



**ENVIRONMENTAL &  
ARCHITECTURAL BEST PRACTICE FOR  
EMERGENCY POWER SYSTEMS IN COMMERCIAL  
PROJECTS:**

**Installing a Fire Rated Tank vs  
Creating a Fire Rated Room vs  
Going Underground in a Commercial Building**



## *The importance of power*

### **Safety & Environment Are Key**

Most large building complexes today are designed with a generator backup system which ensures continuous power in the event of a mains power outage. This generator will be diesel powered and therefore needs an approved diesel tank beside it to provide the specified run times.

However, the installation of a diesel or petrol tank within a building raises two immediate concerns:

- To the safety of people within the tank's location
- To the environment (should a leak or disaster occur)

Therefore, it is very important that a legally compliant tank is used and the correct method of installation is considered for the application.



## *Compliance*

### **Standards For Australia & New Zealand**

In Australia and New Zealand, the common standard used in order to comply to health and safety requirements is the Australian Standard AS1940-2017, 'The storage and handling of flammable and combustible liquids'.

### **3 Installation Options**

The three most common styles or types of installation set out in AS1940-2017 are shown in clause 5.6.3.2 and is for any **tank having a capacity greater than 1000 litres.**



**1**

**A double-wall tank  
buried in  
accordance with  
Clause 5.12; or**

**2**

**Installed on or  
below the lowest  
floor level of a  
building, in a tank  
chamber in  
accordance with  
Clause 5.13; or**

**3**

**A tank having  
integral secondary  
containment with a  
'Fire Resistance  
Level' (FRL) of  
240/240/240 and  
complying with  
Clause 5.9**

**4**



*Let's look at the three options in more detail*



## **OPTION 1: An Underground Storage Tank (UST)**

The implementation for an underground tank comes with many implications upfront and ongoing, these include:

- The purchase and installation process being more expensive upfront
- The risk of tank corrosion
- The difficulty of accurately inspecting and repairing the tank
- Leaks aren't easily visible, and therefore are more expensive to remove when "worn out" (especially if they leaked into the soil, and your area requires clean-up of contamination)
- Underground tanks require expensive excavation work (for both install and removal) which includes a variety of permits, land-use consents and specialised equipment
- Other factors to consider if burying a tank within a building include access pits for servicing, proximity to property boundaries and building foundations and corrosion protection.



**Check out our content piece: Above Ground Storage Tanks vs Underground Storage Tanks here:**  
<https://fuelchieftanks.com/news/above-ground-fuel-storage-tanks-vs-underground-fuel-storage-tanks/>



## *Cost comparison example*

### **OPTION 1: 5,000L UST vs 4-Hour Fire Rated Tank AST**

To install an Underground Storage Tank

- Tank cost: \$15,000
- Installation cost: including excavation, placement and back fill @ \$4.00 p/l - \$20000

Total Price = \$35, 290.00

To install an Above Ground Storage Tank (AST) - A SuperVault SVR-4999 4 hours fire rated tank

- Tank cost - \$26085
- Installation cost: including placement and bolt down - \$1500

Total Price - \$27, 585.00





## OPTION 1: Servicing & Relocating a UST

When maintenance is necessary, it is less expensive (and faster) to make repairs on an above ground tank rather than one installed underground. Repairs are a key concern for long-term costs. For installation, above grounds tend to be less expensive overall.

In almost all areas of the globe, the responsibility lies with the owner to ensure that your underground storage tank does not leak, and it is certainly recommended that if you choose this option that you establish a well-documented system of care for your tank. Underground tank recordkeeping includes maintaining a record of detection system performance; recording results of sampling, testing or monitoring; and documenting calibration, maintenance and repair of the equipment.

Relocating in the future; There are many factors that affect the cost of removing underground fuel storage tanks. The most important factors include the tank's size, whether there is evidence of leaking and what was stored in the tank. Underground storage tanks cost much more than above ground tanks to remove due to the added labour of excavation and the need to locate any underground pipes or utility lines. The larger the tank, the more it costs to remove. In summary, if you choose this option, you're deciding the tank will be there forever regardless of consequences.

Removing an underground tank requires specialist attention and is mostly left in place and decommissioned by filling with concrete or some other like substance. Replacing an underground tank with a larger size is mostly not an option unless another location within the building is available



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<https://fuelchieftanks.com/news/above-ground-fuel-storage-tanks-vs-underground-fuel-storage-tanks/>



## OPTION 2: Locating In a Fire-Rated Tank Chamber

**Installation:** This method is not as difficult as underground but in effect comes with most of the difficulties and is potentially more expensive to install than going underground.

In the construction phase, you will need to consider that the walls and roof need to have an **FRL (Fire Resistance Level) of 240/240/240**. You will need to design a removable roof tank placement, a fire rated door that is designed to stay closed, separation distances from other tanks, and foundations of the building and boundaries of other properties will need to be considered and separated from.

It will also be important to ensure that the concrete products used to construct the room will have certification to the FRL. Although commonly referred to as fire rating, the correct term to describe the fire resistance of a building element is FRL (Fire Resistance Level).

The FRL is the ability of a building element to withstand a fire under test conditions for a certain period of time and consists of the three criteria being:

- **Structural Adequacy** - this means that for a period of 240 minutes (four hours) the product being tested was able to support a load while subject to fire conditions.
- **Structural Integrity**- this means the product did not disintegrate or crack so as to see the flames of the fire or for gases to escape.
- **Insulation** - which means the product being tested did not transfer an average temperature reading that exceeds 180°C above the ambient temperature.

This means that if a building element were exposed to a standard fire test, it would not be expected to fail for 240 minutes, (4 hours) in each of the three criteria.





## OPTION 2: Locating In a Fire-Rated Tank Chamber

**Servicing:** Servicing a tank in a fire rated tank chamber is only possible if the chamber is designed with a compliant fire rated door and is sufficiently larger than the tank enabling the technician to have access to all four sides of the tank.

**Relocating:** Removing the tank in the future will be difficult and in the event of a larger tank being required, the chamber will need to be altered at considerable cost to allow for the installation





# OPTION 3: Using a Fire-Rated Tank with Fire Resistance Level of 240/240/240

Fuelchief take the hassle out of your whole decision when it comes to the safe storage of fuel. Fuelchief have engineered a compliant tank that can be customised for your clients requirements called the SuperVault®.

This engineered fuel tank is 4-hour fire-rated and is recommended due to its fire protective safety for commercial sectors.

The **SuperVault® tank offers elite fire-rated, bullet-proof, impact-resistant technology and has been designed, fabricated and tested in accordance with SwRI 95-03**; which makes it the safest and most durable tank in the world.

In many circumstances where diesel or petrol needs to be stored in commercial buildings, the SuperVault® is the only permitted tank. The SuperVault® has been engineered to withstand conditions – from the sub-zero temperature of the Arctic to the blistering heat of the desert. No other fuel storage system in the world can provide a higher level of certified fire protection, insulation, and fuel security than a Fuelchief SuperVault®.



**Check out our content piece: The Importance The Incorporation of Energy Supply Rooms into Commercial Building Design:**  
<https://fuelchieftanks.com/news/important-the-incorporation-of-energy-supply-rooms-into-commercial-building-design/>



**Check out our content piece: Insist on SwRI 95 - 03:**  
<https://fuelchieftanks.com/news/why-to-insist-on-swri-95-03-for-your-tank/>



## OPTION 3: Using a Fire-Rated Tank with Fire Resistance Level of 240/240/240

**Installation:** The SuperVault® rectangular series is the only tank in the world with the correct certification for installation within buildings. Clause 5.9.4(c) of Standards Australia state that tanks having an FRL of 240/240/240 shall be regarded as complying with the requirements for tanks in chambers (see clauses 5.13.1 & 2).

**Servicing:** Regular maintenance is important with all fuel tanks to ensure a stable fuel supply in all conditions and applications. The most important service function is to ensure fuel is clean and free of contaminants. To do this, tanks will need a maintenance schedule that includes the ability to remove all fuel, flush the tank and refill. All fuels are subject to condensation and will need to be checked for water and sludge build up to ensure nothing gets transferred to expensive equipment or prohibit generator start up in the event of a power outage.

The interstitial insulation provides maximum thermal protection to the internal steel tank, thus minimising condensation build-up. This insulation material reduces heat transfer from the outer tank to the inner tank, therefore minimising the risk of an environmental disaster or the event of a pool fire. The porous nature of the insulating material allows for monitoring of leakage from the primary tank. In hot climates, the insulation also minimises fuel losses due to evaporation. The SuperVault® emergency vent controls the pressure in the tank in extreme fire conditions to eliminate explosion.



Check out our content piece: **Steps to Maintaining your Fuelchief SuperVault:**  
<https://fuelchieftanks.com/news/key-steps-to-maintaining-your-fuelchief-supervault-tank/>



## OPTION 3: Using a Fire-Rated Tank with Fire Resistance Level of 240/240/240

**Relocation:** You can easily relocate your SuperVault® from building to building by simply unplugging from associated pipework, unbolting from your seismic restraints and lifting out.

Aboveground storage tanks are much easier to move than their below-ground counterparts. If you need to move your tanks for new construction, you can easily move them elsewhere. In turn, this ease of movement makes any upgrade possible more appealing if your power requirements change. Need a bigger generator, remove the tank and put in a bigger one, no hassle at all.



Check out our content piece: What you need to know about IL4:  
<https://fuelchieftanks.com/uncategorized/what-you-need-to-know-about-importance-level-4-il4/>



We are now in an age where the community is much more aware of the potential risks of **pollution, fire and flooding** and we have very strict regulations covering fuel storage and the consequences and penalties for any neglect can be huge.

# 1

## Case Study: Nelson City Council Gen Set Room

### Challenge

Power supply to generators needed for Nelson City Council waste treatment plant in New Zealand.



### Solution

Fuelchief were pleased to be selected to provide two fire rated SuperVault tanks to Nelson City Council for a wastewater treatment plant at Neale Park. Working closely with ECL Group Ltd, we crafted 2 custom 1,500L SuperVault tanks to feed onsite generators. Working with very tight configurations was not a problem with the help of installer Derek and our resident in-house Design Engineer David Lawson.



### Result

A precision placed series of SuperVault's measured and constructed to the millimetre for the allocated space available.

The tanks have been functioning successfully for the plant. It's always good to remember the SuperVault is the only tank option that complies for rooms in buildings or alongside buildings where there is limited isolation distance and the area is a critical or high populated area.



# 2

## Case Study: Christchurch Hospital Critical Power Supply

### Challenge

Christchurch Hospital Acute Services Building (ASB) required 2 x 22,000 litre fuel storage tanks and 4 x 1,200L day tanks to supply the generators and boilers respectively for the hospital. As specified by regulations the tanks all had to be 4-hour fire rated. The aggregate quantity of all tanks above 500 litres need to be fire rated according to WorkSafe legislation.



### Solution

The tanks chosen for Christchurch Hospital were 2 x SuperVault cylindrical 22,000L tanks and 4 x SuperVault (rectangular) at 1,200L t was the DC50 5,000L fuel tank. Fuelchief worked with a host of consultants over a period of years to ensure each tank had the necessary fittings and optional requirements needed for resilience in the field.

A concern primarily was to meet legislation and comply for such a critical building situation. This project ensured the tanks were IL4 seismic engineered and rated with additional requirements to be capable of meeting the California Shake Table Test.

### Result

Over the course of two years the tanks have been in place and the commissioning continues to be underway. Such is the complexity of some projects.








**Installing an 'Above Ground Double Wall 4-hour Fire Rated' compliant tank offers huge benefits for the environment, now and in the future:**

### **WHY?**

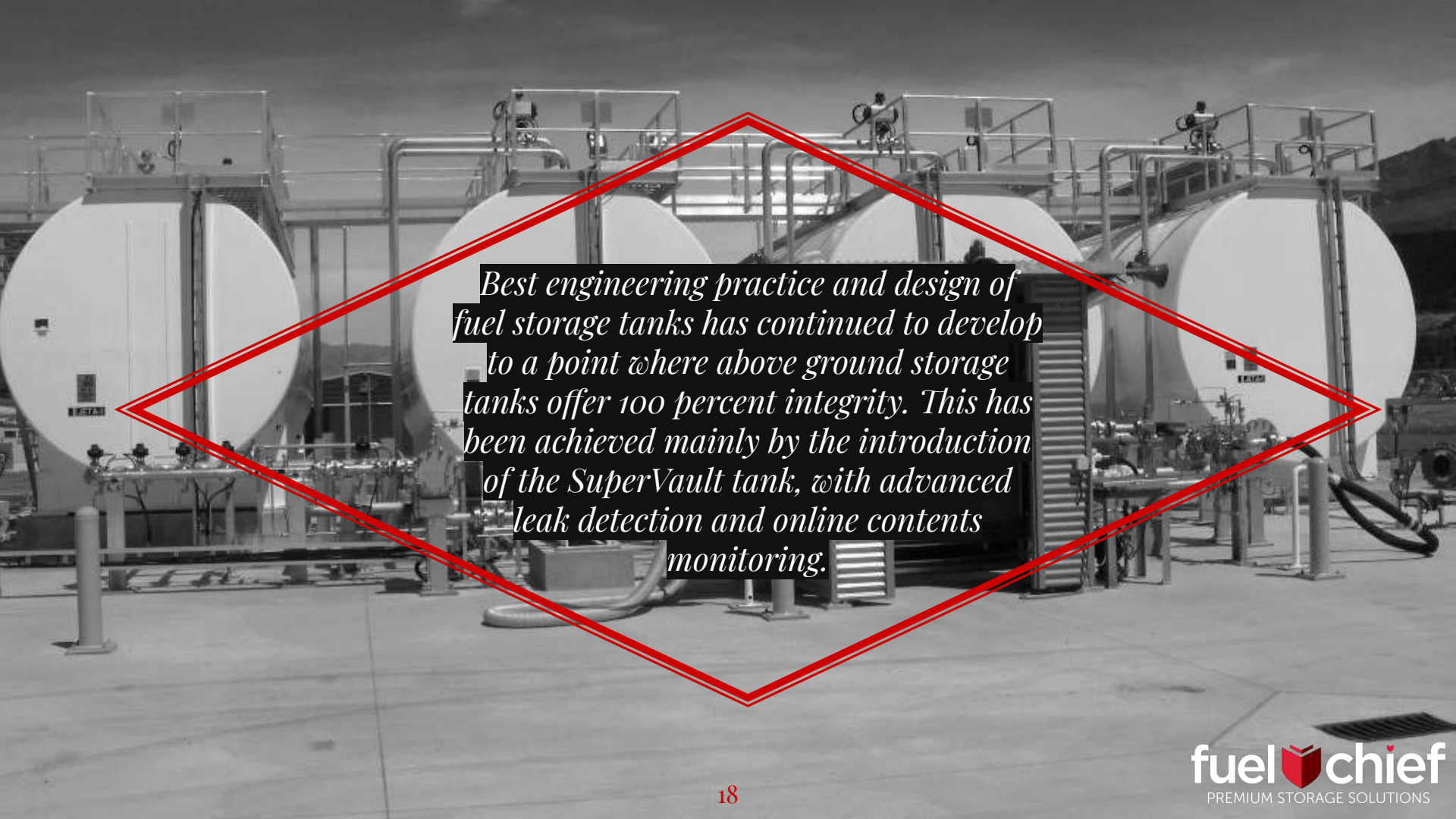
- ◆ It is easier to install
- ◆ It is seismically safer (ie in the event of a natural disaster is can be serviced)
  - ◆ It is easily relocatable should the needs of the tank owner change
- ◆ Also, if you have a high water table problem, you'll have no concern as to the tank 'popping' out of the ground when the fluid level is low.







*In our opinion, it is a sensible decision and one with a lot less implication to make the 'SuperVault' choice. We are now in an age where the community is much more aware of the potential risks of pollution and flooding and we have very strict regulations covering fuel storage and the consequences and penalties for any neglect can be huge.*



*Best engineering practice and design of fuel storage tanks has continued to develop to a point where above ground storage tanks offer 100 percent integrity. This has been achieved mainly by the introduction of the SuperVault tank, with advanced leak detection and online contents monitoring.*



*The Fuelchief team and our suppliers and manufacturers work very closely together to provide the very best solution for your application. Whether it is a small or large installation, we have the knowledge and experience to provide the solution that works for you today and in future generations. All of our tanks will remain an asset for you the business owner, and that can be relocated easily, if for any reason the operational requirements should change.*



*Thanks!*

**Any questions?**

You can contact our team:  
[info@fuelchieftanks.com](mailto:info@fuelchieftanks.com)



<https://nz.linkedin.com/company/fuelchief>



<https://www.youtube.com/channel/UC7XWO8Hsg7Y6Uj1Atiz8CvQ>



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