BALMORAL TANKS

HOT PRESS
GRP SECTIONAL
WATER TANKS
Balmoral Tanks

Balmoral Tanks is a leading design and manufacturing company that provides unique turnkey services spanning civils groundwork, tank design and manufacture, installation, pipework, commissioning and technical after sales services.

Producing what is believed to be the most comprehensive range of tank products from a single source, civil engineering, firefighting, potable/non-potable water, anaerobic digestion, wastewater, desalination and drainage are key sectors for the company.


Our decades-long global track record is built on outstanding levels of customer service. We continually drive efficiencies and add value to our valued client base through our end to end market offering from design to installation, commissioning and after sales care.

Since 2018 we have invested more than $25m in our 150,000sqft (14,000sqm) state-of-the-art design and manufacturing facilities as well as in a continuous learning programme for all staff. We believe we have the most technically advanced production facilities in the industry supported by unrivalled levels of expertise across the whole operation.

Our longevity is proof of our success; we’re here for the long term.

Our promise

Balmoral Tanks benefits from being part of Balmoral Group Holdings Ltd and the huge support infrastructure that offers. It is this depth of expertise that differentiates us from any other tank manufacturer in the world.

With 40+ years’ experience in managing the design, manufacture and installation of liquid storage and treatment products we will do all that is humanly possible to ensure delivery of your project on budget, on time with care and professionalism from enquiry to installation.
With an unrivalled reputation for quality and service Balmoral offers sectional tanks, which can be pre-insulated, ranging from 1m⁴-10,000m³ litres capacity and erected to a height of 4m in 1m and 0.5m increments.

These tanks are designed and manufactured to BSEN 13280 standards and carry WRAS approval for potable water storage. All panels are fully tested to resist pressures in excess of six times their working pressure.

**Design**
The design of each sectional tank panel is modelled using FEA software. This allows fine detail to be thoroughly investigated and improved before proceeding to mouldmaking and production.

**Materials**
All materials used in the production and assembly of Balmoral GRP tanks are rigorously tested for potable water compatibility. This includes long term material performance and mechanical properties, non-metallic components, adhesives, etc. Combined, these analyses form the basis of the company’s extensive QC procedures.

**Manufacturing process**
Balmoral sectional tank panels are hot press moulded in glass reinforced plastics (GRP) using isophthalic unsaturated polyester resins and electrical glassfibre reinforcement.

The panels are moulded at temperatures up to 150°C under strict quality control disciplines. The process results in strong, consistent panels which are fully cured, dimensionally accurate with sharply defined profiles and smooth surfaces on both faces.

Drilling and finishing of the panels is undertaken in a purpose built controlled area, where high technology automated drilling equipment is used to complete production to exacting tolerance levels.

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### HOT PRESS GRP SECTIONAL WATER TANKS

- **Feature**
- **Benefit**

<table>
<thead>
<tr>
<th>Design</th>
<th>Designed to BS EN 13280 (2001)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing</td>
<td>Consistent product offering dimensional stability</td>
</tr>
<tr>
<td>Automated finishing</td>
<td>Provides high levels of accuracy</td>
</tr>
<tr>
<td>High grade materials</td>
<td>Improved resistance to bacterial growth, increased water resistance, reduced risk of osmotic attack. Colour RAL 7004</td>
</tr>
<tr>
<td>UV stabilised materials</td>
<td>Suitable for global climatic conditions</td>
</tr>
<tr>
<td>100% opacity</td>
<td>Prevents algae growth</td>
</tr>
<tr>
<td>Heavy duty cover</td>
<td>Low maintenance, resists wind and snow loadings. BS 6399 Pt1 (1996)</td>
</tr>
<tr>
<td>Integrated insulation</td>
<td>Provides U value of 0.6W/m²K. CFC and HCFC free. Suitable for water storage up to 38°C (Non-standard - price on application)</td>
</tr>
<tr>
<td>Exclusive sealant</td>
<td>WRAS approved, provides optimum performance under varying climatic conditions</td>
</tr>
<tr>
<td>Bracing</td>
<td>Designed to BS 6700:1997 to limit structure deformation</td>
</tr>
<tr>
<td>QA</td>
<td>Certified to BS EN ISO 9001:2015</td>
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</table>

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### Mechanical property

- **Performance value**

<table>
<thead>
<tr>
<th>Method of manufacture</th>
<th>Hot Press Moulded</th>
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<tbody>
<tr>
<td>Specific gravity</td>
<td>1.8</td>
</tr>
<tr>
<td>Tensile strength</td>
<td>110 Mpa</td>
</tr>
<tr>
<td>Flexural strength</td>
<td>220 Mpa</td>
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<tr>
<td>Flexural modulus</td>
<td>Detail</td>
</tr>
<tr>
<td>Impact strength</td>
<td>180 KJ/m²</td>
</tr>
<tr>
<td>Barcol hardness</td>
<td>90</td>
</tr>
<tr>
<td>Shear strength</td>
<td>107.8 Mpa</td>
</tr>
<tr>
<td>Glass content</td>
<td>&gt; 30%</td>
</tr>
<tr>
<td>Thermal expansion</td>
<td>2.0 x 10⁻⁵/°C</td>
</tr>
<tr>
<td>Thermal conductivity</td>
<td>0.15 Kcal/m hr°C</td>
</tr>
<tr>
<td>Overall heat transmission</td>
<td>0.6 W/m² K</td>
</tr>
<tr>
<td>Water absorption</td>
<td>&lt; 0.1%</td>
</tr>
<tr>
<td>Light transmission</td>
<td>Zero</td>
</tr>
<tr>
<td>Insulation thickness</td>
<td>40mm EPS</td>
</tr>
<tr>
<td>Insulation cover</td>
<td>ABS</td>
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</table>
The Balmoral range of sectional GRP tanks may be specified as either externally flanged base (EFB) or internally flanged base (IFB). This allows the use of either flat continuous foundations, close centre beams, pier walls or bearer beams depending upon the type of base required. The internally built tank (IBT) to be supported as standard on an IFB foundation.

The EFB specification is fully self-draining allowing ease of maintenance and cleaning.

**Flange types**

- **EFB** Externally flanged base, externally flanged sides
- **IFB** Internally flanged base, externally flanged sides
- **IBT** Internally flanged base, internally flanged sides

- The dimensions shown above apply to tanks where the top of the tank is less than 2.5m above FFL. Where the top of tank is greater than 2.5m above FFL work at height equipment should be supplied.
- Dimensions increase to OD+750mm for fixed scaffold and OD+850mm for mobile tower
- IBT tanks to be tight to two adjacent walls only
- 500mm required underneath the EFB tank for installation
- IBT tanks maximum height: 3m

**Clearance requirements**

All installations require a clearance of 500mm above manway. A minimum clearance of 350mm is required above the tank to comply with water regulations.

**External plan sizes (for IFB/EFB only)**

| Height up to 1m | = 80mm over the internal dimensions for each side
| Height up to 1.5m | = 210mm over the internal dimensions for each side
| Height from 2 to 4m | = 210mm over the internal dimensions for each side

**Flange detail**

- Flexibility of panel sizes allows connections to be agreed on site to suit actual tank location
- Modular design provides ease of transport and flexibility of assembly on either a prepared flat and level concrete foundation, support walls or bearer beams
- Panels are rigidly supported by a combination of stainless steel tie rods internally and galvanised box sections externally
- Installation is carried out by Balmoral approved installers, fully trained to provide total unified responsibility
Base supports

Option 1 - Flat foundation
For IFB and IBT tanks. Flat screed concrete foundation to be level and not vary more than 2mm p/m or 6mm p/6m, measured laterally or diagonally. Levelling steels are recommended due to difficulties in achieving +/- 2mm per metre over whole base area.

Option 2 - Close centre beams
IFB and IBT tanks may also be supported by steel bearer beams.

Option 3 - Pier walls
For EFB tanks allowing self drain. 1m centres required.

Thermal insulation
Balmoral Tanks uses expanded polystyrene (EPS) materials in its thermally insulated panels. This is made using a pentane expansion agent which is CFC and HCFC free and can be recycled by melting down and reforming.

Handrailing and supports
Float valve chamber (type AB and AF air gaps available)
A4 stainless steel internal fasteners and fixings
Screened air vent
Kick plate
Roof support struts
Balmoral FireFlow™ vortex inhibitor
Side entrance manway access panel
Galvanised steel external bracing
Hot press moulded GRP panels BS EN 13280 (2001)
0.5 x 1m hot press moulded panel
316 Grade stainless steel partition supports
316 Grade stainless steel internal tie rods
Partition panels
Hot press moulded GRP corner section
500mm centred 100x50mm high galvanised levelling steels
Aluminium or galvanised steel gated ladder (BS 4211)
Galvanised or stainless steel external fasteners and fixings
WRAS approved BALSEAL sealing strip

Note: Tank configuration, panels and components are shown for illustration purposes only.
Automatic fire sprinkler systems are installed for two main reasons; property protection or life safety. In both cases their efficiency in controlling and extinguishing fires has for over one hundred and twenty years protected lives and the environment and it should be accepted that all sprinkler systems will protect lives by restricting fire spread and protection escape routes.

Property protection systems are often installed at the request of the building occupier’s insurer to protect the business by ensuring the building and contents are protected against fire. Some systems are installed to comply with building or fire regulations primarily to protect employees, the public and fire fighters from the risks of fire. This type of system should be more accurately referred to as ‘enhanced availability’ sprinkler systems but are more commonly called ‘life safety’ sprinkler systems and include a range of added features which reduce the possibility that the system will ever be non-operational due to scheduled service and maintenance being carried out.

In both of these cases an essential part of the system is the water supply. This can take the form of a direct supply from the local water service main with or without a booster pump or, more reliably, having water stored in a tank with a pump or pumps to deliver the water to the sprinkler system.

The most common arrangement is a single water storage tank with two fire pumps, each capable of meeting the needs of the sprinkler system.

For enhanced reliability, the water storage tank can be split into two half-capacity tanks. This ensures that there is always a water supply available to the sprinkler system, even when one tank (or any of its equipment) is being serviced or maintained.

Balmoral FireFlow™ vortex inhibitor

Fire fighting water tanks require a large, fast flowing volume of water with a vortex inhibitor playing a key role in preventing air being drawn into the system and reducing the flow. Vortex inhibitors are fitted to the outlet pipe of the pumped water system.

Standards require the usable water level to be no less than 100mm above the lowest suction point, the height of the vortex inhibitor also affects the effective capacity within a sprinkler tank.

Simple vortex inhibitors are available commercially; however the Balmoral FireFlow vortex inhibitor provides a significantly improved design which optimises both the capacity of the tank and the flow rate.

Balmoral’s vortex inhibitor was designed using computational fluid dynamics to remove turbulent areas that would otherwise reduce the flow rate.

Balmoral’s unique design fully meets the requirements of BS EN 12845 standards, including pipe dimensions, flow rate and mechanical strength, but with the advantage of increasing the effective capacity of the tank and decreasing the suction loss through the vortex inhibitor by an industry-leading 30%.

The injection moulded vortex inhibitors are made from structural thermosetting polyurethane, are fully corrosion resistant and range from 80-450mm in diameter. These PU materials are used by Balmoral’s offshore division at water depths of 2000m and beyond.
**ACCESSORIES AND ANCILLARIES**

**Ball float valve**
These are installed at the end of the incoming water supply pipe and automatically keep the tank full.

**Pipe connections**
Customers are asked to provide full details when ordering. The type of pipe connection should be specified together with the relevant standard to which the coupling flanges are drilled or the pipes screwed. To assist delivery, the size and position of each connection should also be specified at the time of ordering. Ball and gate valves and all pipework, including bends and flanges, can be supplied if specified at the time of ordering.

Connections can be supplied as flanged stools to BS4504, ASA or DIN standards, or, for small pipework, screwed sockets to BS1387. The connections are fitted to the plates in positions agreed at the time of order.

**Pipework configuration**
The inlet or delivery pipe can enter the tank through either the side wall at the top of the tank or into a raised chamber. Flow can be controlled through a ball valve, equilibrium float valve or automatic float switch.

Overflows should be positioned in accordance with the required air gap, and all outlets (suction), drains and overflows will come through the side walls of the tanks.

Overflows and warning pipes terminate at high level, horizontally, and can be extended to the floor if required.

**TANK REPLACEMENT**

Balmoral Tanks provides a complete tank replacement service and has completed a significant number of full service projects in recent years.

Acting as main contractors, Balmoral Tanks is supported by in-house health and safety, design and contract management while also providing guidance on ACOP L8 and CDM.

**Turnkey project design and installation service**
- Secondary base steel design and installation
- Tank design (ISO9001) and installation
- Tank removal and responsible disposal
- Establishment of temporary supply
- Pipework re-routing
- Updating/replacement of valve systems
- Health and Safety and CDM experience
- ACOP L8
NOT JUST ANOTHER TANK COMPANY
### GRP ONE-PIECE TANKS

Balmoral one-piece tanks are manufactured to BS 13280:2001 standard using high quality glass reinforced polyester (GRP) resins. The tanks comply with UK Water Supply Regulations 1999 and have been tested and approved by WRAS.

<table>
<thead>
<tr>
<th>Model</th>
<th>Internal Length</th>
<th>Internal Width</th>
<th>Internal Height</th>
<th>External Length</th>
<th>External Width</th>
<th>External Height</th>
<th>Capacity Litres</th>
<th>Capacity Gallons</th>
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<tr>
<td>BOP40-I</td>
<td>680</td>
<td>510</td>
<td>510</td>
<td>790</td>
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<td>540</td>
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<td>559</td>
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<td>1068</td>
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<td>1265</td>
<td>2730</td>
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<td>800</td>
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<td>2588</td>
<td>1674</td>
<td>1265</td>
<td>4550</td>
<td>1000</td>
</tr>
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</table>

All dimensions in mm
SPECIALIST PIPEWORK AND MECHANICAL SERVICES

Balmoral Tanks specialises in a full range of stainless steel pipework along with nominal bore carbon steel, fusion bonded epoxy coated carbon steel, ductile iron, galvanised and plastic pipework.

With decades of experience Balmoral provides the following services:
- Comprehensive range of pipework systems including stainless, carbon and coated steel, ductile iron, plastics
- Design, 3D modelling and site survey
- Off-site fabrication
- Pipe supports and bridges
- Bespoke fabrications
- Mechanical installation
- Skid units
- DfMA

LEGIONELLA COMPLIANCE AND WATER INDUSTRY SERVICES

W.E.T Services
Balmoral Tanks retains a majority shareholding in Water Environmental Treatment Ltd (W.E.T), servicing the UK legionella compliance and water industry services market.

W.E.T has been providing legionella sampling and risk assessments, water hygiene monitoring services, tank cleaning and remedial works since the first edition of ACoP L8 was published by the HSE in 1991 working with NHS trusts, county councils, schools, care homes, housing associations and property management companies.

Balmoral Group
Established in 1980, Balmoral is a diverse privately owned Group. Balmoral Tanks specialises in civil and environmental engineering liquid storage/treatment solutions while Balmoral Comtec provides buoyancy, protection and insulation product solutions to the offshore energy markets. Balmoral Park is the property development division of the Group.

At Group HQ in Aberdeen the company has invested in a pioneering design and manufacturing facility that includes laboratory, design engineering, toolmaking, production, project management and testing facilities.

Balmoral Tanks’ Thurnscoe facility designs and produces the company’s glass fused to steel, epoxy coated and stainless steel tanks as well as concrete tanks for the water, wastewater, processing and anaerobic digestion sectors.

In Llantrisant, South Wales, Balmoral Tanks runs a specialised design and manufacturing operation providing hot press GRP and steel sectional tanks as well as cylindrical steel tanks for the global water storage and fire-fighting sectors.

The Group is dedicated to a policy of continuous improvement and consistently providing the highest quality of products on a global basis.