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Sectional GRP Cold Water Tanks in UK Infrastructure Projects

A Specification and Compliance Guide for Engineers and Asset Managers

2026 Edition

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www.tricelwater.co.uk

Executive Summary

Cold water storage is a fundamental but frequently underspecified element of building services design. The decisions made at specification stage — material, configuration, capacity, and compliance route — directly affect water quality, regulatory liability, maintenance burden, and asset longevity across the full life of a building. Errors made in specification are rarely cheap to correct once a building is occupied.

Glass Reinforced Plastic (GRP) has been the dominant material for cold water storage tanks in UK commercial and public sector infrastructure for several decades. It is well-supported by British and European standards, carries regulatory approval for potable water storage, and offers measurable advantages over alternatives in corrosion resistance, structural loading, and hygienic internal surface characteristics. Yet the published guidance available to specifiers and asset managers remains fragmented — spread across product data sheets, health and safety legislation, British Standards, and sector-specific health technical memoranda.

This document brings that material together into a single technical reference. It is written for consulting engineers, M&E designers, and asset managers working on UK infrastructure projects. It covers the case for GRP as a storage material, the regulatory and standards framework that governs its use, the principles of capacity calculation, configuration selection, installation, and ongoing maintenance obligations. Sector-specific considerations for healthcare, education, data centres, and high-rise residential are addressed in Section 8.

Key reference standards: BS EN 13280:2001 |Water Supply (Water Fittings) Regulations 1999 | ACoP L8 |HSG274 Parts 1–3 | BS EN 12845| BS 8558 |Approved Document G | HTM 04-01

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 Points

The following statements summarise the principal technical, regulatory, and operational conclusions of this whitepaper. They are written to provide a rapid orientation for readers who are reviewing the document for the first time and as a reference for experienced practitioners who need to confirm a specific position.

Material and Specification

- Sectional GRP is the standard material for large-volume cold water storage in UK infrastructure. Its combination of corrosion immunity, smooth internal surface, structural economy, and BS EN 13280 compliance makes it the default choice across commercial, public sector, and industrial applications.
- Regulation 4 compliance is the accepted mechanism in the UK for demonstrating that a tank and its materials are suitable for contact with potable water under the Water Supply (Water Fittings) Regulations 1999. Tricel Water products carry Kiwa certification as their route to Regulation 4 compliance. Certification status must be verified at kiwa.com/uk at the time of specification; certificates can and do lapse. The certificate number must be recorded on specification documents and in the building O&M manual at handover.
- BS EN 13280:2001 is the governing product standard for above-ground GRP cold water storage tanks. Compliance is a prerequisite for Regulation 4 certification of GRP products, including Kiwa certification. The current status of the standard must be confirmed before it is cited in a specification.
- GRP is not appropriate for every application. Tanks above approximately 2–3 million litres are generally better served by glass fused to steel (GFS). Burial, elevated temperature storage, and aggressive chemical storage each require different materials or configurations.

Regulatory and Compliance

- Non-compliance with the Water Supply (Water Fittings) Regulations 1999 is a criminal offence. Enforcement is held by water undertakers. Water companies may require evidence of WRAS approval as a condition of mains connection.
- Water fittings regulation is devolved. Scotland operates under SSI 2014/317; Northern Ireland under SR 2009/75. Projects in those jurisdictions must cite the correct statutory instrument — citing SI 1999/1148 alone is technically incorrect.
- ACoP L8 has quasi-legal status. Failure to comply is taken as evidence of non-compliance with the Health and Safety at Work etc. Act 1974 in enforcement proceedings. It must be treated as a binding obligation, not guidance.

Key Points

- Cold water must be stored and distributed at or below 20°C. This is the operative Legionella control limit under ACoP L8 and HSG274 Part 2. The maximum tested storage temperature under Regulation 4 certification (BS 6920) is 23°C — this is a product testing boundary, not a temperature target for cold water storage. The operative design limit under ACoP L8 and HSG274 Part 2 is 20°C.
- A Type AB air gap is required wherever a Category 5 fluid risk exists — in practice, in all healthcare buildings and any application where the risk assessment confirms Category 5 risk. A Type AG air gap does not provide Category 5 protection. Mechanical backflow devices cannot substitute for an air gap on a cold water storage cistern.
- LPCB certification under LPS 1276 is required for any tank serving a fixed automatic sprinkler system designed to BS EN 12845. It is a separate scheme from Regulation 4 compliance certification (Kiwa). A tank must hold both certifications where combined potable and firefighting storage is intended.
- The Confined Spaces Regulations 1997 apply to tank inspection and cleaning for all but the smallest cisterns. A written system of work, permit-to-work procedure, and rescue arrangements must be in place before any person enters or works in a confined cold water storage tank.

Sizing and Configuration

- The standard cold water storage sizing basis in UK commercial buildings is a 24-hour demand reserve. Critical infrastructure — hospitals, data centres, high-security facilities — should be assessed for 48- or 72-hour reserves based on documented consequence of supply interruption.
- Oversizing is a Legionella risk, not a safety margin. A tank that rarely achieves full daily turnover develops stagnant zones in which bacteria can proliferate. Sizing should reflect realistic demand, not theoretical maximum occupancy.
- The firefighting reserve must be physically separated from the general potable supply. A single undivided tank holding both is a compliance failure under BS EN 12845. Coordinate with the sprinkler system designer at the earliest design stage.
- Duty-standby and dual-compartment configurations are required wherever the tank cannot be taken out of service for maintenance without interrupting supply — in practice, in most acute healthcare settings, data centres, and critical infrastructure.
- Base levelness is the single most common cause of premature sectional tank joint failure. Foundation level must be verified to the manufacturer's stated tolerance

and signed off before assembly begins. This is a hold point, not a post-assembly check.

Maintenance and Whole-Life Performance

- The minimum inspection frequency for cold water storage tanks is annually for visual inspection and annually for cleaning and disinfection in standard commercial settings. Higher-risk settings — including healthcare, and any installation with prior positive Legionella results — require at least six-monthly inspection.
- Commissioning documentation is an ACoP L8 compliance record. Disinfection procedure, dosing details, and UKAS-accredited laboratory results must be incorporated into the building's O&M manual at handover. A tank should not be connected to the distribution system until satisfactory bacteriological results are received.
- A correctly installed and regularly maintained sectional GRP tank can achieve a service life of 25–30 years or more. The most common causes of premature failure are foundation levelness errors, neglected bolt re-torque, insulation detachment in externally insulated tanks, and infrequent maintenance.
- Whole-life cost analysis favours GRP over galvanised steel. When maintenance, relining, and contamination remediation costs are included over a 30-year period, the capital premium of GRP over galvanised steel is likely to be offset in many applications. Specifiers should conduct a project-specific whole-life cost assessment rather than rely on capital cost alone.
- The Responsible Person appointed under ACoP L8 must have genuine authority, adequate competence, and sufficient resources to implement the written control scheme. A nominal appointment without these attributes does not discharge the duty holder's obligation.

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 or contact the Tricel Water technical team on +44 (0)1934 314 079.

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1.1. Why Cold Water Storage Matters

The UK public water supply operates under pressure, and in most commercial and public sector buildings, a direct connection to the mains is the starting point for cold water distribution. Mains-only supply is, however, insufficient for a wide range of infrastructure applications. Demand peaks, planned and unplanned supply interruptions, firefighting obligations, process cooling requirements, and pressure management across tall buildings all create service needs that a mains connection alone cannot reliably meet.

Cold water storage addresses these needs by maintaining a local reserve that is independent of mains pressure fluctuations and supply continuity. In its simplest form, this is a break tank: an intermediate vessel between the mains supply and a booster pump set that prevents direct connections that would otherwise risk backflow contamination. At greater scale, storage tanks provide 24-hour or multi-day reserves for occupancy demand, firefighting reserves, and independently isolated supplies for different water quality grades within the same building.

The distinction between these functions matters because each carries different sizing, quality, and compliance obligations. A firefighting tank designed to BS EN 12845 must hold a calculated reserve based on system design flow rate and duration. A potable storage tank must meet the material and bacteriological requirements of the Water Supply (Water Fittings) Regulations 1999. A process cooling tank may operate at temperatures and chemical conditions that exclude it from potable water compliance routes. Identifying which function — or combination of functions — a tank serves is the indispensable starting point for every specification decision.

1.2 Where Cold Water Storage Appears in UK Infrastructure?

Cold water storage is present in virtually every commercial, public sector, and industrial building above the most basic scale. Application contexts vary considerably in their technical and regulatory requirements.

Hospitals and Healthcare Facilities

Healthcare buildings are among the highest-risk environments for waterborne infection in the UK. Cold water storage forms part of a comprehensive water safety plan governed by NHS England Health Technical Memorandum HTM 04-01 (Safe Water in Healthcare Premises). Potable and non-potable supplies are typically segregated. Temperature control is critical because healthcare environments present elevated Legionella risk from immunocompromised patients. Tanks are subject to more frequent inspection and cleaning requirements than in commercial buildings, and documentation requirements are extensive.

1. The Role of Cold Water Storage in UK Infrastructure

Schools and Further Education Buildings

Educational buildings have cold water storage requirements shaped by occupancy patterns: high peak demand during school hours, extended periods of low or zero demand during holidays, and a user population that includes children whose susceptibility to waterborne illness is higher than the adult average. Holiday stagnation — periods when water sits at temperatures that may permit bacterial growth — is a documented and manageable risk that must be addressed in the water safety plan and maintenance programme.

Civic and Local Authority Buildings

Court buildings, libraries, council offices, leisure centres, and civic halls present standard commercial cold water storage requirements, but many hold legacy tanks installed in the 1970s and 1980s that are now at or beyond their intended service life. Galvanised steel tanks from this era frequently exhibit corrosion, sediment accumulation, and joint failure that warrants condition survey and replacement planning. The local authority estates manager must weigh immediate remediation against replacement within a capital programme.

Data Centres

Data centres present an increasingly demanding cold water storage brief. Cooling systems, fire suppression systems (typically FM200, gaseous suppression, or wet sprinkler), and potable supply each require independent storage. The high ambient temperatures within data centre plant rooms introduce Legionella risk requiring specific management. The financial consequences of supply interruption — measured in downtime costs and service level agreement liability — justify the highest levels of storage redundancy, typically duty-standby configurations with independent feed pipework.

High-Rise Residential Developments

Buildings above approximately 25–30 metres use intermediate break tanks and booster sets to manage cold water distribution pressure in upper pressure zones. Material selection, modular assembly within plant rooms, and structural floor loading are critical considerations. Residents have no obligation to manage the water system, so maintenance responsibility falls entirely on the building owner or managing agent; the written control scheme under ACoP L8 must account for this.

Transport Infrastructure

Airports, railway stations, and motorway service areas require cold water storage at scale, often incorporating firefighting reserves, in environments where access for maintenance may be infrequent and where supply interruption affects very large of people simultaneously. The consequential costs of failure justify investment in resilience beyond the commercial norm, including N+1 or 2N storage configurations and continuous water quality monitoring.

Industrial and Manufacturing Facilities

Process water storage requirements in industrial facilities may include non-potable cold water, chemical solutions, fire suppression reserves, and cooling tower make-up water. GRP is suitable for a wide range of these applications, but chemical compatibility must always be verified with the manufacturer for any application involving non-standard contents. The design life expectation and maintenance regime will differ from potable water storage.

Defence and Secure Facilities

Ministry of Defence and other secure facilities have cold water storage requirements governed not only by the standards applicable to commercial and public sector buildings but also by MoD-specific design guidance. Access for inspection and maintenance may be constrained by security requirements, and continuity of supply is a mission-critical obligation. Where defence-specific standards exist, they supplement rather than replace the general regulatory framework described in Section 3.

1.3 Why Specification Decisions Are Difficult to Reverse

Cold water storage tanks are, in almost all building types, installed within the building fabric — in plant rooms, roof spaces, basement service areas, or below-ground chambers. Unlike many building services components, a tank that is the wrong size, wrong material, or non-compliant cannot generally be replaced quickly or cheaply once a building is occupied and operational.

Correcting an undersized tank during occupation typically means extended disruption to water supply, structural modification to accommodate a larger tank, and in some cases the removal of plant room walls to permit access. Correcting a non-compliant tank — one installed without Regulation 4 compliant materials in a potable supply application — may require replacement as a condition of a building insurance claim, a public health enforcement notice, or a Legionella incident investigation. The reputational and legal consequences of a Legionella outbreak traced to a poorly specified or maintained water system can be severe.

The long-term cost of a poor specification decision substantially exceeds the cost difference between options at tender stage. This is the primary reason that comprehensive specification guidance in this area warrants the investment of engineering time it represents.

A non-compliant tank discovered after occupation may require full replacement as a condition of a building insurance claim, a public health enforcement notice, or a Legionella incident investigation. The cost of replacement in an occupied building consistently exceeds the original cost of correct specification.

1.4 The Economic Case for Correct Specification

A whole-life cost analysis of cold water storage consistently favours correct specification over minimum-cost procurement. The variables that matter most are not capital cost but operational cost, maintenance cost, compliance cost, and the cost of unplanned failure. A tank that costs 15% more to buy but requires significantly less maintenance over 30 years, eliminates corrosion-related water quality incidents, and avoids a single Legionella-related enforcement action will outperform a lower-capital option by a considerable margin.

This analysis applies with particular force to public sector and NHS procurement, where the indirect costs of waterborne illness, enforcement action, and regulatory scrutiny are institutional as well as financial. The emphasis on lowest-price procurement, where it exists, should be actively challenged against a robust whole-life cost assessment.

Specification tip: when presenting a GRP option against a lower-capital steel alternative, a 30-year whole-life cost comparison typically reverses the cost ranking once maintenance, coating replacement, and contamination remediation are properly accounted for.

2. Understanding Sectional GRP: Material, Manufacturing and Performance

2.1 What GRP Is?

Glass Reinforced Plastic — also described in the market as glass-reinforced polyester, GRP, glass fibre, or fibre glass — is a composite material formed by embedding glass fibre reinforcement within a polymer resin matrix. For cold water storage applications in the UK, the polymer matrix is typically an isophthalic unsaturated polyester resin, selected for its chemical resistance, mechanical strength, and demonstrated compatibility with potable water.

GRP is not a single material but a family of composites whose properties vary with glass content, fibre orientation, resin type, and manufacturing method. Specifiers should not treat all GRP products as equivalent: the performance of a hot press moulded panel produced to BS EN 13280:2001 from a defined resin formulation differs materially from a hand lay-up product produced to a less rigorous quality control regime.

2.2 Manufacturing Methods

Hot Press Moulding

Hot press moulding produces panels under controlled temperature (typically up to 150°C) and defined pressure. The process results in panels that are fully cured, dimensionally consistent, and suitable for high-volume production to defined tolerances. The panel dimensions, resin content, and glass-to-resin ratio can be precisely controlled and verified. Hot press moulded panels form the basis of most modular sectional tank ranges from established UK manufacturers and are the standard method for BS EN 13280-compliant sectional tank panels.

Hand Lay-Up

Hand lay-up is a manual process in which glass fibre reinforcement is laid into a mould and saturated with resin by hand. It is used for bespoke and larger one-piece tanks where the geometry or scale makes press moulding impractical. Hand lay-up products require rigorous quality control because dimensional consistency and resin content depend heavily on operative skill. Specifiers procuring hand lay-up tanks should seek evidence of quality management certification (ISO 9001 or equivalent) and product testing against BS EN 13280 requirements.

Specification tip: always ask for the manufacturing method (hot press moulded or hand lay-up) and request evidence of quality management certification when comparing products from different manufacturers. Hot press moulded panels produced to defined tolerances carry a lower risk of dimensional inconsistency and resin variation.

2. Understanding Sectional GRP: Material, Manufacturing and Performance

2.3 Mechanical Properties Relevant to Specifiers

Strength-to-Weight Ratio

GRP has a high strength-to-weight ratio compared with steel, concrete, and aluminium. An empty GRP sectional tank weighs substantially less than an equivalent galvanised steel tank of the same capacity. This has a material implication for structural floor loading calculations: GRP panels can be delivered to upper-floor plant rooms without the lifting equipment that heavier steel alternatives require, and the dead load of the tank itself adds less to the structural floor loading assessment.

Corrosion Immunity

Steel corrodes when exposed to water and oxygen. Galvanised steel offers protection through its zinc coating, but the coating degrades over time, particularly at cut edges, fixing points, and anywhere mechanical damage has occurred. GRP does not corrode. In the context of cold water storage, a correctly specified and maintained GRP tank does not shed rust particles into the stored water, does not require internal coating maintenance, and does not suffer structural degradation from contact with water. This is the single most significant performance advantage of GRP over steel in long-term service.

> A corroded galvanised steel tank that sheds particulate matter into the distribution system creates downstream problems — blocked filters, contaminated outlets, persistent microbiological results — whose indirect remediation costs typically exceed the original cost difference between steel and GRP.

Internal Surface Characteristics

The internal surface of a well-manufactured GRP tank is smooth and non-porous. This is significant for water quality: a smooth surface is less hospitable to bacterial biofilm formation than a corroded or pitted metal surface, and it is more amenable to thorough cleaning and disinfection during routine maintenance. The surface finish of a new GRP tank is a direct product of manufacturing quality; specifiers should request evidence of surface finish standards from manufacturers when procurement is competitive.

Thermal Performance

GRP has lower thermal conductivity than steel, which means an uninsulated GRP tank gains heat from the ambient environment more slowly than a steel equivalent. For cold water storage, where the objective is to maintain stored water below 20°C to control Legionella risk (as required by ACoP L8), this thermal inertia is beneficial. Where pre-insulated tanks are specified — with polyurethane foam encapsulated within the GRP laminate — additional thermal performance is achieved. The maximum tested storage temperature under Regulation 4 certification (BS 6920) for a compliant GRP tank is 23°C; beyond this temperature, the tank is operating outside its tested parameters and Regulation 4 compliance cannot be assumed.

UV Resistance

GRP resists degradation from ultraviolet radiation to a degree not available from polyethylene or polypropylene alternatives. This is relevant for tanks installed in exposed outdoor locations, in plant rooms with roof lights, or in other environments where prolonged UV exposure would cause surface chalking and potential structural degradation. External tanks should have a UV-stable gel coat or surface layer; specifiers should confirm this with the manufacturer for any externally sited installation.

Chemical Resistance

The internal surface of a well-manufactured GRP tank is smooth and non-porous. This is significant for water quality: a smooth surface is less hospitable to bacterial biofilm formation than a corroded or pitted metal surface, and it is more amenable to thorough cleaning and disinfection during routine maintenance. The surface finish of a new GRP tank is a direct product of manufacturing quality; specifiers should request evidence of surface finish standards from manufacturers when procurement is competitive.

2.4 BS EN 13280:2001 — The Governing Product Standard

BS EN 13280:2001 is the British Standard (harmonised with European Standard EN 13280) that sets out the requirements for glass-reinforced thermosetting plastics tanks used for above-ground storage of cold potable water. It covers both one-piece and sectional configurations. Compliance with BS EN 13280:2001 is a prerequisite for Regulation 4 certification of GRP cold water storage products.

The standard specifies requirements for:

- Material quality, including resin type, glass content, and gel coat specification
- Panel dimensions and dimensional tolerances
- Mechanical performance, including pressure resistance tests at significantly above working pressure
- Dimensional stability under load
- Acceptability of construction methods and joining arrangements
- Marking, documentation, and installation guidance requirements

2. Understanding Sectional GRP: Material, Manufacturing and Performance

Specifiers should note that BS EN 13280:2001 applies specifically to above-ground cold water storage. Underground tanks and tanks for non-potable applications may be governed by different standards. The currency of BS EN 13280:2001 should be verified before specification; standards are subject to revision and withdrawal by BSI.

2.5 GRP vs Alternative Tank Materials

GRP is not the only material available for cold water storage in UK infrastructure. The following comparison provides a framework for material selection decisions.

Material	Typical capacity range	Key advantages	Key limitations
Sectional GRP	1,000 L – 2M+ L	Corrosion-free, smooth internal surface, modular assembly, BS EN 13280 compliant, Regulation 4 certifiable, low whole-life maintenance	Higher capital cost than steel; above ~2M L becomes less economic than GFS or bolted steel
One-piece GRP	50 L – ~16,000 L	No assembly joints, simple to clean, durable	Access-constrained by physical size; not suitable for large infrastructure storage
Galvanised steel	Any	Lower capital cost	Corrodes; requires periodic re-lining or replacement; particulate contamination risk; shorter service life under equivalent maintenance
Glass fused to steel (GFS)	100,000 L+	Structural economy at very large scale; corrosion resistant	Not appropriate below ~100,000 L; specialist installation required

2.5 GRP vs Alternative Tank Materials

Material	Typical capacity range	Key advantages	Key limitations
Stainless steel	Any	Excellent corrosion resistance; robust	High capital cost; heavier than GRP; requires specialist welding for on-site assembly
Reinforced concrete	Large scale only	Very high load capacity; permanent	No flexibility post-construction; waterproofing and lining required; expensive to modify or replace
Polyethylene (PE/HDPE)	Small to medium	Low cost; lightweight; chemical resistance	Limited to smaller capacities; UV degradation risk; not appropriate for large infrastructure storage

2.6 When GRP Is Not the Right Choice

GRP is not appropriate for all water storage applications. The following scenarios warrant consideration of alternatives:

- Very large capacity requirements — above 2–3 million litres, glass fused to steel (GFS) or epoxy-coated bolted steel tanks typically offer better structural economics at extreme scale.
- Elevated temperature storage — GRP cold water storage tanks are designed for cold water only, generally below 23°C for Regulation 4 compliant potable applications.
- Aggressive chemical storage — while GRP resists a broad range of chemicals, specific formulations may attack particular resin systems. Chemical compatibility must be confirmed with the manufacturer for any non-standard contents.
- Burial — above-ground GRP tanks are not designed for burial. Underground applications require tanks specifically designed and tested for ground loading and external water pressure.

2. Understanding Sectional GRP: Material, Manufacturing and Performance

2.7 Embodied Carbon and Whole-Life Environmental Performance

Procurement frameworks for major UK infrastructure projects — including those delivered under HS2, Network Rail, and NHS frameworks — increasingly require whole-life carbon assessments as part of the design and specification process. The following provides a factual basis for GRP in this context. Where precise figures are required, specifiers should request Environmental Product Declarations (EPDs) or verified carbon data from the manufacturer, as embodied carbon values vary by product, resin formulation, and manufacturing process.

Embodied carbon at manufacture

GRP manufacture involves energy-intensive processes, and the embodied carbon of a GRP panel is higher per kilogram than galvanised steel. However, the lower density of GRP means that a tank of equivalent capacity typically uses less material by mass than a steel equivalent, partially offsetting this difference. No universal embodied carbon figure for GRP cold water tanks should be assumed without manufacturer-specific data.

Operational phase

The absence of corrosion in GRP eliminates the need for coating maintenance, relining, or rust treatment — activities that require additional materials and energy over the asset life. A GRP tank that achieves a 30-year service life without relining has a lower operational phase carbon footprint than a galvanised steel tank requiring periodic re-coating.

End of life

GRP is not straightforwardly recyclable in the same way as steel. Most end-of-life GRP currently goes to landfill or energy recovery in the UK, though composite recycling technologies are developing. Specifiers working to circular economy requirements should note this and raise it with the manufacturer. Steel tanks are more readily recycled at end of life.

Overall position

For projects requiring a formal whole-life carbon comparison, manufacturers should be asked to provide verified EPD data or carbon footprint figures based on a defined functional unit. In the absence of this data, comparisons should not be made from general assumptions. Where sustainability reporting is required, the specifier should ensure that the scope of the assessment covers manufacture, transport, installation, operational maintenance, and end of life.

3. Regulatory and Compliance Framework

3.1 The Legal Starting Point: Water Supply (Water Fittings) Regulations 1999

The Water Supply (Water Fittings) Regulations 1999 (SI 1999/1148) establish the legal framework governing the design, installation, operation, and maintenance of plumbing systems and water fittings in premises supplied by a water undertaker in England and Wales. Regulation 4(1)(a) is the provision of most immediate relevance to cold water storage tank specification: it requires that a water fitting — which includes storage cisterns and the materials from which they are made — shall not be used if it is not of an appropriate quality and standard. For potable water storage tanks, this means materials must be demonstrated to be safe for contact with drinking water.

The Regulations also set requirements for the installation of cold water storage cisterns, including backflow protection (Regulation 15), overflow arrangements, and the provision of covers and screened vents. Non-compliance with the Regulations is a criminal offence, with enforcement powers held by water undertakers. In practice, local water companies may require evidence of Regulation 4 compliance as a condition of connection to the mains supply.

3.2 Devolved Regulatory Frameworks

Water fittings regulation is devolved. Specifiers must cite the correct instrument for their jurisdiction; citing only the 1999 Regulations for projects in Scotland or Northern Ireland is technically incorrect.

Jurisdiction	Applicable legislation	Enforced by
England	Water Supply (Water Fittings) Regulations 1999, SI 1999/1148	Local water undertakers (e.g. Thames Water, Anglian Water, Severn Trent)
Wales	Water Supply (Water Fittings) Regulations 1999, SI 1999/1148	Dŵr Cymru Welsh Water and other undertakers
Scotland	Water Supply (Water Fittings) (Scotland) Regulations 2014, SSI 2014/317	Scottish Water
Northern Ireland	Water Supply (Water Fittings) Regulations (Northern Ireland) 2009, SR 2009/75	Northern Ireland Water

3. Regulatory and Compliance Framework

Specifiers working on projects in Scotland or Northern Ireland: citing only SI 1999/1148 (the England and Wales Regulations) in project documentation is technically incorrect. Use SSI 2014/317 for Scotland and SR 2009/75 for Northern Ireland.

3.3 Regulation 4 Compliance and Kiwa Certification

Regulation 4(1)(a) of the Water Supply (Water Fittings) Regulations 1999 requires that no water fitting shall be used if it is not of an appropriate quality and standard. For materials in contact with potable water — including the GRP panels, seals, fittings, and coatings of a cold water storage tank — this requirement is satisfied by demonstrating compliance with BS 6920:2000 (Suitability of non-metallic products for use in contact with water intended for human consumption) through independent third-party product certification.

Kiwa is an internationally accredited independent certification body whose product testing and approval scheme for water fittings is recognised by UK water undertakers as evidence of Regulation 4 compliance. Tricel Water products carry Kiwa certification. In all cases, certification is product-specific: it covers the tank, panels, and materials as described and tested. It is not transferable between products and is not permanent — certifications are subject to reassessment and can be withdrawn if the product or its manufacturing process changes.

Tricel Water products carry Kiwa certification, which is a recognised route to demonstrating Regulation 4 compliance under the Water Supply (Water Fittings) Regulations 1999. Kiwa certification status must be verified at kiwa.com/uk at the time of specification and the certificate number recorded on specification documents and included in the building O&M manual at handover.

Key distinctions specifiers frequently conflate:

- Regulation 4 compliance certification covers the tank and its constituent materials. It does not certify that a tank as installed is compliant with all requirements of the Water Supply (Water Fittings) Regulations. Installation practice, backflow protection configuration, and ongoing maintenance are separately governed.
- Regulation 4 compliance is not the same as compliance with BS EN 13280:2001. Both should be required for potable water storage in UK infrastructure; each addresses different aspects of product performance.
- For potable water storage, Regulation 4 compliance — evidenced by Kiwa certification or equivalent third-party testing to BS 6920 — must be treated as a non-negotiable specification requirement.

3. Regulatory and Compliance Framework

3.4 BS 6920 Material Testing

BS 6920:2000 (Suitability of non-metallic products for use in contact with water intended for human consumption) is the test standard used to assess whether materials in contact with potable water will adversely affect water quality. Testing covers taste, odour, colour, turbidity, microbial growth promotion, and mutagenicity. A GRP tank seeking Regulation 4 certification must demonstrate that its materials pass BS 6920 testing. Kiwa certification is issued on the basis of this testing.

BS 6920 testing is product-specific and batch-specific where manufacturing changes affect the material formulation. Specifiers should not assume that a positive BS 6920 result for one product applies to a superficially similar product from a different manufacturer or of a different resin formulation.

3.5 LPCB Certification for Fire Suppression Tanks

Where a cold water storage tank is to serve a fixed automatic sprinkler system designed to BS EN 12845:2015+A1:2019, the tank must be certified by the Loss Prevention Certification Board (LPCB). LPCB certification under LPS 1276 confirms that the tank meets the structural and material requirements appropriate to its role as a firefighting water reserve. The LPCB register of approved products is maintained at redbooklive.com and should be consulted to verify current certification status.

LPCB certification and Regulation 4 compliance are entirely separate schemes. A tank holding both certifications is suitable for combined potable and firefighting storage where the design permits such an arrangement. A tank holding LPCB certification only is not approved for potable water storage. Tank sizing for fire suppression is determined by the sprinkler system designer based on design density, hazard classification, and required flow duration under BS EN 12845; the tank manufacturer supplies a tank of the required certified capacity.

3.6 Backflow Protection: Fluid Categories and Air Gap Configurations

The Water Supply (Water Fittings) Regulations 1999, Schedule 1, specifies backflow protection requirements based on the category of fluid risk presented by the downstream system. Cold water storage cisterns are classified as containing a Category 5 fluid — the highest risk category — defined in the Regulations as fluid presenting a serious health hazard through the presence of pathogenic micro-organisms, radioactive or very toxic substances.

> Mechanical backflow prevention devices — including non-return valves, double check valves, and RPZ (reduced pressure zone) valves — cannot protect against Category 5 fluid risk. An air gap is the only permissible backflow protection measure for a cold water storage cistern.

Category 5 classification means that the cistern inlet from the mains must be protected by an appropriate air gap device. The relevant configurations are:

Air gap type	Protection level	Typical application	Standard requirement
Type AG	Categories 1–4	Most commercial cold water storage cisterns	Screened inlet controlled by float valve; overflow with insect screen
Type AB	Category 5	Healthcare premises, facilities with Category 5 fluid risk	Raised float valve housing with screened spillover weir above maximum stored water level; air gap maintained under all flow conditions

Specifiers should consult the WRAS Water Regulations Guide for a full schedule of fluid risk categories and the corresponding backflow protection requirements. For healthcare buildings, HTM 04-01 specifies Type AB air gap protection for cold water storage cisterns as the baseline requirement.

3.7 Legionella Control: ACoP L8 and HSG274

The legal framework for Legionella control in water systems is established by the Health and Safety at Work etc. Act 1974, the Control of Substances Hazardous to Health Regulations 2002 (COSHH), and the Management of Health and Safety at Work Regulations 1999. Practical obligations are set out in two HSE documents that should be treated as authoritative:

ACoP L8 — Approved Code of Practice

ACoP L8 (Legionnaires' Disease: The Control of Legionella Bacteria in Water Systems, 4th edition, 2013) has quasi-legal status. Compliance with an Approved Code of Practice is not mandatory in the strict sense, but failure to follow its guidance is taken as evidence of non-compliance with the underlying regulations in enforcement proceedings and criminal prosecutions. For practical purposes, ACoP L8 must be treated as a binding obligation.

ACoP L8 requires that duty holders carry out a suitable and sufficient written risk assessment of all water systems, implement a written scheme for preventing or controlling Legionella risk, appoint a Responsible Person (Regulation 5 duty holder), and maintain records of all relevant activities for a minimum of five years.

3. Regulatory and Compliance Framework

HSG274 — Technical Guidance

For specifiers, the key Legionella-related requirements that influence tank specification directly are:

- Cold water must be stored and distributed at or below 20°C. Stored water exceeding 20°C is a control failure requiring immediate investigation.
- Tanks must be sized to maintain adequate turnover — HSG274 recommends that stored volume turns over within 24 hours under normal demand conditions.
- Tanks must be insulated to resist ambient heat gain in warm plant rooms.
- Inlet and outlet positions must promote throughflow rather than short-circuiting or dead zones.
- Tanks must be fully drainable, accessible for cleaning, and fitted with screened vents.

> The 20°C storage limit under ACoP L8 is not a design aspiration — it is a control limit. Any temperature reading above 20°C in a cold water storage or distribution system must trigger immediate investigation and corrective action under the written control scheme.

For a comprehensive technical report on Legionella, download our whitepaper: Control of Legionella; Best Practices, Regulations and Health Guidelines.

3.8 Building Regulations Approved Document G

Approved Document G to the Building Regulations (England) covers sanitation, hot water safety, and water efficiency. Part G1 addresses cold water supply and sets out requirements for water storage in new buildings subject to Building Control sign-off. Specifiers should confirm the current edition; Approved Document G has been revised and is subject to further amendment.

For most commercial and public sector infrastructure projects, the Water Supply (Water Fittings) Regulations 1999 and associated guidance take practical precedence over Approved Document G. However, both must be considered in the context of Building Control, and the two documents should be cross-checked where their requirements could conflict.

3.9 The Confined Spaces Regulations 1997

Inspection and cleaning of cold water storage tanks above approximately 1,000 litres capacity typically requires an operative to enter the tank. This constitutes confined space entry under the Confined Spaces Regulations 1997.

3. Regulatory and Compliance Framework

Duty holders who arrange tank inspection or cleaning without implementing confined space entry controls are committing a criminal offence under the Confined Spaces Regulations 1997 and the Health and Safety at Work etc. Act 1974.

The Regulations require:

- A written system of work appropriate to the confined space
- A permit-to-work procedure for all non-trivial confined space entry
- Appropriate rescue arrangements in place before any entry begins
- Competent persons carrying out the work, with adequate training and information

3.10 COSHH and the Health and Safety at Work etc. Act 1974

Cleaning and disinfection of cold water storage tanks involves the use of biocidal substances — typically chlorine-based compounds. These are hazardous substances for the purposes of the Control of Substances Hazardous to Health Regulations 2002 (COSHH). A COSHH risk assessment must be in place before cleaning commences, and operatives must have access to appropriate personal protective equipment (PPE) and emergency procedures.

The overarching duty under the Health and Safety at Work etc. Act 1974 to ensure the health, safety, and welfare of employees and persons affected by the work applies to all phases of installation, inspection, and maintenance of cold water storage tanks.

3.11 Supplementary Water Treatment

ACoP L8 and HSG274 Part 2 establish temperature control as the primary means of managing Legionella risk in cold water storage systems: stored water maintained consistently below 20°C presents a low risk of Legionella proliferation. Where temperature control alone cannot be reliably achieved — for example, in warm plant rooms with elevated ambient temperatures or in tanks with poor turnover characteristics — supplementary chemical treatment may be used as an additional control measure.

The most commonly used supplementary treatments in cold water systems are:

Chlorine dioxide (ClO_2)

A biocide effective against Legionella and biofilm at low concentrations. It does not form the same disinfection by-products as chlorine and penetrates biofilm more effectively. Dosing systems require regular maintenance and the ClO_2 generator must be installed and operated in accordance with the manufacturer's specification and Health and Safety Executive guidance. Chlorine dioxide is classified as a hazardous substance under COSHH; a COSHH risk assessment must be in place.

3. Regulatory and Compliance Framework

Continuous chlorination

Dosing of hypochlorite to maintain a residual free chlorine level within the stored water. This is a well-established approach but requires careful management to maintain effective concentrations without exceeding the limits set by the Water Supply (Water Quality) Regulations 2016. Residual chlorine at the tank outlet should be monitored as part of the written control scheme.

Silver/copper ionisation

Silver/copper ionisation is used in some healthcare and high-risk settings as a supplementary measure. Its use requires specific assessment and it should not be introduced without specialist advice and review of the written risk assessment.
Supplementary treatment does not remove the obligation to maintain temperature control, carry out regular inspection and cleaning, or fulfil any other requirement of the written control scheme. It is an additional control measure, not a substitute for the primary obligations under ACoP L8.

Where supplementary treatment is specified, the written control scheme must describe the treatment type, target concentrations, monitoring frequency, and response procedures when concentrations fall outside the specified range. All dosing equipment must be maintained in accordance with the manufacturer's instructions, and records of dosing, monitoring, and maintenance must be retained for a minimum of five years.

Specifiers should note that the introduction of supplementary chemical treatment to a GRP tank must be assessed for material compatibility. Where non-standard chemical concentrations or treatment agents are proposed, confirm compatibility with the tank manufacturer before installation.

4. Tank Configuration: One-Piece, Two-Piece, Sectional and Bespoke

4.1 One-Piece GRP Tanks

A one-piece GRP tank is manufactured as a single moulded unit with no assembly joints within the vessel body. This eliminates joint failure as a mode of degradation and means there are no complex internal surfaces in areas that are difficult to access. One-piece tanks are manufactured to BS EN 13280:2001 and available in capacities typically ranging from under 50 litres to approximately 16,000 litres, depending on manufacturer.

The primary constraint on one-piece tank selection is physical access to the installation location. A one-piece tank must pass through every opening between the delivery point and its final position: doors, corridors, lift shafts, hatch openings, and stairwells. Where a one-piece tank can be delivered and installed without obstruction, it is generally the preferred configuration for smaller to mid-range capacities because of its simplicity, the absence of assembly joints, and ease of cleaning.

Insulated one-piece tanks have factory-applied polyurethane foam insulation encapsulated within the GRP laminate, eliminating the possibility of insulation detachment and the associated maintenance risk. This is the preferred insulation arrangement for one-piece tanks.

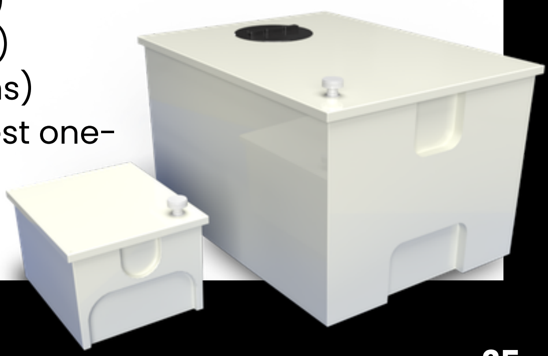
One-Piece Tricel Water Storage Tanks (Cisterns)

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



4. Tank Configuration: One-Piece, Two-Piece, Sectional and Bespoke

4.2 Sectional GRP Tanks

A sectional GRP tank is assembled on-site from individual flat or curved panels, bolted together using stainless steel hardware (internal) and galvanised steel hardware (external), with sealing gaskets between panel flanges. The modular format means there is no upper capacity constraint imposed by panel size or transport logistics: a sectional tank of any practical capacity can be assembled from panels delivered through any access point that can admit a standard panel (typically 1m × 1m or 2m × 1m formats — 600 mm minimum clear doorway width for 1m × 1m panels).

UK manufacturers offer sectional GRP tanks from approximately 1,000 litres to over 2 million litres. On-site assembly by the manufacturer's trained assembly team is standard practice; specifiers and project managers should obtain programme information from the manufacturer at tender stage to allow adequate building services programme float. Assembly time for large tanks in constrained plant rooms can range from one to several days.

> Assembly must be carried out by the manufacturer's own trained operatives, not by a general M&E contractor or a labourer provided by the main contractor. Incorrect panel assembly, wrong bolt torque, or incorrect sealant application will not be apparent at installation but will cause joint failure in service.

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)

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

4. Tank Configuration: One-Piece, Two-Piece, Sectional and Bespoke

4.3 Sectional Tank Base Configurations

Sectional tanks are manufactured in three principal base configurations, each with different structural, maintenance, and spatial implications:

Configuration	Description	Advantages	Best suited for
EFB — Externally Flanged Base	Base flanges external to tank footprint; tank supported on raised beams or piers	Complete drainage; full inspection of base panels; air circulation under tank	New-build plant rooms with adequate floor-to-ceiling height; compliance-critical potable applications
IFB — Internally Flanged Base	Base flanges internal to footprint; tank sits on continuous flat floor slab	Lower overall height; no raised plinth required	Rooms with restricted headroom; the base does not fully gravity-drain and requires pumping to empty completely
TIF — Totally Internally Flanged	All flanges internal; tank can be positioned against two perpendicular walls	Maximum space efficiency; full wall-to-wall installation possible	Plant rooms where floor area is severely constrained; clearance required on two remaining sides only

> EFB (Externally Flanged Base) is the preferred configuration for potable water applications where plant room height permits. It provides complete gravity drainage, full inspection of base panels, and air circulation beneath the tank — all of which support thorough cleaning and Legionella control.

4.4 Insulation

For potable cold water storage, maintaining stored water below 20°C is a Legionella control requirement. Whether insulation is required depends on the ambient temperature of the installation location. Warm plant rooms — including basement service areas, roof spaces exposed to solar gain, and any location adjacent to heat-generating plant — will cause stored water to rise above 20°C in an uninsulated tank during warm weather.

4. Tank Configuration: One-Piece, Two-Piece, Sectional and Bespoke

Pre-Insulated (Integrated) Panels

Pre-insulated GRP tank panels have polyurethane foam directly bonded and fully encapsulated within the GRP laminate during manufacture. This is the most durable insulation arrangement because the insulation is integral to the panel body and cannot become detached, cannot absorb moisture, and requires no maintenance. Pre-insulated panels are available in standard sectional tank ranges from most UK manufacturers. The additional panel weight compared with uninsulated panels is a consideration for the delivery and assembly programme.

Externally Applied Insulation

For large sectional tanks where factory-applied insulation adds prohibitively to panel weight or transport cost, external insulation applied after assembly is an alternative. External insulation must be protected from moisture ingress and physical damage, typically with a rigid GRP outer shell or foil-faced cladding. Its continued effectiveness must be assessed during routine inspections; detached or moisture-saturated insulation provides negligible thermal protection and may itself become a microbiological risk.

The insulation specification must address all six faces of the tank, including the base. For tanks on suspended floors, cold bridging through the base structure can affect stored water temperature even when wall insulation is effective.

4.5 Dual-Compartment and Duty-Standby Configurations

For applications where continuity of supply is critical — healthcare premises, data centres, high-risk commercial buildings — a single-tank configuration may be unacceptable because the tank cannot be taken out of service for maintenance without interrupting supply. Two configurations address this:

Divided (Dual-Compartment) Tank

A single tank with an internal dividing wall, typically at mid-capacity, with isolation valves on the inlet and outlet of each compartment. Either compartment can be isolated, drained, and cleaned while the other remains in service, serving the full building demand during the maintenance period. The division also physically separates the firefighting reserve from the general potable supply where both are held in the same tank structure.

4. Tank Configuration: One-Piece, Two-Piece, Sectional and Bespoke

Duty-Standby (Two-Tank) Configuration

Two tanks connected in parallel, each individually capable of serving the full building demand, with automatic changeover on detection of low level or failure in the duty tank. The standby tank is maintained full and tested periodically. This configuration provides the highest level of supply resilience and allows either tank to be fully taken out of service without any interruption to building supply.

> For healthcare, data centres, and any building where supply interruption is unacceptable, the duty-standby configuration must be established at RIBA Stage 2. Retrofitting a second tank into an occupied plant room is significantly more disruptive and expensive than designing for two tanks from the outset.

4.6 Bespoke Configurations

Standard GRP tank ranges are designed around modular dimensions that suit the majority of applications. Where site conditions impose constraints that standard configurations cannot accommodate — non-standard aspect ratios, L-shaped or U-shaped plan configurations, internal access galleries, non-standard connection positions, integral baffle walls to promote circulation — manufacturers can produce bespoke configurations.

Bespoke tanks are generally not materially more expensive than a standard configuration of comparable capacity; the additional cost reflects design engineering time rather than material cost. Specifiers with non-standard requirements should engage manufacturers at RIBA Stage 2 or equivalent to establish feasibility, programme, and pricing before the design is committed. Leaving bespoke configuration decisions to the procurement stage typically results in compressed design time, higher cost, and programme risk.

5. Sizing and Capacity Calculation

5.1 The Principles of Cold Water Storage Sizing

- Cold water storage capacity is determined by the demand the stored water must meet and the conditions under which that demand must be met. The calculation requires the specifier to establish:
- The peak daily demand for the building or served zone
- The duration of storage required (reflecting the consequences of supply interruption and the reliability of the mains feed)
- Any additional reserves required for firefighting, process cooling, or other dedicated uses that must not deplete the general supply
- Any regulatory or sector-specific minimum storage requirements applicable to 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?

CIBSE Guide G (Public Health and Plumbing Engineering) provides the authoritative demand estimation methodology for UK building types, including per-capita cold water consumption figures that form the starting point for sizing calculations. The current edition of CIBSE Guide G should be used and its figures verified against the specific occupancy and use of the building under design.

5. Sizing and Capacity Calculation

5.2 Demand Estimation by Building Type

Demand varies substantially by building type and occupancy pattern. The following provides indicative parameters; specifiers must apply building-specific data wherever it is available.

Building type	Indicative cold water demand	Demand profile characteristics
Office (standard)	40–50 L/person/day	Concentrated in working hours; predictable daily profile; moderate holiday reduction
Healthcare (hospital)	180–350 L/bed/day (potable; varies by specialty)	Continuous; high clinical use; minimal demand reduction at night; holiday period demand approximately similar to term
School (primary/secondary)	20–40 L/pupil/day during term	Very high peak demand during break and lunch periods; near-zero demand during evenings, weekends, and holidays
Hotel	150–250 L/bed/day	High peak in morning; laundry and F&B loads significant; relatively predictable by season
Data centre (potable)	Based on occupancy — typically modest	Process cooling and fire suppression separately sized; potable demand driven by staff occupancy
Retail/leisure	Variable; WC and café/kitchen loading dominant	High peak at busiest trading periods; low overnight
Industrial/manufacturing	Process-driven; site-specific	Derive from process data rather than per-capita figures

5. Sizing and Capacity Calculation

5.3 Storage Duration

The standard approach to cold water storage sizing in UK commercial buildings is to provide a 24-hour reserve. This reflects the historical reliability of the UK mains supply and is consistent with CIBSE Guide G and established good practice.

Deviation from the 24-hour standard may be appropriate in specific circumstances:

- 48-hour or 72-hour reserves are appropriate for buildings where supply interruption has severe consequences — hospitals, data centres, high-security facilities. This is a risk management decision that should be documented and approved by the client or their appointed advisor.
- Reduced reserves may be appropriate for buildings on particularly reliable private supply infrastructure, but only where reliability is documented and the risk of interruption has been formally assessed.
- Break tanks sized primarily to match booster pump set capacity rather than full daily demand — applicable where the tank function is hydraulic separation rather than demand reserve.
-

> Oversizing cold water storage is a Legionella risk, not a safety margin. A tank sized on notional maximum occupancy that rarely sees its full stored volume turn over will develop stagnant zones. Size to realistic demand and manage turnover through configuration, not excess capacity.

5.4 Firefighting Reserve

Where a fixed automatic sprinkler system is installed, BS EN 12845 requires an independent water supply reserve sufficient to supply the system at its design flow rate for the specified duration. Duration depends on the system category (typically 30, 60, or 90 minutes) and hazard classification of the protected occupancy. The firefighting reserve must be maintained separately from the general cold water supply reserve — in a dedicated tank or in a clearly divided section of a shared tank — and must not be available to normal building demand.

The firefighting tank sizing calculation is the responsibility of the sprinkler system designer. The cold water storage specifier's responsibilities are to accommodate the specified reserve within the building water strategy and to confirm that the selected tank configuration (LPCB-certified, correct capacity and dimensions) meets the sprinkler designer's specification. Coordination between the cold water engineer and the sprinkler system designer at early design stage is essential and is frequently absent in practice.

5. Sizing and Capacity Calculation

The firefighting reserve must be physically separated from the general potable supply in all cases. A single undivided tank holding both is non-compliant with BS EN 12845. The sprinkler system designer and cold water engineer must coordinate at RIBA Stage 2 — not at tender stage.

5.5 Legionella Risk and Turnover

HSG274 Part 2 recommends that cold water storage tanks are sized so that the entire stored volume turns over within 24 hours under normal demand conditions. An oversized tank that rarely achieves full turnover develops zones of stagnant water in which Legionella bacteria can proliferate at temperatures between 20°C and 45°C.

Where demand is insufficient to achieve daily turnover in a tank sized on the 24-hour reserve calculation, the specifier should consider:

- Reducing tank capacity to match realistic demand — accepting reduced resilience against prolonged supply interruptions
- Installing a time-controlled secondary flow arrangement that promotes water movement through the tank
- Fitting multiple temperature sensor pockets at low, mid, and high levels within the tank to identify stratification
- Specifying internal baffles to direct flow and improve mixing, particularly in large-capacity tanks

5. Sizing and Capacity Calculation

5.6 Common Sizing Errors

The following sizing errors are encountered regularly in practice. Each has direct consequences for compliance and asset performance.

Error	Consequences	Mitigation
Oversizing to be "safe"	Reduced turnover; Legionella risk; excess capital and space cost	Size to realistic demand; document turnover calculation
Failure to separate firefighting reserve	Regulatory non-compliance under BS EN 12845; risk of firefighting reserve being depleted by normal demand	Specify divided tank or separate firefighting tank; coordinate with sprinkler designer
Using theoretical maximum occupancy rather than realistic demand	Chronic oversizing with persistent stagnation risk	Use CIBSE Guide G figures calibrated to actual occupancy data where available
Ignoring booster pump minimum flow requirement	Pump cavitation; premature pump failure; potential supply interruption	Size break tank to ensure pump never runs dry under maximum demand
Single undivided tank for critical facilities	Tank cannot be taken out of service for maintenance without supply interruption	Specify dual-compartment or duty-standby configuration for healthcare, data centres, and critical infrastructure
No allowance for float valve shut-off height	Usable capacity less than nominal capacity; demand calculation error	Confirm usable capacity with manufacturer allowing for float valve and outlet geometry

6. Installation, Access and Structural Considerations

6.1 Plant Room Access Assessment

Before a tank configuration is finalised, the access route from the building delivery point to the installation location must be assessed in detail. This assessment — which must be completed before procurement, not after delivery — should record the clear opening dimensions at every doorway, corridor, stairway, lift, service hatch, and roof opening on the route, and should confirm the structural load capacity of any floor or platform traversed by the delivery.

For sectional tanks, individual panel dimensions (typically 1m × 1m or 2m × 1m) must be compared against every opening. Panels cannot be bent or compressed; if a panel will not pass through an opening at right angles or on edge, a different panel configuration must be selected or the access route modified. This assessment is the tank manufacturer's responsibility as part of their pre-delivery service, but it requires the specifier to have obtained and provided accurate building as-built information.

6.2 Structural Floor Loading

A filled cold water storage tank imposes a significant load on the supporting floor or structure. The magnitude of this load must be assessed by a structural engineer before the tank is installed; this is not an optional step for large tanks.

Water has a density of 1,000 kg/m³ (1 kg per litre). The following example illustrates the order of magnitude:

> A sectional tank with internal dimensions 4m × 4m × 2m depth holds 32,000 litres. The water alone exerts a load of 32,000 kg (32 tonnes) uniformly distributed across the tank footprint of 16m². This equates to 2,000 kg/m² — equivalent to approximately 20 kN/m² — before accounting for the tank self-weight or any dynamic loading from filling and emptying. Standard commercial floor slabs are typically designed for 2.5–7.5 kN/m². Structural assessment is essential.

Where the existing structure is found to be inadequate, options include:

- Distributing the load over a larger area using spread beams, a reinforced concrete slab, or a steel grillage designed by a structural engineer
- Relocating the tank to a ground-floor or basement position where the bearing capacity is greater
- Reducing tank capacity and compensating with a duty-standby configuration

6. Installation, Access and Structural Considerations

6.3 Foundation Requirements

Sectional GRP tanks require a flat, level, and structurally adequate foundation. The permissible deviation from level varies by manufacturer and tank size; typical tolerances are in the range of ±2mm over the full tank footprint. Any deviation beyond the specified tolerance introduces uneven stresses into panel joints, which over time causes joint sealant failure and potential leakage or structural compromise.

Foundation construction should be to the manufacturer's specification. The level should be verified using a precision level or laser level across the full tank footprint, with the result recorded and signed off before tank assembly commences. Verification responsibility lies with the assembly team; the general contractor should not release the foundation for assembly without this sign-off.

> Foundation levelness is the single most common cause of premature sectional tank joint failure. A deviation of only a few millimetres across a large tank footprint introduces unequal panel joint loading that progressively works sealant loose. This failure mode is not covered by most product warranties if installation records cannot demonstrate that the foundation was within tolerance.

6.4 Clearance Requirements

Maintenance access to the tank requires minimum clearances on all sides and above. These clearances permit panel and joint inspection, access to fixings, confined space entry for cleaning and disinfection, and the safe working of operatives in the plant room. Minimum clearance requirements vary by manufacturer and configuration; as a general principle, at least 600mm on all accessible sides and sufficient headroom above the tank lid for lid removal and access hatch operation should be assumed in the plant room layout design.

Where the TIF configuration is used against two walls, the two accessible sides must have clearances sufficient for the above activities. The implications for plant room layout, including the routing of pipework, cable trays, and other services, must be resolved at design stage. Late changes to plant room layouts that compromise tank access are a common source of maintenance programme failures in service.

6. Installation, Access and Structural Considerations

6.5 Connections and Fittings

All cold water storage tanks in potable water applications require a defined set of connections. The position, size, and specification of each connection must be confirmed at order stage, not at installation stage.

Connection	Position	Specification note
Inlet	Upper section of tank wall or raised float valve housing	Controlled by float valve (BS 1212 ball valve or equivalent). Size to deliver required fill
Outlet	At or near base of tank wall	Position to maximise turnover — on opposite side and at different level from inlet
Overflow	Below float valve shut-off level; above warning pipe	Must be sized to discharge maximum inlet flow rate safely. Must discharge to a
Warning pipe	25–50mm below overflow level	Gives early warning of float valve fault before overflow operates. Visible discharge
Drain	At base, lowest accessible point	Full-bore valve. Must allow complete tank drainage. Include lockable valve.
Manway	Lid or wall panel as specified	Minimum size 550mm × 450mm clear opening for confined space entry. Position
Vent	Lid or upper wall	Screened against insect ingress. Positioned to draw clean air — away from exhaust
Temperature sensor pockets	Low, mid, and high level	Minimum one; three recommended for tanks > 5,000 L to detect thermal

6. Installation, Access and Structural Considerations

6.6 Commissioning

On completion of installation and before connection to the distribution system, every potable cold water storage tank must be commissioned in accordance with BS 8558:2015. The commissioning sequence is:

1. Inspection — Visual inspection of all internal surfaces, panel joints, connections, and fittings. Confirmation that installation is complete, no construction debris is present, all fittings are correctly positioned and secure, and the manway and vent screens are properly fitted.

2. Chlorination and disinfection — Fill the tank with potable mains water. Dose to the chlorine concentration specified in BS 8558 (typically 50 mg/L free chlorine). Hold for the specified contact time. Drain to waste. Refill with untreated mains water.

3. Water sampling — After refill, submit water samples to a UKAS-accredited laboratory for bacteriological analysis (total coliforms, E. coli, and colony count). Do not connect the tank to the distribution system until satisfactory results are received.

4. Documentation — Record the disinfection procedure, dosing details, contact time, and laboratory results in the building's O&M manual. This commissioning record is an ACoP L8 compliance document.

6.7 Contractor and Assembler Competence

The technical requirements described in this guide are only met in practice if the contractors and operatives carrying out the work are competent to do so. Competence is not the same as willingness or general construction experience.

For tank assembly, the critical requirement is that assembly is carried out by the manufacturer's own trained operatives or formally approved installers. This is not a commercial preference — it is a technical necessity. Sectional GRP tanks require precise panel alignment, correct gasket seating, and bolt torques applied to the manufacturer's specification in the correct sequence. These requirements cannot be met by a general M&E contractor or a labourer provided by the main contractor without specific training on the product being assembled.

Specifiers and project managers should, at tender stage, confirm the following with the proposed manufacturer or installer:

- That assembly will be carried out by the manufacturer's own trained operatives or a formally accredited installer, not subcontracted to an uncertified third party.
- That the assembly supervisor holds current product-specific training documentation from the manufacturer.
- That bolt torque records will be completed during assembly and retained as part of the commissioning documentation.
- That the assembly team has reviewed the access route, foundation drawings, and plant room layout before the delivery date is confirmed.
-

For Legionella risk assessment and cleaning, the Responsible Person should satisfy themselves that any contracted water hygiene company holds relevant industry accreditation — for example, membership of the Legionella Control Association (LCA) or equivalent. Accreditation status can be checked at the LCA register: lca.org.uk.

For confined space entry during inspection or cleaning, all operatives must be trained and assessed as competent for the specific confined space involved. A certificate of competence from a recognised training provider (for example, to the standards of the Confined Space Training Association or equivalent) provides evidence of this. The duty holder should request and retain copies of operative competence records before authorising any tank entry.

7. Maintenance, Inspection and Whole-Life Performance

7.1 Statutory Maintenance Obligations

The building owner or person responsible for the premises has a legal duty under the Health and Safety at Work etc. Act 1974, implemented through ACoP L8 and HSG274, to maintain cold water storage assets in a condition that prevents or minimises Legionella risk. This duty does not diminish over the life of the asset, and it cannot be discharged by delegating responsibility to a contractor without ensuring that the contractor is competent and that adequate oversight and record-keeping are maintained.

In practical terms, the duty requires:

- A written Legionella risk assessment covering the cold water storage tank and distribution system, reviewed when there is a material change to the system and at least every two years.
- A written control scheme specifying inspection, cleaning, monitoring, and response procedures.
- Appointment of a Responsible Person (RP) with appropriate authority, competence, and resources to implement the control scheme.
- Records of all inspection, cleaning, monitoring, and corrective actions, retained for a minimum of five years.

> ACoP L8 requires maintenance records to be retained for a minimum of five years. In the event of a Legionella-related enforcement investigation or prosecution, the absence of records is treated as evidence of non-compliance — not as a neutral gap. A building with records demonstrating consistent maintenance is in a materially stronger position than one with no records.

7.2 Inspection: Frequency and Scope

HSG274 Part 2 specifies minimum inspection frequencies:

Routine visual inspection

At least annually for most commercial settings; at least every six months in higher-risk settings (healthcare, facilities with immunocompromised occupants, or where previous Legionella sampling has returned positive results).

Full cleaning and disinfection

At least annually, or more frequently where the written risk assessment identifies elevated risk.

Temperature monitoring

At a frequency specified in the written control scheme; typically weekly or monthly cold water temperature checks at representative points in the distribution system.

7. Maintenance, Inspection and Whole-Life Performance

A routine visual inspection covers:

- Internal surfaces of all tank walls, floor, and underside of lid: evidence of biofilm, sediment, discolouration, laminate degradation, or physical damage
- Internal fittings — float valve, connections, overflow, warning pipe, vent screen, internal support steelwork — for corrosion, mechanical failure, or contamination risk
- Panel joints in sectional tanks: evidence of joint sealant failure, water tracking, or delamination
- External surfaces and insulation: evidence of physical damage, moisture ingress, or insulation detachment
- Environmental conditions: evidence of warm air ingress, condensation, or other conditions that could affect stored water temperature

7.3 Cleaning and Disinfection Procedure

Cleaning and disinfection of cold water storage tanks must be carried out in accordance with BS 8558:2015 and HSG274 Part 2. The procedure involves:

1. Isolate the tank from the distribution system.
2. Drain the tank to waste.
3. Physically clean all internal surfaces — scrubbing to remove biofilm, sediment, and any scale — using appropriate equipment and PPE. Confined space entry controls apply throughout.
4. Apply chemical disinfectant to the specified concentration and hold for the specified contact time.
5. Flush the tank and disinfectant solution to waste.
6. Refill with untreated mains water and flush distribution system.
7. Take post-cleaning water samples and submit to a UKAS-accredited laboratory.
8. Do not return the tank to service until a satisfactory bacteriological result is received.
9. Document the complete procedure and results in the Legionella logbook.

7.4 Tank Condition Surveys

A tank condition survey is a more detailed assessment than a routine inspection, involving non-destructive testing and a written assessment of remaining service life. It is appropriate when:

- A tank has reached or is approaching its expected service life (typically 25–30+ years for GRP under good maintenance)
- Visual inspection has revealed deterioration requiring quantification
- A building is being acquired, changed in use, or included in a capital refurbishment programme
- Insurance or financing requirements specify a formal condition assessment

Non-destructive testing methods applicable to GRP tanks include:

- Ultrasonic thickness measurement — assesses whether the GRP laminate has thinned through degradation or mechanical damage over time
- Joint sealant assessment — physical testing of gasket and sealant condition at accessible panel joints
- Internal support steelwork inspection — visual and thickness assessment of stainless steel internal tie rods and base frame members in sectional tanks
- Microbiological sampling — targeted sampling to characterise the microbiological burden and inform the cleaning and disinfection programme

The condition survey output should be a written report that categorises tank condition, identifies immediate remediation requirements, and gives an evidenced assessment of remaining service life. This provides the basis for capital planning decisions on repair, refurbishment, or replacement.

7.5 When to Replace Rather Than Repair

There is no defined maximum service life for a GRP cold water storage tank; a well-maintained tank may remain serviceable beyond 30 years. The decision to replace rather than repair should be based on a condition survey and should consider:

- Structural integrity — widespread laminate thinning, panel joint failure, or corrosion of internal support steelwork beyond economical repair
- Persistent microbiological contamination — consistently positive Legionella sampling despite thorough cleaning and disinfection, indicating a surface that can no longer be reliably cleaned
- Regulatory non-compliance — a tank lacking Regulation 4 certification that cannot be retrospectively certified may require replacement to achieve and maintain compliance with the Water Supply (Water Fittings) Regulations
- Changed demand — a tank materially oversized or undersized for current building demand, creating a chronic Legionella or supply risk
- Operational economics — a whole-life cost assessment demonstrating that the ongoing maintenance cost of repair exceeds the amortised cost of replacement

7. Maintenance, Inspection and Whole-Life Performance

7.6 Whole-Life Cost

A correctly specified and maintained GRP sectional tank has a higher initial capital cost than an equivalent galvanised steel tank. The relevant investment decision for infrastructure projects, however, is whole-life cost — the sum of capital cost, installation, maintenance, and end-of-life replacement, discounted to a common base over the planned asset life.

The principal cost advantages of GRP over galvanised steel over a 30-year asset life are:

- Lower maintenance cost — no coating maintenance; no rust treatment; no relining programme
- Lower contamination risk — no corrosion particulates; reduced biofilm risk from smooth internal surface; lower bacteriological remediation costs
- Longer service life — a well-maintained GRP tank outlasts galvanised steel under equivalent conditions; replacement programme deferred
- Modular repairability — individual panels in a sectional tank can be replaced without replacing the entire tank; a galvanised steel tank typically requires full replacement when the coating fails

7.7 Remote Monitoring and Digital Water Management

HSG274 Part 2 requires temperature monitoring at a frequency specified in the written control scheme. In most commercial settings this has historically been delivered by periodic manual checks — typically monthly. There is no regulatory requirement to use automated monitoring, but its use is increasing in higher-risk applications and where the written control scheme requires more frequent data.

Remote temperature monitoring systems consist of sensors installed at low, mid, and high levels within the tank, connected to a data logger that transmits readings at defined intervals to a cloud-based platform or building management system (BMS). Alerts can be configured to notify the Responsible Person when a reading exceeds the 20°C control limit, enabling a faster response than would be possible through monthly manual checks.

For specifiers and facilities managers, the relevant considerations are:

1. Temperature sensor pockets should be specified at the tank order stage, not retrofitted. Retrospective installation of sensor pockets in a GRP sectional tank requires panel modification and resealing, which may void the manufacturer's warranty.

- Data from remote monitoring systems constitutes a monitoring record under ACoP L8. Records should be retained for a minimum of five years. The monitoring system specification should include provision for data export and long-term storage

- Remote monitoring does not replace the visual inspection and cleaning requirements of the written control scheme. It supplements them by providing continuous temperature data between scheduled inspection visits.

In data centre applications, where plant room ambient temperatures may approach or exceed the Legionella growth optimum of 37°C in warm weather, remote monitoring with automated alerts is strongly advisable. A monthly manual temperature check is unlikely to detect a transient exceedance of 20°C between visits.

The written control scheme should specify the monitoring frequency, the alert threshold, and the response procedure when an alert is triggered. Where a BMS is used, the cold water storage temperature alarms should be included in the BMS alarm schedule and escalation procedure.

7.8 Tank Replacement in Occupied Buildings

Where a condition survey or regulatory assessment indicates that a tank requires replacement, the project presents different constraints from a new-build installation. The following considerations apply specifically to replacement in occupied or operational buildings.

Temporary supply

Before the existing tank is taken out of service, a plan for maintaining water supply to the building must be in place. Options include a temporary above-ground tank and pump set with connection to the distribution system; supply from a secondary tank where a duty-standby configuration is already in place; or, where building occupancy permits, a planned shutdown of limited duration. The temporary supply arrangement must maintain cold water temperature control and must be included in the Legionella risk assessment.

Access

The access constraints described in Section 6.1 apply with additional complexity in a retrofit situation. The existing tank must be decommissioned, drained, and removed before the new tank can be assembled. In plant rooms with restricted access, this may require partial dismantling of the old tank in situ. The route for panel removal and new panel delivery should be assessed independently; the access route may have changed since the original installation through the addition of plant, services, or structural modifications.

7. Maintenance, Inspection and Whole-Life Performance

Decommissioning and disinfection

Before the existing tank is decommissioned, it should be subject to a final internal inspection and water sampling. If Legionella is detected, the tank and connected pipework must be disinfected before any work begins, in accordance with HSG274. All water arising from draining and disinfection must be disposed of safely and in accordance with applicable environmental requirements.

Structural assessment

A structural assessment is required for the replacement tank in the same way as for a new installation. If the replacement tank is of different dimensions or capacity from the original, the floor loading calculation must be revisited. Do not assume that because a tank of similar size was previously installed on the floor, the floor is adequate for the replacement.

Programme

Tank replacement in an occupied building requires close programme management to minimise the period without normal cold water supply. Agree the programme with the manufacturer, the main contractor, the building occupier, and any relevant statutory authorities before work commences. Where the building is a healthcare facility, hospital, or other high-consequence environment, formal change control through the estates design and approval process will be required.

8. Sector Considerations

8.1 Healthcare: NHS and Private

Healthcare buildings are governed by NHS England Health Technical Memorandum HTM 04-01 (Safe Water in Healthcare Premises) alongside the general statutory framework of ACoP L8 and HSG274. HTM 04-01 is specific to NHS England premises; NHS Scotland, NHS Wales, and Health and Social Care in Northern Ireland each publish equivalent guidance which must be consulted for projects in those jurisdictions.

> HTM 04-01 is not a guidance document that can be selectively followed — it is the primary technical reference for water system design in NHS premises and its requirements must be met in full. Any deviation requires formal approval through the NHS estates design process.

Key Specification Requirements in Healthcare

- AB air gap (Category 5) protection as standard on all cold water storage cistern inlets — not AG as used in commercial applications
- Pre-insulated tanks with documented insulation performance to maintain stored water below 20°C in all ambient conditions
- Duty-standby (two-compartment or two-tank) configuration wherever clinically continuous supply is required — which, in practice, means most acute healthcare settings
- Higher inspection and cleaning frequency than HSG274 commercial baseline, as specified in the site water safety plan
- Segregated potable and non-potable supplies with no cross-connection
- Documented water safety plan covering all water systems in the premises, reviewed annually and following any system change

Documentation requirements in healthcare settings are extensive. Water safety plans, risk assessments, logbooks, laboratory records, and maintenance contracts must be maintained and must be available to the Care Quality Commission (CQC) and NHS estates auditors on request.

8.2 Education

Cold water storage in educational buildings is governed by the same statutory framework as commercial buildings — ACoP L8, HSG274, and the Water Supply (Water Fittings) Regulations — with additional guidance from the Department for Education (DfE). Building Bulletin 93 (BB93) is the DfE reference document for school building design; the current edition should be consulted for water services guidance specific to educational buildings.

Key Specification and Management Issues

- Holiday stagnation — extended periods of low or zero demand during school holidays allow stored water to sit at ambient temperature, which in summer in roof-space plant rooms may significantly exceed 20°C. The written control scheme must include a flushing protocol for the beginning of each term.
- Realistic sizing — school demand is concentrated into term-time school hours. Tanks sized on notional full occupancy will be materially oversized during holiday periods. Size on term-time demand and manage stagnation risk through protocol rather than oversizing.
- Vulnerable users — children's susceptibility to waterborne illness is higher than the adult average. The Responsible Person should ensure that the water safety plan reflects this, and that sampling and response protocols are appropriately conservative.

8.3 Data Centres

Data centres present a demanding cold water storage brief in which three independent storage functions — potable supply, firefighting reserve, and process cooling make-up — must each be specified, sized, and maintained independently.

Legionella Risk in Warm Plant Rooms

Cooling systems generate heat, and plant rooms in data centres operate at ambient temperatures that can readily exceed 25–30°C in warm weather. Maintaining cold water storage below 20°C in this environment requires effective insulation — typically pre-insulated panels with a minimum 50mm polyurethane foam thickness — and must be verified by temperature monitoring at multiple levels within the tank. The written control scheme should include a response protocol for any exceedance of 20°C, including immediate investigation of insulation integrity and consideration of additional cooling.

> Data centre plant room temperatures can approach or exceed the Legionella growth optimum of 37°C in warm weather. A single temperature sensor at low level in a large uninsulated tank will not detect upper-layer stratification. Specify multiple temperature sensor pockets and review monitoring data at the frequency set in the written control scheme.

Resilience Requirements

Data centres are typically designed to defined Uptime Institute Tier levels, each specifying a resilience standard. Tier III and Tier IV data centres require concurrently maintainable or fault-tolerant water supply systems. In practice, this means duty-standby cold water storage configurations with automatic changeover, independent feed pipework for each tank, and continuous water quality monitoring with remote alarm capability. The water storage specification must be developed in the context of the facility's overall resilience tier and the client's SLA obligations.

Fire Suppression Storage

Sprinkler system designers for data centres address the specific fire load characteristics of high-density IT equipment and cable management systems. The firefighting water reserve for a data centre can be substantially larger than for a comparable commercial building. Specifiers should obtain the sprinkler designer's storage requirement at RIBA Stage 2 to ensure that structural provisions and plant room space allocations are made early enough to influence the building design.

> Related to this series:Whitepaper: ***Water Storage as a pillar of resilience in CNI Data Centres***. A technical reference for water storage systems in UK data centres classified as Critical National Infrastructure (CNI). This whitepaper covers regulatory compliance, system sizing, risk mitigation, and current guidance on cooling and fire suppression water storage.

8.4 High-Rise Residential Developments

Buildings where the highest occupied floor is more than approximately 25 metres above the mains connection point use intermediate cold water storage and booster sets to maintain acceptable distribution pressure. The break tank at the booster set prevents direct mains connection; separate zonal tanks or further booster stages manage pressure in the upper floors of very tall buildings.

Buildings above 18 metres height are subject to the Building Safety Act 2022 and associated secondary legislation, which establishes the role of Accountable Person and Principal Accountable Person with defined responsibilities for building safety, including the safety of building services systems. Water safety — particularly Legionella control — falls within the scope of building safety for higher-risk residential buildings.

The Accountable Person must ensure that Legionella risk assessment and control are properly managed and documented. The absence of dedicated building management staff in most residential buildings means that the written control scheme must be designed to be deliverable by a competent service contractor without specialist building knowledge.

> Under the Building Safety Act 2022, Accountable Persons for higher-risk residential buildings (18 metres+ or 7+ storeys) have defined legal duties for building safety, which extends to the safety of building services systems including water storage. Legionella control and Regulation 4 compliance form part of this obligation.

8. Sector Considerations

Related to this series: Whitepaper: **Sectional GRP Cold Water Tanks in High-Rise and Multi-storey Buildings**. A specification, compliance, and maintenance reference for consulting engineers, MEP contractors, and facilities managers working on cold water storage in UK multi-storey and high-rise developments.

8.5 Civic and Local Authority Buildings

Court buildings, libraries, council offices, and similar civic buildings present standard commercial cold water storage requirements. The significant challenge for local authority estates teams is the legacy portfolio: many civic buildings contain tanks installed in the 1970s and 1980s, now at or beyond their design service life. Galvanised steel tanks from this era frequently exhibit corrosion, sedimentation, and joint failure.

A structured replacement programme, informed by condition surveys and prioritised by risk (based on the building's occupancy, the tank's condition, and the presence of vulnerable users), is the recommended approach. Condition surveys provide the evidential basis for capital programme submissions and enable prioritisation against demonstrable risk rather than age alone.

8.6 Transport Infrastructure

irports, railway stations, and major motorway service areas require cold water storage at substantial scale. Key characteristics of transport infrastructure storage include:

- **Scale** — large passenger throughput drives significant daily demand; firefighting reserves for large floor areas can be substantial
- **Maintenance access** — maintenance windows in 24/7 transport facilities may be severely restricted; duty-standby configurations are typically required
- **Consequence of failure** — supply interruption in a busy transport hub has immediate consequences for large numbers of people; the water storage specification should reflect this in resilience terms
- **Regulatory oversight** — airports and railway stations are subject to regulation from multiple bodies (CAA, ORR, local authority EHOs) as well as the standard water and health and safety framework

8.7 Industrial and Manufacturing

Process water storage requirements in industrial and manufacturing facilities vary enormously by sector. GRP is suitable for a range of these applications; the specifier must verify chemical compatibility with the manufacturer for any application involving non-standard contents.

Key considerations:

- **Potable vs non-potable storage** — separate supply systems with no cross-connection; non-potable storage does not require Regulation 4 compliant materials but should be clearly labelled to prevent accidental connection

- **Process cooling water** — may be at higher temperatures or with chemical additives that exclude standard Regulation 4 compliant GRP from the application; verify compatibility

- **Fire suppression** — industrial fire loads may drive large firefighting reserves; LPCB-certified tanks to BS EN 12845 specification

- **Regulatory oversight** — industrial sites may be subject to Environment Agency, HSE, or sector-specific regulatory requirements in addition to the standard water and safety framework

8.8 Defence and Secure Facilities

Ministry of Defence and other secure facilities have cold water storage requirements governed by MoD JSP 375 (MoD Health and Safety Handbook) and sector-specific design guidance, in addition to the statutory framework applicable to all buildings in the UK. Specifiers must obtain and follow the applicable MoD or sector guidance for defence projects.

Security constraints may limit maintenance access and the deployment of routine service contractors. The written control scheme must be designed with these constraints in mind, including the possibility that routine inspection and cleaning visits require security clearance and advance planning. This argues for longer maintenance intervals between cleaning events, offset by enhanced monitoring, temperature control, and supplementary treatment where the risk assessment supports it.

9. Common Specification Errors and How to Avoid Them

The following errors are encountered repeatedly in practice across UK infrastructure projects of all sizes and sectors. Each is preventable at design stage.

Error	How it occurs	Consequence	Prevention
Non-compliant materials specified (no Regulation 4 certification)	Specifier omits compliance requirement; contractor substitutes uncertified product; Kiwa or equivalent certification not verified at time of order	Regulatory non-compliance under Regulation 4; potential enforcement; insurance risk; tank may require replacement	Specify Regulation 4 compliance as non-negotiable; verify Kiwa certification at kiwa.com/uk before specification issue and before order placement
Oversizing driven by conservative demand estimates	Specifier applies maximum occupancy rather than realistic demand; client requests "extra capacity"	Poor turnover; chronic Legionella risk; wasted capital and space	Size on realistic demand; document turnover calculation; educate client on turnover risk
Firefighting reserve not separated from general supply	Single undivided tank with combined reserve; fire engineer and cold water engineer not coordinating	BS EN 12845 non-compliance; firefighting reserve depleted by demand; sprinkler system may not perform	Mandate early coordination between cold water engineer and sprinkler designer; specify divided tank or separate firefighting tank

9. Common Specification Errors and How to Avoid Them

The following errors are encountered repeatedly in practice across UK infrastructure projects of all sizes and sectors. Each is preventable at design stage.

Error	How it occurs	Consequence	Prevention
Foundation not verified before assembly	General contractor releases area without independent level check; manufacturer's assembly team not provided with level verification record	Uneven joint loading; joint leakage; panel cracking; structural failure over time	Specify independent level verification as a hold point before assembly commences; record and sign off
Inadequate maintenance access in plant room	Tank positioned too close to wall, pipework, or other plant; access requirements not coordinated at design stage	Maintenance programme compromised; confined space entry risks; regulatory non-compliance	Confirm minimum clearances with manufacturer at design stage; review plant room layout against access requirements
Type AG air gap where Type AB is required	Specifier defaults to AG; healthcare requirement for AB not recognised; contractor installs to standard commercial specification	Category 5 backflow risk; HTM 04-01 non-compliance in healthcare settings; regulatory enforcement risk	Identify fluid category at design stage; cross-check against WRAS Water Regulations Guide and HTM 04-01 where applicable
Single tank where duty-standby required	Client or specifier accepts single-tank design to reduce cost; resilience requirement not formally assessed	Tank cannot be maintained without supply interruption; non-compliant with continuity requirements for critical facilities	Define resilience requirement at project inception; specify dual-compartment or duty-standby for healthcare, data centres, and high-criticality applications

9. Common Specification Errors and How to Avoid Them

The following errors are encountered repeatedly in practice across UK infrastructure projects of all sizes and sectors. Each is preventable at design stage.

Error	How it occurs	Consequence	Prevention
Commissioning documentation not retained	Commissioning completed but records not incorporated into O&M manual; contractor fails to provide results	No evidence base for ACoP L8 compliance; Legionella liability exposure; Building Control sign-off issues	Specify commissioning documentation as a condition of practical completion; include in O&M manual and Legionella logbook

10. Specification and Asset Management Checklists

The following checklists are provided as practical tools for use at each stage of the project. They summarise the key requirements described in the preceding sections. They are not exhaustive and do not substitute for reference to primary standards and legislation.

Compliance and Approvals

- Tank specified to BS EN 13280:2001 — confirm current standard status
- Regulation 4 compliance required and specified as mandatory — Kiwa certificate number to be recorded on specification documents
- LPCB certification required if tank serves fire suppression system — verify at redbooklive.com
- Backflow protection type established (AG or AB) based on fluid category assessment
- Applicable legislation identified for jurisdiction (England/Wales 1999 SI; Scotland SSI 2014/317; NI SR 2009/75)

Capacity and Configuration

- Demand estimated using CIBSE Guide G figures calibrated to building-specific occupancy data
- Storage duration selected and documented (24-hour, 48-hour, or other, with justification)
- Firefighting reserve sized by sprinkler system designer and coordinated with cold water storage design
- Firefighting reserve physically separated from general potable supply
- Turnover calculation completed — confirm daily turnover achieved under realistic demand
- Duty-standby or dual-compartment configuration specified where continuity of supply requires it
- Tank configuration selected — one-piece, two-piece, or sectional — based on access route assessment
- Base configuration selected — EFB, IFB, or TIF — based on plant room constraints

Installation and Access

- Access route survey completed — all opening dimensions confirmed and compared against largest panel or tank dimension
- Structural floor loading assessment by structural engineer — adequacy confirmed or remediation specified
- Foundation specification confirmed with manufacturer — level tolerance stated and inspection hold point specified

10. Specification and Asset Management Checklists

Installation and Access

- Minimum clearances on all sides and above — confirmed against manufacturer's requirements and incorporated in plant room layout
- All connections specified — inlet, outlet, overflow, warning pipe, drain, manway, vent, temperature sensor pockets

Legionella Control

- Cold water storage within scope of Legionella risk assessment
- Written control scheme to include inspection frequency, cleaning schedule, temperature monitoring regime, and response procedures
- Responsible Person appointed with authority, competence, and resources
- Insulation specified to maintain stored water below 20°C in maximum anticipated ambient conditions

Related to this series: Whitepaper: ***Control of Legionella | Best Practices, Regulations, and Health Guidelines.*** A technical reference for engineers, contractors, and facilities managers responsible for Legionella control in building water systems. This white paper covers current legal obligations, control measures, and developments in monitoring and treatment. Download to support compliance and inform your approach to water safety.

11. Case Study: GRP Sectional Tank Installation for HS2's Green Tunnel projects

Project: Cold water storage installation
HS2's Green Tunnels programme forms part of the high-speed rail route between London and Birmingham. Two cut-and-cover tunnels — Greatworth Green and Chipping Warden Green, each 2.5 km in length — were designed to reduce the railway's surface impact, limit noise disruption, and enable ecological restoration of the surrounding landscape. Unlike bored tunnels, cut-and-cover construction proceeds in open trenches before the structure is covered and the land above reinstated.

Water storage infrastructure was required to support both the construction programme and long-term site operations. The environmental sensitivity of the sites, their rural locations, and the programme constraints of a major civil works project set the parameters for the specification.

Requirement
Two large-capacity GRP cold water storage tanks were required for the Greatworth Green and Chipping Warden Green tunnel sites, with a third tank scheduled for installation in 2026. Each tank was specified at 8 m × 7 m × 4 m deep — a size that presented significant demands in terms of manufacture, transport, and on-site installation. The solution needed to meet HS2's engineering requirements and align with the project's environmental management commitments.

11. Case Study: GRP Sectional Tank Installation for HS2's Green Tunnel projects

Supply and installation

Tricel Water designed, manufactured, and installed both tanks, working alongside EKFB, the joint venture contractor responsible for delivering HS2's central section. The principal constraints were rural site access and the logistics of moving oversized panel components to confined construction areas within the tunnel envelopes.
Delivery was coordinated against HS2's traffic and environmental management plans. On-site, Tricel's installation teams used specialist equipment to position and assemble the tanks within the restricted working areas available on each site. Both tanks were installed in 2025 without reported delay to HS2's construction programme.

Why GRP

GRP construction was appropriate for this application for several reasons. The material is corrosion-resistant, requires minimal maintenance over its service life, and does not require protective coatings that might need periodic renewal. These characteristics align with the long asset life expected of permanent infrastructure and reduce the whole-life maintenance burden on the operator.

Technical Summary

Client	HS2 Ltd
Contractor	EKFB (Eiffage, Kier, Ferrovial, BAM Nuttall)
Supplier	Tricel Water
Tank dimensions	8 m × 7 m × 4 m deep
Tank Capacity	224,000 litres (224 m³) per tank
Project Capacity x 3 Tanks	672,000 litres (672 m³)
Quantity	2 installed (2025); 1 further tank scheduled (2026)
Application	Construction and operational water storage
Material	GRP sectional
Locations	Greatworth Green Tunnel; Chipping Warden Green Tunnel, Northamptonshire

11. Case Study: GRP Sectional Tank Installation for HS2's Green Tunnel projects

Successful Execution

- On-Time Delivery: Both tanks were delivered and installed to programme, with zero delays to HS2's construction programme.
- Enhanced Site Capabilities: The tanks provide essential water storage for construction and future operational requirements, supporting site safety and environmental management.
- Proven Expertise: This high-profile project demonstrates Tricel's capability in delivering complex GRP water storage solutions for large-scale infrastructure.
- Sustainability Integration: Solutions align with HS2's commitment to reducing environmental impact and integrating construction with natural landscapes.

Relevance to this guide

This project illustrates several of the specification principles covered in preceding sections. Large-format sectional GRP tanks were selected precisely because the panel-based construction method places no practical upper limit on tank capacity and allows assembly within a confined or access-restricted envelope — conditions that would preclude the use of one-piece or two-piece tanks of equivalent volume. Pre-delivery access route assessment and coordination with site logistics were essential given the rural locations and the environmental sensitivities of an HS2 construction zone.

The project also reflects the growing use of GRP cold water storage in major civil infrastructure, extending beyond the building services context to encompass construction-phase and long-term operational requirements on nationally significant projects.

High Speed Two Ltd (HS2) is a UK government-owned company established in January 2009 to design, build, and operate a new high-speed rail network connecting major cities, beginning with London and Birmingham. Its scope covers tracks, bridges, viaducts, tunnels, and stations, with environmental management and integration with existing transport networks central to its remit. With over 33,000 construction workers and thousands of UK businesses across the supply chain, it is one of the largest civil engineering undertakings currently under way in Britain.

12. Conclusion

Cold water storage is not a peripheral element of building services design. It sits at the intersection of public health law, water quality regulation, health and safety legislation, and long-term asset management — and the consequences of poor decisions in this area are disproportionate to the cost of avoiding them.

Sectional GRP tanks dominate large-volume cold water storage in UK infrastructure for well-founded reasons: they are corrosion-free, manufactured to a defined product standard, certifiable for potable water contact under an established compliance route, and capable of assembly within the access constraints that characterise most plant rooms. Their whole-life performance, when correctly specified and maintained, consistently justifies the capital premium over alternatives. None of this means they are the right choice in every scenario — this guide has described the conditions under which alternative materials or configurations are more appropriate — but it explains their prevalence across commercial, public sector, and critical infrastructure applications.

The regulatory framework governing cold water storage in the UK is more extensive than many specifiers recognise. The Water Supply (Water Fittings) Regulations 1999 and their devolved equivalents, ACoP L8, HSG274, the Confined Spaces Regulations, the Building Safety Act 2022, and sector-specific instruments such as HTM 04-01 each impose distinct and enforceable obligations. None of these can be treated as guidance to be followed selectively. Non-compliance carries criminal liability, enforcement exposure, and — in the event of a Legionella outbreak — consequences that extend well beyond the regulatory. The devolved nature of water fittings legislation in Scotland and Northern Ireland means that correct jurisdictional citation in project documentation is a basic professional obligation, not a formality.

The most common failures in cold water storage are not failures of the tank itself. They are failures of specification — oversized tanks that cannot achieve daily turnover; undivided tanks where the firefighting reserve is not separated from the potable supply; installations where access constraints were not assessed before delivery; foundations released for assembly without independent level verification; commissioning documentation that did not make it into the O&M manual. Every one of these failures is preventable at design stage, and every one has a cost in service that substantially exceeds the cost of the correct decision at procurement.

Maintenance obligations do not diminish over the life of the asset. The written control scheme, the Responsible Person appointment, the inspection and cleaning programme, and the five-year record-keeping requirement under ACoP L8 are not completion-stage formalities — they are the framework within which a cold water storage asset either performs safely across its design life or becomes a liability.

12. Conclusion

Buildings change hands, management changes, and institutional memory is lost; the O&M manual, the Legionella logbook, and the commissioning records are the only reliable continuity between the decisions made at design stage and the operatives responsible for the building twenty years later.

This guide has been written to reduce the distance between what the standards require and what practitioners specify, install, and maintain. The checklists, worked examples, and sector-specific guidance in the preceding sections are intended to make correct practice the path of least resistance. Where primary standards and legislation have been cited, readers should verify their currency before reliance; this is not a static field.

The buildings covered by this guide — hospitals, schools, data centres, high-rise residential developments, transport hubs, civic buildings, and major infrastructure projects — serve large numbers of people whose health depends, in part, on decisions that engineers, contractors, and facilities managers make about cold water storage. That is sufficient reason to make those decisions carefully.

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This document is provided for guidance purposes only. It does not constitute legal, regulatory, or engineering advice. Readers should satisfy themselves that the standards and regulatory requirements referenced in this document are current at the time of their project, as all standards and regulations are subject to amendment, revision, and withdrawal. Regulatory requirements that are described in this document reflect the position in England and Wales as of April 2026 unless otherwise stated. Scotland and Northern Ireland operate under different but broadly equivalent regulatory frameworks in several areas; specifiers in those jurisdictions should confirm applicable requirements with the relevant authorities.

Nothing in this document relieves the specifier, designer, or building owner of the obligation to comply with applicable statutory requirements, British Standards, and sector-specific guidance documents.
Tricel Water UK has taken reasonable care in preparing this document but does not warrant the accuracy or completeness of the information it contains. Tricel Water UK accepts no liability for any loss or damage arising from reliance on this document.

13. References and Further Reading

All references should be verified for currency before use. Standards are subject to revision and withdrawal. Legislation may have been amended since the date of publication of this guide (April 2026).

Primary Legislation

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Industry and Regulatory Guidance

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WRAS Water Regulations Guide. Water Regulations Advisory Scheme. Covers fluid categories, backflow protection requirements, and cold water storage cistern compliance. Available at: waterregsuk.co.uk

Drinking Water Inspectorate (DWI). Guidance on landlord and owner responsibilities and plumbing system maintenance. Available at: dwi.gov.uk

Ministry of Defence. JSP 375: MoD Health and Safety Handbook. Applicable to defence and secure facility projects. Available through MoD procurement and estates channels.

Uptime Institute. Tier Standard: Topology. Reference for data centre resilience classification. Available at: uptimeinstitute.com

Certification and Verification Databases

Kiwa KUKreg4 — product certification database for Regulation 4 compliance verification. Available at: kiwa.com/uk

WRAS product approval scheme — alternative route to Regulation 4 compliance verification. Available at: wras.co.uk

LPCB — Loss Prevention Certification Board product register for LPCB-certified firefighting water storage tanks (LPS 1276). Available at: redbooklive.com

UKAS — United Kingdom Accreditation Service. Directory of accredited laboratories for microbiological and chemical water testing. Available at: ukas.com

Frequently Asked Questions

Sectional GRP Cold Water Tanks in UK Infrastructure Projects

Q1. What is a sectional GRP cold water storage tank?

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 flanged joints. The panels are typically 1m × 1m or 2m × 1m and can be transported through standard building doorways (minimum 600–750mm clear width), enabling large-capacity tanks to be assembled in plant rooms that a one-piece tank of equivalent volume could not enter. Sectional GRP tanks are manufactured to BS EN 13280:2001 and carry Regulation 4 compliance certification (Tricel Water products hold Kiwa certification) for potable water storage. Capacities range from approximately 1,000 litres to over 2 million litres.

Q2. What standard governs GRP cold water tanks in the UK?

BS EN 13280:2001 (Specification for glass-reinforced thermosetting plastics (GRP) tanks for above-ground storage of cold potable water) is the governing product standard. It covers material composition, structural performance, dimensional tolerances, testing requirements, and hygiene suitability. Compliance with BS EN 13280:2001 is a prerequisite for Regulation 4 certification of GRP cold water storage products in the UK. The currency of the standard should be confirmed before specification.

Q3. What does Regulation 4 compliance mean for a GRP cold water tank?

Regulation 4(1)(a) of the Water Supply (Water Fittings) Regulations 1999 requires that no water fitting shall be used unless it is of an appropriate quality and standard. For cold water storage tanks used in potable water applications, this means the tank and its materials must be independently tested to BS 6920:2000 and certified by a recognised third-party body. Kiwa certification is a recognised route to Regulation 4 compliance; Tricel Water products carry Kiwa certification. Most water undertakers require evidence of Regulation 4 compliance as a condition of mains connection, and most professional specifications mandate it as non-negotiable. Certification status must be verified at the time of specification — certificates can lapse — and the certificate number must be recorded in the project specification and the building O&M manual.

Q4. What is the maximum storage temperature for a Regulation 4 compliant GRP tank?

The maximum tested storage temperature under Regulation 4 certification (BS 6920) for a GRP cold water storage tank is 23°C. Above this temperature, the tank is operating outside its tested parameters and compliance cannot be assumed. For Legionella control purposes under ACoP L8 and HSG274 Part 2, cold water must be stored and distributed at or below 20°C. The 20°C ACoP L8 limit is the operative design criterion; the 23°C Regulation 4 parameter is a product testing boundary, not a temperature target.

Frequently Asked Questions

Sectional GRP Cold Water Tanks in UK Infrastructure Projects

Q5. How is cold water storage capacity calculated for an infrastructure project?

The calculation follows four steps: (1) Estimate daily cold water demand using CIBSE Guide G per-capita figures calibrated to the building's specific occupancy type and headcount. (2) Select storage duration — typically 24 hours for commercial buildings, 48–72 hours for critical infrastructure such as hospitals and data centres. (3) Calculate and separately size any firefighting reserve required by the sprinkler system designer under BS EN 12845. (4) Check turnover — confirm that the entire stored volume will turn over within 24 hours under realistic demand conditions to manage Legionella risk. The worked example in Appendix C illustrates this process.

Q6. What does ACoP L8 require for cold water storage tanks?

ACoP L8 requires duty holders to: carry out a written Legionella risk assessment of all water systems including cold water storage; implement a written control scheme covering inspection, cleaning, temperature monitoring, and corrective actions; appoint a competent Responsible Person; and maintain records for a minimum of five years. For cold water storage tanks specifically, ACoP L8 requires stored water to be maintained at or below 20°C, stagnation to be minimised through adequate turnover, and tanks to be inspected and cleaned at defined frequencies. Failure to comply with ACoP L8 is taken as evidence of non-compliance with the Health and Safety at Work etc. Act 1974 in enforcement proceedings.

Q7. What are the different base configurations for sectional GRP tanks?

Three configurations are available. An Externally Flanged Base (EFB) tank has base flanges outside the tank footprint; the tank is elevated on beams or piers, allowing complete gravity drainage and underside access for inspection. An Internally Flanged Base (IFB) tank sits directly on a flat floor slab with base flanges inside the footprint; it cannot fully gravity-drain and requires pumping to empty completely. A Totally Internally Flanged (TIF) tank has all flanges internal, enabling it to be positioned against two perpendicular walls in severely constrained plant rooms; clearance must be maintained on the remaining two sides.

Q8. When is a Type AB air gap required instead of a Type AG air gap?

A Type AB air gap (Category 5 backflow protection) is required wherever the water stored in the cistern is at risk of contamination from a Category 5 fluid source — defined in the Water Supply (Water Fittings) Regulations 1999 as fluid presenting a serious health hazard through the presence of pathogenic micro-organisms, radioactive or very toxic substances. In practice, this means healthcare buildings (where it is mandated by HTM 04-01), facilities handling hazardous biological or chemical materials, and any installation where a Category 5 fluid risk assessment confirms the requirement. The alternative Type AG air gap provides protection only against Category 1–4 fluid risk and is not adequate where Category 5 risk exists.

Frequently Asked Questions

Sectional GRP Cold Water Tanks in UK Infrastructure Projects

Q9. How often must a cold water storage tank be cleaned?

HSG274 Part 2 specifies a minimum of annual cleaning and disinfection for most commercial settings. Higher-risk settings — healthcare buildings, premises with immunocompromised occupants, and any installation where previous Legionella sampling has returned positive results — require cleaning at least every six months. The precise frequency must be determined by the site Legionella risk assessment and documented in the written control scheme. Both the risk assessment and the control scheme must be reviewed whenever there is a material change to the water system or when monitoring results indicate that control limits are being exceeded.

Q10. When is LPCB certification required for a GRP cold water tank?

LPCB (Loss Prevention Certification Board) certification is required whenever a cold water storage tank serves a fixed automatic sprinkler system designed to BS EN 12845. The certification, issued under LPS 1276, confirms that the tank meets the structural and material requirements for a firefighting water reserve. LPCB certification and Regulation 4 compliance (Kiwa certification) are separate; a tank serving combined potable and firefighting storage must hold both. Current LPCB status can be verified at redbooklive.com.

Q11. What is thermal stratification in a cold water tank and why does it matter?

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 plant room with heat gain, the upper layers of a tank larger than approximately 5,000–10,000 litres can exceed 20°C even when a single low-level temperature sensor shows an acceptable reading. This is significant because a recorded temperature below 20°C does not confirm compliance when only one sensor is present in a large, thermally stratified tank. Mitigation measures include specifying multiple temperature sensor pockets at low, mid, and high levels; internal baffles to direct flow and promote mixing; and positioning inlet and outlet on opposite sides of the tank to encourage end-to-end circulation.

Q12. What regulations apply to cold water tanks in Scotland and Northern Ireland?

Water fittings regulation is devolved. In Scotland, the applicable legislation is the Water Supply (Water Fittings) (Scotland) Regulations 2014 (SSI 2014/317), enforced by Scottish Water. In Northern Ireland, the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 (SR 2009/75), enforced by Northern Ireland Water. The substantive requirements — material suitability, backflow protection, overflow arrangements — are equivalent to the 1999 Regulations in England and Wales, but the correct instrument must be cited in project documentation. Citing only the 1999 Regulations for a project in Scotland or Northern Ireland is technically incorrect.

Frequently Asked Questions

Sectional GRP Cold Water Tanks in UK Infrastructure Projects

Q13. How long does a sectional GRP cold water tank last?

A correctly installed and regularly maintained sectional GRP cold water tank can achieve a design life of 25–30 years or more. Key factors affecting longevity include: foundation levelness (the most common cause of premature joint failure); periodic bolt re-torque and seal inspection; resin quality and surface finish; UV protection for externally sited installations; water chemistry (low pH or high chloride water accelerates seal and fitting degradation); and maintenance frequency. Neglected tanks fail significantly earlier than well-maintained ones. No authoritative study establishes a definitive mean service life figure; condition surveys provide the most reliable basis for remaining-life assessment.

Glossary of GRP Cold Water Tanks in UK Infrastructure Projects

TERM / ABBREVIATION	DEFINITION
AB air gap	Type AB air gap: provides Category 5 backflow protection by means of a raised float valve housing with a screened spillover weir above the maximum stored water level. Required in healthcare and other Category 5 risk applications.
ACoP L8	Approved Code of Practice: Legionnaires' Disease: The Control of Legionella Bacteria in Water Systems, 4th edition, 2013. Published by the HSE. Has quasi-legal status.
AG air gap	Type AG air gap: provides backflow protection against Categories 1–4 fluid risk. Standard screened inlet and overflow arrangement.
Break tank	A tank providing hydraulic separation between the incoming mains supply and a downstream system (typically a booster pump set). Prevents direct mains connection.
BS EN 13280	British Standard specifying requirements for above-ground GRP cold water storage tanks. Compliance is a prerequisite for Regulation 4 certification of GRP tanks.
BS 6920	Suitability of non-metallic products for use in contact with water intended for human consumption. The test standard used to assess Regulation 4 compliance for non-metallic products including GRP tanks. The basis of Kiwa certification for cold water storage products.
BS 8558	Guide to the design, installation, testing, and maintenance of services supplying water for domestic use within buildings.
Category 5 fluid	Fluid classification under the Water Supply (Water Fittings) Regulations 1999 representing the highest health hazard level. Requires AB air gap backflow protection.
CIBSE	Chartered Institution of Building Services Engineers. Publisher of Guide G (Public Health and Plumbing Engineering).
COSHH	Control of Substances Hazardous to Health Regulations 2002. Requires risk assessment and control of exposure to hazardous substances including cleaning chemicals.
CWSC	Cold Water Storage Cistern.
EFB	Externally Flanged Base. Base flanges external to tank footprint; tank elevated on beams or piers for complete drainage and base access.

Glossary of GRP Cold Water Tanks in UK Infrastructure Projects

TERM / ABBREVIATION	DEFINITION
GFS	Glass Fused to Steel. Tank material using a glass coating fused to a steel panel substrate. Used for very large-capacity tanks above the practical range of sectional GRP.
GRP	Glass Reinforced Plastic. Composite material formed from glass fibre reinforcement embedded in a polymer resin matrix.
HSG274	Legionnaires' Disease: The Control of Legionella Bacteria in Water Systems. HSE technical guidance in three parts. Part 2 covers cold water storage systems.
HTM 04-01	NHS England Health Technical Memorandum: Safe Water in Healthcare Premises. Primary reference for water system design in NHS England buildings.
IFB	Internally Flanged Base. Base flanges internal to tank footprint; tank sits on a continuous flat floor slab.
LPCB	Loss Prevention Certification Board. Issues certification for firefighting water storage tanks under LPS 1276.
Regulation 4 compliance	Compliance with Regulation 4(1)(a) of the Water Supply (Water Fittings) Regulations 1999, which requires that materials in contact with potable water are of an appropriate quality and standard. Demonstrated through third-party product certification to BS 6920, including Kiwa certification.
Responsible Person	The individual appointed under ACoP L8 with authority, competence, and resources to implement and manage the Legionella control programme for a building.
Sectional tank	A GRP cold water storage tank assembled on-site from individual bolted panels. No upper capacity limit constrained by panel size.
Thermal stratification	Temperature gradient within a stored water body where warm water rises to the upper layers and cool water settles below. Creates localised zones above 20 °C even when overall average temperature appears acceptable.
TIF	Totally Internally Flanged. All flanges internal to footprint; tank can be positioned against two perpendicular walls.

Glossary of GRP Cold Water Tanks in UK Infrastructure Projects

TERM / ABBREVIATION	DEFINITION
UKAS	United Kingdom Accreditation Service. Accredits laboratories for microbiological and chemical water testing required for commissioning and Legionella sampling.
Written control scheme	Document required under ACoP L8 setting out how Legionella risk will be prevented or controlled in a building's water systems, including inspection schedules, monitoring requirements, and response procedures.

Appendix A: Key Standards and Guidance Documents

All documents listed below should be obtained in their current edition at the time of specification. Standards are subject to revision, withdrawal, and replacement by BSI and other publishers. Verify current status before relying on any document for specification purposes.

Document	Publisher	Relevance
BS EN 13280:2001	BSI	Product standard for GRP tanks for above-ground cold potable water storage. Prerequisite for Regulation 4 certification.
Water Supply (Water Fittings) Regulations 1999 (SI 1999/1148)	UK Government	Primary legislation governing water fittings in England and Wales. Requires appropriate quality and standard for materials in contact with potable water.
Water Supply (Water Fittings) (Scotland) Regulations 2014 (SSI 2014/317)	Scottish Government	Equivalent to 1999 Regulations for Scotland. Enforced by Scottish Water.
Water Supply (Water Fittings) Regulations (Northern Ireland) 2009 (SR 2009/75)	Northern Ireland Executive	Equivalent to 1999 Regulations for Northern Ireland. Enforced by NI Water.
WRAS Water Regulations Guide	WRAS (Water Regulations Advisory Scheme)	Comprehensive guidance on Water Supply (Water Fittings) Regulations 1999 compliance including fluid categories and backflow protection. Available from wras.co.uk. Note: Regulation 4 compliance certification is also provided by Kiwa and other accredited bodies.

Appendix A: Key Standards and Guidance Documents

All documents listed below should be obtained in their current edition at the time of specification. Standards are subject to revision, withdrawal, and replacement by BSI and other publishers. Verify current status before relying on any document for specification purposes.

Document	Publisher	Relevance
ACoP L8 — Legionnaires' Disease: The Control of Legionella Bacteria in Water Systems (4th edition, 2013)	HSE	Approved Code of Practice for Legionella control. Quasi-legal status. Primary reference for Responsible Person obligations.
HSG274 — Legionnaires' Disease, Parts 1–3 (Part 2 most relevant to cold water storage)	HSE	Technical guidance on Legionella control. Part 2 covers hot and cold water systems.
BS EN 12845:2015+A1:2019	BSI	Fixed firefighting systems: automatic sprinkler systems. Governs firefighting tank sizing and LPCB certification requirement.
BS 8558:2015	BSI	Guide to the design, installation, testing, and maintenance of services supplying water for domestic use. Covers commissioning and disinfection procedure.
Building Regulations Approved Document G (current edition)	MHCLG	Sanitation, hot water safety, and water efficiency for new buildings in England.

Appendix B: Regulation 4 Compliance: Kiwa Certification and Verification

Regulation 4(1)(a) of the Water Supply (Water Fittings) Regulations 1999 requires that materials in contact with potable water are of an appropriate quality and standard. The accepted means of demonstrating this is independent third-party certification to BS 6920:2000. Tricel Water products carry Kiwa certification, which is recognised by UK water undertakers as evidence of Regulation 4 compliance.
Kiwa certification status can be verified at:

kiwa.com/uk — product certification search

To verify certification, you will need one or more of: the manufacturer's name; the product name or model reference; or the Kiwa certificate number (provided by the manufacturer on the product data sheet or quotation).

The search returns the certificate number, scope, and date. Key points for specifiers:

- Certification status must be checked at the time of specification, not at the time a previous project was completed. Certificates can lapse and can be withdrawn if a product or its manufacturing process changes.
- The certificate number must be recorded on specification documents and incorporated into the building O&M manual at handover. This is an ACoP L8 compliance record.
- If a manufacturer claims Regulation 4 compliance but certification cannot be independently verified, treat the product as unverified until the discrepancy is resolved in writing.
- Certification covers the product as tested — not necessarily all sizes or configurations in a range. Confirm that the certificate scope covers the specific tank size and configuration being procured.
- Other certification bodies (including those operating under the WRAS product approval scheme) also provide routes to Regulation 4 compliance; the same verification principles apply regardless of certifying body.

Appendix C — Worked Capacity Calculation Example

This example is illustrative only. Specifiers must use demand figures appropriate to their specific building type and occupancy, drawn from CIBSE Guide G or other authoritative sources, and should seek qualified engineering advice where the calculation involves material

Project Scenario
A new-build four-storey local authority office building. Occupancy: 500 staff, standard office use, five days per week. Plant room accessible through standard doorways. No sprinkler system specified.

Step 1 — Estimate Daily Cold Water Demand
Using CIBSE Guide G indicative figures for office buildings: typical cold water demand allowance in the range of 40–50 litres per person per day (cold water only, excluding hot water).
For this example: 500 persons × 45 L/person/day = 22,500 litres per day.

Step 2 — Select Storage Duration
Standard commercial practice: 24-hour reserve. Required storage volume: 22,500 litres.

Step 3 — Check Turnover
At 22,500 litres per day average consumption, a 22,500-litre tank turns over in approximately 24 hours under average demand. This is consistent with HSG274 guidance. If peak demand is concentrated into a shorter daily period (office hours), actual turnover may be shorter, which is acceptable. The risk to manage is the weekend and bank holiday period when demand drops significantly — the written control scheme should address this.

Step 4 — Firefighting Reserve
No sprinkler system in this scenario. No firefighting reserve required in the cold water tank.

Step 5 — Configuration Selection
22,500 litres falls within the sectional GRP tank range. Plant room access is through standard doorways — sectional panels are appropriate. A configuration with internal dimensions of approximately 5.0m × 3.0m × 1.5m (L × W × D) yields a nominal capacity of 22,500 litres.
The specifier should confirm with the manufacturer the actual usable capacity, allowing for: the minimum water level above the outlet fitting (typically 100–150mm); the maximum water level at float valve shut-off; and the tank's geometric volume within those limits. The usable capacity will be slightly less than the nominal volume.

Appendix C — Worked Capacity Calculation Example

> This example is illustrative only. Specifiers must use demand figures appropriate to their specific building type and occupancy, drawn from CIBSE Guide G or other authoritative sources, and should seek qualified engineering advice where the calculation involves material

Step 6 — Select Base Configuration

If plant room headroom permits, EFB is preferred for complete drainage and base inspection access. If headroom is marginal, IFB on a continuous floor slab. Confirm which is appropriate with the manufacturer based on the as-built plant room dimensions.

Step 7 — Structural Assessment

Filled tank: 22,500 litres = 22,500 kg = 22.5 tonnes. Footprint: 5.0m × 3.0m = 15m². Floor loading: 22,500 / 15 = 1,500 kg/m² (approximately 15 kN/m²), before tank self-weight.

A structural engineer must confirm that the floor can support this load; most standard commercial floor slabs cannot without assessment.

Appendix D — GRP vs Alternative Tank Materials: Detailed Comparison

Criterion	Sectional GRP	Galvanised steel	Glass fused to steel (GFS)	Stainless steel	HDPE/PE
Corrosion resistance	Excellent — does not corrode	Moderate — zinc coating degrades; corrosion risk at edges and damage points	Excellent — glass coating resists corrosion	Excellent	Good — not applicable for corrosion
Internal surface	Smooth, non-porous — low biofilm risk	Can corrode and pit — elevated biofilm and particulate risk over time	Smooth glass surface	Smooth	Smooth, but prone to scratching
Regulation 4 compliance	Yes — Kiwa certified (standard)	Yes — third-party certified	Yes — third-party certified	Yes — third-party certified	Yes for suitable grades
BS EN 13280 compliance	Yes — designed to this standard	No — different standard applies	No — different standard applies	No	No
On-site assembly	Yes — panels delivered through standard doorways	Yes — panels deliverable	Yes — large panels; specialist installation	Generally site-welded; specialist	One-piece or welded
Practical capacity range	1,000 L – 2M+ L	Any	100,000 L+	Any	Up to ~50,000 L practical
Thermal performance	Better than steel; insulated panels available	Poor uninsulated — requires separate insulation	As steel	As steel	Moderate

Appendix D — GRP vs Alternative Tank Materials: Detailed Comparison

Criterion	Sectional GRP	Galvanised steel	Glass fused to steel (GFS)	Stainless steel	HDPE/PE
Capital cost	Moderate to high	Low to moderate	High at applicable scale	High	Low to moderate
Maintenance cost (30-year)	Low — no coating maintenance; panel repair possible	Moderate to high — coating maintenance; relining programme likely	Low at applicable scale	Low	Moderate
Service life (maintained)	25–30+ years	15–25 years (coating dependent)	30+ years	30+ years	15–25 years

Appendix E — Compliance Summary by UK Jurisdiction

Requirement	England & Wales	Scotland	Northern Ireland
Applicable water fittings legislation	SI 1999/1148	SSI 2014/317	SR 2009/75
Material suitability requirement	Same — Regulation 4 compliance — standard route	Same	Same
Backflow protection requirement	Schedule 1, SI 1999/1148	Schedule 1, SSI 2014/317 (equivalent)	SR 2009/75 Schedule 1 (equivalent)
Legionella control framework	ACoP L8 + HSG274 (HSE)	ACoP L8 + HSG274 (HSE) + Scottish Government guidance	ACoP L8 + HSG274 (HSENI guidance may apply)
Healthcare water guidance	HTM 04-01 (NHS England)	SHTM 04-01 (NHS Scotland)	DHSSPS guidance (Northern Ireland)
Building regulations	Approved Document G (MHCLG)	Building Standards Scotland (BSD)	Building Regulations (Northern Ireland)
Regulation 4 compliance	Yes	Yes	Yes

Note: the substantive technical requirements — material suitability, backflow protection arrangements, Legionella control obligations — are equivalent across all four UK jurisdictions. The legal instruments differ. Always cite the correct statutory instrument for the project jurisdiction in specification documents, design reports, and O&M manuals.

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