Pumps & Accessories for the air conditioning and refrigeration industry

www.aspenpumps.com
designed by engineers for engineers...

Aspen was established in 1992 by three engineers who were installing air conditioning and refrigeration equipment. This often proved to be awkward with the existing products, so we developed the peristaltic condensate pumps to meet our own needs.

Since then Aspen Pumps have developed a market leading range of pumps, designed and manufactured in the UK, for all conditions and variable installations. The success has been built by hands-on knowledge of installation engineers.

Only Advanced Engineering’s indoor range of Coil Cleaners and condensate drain cleaners are approved ‘pump safe’ by Aspen Pumps.
Peristaltic Pumps

In 1992 Aspen pioneered the use of Peristaltic condensate pumps and today are still setting the standard for reliability and innovation.

Peristaltic pumps offer the ideal solution for condensate removal due to the combination of quietness, reliability and installation advantages. The Peristaltic rotary movement generates a continuous pressure meaning that the pump can be sited over 15m away from the condensate source with no effect on performance. In addition, the pump mechanism does not come into contact with the water, removing the risk of contamination or corrosion.

• QUIET OPERATION
• SITED AWAY FROM THE CONDENSATE SOURCE
• RELIABILITY & LONG LIFE
• CAN RUN DRY

New & improved Universal
The Universal peristaltic pump operates with two temperature sensors. These allow the pump to detect and be triggered by a change in air temperature, making this pump suitable for many applications.

New & improved Standard
The Standard peristaltic pump is triggered by the hard-wired cooling signal from the air conditioning unit.

MK4
The MK4 peristaltic pump operates using water level sensors. This allows the pump to detect and be triggered by the level of water in the condensate tray.

Mechanical
The Mechanical peristaltic pump operates by using a remote reservoir with an internal float mechanism. It is available with or without a high level alarm output.

Compressor Sensor
Ideal for applications where complete silence is important. The Compressor Sensor pump is triggered by a sensor, which is designed to be mounted onto the compressor in an external condenser unit.

Peristaltic accessories are available on page 44
PERISTALTIC PUMPS

TECHNICAL SPECIFICATIONS

- Senses 5°C differential across the evaporating coil
- Only requires live/neutral supply and 2 sensors either side of the evaporating coil – one ‘air on’ and one ‘air off’
- Operates only on cooling
- Self-priming lifts 3 metres
- 12 metres discharge head
- Water flow rate: 6.25 ltrs per hr @ 12 metres head
- 3 minute timer overrun
- No siphoning back
- No loud sound from dry running
- Manual test switch
- Pumps water, fibrously contaminated water and air
- Pump rating: 0.2A, 230V AC
- Alternate voltages available
- Connecting cable: 3 metres
- Fire retardant plastics
- Inlet/outlet size: 6mm
- Push-in plug
- Wall-mounted bracket

INSTALLATION NOTES

Connect the pump to the appropriate drip tray (using the vinyl tube supplied), then connect to the mains power supply. Situate the red sensor in the ambient ‘air on’ side of the evaporating coil (NOT TOUCHING COIL). Position the blue sensor to the ‘air off’ side of the evaporating coil. This will sense 5°C differential and operate the pump.

The pump is designed to sit level on its base and MUST at all times have adequate space around it for good ventilation. Ensure that there are no kinks or trapped parts in the piping, which must have a 6mm I/D and a 9mm O/D. Fix the pipes with cable ties to the pump inlet and outlet.

PLEASE NOTE: where space is limited lay and fix suction vinyl tube along bottom of condense tray, as pump is self-priming.

A variable connector is provided to make easy installation between the condensate tray outlet and vinyl tube.

SERVICE GUIDE

We recommend that you inspect the pump head regularly, and change the pump head tube every 12 months or more frequently if required.

ELECTRICAL CONNECTIONS

| Brown | Live |
| Blue  | Neutral |
| Green/Yellow | Earth |

UNIVERSAL PUMP DIMENSIONS

<table>
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<td>1.35kg</td>
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The Universal peristaltic pump operates with two temperature sensors. These allow the pump to detect and be triggered by a change in air temperature, making this pump suitable for many applications.

The Universal is designed to fit in ceiling voids and lift the condensate water from wall mounted machines where a gravity drain is too obtrusive. It can also be used on cassettes fitted with an internal lift pump.

The pump can be mounted remotely as it is self-priming to a height of 3 metres and will pump 6.25 litres of water per hour against a maximum head of 12 metres. The pump runs constantly while the air conditioning system is cooling – when the cooling switches off a 3 minute timer ensures that the condensate tray is emptied before the pump switches off.

The Universal peristaltic rotary type - which means that it is quiet in operation, very reliable and will run dry without fear of damage or embarrassing noise. Unlike other pumps using either mechanical or electrical conductivity sensors, the Universal does not suffer from corrosion or contamination problems.
**TECHNICAL SPECIFICATIONS**

- Operates on hard-wired 150-230V cooling signal
- Self-priming lifts 3 metres
- 12 metres discharge head
- Water flow rate: 6.25 ltrs per hr @ 12 metres head
- 3 minute timer overrun
- No siphoning back
- No loud sound from dry running
- Manual test switch
- Pumps water, fibrously contaminated water and air
- Pump rating: 0.2A, 230V AC
- Alternative voltages available
- Fire retardant plastics
- Inlet/outlet size: 6mm
- Push-in plug
- Wall-mounted bracket

**INSTALLATION NOTES**

Connect the pump to the appropriate drip tray (using the vinyl tube supplied), then connect to the mains power supply, and control link to the air-conditioning units cooling signal.

**PLEASE NOTE:** The signal wire must be connected to the cooling signal only. This ensures that when the system is on heating, the pump does not run.

The pump is designed to sit level on its base and MUST at all times have adequate space around it for good ventilation.

Ensure that there are no kinks or trapped parts in the piping, which must have a 6mm ID and 9mm O/D. Fix the pipes with cable ties to the pump inlet and outlet.

A variable connector is provided to make easy installation between the condensate tray outlet and vinyl tube.

**SERVICE GUIDE**

We recommend that you inspect the pump head regularly, and change the pump head tube every 12 months or more frequently if required.

**ELECTRICAL CONNECTIONS**

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<th>Color</th>
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<tr>
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<tr>
<td>Blue</td>
<td>Neutral</td>
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<tr>
<td>Green/</td>
<td>Earth</td>
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<tr>
<td>Yellow</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>Switched live from signal</td>
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**PUMP DIMENSIONS**

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<tbody>
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<td>135mm</td>
<td>77mm</td>
<td>1.35kg</td>
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</table>
MK4 INSTALLATION NOTES

Connect the pump to the appropriate drip tray (using the vinyl tube supplied), then connect to the mains power supply.

WATER LEVEL DETECTOR:
When the unit is first switched on you need to allow 5 mins for the electronics to stabilise.

To ensure that the detector will operate satisfactorily, please abide by the following:

1. The detector will trigger when the water level has reached the first 2 or 3mm of the sensor, this should be taken into account when positioning the height of the sensor. As the device works on heat conductivity it can take up to 30 secs for the pump to switch on.

2. Position the sensor away from direct draught and make sure the tip is a minimum of 5mm from the base of the tray. Ensure the tip is in free air and unable to touch the sides. The ambient sensor within the cable 5cm from the tip can be seen as a small disc beneath the sleeve, this should also be positioned in free air to avoid any heat conduction.

MECHANICAL INSTALLATION NOTES

Connect to the mains power supply.

Decide which reservoir is correct for your installation and position the reservoir into the condensate tray or to the drain-pipe connection (depending on which reservoir you use).

ALWAYS ENSURE RESERVOIR IS MOUNTED HORIZONTALLY

The pump is designed to sit level on its base and must at all times have adequate space around it for good ventilation.

Ensure that there are no kinks or trapped parts in the piping, which must have a 6mm ID and an 8mm OD. Fix the pipes with cable ties to the pump inlet and outlet.

Both the MK4 and Mechanical share the same SERVICE GUIDE & ELECTRICAL CONNECTIONS as the Universal peristaltic pump (see page 6).

MK4 & Mechanical

The MK4 peristaltic pump operates using water level sensors. This allows the pump to detect and be triggered by the level of water in the condensate tray.

The Mechanical peristaltic pump operates by using a remote reservoir with an internal float mechanism. It is available with or without a high level alarm output.

The detector has two sensors within the head which warm up to 15°C above ambient. When the lower sensor comes into contact with water, the heat conductivity from the sensor provides a temperature difference energising the pump. Once the level of the water has dropped below the tip of the sensor, the pump will continue until the the sensor has completely dried out.
TECHNICAL SPECIFICATIONS

- Operates on 150-230V compressor signal
- Self-priming lifts 5 metres
- 12 metres discharge head
- Water flow rate: 6.25 ltrs per hr @ 12 metres head
- 3 minute timer overrun
- No siphoning back
- No loud sound from dry running
- Manual test switch
- Pumps water, fibrously contaminated water and air
- Pump rating: 0.2A, 230V AC
  Alternative voltages available
- Fire retardant plastics
- Inlet/outlet size: 6mm
- Push-in plug
- Wall-mounted bracket
- Mains cable: 3 metres
- Sensor cable: 10 metres

INSTALLATION NOTES

Decide where the pump will be located and connect it to the appropriate drip tray (using 6mm ID vinyl tube), then connect to a 240V mains power supply.

Position the sensor vertically against the compressor, so it protrudes above the top of the compressor like an aerial. This is important as it is where the electromagnetic field is strongest. Use the cable tie supplied to fix the sensor securely to the compressor. A 10m sensor cable is supplied, which can be extended if required.

The pump is designed to fit level on its base and MUST have adequate ventilation space around it at all times.

Ensure that there are no kinks or trapped sections in the piping, which must have a 6mm ID and 9mm O/D. Fix the pipes with cable ties to the pump inlet & outlet.

A variable connector is provided to allow easy fixing between the condensate outlet tray and the vinyl tube.

SERVICE GUIDE

We recommend that you inspect the pump head regularly, and change the pump head tube every 12 months or more frequently if required.

ELECTRICAL CONNECTIONS

| Brown | Live |
| Blue  | Neutral |
| Green/Yellow | Earth |

PERISTALTIC PUMPS

Compressor Sensor

Ideal for applications where complete silence is important.

The Compressor Sensor pump is triggered by a sensor, which is designed to be mounted onto the compressor in an external condenser unit. When the air conditioning system starts up, the compressor produces a localised electromagnetic field, triggering the sensor, which in turn activates the peristaltic pump. The pump runs constantly while the compressor is operational. When the compressor switches off, a 3 minute timer ensures that the condensate tray is emptied before the pump switches off.

Rollers in the pump act as check valves to stop the condensate draining back into the condensate tray.

The pump can either be fitted in the ceiling void or installed within the condenser unit (or nearby), as long as the pump and it’s plug/socket are sheltered and fully protected from any water ingress. The pump can be mounted remotely in this way, as it is self-priming to a height of 5m and will pump 6.25l/h of water against a maximum head of 12m. The Compressor Sensor pump is a peristaltic rotary type - which means that it is quiet in operation, very reliable and will run dry without fear of damage or embarrassing noise.
Tank Pumps

When looking for high flow rate, reliability and value for money, Aspen tank pumps are the perfect solution.

Aspen’s continued focus on innovation has created a market leading range of tank pumps, designed to suit a diverse array of applications. With reliability as the key decision criteria, the tank pumps are designed to perform even under the most challenging of applications, including hot water.

- HIGH FLOW RATES
- BUILT IN HIGH LEVEL SAFETY
- HOT & COLD WATER OPTIONS
- VALUE FOR MONEY

Improved Hi-flow 1L & 2L
Hi-flow tank pumps are designed to collect condensate water from refrigeration and air conditioning units. They operate automatically when the float rises and will discharge to a head of 4.6 metres.

Hi-lift 1L & 2L
Hi-lift tank pumps are designed to collect condensate water from refrigeration and air-conditioning units. They operate automatically when the float rises to discharge to a head of 12 metres. The Hi-lift will pump a smaller volume of water than the Hi-flow, but to a greater head.

Heavy Duty 6m & 10m
Heavy Duty pumps are designed for the rapid removal of condensate. They are particularly useful in situations where multiple refrigeration units are installed, or where large refrigeration systems deposit considerable quantities of condensate at one time.

Hot Water Heavy Duty & Economy
The Hot Water Heavy Duty and Economy pumps are designed to collect hot water from humidifier drain down cycles and normal condensate water from any associated air conditioning or boiler systems.

NEW, COMPACT HI-FLOW 0.5 LITRE TANK PUMP
The same market leading reliability of the Hi-flow pump, for use when space is limited.

Tank pumps accessories are available on page 44
Aspen’s Hi-flow tank pumps are designed to collect condensate water from refrigeration and air-conditioning units. They operate automatically when the float rises and will discharge to a head of 4.6 metres.

The Hi-flow will pump a greater volume of water than the Hi-lift, but to a lesser head.

Aspen’s Hi-flow tank pumps are designed to collect condensate water from refrigeration and air-conditioning units. They operate automatically when the float rises and will discharge to a head of 4.6 metres.

The Hi-flow will pump a greater volume of water than the Hi-lift, but to a lesser head.

Aspen’s Hi-flow tank pumps are designed to collect condensate water from refrigeration and air-conditioning units. They operate automatically when the float rises and will discharge to a head of 4.6 metres.

The Hi-flow will pump a greater volume of water than the Hi-lift, but to a lesser head.

The Hi-flows incorporate two high quality switches, activated by a float system. One operates the centrifugal type pump and the other is used as a high level safety switch. In the event of a pump failure this device will switch off the refrigeration unit and can simultaneously activate an optional audio and/or visual alarm.

The deck of the pump is clear plastic for quick and easy internal inspection, and it comes with a 2 metre long cable with push in plug which makes installation and maintenance easier.

In all cases a tank pump must be sited under the source of the condensate.
Aspen’s Hi-lift tank pumps are designed to collect condensate water from refrigeration and air-conditioning units. They operate automatically when the float rises to discharge to a head of 12 metres.

The Hi-lift will pump a smaller volume of water than the Hi-flow, but to a greater head.

The pumps incorporate two high quality switches, activated by a float system. One operates the centrifugal type pump and the other is used as a high level safety switch. In the event of a pump failure this device will switch off the refrigeration unit and can simultaneously activate an optional audio and/or visual alarm.

The pump is a peristaltic rotary type, which means that it is quiet in operation, very reliable and will run dry without fear of damage or embarrassing noise.

Unlike other pumps using either mechanical or electrical conductivity sensors, the Hi-lift does not suffer from corrosion or contamination problems. The deck of the pump is clear plastic for quick and easy internal inspection.
The Aspen Heavy Duty pumps are designed for the rapid removal of condensate. They are particularly useful in situations where multiple refrigeration units are installed, or where large refrigeration systems deposit considerable quantities of condensate at one time.

The pump unit is robustly constructed and designed to give reliable performance. This is particularly important in environments where efficient cleanliness is of utmost importance.

Two floats provide the operational control, one to operate the pump, and the other a safety float to be wired into the refrigeration unit control circuit.

The Heavy Duty tank pumps have a greater water flow rate than the Hi-flow tank pumps, for more heavy duty applications.

Flush the pump thoroughly with anti-bacterial wash every 6 months to avoid sludge build-up in the pump housing.

**Heavy Duty 6m**
- 6 metre discharge head
- Power supply: 230V 1.5A
- Alternative voltages available
- Water flow rate: 900 litres per hr

**Heavy Duty 10m**
- 10 metre discharge head
- Power supply: 230V 0.7A
- Alternative voltages available
- Water flow rate: 1250 litres per hr

**Technical Specifications**

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<td>300mm</td>
<td>150mm</td>
<td>3.5kg</td>
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<tr>
<td>Heavy Duty 10m</td>
<td>265mm</td>
<td>300mm</td>
<td>150mm</td>
<td>4.3kg</td>
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</tbody>
</table>

**Electrical Connections**

- Brown: Live
- Blue: Neutral
- Green/Yellow: Earth
- 2x Black: Safety switch

**Heavy Duty Performance**

**Service Guide**

The pump unit is robustly constructed and designed to give reliable performance. This is particularly important in environments where efficient cleanliness is of utmost importance.

The Aspen Heavy Duty pumps are designed for the rapid removal of condensate. They are particularly useful in situations where multiple refrigeration units are installed, or where large refrigeration systems deposit considerable quantities of condensate at one time.

The pump unit is robustly constructed and designed to give reliable performance. This is particularly important in environments where efficient cleanliness is of utmost importance.
The Hot Water pumps are designed to collect hot water from humidifier drain down cycles and normal condensate water from any associated air conditioning or boiler systems.

Hot Water Heavy Duty
The internal pre-wired safety float is a low current switch to stop the drain down cycle in the unlikely event of pump failure. The pump is operated via internal float switches.

Hot Water Economy
The pump unit is built of heat resistant cycoloy and operates in the same way as the Heavy Duty tank pumps (see pages 20-21).
Mini Pumps

Since the launch of the Mini Orange, Aspen has become the global market innovator for Mini Pumps. Aspen has built a reputation for designing reliable and quiet pumps, that the installer can fit where space is limited.

The Mini Lime was an industry revolution, a one piece pump held horizontally within a dedicated system, which allows easy access and pipe management. Following the trend for smaller AC units, the Mini Aqua was designed to fit in the smallest of spaces, continuing Aspen’s focus on making the installer’s life easier.

- QUIET
- SMALL
- RELIABLE
- FLEXIBLE INSTALLATION OPTIONS

Mini Aqua
The ultra slim Mini Aqua is the latest addition to Aspen’s family of mini pumps. It has been designed to give the installation flexibility needed, where the latest generation of A/C units are becoming even smaller.

Mini Orange & Maxi Orange
The Mini Orange and Maxi Orange condensate pumps allow great installation flexibility. Perfect for fitting quickly and easily either above the false ceiling, behind wall-mounted evaporators or in the plastic conduit.

Mini Lime & Maxi Lime
The Mini Lime and Maxi Lime pumps are completely unique, in both their design and installation advantages. The pumps are clipped directly onto the reservoir so there is minimal suction lift. The Lime pumps are completely reversible and also benefit from easy access for servicing.

Lime Systems
Once you have selected the required Lime pump, the next step is choosing the desired system. There are 5 types of trunking systems available; all comprise all the components required: pump, elbow, 800mm conduit & ceiling plate. (Pump is available without system).

NEW EASYFIT
A discreet mini pump that can be mounted directly below the wall unit.

Mini pumps accessories are available on page 44
The Mini Aqua is the latest addition to the Aspen family of mini pumps, and has been designed to give the installation flexibility, where the latest generation of A/C units are becoming even smaller.

The Mini Aqua is designed to be installed:
- within wall mounted evaporators
- in plastic conduit

By connecting the drain hose to the reservoir and placing the pump drive unit within the evaporator or conduit, condensate water can be pumped to a height of 8 metres.
Mini Orange & Maxi Orange

The Aspen Mini Orange and Maxi Orange pumps are designed to be installed:

- above the false ceiling where possible
- behind wall mounted evaporators
- in plastic conduit

By connecting the drain hose to the reservoir and placing the pump drive unit within the evaporator, condensate water can be pumped away to a suitable drain.

Within the Orange kit there are two reservoirs to choose from, which must sit flat and horizontal. One allows you to connect directly to the drain hose of the evaporator and the second reservoir can be placed directly into a condensate tray.

SYSTEM LOCATION

- above the false ceiling
- behind wall mounted evaporators
- in plastic conduit

PUMP DIMENSIONS

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<td>66mm</td>
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<td>44mm</td>
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The Aspen Mini & Maxi Lime pumps are completely unique, in both their design and installation advantages. The pumps are clipped directly onto the reservoir so there is minimal suction lift. By connecting the drain hose to the reservoir of the pump unit, condensate water can be pumped away to a suitable drain.

The pumps fit securely into a specifically designed elbow that holds them horizontally to ensure reliable operation. The pump and elbow are reversible therefore they can be installed easily on either side of an evaporator unit.

The Lime system makes installation easy by providing a pump complete with the conduit trunking, in which the pump and all pipework are hidden. This system allows easy access for maintenance and ensures that the reservoir is level at all times.

- Completely reversible
- Quick and easy to install

**Simple...**

1. Select Mini or Maxi Lime
2. Choose from the 5 trunking ranges available (see next page)
Once you have selected the required pump, the next step is choosing the desired system. There are 5 types of trunking systems available.

The systems all comprise of all the components required: pump, elbow, 800mm conduit & ceiling plate.

For both simple and more complex installations the BBJ and Inoac system packs are ideal. They can be integrated within the ranges of BBJ (pages 64/65), Inoac (page 66/67) and Inaba trunking. This allows for maximum installation flexibility when required.

Finally there are the Artiplastick and Optimal systems which can be integrated within the Artiplastick and Optimal ranges of trunking accessories respectively.

The Lime pumps are available on their own, without a system.

For simple installations the Slimline system is perfect (Slimline is a non extendable range of trunking).

Please note that the Maxi Lime is supplied with BBJ trunking (D.70) as standard.
Supermarket Pumps

A complete solution, to meet the growing demand for the reliable condensate removal pumps within the retail refrigeration industry.

As environmental concerns grow over the use of energy within the retail sector, the use of energy inefficient evaporator/condensate trays is starting to raise questions. Aspen’s refrigeration pumps offer a lower carbon alternative. The range is designed to work with integral HT or LT multidecks. The pumps are suitable for use by both the OEM market and direct installers.

- QUICK AND EASY TO INSTALL
- EXCEPTIONALLY RELIABLE
- EASY TO CLEAN
- LOWER CARBON ALTERNATIVE TO EVAPORATOR TRAYS

NEW Low Profile ERRP
Standing at a height of only 75mm, it is a simple but very effective solution for the removal of water from directly underneath refrigeration units during the auto defrost cycle. Ideal for individual refrigeration units with limited space, it is suitable for both the OEM market and for direct installers.

ERRP
The high capacity Economy Retail Refrigeration Pump tank and covers are plastic, which not only makes the unit lightweight and easy to clean, but has allowed the freedom to incorporate extra features to benefit the service engineer during installation and maintenance.

Cold Cabinet
The stainless steel Cold Cabinet Refrigeration Pumps high capacity permits the draining of several units together. The pump is operated by floats which activate sensors as the water level rises in the tank. Cleaning and maintenance of the pump is simple, as they can be removed easily from underneath any unit.

Macerators
The Macerator pumps are designed to collect condensation and defrost water from food hall cabinets. They both feature an internal filter blade to stop the pump from clogging with food debris between maintenance visits and will discharge the water to a head of 8.5 metres.

Accessories are available on page 44
A simple yet very effective solution for the removal of water from supermarket retail refrigeration units.

The Retail Refrigeration pumps are low in height which means they can be easily installed underneath a refrigeration unit, where direct drainage is not available and water needs to be pumped up above the ceiling and away to a suitable drain. The high capacity of the pumps also permits the draining of several units together. The pumps are operated by floats which activate sensors as the water level rises in the tank.

Cleaning and maintenance of the pumps is simple, as they can be removed easily from underneath any unit.

Important: Flush the pump through with anti-bacterial wash and clean both filters every 6 months or more often if required, to avoid sludge build-up. Replacement anti-bacterial “Stayclean” strips are recommended and are available from Aspen Pumps.
Standing at a height of only 75mm, it is a simple but very effective solution for the removal of water from directly underneath refrigeration units during the auto defrost cycle.

Ideal for individual refrigeration units with limited space, it is suitable for both the OEM market and for direct installers.

The tank side of the pump has capacity for 3.5 litres of water drained directly from the refrigerator during the auto defrost cycle, which is pumped away quickly through two filters to catch any debris.

The design shares many ‘service engineer friendly’ features with the larger, established ERRP, including lightweight and easy-to-clean plastic tank and covers, plus a push-in plug and recessed handles at either end to enable easy installation and servicing.
The Macerator pump is designed to collect condensation and defrost water from food hall cabinets. It has an internal filter blade to stop the pump from clogging with food debris between maintenance visits and will discharge the water to a head of 8.5 metres.

The internal pre-wired safety float is a low current switch to stop the drain down cycle in the event of pump failure. The pump is operated via two internal float switches.

The Macerator pump comes in two different tank sizes: The 4 litre, made from plastic and the 12 litre, made in stainless steel.
TECHNICAL SPECIFICATIONS

- Temperature: -20ºC to +90ºC
- Motor options:
  - 230V-1Ph-50Hz thermally protected
  - 110V-1Ph-60Hz
  - Other motors available on request
- Shaft: 316 Stainless steel
- Sealed upper and lower bearings
- Motor IP54 rated (excluding Miniature column pump)
- All pumps supplied with agitator

COLUMN PUMP PERFORMANCE

COLUMNS PUMP DIMENSIONS
(Mounting plate: 122mm x 149mm)

MINIATURE COLUMN PUMP DIMENSIONS
Above fixing surface: 76mm  Below fixing surface: 116mm  Fixing plate: 136.5mm x 90mm

The four Aspen Column pumps are designed primarily for beverage chillers, to continuously pump chilled water around a python system to provide the optimum cooling rate for soft drinks and cold beverages.

Once the mounting plate is fixed to the water tank, any of the four interchangeable pumps can be fitted by simply twisting the pump so it locks securely into the bayonet detail on the plate.

The pumps are just as quick to release from the plate, without the need to remove the outlet tube. With minimal installation costs and low maintenance, these pumps are ideal for both direct installers and the replacement market.

Miniature Column Pump
For small chiller and recirculation duties, this pump offers high performance and quality at low cost. The pump is typically used in vending machines but can be adapted to suit many different markets.
Highly affordable with no frills on the outside, it’s extremely efficient on the inside where it matters.

With a 500W oil-less compressor, a large condenser and high airflow, the EcoWarrior offers a quick, easy to use solution for reclaiming refrigerant gases, which is not only an environmental necessity but a legal requirement.

Suitable for most types of refrigerant, the unit has a liquid recovery rate of up to 80kgs/hr, a vapour recovery rate of up to 30kgs/hr, with a purge facility.
The lightweight EcoBuddy offers a highly efficient and easy to use solution for reclaiming refrigerant gases, which has not only become an environmental necessity, but a legal requirement.

The EcoBuddy has many features which make it unique in comparison to other reclaim units. The adjustable shoulder strap enables the EcoBuddy to be carried wherever you want, leaving your hands free. Integrated into this strap is a shorter carry strap for easy manoeuvring. The EcoBuddy is lightweight at under 13kg.

The plug socket on the side of the EcoBuddy can be used to power a vacuum pump, electric drill, battery charger or even your radio!

A tool tray is incorporated at the front of the EcoBuddy for small fittings and tools. This releases at the push of a button and latches securely when pushed shut.

With its own switch, the light is invaluable in roof spaces, or on roofs when nights draw in to help you finish the job.
### TECHNICAL SPECIFICATIONS

**Fan Speed Controller**
- Available for cooling only
- Optional heat pump model
- Condenser temperature coil sensor
- Max 3 amp output
- Minimum speed setpoint 30 to 60°C
- Volts: 230V Hertz: 50-60 Hz
- Heat pump model: reversing valve input 24 to 240V A.C. opto isolated

**3 Phase Failure + Phase Protection Detector**
- Input supply 300 to 480V A.C. phase to phase
- Supply frequency 48-63 Hz
- Temp range -20 to 60°C
- Relay output 8A 250V A.C. resistive
- 3A 250V A.C. inductive 8A 24V D.C.

**Hi-Level Water Sensor**
- Volts: 230V Hertz: 50-60 Hz
- Two sensor operating systems available: condensate sensor or float sensor

### Ventilation Fan Speed Controller
These slim, stylish units are designed for supply/extract ventilation systems.

So many Controllers on the market are bulky and unattractive, but this range from Aspen is designed to be on show... not hidden in a cupboard!

The controller can easily be installed either as a flush-fit unit (recessed) or as a surface mount unit (retro-fit). The fascia and enclosure are designed to be slim and unobtrusive, while the smooth keypad provides a simple interface for the end user, to allow easy control of their local ventilation.

### Fan Speed Controller
Controls head pressure to air conditioning and refrigeration systems by increasing and reducing fan speed with temperature on the condenser coil. There is also a heat pump model for connection to the reversing valve.

**Hi-Level Water Sensor**
For utmost security! The versatile Hi-Level Water Sensor is available with two different sensor options:
- Condensate sensor, as used by the Aspen MK4 peristaltic pump (page 11).
- Float sensor, as used by the Aspen Mechanical peristaltic pump (page 11) and Mini Orange pump (page 28-29).

The Hi-Level Water Sensor can be used in conjunction with most pumps that do not include high level safety. It also has 2 levels of sensing - high and low, both with N.O, N.C & C.

### ELECTRICAL SPECIFICATION
- 2 & 4 amp models available
- I230V 50Hz fused
- Maximum ambient temperature: 40°C
- IP33 rated

### DIMENSIONS

<table>
<thead>
<tr>
<th>Product</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
</tr>
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<td>52mm</td>
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<td>150mm</td>
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<tr>
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<tr>
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The BBJ line of products have been developed over a number of years using our extensive knowledge of air conditioning installations. These are designed to complement our extensive range of pumps. This includes condensing unit brackets, protective guards and a complete range of pipe fixings, all designed to make life easy and quick for the installation engineer.

We offer full sales and technical support from our UK based team who will be pleased to help with any enquiries.
BBJ offer a range of easy to install Condensing Unit Brackets that benefit from a high quality finish. They offer a professional appearance and highly economic solution for installations.

These sturdy and secure Brackets all offer horizontal flexibility. They are designed for easy installation and are boxed complete with all necessary fixings.

All steelwork undergoes a 5-part phosphating pre-treatment prior to a 60 micron powder coat finish in ivory.

The Type 1 Brackets are designed to give the choice of 3 positions, enabling the installation of equipment in difficult areas.

The self-adjusting Type 2 Brackets are designed for quick installation and easy levelling on uneven wall surfaces.
NON METAL BRACKET

- 2 sizes available:
  TYPE 1 80kg maximum load
  TYPE 2 80kg maximum load

- Ideal for use where there is salty sea air

QUICK FIT BRACKET

- 3 sizes available:
  60, 90 or 140kg maximum load

- Levelling system

- Adjustable anti-vibration rear foot

- Insulating washer and wall fixing kit supplied

INDUSTRIAL GALVANISED ARM

- 2 sizes available:
  450mm (sold as a pair)
  600mm (sold as a pair)

Condensing Unit Drip Tray

- Fits all BBJ Brackets
- Available in 2 sizes
- Choice of metal or plastic
- Flat packed with all required fixings (including 15mm tank connector for outlet)
BBJ Condensing Unit Guard Assembly

1. Back frame is provided pre-assembled and should be fixed to the wall through the frame in four places.
2. Push horizontal bars on to fixed back frame.
3. Attach pre-assembled front frame and panel by pushing onto the horizontal bars.
4. Self-drilling fixings for side and top panels secure the complete frame.
5. Self-adjusting feet are provided to level the front of the unit or to lift the unit off the ground to allow services at ground level.

**BBJ Condensing Unit Blocks**
- Adapts to all units
- UPVC
- 2 lengths available:
  - SB 450mm length (12 per box) including fixings
  - SB 1000mm length (2 per box) including fixings
- Maximum load 250 kilos on one point

**BBJ Condensing Unit Guard**

A range of 3 aesthetically pleasing, unobtrusive BBJ Condensing Unit Guards to deter vandalism and prevent damage to valuable equipment.

The Unit Guard framework is a painted aluminium structure and the panels are steelwork, which pass through a 5-part phosphating pretreatment prior to a 60 micron powder coat finish in ivory.

The Guards are simple and easy to install, and all panels are removable to allow maintenance of the unit. A back panel is available for free-standing units and extra bottom panels are also available for Guards fixed at high level on walls.

**External Dimensions**

<table>
<thead>
<tr>
<th>Product</th>
<th>Height</th>
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<td>450mm</td>
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<tr>
<td>MEDIUM</td>
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<tr>
<td>LARGE</td>
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**Internal Dimensions**

<table>
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<tr>
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<tr>
<td>MEDIUM</td>
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<tr>
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<td>1000mm</td>
<td>500mm</td>
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**Packing Weights**

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<tr>
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(Units can be supplied in other colours subject to requirements)
BBJ Insulclamps are a well-known range of pipe clips, supporting individual pipes in a thermo-rubber cushion between 2 metal parts. Used in the air-conditioning and refrigeration industry, Insulclamps are ideal for bigger commercial installations.

The clamps are made of metal and are therefore safe in the event of a fire if they are fitted in ceiling voids. The Insulclamps can be used both internally and externally.

**BBJ Insulclamps provide a simple yet excellently engineered solution to the problem of effective pipe support.**

**SIZES AVAILABLE & PART NUMBERS**

<table>
<thead>
<tr>
<th>SIZE</th>
<th>PART NO.</th>
<th>SIZE</th>
<th>PART NO.</th>
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<td>1 1/8&quot;</td>
<td>B6264</td>
<td>4 1/8&quot;</td>
<td>B6275</td>
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**INSULCLAMP SPECIFICATIONS**

- Bagged in 10’s
- A complete range of 14 sizes to fit 1/4” to 4 1/8” O/D pipes
- Insulates against heat loss and reduces vibration
- Semi-rigid inserts offer good heat resistance
- Plastic inserts designed to withstand temperatures from ~25°C to +125°C
- Quick to install with integral lock nuts
- All metal parts are zinc plated and colour passivated to resist corrosion
- Fits into shallow ceiling void or unit
- Fix to 40 x 40mm and 40 x 20mm channel
- Aluminium channel supplied in either 1 metre (B6000) or 3 metre (B6023) lengths

**BBJ Hangers are used to support pipe work hanging from ceilings. They hold both liquid and gas lines.**

They fit on both M8 and M10 size studding, saving time when supporting pipework or condensate lines. The hangers are adjusted by simply twisting them up or down the rod. They need to be installed every 6ft, and using Hangers means that you no longer need to hang cable trays.

**METAL HANGER SPECIFICATIONS**

- Bagged in 10’s
- Quick and easy pipe installation
- Avoids the need for cable trays
- 8 microns colour passivation coating
- Use in areas that are fire sensitive

**DIMENSIONS**

Approximate pipe sizes (allowing for insulation)

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<thead>
<tr>
<th>LIQUID</th>
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**PLASTIC HANGER SPECIFICATIONS**

- Bagged in 10’s
- Quick and easy pipe installation
- Avoids the need for cable trays
- Adjustable clipping mechanism

**DIMENSIONS**

Approximate pipe sizes (allowing for insulation)

<table>
<thead>
<tr>
<th>LIQUID</th>
<th>GAS</th>
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</thead>
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<tr>
<td>B6545</td>
<td>1 1/8&quot;</td>
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</table>
BBJ Quick Positioning Clips are a simple pipe clip made from a UV resistant plastic. They are fitted into standard unistrut channels by just a single twist.

QPC SPECIFICATIONS
- Bagged in 10’s
- A complete range of 9 sizes to fit 1/4” to 5/8” O/D pipes
- Easy installation to 40mm x 20mm channel
- External diameter matches diameter of pipes with 9mm insulation
- Material withstands temperatures from ~30°C to +135°C
- Excellent resistance to oil

BBJ Quick Positioning Hangers reduce the number of stud clips needed to be kept in stock.

This dual stud size clamping system will fit securely to both M8 and M10 studding. Five sizes are available to fit a wide range of different pipe diameters.

QPH’s can support refrigeration pipework, insulated pipes and condensate lines.

BBJ Grip Locks are particularly good for installers who, when installing the first pipe, can hold it within the Grip Lock whilst installing the second pipe.

Grip Locks are simple metal pipe clips that hold both liquid and gas lines. Designed to be fitted directly to the wall or solid ceiling, they can hold insulated pipes without a break in the insulation. Installation requires only one screw to be tightened.

BBJ Pipe Ties are great for multiple pipework routes. These simple ties can be fixed easily and directly to a wall or channel.

There are 3 sizes of Pipe Tie bases and 6 different lengths of cable ties to suit various pipe diameters.
BBJ Stud and Channel Clips have a secure and lockable fastening mechanism, allowing quick and easy fixing with the simple fit and twist action.

The unique ratchet design ensures that the clip remains closed when insulated pipe is squeezed against the wall of the clip. The clips are also easy to remove and relocate for maintenance.

**SIZES AVAILABLE & PART NUMBERS**

<table>
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<td>2 1/8&quot;</td>
<td>B6813</td>
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**STUD CLIP SPECIFICATIONS**

- Bagged in 10’s
- A complete range of 28 sizes to fit 1/4” to 2 1/8” O/D pipes
- Easy installation to M8 and M10 studding
- Fits all types of Metric & Imperial sizing
- Material withstands temperatures from –40°C to +140°C
- Unique lockable ratchet design

**CHANNEL CLIP SPECIFICATIONS**

- Bagged in 10’s
- A complete range of 14 sizes to fit 1/4” to 2 1/8” O/D pipes
- Easy installation to 41mm channel
- Fits all types of Metric & Imperial sizing
- Material withstands temperatures from –40°C to +140°C
- Unique lockable ratchet design

**BBJ Isolators**

- IP 65 electrical isolator for outside use
- 4 types available

**Isolator Security Box**

Two part metal housing (270x190x125mm) to protect an electric isolator with a facility to utilise a padlock or otherwise.

**Condensate Traps for air handling units with 3/4” female outlets**

- **MODEL EZT-113B**
  - 3/4” economy condensate trap
  - PART NO. FP2462
- **MODEL EZT-150**
  - “waterless” 3/4” condensate trap
  - PART NO. FP2463
- **MODEL EZT-210**
  - 3/4” condensate trap with overflow switch
  - PART NO. FP2464
- **MODEL EZT-226**
  - 3/4” slip fit close-coupled condensate overflow switch
  - PART NO. FP2465

**CONDENSATE DRAIN PIPE**

**FIXTURES:** (All sold in packs of 20)

- Straight connector
- ‘T’ piece
- 90° connector
- 45° connector
- Wall fixing clip
- 32-25mm reducer
- 25-20mm reducer

The sections of PVC pipe contain ‘O’ rings which form a secure waterproof seal between fixings when pushed together, with-out the need for gluing.

The drain pipe is available in 3 sizes: 20mm, 25mm and 32mm o/d and comes in 3 metre straight lengths.
### Straight Duct

<table>
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<tr>
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<th>B</th>
<th>C</th>
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### Outlet Cover

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### Elbow (Horizontal)

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### Socket

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### Wall Cap

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### Elbow (Vertical)

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### 45° Elbow (Vertical)

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### 45° Elbow (Horizontal)

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</tbody>
</table>

### Corner Cap

<table>
<thead>
<tr>
<th>Product code</th>
<th>A (mm)</th>
<th>B</th>
<th>C</th>
<th>Qty boxed</th>
</tr>
</thead>
<tbody>
<tr>
<td>NA-60</td>
<td>65</td>
<td>62</td>
<td>60</td>
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</tr>
<tr>
<td>NA-75</td>
<td>70</td>
<td>62</td>
<td>60</td>
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<tr>
<td>NA-100</td>
<td>95</td>
<td>62</td>
<td>60</td>
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### Flexible Joint

<table>
<thead>
<tr>
<th>Product code</th>
<th>A (mm)</th>
<th>B</th>
<th>C</th>
<th>Qty boxed</th>
</tr>
</thead>
<tbody>
<tr>
<td>NF-60</td>
<td>55</td>
<td>60</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>NF-75</td>
<td>60</td>
<td>70</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>NF-100</td>
<td>75</td>
<td>76</td>
<td>82</td>
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<td>NF-140</td>
<td>90</td>
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### Saddle Band

<table>
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<th>Product code</th>
<th>A (mm)</th>
<th>B</th>
<th>C</th>
<th>Qty boxed</th>
</tr>
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<tbody>
<tr>
<td>NV-L</td>
<td>80</td>
<td>82</td>
<td>80</td>
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### Reducer

<table>
<thead>
<tr>
<th>Product code</th>
<th>A (mm)</th>
<th>B</th>
<th>C</th>
<th>Qty boxed</th>
</tr>
</thead>
<tbody>
<tr>
<td>NR-60/75</td>
<td>68</td>
<td>90</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>NR-75/100</td>
<td>90</td>
<td>70</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

**Small Selection Available in White:** CD-75, NE-75, NW-75, NA-75, NS-75, NC-75
The complete solution to supporting building services and access equipment on a flat roof

Big Foot Systems are designed to support anything that is installed on a flat roof. This creates a safe and secure support for all air conditioning and refrigeration roof plant and associated services.

The main advantages of using the Big Foot System are:

- **Reduced risk of leaks**
  Does not penetrate the roof surface, removing any difficult detailing around concrete structures

- **Reduced the cost of the roofing installation**
  Removes concrete obstacles, creating a clear roof area therefore reducing complex, timely and expensive detailing

- **No plant decommissioning**
  No need to remove or decommission roof plant during roof repairs or resurfacing

- **Improved aesthetics**
  Neat and tidy solution for all roof plant and associated services
**Benefits**

- SETS THE STANDARD!
- 48 HOUR DESIGN SERVICE – LET US DO THE WORK
- SPREADS THE WEIGHT OF THE SUPPORTED PLANT
- EACH FOOT CAN BE REMOVED INDIVIDUALLY TO ALLOW EASY ACCESS TO THE ROOF SURFACE DURING RE-ROOFING OR REFURBISHMENT WITHOUT DECOMMISSIONING EQUIPMENT
- NO PENETRATION OF THE WATERPROOF MEMBRANE, ELIMINATING ANY DIFFICULT DETAILING, THEREFORE REDUCING THE RISK OF LEAKS
- COST EFFECTIVE
- COMPLETE ON-SITE FLEXIBILITY BOTH DURING AND AFTER INSTALLATION
- FLATPACK SYSTEM FOR EASY TRANSPORT
- HOT DIP GALVANISED METALWORK
- ELIMINATES THE RISK TO ROOF GUARANTEE

**RE-ROOFING**
The Big Foot System legs may be removed individually for re-roofing/refurbishment, without decommissioning or removing the equipment.

**HEIGHT ADJUSTMENT**
The legs incorporate over 100mm of vertical height adjustment, to take up variations in the roof. (300mm: stepped roof option).

**CONDENSER CLAMPS**
The repositionable clamps locate on both sides of the cross bars, locking down onto the feet of the condenser units as they are tightened.

**LINEAR ADJUSTMENT**
The cross bars which support the condenser units can slide along the plain bars into the position required, then are locked securely in place.

**LEG & BRACKET POSITIONING**
The leg & bracket are usually positioned outside the framework, but can be positioned inside if there is an obstruction.

**IMPORTANT:** The purchaser or installer of these products must satisfy themselves that the roof structure is of sufficient strength to take the combined weight of the Big Foot System and units.

**TOTAL LEG HEIGHT:** 375mm
(575mm: stepped roof option)

**HEIGHT ADJUSTMENT:**
245mm – 350mm: floor to framework
(245mm – 550mm: stepped roof option)

Large Stud (440mm) can be purchased as an extra individual component if required.
Bespoke Frameworks

Tailored to meet your every need.

Using a plan of your roof with dimensions and weights of the plant, we can specify complete Big Foot frameworks to support up to 10 tons. The system is completely flexible – we can change any part of the design of the frame at any time! We can increase or reduce the weight loading (kN/m²) by changing the size or number of leg assemblies on the frame.

The Big Foot mouldings are made of Glass filled Nylon with UV protection. An independent anti-vibration mat is provided for each foot. All metalwork is hot dip galvanised for all weather protection.

Our system allows for each leg assembly to be removed individually whilst the roof surface is maintained or even re-roofed without the need to decommission or remove the equipment.

Big Foot Systems set the standard of installation on site, providing the consultant with a method of installation which is quick, clean, practical and aesthetically pleasing.

- SITE VISIT
- 48 HRS DESIGN SERVICE
- DETAILED PROJECT COSTINGS

Big Foot Systems takes no responsibility for the condition of the roof on which our equipment is to be used. You must ensure that the substrate on which the Big Foot is intended for use is structurally sound enough to take the weight and point loadings we have indicated.

All Big Foot products must be installed in line with the guarantees and recommendations of the manufacturer of the roofing system. The manufacturer of PVC membranes should advise on the susceptibility migration of plasticizers and specific recommendations should be adhered to so that the roof guarantee is not affected.
Modular Frameworks

There are three basic modular frameworks available in 1m, 2m and 3m versions.

For flexibility, all leg assemblies and cross bars on the modular frameworks slide up and down to the required location (see page 73).

The modular frameworks come with 305mm² feet which are provided with anti-vibration mats to fit underneath. The frame is constructed from 40mm x 40mm standard box section steel.

For heavier loads, larger 450mm² feet are available and heavy duty 50mm x 50mm box section steel for some components.
H Frame Support System

The H Frame Set is a quick, versatile and economical solution for supporting pipework, ductwork, cable trays or any combination of these. You provide your own unistrut, keeping the duct and pipe installations low cost and totally flexible by fabricating the frameworks on-site.

Using inserts, the feet adapt to accommodate 41mm x 41mm off-the-shelf unistrut. The majority of installations require 305mm H Frames but where a greater load spread is required 450mm H Frames are also available.

SMALL FEET: 305 x 305 x 75mm
LARGE FEET: 450 x 450 x 100mm

On larger, more complex projects, we are able to offer a pre-fabricated H Frame design service.

KIT INCLUDES:
• 2 x feet
• 2 x AV mats
• 2 x unistrut inserts
• 2 x L-Brackets
• 4 x M10 bolts
• 4 x square channel nuts

KIT DOES NOT INCLUDE UNISTRUT

H Frame Set 305mm – Part no. B6088
H Frame Set 450mm – Part no. B6089
Multi Foot Support System

As part of the expanding Big Foot range, the Multi Foot is designed to be a multi-purpose ductwork, cable and pipework support.

The Multi Foot is an extremely versatile and cost effective one-piece support available in two sizes with optional AV mats.

SMALL: 400 x 180 x 95mm
LARGE: 600 x 220 x 95mm

Multi Foot can be used to support small and large pipework systems, cable trays, ductwork or any combination of these.

Small Multi Foot – Part no. B6357
Small Multi Foot AV mat – Part no. B6358
Large Multi Foot – Part no. B6359
Large Multi Foot AV mat – Part no. B6360

Fix-it Foot Support System

The 3 sizes of Fix-it Foot are the latest addition to the Big Foot support range. This foot has 40mm x 20mm aluminium channel recessed and bonded into the top face, allowing fixing of the services resting across the feet.

RECESSES IN THE UNDERSIDE ALLOW FOR SMALL DEBRIS ON THE ROOF SURFACE.
The Fix-it Foot is made of durable recycled rubber, which offers built-in anti-vibration and makes it both an economical and environmentally responsible piece of kit!

Small Fix-it Foot with Channel – Part no. B6735
Medium Fix-it Foot with Channel – Part no. B6736
Large Fix-it Foot with Channel – Part no. B6737

DESIGNED TO ACCOMMODATE:
- 41mm x 41mm unistrut
- 40mm wide channel (horizontally)
- 12mm threaded rod (vertically)

UNISTRUT, CHANNEL & THREADED ROD NOT SUPPLIED

3 SIZES AVAILABLE:
FIX-IT FOOT 250 250 x 180 x 95mm
FIX-IT FOOT 400 400 x 180 x 95mm
FIX-IT FOOT 600 600 x 220 x 95mm
Rapid Walkway System

The Big Foot Walkway is ideal for establishing clear, safe pathways around installations on a flat roof. It offers a secure route for service engineers to gain access to plant and for managing the flow of other personnel. A brand new product for the Big Foot Systems range, this beautifully simple walkway system is supported on the Fit-it Foot Support System. Designed to protect and create a designated walkway area for roof protection, safety of personnel.

• RAPID ON SITE FABRICATION – 30M PER HOUR
• STRAIGHT LENGTHS IN UP TO 3M SECTIONS
• OPTIONAL HAND RAILS CAN BE ADDED AFTERWARDS
• RECYCLED RUBBER FOOT SUPPORTS
• AVAILABLE OFF-THE-SHELF

BBJ Walkway Paving Blocks
Lightweight blocks which protect the roof surface from damage caused by regular access. 600mm x 600mm

BBJ Vibromats
The Vibromats are constructed from milled, sieved and graded Styrene Butadiene Rubber. Embedded in two of the Vibromats are metal plates inserted to a depth of 15mm which allow a condenser unit to be screwed directly onto the tile.

Small Tile
600 x 150 x 30mm
Inserted metal plate
Part no. B6491

Large Tile
1000 x 500 x 30mm
2 Inserted metal plates
Part no. B6282

AV Strip
1000 x 75 x 15mm
Multi purpose anti vibration strip
Part no. B6024

Plain Tile
500 x 500 x 45mm
Ideal for walkways and to protect roof surfaces
Part no. B6416

Part no. B6496

• QUICK & SIMPLE ASSEMBLY
• EASY TO REMOVE A SECTION FOR ACCESS
• DESIGNED TO SPREAD WEIGHT ON DELICATE ROOF SURFACES
• FLAT PACKED FOR EASY TRANSPORT
• NON-SLIP FIBREGGLASS GRATING AVAILABLE IN YELLOW OR GREY
• GALVANISED METALWORK

AA (1.5m) 90º 45º
PQ (1.5m) PQ (1m) OO (1m) OO (0.5m)

1018mm 1388mm 1065mm 168mm 103mm

1018mm 1388mm 1065mm

1m 90º (Corner) 2m Handrail 3m Handrail

1m Handrail 2m Handrail 3m Handrail

Big Foot Walkway System