





WinterTech Systems

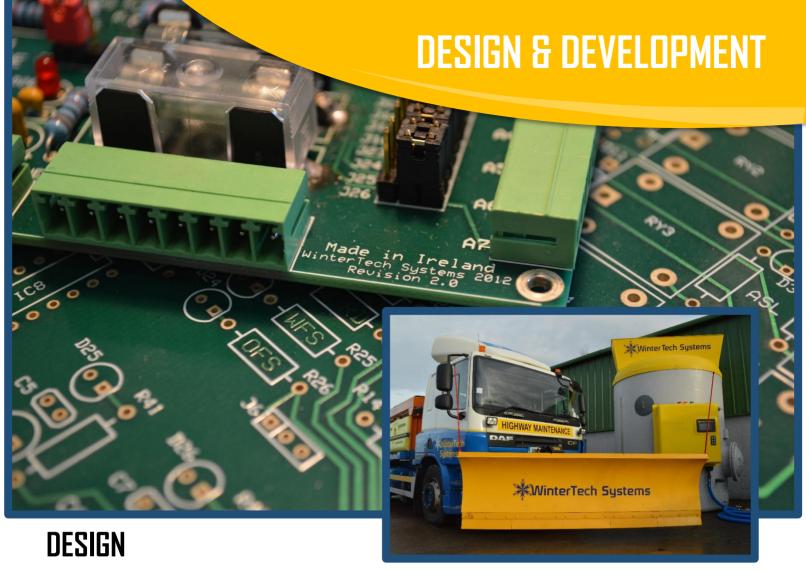
WinterTech Systems Ltd design, develop and manufacture Salt Saturation & Storage Solutions. We manufacture in Ireland, in England and in France. Our BS Series of Salt Saturation & Storage Solutions are currently the systems of choice for National Highways England and Transport Infrastructure Ireland contractors. Due to its ease of use, back office visibility, rich feature set and reliability we are now gaining an ever increasing client portfolio in the UK and have commenced exporting to Europe.

We have a combined expertise of over 50 years across a wide range of engineering disciplines including electronics, mechanical, software development and IT. This experience ensures that we can produce the best possible products that always meet or exceed the needs and expectations of our customers.

We place a lot of emphasis on our ability to provide a top class after sales service. Our relationship with the customer doesn't end after installation, we feel it's just the beginning. A close relationship with the end user ensures that our products will constantly evolve to meet ever changing needs.

Our track record with our customers is impeccable. We provide servicing and service contracts that are unrivalled in response for machines that work in such extreme environments. References are available from all customers with whom we have worked.

100% resilience for us is not a goal – it's a fact!



All of our products have been designed to ensure that end users can operate with minimal intervention, freeing them to get on with the job of winter servicing. The BS Series of Salt Saturators have been designed with this ethos in mind. We have created what we believe to be the most reliable and user-friendly brine stations currently available on the market.

When designing and developing our saturators we are passionate in our focus of what CAN go wrong. This is what sets our saturators apart from many others. Our design team use our 10 years of experience and 100 installation as well as the environment, possible human error and machine failure and have devised a design that actively informs the user of any problems/issues that can arise. For example, our saturators automatically tell you by SMS when they need to be topped up with salt and also if any problem develops in the system. It's not every day you receive a text message from a brine station!

USER RELATIONSHIP

We value the relationship we have with our customers. We encourage our customers to provide us with any feedback they may have about our systems. Any mechanical & software issues can be discussed with our development team who guarantee with each new update that any known issues will be resolved. This ensures that the saturators are running at maximum efficiency and in turn, you can operate at maximum effectiveness.

FIELD TESTING

We uniquely are also providers of Winter Services to a variety of customers in Ireland and thus we actively use our own products in real world conditions. This means that our saturators and their software are thoroughly tested from prototype to finished product. Our engineers work closely with our operatives to ensure every potential issue is rectified before final release ensuring you have a tried, tested, proven product delivered to your depot at all times.



Our manufacturing facility in Ireland is located just five minutes from the M1 motorway and just thirty minutes from Dublin airport. This excellent location provides us with easy access to every major town & city across Ireland.

We also manufacture in the UK which allows us to easily ship and service within the UK. In 2018 we further expanded our European manufacturing capability by building machines in France and the Netherlands.

STAFF

Our staff are highly qualified and are knowledgeable in every aspect of our products. As machine designers and builders, all of the intellectual property of our systems resides in-house. All our technical staff are involved in the design & development process which allows us to design products drawing from a large knowledge base. Taking feedback from the customer experiences in the field ensures that our products are always designed with the end user in mind.

MATERIALS

Our products are built with some of the most reliable components currently on the market. From the PVC pipes to the control systems each individual component that makes up our saturators has been proven time and time again across a huge range of industries.

We have established a strong relationship with our suppliers to ensure that we receive the best products on the market. The quality of the materials fitted is reflected in the end-product. All materials and components are selected to reduce lead time should fast replacement be required.

SERVICE & SUPPORT

INSTALLATION

Installation of a BS7000 Brine Station is extremely simple and can be completed within 8 hours of the saturator being delivered to your depot. The WinterTech Systems installation crew will ensure that the saturator is fully operational, and that all communications equipment is working. On-site training is then carried out at manager and operator levels ensuring from the get go all users have a working knowledge of the machine

DEDICATED SUPPORT

WinterTech Systems have a dedicated support team who are on call throughout the winter season. We can uniquely guarantee to diagnose every possible problem that can occur after just one phone call.

Our Brine Saturators come equipped with the latest connectivity technology that allow our technicians to remotely access each saturator. Therefore, we can diagnose any problem quickly and efficiently. If a problem cannot be resolved over the internet and a depot visit is required, we come to the depot to FIX the problem and not to DIAGNOSE it thus saving many days of potential downtime.

If our service team has diagnosed a problem that requires a depot visit, a technician can be at your depot within 72 hours. All components in our saturators including all sensors and pumps are designed to be replaced without having to empty any of the brine tanks. This will mean that your saturator should never be non-functional for any longer than necessary. Depending on the nature of your business (Winter Services, Food Production etc.), this can be an important factor in choosing your brine technology provider. We carry a large stock of spare parts which ensures that our Service Technicians are always equipped with the parts needed to complete the job when they arrive at your depot.

SERVICE CONTRACTS & TRAINING

We offer excellent service contracts with annual preventative maintenance schedules that will ensure your saturator remains functional and efficient for as long as you require.





SALT BRINE

Standard brine is a simple mixture of water and Sodium Chloride (NaCl) salt. A pure or eutectic NaCl salt brine contains 23.3% salt concentration by mass. A eutectic NaCl brine will not freeze until $-21^{\circ}C$ and is capable of protecting the road surface against significant freezing. For protection at even lower temperatures other chlorides such as Calcium Chloride (CaCl₂) brine can be used. A eutectic CaCl₂ brine will not freeze until $-51^{\circ}C$ and will protect the road surface to much lower temperatures.

WHY USE SALT BRINE IN WINTER SERVICES?

- It has been proven to slash annual salt consumption by as much as 78% providing huge savings.
- Applications with brine will last up to 6 times longer than dry salt spreading. This will provide additional time to respond to freezing precipitation.
- Brine can be applied at much higher vehicle speeds of up to 80km/h improving treatment times as it does not bounce or blow off the road.
- On marginal nights, using brine will significantly reduce the number of second interventions required due to hoar frost. This will result in significant savings in salt usage, labour, diesel and vehicle wear and tear.
- Brine is a simple and safe anti-icing treatment that helps prevent the bonding of ice to road surfaces.
- Brine melts frozen precipitation faster than dry rock salt. It can be used to pre-wet salt (reducing application scatter) or as a full-wet where dry salt is not needed.
- Unlike dry salt, brine can be applied several days before it snows.
- Brine will stop snow compacting on roadways.
- Overall, the increased efficiency results in the use of much less salt, minimizing environmental impact.

WHAT IS BRINE?

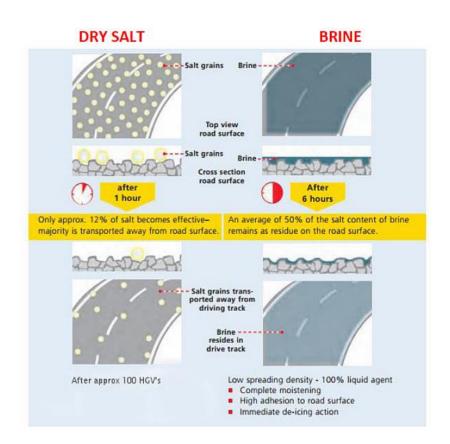
HOW DOES BRINE COMPARE TO DRY SALT?

Brine has many advantages over dry salt. After a short period, the dry salt will begin to dissipate from the road surface mainly due to wind and also being removed by vehicles from the main driving track. Brine effectively coats the road and will not dissipate meaning that far more of the treatment stays on the road. Therefore, it remains effective for much longer.

Dry salt needs moisture to activate but brine is effective immediately especially when the roads are dry. It is instantly active and there is no delay in its effectiveness

As brine is a liquid, it doesn't get bounced around or blown off the roadway while being spread, meaning it can be applied much faster than dry salt.

Brine can be applied up to two days before snow arrives. This is obviously ideal as the ploughs don't need to be driving as often on the dangerous roadways once it starts to snow. This also lessens the service company's payroll costs.











Winter Tech Systems

SYSTEM DESCRIPTION

The BS Series of Salt Saturators consisting of the BS6000,BS6500, BS6800 and BS7000 are all fully featured state of the art machines. Sharing the same control system, each saturator is designed to produce brine for the purpose of Road Surface Condition Management during the winter season, specifically to treat the roads for frost, ice and snow. They are capable of producing brine from sodium chloride, calcium chloride* & magnesium chloride*.

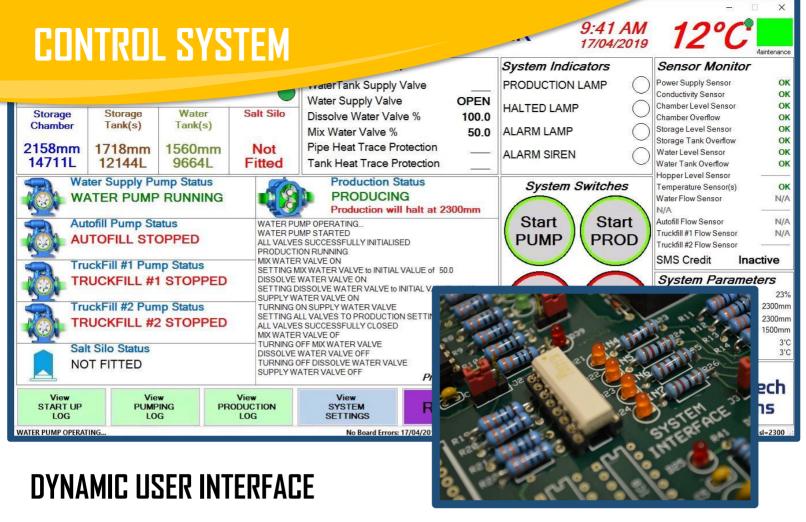
Salt brine is a liquid solution made up of salt and fresh water. The ideal concentration of salt brine for road treatment applications is typically 22-23%. This concentration has been shown to be the most effective in both treating the road surface and also in maintaining the stability of the solution for long term storage.

The control system of the BS Series of Brine Mixing Stations is designed to produce salt brine at this concentration with no user intervention. It does this by using a closed loop control system where the custom designed electronics and software uses Pulse Width Modulation (PWM) to control the valves that supply water to dissolve the dry salt.

FEATURES:

- Fully Automatic Brine Production from mains or harvested water
- Option for automatic Storage Tank Filling and Replenishment
- Option for automatic Salt Storage and loading from integrated Salt Silo
- Production Rate of Between 1,500 & 12,000L/hr (dependent on water supply)
- Pumping Rate of up to 800L/min
- Intelligent Frost Protected Pipework
- Microsoft IoT Based Operating System
- Dynamic User Interface
- SMS Messaging of Salt Status and System Errors
- Pumping & Production Logs (remote viewing)
- Remote Support & Diagnostics





The user interface of the BS Series has been designed to maximise efficiency. Every aspect of the production and pumping processes can be viewed on the 11" display. System information is displayed in real time and also logged continually. All logs can then be viewed locally on the saturator or if you prefer can be viewed remotely from any internet enabled device.

Emphasis was placed on designing a control system that needed very little formal training to operate. The layout of the BS Series software is easy to read and everything is explained through on-site training and in our comprehensive user manuals. BS Series machines ensure that everything is easy to use, both from an operator's perspective and also from a service/maintenance perspective. The entire production and pumping system is controlled by six buttons located on the front of the unit of which typically only one is ever used!

The system software reads data from various sensors on the saturator via the proprietary System Interface circuit board. The board reads inputs from various sensors on the saturator, all of which are optically isolated providing protection from any short circuits or power surges.

The System Interface has also been designed with spare inputs and outputs to allow for potential expansion of your system. Expansion could include extra pumps, valves, truck fill sensors, storage tanks, dosing systems and rainwater harvesting systems, all of which can be provided by WinterTech Systems.





Production on the BS Series is completely automatic. Once the saturator has sufficient salt and a water supply all the operator needs to do is press "Start Production". From here the control system will handle the rest. Brine production begins with the control system dissolving the salt crystals. The brine at this stage is in an unprocessed state and is at about 26-27%

concentration. The control system detects the brine percentage by means of a conductivity sensor located in the production pipework. When the control system detects brine at 26-27% it will open up a proportional valve that adds fresh water to the brine. The fresh water will dilute the concentrated brine until it detects a concentration of 22-23% for winter services use. (The BS series can be configured to produce any concentration of brine you may require from 0-26%). The control system will trigger a Green Strobe to visually display that the system is producing brine.

Production will continue with the control system automatically adjusting the brine percentage until it detects that the storage chamber is full. Production will then automatically halt. In the halted state the BS Series control system will trigger an Amber Strobe to physically display that the Storage Chamber is full. If an operator pumps brine out of the Storage Chamber, the system will leave the halted state and production will automatically re-commence without any user input.



CONTROL SYSTEM

ERROR HANDLING

Most saturators currently on the market give very little feedback during the production and pumping processes. In most cases it is down to the operator to determine any errors that may have occurred. Considering how many components make up a saturator it could take a long period of time before issues are located and fixed.

The WinterTech Systems BS Series software continually checks each sensor during the production process. If it finds any issue it will automatically stop production. When production is stopped it will then display any active problems with the system. This will include a flashing Red Strobe, an Error Message on the screen, a Warning Siren, and a message sent by SMS to any assigned numbers. The error will also be displayed on the Brine Station Back Office software in the customer's office and in our monitoring centre.

Once an error has been rectified the operator can press "Start Production". The control system will run diagnostics and the production process will begin once the system detects that the error has been fixed.

PUMPING BRINE

Pumping Brine from the saturator is simple. All pumping actions are controlled by the buttons on the front of the unit. All pumping choices are relayed back to the user via the software to ensure that they have correctly attached the hose and also to ensure that the valves are in the correct position.

The pump is one of the more expensive components of the system. Pump failure can have a catastrophic effect. To protect the pump, we have put in a number of safety features to protect against human error and system failure.

1. Pump Flow Sensor

Detects if there is brine flowing through the pipes. The pump is stopped automatically if no flow is detected.

2. Pump Timeout

The pump will only run for a safe period of time and then shut off.

3. Valve Position Reminder

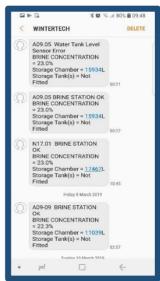
On screen reminder that the valves are in the correct position.

If the BS saturator is configured with storage tanks it will have an additional pump. This pump will automatically fill each storage tank during the production process without any user intervention.

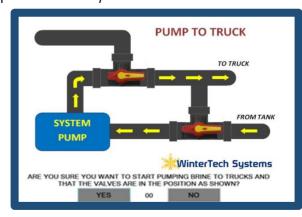


System Watcher
SALT LEVEL LOW - TOP UP











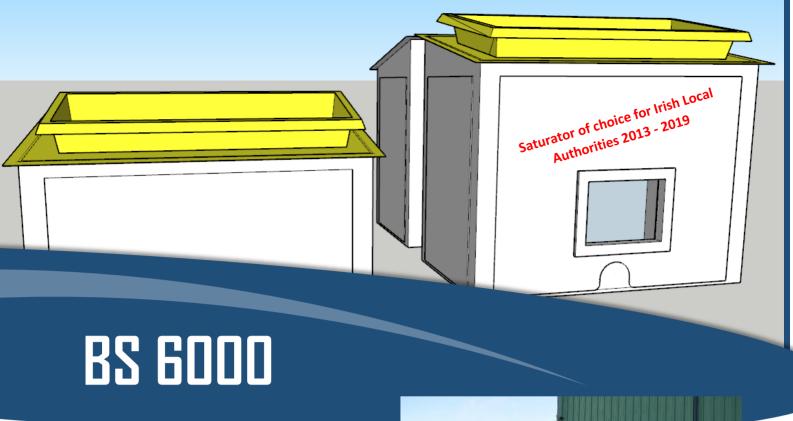
REMOTE SUPPORT, DIAGNOSTICS & OPERATION

One of the most significant features of the BS Series is the remote support capability. Each BS Series saturator can be remotely accessed. This provides huge advantages to both WinterTech Systems personnel and to the end user. From the end user's perspective, the saturator can be operated with the peace of mind that if something goes wrong, they can have a WinterTech Systems technician investigate the problem remotely. Most issues are resolved remotely but if the problem requires it, a depot visit can be made with the technician arriving already knowing exactly what is wrong with the machine. With other salt saturators it could potentially require more than one depot visit in order to diagnose and then to fix a problem. If your salt saturator provider is in a different country to your salt saturator installation it could potentially become a very costly process, even for the smallest of repairs.

WinterTech Systems can also allow the customer to have remote access to the saturator, via the Online Back Office System. This is incredibly useful if you have several saturators in various locations. Combined with the SMS messaging module you will know exactly what the status of each saturator is at any stage. This avoids the necessity of having to physically check each saturator in person to ensure they are operating correctly. In the depths of winter this kind of feature can be invaluable,

Periodic system software updates are necessary for any system and our brine saturator is no different. With competitors' saturators that have no remote support, updating can be an extremely time-consuming process, requiring the technician to note down every parameter and then manually re-enter them after the update. The BS series however does not require a depot visit for a system update. Instead, we can log-in remotely and update the software package. The new software version can be installed in a matter of seconds. The entire update process can be completed in about 2-3 minutes. At worst case, brine production will be stopped for no longer than 5 minutes! This feature also ensures that your machine is always up to date with the latest features and developments.





FEATURES:

- BS Series Control System
- MINI or MAXI option
- Automated Brine Production
- Production Rate of 1.500 to 12.000L/hour
- Pumping Rate of up to 800L/min
- Remote Support Capability
- Intelligent Frost Protected Pipework
- SMS Messaging for Salt Levels, Error and Temperature Monitoring
- Automatic External Storage Tank Replenishment
- MINI Production Chamber Volume: 5000L Gross
- MINI Storage Chamber Volume: 5000L Gross
- MAXI Production Chamber Volume: 8000L Gross
- MAXI Storage Chamber Volume: 8000L Gross
- Material: GRP
- Loading Options: Teleporter, JCB, Silo, Auger, Hand

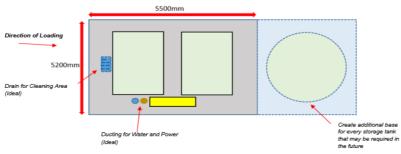


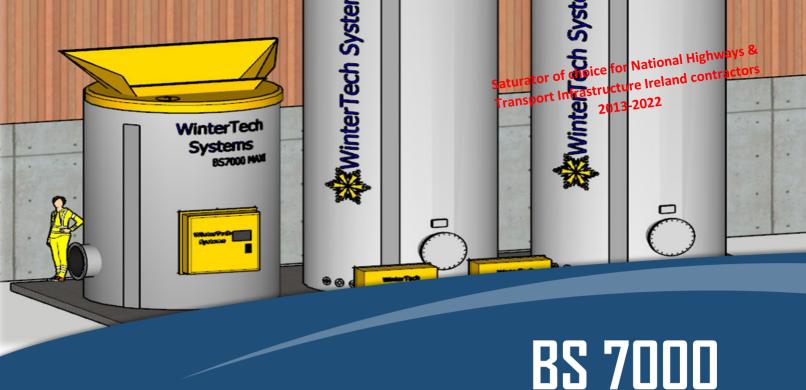
BENEFITS OF THE BS6000

- Low Cost
- Easy to Load
- Easy to Maintain & Inspect
- Modular System

The BS6000 is our entry level brine low-cost saturator. It still, however, contains the same proven BS Series Control System. The internal production and storage chambers are smaller in comparison to the BS7000.

Due to the smaller storage chamber, it is generally necessary to have external storage tank(s) attached to the saturator. This increases the footprint of the installation, however it means that you can have any size storage capacity you may require.







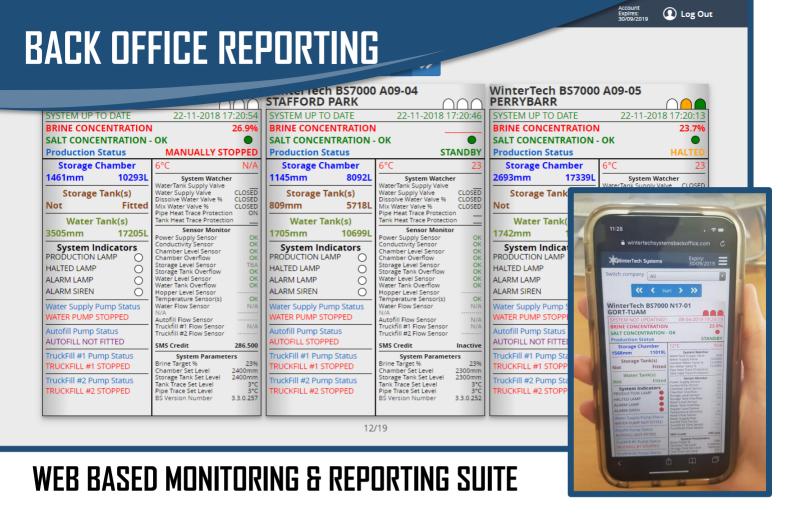
FEATURES:

- BS Series Control System
- MINI or MAXI option
- Automated Brine Production
- Production Rate of 1500 to 12.000L/hour
- Pumping Rate of up to 800L/min
- Remote Support Capability
- Intelligent Frost Protected Pipework
- SMS Messaging for Salt Levels, Errors and Temperature Monitoring
- Automatic External Storage Tank replenishment
- MINI Production Chamber Volume: 3,200L Gross
- MINI Storage Chamber Volume: 10,000L Gross
- MAXI Production Chamber Volume: 5.750L Gross
- MAXI Storage Chamber Volume: 22,000L Gross
- Material: GRP
- Loading Options: Teleporter, Silo, Auger

The BS7000 is our flagship saturator. It contains the proven BS Series control system. The height of this saturator provides extra storage and production capacity. The MINI station provides 10,000L of storage and the MAXI station provides a large 22,000L of internal storage. Additional external storage tanks can be added to create an installation of whatever capacity is required. The vertical cylinder shape means a smaller footprint compared to the BS6000. A teleporter, auger or silo will be

required to fill the unit.

Create additional base for every storage tank that may be required in



Each BS Series saturator can process and transmit live data across the internet. This live data consists of pumping status, production status, and also the current brine content of the saturator's storage tanks. To harness the power of all this data, WinterTech Systems offer a back-office web based monitoring & reporting suite which has the capability of displaying this information in a user friendly interface which is available through any web browser on PC and mobile devices.

Live status of all brine stations in the customer's network in one place.

To ensure 100% brine production resilience, WinterTech Systems have made it possible to view the live status of each brine station in the customer's network all on one screen from any device connected to the internet. This means that salt usage, brine usage, brine concentration, and operator interventions can be monitored without the need for a phone call.

View all current and historical production and pumping logs for all brine stations in the network.

The Brine Station Monitoring & Reporting Suite can display and report from all the stored historical data. This data will enable the user to investigate if the brine station is being used correctly and that the spreading vehicles are using brine. This data can be invaluable if an accident were to occur on the road network. Every event is stored!

View system parameters on all brine stations in the network.

The software settings on each saturator can be checked. This can be useful if the customer requires a setting to be changed. The customer can check that the change was implemented by WinterTech Systems.

Live error logging.

If the brine station enters an error state it will be seen by more than one person and logged even if the error is cleared.

Historical Reporting.

The back-office system also provides reports by depot and by date range on all brine pumped and salt used.

WinterTech Systems can also allow the customer to have remote access to the saturator. This allows the user to remotely stop and start production. In the depths of winter this kind of feature can be absolutely invaluable, especially if you are running a pre wet or full wet brine operation.



STORAGE TANKS

Storage tanks are available in a variety of sizes in either single wall, double wall, or bunded in two materials:

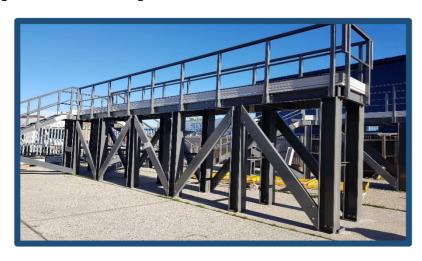
- GLASS REINFORCED POLYESTER (GRP) +20 year Lifespan
- UV STABILISED POLYETHYLENE +5 years Lifespan

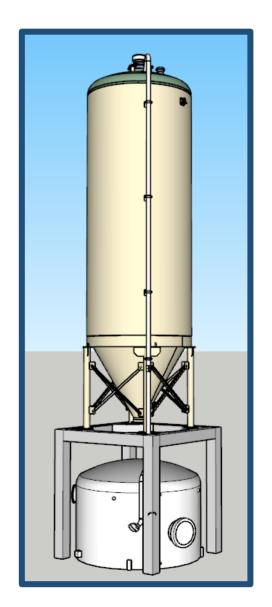
SALT SILOS

Salt Silos are available in a variety of sizes in glass reinforced polyester material and provide many advantages over standard white salt storage and loading

GRP GANTRIES

GRP Gantries can be added to your installation where required. The benefits of building your access gantries in glass reinforced polyester are that the gantries will last as long as the brine station installation and will not weaken





CUSTOMERS

Below are some of the prestigious private companies and local authorities that currently use WinterTech Systems products and services. If you require references from any of our customers, please contact us. **All** of our customers will be very pleased to recommend us.





























































For any further information regarding our company or our products please don't hesitate to contact us. A full price list of our product range can be provided by our sales team who are more than happy to help you with any aspect of our products and services.

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