

Installation, Operation & Maintenance Guide

BSP/PN6/10/16 Connections

Swimming Pool Heat Exchangers



BOWMAN®
100 YEARS OF HEAT TRANSFER TECHNOLOGY

Foreword

Dear customer,

Thank you for purchasing a high-quality Bowman swimming pool heat exchanger.

Bowman have been manufacturing swimming pool heat exchangers for over 60 years and are acknowledged as the brand leader due to their quality, heat transfer performance and durability.

Please read this Installation, Operation & Maintenance guide fully and carefully before installation to ensure your Bowman swimming pool heat exchanger operates efficiently and reliably.

Please keep this guide for future reference to ensure the long-term performance of your Bowman swimming pool heat exchanger.

Should you require additional advice or assistance, please contact your Bowman stockist or dealer.

Installation, Operation & Maintenance guides are also available in:



French



German



Italian



Spanish



Portuguese



Russian



Chinese

If you require a copy of this guide in one of these languages, visit

<https://ej-bowman.com/downloads/> where copies are available to download.

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Warranty

All **BOWMAN**® Swimming Pool Heat Exchangers are guaranteed against manufacturing faults for a period of 12 months from the date of invoice.

Bowman titanium heat exchangers have a full 10 year guarantee on all titanium material in contact with pool water.

For full warranty terms, please see the **BOWMAN**® Conditions of Sale, a copy of which is available on request or can be downloaded from our website: www.ej-bowman.com

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1. Safety

1.1 Hazards When Handling the Heat Exchanger

BOWMAN® “Swimming Pool Heat Exchangers” are constructed in accordance with current practice and recognised safety rules. Hazards may still arise from operation, such as:

- Injury of the operator or
- Third parties or
- Damage to the heat exchanger or
- Damage to property and equipment

Any person involved with the installation, commissioning, operation, maintenance or repair of the heat exchanger must be:

- Physically and mentally capable of performing such work
- Appropriately qualified
- Comply completely with the installation instructions

The heat exchanger must only be used for this purpose.

In the event of breakdowns, which may compromise safety, a qualified plumber must always be contacted.

1.2 Safety Instructions

The following symbols are used in these operating instructions:



Danger

This symbol indicates an immediate danger to health.
Failure to comply with this instruction may result in severe injury.



Caution

This symbol indicates a possible danger to health.
Failure to comply with this instruction may result in severe injury.



Take Care

This symbol indicates a possible risk to health.
Failure to comply with this instruction may result in injury or damage to property.



This symbol indicates important information about correct handling of the equipment
Failure to comply with this instruction may cause damage to the heat exchanger and/or its surroundings.

1.3 Approved Use



BOWMAN® "Swimming Pool Heat Exchangers" are only approved for heating or cooling pools with boiler water, solar and heat pump systems.

Any other use unless agreed by **BOWMAN®** is not approved. We decline all liability for damage associated or arising from such use.

The maximum working pressure is:

Heating/Cooling Side : 6 bar

Pool Water Side : 6 bar

The maximum working temperature is:

Heating/Cooling Side : 110 °C

Pool Water Side : 100 °C

1.4 Potential Hazards



Take Care

The heat exchanger may be damaged or leak, if the maximum working pressure is exceeded.



Caution

Connections on the heating water side of the heat exchanger may reach temperatures as high as 110°C.

The heat exchanger may heat up to the flow temperature of the heating water, if there is no pool water flowing through the heat exchanger. Any plastic pipe work may be exposed to excessive temperature and suffer damage.

1.5 Safety Measures at Installation Site



Take Care

The heat exchanger should be installed in a frost-free enclosure.



Ensure the maximum working pressure on either side of the heat exchanger is not exceeded or the heat exchanger or surrounding equipment may be damaged.

While the pool is in operation, weekly inspection of the heat exchanger and its connections should be made to check for leaks and external damage.

2. Installation

2.1 Transport / Storage

The heat exchanger must be drained prior to transportation. Once drained and dry, the heat exchanger must only be stored indoors in a non-aggressive atmosphere.



Take Care



Take Care

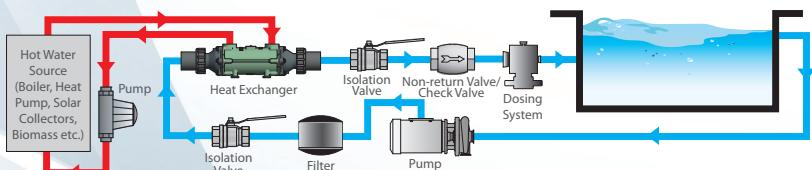
2.2 Installation

The heat exchanger should only be installed in a frost-free, dry area with a non-aggressive atmosphere. Ensure easy access for assembly/disassembly.

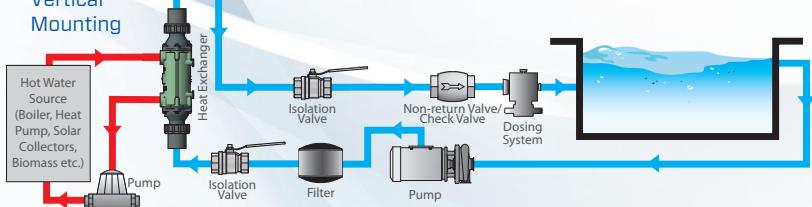
2.3 Fitting

Before fitting, check the heat exchanger for damage. It can be installed above or below the pool water level, positioned horizontally or vertically, as shown below.

Horizontal Mounting



Vertical Mounting



The heat exchanger may be damaged by chemicals. Dosing systems must be fitted downstream from the heat exchanger incorporating a non-return valve / check valve. If chemicals are used, gases must be prevented from entering the heat exchanger when the filtration system is not in use.

The heat exchanger should always be installed downstream of the pumping and filtration equipment. The boiler/solar water must be pump-assisted and the usual precautions taken to prevent air locks. It is recommended that an inhibitor is added to the boiler circuit to protect the system against corrosion.

The heat source should be controlled by a thermostat in the pool water pipework before the heat exchanger and set at the required pool temperature.

2.4 Connecting the Heat Exchanger



Take Care



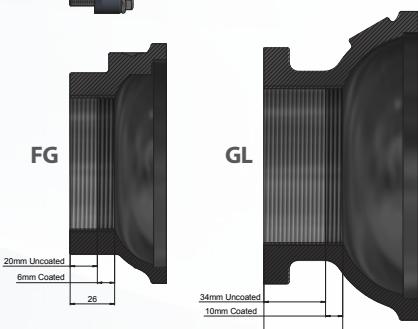
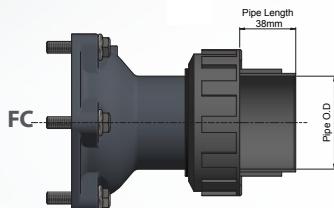
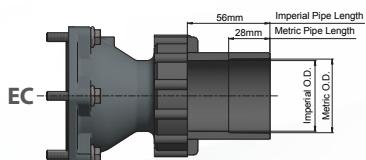
Close all isolating valves in the flow and return pipes of both circuits.

Ensure compliance with water quality and maximum permissible pressures.

When fitting the heat exchanger into the pipework, care must be taken to ensure that no debris has been introduced into it.

Please refer to the table below for the pool water and boiler/solar water connections.

| Metric | Universal Fit | Individual Fit | | | | | |
|--|------------------------------------|-------------------------------------|------------------|------------------|-------------------------|--|-----------------------|
| Type | EC | FC | FG | GL | GK | JK | PK |
| Pool Water Connection | Solvent Weld Ø48/Ø50mm (DN40 Pipe) | Solvent Weld Ø603/Ø63mm (DN50 Pipe) | Threaded 2½" BSP | Threaded 3" BSP | Flanged PN6/10/16 DN100 | Flanged PN10/16 DN125 | Flanged PN10/16 DN150 |
| Boiler / Solar Water Connection | Threaded ¾" BSP | Threaded 1" BSP | Threaded 1¼" BSP | Threaded 1½" BSP | Threaded 2" BSP | Threaded 2½" BSP Flanged PN6 - DN80 | PN6 - DN100 |



Important pool water connection information

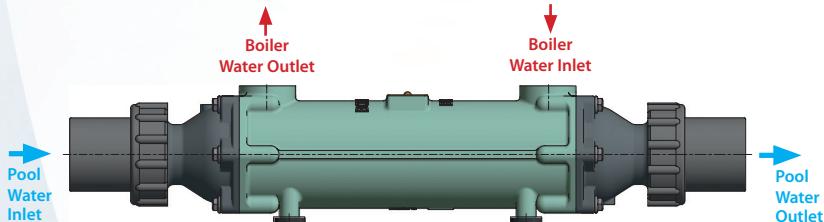
EC heat exchangers; feature 'Universal Fit' end covers designed to accommodate both metric and imperial pipe. For metric 50mm (DN40) pipe, there is a 28mm deep recess to secure the pipe to the end cover. For imperial 1½" NPS pipe, there is a 56mm deep recess to secure the pipe to the end cover. When installing 1½" NPS it is important to locate sufficient pipe length into the full recess in order to ensure a water tight seal between the pipe and the end cover. Please refer to diagram below for more details.

FC heat exchangers; are supplied with adaptors which enable either 63mm (DN50) metric pipe, or 2" NPS (60.3mm) imperial pipe to be used. There is a 38mm deep recess to secure the pipe in the end cover for both pipe sizes. Please refer to diagram for more information.

FG & GL heat exchangers; when connecting an FG or GL heat exchanger to the pool water, always ensure that sufficient connecting pipe thread goes into the end cover to enable it to engage with the black coated thread. This prevents the uncoated thread being exposed to the pool water.

2.5 Counterflow installation

The heat exchanger must be installed in counterflow – i.e. where the pool water flows in the opposite direction to the heating water as shown below.



NOTE: failure to install the heat exchanger in this arrangement will reduce the performance.

2.6 Integral thermostat pocket

Most Bowman swimming pool heat exchangers have an integral thermostat pocket. To ensure accurate monitoring of the pool water temperature, it is important to install the thermostat on the pool water inlet to the heat exchanger.

3. Operation

It is essential that the following instructions are followed to prevent corrosion/erosion of the heat exchanger:



- BOWMAN**® Stainless Steel Heat Exchangers should not be used with salt water chlorinators or salt water pools. (Cupronickel or Titanium is available for these applications).
- Always maintain the water pH to within correct levels. The ideal pool pH should be kept within 7.4 to 7.6. On no account should it fall below 7.2 or rise above 7.8. Checks should be made daily. Recommended chemical limits for **BOWMAN**® Swimming Pool Heat Exchangers are shown below, however, any local swimming pool water guidelines should be followed for safe bathing.



Take Care

| Material | Cupronickel | Stainless Steel | Titanium |
|------------------|-------------------|-------------------|--------------------|
| Free Chlorine | 1.0 - 3.0 ppm | 1.0 - 3.0 ppm | 15.0 ppm max. |
| pH | 7.2 - 7.8 | 7.2 - 7.8 | 6.8 - 8.0 |
| Calcium Hardness | 200 - 400 ppm | 200 - 1000 ppm | 200 - 1000 ppm |
| Alkalinity | 100 - 150 ppm | 100 - 150 ppm | 100 - 150 ppm |
| Bromine | 2.0 - 4.0 ppm | 2.0 - 4.0 ppm | 15.0 ppm max. |
| Chloride | Less than 150 ppm | Less than 350 ppm | Less than 3000 ppm |

- If a by-pass is fitted, it is essential that any valves are correctly positioned to allow the recommended pool water flow to pass through the heat exchanger.

- d) The filter unit should be checked regularly, especially if sand filters are used. If sand filters are not working correctly, fine particles of sand can flow round the pool circuit causing erosion of the pipework, heat exchanger and pump.
- e) Keep the pool free from debris such as leaves, grass cuttings etc. Foreign matter can decay and increase the pH level in the pool.
- f) It is essential that the correct amount of chemical is added to the pool. To allow proper dispersion of the dose in the pool water, distribution of the dose should be made to various areas of the pool. Do not dose in one area only, especially adjacent to the pool water return as this will create high acidic areas which can cause corrosion/erosion of the pool equipment.

4. Commissioning



Take Care



Danger



Commissioning of the heat exchanger should not be undertaken until this document has been fully read and understood.

Both circuits of the heat exchanger must be connected before commissioning.

Adequate provision should be made to ensure that correct operating equipment along with personal protection (PPE) in accordance with current standards is used.

5. Maintenance / Repair



5.1 Winter Shutdown in Frost-Free Areas

When shut down in frost-free premises, the heat exchanger must be completely full of water and purged of air.



5.2 Winter Shutdown in Areas Exposed To Frost

Care should be taken to prevent frost damage from a winter shutdown in premises exposed to frost. We recommend draining the heat exchanger or removing it from the installation for the shutdown period.

5.3 General Maintenance

The heat exchanger should require little attention in service, however, if cleaning or replacement of the tube stack is necessary, the end cover screws should be tightened to the torque figures below. Note, new seals are recommended, if the end covers are removed.

| Type | EC Series | FC Series | FG Series | GL | GK | JK | PK |
|-------------|-----------|-----------|-----------|-----|-----|-----|-----|
| Screw Size | M6 | M8 | M8 | M10 | M12 | M16 | M16 |
| Torque (Nm) | 8 | 16 | 22 | 37 | 54 | 95 | 130 |

Note: The 915 B tapered drain plug must be tightened to a torque of 17 Nm and with the application of thread sealant Loctite 577.

6. Typical performance with boilers...

| Type | Pool Capacity | | Heat Transfer 82°C Boiler Water | | Heat Transfer 60°C Boiler Water | | Boiler Water Flow | | Maximum Pool Water Flow | | Weight |
|------------------|----------------|---------|------------------------------------|-----------|------------------------------------|-----------|----------------------|-------|----------------------------|-------|-----------|
| | m ³ | gal | kW | Btu/h | kW | Btu/h | m ³ /h | l/min | m ³ /h | l/min | |
| EC80-5113-1C | 40 | 8,800 | 20 | 68,000 | 12 | 41,000 | 2.1 | 35 | 9.0 | 150 | 3.0 |
| EC80-5113-1S/T* | 50 | 11,000 | 25 | 85,000 | 16 | 55,000 | 3.0 | 50 | 12.0 | 200 | 3.0 / 2.7 |
| EC100-5113-2C | 80 | 18,000 | 40 | 135,000 | 22 | 75,000 | 2.4 | 40 | 10.2 | 170 | 4.5 |
| EC100-5113-2S/T* | 90 | 20,000 | 50 | 170,000 | 30 | 102,000 | 3.0 | 50 | 12.0 | 200 | 4.5 / 4.0 |
| EC120-5113-3C | 120 | 26,000 | 70 | 240,000 | 40 | 135,000 | 3.6 | 60 | 13.5 | 225 | 5.5 |
| EC120-5113-3S/T* | 130 | 28,500 | 80 | 270,000 | 46 | 157,000 | 4.0 | 67 | 15.0 | 250 | 5.5 / 4.9 |
| FC100-5114-2C | 170 | 37,000 | 100 | 340,000 | 55 | 190,000 | 5.4 | 90 | 21.0 | 350 | 8.8 |
| FC100-5114-2S/T* | 180 | 39,500 | 110 | 375,000 | 60 | 205,000 | 6.0 | 100 | 22.8 | 380 | 8.8 / 7.8 |
| FG100-5115-2C | 230 | 50,000 | 170 | 580,000 | 100 | 340,000 | 7.2 | 120 | 28.8 | 480 | 16 |
| FG100-5115-2S/T* | 250 | 55,000 | 190 | 650,000 | 110 | 376,000 | 8.4 | 140 | 33.0 | 550 | 16 / 14 |
| FG160-5115-5S/T* | 320 | 70,000 | 300 | 1,000,000 | 170 | 580,000 | 9.6 | 160 | 39.0 | 650 | 29 / 25 |
| GL140-3708-2C | 455 | 100,000 | 300 | 1,000,000 | 170 | 580,000 | 12.6 | 210 | 50.4 | 840 | 30 |
| GL140-3708-2T | 478 | 105,000 | 320 | 1,100,000 | 180 | 615,000 | 13.5 | 225 | 54.0 | 900 | 27 |
| GK190-5117-3C | 660 | 145,000 | 556 | 1,900,000 | 310 | 1,060,000 | 19.2 | 320 | 75.0 | 1,250 | 57 |
| GK190-5117-3T | 750 | 165,000 | 630 | 2,150,000 | 360 | 1,230,000 | 21.6 | 360 | 96.0 | 1,600 | 51 |
| JK190-5118-3C | 1,000 | 220,000 | 780 | 2,660,000 | 440 | 1,500,000 | 28.6 | 475 | 114.0 | 1,900 | 85 |
| JK190-5118-3T | 1,230 | 270,000 | 960 | 3,280,000 | 540 | 1,840,000 | 37.5 | 625 | 150.0 | 2,500 | 76 |
| PK190-5119-3C | 1,500 | 330,000 | 1,055 | 3,600,000 | 585 | 2,000,000 | 44.0 | 730 | 175.0 | 2,900 | 120 |
| PK190-5119-3T | 1,680 | 370,000 | 1,170 | 4,000,000 | 650 | 2,200,000 | 49.2 | 820 | 216.0 | 3,600 | 106 |

*Add the appropriate suffix indicating tube material when ordering these part numbers (S or T).

C = Cupronickel S = Stainless steel T = Titanium. N.B. Stainless steel heat exchangers should not be used on pools fitted with salt water chlorinators or salt water pools. The performance capabilities of the heat exchangers are based on achieving a pool water temperature of 30°C.

... and with solar panels & heat pumps

| Type | Pool Capacity | | Heat Transfer | | Solar or Heat Pump Water Flow | | Maximum Pool Water Flow | | Weight | |
|--------------------|----------------|--------|---------------|---------|----------------------------------|-------|----------------------------|-------|-----------------|--|
| | m ³ | gal | kW | Btu/h | m ³ /h | l/min | m ³ /h | l/min | kg | |
| Hot Water at 70°C | | | | | | | | | | |
| EC120-5113-3C/S/T* | 50 | 11,000 | 30 | 102,000 | 1.5 | 25 | 6.2 | 104 | 5.5 / 5.5 / 4.9 | |
| EC160-5113-5C/S/T* | 120 | 26,000 | 75 | 256,000 | 3.0 | 50 | 15.0 | 250 | 8.5 / 8.5 / 7.3 | |
| FC160-5114-5C/S/T* | 200 | 44,000 | 130 | 444,000 | 4.5 | 76 | 23.0 | 380 | 17 / 17 / 15 | |
| FG160-5115-5C/S/T* | 300 | 66,000 | 200 | 680,000 | 6.6 | 110 | 29.0 | 480 | 29 / 29 / 25 | |
| Hot Water at 60°C | | | | | | | | | | |
| EC120-5113-3C/S/T* | 40 | 8,800 | 20 | 68,000 | 1.5 | 25 | 6.2 | 104 | 5.5 / 5.5 / 4.9 | |
| EC160-5113-5C/S/T* | 110 | 24,000 | 55 | 190,000 | 3.0 | 50 | 15.0 | 250 | 8.5 / 8.5 / 7.3 | |
| FC160-5114-5C/S/T* | 180 | 40,000 | 96 | 325,000 | 4.5 | 76 | 23.0 | 380 | 17 / 17 / 15 | |
| FG160-5115-5C/S/T* | 230 | 50,000 | 150 | 512,000 | 6.6 | 110 | 29.0 | 480 | 29 / 29 / 25 | |
| Hot Water at 45°C | | | | | | | | | | |
| EC120-5113-3C/S/T* | 20 | 4,400 | 10 | 34,000 | 1.5 | 25 | 6.2 | 104 | 5.5 / 5.5 / 4.9 | |
| EC160-5113-5C/S/T* | 52 | 11,400 | 27 | 92,000 | 3.0 | 50 | 15.0 | 250 | 8.5 / 8.5 / 7.3 | |
| FC160-5114-5C/S/T* | 94 | 20,600 | 47 | 160,000 | 4.5 | 76 | 23.0 | 380 | 17 / 17 / 15 | |
| FG160-5115-5C/S/T* | 140 | 30,800 | 70 | 240,000 | 6.6 | 110 | 29.0 | 480 | 29 / 29 / 25 | |

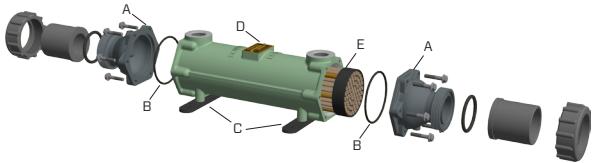
*Add the appropriate suffix indicating tube material when ordering these part numbers (C, S or T).

C = Cupronickel S = Stainless steel T = Titanium N.B. Stainless steel heat exchangers should not be used on pools fitted with salt water chlorinators or salt water pools.

7. Spare Parts List

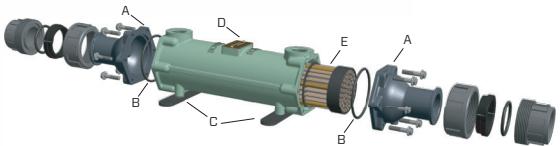
We keep a comprehensive stock of spare parts. Please contact our sales department for details.

EC Spare Parts

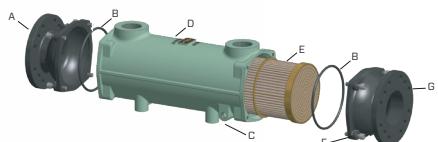


| Type | End Cover Assembly (A) | 'O' Seals (B) | Mounting Brackets (C) | Body (D) | Tube Stack (E) |
|---------------|------------------------|---------------|-----------------------|------------------|----------------|
| EC80-5113-1C | | | | | 5095-1TNP |
| EC80-5113-1S | 5030-1 | AN12NT | 5032-1 | EC69-5568-1CI | 5095-1STP |
| EC80-5113-1T | | | | | 5095-1TIP |
| EC100-5113-2C | | | | | 5095-2TNP |
| EC100-5113-2S | 5030-1 | AN12NT | 5032-1 | EC70-4568-2CI | 5095-2STP |
| EC100-5113-2T | | | | | 5095-2TIP |
| EC120-5113-3C | | | | | 5095-3TNP |
| EC120-5113-3S | 5030-1 | AN12NT | 5032-1 | EC71-4568-3CI-SP | 5095-3STP |
| EC120-5113-3T | | | | | 5095-3TIP |
| EC160-5113-5C | | | | | 5095-5TNP |
| EC160-5113-5S | 5030-1 | AN12NT | 5032-1 | EC73-4568-5CI | 5095-5STP |
| EC160-5113-5T | | | | | 5095-5TIP |

FC Spare Parts



| Type | End Cover Assembly (A) | 'O' Seals (B) | Mounting Brackets (C) | Body (D) | Tube Stack (E) |
|---------------|------------------------|---------------|-----------------------|------------------|----------------|
| FC100-5114-2C | | | | | 5096-2TNP |
| FC100-5114-2S | 5031 | OS46NT | 5032-2 | FC70-4668-2CI-SP | 5096-2STP |
| FC100-5114-2T | | | | | 5096-2TIP |
| FC160-5114-5C | | | | | 5096-5TNP |
| FC160-5114-5S | 5031 | OS46NT | 5032-2 | FC73-4668-5CI-SP | 5096-5STP |
| FC160-5114-5T | | | | | 5096-5TIP |



FG, GL, GK, JK & PK Spare Parts

| Type | Non Drain End Cover (A) | 'O' Seals (B) | Mounting Brackets (C) | Body (D) | Tube Stack (E) | End Cover Screws (F) | Drain End Cover (G) |
|---------------|-------------------------|---------------|-----------------------|---------------------|--------------------------|----------------------|---------------------|
| FG100-5115-2C | | | | | 5090-2TN1P | | |
| FG100-5115-2S | FG7-2802CIC-DR | OS52NT | 5032-2 | FG10-1650-2CI-SP | 5097-2STP 5097-2TIP | HS08X35DP | FG7-2802CIC-DR |
| FG100-5115-2T | | | | | | | |
| FG160-5115-5C | | | | | 5090-5TN1P | | |
| FG160-5115-5S | FG7-2802CIC-DR | OS52NT | 5032-2 | FG16-1650-5CI-SP | 5097-5STP 5097-5TIP | HS08X35DP | FG7-2802CIC-DR |
| FG160-5115-5T | | | | | | | |
| GL140-3708-2C | GL37-3140CIC | OS63NT | - | GL15-3136NF-2CI6-SP | 3447-2TN1B 5367-2T14B | HS10X40DP | GL37-3140CIC-DR |
| GL140-3708-2T | | | | | | | |
| GK190-5117-3C | GK65-5255CIC | OS69NT | - | GK19-2865NF-3CI7-SP | 3448-3TN1B 5369-3T14B | HS12X50DP | GK65-5255CIC-DR |
| GK190-5117-3T | | | | | | | |
| JK190-5118-3 | JK4-3331CIC | OS74NT | - | JK19-3332NF-3CI8-SP | 3450-3TN1B 5371-3T14B | HS16X70DP | JK4-3331CIC-DR |
| JK190-5118-3T | | | | | | | |
| PK190-5119-3 | PK4-2926CIC | OS81NT | - | PK19-2920HF-3CI0 | 3449-3TN1B 5373-3T14B | HS16X70DP | PK4-2926CIC-DR |
| PK190-5119-3T | | | | | | | |

When an end cover is removed for cleaning or maintenance, a new 'O' seal should be fitted.

Bowman heat transfer solutions

Bowman is now established as the leading manufacturer of swimming pool heat exchangers. With tens of thousands of units operating reliably and efficiently throughout the world, you can have complete confidence when you specify Bowman heat exchangers.

Additionally, Bowman heat exchangers and oil coolers can be found in Active Fire Protection Systems, Automotive Engine Testing, Combined Heat & Power, Hydraulic Systems, Marine Engineering, plus Mining Equipment and Machinery, in a range that includes:



Exhaust Gas Heat Exchangers



Hydraulic Oil Coolers



Charge Air Coolers



Stainless Steel Heat Exchangers



Header Tank Heat Exchangers



Plate Heat Exchangers



Transmission Coolers



Engine Oil Coolers



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