Submersible Sewage Pumps with Cutter Impeller

Tsurumi C-series pumps are heavy-duty, submersible cutter pumps for sewage and wastewater, which are made of castings and equipped with cutting mechanism. Featuring a combination of impeller vane with brazed sintered tungsten carbide alloy edge and a suction cover of serrated shape, the C-series pumps enable smooth pumping, while cutting fibrous foreign objects during suction. These pumps have been used to drain sewage and wastewater from buildings and kitchens, and to transfer sewage and wastewater in water treatment facilities of factories and commercial complexes.

The C-series comes in a wide product lineup, covering discharge bore diameters of 50 to 200 mm and motor outputs of 0.75 to 37 kW. Among the C-series pumps, “CR” models are available as highly-durable cutter pumps, whose impeller and suction cover are made of high-chromium cast iron as a standard feature.

All models of the C-series can be used in combination with a guide rail fitting device that enables easy installation and maintenance. In addition, a new model of dry pit type can be optionally available. The dry pit type pump can be installed indoors, and outside a tank. With Tsurumi’s original specifications for dry pit installation and maintenance, these pumps enable smooth pumping, while cutting fibrous foreign objects during suction. These pumps have been used to drain sewage and wastewater from buildings and kitchens, and to transfer sewage and wastewater in water treatment facilities of factories and commercial complexes.

These pumps integrate original technologies that Tsurumi has researched and proven in the field over many years, such as anti-wicking cable, dual inside mechanical seals with silicone carbide face and Oil Lifter, etc.

Furthermore, durability and wear resistance have been thoroughly considered in their design, so these pumps enable continuous duty over long periods of time. Tsurumi products are designed to provide excellent durability and sound quality, thus contributing to the stable operation of facilities and enabling a considerable reduction in maintenance cost.

Cutting various foreign objects with cutting mechanism

- Aluminum can
- Plastic bottle
- Non-flushable wipes
- Nylon pantyhose

Performance Range

50 Hz

60 Hz
Guide Rail Fitting System

Tsurumi offers an automatic alternation system by a duplex pump comprising an automatic model “A” unit and auto-alternation model “W” unit. The “A” unit is a stand-alone automatic pump and the “W” unit is a pump that has an alternating circuitry. All without the need of extra wiring, level sensors, or control panels.

Advanced Model “CR”

Among the C-series pumps, the “CR” models have been developed to transfer wastewater containing foreign matter efficiently and smoothly, while maintaining high head and high volume. Since high-chromium cast iron is used for the impeller and the suction cover, the “CR” model pumps provide high durability, and enable continuous duty over long periods of time. Also, with other models, the impeller and suction cover material can be changed to high-chromium cast iron, as an option.

Model Number Designation

- TOS / TO: Guide rail fitting
- D: Dry pit
- Operation sub code
  - None: None automatic operation
  - A: Automatic operation
  - W: Auto-alternation operation
- Motor Output
- Number of poles of the motor
- Rated motor output in kW
- Discharge bore in mm
- Name of the series
- Phase
  - None: Three-phase
  - S: Single-phase
  - Cutter
    - (Channel Impeller with Cutting Edge)
  - Leakage Sensor
    - (Float type, 1.5 - 22kW only)
    - (Electrode type, 37kW only)
  - Seal Pressure Relief Ports
    - (5.5 - 22kW only)
    - (37kW only)
  - Automatic or Auto-alternation Operation
    - (0.75 - 1.5kW only)
  - Guide Rail Fitting System
  - CR: Made of high-chromium cast iron impeller & suction cover

Guide Rail Fitting System

The guide rail fitting system connects the pump to and from the piping easily just by lowering and hoisting the pump, allowing easy maintenance and inspection without the need to enter the sump. The TOS/TO is the guide rail fitting system made of cast iron and compatible with cast iron pumps.

Automatic or Auto-alternation Operation

Guide Rail Fitting Operation

- Duckfoot Bend
- Guide Support
- Guide Hook
- Lifting Chain 5m (with Shackles)
- JIS 10kg/cm² Flange

Options

- Seawater-resistant version:
  Galvanic anode & special Impeller
- High temperature liquids version:
  Max. 90°C
- Special material version:
  Made of high-chromium cast iron impeller & suction cover
- Dry pit version:
  Available upon request
**Anti-wicking Cable Entry**
Prevents water incursion due to capillary action should the cable sheath be damaged or the end of cable submerged. Also prevents moist air from infiltrating the motor housing and condensation from forming inside the housing due to temperature differences between the housing and outside air.

**Motor Protector**
- **Circle Thermal Protector (7.5kW and below)**
  Directly cuts the motor circuit if excessive heat builds up or overcurrent occurs in the motor.
- **Miniature Thermal Protectors (11kW and above)**
  React to excessive heat caused by dry-running. The bimetal strip opens to cause the control panel to shut the power supply.

**Dual Inside Mechanical Seals with Silicon Carbide Faces**
Isolated in the oil chamber where a clean, non-corrosive and abrasion-free lubricating environment is maintained. Compared with the water-cooled outside mechanical seal, it reduces the risk of failure caused by dry-heating and adhering matter. The silicon carbide provides 5 times higher corrosion, wear and heat resistance than the tungsten carbide. Rubber parts of the upper and lower fixing rings are made of NBR or FPM (FKM), which provides higher resistance to heat and chemicals.

**Oil Lifter [Patented]**
Provides lubrication and cooling of the seal faces down to 1/3 of normal oil level, thus maintaining a stable shaft sealing effect and prolonging seal life longer.

**Leakage Sensor**
- **Float Type** ([80C215-CR and 100C222-CR](#))
- **Electrode Type** ([200C437-CR](#))
Detects flooding into the incursion water storage chamber and oil chamber that may occur in a worst case scenario. When flooding is detected, signals are sent to operate the indicator lamps through the external control panel.

**Oil Seal**
Used as a “Dust Seal,” it protects the mechanical seal from abrasive particles.

**Seal Pressure Relief Port** ([5.5kW and above of 2-pole, 200C437-CR](#))
Protects the mechanical seal from pump pressure. It also protects the seal face by discharging wear particles.

**Air Release Valve** *excluding some models*
Fitted on the pump casing to prevent the air lock. When air flows through the valve, the ball stays at the bottom, but when the pumped water starts to flow, the ball closes the outlet because of its buoyancy.

### Options
- **Seawater-Resistant Version**
  In seawater, a material’s resistance to corrosion can be seen clearly. When metals with different potentials are brought into contact in seawater, only the metal of lower potential corrodes. As the difference in potential increases, the metal of lower potential corrodes faster. As an option, Tsurumi can supply pumps with parts made of higher electric potential metal as the sacrificial anode.

- **High Temperature Liquids Version**
  Tsurumi’s submersible pumps are applicable to high temperature liquids of up to 90°C. Pumps of the standard specification can discharge liquids of up to 40°C. However, there are many fields that need to discharge higher temperature liquids, e.g., discharging industrial water from a power plant or ironworks, or discharging hot spring water from a mine in a volcanic zone.

- **Special Material Version**
  Tsurumi can also provide you with pumps with essential components such as the impeller, pump casing and the suction cover made of non-standard materials. Select from stainless steel, high-chromium cast iron and bronze to suit your specific requirements.
As a special option of the Tsurumi C-series cutter pumps, dry pit specifications are available. The dry pit pumps have been designed to drain wastewater from buildings, in which a mixture of all kinds of sewage and wastewater is expected.

The dry pit pumps can be installed indoors and outside of tanks, and still deliver the performance of conventional submersible pumps. Daily inspection and maintenance are easy, because the pump body is installed indoors.

These pumps have been developed with Tsurumi-original specifications, aiming for stable operation and reduction in maintenance labor. Of course, the dry pit pumps inherit the anti-wicking cable, dual inside mechanical seals with silicone carbide faces on the sides that are not in contact with wastewater, and Oil Lifter from Tsurumi’s submersible pumps. In addition, they are designed with the maximum consideration for high-temperature resistance, with bearing grease for high temperature use, class H insulation, a leakage sensor, mechanical seals made of FPM (FKM), and high-grade lubricating oil as standard specifications.

Pump models of 7.5 kW or lower motor output come without a water jacket, while the models of 11 kW or higher motor output are equipped with a water jacket as a standard feature.

As the most advanced feature of the 11 kW or higher output models, a wear ring is provided to prevent waste from clogging in the water jacket. Thus, solids can enter the water jacket only through the minute clearance between the impeller and the wear ring. This structure is a Tsurumi-original design.

As described above, Tsurumi’s dry pit pumps feature a high quality, highly-reliable design that ensures excellent durability and high wear resistance. They can be installed in a variety of sites and will help keep facilities operating stably and will remarkably reduce maintenance costs.

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**Model D100C415**

- **Anti-wicking Cable Entry**
- **Motor Protector**
- **Water Jacket (11kW and above)** The motor is cooled by a water jacket assuring efficient motor cooling even when the pump operates with its motor exposed to air.
- **Motor** Class H insulation
- **Oil Lifter [Patented]**
- **Oil Seal**
- **Cleaning Cover**

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**Example of Installation**

- **Air release pipe**
- **Float sensor**
- **Alarm**
- **Start pump**
- **Stop pump**

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**Standard Specifications**

- **Special Specifications for Dry Pit Version**

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Pump models of 7.5 kW and below without Water Jacket

Pump models of 11 kW and above with Water Jacket
C (2-pole) –Cutter Impeller–

The C-series is a submersible cutter pump designed for handling raw sewage, wastewater, and heavy-duty industrial applications, where the pump is subject to clogging from oversize material. Single or two tungsten carbide alloy edge blazed on the impeller vane on the serrated suction cover. This mechanism cuts incoming fibrous material into pieces, permitting smooth passage of fibrous material. The impeller and suction cover of the “CR” type are made of high-chromium cast iron, ensuring excellent durability and enabling the pump to maintain high performance for an extended period.

.performance curves

<table>
<thead>
<tr>
<th>Discharge Bore</th>
<th>Standard Model</th>
<th>Automatic Model</th>
<th>Auto-Alternation Model</th>
<th>Motor Output kW</th>
<th>Starting Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 mm</td>
<td>50C2.75S</td>
<td>TOS90C2.75S</td>
<td>TOS50C2.75S</td>
<td>0.75</td>
<td>Single Capacitor Start</td>
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<tr>
<td>80 mm</td>
<td>80C21.5S</td>
<td>TOS80C21.5S</td>
<td>TOS60C21.5S</td>
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<td>Three D.O.L.</td>
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<td>100 mm</td>
<td>100C22.2S-CR</td>
<td>TOS100C22.2S-CR</td>
<td>TOS80C22.2S-CR</td>
<td>2.2</td>
<td>Three D.O.L.</td>
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Dimensions L x H mm

<table>
<thead>
<tr>
<th>Standard Model</th>
<th>Auto-Alternation Model</th>
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</thead>
<tbody>
<tr>
<td>Free Standing</td>
<td>Guide Rail Fitting</td>
</tr>
<tr>
<td>405 x 323</td>
<td>621 x 566</td>
</tr>
</tbody>
</table>

Dry Weight kg

<table>
<thead>
<tr>
<th>Standard Model</th>
<th>Auto-Alternation Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free Standing</td>
<td>Guide Rail Fitting</td>
</tr>
<tr>
<td>32</td>
<td>30</td>
</tr>
</tbody>
</table>

Cable Length m

Guide Rail Fitting

Dimensions

Free Standing

Guide Rail Fitting

50C2.75
80C23.7-CR
TOS80C23.7-CR

< 0.75 - 7.5kW >

< 11 - 22kW >

< 22kW >
The C-series is a submersible cutter pump designed for handling raw sewage, wastewater, and heavy-duty industrial applications, where the pump is subject to clogging from oversize material. Single or two tungsten carbide alloy edge blazed on the impeller vane on the serrated suction cover. This mechanism cuts incoming fibrous material into pieces, permitting smooth passage of fibrous material. The impeller and suction cover of the "CR" type are made of high-chromium cast iron, ensuring excellent durability and enabling the pump to maintain high performance for an extended period.

### Performance Curves

**< 4-pole  2.2 - 15kW >**

**< 4-pole  37kW, 6-pole  11 - 15kW >**

### Dimensions

Free Standing  
Guide Rail Fitting

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### Discharge Bore

<table>
<thead>
<tr>
<th>Model</th>
<th>Motor Output kW Phase</th>
<th>D.O.L.</th>
<th>Guide Rail Fitting mm</th>
<th>Free Standing kg</th>
<th>Guide Rail Fitting kg</th>
<th>Cable Length m</th>
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</thead>
<tbody>
<tr>
<td>100C42.2</td>
<td>2.2</td>
<td>D.O.L.</td>
<td>94 x 641</td>
<td>68</td>
<td>64</td>
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<td>100C43.7</td>
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<td>100C45.5</td>
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<td>100C47.5</td>
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<td>D.O.L.</td>
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<td>144</td>
<td>135</td>
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<td>100C411</td>
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<td>Star-Delta</td>
<td>135 x 929</td>
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<td>173</td>
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<tr>
<td>100C415</td>
<td>15</td>
<td>Star-Delta</td>
<td>145 x 929</td>
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<tr>
<td>150C611-CR</td>
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<td>Star-Delta</td>
<td>165 x 1211</td>
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<tr>
<td>150C615-CR</td>
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<td>Star-Delta</td>
<td>175 x 1238</td>
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<td>400</td>
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<td>200C437-CR</td>
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<td>Star-Delta</td>
<td>185 x 1588</td>
<td>550</td>
<td>500</td>
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*Star-Delta available upon request*

*All weights excluding cable*

Weights of guide rail fitting excluding duckfoot bend
# Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>C (2-pole)</th>
<th>C (4 · 6-pole)</th>
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<tbody>
<tr>
<td><strong>PUMP</strong></td>
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</tr>
<tr>
<td>Discharge Bore</td>
<td>mm</td>
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<tr>
<td>Discharge Connection</td>
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<td>Threaded Oval Flange</td>
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<tr>
<td>Impeller</td>
<td></td>
<td>Cutter (Semi-open Single-channel Impeller with Cutting Edge)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gray Cast Iron with Tungsten Carbide Alloy</td>
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<tr>
<td>Suction Cover</td>
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<td>Ductile Cast Iron</td>
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<tr>
<td>Oil Seal</td>
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<td>Nitrile Butadiene Rubber</td>
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<td>Casing</td>
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<td>Gray Cast Iron</td>
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<tr>
<td>Shaft Seal</td>
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<td>Dual Inside Mechanical Seals (with Oil Lifter)</td>
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<tr>
<td>Type</td>
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<td>Continuous-duty Rated, Dry-type Induction Motor</td>
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<tr>
<td>Output</td>
<td>kW</td>
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<td>Phase</td>
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<td>Speed (S.S.)</td>
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<td>1000/1200</td>
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<td>Insulation</td>
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<tr>
<td>Motor Protector (built-in)</td>
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<td>CTP</td>
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<tr>
<td>Leakage Sensor (built-in)</td>
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<tr>
<td>Lubricant</td>
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<td>Turbine Oil (ISO VG32)</td>
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<td>Frame</td>
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<td>Gray Cast Iron</td>
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<td></td>
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</tr>
<tr>
<td>Guiding Flange</td>
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</tr>
</tbody>
</table>

*All weights excluding cable

Weights of guide rail fitting excluding ductfoot bend

*1 Star-Delta available upon request