# Header Tank
## Heat Exchangers

Heat Transfer Technology from Bowman


BOWMAN®

A World Leader in Heat Exchanger Technology

# Staying cool under

## Bowman Header Tank Heat Exchangers

### For marine propulsion and stationary land based engine cooling

When it comes to heat transfer performance, Bowman header tank heat exchangers deliver the optimum efficiency for a range of demanding engine cooling applications. For over 50 years, Bowman header tank heat exchangers have been cooling engines in applications as diverse as marine propulsion, CHP/power generation, automotive engine testing and active fire protection systems. In every case, efficient cooling is vital to the performance and operation of the engine and, by installing Bowman header tank units, the correct operating temperature can be maintained consistently throughout the engine's performance range.

**Unique design**
All Bowman header tank heat exchangers feature a unique 'quiet zone' design with a special de-aeration feature and pressurised filler cap.

**Reliable operation**
The large reservoir area above the tube stack eliminates the problem of air pockets or air locks getting into the coolant stream, improving operational reliability.

**Fully floating tubestack**
The 'fully floating' design allows expansion and contraction of the tubestack within the cast body of the heat exchanger, which minimises thermal stress, enhancing reliability and longevity.

**Simple to maintain**
The easily removable tubestack and end covers makes cleaning and routine maintenance procedures simple and straightforward.

**Wide range**
Bowman provide the most comprehensive range of header tank heat exchangers available. On the coolant side, there is a choice of single, double or triple pass units to suit different flow rates.

**Marine and land based versions**
Whether the cooling medium is salt water, fresh water, or mineral rich/contaminated water, Bowman has a range of header tank units to suit any marine or land based application.

**Titanium tubestacks**
Titanium is the ultimate 'fit and forget' material for applications where aggressive water conditions exist. Bowman now offer titanium tube stacks on many of our header tank units. See page 11 for more details.

# pressure



## Easy product selection

At Bowman, we have developed a technical programme to make it easy to select the correct header tank heat exchanger for your application. Simply by supplying us with the following information we can advise the correct specification unit;

1: Heat to be dissipated in kW
2: Engine water flow rate in l/min
3: Max. engine water temperature in °C
4: Cooling water temperature in °C
5: Type of cooling water to be used (sea water, fresh water or contaminated water)

## Bespoke designs for specific engines

Within our range are a number of heat exchangers that have been designed for specific engines. You can find more information on these units by calling our technical sales team on +44 (0) 121 359 5401.

## Jacket water connection

All units are supplied with either counter flange plates or hose adaptors for connecting the engine jacket water inlet and outlet side. Please see page 11 for more details.

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# Marine Header Tank Heat Exchangers

Bowman's range of marine grade header tank units is specially designed to operate with cooling media such as sea water, aggressive chemicals, or mineral rich fresh water. The specification of these heat exchangers includes cupro-nickel inner tube stacks, plus corrosion resistant end covers, to ensure long life reliability in the harshest operating conditions.

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| Single Pass Marine | | Two Pass Marine | | Three Pass Marine | |
|---|---|---|---|---|---|
| Type | Max Raw Water Flow l/min | Type | Max Raw Water Flow l/min | Type | Max Raw Water Flow l/min |
| EH100-4965-2 | 180 | EH100-4165-2 | 60 | EH100-3401-2 | 54 |
| EH200-4965-3 | 180 | EH200-4165-3 | 60 | EH200-3401-3 | 54 |
| FH100-4966-2 | 270 | FH100-4166-2 | 100 | FH100-3182-2 | 95 |
| FH200-4966-3 | 270 | FH200-4166-3 | 100 | FH200-3182-3 | 95 |
| FH300-4967-2 | 375 | FH300-4167-2 | 140 | FH300-3282-2 | 125 |
| FH400-4967-3 | 375 | FH400-4167-3 | 140 | FH400-3282-3 | 125 |
| GH200-4968-2* | 640 | GH200-4168-2* | 240 | GH200-3482-2* | 225 |
| GH300-4968-3* | 640 | GH300-4168-3* | 240 | GH300-3482-3* | 225 |
| GH400-4968-4* | 640 | GH400-4168-4* | 240 | GH400-3482-4* | 225 |
| KH200-4969-3* | 975 | KH200-4169-3* | 400 | KH200-3071-3* | 325 |
| KH300-4969-4* | 975 | KH300-4169-4* | 400 | KH300-3071-4* | 325 |
| KH400-4969-5* | 975 | KH400-4169-5* | 400 | KH400-3071-5* | 325 |
| JH200-4970-3* | 1400 | JH200-4170-3* | 540 | JH200-3335-3* | 460 |
| JH300-4970-4* | 1400 | JH300-4170-4* | 540 | JH300-3335-4* | 460 |
| JH400-4970-5* | 1400 | JH400-4170-5* | 540 | JH400-3335-5* | 460 |
| PH200-4971-4* | 2125 | PH200-4171-4* | 820 | PH200-3073-4* | 700 |
| PH300-4971-5* | 2125 | PH300-4171-5* | 820 | PH300-3073-5* | 700 |
| PH400-4971-6* | 2125 | PH400-4171-6* | 820 | PH400-3073-6* | 700 |

* Murphy Water Level Switch can be fitted to these units.

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# Land based Header Tank Heat Exchangers

For land based cooling applications, where fresh or contaminated water is used as the cooling medium, Bowman header tanks have cupro-nickel tube stacks with cast iron end covers as standard. For applications where clean, mains water is used, such as fire pumps, copper tube stacks are also available, offering a cost effective alternative provided there are no contaminants in the water.

*Irrigation pump sets being cooled by Bowman header tank units in Australia*

| Single pass Land | | Three pass Land | |
|---|---|---|---|
| Type | Max Raw Water Flow l/min | Type | Max Raw Water Flow l/min |
| EH100-4265-2 | 180 | EH100-4065-2 | 60 |
| EH200-4265-3 | 180 | EH200-4065-3 | 60 |
| FH100-4266-2 | 270 | FH100-4066-2 | 100 |
| FH200-4266-3 | 270 | FH200-4066-3 | 100 |
| FH300-4267-2 | 375 | FH300-4067-2 | 140 |
| FH400-4267-3 | 375 | FH400-4067-3 | 140 |
| GH200-4268-2* | 640 | GH200-4068-2* | 240 |
| GH300-4268-3* | 640 | GH300-4068-3* | 240 |
| GH400-4268-4* | 640 | GH400-4068-4* | 240 |
| KH200-4269-3* | 975 | KH200-4069-3* | 400 |
| KH300-4269-4* | 975 | KH300-4069-4* | 400 |
| KH400-4269-5* | 975 | KH400-4069-5* | 400 |
| JH200-4270-3* | 1400 | JH200-4070-3* | 540 |
| JH300-4270-4* | 1400 | JH300-4070-4* | 540 |
| JH400-4270-5* | 1400 | JH400-4070-5* | 540 |
| PH200-4271-4* | 2125 | PH200-4071-4* | 820 |
| PH300-4271-5* | 2125 | PH300-4071-5* | 820 |
| PH400-4271-6* | 2125 | PH400-4071-6* | 820 |

For units fitted with copper tubes add suffix 'TC' to type number.
* Murphy Water Level Switch can be fitted to these units.

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# The Complete Header Tank Range

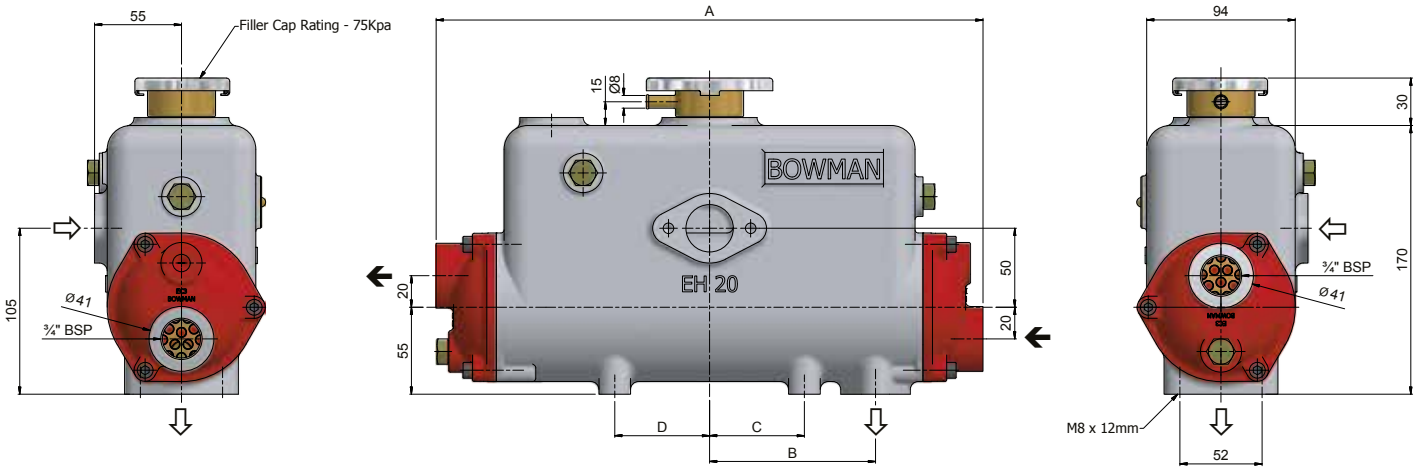
The range of Bowman Header tank heat exchangers showing their power ratings, various water volumes and our equivalent non header tank shell and tube heat exchangers.

| Type | Typical Engine Suitability | | Raw Water Volume | Engine Water Volume | Header Tank Capacity | Shell & Tube Heat Exchanger* |
|---|---|---|---|---|---|---|
| | kW | HP | Litres | Litres | Litres | |
| EH100 | 40 | 54 | 0.45 | 1.30 | 0.90 | EC100* |
| EH200 | 52 | 70 | 0.60 | 2.20 | 1.32 | EC120* |
| FH100 | 82 | 110 | 0.85 | 3.25 | 2.08 | FC100* |
| FH200 | 115 | 154 | 1.10 | 4.50 | 2.93 | FC120* |
| FH300 | 150 | 201 | 1.55 | 6.55 | 4.12 | FG100* |
| FH400 | 200 | 270 | 2.00 | 9.15 | 5.70 | FG120* |
| GH200 | 240 | 322 | 3.10 | 10.90 | 6.20 | GL140* |
| GH300 | 320 | 429 | 3.80 | 14.85 | 8.54 | GL180* |
| GH400 | 400 | 540 | 4.60 | 18.10 | 11.24 | GL240* |
| KH200 | 450 | 603 | 6.30 | 18.80 | 13.00 | GK190* |
| KH300 | 600 | 804 | 7.50 | 25.60 | 17.33 | GK250* |
| KH400 | 750 | 1005 | 9.00 | 33.50 | 22.56 | GK320* |
| JH200 | 620 | 831 | 8.80 | 27.20 | 18.56 | JK190* |
| JH300 | 820 | 1100 | 10.40 | 36.90 | 24.80 | JK250* |
| JH400 | 1000 | 1340 | 12.50 | 46.30 | 32.26 | JK320* |
| PH200 | 1200 | 1608 | 18.60 | 49.00 | 34.24 | PK250* |
| PH300 | 1500 | 2010 | 21.80 | 64.00 | 44.63 | PK320* |
| PH400 | 1800 | 2413 | 25.30 | 81.00 | 56.43 | PK400* |

Maximum working raw water pressure 16 bar
Maximum working engine water pressure 1 bar (depending on the filler cap rating)
Maximum working temperature 110°c
* This column shows the equivalent shell and tube heat exchanger. If this type is required instead of a header tank heat exchanger, please contact us for further details of full type numbers.

# EH Range

## Three Pass Version

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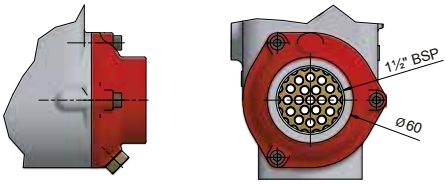


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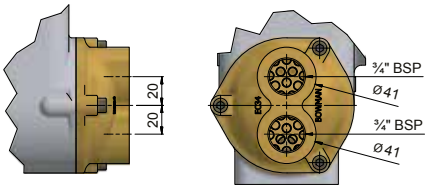
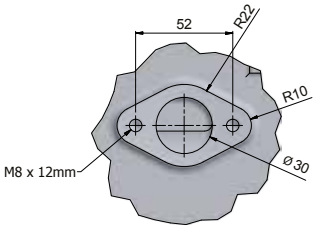



**Engine Water Inlet & Outlet Flange Detail**

**Water Flow**

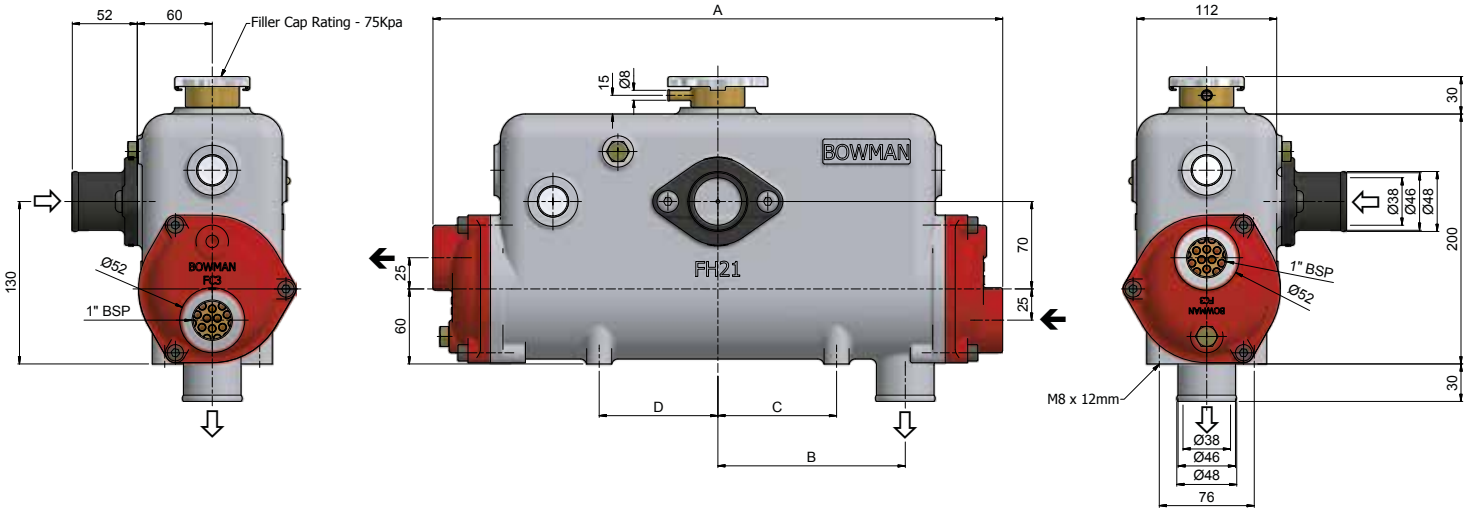
Raw Water Flow

Engine Water Flow

EH Header Tank Range - Three Pass

| Type | Weight | A | B | C | D |
|---|---|---|---|---|---|
| EH100 | 5kg | 260mm | 62mm | 20mm | 60mm |
| EH200 | 6kg | 346mm | 105mm | 60mm | 60mm |

## Three Pass Version

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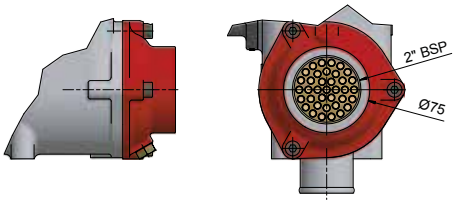


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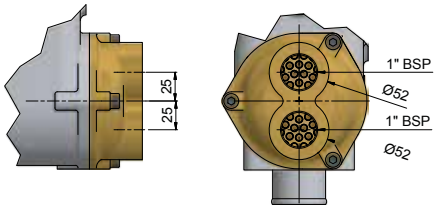
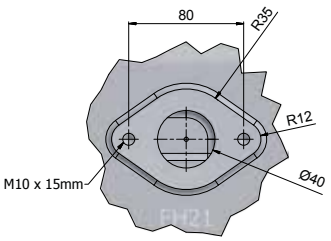



**Engine Water Inlet Flange Detail Without Hose Adaptor**

Raw Water Flow

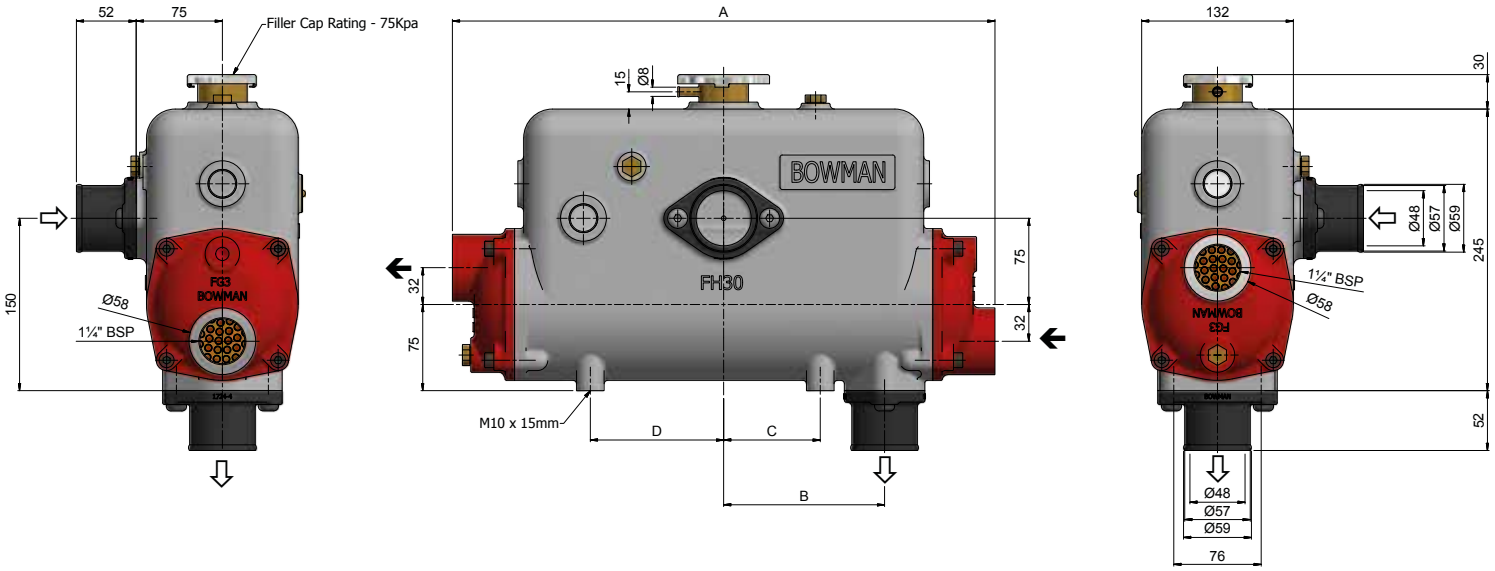
Engine Water Flow

FH Header Tank Range - Three Pass

| Type | Weight | A | B | C | D |
|---|---|---|---|---|---|
| FH100 | 8kg | 358mm | 100mm | 45mm | 95mm |
| FH200 | 11kg | 454mm | 150mm | 95mm | 95mm |

# FH Range continued

## Three Pass Version

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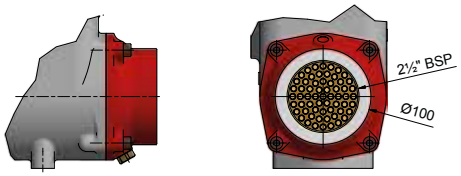


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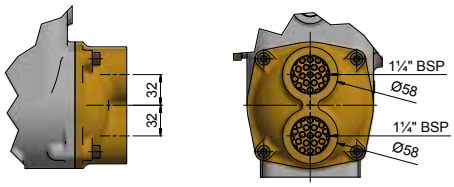
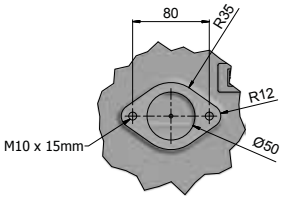



**Engine Water Inlet & Outlet Flange Detail Without Hose Adaptor**

Raw Water Flow

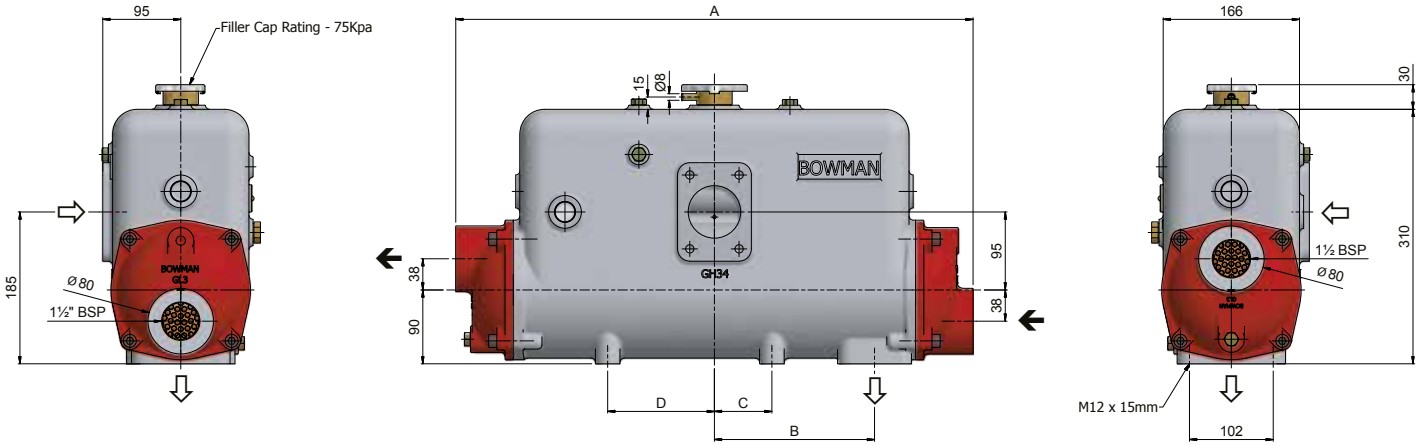
Engine Water Flow

### FH Header Tank Range - Three Pass

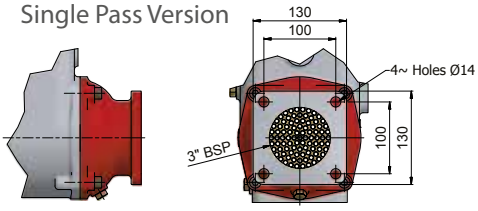
| Type | Weight | A | B | C | D |
|---|---|---|---|---|---|
| FH300 | 14kg | 472mm | 140mm | 84mm | 116mm |
| FH400 | 17kg | 600mm | 200mm | 144mm | 144mm |

# GH Range

## Three Pass Version




## Single Pass Version

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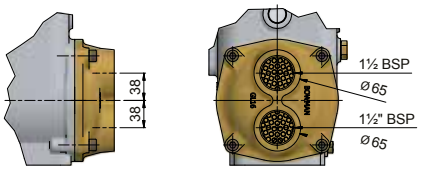
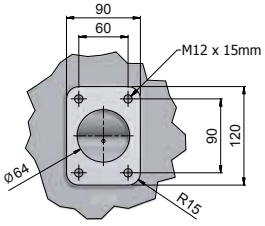



**Engine Water Inlet & Outlet Flange Detail**

**Water Flow**

Raw Water Flow

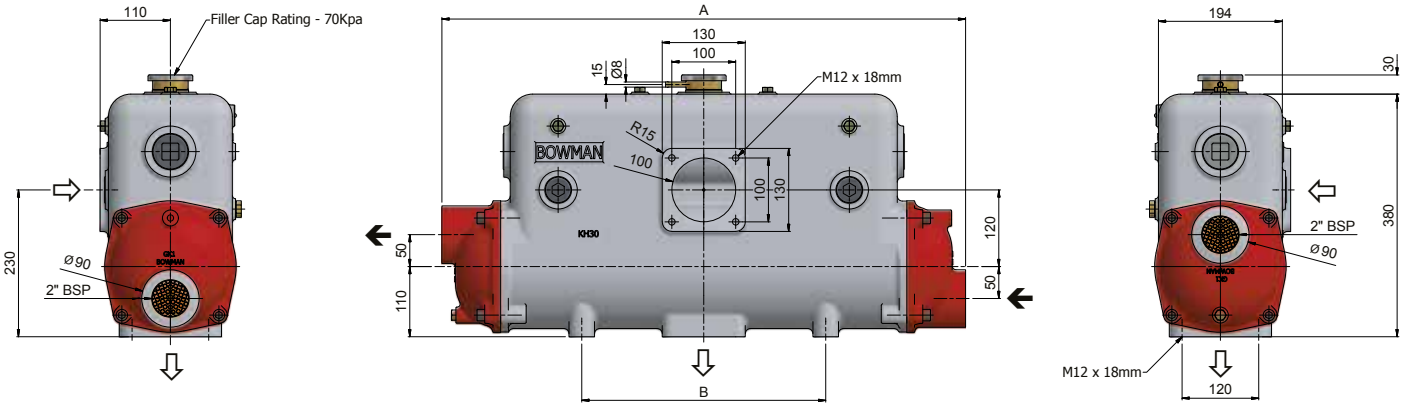
Engine Water Flow

### GH Header Tank Range - Three Pass

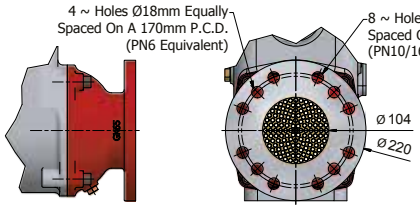
| Type | Weight | A | B | C | D |
|---|---|---|---|---|---|
| GH200 | 24kg | 502mm | 135mm | 70mm | 130mm |
| GH300 | 29kg | 630mm | 195mm | 70mm | 130mm |
| GH400 | 34kg | 776mm | 270mm | 146mm | 200mm |

# KH Range

## Three Pass Version




### Single Pass Version

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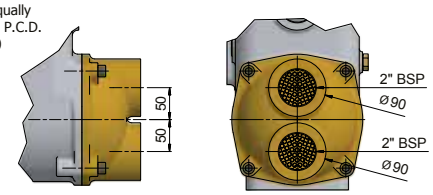
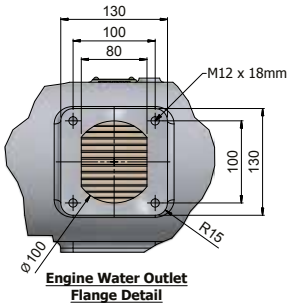


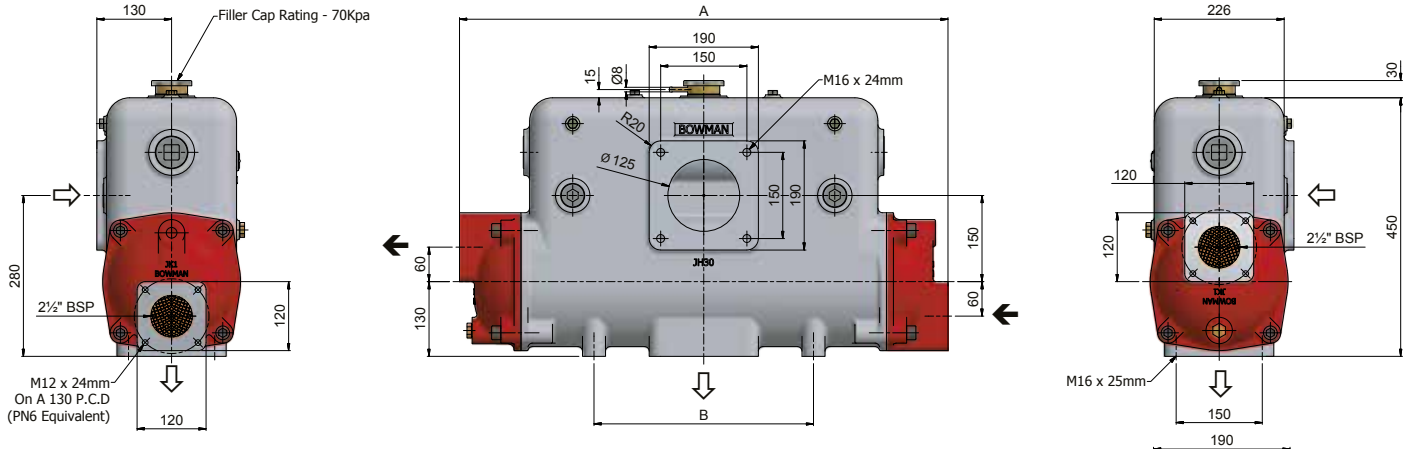

| Water Flow |
|---|
| Raw Water Flow |
| Engine Water Flow |

KH Header Tank Range - Three Pass

| Type | Weight | A | B |
|---|---|---|---|
| KH200 | 51kg | 674mm | 382mm |
| KH300 | 59kg | 820mm | 382mm |
| KH400 | 67kg | 998mm | 560mm |

# JH Range

## Three Pass Version

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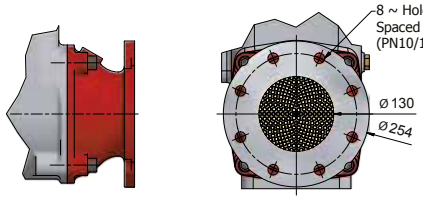


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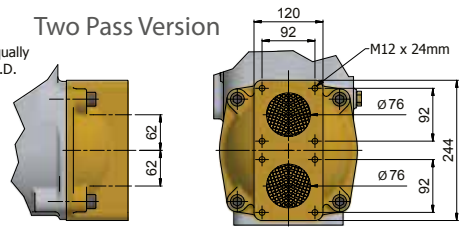
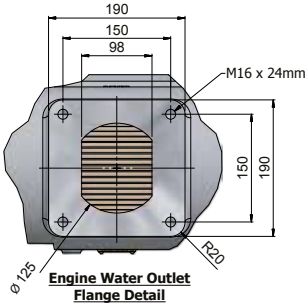


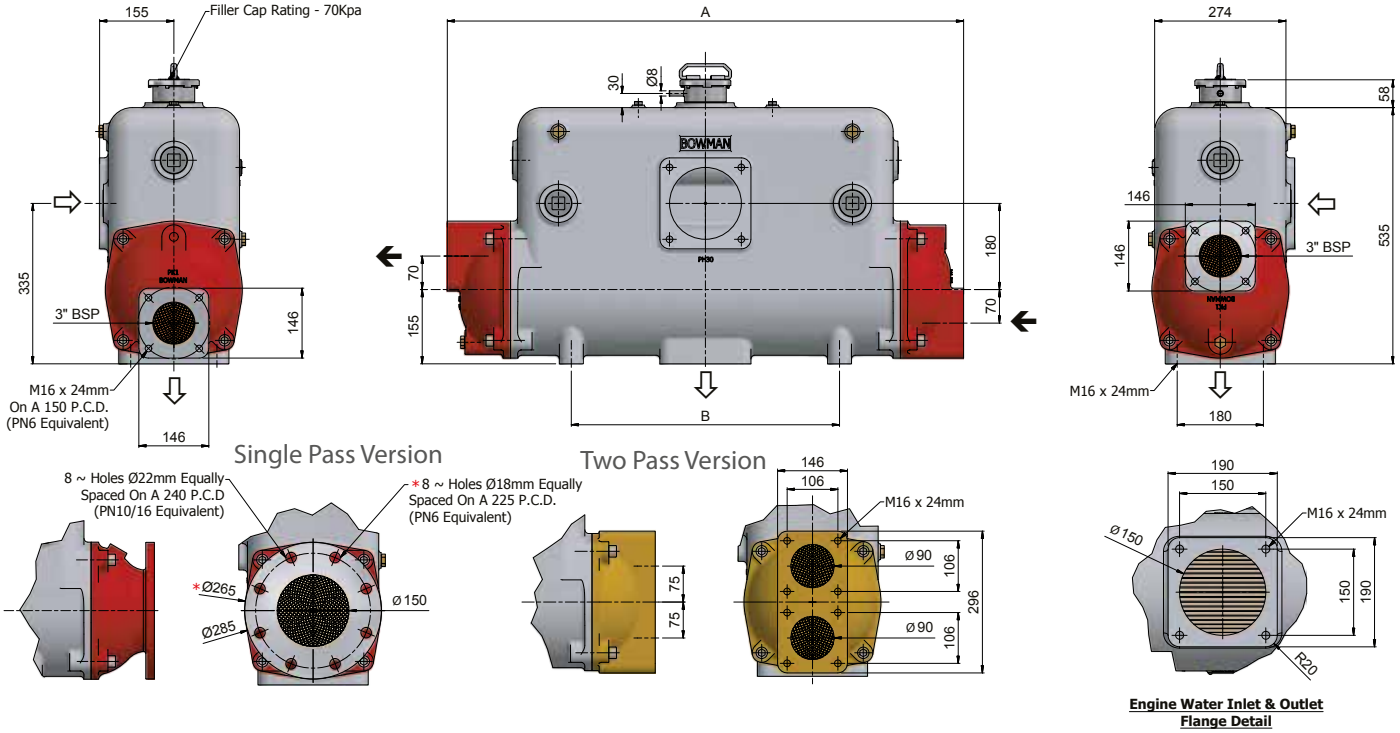

| Water Flow |
|---|
| Raw Water Flow |
| Engine Water Flow |

JH Header Tank Range - Three Pass

| Type | Weight | A | B |
|---|---|---|---|
| JH200 | 82kg | 704mm | 382mm |
| JH300 | 93kg | 850mm | 382mm |
| JH400 | 106kg | 1028mm | 560mm |

# PH Range

Three Pass Version




**Engine Water Inlet & Outlet Flange Detail**

| Water Flow |
|---|
| Raw Water Flow |
| Engine Water Flow |

PH Header Tank Range - Three Pass

| Type | Weight | A | B |
|---|---|---|---|
| PH200 | 136kg | 890mm | 382mm |
| PH300 | 156kg | 1078mm | 560mm |
| PH400 | 190kg | 1280mm | 762mm |

## Installation and Maintenance

1: Bowman header tanks must always be mounted above the engines cylinder head level.

2: The engine water circuit should be arranged so that it is self-venting on initial fill up.

3: A by-pass type thermostat should be used and arranged so that only the heat exchanger is by-passed when the engine is cold.

4: Ensure all other cooling components are positioned in the circuit so they receive the full flow of coolant from the engines water pump. These units include water jacketed exhaust manifolds (if fitted), oil coolers, charge air coolers and exhaust gas heat exchangers.

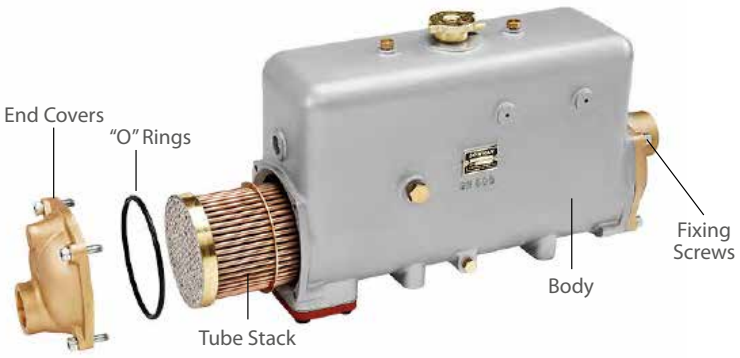
5: Automotive type thermostats, which simply interrupt the cooling water flow when the engine is cold, are not recommended for use with Bowman header tank heat exchangers.

6: When operated unattended, it is recommended that an automatic engine shut down system is always installed.

7. Bowman recommend using an ethylene glycol solution on the engine circuit in the concentration advised by the engine manufacturer for the operating conditions. Should you intend to use an alternative coolant, please contact our technical sales team.

## Replacement Parts

A comprehensive range of replacement parts is available for all Bowman header tank heat exchangers. This includes end covers, "O" seals, tube stacks, bodies and end cover fixings.




## Servicing the unit

By simply unscrewing the end cover retaining bolts, the tube stack can be removed from its outer 'shell' for routine cleaning and maintenance. On reassembly, it is always recommended that the "O" rings are replaced to ensure a reliable, water tight seal.

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## Jacket Water Connection

All Bowman header tank heat exchangers are supplied with blank counter flange plates on the engine water inlet and outlet side, for connecting the engine jacket water to the heat exchanger, except on the following models:

**FH 100, 200** – these models are now being supplied with one composite hose adaptor on the water inlet, whilst the water outlet hose connector is cast into the body of the heat exchanger.

**FH 300 & 400** – these models are now being supplied with two composite hose adaptors for the water inlet and outlet.

Where counter flange plates are supplied, they must be modified by the customer to enable the appropriate connections to be made, to connect the engines jacket water circuit to the heat exchanger.

*Counter flange plate*

**Note:** for customers still wishing to have blank counter flange plates on their FH header tank units instead of hose adaptors these will be available to special order only and at additional cost.

## Titanium Tube Stacks

Titanium is the ultimate 'fit and forget' solution for any application where super aggressive water conditions exist, including salt water, or contaminated / mineral rich fresh water. It resists chemical attack indefinitely and also eliminates the possibility of 'galvanic reaction' between dissimilar materials – often the cause of premature failure in certain operating conditions.

Bowman can now offer Titanium tube stacks as an option for many of our header tank heat exchangers, providing a highly durable, long life solution for the most demanding applications.

All Titanium tubestacks benefit from a full 10 year guarantee and, as a further advantage, they also offer the ability to operate at higher flow rates compared to standard cupro-nickel, without the risk of tube erosion.

GUARANTEED
**10**
YEARS

Full 10 year guarantee on all titanium material in contact with cooling water.

## Composite Hose Adaptors

Supplied as standard on the FH 100, 200, 300 & 400, these adaptors enable easy installation of the inlet or outlet hose for the engine jacket water and come complete with a Nitrile 'O' ring seal and 2 x M10 socket screws.

Hose adaptor outside diameter:
FH100 & 200: 46 mm
FH300 & 400: 57 mm

## Total Engine Cooling Solutions

For nearly 100 years, Bowman has provided efficient, reliable cooling solutions for normally aspirated and forced induction engines. During that time the company has amassed a wealth of expertise and can provide a complete cooling solution for both marine and land based stationary engines, including:

**Charge Air Coolers**
Improved combustion efficiency and reduced fuel consumption are just some of the benefits provided by Bowman charge air coolers.

**Exhaust Gas Heat Exchangers**
Recovers valuable 'waste heat' from the engines exhaust stream for use as a valuable 'free' energy resource

**Engine & Gearbox Oil Coolers**
A range of compact units suitable for engine or transmission oil cooling

**Fuel Coolers**
Bowman in line plate fuel coolers are compact, easy to install and suitable for use with all fuel types – including Ethanol rich fuels

# A world of applications

Bowman header tank heat exchangers can be found cooling engines in some of the most extreme conditions in the world. From the searing heat of an Australian summer, to the chilling depths of an Arctic winter, plus just about every other operating condition in between. Here are just a few examples.

## Irrigation Systems

In Australia - Bowman FH300 header tank heat exchangers are being used to cool Iveco 6.7L irrigation pump sets at the 165 hectare 8a Benerembah grape farm to ensure the pumps engines run at their optimum efficiency, even in the challenging climate of a New South Wales summer!

## Marine Engineering

In Portugal, Bowman header tank heat exchangers have been used to convert two John Deere engines for marine operation. The installation, on the catamaran 'Independencia', reduced temperatures in the engine room from over 50° C, to just 25° C.

## Automotive Engine Testing

Within the extensive engine testing facilities of one of Europe's leading automotive research and development organisations, you'll find Bowman header tank heat exchangers precisely controlling engine coolant temperatures in both extreme hot and cold operating conditions.

## Fire Protection Systems

At Durban International Airport, Bowman header tank heat exchangers are at the heart of a 'mission critical' fire protection system which, in the event of an emergency, either with aircraft take-off and landing, or at the airport's bulk fuel stores, dispenses thousands of gallons of foam to support emergency response teams.


Bowman is now established as the 'leading brand' for header tank heat exchangers. With tens of thousands of units operating reliably and efficiently throughout the world, you can have complete confidence when you specify Bowman header tank heat exchangers.

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