

D-Series

Ideal for offshore structures and large commercial vessels



School Ships

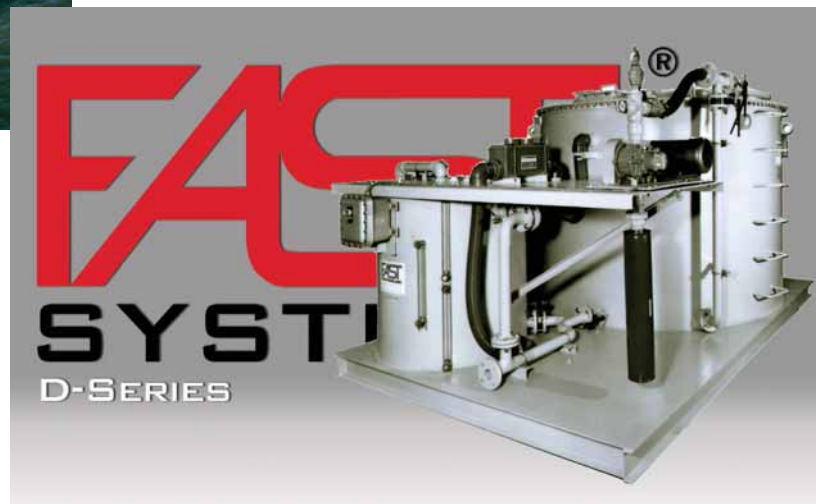
Office Barges

Ore Carriers

Tankers

Container Ships

Offshore Structures



Features

- Fully assembled, factory tested, skid-mounted systems
- Available in bolt-together construction for ease of installation aboard existing vessels
- Certified by USCG /IMO and Environment Canada
- Meets the requirements of all major classification societies
- Easy, low-cost operation that does not require special training or expensive spare parts—self cleaning

Features of the D-Series

All Marine FAST® systems incorporate state-of-the-art process technology. The D-Series was designed to meet the needs of larger vessels and offshore platforms.

The unique design places virtually all piping outside the tank where it can be accessed for service and repair as needed. Standard units are completely assembled, wired and tested at the factory before shipment.

Background

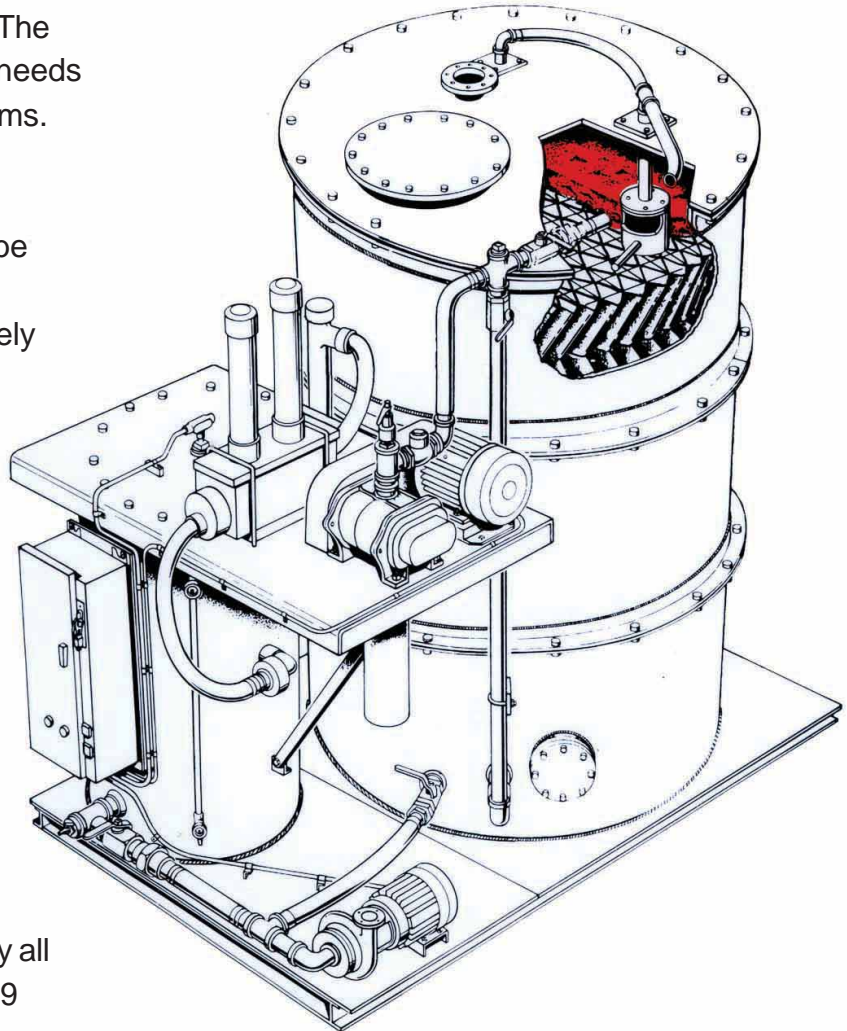
The first D-Series unit was delivered in 1976. Since then, more than 500 D-Series units have been placed in service.

Thanks to continuing R&D, rated capacities have more than doubled during the same time period. Thanks to superior engineering and construction, virtually all of the FAST units installed since 1969 remain in everyday service.

Modular Construction

D-Series units are available in bolt-together, modular form to ease installation through available access openings and to permit most efficient use of limited available space.

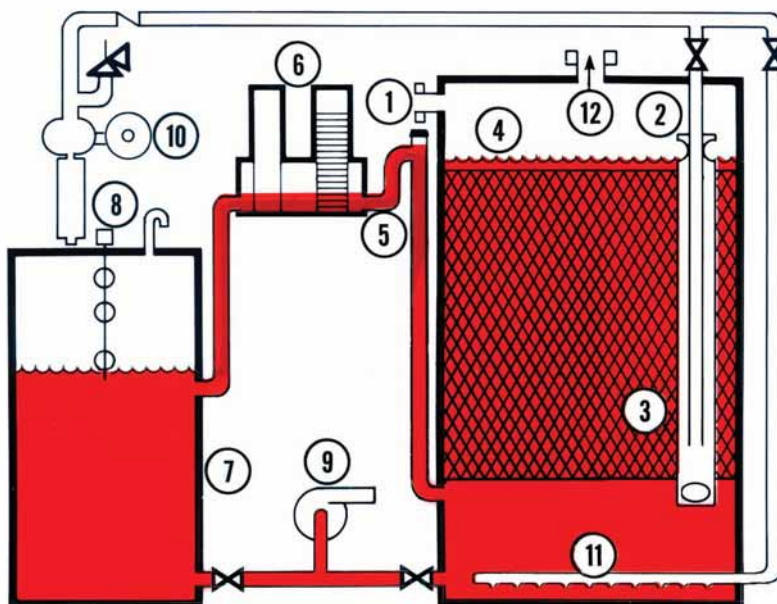
Individual components can be located separately or on a common skid depending upon individual requirements.



Worldwide Service

Equipment is currently manufactured in the U.S. and Canada. Service is available worldwide.

Flow Diagram



1. **Sewage Inlet** - No macerator or bar screen to clean or repair. Any combination of black and gray water can be piped into a common inlet.

2. **Airlift** - Circulates and aerates tank contents to prevent foul odors. High turbulence breaks up solids and throws foreign objects to the side for later disposal by the process.

3. **Media** - Microorganisms present in sewage grow on fixed surfaces and digest the organic material in sewage. Media does not require manual cleaning or replacement.

4. **Spillover** - Maintains constant water level. Raw sewage cannot enter spillover.

5. **Trap** - Positive water seal keeps odors out of the engine room.

6. **Tablet Chlorinator** - Simple, low cost, effective, and reliable. Water dissolves tablets at a rate proportional to flow.

7. **Wet Well** - Provides contact time for

chlorine to disinfect water. Sized for peak flow periods.

8. **Float Switch** - Located on tank centerline for operation in a seaway.

9. **Discharge Pump** - Complete with all controls necessary for automatic operation, may be fitted on the system.

9a. **Effluent Pump (not shown)** - Installed inside the wet well, provides automatic discharge of effluent when the system is installed below the waterline.

10. **Roots Blower** - Slow speed, reliable, long life, provides compressed air for aeration and for air scour as required.

10a. **Regenerative Turbine Blower (not shown)** - Quiet, compact, reliable, provides compressed air for aeration.

11. **Air Scour** - Built in cleaning system uses compressed air. No need for manual cleaning.

12. **Vent** - No foul odors.

Standard Specifications

Complete System – Assembled, wired and tested at the factory before shipment; includes all machinery, valves and controls required for automatic operation.

Process – Fixed Activated Sludge Treatment (FAST®) employs fixed media as the site for microbial growth.

Certifications – Certified by USCG for inspected vessels under 33 CFR Part 159 and IMO rules.

Sewage Treated – Any combination of standard or vacuum toilets, fresh or salt water flush, showers, laundry and galley.

Rated Capacity – Any population from zero to maximum shown in Table 2 on page 7.

Overload Capacity – Up to 150% rated capacity for up to 24 hours.

Operating Conditions – Maximum air temperature 50°C., minimum water temperature 10°C., maximum roll 45°C.

Machinery – Regenerative turbine blower, stainless steel submersible effluent pump, tablet chlorinator installed on unit.

Electrical Equipment – Meets USCG electrical engineering regulations Title 46, TEFC IEEE 45 commercial marine motors, 50° C. ambient, class F insulation, IP55 motor starters with integral overload and short circuit protection, armored cable secured to structure per ABS requirements.

Construction – Welded steel construction per ABS Section 13 Deep Tanks, externally reinforced, minimum section thickness 1/4 inch (6 mm), tank penetrations and seams full welded both sides, welding per ABS requirements, lifting lugs.

Corrosion Protection – Grit blasted to white metal (SSPC5), two coats polyamide epoxy 6-8 mils DFT, brush welds before spraying, 316SS threaded tank penetrations and assembly hardware.

Consumables – Chlorine tablets, 1.8 lb. per person per year for black water, add 2.2 lb. for gray water; 5-1/4% laundry bleach, 3.1 gal per person per year for black water, add 3.6 gal for gray water.

Options:

Roots Blower – V-drive, belt guard, electric motor, relief valve, inlet silencer, vibration isolators.

Discharge Pump – Dry pit end suction centrifugal, 85-5-5-5 marine brass with stainless steel shaft and hardware.

Chlorine Pump – Disinfects effluent with laundry bleach instead of chlorine tablets.

Canadian Great Lakes Certification – UV sterilizer and chart recorder in lieu of tablet chlorinator.

Special Construction for Severe Environments – Full-welded, external seams, organic zinc primer, two coats epoxy and urethane topcoat, IEEE-845 severe duty motors.

Secondary Treatment – Tank modified to produce effluent containing 30 mg/l BOD₅, 30 mg/l SS.

Other Options – Custom designs, systems built into ship's tanks, high head discharge pumps, explosion proof electrical equipment, extended sludge storage.

Sizing and Selecting Units

Step One: Live-On Persons

Rated capacities are shown for treatment of black water only from persons working and living aboard. If persons work, but do not live aboard, count each of these as one-half person.

Step Two: Service Factor

If other types of sewage are to be treated in addition to black water, add the appropriate factors to obtain a total service factor. The service factor for black water only is 1.0. Multiply the number of live-on persons by the service factor to obtain equivalent black water persons and use the figure below to select a unit from the rated capacities.

Sewage Service Factors	
Types of waste	Service Factor
Black water	1.00
Personal wash water	0.42
Laundry	0.31
Dishwashing	0.33
Garbage disposal	1.21

Step Three: Effluent

Two rated capacities are shown for each unit:

- ❑ **USCG / IMO Effluent** - rated capacities for units are certified by U.S. Coast Guard under 33 CFR Part 159 and under Marpol 73/78 resolution MEPC.2(VI) and are applicable to sewage treatment systems to be installed in vessels.
- ❑ **30/30 Effluent** - rated capacities for units also USCG certified but internally modified to provide secondary treatment, with effluent to contain not more than 30 mg/l BOD5 and 30 mg/l TSS. Secondary treatment may be required for vessels operating in restricted waters, barges meeting local or harbor regulations and offshore applications subject to state or other regulations.

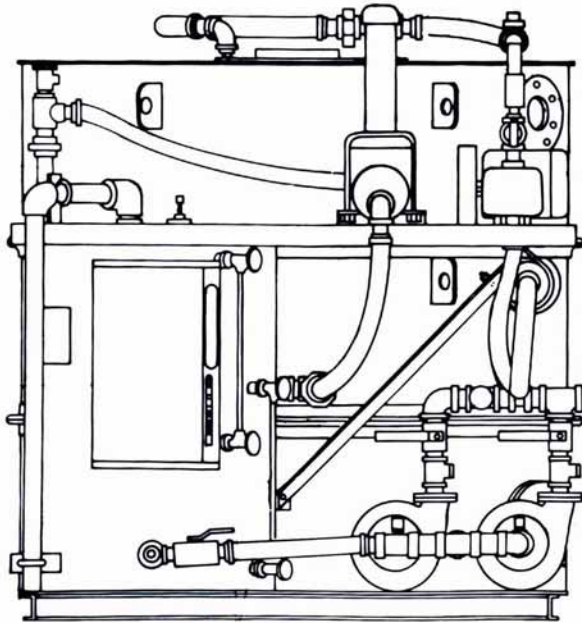
Unless otherwise specified, minimum sludge storage capacity is three months. Media Tank extension can increase sludge storage to one year or more.

Step Four: Sizing

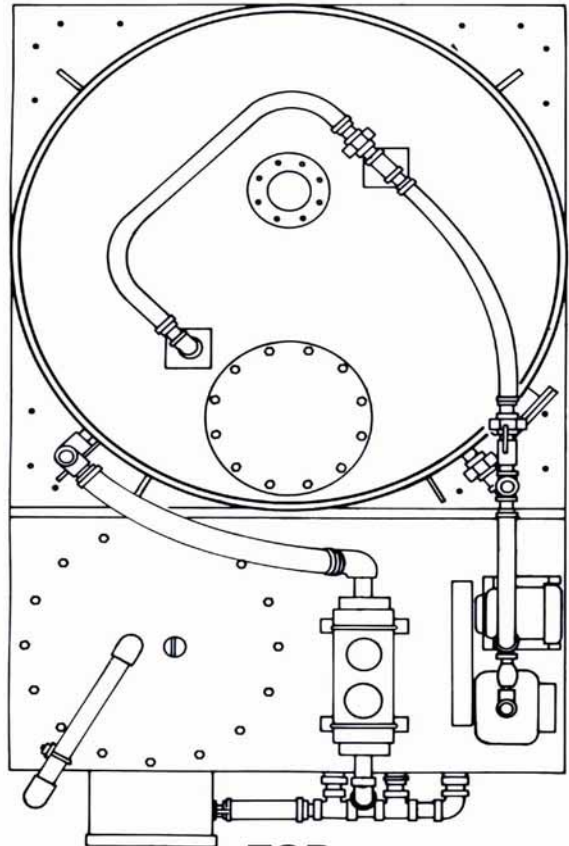
Now select the correct model size from the table on page 7. The **D-Series** units are ideal on-board sewage treatment systems for commercial vessels and offshore structures. For other Marine FAST® sizes and models, see brochure 3041 on the LX-Series or 3050 for the M-Series and MX-Series.

Technical Drawings

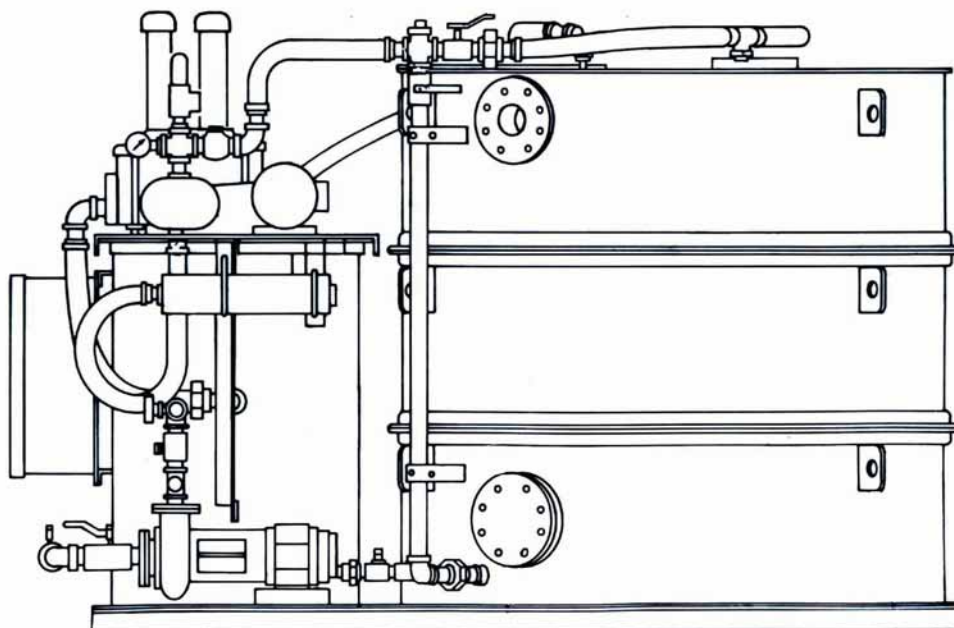
The Marine FAST® Model D-4 features bolt-together, modular construction, and comes equipped with a Roots blower, tablet chlorinator and duplex discharge pumps.



END



TOP



SIDE

Marine FAST® D-Series Reference Data - Standard Units - Not for construction									
Model	D1	D2	D3	D4	D5	D6	D7	D8	D9
Rated Capacities (persons)									
USCG / IMO Effluent	44	64	97	146	184	258	387	607	872
30/30 Effluent	26	38	56	83	104	145	213	326	456
Sludge Storage (months)									
USCG / IMO Effluent	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30/30 Effluent	3	3	3	3	3	3	3	3	3
Stretched Media Tank	12	12	12	12	12	12	12	12	12
Overall Dimensions (ft)									
Standard Tanks									
Length	7.3	8.0	9.3	10.8	12.1	13.9	15.0	18.1	21.8
Width	4.3	5.0	5.8	6.9	7.7	8.9	8.9	10.9	12.9
Height	6.9	7.0	7.2	7.3	7.5	7.6	9.7	10.3	10.3
Deckhead Height Required	9.1	9.1	9.3	9.3	9.3	9.4	11.4	11.4	11.4
Rectangular Tanks*									
Length	6.8	7.0	8.8	10.1	10.8	13.6	16.1	Note	Note
Width	3.8	4.8	4.8	5.8	6.8	6.8	6.8	Note	Note
Height	7.1	7.1	7.3	7.3	7.3	7.5	8.5	Note	Note
Modular Construction Dimensions (ft)									
Media Tank Sections									
Length = Width	4.3	5.0	5.8	6.9	7.7	8.9	8.9	10.9	12.9
Height	2.3	2.3	2.4	2.4	2.5	2.5	3.2	3.4	3.4
Machinery Module Complete									
Length	4.3	5.0	5.8	6.9	7.7	8.9	8.9	10.9	12.9
Width	2.9	2.9	3.1	3.5	3.9	4.4	5.1	6.2	7.3
Height	5.3	5.3	5.5	5.5	5.5	5.9	5.9	5.9	5.9
Wet Well Only									
Length	1.9	2.3	2.6	3.1	3.3	3.9	4.7	5.8	7.0
Width	2.3	2.3	2.6	3.1	3.3	3.9	4.7	5.8	6.8
Height	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
Estimated Weights (lb.)									
Shipping	3,400	3,900	4,900	6,200	7,300	9,500	11,000	15,300	20,400
Operating	6,900	8,700	12,000	17,000	21,000	29,000	38,000	57,000	80,000
Pipe Sizes (inches)									
Discharge Pump	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2 1/2	2 1/2
Effluent Pump	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2	2
Gravity Discharge	2 1/2	2 1/2	2 1/2	3	3	4	4	4	6
Sewage Inlet	4	4	6	6	6	6	6	8	8
Vent	3	4	4	6	6	6	8	10	10
Max TDH for Standard Pumps (ft)									
Discharge Pump	50	50	50	50	50	50	50	80	80
Effluent Pump	20	20	20	20	20	30	30	30	30
Motor Horsepowers									
Discharge Pump	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	5	5
Effluent Pump	1/3	1/3	1/3	1/3	1/3	1/2	1/2	3/4	1 1/2
Roots Blower	1	1	1 1/2	2	3	5	5	7 1/2	10
Spencer Blower	2 1/2	2 1/2	2 1/2	2 1/2	4	4	10	10	10

* Note: Modular construction, consult factory for details.

Table revised 11/04

Have It Your Way...FAST®

Marine FAST® D-Series units are ideal on-board sewage treatment systems for commercial vessels and offshore structures. Marine FAST® systems are also available in lightweight modular systems, epoxy coated steel, stainless steel and aluminum tank designs for all crew sizes, from the very smallest to the very largest vessels. For more information, visit www.marinefast.com, e-mail us at solutions@marinefast.com or call (314) 645-6540 today.



From the very smallest to the very largest vessels, **FAST®** Systems has a sewage system to meet your vessel's requirements.

Exclusive Benefits of FAST®

Natural Process

FAST® is a biological process, the most widely used method of sewage treatment in the world. It is economical, reliable and effective.

Superior Technology

FAST® process technology is literally state-of-the-art. Approved for both marine and land use, FAST® Systems can meet the most stringent standards worldwide.

No Adjustments

FAST® is self-regulating. It handles surges, overloads and light loads without problems.

Flexible

FAST® systems can handle any combination of fresh water or seawater sewage.

Compact

Operating weight is typically half that of competing biological units.

Operator Friendly

The equipment is simple and rugged. Operation does not depend upon the skill of the operator.

Simple Maintenance

The only maintenance is adding chlorine tablets.

Reliable and Durable

FAST® D-Series systems will not corrode in seawater. They won't rust, clog or smell.

Proven

Since 1969, approximately 8,000 FAST® systems have been delivered. Virtually all of these units remain in operation today.



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