Velocity profile  
in a section through the centre

### 3. Small manifolds



Small manifold

#### Small manifolds – precision in perfection

The main feature that makes our small manifolds special is their highly precise manufacturing using laser welding robots. Thanks to the wide range of nozzle spacings and connection options, we have the right manifolds for all common pump groups. They are available in 3 power ratings: 30 kW, 70 kW & 150 kW.

Type	Flow rate up to	Power at $\Delta T$ 20 K	Nozzle spacing
60/60	1.3 m³/h	30 kW	100 mm
80/60	3.0 m³/h	70 kW	125/130/200 mm
120/80	6.5 m³/h	150 kW	125/130/200 mm



With external thread

#### External thread

For the attachment of customised pump connections



With union nut

#### Union nut

To accommodate industry standard pump assemblies



With internal thread

#### Internal thread

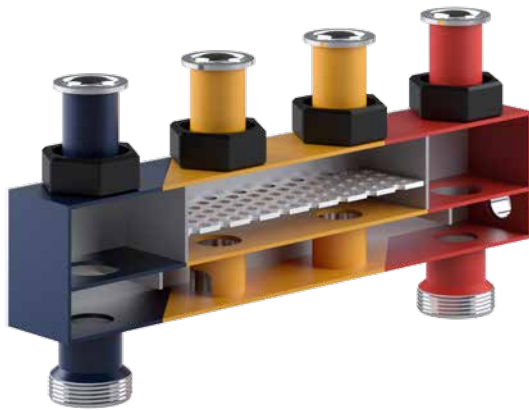
For the attachment of customised pump connections

#### Perfectly matched

**SINUS small manifold set** consisting of the manifold, EPP insulation and up to 150 kW including wall brackets

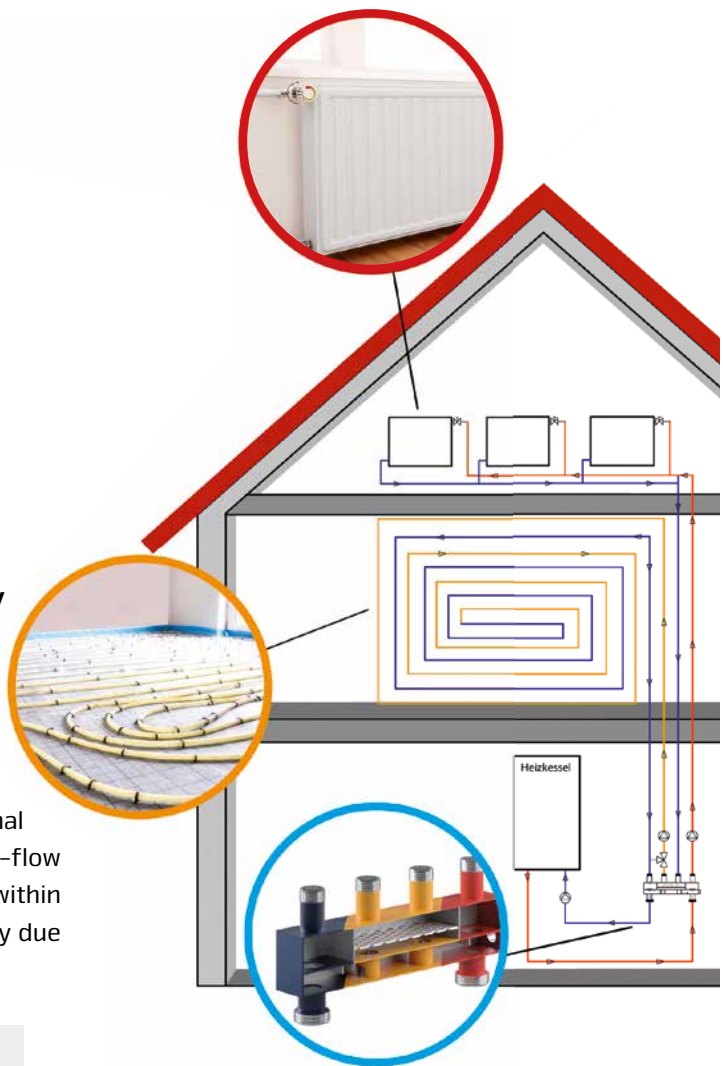


## Multi-zone manifolds



Multi-zone manifold

**A finger on the pulse – intelligent technology for superior energy efficiency** What makes the manifold-separator combination special is its division into three temperature zones, combined with an integrated hydraulic separator to avoid mutual interference. The connection of high- and low-temperature circuits in normal operation provides the desired minimum return-flow temperature for operating the condensing boiler within the condensation range. The result: high efficiency due to optimal utilisation of the heat in the hot water.



### Benefits

- Increased efficiency of your heating systems
- Optimum hydraulics in all operating states
- Exceptional utilisation of condensing technology, i.e. highly efficient condensing technology thanks to low return temperature

## Maintenance box – more security for your heating system



maintenance box

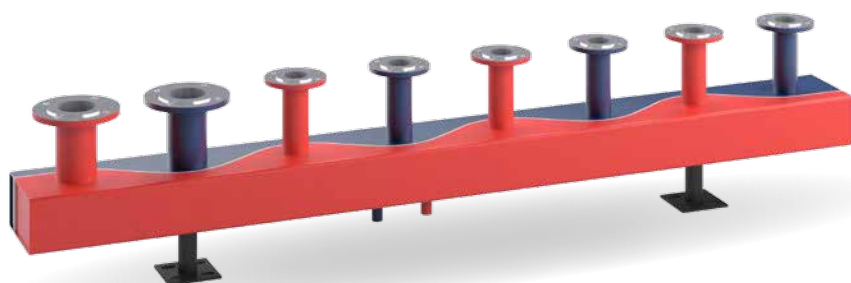
The maintenance box as an optional accessory for all small manifolds, MonoFixx and HydroFixx models. Enables magnetite separation during operation!

## 4. Compact manifolds

### Standardised and variable

**Compact manifold** Combined flow and return manifold consisting of rectangular tubing with chambers made of black sheet steel S235 arranged adjacent to one another and separated by sinusoidal parting wall. The compact manifold is leak-tested and primed in the factory, with corrosion protection compliant with AGI Q

151 on request. Max. operating pressure of either 6 bar or 16 bar, max. operating temperature of 110°C. All nozzles are aligned to the height of the shut-off valves and can be at the top, side or underneath. Drainage bushings for flow and return chambers are provided as standard.



Uniform nozzle spacing



Variable nozzle spacing

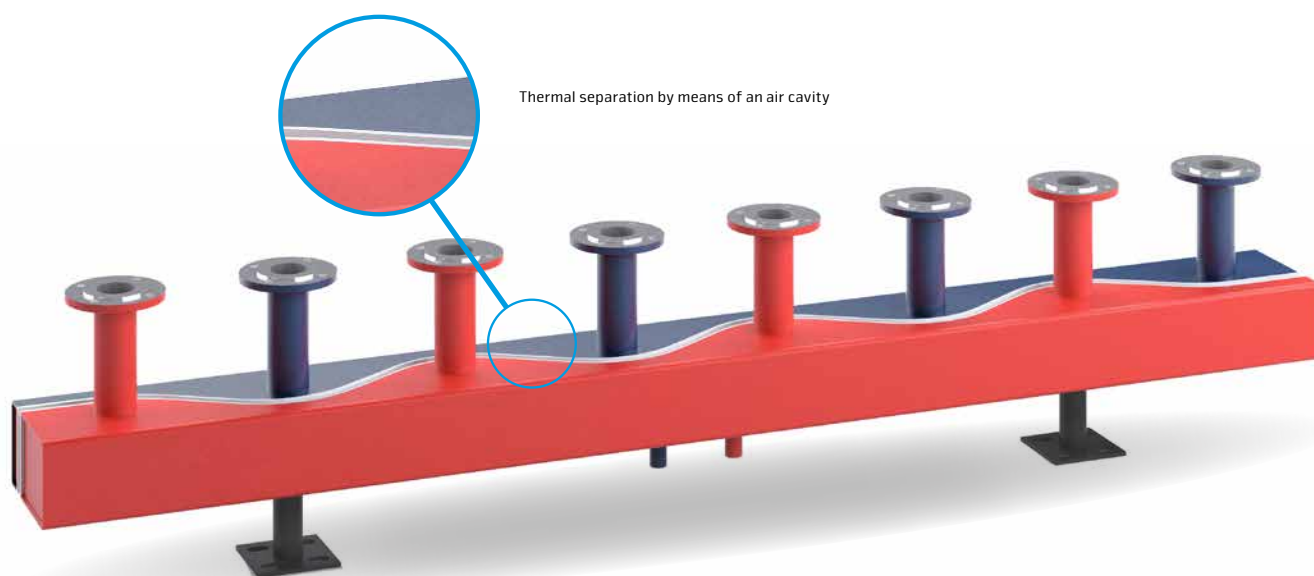
Flow rate at flow velocity 0.4 m/s	Chamber size width/height	Power at $\Delta T$ 20 K	Largest nozzle
6.5 m <sup>3</sup> /h	120/80	150 kW	DN 65
10.8 m <sup>3</sup> /h	160/80	250 kW	DN 80
10.8 m <sup>3</sup> /h	180/110	400 kW	DN 100
25.8 m <sup>3</sup> /h	200/120	600 kW	DN 125
53.8 m <sup>3</sup> /h	280/180	1,250 kW	DN 150
68.8 m <sup>3</sup> /h	300/200	1,600 kW	DN 150
90.0 m <sup>3</sup> /h	400/200	2,100 kW	DN 150
150.0 m <sup>3</sup> /h	450/250	3,500 kW	DN 200
194.0 m <sup>3</sup> /h	500/300	4,500 kW	DN 250
267.0 m <sup>3</sup> /h	600/400	6,200 kW	DN 300
391.0 m <sup>3</sup> /h	700/500	9,100 kW	DN 350



## Thermally separated compact manifolds

Combined flow and return manifold consisting of rectangular tubing, standard design with 20 mm air cavity with chambers made of black sheet steel S235 arranged adjacent to one another and separated by sinusoidal parting wall, with corrosion protection compliant with AGI Q 151 on request. The compact manifold is leak-tested and primed before leaving the factory.

Max. operating pressure of either 6 bar or 16 bar, max. operating temperature of 110°C. All nozzles are aligned to the height of the shut-off valves and can be at the top, side or underneath. Drainage bushings for flow and return chambers are provided as standard.



Flow rate at flow velocity 0.4 m/s	Chamber size width/height	Power at $\Delta T$ 20 K	Largest nozzle
9.0 m <sup>3</sup> /h	160/81	210 kW	DN 65
13.8 m <sup>3</sup> /h	180/111	320 kW	DN 80
22.0 m <sup>3</sup> /h	200/121	510 kW	DN 80
42.0 m <sup>3</sup> /h	280/181	980 kW	DN 125
60.2 m <sup>3</sup> /h	300/201	1,400 kW	DN 125
77.0 m <sup>3</sup> /h	400/201	1,800 kW	DN 150
125.0 m <sup>3</sup> /h	450/251	2,900 kW	DN 200
194.0 m <sup>3</sup> /h	500/301	4,500 kW	DN 250
267.0 m <sup>3</sup> /h	600/401	6,200 kW	DN 300
391.0 m <sup>3</sup> /h	700/501	9,100 kW	DN 350

## Special construction methods



### Edge welding

Supply of the Sinus compact manifold (with or without thermal separation) or the HydroFixx manifold (manifold with integrated hydraulic separator) in two (or more) parts, due to excess length. The welding of the parts is performed on-site by the customer.



### Flange connections

The alternative for split delivery of the Sinus compact manifold (with or without thermal separation) is to fit a flange connection in the factory and provide screws, nuts and seal.



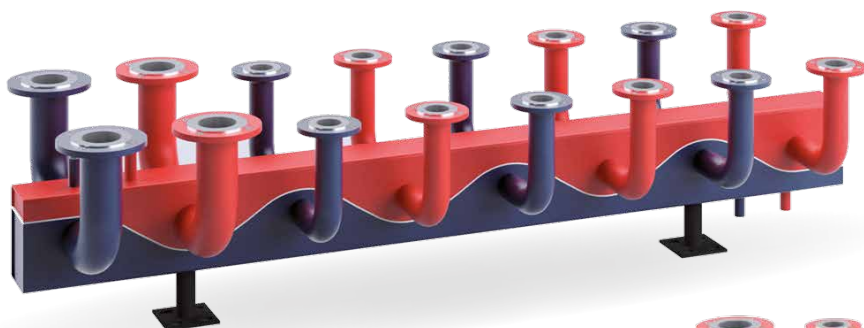
### Angled manifold

Delivery of the Sinus compact manifold (with or without thermal separation) or the HydroFixx manifold (manifold with integrated hydraulic separator) in an angled design. The manifold is typically supplied with a 90° angle.

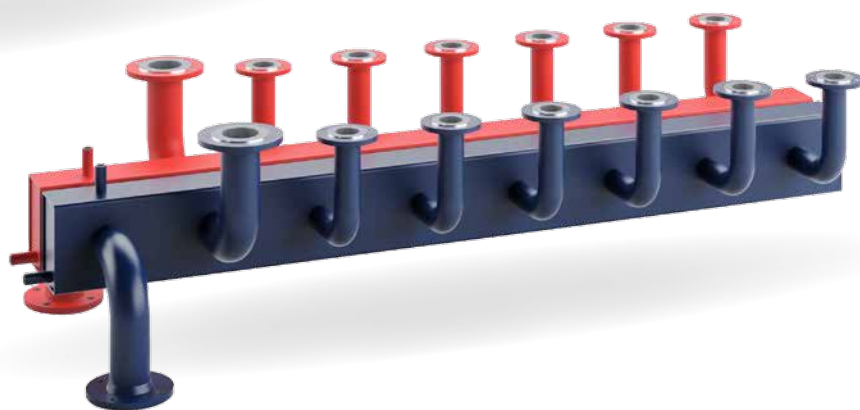
## Compact & dual-chamber with 90° bends

**Compact manifold with 90° bends** Combined flow and return manifold with 90° bends, consisting of rectangular tubing, standard design with chambers made of black sheet steel S235 arranged adjacent to one another and separated by sinusoidal parting wall, configured with threaded and/or flanged nozzles PN 6/PN 16 exiting adjacent to one another at the front and back sides and directed upwards. Nozzles aligned to the height of the shut-off valves. Drainage bushings for flow and return chambers are provided as standard. The compact manifold is leak-tested and primed before leaving the factory. Max. operating pressure of either 6 bar or 16 bar, max. operating temperature of 110°C. Also available in a thermally separated design.

**Dual-chamber manifold with 90° bends** Combined flow and return manifold with 90° bends, consisting of two rectangular tubes welded to one another with flow and return chambers arranged opposite one another (flow on one side and return on the other), made from black sheet steel S235 as standard design. The threaded and/or flanged nozzles PN 6/PN 16 are aligned to the height of the shut-off valves and are directed upwards by means of 90° bends. Drainage bushings for flow and return chambers are provided as standard. The dual-chamber manifold is leak-tested and primed before leaving the factory. Max. operating pressure of 6 bar, max. operating temperature of 110°C. Also available in a thermally separated design.



Compact manifold with 90° bends



Dual-chamber manifold with 90° bends

### Benefits

- Short delivery times thanks to the availability of various models as stock items
- Custom grids and shapes available
- Particularly easy to install
- High production quality

## 5. HydroFixx

### Manifolds with integrated hydraulic separator

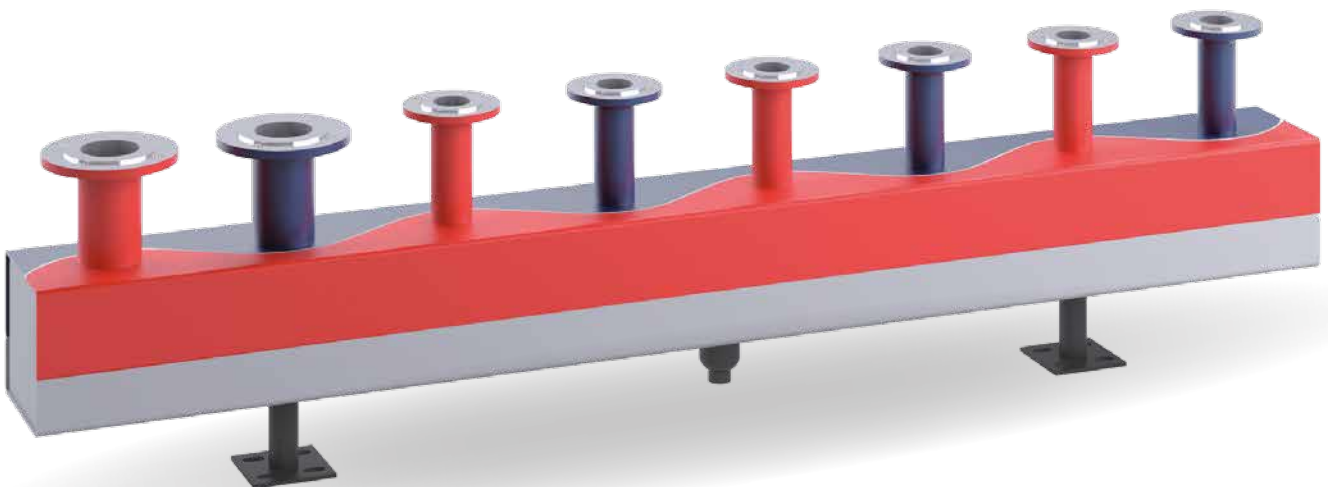
**HydroFixx** One of the pioneering achievements by our company is the HydroFixx. It takes the room efficiency in modern central heating systems into account – minimal space requirements with maximum operating reliability.

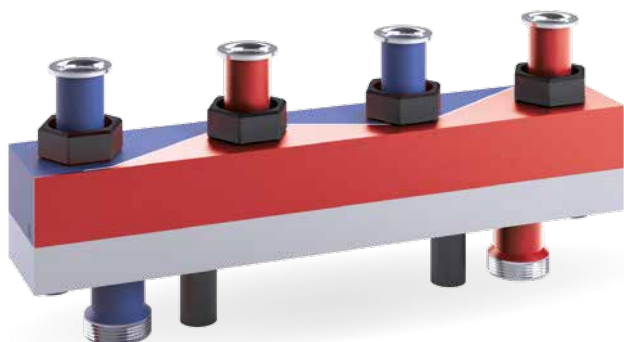
It is a compact unit combining the advantages of the space-saving heating circuit arrangement of a compact manifold with the functionality of a hydraulic sep-

arator. The Sinus manifold features two consecutive flow and return chambers separated by a sinusoidal parting wall. At the Sinus HydroFixx, two openings of the subjacent hydraulic separator lead into the aforementioned chambers. Since these openings are situated close to the end caps of the junction body, the hydraulic separator's entire water content can be used as a buffer volume for longer response times of the control system at the hydraulic balancing.

#### Benefits

- Low space requirement due to the hydraulic separator being arranged horizontally below the manifold
- Cost and time-saving due to very short assembly time
- Optimum hydraulic decoupling of the primary and secondary circuit by means of upstream separator
- Compatible with all makes and models of condensing boiler
- Designed for industry standard pump groups
- Optimised for use in rooftop heating systems on account of the compact construction





HydroFixx, small construction

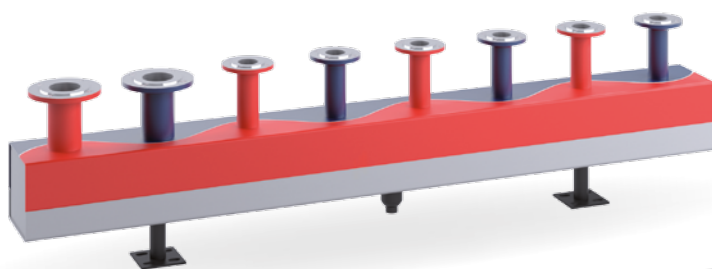


Manifold with separate Hydraulic Separator

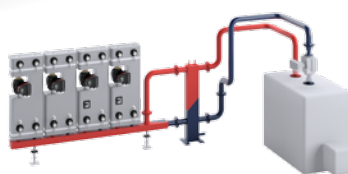


HydroFixx

Flow rate	Type	Power at $\Delta T$ 20 K	Nozzle spacing
3 m <sup>3</sup> /h	80/80	70 kW	125/130 mm
7 m <sup>3</sup> /h	120/120	160 kW	125/130 mm



HydroFixx, large construction



Manifold with separate Hydraulic Separator



HydroFixx

Flow rate	Type	Power at $\Delta T$ 20 K	Nozzle size max.	Nozzle spacing
7 m <sup>3</sup> /h to 387 m <sup>3</sup> /h	120/120 to 700/750	160 kW to 9,000 kW	DN 50 to DN 350	200 mm/250 mm 300 mm/350 mm and variable

## 6. Single-chamber manifolds

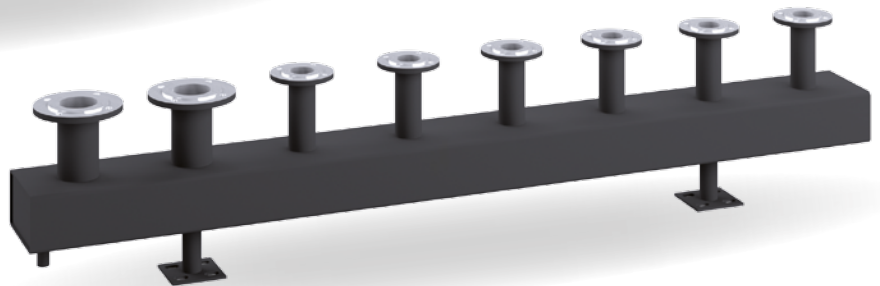
### Manifolds with cylindrical profile, manifolds with rectangular profile

**Manifolds with cylindrical profile** Can be produced from different grades of material to suit any requirements. From the classic heating manifold (110°C, 6 bar) to the TÜV-tested steam manifold (e.g. 300°C, 40 bar). These requirements, ranging from hot water, compressed air, steam, thermal oil, substrate etc. are taken into account by the various welding procedures, according to assessment groups D – B. Corrosion protection according to AGI Q 151 is quite straightforward; other requests for special coatings and for powder coating or galvanisation can also be implemented.

**Manifolds with rectangular profile** For heating and cooling water systems, as a single-chamber manifold with a rectangular profile. Made from black sheet steel S235. The nozzles can be freely selected, flanges and/or threads up to PN40 are possible. The nozzles are aligned at a specific height (centre of the spindle) in relation to the valves. Corrosion protection according to AGI Q 151 is quite straightforward; other requests for special coatings and for powder coating or galvanisation can also be implemented.



Manifolds with cylindrical profile



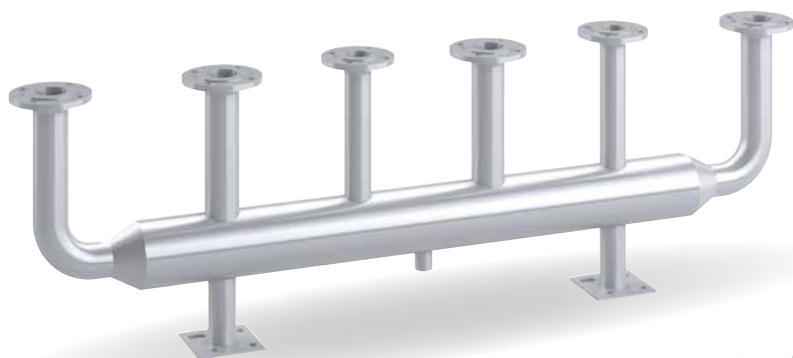
Manifolds with rectangular profile

## 7. Stainless steel manifolds

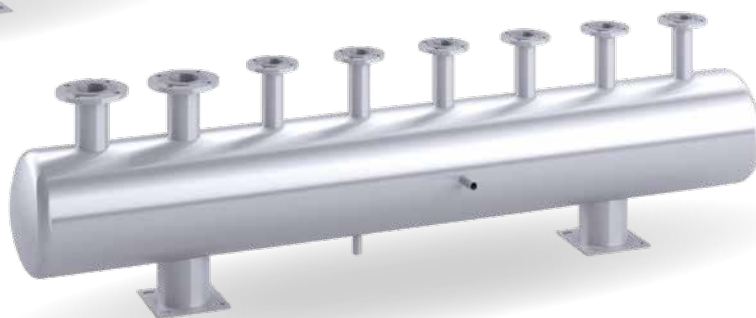
### LegioNixx drinking water manifolds, Service water manifolds

**LegioNixx drinking water manifolds** without dead zones, to prevent the proliferation of Legionella. When developing the LegioNixx the emphasis was placed on the avoidance of dead zones. Within the industry, there have been all kinds of proposals for preventing the proliferation of Legionella. With the full-flow manifold, Sinusverteiler was the first manifold manufacturer that not only made reference to this issue, but also actively counteracted it, making a significant contribution to the safety of drinking water. Stainless steel manifolds in accordance with EN 10217-7/DIN EN ISO 1127 WIG-welded, bath-etched and passivated. Material 1.4571. Manifolds with concentric reducers at the ends and/or 90° bends directed upwards. The stainless steel manifolds are leak-tested before leaving the factory.

**Service water manifolds** Stainless steel manifolds in accordance with EN 10217-7/DIN EN ISO 1127 WIG-welded, bath-etched and passivated. Material either 1.4301 (V2A) or 1.4571 (V4A). Manifolds fitted with dished boiler ends. The stainless steel manifolds are leak-tested before leaving the factory. Nozzles in the form of pipe nozzles (smooth ends for pressing), bushings/threaded nozzles or flanged nozzles PN 10/16 aligned to the height of the shut-off valves. Nozzles at the top, side or underneath. Drainage bushing provided as standard.



LegioNixx drinking water manifold



Service water manifolds



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