Waste management is a critical issue for modern cruise vessels, both in terms of cost of disposal and on board management. The Wärtsilä range of products is designed to minimise processing costs and make best use of the limited space available on board. While Wärtsilä are focused on providing cost and space effective solutions to meet current needs, we are continuously looking ahead to the future of waste management, and the future technologies to overcome the challenges that lie ahead.

Vessels can be fitted with Wärtsila’s dry waste disposal system for food waste collection and treatment, bio-sludge dewatering, food waste and bio-sludge drying, recycling equipment, incineration and waste to energy products. Procuring the complete wet & dry solution from a single source streamlines the coordination and integration, making for an easier and efficient project delivery with a single reliable source of after sales.

The cruise market is changing and shipyards now require complete waste treatment packages. In addition to vacuum toilets, collection systems and the advanced waste water treatment plant, Wärtsilä now also offers:

- Food waste collection & treatment
- Solid waste handling
- Drying and incineration
FOOD WASTE COLLECTION & TREATMENT

An extensive quantity of food waste is produced on board cruise vessels which needs to be collected, processed, and treated. Wärtsilä Water Systems has designed highly efficient systems to cope with all needs of managing this waste on board.

Feeding hoppers with integrated macerators are designed to be integrated into table tops which are connected to the main vacuum pipes, where food waste will be fed directly into the food waste holding tanks.

**ADVANTAGES OF FOOD WASTE MACERATOR VACUUM SYSTEM**

<table>
<thead>
<tr>
<th>Advantage</th>
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<tr>
<td>Smaller pipes due to vacuum generation</td>
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<tr>
<td>Decentralized macerating in galleys and pantries at point of origin</td>
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<tr>
<td>Safe operation with no risk of cutlery entering system</td>
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<tr>
<td>Food waste is grinded in small particles – easier thermal food waste drying</td>
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<tr>
<td>Several grinder stations can work simultaneously parallel</td>
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<td>Overfilling is not possible</td>
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<td>Low water consumption</td>
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**INTERFACE EQUIPMENT**

The food waste collected has several options for being treated. From using food waste digesters that convert particulate matter to treatable waste water, to dewatering where removal of surface water is key. This reduces the volume and increases the concentrations of solids by use of centrifuges or decanters. Solids are then fed into the de-watered bio waste tanks and the liquid directed to food waste reject water tanks and AWP. This solid waste will then be dried and sent to the dried bio waste silo which is then transported via a screw conveyor to the incinerator and wet ash bagged to be taken ashore. During this process the bio sludge taken from the MBR will also be de-watered, dried and fed into the same silo for dried biowaste.

**DRYING**

The dryer in the Wärtsilä Bio-Sludge Treatment system can process all sludge from the wastewater treatment process and food waste before incineration.

The drying process increases the dryness of the waste to a high level of dry solids, ready for incineration.

Dried sludge is stored in the bio-sludge silo before incineration. In addition, the design of the agitators/blades within our dryer, crushes “potatoes” during the drying / mixing process, which prevents the sticky phase effect, and the creation of large stones, reducing any unplanned maintenance.
RECYCLING EQUIPMENT

The accumulation of recyclable wastes on board vessels must be managed correctly on board, our systems take advantage of any storage and working spaces, reducing handling time, as well as maximizing the off-loadable efficiency.

All fork lifts and lifting devices for transport of ash bags and recycling equipment can also be supplied by Wärtsilä.

Wärtsilä recycling equipment consists of:
- Shredders
- Densifiers
- Glass crushers
- Bale compactors
- Briquetting
EXPERIENCE & RECENT SUCCESSES

**SCOPE OF SUPPLY**
Meyer Werft awarded Wärtsilä the contract to supply the complete wet & dry waste treatment package.

Shipowner................................. Saga Cruises  
Shipyard.................................................. Meyer Werft, Germany

MV Werften awarded Wärtsilä the contract to supply the complete wet & dry waste treatment package.

Shipowner................................. Genting HK/Crystal Cruises  
Shipyard.................................................. MV Werften, Germany

AFTERSALES, SERVICE & SUPPORT

Wärtsilä supports its customers throughout the lifecycle of their installations by optimising efficiency and performance. We offer expertise, proximity and responsiveness for all our customers in the most environmentally sound way.

Our Services & Support solutions range from basic support, installation and commissioning, performance optimisation, staff training, upgrades and conversions to service projects and agreements focusing on overall equipment performance and asset management.

We deliver aftersales support through our network of service centres in more than 70 countries worldwide and provide original spare parts for all of our waste management systems, ensuring prompt service and delivery to minimise downtime.