

DESIGN, INSTALLATION & OPERATION ANALYSIS

WATER DISPENSING STATIONS



Objective

Semi-technical, this overview expands on the Product Information Sheets, to give customers a broad understanding of how the systems are designed and how they can best be operated, giving the longest trouble-free life.

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WATER DISPENSING STATIONS

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Harsh Operating Conditions

Water Dispensing Systems have to work in extremely harsh conditions. The principle concern is heat, but also cold, rain, dust and insect infestation.

The equipment is designed to withstand such abuse, but understanding some of the mitigation measures gives users a needed level of confidence. More importantly, decisions by customers form part of the mitigation process, for example, the colour of the machine.

Machine Colour

Dark colours absorb heat, light colours reflect heat. Customers should choose a light colour, or stick with Abberfield's default colour of Acid Green, which stands out yet does not look out of place in most application environments.

Machine Placement

Preferably face the machine south, certainly try to avoid facing west, as in the later afternoon the sun will shine under the cabinets sun-shield and this increases the absorption of radiant heat. Machine location is a prudent precaution and additional heat mitigation measures can be implemented. Even so, of the first machines installed, many faced west and used the first generation electronics, which for other machines have been superseded with more robust alternatives. These machines have performed well for over eight years before the additional heat mitigation measures were fitted.

The data communication is by 3G/4G wireless and signal strength needs to be considered. Telstra is the chosen carrier as they have the best coverage in rural communities. The location of the nearest Telstra tower can be found on the internet.

In poor signal areas it is preferable to have the Telstra tower behind or to the side of the Tanker Filling Station as the arrival of a water tanker can mask the communication signal, since they are large metal structures.

If reception is doubtful higher gain antennas can be used.

Telstra can also install a local area transmitter to not only support the Tanker Filling Station, but also the surrounding community.

Site Visitation

Since Abberfield have been established for fifty years many tradesmen are now retired and travel widely. Some act as ambassadors and can check on the operation of installed equipment. Some are qualified to affect maintenance or repairs and others can report to Abberfield on any support Abberfield needs to provide.

Heat Mitigation

Water Filling Stations are usually installed in locations of direct sunlight, without any form of shading. The

operating temperature of the electronics is extreme and considerable engineering is employed to allow reliable operation.

Lighter colours will better reflect the excess sun's rays. It is recommended that dark cabinet colours are avoided, bright colours should be chosen with acid green the default colour.

It is also highly recommended that trees are planted adjacent to the Filling Stations, to provide shade, particularly from the midday or afternoon sun.

Better still would be shelter over the cabinet, although with over 300 installations to date, none have a shelter.

The primary heat mitigation is based upon creating a "thermos flask" machine concept.

Within the cabinet there are multiple layers of framework and air insulation barriers; the top sun-shield, the outer cabinet and inner cabinet and the housings around each part of the electronics. This has the effect of slowing down the heat rise of the inner contents during the day and storing heat during the night. The objective is to **average** the heat of day and night. Certainly the worst of the hot summer day is avoided and conversely the worst of the frigid night is also avoided.

Further levels of insulation can be added, including heat reflective parts, but these measures have not been found necessary.

Sealed Modules

Each of the electronic parts, power supply, configuration module, controller and battery pack, are all sealed in their own plug-in metal housings.

There are many reasons, including:

1. Allowing modular exchange by unskilled staff.
2. Creating an additional heat barrier.
3. Avoiding air exchange when the cabinet door is open. Therefore the water content of the air surrounding the electronics remains effectively zero and corrosion of the parts does not occur.
4. Keeping insects and other animals out.

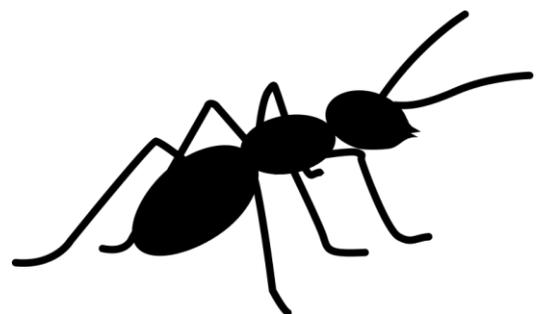


Insect Repellent

Insects love to invade new homes out of the wind and in relative stable temperatures; all kinds of insects and other creatures; geckos, ants, cockroaches, spiders etc.

Because the electronics are largely sealed, insects do little damage, but there remains a risk. To counter insect infestations Abberfield are experimenting with high frequency oscillators to form part of the electronics. These emit sounds above the frequency heard by the human ear. Their output is limited in volume and housed inside the electronics modules, and will not affect animals outside of the cabinet, primarily dogs and birds.

Machine owners can also assist with a very simple yet very effective deterrent system. Inserting moth balls or similar insect guards within the cabinet will be totally effective. In the heat of summer the moth balls evaporate over time and when expired should be replaced. This low cost, simple solution is highly effective and is definitely recommended. The use of surface spray around the base of the machine also works well.



Quality

Abberfield produce the highest of quality Water Dispensing Stations. Some examples are:

- **Made of stainless steel** they do not rust.
- **All screws, nuts and bolts** are made of stainless steel.
- **Push button contacts** are magnetically operated in an inert gas.
- **Solid brass and stainless steel** kick proof buttons.
- **Enclosed electronics** (no open circuit boards).
- **Wiring harnesses** are effectively eliminated by use of a rear mounted large circuit board.
- **Electronics connections** are in the rigid track work, terminated by circuit board module interface plugs, which eliminates frayed wires and poor termination connections.
- **Gold plated plug connections**, diminished corrosion on the contacts for the life of the product.
- **Plug-in module parts** (power supply, controller, battery, module etc.) allows ease of exchange by unskilled persons.
- **Removable interior assembly**. This internal shell carries the rear-mounted circuit board and houses all of the electronic components. It also facilitates the ease of installation and equipment testing, independent of the mounting cabinet.
- **Top down mounting**. Bolts mounting the cabinet extend from the upper section and secure into the ground plate, placing the cabinet in compression, which dramatically increases cabinet rigidity.
- **Ease of installation** with a separate ground plate, attaching the plumbing. Once installed the cabinet is lifted over and is secured by top down mounting bolts.
- **The ground plate** securing the plumbing is made of 10mm thick stainless steel.
- **Stands securing the plumbing system** are adjustable longitudinally and for plumbing height. The stands are fabricated of stainless steel rectangular hollow section, welded to bottom and top mounting plates.
- **Incorporates a switch board** including; residual current device mains switch, machine electronics switch and an internal power point. This simplifies installation with a single cabinet construction, avoiding the need for an external switch board.
- **Optional inbuilt solar panel**, not visible from eye height, designed for ease of retrofit if subsequently required.
- **The battery box is self-contained** with a charger and battery indicator lights, in one plug-in, sealed metal housing.
- **Switch mode mains power supply** allows for variable mains input, therefore accommodating low voltage and varying voltages experienced in country locations.
- **Switch board and control cabinet** protected by weather shield, security gasket and water gutter.
- **10 point locking system** provides excellent security.
- **Internal full length hinge** provides excellent security.
- **Front door of the plumbing section** is fully removable, giving clear access to the plumbing system.
- **Flow meter** resolution is in one litre increments.
- **Dual plumbing outlets** are standard (80mm and 25mm, or 50mm and 25mm, machine type dependant). Alternate plumbing arrangements are available.
- **Remote monitoring** detects loss of water pressure, battery condition and temperature, as well as the system operations.

Customisation

With in-house design and manufacture Abberfield can configure equipment to meet specific requirements, or design completely different systems.

Installation

Installation of equipment is normally by Council employees or selected contractors, with Abberfield's project management and commissioning support.

If required Abberfield can complete the installation with the company's own team, although best practice is for Abberfield to engage local site contractors, as this best supports the local community.

Made in Australia

The Abberfield Group of Companies are all Australian owned and operated, employing Australian labour. This provides the greatest job security and economic advantage to the Australian Government and citizens.



Partnerships

Enduring relationship[s] often develop between Abberfield's senior staff and their customers.

In cases where mutual respect is earned Abberfield offer a Partnership Agreement, the terms of which are case specific, but generally include customers providing referrals for the equipment and Abberfield extending the equipment warranty by three years.

Whole of Life Warranty

Abberfield have a policy of continual improvement in all of the companies' endeavours, including equipment and services.

To the extent that operating margins, new technology and human resources allow, the equipment will be progressively improved, particularly the electronic devices. These will be upgraded to higher temperature rated devices, even with similarity specification components.

New injection moulded housings will be created to better protect the electronics keeping out insects and moisture and generally improving system functionality.

The modular components of power supply, controller, battery box etc. being 'black boxes' allows on-site exchange by unskilled persons. This allows simply upgrading equipment and as this occurs Abberfield will extend the equipment warranty.

The company has an aspirational objective of whole of life warranty.

Sustainability

Councils and Government Authorities sustainability objectives are well met with the Abberfield Water Dispensing Stations. Modular construction allows enhancement or technology upgrades and the material choice ensures an extraordinary long trouble-free and largely maintenance-free operating life. This equipment will outlast inferior designs and therefore provides the least material input for the achieved whole of life use.

Optional solar panel (inbuilt version or external pole mounted, or both) provides self-contained operation, from a renewable energy.

Dollar Value

With this repair and maintenance support, a system life could be 20 to 40 years (past designs of Abberfield equipment exceed 40 years of sustained use).

Conversely if the cabinets were of painted mild steel and open contact push buttons were used, the equipment life would be less than 5 years. Therefore an Abberfield system would outlast 6 or more low cost machines. Take an Abberfield purchase price and divide it by 6 and the result is the price a lower cost design must sell at to be the same **whole of life cost**.

These calculations exclude the cost of maintaining and constantly repairing an inferior system.

Through these comparisons the Abberfield system can be seen as the **lowest cost alternative**, as well as the highest quality system.



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