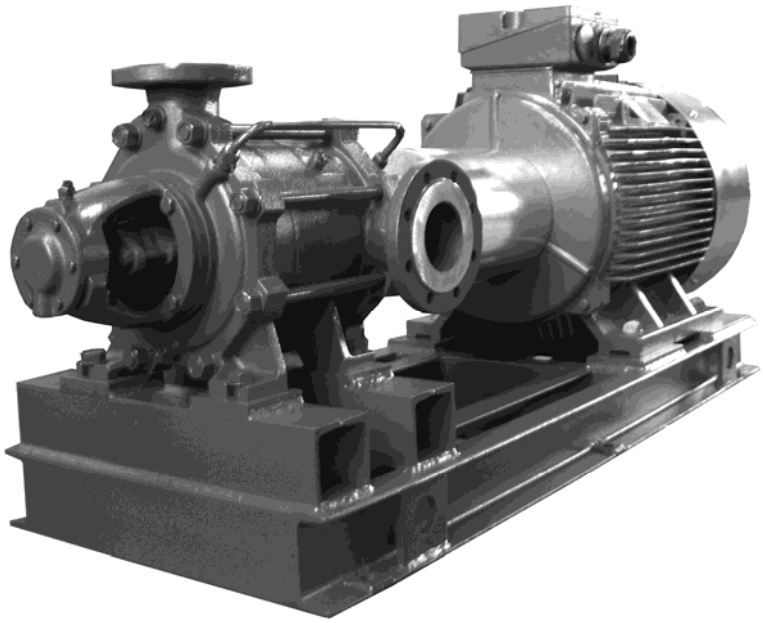
Gruppo Aturia

TK

MULTISTAGE
CENTRIFUGAL PUMPS

INSTRUCTION MANUAL



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CONTENTS

FOREWORD, WARRANTIES AND LIMITATIONS

1) FOREWORD

Purpose of this instruction manual is to ease as much as possible the installation, operation and servicing of **TK** multistage centrifugal pumps.

We strongly recommended to read it attentively and consult it whenever work is done on the pump, to guarantee the correct operation of the pump and the maximum safety for the personnel in charge of pump installation, starting and maintenance.

Remember that **TK** pumps are potentially dangerous to the person and to the things due to the presence of :

- High speed rotating parts
- High pressure and temperature
- Dangerous fluids

- Electrical connections

ATTENTION !

UNOBSERVANCE OF THE INSTRUCTIONS HERE REPORTED OR IMPROPER USE OF THE PUMP BY UNSKILLED PERSONNEL MAY RESULT IN HEAVY DAMAGE TO THINGS AND/OR INJURIES TO THE PEOPLE.

ATURIA TECHNICAL ASSISTANCE IS READILY AVAILABLE, FOR ANY PROBLEM PLEASE CONTACT US ALSO BY PHONE.

2) SHIPPING DOCUMENTS CHECK

Check the equipment at delivery against the accompanying documents, paying paticular attention to its completeness and to possible damages occured during transport.

The same should be done for any ancillary equipment.

3) WARRANTY AND LIMITATIONS

The warranty does not include possible damages or failure caused by mishandling, worn electrical connections and uncorrect assembly.

The warranty also excludes in all cases the reimbursement for consequential damages to the equipments or to the plants.

ATURIA declines any responsibility for damages to persons and things due to improper use of the machinery here described.

Consumables are not subject to warranty.

CHAPTER 1

GENERAL DESCRIPTION

1.1 Construction Features

TK pumps are centrifugal multistage pumps for high pressures.

Coupling to the drive, generally an electric motor, is ensured by a flexible joint.

Pump nameplate reports the following information :

Manufacturer - Pump type

Serial number - Capacity (m3/h)

Head (meters) - Month/ year of construction

Shaft speed (Rpm)

TK are multistage pumps with more elements in line, and they are divided into perpendicular planes to the rotation axis. Sealing between the different elements is ensured by O-rings tightened by sturdy outer tie rods.

The supporting feet on delivery side are located beneath the delivery casing.

For sizes up to 65-100, the supporting feet on suction side are located under the first stage to allow different orientations of suction nozzle, while for larger sizes they are located under the suction casing.

In this latter case, orientation of suction nozzle should be specified by the customer at pump ordering.

Hydraulical balancing of each impeller guarantees full absorption of axial thrust.

The shaft is supported by sturdy, grease-lubricated roller bearings. In standard constructions, shaft sealing is ensured by gland packing.

Upon request, it is possible to install a mechanical seal.

1.2 Fields of applications

TK pumps range are mainly employed in the following applications:

-Hydraulic power plants -Boiler feeding

-Hydraulic press plants -Condense pumping

-Fire-fighting equipments - Cold and warm water pumping

-Irrigation and reclaiming installations

The performance are described in the technical specification enclosed in the ATURIA order confirmation.

1.3 Noise levels

The following table reports the noise level produced by TK pumps running within their operating limits and installed according to the instructions given in this manual.
(Average values measured at 1 meter from the pump and elaborated according to ISO curve A - standard R 1680).

MOTOR	NOISE LEVELS Db (A)		MOTOR	NOISE LEVELS Db (A)	
SIZE	2 POLES	4 POLES	SIZE	2 POLES	4 POLES
63	65	61	180L	83	71
71	67	62	200	83	71
80	71	64	225	88	74
90	73	66	250	88	74
100	77	68	280	89	83
112	79	69	315S	89	83
132	80	69	315M	90	84
160	81	69	355	91	87
180M	81	69	400	93	89

For other motors the table values shall be compared to the actual used motors.

CHAPTER 2

TRASPORT AND STORAGE

2.1 Transport

Before transportation, please perform the following checks:

-Weight of pump/motor group

-Overall dimensions of pump/motor group

-Suitability of lifting points

The pump can be dispatched in the following ways:

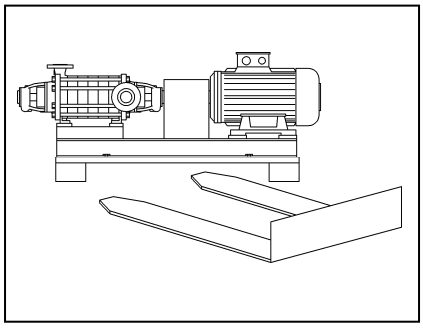
A) Single pallet

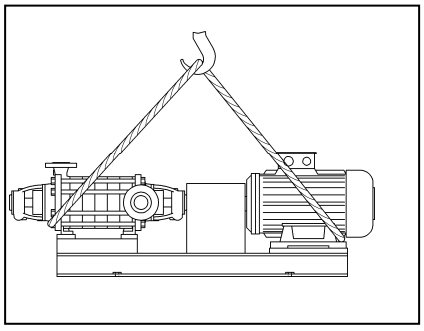
B) Wood box

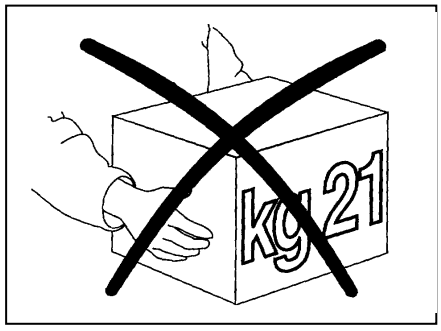
ATTENTION !

The pump should be transported with equipment fit for its weight and for the shape of its packing case (see side pictures).

Hand lifting is allowed only for weights lower than 20 kilograms.







2.2 Site installations

During site installation and maintenance a safety transport of all components must be done. The specialized personnel must use proper slings in order to avoid any damage to the pump and to the people.

The lifting eyebolts of pumping set components must be used for lifting each related component; please refer to above pictures in order to move the whole skid.

2.3 Storage

The deivered pump is generally suitable for immediate installation.

STORAGE FOR A PERIOD OF LESS THAN 3 MONTHS :

- Store the pump in a dry and sheltered area.
- Check that ambient temperature never falls below 5°C.
- It is recommended that the pump shaft is rotated at regular intervals (every 30 days); this prevents damage to the bearings and seizure of the rotating parts.

STORAGE FOR A PERIOD EXCEEDING 3 MONTHS :

- Rise the pump by means of wooden supports.
- Open the package, if any, remove the protection from the pump nozzles and clean by compressed air, then dry carefully inside the pump, if necessary.
- Protect the pump inside with anti-condensation products and close the flanges so that no foreign objects can enter the pump.
- Cover the pump with a plastic film and put inside some products the prevent water condensation.
- Check protections periodically.
- It is recommended that the pump shaft is rotated at regular intervals (every 30 days); this prevents damage to the bearings and seizure of the rotating parts.

STORAGE (AFTER OPERATION) :

- In case of long periods after operation, drain the pipings and the pump through the drain hole in the lower part of the pump casing.
- Follow above instruction according to circumstances.

The delivered pump is generally suitable for immediate installation.

CHAPTER 3

GENERAL SAFETY INSTRUCTIONS

3.1 General Instructions

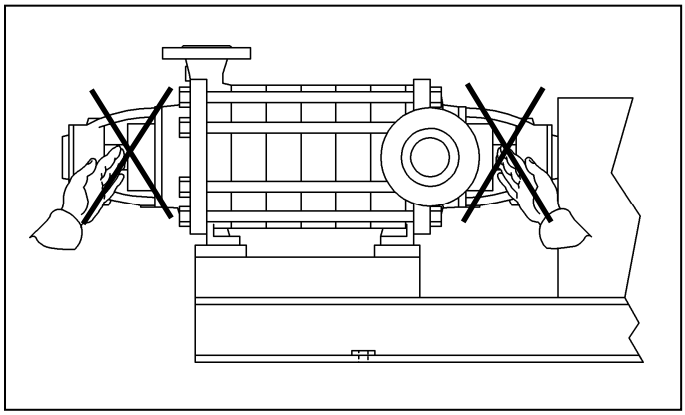
The pump(s) should be used only for the applications specified in par. 1.2. Recommended operational limits must be strictly observed. In case of applications not specified on this manual, please contact ATURIA to check for pump suitability, installation safety and pump life.

3.2 Precautions during operation

Never put your hands or any kind of object into pump openings where the shaft rotates (see side picture).

In case of gland packing, pay attention when adjusting the gland as gland nuts are very close to the shaft.

If warm water is pumped, do not touch the pump.



ATTENTION !

Protect motor and electric parts in general according to current regulations.

WE RECOMMEND BESIDES TO INSTALL THE PUMP IN A SAFE PLACE.

3.3 Residual risks

Inobservance of the safety instructions here reported or improper use of the pump may result in heavy damage to things and/or injuries to the person.

Always keep to the following directions :

- Don’t kick the pump
- Don’t damage the pump by wrong handling
- Don’t pressurize the pump beyond recommended limits
- Avoid dry running, operation at lower capacity than allowed, or running with closed gate valve at discharge
- Avoid cold fluids uneven contact with the warm surfaces of the pump
- Don’t use the pump unproperly with dangerous fluids or different from what specified in the order data sheets

3.4 In case of emergency

- Switch off line voltage
- Warn service personnel responsible of the plant

CHAPTER 4

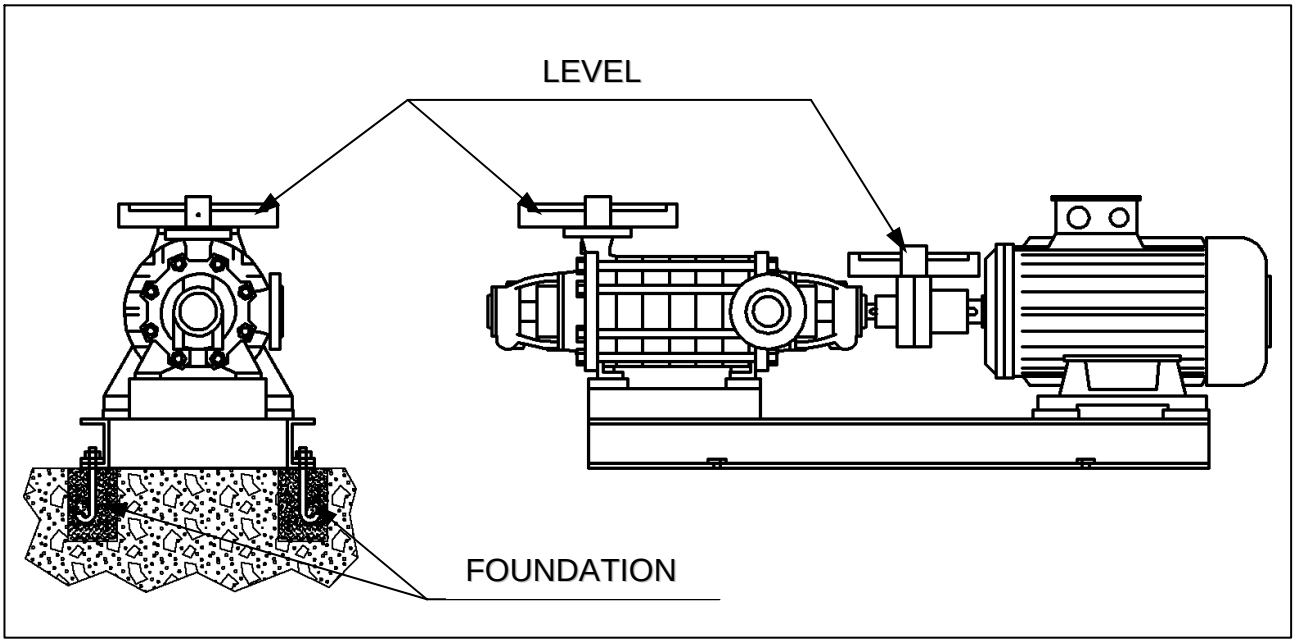
INSTALLATION

4.1 Installation

For what concerns pump handling at the installation site, please refer to section **2.1**.

The pump/motor group, coupled on a single steel-sections baseplate, must be properly fastened to its concrete slab in which the foundation bolts have been previously bedded.

The group should be installed on a levelled plane. To this purpose, check levelling when anchoring the group baseplate to the concrete slab by placing a level (bubble tube) on the pump delivery flange (see side pictures).



ATTENTION !

PIPINGS

We recommend to support adequately the pipings to avoid any kind of stress to the pump suction and delivery nozzles, with resulting difficulties to proper pump operation.

Pipe dimensions should not be determined according to the pumps nozzles diameters, but only according to friction losses. Avoid narrow bends and elbows, and conical joints wrongly placed.

The suction pipe should be absolutely airtight, without counterslopes where harmful air bubbles can collect.

We recommend the use of gate valves upstream and downstream the pump. Leave enough space for motor ventilation.

4.2 Alignment

After positioning the pump unit on the foundation and connecting the pipes, it is necessary to align it with due precision before starting.

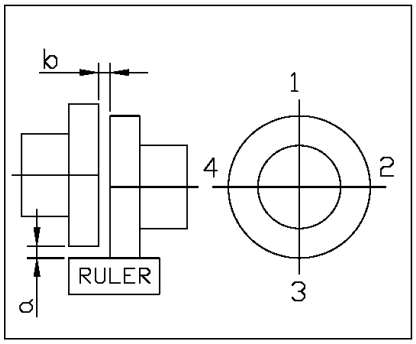
To this purpose, remove the coupling guard and measure the concentricity and the parallelism of the half coupling joints with a ruler and a thickness gauge.

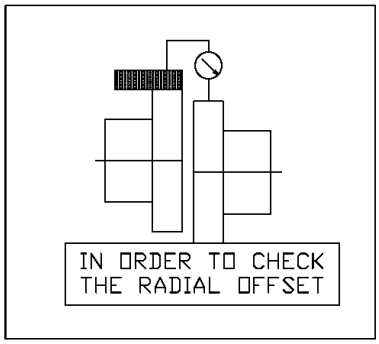
Place the ruler in positions 1-2-3-4 (see below picture) and check radial offset "a" it should not exceed 0,1 mm

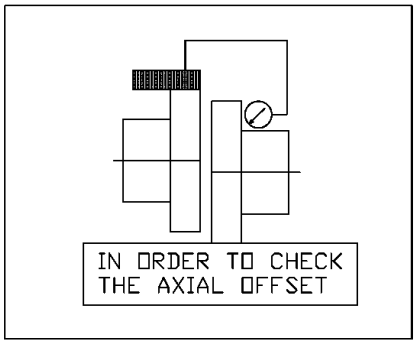
Measure then the distance " b " with a thickness gauge at positions 1-2-3-4.

The difference between readings in positions 1-3 and 2-4 should not exceed 0,1 mm.

Group alignment can be checked more accurately by using a millesimal comparator (millesimal dial indicator).







THE COUPLING GUARD MUST BE FITTED ON BASEPLATE AFTER ALIGNMENT.

4.3 Electrical connections.

Electrical connections should be made only by specialized personnel, strictly following the instructions of motor and electrical equipments manufacturers.

In case of three-phase line make sure that voltage is the same in the three phases.

Connect motor earthing correctly.

Remove the terminal board cover, connect electrical lines as shown inside the terminal board, then put back the terminal board cover.

ATTENTION !

We recommend to install a safety switch upstream the motor to protect the motor against voltage drop or overload.

Please refer to current data on motor nameplate for its correct sizing.

CHAPTER 5

COMMISSIONING AND STARTUP

5.1 Startup

Before starting the pump it is necessary to fill it with water through the suited filling hole, located on suction casing. Once the pump has been primed, close delivery gate valve and start the pump for a fraction of a second to check rotation direction. Open gradually but within a minute the delivery gate valve, as running with the valve closed may cause water overheating leading to pump seizing (startup with gate valve closed reduces the initial transient voltage peak).

Check rotation direction against the arrow on pump/motor casing; if motor rotation does not match the one shown by the arrow, reverse two motor phases (in case of three-phases motors).

Once started the group, open delivery gate valve slowly but fully till reaching the required pressure shown on pressure gauge.

Avoid dry running.

During operation, check shaft seal. If a mechanical seal is installed, there should be no leaks; with gland packing, there should be a continuous dropping to ensure lubrication between packing and shaft sleeve.

Check also that the pump runs within its operating limits and that voltage rates reported on control panel do not exceed motor nameplate rated values. If necessary, partially close gate valve or adjust the intervention of pressure switches.

However, if some malfunctioning is detected during startup, stop immediately the pump and investigate the problem starting with the Fault Finding chart (chapter 7).

ATTENTION !

Attention: The system should be fully completed before starting the pump, especially for what concerns electrical, mechanical an hydraulic components. All safety systems must be correctly operating.

STARTING THE PUMP WITHOUT COUPLING GUARD AND MOTOR TERMINAL BOARD COVER IS ABSOLUTELY PROHIBITED.

CHAPTER 6

MAINTENACE

6.1 Ordinary Maintenance

Once started the pump, check it as frequently as possible by means of plant instruments like pressure gauges, vacuum meters and ammeters. The pump needs normally no maintenance, except a periodical check to:

- Seal operation (either mechanical or packing)
- Bearing operation
- Periodical renew of lubricant grease in bearings

PACKING SEAL

The quantity of leakage of medium should be sufficient to ensure correct cooling and lubrication of the packing and shaft sleeve; generally 30-60 drops a minute is correct.

If necessary vary the quantity by adjusting the packing follower and, if fitted, check for a correct flow of the flushing connections. If this adjustment has no effect, all the packing rings should be replaced. If also the shaft sleeve is worm it should be replaced.

The number and dimensions of new packing rings must be the same of the original.

Replace the packing whenever needed.

Size and quality of the new packing must absolutely suit the service.

It is important to replace all the packing and not only those at the ends.

To replace the packing, remove the gland and then the packing with a flexible extractor, available by seals manufacturers. Do not over tighten the packing. as that will cause their immediate failure.

Check shaft sleeve: it should be smooth also under the packing. If the sleeve is scratched or shows any sign of surface roughness, it should be machined again or replaced according to the situation.

MECHANICAL SEAL

During the first running hours the mechanical seal can have small leak but after no leaks should be occur.

The mechanical seal must be checked every 4.000 hours running; in case of leakage check the seal faces and the seal shaft sleeve that must be perfectly smooth, especially on O-Ring contact zone.

If it is worn it should be replaced.

LUBRICATION

It is very important to check the bearing operation, their temperature and the level.

Check bearing housing temperature: it can raise up to 50°C above the ambient temperature, but it should never exceed 90°C.

Bearings are grease-lubricated. Every 2,000 running hours, 5-10 grams of grease (depending on the size of the pump) has to be let in through the grease nipples. Use grease lithium SKF 65-2 or similar.

Replace the bearings only if they are noisy.

Check bearing housing temperature: it should never exceed 70°C. If this happens, check group alignment or remove bearing housing cover as the cause might be an excessive amount of grease or a failed bearing.
If a danger of frost exists, drain the pump completely during idle periods by unscrewing the draining plug (see picture aside). Fill then the pump again as described in sect. 5.1.

6.2 Pump stop

Before any stop it is necessary to:

- Switch off the line voltage
- Close suction and delivery gate valves
- Drain the pump through the hole on the lower side of the pump casing.

CHAPTER 7

DISASSEMBLY

Disassembly and reassembly operation must be carried out by skilled personnel only.

Before any intervention on the pump it is necessary to:

- Switch the voltage off
- Close pump suction and delivery gate valve
- If the pump transports hot liquids let it cool at ambient temperature
- Discharge pump bowl from pumped liquid through a discharge hole.

7.1 Disassembly of the pump from the plant:

- Remove the joint protection and, if necessary, free the motor from its screws, remove it from the baseplate using a tackle.
- Remove the bolts from suction and delivery flange.
- Disconnect all auxiliary supplies and possible sockets for instruments check.
- Disassembly the pump by loosing the baseplate fixing screws; use a tackle to move and lift (see chapter 2) and send the pump to a local authorized workshop or to the manufacturer.

7.2 Pump disassembly (ref. dwg. EKY0101, EKY0201):

Start disassembly from delivery side removing the cover (3266) from the bearing housing (3200), after removing the relative fixing screws.
Unscrew the bearing nut (6586) and, after loosening the bearing housing (3200) remove it complete with radial ball bearing (3011), strike it on the sides using a lead hammer.
Remove the shaft (2110) , the spacer sleeve (2461.2) and the shaft sleeve (2450.2).
Free the tie bolt (6571), the discharge casing (1140) and remove it from the shaft.
Remove as follows: impeller (2200), stage casing (1150), diffuser (1450), spacer sleeve (2461.1), and go on like this until the last impeller.
After loosening the bearing housing (3200) take it off complete with shaft (2110) and remove it from the suction casing (1130).
Remove the spacer sleeve (2461.1) and the shaft sleeve (2450.1).
Remove the radial roller bearing (3012).

It is advisable, at any disassembly, to substitute all gaskets in the pump, bowl O-rings (4610) and sleeves O-ring (4610.19, gaskets (4590.4) and gland packing (4130).

Check conditions of impellers (2200), wear rings (1500), impeller rings (if any 2300), spacer sleeves (2461) and bearings (3011-3012), which must be without linings or, on the contrary, must be replaced.
Diametric clearance between bowl wear ring and impeller collar, or between bowl wear ring and impeller wear ring (if any) must be as indicated in the following table:

CLEARANCE REFERENCE DIAMETER	**MINIMUM DIAMETER CLEARANCE**
< 50 mm	0.25mm
from 50 < 65	0.28mm
from 65 < 80	0.30mm
from 80 < 90	0.33mm
from 90 < 100	0.35mm
from 100 < 115	0.38mm
from 115 < 125	0.40mm
from 125 < 150	0.43mm
from 150 < 175	0.45mm
from 175 < 200	0.48mm
from 200 < 225	0.50mm
from 225 < 250	0.53mm
from 250 < 275	0.55mm

During operation this clearance is bound to rise, with consequent performance and efficiency drop and relative bearings overheating.
It is advisable to provide a set of spare parts to restore optimal performances.

CHAPTER 8

For reassembly proceed in the opposite direction disassembly.

8.1 PUMP REASSEMBLY

Lock the radial roller bearing (3012) on the shaft (2110) using the circlip (6545), the retaining ring, split (2531) and the relative sleeve (2483), insert the bearing in the bearing housing (3200) and close the bearing cover (3261).
Slide on the shaft the gland (4120), the spacer sleeve (2461) and the shaft sleeve (2450); insert everything through the suction casing (1130) and start assembly as follows: bush (4132.2), impeller 82200), diffuser (1413), key (6710.2), spacer sleeve (2461) and stage casing (1150) with the proper O-ring (4610).
Go on in this way up to the discharge casing (1140) and remember to insert the bush (4132.1).
Insert the shaft sleeve (2450.2), the spacer sleeve (2461.2) and let the gland (4120) slide on the axis.
Close the pump with the proper tie-bolt (6571), reassembly the bearing housing (3200), where the bearing (3011) has been inserted.
Lock everything with the proper bearing nut (6586) and close the cover (3266).

- Before starting check the pump free rotation
- Reconnect gland packing flow pipings and close all drainage gate valves
- Proceed with filling and pump start
- It is always necessary to review group alignment (see Chapter 4.2).

CHAPTER 9

SPARE PARTS

For a faster processing of Your order, when ordering spare parts please specify:

- Pump type

-.Pump serial number

-.Part name and number as listed on sectional drawing.

Pump type and serial number are printed on the nameplate.

For recommended spare parts see part list (EKY0102 – EKY0103 – EKY0202 – EKY0203).

CHAPTER 10

FAULT FINDING CHART

PROBLEM	PROBABLE CAUSE	REMEDY
1 . THE PUMP GIVES NO WATER	1.1 Pump and suction pipe not well primed, with air trapped in the system	Prime again pump and suction pipe
	1.2 Air enters the system through suction pipe open taps or through foot valve not enough submersed	Correct installation
	1.3 Foot valve clogged by mud, leaves or other debris	Clean foot valve
	1.4 Defected foot valve allows water to pass through with loss of suction power	Repair or change foot valve
	1.5 Too high suction head	Correct installation
	1.6 Wrong rotation direction	See par 5.1.
	1.7 The total head required by the system is higher than rated pump head	The pump is not suited to the duty required
2. UNSUFFICIENT DELIVERY	2.1 Foreign bodies at impeller channels or the same causes as points 1.1, 1.3, 1.5, 1.6, 1.7.	Clean impeller channels. See mentioned points and suggested remedies
	2.2 Undersized suction pipe or foot valve, or wrong positioning of suction pipe	Correct installation
	2.3 Worn impeller and/or pump casing	Replace impeller Repair pump casing **(see section 8)**
3. UNSUFFICIENT PRESSURE	3.1 Liquid viscosity higher than specified or the same causes as points 1.6, 1.7, 2.3.	Pump not suited for operation with higher viscosity and/or see mentioned points and suggest remedies
4. EXCESSIVE BREAK POWER	4.1 Pump performances are different than rated	Close partially the delivery gate valve
	4.2 Liquid SG higher than specified	Pump not suited to the service/close partially the delivery gate valve
	4.3 Abnormal internal rubbing (rotating parts rub against fixed parts)	Repair the pump - see section 8

PROBLEM	PROBABLE CAUSE	REMEDY
5. THE SEAL LEAKS EXCESSIVELY	5.1 Worn seal	Replace (See section 8)
	5.2 Worn sleeve at seal position	Repair the pump - see section 8.
6. THE PUMP VIBRATES AND IT IS NOISY	6.1 Unbalanced rotating assembly	Repair the pump - see chapter 8
	6.2 Worn pump bearings	See chapter 8
	6.3 The pump runs with too low or too high capacity; also, the same causes as points: 1.5, 2.1,2.2 .	Operate the pump differently; remove the causes of the malfunctioning

ADMISSIBLE EXTERNAL FORCES AND TORQUES ON PUMP FLANGE

TYPE	FLANGE	Forces – (daN)				Moments –(daN.m)			
		Fx	Fy	Fz	ΣF	Mx	My	Mz	ΣM
TK25-40	SUCTION	35	40	30	60	34	23	27	49
	DELIVERY	25	20	28	40	25	15	19	30
TK32-50	SUCTION	45	50	40	80	37	27	30	54
	DELIVERY	28	25	30	50	27	18	21	38
TK40-65	SUCTION	55	60	50	95	40	29	33	58
	DELIVERY	35	30	40	60	34	23	27	49
TK50-80	SUCTION	70	75	60	120	44	32	36	65
	DELIVERY	45	40	50	80	37	27	30	54
TK65-100	SUCTION	90	100	80	160	50	36	41	74
	DELIVERY	55	50	60	95	40	29	33	58
TK80-125	SUCTION	110	125	100	200	60	44	50	88
	DELIVERY	70	60	75	120	44	32	36	65
TK100-150	SUCTION	135	150	120	240	75	53	62	110
	DELIVERY	90	80	100	160	50	36	41	74
TK125-150	SUCTION	135	150	120	240	75	53	62	110
	DELIVERY	110	100	125	200	60	44	50	88
TK150-200	SUCTION	150	175	140	280	80	62	70	130
	DELIVERY	135	120	150	240	75	53	62	110
TK200-250	SUCTION	170	200	160	320	90	70	80	150
	DELIVERY	155	140	175	280	85	60	70	135
TK250-300	SUCTION	190	225	180	360	100	80	90	170
	DELIVERY	175	160	200	320	100	80	90	170

CHAPTER 11

DECOMMISSIONING

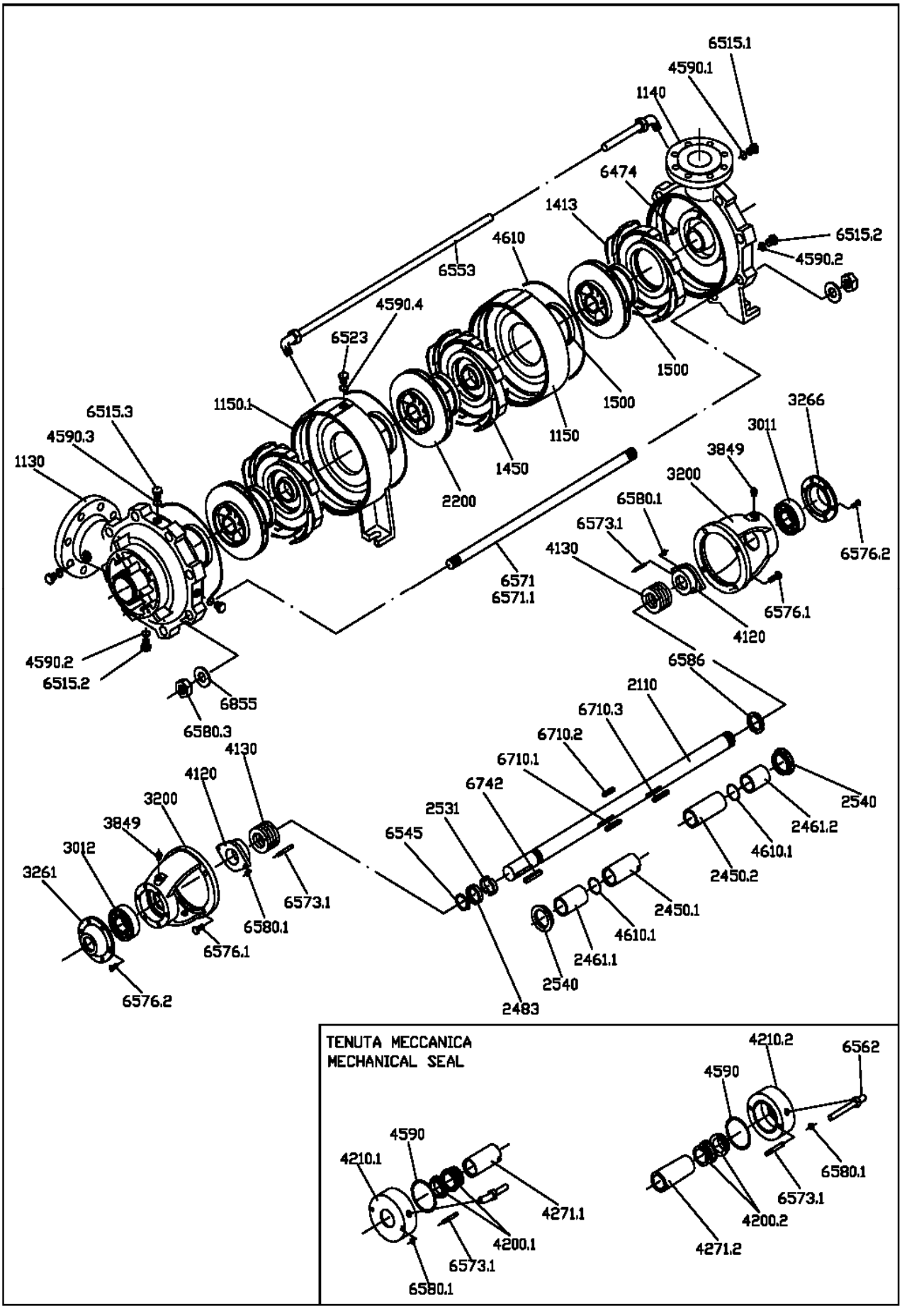
10.1: Decommissioning and Dismantlement

When the pump will be permanently stopped and dismantled, the various materials composing it should be properly disposed of. It is important to make sure that no residual polluting liquids are trapped within the pump.

The materials used in pump construction are:

- Steel and cast iron
- Aluminium
- Rubber and plastic
- Copper and brass

The disposal of polluting liquids and materials should follow current environment regulations.
Environments protection is an increasingly pressing problem.


6515.1
4590.1
1140
6474
1413
6515.2
4590.2
4610
6553
4590.4
6523
1500
1500
1150
1450
2200
1150.1
6515.3
4590.3
1130
3266
3011
3849
3200
6580.1
6573.1
4130
6576.2
6571
6571.1
6576.1
4120
4590.2
6515.2
6855
6580.3
6586
2110
6710.3
6710.2
6710.1
6742
2531
6545
4130
4120
3200
3849
3012
3261
6573.1
6580.1
6576.1
6576.2
2540
2461.2
4610.1
2450.2
2450.1
4610.1
2461.1
2540
2483
TENUTA MECCANICA
MECHANICAL SEAL
4590
4210.1
4271.1
4200.1
6573.1
6580.1
4210.2
6562
4590
6580.1
6573.1
4200.2
4271.2

	POMPE CENTRIFUGHE MULTICELLULARI TK *MULTISTAGE CENTRIFUGAL PUMPS*	EKY0102 DATA . DIS. .

POS.	QUANTITA' QUANTITY	DENOMINAZIONE	DENOMINATION
1130	1	Camera aspirante	*Suction casing*
1140	1	Camera premente	*Discharge casing*
1150	N°−2	Corpo di stadio	*Stage casing*
1150.1	1	Corpo di stadio con piede	*Stage casing with foot*
1413	1	Diffusore ultimo stadio	*Diffuser,last stage*
1450	N°−1	Diffusore	*Diffuser*
1500	* N°x2	Anello di usura	*Wear ring*
2110	1	Albero	*Shaft*
2200	N°	Girante	*Impeller*
2450.1	1	Camicia protezione albero	*Shaft sleeve*
2450.2	1	Camicia protezione albero	*Shaft sleeve*
2461.1	1	Bussola distanziatrice	*Spacer sleeve*
2461.2	1	Bussola distanziatrice	*Spacer sleeve*
2483	1	Bussola di bloccaggio	*Locating sleeve*
2531	1	Anello di arresto in due meta'	*Retaining ring,split*
2540	2	Deflettore	*Trower*
3011	1	Cuscinetto radiale a sfere	*Radial ball bearing*
3012	1	Cuscinetto radiale a rulli	*Radial roller bearing*
3200	2	Corpo del supporto	*Bearing housing*
3261	1	Coperchio del supp. lato comando	*Bearing cover,drive size*
3266	1	Coperchio del supp. lato terminale	*Bearing end cover*
3849	2	Ingrassatore	*Greaser*
4120	2	Collare del premitreccia	*Gland*
4130	mt.2	Guarnizione a treccia	*Gland packing*
4200.1	1	Tenuta meccanica	*Mechanical seal*
4200.2	1	Tenuta meccanica	*Mechanical seal*
4210.1	1	Scatola tenuta meccanica	*Housing for mechanical seal*
4210.2	1	Scatola tenuta meccanica	*Housing for mechanical seal*
4271.1	1	Camicia d'albero tenuta meccanica	*Shaft sleeve for mechanical seal*
4271.2	1	Camicia d'albero tenuta meccanica	*Shaft sleeve for mechanical seal*
4590	2	Guarnizione piana	*Gasket*
4590.1	1	Guarnizione piana	*Gasket*
4590.2	2	Guarnizione piana	*Gasket*
4590.3	1	Guarnizione piana	*Gasket*
4590.4	1	Guarnizione piana	*Gasket*
4610	N°	O−Ring	*O−Ring*
4610.1	2	O−Ring	*O−Ring*
6474	1	Spina	*Pin*
6515.1	1	Tappo	*Plug*
6515.2	2	Tappo	*Plug*
6515.3	1	Tappo	*Plug*

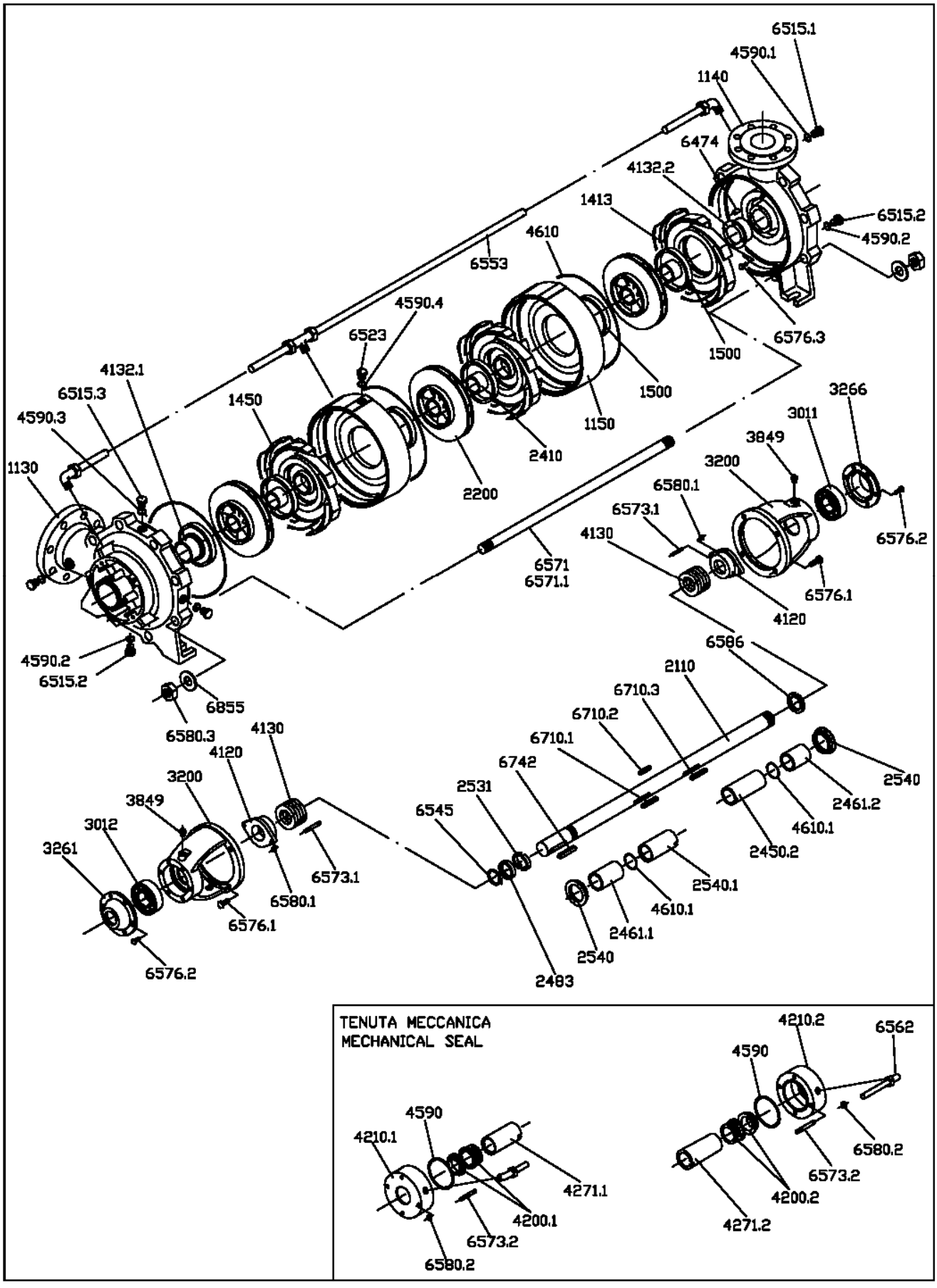
	POMPE CENTRIFUGHE MULTICELLULARI *MULTISTAGE CENTRIFUGAL PUMPS* TK	EKY0103	
		DATA .	DIS. .

POS.	QUANTITA' QUANTITY	DENOMINAZIONE	DENOMINATION
6515.4	1	Tappo	*Plug*
6523	1	Valvola di sfiato	*Vent valve*
6545	1	Anello di fermo	*Circlip*
6553	1	Tubazione scarico pressione	*Pressure discharge conduit*
6562	1	Tubazione lavaggio tenute	*Seal washing conduit*
6571	6	Tirante	*Tie bolt*
6571.1	2	Tirante prigioniero	*Tie bolt stud*
6573.1	4	Prigioniero	*Stud*
6576.1	8	Vite	*Screw*
6576.2	** 8	Vite	*Screw*
6580.1	4	Dado	*Nut*
6580.3	14	Dado	*Nut*
6586	1	Ghiera del cuscinetto	*Bearing nut*
6855	14	Rosetta	*Washer*
6710.1	1	Linguetta	*key*
6710.2	N°–2	Linguetta	*key*
6710.3	1	Linguetta	*key*
6742	1	Linguetta del giunto	*key for coupling*

* OPZIONE A RICHIESTA / OPTION IF REQUIRED

** N°12 x TK65–100

☐ RICAMBI CONSIGLIATI / RECOMMENDED SPARE PARTS


6515.1
4590.1
1140
6474
4132.2
1413
6515.2
4590.2
4610
6553
4590.4
6523
6576.3
1500
1500
1150
2410
2200
4132.1
6515.3
4590.3
1450
1130
3266
3011
3849
3200
6580.1
6573.1
4130
6576.2
6571
6571.1
6576.1
4120
6586
2110
6710.3
6710.2
6710.1
6742
2531
6545
2540
2461.2
4610.1
2450.2
2540.1
4610.1
2461.1
2540
2483
4590.2
6515.2
6855
6580.3
4130
4120
3200
3849
3012
3261
6573.1
6580.1
6576.1
6576.2
TENUTA MECCANICA
MECHANICAL SEAL
4590
4210.1
4271.1
4200.1
6573.2
6580.2
4210.2
6562
4590
6580.2
6573.2
4200.2
4271.2

	POMPE CENTRIFUGHE MULTICELLULARI TK *MULTISTAGE CENTRIFUGAL PUMPS*	EKY0202
		DATA . / DIS. .

POS.	QUANTITA' QUANTITY	DENOMINAZIONE	DENOMINATION
1130	1	Camera aspirante	*Suction casing*
1140	1	Camera premente	*Discharge casing*
1150	N°–1	Corpo di stadio	*Stage casing*
1413	1	Diffusore ultimo stadio	*Diffuser,last stage*
1450	N°–1	Diffusore	*Diffuser*
1500	* N°–2	Anello di usura	*Wear ring*
2110	1	Albero	*Shaft*
2200	N°	Girante	*Impeller*
2410	N°–1	Bussola interstadi	*Interstage sleeve*
2450.1	1	Camicia protezione albero	*Shaft sleeve*
2450.2	1	Camicia protezione albero	*Shaft sleeve*
2461.1	1	Bussola distanziatrice	*Spacer sleeve*
2461.2	1	Bussola distanziatrice	*Spacer sleeve*
2483	1	Bussola di bloccaggio	*Locating sleeve*
2531	1	Anello di arresto in due meta'	*Retaining ring,split*
2540	2	Deflettore	*Trower*
3011	1	Cuscinetto radiale a sfere	*Radial ball bearing*
3012	1	Cuscinetto radiale a rulli	*Radial roller bearing*
3200	2	Corpo del supporto	*Bearing housing*
3261	1	Coperchio del supp. lato comando	*Bearing cover,drive size*
3266	1	Coperchio del supp. lato terminale	*Bearing end cover*
3849	2	Ingrassatore	*Greaser*
4120	2	Collare del premitreccia	*Gland*
4130	mt.2	Guarnizione a treccia	*Gland packing*
4132.1	* 1	Boccola di fondo	*Neck bush*
4132.2	1	Boccola di fondo	*Neck bush*
4200.1	1	Tenuta meccanica	*Mechanical seal*
4200.2	1	Tenuta meccanica	*Mechanical seal*
4210.1	1	Scatola tenuta meccanica	*Housing for mechanical seal*
4210.2	1	Scatola tenuta meccanica	*Housing for mechanical seal*
4271.1	1	Camicia d'albero tenuta meccanica	*Shaft sleeve for mechanical seal*
4271.2	1	Camicia d'albero tenuta meccanica	*Shaft sleeve for mechanical seal*
4590	2	Guarnizione piana	*Gasket*
4590.1	1	Guarnizione piana	*Gasket*
4590.2	2	Guarnizione piana	*Gasket*
4590.3	1	Guarnizione piana	*Gasket*
4590.4	1	Guarnizione piana	*Gasket*
4610	N°	O–Ring	*O–Ring*
4610.1	2	O–Ring	*O–Ring*
6474	1	Spina	*Pin*
6515.1	1	Tappo	*Plug*

	POMPE CENTRIFUGHE MULTICELLULARI *MULTISTAGE CENTRIFUGAL PUMPS* TK	EKY0203 DATA . DIS. .

POS.	QUANTITA' QUANTITY	DENOMINAZIONE	DENOMINATION
6515.2	2	Tappo	*Plug*
6515.3	2	Tappo	*Plug*
6523	1	Valvola di sfiato	*Vent valve*
6545	1	Anello di fermo	*Circlip*
6553	1	Tubazione scarico pressione	*Pressure discharge conduit*
6562	1	Tubazione lavaggio tenute	*Seal washing conduit*
6571	6	Tirante	*Tie bolt*
6571.1	2	Tirante prigioniero	*Tie bolt stud*
6573.1	4	Prigioniero per tenuta baderna	*Stud*
6573.2	8	Prigioniero per tenuta meccanica	*Stud*
6576.1	4	Vite	*Screw*
6576.2	12	Vite	*Screw*
6576.3	4	Vite	*Screw*
6580.1	4	Dado	*Nut*
6580.2	8	Dado	*Nut*
6580.3	14	Dado	*Nut*
6586	1	Ghiera del cuscinetto	*Bearing nut*
6855	14	Rosetta	*Washer*
6710.1	1	Linguetta	*key*
6710.2	N°-2	Linguetta	*key*
6710.3	1	Linguetta	*key*
6742	1	Linguetta del giunto	*key for coupling*

* OPZIONE A RICHIESTA PER POMPE TK80-125 E 100-150 STANDARD PER LE ALTRE

* OPTION IF REQUIRED FOR PUMPS TK80-125 E 100-150 STANDARD FOR OTHER SIZE

☐ RICAMBI CONSIGLIATI / RECOMMENDED SPARE PARTS

DICHIARAZIONE DI CONFORMITA'

(secondo allegato II A - Direttiva Macchine 2006/42/CE)

DECLARATION OF CONFORMITY

(according to enclosure II A - Machinery Directive 2006/42/EC)

Sezione 1 — **DESCRIZIONE MACCHINA**
Section 1 — *Machinery Description*

Costruttore — **GRUPPO ATURIA S.p.A.**
Manufacturer

Tipo — **TK**
Type

Descrizione — **Elettropompa centrifuga multicellulare**
Description — *Multistage centrifugal electric pump*

Sezione 2 — **NORME / DIRETTIVE APPLICABILI**
Section 2 — *Applicable Directives / Standards*

Direttiva Macchine *Machinery Directive*	2006/42/CE *2006/42/EC*
Norma Armonizzata *Harmonised Standard*	UNI EN 809 *UNI EN 809*

Sezione 3 — **DICHIARAZIONE**
Section 3 — *Declaration*

Noi, Gruppo Aturia S.p.a. /Piazza Aturia,9 /Gessate/ Mi/, dichiariamo che é garantita la conformità ai requisiti essenziali di sicurezza e di tutela della salute della Direttiva Macchine 2006/42/CE.

We, Gruppo Aturia S.p.a. /Piazza Aturia,9/Gessate/ Mi/, declare that is in conformity with all the essential health and safety requirements of the Machinery Directive 2006/42/CE.

RESPONSABILE
Authorized/Responsible Officer

Firma
Signed

Marino Ing. Pugliese

data/*date*: 10/2016

Qualifica
Title
Direttore Generale
General Manager

Persona Giuridica Responsabile del Fascicolo Tecnico
Legal Person Responsible of Technical File

Gruppo Aturia S.p,A.
P.zza Aturia, 9 – 20060 Gessate (MI) - Italy
