

M-Series MX-Series

Ideal for small commercial vessels.



Featured above is an MX-2 Series FAST® Unit.

Harbor Tugs

Dredges

Pilot Boats

Fireboats

Towboats

Small Vessels

Offshore Vessels

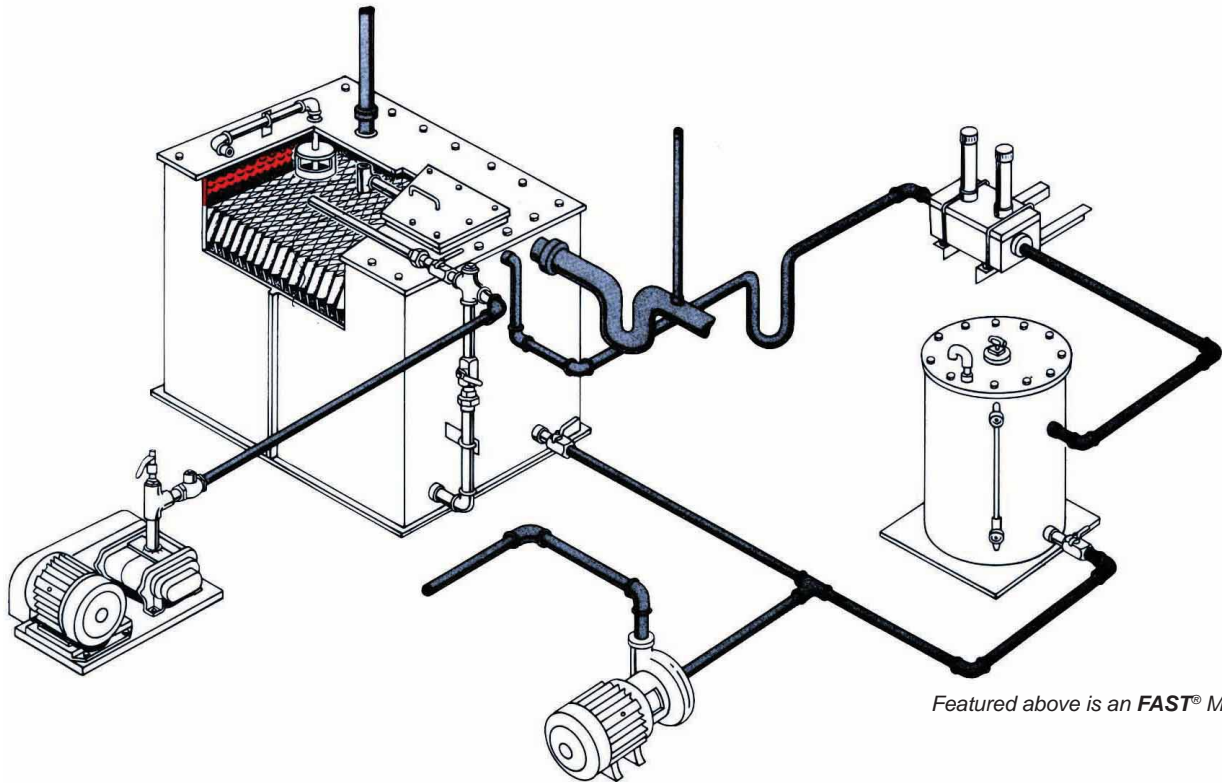
Offshore Structures

Office Barges

Features

- Modular Systems for Marine and Offshore Applications
- Certified by USCG/IMO and Environment Canada
- Self cleaning
- Meet the requirements of all major classification societies
- Easy low cost operation that does not require special training or expensive spare parts

How To Select The Right Model



Featured above is an **FAST® M-2 Unit**.

All Marine **FAST®** Systems incorporate state-of-the-art process technology. The M-Series and MX-Series were designed specifically for installation where space and access for installation are limited.

M-Series

Use the Marine **FAST®** M-Series in low headroom installations and other installations where access to available space and the space itself are extremely limited. Each of the M-Series' components can be located in different compartments or on different decks if necessary.

Additionally, each M-Series component will pass through a standard watertight door without disassembly and is pre-assembled and tested at the factory.

MX-Series

The MX-Series is the assembled version of the M-Series. On the MX-Series, the Media

tank and Wet Well are combined in a single compact weldment. Standard units are completely assembled, wired and tested at the factory before shipment.

Background

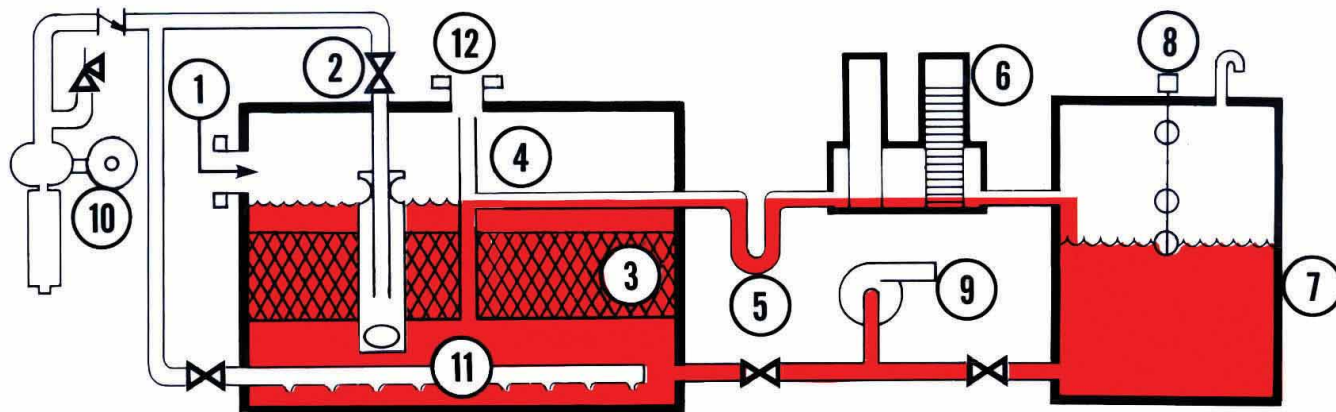
The first Marine **FAST®** M-Series unit was delivered in 1976. Since then, more than 700 M-Series and MX-Series units have been placed in service.

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 1,500 **FAST®** units installed since 1969 remain in everyday service.

Worldwide Service

Service is available worldwide, with equipment manufactured in the United States, Canada and Australia.

Flow Diagram



1. **Sewage Inlet** - No macerator or bar screen to clean or repair. Any combination of black and gray water.
2. **Airlift** - Circulates and aerates tank contents to prevent foul odors. Turbulence breaks up solids and throws foreign objects to the side.
3. **Media** - Microorganisms present in human waste grow on fixed surfaces and digest the organic material in sewage. Media does not require manual cleaning or replacement.
4. **Spillover** - Located at tank centerline to maintain constant water level in a seaway.
5. **Trap** - Positive water seal keeps odors out of the engine room.
6. **Tablet Chlorinator** - Simple, low cost, effective, 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 at change of watch.

8. **Float Switch** - Located on tank centerline for operation in a seaway.
9. **Discharge Pump** - Provides automatic discharge of effluent when system is installed below waterline, can also be used to pump out Media Tank.
- 9a. **Effluent Pump (Not Shown)** - Installed inside the Wet Well, provides automatic discharge of effluent when 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 and tested at the factory; the **FAST**® M-Series and MX-Series System 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.

M-Series.

Modular system furnished as factory-built components with interconnecting piping and wiring by others. Each module will fit through a USCG standard 28 inch X 60 inch watertight door with 6 inch radius corners.

MX-Series.

Package unit, piped and wired at the factory before shipment.

Certification.

Certified by USCG under 33 CFR Part 159 and IMO rules for both inspected and uninspected vessels and all major classification societies.

Sewage Treated.

Any combination of standard & vacuum toilets, fresh & salt water flush, showers, laundry, galley.

Rated Capacity.

Any population from zero to maximum shown in Table.

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 $\pm 45^\circ$.

Machinery.

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

Electrical Equipment.

TEFC motors, class F insulation, NEMA Type 3R/12 rainproof/dusttight motor starters, armored cable secured per ABS requirements, certified by USCG for uninspected vessels.

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 blast to white metal (SSPC-SP-5%), two coats polyamide epoxy 6-8 mils DFT, brush welds before spraying, stainless steel threaded tank penetrations and assembly hardware.

Consumables.

Chlorine tablet consumption for continuous operation 1.9 lb. per year per person with conventional toilets, 0.2 lb. per year, per person with vacuum toilets, add 2.5 lb. per year per person for gray water.

Options.

Roots Blower - V-drive, belt guard, electric motor, inlet silencer, vibration isolators, normally furnished for separate installation, can be installed on MX-2 and larger MX-Series units.

Discharge Pump - dry pit end suction centrifugal, 85-5-5-5 marine bronze with stainless steel shaft and hardware, normally furnished for separate installation.

Duplex Discharge Pumps - each pump 100% duty, either pump can be duty pump, standby pump starts when high level float switch energized, normally furnished for separate installation.

Certification for USCG Inspected Vessels - electrical equipment per 46 CFR Subchapter J - Electrical Engineering.

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

Special Construction for Exterior

Installation - full welded external seams; special coating system using inorganic zinc, epoxy and urethane; exterior duty motor; 316SS exterior piping, valves and sight glass.

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

Specifying the Correct Model Size

Sizing and selecting the correct model size can be accomplished by following Steps One through Four. Step One, determine the service factor below. Step Two, multiply the number of persons by the service factor to obtain the equivalent black water persons. Step Three, determine your effluent requirements. Step Four, select the correct model and model size.

Step One.

Live-On Persons

Rated capacity is shown for treatment of black water and hand sinks only from persons working and living aboard the vessel. If persons work but do not live aboard, count each of these persons as one-half a person to obtain the equivalent number of live-on persons.

Service Factor

If other types of sewage are to be treated in addition to black water, add the appropriate factors from table below to obtain a total service factor. The service factor for black water only is 1.0.

Type of Sewage	Service Factor
Toilets, urinals, lavatories	1.00
Showers	0.42
Laundry	0.31
Galley sink, dishwasher	0.33
Ground food waste	1.21
Total all domestic sewage	3.27

Step Two.

Figuring Equivalent Black Water Persons

Multiply crew size by the service factor to obtain equivalent black water crew size and use this figure to select the correct unit from the first section, **Rated Capacities**, of the tables on page 6 and 7 .

$$\begin{array}{ccc} \text{Number of} & \times & \text{Service factor} & = & \text{Equivalent} \\ \text{persons} & & & & \text{black water} \\ & & & & \text{persons} \end{array}$$

Step Three.

Effluent

Two rated capacities are shown for each unit: Check which of the two effluent requirements you must meet.

- USCG/IMO Certification** - rated capacities for units 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 and model size. The **M-Series** was designed for installations where headroom and access to available space are extremely limited.

FAST [®] M-Series Design Data - Standard Units					
Model	L-1	M-1	M-2	M-3	M-4
Rated Capacities (persons)					
USCG / IMO Effluent	7	13	20	30	40
DOE	5	9	14	21	28
30/30 Effluent	5	8	13	19	25
Sludge Storage (months)					
USCG/IMO Effluent	N/A	N/A	N/A	N/A	N/A
30/30 Effluent	3	3	3	3	3
Stretched Media Tank	12	12	12	12	12
Overall Dimensions (inches)					
Number of Media Tanks	1	1	1	1	2
Media Tank					
Length	30	38	54	78	54
Width	28	28	28	28	28
Height	53	53	53	54	54
Wet Well (Contact Tank)					
Length/Width	20	20	22	26	29
Height	31	31	31	31	31
Deckhead Height Required					
Media Tank	73	73	73	73	73
Chlorinator	71	71	71	71	71
Estimated Weights (lb.)					
Shipping	1,300	1,600	1,900	2,300	3,000
Operating	2,300	3,000	4,000	5,300	7,000
Pipe Sizes					
Discharge Pump	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Effluent Pump	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Sewage Inlet	4	4	4	4	4
Vent	2	2 1/2	3	4	4
Standard Pump TDH (feet)					
Discharge Pump	50	50	50	50	50
Effluent Pump	20	20	20	20	20
Motor Horsepowers					
Discharge Pump	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Effluent Pump	1/3	1/3	1/3	1/3	1/3
Roots Blower	1	1	1	1	1 1/2
Rotron Blower	1/2	1/2	1/2	1/2	3/4

Also compact, the **MX-Series** integrates tanks, chlorinator and blower in a single package.

FAST[®] MX-Series Design Data - Standard Units					
Model	MX-1	MX-2	MX-3	MX-4	MX-5
Rated Capacities (persons)					
USCG / IMO Effluent	14	21	31	46	70
30/30 Effluent	8	13	18	27	40
Rated gpd					
USCG	300	450	660	966	1,470
Sludge Storage (months)					
USCG / IMO Effluent	N/A	N/A	N/A	N/A	N/A
30/30 Effluent	3	3	3	3	3
Stretched Media Tank	12	12	12	12	12
Overall Dimensions (inches)					
Length	60	83	83	83	107
Width	28	28	28	40	40
Height Equipped With					
Remote Blower	53	53	65	65	66
Roots Blower	53	72	84	84	84
Rotron Blower	61	61	73	74	75
Deckhead Height Required	73	73	85	85	85
Estimated Weights (lb.)					
Shipping	2,000	2,200	2,300	2,800	3,300
Operating	3,600	4,600	5,300	7,300	9,500
Pipe Sizes					
Discharge Pump	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Effluent Pump	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Sewage Inlet	4	4	4	4	4
Vent	2 1/2	3	3	3	4
Standard Pump TDH (feet)					
Discharge Pump	50	50	50	50	50
Effluent Pump	20	20	20	20	20
Motor Horsepowers					
Discharge Pump	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Effluent Pump	1/3	1/3	1/3	1/3	1/3
Roots Blower	1	1	1	1	1 1/2
Rotron Blower	1/2	1/2	1	1	1

Have It Your Way . . . FAST®

FAST® M-Series and MX-Series units are ideal on-board sewage treatment systems for commercial vessels. 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. You can also send us an e-mail at solutions@marinefast.com or call us at **(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.

Maintenance.

The only maintenance is adding chlorine tablets.

Reliable and Durable.

FAST® M-Series and MX-Series are designed for seawater service. They won't rust, clog or smell.

Proven.

Since 1969, approximately 4,500 **FAST®** Systems have been delivered. Virtually all remain in everyday operation.



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