Installation, Operation, and Maintenance Manual

Flygt jet aerator JA 112, JA 117, JA 217, JA 317

Engineered for life
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<td>JA 112 with pump NS 3102 MT ______________________________________46</td>
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SAFETY

This manual contains basic information on the installation, operating and maintenance and should be followed carefully. It is essential that these instructions are carefully read before installation or commissioning by both the installation crew as well as those responsible for operation or maintenance. The operating instructions should always be readily available at the location of the unit.

Unilateral modification and spare parts manufacturing

Modifications or changes to the unit/installation should only be carried out after consulting with ITT. Original spare parts and accessories authorized by the manufacturer are essential for compliance. The use of other parts can invalidate any claims for warranty or compensation.

Safety regulations for the owner/operator

All government regulations, local health and safety codes shall be complied with. All dangers due to electricity must be avoided (for details consult the regulations of your local electricity supply company).

Qualifications of personnel

An authorized (certified) electrician and mechanic shall carry out all work.

Identification of safety and warning symbols

General Danger:
Non-observance given to safety instructions in this manual, which could cause danger to life have been specifically highlighted with this general danger symbol.

High Voltage:
The presence of a dangerous voltage is identified with this safety symbol.

NOTE!
Non-observance to this warning could damage the unit or affect its function.

The pictures in this manual may differ somewhat from the delivered jet aerator depending on the size and configuration.

GUARANTEE

ITT undertakes to remedy faults in products sold by ITT provided that:
— the fault is due to defects in design, materials or workmanship;
— the fault is reported to ITT or ITT’s representative during the guarantee period;
— the product is used only under conditions described in the maintenance instructions and in applications for which it is intended;
— the monitoring equipment incorporated in the product is correctly connected;
— all service and repair work is done by a workshop authorized by ITT;
— genuine Flygt parts are used.

Hence, the guarantee does not cover faults caused by deficient maintenance, improper installation, incorrectly executed repair work or normal wear and tear. ITT assumes no liability for bodily injuries, material damages or economic losses beyond what is stated above.

ITT guarantees that spare parts will be kept for 15 years after the manufacture of this product has been discontinued.

The manufacturer reserves the right to alter performance, specification or design without notice.

DATA PLATE INTERPRETATION

Jet aerators are not provided with any special data plate.

For plate data please refer to the installation manual of the pump that forms part of the jet aerator.
PRODUCT DESCRIPTION

Introduction
Thank you for buying a Flygt designed submersible self-aspirating jet aerator.

In this installation manual you will find general information on how to handle, install and service the jet aerator to give it a long and reliable life.

The parts list and installation manual of the pump that forms part of the jet aerator give full technical data on your particular pump.

Applications
Submersible, self-aspirating jet aerator intended for aerating and mixing of waste water. The Flygt jet aerator is based on a submersible Flygt pump and a Flygt designed ejector system.

The jet aerator is designed for use in small to medium tanks and basins, where the tasks include BOD/COD reduction, mixing, homogenization, odor control and/or oxidation of nutrients. Common applications are the activated sludge process, aerobic sludge digestion, retention basins and storm water tanks.

For further information on applications contact your ITT representative.

Application data
Liquid temperature: maximum 40°C (104°F)
For temperature higher than 40°C (104°F), please contact your ITT representative.

Liquid density: maximum 1100 kg/m³ (9.2 lb per US gallon).

The pH of the pumped liquid: 5.5 - 14
Choose Stainless steel for the pH of the pumped liquid > 11.

Air flow data: given at 1 atm. and 20°C (68°F).

Oxygen transfer data: 1 atm, 20°C (68°F) water temperature, and dissolved oxygen content of 0 mg O2/l.

Installation alternatives
P = Semi permanent wet well arrangement with pump installed by means of twin guide bars with automatic connection to discharge.
S = Transportable version.
For more detailed information, please contact your ITT representative.

Pump versions
MT = medium head execution
LT = low head execution

Weights
P-installation
The following pumps can be used. Approximate pump weight and ejector system weight (without suction pipe) in kg (lb).

<table>
<thead>
<tr>
<th>Pump</th>
<th>Pump weight kg (lb)</th>
<th>Ejector system weight kg (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N3085 MT</td>
<td>69 (152)</td>
<td>45 (99)</td>
</tr>
<tr>
<td>N3102 MT</td>
<td>107 (236)</td>
<td>45 (99)</td>
</tr>
<tr>
<td>N3127 MT</td>
<td>152 (335)</td>
<td>105 (232)</td>
</tr>
<tr>
<td>N3153 MT</td>
<td>218 (481)</td>
<td>105 (232)</td>
</tr>
<tr>
<td>N3171 MT</td>
<td>329 (725)</td>
<td>105 (232)</td>
</tr>
<tr>
<td>N3202 MT</td>
<td>580 (1279)</td>
<td>235 (518)</td>
</tr>
<tr>
<td>N3202 LT</td>
<td>790 (1742)</td>
<td>380 (838)</td>
</tr>
</tbody>
</table>

S-installation
Approximate jet aerator weight including pump and 5 m PVC-U suction pipe in kg (lb).

<table>
<thead>
<tr>
<th>Pump</th>
<th>JA weight total kg (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N3085 MT</td>
<td>120 (266)</td>
</tr>
<tr>
<td>N3102 MT</td>
<td>170 (375)</td>
</tr>
<tr>
<td>N3127 MT</td>
<td>280 (617)</td>
</tr>
<tr>
<td>N3153 MT</td>
<td>350 (772)</td>
</tr>
<tr>
<td>N3171 MT</td>
<td>470 (1036)</td>
</tr>
<tr>
<td>N3202 MT</td>
<td>750 (1653)</td>
</tr>
<tr>
<td>N3202 LT</td>
<td>1300 (2866)</td>
</tr>
</tbody>
</table>

TRANSPORTATION AND STORAGE

Carefully follow the instructions in the installation manual of the Flygt submersible pump that forms part of the jet aerator.
Safety precautions

In order to minimize the risk of accidents in connection with service and installation work, the following rules should be followed:

1. Never work alone. Use a lifting harness, a safety line and a respirator, as required. Do not ignore the risk of drowning!
2. Make sure there is sufficient amount of oxygen and that there are no dangerous gases within the work area.
3. Check the explosion risk before welding or using electric hand tools.
4. Observe strict cleanliness. Do not ignore health hazards.
5. Bear in mind the risk of electrical accidents.
6. Make sure that the lifting equipment is in good condition, and comply to local ordinances.
7. Provide a suitable barrier around the work area, for example a guard rail.
8. Make sure that you have a clear path of retreat.
9. Use safety helmet, safety goggles and protective shoes.
10. All personnel who work with sewage systems should be vaccinated against diseases they may be exposed to.
11. A first-aid kit must be close at hand.
12. Note that special rules apply to installation in explosive atmosphere.

Follow all other health and safety rules and local codes and practices.

General recommendations

To ensure proper installation, see please dimensions on the dimensional drawings.

Check the horizontal positioning of the jet aerator according to the dimensional drawings.

The jet aerator should be installed in such a way that the water jet propagates freely in water without meeting obstacles or side walls and the direction of flow created does not conflict with flows of other mixers or jet aerators installed.

Installation has to be within specified submergence range. Installation should be in such a way that the pump inflow is not disturbed and air is not sucked into the pump.

For more detailed information, please contact your ITT representative.

Handling equipment

Always pay extra attention to safety aspects when working with lifting equipment.

- Stay clear of suspended loads.
- Always lift the pump by its lifting handle - never by the motor cable or hose.

P-installation

Lifting equipment is required for handling the jet aerator. The lifting chain and the schackle should be in stainless steel and inspected every year.

S-installation

The minimum height between the lifting hook and the ground must be sufficient to be able to lift the jet aerator out of the tank.

NOTE! — Always use the supplied lifting equipment “Pump lift” and “Chain sling” when lifting the jet aerator.
— Assembly of the lifting equipment must be done according to the assembly instructions.

Oversized lifting equipment could cause damage if the pump should stick when being lifted.

Make sure that the handling equipment is securely attached.

Check that the lifting handle and chain are in good condition.

For further information of installation, contact your ITT representative.

Assembling jet aerator on site

The various parts shall be assembled as indicted in the assembly instruction, using the screws supplied and applying the recommended tightening torques.
**Recommended tightening torques**

Flygt standard screws in Nm and ft-lb. Chart valid only for lubricated screws. Use suitable lubricant.

<table>
<thead>
<tr>
<th>Material</th>
<th>Stainless (A2, A4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thread</td>
<td>Properly class 80 (and 70)</td>
</tr>
<tr>
<td></td>
<td>Nm</td>
</tr>
<tr>
<td>M5</td>
<td>5.4</td>
</tr>
<tr>
<td>M6</td>
<td>9.3</td>
</tr>
<tr>
<td>M8</td>
<td>22</td>
</tr>
<tr>
<td>M10</td>
<td>44</td>
</tr>
<tr>
<td>M12</td>
<td>76</td>
</tr>
<tr>
<td>M16</td>
<td>187</td>
</tr>
<tr>
<td>M20</td>
<td>364</td>
</tr>
<tr>
<td>M24</td>
<td>629</td>
</tr>
</tbody>
</table>

**Lubricating screws**

To maintain screw tightness and prevent screws from seizing or getting stuck use a suitable lubricant such as Klüber ALTEMP Q NB50.

**Installation alternatives**

The total submergence \( H \) is the depth from the liquid surface in the tank to the bottom of the tank.

The distance \( Z \) is measured from the bottom of the tank to the floor above the tank.

**P-installation**

The pump is installed on a discharge connection fixed to the base of the tank, with the ejector system mounted on it. This installation is recommended for large jet aerators, where moving the pump is more practical than moving the ejector system.

**S-installation**

The jet aerator is placed on the bottom of the tank without the need for any kind of anchoring device.

The configuration of the equipment has been specially designed to ensure that no movement will occur even under the most adverse operating conditions.

When necessary the jet aerator can be installed without emptying the tank.

**Installation in empty tank**

If installing in an empty tank, clean any debris or coarse solid matter out of the tank before putting the pump unit into operation.

Use a support grip unit and cable holders at the edge of the tank for suspension of the power cables.

Cables should be kept taut to prevent any possibility of their being sucked in by the pump.

Make sure that cables are not bent or squeezed in such a way as to be liable to break or wear out.

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**Warning**

The end of the cable may not be submerged. The starting equipment should be firmly fixed above the maximum liquid level, since water might make its way, via the cable, into the terminal box or the motor.
Installation in filled tank
   Installing the jet aerator in a filled tank is only applica-
   ble for S-installation.

Holder
   Rubber damping is standard for S-installation.
   Level the jet aerator in a horizontal position according 
   to the assembly instructions.

Chain hose
   The hose keeps the chain taut when hanging from
   the holder on the suction pipe and is standard for S-
   installation.
   IMPORTANT! To secure the state of balance when the 
   jet aerator is hanging freely, the chain hose has to be 
   cut to the correct length when pumps 3127 and 3153 
   are being used. The hose shall NOT be cut when 
   other pumps are being used. Follow the instruction on 
   the chain hose sticker.

ELECTRICAL CONNECTION
   Carefully follow the instructions in the installation 
   manual of the Flygt submersible pump that forms part 
   of the jet aerator.
OPERATION

Before start-up
Check that all visible parts of the pump and of the installation are undamaged and in good condition. Check the oil level in the pump.
Remove the fuses or open the master switch and check that the rotor runs freely when turned by hand.

- Check that the power supply is disconnected and that the pump cannot start up again, not even accidentally, before commencing any work on it.

Check that the monitoring equipment works.
The impeller should rotate clockwise as viewed from above. When started, the pump will jerk in the opposite direction to that in which the impeller rotates. See figure. Transpose two phase leads if the impeller rotates in the wrong direction (3-).

- In some installations the surface of the pump and the surrounding liquid may be very hot.
- Bear in mind the risk of scalding.
- Make sure that the pump cannot overturn or fall and thereby cause injury to persons or damage to property.

- In some installations and working points of the pumps, the noise level of 70 dB, or the level specified for each pump, may be exceeded.

Starting jerk

- The starting jerk can be powerful.

Return jet

- Watch out for the return jet from the suction pipe when the machine stops.

The suction pipe can be extended if there is a problem with the return jet.
MAINTENANCE

When working on the pump, observe carefully the following precautions:
— make sure that the pump has been drained and properly flushed with clean water.
— rinse the various components after disassembling them.
— observe good standards of personal hygiene.
— bear in mind the risk of infections.
— follow the local safety rules.

— Check that the power supply is disconnected and that the pump cannot start up again, not even accidentally, before commencing any work on it.

This also applies to the control circuit.

Even if the pump is new or the seals have been replaced, an inspection after the first week of operation is recommended.

IMPORTANT! Periodic inspection of the fixing elements between the pump and the ejector system is very important.

NOTE! ITT does not assume any liability in the event of such work being done by unauthorised persons.

Service/Inspection

ITT recommends a preventive maintenance program based on Intermediate and Major Services at regular intervals. For standard sewage applications where FLS10 is correctly connected and in use and the temperature of the pumped liquids is 40 C (104 F) or less an Intermediate Service should be performed every 8000 hours or every 2 years, whichever occurs first.

For details regarding service and inspection check appropriate pump installation manual.

These overhauls require special tools and should be done in an ITT workshop.

When the pump is new or the seals have been replaced, an inspection after the first week of operation is recommended.

IMPORTANT! Periodic inspection of the fixing elements between the pump and the ejector system is very important.

ITT disclaims all responsibility for work done by untrained, unauthorized personnel.
CONTROL AND MONITORING BOARDS

Suitable control boards for jet aerators are available from ITT.
Contact ITT for further information.

TOOLS

No particular tools are necessary other than the normal ones of specialized workshops and those provided for the pump that forms part of the jet aerator.
For further information on tools available, please contact your ITT representative.

OPTIONS

Only available for metric dimensions of PVC-U PN10 suction pipes, OD 110 mm and 160 mm.
Flange and suction pipes are to be supplied locally for US-dimensions of suction pipe OD 114,3 mm (4 1/2 in) and 168,3 mm (6 5/8 in).

Suction pipes

Suction pipe kit 4x1 m is available for metric dimensions if suction pipes cannot be supplied locally.
Always supplied locally for US-dimensions in lengths of approx. 5 m, which covers most needs. The approved standard quality is PVC-U PN10.
Glue is supplied locally.
Stainless steel pipes are approved and are to be supplied locally.

SUCTION PIPE EXTENSION KIT

Available for metric dimensions.
Suitable if H and/or Z > 5 m (for locally supplied pipe length 5 m).
Suitable if H and/or Z > 4 m (for pipe unit 4x1 m).
See section Installation alternatives.

PIPE BEND (FOR AIR INLET PROTECTION)

Available for metric dimensions.

CHAIN SLING EXTENSION KIT (ONLY S-VERSION)

Available for all dimensions.
Suitable if H > 5 m.
See section Installation alternatives.

FLANGE

Flange kit is available for metric dimensions.
Use the flange selection table below for US-dimensions.

Suction pipe connection | Suitable flange bore standards | øD mm (in) | ed mm (in) | Min. screw length mm (in)
--- | --- | --- | --- | ---
Ejector 112 (DN100) | - EN 1092-2 table 9. - 6" AS 2129 FANC table D (flat flange) | 180 (7.09) | 18 (0.71) | 80 (3.15)
Ejector 117, 217, 317 (DN150) | - EN 1092-2 table 9. - 6" AS 2129 FANC table D (flat flange). - 6" ANSI B16.1-1989 table 5. | 240 (9.45) | 23 (0.9) | 110 (4.33)
### VIEW OF PARTS

**P-installation**

<table>
<thead>
<tr>
<th>Pos. no.</th>
<th>Denomination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pump</td>
</tr>
<tr>
<td>2</td>
<td>Outlet pipe</td>
</tr>
<tr>
<td>3</td>
<td>Ejector Housing</td>
</tr>
<tr>
<td>4</td>
<td>Flange kit</td>
</tr>
<tr>
<td>5</td>
<td>Holder</td>
</tr>
<tr>
<td>6</td>
<td>Mounting kit</td>
</tr>
<tr>
<td>7</td>
<td>Discharge Connection</td>
</tr>
<tr>
<td>8</td>
<td>Guide bracket set</td>
</tr>
<tr>
<td>9</td>
<td>Connection pipe</td>
</tr>
<tr>
<td>10</td>
<td>Flange kit</td>
</tr>
<tr>
<td>31**</td>
<td>Pipe unit PVC-U (4x1m)</td>
</tr>
<tr>
<td>32**</td>
<td>Pipe bend</td>
</tr>
<tr>
<td>33**</td>
<td>Pipe extension kit (2x1 m)</td>
</tr>
<tr>
<td>34**</td>
<td>Flange kit PVC-U</td>
</tr>
</tbody>
</table>

**Option**

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![Diagram of P-installation](image-url)
### S-installation

<table>
<thead>
<tr>
<th>Pos. no.</th>
<th>Denomination</th>
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<tbody>
<tr>
<td>1</td>
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<tr>
<td>2</td>
<td>Outlet pipe</td>
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</tr>
<tr>
<td>4</td>
<td>Flange kit</td>
</tr>
<tr>
<td>5</td>
<td>Holder</td>
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<tr>
<td>6</td>
<td>Damper</td>
</tr>
<tr>
<td>7</td>
<td>Holder complete</td>
</tr>
<tr>
<td>8</td>
<td>Lifting eye unit</td>
</tr>
<tr>
<td>9</td>
<td>Chain sling unit</td>
</tr>
<tr>
<td>10</td>
<td>Flange kit</td>
</tr>
<tr>
<td>11</td>
<td>Stand</td>
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<tr>
<td>12</td>
<td>Mounting kit</td>
</tr>
<tr>
<td>13</td>
<td>Bracket</td>
</tr>
<tr>
<td>14</td>
<td>Hose</td>
</tr>
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<td>15</td>
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<td>17</td>
<td>Stand part complete Right</td>
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<td>18</td>
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<tr>
<td>31**</td>
<td>Pipe unit PVC-U (4x1m)</td>
</tr>
<tr>
<td>32**</td>
<td>Pipe bend</td>
</tr>
<tr>
<td>33**</td>
<td>Pipe extension kit (2x1 m)</td>
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<tr>
<td>34**</td>
<td>Flange kit PVC-U</td>
</tr>
<tr>
<td>35**</td>
<td>Chain sling</td>
</tr>
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**Option

---

[Diagram of S-installation system]
ASSEMBLY INSTRUCTIONS

P-installation
JA 112, 117 with pumps 3085 MT, 3102 MT, 3127 MT, 3153 MT, 3171 MT

1. 

2. 

3. 

4.
S-installation
JA 112 with pump 3085 MT

1. 

2. 

3.
JA 117 with pump 3127 MT

1.

2.

3.

4.
PARTS LIST

P-installation, exploded view
## P-installation, parts list tables

### JA 112 with pumps NP 3085 MT, NP 3102 MT

<table>
<thead>
<tr>
<th>Pos. no.</th>
<th>Denomination</th>
<th>Part no. 727 45 21 (galvanized steel)</th>
<th>Part no. 727 45 51 (stainless steel)</th>
<th>Qty.</th>
<th>Remark</th>
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<tbody>
<tr>
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<tr>
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### JA 117 with pumps NP 3127 MT, NP 3153 MT, NP 3171 MT

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<td>687 78 01</td>
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<tr>
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<td>727 81 01</td>
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<tr>
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<td>84 14 88</td>
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### JA 117 with pumps NP 3127 MT, NP 3153 MT, NP 3171 MT

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<th>Part no. 727 53 51 (stainless steel)</th>
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<td>Holder</td>
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<td>Discharge connection</td>
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<tr>
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** Option

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** Option
### JA 217 with pump NP 3202 MT

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<td>688 33 01</td>
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### JA 317 with pump NP 3202 LT

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<tr>
<td>8</td>
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<td>670 05 06</td>
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<td>9</td>
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<td>688 78 01</td>
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</tr>
<tr>
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** Option

<table>
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<th>Denomination</th>
<th>Part no. (galvanized steel)</th>
<th>Part no. (stainless steel)</th>
<th>Qty.</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>31**</td>
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<tr>
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<td>728 00 00</td>
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<tr>
<td>33**</td>
<td>Pipe Extension kit (2x1 m)</td>
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<td>727 98 10</td>
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S-installation, exploded view
## S-installation, parts list tables

### JA 112 with pump NS 3085 MT

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<th>Remark</th>
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### JA 112 with pump NS 3102 MT

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<th>Part no. 727 49 50 (stainless steel) consisting of:</th>
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**Option**
## JA 117 with pump NS 3127 MT

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<th>Part no. 727 53 50 (stainless steel) consisting of:</th>
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<td>Ejector Housing</td>
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<td>5</td>
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<td>6</td>
<td>Damper</td>
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<td>Holder</td>
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<td>8</td>
<td>Holder complete</td>
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<td>727 86 00</td>
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<td>Lifting eye unit</td>
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<td>728 12 00</td>
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<td>10</td>
<td>Chain sling unit</td>
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<td>12</td>
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## JA 117 with pump NS 3153 MT

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<th>Part no. 727 57 50 (stainless steel) consisting of:</th>
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<td>1</td>
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<td>Lifting eye unit</td>
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<td>728 12 00</td>
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<tr>
<td>11</td>
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** Option
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<tr>
<th>Pos. no.</th>
<th>Denomination</th>
<th>Part no. (galvanized steel)</th>
<th>Part no. (stainless steel)</th>
<th>Qty</th>
<th>Remark</th>
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<tr>
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JA 117 with pump NS 3171 MT

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<th>Part no. 727 61 50 (stainless steel) consisting of:</th>
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** Option
### JA 217 with pump NS 3202 MT

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<th>Part no. 727 65 20 (galvanized steel)</th>
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<th>Qty.</th>
<th>Remark</th>
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** Option

<table>
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<th>Pos. no.</th>
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<th>Part no. (galvanized steel)</th>
<th>Part no. (stainless steel)</th>
<th>Qty.</th>
<th>Remark</th>
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<td>-</td>
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<td>To be ordered separately</td>
</tr>
<tr>
<td>31**</td>
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<td>727 98 00</td>
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<tr>
<td>32**</td>
<td>Pipe bend</td>
<td>728 00 00</td>
<td>728 00 00</td>
<td>2</td>
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<td>33**</td>
<td>Pipe Extension kit (2x1 m)</td>
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<td>727 98 10</td>
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<td>Flange kit PVC-U</td>
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<td>727 99 00</td>
<td>2</td>
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<td>35**</td>
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<td>728 16 00</td>
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### JA 317 with pump NS 3202 LT

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<th>Part no. 727 69 50 (stainless steel) consisting of:</th>
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<tr>
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<td>Outlet pipe</td>
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<td>Ejector Housing</td>
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<td>6</td>
<td>Damper</td>
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<tr>
<td>7</td>
<td>Holder</td>
<td>727 92 00</td>
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<td>8</td>
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<td>9</td>
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** Option

<table>
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<th>Pos. no.</th>
<th>Denomination</th>
<th>Part no. (galvanized steel)</th>
<th>Part no. (stainless steel)</th>
<th>Qty.</th>
<th>Remark</th>
</tr>
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<tbody>
<tr>
<td>31**</td>
<td>Pipe unit PVC-U (4x1 m)</td>
<td>727 98 00</td>
<td>727 98 00</td>
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<td>To be ordered separately</td>
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<tr>
<td>32**</td>
<td>Pipe bend</td>
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<td>728 00 00</td>
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</tr>
<tr>
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<td>Pipe Extension kit (2x1 m)</td>
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<td>727 98 10</td>
<td>3</td>
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<td>727 99 00</td>
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<tr>
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<td>728 17 00</td>
<td>728 17 01</td>
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<td></td>
</tr>
</tbody>
</table>
What can ITT Water & Wastewater do for you?

Integrated solutions for fluid handling are offered by ITT Water & Wastewater as a world leader in transport and treatment of wastewater. We provide a complete range of water, wastewater and drainage pumps, equipment for monitoring and control, units for primary and secondary biological treatment, products for filtration and disinfection, and related services. ITT Water & Wastewater, headquartered in Sweden, operates in some 140 countries across the world, with own plants in Europe, China and North and South America. The company is wholly owned by the ITT Corporation of White Plains, New York, supplier of advanced technology products and services.