



# TRICEL

GENERATIONS OF INNOVATION

# Sectional GRP Cold Water Tanks in High-Rise and Multi-Storey Buildings:

A Technical Guide to Specification,  
Compliance, and Maintenance

2026 Edition

White Paper | April 2026

[www.tricelwater.co.uk](http://www.tricelwater.co.uk)

Multi-storey and high-rise buildings depend on stored cold water to manage variable demand, maintain pressure across vertical zones, and sustain services during short mains interruptions. Sectional GRP (glass reinforced plastic) tanks are the standard choice for this application in the UK. Their primary advantage is practical: individual panels pass through standard doorways and are assembled on-site, making them the only viable option for large-volume cold water storage in plant rooms that cannot be accessed as open construction.

This whitepaper provides a complete technical reference for everyone involved in specifying, installing, operating, or maintaining sectional GRP cold water tanks in high-rise and multi-storey developments – from developers and building owners making procurement decisions, to consulting engineers and MEP contractors designing and installing systems, to facilities managers and dutyholders responsible for compliance and maintenance throughout the building's operating life.

It covers the full lifecycle: product selection and specification, sizing, UK compliance, installation, water treatment, maintenance, and failure prevention.

It addresses the specific gaps that most technical documentation leaves open;

- Explicit Legionella temperature thresholds with their regulatory source;
- Fluid category and backflow prevention device classification;
- Overflow sizing methodology;
- Water treatment options for elevated-risk installations;
- The specific regulations that apply in Scotland and Northern Ireland;
- Building Regulations Part G;
- Thermal stratification in large-volume tanks;
- Cost factors; material comparisons; and a structured FAQ directly targeting the questions people search for.

## **WHO THIS IS FOR**

Developers · Consulting engineers · Main contractors · MEP installers · Facilities managers · Building owners · Dutyholders · Principal Accountable Persons (Building Safety Act 2022) · Property managers of high-rise residential buildings

## **JURISDICTION**

Primary: United Kingdom – England & Wales, Scotland, and Northern Ireland. Principles broadly applicable internationally; always verify local requirements.

# Key Facts



Key facts – sectional GRP cold water tanks in high-rise and multi-storey buildings (UK)

- Standard product for large-volume cold water storage in multi-storey and high-rise plant rooms; panels fit through doorways of 750 mm or wider.
- Product standard: BS EN 13280. Products in potable water contact must be certified as compliant with Regulation 4(1)(a) of the Water Supply (Water Fittings) Regulations 1999. Accepted certification schemes include WRAS and Kiwa KUKreg4. Verify current certification status at [wras.co.uk](http://wras.co.uk) or [kiwa.com/uk](http://kiwa.com/uk)
- Cold water must be stored and distributed below 20°C (HSG274 Part 2; ACoP L8).
- A cold water storage cistern is classified as Fluid Category 5 under the Water Fittings Regulations, requiring a Type AG or Type AA air gap at the inlet.
- Statutory notification is required before installing any storage vessel exceeding 1,000 litres; failure to notify is a criminal offence.
- Regulatory instruments vary by jurisdiction: SI 1999/1148 (England and Wales); Water Supply (Water Fittings) (Scotland) Byelaws 2014; SR 2009/255 (Northern Ireland).
- Design life: 25–30 years with correct installation and maintenance.
- Annual cleaning and disinfection is the minimum maintenance baseline per HSE guidance.



## About This Guide and Its Author

This whitepaper was written by Tricel Water, a UK manufacturer of GRP water storage tanks with direct experience supplying and installing cold water storage systems in multi-storey commercial, residential, healthcare, and industrial buildings.

Tricel Water manufactures sectional and one-piece GRP cisterns covering capacities from 1,000 litres to 4.6 million litres. Products are manufactured to BS EN 13280, the European standard for GRP cisterns and sectional tanks for above-ground cold water storage, and carry approval under Regulation 4(1)(a) for potable water contact. The company's sectional tank range is designed for installation in plant rooms accessed through standard doorways, and installation is carried out by Tricel site crews or approved installers.

The guidance in this document draws on the regulatory sources and industry standards listed in the References section. It has been written to be accurate and useful to anyone involved in specifying, installing, or maintaining cold water storage systems in multi-storey buildings – regardless of which manufacturer's products are ultimately specified. Where design decisions or sizing calculations are discussed, readers should engage a suitably qualified engineer; this guide does not constitute engineering advice.

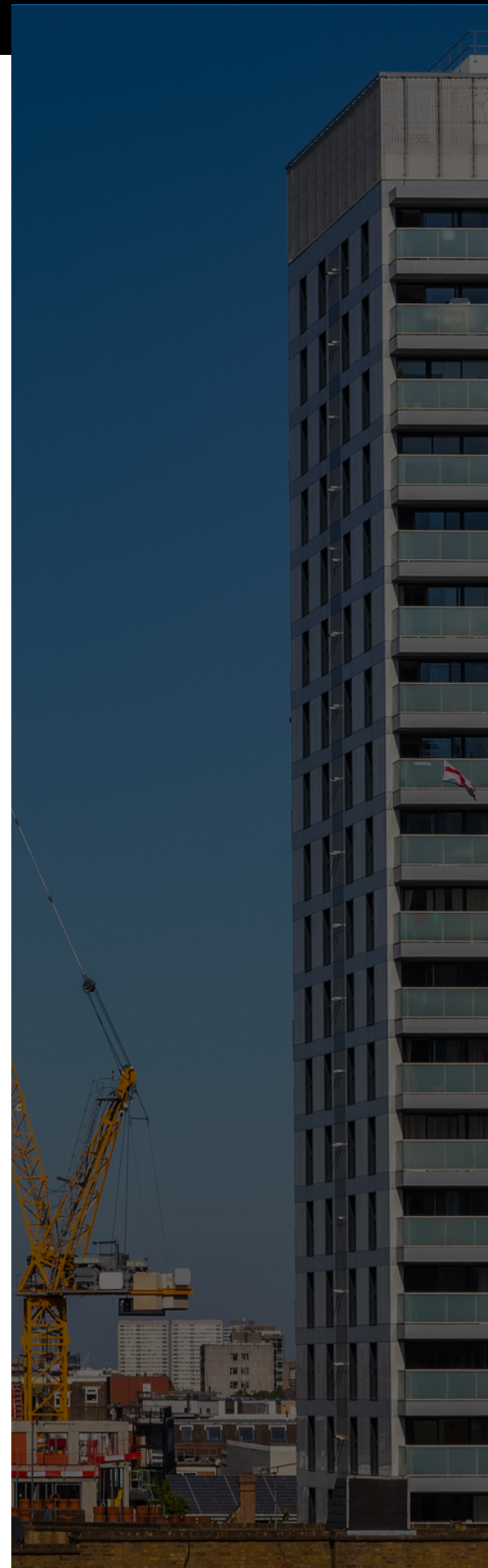
Readers seeking product-specific information – capacity tables, dimensional data, configuration options, or a project quotation – should visit [www.tricelwater.co.uk](http://www.tricelwater.co.uk) or contact the Tricel Water technical team on +44 (0)1934 314 079.

### Disclaimer

*This whitepaper is provided for general guidance and information purposes only. It does not constitute engineering advice and should not be relied upon as the sole basis for design decisions. All installations must be designed by a suitably qualified engineer with reference to the current applicable standards, regulations, and site-specific conditions. The author accepts no liability for loss or damage arising from reliance on this document.*

# Contents

<b>Executive Summary</b>	<b>2</b>
<b>What Is a Sectional GRP Cold Water Tank?</b>	<b>5</b>
<b>Why High-Rise and Multi-Storey Buildings Use Sectional GRP Tanks</b>	<b>7</b>
<b>Product Specifications, Sizes, and Durability</b>	<b>8</b>
<b>Design Considerations</b>	<b>11</b>
<b>Cost Factors and Budgeting</b>	<b>15</b>
<b>GRP Versus Alternative Tank Materials</b>	<b>18</b>
<b>UK Compliance Landscape</b>	<b>21</b>
<b>Water Treatment Options for Elevated-Risk Installations</b>	<b>33</b>
<b>Installation: Practical Guidance</b>	<b>37</b>
<b>Operation and Maintenance</b>	<b>42</b>
<b>Common Failure Modes and Prevention</b>	<b>46</b>
<b>Implementation Framework: Design to Handover</b>	<b>48</b>
<b>GRP Water Solutions for High-Rise Applications</b>	<b>49</b>
<b>Case Study: The 'Walkie Talkie' Building, London</b>	<b>54</b>
<b>Conclusion</b>	<b>56</b>
<b>References and Further Reading</b>	<b>58</b>
<b>Frequently Asked Questions</b>	<b>59</b>
<b>Glossary</b>	<b>62</b>
<b>Appendix A: Draft Operation and Maintenance Schedule</b>	<b>66</b>



# 1. What Is a Sectional GRP Cold Water Tank? Definition, Types, and Key Terminology

## 1.1. What Is a Sectional GRP Cold Water Tank?

A sectional GRP cold water tank (also called a sectional GRP cold water storage cistern) is a modular water storage vessel assembled on-site from glass reinforced plastic panels bolted to a structural frame, with joints sealed and internal bracing installed as required. The term sectional distinguishes it from a one-piece moulded GRP tank, which is manufactured as a single unit and limited in size by what can be transported and manoeuvred into a building.

GRP (glass reinforced plastic) is a composite material comprising glass fibres embedded in a polymer resin matrix. It does not corrode in the way that ferrous metals do, has a high strength-to-weight ratio, and is available in formulations approved for contact with drinking water.

### Cistern vs tank

What's the difference between a cistern and a tank?

In UK building services practice, a cistern is strictly an open-topped (vented) vessel, while a tank may be pressurised or sealed. Most cold water storage vessels in multi-storey buildings are vented cisterns.

The term tank is dominant in industry practice and is used throughout this guide. Both terms refer to the same physical product in this context. The Water Fittings Regulations use "storage cistern"; this guide uses "tank" throughout in line with industry practice.

## 1.2 How Sectional GRP Differs from a One-Piece Tank

Factor	One-piece GRP tank	Sectional GRP tank
Maximum practical capacity	Typically up to approx. 16,000 L. individual manufacturers' ranges vary – verify maximum available capacity with the specified supplier (transport and access limited)	No practical upper limit; panels assembled in-situ
Site access requirement	Must enter building as a complete unit	Individual panels pass through standard doorways ( $\geq 750$ mm)
On-site assembly	Not required	Required; following manufacturer instructions
Configuration flexibility	Fixed dimensions as manufactured	Configurable in any combination of panel modules
Structural frame	Integral to moulded form	Separate structural frame; part of assembly
Suitable for restricted plant rooms	Only if tank fits through access route	Yes – primary advantage for multi-storey buildings

# 1. What Is a Sectional GRP Cold Water Tank? Definition, Types, and Key Terminology

## 1.3 Key Terminology

Term	Definition
CWSC	Cold Water Storage Cistern – the standard UK term for a vented cold water storage vessel
Break tank	A cistern that breaks the direct hydraulic link between the incoming mains and the downstream distribution system; water is drawn by a booster pump set
DCWS	Domestic Cold Water Services
Booster set	Pressurised pump system drawing suction from a break tank to serve upper floors or pressure zones
Pressure zone	A section of distribution served at a controlled pressure band, typically defined by static height or pump performance
Float valve (ball valve)	Inlet control device that closes automatically when the cistern reaches the design water level
Air gap	A physical discontinuity in a water supply pipe, preventing backflow by hydrostatic or siphonic means
Fluid category	A classification (1–5) under the Water Fittings Regulations defining the contamination risk level of a fluid, which determines the required backflow prevention device
Regulation 4(1)(a) certification	The legal requirement under Regulation 4(1)(a) of the Water Supply (Water Fittings) Regulations 1999 that fittings in contact with potable water must not contaminate water and must be fit for purpose. Independent certification schemes – including WRAS ( <a href="http://wras.co.uk">wras.co.uk</a> ) and Kiwa KUKreg4 ( <a href="http://kiwa.com/uk">kiwa.com/uk</a> ) – are the accepted means of demonstrating compliance. Certification status should be verified at the time of specification and at procurement; do not rely on historic certificates
BS EN 13280	European standard specifying requirements for GRP cisterns and sectional tanks for above-ground cold water storage
ACoP L8	HSE Approved Code of Practice on the control of Legionella bacteria in water systems – has special legal weight. Given HSE's stated intention to revise L8, a brief note acknowledging that readers should verify the current edition at <a href="http://hse.gov.uk">hse.gov.uk</a>
Dutyholder	The person or organisation with legal responsibility for the water system and Legionella control obligations
SFG20	Standard Maintenance Specification for Building Engineering Services – widely used UK Planned Preventive Maintenance (PPM) framework

# 2. UK Definitions: High-Rise and Multi-Storey Buildings

## 2.1 How "High-Rise" and "Multi-Storey" Are Defined in the UK

These terms appear throughout this guide and throughout UK building services practice. They do not carry a single consistent definition across legislation, regulation, and industry guidance. The threshold that applies to a given building depends on the regulatory context – building safety, fire safety, planning, or building services design – and on the jurisdiction within the UK. The table below sets out the operative definitions.

### Why the Definition Matters

The classification of a building as high-rise or higher-risk determines which regulatory regime applies. Under the Building Safety Act 2022, buildings meeting the higher-risk definition are subject to additional dutyholder obligations, mandatory registration with the Building Safety Regulator, and a Safety Case requirement. These obligations sit alongside, and do not replace, the water fittings and Legionella control duties that apply to all buildings regardless of height. A building owner or facilities manager who does not know which classification applies to their building cannot reliably identify their full compliance obligations.

## 2.2 Operative UK Definitions

Classification	Definition	Source	Jurisdiction
Higher-risk building – in occupation	At least 18 metres in height or at least 7 storeys, containing at least 2 residential units	Building Safety Act 2022, s.65; Higher-Risk Buildings (Descriptions and Supplementary Provisions) Regulations 2023	England
Higher-risk building – design and construction	At least 18 metres in height or at least 7 storeys; includes buildings with at least 2 residential units, care homes, and hospitals	Building Safety Act 2022, s.120D; Higher-Risk Buildings (Descriptions and Supplementary Provisions) Regulations 2023	England

# 2. UK Definitions: High-Rise and Multi-Storey Buildings

## 2.2 Operative UK Definitions

Classification	Definition	Source	Jurisdiction
Higher-risk building – design and construction	At least 18 metres in height or at least 7 storeys; includes buildings with at least 2 residential units, care homes, and hospitals	Building Safety Act 2022, s.120D; Higher-Risk Buildings (Descriptions and Supplementary Provisions) Regulations 2023	England
High-rise domestic building	Any domestic building with a storey at more than 18 metres above ground level	Scottish Building Standards Technical Handbook, Appendix A – Defined Terms	Scotland
High-rise – fire risk appraisal of external walls	A building with any storey floor at not less than 18 metres above ground level, or at least 7 storeys (ground plus five upper storeys or more), whichever is the lower	PAS 9980:2022	UK
High-rise – historical fire service reach threshold	18 metres or above; the height historically associated with the operational reach of fire and rescue service equipment	Home Quality Mark; post-Hackitt Review guidance	England

# 2. UK Definitions: High-Rise and Multi-Storey Buildings

## Operative UK Definitions

Classification	Definition	Source	Jurisdiction
Mid-rise – general industry	Five to ten storeys, equipped with lifts	Industry classification (Designing Buildings; CIBSE)	UK – no statutory definition

### 2.3 How Height Is Measured Under the Building Safety Act 2022

Height is measured from ground level on the lowest side of the building to the top of the floor surface of the highest occupied storey. Ground level means the level of the ground immediately adjacent to the building; where ground level is not uniform, measurement is taken from the lowest point.

The following are excluded from storey counts and height measurements:

- Any storey used exclusively for plant or machinery, including lift motor rooms.
- Any mezzanine or gallery floor smaller than half the area of the largest storey in the building.
- Roof gardens – the government's current position, confirmed in guidance updated May 2025 following a First-tier Tribunal decision of 3 July 2024, is that roof gardens are not storeys for the purposes of the higher-risk building definition. An amendment to the Higher-Risk Buildings (Descriptions and Supplementary Provisions) Regulations 2023 is under consultation to put this position beyond doubt.

### 2.4 Buildings Excluded from the In-Occupation Higher-Risk Definition

The following building types are excluded from the in-occupation higher-risk regime even where they meet the height or storey threshold: buildings comprising entirely of occupied care homes, hospitals, secure residential institutions, hotels, military barracks, and living accommodation for military personnel.

### 2.5 How This Guide Uses the Terms

"Multi-storey" is used in this guide to refer to any building above approximately four or five storeys where direct mains pressure from the incoming main is insufficient to serve upper floors reliably, and where on-site cold water storage and a booster arrangement are therefore required. This is a practical building services threshold, not a statutory classification.

# 2. UK Definitions: High-Rise and Multi-Storey Buildings

## **How This Guide Uses the Terms**

"High-rise" is used in this guide to refer to buildings meeting the Building Safety Act 2022 definition – at least 18 metres in height or at least seven storeys, with at least two residential units – unless the context indicates a different regulatory frame of reference.

Where the distinction matters to a specific compliance obligation, this guide identifies the applicable definition explicitly. Readers should not assume that a building falling below the Building Safety Act 2022 higher-risk threshold is exempt from other regulatory requirements. The Water Fittings Regulations, ACoP L8 Legionella control duties, and Building Regulations Part G apply to buildings regardless of height classification.

## **Devolved Frameworks**

The Building Safety Act 2022 and the Higher-Risk Buildings (Descriptions and Supplementary Provisions) Regulations 2023 apply in England only. Scotland, Wales, and Northern Ireland have separate devolved building safety frameworks. The Scottish Building Standards Technical Handbook uses an 18-metre threshold for high-rise domestic buildings but does not apply the seven-storey alternative used in English legislation. Specifiers and dutyholders working on projects in Scotland, Wales, or Northern Ireland must identify the applicable devolved regime at project outset and must not apply England-only definitions as if they were UK-wide.

## **Registration Requirement for Higher-Risk Residential Buildings in England**

Buildings meeting the higher-risk definition must be registered with the Building Safety Regulator before occupation. Registration is the responsibility of the Principal Accountable Person. Operating an unregistered higher-risk building is a criminal offence. The Building Safety Regulator maintains a publicly searchable register of higher-risk residential buildings in England.

# 3. Why High-Rise and Multi-Storey Buildings Use Sectional GRP Tanks

## 3.1 Why Cold Water Storage Is Required in High-Rise and Multi-Storey Buildings

Multi-storey buildings have hydraulic and operational constraints that typically make on-site cold water storage necessary:

- **Pressure management:** supplying upper floors directly from mains at acceptable pressure is often impractical. Many water companies restrict incoming mains pressure at the boundary, making break-tank-and-booster arrangements necessary for floors above five or six storeys.
- **Peak demand buffering:** stored volume absorbs demand peaks and reduces the required size of the incoming main connection.
- **Resilience:** limited-duration storage maintains services during short mains interruptions – planned maintenance, pressure incidents, or emergency works.
- **Access and space:** sectional construction is the only practical way to install large-volume tanks in buildings where plant rooms are accessed through standard doorways, stairwells, or passenger lifts.

## Quick Answer

What is CIBSE Guide G on break-tank arrangements?

CIBSE Guide G notes that pressurising distribution systems via low-level break tanks and booster sets can reduce certain contamination risk pathways compared with elevated cisterns, because the main open storage vessel is at low level and not exposed to the same airborne contamination risk as roof-mounted cisterns.

## 3.2 Typical Cold Water System Configurations in Multi-Storey Buildings

Configuration	Description	Typical application
Low-level break tank + booster set	Sectional tank at basement or ground level; pressurised distribution by pump set serving one or more pressure zones	Majority of UK multi-storey commercial and residential developments
Rooftop storage (gravity)	Tank at or near roof level provides gravity head to floors below	Historically common; less favoured in modern practice due to stagnation risk, structural loading, and maintenance access difficulties
Hybrid zoned systems	Multiple break tanks and booster sets serving distinct vertical zones (podium, mid-rise, high-rise)	High-rise residential towers, hotels, hospitals; improves redundancy and controls static pressure at lower floors
Twin-compartment break tank	Two cisterns in parallel with a dividing partition and interconnecting valve	Any building where continuous supply is required; allows isolation of one compartment for maintenance without supply interruption

# 4. Sectional GRP Tank Specifications, Sizes, and Design Life

## 4.1 How Sectional GRP Tanks Are Built: Panel Construction and Capacity Ranges

Sectional GRP tanks are built from modular panels – commonly in 1m x 1m increments – enabling any footprint and height combination. Panels are typically single-skin or twin-skin (for insulated versions).

Structural frames are usually hot-dip galvanised mild steel or, for higher-specification installations, stainless steel. Panel increments and frame designs vary between manufacturers. Obtain detailed dimensional data at early design stage and confirm access route compatibility before specifying.

Capacity range	Typical application
1000 L – 5,000 L	Smaller multi-residential buildings, light commercial break tanks
5,000 L – 30,000 L	Mid-size commercial offices, mixed-use multi-storey buildings
30,000 L – 100,000 L	Large commercial, hotel, hospital, high-rise residential
100,000 L+	Major campus, hospital complex, or data centre; bespoke design required

## 4.2 BS EN 13280: The UK Product Standard for GRP Cold Water Tanks

BS EN 13280 is the European standard specifying requirements for GRP cisterns and sectional tanks for above-ground cold water storage. Its scope includes sectional tanks with a capacity of 500 L and above. The standard covers:

- Material composition and mechanical properties of GRP panels.
- Structural performance under hydrostatic loads, including deflection limits.
- Dimensional tolerances for panels and assembled tanks.
- Testing requirements: water tightness, structural integrity, and material properties.
- Hygiene: material suitability for potable water contact.

Specifying compliance with BS EN 13280 is the accepted product quality baseline in UK building services procurement. Where a project requires formal compliance evidence, manufacturers should provide a declaration of performance against the standard.

# 4. Sectional GRP Tank Specifications, Sizes, and Design Life

## 4.3 Regulation 4(1)(a) Certification for Cold Water Tanks: What It Means and Why It Matters

Regulation 4(1)(a) of the Water Supply (Water Fittings) Regulations 1999 requires that water fittings – including tank panels, float valves, pipework fittings, and associated components – do not contaminate water intended for human consumption and are mechanically fit for purpose. Independent certification schemes test and certify products against this requirement. The two principal schemes currently operating in the UK are WRAS (Water Regulations Advisory Scheme) and Kiwa KUKreg4A .

### Does Regulation 4(1)(a) certification expire?

Yes. A product certified several years ago may no longer hold a current certification under either WRAS or Kiwa KUKreg4. Always verify current status at the time of specification and again at procurement – WRAS at [wras.co.uk](http://wras.co.uk); Kiwa KUKreg4 at [kiwa.com/uk](http://kiwa.com/uk). Do not rely on a copy of a historic certificate.

A product certified under either scheme has been independently tested to confirm that it:

- Does not impart taste, odour, colour, or substances to water in quantities that constitute a health risk or render the water unacceptable for consumption.
- Is mechanically fit for purpose in water supply systems.

Complies with the Regulations' requirements on materials (referencing BS 6920 for non-metallic materials)

Certification under either scheme is the standard acceptance mechanism used by water companies, designers, and main contractors. Specifying certification without naming a single scheme avoids excluding compliant products certified through either route.

## 4.4 Standard Features and Specification Options

Feature	Standard or option	Notes
Twin-skin insulated panels	Option	Factory-applied insulation; essential for temperature control in warm plant rooms or external installations
Manway / access hatch	Standard (size to specify)	600×600 mm minimum for confined-space entry; size and position at design stage, not on site
Screened air vent	Standard	Prevents insect and dust ingress while allowing atmospheric venting; vent mesh certified under an accepted Regulation 4(1)(a) scheme
Float valve(s)	Standard – specify Regulation 4(1)(a) certified	Size for fill rate; position to maintain required air gap
Drain valve	Standard	Locate at lowest point; size for acceptable drain-down time

# 4. Sectional GRP Tank Specifications, Sizes, and Design Life

## 4.5 Standard Features and Specification Options

Feature	Standard or option	Notes
Overflow and warning pipe connections	Standard	Position and size per Water Fittings Regulations requirements
Level controls / electrodes	Option	For BMS integration; high-level, operational, and low-level (pump-protection) electrodes
Temperature sensor pocket	Option	For Legionella monitoring where required by risk assessment
Internal ladder or step irons	Option (specify if confined-space entry anticipated)	Required where maintenance personnel must enter; confirm with confined-space procedure
Baffles / turnover dividers	Option	Improve water circulation and reduce effective residence time in large-volume tanks
Stainless steel structural frame	Option (premium)	Preferred in high-humidity environments or where galvanic corrosion of standard frame is a concern
Outlet vortex breaker / foot valve	Option	Prevents air entrainment at suction connection to booster set under low-water conditions

## 4.6 How Long Does a Sectional GRP Cold Water Tank Last? Design Life and Durability

When correctly specified, installed on a level base, and maintained with periodic bolt re-torque and seal inspection, a sectional GRP cold water tank has a realistic design life of 25–30 years or more. The principal factors that reduce service life are:

- Inadequate base levelling – the most common cause of premature joint failure and panel stress.
- UV degradation – relevant for externally sited tanks without UV-stabilised panels or opaque cladding.
- Aggressive water chemistry – low pH or high chloride water accelerates degradation of seals and metallic fittings.
- Neglected maintenance – seals that are not periodically inspected and bolt connections that are not re-torqued will degrade faster.
- Thermal cycling – large temperature swings accelerate fatigue of joint seals; insulation reduces this.

# 5. Design Considerations for Cold Water Storage in High-Rise Buildings

## 5.1 How to Size a Cold Water Storage Tank: Sizing Philosophy

Storage volume is not 'more is always safer'. Oversizing increases water age (residence time), raises stagnation risk, and makes temperature control harder – particularly in warm plant rooms where heat gain drives cold water temperatures up toward the Legionella risk threshold.

A sound sizing approach balances four competing requirements:

- Peak demand buffering – what peak draw-off rate must the storage sustain, and for how long?
- Resilience – how many minutes or hours of service is the design required to maintain under loss of mains supply?
- Water hygiene – what maximum residence time is acceptable, given the thermal environment and Legionella risk profile?
- Physical constraints – what footprint and height are available, and what structural floor loading is permissible?

## Quick Answer

CIBSE Guide G and BS 8558 sizing guidance

CIBSE Guide G and BS 8558 both provide demand-based sizing methodologies for cold water storage in buildings. These should be used as the primary sizing tools. The worked example below illustrates the logic only; it is not a substitute for project-specific calculation.

## 5.2 Cold Water Tank Sizing: Worked Example for a Residential Tower

### Illustrative only

The following is a simplified illustration of sizing logic for a residential tower. Actual storage calculations must be performed by a suitably qualified engineer using building-specific demand data, water company requirements, and Legionella risk assessment outputs. Do not use these figures directly for design.

Scenario: a 120-apartment residential tower, each flat averaging 2 occupants.

1. Estimate average daily demand:  $120 \times 2 \text{ persons} \times 150 \text{ L/person/day} = 36,000 \text{ L/day}$ .
2. Estimate 1-hour average demand (resilience basis):  $36,000 \div 24 = 1,500 \text{ L}$ .
3. Apply demand buffering and draw-down margin allowance of approximately 50%:  $1,500 \times 1.5 = 2,250 \text{ L}$  minimum storage.
4. Check water age: at 36,000 L/day consumption, a 10,000 L tank has a theoretical turnover time of 6.7 hours. A 50,000 L tank would have a theoretical turnover time of 33 hours – which in a warm plant room would likely create a Legionella risk. Right-size or increase turnover by baffling.
5. For continuity of supply, adopt a two-compartment arrangement:  $2 \times 2,500 \text{ L}$  provides minimum resilience during maintenance isolation of one compartment. This volume addresses short-term resilience only; continuous mains replenishment meets the full daily demand figure derived in Step 1.

# 5. Design Considerations for Cold Water Storage in High-Rise Buildings

## 5.3 Two-Compartment and Twin-Tank Arrangements: When Are They Required?

A two-compartment or twin-tank arrangement allows one compartment to be isolated for cleaning, inspection, or repair without interrupting supply from the other. This arrangement is strongly recommended for:

- Residential buildings above five storeys.
- Any building where supply interruption creates significant welfare, operational, or commercial impact.
- Buildings with a single incoming main and no alternative supply.
- Healthcare, hotel, or other occupancy types where water supply continuity is critical.

The two compartments should be separately valved on inlet, outlet, and overflow, and the arrangement should allow the building to be maintained from a single compartment indefinitely during the other's inspection cycle.



## 5.4 Where to Install a Cold Water Tank: Plant Room, Basement, or Roof

Location	Preferred characteristics	Risks to mitigate
Basement plant room	Controlled temperature; drainage; secure access; sufficient ceiling height for tank plus access platforms; structural floor loading adequate	Heat gain from boiler plant or electrical equipment adjacent to tank; flooding risk from drain back-up; pest ingress
Ground-floor plant room	Similar to basement; better structural options in some buildings	External wall proximity may allow solar heat gain; ensure thermal separation. Where Approved Document O overheating analysis has been carried out for the building, the outputs for the relevant plant room zone should be used to establish peak summer temperatures and inform the insulation specification accordingly.
Roof or roof void	Gravity head available; avoids pump energy for low floors	UV exposure; thermal extremes (summer heat and winter frost); maintenance access and safe working at height; structural loading at roof level; insulation requirements significantly greater

# 5. Design Considerations for Cold Water Storage in High-Rise Buildings

## 5.5 Where to Install a Cold Water Tank: Plant Room, Basement, or Roof

Location	Preferred characteristics	Risks to mitigate
Intermediate plant rooms (mid-rise)	Serves localised pressure zone; reduces pump head	Space constraints; access route for installation and ongoing maintenance; structural considerations at intermediate slab
Basement plant room	Controlled temperature; drainage; secure access; sufficient ceiling height for tank plus access platforms; structural floor loading adequate	Heat gain from boiler plant or electrical equipment adjacent to tank; flooding risk from drain back-up; pest ingress

## 5.6 Thermal Stratification in Large Cold Water Tanks: Risks and Controls

Thermal stratification is a significant and often overlooked risk in cold water tanks above approximately 10,000 L. This figure is a practical design threshold rather than a regulatory limit; the risk should be assessed on its merits for any large-volume installation regardless of precise capacity. In large cold water tanks – typically above 10,000 L – warmer, less dense water rises to the upper layers while cooler water settles at the base. This temperature gradient means the upper layers may exceed 20°C and enter the Legionella risk range even when a single sensor reading appears acceptable. The risk is greatest in warm plant rooms and should be assessed for any large-volume installation regardless of precise capacity.

### Design and operational responses:

- Multiple temperature sensors: specify sensor pockets at low, mid, and high levels within the tank for large-volume installations where Legionella risk assessment identifies temperature monitoring as a control measure.
- Inlet and outlet arrangement: position the inlet and outlet connections on opposite sides of the tank (diagonal flow path) to promote end-to-end turnover and mixing, rather than short-circuit flow.
- Baffles: internal baffles can divide large tanks into flow cells, forcing water to follow a defined path from inlet to outlet, reducing stagnation pockets and improving mixing.
- Insulation: adequate tank and pipework insulation reduces heat gain and minimises temperature gradients caused by external heat sources.
- Regular review of turnover time: if building occupancy changes (e.g., residential to office, or seasonal occupancy patterns), review whether storage volume remains appropriately matched to actual demand.

### Stratification risk in underoccupied buildings

Buildings that are temporarily underoccupied – during construction snagging, seasonal closures, or prolonged vacancies – are at elevated risk of thermal stratification. If stored water consumption drops significantly below design assumptions, either reduce the active storage volume or increase monitoring frequency.

# 5. Design Considerations for Cold Water Storage in High-Rise Buildings

## 5.7 Pressure Zoning and Booster Set Interface in Multi-Storey Buildings

Where tanks feed booster sets, the following design requirements apply:

- Inlet control: size float valve for maximum fill rate without water hammer. Slow-fill or delayed-fill inlet arrangements can reduce hammer risk. Devices certified under an accepted Regulation 4(1)(a) scheme required for potable supply.
- Air gap at inlet: see Section 8.3 on fluid categories and backflow prevention – the cistern inlet is typically a Category 5 risk requiring a Type AG or Type AA air gap.
- Suction arrangement: avoid vortexing at draw-off under low-water conditions. Specify a vortex breaker or foot valve on the outlet connection. The low-level pump protection cut-out electrode must prevent the booster set running dry.
- BMS integration: provide high-level, operational, and low-level (pump-protection) signals. Where water age or temperature monitoring is a control measure, integrate sensor outputs into BMS with configurable alarm thresholds.
- Bypass provision: where supply continuity is critical, provide a bypass connection that allows direct mains supply to the booster set suction in the event of tank isolation. Note: this bypasses backflow protection and requires design assessment.

## 5.8 Materials and Potable Water Suitability

All materials in contact with potable water must be verified as suitable. The relevant UK reference is BS 6920, which specifies testing for non-metallic materials in contact with water intended for human consumption. Certification under an accepted Regulation 4(1)(a) scheme – whether WRAS or Kiwa KUKreg4 – is the standard evidence mechanism. Current certification status should be verified at [wras.co.uk](http://wras.co.uk) or [kiwa.com/uk](http://kiwa.com/uk).

Internal metallic fittings (ladders, brackets, sensors) should be specified in materials that do not create galvanic corrosion or leach substances into stored water. Stainless steel grade 316 is appropriate for internal use; avoid mild steel, zinc-coated, or brass components where they would be in prolonged water contact.



# 6. GRP Cold Water Tank Costs: What Drives Price and How to Budget

## 6.1 What Drives the Cost of a Sectional GRP Cold Water Tank?

There is no standard price list for sectional GRP tanks – costs vary considerably with capacity, specification, site conditions, and procurement route. The principal drivers are:

Cost driver	Typical influence on total cost
Tank capacity	The largest single variable; larger tanks cost more in absolute terms but cost-per-litre generally falls at scale
Panel specification	Insulated twin-skin panels, UV-stabilised grades, and food-grade resin all carry a premium over standard single-skin
Structural frame material	Stainless steel frame costs more than hot-dip galvanised mild steel; justified in high-humidity or corrosive environments
Fittings and controls	Float valves, level electrodes, BMS-compatible sensors, access platforms, and manways certified under an accepted Regulation 4(1)(a) scheme add cost but are commonly mandatory
Access constraints	Difficult access routes, small plant rooms, above-ground lifting, or crane operations increase labour cost significantly
Base preparation	Concrete plinth, levelling works, drainage, and anti-vibration measures
Insulation and cladding	Proportional to tank surface area; vapour barrier and cladding protection add to cost
Commissioning and disinfection	Cleaning and disinfection to BS EN 806-5 standards; typically priced separately by a specialist contractor
Regional labour rates	Material costs are broadly national; installation labour rates vary materially by region

# 6. GRP Cold Water Tank Costs: What Drives Price and How to Budget

## 6.2 GRP Cold Water Tank Price Guide: Indicative Budget Ranges (Supply Only)

### Illustrative only

The ranges below reflect general industry knowledge as at Q1 2026 and should be treated as order-of-magnitude estimates for early budget purposes. They exclude VAT, installation, base preparation, commissioning, pipework, and associated BMS works. Costs vary by region, specification, and market conditions. Always obtain competitive quotations from manufacturers and specialist installers..

Tank capacity (approx.)	Supply-only indicative range (£)	Key specification assumption
1,000 – 5,000 L	£1,500 – £6,000	Standard single-skin panels, basic fittings
5,000 – 20,000 L	£5,000 – £20,000	Standard panels; WRAS-approved fittings; insulation option
20,000 – 50,000 L	£16,000 – £45,000	Insulated panels; full fittings; level controls
50,000 – 100,000 L	£40,000 – £90,000	Full specification including stainless frame option
100,000 L+	Bespoke quotation required	Project-specific design and pricing

## 6.3 Total Cost of Ownership: Lifecycle Budgeting for Cold Water Storage

The supply cost is a small fraction of the total lifecycle cost. A realistic budget model should also include:

Cost element	Indicative frequency	Notes
Annual inspection and water hygiene maintenance	Annual minimum	Specialist water hygiene contractor; includes temperature monitoring, microbiological sampling where required by risk assessment
Cleaning and disinfection	Annual (minimum); more frequently where risk assessment requires	Contractor-performed; confined space entry for full internal clean

# 6. GRP Cold Water Tank Costs: What Drives Price and How to Budget

## 6.4 Total Cost of Ownership: Lifecycle Budgeting for Cold Water Storage

Cost element	Indicative frequency	Notes
Component replacement (float valves, seals, level controls)	As required / 5–10 year cycles	Replacement components must be certified under an accepted Regulation 4(1)(a) scheme for potable systems
Bolt re-torque	After first fill; then as inspection findings dictate	Can be performed by site FM with appropriate training and torque equipment
Insulation condition and replacement	5–10 year inspection; replace as required	Degraded insulation increases heat gain and Legionella risk
Eventual panel replacement or full renewal	25–30 year horizon	Budget for panel-by-panel replacement or full new tank; sectional construction facilitates phased replacement



# 7. GRP vs Stainless Steel vs Polyethylene: Cold Water Tank Material Comparison

## 7.1 Cold Water Tank Materials: The Main Options in UK Building Services

Three material types dominate cold water storage in UK building services: sectional GRP, stainless steel (sectional or welded), and polyethylene (rotationally moulded, one-piece). A fourth option – concrete – is encountered in older buildings but is not specified for new-build cold water storage.

## 7.2 Detailed Comparison

Factor	Sectional GRP	Stainless steel (sectional/welded)	Polyethylene (PE/MDPE)
Typical capacity range	500 L – 500,000 L+	500 L – 500,000 L+ (fabricated to order)	100 L – approx. 30,000 L (one-piece)
Large-volume suitability	Excellent – panels enable any footprint	Excellent – fabricated to order; on-site welding possible	Limited above approx. 10,000 L (no one-piece above this)
Site assembly for restricted access	Excellent – panels through 750 mm doorways	Complex – on-site welding requires skilled trades and confined-space protocols	Not applicable – one-piece delivery only
Corrosion resistance	Excellent – GRP does not corrode	Very good (304); excellent (316) – susceptible to pitting in high-chloride water	Excellent – no corrosion
UV resistance	UV-stabilised panels required for external use	Not an issue	UV-stabilised grade required for external use
Potable water suitability	Panel formulations certified under an accepted Regulation 4(1)(a) scheme available	Grades certified under an accepted Regulation 4(1)(a) scheme available; 304 and 316 accepted	Grades certified under an accepted Regulation 4(1)(a) scheme available
Integral thermal insulation	Available as twin-skin panels; relatively effective	Low inherent insulation; external cladding required	Low inherent insulation; cladding required for temperature control

# 7. GRP vs Stainless Steel vs Polyethylene: Cold Water Tank Material Comparison

## 7.2 Detailed Comparison

Factor	Sectional GRP	Stainless steel (sectional/welded)	Polyethylene (PE/MDPE)
Design life (maintained)	25–30+ years	30+ years (316); 20–25 years (304 in aggressive water)	20–25 years
Maintenance of joints	Periodic bolt re-torque; seal inspection every 1–2 years	Minimal (welded tanks); flanged joints require periodic check	None (seamless moulding)
Capital cost (indicative)	Mid-range; cost-effective at large volumes	Higher capital cost than GRP	Low at small volumes; impractical at large
Weight / structural load	Relatively light – structural advantage over steel	Heavier; relevant for intermediate or roof locations	Lightest – minimal structural impact
Recyclability	Limited – GRP recycling is not widely available in UK	Steel is widely recycled	PE is recyclable
Typical preference	Large-volume, restricted-access multi-storey plant rooms	Healthcare, pharmaceutical, food industry where perception of hygiene is paramount; external welded tanks	Smaller break tanks in accessible locations; plant rooms with easy one-piece delivery access

# 7. GRP vs Stainless Steel vs Polyethylene: Cold Water Tank Material Comparison

## 7.3 Which Cold Water Tank Material Should You Choose?

### Choose sectional GRP when:

- The plant room is accessed through standard doorways, stairwells, or a passenger lift.
- The required volume exceeds approximately 2,000 L.
- Cost efficiency at volume is a priority.
- The installation environment is sheltered (or appropriate UV panels are specified).



### Choose stainless steel when:

- The application is healthcare, pharmaceutical, or food-related, and the client or specifier has a strong preference for stainless steel for hygiene or perception reasons.
- An externally located, welded tank is required for a specific site configuration.
- Capital cost is less sensitive and long-term maintenance of joints is a concern.

### Choose polyethylene when:

- The required volume is below approximately 2,000 L and the tank can be delivered in one piece.
- The plant room is easily accessible for one-piece delivery.
- The lowest capital cost is the overriding criterion for a smaller installation.

[Water Storage Sizing Calculator](#)

# 8. UK Compliance for Cold Water Storage Tanks: Regulations, Standards, and Legionella Control

## 8.1 Water Fittings Regulations by UK Jurisdiction: England, Wales, Scotland, and Northern Ireland

Water fittings regulation is a devolved matter in the UK. There are three separate legal instruments.

Jurisdiction	Primary Legislation	Legal Basis	Enforced by
England & Wales	Water Supply (Water Fittings) Regulations 1999 (SI 1999/1148)	Water Industry Act 1991	Water undertakers (water companies) under Regulation 5 of SI 1999/1148. They may inspect water fittings, issue enforcement notices, and bring prosecutions for contraventions.
Scotland	Water Supply (Water Fittings) (Scotland) Byelaws 2014	Water (Scotland) Act 1980, s.70	Scottish Water
Northern Ireland	Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 (SR 2009/255)	Water and Sewerage Services (Northern Ireland) Order 2006	Northern Ireland Water

### Note on Scotland:

The Scotland instrument is not a statutory instrument and carries no SSI number. The Byelaws were made by Scottish Water on 13 May 2014 and came into operation on 12 July 2014. Their period of operation has been extended by SSI 2024/139 to 12 May 2029. Most industry guidance written around "the 1999 Regulations" applies substantively to the Scotland Byelaws, but specifications must reference the correct instrument by name.

### Note on Northern Ireland:

The 2009 Regulations came into force on 3 August 2009 and were made under the Water and Sewerage Services (Northern Ireland) Order 2006, not the Water Industry Act 1991. The SR number is 2009/255.

Practical requirements are substantively the same across all three jurisdictions. Compliance documentation must reference the applicable instrument, not cite "the 1999 Regulations" as a generic UK-wide reference.

# 8. UK Compliance for Cold Water Storage Tanks: Regulations, Standards, and Legionella Control

**Do not assume England and Wales legislation applies UK-wide.** Specifications, method statements, and compliance matrices that cite only SI 1999/1148 are technically incorrect for projects in Scotland or Northern Ireland.

## 8.2 Statutory Notifications and Building Regulations Part G: England and Wales

Part G of the Building Regulations 2010 applies to cold water systems in residential and commercial buildings in England and Wales. Requirement G1 mandates a sufficient supply of wholesome water for drinking, washing, and food preparation; cold water storage installations must be designed to maintain this, including protection from contamination and adequate capacity. Where cold water tanks feed hot water plant, Requirement G3 – covering hot water storage and temperature control – is also relevant; the cold-to-hot interface and associated backflow risk should be assessed at design stage. Approved Document G references the Water Fittings Regulations as the accepted route to demonstrating compliance. Wales has its own Approved Document G, published by the Welsh Government. Projects in Wales should reference the Welsh version.

Pending change to Requirement G2 – Water Efficiency. A government consultation that closed in December 2025 proposed reducing the minimum water efficiency standard for new dwellings in England from 125 litres per person per day to 105 litres per person per day, and the optional technical standard from 110 litres per person per day to 100 litres per person per day. As of the date of this guide, the amended Approved Document G has not been formally enacted.

Regulation 5 of the Water Supply (Water Fittings) Regulations 1999 – and equivalent provisions in Scotland and Northern Ireland – requires notification to the relevant water undertaker before installing any water storage vessel exceeding 1,000 litres. Most cold water storage installations in multi-storey buildings exceed this threshold. Failure to notify is a criminal offence. Notification must be submitted before work commences; the undertaker has ten working days to respond. Submission procedures vary between undertakers and should be confirmed at project outset. Notification should be programmed as a formal milestone, and the reference number retained in the commissioning and handover documentation.

In Scotland, the Building (Scotland) Regulations 2004 and Technical Handbooks apply; in Northern Ireland, the Building Regulations (Northern Ireland) 2012 and the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 as a formal milestone with adequate lead time before the planned installation date.

# 8. UK Compliance for Cold Water Storage Tanks: Regulations, Standards, and Legionella Control

## 8.3 Statutory Notifications and Building Regulations Part G: England and Wales

The Water Fittings Regulations (and their devolved equivalents) require backflow prevention to be provided at every point where a water fitting connects to, or is supplied by, a water undertaker's main. The type of backflow prevention device required is determined by the fluid category of the water at the connection point.

### Fluid Category Definitions

Fluid category	Definition	Cold water tank relevance
Category 1	Wholesome water supplied by the water undertaker – the reference quality	The incoming mains supply before it enters any building system
Category 2	Water with a slight risk of change in aesthetic quality, e.g. water heated above 25°C or with dissolved gases from a carbonation process	Not typical for cold water tanks
Category 3	Fluid presenting a slight health hazard – water with small quantities of substances of low toxicity	Unlikely in typical cold water storage unless chemical dosing is added
Category 4	Fluid presenting a significant health hazard – water containing toxic substances, pathogens, or high concentrations of substances harmful to health	Not typical for a standard cold water CWSC in normal operation
Category 5	Fluid presenting a serious health hazard – water containing pathogens, faecal material, or hazardous substances at concentrations presenting an immediate danger to health	The water in a cold water storage cistern is classified as Category 5 because it is no longer under the control of the water undertaker and could contain bacteria, algae, or other contaminants

A cold water storage cistern (CWSC) is classified as a Category 5 risk fluid. This means the inlet arrangement feeding the cistern from the mains must incorporate the highest level of backflow protection – an air gap.

# 8. UK Compliance for Cold Water Storage Tanks: Regulations, Standards, and Legionella Control

## Backflow Prevention Device Types for Cold Water Cisterns

Device type	Description	Applicable fluid categories	Applicability to cold water cisterns
Type AA – Unrestricted air gap	Free-flowing air gap; the discharge point is at least 20 mm above the spillover level of the receiving vessel	1–5	Fully appropriate but requires careful dimensional design of the inlet pipe termination above overflow level
Type AB – Fixed air gap appliance	Air gap where the outlet discharges into an appliance with a defined overflow	1–5	Not typically used for tank inlets directly
Type AD – Air gap with injector	Air gap with a non-circular cross-section inlet; special form of air gap	1–5	Specialist application; not standard for CWSC inlets
Type AG – Air gap with circular overflow (cistern type)	The standard device for vented cistern inlets; the float valve outlet is above the defined overflow level of the cistern; the overflow acts as the primary control of maximum water level, ensuring the air gap is maintained	1–5 (when correctly sized and installed)	This is the standard backflow prevention arrangement for cold water storage cisterns in UK buildings – it is the mechanism by which the float valve and overflow together create a compliant air gap
Type AUK1 – Tap over appliance	Taps discharging over a defined appliance	3 max.	Not relevant for cistern inlets
Type BA – Reduced pressure zone valve (RPZ)	Mechanical device maintaining a zone of reduced pressure between two check valves	4 max.	Not applicable for Category 5 risk; RPZ cannot be used where backflow risk is Category 5

# 8. UK Compliance for Cold Water Storage Tanks: Regulations, Standards, and Legionella Control

## The key rule: air gap required for Category 5

Because the water in a cold water storage cistern is classified as a Category 5 fluid, the only compliant backflow prevention at the cistern inlet is an air gap device (Type AA or Type AG). Mechanical non-return valves, check valves, or RPZ valves cannot be used to protect against Category 5 backflow risk.

### Minimum Air Gap Dimension

Under the Water Fittings Regulations (and Water Regs UK guidance), the minimum free air gap at the inlet to a cistern is:

- Type AG arrangement: the float valve outlet must terminate above the overflow spillover level. The effective air gap – the vertical distance from the valve outlet to the overflow level – must be at least 20 mm or twice the internal diameter of the inlet pipe, whichever is the greater.
- The air gap must be maintained under all operating conditions, including maximum fill rate when the float valve is wide open.

### 8.4 How to Size an Overflow Pipe for a Cold Water Storage Tank

The overflow pipe must be sized so that it can discharge the full maximum inflow rate – i.e., the total inlet flow under fault conditions (float valve fully open, maximum mains pressure) – without the water level in the cistern rising above the design maximum or threatening to submerge the air gap.

#### Step-by-step sizing approach

1. Establish the maximum inlet flow rate: determine the flow rate through the float valve when it is fully open at the maximum available mains pressure. This should be obtained from the valve manufacturer's data for the specified valve size and rated pressure.
2. Apply a safety factor: the overflow pipe should be sized for at least 1.5× the maximum inlet flow rate to allow for blockage or partial obstruction over time (Water Regs UK guidance on cistern overflow arrangements).
3. Select pipe bore: use Colebrook-White or published pipe capacity tables to select a bore that discharges the design flow rate at the available head (typically the depth of overflow entry above the pipe discharge point). Circular, free-discharging overflow pipes running part-full are standard.
4. Position the overflow: the overflow entry into the cistern must be below the float valve outlet (ensuring the air gap is not threatened if water rises) and high enough above the operational water level to give a clear alarm margin before overflow commences. A warning pipe entry point is typically set 25–50 mm below the overflow level to give early warning.

# 8. UK Compliance for Cold Water Storage Tanks: Regulations, Standards, and Legionella Control

## 8.4 How to Size an Overflow Pipe for a Cold Water Storage Tank Step-by-step sizing approach

Route the discharge: the overflow discharge must be to a visible, traceable point – ideally discharging to a safe, observable location where it is immediately apparent that overflow is occurring. Do not route to a concealed drain. Water Regs UK provides additional guidance on acceptable discharge routes.

Example: a 50 mm nominal bore Reg 4-approved float valve at 3 bar mains pressure may have a maximum flow rate of approximately 2.5 L/s. The overflow should be sized to discharge at least 3.75 L/s (1.5× safety factor). A 75 mm bore overflow pipe, discharging freely, will typically carry this flow comfortably. Verify with actual pipe capacity data for the route length and fall available.

### Undersized overflows are a frequent compliance failure

Water Regs UK and DWI inspection findings consistently identify undersized or poorly routed overflow arrangements as one of the most common compliance deficiencies in cold water storage installations. Size the overflow at design stage, not on site, and verify against the specified float valve data.

## 8.5 UK Standards and Guidance for Cold Water Storage: Full Reference Table

Reference	Type	Scope	Access
Water Supply (Water Fittings) Regulations 1999 SI 1999/1148	Legal instrument (E&W)	Primary legislation for water fittings compliance in England and Wales; enforceable by water undertakers	legislation.gov.uk (free)
Water Supply (Water Fittings) (Scotland) Byelaws 2014	Legal instrument (Scotland)	Scottish equivalent of the 1999 Regulations	legislation.gov.uk (free)
Water Supply (Water Fittings) Regulations (NI) 2009 SR 2009/255	Legal instrument (NI)	Northern Ireland equivalent	legislation.gov.uk (free)

# 8. UK Compliance for Cold Water Storage Tanks: Regulations, Standards, and Legionella Control

**8.5 UK Standards and Guidance for Cold Water Storage: Full Reference Table**

Reference	Type	Scope	Access
Building Regulations 2010, Part G (E&W)	Regulatory requirement	Cold and hot water supply in new and altered buildings; requires wholesome water supply	planningportal.gov.uk (free)
BS EN 13280:2001*	British/European Standard (product)	GRP cisterns and sectional tanks; material properties, structural performance, testing; covers sectional tanks $\geq 500$ L	BSI (purchase required).
BS EN 806-5:2012	British/European Standard (operation)	Operation and maintenance of water supply installations in buildings	BSI (purchase required)
BS 8558:2015	British Standard (guidance)	Guide to the design, installation, testing, and maintenance of services supplying water for domestic use	BSI (purchase required)
BS 6920	British Standard (materials)	Non-metallic materials in contact with water intended for human consumption; referenced by Water Regs UK for material suitability	BSI (purchase required)
HSE ACoP L8 (4th edition)	Approved Code of Practice	Legionella control in water systems; has special legal weight – non-compliance is presumed negligent. Given HSE's stated intention to revise L8, a brief note acknowledging that readers should verify the current edition at hse.gov.uk	HSE website (free)

\*Verify current status with BSI at time of specification; standards are subject to periodic review.

# 7. UK Compliance for Cold Water Storage Tanks: Regulations, Standards, and Legionella Control

## 8.5 UK Standards and Guidance for Cold Water Storage: Full Reference Table

Reference	Type	Scope	Access
HSG274 Part 2	HSE guidance	Practical guidance on Legionella control in hot and cold water systems; supplements ACoP L8	HSE website (free)
CIBSE Guide G (2nd edition)	Engineering guidance	Public health and plumbing engineering; cold water storage sizing and system design	CIBSE (purchase required)
Water Regs UK guidance notes	Industry compliance guidance	Practical interpretation of Water Fittings Regulations; topic guides on cisterns, overflows, backflow prevention	waterregsuk.co.uk (free)
DWI guidance (landlord responsibilities)	Regulatory guidance	Responsibilities of building owners/landlords; references BS EN 806-5 and BS 8558	DWI website (free)

# 8. UK Compliance for Cold Water Storage Tanks: Regulations, Standards, and Legionella Control

## 8.6 Legionella Control in Cold Water Tanks: Temperature Thresholds and Risk Factors

Legionella bacteria are naturally present in the environment and colonise building water systems where temperature, stagnation, and nutrient conditions are favourable. The primary risk organism is Legionella pneumophila, the causative agent of Legionnaires' disease.

HSE guidance documents are periodically revised. Readers should confirm they are working from the current edition of both ACoP L8 and HSG274 Part 2 at the time of use. As of the date of this review, the 4th edition of ACoP L8 (2013) remains current.

### Temperature thresholds (HSE guidance)

Temperature / condition	Significance	Source
Below 20°C	Target storage and distribution temperature for cold water. HSE guidance specifies cold water should be stored and distributed below this threshold.	HSG274 Part 2; ACoP L8
20°C – 45°C	The temperature range in which Legionella can survive and multiply. Risk increases progressively through this range.	HSG274 Part 2
Around 37°C	Optimal growth temperature for Legionella pneumophila.	HSG274 Part 2
Above 60°C	Temperature at which Legionella are killed rapidly; relevant to hot water disinfection, not cold storage.	HSG274 Part 2
>20°C in cold storage	Indicates a control failure; must trigger investigation and corrective action per the written control scheme.	ACoP L8

# 8. UK Compliance for Cold Water Storage Tanks: Regulations, Standards, and Legionella Control

## Risk factors specific to cold water storage

Risk factor	Mechanism	Control measure
Warm plant room	Heat gain raises stored water temperature above 20°C	Insulate tank and pipework; manage heat sources in plant room; monitor temperature
Low turnover / oversized tank	Long residence time allows temperature rise and nutrient accumulation	Right-size storage; consider baffles; review occupancy vs design demand periodically
Sediment accumulation	Organic sediment provides nutrients for biofilm and Legionella growth	Regular inspection; annual cleaning minimum
Missing or ill-fitting lids	Ingress of dust, organic matter, insects	Maintain lids; specify lockable close-fitting covers with screened air vent
Thermal stratification	Upper layers may exceed 20°C while lower sensors show acceptable temperature	Multiple sensors at varying heights; baffles; correct inlet/outlet positioning
Stagnant deadlegs	Branch pipework with low or no flow harbours warm water	Eliminate deadlegs at design stage; where unavoidable, flush regularly
Post-modification or extended shutdown	Disruption to normal flow pattern; potential contamination during works	Disinfect after any significant modification or shutdown >7 days

# 8. UK Compliance for Cold Water Storage Tanks: Regulations, Standards, and Legionella Control

## 8.7 Dutyholder Responsibilities for Cold Water Storage: ACoP L8 Requirements

Under HSE's ACoP L8, a dutyholder must:

- Identify and assess sources of Legionella risk – a written risk assessment.
- Prepare a written scheme of precautions describing control measures.
- Implement, manage, and monitor precautions.
- Keep records of all risk assessment, monitoring, inspection, and cleaning activities.
- Appoint a responsible person to manage compliance.

For multi-storey buildings, the dutyholder is the building owner, freeholder, or management company. This responsibility cannot be fully delegated – appointing a specialist contractor discharges the operational task but not the underlying legal duty. Dutyholders remain accountable for ensuring contractors are competent and works are carried out and documented correctly.

## 8.8 Higher-Risk Residential Buildings and the Building Safety Act 2022

The Building Safety Act 2022 (BSA) introduces a separate dutyholder regime for occupied higher-risk buildings in England – defined as buildings of at least 18 metres or seven storeys containing at least two residential units. Most multi-storey residential buildings within the scope of this guide will meet this definition.

From 27 January 2026, the Building Safety Regulator (BSR) became an independent executive non-departmental public body under the Ministry of Housing, Communities and Local Government, formally separating from the HSE. The transfer of functions was effected by statutory instrument; verify the current SI number at [legislation.gov.uk](https://legislation.gov.uk) before citing in project documentation.

The Principal Accountable Person (PAP) – typically the building owner, freeholder, or management company – cannot delegate its statutory duties under the BSA. Key obligations include registering the building with the BSR, preparing and maintaining a Safety Case Report, maintaining a Golden Thread of building information, and applying for a Building Assessment Certificate when directed.

The PAP role sits alongside, and does not replace, the ACoP L8 dutyholder obligations. In practice the same organisation will hold both roles. The written Legionella control scheme and the Building Safety Case should be treated as complementary documents and kept consistent.

The BSA applies in England. Scotland, Wales, and Northern Ireland have separate devolved frameworks. Specifiers must verify the applicable regime for projects outside England.

# 8. UK Compliance for Cold Water Storage Tanks: Regulations, Standards, and Legionella Control

## 8.9 Compliance Documentation Required at Project Handover

### Evidence-based compliance

Compliance must be demonstrated through documentation at handover, not asserted verbally. A verbal assurance that the installation is compliant has no evidential value in enforcement proceedings or civil claims.

Document	Minimum content	Who is responsible
As-built drawings	Tank location, dimensions, connections, overflow route, access provisions, pipework interfaces, pressure zones	Installer / design engineer
Product data and certification	BS EN 13280 compliance declaration; evidence of current Regulation 4(1)(a) certification (WRAS or Kiwa KUKreg4) for all components in potable water contact	Installer / manufacturer
Backflow protection evidence	Drawing showing air gap arrangement; specification of float valve type (Type AG) with dimensions confirming air gap requirement is met	Design engineer / installer
Commissioning records	Inlet control test; overflow path test; BMS signal verification; leak check on fill; booster interface check	Commissioning engineer
Cleaning and disinfection certificate	Signed certificate confirming cleaning and disinfection procedure, chlorination residuals achieved, and clearance to commission	Water hygiene specialist
O&M pack	Maintenance schedule aligned to BS EN 806-5 / BS 8558; responsible person appointment; contractor contacts	Installer / building owner
Legionella risk assessment and written control scheme	Site-specific risk assessment; written scheme of precautions; monitoring regime	Water hygiene specialist / dutyholder

# 9. Water Treatment Options for Cold Water Tanks in Elevated-Risk Buildings

In most multi-storey cold water storage installations, physical controls – correct sizing, insulation, maintained covers, and regular cleaning – are sufficient to manage Legionella risk when implemented consistently.

However, some installations require supplementary water treatment:

- Buildings where it is technically impractical to maintain stored cold water below 20°C (e.g., high-temperature basement plant rooms with significant heat load).
- Where Legionella sampling has returned positive results despite physical controls being in place.
- High-risk building types where a risk assessment identifies a need for secondary control (e.g., care homes, hospitals, buildings with immunocompromised occupants).
- Where extended shutdowns or infrequent occupancy create periods of stagnation.
- The three principal supplementary water treatment options for cold water storage are described below. Selection of a treatment method should be part of the Legionella risk assessment process and written control scheme, with reference to HSE guidance.

## 9.1 UV Disinfection for Cold Water Storage: How It Works, Advantages, and Limitations

### How it works

Ultraviolet (UV) disinfection units are installed in the water distribution pipework downstream of the storage tank. Water passes through a chamber in which a UV lamp emits light at a germicidal wavelength (typically 254 nm). The UV radiation inactivates microorganisms – including Legionella – by damaging their DNA and preventing reproduction.



### Advantages

- Effective against Legionella and a wide range of microorganisms.
- Does not add chemicals to the water or alter taste, odour, or chemical composition.
- Relatively simple to install on distribution pipework downstream of the tank.
- No disinfection by-products.

### Limitations

- Provides no residual protection: UV inactivates bacteria at the point of treatment only. Downstream of the UV unit, any bacteria introduced (including from biofilm in pipework) are not controlled.
- Effectiveness depends on water clarity (turbidity reduces UV transmission). UV dose is calculated for a defined water quality; if water quality changes, dose may be insufficient.

# 8. Water Treatment Options for Cold Water Tanks in Elevated-Risk Buildings

## Limitations

- Requires regular lamp replacement (typically annually) and monitoring of UV intensity to confirm adequate dose.
- Does not address the risk of Legionella growth within the tank itself – only in the water passing through the unit.

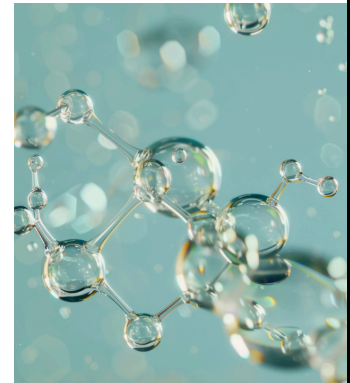
## Typical application

UV is most commonly used as a secondary control on distribution pipework in high-risk or large-scale installations (hospitals, care homes, hotel buildings) where it provides an additional barrier for water leaving the storage tank.

## 9.2 Chlorine Dioxide Dosing for Cold Water Systems: How It Works, Advantages, and Limitations

### How it works

Chlorine dioxide ( $\text{ClO}_2$ ) is a powerful oxidising biocide that is dosed into the water system – typically at the storage tank inlet, cold water distribution, or both – using an automated dosing system.  $\text{ClO}_2$  inactivates Legionella and other microorganisms and, unlike chlorine, provides a residual disinfectant effect throughout the distribution system. It also penetrates and disrupts biofilm.



### Advantages

- Provides residual disinfectant protection throughout distribution – unlike UV.
- Effective against Legionella in both planktonic (free-swimming) and biofilm-associated forms.
- Effective over a wider temperature range than chlorine.
- Does not form chloramines or trihalomethanes (the principal disinfection by-products of chlorine).

### Limitations

- Generates chlorite and chlorate by-products, which are regulated in drinking water. The Water Supply (Water Quality) Regulations 2016 (England) set a maximum of 0.5 mg/L  $\text{ClO}_2$  in water at the point of use; dosing must be controlled to comply.
- Requires a specialist dosing system with automatic control, monitoring, and failsafe provision.
- Ongoing reagent supply, system calibration, and specialist maintenance are required.
- HSE guidance notes that  $\text{ClO}_2$  systems must be properly designed and monitored – over-dosing creates regulatory and health risks; under-dosing is ineffective.

# 8. Water Treatment Options for Cold Water Tanks in Elevated-Risk Buildings

## 9.2 Chlorine Dioxide Dosing for Cold Water Systems: How It Works, Advantages, and Limitations

### Typical application

Chlorine dioxide is used in complex, large, or high-risk water systems (hospitals, care homes, large hotels, and buildings with consistently elevated Legionella risk) where a continuous residual biocide effect is required. It requires specialist design and ongoing management.

## 9.3 Copper-Silver Ionisation for Legionella Control: How It Works, Advantages, and Limitations

### How it works

Copper-silver ionisation (CSI) systems pass water through an electrolytic cell containing copper and silver electrodes. An electrical current releases copper ( $\text{Cu}^{2+}$ ) and silver ( $\text{Ag}^+$ ) ions into the water. These ions are toxic to Legionella and other microorganisms and provide residual protection throughout the distribution system.

### Advantages

- Provides residual protection throughout distribution.
- Effective against biofilm-associated Legionella where other methods are less effective.
- No chemical storage or reagent supply required on site (the electrodes are the source).

### Limitations

- Ion concentrations must be carefully monitored and controlled. Excessive copper concentrations can cause staining on sanitary ware and may exceed drinking water quality limits. The Water Supply (Water Quality) Regulations 2016 (England) set a parametric value of 2.0 mg/L copper at the point of compliance; dosing must be controlled to remain below this limit.
- Effectiveness can be reduced by high water hardness (ions may precipitate), or by low pH or high organic content.
- Electrode replacement is required periodically.
- Some evidence suggests Legionella can develop tolerance to copper-silver ionisation over time if concentrations are not maintained consistently.

### Typical application

Copper-silver ionisation is used in healthcare settings, large hotels, and other high-risk buildings, particularly where temperature control alone is insufficient. It is less commonly used than  $\text{ClO}_2$  in new UK installations but remains an accepted control measure in HSE guidance.

# 9. Water Treatment Options for Cold Water Tanks in Elevated-Risk Buildings

## 9.4 UV vs Chlorine Dioxide vs Copper-Silver Ionisation: Cold Water Treatment Comparison

Factor	UV disinfection	Chlorine dioxide	Copper-silver ionisation
Residual protection	No	Yes	Yes
Biofilm penetration	Limited	Good	Good
Chemical addition to water	No	Yes (ClO <sub>2</sub> ; by-products)	Yes (Cu, Ag ions)
Regulatory limits	None for UV itself	ClO <sub>2</sub> : max 0.5 mg/L in drinking water	Cu: max 2.0 mg/L at consumers' taps (SI 2016/614, Schedule 1)
Ongoing maintenance	Annual lamp replacement; dose monitoring	Reagent supply; system monitoring; calibration	Electrode replacement; ion concentration monitoring
Capital cost (indicative)	Lower	Mid-range	Mid-range
Complexity of operation	Lower	Higher	Mid-range
Typical application	Secondary control on distribution	High-risk or complex systems requiring residual protection	Healthcare; large hotels; high-risk buildings

*Selection of any supplementary treatment method should be part of the site Legionella risk assessment and written control scheme. Consult a qualified water hygiene specialist. All dosing systems must comply with drinking water quality regulations.*

# 10. Sectional GRP Tank Installation: Practical Guidance for High-Rise and Multi-Storey Buildings

## 10.1 Pre-Installation Checklist for Cold Water Tank Installation: Site Readiness

Check item	What to verify
Access route survey	Measure widths of all doorways, stairwells, and corridors on the delivery route; compare with the largest panel dimension plus handling equipment. Confirm lift capacity if panels are to be lifted.
Base readiness	Level tolerance: typically $\pm 3$ mm over full footprint; structural load capacity confirmed; anti-vibration provision if co-located with pumps.
Drainage	Floor drain capacity and location; safe discharge route for overflow and washdown; bunding if required.
Thermal environment	Plant room temperature profiled over a representative period; insulation strategy confirmed; heat sources identified and mitigated.
Isolation strategy	Isolation valves, bypass provision, and drain-down route confirmed and labelled before tank installation commences.
Method statement	Access and handling method statement reviewed and approved; manual handling and lifting risk assessments completed.
Permit to work	Permit system active if working adjacent to live services.

## 10.2 Cold Water Tank Base Design and Levelling: The Most Common Cause of Failure

Base errors are the leading cause of premature panel joint failure and frame distortion in sectional GRP tanks. They are also the most preventable.

- Provide a flat, level, continuous reinforced concrete plinth or designed support structure per the manufacturer's installation instructions.
- Check level in two axes across the full footprint of the tank – not only at corners.
- Maximum deviation: typically  $\pm 3$  mm over the entire base unless the manufacturer specifies a tighter tolerance.
- Do not allow point loads under frame members unless the structural design accounts for them.
- Complete a formal base inspection record, signed by the site supervisor, before assembly begins.

# 10. Sectional GRP Tank Installation: Practical Guidance for High-Rise and Multi-Storey Buildings

## 10.3 Sectional GRP Tank Assembly and Sealing: Step-by-Step

The manufacturer's installation manual is the controlling document. Deviations from it void warranties and can compromise compliance with BS EN 13280.

1. Panel orientation: follow manufacturer drawings exactly. Incorrect orientation can compromise structural performance and water tightness.
2. Seal protection: keep joint surfaces clean and free of debris, moisture, and contamination throughout assembly. Do not allow seals to be walked on or dragged across site.
3. Frame assembly: complete the structural frame before introducing panels; check frame squareness before panel installation.
4. Panel installation: follow the specified sequence (typically bottom panels first, working up); do not over-tighten fixings during initial assembly.
5. Torqueing: apply specified torque values using a calibrated torque wrench, following the manufacturer's prescribed sequence. Record all torque values on a torque log.
6. Tie rods and internal bracing: install exactly as specified. These resist hydrostatic pressure and prevent panel bowing under load – do not omit or substitute.
7. Initial water fill and re-torque: fill the tank to the operational level and allow to stand for a minimum period per manufacturer instructions before re-torqueing all bolts. This is not optional.
8. Post-settlement re-torque: schedule a further re-torque check at 4–6 weeks after initial fill. Record and retain.

### Re-torque is not optional

GRP panel seals compress slightly after initial water fill and thermal cycling. Manufacturers universally specify re-torqueing after first fill. Skipping this step is the most common cause of early joint leaks. Both the initial re-torque and the post-settlement re-torque must be logged and retained as commissioning records.

## 10.4 Cold Water Tank Connections: Inlet, Outlet, Overflow, Drain, and BMS Sensing

- Provide a Type AG air gap arrangement (float valve terminating above overflow spillover level); minimum air gap 20 mm or 2× inlet pipe diameter, whichever is greater.
- Size float valve for maximum fill rate; specify a device certified under an accepted Regulation 4(1)(a) scheme for potable applications.
- Support inlet pipework independently of the tank to avoid stress at the tank connection.

# 10. Sectional GRP Tank Installation: Practical Guidance for High-Rise and Multi-Storey Buildings

## Outlet to booster suction

- Locate outlet connection at the lowest practical point of the tank, with a vortex breaker to prevent air entrainment at low-water levels.
- Provide low-level cut-out electrode to prevent booster set running dry.

## Overflow and warning

- Size per Section 8.4 methodology: minimum 1.5× maximum inlet flow rate.
- Warning pipe entry at 25–50 mm below overflow entry – provides early alarm before full overflow commences.
- Route both overflow and warning to a clearly visible discharge point; install overflow alarm on warning pipe for BMS integration.

## Drain

- Provide a drain valve at the lowest point of the tank; size for an acceptable drain-down time given maintenance scheduling requirements.
- Route drain discharge to a safe, contained location with adequate drainage capacity.

## Sensing and BMS

- High-level, operational, and pump-protection low-level electrodes to BMS or local panel.
- Temperature sensor pockets at low, mid, and high levels for large tanks (>10,000 L) or where risk assessment requires monitoring.
- Overflow alarm (float switch or flow switch on overflow pipe) to BMS.

## 10.5 Access Hatches, Covers, and Safe Maintenance Provisions

A tank that cannot be safely accessed for inspection will not be inspected. Design access at the start, not as an afterthought:

- Specify lockable, close-fitting covers with screened air vents as a mandatory element of the tank specification, not a client option.
- Provide a manway of at least 600×600 mm (or larger if internal equipment requires access) at a height and position that enables confined-space entry per site procedure.
- Install safe access platforms or fixed handrails where the tank top is more than 1.2 m above floor level.
- Confirm adequate lighting and working space around the tank for inspection without restricted body posture.

# 10. Sectional GRP Tank Installation: Practical Guidance for High-Rise and Multi-Storey Buildings

## 10.6 Cold Water Tank Insulation and Condensation Control

- Insulate tank body and all cold water pipework in plant rooms where heat gain or condensation is a risk.
- Specify vapour-barrier-faced insulation; ensure the vapour barrier is on the warm side of the insulation to prevent moisture migration into the insulation layer.
- Confirm insulation installation does not obstruct covers, access hatches, inspection points, or sensing devices.
- Where tanks are installed in plant rooms adjacent to boilers, LPHW plant, or electrical switchgear, conduct a thermal survey to establish actual peak temperatures and size insulation accordingly.

## 10.7 Cold Water Tank Commissioning Procedure: Step-by-Step Checklist

Step	Activity	Record
1	Pre-fill visual inspection: check all seals, connections, covers, and access provisions are correct and complete.	Inspection checklist
2	Controlled fill: observe all joints, connections, and base for leaks during and after first fill. Note and address any weeping joints before proceeding.	Leak check log
3	Float valve test: confirm shut-off at design water level; confirm air gap dimension is maintained at operational level.	Float valve test sheet
4	Overflow path test: simulate high-level condition; confirm overflow discharges freely at the correct point and is visible and traceable.	Overflow test sheet
5	Warning pipe test: confirm warning pipe discharge occurs at the correct intermediate level before full overflow.	Overflow test sheet

# 10. Sectional GRP Tank Installation: Practical Guidance for High-Rise and Multi-Storey Buildings

## 10.7 Cold Water Tank Commissioning Procedure: Step-by-Step Checklist

Step	Activity	Record
6	BMS signal test: verify high-level, operational, low-level, and overflow alarm signals are correctly received and labelled in BMS.	BMS commissioning record
7	Booster set interface (where applicable): confirm low-level pump cut-out operates correctly; verify pressure and flow performance.	Booster commissioning record
8	Re-torque after fill: complete bolt re-torque per manufacturer instructions; record all torque values.	Torque log (post-fill)
9	Cleaning and disinfection: execute the specified cleaning and disinfection procedure; achieve target chlorination residuals and confirm clearance for service.	Disinfection certificate
10	Documentation: compile all records into the commissioning file; confirm O&M pack is complete and handed over.	Commissioning file

# 11. Cold Water Tank Operation and Maintenance: Schedules, Records, and Legal Requirements

## 11.1 Who Is Responsible for Cold Water Tank Maintenance? Dutyholder and Legal Accountability

Under the Water Supply (Water Fittings) Regulations and HSE's ACoP L8, the building owner or person responsible for the premises is legally accountable for the water system. For multi-storey developments, this typically sits with the building owner, freeholder, or management company, and is discharged operationally through facilities management and specialist contractors. The responsible person must be named and their appointment documented.

## 11.2 Cold Water Tank Maintenance Schedule: Weekly, Monthly, Quarterly, Six-Monthly, and Annual Tasks Weekly (FM team)

Reference	Type	Scope	Access
Check for external leaks	Visual – panels, joints, base	FM technician	Logbook
Confirm overflow not discharging	Inspect warning/overflow outlet	FM technician	Logbook
Check lid and cover integrity	Physical check – secure and sealed	FM technician	Logbook
Check plant room temperature	Verify no abnormal heat gain	FM technician	BMS / logbook

### Monthly

Reference	Type	Scope	Access
Inlet float valve operation	Observe fill cycle; confirm shut-off at	FM / contractor	Inspection sheet
Inlet screens and strainers	Remove and clean	Contractor	Service log
Insulation condition	Visual – damage, wet spots,	FM technician	Logbook
Access platform and handrail safety	Visual and physical check	FM technician	Safety log

# 11. Cold Water Tank Operation and Maintenance: Schedules, Records, and Legal Requirements

## 11.2 Cold Water Tank Maintenance Schedule: Weekly, Monthly, Quarterly, Six-Monthly, and Annual Tasks

### Quarterly

Reference	Type	Scope	Access
Internal visual inspection	Via access hatch or manway	Water hygiene contractor	Hygiene report
Sediment check	Inspect base for sludge accumulation	Contractor	Hygiene report
Internal bracing inspection	Structural visual review	Contractor	Condition report
Float valve service	Clean, adjust, test operation	Contractor	Service sheet
BMS alarm test	Test high-level, low-level, and overflow alarm signals	FM / BMS engineer	BMS log

### Six-monthly

Reference	Type	Scope	Access
Water temperature check	Calibrated thermometer at multiple levels in	Water hygiene contractor	Monitoring log
Turnover / water age review	Compare storage volume against actual	FM / engineer	Review record
Microbiological sampling *	Laboratory testing per risk assessment	Hygiene contractor	Test certificate
Water treatment system check (where installed)	UV lamp output; ClO <sub>2</sub> or ionisation dosing verification	Treatment specialist	Service report

# 11. Cold Water Tank Operation and Maintenance: Schedules, Records, and Legal Requirements

## 11.2 Cold Water Tank Maintenance Schedule: Weekly, Monthly, Quarterly, Six-Monthly, and Annual Tasks

Reference	Type	Scope	Access
Full internal inspection – drain and enter	Confined space entry procedure; inspect all internal surfaces, joints, bracing, and fittings	Specialist contractor	Inspection report
Tank clean and disinfection	Per written disinfection procedure; chlorination to residuals specified in written control scheme	Hygiene contractor	Disinfection certificate
Structural integrity review	Panels, bolts, frame condition, seal condition	Contractor	Condition report
Valve and fitting overhaul	Replace worn components; verify Regulation 4(1)(a) certification of replacement components	Contractor	Service report
Insulation inspection	Remove sections if required to inspect tank shell; reinstate with vapour barrier	Contractor	Maintenance record
Bolt re-torque	Full re-torque to manufacturer specification; record all values	Contractor	Torque log (annual)

\* Sampling frequency to be set by the site Legionella risk assessment; may be more frequent in high-risk buildings.

# 11. Cold Water Tank Operation and Maintenance: Schedules, Records, and Legal Requirements

## 11.3 Confined Space Entry for Cold Water Tank Inspection and Cleaning: Legal Requirements

Entry into a drained cold water tank for cleaning or inspection is a confined space entry under the Confined Spaces Regulations 1997. All such entries require:

- A written safe system of work and permit to work, specific to the tank entry.
- Atmospheric testing (oxygen, LEL, toxic gases) before and during entry.
- At least one trained standby person outside the confined space at all times during entry.
- Emergency rescue equipment and a trained rescue procedure.
- All entrants to hold appropriate confined space training and medical fitness.

### **Entrant competence is not optional**

Only trained and authorised personnel may enter a confined space. Appointing an untrained contractor to clean a tank because cost is a consideration is not a defence in an enforcement action following an incident. Verify contractor competence and confined space training records before commissioning any tank cleaning work.

## 11.4 Maintenance Records and Compliance Assurance for Cold Water Storage Systems

Maintain the following as a running O&M file:

- Inspection log: date, task, findings, defects, corrective actions, sign-off.
- Cleaning and disinfection certificates: signed by the contractor performing the work.
- Microbiological and temperature monitoring results – with trend data.
- Evidence of contractor competence: qualifications, training certificates, authorisation records.
- Escalation records: notifications made to dutyholder when defects or exceedances occurred.

Recommended minimum retention: 5 years, or per contractual requirements if longer.

# 12. Common GRP Cold Water Tank Failure Modes: Causes, Warning Signs, and Prevention

Failure mode	Root causes	Early warning signs	Prevention
Leaks at panel joints	Poor base levelling; debris on seals during assembly; incorrect or omitted torque; frame distortion	Wet patches on floor around tank base; water tracks on panel faces; staining on external insulation	Enforce base level tolerance; clean assembly protocol; torque log; re-torque after fill and annually
Overflow incidents and concealed flooding	Undersized overflow; blocked screens; float valve sticking; uncontrolled fill rate; no overflow alarm	Overflow discharging continuously; abnormally high water meter readings; water damage in plant room	Design overflow to fault condition flow rate; route to visible discharge; BMS overflow alarm; maintain float valve and screens
Water quality degradation (Legionella risk)	Low turnover; warm plant room; missing covers; sediment accumulation; lack of cleaning	Temperature exceedances in monitoring log; positive Legionella sampling; visible sediment at internal inspection; algae or biofilm on surfaces	Right-size storage; insulate; maintain lids and vents; implement written control scheme; annual clean minimum
Thermal stratification (large tanks)	Large volume, low occupancy, heat gain, single-point temperature measurement	Temperature at upper sensor consistently higher than lower sensor; average temperature appears acceptable but upper-layer spot checks exceed 20°C	Multiple sensors; baffles; correct inlet/outlet positioning; turnover review when occupancy changes
Panel distortion or structural failure	Inadequate base; incorrect bracing installation; excessive unsupported span; tank modification without structural assessment	Visible bowing of panel faces; separation at joints; audible creaking under load	Structural design review at specification; install bracing exactly per manufacturer; no improvised modifications

# 12. Common GRP Cold Water Tank Failure Modes: Causes, Warning Signs, and Prevention

Failure mode	Root causes	Early warning signs	Prevention
Inlet valve failure	Wear; incorrect sizing; water hammer; debris ingress	Constant sound of mains flow into cistern; tank overfilling and overflow discharging	Specify and size correctly; strainer on inlet; water hammer arrestor where required; regular valve inspection
Insulation degradation	Water ingress into insulation; mechanical damage; UV exposure; condensation	Visible damp patches on insulation; mould on cladding surface; rising cold water temperature despite insulation	Inspect annually; maintain vapour barrier; protect mechanically; replace degraded sections promptly

# 13. Cold Water Tank Implementation Framework: From Design to Handover

## 13.1 Design Stage Deliverables for Cold Water Storage in High-Rise Buildings

- Basis of design: storage volume calculation, two-compartment justification (or justification for single), system configuration, pressure zoning strategy.
- Tank schedule: capacity, configuration, insulation specification, access provisions, fittings summary, BMS integration requirements.
- Compliance matrix: Water Fittings Regulations interface points (inlet air gap type, overflow sizing calculation, materials evidence); Building Regulations Part G compliance demonstration; devolved jurisdiction references where applicable.
- Backflow prevention design: drawing showing Type AG air gap arrangement with dimensions confirming compliance.
- Overflow sizing calculation: documented flow rate analysis confirming overflow pipe size.
- Draft O&M regime: aligned to BS EN 806-5 / BS 8558 and HSE ACoP L8 / HSG274 Part 2.

## 13.2 Construction Stage Quality Controls

- Access route survey completed and delivery route confirmed.
- Base inspection sign-off before assembly.
- Assembly QA: torque log, photographic record of seals and joint condition at each stage.
- Re-torque after fill: logged and signed.
- Functional tests: all items in commissioning checklist (Section 9.7) completed and recorded.

## 13.3 Minimum Handover Documentation for Cold Water Storage Installations

- As-built drawings and schematics.
- Product data: BS EN 13280 declaration; copies of current Regulation 4(1)(a) certification evidence (WRAS or Kiwa KUKreg4) for all components in potable water contact.
- Backflow prevention evidence: drawing and float valve specification confirming Type AG compliance.
- Overflow sizing: calculation record retained in commissioning file.
- Commissioning records and cleaning/disinfection certificates.
- Completed O&M pack: maintenance schedule, responsible person, contractor contacts.
- Legionella risk assessment and written control scheme (or formal commitment to complete within agreed timescale).
- Defect and escalation procedure: who is notified when, and how.

# 14. GRP Water Solutions for High-Rise and Multi-Storey Applications

## 14.1 GRP Sectional Water Storage Tanks

The following section describes Tricel Water's own product range specifically. Capacity figures, panel dimensions, and specification details are manufacturer-specific and may differ from other suppliers. For general market comparisons, refer to Sections 3 and 6.

- Capacity: 1,000 litres to 4.6 million litres
- Construction: 1m modular GRP panels
- Larger Tanks available on request

### Panel Sizes:

- Metric panels: 1m modular format
- Available in half-panel increments (e.g., 6.65m × 4.65m × 2.5m height)
- Maximum height: 4m
- No restrictions on length or width

### Capacity Examples (Metric Panels):

- 1.15m H × 1.15m L × 1m W = 1,000 litres (220 gallons)
- 2.15m H × 2.15m L × 2m W = 8,000 litres (1,760 gallons)
- 2.65m H × 2.65m L × 2.5m W = 14,375 litres (3,162 gallons)
- 4m H × 10m L × 10m W = 400,000 litres (88,000 gallons)

### Configuration Types

#### Externally Flanged Base (EFB) Tanks:

- Manufactured for areas without space restrictions
- Built on raised supports
- Fully self-draining bases
- Ideal for maintenance and cleaning
- Easy access for joints and connections below tank

#### Internally Flanged Base (IFB) Tanks:

- Suited for areas with height or headroom restrictions
- Can be built on flat base or levelled steel beams
- Supports full weight of tank
- More compact vertical profile
- Ideal for confined spaces and rooftop installations



# 14. GRP Water Solutions for High-Rise and Multi-Storey Applications

## TIF (Tank In Frame) Tanks:

- Space-saving design for plant rooms
- Can be installed as close as 25mm from wall
- Available in 500mm and 1000mm lateral panel increments
- L-shaped tank options for awkward spaces
- Twin compartment options available
- NSF approved
- Maximizes water storage capacity in restricted spaces

## Format 30 Specification

Tricel's heavy-duty sectional tank specification meeting Section 30 of UK Water By-laws

## Features:

- Heavy-duty panel covers
- Screened vents, overflows, warning pipes
- Roof panels and side walls insulated with CFC-free polyurethane foam
- Encapsulated insulation
- Suitable for indoor and outdoor use
- Storage of potable (drinking) water
- Prevents freezing and maintains water temperature below 20°C

## Insulation Performance:

- 25mm encapsulated polyurethane foam insulation
- Thermal performance: 0.85 w/m<sup>2</sup>°C
- Slows heat transfer (note: does not completely prevent heat loss/gain over extended periods)
- Tanks in boiler rooms may require additional base insulation

## Certifications & Approvals

- Certified under Regulation 4(1)(a) of the Water Supply (Water Fittings) Regulations 1999 – confirms suitability for potable water storage.
- BS EN 13280:2001 – European standard specifying material, structural, and testing requirements for GRP cisterns and sectional tanks used for above-ground cold water storage. Verify current status with BSI at time of specification.
- BS 7491 Part 3:1994 – Withdrawn British standard for glass fibre reinforced plastics cisterns. Retained for legacy reference only; BS EN 13280 is the current applicable standard.
- BS 8558:2015 – Guide to the design, installation, testing, and maintenance of services supplying water for domestic use within buildings and their curtilages.
- BS EN 806-5:2012 – Specifications for the operation and maintenance of installations inside buildings conveying water for human consumption.
- ISO 9001 – Quality management system certification.



# 14. GRP Water Solutions for High-Rise and Multi-Storey Applications

## Installation Features

- Delivered to site palletised
- Assembled by expert Tricel site crews
- Modular design enables confined-space installation (panels fit through standard doorways)
- Base levelling steels available
- Internal stainless steel stays (underwater components)
- Full range of connections and ancillary items

## Applications

- Data centres and server rooms
- Hospitals and healthcare facilities
- Hotels and commercial buildings
- Industrial facilities
- Schools and universities
- Shopping centres and retail
- Office buildings
- Manufacturing plants

## 14.2 One-Piece Water Storage Tanks (Cisterns)

Description: Pre-moulded single-unit GRP tanks for smaller capacity water storage needs.

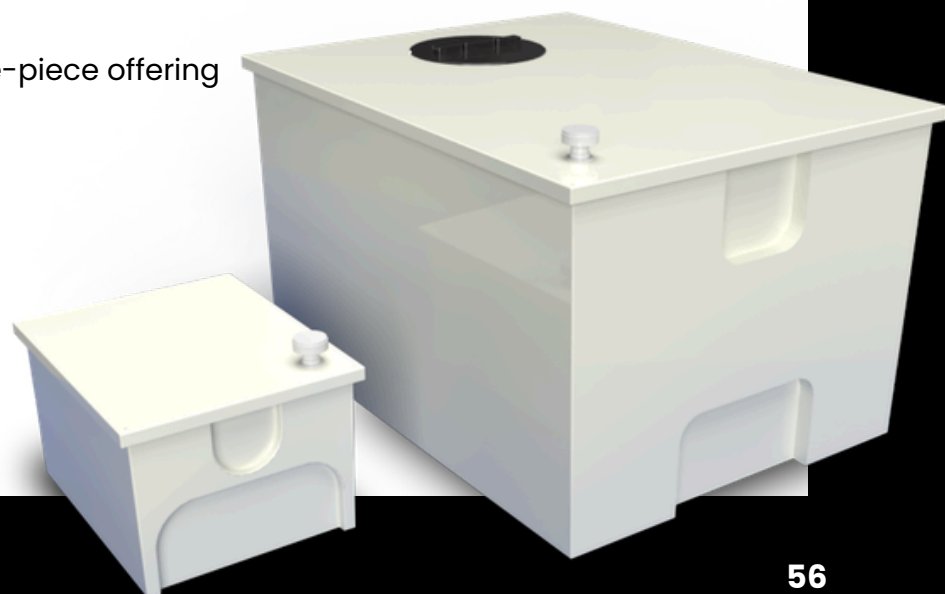
### Key Specifications

Capacity Range:

- Minimum: 45 litres
- Standard range: 45 to 6,000 litres
- Maximum (new addition): 16,000 litres
- Bespoke sizes available on request

### Popular Sizes:

- 682 litres (150 gallons) – Residential/small commercial
- 900 litres (198 gallons)
- 1,364 litres (300 gallons)
- 2,273 litres (500 gallons)
- 4,546 litres (1,000 gallons)
- 6,000 litres – NEW largest one-piece offering



# 14. GRP Water Solutions for High-Rise and Multi-Storey Applications

## 14.3 Fire Suppression Water Storage Tanks

Specialized water storage tanks designed specifically for fire protection systems, including sprinkler systems and water mist suppression.

### A. LPCB approved Fire Sprinkler Tanks

- Minimum: 135,000 litres (depending on hazard group)
- Maximum: Up to 1,300 m<sup>3</sup> (1,300,000 litres)
- Custom sizes available based on project requirements

### Certifications & Standards:

- LPCB Approved: Loss Prevention Certification Board certified
- LPS 1276 Issue 2.0: Fire sprinkler protection system standards
- LPS 1048-1: Sprinkler contractor approval scheme (UK & Ireland)
- BS EN 12845:2015+A1:2019: Fixed firefighting systems—automatic sprinkler systems
- BS 9251: Fire sprinkler systems for residential and domestic occupancies
- BS 5306 Part 2: Fire extinguishing installations and equipment—Sprinkler systems

### Hazard Group Classification:

Tanks are sized according to building hazard classification per BS EN 12845:

#### Light Hazard (LH):

Typical buildings: Hospitals, hotels, libraries, restaurants, schools, offices, data processing offices. Minimum capacity: 135,000-185,000 litres

#### Ordinary Hazard Group 1 (OH1):

Typical buildings: Laboratories, laundries, car parks, leather goods factories, museums. Minimum capacity: 185,000+ litres

#### Ordinary Hazard Group 2 (OH2):

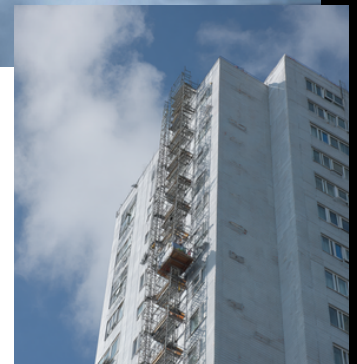
Typical buildings: Broadcasting studios, railway stations, plant rooms, farm buildings  
Minimum capacity: 185,000+ litres

#### Ordinary Hazard Group 3 (OH3):

Typical buildings: Department stores, shopping centres, paper/cardboard factories, bookbinding. Minimum capacity: Variable based on floor area

#### High Hazard:

Industrial facilities with flammable materials. Customized capacity calculations required



# 14. GRP Water Solutions for High-Rise and Multi-Storey Applications

## Design Considerations

Tricel ensures each sprinkler tank is tailored based on:

- Building volume and floor area
- Occupancy type and fire risk classification
- Hydraulically most demanding area
- Required flow rate (L/min) and duration (typically 30-90 minutes)
- Hose reel and hydrant provisions
- Local fire authority requirements
- Insurance underwriter specifications

## Construction Features

- Corrosion-resistant for long-term reliability
- Modular panel assembly for confined spaces
- Minimal maintenance requirements
- Durable construction for harsh environments
- Ancillary items typically fitted:
  - Hydrostatic contents gauge (measures water level)
  - Pressure monitoring systems
  - Pump connection provisions
  - Test and drain connections
  - Overflow and vent arrangements

## Applications

- Data centres and telecommunications facilities
- Hospitals and healthcare centres
- Hotels and residential buildings
- Commercial offices and banks
- Shopping centres and retail
- Schools and universities
- Industrial facilities
- Warehouses and distribution centres
- Museums and archiving centres



## Additional Resources

- Water tank calculators (online sizing tools)
- Technical specification sheets
- Installation manuals
- CAD drawings
- Capacity tables
- White papers
- Case studies and project references
- Product brochures (sectional tanks, one-piece tanks, fire suppression)
- Regulatory compliance guides

Other Tank Configurations include:

FIRE PROTECTION MISTING TANKS

COMBINED TANK AND PUMP SYSTEMS (CTPS).

STORMWATER ATTENUATION SYSTEMS

# 15. Case Study: Sectional GRP Cold Water Tank Installation at 20 Fenchurch Street (The 'Walkie Talkie'), London

## Project: Cold water storage installation

Case Study: 20 Fenchurch Street, London EC3 (colloquially known as the 'Walkie Talkie')

Installation date: July 2012 Sector: Commercial office

## Project Background

20 Fenchurch Street is a 38-storey, 160-metre office tower in the City of London, notable for its widening profile towards the upper floors. This configuration concentrates considerable mass at height, placing particular demands on the design and installation of building services plant installed at high level.

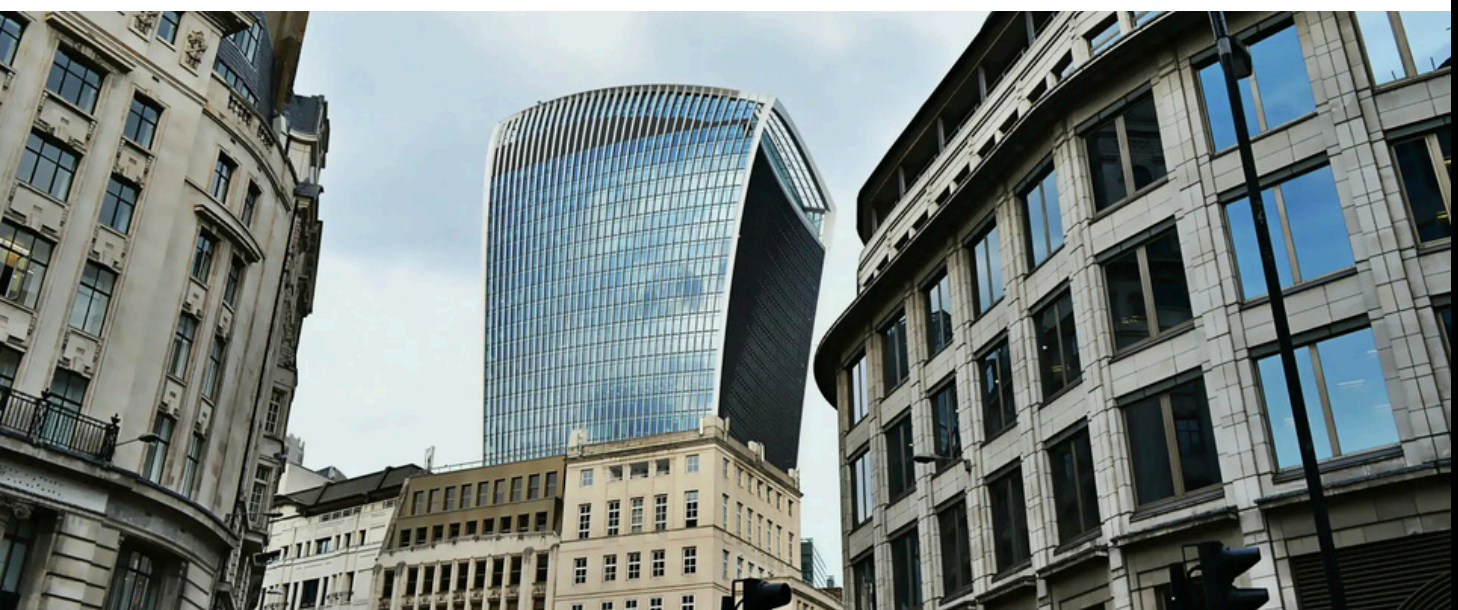
Tricel Weston was appointed to supply and install the cold water storage tank system serving the building's filtered water distribution.

## Scope of Works

The installation comprised four GRP hot-press sectional tanks:

Tank	Dimensions (metres)	Capacity (litres)
1	9 × 6 × 3	162,000
2	7 × 6 × 3	126,000
3	2 × 2 × 2	8,000
4	2 × 2 × 2	6,000

Total installed capacity: **302,000 litres**



# 15. Case Study: Sectional GRP Cold Water Tank Installation at 20 Fenchurch Street (The 'Walkie Talkie'), London

The works included supply, delivery, offloading, positioning, and installation, together with levelling steelwork, interconnecting pipework, access ladders, and perimeter guardrails. All work was carried out under a single-point responsibility arrangement.

## **Installation Considerations**

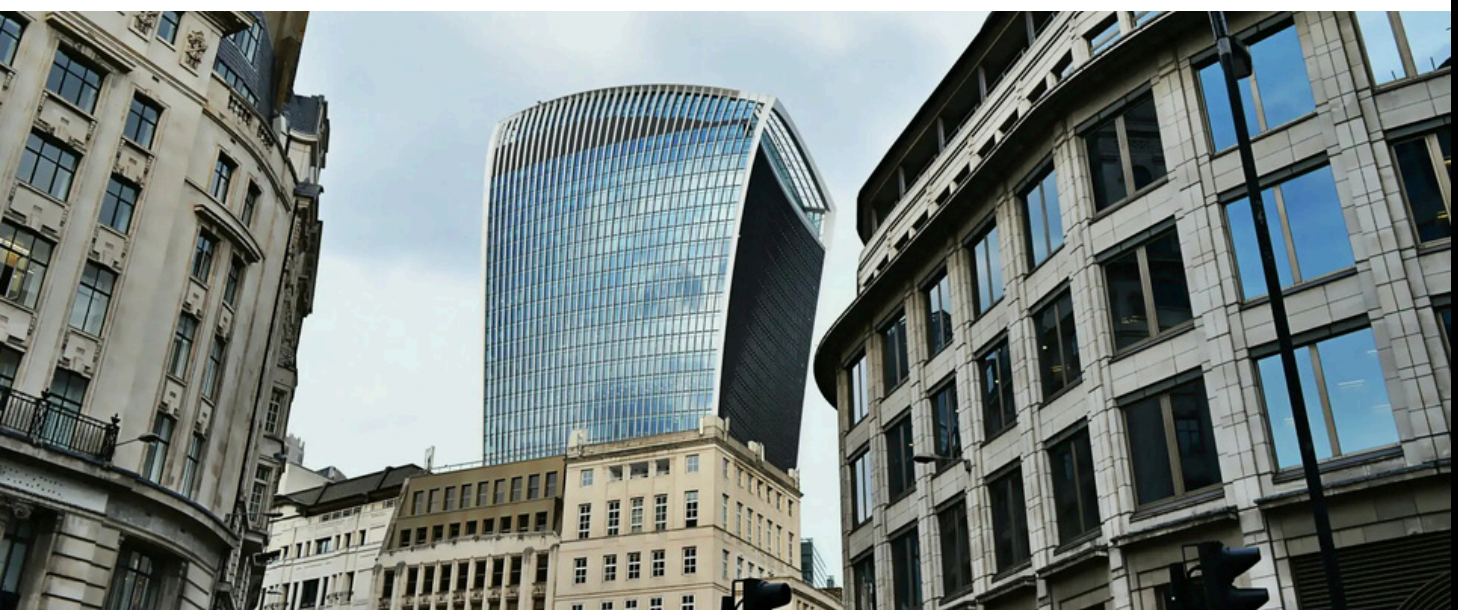
High-rise installations of this scale present logistical and co-ordination constraints that differ materially from ground-level plant room work. Key considerations on this project included:

- Access and crange – tank panels and ancillary steelwork required coordinated lifting to the plant level within the construction programme
- Structural interface – levelling steelwork was designed to distribute tank loads onto the designated structural supports without modification to the primary frame
- Programme integration – installation was sequenced alongside other building services trades to avoid programme conflict in a constrained plant area

## **Outcome**

The four tanks were installed as specified and within the project programme. The completed system provides filtered water storage and distribution across the full height of the building.

20 Fenchurch Street remains one of the taller commercial office buildings in the City of London. The installation demonstrates the suitability of GRP hot-press sectional tanks for high-level plant rooms where access constraints, structural load limits, and programme pressure require careful pre-installation planning.



# Conclusion

Sectional GRP tanks solve a specific practical problem: how to install large-volume cold water storage in plant rooms that cannot accept a one-piece vessel. The technology is mature. The failures documented in this guide – joint leaks, overflow incidents, Legionella exceedances, thermal stratification – are not inherent to the product. They result from decisions made at design, installation, or facilities management stage.

What this guide makes clear, however, is that the tank itself is only one part of the picture. The decisions that determine whether a cold water storage installation performs well over its full service life are made before and after the tank arrives on site – in the sizing calculation, the structural interface design, the access and commissioning plan, and the maintenance regime that follows handover.

Five points determine whether an installation performs well over its service life.

**Sizing is a balance, not a maximum.** Oversized tanks increase water age and stagnation risk. Size for demand and resilience without compromising temperature control.

**Compliance requires documentation, not assertion.** Backflow prevention, overflow sizing, material suitability, and cleaning certification must be evidenced at handover. Verbal assurances are not acceptable substitutes.

**Jurisdiction matters.** Scotland and Northern Ireland have separate legal instruments. Citing only the England and Wales 1999 Regulations is incorrect for projects in those jurisdictions.

**Maintenance determines longevity.** The 25 to 30 year design life is conditional on bolt re-torque, annual cleaning, temperature monitoring, and a written Legionella control scheme.

**The dutyholder carries the liability.** Appointing a competent contractor discharges the operational task. It does not transfer the underlying legal duty.

# References and Further Reading: UK Regulations, Standards, and Guidance for Cold Water Storage

## Legislation

- Water Supply (Water Fittings) Regulations 1999, SI 1999/1148 – [legislation.gov.uk](https://www.legislation.gov.uk)
- Water Supply (Water Fittings) (Scotland) Byelaws 2014, made by Scottish Water under the Water (Scotland) Act 1980, s.70. These Byelaws are not a statutory instrument and carry no SSI number. Their period of operation has been extended to 12 May 2029 by SSI 2024/139. Available at [legislation.gov.uk](https://www.legislation.gov.uk).
- Water Supply (Water Fittings) Regulations (Northern Ireland) 2009, SR 2009/255 – [legislation.gov.uk](https://www.legislation.gov.uk)
- Building Regulations 2010 (as amended), Part G Approved Document – [planningportal.gov.uk](https://www.planningportal.gov.uk)
- Confined Spaces Regulations 1997, SI 1997/1713 – [legislation.gov.uk](https://www.legislation.gov.uk)
- Water Supply (Water Quality) Regulations 2016 (England), SI 2016/614 – [legislation.gov.uk](https://www.legislation.gov.uk)
- Building Safety Regulator (Establishment of New Body and Transfer of Functions etc.) Regulations 2026 (SI 2026/20) – [legislation.gov.uk](https://www.legislation.gov.uk). Formally separates the Building Safety Regulator from the Health and Safety Executive with effect from 27 January 2026.

## British and European Standards

- BS EN 13280:2001 – Cisterns for the storage of cold potable water for household and catering purposes. Subject to periodic review cycles, latest version to be consulted
- BS EN 806-5:2012 – Specifications for installations inside buildings conveying water for human consumption: operation and maintenance.
- BS 8558:2015 – Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.
- BS 6920 – Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water.

## HSE Guidance: Available at [hse.gov.uk](https://www.hse.gov.uk)

- [HSE Approved Code of Practice and Guidance](#) (L8, 4th edition): Legionella bacteria – the control of Legionella bacteria in water systems.
- [HSG274 Part 2](#): Legionella and the prevention of Legionellosis – the control of Legionella bacteria in hot and cold water systems.

## Industry and Regulatory Guidance

- Water Regs UK – topic guidance notes on cold water storage cisterns, overflow and warning pipe arrangements, backflow prevention, and material suitability. Available at: [waterregsuk.co.uk](https://www.waterregsuk.co.uk)
- Drinking Water Inspectorate (DWI) – guidance on landlord and owner responsibilities and plumbing system maintenance. Available at: [dwi.gov.uk](https://www.dwi.gov.uk)
- CIBSE Guide G: Public Health and Plumbing Engineering (2nd edition). Available from: [cibse.org](https://www.cibse.org)
- Regulation 4(1)(a) product certification databases – WRAS: [wras.co.uk](https://www.wras.co.uk); Kiwa KUKreg4: [kiwa.com/uk](https://www.kiwa.com/uk)

## Frequently Asked Questions

### GRP Cold Water Tanks in High-Rise and Multi-Storey Buildings

**Q: What is a sectional GRP cold water tank?**

**A:** A sectional GRP cold water tank is a modular water storage vessel assembled on-site from glass reinforced plastic panels bolted to a structural frame and sealed at joints. The sectional construction allows panels to be passed through standard doorways and assembled in restricted plant rooms, making it the dominant choice for large-volume cold water storage in high-rise and multi-storey buildings. See Section 2 for a full definition.

**Q: What is the difference between a GRP tank and a GRP cistern?**

**A:** The terms are used interchangeably in practice. Technically, a cistern is open to atmosphere (vented), while a tank may be pressurised or sealed. Most cold water storage vessels in high-rise and multi-storey buildings are vented cisterns. The Water Fittings Regulations refer to storage cisterns; industry practice uses tank. Both refer to the same product in this context.

**Q: How long does a sectional GRP cold water tank last?**

**A:** A correctly installed and maintained sectional GRP tank can achieve a design life of 25–30 years or more. The principal factors affecting longevity are base levelness, maintenance of joint seals (periodic bolt re-torque), quality of the panel resin system, and whether the tank is protected from UV (for external installations). Neglected maintenance significantly shortens service life.

**Q: Does a GRP cold water tank require Regulation 4(1)(a) certification?**

**A:** Regulation 4(1)(a) of the Water Supply (Water Fittings) Regulations 1999 requires that fittings in contact with potable water do not contaminate the water supply and are mechanically fit for purpose. Independent certification is not a statutory obligation in every instance, but it is the accepted means of demonstrating compliance and is required by most water companies and project specifications. Two schemes currently operate in the UK: WRAS and Kiwa KUKreg4. Always verify current certification status at [wras.co.uk](http://wras.co.uk) or [kiwa.com/uk](http://kiwa.com/uk); certifications can lapse.

**Q: What fluid category is a cold water storage cistern?**

**A:** The water in a cold water storage cistern is classified as Fluid Category 5 under the Water Fittings Regulations – a fluid presenting a serious health hazard. This means the inlet to the cistern from the mains supply must be protected by an air gap device (Type AA or Type AG air gap). Mechanical backflow prevention devices such as non-return valves or RPZ valves cannot protect against Category 5 risk. See Section 7.3.

**Q: What type of air gap is required at a cistern inlet?**

**A:** The standard backflow prevention arrangement for a cold water storage cistern inlet is a Type AG air gap – a float valve whose outlet terminates above the cistern overflow spillover level. The minimum free air gap is 20 mm or twice the internal diameter of the inlet pipe, whichever is greater. This must be maintained under all operating conditions including maximum fill rate.

This guide provides general information only. Consult qualified professionals for facility-specific advice.

## Frequently Asked Questions

### GRP Cold Water Tanks in High-Rise and Multi-Storey Buildings

**Q: How should the overflow pipe on a cold water tank be sized?**

**A:** Size the overflow pipe for at least 1.5 times the maximum inlet flow rate under fault conditions – that is, when the float valve is fully open at maximum available mains pressure. This safety factor allows for partial blockage over time. Select pipe bore using standard flow calculations for the available head and discharge route. The overflow must discharge to a visible, traceable point; do not route to a concealed drain. See Section .4 for the full methodology.

**Q: What temperature should a cold water storage tank be kept at?**

**A:** HSE guidance (HSG274 Part 2 and ACoP L8) specifies that cold water should be stored and distributed at or below 20°C. Legionella bacteria can survive and multiply at temperatures between 20°C and 45°C, with optimal growth at approximately 37°C. Cold water tanks in warm plant rooms must be insulated and monitored to confirm that stored water remains below the 20°C threshold.

**Q: How often should a cold water tank be cleaned?**

**A:** Annual cleaning and disinfection is the minimum baseline per HSE guidance and the standards referenced by the DWI (BS EN 806-5 and BS 8558). The exact frequency should be determined by the site Legionella risk assessment. Tanks in high-risk environments – warm plant rooms, buildings with immunocompromised occupants, or following positive Legionella sampling – may require more frequent cleaning.

**Q: What regulations apply to cold water tanks in Scotland?**

**A:** In Scotland, the applicable legislation is the Water Supply (Water Fittings) (Scotland) Byelaws 2014, made by Scottish Water under the Water (Scotland) Act 1980, s.70. These Byelaws are not a statutory instrument and carry no SSI number. They are enforced by Scottish Water. The requirements are substantively the same as the 1999 Regulations in England and Wales – including backflow prevention, overflow arrangements, and material suitability – but the Scottish instrument must be cited in Scottish project documentation. Building services standards (BS EN 13280, BS EN 806-5, HSE ACoP L8) apply UK-wide.

**Q: What regulations apply to cold water tanks in Northern Ireland?**

**A:** In Northern Ireland, the applicable legislation is the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 (SR 2009/255), enforced by Northern Ireland Water. Requirements are substantively the same as the 1999 Regulations in England and Wales. Always reference the correct instrument in Northern Ireland project documentation.

This guide provides general information only. Consult qualified professionals for facility-specific advice.

## Frequently Asked Questions

### GRP Cold Water Tanks in High-Rise and Multi-Storey Buildings

**Q: What is Building Regulations Part G and does it apply to cold water tanks?**

**A:** Part G of the Building Regulations 2010 (England and Wales) covers Sanitation, Hot Water Safety and Water Efficiency. Requirement G1 requires that premises are provided with a sufficient supply of wholesome water. Cold water storage tanks supplying domestic cold water services in new or altered buildings must be designed and installed to comply with G1, including protection from contamination and adequate capacity. Approved Document G references the Water Supply (Water Fittings) Regulations as the accepted compliance route.

**Q: What are the options for water treatment in a cold water tank?**

**A:** Where physical controls alone are insufficient to manage Legionella risk – for example in buildings where stored cold water temperature cannot reliably be kept below 20°C – three supplementary treatment options are available: UV disinfection (point-of-treatment inactivation; no residual protection); chlorine dioxide dosing (residual biocide; requires careful control within drinking water limits); and copper-silver ionisation (residual protection; requires ion concentration monitoring). Selection should be part of the Legionella risk assessment. See Section 8 for full details.

**Q: What is thermal stratification and why does it matter in large cold water tanks?**

**A:** Thermal stratification occurs when warmer, less dense water rises to the upper layers of a large storage tank while cooler water settles lower. In a multi-storey plant room with heat gain, the upper layers of a large tank can exceed 20°C – entering the Legionella risk range – even when average temperature or a single low-level sensor reading appears acceptable. Mitigation measures include multiple temperature sensors at different heights, internal baffles to promote mixing, and correct inlet/outlet positioning.

**Q: Can I install a sectional GRP tank in a confined plant room?**

**A:** Yes – this is the primary design advantage of sectional GRP construction. Panels can be carried through standard doorways (typically 750 mm minimum) and assembled in-situ. Complete an access route survey before delivery to confirm panel dimensions are compatible with available openings, turns, stairwells, and lift capacity. Prepare a handling method statement and lifting plan before delivery.

This guide provides general information only. Consult qualified professionals for facility-specific advice.

## Frequently Asked Questions

### GRP Cold Water Tanks in High-Rise and Multi-Storey Buildings

**Q: Does a cold water storage tank need to be notified to the water company?**

**A:** Yes. Regulation 5 of the Water Supply (Water Fittings) Regulations 1999 – and equivalent provisions in Scotland and Northern Ireland – requires notification to the relevant water undertaker before installing any water storage vessel with a capacity exceeding 1,000 litres. Most multi-storey installations exceed this threshold. Failure to notify is a criminal offence. Notification must be submitted before work commences; the undertaker has ten working days to respond.

**Q: What is the Building Safety Act 2022 and does it apply to cold water tanks?**

**A:** The Building Safety Act 2022 (BSA) introduces a separate dutyholder regime for occupied higher-risk buildings in England – defined as buildings of at least 18 metres or seven storeys containing at least two residential units. The Principal Accountable Person (PAP) under the BSA holds obligations that sit alongside, and do not replace, the ACoP L8 Legionella control duties. The written Legionella control scheme and the Building Safety Case should be treated as complementary documents. The BSA applies in England; Scotland, Wales, and Northern Ireland have separate devolved frameworks.

**Q: Can a sectional GRP cold water tank be installed on a roof?**

**A:** Yes, but rooftop installations carry specific risks that require careful design attention: UV exposure requires UV-stabilised panel grades; thermal extremes (summer heat and winter frost) demand significantly greater insulation; structural loading at roof level must be assessed by a structural engineer; and safe working at height must be provided for ongoing maintenance access. Rooftop gravity storage is less favoured in modern practice than low-level break-tank-and-booster arrangements. See Section 4.4 for a full comparison of installation locations.

This guide provides general information only. Consult qualified professionals for facility-specific advice.

## Glossary of Cold Water Storage and Compliance Terms

Term	Definition
ACoP L8	HSE Approved Code of Practice: Legionella bacteria – the control of Legionella bacteria in water systems. Has special legal status – failure to comply is admissible in evidence and presumed negligent unless the duty holder can demonstrate an equally effective alternative. Given HSE's stated intention to revise L8, readers should verify the current edition at <a href="http://hse.gov.uk">hse.gov.uk</a>
Air gap	A physical break in a water supply pipe; the space between the outlet of a fitting and the maximum water level in a receiving vessel or appliance. The most reliable form of backflow prevention.
Backflow	The reverse flow of water from a downstream point back towards a supply main; can contaminate the public supply.
Backflow prevention	Engineering measures preventing contaminated water flowing back into the supply main.
Baffle	An internal partition within a storage tank designed to direct or impede water flow, improving circulation and reducing stratification.
BMS	Building Management System – centralised electronic monitoring and control of building services plant.
Break tank	A cistern providing a hydraulic break between the mains supply and the downstream booster pump system.
BS 6920	British Standard for non-metallic materials in contact with water intended for human consumption.
BS 8558	Guide to the design, installation, testing, and maintenance of services supplying water for domestic use within buildings; published by BSI.
BS EN 13280	European standard specifying requirements for GRP cisterns and sectional tanks for above-ground cold water storage (≥500 L).
BS EN 806-5	Specifications for installations inside buildings conveying water for human consumption: operation and maintenance.
Building Safety Act 2022 (BSA)	UK legislation introducing a dutyholder regime for higher-risk buildings in England (18 metres or seven storeys, at least two residential units). Creates the role of Principal Accountable Person (PAP) with non-delegable statutory duties. Applies in England; devolved frameworks apply elsewhere.

## Glossary of Cold Water Storage and Compliance Terms

Term	Definition
CAFM / CMMS	Computer Aided Facilities Management / Computerised Maintenance Management System.
Chlorine dioxide (ClO <sub>2</sub> )	An oxidising biocide used as a supplementary water treatment; provides residual protection; regulated in drinking water quality standards.
Cistern	An open-topped (vented) water storage vessel; commonly used synonymously with 'tank' in building services practice.
Confined space	A space that is substantially enclosed and where a reasonably foreseeable risk exists of serious injury from hazardous substances, oxygen deficiency, or other conditions; defined by the Confined Spaces Regulations 1997.
Copper-silver ionisation (CSI)	A water treatment method using copper and silver ions to inactivate Legionella; requires monitoring of ion concentrations against drinking water quality limits.
COSHH	Control of Substances Hazardous to Health Regulations 2002.
CWSC	Cold Water Storage Cistern.
DCWS	Domestic Cold Water Services.
Deadleg	A section of pipe with no or very low flow; creates a warm, stagnant zone that can harbour Legionella.
DWI	Drinking Water Inspectorate – independent UK regulator for drinking water quality.
Dutyholder	The person or organisation with legal responsibility for the water system; responsible for Legionella control under ACoP L8.
Fluid category	A classification (1–5) under the Water Fittings Regulations defining the contamination risk level of a fluid, which determines the required type of backflow prevention device.
Float valve	Inlet control valve that closes automatically when the cistern reaches the design water level; the standard inlet control for cold water cisterns.
GRP	Glass Reinforced Plastic – a composite material of glass fibres and polymer resin; does not corrode; used for cold water tank panels.
HSG274 Part 2	HSE guidance on Legionella control in hot and cold water systems; supplements ACoP L8 with practical guidance.

## Glossary of Cold Water Storage and Compliance Terms

Term	Definition
Kiwa KUKreg4	A Regulation 4(1)(a) certification scheme operated by Kiwa UK. An accepted alternative to WRAS certification for demonstrating that water fittings comply with the Water Supply (Water Fittings) Regulations 1999 and are suitable for potable water contact. Certification status searchable at <a href="http://kiwa.com/uk">kiwa.com/uk</a>
Legionella	A genus of gram-negative bacteria found naturally in water; Legionella pneumophila causes Legionnaires' disease when inhaled as a fine aerosol.
Legionella risk assessment	A systematic written evaluation of a water system to identify conditions that could promote Legionella growth and assess risk of exposure.
MDPE	Medium Density Polyethylene – a plastic material used for smaller cold water storage tanks and pipework.
O&M	Operation and Maintenance.
Overflow pipe	A pipe from the cistern that discharges if the water level rises above the design maximum level; sized for fault-condition inlet flow.
Notification (Regulation 5)	The statutory requirement under Regulation 5 of the Water Fittings Regulations to notify the relevant water undertaker before installing a water storage vessel exceeding 1,000 litres. Failure to notify is a criminal offence.
PPM	Planned Preventive Maintenance.
Principal Accountable Person (PAP)	Under the Building Safety Act 2022, the person or organisation responsible for the safety of a higher-risk residential building in England. Cannot delegate statutory duties. Obligations sit alongside, and do not replace, ACoP L8 dutyholder duties.
Responsible person	Under HSE's ACoP L8, the individual appointed by the dutyholder to manage and implement Legionella precautions; must have sufficient authority, competence, and knowledge.
RPZ valve	Reduced Pressure Zone valve – a mechanical backflow prevention device; can only protect against Category 4 or lower fluid risk; cannot be used for Category 5.
Sectional tank	A water storage tank assembled from modular panels on-site.
SFG20	Standard Maintenance Specification for Building Engineering Services – widely used UK framework for planned preventive maintenance schedules.

## Glossary of Cold Water Storage and Compliance Terms

Term	Definition
Thermal stratification	A temperature gradient in a stored water vessel, typically warmer at the top and cooler at the bottom; a risk factor for Legionella in large cold water tanks.
Torque log	A record of the bolt torque values applied during tank assembly and re-torque checks; required as a commissioning and maintenance record.
Turnover time / water age	The average time water spends in storage before use; high water age increases temperature, stagnation, and contamination risk.
Type AG air gap	The standard backflow prevention arrangement for a cold water cistern inlet – a float valve whose outlet terminates above the cistern overflow spillover level with a minimum free air gap.
UV disinfection	Water treatment using ultraviolet light to inactivate microorganisms; provides no residual protection downstream of the treatment point.
Vortex breaker	A device fitted to the outlet connection of a tank to prevent air entrainment and vortexing at low-water draw-off conditions.
Warning pipe	A smaller pipe positioned below the overflow pipe entry; discharges before full overflow to give early warning of a float valve fault.
Water Fittings Regulations	Water Supply (Water Fittings) Regulations 1999 (E&W); primary legal instrument for water fittings compliance.
WRAS	WRAS – Water Regulations Advisory Scheme – one of two principal UK independent bodies that test and certify water fittings for compliance with Regulation 4(1) (a) of the Water Supply (Water Fittings) Regulations 1999 and for suitability in contact with potable water. Certification status searchable at <a href="http://wras.co.uk">wras.co.uk</a>
Written control scheme	A document, required by ACoP L8, describing the precautions in place to control Legionella risk in a water system; must be site-specific, implemented, and kept current.

# Appendix A: Draft Operation and Maintenance Schedule for Sectional GRP Cold Water Tanks

This schedule is formatted for direct inclusion in an O&M manual or CAFM system. Task references follow an SFG20-compatible naming convention.

## A1. Asset Register Information

Field	Entry (to be completed)
Building / Site	
Plant Room Location	
Tank Reference ID	
Manufacturer	
Tank Type	Sectional GRP
Capacity (litres)	
Dimensions (L x W x H)	
Installation Date	
Commissioning Date	
Potable Water Use	Yes / No
Insulation Type	
Booster Set Interface	Yes / No
Water Treatment System (if installed)	None / UV / ClO <sub>2</sub> / CSI / Other
Responsible Dutyholder	
Water Hygiene Contractor	
Mechanical Maintenance Contractor	

# Appendix A: Draft Operation and Maintenance Schedule for Sectional GRP Cold Water Tanks

## A2. Compliance References by UK Jurisdiction

- Water Supply (Water Fittings) Regulations 1999 (E&W) / 2014 (Scotland) / 2009 (NI) – as applicable to project jurisdiction.
- Building Regulations Part G (E&W) / equivalent devolved regulations – as applicable.
- BS EN 806-5:2012 – Operation and maintenance of water supply installations in buildings.
- BS 8558:2015 – Complementary UK guidance for water services.
- HSE ACoP L8 – Legionella control (where applicable).
- HSG274 Part 2 – Legionella control in hot and cold water systems.
- Exact applicability to be confirmed within the site Water Hygiene Risk Assessment and written control scheme.

## A3. Defect Escalation Protocol

Issue	Action	Response time	Record
Active leak from tank or joints	Isolate tank; notify contractor immediately	Immediate	Defect log
Contamination risk identified	Notify dutyholder and water hygiene contractor; do not use water for potable supply until cleared	Immediate	Incident log
Temperature exceedance (>20°C in cold storage)	Notify responsible person; assess heat source and insulation; increase monitoring frequency	Same day	Monitoring log
Thermal stratification detected	Review sensor data; assess insulation, baffles, and inlet/outlet arrangement; consult water hygiene specialist	Within 48 hours	Hygiene report
Structural defect (bowing, joint separation)	Engineering assessment; restrict or isolate tank use if structural risk is identified	Within 48 hours	Defect log
Overflow discharging	Inspect and service inlet float valve; confirm overflow route is unobstructed	Same day	Service log

# Appendix A: Draft Operation and Maintenance Schedule for Sectional GRP Cold Water Tanks

## A3. Defect Escalation Protocol

Issue	Action	Response time	Record
Microbiological exceedance (Legionella positive)	Notify dutyholder; execute shock disinfection procedure per written control scheme; resample to confirm clearance	Immediate	Hygiene report
Water treatment system fault (UV, ClO <sub>2</sub> , CSI)	Notify treatment specialist; assess whether alternative controls are adequate while treatment is offline	Within 24 hours	Service record

## A4. Recommended Spare Parts Inventory

Component	Recommended stock
Float valves (Regulation 4(1)(a) certified, matched to specified type)	1 set per tank
Panel bolts and joint gaskets	Manufacturer's maintenance kit
Access hatch seals	1 spare per hatch
Level control electrodes / switches	1 set
Drain valves	1 spare
Inlet strainer elements / screens	2 spares
UV lamp (where UV system installed)	1 spare lamp
Water treatment reagents (where ClO <sub>2</sub> system installed)	Minimum 4-week supply



# TRICEL

GENERATIONS OF INNOVATION

+44 (0)1934 314 079  
websales@tricelwater.co.uk  
[www.tricelwater.co.uk](http://www.tricelwater.co.uk)