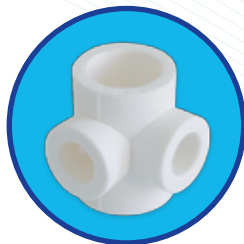




berkeplastik



Product Catalogue





berkeplastik

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PP-R PP-R

PP-R PP-R

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PP-R PP-R

PP-R PP-R

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PP-R PP-R



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PP-R; Polypropylene Random Copolymer Type - 3

This material is a proven, high performance random copolymer that enables the production of top quality solutions for hot & cold water piping applications.

Thanks to its high exceptional heat stability, extraction resistance, stable processing characteristics, and ease of welding and installation, random copolymer enables pipes with reliable performance to be manufactured.

- Extremely long life at least 50 years
- Taste and odor neutral
- Excellent weld ability
- Good chemical resistance
- Bacteriologic ally neutral
- Physiologically harmless

Physical, Thermal and Mechanical Properties

| Properties | Testing methods | Unit | Values |
|--|-----------------|--------------------|------------------------|
| Physical properties | | | |
| Density at 23 °C | ISO 1183 | g /cm ³ | 0.9 |
| Melt flow index (MFI) 190 C°/ 5 kg | ISO 1133 | g/10 min | <0.8 |
| Melt flow index (MFI) 230 C°/ 2.16 kg | ISO 1133 | g/10 min | <0,5 |
| Linear expansion coefficient | DIN 8078 | K ⁻¹ | 1.5 x 10 ⁻⁴ |
| Heat conductivity | DIN 8078 | WK-1m-1 | 0,23 |
| Surface resistance | DIN 8078 | Ω | >10 ¹² |
| Elasticity module | DIN 8078 | N/mm ² | 800 |
| Thermal properties | | | |
| Melting point | DSC | C° | 146–150 |
| Subjective heat | Calorimeter | Kj/kgK | 1.73 |
| Coefficient of linear expansion | ASTM D 696 | mm / m(C°) | 0.15 |
| Deflection temperature under load – 1.8Mpa | ISO 75A–1, -2 | °C | 46 |
| VICAT softening point | ISO 306 | °C | 132 |
| Mechanical properties | | | |
| Tensile stress at yield at 50 mm/min | ISO 527–1,-2 | Mpa | 25 |
| Elongation at yield at 50 mm/min | | % | % |
| Elongation at break at 50 mm/min | | 13 | >500 |
| Charpy impact strength (0 °C) | ISO 179 | 15J | <i>Fara rupere</i> |

Long Service Life

With all water carrying pipes, resistance to internal pressure is an important factor affecting long life characteristic.

To assure optimal life performance, straight and curved pipes have been subjected to extensive hydrostatic pressure testing, in the laboratory, at a variety of temperatures.

Long-Lasting Performance

Random copolymer that is used for production of Berke pipes and fittings can withstand temperatures up to 70° C without losing shape, and handle short duration temperatures of up to 100° C. Combined with good chemical resistance and impact strength, Berke pipes can simply be installed and forgotten about for at least 50 years!

Particularly important for domestic water installations, is the fact that random copolymer type 3 is physiologically harmless, and taste and color neutral.

Excellent Stability

In use, the formulation of Berke pipes is such that it offers a high molecular weight, plus excellent mechanical properties. Additional benefits include high heat stability as well as excellent resistance to extraction.

Berke pipes and fittings conform to DIN 8077/78, EN ISO 15874 -1,2,3 and DIN 16962 standards.

Easy Installation, Cost-Effective in Use

Whatever the complexity of a domestic water installation, Berke pipes have the ability to be shaped to conform to even most complex layouts.

Berke pipes easy weld ability also makes them faster and simpler to install.

Measuring Hydrostatic Pressure Performance

Hydrostatic pressure is calculated according to the below formula:

$$P = \frac{2 \times e_{\min} \times \sigma}{d_{em} - e_{\min}}$$

- P** = internal pressure ,MPa
d_{em} = outside diameter of the pipe, mm
e_{min} = minimum wall thickness of the pipe, mm
σ = hydrostatic stress, MPa
1 Mpa = 10 bar

Service life DIN 8077 (SF=1.S PP-R)

| Temperature °C | Services Life | Pipe Series (S) - Standart Dimension Rate (SDR) | | | | | | | |
|-------------------|------------------|---|----|-------|-----|-------|---|-------|---|
| | | 5 | 11 | 3.2 | 7.4 | 2.5 | 6 | 2 | 5 |
| | | PN 10 | | PN 16 | | PN 20 | | PN 25 | |
| | | Pressure (bar) | | | | | | | |
| 20 | 1 | 15.0 | | 23.7 | | 29.9 | | 37.7 | |
| | 5 | 14.1 | | 22.3 | | 28.1 | | 35.4 | |
| | 10 | 13.7 | | 21.7 | | 27.4 | | 34.5 | |
| | 25 | 13.2 | | 21.0 | | 26.4 | | 33.3 | |
| | 50 | 12.9 | | 20.4 | | 25.7 | | 32.4 | |
| 40 | 1 | 10.8 | | 17.1 | | 21.6 | | 27.2 | |
| | 5 | 10.1 | | 16.0 | | 20.2 | | 25.4 | |
| | 10 | 9.8 | | 15.5 | | 19.6 | | 24.7 | |
| | 25 | 9.4 | | 15.0 | | 18.8 | | 23.7 | |
| | 50 | 9.2 | | 14.5 | | 18.3 | | 23.1 | |
| 60 | 1 | 7.7 | | 12.2 | | 15.4 | | 19.4 | |
| | 5 | 7.1 | | 11.3 | | 14.3 | | 18.0 | |
| | 10 | 6.9 | | 11.0 | | 13.9 | | 17.5 | |
| | 25 | 6.6 | | 10.5 | | 13.3 | | 16.7 | |
| | 50 | 6.4 | | 10.2 | | 12.9 | | 16.2 | |
| 70 | 1 | 6.5 | | 10.3 | | 12.9 | | 16.3 | |
| | 5 | 6.0 | | 9.5 | | 12.0 | | 15.1 | |
| | 10 | 5.8 | | 9.2 | | 11.6 | | 14.6 | |
| | 25 | 5.0 | | 8.0 | | 10.0 | | 12.7 | |
| | 50 | 4.2 | | 6.7 | | 8.5 | | 10.7 | |
| 80 | 1 | 5.4 | | 8.6 | | 10.8 | | 13.7 | |
| | 5 | 4.8 | | 7.6 | | 9.6 | | 12.1 | |
| | 10 | 4.0 | | 6.4 | | 8.1 | | 10.2 | |
| | 25 | 3.2 | | 5.1 | | 6.5 | | 8.1 | |
| 95 | 1 | 3.8 | | 6.1 | | 7.6 | | 9.6 | |
| | 5 | 2.6 | | 4.1 | | 5.2 | | 6.5 | |

Standards And Guidelines

| | |
|---------------------|--|
| DIN 8077 | Polypropylene (PP) pipes. PP-H. PP-B. PP-R. PP-RCT dimensions. |
| DIN 8078 | Polypropylene (PP) pipes. PP-H. PP-B. PP-R. PP-RCT general quality requirements and testing |
| DIN 16962 | Pipe fittings and joint assemblies for polypropylene (PP) pressure pipes. Part 5- General Quality Requirements and Testing. Part 6- Injection Molded Elbows for socket-welding Dimension. Part 9 Injection Molded reducers and nipples for socket welding Dimension. |
| DIN 1988 | Drinking water supply systems- Part 1 General, Part 2 Materials, components, appliances, design and installation. |
| ISO 3213 | Polypropylene (PP) pipes effect of time and temperature on the expected strength. |
| ISO 10508 | Plastics piping systems for hot and cold water installations -- Guidance dor classification and design. |
| EN ISO 15874 | Plastic piping systems for hot and cold water installations polypropylene (PP) Part 1 - general, Part 2 -pipe, Part 3 - fittings, Part 5 - fitness for purpose of the system, Part 7 -guidance for the assessment of conformity |
| DVGW544 | Plastic pipes in the drinking water installation; Requirements and testing |
| DVS 2207 | Welding of thermoplastics materials heated tool welding of piping system and sheet of PP. |

Metal Component Compatibility

As with all polypropylenes prolonged exposure to copper can cause damage to the properties of random copolymer Type-3.

Where metal inserts are to be used in an installation the recommended choice is nickel or chromiumplated brass components in order not to harm raw material properties. All the metal inserts that are used in production of Berke metal fittings are nickel or chromium-plated brass components that does not harm the raw material.

Chemical Resistance

As with all PP pipes it is advisable that substances such as oils, waxes and bitumen should be kept away from the pipes.

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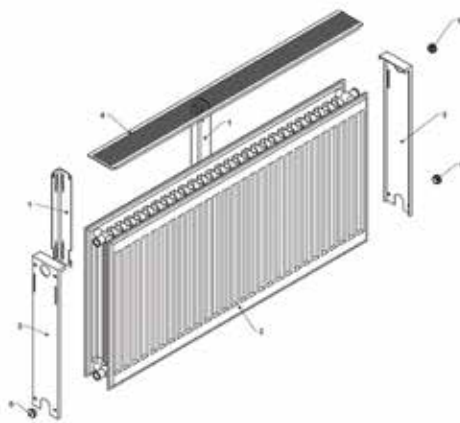


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TECHNICAL SPECIFICATIONS

KALDE steel panel radiators are produced with fully integrated and fully automated lines under PLC supervision which use latest technologies in compliance with BS, DIN EN 442 norms. The radiators come in two different heights (500 mm, 600 mm) and 27 different lengths (from 400 mm to 3,000 mm increasing by 100 mm). They are produced with German made presses and moulding equipment specially designed for panel radiator. To provide maximum heat output capacity, we use high quality steel sheets produced specifically for panel radiator and wide surface convectors, and raw materials that comply with EN norms.



Both the radiator's inner and outer surfaces are fully cleaned and purified by dipping, spray oil taking, phosphatizing and passivation conforming to DIN 55900. As a result, the whole surface of the radiator is totally purified from any chemical substances that might effect the quality of the paint. A premier coating is applied by dipping. The radiators then pass through a furnace, and are painted in climatized cabinets by robotic pistols with electrostatic powder paint and are furnace again.

| | |
|---|------------------|
| Thickness of the panel steel sheet | : 1,11 ± 0,09 mm |
| Thickness of the convector steel sheet | : 0,30 ± 0,09 mm |
| Thickness of the grill and side cover steel sheet | : 0,50 ± 0,09 mm |
| Maximum working temperature | : 120 °C |
| Maximum working pressure | : 10 Bars |
| Test pressure | : 13 Bars |

DIMENSIONS

Standart heights are: (H) 500 mm and 600 mm

Standart lengths are: (L) From 400 to 3,000 mm in 100 mm increments

Produced with fully automated Italian robot welding machinery, each radiator is tested fully under 13 bars.

| Height | Axis Distance | Width | Weight | Water Content |
|--------|---------------|--------|--------|---------------|
| (H) mm | (A) mm | (a) mm | Kg/m | Mt/Lt |
| 500 | 450 | 104 | 24,53 | 4,82 |
| 600 | 550 | 104 | 29,26 | 5,66 |

TYPE

Type 22 is connected from the holes to the installation system using T type welded connection parts. T parts enable the radiator to be connected to different shapes. This provides the flexibility to connect the radiator to different installation systems under different positions.

PACKING AND ASSEMBLY

The radiators have side covers and top grills which can be easily mounted to the body. They are protected from outer impacts by cardboard carton and plastic cover for hangers, and are also wrapped in nylon against dust and humidity. Inside the radiator, you will find a full assembly set including purjor plug, blind plug, screws, dubels, suspension brace clamp for easy installation. Our packaging system with added protection also enables the radiators to be assembled to the wall while the packaging is still on the radiator giving protection against dust, external effects and other impacts during the construction phase of the house.

| Radiator Length | Type 11-21-22-33 | Radiator Length | Type 11-21-22-33 | |
|-----------------|------------------|-----------------|------------------|---------|
| mm | L3 (mm) | mm | L1 (mm) | L2 (mm) |
| 400 | 200 | 1700 | 766,5 | 733,5 |
| 500 | 300 | 1800 | 800 | 800 |
| 600 | 400 | 1900 | 866,5 | 833,5 |
| 700 | 500 | 2000 | 900 | 900 |
| 800 | 600 | 2100 | 966,5 | 933,5 |
| 900 | 700 | 2200 | 1000 | 1000 |
| 1000 | 800 | 2300 | 1066,5 | 1033,5 |
| 1100 | 900 | 2400 | 1100 | 1100 |
| 1200 | 1000 | 2500 | 1166,5 | 1133,5 |
| 1300 | 1100 | 2600 | 1200 | 1200 |
| 1400 | 1200 | 2700 | 1266,5 | 1233,5 |
| 1500 | 1300 | 2800 | 1300 | 1300 |
| 1600 | 1400 | 2900 | 1366,5 | 1333,5 |
| | | 3000 | 1400 | 1400 |

| Radiator Height | B | C |
|------------------|--------|-------|
| Mm | mm | Mm |
| 500 | 285 | 107,5 |
| 600 | 385 | 107,5 |
| Type 11-21-22-33 | A (mm) | |
| | 100 | |

ASSEMBLY

STEP 1

Carefully take out the set inside the pe bag in order not to scratch the radiator. Check contents of the bag. If there is any missing item, please obtain it before starting the installation.

STEP 2

Place the inner and outer surfaces of the radiator according to the installation connections. Mark the location of the radiator on the wall leaving spaces on the bottom, top, left and right sides of the radiator. You will also need some space to install the valves both on the right and left sides of the radiator.

STEP 3

Mark the wall 107.5 mm below the bottom edge of the radiator on suspension brace clamp axis.

STEP 4

The suspension brace clamp can be mounted on the wall so that either the wide or the narrow part can be on the wall.

STEP 5

You can use the suspension brace clamp as a guide. Place lower edge to match point A showing upwards and the clamp holes to center the axis line to make it vertical to the floor. Use a water gauge during this process.

STEP 6

Mark the wall where the suspension brace clamps will be screwed to the wall.

STEP 7

Use the values on page 5 (L1, L2, or L3) to mark the location where the suspension brace clamp axis should be. Again use the suspension brace clamps as a template to mark the locations to be drilled in.

STEP 8

Using a suitable drill make the holes in the wall and place the dubels inside the holes.

STEP 9

Place the suspension brace clamps on the wall taking care of the position of the narrow/wide sides. Use the screws to firmly mount the first clamp to the wall. Use a water gauge to make sure that the clamps are located parallel to each other and then mount the other clamp to the wall.

STEP 10

Hang the radiator on the suspension brace clamps

STEP 11

Unplug the plastic on the side (right or left) where the water is flowing. Fasten the valve to the top hole and the blind plug to the bottom hole.

STEP 12

Then unplug the other plastic on the top and replace it with the purjor plug, and fasten the valve to the bottom hole. Now, the radiator is ready to be connected to the system. You can make the connections.

STEP 13

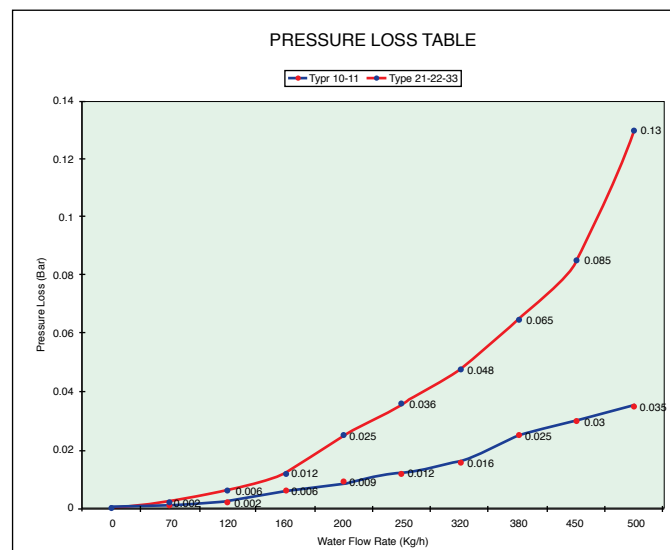
Do not use the radiator before filling water into the system and controlling if there is any leakage.

RADIATOR CHOICE CALCULATIONS

In order to get the biggest efficiency from the radiator, you should choose the appropriate one for your needs. While making your choice, you need to calculate the capacity changes according to the pressure losses, different water in and out conditions, and the room temperatures. Below you can find some samples for these choices.

PRESSURE LOSS

Due to the friction inside the system, a pressure loss will occur. This is important for the choice of the pump. Most of the pressure loss happens inside the radiator. You can calculate the pressure loss in the radiators using the below chart.



Example: What is the pressure loss on a 600/22DPDC/1000 radiator?

$Q_n = 1808$ watt = for one radiator of size 600/22DPDC/1000; it is 1554 kcal/h (1 watt = 0,86 kcal/h)

Water flow percentage = $Q_{rv} / (\text{water temperature in} - \text{water temperature out})$

Water flow percentage = $1554 / (75 - 65)$ Water flow percentage = 155,4 kg/h

You can use the chart to calculate the pressure loss as below.

-On type 22 line; draw a vertical line from x-axis to meet water flow

-Then draw a horizontal line from y-axis;

-Where the lines meet is the value of the pressure loss for type 22 x 600 x 1000. For this example, the value of the pressure loss is 0,002 bars.

Generally speaking, pressure loss depends on the water flow and the radiator's type and dimensions. It is more critical for longer radiators.

EXAMPLE 1

If heat output value for (75/65) 20 °C room temperature is 1808 watts, what will be the heat output for a room of 18 °C and 70/55°C In Table 3 (showing F Factor), in the first vertical column you can see the water temperature and in the second vertical column you can see the room temperature. In the horizontal column you can see the temperature of the water out from the radiator. Where these columns meet, you can find the F value. F value is 1,17 for the values of 70/55 °C and 18 °C.

New heat output value is calculated with the below formula: $Q=Q_n/F$

$$Q = 1808/1.17 = 1,545 \text{ watts}$$

Q = Needed heat output

Q_n = Standard heat output

F = Capacity factor in the Table 3

EXAMPLE 2

This calculation is used to choose a radiator for a room or a space.

Let's assume that heat needed for a room is Q=1,700 watts. How can we calculate the heat output of a radiator on 18°C and 70/55°C And how can we choose a radiator?

From Table 2, F value is 1.17

$$Q_n=Q \times F \quad Q_n=1,700 \times 1.17 \quad Q_n=1,989 \text{ watts}$$

So, we choose a radiator of Q_n=1,989 watts (according to 75/65 °C and room temperature 20 °C) we can choose these radiators: DPDC 500x1400mm or 600x1200mm.

If we do not apply this condition and choose a radiator of 1,700 watts instead of 1,989 watts, then the room temperature will never come to requested levels.

| HEAT OUTPUT TABLE (90 "C / 70 "C) WATER TEMPERATURE | | | | | | | | | |
|---|---------|-----|------|------|------|------|------|------|------|
| Height | | 500 | | | | 600 | | | |
| Room Temp. °C | | PC | DPSC | DPDC | TPTC | PC | DPSC | DPDC | TPTC |
| 12 °C | Watt/mt | 598 | 868 | 1211 | 1585 | 717 | 1036 | 1414 | 1895 |
| | Kcal/mt | 514 | 747 | 1042 | 1363 | 616 | 891 | 1216 | 1630 |
| 15 °C | Watt/mt | 642 | 933 | 1302 | 1704 | 770 | 1114 | 1519 | 2037 |
| | Kcal/mt | 552 | 802 | 1120 | 1465 | 663 | 958 | 1307 | 1752 |
| 18 °C | Watt/mt | 678 | 985 | 1374 | 1798 | 813 | 1176 | 1604 | 2150 |
| | Kcal/mt | 583 | 847 | 1182 | 1546 | 699 | 1011 | 1379 | 1849 |
| 20 °C | Watt/mt | 892 | 1296 | 1808 | 2366 | 1070 | 1547 | 2110 | 2829 |
| | Kcal/mt | 767 | 1114 | 1555 | 2035 | 920 | 1330 | 1815 | 2433 |
| 22 °C | Watt/mt | 740 | 1076 | 1501 | 1964 | 888 | 1284 | 1751 | 2348 |
| | Kcal/mt | 637 | 925 | 1291 | 1689 | 764 | 1104 | 1506 | 2019 |
| 24 °C | Watt/mt | 767 | 1115 | 1555 | 2035 | 920 | 1330 | 1815 | 2433 |
| | Kcal/mt | 660 | 959 | 1337 | 1750 | 791 | 1144 | 1561 | 2092 |

HEAT INPUT / OUTPUT (Watt)

| 20°C | | TYPE 11 | | TYPE 21 | | TYPE22 | | TYPE 33 | |
|--------|-------------|---------|------|---------|------|--------|------|---------|------|
| L (mm) | t1/ t2 (°C) | H (mm) | | H (mm) | | H (mm) | | H (mm) | |
| | | 500 | 600 | 500 | 500 | 500 | 600 | 500 | 600 |
| 400 | 90 / 70 | 357 | 428 | 518 | 619 | 723 | 844 | 946 | 1132 |
| | 75 / 65 | 281 | 336 | 408 | 487 | 578 | 675 | 743 | 885 |
| | 70 / 55 | 244 | 293 | 356 | 424 | 463 | 540 | 646 | 768 |
| | 55 / 45 | 143 | 171 | 209 | 249 | 291 | 339 | 377 | 445 |
| 500 | 90 / 70 | 446 | 535 | 648 | 773 | 904 | 1055 | 1183 | 1415 |
| | 75 / 65 | 351 | 421 | 510 | 608 | 723 | 844 | 928 | 1107 |
| | 70 / 55 | 305 | 366 | 445 | 530 | 578 | 675 | 807 | 961 |
| | 55 / 45 | 179 | 214 | 261 | 311 | 363 | 424 | 471 | 557 |
| 600 | 90 / 70 | 535 | 642 | 778 | 928 | 1085 | 1266 | 1419 | 1697 |
| | 75 / 65 | 421 | 505 | 612 | 730 | 868 | 1013 | 1114 | 1328 |
| | 70 / 55 | 366 | 439 | 533 | 636 | 694 | 810 | 968 | 1153 |
| | 55 / 45 | 215 | 257 | 314 | 373 | 436 | 509 | 565 | 668 |
| 700 | 90 / 70 | 624 | 749 | 907 | 1083 | 1265 | 1477 | 1656 | 1980 |
| | 75 / 65 | 491 | 589 | 714 | 852 | 1012 | 1182 | 1300 | 1550 |
| | 70 / 55 | 428 | 512 | 622 | 742 | 810 | 945 | 1130 | 1345 |
| | 55 / 45 | 251 | 300 | 366 | 435 | 509 | 594 | 659 | 779 |
| 800 | 90 / 70 | 713 | 856 | 1037 | 1237 | 1446 | 1688 | 1893 | 2263 |
| | 75 / 65 | 561 | 673 | 817 | 973 | 1157 | 1350 | 1485 | 1771 |
| | 70 / 55 | 489 | 565 | 711 | 847 | 925 | 1080 | 1291 | 1537 |
| | 55 / 45 | 287 | 342 | 418 | 497 | 581 | 679 | 753 | 891 |
| 900 | 90 / 70 | 803 | 963 | 1166 | 1392 | 1627 | 1899 | 2129 | 2546 |
| | 75 / 65 | 631 | 757 | 919 | 1095 | 1301 | 1519 | 1671 | 1992 |
| | 70 / 55 | 550 | 659 | 800 | 953 | 1041 | 1215 | 1453 | 1729 |
| | 55 / 45 | 322 | 385 | 471 | 559 | 654 | 763 | 847 | 1002 |
| 1000 | 90 / 70 | 892 | 1070 | 1296 | 1547 | 1808 | 2110 | 2366 | 2829 |
| | 75 / 65 | 701 | 841 | 1021 | 1217 | 1446 | 1688 | 1856 | 2214 |
| | 70 / 55 | 611 | 732 | 889 | 1059 | 1157 | 1350 | 1614 | 1921 |
| | 55 / 45 | 358 | 428 | 523 | 621 | 727 | 848 | 942 | 1113 |
| 1100 | 90 / 70 | 981 | 1177 | 1426 | 1701 | 1988 | 2321 | 2602 | 3112 |
| | 75 / 65 | 772 | 925 | 1123 | 1338 | 1591 | 1857 | 2042 | 2435 |
| | 70 / 55 | 672 | 805 | 978 | 1165 | 1272 | 1485 | 1775 | 2113 |
| | 55 / 45 | 394 | 471 | 575 | 684 | 799 | 933 | 1036 | 1225 |
| 1200 | 90 / 70 | 1070 | 1284 | 1555 | 1856 | 2169 | 2532 | 2839 | 3395 |
| | 75 / 65 | 842 | 1009 | 1225 | 1460 | 1735 | 2026 | 2228 | 2656 |
| | 70 / 55 | 733 | 878 | 1067 | 1271 | 1388 | 1620 | 1937 | 2305 |
| | 55 / 45 | 430 | 514 | 627 | 746 | 872 | 1018 | 1130 | 1336 |

| HEAT INPUT / OUTPUT (Watt) | | | | | | | | | |
|----------------------------|------------|---------|------|---------|-------|--------|------|---------|------|
| 20°C | | TYPE 11 | | TYPE 21 | | TYPE22 | | TYPE 33 | |
| L (mm) | t1/t2 (°C) | H (mm) | | H (mm) | | H (mm) | | H (mm) | |
| | | 500 | 600 | 500 | 500 | 500 | 600 | 500 | 600 |
| 1400 | 90 / 70 | 1248 | 1499 | 1814 | 2165 | 2531 | 2954 | 3312 | 3961 |
| | 75 / 65 | 982 | 1177 | 1429 | 1704 | 2024 | 2363 | 2599 | 3099 |
| | 70 / 55 | 855 | 1024 | 1245 | 1483 | 1620 | 1891 | 2260 | 2690 |
| | 55 / 45 | 502 | 599 | 732 | 870 | 1017 | 1188 | 1318 | 1559 |
| 1600 | 90 / 70 | 1427 | 1713 | 2074 | 2475 | 2892 | 3376 | 3785 | 4527 |
| | 75 / 65 | 1122 | 1346 | 1633 | 1947 | 2314 | 2701 | 2970 | 3542 |
| | 70 / 55 | 977 | 1171 | 1423 | 1695 | 1851 | 2161 | 2582 | 3074 |
| | 55 / 45 | 573 | 685 | 836 | 994 | 1163 | 1357 | 1507 | 1781 |
| 1800 | 90 / 70 | 1605 | 1927 | 2333 | 2784 | 3254 | 3798 | 4258 | 5092 |
| | 75 / 65 | 1263 | 1514 | 1837 | 2190 | 2603 | 3038 | 3342 | 3984 |
| | 70 / 55 | 1099 | 1317 | 1600 | 1907 | 2082 | 2431 | 2905 | 3458 |
| | 55 / 45 | 645 | 770 | 941 | 1119 | 1308 | 1527 | 1695 | 2004 |
| 2000 | 90 / 70 | 1783 | 2141 | 2592 | 3093 | 3615 | 4220 | 4731 | 5658 |
| | 75 / 65 | 1403 | 1682 | 2041 | 2434 | 2892 | 3376 | 3713 | 4427 |
| | 70 / 55 | 1221 | 1463 | 1778 | 2119 | 2314 | 2701 | 3228 | 3842 |
| | 55 / 45 | 717 | 856 | 1046 | 1243 | 1453 | 1696 | 1883 | 2226 |
| 2200 | 90 / 70 | 1962 | 2355 | 2851 | 3403 | 3977 | 4642 | 5204 | 6224 |
| | 75 / 65 | 1543 | 1850 | 2245 | 2677 | 3181 | 3714 | 4084 | 4870 |
| | 70 / 55 | 1344 | 1610 | 1956 | 2331 | 2545 | 2971 | 3551 | 4226 |
| | 55 / 45 | 788 | 941 | 1150 | 1367 | 1599 | 1866 | 2071 | 2449 |
| 2400 | 90 / 70 | 2140 | 2569 | 3110 | 3712 | 4338 | 5064 | 5678 | 6790 |
| | 75 / 65 | 1852 | 2220 | 2695 | 3212 | 3817 | 4052 | 4901 | 5844 |
| | 70 / 55 | 1612 | 1932 | 2347 | 2797 | 3054 | 3565 | 4261 | 5072 |
| | 55 / 45 | 946 | 1130 | 1380 | 1640 | 1918 | 2239 | 2486 | 2939 |
| 2600 | 90 / 70 | 2318 | 2783 | 3369 | 4021 | 4700 | 5486 | 6151 | 7356 |
| | 75 / 65 | 1824 | 2187 | 2654 | 3164 | 3760 | 4389 | 4827 | 5755 |
| | 70 / 55 | 1588 | 1902 | 2312 | 2754 | 3008 | 3511 | 4196 | 4995 |
| | 55 / 45 | 931 | 1113 | 1359 | 1616 | 1889 | 2205 | 2448 | 2894 |
| 2800 | 90 / 70 | 2497 | 2997 | 3629 | 4331 | 5061 | 5908 | 6624 | 7921 |
| | 75 / 65 | 1964 | 2355 | 2858 | 3407 | 4049 | 4726 | 5198 | 6198 |
| | 70 / 55 | 1710 | 2049 | 2490 | 2966 | 3239 | 3781 | 4519 | 5379 |
| | 55 / 45 | 1003 | 1198 | 1464 | 1740 | 2035 | 2375 | 2636 | 3117 |
| 3000 | 90 / 70 | 2675 | 3211 | 3888 | 4640 | 5423 | 6330 | 7097 | 8487 |
| | 75 / 65 | 2104 | 2523 | 3062 | 3.650 | 4338 | 5064 | 5569 | 6641 |
| | 70 / 55 | 1832 | 2195 | 2667 | 3178 | 3470 | 4051 | 4842 | 5763 |
| | 55 / 45 | 1075 | 1284 | 1568 | 1864 | 2180 | 2545 | 2825 | 3340 |

| ENTRANCE WATER TEMPERATURE t1 (°C) | EXIT WATER TEMPERATURE t2 (°C) | F FACTOR VALUES | | | | | | |
|------------------------------------|--------------------------------|-----------------|-------|-------|-------|-------|-------|-------|
| | | 10 °C | 12 °C | 15 °C | 18 °C | 20 °C | 22 °C | 24 °C |
| 95 | 80 | 0.57 | 0.59 | 0.62 | 0.65 | 0.68 | 0.70 | 0.73 |
| | 70 | 0.62 | 0.65 | 0.68 | 0.73 | 0.76 | 0.79 | 0.83 |
| | 60 | 0.69 | 0.72 | 0.77 | 0.83 | 0.87 | 0.91 | 0.96 |
| | 50 | 0.79 | 0.83 | 0.89 | 0.96 | 1.02 | 1.08 | 1.15 |
| 90 | 80 | 0.59 | 0.61 | 0.64 | 0.68 | 0.71 | 0.74 | 0.77 |
| | 75 | 0.62 | 0.64 | 0.68 | 0.72 | 0.75 | 0.78 | 0.82 |
| | 70 | 0.65 | 0.67 | 0.72 | 0.76 | 0.80 | 0.83 | 0.87 |
| | 65 | 0.68 | 0.71 | 0.76 | 0.81 | 0.85 | 0.89 | 0.93 |
| | 60 | 0.72 | 0.76 | 0.81 | 0.87 | 0.91 | 0.96 | 1.01 |
| | 55 | 0.77 | 0.81 | 0.87 | 0.93 | 0.98 | 1.04 | 1.10 |
| | 50 | 0.83 | 0.87 | 0.93 | 1.01 | 1.07 | 1.14 | 1.21 |
| 85 | 75 | 0.64 | 0.67 | 0.71 | 0.75 | 0.79 | 0.82 | 0.86 |
| | 70 | 0.68 | 0.70 | 0.75 | 0.80 | 0.84 | 0.88 | 0.92 |
| | 65 | 0.72 | 0.75 | 0.80 | 0.85 | 0.89 | 0.94 | 0.99 |
| | 60 | 0.76 | 0.79 | 0.85 | 0.91 | 0.96 | 1.01 | 1.07 |
| | 55 | 0.81 | 0.85 | 0.91 | 0.98 | 1.04 | 1.10 | 1.16 |
| 80 | 70 | 0.71 | 0.74 | 0.79 | 0.84 | 0.88 | 0.93 | 0.97 |
| | 65 | 0.75 | 0.78 | 0.84 | 0.90 | 0.94 | 0.99 | 1.05 |
| | 60 | 0.80 | 0.83 | 0.89 | 0.96 | 1.01 | 1.07 | 1.13 |
| | 55 | 0.85 | 0.89 | 0.96 | 1.04 | 1.10 | 1.16 | 1.24 |
| | 50 | 0.91 | 0.96 | 1.04 | 1.13 | 1.20 | 1.28 | 1.37 |
| 75 | 65 | 0.79 | 0.82 | 0.88 | 0.95 | 1.00 | 1.05 | 1.12 |
| | 60 | 0.84 | 0.88 | 0.94 | 1.02 | 1.08 | 1.14 | 1.21 |
| | 55 | 0.89 | 0.94 | 1.01 | 1.10 | 1.17 | 1.24 | 1.32 |
| | 50 | 0.96 | 1.01 | 1.10 | 1.20 | 1.28 | 1.37 | 1.47 |
| 70 | 60 | 0.88 | 0.93 | 1.00 | 1.08 | 1.15 | 1.22 | 1.30 |
| | 55 | 0.94 | 0.99 | 1.08 | 1.17 | 1.25 | 1.33 | 1.42 |
| | 50 | 1.01 | 1.07 | 1.17 | 1.28 | 1.37 | 1.47 | 1.58 |
| | 45 | 1.10 | 1.16 | 1.28 | 1.42 | 1.52 | 1.64 | 1.79 |
| 65 | 55 | 1.00 | 1.05 | 1.15 | 1.26 | 1.34 | 1.43 | 1.54 |
| | 50 | 1.08 | 1.14 | 1.25 | 1.37 | 1.47 | 1.59 | 1.71 |
| | 45 | 1.17 | 1.24 | 1.37 | 1.52 | 1.64 | 1.78 | 1.94 |
| | 40 | 1.28 | 1.37 | 1.52 | 1.71 | 1.87 | 2.05 | 2.27 |
| 55 | 50 | 1.23 | 1.31 | 1.45 | 1.62 | 1.75 | 1.90 | 2.07 |
| | 45 | 1.34 | 1.43 | 1.60 | 1.80 | 1.96 | 2.15 | 2.37 |
| | 40 | 1.47 | 1.59 | 1.78 | 2.03 | 2.24 | 2.48 | 2.78 |
| | 35 | 1.64 | 1.78 | 2.03 | 2.36 | 2.64 | 2.99 | 3.43 |

| ENTRANCE WATER TEMPERATURE t1 (°C) | EXIT WATER TEMPERATURE t2 (°C) | F FACTOR VALUES | | | | | | |
|------------------------------------|--------------------------------|-----------------|-------|-------|-------|-------|-------|-------|
| | | 10 °C | 12 °C | 15 °C | 18 °C | 20 °C | 22 °C | 24 °C |
| 50 | 45 | 1.45 | 1.56 | 1.75 | 1.98 | 2.17 | 2.40 | 2.67 |
| | 40 | 1.6 | 1.73 | 1.96 | 2.25 | 2.50 | 2.79 | 3.15 |
| | 35 | 1.78 | 1.94 | 2.24 | 2.63 | 2.96 | 3.38 | 3.92 |
| | 30 | 2.03 | 2.24 | 2.64 | 3.20 | 3.70 | 4.39 | 5.39 |
| 45 | 40 | 1.75 | 1.90 | 2.17 | 2.53 | 2.83 | 3.19 | 3.66 |
| | 35 | 1.96 | 2.15 | 2.50 | 2.96 | 3.37 | 3.89 | 4.58 |
| | 30 | 2.24 | 2.48 | 2.96 | 3.63 | 4.25 | 5.11 | 6.38 |
| 40 | 35 | 2.17 | 2.40 | 2.83 | 3.41 | 3.93 | 4.62 | 5.54 |
| | 30 | 2.50 | 2.79 | 3.37 | 4.21 | 5.01 | 6.14 | 7.87 |



STEEL PANEL RADIATOR TYP 22/DPDC

| Code | d(mm) | Package Standart |
|----------------|-------------|------------------|
| 4075.22.300400 | 22x300x400 | 1 |
| 4075.22.300500 | 22x300x500 | 1 |
| 4075.22.300600 | 22x300x600 | 1 |
| 4075.22.300700 | 22x300x700 | 1 |
| 4075.22.300800 | 22x300x800 | 1 |
| 4075.22.300900 | 22x300x900 | 1 |
| 4075.22.301000 | 22x300x1000 | 1 |
| 4075.22.301100 | 22x300x1100 | 1 |
| 4075.22.301200 | 22x300x1200 | 1 |
| 4075.22.301300 | 22x300x1300 | 1 |
| 4075.22.301400 | 22x300x1400 | 1 |
| 4075.22.301500 | 22x300x1500 | 1 |
| 4075.22.301600 | 22x300x1600 | 1 |
| 4075.22.301700 | 22x300x1700 | 1 |
| 4075.22.301800 | 22x300x1800 | 1 |
| 4075.22.301900 | 22x300x1900 | 1 |
| 4075.22.302000 | 22x300x2000 | 1 |
| 4075.22.302100 | 22x300x2100 | 1 |
| 4075.22.302200 | 22x300x2200 | 1 |
| 4075.22.302300 | 22x300x2300 | 1 |
| 4075.22.302400 | 22x300x2400 | 1 |
| 4075.22.302500 | 22x300x2500 | 1 |
| 4075.22.302600 | 22x300x2600 | 1 |
| 4075.22.302700 | 22x300x2700 | 1 |
| 4075.22.302800 | 22x300x2800 | 1 |
| 4075.22.302900 | 22x300x2900 | 1 |
| 4075.22.303000 | 22x300x3000 | 1 |



STEEL PANEL RADIATOR TYP 22/DPDC

| Code | d(mm) | Package Standart |
|----------------|-------------|------------------|
| 4075.22.400400 | 22x400x400 | 1 |
| 4075.22.400500 | 22x400x500 | 1 |
| 4075.22.400600 | 22x400x600 | 1 |
| 4075.22.400700 | 22x400x700 | 1 |
| 4075.22.400800 | 22x400x800 | 1 |
| 4075.22.400900 | 22x400x900 | 1 |
| 4075.22.401000 | 22x400x1000 | 1 |
| 4075.22.401100 | 22x400x1100 | 1 |
| 4075.22.401200 | 22x400x1200 | 1 |
| 4075.22.401300 | 22x400x1300 | 1 |
| 4075.22.401400 | 22x400x1400 | 1 |
| 4075.22.401500 | 22x400x1500 | 1 |
| 4075.22.401600 | 22x400x1600 | 1 |
| 4075.22.401700 | 22x400x1700 | 1 |
| 4075.22.401800 | 22x400x1800 | 1 |
| 4075.22.401900 | 22x400x1900 | 1 |
| 4075.22.402000 | 22x400x2000 | 1 |
| 4075.22.402100 | 22x400x2100 | 1 |
| 4075.22.402200 | 22x400x2200 | 1 |
| 4075.22.402300 | 22x400x2300 | 1 |
| 4075.22.402400 | 22x400x2400 | 1 |
| 4075.22.402500 | 22x400x2500 | 1 |
| 4075.22.402600 | 22x400x2600 | 1 |
| 4075.22.402700 | 22x400x2700 | 1 |
| 4075.22.402800 | 22x400x2800 | 1 |
| 4075.22.402900 | 22x400x2900 | 1 |
| 4075.22.403000 | 22x400x3000 | 1 |



STEEL PANEL RADIATOR TYP 22/DPDC

| Code | d(mm) | Package Standart |
|----------------|-------------|------------------|
| 4075.22.500400 | 22x500x400 | 1 |
| 4075.22.500500 | 22x500x500 | 1 |
| 4075.22.500600 | 22x500x600 | 1 |
| 4075.22.500700 | 22x500x700 | 1 |
| 4075.22.500800 | 22x500x800 | 1 |
| 4075.22.500900 | 22x500x900 | 1 |
| 4075.22.501000 | 22x500x1000 | 1 |
| 4075.22.501100 | 22x500x1100 | 1 |
| 4075.22.501200 | 22x500x1200 | 1 |
| 4075.22.501300 | 22x500x1300 | 1 |
| 4075.22.501400 | 22x500x1400 | 1 |
| 4075.22.501500 | 22x500x1500 | 1 |
| 4075.22.501600 | 22x500x1600 | 1 |
| 4075.22.501700 | 22x500x1700 | 1 |
| 4075.22.501800 | 22x500x1800 | 1 |
| 4075.22.501900 | 22x500x1900 | 1 |
| 4075.22.502000 | 22x500x2000 | 1 |
| 4075.22.502100 | 22x500x2100 | 1 |
| 4075.22.502200 | 22x500x2200 | 1 |
| 4075.22.502300 | 22x500x2300 | 1 |
| 4075.22.502400 | 22x500x2400 | 1 |
| 4075.22.502500 | 22x500x2500 | 1 |
| 4075.22.502600 | 22x500x2600 | 1 |
| 4075.22.502700 | 22x500x2700 | 1 |
| 4075.22.502800 | 22x500x2800 | 1 |
| 4075.22.502900 | 22x500x2900 | 1 |
| 4075.22.503000 | 22x500x3000 | 1 |


STEEL PANEL RADIATOR TYP 22/DPDC

| Code | d(mm) | Package Standart |
|----------------|-------------|------------------|
| 4075.22.600400 | 22x600x400 | 1 |
| 4075.22.600500 | 22x600x500 | 1 |
| 4075.22.600600 | 22x600x600 | 1 |
| 4075.22.600700 | 22x600x700 | 1 |
| 4075.22.600800 | 22x600x800 | 1 |
| 4075.22.600900 | 22x600x900 | 1 |
| 4075.22.601000 | 22x600x1000 | 1 |
| 4075.22.601100 | 22x600x1100 | 1 |
| 4075.22.601200 | 22x600x1200 | 1 |
| 4075.22.601300 | 22x600x1300 | 1 |
| 4075.22.601400 | 22x600x1400 | 1 |
| 4075.22.601500 | 22x600x1500 | 1 |
| 4075.22.601600 | 22x600x1600 | 1 |
| 4075.22.601700 | 22x600x1700 | 1 |
| 4075.22.601800 | 22x600x1800 | 1 |
| 4075.22.601900 | 22x600x1900 | 1 |
| 4075.22.602000 | 22x600x2000 | 1 |
| 4075.22.602100 | 22x600x2100 | 1 |
| 4075.22.602200 | 22x600x2200 | 1 |
| 4075.22.602300 | 22x600x2300 | 1 |
| 4075.22.602400 | 22x600x2400 | 1 |
| 4075.22.602500 | 22x600x2500 | 1 |
| 4075.22.602600 | 22x600x2600 | 1 |
| 4075.22.602700 | 22x600x2700 | 1 |
| 4075.22.602800 | 22x600x2800 | 1 |
| 4075.22.602900 | 22x600x2900 | 1 |
| 4075.22.603000 | 22x600x3000 | 1 |





STEEL PANEL RADIATOR TYP 22/DPDC

| Code | d(mm) | Package Standart |
|----------------|-------------|------------------|
| 4075.22.700400 | 22x700x400 | 1 |
| 4075.22.700500 | 22x700x500 | 1 |
| 4075.22.700600 | 22x700x600 | 1 |
| 4075.22.700700 | 22x700x700 | 1 |
| 4075.22.700800 | 22x700x800 | 1 |
| 4075.22.700900 | 22x700x900 | 1 |
| 4075.22.701000 | 22x700x1000 | 1 |
| 4075.22.701100 | 22x700x1100 | 1 |
| 4075.22.701200 | 22x700x1200 | 1 |
| 4075.22.701300 | 22x700x1300 | 1 |
| 4075.22.701400 | 22x700x1400 | 1 |
| 4075.22.701500 | 22x700x1500 | 1 |
| 4075.22.701600 | 22x700x1600 | 1 |
| 4075.22.701700 | 22x700x1700 | 1 |
| 4075.22.701800 | 22x700x1800 | 1 |
| 4075.22.701900 | 22x700x1900 | 1 |
| 4075.22.702000 | 22x700x2000 | 1 |
| 4075.22.702100 | 22x700x2100 | 1 |
| 4075.22.702200 | 22x700x2200 | 1 |
| 4075.22.702300 | 22x700x2300 | 1 |
| 4075.22.702400 | 22x700x2400 | 1 |
| 4075.22.702500 | 22x700x2500 | 1 |
| 4075.22.702600 | 22x700x2600 | 1 |
| 4075.22.702700 | 22x700x2700 | 1 |
| 4075.22.702800 | 22x700x2800 | 1 |
| 4075.22.702900 | 22x700x2900 | 1 |
| 4075.22.703000 | 22x700x3000 | 1 |



STEEL PANEL RADIATOR TYP 22/DPDC

| Code | d(mm) | Package Standart |
|----------------|-------------|------------------|
| 4075.22.900400 | 22x900x400 | 1 |
| 4075.22.900500 | 22x900x500 | 1 |
| 4075.22.900600 | 22x900x600 | 1 |
| 4075.22.900700 | 22x900x700 | 1 |
| 4075.22.900800 | 22x900x800 | 1 |
| 4075.22.900900 | 22x900x900 | 1 |
| 4075.22.901000 | 22x900x1000 | 1 |
| 4075.22.901100 | 22x900x1100 | 1 |
| 4075.22.901200 | 22x900x1200 | 1 |
| 4075.22.901300 | 22x900x1300 | 1 |
| 4075.22.901400 | 22x900x1400 | 1 |
| 4075.22.901500 | 22x900x1500 | 1 |
| 4075.22.901600 | 22x900x1600 | 1 |
| 4075.22.901700 | 22x900x1700 | 1 |
| 4075.22.901800 | 22x900x1800 | 1 |
| 4075.22.901900 | 22x900x1900 | 1 |
| 4075.22.902000 | 22x900x2000 | 1 |
| 4075.22.902100 | 22x900x2100 | 1 |
| 4075.22.902200 | 22x900x2200 | 1 |
| 4075.22.902300 | 22x900x2300 | 1 |
| 4075.22.902400 | 22x900x2400 | 1 |
| 4075.22.902500 | 22x900x2500 | 1 |
| 4075.22.902600 | 22x900x2600 | 1 |
| 4075.22.902700 | 22x900x2700 | 1 |
| 4075.22.902800 | 22x900x2800 | 1 |
| 4075.22.902900 | 22x900x2900 | 1 |
| 4075.22.903000 | 22x900x3000 | 1 |





