

Shipping Containers for Frog and Tadpole Husbandry

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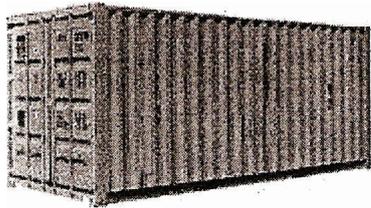
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The Container

Dimensions and availability

Shipping containers are available in 20 and 40 foot lengths. We use a 20' container at Taronga.



STANDARD 20'

INSIDE LENGTH	19'4"	5.89 m
INSIDE WIDTH	7'8"	2.33 m
INSIDE HEIGHT	7'10"	2.38 m
DOOR WIDTH	7'8"	2.33 m
DOOR HEIGHT	7'8"	2.28 m
CAPACITY TARE	7'6"	33.18 m ³
WEIGHT MAX.	1,172 ft ³	2,229 kg
CARGO	4,916lb	21,727 kg
	47,999lb	

Taronga's 20 foot container

External dimensions: Length = 6100 mm, Width = 2450mm, Height = 2430mm. This is a 'N.O.R.' (Non-Operational Refrigerated) insulated container with stainless steel internal walls with an up-to-date CSC plate (registration for road or rail transport). It has an aluminium ribbed floor. Price about \$3000 - 4000, plus delivery.

Internal dimensions: Length = 5750mm, Width = 2290mm, Height = 2170 mm.
Length of back wall from open door edge = 4705mm.

Transport

A 20' container can either be delivered with a side-crane truck or on a standard truck with the aid of a crane. Ensure road access and sufficient unloading space are available prior to site preparation.

Footings and site preparation

Power, water and drainage should be in place prior to delivery. Footings are required on each corner only, each a pylon consisting of 4 cemented bricks, and levelled to drain to double-door end. Preferably mount container in full shade, or at least with the viewing window side facing due south. If the container is to be a public display, reflection on the viewing window will be a problem if in direct sun. Some sort of shading will be required.

Level concrete slab; Minimum of 2.4 x 1.1m slab at the rear of container is needed for water storage tank, Air Con. condenser and water pump.

Installation of door and viewing windows

An additional standard door is needed in back wall for ease of entry. Ours is made from the cut-out pieces (removed using a grinder with a cutting disk) and is 1940mm

high, 860mm wide, 80mm thick and opens outwards. It is set 195mm from back end wall, with a 120mm step-up from floor. The four exposed edges are closed in with aluminium flashing (to keep insulation material inside), and riveted outside & inside. Two 'left handed' hinges on the outside suffice. Door also needs a single eye pad bolt (- 150mm) and padlock for locking.

Taronga viewing windows: We have two viewing windows, the larger one is double glazed and 1800 X 900mm (i.e. 1975mm of container wall on each side); so Work Bench should be 1800 + 1000 for a sink + maybe 200mm extra non-sink end = 3000mm bench (includes sink at non-visible end, and 250mm extra on other side). So shelves on one side max 1 725mm long, on sink side max 975mm long.

A smaller double glazed viewing window is 850 x 700mm and mounted to the left of the larger viewing window. The lower edge of both windows are 860 mm from the outside base of the container and public walkway, which allows small children to look inside. Like the door above, windows are cut out cut-out using a grinder with a cutting disk and exposed container edges closed in with aluminium flashing (to keep insulation material inside), and riveted outside.

The container comes with a circular **ventilation hole** high in the end wall (opposite end to double doors), and is 250mm diameter. Needs to be covered with fine wire mesh.

Water Supply

Taronga Filtration System

The system below is used for all amphibian water used in the Reptile Building, however the Corroboree frog container has its own Reverse Osmosis water system, which we do not recommend.

Sydney water enters the system via an on-demand float valve into a 1200 L water storage tank which is located outside the container. Water is recirculated from this through a 'Rainbow Lifeguard' model M-6 modular mechanical filter, which can take up to 17033 Llh. The M-6 filter has six ~ 70 cm tower compartments, the first three are filled with up to 680g activated aquarium filter carbon (Aquasonic). The next three chambers have pleated paper filter cartridges which filter down to 5 micron size particles. The water is forced through this under pressure of around 150 psi. After leaving the filters all water is passed through a 'Rainbow Lifeguard' UV filter model QL - 80, at up to 11350 Llh. This comprises of two - 70 cm towers, each . containing a 40 watt UV tube, i.e. 80 watts of sterilization.

Water is then sent back into the storage tank, or removed at this point for piping to frog tanks. We use a Lowarra 4HM7 pressure pump connected to a Lowara Dominator pressure switch, to transfer water to all areas required.

Note that all water passes through the entire filtration system above (including UV) before it goes to any frog tank. When water is being removed for use new town water automatically enters the on-demand float valve, so a small percentage of this water may have only been filtered once. The total water volume in the storage tank is being recirculated at approx 11 times per hour, or 264 times per day by a Waterco

Supastream 075 pump which can pump up to 260l/min 15,600 l/hr (See web site for any particular specs, www.waterco.com).

Temperature Control

Taronga refrigeration system and control unit.

Climate control software

Control Unit is an Emerson Climate Technologies E2 RX 100 Refrigeration Controller (from CPC Computer Process Controls, Kennesaw, GA, USA). To supply and install the CPC Einstein controller is \$2650 + GST. Additionally to supply and install a flashing alarm light to the roof of the container and wire to alarm relay is \$370.

This software has a number of features including:

- The ability to set variable temperatures during the day using different schedules (i.e. different day and night temperatures).
- Hi and Lo case alarms to be triggered if the temperature falls outside of the desired range.
- The ability to view temperature graphs for the most recent 48hr period on the unit screen.
- Connectivity to a working computer. With installation of the appropriate software, the control unit can be accessed via the user's PC. From the PC, this allows for full control of the unit, ability to graph temperatures over a 6 month period and alarm warning to be viewed should the temperature fall out of the desired range.

Fan-motor - Hitec Lu-Ve Contardo unit, Model SHDS 74 N 32, 85W and 0.31 A unit.
Compressor - ACC Compressor, Model R404A.

Day length variability option and temperature alarm

Lighting

All lighting in the container is governed by natural photoperiod through the use of a photo-electric (PE) cell. As PE cells are programmed to turn lights on upon dark, a relay must be wired in to achieve the alternate affect, with lights on during daylight hours. Within the container, a twin fluorescent light, weatherproof batten fixed to the roof of the container can be hard-wired in to the lighting circuit. All lighting above cage banks should be powered via red GPO's.

Temperature alarm lighting cut-off

As a protection measure, a relay should be installed to allow for an automatic cut-off of power to the lighting circuit (Red GPO's) should the temperature alarm be generated. This ensures the turning off of heat generating devices in the container should the refrigeration fail. Fluorescent lighting alone in the container will permit the temperature to rise at least 2 degree Celsius an hour without refrigeration. If unchecked, this can rise to fatal levels in a number of hours

Container Internal Fit Out

Shelving and Shelf lighting

We use adjustable cold room shelving, which can be ordered in stainless steel, Bright Zinc (galvanized) or powder coated, with standard or *50mm* x *50mm* angle beams (to carry extra weight). One company (BOS Pty Ltd) supplies in the following specifications:

Height	Lengths	Widths
1350mm	600mm	300mm
1800mm	750mm	375mm
2000mm	900mm	450mm
	1050mm	525mm
	1200mm	600mm
	1350mm	
	1500mm	
	1650mm	
	1800mm	
	1950mm	
	2100mm	
	2250mm	
	2400mm	

Lights: Twin 36W weatherproof battens. Uses 4' tubes, batten external length is 1290mm and 100 deep (including tubes). Approx \$70 each.

Need 4 per shelf on back wall of 20' container, adjust height above trays/tanks with 'jack-chain'. For tadpole trays we use one ordinary daylight and one 'NEC 'Blacklight' tube mounted in each batten, and have tubes 150mm above the tadpole water. Remove clear plastic cover if UV is required for tadpoles.

Automatic watering systems

Frog Tanks

For flexible, general purpose frog holding, in future we will probably use front opening Exo-Terra 18 x 18 x 18' glass tanks, plumbed with a drainage hole in the base into the waste water system. These fit onto the shelving, and can be removed when not required. Regular water changes can easily be supplied via commercial irrigation piping, controlled by a manual or automatic timer. This is the same system (and plumbing) used for the tadpole rearing trays below.

Tadpole Trays

We now grow our tadpoles in shallow trays for most purposes. Currently we use plastic 23 L opaque crates (external dimensions 610 X 410 X 130mm deep), and plumb with a waste water overflow at the front so that water in the tray is 30mm (or

40mm) deep. Water from our filtration system enters at the back of each tray via commercial irrigation piping, controlled by a manual (eg. Pope 'Simple Set Duo Dial' two channel timer) or automatic timer.

Plumbing required for frog tanks and tadpole trays

Electrical connections and power requirements

- Power supply to container requires a 6mm sub-mains cable.
- The electrical board within the container is a 63A, 12 pole weatherproof board (IP54 Dust resistant splash proof). A 12 pole board is recommended to allow for the various circuits required.
- Switches- The switches for the following circuits are required:
 - Mains switch - 60A
 - Red GPO's (lights) + PE Cell- 20A
 - White GPO's (pumps and internal UV filters) - 20A
 - Refrigeration - 20A
 - External water filtration - 20A

Power needs associated with the container -

Refrigeration

- Climate control computer
- External water filtration (Pressure pump, re-circ pump, 2 x UV sterilisers)
- Internal. water filtration (Water pumps x 9, UV filters x 9)
- 36W lights x 13

Powerpoints required

Internal

Front wall - 2 Red double GPO's - one above each bank to control lighting dictated by the photo-electric cell.
 - 3 White double GPO's - One above each bank and one above the working area. These have power supply 24hrs and will supply power to pumps and UV filters.

Rear wall - 2 Red double GPO's - one above each bank to control lighting dictated by the photo-electric cell.

- 2 White double GPO's - One above each bank. These have power supply 24hrs and will supply power to pumps and UV filters.

External

8 Weatherproofpowerpoints are required a secured box. The use for these powerpoints is listed below. Please note, the refrigeration and computer software may alternatively be hard-wired.

- 1 x Refrigeration
- 1 x Climate control computer
- 1 x Pressure pump
- 1 x Water Re-circ pump
- 2 x UV Sterilisers
- 2 x Spare

APPENDIX

Some Costs and Suppliers of items mentioned in the text

The Container

Viewing Windows and Door.

Double glazed window filled with argon gas 1800mm x 900mm x 100mm aprox \$1200.

Price varies on size, size made to order. This is just one supplier, price may vary from others. Precision installations (Speak to Vic on 0418605831)

Water Supply

Taronga filtration system Bushman's

1200L water tank T260 \$

Bushman NSW 026361 8750, (www.bushmantanks.com)

Water co pump and Water co Supastream 075 pump (www.waterco.com)

Rainbow lifeguard modular filter M-6 Mechanical life filter \$999.00 plus GST Rainbow life guard UV filters QL - 80 \$695 plus GST. Aqua sonic Ph 02 65 864933 (www.aquasonic.com.au)

Temperature Control

Taronga refrigeration system and control unit.

E2 RX 100 Refrigeration Controller

Supplied and fitted for \$2650 + GST by Knights Refrigeration.

Emerson Climates Technologies Inc.

Day length variability option and temp alarms

Container Internal Fit Out

Shelving and Shelf lighting

Cold Room shelving: Try BDS Pty Ltd, 5/59 Pine Rd, Yennora NSW, 2161.

ph: 02 -9632 4677, fax: 02 - 9632 5066 (see web site:

<http://www.bdsptyltd.com.au/Shiva.html>). Available sizes below; can be ordered in stainless steel, Bright Zinc (galvanized) or powder coated, with standard or SOM111 x SOMm angle beams (to carry extra weight)

Some prices (Nov 07)

1 Bay 2000H x 22S0L x 600W with 3 wire shelves \$538.82

1 Bay 2000H x 21 OOL x 600W with 3 wire shelves .. \$51 0.05

1 Bay 2000H x 16S0L x 600W with 3 wire shelves \$362.36

1 Bay 2000H x 1S00L x 600W with 3 wire shelves \$346.61

I Bay 2000H x 900L X 600W with 3 wire shelves \$259.94

Quotes above (Nov 2007) are for shelves with 50 x 50 angle beams to carry extra weight, with Bright Zinc finish. Delivery is extra & 3 weeks from receipt of order.

I Bay 1800H x 1500L X 375W with 4 wire shelves & standard angle beams & Bright Zinc finish is \$408.00.

Shelf lighting: Waterproof 36W flourescent lamp holders for above-tank/tray fixtures from: TLE Brookvale, NSW, ph: 02 - 9938 3516. (~\$70.00 + GST each)

Automatic watering systems

All internal and external plumbing and irrigation supplied through Reece, cost varies on location, and set up, used pressure PVC pipe fittings for filters. Can use any brand.

Lowara4HM7 with Dominator pressure switch \$

Reece Irrigation plumbing centre, Waterloo Sydney 96997777

www.reece.com.au

Frog Tanks

Frog tanks: Exo-Terra 18 x 18 x 18' glass tanks, plumbed with drainage hole (tank \$93.50 + GST, plus \$20 for hole per tank).

Tadpole Trays

Plastic tadpole trays: we use Ki- Tab 23 L opaque crates with lids; External dimintions 610 X 410 X 130 mm deep (crates \$14.50, lids \$6.0 + GST)

From: Dexion Liverpool (NSW), 2/33 Heathcote Rd, Moorebank, NSW, 2170. ph: 02 - 9600 8443, Fax: 02 - 9602 5347.

Plumbing required for both above, i.e. needs to be adjustable

Electrical connections and power requirements

Electrical connections - These are generic electrical connections including conduit, double GPOs, building wires, breakers, surface mount enclosure, contactor, surface switches and sunset switch (photo-electric cell). Quote - \$1600 ..

From: Quote from Ritera Electrical Gladesville, Unit 22, 43 College St, Gladesville, NSW, 2111. ph: (02) 9879 5444, Fax: (02) 9879 5544