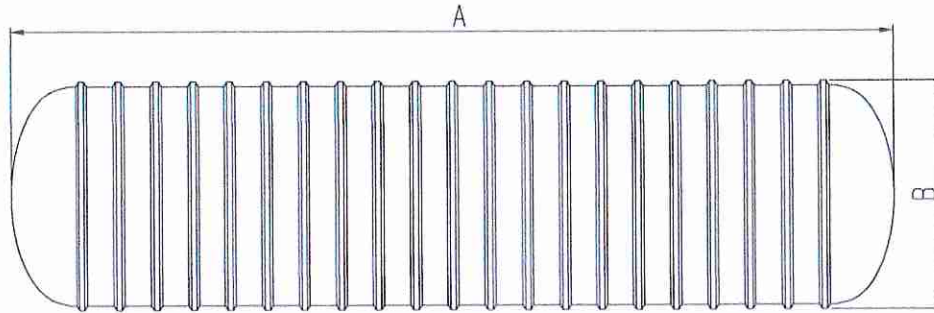


Appendix D

Underground Fuel Tank Details and Specifications

DIMENSIONS AND CAPACITIES



Type	Nominal Capacity Litres	Double Wall Actual Capacity Litres	Length Overall 'A' mm	External Diameter 'B' mm	Double Wall Shipping Weight Kg	No. of Straps
DWII T2	2,000	2,400	1,700	1470	300	2
DWII T5	5,000	5,100	3,300	1470	500	2
DWII T10	10,000	13,200	3,295	2600	1,300	2
DWII T15	15,000	15,200	3,720	2600	1,500	2
DWII T20	20,000	21,300	4,995	2600	1,900	2
DWII T25	25,000	25,400	5,845	2600	2,200	2
DWII T30	30,000	29,500	6,695	2600	2,500	4
DWII T35	35,000	35,600	7,970	2600	2,900	4
DWII T40	40,000	39,700	8,820	2600	3,200	4
DWII T45	45,000	45,800	10,095	2600	3,600	4
DWII T50	50,000	49,800	10,945	2600	3,900	6
DWII T55	55,000	56,000	12,200	2600	4,300	6
DWII T60	60,000	60,000	13,070	2600	4,600	6
DWII T70	70,000	69,400	9,994	3275	4,200	4
DWII T80	80,000	79,200	11,254	3275	4,700	4
DWII T90	90,000	89,000	12,514	3275	5,100	6
DWII T100	100,000	102,000	14,194	3275	5,600	6
DWII T110	110,000	108,600	15,034	3275	6,700	7

Weights, Capacities & Dimensions are nominal only

Custom manufactured tanks can be supplied upon request

Tanks are supplied as standard with:

- Access Manways, Riser and Standard Cover (for pressure systems only)
- Hold Down Straps and Lifting Lugs
- Fill, Dip, Vent, Suction, Spare Point, Dipstick and Striker Plates
- Non Slip Surface on Tank Top • Tag Lines (Guide Rope)

Options and accessories available on request include:

- Water Tight Riser Cover • Dry and Wet Monitoring System • Driveway Covers
- Concrete Anchors and Hold Down Hardware for Bottom Anchoring
- Access Manways, Fabricated Steel Cover complete with 5 Sockets

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Single Wall & Double Wall

Installation Checklist

INSTALLATION SUPPLEMENT – TANK HANDLING DATA

Nominal Diameter mm	Nominal Capacity Litres	Single Wall Actual Capacity Litres	Single Wall Shipping Weight Kg	Double Wall Actual Capacity Litres	Double Wall Shipping Weight Kg	Length Overall mm
1470	2,000	2,500	150	2,400	300	1,700
1470	5,000	5,300	300	5,100	500	3,300
2600	10,000	13,500	900	13,200	1,300	3,295
2600	15,000	15,600	1,000	15,200	1,500	3,720
2600	20,000	21,800	1,300	21,300	1,900	4,995
2600	25,000	25,900	1,500	25,400	2,200	5,845
2600	30,000	30,000	1,700	29,500	2,500	6,695
2600	35,000	36,200	1,900	35,600	2,900	7,970
2600	40,000	40,300	2,100	39,700	3,200	8,820
2600	45,000	46,500	2,400	45,800	3,600	10,095
2600	50,000	50,600	2,600	49,800	3,900	10,945
2600	55,000	56,800	2,900	56,000	4,300	12,200
2600	60,000	60,900	3,100	60,000	4,600	13,070
3275	70,000	69,900	2,200	69,400	4,200	9,994
3275	80,000	79,800	2,600	79,200	4,700	11,254
3275	90,000	91,600	2,900	89,000	5,100	12,514
3275	100,000	102,000	3,100	102,000	5,600	14,194
3275	110,000	111,200	3,300	108,600	6,700	15,034

INSTALLATION CHECKLIST:

Single Wall and Double Wall Underground Fibreglass Storage Tank(s)

The installing contractor must read the installation manual and complete and return this checklist within 30 days after the date of installation to validate the Tank Solutions warranty. The tank owner must retain a copy of this checklist and a copy of all deviation authorisations to substantiate any warranty claim.

Date of Installation _____ Tank size and capacity _____

Tank Type (Please Circle) [SW] [DW] - [SC] [DC] [TC] Tank Number _____

Site Owner _____

Site Address _____
Street City State Postcode

Installing Contractor _____

Contractor Address _____
Street City State Postcode

Supervisor On-Site _____

Single Wall & Double Wall

PRE INSTALLATION

Verified By: _____

- 1) Visual Inspection. No evidence of damage (holes, cracks, gouges) in tank (document any damage found)
- 2) Brine Tanks:
 - A) Check and record brine level in reservoir
 - B) Check for brine inside tank
- 3) Physical Test. Pre-installation air/soap test completed in accordance with installation instructions
- 4) Backfill material (*indicate which type*)
 - A) Crushed stone or pea gravel as specified by FTS
 - B) Other / describe (requires specific approval by FTS)
- 5) Excavation. Hole dimensions are correct as per installation instructions for appropriate conditions
- 6) Internal Measurement. The inside diameter of the tank has been measured and documented.
(Dimension "A" Below)
- 7) Filter Fabric Utilised. (*Indicate one*)
 - A) Yes
 - B) No
- 8) Hole Condition (*Indicate one*)
 - A) Dry hole. Water not anticipated to reach tank. Area not subject to flooding
 - B) Wet hole. Excavation may trap water. Area subject to flooding.
- 9) Traffic Loads. (*Indicate one*)
 - A) Traffic loads anticipated
 - B) No traffic loads
- 10) Anchoring. Performed in accordance with installation instructions.
 - A) Concrete Anchors
 - B) Full slab

Verified By: _____

DURING INSTALLATION

- 11) Backfill material bed is level and is a minimum of 300mm deep, over native soil or slab, before setting tank
- 12) Tank spacing. Tanks are spaced correctly from each other and excavation walls according to instructions
- 13) Visual Inspection. No evidence of damage found after setting in hole
- 14) Straps and tie-downs positioned and secured according to installation instructions
- 15) Backfill compacted. Material has been tamped and/or compacted to fill all voids around tank
- 16) Tank properly ballasted during backfilling
- 17) Tank (s) buried at proper depth to conform to appropriate conditions, (wet, dry, traffic or not)

Verified By: _____

POST INSTALLATION

- 18) Pressure Test. Air/soap test completed according to installation instructions (Section 9)
- 19) Internal Measurement. The inside diameter of the tank has been measured and documented.
(Dimension "B" Below) (Section 13)
- 20) Brine Tanks:
 - A) Check and record brine level in reservoir
 - B) Check for brine inside tank

MEASUREMENT OF DEFLECTION

All tanks must be measured to determine vertical deflection. Follow deflection measurement instruction in the installation manual. An initial deflection measurement is taken and recorded as a point of reference. Subsequent measurements show tank deflection and can be compared to the table below. Take each measurement from the same fitting using the same procedure.

Tank Diameter mm	Maximum Deflection mm	Nominal Inside Diameter mm	
		SW	DW
1470	19	1440	1440
2600	30	2466	2452
3275	38	3150	3134

***Note: If Deflection is 75% of Maximum
notify Tank Solutions Technical Department**

Measurements

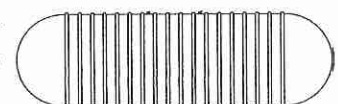
I.D. before backfilling (A) _____

I.D. after backfilling (B) _____

DEFLECTIONS (A) – (B) _____

Measured at: ☐ End ☐ Centre

Verified By: _____



**Mark Location of
Deflection Readings**

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Technical Data Sheet

F 980 REV D

DOUBLE WALL FIBREGLASS STORAGE TANKS

Tank Solutions Pty Ltd is the market leader in the manufacture of Double Wall Fibreglass Storage Tanks.

Our Double Wall Fibreglass Tanks offer a full 360-degree secondary containment with a variety of monitoring devices, which can be installed in the interstitial space between the two walls. Due to the unique integral rib design, Double Wall Fibreglass Tanks are the strongest, most robust underground tanks available. They are rust-proof, maintenance free and formulated to be compatible with all petroleum fuel products, alcohols and alcohol-gasoline mixtures. By choosing a Tank Solutions Double Wall Fibreglass Storage Tank, you can be assured of maximum protection in the unlikely event of a leak in the primary wall therefore preventing ground water contamination. Capacities range from 2,000 litres to 110,000 litres.

Double Wall Multi-Compartment tanks are also available in a wide variety of sizes and feature a choice of two or three completely separate compartments within one tank. This enables the storage of multiple products within the same tank.

DOUBLE WALL FIBREGLASS TANK FEATURES

Suitable for a wide range of liquids:

- Petroleum, Petrochemical and Chemical applications

Strength, Durability and Safety:

- All Tank Solutions Fibreglass Tanks are constructed of virgin resin and glass fibre reinforcement
- All Tank Solutions Tanks incorporate integral ribs for maximum strength
- All Tank Solutions Fibreglass Tanks undergo stringent testing during manufacture
- All Tank Solutions Tanks carry a 30 year warranty against structural failure, internal and external corrosion

A standard of consistent quality:

- Manufactured to meet or exceed industry and statutory requirements:
 - UL 1316
 - AS1692

COMPANY FEATURES

- Australian owned and operated
- Application and installation technical support
- Extensive manufacturing experience
- Full range of optional equipment and accessories to suit the complete project

Backfill Guidelines

F 907 Rev B

BACKFILL MATERIAL – CRUSHED STONE OR PEA GRAVEL

The backfill material surrounding a Fibreglass tank is a critical part of the installation. This data sheet provides guidelines for choosing the best material when installing Fibreglass tanks.

Tank Solutions Pty Ltd recommends that either crushed stone or pea gravel is used as a backfill material.

1. **CRUSHED STONE** should be washed and free flowing. Angular particle size should be between 10 mm and 14 mm.
2. **PEA GRAVEL** (rounded particles, river gravel deposits) must have a nominal diameter of 10 mm and a maximum diameter of 20 mm.

Australian Standards AS2758.1, AS1141.11, AS1141.12, AS1141.24 and AS1141.34 have been used to specify the aggregate required for backfill.

The standard sizes of coarse aggregate that meet Tank Solutions' crushed stone or pea gravel specifications are given in the table on the back page of this data sheet.

Suppliers should be able to provide a specification that identifies the size or gradation of the material. If a specification for the material is not available, an independent testing laboratory can provide a sieve analysis on a sample of the backfill material. The sieve analysis or material specification can then be compared against size requirements for the crushed stone or pea gravel.

WARNING: An important characteristic of good backfill material is hardness or stability when exposed to water or loads. Most materials have no problem meeting the hardness requirement. Materials like soft limestone, sandstone or shale should not be used as backfill because they break down over time.

If in doubt about backfill, contact Tank Solutions Pty Ltd.





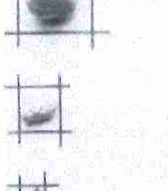

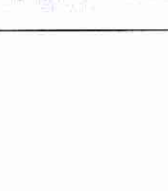
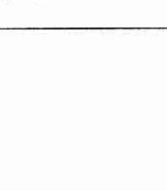


Single Wall & Double Wall

STANDARD SIZES OF COARSE AGGREGATE THAT MEET CRUSHED STONE OR PEA GRAVEL SPECIFICATIONS

The first column of each table identifies the standard sieve sizes that are used to grade aggregate material. The remaining two columns have a standard aggregate size range.

For each aggregate size, the amount of material finer than each laboratory sieve (square openings) is given as percentage of the total weight of the sample. These percentages give an indication of the particle size distribution within the given aggregate size.

For example: 20 mm pea gravel aggregate size, 20% to 55% of the sample (measured by weight) should pass through a 13.2 mm sieve.

Crushed Stone				Pea Gravel			
Sieve Size		Aggregate Size		Sieve Size		Aggregate Size	
		14mm	10mm			20mm	10mm
	19 mm	100 %	100 %		19 mm	90 to 100 %	100 %
	13.2 mm	90 to 100 %	100 %		13.2 mm	20 to 55 %	90 to 100 %
	9.5 mm	40 to 70 %	85 to 100 %		9.5 mm	0 to 15 %	40 to 70 %
	4.75 mm	0 to 15 %	10 to 30 %		4.75 mm	0 to 5 %	0 to 15 %
	2.36 mm	0 to 5 %	0 to 5 %		2.36 mm	-	0 to 5 %

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Single & Double Wall

Specification and Performance Warranty

Guide Specifications For Single and Double Wall Fibreglass Reinforced Plastic (FRP) Underground Storage Tanks.

SHORT FORM:

Tank Solutions Pty Ltd will provide Single or Double Wall Fibreglass Reinforced Plastic (FRP) Underground Storage Tanks as shown on the drawings. Sizes and fittings shall be as shown. The tanks will be fibreglass tanks as manufactured by Tank Solutions, under licence to ZCL Corporation of USA. Tanks will be tested and installed with crushed stone or pea gravel as specified in the current installation instructions provided with the tank.

LONG FORM:

1.0 General

1.1 Quality Assurance

- A. Acceptable Manufacturer: Tank Solutions Pty Ltd
- B. Governing Standards as applicable:
 1. AS1692 CAT.4 TANKS
 2. Underwriters Laboratories Inc. (UL) Standard for safety 1316. File MH 9061 (N) for storage of flammable liquids.

1.2 Submittals

- A. Shop Drawings: Tank Solutions will submit a general arrangement drawing for each tank. Drawings will show locations of all fittings, accessories and critical dimensions.
- B. Catalogue Data: Installer will submit one copy of manufacturer's literature to include one copy of manufacturer's current installation instruction.

2.0 Products

2.1 Single and Double Wall Fibreglass Reinforced Plastic (FRP) Underground Storage Tanks

Note that Double Wall tanks will have space between the primary and secondary shell walls to allow for the free flow and containment of all leaked product from the primary tank. The space also allows the insertion of a monitoring device through a monitoring fitting. Each monitor fitting will consist of a 100mm BSP fitting on the secondary tank.

- A. Loading Conditions - Tank will meet design criteria below:
 1. Internal Load: Tank will withstand without leakage a 35kPa .35153 kg/cm² pressure test. Installer will test prior to installation as this test is to test for leakage.
 2. Vacuum Test: Every tank will be tested to 266 mm mercury vacuum by the tank manufacturer to assure structural integrity.
 3. Surface Loads: Tank will withstand surface H-20 axle loads when properly installed according to current manufacturer's installation instruction.

4. External Hydrostatic Pressure: Tank will withstand 2133mm burden with the hole fully flooded with a 3:1 safety factor against buckling.
5. Tanks will support accessory equipment i.e. drop tubes, submersible pumps and ladders when installed according to tank manufacturer's recommendations and limitations.
6. Striker plates will be installed under each service fitting and manway opening.
7. B.S.P. Threaded Fittings.
 - (i) All threaded fittings will be of a material of construction consistent with the requirements of AS1210 and located as per drawings.
 - (ii) All standard threaded fittings will be B.S.P. sockets and will be 100 mm diameter. Reducers are to be used for smaller sizes where shown and provided by installer.

B. Product Storage:

1. Tanks will be capable of storing petroleum products with a specific gravity up to 1:1; and will be chemically inert to petroleum products.
2. All tanks will be vented to atmosphere. Tanks are not designed as pressure vessels.
3. Tanks will be capable of storing petrol products, ethanol petrol blends up to 100%, jet fuel, av-gas, kerosene, diesel, motor oil; water and sewage at ambient underground temperatures.

C. Materials: Tanks will be manufactured with 100% resin and glass fibre reinforced with no sand fillers.

D. Tank Dimensions (Refer Tank Solutions literature).

E. Webbing straps with "man out of hole" binding straps provided as standard. Number and location of straps to be determined by manufacturer. Straps will be capable of withstanding the buoyancy load of the tank diameter.

2.2 Optional Accessories

A. Manholes:

1. All manholes to be flanged at 600 ID complete with Australian Standard listed gaskets, black bolts and covers. For larger tanks 700NB manholes are available.
2. Location as shown on drawings.

B. Manhole Risers - Provide fibreglass manhole risers (not attached to manholes) to permit access to manhole. (Street box at grade level to be furnished by others).

C. Fill Tubes - Can be Aluminium and factory installed by manufacturer (optional).

1. Location as shown on drawing.
2. Aluminium tubes shall be 100 mm diameter with 100 mm threaded fitting.

D. Ladders - Will be standard ladder as supplied by tank manufacturer (aluminium).

3.0 Execution

3.1 Installation and Testing

Tanks will be tested and installed according to current installations instructions provided with the tank. (Refer to Tank Solutions Fibreglass publication and include as part of specification).

Single & Double Wall

PERFORMANCE WARRANTY

Tank Solutions Pty Ltd warrants that our underground storage tanks, if used in accordance with our specifications and installed according to our published installation instructions:

1. Will not fail for a period of thirty (30) years from date of original delivered by Tank Solutions due to internal corrosion, provided the Tank is used solely, with or without tank water bottoms, to store the following products at ambient temperature, or fuel oils at temperature not to exceed 150°F:
 - a. Gasoline, jet fuel, aviation gasolines, motor oils, motor vehicle waste oils, kerosene, diesel fuels, or fuel oils
 - b. Alcohol, alcohol-gasoline blend, and oxygenated motor fuels
 1. Ethanol and ethanol blends
 - 100% ethanol
 - E10 (90% gasoline and 10% ethyl alcohol)
 - E85 (85% ethanol and 15% gasoline)
 2. Methanol and methanol blends
 - 100% methanol
 - M85 (85% methanol and 15% gasoline)
 3. Other oxygenated fuels
 - gasoline with up to 20%, by volume, of methyl tertiary butyl ether (MTBE), ethyl tertiary butyl ether (ETBE), di-isopropyl ether (DIPE), tertiary amyl methyl ether (TAME), or tertiary amyl ethyl ether (TAEE).
 - c. Blended fuel up to 20% by volume of refined Bio diesel as defined by:
 1. ASTM® D975-08a (diesel fuel oils)
 2. ASTM® D396-08b (fuel oils)
 3. ASTM® D7467-08 (diesel fuel oil and biodiesel blend B6-B20)
2. Will not fail for a period of thirty (30) years from date of original purchase due to internal corrosion, provided the tank is used solely for the storage of petrol products, jet fuel; av-gas; kerosene; diesel; motor oil; water and sewage at ambient underground temperatures.
3. Will not fail for a period of thirty (30) years from date of original purchase due to structural failure (defined as breaking or collapse) provided the installation is performed and validated by a qualified installation contractor and the tank is used as stated above
4. Will meet our published specifications and will be free from material defects in materials and workmanship for a period of one (1) year following date of original delivery by us

If any tank(s) is to be removed from an installation, moved to another location and is intended for active service at a new location, the tank(s) must be recertified by Tank Solutions in order to maintain the warranty as originally extended. The foregoing warranties do not extend to tank failures caused by earthquakes, hydrological or geological changes or other extraordinary natural forces which may act upon the Products.

Tank Solutions liability under this warranty shall be limited to, at Tank Solutions option:

1. Repair of the defective product
2. Delivery of a replacement product to the point of the original delivery, or
3. Refund of the original purchase price,

and we shall not be liable for any labour, other installation costs, indirect or consequential damages or other damages in connection with such tanks. A claim must give Tank Solutions the opportunity to observe and inspect the tank prior to removal from the ground or the claim will be barred. All claims must be made in writing within one year of tank failure or be forever barred.

The foregoing warranty constitutes Tank Solutions exclusive obligation and Tank Solutions makes no warranty or representation, express or implied, with respect to the product or any service, advice or consultation, if any, furnished to customer by Tank Solutions or its representatives, whether as to merchantability, fitness for a particular purpose, or otherwise the remedies set forth in the above warranties are the only remedies available to any person for breach of the warranty or for breach of any covenant, duty, or obligation on the part of Tank Solutions hereunder, Tank Solutions shall have no liability for incidental, consequential or punitive damages of any description, whether any such claim be based upon warranty, contract, negligence, strict liability or other tort, or otherwise.

This Warranty Is Only Valid If The Installation Checklist Is Returned to Tank Solutions Within 30 Days Of The Initial Installation Of The Tank.
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