

# IOM manual

2012 rev 2

Pumps CTH in electro polished stainless steel AISI 316L.

Pumps CTI in glass blasted stainless steel AISI 316L.

Instructions for installation, start up, operation, maintenance and repair.

## Pump models:

### CTI

#### ■ With motor 2900 rpm:

CTI AA-03	7 m³/h, 10 m
CTI AA-05	12 m³/h, 10 m
CTI BB-07	17 m³/h, 11 m
CTI CC-15	19 m³/h, 22 m
CTI CC-22	34 m³/h, 22 m
CTI CE-22	20 m³/h, 31 m
CTI DD-40	50 m³/h, 22 m
CTI DF-40	28 m³/h, 35 m
CTI EF-55	42 m³/h, 35 m
CTI EG-55	30 m³/h, 47 m
CTI EF-75	60 m³/h, 35 m
CTI EG-75	35 m³/h, 47 m
CTI EG-110B	50 m³/h, 32 m*

#### ■ With motor 1450 rpm:

CTI AA-024	7 m³/h, 2.7 m
CTI BB-054	9 m³/h, 2.8 m
CTI CC-114	18 m³/h, 5.5 m
CTI CE-114	22 m³/h, 7.7 m
CTI DD-224	25 m³/h, 5.5 m
CTI DF-224	34 m³/h, 8.7 m
CTI DG-224	42 m³/h, 12.0 m

### CTH

#### ■ With motor 2900 rpm:

CTH AA-03	7 m³/h, 10 m
CTH AA-05	12 m³/h, 10 m
CTH BB-07	17 m³/h, 11 m
CTH CC-15	19 m³/h, 22 m
CTH CC-22	34 m³/h, 22 m
CTH CE-22	20 m³/h, 31 m
CTH DD-40	50 m³/h, 22 m
CTH DF-40	28 m³/h, 35 m
CTH EF-55	42 m³/h, 35 m
CTH EG-55	30 m³/h, 47 m
CTH EF-75	60 m³/h, 35 m
CTH EG-75	35 m³/h, 47 m
CTH EG-110B	50 m³/h, 32 m*

#### ■ With motor 1450 rpm:

CTH AA-024	7 m³/h, 2.7 m
CTH BB-054	9 m³/h, 2.8 m
CTH CC-114	18 m³/h, 5.5 m
CTH CE-114	22 m³/h, 7.7 m
CTH DD-224	25 m³/h, 5.5 m
CTH DF-224	34 m³/h, 8.7 m
CTH DG-224	42 m³/h, 12.0 m

\*only in long coupled pump execution



**Read this instruction manual carefully,  
before you install and operate the pump**

**topflo®**



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## Declaration of conformity

Machinery directive 2006/42/EC

Tapflo AB declares that:

Product name: **Centrifugal pumps**  
Models: **CT...**

Is in conformity with the essential health and safety requirements and technical construction file requirements of the EC Machinery directive 2006/42/EC with amendments 91/368/EEC, 93/94 EEC and 93/68 EEC.

Manufacturer: **Tapflo AB**

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**Tapflo AB**, may 2:nd 2012

Håkan Ekstrand  
Managing director

# 0. GENERAL



## 0.1 Introduction

CT is an open impeller centrifugal pump, manufactured from stainless steel AISI 316L. CTH with excellent electro polished surfaces, FDA approved seals, high finish and mechanical strength, meet the demands from food and sanitary applications, CTI with AISI 316L chemical resistance and mechanical strength is reliable choice.

With proper attention to maintenance, CT pumps will give efficient and trouble free operation. This instruction manual will familiarise operators with detailed information about installing, operating and maintaining the pump.

## 0.2 The warning symbols

The following warning symbols are present in this instruction manual. This is what they say.



This symbol stands next to all safety instructions in this instruction manual where danger to life and limb may occur. Observe these instructions and proceed with utmost caution in these situations. Inform also other users of all safety instructions. In addition to the instructions in this instruction manual, the general safety and accident prevention regulations must be observed.



This symbol signals possible danger caused by the presence of electric fields or live wires.



This signal stands at points in this instruction manual of particular importance for compliance with regulations and directives, for correct work flow and for the prevention of damage to and destruction of the complete pump or its subassemblies.

## 0.3 Qualification and training of personnel



The personnel in charge of installation, the operation cycle and maintenance of the pumps we produce must be qualified to carry out the operations described in this manual. Tapflo shall not be held responsible for the training level of personnel and for the fact that they are not fully aware of the contents of this manual.



## 0.4 Health & safety



### **Electric safety**

Do not carry out any maintenance operation on the pump while it is running or before it has been disconnected from the power supply. Avoid any danger caused by electric power (for details see current regulations in force). Check that electrical specifications on the data plate are equivalent to the power supply to which it will be connected.



### **Chemical hazards**

Avoid pumping liquids, even in different moments that may cause chemical reactions without having cleaned the pump.



### **Dry running**

Do not start nor carry out running tests before filling the pump with liquid. Always avoid the dry operation of the pump. Start the pump when it is completely filled with the delivery valve almost fully closed, limiting this condition to the time that is strictly necessary to start the pump.



### **Temperature hazards**

The cold or hot parts of the machine must be protected to avoid accidental contacts.



### **Rotating parts**

Do not tamper with the protection of the rotating parts, do not touch or approach rotating parts in movement.



### **Noise level**

CT pumps, including the motor, in normal operating conditions produce a sound level below 80 dB(A). The major sources of noise are: liquid turbulence in the plant, cavitation or any other abnormal operation that do not depend from the pump construction nor the pump manufacturer. The user must provide suitable protective means if the sources of noise could produce a harmful noise level for operators and for the environment (in compliance with current regulations).



### **Cleaning & disinfection**

Cleaning and disinfection of the pump system is of greatest importance when the pump is used in a food process installation. Use of a pump system that is NOT cleaned or disinfected can cause contamination of the product.

# 1. INSTALLATION



## 1.1 Receiving inspection

Although precaution is taken by us when packing and shipping, we urge you to carefully check the shipment on receipt. Make sure that all parts and accessories listed on the packing list are accounted for. Immediately report any damage or shortage to the transport company and to us.

## 1.2 Storage



If the equipment is to be stored prior to installation, place it in a clean location. Do not remove the protective covers from the suction and discharge which have been fastened to keep pump internals free of debris. Make sure to clean the pump thoroughly before installation.

## 1.3 Foundation



The pump-motor unit must stand on and be fixed to a sufficiently rigid structure that can support the entire perimeter on which the unit stands. The foundation on a firm bottom are the most satisfactory. Once the pump is in position, adjust level with metal shims between the feet and the surface on which it stands. Check that the feet of the pump-motor unit stand well on each of them. The surface on which the foundation stands must be flat and horizontal. If the unit is fitted on a steel structure, make sure that it is supported so that the feet do not warp. In any case, it is advisable to fit some antivibration rubber pieces between the pump and the brickwork.

For close-coupled type, pump-motor alignment is not required.

## 1.4 Piping connections



A pump is generally part of a piping system that can include a number of components such as valves, fittings, filters, expansion joints, instruments, etc. The way the piping is arranged and the positioning of the components has a great influence on operation and the operating life of the pump. The pump cannot be used as a support for the components connected to it.

The flow of liquid from the pump must be as even as possible. It is advisable to avoid any tight bends or drastic reductions of diameters that may cause flow resistance in the plant. In case of diameter reduction, it is advisable to use appropriate conical reductions (possibly eccentric on suction side and concentric on delivery side) at changes of diameter and at a minimum distance from pump inlets of five diameters.

### 1.4.1 Discharge pipe



A nonreturn valve and a shutoff/regulation valve are normally fitted on the discharge side.

The nonreturn valve protects the pump from any backflow. The shutoff/regulation valve excludes the pump from the line and adjusts output. Never adjust flow-rate using the valve on the suction pipe.

### 1.4.2 Suction pipe



The suction piping is very important for the correct operation of the pump group. It must be as short and as direct as possible. If a longer suction line is unavoidable, the diameter should be large enough, i.e. at least as the inlet connection on the pump, to ensure less flow resistance. In any case, suction must be carried out properly avoiding any air locks.



The CT pumps are single-stage centrifugal type, thus not self-priming. It will therefore always be necessary to install a bottom valve in all cases when the static height of the liquid is lower than the suction height of the pump. The suction piping must be without air inlets that are more probable with long suction lines or if suction occurs with negative head. Critical points in these terms are also the seals between flanges and the seals of the valve stems. Even some small air let into the suction line cause serious operating problems that can make the pump stop.

- 1) YES: gate valve (may also be near pump in the case of long piping)
- 2) With positive head: tilt of piping towards pump
- 3) YES: line strainer if particles are present
- 4) NO: air pockets: the circuit must be short and straight
- 5) YES: pipe fixing parts
- 6) Suction line as short and direct as possible
- 7) YES: check valve (especially for long vertical or horizontal pipes; compulsory with parallel pumps)
- 8) YES: adjusting gate valve on outlet
- 9) Bends placed after valves and instruments
- 10) YES: attachment for gauge or safety pressure switch
- 11) NO: elbow joints (and other parts) on the pump (discharge and suction lines)
- 12) With negative suction lift: tilt of piping towards suction tank
- 13) YES: check valve (with negative suction lift)
- 14) YES: strainer if particles are present
- 15) Suction head varies according to flow in order to prevent windage
- 16) Suction head
- 17) Immersion depth
- 18) YES: expansion joint (indispensable with long pipes or hot liquids) and/or anti-vibration facility during discharge and suction; anchored near to pump
- 19) YES: pipe discharge (completely sealed), discharge valve shut during normal operations
- 20) YES: overcoming obstacles at lower depths
- 21) Fix the pump by the fixing holes provided: the supports must be level
- 22) YES: drainage channel around base

# 1. INSTALLATION



## 1.6 Instruments



In order to ensure a reasonable control of the performance and the conditions of the pump installed, we recommend using the following instruments:

- a pressure-vacuum gauge on the suction piping;
- a pressure gauge on the delivery piping.

The pressure intakes must be made on straight pieces of piping at minimum five diameters from the pump inlets. The pressure gauge on delivery must always be fitted between the pump and the shutoff/regulation valve. The output can be read on the pressure, transformed into meters and then compared with the typical curves.

### Electric power

The electric power absorbed by the motor can be measured with wattmeters.



### Optional instruments

The optional instruments can advise of abnormal operating conditions of pumps, such as: valves closed accidentally, missing liquid, overloads, etc.

### Thermometer

If the temperature of the pumped liquid can be a critical element, provide a thermometer (preferably on suction).

## 1.7 Motor Connection



An expert electrician must always carry out the electrical connection. Compare the power supply with the data plate specifications and then choose a suitable connection. The type of connection is stated on the motor data plate that can be Y (star) or D (Delta), according to the power supply of the motor (see figure).

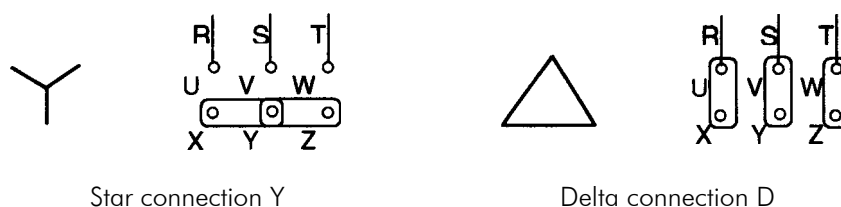


Fig. 2 Motor connection






Follow the prescriptions of the local electricity board for the connection. In no case connect the electrical motors directly to mains but also fit in between a suitable electric switchboard equipped with a knife switch and suitable safety devices. Safety devices against overloads must protect the motors. Make sure that the motor has suitable grounding and that it has been connected properly.



## 2. OPERATION



### 2.1 Start-up

- Check manually that the motor is free to turn, moving the motor cooling fan.
- Make sure that the piping is not clogged and is free from residues or foreign objects. Make sure that the liquid flows regularly into the pump.
-  - The pump and piping connected to it, at least the suction pipe, must be full of liquid. Any air or gas must be carefully released. In case of suction with negative head, fill the suction piping and check how the bottom valve works. It must guarantee that the liquid must not flow back, emptying therefore the suction pipe with consequent disconnection of the pump.
- The suction shutoff valve (if any) must be completely open.
- The shutoff/regulation valve on the discharge side must be almost completely closed.
-  - The motor must turn in the same direction as the arrow shown on the pump. The direction of rotation is always clockwise looking at the pump from the motor side; check by starting briefly, then looking at the direction of rotation of the motor fan through the fan lid. If it is wrong, the motor must be stopped immediately. Change the connection to the terminals of the electric motor (chapter 1.7) and repeat the procedure described above.
-  - Any auxiliary connections must all be connected.

#### 2.1.1 Starting the pump



Start the electric motor and open the discharge adjustment/shutoff valve gradually until the desired output has been reached. The pump must not turn more than two or three minutes with discharge closed. A longer operation in these conditions can damage the pump seriously.

If the pressure shown on the pressure gauge on the discharge piping does not increase, turn off the pump immediately and release pressure carefully. Repeat the connection procedure.



If there are changes of flow-rate, head, density, temperature or viscosity of the liquid, stop the pump and get in touch with our technical service.

#### 2.1.2 Re-starting after power shutoff

In case of accidental stopping, make sure that the non-return valve has prevented backflow and check that the motor cooling fan has stopped. Start the pump again following the instructions of chapter 2.1.1 "Starting the pump".

If the pump intakes from a lower level, it can unprime during the standstill and therefore you must check again before starting that the pump and the suction piping are full of liquid.

### 2.2 Stopping the Pump



It is advisable to close the discharge adjustment/shutoff valve gradually and stop the motor immediately after. The reverse sequence is not recommendable, especially with larger pumps or longer delivery piping. That is to avoid any problems due to water hammering. If a suction shutoff valve has been installed, it is advisable to close it completely.

## 2. OPERATION



### 2.3 Cleaning and disinfection



Cleaning and disinfection of the pump system is of greatest importance when the pump is used in a food process installation. Use of a pump system that is NOT cleaned or disinfected can cause contamination of the product. The cleaning cycles as well as chemicals to use for the cleaning vary depending on the pumped product and the process. The user is responsible to establish a suitable cleaning and/or disinfection program according to local and public health and safety regulations.

#### 2.3.1 Cleaning procedure

The pump may be cleaned in two different ways:

##### **CIP (Cleaning In Place)**

without dismantling the pump, using steam, water or cleaning chemicals. Follow these safety instructions during the CIP procedure:



- Make sure that all cleaning line connections are properly tightened to avoid splashing of hot water or cleaning chemicals.
- When using a automatic process, a safety device should be installed to avoid unintentional automatic start-up of the pump.
- Make sure that the connections in the pump system are secure and tight.
- Before any disassembly of the pump, fittings or pipes, make sure that the cleaning cycle is finished.

##### **Manual cleaning**

by simply dismantling the pump casing, impeller and mechanical seal. Always follow these safety instructions:



- Switch off the electric power to the motor and disconnect the motor starting system if installed.
- The cleaning personnel shall wear suitable protective clothing, footwear and goggles.
- Use a suitable non-toxic and non-inflammable cleaning solution.
- Always keep the area around the pump clean and dry.
- Never clean the pump by hand with pump running.

### 3. MAINTENANCE



Maintenance work on electrical installations must be performed by qualified personnel and only when the power supply has been shutoff. Follow the local and national safety regulations.

#### 3.1 Inspections

- Periodically check suction and discharge pressures.
- Inspect the motor according to the instructions from the motor manufacturer.
- In general, a mechanical seal does not require maintenance, but the pump should never run when empty (dry). If a leakage occurs, replace the mechanical seal.

#### 3.2 Location of faults

Problem									Possible reason	Solutions
Overloading of motor	Insufficient flow rate or pressure in pump	No pressure on the discharge side	Irregular discharge flow/pressure	Noise and vibrations	The pump gets clogged	Overheating of the pump	Abnormal wear	Leak in mechanical seal		
●	●								Wrong direction of rotation	Invert the direction of rotation
●	●	●	●						Insufficient suction head (NPSH)	Increase available NPSH: - Raise the suction reservoir - Lower the pump - Reduce the vapour pressure - Increase the diameter of the suction pipe - Make suction pipe short and direct
	●								Pump is clogged	Clean the pump
●		●	●				●		Cavitation	Increase suction pressure
●		●	●				●		The pump sucks air	Make sure all connections on suction pipe are tight
	●	●	●						Suction pipe is blocked	Check pipe/valves and filters on the suction line
●			●						Discharge pressure too high	Reduce the head by increasing pipe diameter and/or reduce number of valves and bends
●			●		●				Flow rate too high	Reduce the flow: - Partially close the discharge valve - Reduce the impeller diameter (contact us) - Reduce the rotation speed
●			●	●	●	●			Liquid temperature too high	Cool the liquid
							●		Broken or worn mechanical seal	Replace the seal
							●		Wrong material of o-rings for the liquid	Mount o-rings in other material (contact us)
●			●	●	●				The impeller scratches	- Reduce the temperature - Reduce the suction pressure - Adjust the clearance between housing and impeller
			●				●		Loads on the pipes	Connect the pipes independent of the pump
			●	●	●	●			Foreign objects in the liquid	Use a filter on the suction side
							●		Spring tension too low on mechanical seal	Adjust as mentioned in this manual
	●								Shut off valve closed on suction side	Check and open the valve
●									Discharge pressure too low	Increase the pressure: - Install an impeller with bigger diameter (consult us)

Changes reserved without notice

## 3. MAINTENANCE



### 3.3 Assembly and disassembly



The assembly and disassembly should only be performed by qualified personnel.



Each operation carried out on the machine must always be carried out once all the electrical contacts have been disconnected. The pump-motor unit must be placed in a position where it cannot be started unintentionally.



Before servicing in any way the parts in contact with the pumped liquid, make sure that the pump has been fully emptied and washed. When draining the liquid, make sure that there is no danger for people or the environment.

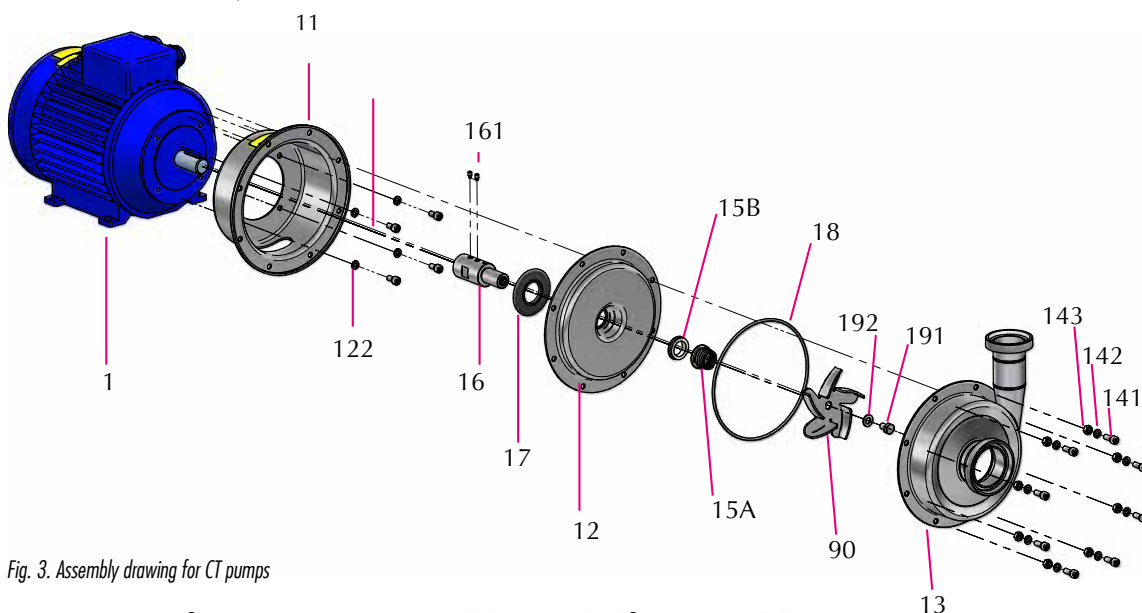


Fig. 3. Assembly drawing for CT pumps

#### 3.3.1 Pump casing (13) – assembly and disassembly

Follow the safety instructions in above section 3.3

##### Disassembly

- Remove the casing mounting screws (141), washers (142) and nuts (143) - Fig 4.
- Carefully remove the casing (13) - Fig 5.

Check the casing O-ring (18) and replace with new one if worn or damaged.

##### Assembly

- When reassembling the casing, make sure that the O-ring sealing surfaces on the casing (13) and the back casing (12) are clean.
- Put the casing O-ring (18) on the back casing (12).
- Assemble the pump casing (13), insert the casing mounting screws (141), washers (142) and nuts and tighten alternately.



Fig. 4



Fig. 5

Changes reserved without notice

## 3. MAINTENANCE



### 3.3.2 Impeller (90) and back casing (12) – disassembly

Disassemble the pump casing (13) according to chapter 3.3.1

- Remove the impeller mounting screw (191) and the washer (192), use spanner key on the cut in pump shaft (pos. 16) to lock the impeller - Fig 6.
- Remove the impeller (90).
- Carefully remove the rotating seal part with spring (15A) - Fig 7.
- Carefully remove the back casing (12). The static part of the mechanical seal (15B) will remain in the back casing - Fig 8.



Fig. 6.



Fig. 7.



Fig. 8.

### 3.3.3 Mechanical seal (15) – assembly and disassembly

Follow the disassembly instructions for the pump casing (3.3.1) and impeller and back casing (3.3.2).

Disassembly

- When the impeller (90) has been removed, the rotating part of the seal (15A) remains on the shaft extension (16). The static part (15B) remains in the back casing - Fig 9.
- Carefully pull out the rotating part of the seal (15A) from the shaft extension (16) - Fig 10.
- Carefully push out the static part of the seal (15B) - Fig 11.

Check the sealing surfaces and the O-rings. If they are worn or damaged, replace the complete mechanical seal (15).



Fig. 9.



Fig. 10



Fig. 11.

### 3. MAINTENANCE

#### Assembly

- Before assembly, wet the O-rings on the seal with soapy water.
- Carefully insert the static part of the seal (15B) in the back casing - Fig 12.
- Fit the back casing (12) onto the back cover (11) - Fig 13.
- Check the seal fitting dimensions according to table 3.3.3 to ensure the correct pressure on the seal. This procedure is important only if you have disassembled the motor/shaft extension. In order to adjust the dimension "S", move the shaft extension (16).
- Carefully slide the rotating part of the seal (15A) onto the shaft extension (16) - Fig 14.
- Mount the impeller as described in the next section.



Fig. 12.



Fig. 13.



Fig. 14.

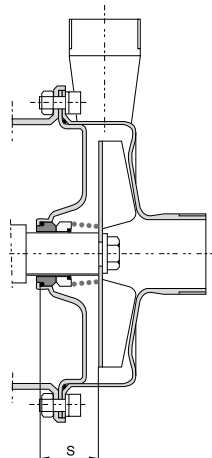


Fig. 15. Seal fitting dimensions

**Table 3.3.3**

Pump type	S (mm)
CTA	33
CTB	33
CTC	35,5
CTC	35,5
CTC	35,5
CTD	35,5
CTD	35,5
CTD	35,5
CTD	35,5
CTE	35,5

#### 3.3.4 Assembly of impeller (90)

- Push the impeller (90) towards the spring of the rotating seal part (15A) and mount the impeller on the shaft extension (16) - Fig 16.
- Make sure that the impeller is locked in its position and tighten the impeller mounting screw (191) with its washer (192) - Fig 17.



Fig. 16.



Fig. 17.

Changes reserved without notice



## 3. MAINTENANCE

### 3.3.5 Replacement of motor (1)

Follow the instructions for disassembly of the impeller and back casing according to chapter 3.3.2.

- Remove the deflector (17) from the shaft extension (16) - Fig 18.
- Remove the back cover screws (121) and washers (122) - Fig 19.
- Remove the back cover (11).
- Loosen the lock screws (161) and remove the shaft extension (16) - Fig 20.



Fig. 18.



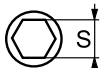

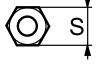

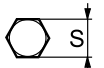
Fig. 19.



Fig. 20.

Check the motor and repair or replace according to the instructions from the motor manufacturer. Assemble in the reverse order.

## 3.4 Mounting torques and dimensions of screws/nuts

		Pump model				
		CT A..	CT B..	CT C..	CT C..	CT E..
	<b>Pos 121, allen screw</b> Mounting torque (Nm) Tool size "s" (mm) Thread	15 5 M6	15 5 M6	15 5 M6	15 6 M8	15 6 M8
	<b>Pos 141, allen screw</b> Mounting torque (Nm) Tool size "s" (mm) Thread	15 5 M6	15 6 M8	15 8 M10	15 6 M10	15 6 M8
	<b>Pos 143, hexagonal nut</b> Mounting torque (Nm) Tool size "s" (mm) Thread	15 5 M6	15 13 M8	15 17 M10	15 13 M8	15 13 M8
	<b>Pos 161, allen screw</b> Mounting torque (Nm) Tool size "s" (mm) Thread	17 3 M6	17 3 M6	17 4 M8	17 4 M8	17 4 M8
	<b>Pos 191, hexagonal screw</b> Mounting torque (Nm) Tool size "s" (mm) Thread	17 17 M10	17 17 M10	17 17 M10	17 17 M10	17 17 M10

Changes reserved without notice

## 3. MAINTENANCE



### 3.5 Lubricated seal

A great option where there is a potential risk of dry running, or where the product tends to solidify or crystallize. An oil chamber is connected to the mechanical seal chamber.

The pump is delivered without lube medium in oil chamber!

- Before the first start fill up the oil chamber with proper medium (i.e. SAE 20 oil). In case the pumped medium can't be contaminated by oil, you should use a lubricating medium compatible with pumped medium.
- Medium in the oil chamber should be also compatible with materials that the pump is made of (when using oil as buffering liquid you should not use EPDM O-rings in mechanical seal)
- NBR lip seal is a standard (other materials are available upon request).
- Oil chamber should be filled up to  $\frac{3}{4}$  of oil cup height.
- You should change oil after 2000 hours of operation or once a year.

#### Important!



- If mechanical seal damage will occur, fluid level in the chamber will increase and then it will spill out of the oil cup. You must stop the pump immediately to replace mechanical seal!
- If oil level in oil cup will start decreasing in short period of time, probably lip seal is damaged. You should stop the pump and replace damaged lip seal.

#### Additional parts:



Pos	Description
114	Pump back cover for lubricated seal
126	Pump back casing with welded seal chamber
159	Lip seal (for 4Z pump configuration)
16Z	Shaft for pump with lubricated seal
16WZ	Shaft – reinforced version for pump with lubricated seal
62	Oil reservoir for seal

Fig. 21.



## 3. MAINTENANCE



### 3.6 Heating/cooling jacket

Great protection for the mechanical seal in cases where there is a risk for solidification of the product. The heating jacket is also used when the pumped product has to maintain a specific temperature, high or low. A heating or cooling medium is continuously circulated in the jacket.

Back casing heating/cooling system is available in sizes: "C" , "D" and "E" of Tapflo CT pumps. Heating/cooling is operated by a jacket placed in pump back casing (12). The jacket have two G 1/2" connections. To connect the jacket use flexible hose to prevent any undue stress and strain on the heating jacket connectors.

For heating/cooling process use medium fully compatible with materials the pump is made of.

Maximum temperature for heating medium is 60°C, maximum pressure is 2 Bar. It's crucial to avoid sudden temperature changes that could cause excessive strains.

**Comparing to standard execution, heating jacket option contains followed additional parts:**

Pos	Description
111	Pump back cover for heating jacket
120	Pump back casing with heating jacket
125	Joint for pump with heating jacket



Fig. 22.

### 3.7 Flushed seal

When abrasive or sticky particles are present, it's recommended to use flushed seal (plan 11). A small amount of the pumped product is recirculated from the discharge side to the seal chamber to flush solids cumulated in it. It helps to save mechanical seal (15) and back casing (12) from being worn. In addition a self-cleaning filter is used at the discharge.

Flushed seal pipe work is fully demountable. To disassemble self-cleaning filter for removal of collected "big" particles or routine inspections, remove upper flange and then disassemble the filter. To provide easy disassembly the flushing steel pipe line is fixed with gas fittings.

**For flushed seal design of pump is supplied in parts for this application as follows:**

Pos	Description
116	Back cover for flushed seal
126	Pump back casing with welded seal chamber
136	Pump cover for flushed seal
1361	Strainer
1362	Nipple
1363	Metal pipe
1364	Connection adaptor
1365	Adaptor o-ring



Fig. 23.

### 3. MAINTENANCE



To meet the demands from a variety of today's industry we also provide options that are a combination of executions listed above such as:

#### Flushed and oil lubricated seal with heating jacket.

Additional parts:



Fig. 24.

Pos	Description
11146	Pump back cover for flushed and oil lubricated seal with heating jacket
125	Joint for pump with heating jacket
1260	Pump back casing with welded seal chamber and heating jacket
136	Cover for flushed seal
1361	Strainer
1362	Nipple
1363	Metal pipe
1364	Connection adaptor
1365	Adaptor O-ring
159	Lip seal (for 4Z pump configuration)
16Z	Shaft for pump with lubricated seal
16WZ	Shaft – reinforced version for pump with lubricated seal
62	Oil reservoir for seal

#### Lubricated seal with heating jacket



Fig. 25.

Pos	Description
1114	Pump back cover for heating jacket and lubricated seal
1141	Oil cup
1260	Pump back casing with welded seal chamber and heating jacket
125	Plug for pump with welded seal chamber
159	Lip seal for 4Z pump configuration
16Z	Shaft for pump with lubricated seal
62	Oil reservoir for seal

#### Flushed and oil lubricated seal



Fig. 26.

Pos	Description
1146	Pump back cover for flushed and lubricated seal
126	Pump back casing with welded seal chamber
136	Cover for flushed seal
1361	Strainer
1362	Nipple
1363	Metal pipe
1364	Connection adaptor
1365	Adaptor O-ring
159	Lip seal for 4Z pump configuration
16Z	Shaft for pump with lubricated seal
16WZ	Shaft - reinforcement version for pump with lubricated seal
62	Oil reservoir for seal

Changes reserved without notice

## 3. MAINTENANCE



### 3.8 Hygienic shroud

Optional motor shroud and baseplate in stainless steel provide easy cleaning and splash protection for electrical motor.

To protect electric motor from liquids and to keep an pump application clean, the hygienic shroud design contains additional parts as follow:

Pos	Description
31	Hygienic cover for motor
34	Shroud foot
341	Shroud foot screws
342	Shroud foot screws washers



Fig. 27.

### 3.9 Draining device

To allow easy draining, pump casing is designed with drain and drain plug. To empty the pump just remove the drain plug and the pump casing will be drained automatically.

For draining device the design of pump casing differ from standard casing (13) and contains followed parts:

Pos	Description
131	Pump casing with drain
132	Drain plug
1321	Drain plug o-ring



Fig. 28.

### 3.10 Long coupled execution

Long coupled execution is a perfect solution when pumping hot products like oil at temperatures up to 180°C. Complete pump unit is mounted on baseplate, with coupling, bearing and guard. Usage of additional bearing also provides more stable work for pump unit.

For long coupled execution the design of pump unit is different from standard design and contains followed additional parts:

Pos	Description
21	Pedestal for pump and motor
271	Bearing circlip towards motor
272	Bearing circlip towards pump
40	Coupling
41	Cover for coupling
411	Washers for cover for coupling
42	Elastic connector for coupling
50	Bearing
51	Cover for bearing

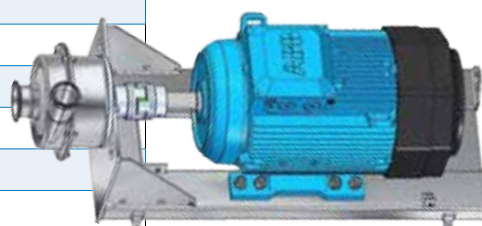


Fig. 29.

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## 4. Technical data

### 4.1 Spare part drawing CT pumps

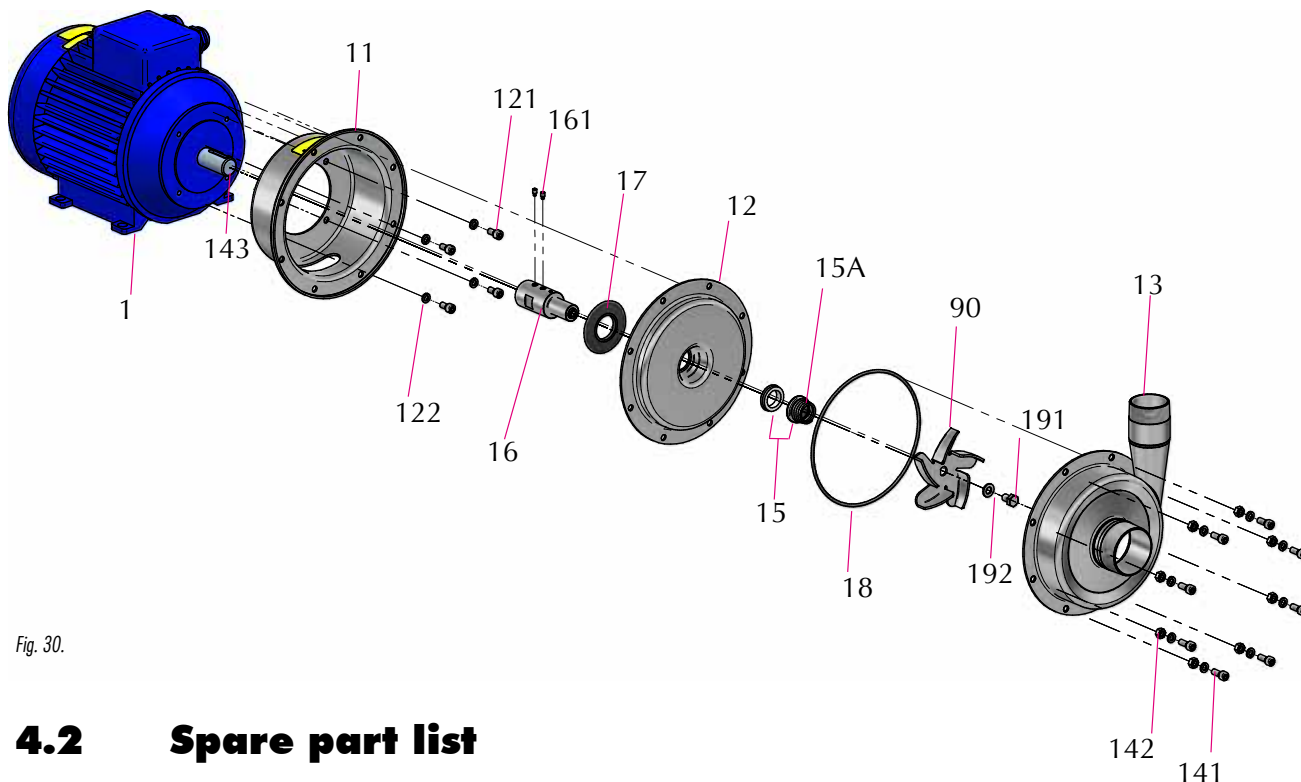


Fig. 30.

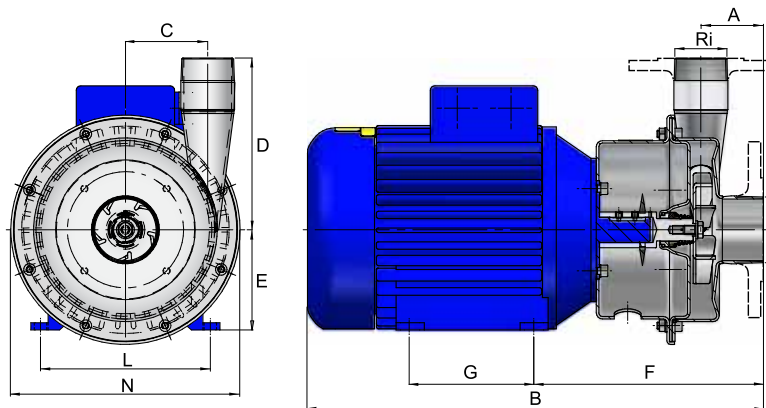
### 4.2 Spare part list

Pos	Description	Pump model / quantity						Material	
		AA-03 AA-05 A A - 024	BB-07 BB-04	CC-15 CC-22 CE-22 CC- 114 CE-144	DD-40 DD- 224 DF-40 DF- 224	DG-55 DG-55	EF-55 EG-55 EF-75 EG-75	CTH	CTI
1	Electric motor	1	1	1	1	1	1		
11	Back cover [H/N]*	1	1	1	1	1	1	AISI 316L Glass blasted	AISI 316L Ra<0.8
12	Back casing [H/N]	1	1	1	1	1	1	AISI 316L	AISI 316L Ra<0.8
121	Back cover mounting screws	4	4	4	4	4	4	AISI 316L	AISI 316L
122	Back cover mounting washers	4	4	4	4	4	4	AISI 316L	AISI 316L
13	Pump casing [H/N]	1	1	1	1	1	1	AISI 316L Glass blasted	AISI 316L Ra<0.8
141	Casing mounting screws	4	4	4	8	8	8	AISI 316L	AISI 316L
142	Casing mounting washers	4	4	4	8	8	8	AISI 316L	AISI 316L
143	Casing mounting nuts	4	4	4	8	8	8	AISI 316L	AISI 316L
15	Mechanical seal (complete) [H/N]	1	1	1	1	1	1	See 4.4	See 4.4
16	Shaft extension	1	1	1	1	1	1	AISI 316L	AISI 316L
161	Lock screw	1	1	1	2	2	2	AISI 316L	AISI 316L
17	Deflector	1	1	1	1	1	1	NBR	NBR
18	Casing O-ring [H/N]	1	1	1	1	1	1	EPDM (std) FKM FEP (Silicone), NBR	EPDM FDA aproved (std) FEP/Silicone FDA aproved
191	Impeller mounting screw	1	1	1	1	1	1	AISI 316L	AISI 316L
192	Impeller mounting washer	1	1	1	1	1	1	AISI 316L	AISI 316L
90	Impeller	1	1	1	1	1	1	AISI 316L Glass blasted	AISI 316L Ra<0.8
Accessories									
21	Base plate complete	1	1	1	1	1	1	AISI 316L	AISI 316L
31	Motor cover complete	1	1	1	1	1	1	AISI 316L	AISI 316L

Parts indicated as [H/N] have different execution for CTI and CTH pumps. When order spares please indicate i.e. 5-340N-11 for industrial CTI series or 5-340H-11 for higienic CTM series.

## 4. Technical data

### CTI



#### Connection dimensions

Model	BSPT male thread (standard)*		DIN 2633/ PN16 flange		ANSI 150 flange	
	Ra	Ri	Ra	Ri	Ra	Ri
CTI A..	1"	3/4"	25	20	1"	3/4"
CTI B..	1 1/2"	1"	40	25	1 1/2"	1"
CTI C..	1 1/2"	1 1/2"	40	40	1 1/2"	1 1/2"
CTI D..	2 1/2"	2"	65	50	2 1/2"	2"
CTI E..	2 1/2"	2"	65	50	2 1/2"	2"

\* = NPT thread available as option

#### General dimensions

Model	Motor power (kW)	IEC motor size	A	B**	C	D	E	F	G	L	N
CTI AA-03	0.37	71	60	358	36	100	71	193	90	112	145
CTI AA-05	0.55	71	60	358	36	100	71	193	90	112	145
CTI BB-07	0.75	80	63	395	50	110	80	205	100	125	170
CTI CC-15	1.5	90	64	451	68	160	90	226	125	140	205
CTI CC-22	2.2	90	64	451	68	160	90	226	125	140	205
CTI CE-22	2.2	90	64	451	68	160	90	226	125	140	205
CTI DD-40	4.0	112	70	510	92	192	112	257	140	190	256
CTI DF-40	4.0	112	70	510	92	192	112	257	140	190	256
CTI EF-55	5.5	132	70	587	92	192	132	304	140	216	256
CTI EG-55	5.5	132	70	587	92	192	132	304	140	216	256
CTI EF-75	7.5	132	70	587	92	192	132	304	140	216	256
CTI EG-75	7.5	132	70	587	92	192	132	304	140	216	256
CTI AA-024	0.25	71	60	358	36	100	71	193	90	112	145
CTI BB-054	0.55	80	63	395	50	110	80	205	100	125	170
CTI CC-114	1.1	90	64	451	68	160	90	226	125	140	205
CTI CE-114	1.1	90	64	451	68	160	90	226	125	140	205
CTI DD-224	2.2	100	70	478	92	192	100	250	140	160	256
CTI DF-224	2.2	100	70	478	92	192	100	250	140	160	256
CTI DG-224	2.2	100	70	478	92	192	100	250	140	160	256

\*\* = This dimension may vary depending on motor brand

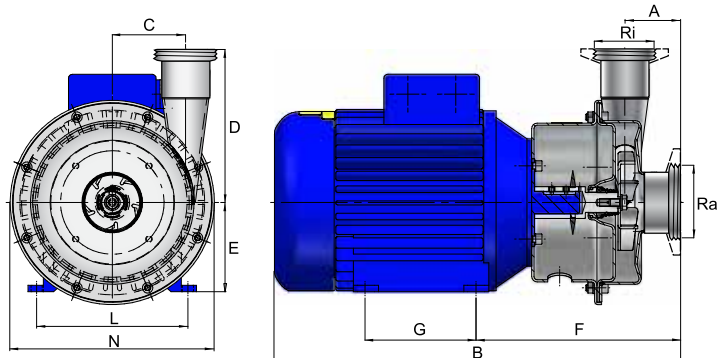
#### Materials, data and limits

Casing	Stainless steel AISI 316L glass blast
Impeller	Stainless steel AISI 316L glass blast, open (standard) or optional semi open type
Mechanical seal	Single ceramic/graphite (standard), SiC/SiC or SiC/graphite, optional with oil lube or flushed
O-rings	EPDM (standard), FKM, FEP/silicone or NBR
Motor	IP55, IEC frame B3/B14 (B3 on long coupled version). Available with ATEX cat 2 or 3, Eex e or Eex d motor
Max pressure	10 bar (PN10)
Temperature	max 90°C, max 180°C for long coupled version
Viscosity	max ~200 cSt
Particles	max diameter 6 mm (with standard open impeller), bigger if soft particles

Changes reserved without notice

## 4. TECHNICAL DATA

### CTH



#### Connection dimensions

Connection type	Dim	Model CTH				
		A..	B..	C..	D..	E..
DIN 11851 thread (standard)	Ra	25	40	40	65	65
	Ri	25	32	40	50	50
DIN 32676 clamp	Ra	25	40	40	65	65
	Ri	20	25	40	50	50
ISO 2852 clamp	Ra	25	38	38	70	70
	Ri	21.3	25	38	51	51
SMS thread	Ra	38	51	51	63	63
	Ri	25	38	38	51	51
RJT thread	Ra	1 1/2"	1 1/2"	2"	3"	3"
	Ri	1"	1 1/2"	2"	2"	2"

#### General dimensions

Model	Motor power (kW)	IEC motor size	A	B**	C	D	E	F	G	L	N
CTH AA-03	0.37	71	60	358	36	100	71	193	90	112	145
CTH AA-05	0.55	71	60	358	36	100	71	193	90	112	145
CTH BB-07	0.75	80	63	395	50	110	80	205	100	125	170
CTH CC-15	1.5	90	64	451	68	160	90	226	125	140	205
CTH CC-22	2.2	90	64	451	68	160	90	226	125	140	205
CTH CE-22	2.2	90	64	451	68	160	90	226	125	140	205
CTH DD-40	4.0	112	70	510	92	192	112	257	140	190	256
CTH DF-40	4.0	112	70	510	92	192	112	257	140	190	256
CTH EF-55	5.5	132	70	587	92	192	132	304	140	216	256
CTH EG-55	5.5	132	70	587	92	192	132	304	140	216	256
CTH EF-75	7.5	132	70	587	92	192	132	304	140	216	256
CTH EG-75	7.5	132	70	587	92	192	132	304	140	216	256
CTH AA-024	0.25	71	60	358	36	100	71	197	90	112	145
CTH BB-054	0.55	80	63	395	50	110	80	205	100	125	170
CTH CC-114	1.1	90	64	451	68	160	90	226	125	140	205
CTH CE-114	1.1	90	64	451	68	160	90	226	125	140	205
CTH DD-224	2.2	100	70	478	92	192	100	250	140	160	256
CTH DF-224	2.2	100	70	478	92	192	100	250	140	160	256
CTH DG-224	2.2	100	70	478	92	192	100	250	140	160	256

\*\* = This dimension may vary depending on motor brand

#### Materials, data and limits

Casing	Stainless steel AISI 316L electro polished Ra <0.8
Impeller	Stainless steel AISI 316L electro polished Ra <0.8, open (standard) or optional semi open type
Mechanical seal	Single ceramic/graphite (standard), SiC/SiC or SiC/graphite, optional flushed
O-rings	EPDM FDA approved (standard), or FEP/silicone FDA approved
Motor	IP55, IEC frame B3/B14 (B3 on long coupled version). Available with ATEX cat 2 or 3, Eex e or Eex d motor
Max pressure	10 bar (PN10)
Temperature	max 90°C, max 180°C for long coupled version
Viscosity	max ~200 cSt
Particles	max diameter 6 mm (with standard open impeller), bigger if soft particles

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## 4. TECHNICAL DATA



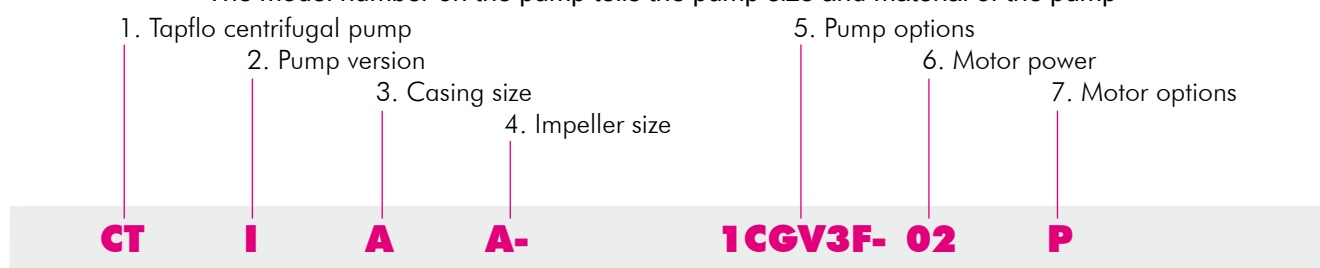
### 4.3 Stocking recommendation

Normally the CT pump is maintenance free. However, depending on the nature of the liquid and temperature etc, some parts of the pump are subject to wear and have to be replaced. We recommend having the following parts in stock:

Pos	Description	Qty
15	Mechanical seal	1
18	Casing o-ring	1

### 4.4 Pump code

The model number on the pump tells the pump size and material of the pump



1. CT = Tapflo centrifugal pump
2. Pump version
  - I = Industrial version
  - H = Hygienic version
3. Casing size  
Motor flange diameter / motor IEC size
  - A = 105 mm / 71
  - B = 120 mm / 80
  - C = 140 mm / 90
  - D = 160 mm / 100 or 112
  - E = 200 mm / 132
4. Impeller size
  - A = 90 mm
  - B = 98 mm
  - C = 125 mm
  - D = 130 mm
  - E = 135 mm
  - F = 155 mm
  - G = 180 mm
5. Pump options
  1. Mechanical seal
    - Blank\* = ceramic/graphite/EPDM (FDA on CTH)
    - 1CGV = ceramic/graphite/FKM (CTI only)
    - 1CGF = ceramic/graphite/FEP (FDA)
    - 1CGN = ceramic/graphite/NBR (CTI only)
    - 1SSE = SiC/SiC/EPDM (FDA on CTH)
    - 1SSV = SiC/SiC/FKM (CTI only)
    - 1SSF = SiC/SiC/FEP (FDA)
    - 1SSN = SiC/SiC/NBR (CTI only)
    - 1SGE = SiC/graphite/EPDM (FDA on CTH)
    - 1SGV = SiC/graphite/FKM (CTI only)
    - 1SGF = SiC/graphite/FEP (FDA)
    - 1SGN = SiC/graphite/NBR (CTI only)
  3. Connection options
    - Blank\* = Thread BSP on CTI
    - Thread DIN 11851 on CTH
    - 3A = Flanged ANSI 150 (CTI only)
    - 3F = Flanged DIN 2633, PN10/16 (CTI only)
    - 3C = Clamp ISO 2852 (CTH only)
    - 3T = Clamp DIN 32676 (CTH only)
    - 3S = Thread SMS (CTH only)
    - 3R = Thread RJT (CTH only)
  4. Special executions
    - 4J = Heating jacket
    - 4F = Flushed seal
    - 4Z = Oil lubricated seal
    - 4H = Semi open heavy duty impeller
    - 4K = Drain plug
    - 4P05 = Polished to Ra<0.5 (CTH only)
  6. Motor power / IEC motor size
    - 2900 rpm motors (2-pole):
      - 03 = 0.37 kW / 71
      - 05 = 0.55 kW / 71
      - 07 = 0.75 kW / 80
      - 15 = 1.5 kW / 90
      - 22 = 2.2 kW / 90
      - 40 = 4.0 kW / 112
      - 55 = 5.5 kW / 132
      - 75 = 7.5 kW / 132
      - 110 = 11 kW / 160\*\*
    - 1450 rpm motors (4-pole):
      - 024 = 0.25 kW / 71
      - 054 = 0.55 kW / 80
      - 114 = 1.1 kW / 90
      - 224 = 2.2 kW / 100
  7. Motor options
    - M = Hygienic motor shroud (CTH only)
    - B = Long coupled pump w. base plate/coupling
    - X2d = Ex d IIB T4 motor
    - X2e = Ex e IIB T3 motor
    - P = Single phase motor
    - T = Motor with PTC thermistor

\* = standard execution

\*\* = only in long coupled pump execution

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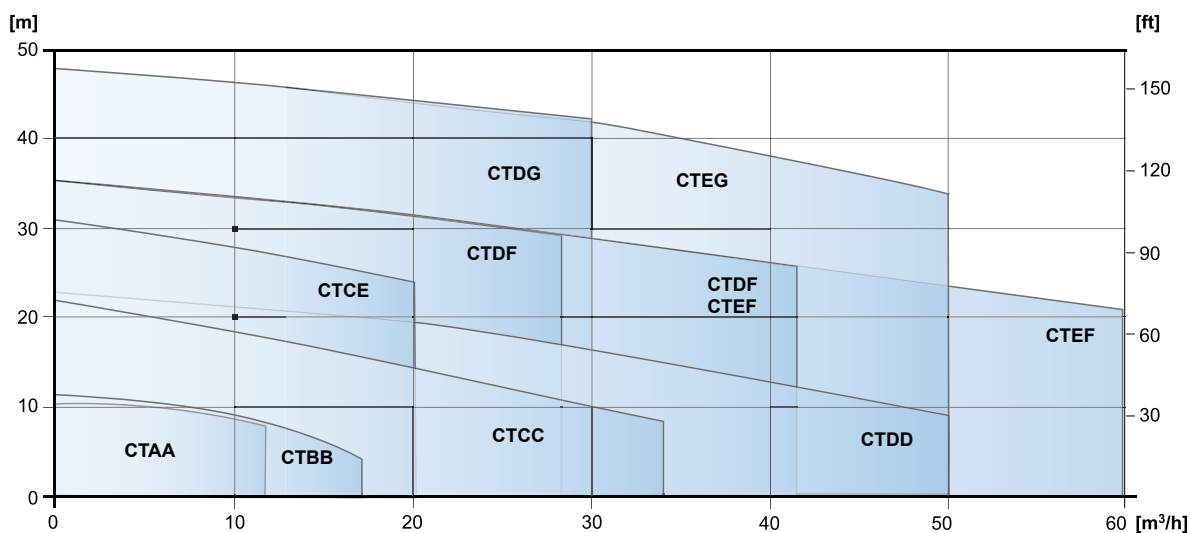
## 5. DATA



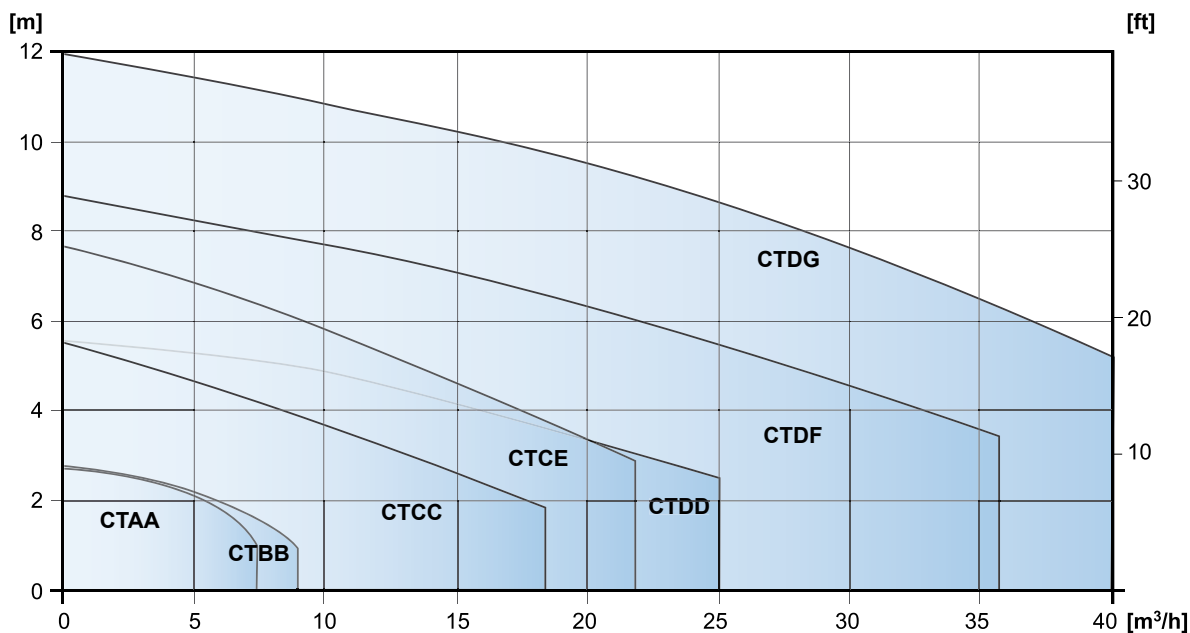
### 5.1 Performance curves

The performance curves are based on water at 20°C.  
Contact us for detailed curves.

#### Speed 2900 rpm



#### Speed 1450 rpm



Changes reserved without notice



## 6. WARRANTY



### 6.1 Returning parts

When returning parts to Tapflo please follow this procedure:

- Consult Tapflo for shipping instructions.
- Cleanse or neutralize and rinse the part/pump. Make sure the part/pump is completely empty from liquid.
- Pack the return articles carefully to prevent any damage under transport.

Goods will not be accepted unless the above procedure has been complied with.

### 6.2 Warranty

Tapflo warrants products under conditions as below for a period of not more than 12 months from installation and not more than 24 months from date of manufacture.

1. The following terms and condition apply to the sale of machinery, components and related services and products, of Tapflo (hereinafter "the products")
2. Tapflo (the manufacturer) warrants that:
  - a.) its products as being free of defects in material, design and workmanship at the time of original purchase;
  - b.) its products will function in accordance with Tapflo operative manuals; Tapflo does not guarantee that the product will meet the precise needs of the Customer, except for those purposes set out in any invitation to render documents or other documents specifically made available to Tapflo before entering into this agreement;
  - c.) high quality materials are used in the construction of the pumps and that machining and assembly are carried out to the highest standards.

Except as expressly stated above, Tapflo makes no warranties, express or implied, concerning the products, including all warranties of fitness for a particular purpose.

3. This warranty shall not be applicable in circumstances other than defects in material, design, and workmanship. In particular warranty shall not cover the following:
  - a.) Periodic checks, maintenance, repair and replacement of parts due to normal wear and tear (seals, O-rings, rubber items, bushings, etc.);
  - b.) Damage to the product resulting from:
    - b.1.) Tampering with, abuse or misuse, including but not limited to failure to use the product for its normal purposes as stated at the time of purchase or in accordance with Tapflo instructions for use and maintenance of the product, or the installation or improper ventilation or use of the product in a manner inconsistent with the technical or safety standard in force;
    - b.2.) Repairs performed by non skilled personell or use of non original Tapflo parts
    - b.3.) Accidents or any cause beyond the control of Tapflo, including but not limited to lightning, water, fire, earthquake, and public disturbances, etc.;
4. The warrantee shall cover the replacement or repairing of any parts, which is documentedly faulty due to construction or assembling, with new or repaired parts free of charges delivered by Tapflo. Parts subjected to normal tear and wear shall not be covered by the warranty. Tapflo shall decide as to whether the defective or faulty part shall be replaced or repaired.
5. The warrantee of the products shall be valid for a period in accordance to the current law from the date of delivery, under the condition that notice of the alleged defect to the products or parts thereof be given to Tapflo in written within the mandatory term of 8 days from the discovery.

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## 6. WARRANTY



- 6 Repair or replacement under the terms of this warranty shall not give a right to an extension to, or a new commencement of, the period of warranty. Repair or replacement under the terms of this warranty may be fulfilled with functionally equivalent reconditioned units. Tapflo qualified personnel shall be solely entitled to carry out repair or replacement of faulty parts after careful examination of the pump. Replaced faulty parts or components will become the property of Tapflo
- 7 The products are built in accordance with standard CE normative and are tested (where applicable) by Tapflo. Approval and tests by other control authority are for the customers account. The products shall not be considered defective in materials, design or workmanship if they need to be adapted, changed or adjusted to conform to national or local technical or safety standards in force in any country other than that for which the unit was originally designed and manufactured. This warranty shall not reimburse such adaptations, changes or adjustments, or attempt to do so, whether properly performed or not, nor any damage resulting from them, nor any adaptation, change or adjustments to upgrade the products from their normal purpose as described in the products operative manual without the prior written consent of Tapflo
- 8 Installation, including electric and other connections to utility mains according to Tapflo drawings, is for the cost and responsibility of the customer, unless otherwise agreed in writing.
- 9 Tapflo will not be liable on any claim, whether in contract, tort, or otherwise, for any indirect, special, incidental, or consequential damages, caused to the customer or to third parties, including loss of profits, arising by any possible infringement of par. 3 above or by the customer or third parties being in the impossibility of using the products.

Steady the above, Tapflo liability to the customer or third parties from any claim, whether in contract, tort, or otherwise, shall be limited to the total amount paid by the customer for the product that caused the damages.

□

## Warranty form

Company: _____			
Telephone: _____		Fax: _____	
Address: _____			
Country: _____		Contact name: _____	
E-mail: _____			
Delivery date: _____		Pump was installed (date): _____	
Pump type: _____		Serial No (see name plate): _____	
Description of the fault: _____			
_____			
_____			
The installation			
Liquid: _____			
Temperature (°C): _____	Viscosity (cPs): _____	Spec. grav. (kg/m <sup>3</sup> ): _____	pH-value: _____
Contents of particles: _____ % , of max size (mm): _____			
Flow (l/min): _____	Duty (h/day): _____	No of starts per day: _____	
Discharge head (mwc): _____		Suction head/lift (m): _____	
Other: _____			
_____			
_____			
_____			
Place for sketch of the installation			
			

# Please contact us at your nearest Tapflo office

Tapflo has approximately 50 sales offices spread over more than 20 countries. In addition to this we are represented by independent distributors in about another 30 countries.

■ Australia ■ Belarus ■ Belgium ■ Bosnia ■ Brazil ■ Bulgaria ■ Chile ■ China ■ Colombia ■ Croatia ■ Czech/Slovakia ■ Denmark ■ Ecuador ■ Estonia ■ Finland ■ France ■ Greece ■ Germany ■ Hong-Kong ■ Hungary ■ India ■ Indonesia ■ Iran ■ Ireland ■ Israel ■ Italy ■ Kazakhstan ■ Latvia ■ Lithuania ■ Macedonia ■ Malaysia ■ Montenegro ■ The Netherlands ■ New Zealand ■ Norway ■ Poland ■ Philippines ■ Romania ■ Russia ■ Singapore ■ Slovenia ■ South Africa ■ Spain ■ Sweden ■ Switzerland ■ Syria ■ Taiwan ■ Thailand ■ Turkey ■ Ukraine ■ United Arab Emirate ■ United Kingdom ■ USA

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