

# REGULATIONS AND COMPLIANCE REQUIREMENTS

**East Coast (ECO) Waste Water Recycling Systems Ltd  
45 Kennedy Road  
Napier**

Building Regulations 1992 and methods of compliance for the waste water recycling system as laid out in the following documentation

## **INTRODUCTION**

The system uses selected waste water in the toilet cistern and reduces household water usage by approximately one third. It will also reduce the amount of water in septic tanks and help prevent overflow problems experienced by some households.

Selected waste water means household water that is least contaminated by fats and dirt i.e. washing machine, bath and shower water. These three produce enough waste water to maintain an adequate supply for toilet use.

It is not recommended that the wash tub, wash hand basins, kitchen sink, garbage disposal units or dishwashers are connected to the system as they contain excess fats, dirt and detergents.

The waste water passes through a filtration system which removes the lint, dirt and majority of soaps. The final filtration before the water enters the toilet cistern is a 50 mesh gauze filter. This prevents any particles not filtered in the primary filtration system from entering the toilet cistern which could upset the operation of the flushing mechanism.

## BUILDING REGULATIONS 1992

Extracts from building regulations as applicable to the Waste Water Recycling System.

### Clause B2 - DURABILITY Provisions

#### OBJECTIVE

**B2.1** The objective of this provision is to ensure that a *building* will throughout its life continue to satisfy other objectives of this code.

#### FUNCTIONAL REQUIREMENT

**B2.2** *Building* materials, components and *construction* methods shall be sufficiently durable to ensure that the *building*, without reconstruction or major renovation, satisfies other functional requirements of this code throughout the life of the *building*.

#### PERFORMANCE

**B2.3** From the time a *code compliance certificate* is issued, *building elements* shall with only normal maintenance continue to satisfy the performances of this code for the lesser of; the *specified intended life* of the *building*, if any, or:

(a) For the structure, including *building elements* such as floors and walls which provide structural stability: the life of the *building* being not less than 50 years.

**Not applicable**

(b) For services to which access is difficult, and for hidden fixings of the external envelope and attached structures of a *building*: the life of the *building* being not less than 50 years.

**Not applicable**

(c) For other fixings of the *building* envelope, lining supports and other *building elements* having moderate ease of access but which are difficult to replace:

**Not applicable**

(d) **For linings, renewable protective coatings, fittings and other *building elements* to which there is ready access: 5 years**

**Compliance**

All waste water fittings such as couplings, bends, Tee's valves and

pipe applicable to this water recycling system are standard plumbing and sanitary fittings and comply with the building standards for durability by the manufacturer. The type used is by Marley N.Z.S. 746. The waste water containers, filters and other fittings are manufactured by the rotary moulding process and are made from Cotene 9036. Polyethylene Cotene 9036 contains a fully formulated long term U.V. stabilisation package.

## Clause G12 - WATER SUPPLIES Provisions

### OBJECTIVE

**G12.1** The objective of this provision is to:

- (a) Safeguard people from illness from contaminated water or food,
- (b) Safeguard people from injury due to the explosion of a pressure vessel or from contact with excessively hot water,
- (c) Safeguard people from ,loss of *amenity* arising from lack of water for personal hygiene, or from a water supply which is offensive in appearance or odour, and
- (d) Ensure that people with disabilities are able to carry out normal activities and function within *building*.

### FUNCTIONAL REQUIREMENT

**G12.2** *Buildings*, provided with drinking water outlets, sanitary fixtures *or sanitary appliances*, shall have a safe and *adequate* piped water supply.

### PERFORMANCE

**G12.3.1** Piped water supplies intended for human consumption, food preparation, utensil washing or oral hygiene should be potable.

**Not applicable**

**G12.3.2 Piped water supply and outlets provided with non-potable water shall be clearly identified.**

#### **Compliance**

Piped water supply and outlets into toilet cisterns will be labelled with the notation: “Recycled water, for toilet use only”.

**G12.3.3** *Sanitary fixtures* and *sanitary appliances* shall be provided with hot water when intended to be used for:

- (a) Utensil washing, and
- (b) Personal washing, showering or bathing.

**Not applicable**

**G12.3.4** Where hot water is provided to *sanitary fixtures* and *sanitary appliances*, used for personal hygiene, it shall be delivered at a temperature which avoids the likelihood of scalding.

**Not applicable**

**G12.3.5** *Water supply systems* shall be installed in a manner which:

- (a) **Avoids the likelihood of potable water contamination within both the system and the *water main*,**

#### **Compliance**

The waste water supply to the toilet cistern enters from the opposite side to the mains water supply. There is no physical connection between the waste water or the mains potable water. The mains water inlet valve is above the water level when the

cistern is full, thus forming an air gap of approximately 50 mm. The cistern cannot be overfilled and the gap reduced because of the toilet cistern's overflow construction. When the waste water cistern is in operation, the mains water supply valve is turned off.

- (b) **Provides water to *sanitary fixtures and sanitary appliance* at flow rates which are *adequate* for the correct functioning of those *fixtures and appliances* under normal conditions,**

**Compliance**

The waste water flow rate from the 12 volt electric pump supplies water at a comparable rate to the mains water supply.

Approximately 10 litres in 1.5 minutes. **Note:** a Caroma Uniset toilet cistern fills in approximately 2 minutes from the mains water supply.

- (c) **Avoids the likelihood of leakage,**

**Compliance**

All fittings, connections and valves are standard plumbing and sanitary fittings and installed in the manner specified by the manufacturer.

- (d) **Allows reasonable access for maintenance of mechanical components, and**

**Compliance**

The waste water shut off valve is located directly under the toilet cistern and the mains shut off valve is located on the mains inlet pipe in the normal manner. The waste water supply 12 volt pump, transformer, relay, protection devices etc. are located on top of the waste water storage container which is situated outside the building and these are readily accessible by removing the protective weather covering.

- (e) **Allows the system and any backflow prevention devices to be isolated for testing and maintenance.**

**Compliance**

The waste water system can be isolated by turning off the inlet valve under the toilet cistern and shutting down the power supply.

**Note:** to allow for continual toilet usage during any testing or maintenance of the waste water system, the mains water supply valve can be turned on and toilet reverted back to mains water.

**G12.3.6** Vessels used for producing or storing hot water shall be provided with safety devices which:

- (a) Relieve excessive pressure during both normal and abnormal conditions, and  
(b) Limit temperatures to avoid the likelihood of flash steam production in the event of rupture.

**Not applicable**

**G12.3.7** *Storage water heaters* shall be capable of being controlled to produce, at the outlet of the *storage water heater*, an *adequate* daily water temperature to prevent the growth of legionella bacteria.

**Not applicable**

## Clause G13 - FOUL WATER Provisions

### OBJECTIVE

**G13.1** The objective of this provision is to:

- (a) Safeguard people from illness due to infection or contamination resulting from personal hygiene activities or
- (b) Safeguard people from loss of *amenity* due to the presence of unpleasant odours or the accumulation of offensive matter resulting from *foul water* disposal.

### FUNCTIONAL REQUIREMENT

**G13.2** *Buildings*, in which *sanitary fixtures* and *sanitary appliances* using water-borne waste disposal are installed, shall be provided with an *adequate* plumbing and drainage system to carry *foul water* to appropriate *outfalls*.

### PERFORMANCE

**G13.3.1** The *plumbing system* shall be constructed to:

- (a) **Convey *foul water* from *building* to a drainage system,**

#### **Compliance**

The foul water is either redirected to the drainage system through the recycling system to the toilet drainage system or directly to the drainage system when the containers are full.

- (b) **Avoid the likelihood of blockage and leakage,**

#### **Compliance**

The design of the recycling system is such that if it became blocked the foul water from the bath, shower or washing machine is directed straight to the gulley trap and into the drainage system. The design does not allow the waste water containers to overflow as the water will discharge into the drainage system before they can overflow.

- (c) **Avoid the likelihood of foul air and gases entering *building*, and**

#### **Compliance**

The system is ventilated with a one way valve such as an Auto Admit valve to allow air into the system and contains any foul air or gases. To stop bacterial growth that could cause any unpleasant odours in the toilet cistern water, chlorine tablets are used in the recycling system's water storage containers.

- (d) **provide reasonable access for maintenance and clearing blockages.**

#### **Compliance**

For maintenance access refer to compliance for G12.3.5 (d). The

clearing of blockages can be readily carried out by removing the holding down screws on the lids of the waste water containers. This also allows access to clean out the containers and filtration system. It also limits access by unauthorised persons.

**G13.3.2** The drainage system shall:

- (a) Convey *foul water* to an appropriate *outfall*,
- (b) Be constructed to avoid the likelihood of blockage,
- (c) be supported, jointed and protected in a way that will avoid the likelihood of penetration of roots or the entry of ground water,
- (d) Be provided with reasonable access for maintenance and clearing blockages,
- (e) be ventilated to avoid the likelihood of foul air and gases accumulating in the drainage system and *sewer*, and
- (f) Be constructed to avoid the likelihood of damage from superimposed loads or normal ground movement.

**Not applicable**

**G13.3.3** Where a *sewer* connection is available, the drainage system shall be connected to the *sewer*, and the connection shall be made in a manner that avoids damage to the *sewer* and is to the approval of the *network utility operator*.

**Not applicable**

**G13.3.4** Where no *sewer* is available, an *adequate* on-site disposal system shall be provided for *foul water* in the same manner as detailed in clause G14 “Industrial Liquid Waste”.

**Not applicable**

## Clause G14 - INDUSTRIAL LIQUID WASTE Provisions

### OBJECTIVE

**G14.1** The objective is to safeguard people from injury or illness caused by infection or contamination resulting from industrial liquid waste.

### FUNCTIONAL REQUIREMENT

**G14.2** *Buildings*, in which industrial liquid waste is generated shall be provided with *adequate* spaces and facilities for the safe and hygienic collection, holding, treatment and disposal of the waste.

### PERFORMANCE

**G14.3.1** Industrial liquid waste shall be conveyed to storage containers and within disposal systems in a way which will:

- (a) **Transfer wastes from *buildings* safely and hygienically,**
- (b) **Avoid the likelihood of blockage and leakage,**
- (c) **Avoid the likelihood of foul air and gases entering *buildings*, and**
- (d) **Provide reasonable access for clearing of blockages.**

#### Compliance

Compliance for (a), (b), (c) and (d) can be found in the previous documentation on G13: Foul Water Provisions.

**G14.3.2** Facilities for the storage treatment and disposal of industrial liquid waste shall be constructed:

- (a) **With *adequate* capacity for the volume of waste and the frequency of disposal,**

#### Compliance

The waste water storage capacity is 400 litres and this relates to 40 10 litre flushes of the toilet system. The potential water supply from a washing machine, shower and bath per week is 2,900 litres. The calculated average water usage for toilet use by a family of four is 1,300 litres of water per week. Because the system refills each time the washing machine, bath or shower is used, there is more than an adequate supply of water for the toilet cistern. If for any reason there was to be an overdemand on the system such as a party or a large number of visitors, the water supply can be readily transferred back to the mains supply.

- (b) With *adequate* vehicle access for collection if required,

#### Not applicable

- (c) **To avoid the likelihood of contamination of any potable water supplies in compliance with Clause G12 “Water Supplies”,**

#### Compliance

Refer G12.3.5 (a), p.5.

- (d) To avoid the likelihood of contamination of soils, ground water and waterways except as permitted by a resource consent given under the Resource Management Act 1991,**

**Compliance**

The system is fully sealed and the waste water can only discharge into the drainage system through the toilet pan or down the gulley trap. Refer G12.3.5. (c), p.5.

- (e) From materials which are impervious both to the waste for which disposal is required and to water,**

**Compliance**

Refer B2.3 (d), p.3.

- (f) To avoid the likelihood of foul air and gases accumulating within or entering into *buildings*,**

**Compliance**

Refer G13.3.1 (c), p.7.

- (g) To avoid the likelihood of unauthorised access by people, and**

**Compliance**

Refer G13.3.1 (d), p.8.

- (h) To permit easy cleaning and maintenance.**

**Compliance**

Refer G12.3.5 (d) & (e), p.5 and G13.3.1 (d), p.8.

# ELECTRICAL REGULATIONS AND COMPLIANCE

## INTRODUCTION

The electrical supply used for the waste water system consists of a 230/12 volt alternating current transformer, rectifier, microswitch located in the toilet cistern and electric motor driving the pump.

The electrical system is free from any electrical hazards because of the totally enclosed transformer which is classed as double insulated. The 12 volt alternating current output of the transformer is rectified to direct current.

Regulation 2 of the Electricity Regulations 1993 states:

Extra low voltage:

“Is any voltage normally not exceeding 32 volts AC or 115 volts DC”.

Under the above regulations the voltages used in the waste water system present no electrical hazards to anyone who inadvertently comes into contact with it. However, the transformer is supplied with low voltage (32-1000 volts AC) and would present a risk to anyone removing the cover with the power on.

NOTE:

Even at such low voltage the electrical components are still vulnerable to damage by any water or condensation if the waste water system is not installed as per the manufacturer's specifications.

## N.Z. ELECTRICAL CODE OF PRACTICE 51 (SUBCLAUSE 8.2)

Socket outlets installed outside shall be protected from the weather and by an R.C.D. affording personal protection, having a residual operating current not exceeding 30 mA.

Fixed wired appliances located outdoors shall be weather protected

## SUGGESTED METHODS OF CONNECTION

Because the system is installed outside the method of connection to the 230 volt supply must be either:

1. connected to a waterproof switch socket unit situated as close to the units as possible and run on a separate supply from the switchboard. This supply line must be controlled by a residual current device for safety reasons of possible electric shock to anyone working on the system. Other external devices could be connected to the switch socket outlet safely;
  2. permanently to the supply through a waterproof isolating switch situated as close to the units as possible. (If permanently connected a registered electrician would be needed to disconnect the supply to the units). The electric supply should be on a separate line from the switchboard and be controlled through a Residual Current Device for safety reasons of possible shock to anyone working on the system;
- or
3. the isolating transformer could be mounted inside the building next to a socket outlet and the 12 volt supply run to the waste water system. The 12 volt supply must not have a volt drop of less than 10% of rated value (N.Z. Electrical Code of Practice 7: Subclause 7.7).

## ELECTRICAL EQUIPMENT USED

### Transformer

C Dax

Model

Type

Voltage input

Voltage output

Teat sprayer transformer

ET 12/37

DR 1072 Double insulated

230 volts fused at 1 amp

12 volts at 3 amps continuous rating

12 volts at 7 amps intermittent rating

## COST TO RUN PUMP

Volt/amp rating of transformer =  $2 \times 3 = 36 \text{ v}$

Rating of total installation (the total installation rating includes transformer and motor) = 72 va

Kilowatts drawn from supply =  $72/1000$   
= 0.072 kw per hour

Cost to run pump at 10 cents per hour =  $0.072 \times 10$   
= 0.72 cents per hour

Dated 09.03.1997

Don Sorensen