

## ***USE AND MAINTENANCE INSTRUCTIONS FOR EXCELSIOR HAND WINGS PUMPS***



In continuous production since 1919, the EXCELSIOR pump is one of the world's original type of semi-rotary hand wing pump.

The pumps are operated by the movement of the handle. This handle causes the shaft and the wings, which is fitted with flap valves, to semi-rotate within the pump. Also enclosed in the body of the pump is the suction divider, fitted with flaps. Two lugs facilitate the mounting of the pump to a wall or similar structure.

### **1 – LETTER TO THE CUSTOMER**

This document contains important indications about security, use and maintenance of the EXCELSIOR hand pump, this manual must be read carefully before operating with EXCELSIOR pump. It must be at disposal for any operator that will use the EXCELSIOR pump in future. Please preserve this manual with care.

The EXCELSIOR pump is made high quality with raw-materials and high profile workmanship using the most modern and up-dated technologies in conformity with the CEE 98/37 standards. Therefore the EXCELSIOR pump cannot be considered dangerous for the operator when used this manual of use and safety.

The manufacturer declines all responsibility for improper use of EXCELSIOR pump. It's strictly forbidden to modify or unduly open the product. Producer cannot be responsible of any damage caused to objects, animals and persons due to above improper modification.

In case of system fault or technical problems, please call immediately the manufacturer BINDA srl, indicating the following details:

- Your name and address.
- The address and the location of the pump.
- The code and the size of the pump.
- The problem description
- The type of application
- The fluid that must be pumped, the suction head, the temperature etc.

### **2 – DELIVERY OF EXCELSIOR PUMP**

#### ***TRANSPORT***

All the material shipped, including the detached parts, has been carefully checked before being consigned to the forwarding agent.

All the packages leave BINDA S.R.L. in good condition. All goods are shipped in special packaging which assures protection to the product; packaging is specially designed considering weight and type of pump it needs to contain. In case of weights over 30 Kg, the box will be sent on pallet.

### ***UNPACKING***

On receipt of the goods, operator has to verify the integrity of the packaging before unpacking and is also due to verify integrity of the goods.

Remove EXCELSIOR pump from the box using the correct equipment to support the weight and then throw away the packaging. For safety, packaging parts such as plastic bags, expanded polystyrene, screws, wood, etc. must be kept away from children's as they might cause injuries.

Take these materials to the appropriate collection points if pollutant or no biodegradable or otherwise recycled. Materials must be disposed or in accordance with the laws in force.

Take maximum care to avoid damages.

Please Verify carefully that goods received are corresponding to the ones listed on the packing list.

Check EXCELSIOR pump right away in order to verify that no damages have occurred during transport. In case of damage or if in doubt, strictly do NOT use the pump and contact BINDA S.R.L. immediately.

Please read carefully the Use and Maintenance Manual (M.U.M.)

### **3 – SAFETY INSTRUCTIONS**

Pumping operations should be started only after reading carefully this booklet.

The operator must use safety equipment according to regulations and have as top priority safety of himself and other people around him.

The appliance must only be used by personnel that has been trained for use.

The use of EXCELSIOR pump is exclusive for authorized personnel, the use is prohibited to anyone without technical knowledge.

Place warning signs indicating prohibitions and dangers around the working area.

Use EXCELSIOR pump according to the safety regulations in force.

Ensure that EXCELSIOR pump and its parts are not on reach for children's and not authorized personnel.

EXCELSIOR pump materials were selected by the producer between the best quality ones available on the market using the historical experience of years of activity. All materials have been processed, assembled and tested in accordance with very strict regulations that ensure maximum safety. Therefore, if the machine is used in the manner and under the conditions prescribed is not dangerous.

Only an improper application or use can cause problems.

The operator must be equipped with proper clothing and safety equipment (face masks, gloves, shoes, aprons, etc.). Any practice not complying to the safety instructions may end up in serious injuries not attributable to the manufacturer.

If using aggressive fluids, toxic or harmful to health, install appropriate protections to contain and collect the product in order to prevent the danger of pollution, contamination, injury. Do not use in areas at risk of explosion. Place warning signs for chemical fluids in proximity of the working area. Ensure that the area has adequate aspiration systems.

Never leave EXCELSIOR pump unattended. If left unattended, unauthorized personnel could get in contact with dangerous fluids.

The work area should be clean and well lit.

Before returning the pump to the manufacturer for review, make sure to empty and wash the pump to prevent loss of fluid during transport.

Traces of grease on the lever or on the operator's hands must be removed before any use.

The operator should not wear large clothes, bracelets, necklaces and must tie up long hair.

Make sure there is someone else than just the operator when EXCELSIOR pump is working in order to help in the event of an accident. If you are pumping hot fluids, avoid contact with the parts that are hot to avoid skin burning.

Some pump models have aluminium and zinc plated parts, these models are not suitable for pumping chlorinated solvents and halogenated (for example: Trichloroethane and Methylene Chloride) as they can create high risk of explosion.

The standard pumps are not suitable for edible liquids (water, wine, milk, oil, juice, etc.), otherwise they are indicated with the abbreviation AT (non-toxic). In case of repair or maintenance of these machines, during reassembly will be indispensable to use specific lubricants as ecological oils etc...

#### **4 – GUARANTEE**

Pumps are guaranteed for the quality of materials and for overall design.  
The warranty runs for 24 (twenty four) months from the despatch date.

Any defects, faults or malfunctions should be reported to BINDA S.R.L. within 8 days of purchase. The repair or replacement under warranty will be made only inside BINDA S.R.L. and EXCELSIOR pump must be returned there.

BINDA S.R.L. does not make any kind of work outside it's firm.  
In case of repair or replacement, the warranty will not be extended.

In the event not functioning of EXCELSIOR pump caused by defects not related to the BINDA S.R.L. product, but due to user's mistakes, the manufacturer reserves the right to charge to customer the cost of parts and repairing work.

#### **5 – INSTALLATION OF EXCELSIOR PUMP**

Please call the manufacturer if you have any questions.

Check the material and its seals, check the compatibility with the operating liquid and then proceed with the installation.

Make also sure you have accessories (if they come with the pump), assembly tools, appropriate seals and security protections.

Make sure the pump is installed in a position where it's accessible for working and maintenance.

If the pump is made of conductive material please pay attention to static electricity to prevent the risk of explosion or fire in case of use of flammable materials.

Never modify any part of the machine during installation. Install EXCELSIOR pump in the upright position following the direction harrows on it and pay attention to the direction of flow. Please verify the positioning also reading the wards written on it that do not have to be upside down.

For connections using only thread type made of compatible material with the fluid and with the material (for example: with a stainless steel pump the joint must be of stainless steel).

During assembly sealing fillets with appropriate sealing systems. Weak screwdriving may lead to leak of liquid during working operations, while strong ones may damage the female thread with cracks or breaks. In case of use of flexible hoses fitted without thread, lock it with appropriate clamps.

The delivery hose and suction tube, connected to the IN and OUT inlets of EXCELSIOR pump should never be of smaller diameter than the attack of the pump and should not be made of material compatible with the operating liquid.

Strainer, foot valves, curved hose connection and other components has to be properly installed to prevent pressure drop.

For viscous fluids use pipe with a larger diameter.

In case of usage of threads, it will be necessary to interpose products that prevent any leakage: PTFE (Teflon) tape or in liquid or fillets paste.

In the case of mounting EXCELSIOR pump on barrels, suction tube is inserted in a hole with a diameter bigger than 2", at the same time unscrew the smaller cap present on the barrel to avoid problems due to the pressure caused by the aspiration of the pump.

In case of use of EXCELSIOR pump on a barrels, the suction tube (which is lowered into the barrel) must have the ends obliquely cut to prevent sticking on the bottom caused by the vacuum exerted by the pump in operation.

Before starting to pump, tighten and check all the joints between EXCELSIOR pump, the suction tube and delivery hose.

Never direct the delivery hose to itself or to any other parts of the pump or the pumping unit.

Make sure that there are not electrical equipment around operating area.

Do not place either fittings or hoses under strong physical shocks. Damaged components have to be replaced because represent danger.

Prevent hoses from being pinched, bent or trampled. If the pump operates with dangerous liquids constantly check that the hoses are not worn or in poor condition, then empty the pump and replace it. If the machine has been purchased to treat explosive substances, make sure that EXCELSIOR pump, the suction tube, the connections and all other particular are anti-spark to prevent to trigger a spark.

When water is used and the pump is placed outside pay attention to winter temperatures as it can fall below zero. Avoid leaving fluid into the pump as water, when iced, increases it's volume and could break the body of the pump. For this kind of use it is highly recommended to empty the pump at the end of each operation.

If the pump body is made of iron or iron bland material, in contact with water can form an oxide film which create problems sliding on the internal parts of the pump. In this case empty each time the pump and dry it in order to avoid formation of rust.

**In conclusion, we provide a brief summary, as written above, for the installation and use for EXCELSIOR hand pumps.**

1. Make sure the pump is installed in a position where it is accessible for working and maintenance.
2. Fit suitable hose. BINDA S.R.L. recommend, when flexible hoses are required, the use of spiral reinforced hoses for suction and delivery. Non reinforced tube on the suction side could collapse or kink during operation and could be badly affecting the pump's performance.
3. To obtain a good air tight connection, with PVC hoses, between the hose and the pump, soften the hose ends in boiling water before fitting.
4. Use good quality hose clips.
5. If possible, mount the pump so that the discharge port is at least 30 cm. below the hose's discharge point. This will ensure positive valve operation.
6. Make sure that there is enough room to obtain the correct movement of the handle.
7. The flow through the pump is in the direction of the arrow on the pump cover.
8. Move the handle of a full stroke. Short quick strokes will result in loss of output.
9. Before any output is obtained will be necessary to make few initial trial strokes. The liquid has to be drawn up from the suction tube.
10. No routine maintenance is required. However the periodic use of the pump will help ensure a freely valves operation, that there are not leakages from the diaphragm and that the pump operates when required.
11. When spare parts are required, contact BINDA S.R.L. and provide a correct description of the part, the model and the quantity required.
12. When re-assembly the pump make sure that the valves seats and faces are clean and that the valves can move freely.
13. When storage is necessary for a long time empty the pump and keep it in a dry place.

## **6 - MAINTENANCE**

For your own safety adopt safety devices (glasses, gloves, aprons, shoes etc) before working with the pump. Before any maintenance or repair need to completely discharge the product.

Maintenance or replacement has to be done by qualified personnel only.

To disassembly follow the assembly steps in reverse order.

Also remove hose connection and any strainer and other accessories.

After those steps place EXCELSIOR pump on a work bench, in the case of simple maintenance, check lever's movement and introduce lubricant fluid.

In case of broken internal parts, the central and the lateral covers can be removed and new parts inserted. Please read Chapter 10 of this MUM "Technical data".

When spare parts are required consult BINDA S.R.L. and quote correct description of parts, pump model and quantity required.

If you do not follow the guidelines above there could be danger for operator's safety and for the environment. Those kind of accidents will not be attributable to the manufacturer.

It is not recommended to try to self repair or replace parts, it is best to return the pump to the manufacturer who has all the equipment for the intervention, and can execute a final test that allows you to verify the success of the operation. If kept in stock for a long time lubricate internal parts, ensure that the pumps are protected from humidity and rain with temperatures between 10° and 45° C and with a humidity under 85%.

Keep out of the reach of children.

EXCELSIOR pump should be lubricated before reassembly and the operator should check the tightness of all its parts.

## **7 – REMOVE FROM SERVICE AND USE**

Protect with appropriate safety clothing. Drain the pump from any remaining fluid.

If the machine has pumped corrosive liquids (acids or dangerous) washed with inert fluid.

Disassembly the accessories. Follow the same instructions as in chapter 6 "Maintenance".

## **8 – DISPOSAL AND SCRAPPING**

EXCELSIOR pump is made of non-dangerous materials, in any case at the end of the life cycle or demolition you must empty the pump from any residual liquid.

In the case of use of hazardous or toxic or harmful to health fluids, clean with water the pump and components to prevent injury or harm to humans and to the environment.

If the appliance is to be scrapped, treat it as a special type of waste.

Dismantle it and divide materials for typology, then dispose them in accordance with law and regulations in the user's country.

## **9 – MAIN CHARACTERISTICS AND TECHNICAL SPECIFICATIONS**

All technical data listed below are for standard EXCELSIOR pumps.

These values are subject to change without notice, due to the constant research for innovation and improvement by the manufacturer.

The following technical data, drawings, product names, text, etc.. are owned by the manufacturer BINDA S.R.L., and any copying or improper use is forbidden.

Any request may be submitted in writing to the manufacturer who will evaluate the possibility of granting such permission.

EXCELSIOR pump performance is referred to normal conditions of work: as process liquid is considered fresh water at room temperature, the reference temperature is 20° C and humidity under 70%.

The data are calculated considering a pump without any accessory and free of pumping, this means that any device mounted downstream or upstream of the pump can cause a pressure drop and perhaps a performance decrease.

Changing environmental conditions or quality of the fluid to be pumped, varies the performance.

Pay attention to the transfer of hot acids, because the degree of aggressiveness of many acids varies in function of temperature.

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## **10 – EXCELSIOR PUMP TECHNICAL DATA**

EXCELSIOR hand pump is robust and easy to manufacture, it was designed to last without maintenance or special assistance. These pump is operated by a left and right reciprocating motion achieved by a handle of wood on an iron spike or a one piece metal handle of iron or aluminium.

Internally there is a "wing" fitted with two valves, at the lower half of the body there is a suction divider that has further two valves. Left and right motion of the handle causes the "wing" to wobble, causing alternate suction and discharge on the two sides of the pump. The resulting flow of liquid is nearly constant with a slight drop at the end of each stroke.

This type of pump can give up to 7 metres of lift if a foot valve is fitted; this device is unnecessary when the lift is less than 2 metres. Discharge pressure is up to 2.5 bar (say 37 lbs psi) depending on the size of the pump.

The following instructions of use will ensure the best performance from the pumps, prevent malfunctions, failures and reduce maintenance interventions.

EXCELSIOR pumps are:

- Easy to use
- Double acting
- Self-priming
- Reciprocating action (from left to right to left)
- Priming-pressing
- Semi-rotary wing pumps

Hand pumps are operated by human power and therefore the flow-rate is proportional to the revolutions per minute (RPM) given by the operator and to the diameter size.

The flow-rate is also influenced by

- Fluid viscosity
- Fluid temperature
- NPSH value
- Pipe diameter
- Distributed and concentrated pressure drops

EXCELSIOR hand pumps are different in size, row materials and type of sealing.

This means that pumps of the same size may have different type of sealing or made of different materials; in particular, EXCELSIOR pump bodies can be made entirely of cast iron (G25 and shaft and bolts are made of ferritic steel) or bronze (BzN7 shaft and bolts are made of bronze).

Pump connectors are female type, and are available 3/8" or 2" size. Each versions has counter flange connections (except E00 1/2") and can be fitted with VITON seals or NBR seals.

Usually every EXCELSIOR pump has a code number related to the diameter size, as follows:

<b>MODEL</b>	<b>DIAMETER (inch)</b>	<b>FLOW RATE (lt/min)</b>	<b>TYPE</b>	<b>WEIGHT (kg)</b>
<b>E 000</b>	3/8"	8	B	1,7
<b>E 00</b>	3/8"	14	GB - B	2,2
<b>E 0</b>	1/2"	16	GB - B	3,3
<b>E 1</b>	3/4"	20	GB - B	4,8
<b>E 2</b>	1"	30	GB - B	6
<b>E 3</b>	1 1/4"	40	GB - B	9
<b>E 4</b>	1 1/4"	55	GB - B	12,5
<b>E 5</b>	1 1/2"	80	GB - B	15
<b>E 7</b>	2"	105	GB	17
<b>E 0</b>	1/2"	14	GB - B	3,3
<b>E 1</b>	3/4"	16	GB - B	4,8
<b>E 2</b>	1"	20	GB - B	6
<b>E 3</b>	1 1/4"	30	GB - B	9

To identify a EXCELSIOR pump model you should know

- Connections material
- Melting material
- Seals material

For example: E2/B-be means

- E = EXCELSIOR pump
- 2 = 1" counter flange diameter
- B = bronze body, stainless steel shaft and screw
- Be = VITON seals for fuel and solvents

EXCELSIOR pumps can be supplied without accessories, or as a part of a pumping unit.

Pumping unit does not provide foot valve, but it's recommended their use to keep the circuit filled after pumping operations.

If you are using a standard EXCELSIOR version (GB), do not use with aggressive chemicals such as solvents, gasoline etc.. The standard type works best with non-aggressive fluids: water, oil and diesel. Always pay attention to safety standards.

In case of use of an EXCELSIOR pump with VITON seals (BE type) operator has to pay attention and care as the machine is risky and dangerous.

The standards refer to Chapter 3 of this MUM "Safety instructions".

All models have, on the back side of the body, two clamps useful for wall mounting.

BINDA S.R.L. does not provide screws for these fittings.

When EXCELSIOR pumps are part of a pumping unit for pumping oil from barrels, these clamps are not needed.

EXCELSIOR pump is individually packed and each box contains:

1. Hand pump
2. Hand lever
3. Counterflange (except the E00)
4. Counterflange seals
5. Screws for hand lever
6. Screws and bolts for counterflange
7. M.U.M. (Use and Maintenance Manual)

BINDA S.R.L. does not supply standard spare parts kit.

EXCELSIOR pumping unit is individually packed and each box contains:

1. Above 1,2,3,4,5,6,7 step.
2. Rigid suction tube
3. Bung adaptor (2")
4. Foot valve (optional)
5. Curved brass hose connection
6. Flexible delivery hose
7. Hose clamps
8. Anti drip spout
9. Manual nozzle (optional)
10. Flow-meter (optional)

When receiving goods customer must check that the package contains the above listed parts.

Then proceed according to Section 5 of this MUM: remove the pump from the packaging, assemble the lever and fix it with the screw and washer provided, assemble counter-flanges and flanges with sealing rings.

In case of mounting on barrel make sure that the hydraulic seal of all the assembled parts are guaranteed: counter-flanges, suction tube, hose connection, manual nozzle, flow-meters etc..

In case of wall mounting, if you install flexible suction tubes, use only reinforced anti-collapsing types in order to prevent crushing of the pipe due to vacuum created by the pump during operation.

The models EXCELSIOR E00, E0, E1 and E2 have an internal system of valves with sealing and compression spring, this allows the EXCELSIOR to work also in oblique or horizontal positions. Pay attention in the case you mount the pump inclined 180° would arise problems caused by the weight of the liquid that could charge on the valves and might open them.

All other models of EXCELSIOR pumps (E000, E3, E4, E5 and E7) have clapper type valves that work only for gravity and therefore must be mounted vertically.

For a correct and complete pumping, act on the lever with reciprocating movement, about 45° to the right and 45° to the left.

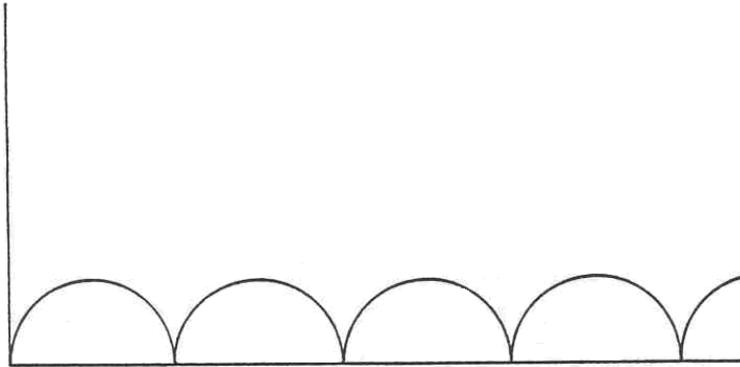
Do not use excessive force to prevent damaging of internal parts, partial or incorrect use of the pump reduces the flow-rate Q.

At the beginning the pump body and the pipes are empty and few cycles need to be made before liquid will flow out from the delivery hose.

The flow will follow bottom-top direction, indicated by the arrow shown on the cover of the pump itself.

For each half-cycle corresponds delivery. At the end of the stroke the direction of rotation of the handle is reversed, this is "point 0" where the pump does not deliver.

The curve looks like this:



Attached here below you can find technical charts showing the overall dimensions, weights of the individual pumps, flow-rate in liters/minute.

(To change the unit of measurement of the flow-rate from Litres/Minute to Cubic Meters/Hour multiply x 0,06. For example: if a pump has a Q of 40 liters / min, multiplying by 0,06 you get 2.4 cubic meters per hour).

The sectional drawings here enclosed are needed to identify all internal and external components of the pump. This will be useful for ordering spares parts as well.

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