

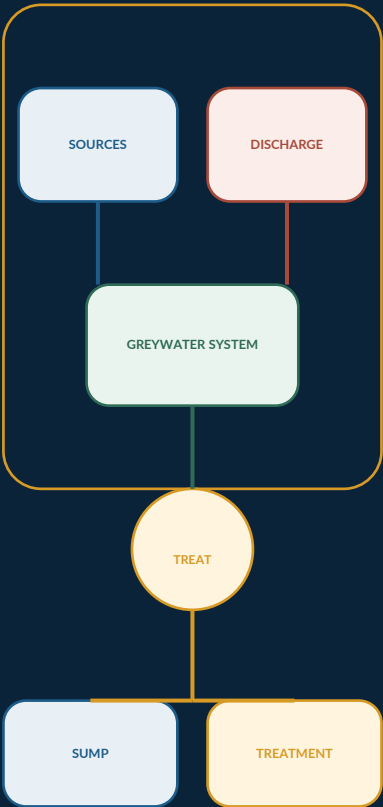
Understanding Greywater Treatment Systems

An owner's guide to collection, treatment, odour control and compliant discharge

Greywater systems manage a variable mixture of water, soap, food residue, hair and cleaning products. Reliability depends on strainers, levels, pumps, ventilation, treatment compatibility and legal discharge control.

Absolute Marine

Commercial thinking for private cruising.



COLLECT | PROCESS | DISCHARGE

GUIDE OVERVIEW

What greywater-treatment systems are designed to do

A greywater system collects wastewater from showers, sinks and domestic appliances and may store, filter, biologically treat or disinfect it before controlled discharge.

SCOPE	This guide covers sumps, collection tanks, strainers, transfer pumps, level controls, vents, treatment units, chemicals, discharge valves and operational restrictions. Local discharge requirements vary substantially.
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By the end of this guide, you should be able to:

- Trace the complete path from command or supply to the physical result.
- Identify the principal components, controls, protection and monitoring.
- Recognise common failure modes and early warning signs.
- Understand hidden dependencies and safe degraded operation.
- Ask better questions during purchase, survey, sea trial, refit and offshore preparation.

CORE PRINCIPLE	The system should prevent overflow into accommodation, cross-connection with blackwater or bilges and discharge that breaches local rules or damages treatment biology.
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Safety

Greywater can contain pathogens, chemicals and hot water. Tanks may produce hazardous gases and should not be entered. Isolate pumps and electrical equipment before cleaning; use appropriate hygiene and ventilation precautions.

SYSTEM ARCHITECTURE

How the complete system produces its intended effect

Understanding Greywater Treatment Systems depend on a complete chain of command, control, power, physical equipment, feedback and safe shutdown.



Area	Why it matters	Owner focus
Greywater sources	Showers, basins, galley or appliances produce variable waste.	Know which outlets enter greywater, blackwater or direct discharge.
Sumps and collection tanks	Receive intermittent flow and solids.	Inspect access, level, corrosion, cleaning and overflow path.
Strainers and transfer pumps	Protect pumps and move water.	Maintain hair, food and grease control.
Treatment process	May use filtration, aeration, biological media or disinfection.	Use compatible cleaning products and correct loading.
Vent and discharge	Control odour and release water through an approved route.	Check vent, anti-siphon, seacock and legal status.

CORE PRINCIPLE	Greywater is not harmless simply because it excludes toilet waste; grease, chemicals, pathogens and oxygen demand still matter.
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MAIN COMPONENTS

What owners should be able to identify

The installation should be traceable from controls and power to working equipment, protective devices, monitoring and manual isolation.



Area	Why it matters	Owner focus
Sumps and collection tanks	Provide buffer capacity and level control.	High-level alarms, lids, seals, cleaning and access.
Strainers	Capture hair, food and larger solids.	Clean regularly and fit correct baskets.
Transfer and discharge pumps	Move wastewater through treatment or overboard.	Impeller, seals, dry-run, non-return and backup.
Level controls	Start pumps and warn before overflow.	Float movement, fouling, redundancy and alarm location.
Treatment unit	Reduces solids, organic load, odour or pathogens.	Media, aeration, chemical compatibility and service support.
Vent and discharge arrangement	Allows gas release and controlled outflow.	Routing, blockage, backflow, valve labels and regulations.

ACCESS AND LABELLING Access, identification and service history are part of system reliability.

SYSTEM ARRANGEMENTS

Local sumps, central tanks, treatment and holding systems

Different arrangements trade simplicity, performance, redundancy, maintenance burden and failure consequence.



Area	Why it matters	Owner focus
Local shower sump	Small sump pumps directly or into a central tank.	Simple but frequent strainer and float maintenance.
Central greywater tank	Several sources collect in one tank before discharge.	One pump or high level can affect the whole yacht.
Integrated treatment plant	Greywater is processed with dedicated or combined wastewater equipment.	Sensitive to loading, chemicals and aeration.
Holding-only system	Stores water for offshore or shore disposal.	Capacity and pump-out logistics are critical.
Direct overboard discharge	Some sources bypass treatment where lawful.	Valve control and local rules must be explicit.

PRACTICAL DISTINCTION	Installed redundancy should be judged by shared dependencies and usable remaining capacity.
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OPERATION AND CONTROL

Managing sources, treatment and lawful discharge

Safe operation requires correct preparation, clear mode awareness, monitoring and a controlled return to standby or safe state.



Area	Why it matters	Owner focus
Source control	Keep grease, wipes, hair and incompatible chemicals out.	Crew behaviour strongly affects reliability.
Normal collection	Observe sump cycles, tank level and odour.	Frequent cycling can indicate leakage or stuck float.
Treatment operation	Maintain required aeration, recirculation, dosing and residence time.	Avoid shock loading or long stagnation.
Discharge decision	Confirm location, valve route and legal permission.	Do not assume greywater is unrestricted.
Lay-up and recommissioning	Clean, drain or preserve the plant as specified.	Stagnant organic water creates severe odour and blockage.

OPERATOR FOCUS

Source control is the cheapest and most effective treatment stage.

DEPENDENCIES AND RESILIENCE

What can remove apparently independent capability

Apparently separate equipment can share power, structure, cooling, sensors, hydraulics, networks or one vulnerable compartment.

SHARED TANK

One high level affects several spaces

SHARED PUMP

One failure stops collection or discharge

SHARED VENT

Blockage creates odour and pressure

SHARED CHEMISTRY

Cleaning products damage treatment

Area	Why it matters	Owner focus
Electrical power	Sumps, treatment and discharge pumps may share one DC or AC supply.	Provide high-level response after blackout.
Common collection tank	One level sensor or discharge fault affects every cabin.	Retain local isolation or reduced-use plan.
Vent system	Blocked or shared vents create odour and pressure.	Inspect terminations and cross-connections.
Cleaning products	Bleach, solvents and antibacterial products can harm biological treatment.	Use approved products and crew guidance.
Discharge seacock and anti-siphon	One blockage or backflow can flood or overflow the system.	Test valve and loop condition.

COMMON-MODE RISK

Follow the shared power, cooling, structural and control paths before describing equipment as independent.

MONITORING AND NORMAL VALUES

Recognising normal condition and early deterioration

Useful monitoring combines displayed values with sound, temperature, movement, leakage, vibration and actual performance.

LEVEL

Sumps and tank capacity

FLOW

Pump and discharge performance

ODOUR / FOAM

Process and vent condition

QUALITY

Treatment status and legal evidence

Area	Why it matters	Owner focus
Sump cycles frequently	Inflow leak, float issue, failed non-return or small capacity.	Inspect source and pump behaviour.
Tank level rises despite discharge	Pump, valve, blockage or level-sensor fault.	Stop sources before overflow.
Strong odour	Stagnation, blocked vent, anaerobic process or dirty sump.	Ventilate and correct the cause.
Excess foam	Detergent load or treatment upset.	Review products and dosing.
Discharge quality changes	Treatment, filter, aeration or chemical problem.	Hold discharge where compliance is uncertain.

TREND, DO NOT GUESS

Trend comparable operating conditions rather than relying on a single reading.

FAILURE AWARENESS

Common weaknesses and warning signs

Most serious faults begin with small changes, intermittent alarms, unusual noise, heat, leakage or declining performance.

HIGH LEVEL
Pump, float or blockage

ODOUR
Vent, stagnation or treatment upset

NO DISCHARGE
Valve, pump or restriction

PROCESS FAILURE
Chemistry, aeration or loading problem

Area	Why it matters	Owner focus
Sump overflows	Blocked strainer, failed pump, float or power.	Water damages joinery and electrical equipment.
Discharge pump runs dry or not at all	Level control, blockage, valve or impeller fault.	Pump can overheat while tank level rises.
Treatment biology collapses	Chemical shock, no aeration, overload or long lay-up.	Odour and discharge quality deteriorate.
Vent blocks	Biofilm, insects, kinked hose or flooded loop.	Pressure and odour enter accommodation.
Backflow or siphoning	Failed non-return, poor loop or submerged outlet.	Tank or sump can refill unexpectedly.

DO NOT NORMALISE CHANGE

A recurring alarm or unusual behaviour is evidence of a defect, not a normal characteristic.

FAILURE RESPONSE

Controlling high level, overflow and treatment upset

The first response should protect people and the wider yacht, stop further damage and move to a safe reduced-capability plan.

STOP SOURCES
Reduce showers and appliances

ISOLATE / CONTAIN
Protect accommodation and bilges

RESTORE FLOW
Clear safe strainer or use backup pump

HOLD / DIVERT
Retain until lawful disposal

Area	Why it matters	Owner focus
High-level alarm	Stop showers and appliances, inspect safe strainers and start backup pumping.	Continue normal water use.
Overflow into accommodation	Isolate electrical hazards, contain water and disinfect affected areas.	Pump contaminated water into clean bilges or tanks.
Treatment upset	Reduce loading, maintain aeration and hold discharge until restored.	Add unapproved chemicals to mask odour.
Discharge blocked	Close valves, isolate pump and clear using approved access.	Pressurise fragile hoses or open fittings blindly.
Regulatory uncertainty	Retain or pump ashore until lawful discharge is confirmed.	Assume offshore rules apply in harbour or protected water.
PROTECT THE WIDER YACHT	Stop incoming water early; a full tank or failed sump gives little time before interior damage.	

TESTING AND DEMONSTRATION

Testing levels, pumps, vents and treatment function

A meaningful test should operate the system under representative load, verify protective functions and demonstrate safe manual or degraded operation.



Area	Why it matters	Owner focus
Level and alarm test	Shows float sequence and warning before overflow.	Use clean controlled water and verify all linked alarms.
Pump and flow test	Shows transfer, non-return and discharge route.	Observe actual outlet and tank level.
Vent test	Shows unobstructed air path and no odour backflow.	Avoid introducing excessive pressure.
Treatment-function check	Shows aeration, recirculation, dosing and indicators.	Sampling may require approved method.
Blackout response drill	Shows available capacity and backup pumping.	Define water-use restrictions immediately.

MEANINGFUL EVIDENCE	A no-load start or green status light does not demonstrate performance under real conditions.
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MAINTENANCE STRATEGY

Maintaining hygienic collection, pumping and treatment

Maintenance should preserve the energy source, working machinery, structure, controls, sensors, protection and correct fluid or electrical condition.



Area	Why it matters	Owner focus
Sumps and strainers	Clean hair, grease and deposits with appropriate hygiene controls.	Prevents blockage and float fouling.
Pumps and non-return valves	Service impellers, seals, valves and dry-run protection.	Maintains flow and prevents backfill.
Level sensors and alarms	Clean, exercise and compare with physical level.	Provides warning before overflow.
Treatment process	Maintain media, aeration, filters, dosing and approved chemistry.	Preserves performance and odour control.
Vents and discharge	Inspect hoses, anti-siphon loops, seacocks and outlets.	Prevents pressure, backflow and corrosion.

WORK TO REFER

High-energy, structural, pressure, lifting and safety-critical work should be completed by competent specialists.

RECORDS, SPARES AND SUPPORTABILITY

Keeping documentation, spares and supportability current

Useful onboard records should show the current arrangement, normal values, service history, safe isolation, selected spares and specialist support.

PLUMBING DIAGRAM

Sources, tanks and discharge

OPERATING LOG

Levels, chemicals and service

DISCHARGE RULES

Areas and restrictions

SPARES

Pumps, floats and filters

Area	Why it matters	Owner focus
Plumbing diagram	Every source, sump, tank, pump, vent and discharge.	Essential for isolation and legal control.
Capacity and operating log	Tank volume, crew loading, pump cycles and alarms.	Supports passage planning.
Treatment records	Media, chemicals, aeration, samples and service.	Shows compliance and recurring upset.
Discharge rules	Current geographic restrictions and pump-out options.	Prevents unlawful release.
Spares and cleaning plan	Pumps, floats, impellers, filters and safe chemicals.	Supports remote recovery.

SUPPORTABILITY	A spare part is useful only when its compatibility, tools, settings and installation procedure are understood.
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BUYER AND SURVEY PERSPECTIVE

Assessing capacity, odour, compliance and maintenance access

A buyer should see the system operate under representative conditions and understand structural, power, control and support implications.



Area	Why it matters	Owner focus
System mapping	Which sinks, showers and appliances enter each route?	Verify against current plumbing, not labels alone.
Capacity	Can tanks and treatment manage intended crew and laundry use?	Test realistic loading.
Condition and odour	Are sumps, tanks, vents and hoses clean and leak-free?	Persistent odour indicates unresolved cause.
Treatment validity	Does the installed plant genuinely treat greywater and meet intended rules?	Review documentation and service.
Access and maintenance	Can strainers, floats, pumps and tanks be cleaned safely?	Poor access creates recurring ownership burden.

BUYER FOCUS

A sophisticated treatment unit cannot compensate for inaccessible dirty sumps, blocked vents or undersized collection capacity.

OFFSHORE READINESS

Questions before relying on greywater systems offshore

A ready system collects expected crew wastewater without overflow, treats or holds it as required and can restrict use or pump safely after one fault.

Area	Question to resolve
Sources	Which fixtures enter greywater, blackwater or direct discharge?
Capacity	How long can collection continue after discharge-pump loss?
Treatment	Which chemicals and loading limits apply?
Alarms	Where are sump and tank high levels reported?
Discharge	Which valves and geographic rules control release?
Backup	What reduced-use and emergency pumping plan exists?

Quick readiness check

	Readiness statement
☐	Sources, sumps, tanks, treatment, vents and discharge paths are documented.
☐	Strainers, floats, pumps and high-level alarms have been tested.
☐	No unresolved odour, blockage, leakage or backflow remains.
☐	Treatment media, aeration and approved cleaning products are understood.
☐	Tank capacity and crew-use limits are included in passage planning.
☐	Discharge valves and legal restrictions are clearly controlled.
☐	Backup pumping and immediate water-use restrictions are practised.
☐	Diagrams, spares, hygiene supplies and specialist contacts are available.

KEY TAKEAWAY

Dependable greywater management combines source control, accessible collection, reliable pumps and levels, compatible treatment, open vents and disciplined lawful discharge.

Guidance to consult

Use current vessel greywater, blackwater and overboard-discharge drawings and the installed sump, pump, treatment and control manufacturers' instructions, together with applicable local discharge, hygiene and environmental requirements.

Understanding Yacht Systems

Practical guides for owners, buyers
and offshore cruising crews.

AMTG-054

Understanding Greywater Treatment Systems

RELATED GUIDES

AMTG-012 Understanding Waste and Blackwater Systems

AMTG-010 Understanding Freshwater Systems

AMTG-011 Understanding Watermakers

AMTG-023 Understanding AC and DC Distribution

AMTG-026 Understanding Monitoring and Alarm Systems

AMTG-030 Understanding Seacocks and Through-Hull Fittings

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