



## NK 20 Sample Cooler

### Installation, Operating and Maintenance Instructions



Safety Information

General Information

Mechanical Installation

Commissioning

Operation

Maintenance

Technical Assistance

Local regulations may restrict the use of this product to below the conditions quoted.  
In the interests of development and improvement of the product, we reserve the right to change  
the specification without notice.

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## 1. Safety Information

Safe operation of these products can only be guaranteed if they are properly installed, commissioned, used and maintained by qualified personnel in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment, must also be complied with.



The name plate, specifies the features of the equipment. Do not commission or operate any item of equipment that does not have its own specific name plate.

Referring to the Installation, Operating and Maintenance Instructions, name-plate and Technical Information sheet, check that the product is suitable for the intended use/application. The products comply with the requirements of the EU Pressure Equipment Directive and fall within category 'SEP'.

It should be noted that products within this category are required by the directive not to carry the CE mark.

## 2. General Information

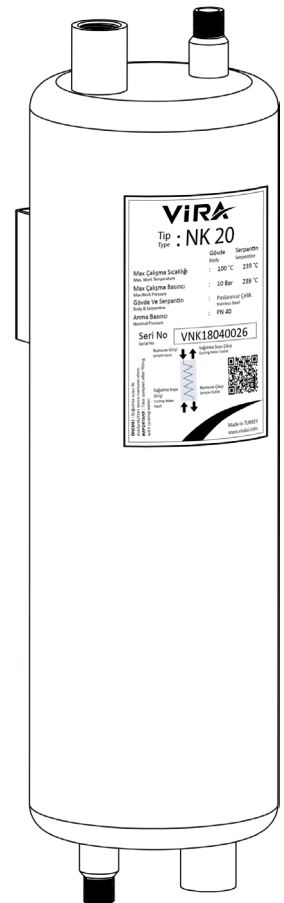
### 2.1 Description

The Vira NK20 sample cooler is used to cool samples of boiler water or steam. The cooler consists of a 304L stainless steel coil, through which the sample flows, and a 304L stainless steel body, through which cooling water flows, and utilizes a counter current flow to maximize cooler efficiency.

The NK20 is also available with installation kit including two clamp adapters, a needle valve, a street elbow, 50 cm extension pipe and a ½ cooling water inlet valve.

### 2.2 Connections

Sample tube inlet connection	: 1/4"
Sample tube outlet connection	: 1/4"
Cooling water inlet connection	: 1/2"
Cooling water outlet connection	: 1/2"



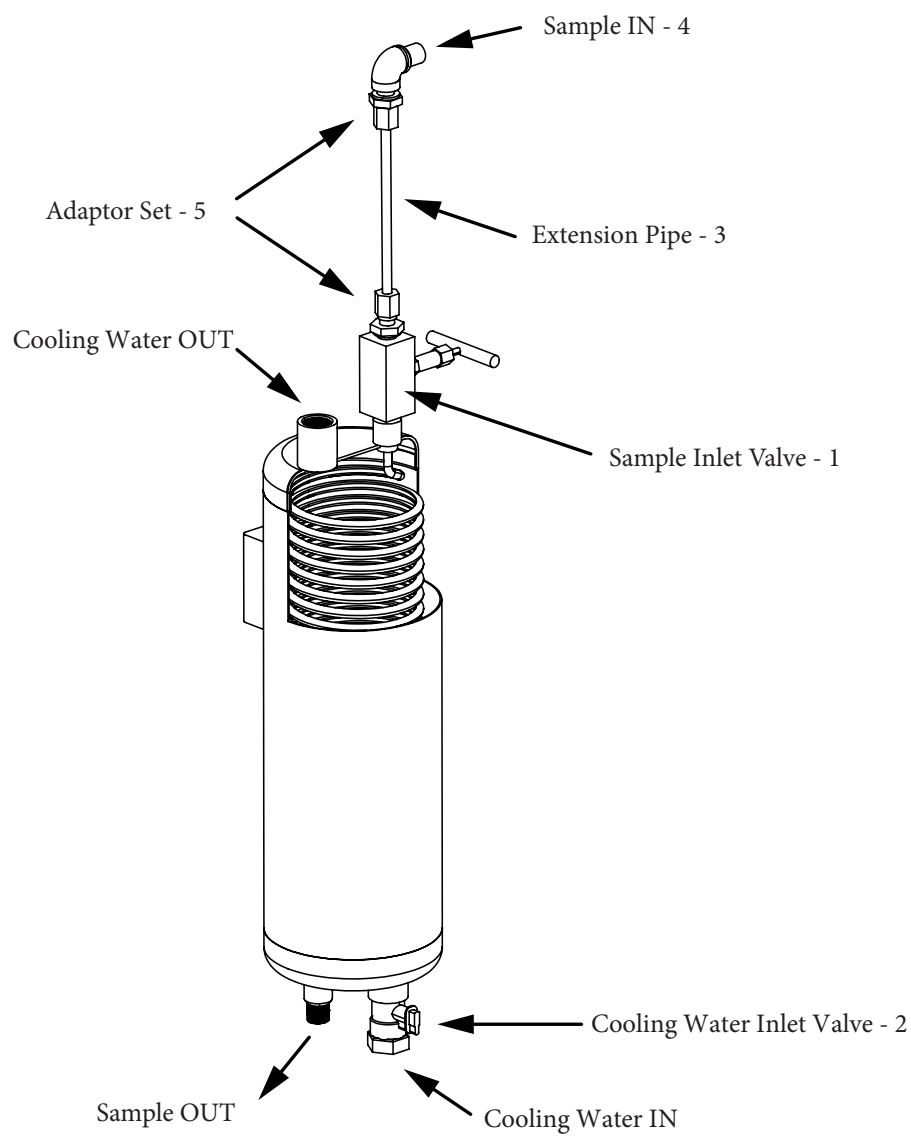
**Figure 1 : Perspective Visual of NK 20**

## 2.3 Connections

**Note :** Sample cooler montage set must be ordered separately.

Item	Description	Size
1	Sample Inlet Valve	1/4"
2	Sample Inlet Valve	1/2"
3	Extension Pipe	50 cm - Ø6 mm
4	Street Elbow	1/4"
5	Adaptor Set	1/4"

**Table 1 :** Sample Cooler Montage Set



**Figure 2 :** Sample Cooler Overview

## 2.4 Name Plate



Figure 3 : NK 20 Name Plate

## 2.5 Performance

The tables below illustrate the expected increase in sample outlet temperature relative to the cooling water inlet temperature at different system pressures and cooling water flow conditions.

### Example

From Table 2 – Saturated Water, at a cooling water flowrate of 0.10 L/s ( $\approx 6$  L/min), the corresponding value for 10 bar / 0.8 L/min shows that the sample outlet temperature will be approximately 7 °C above the cooling water inlet temperature.

(This value is taken directly from Table 2, row “0.8 L/min”, column “10 bar”, under cooling water flowrate 0.10 L/s.)

If the cooling water enters the cooler at 20 °C, the expected sample outlet temperature can be calculated as:

$$20\text{ °C} + 7\text{ °C} = 27\text{ °C}$$

This means that the sample taken from the boiler—initially at saturation temperature—will be effectively cooled down to approximately 27 °C, which is well below the typical safe handling and conductivity-measurement limit of 40 °C.

**Table 2 - Saturated Water (Boiler Water)**
**Cooling water flowrate: 0.10 L/s ( $\approx$  6 L/min)**

Sample flow (L/min)	1 bar	3 bar	7 bar	10 bar	20 bar	32 bar
0,5	2°C	3°C	4°C	4°C	6°C	8°C
0,8	4°C	5°C	6°C	7°C	9°C	11°C
1	6°C	7°C	9°C	9°C	12°C	15°C

**Cooling water flowrate: 0.07 L/s ( $\approx$  4.2 L/min)**

Sample flow (L/min)	1 bar	3 bar	7 bar	10 bar	20 bar	32 bar
0,5	3°C	4°C	5°C	5°C	7°C	9°C
0,8	5°C	6°C	8°C	8°C	10°C	13°C
1	7°C	9°C	11°C	11°C	14°C	18°C

**Cooling water flowrate: 0.04 L/s ( $\approx$  2.4 L/min)**

Sample flow (L/min)	1 bar	3 bar	7 bar	10 bar	20 bar	32 bar
0,5	4°C	5°C	7°C	7°C	9°C	12°C
0,8	6°C	8°C	10°C	10°C	13°C	17°C
1	9°C	11°C	14°C	14°C	18°C	23°C

**Cooling water flowrate: 0.02 L/s ( $\approx$  1.2 L/min)**

Sample flow (L/min)	1 bar	3 bar	7 bar	10 bar	20 bar	32 bar
0,5	6°C	8°C	10°C	11°C	14°C	18°C
0,8	9°C	11°C	14°C	15°C	19°C	24°C
1	13°C	15°C	19°C	20°C	25°C	32°C

**Table 3 - Saturated Steam**
**Cooling water flowrate: 0.10 L/s**

Sample flow (L/min)	1 bar	3 bar	7 bar	10 bar	20 bar	32 bar
0,5	3°C	4°C	5°C	5°C	7°C	10°C
0,8	5°C	7°C	8°C	8°C	11°C	13°C
1	7°C	9°C	11°C	11°C	14°C	18°C

**Cooling water flowrate: 0.07 L/s**

Sample flow (L/min)	1 bar	3 bar	7 bar	10 bar	20 bar	32 bar
0,5	4°C	5°C	6°C	6°C	8°C	11°C
0,8	7°C	8°C	10°C	10°C	12°C	16°C
1	9°C	11°C	13°C	13°C	17°C	22°C

**Cooling water flowrate: 0.04 L/s**

Sample flow (L/min)	1 bar	3 bar	7 bar	10 bar	20 bar	32 bar
0,5	5°C	7°C	8°C	8°C	11°C	14°C
0,8	8°C	10°C	12°C	12°C	16°C	20°C
1	12°C	14°C	17°C	17°C	22°C	28°C

**Cooling water flowrate: 0.02 L/s**

Sample flow (L/min)	1 bar	3 bar	7 bar	10 bar	20 bar	32 bar
0,5	8°C	10°C	13°C	13°C	17°C	22°C
0,8	11°C	14°C	17°C	18°C	23°C	29°C
1	16°C	19°C	23°C	24°C	30°C	38°C

### 3. Mechanical Installation

#### 3.1 Pressure and Temperature Limits

##### Coil (Seamless)

Max. Design Pressure	: 32 bar g @ 239 °C
Max. Design Temperature	: 239 °C @ 32 Bar g
Max. Cold Hydraulic Test Pressure	: 48 Bar g

##### Body

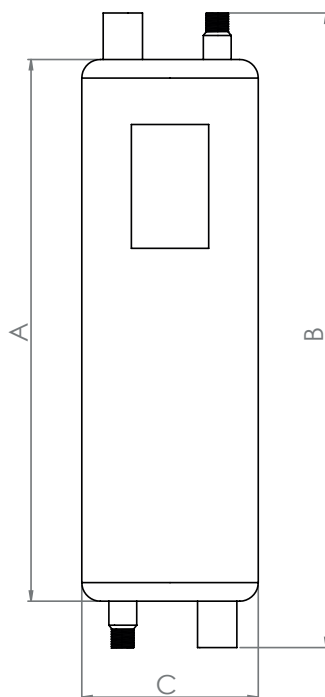
Max. Design Pressure	: 10 bar g @ 100 °C
Max. Design Temperature	: 100 °C @ 10 Bar g
Max. Cold Hydraulic Test Pressure	: 16 Bar g

##### Materials

Body	: Stainless steel (1.4307)
Coil	: Stainless steel (1.4307)

**Note :** Before actioning any installation observe the ‘Safety information’.

- We recommend the use of corrosion resistant pipework suitable for the fluid being sampled.
- Keep the length of all pipes to a minimum.
- Cooling water must be clean and free of scale forming salts.
- The sample cooler must be mounted vertically.



	<b>A</b>	<b>B</b>	<b>C</b>
<b>Size</b>	340 mm	400 mm	114 mm

**Table 2 :** Dimensions

Allow sufficient space below the NK20 for collection of the sample in a beaker or similar container.

- No connection is required on the sample OUT.
- Connect the pipework as shown in the drawing (Figure 2).
- The cooling water IN should be piped to the bottom of the sample cooler in ½” nominal bore pipe via the cooling water inlet valve. A ½” male/female elbow makes a suitable connector.
- Pipe the cooling water OUT from the top of the sample cooler to an open drain.

**Caution :** To avoid the possibility of an air lock at the top of the sample cooler, do not allow the thread of the cooling water OUT elbow to protrude into the sample cooler body - maximum thread engagement 15 mm.

- NK 20 with sample inlet adaptor - Install the clamp fitting and seal in accordance with the manufacturer’s instructions.

## 4. Commissioning

No special commissioning procedure is applicable.

After installation or maintenance carry out tests to ensure that the system is fully functional.

## 5. Operation

**Follow this procedure for safe operation and accurate sampling:**

- Open the cooling water inlet valve first and ensure that a full flow can be seen at the cooling water outlet.
- Gradually open the sample inlet valve and regulate the flow to achieve a cooled sample at about 25 °C.
- Allow the sample to run for a while before collection. This will ensure that a true sample is collected for analysis.
- When enough liquid has been collected close the sample inlet first, and then the cooling water inlet valve.
- After closing the sample inlet valve the sample OUT connection may drip for a few minutes while the coil drains.

### **Warning !**

Sample pipework becomes very hot under normal working conditions, and will cause burns if touched. To avoid the risk of scalding, it is essential that a full flow of cooling water is present before opening the sample inlet valve.

Always close the sample inlet valve before turning off the cooling water.

## 6. Maintenance

No routine maintenance is required.



## **7. Technical Assistance**

For technical assistance or service requests, please directly contact Vira service center by making a phone call or sending an e-mail to **servis@viraisi.com**.

Return faulty or service items to Vira itself or authorized agency in your area. Ensure all items are suitably packed for transit (preferably in the original cartons).

**Please provide the following information with any equipment being returned:**

- Your name, company name, address and telephone number, order number and invoice and return delivery address.
- Description and the serial number of equipment.
- Full description of the fault or repair required.
- If the equipment is being returned under warranty, please indicate the date of purchase.

The manufacturer reserves the right to make change without prior notification.

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