VACUUM SET

Operating manual

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BEFORE USING, PLEASE READ THIS OPERATING MANUAL. Keep the manual for possible future use, as it may always be necessary to remember the information contained in the manual, and it must be provided with the device in the event of reselling the machine or changing the user.

WARNING! In order to avoid the risk of injuries and accidents, as well as to increase work efficiency and prevent premature wear of the device, read all warnings, safety instructions and paragraphs marked with the symbol: ⚠

Do not dispose of that product as unsorted municipal waste.
Used equipment should be sent to an electro-waste collection point.

All photos used in this manual are illustrative photos. The appearance and quantity of the elements supplied to the customer, as well as their mutual location may vary depending on the ordered vacuum set.

This operating manual is based on current knowledge and experience. The manufacturer reserves the right to change the content of this manual without informing the consumer.

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1. Range of applications.

Vacuum sets are used in the process of degassing casting materials such as silicone, resin, gypsum and the process of impregnation of wood and other porous materials.

The vacuum chamber is a sealed tank inside of which it is possible to create a low pressure environment by the suction of contained gases by the vacuum pump.

The vacuum set is operated in the following conditions: ambient temperature between +5°C and +40°C, air humidity up to 80% at 20°C.

2. Elements of the vacuum set.

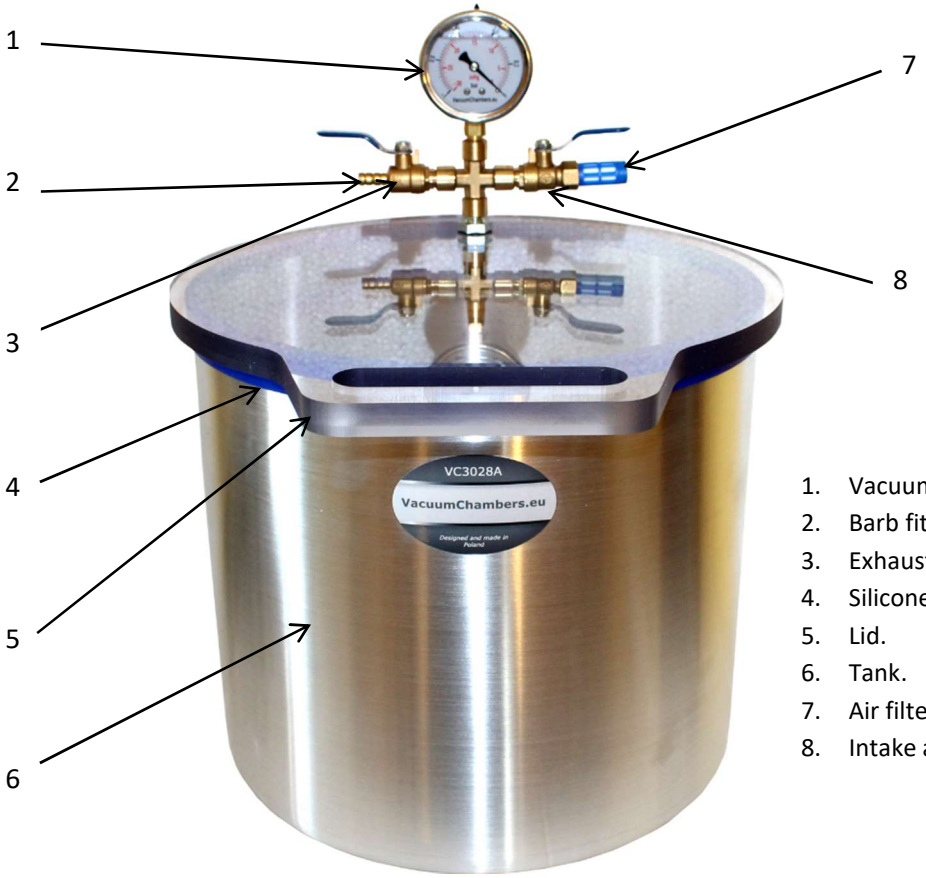
Photo 1: Vacuum set.

The vacuum set (Photo 1) consists of a vacuum chamber (2) and a vacuum pump (3) connected by a pneumatic hose (1). The properties of the Vacuum Chamber are described in the next section of this manual. The vacuum pump included in the standard vacuum set is a rotary oil pump. In the set, instead of an oil pump, an oil-free piston pump or a diaphragm pump can be used. This manual describes the installation of a vacuum set which includes an oil rotary pump. In case of using a different type of pump or a pump supplied by another manufacturer, read and follow the instructions provided with the pump. VcuumChambers.eu is not responsible for vacuum pumps provided by other manufacturers or distributors. The vacuum hose included in the set is a reinforced pneumatic hose with a fitting enabling connection to a vacuum pump. The vacuum set is also equipped with the oil needed to start the pump for the first time (when using a rotary oil pump) and the operating manual.

The vacuum set can be equipped with additional elements: a fitting muffler, a stirrer mechanism, a vacuum trap or a vacuum feedthrough with pouring hose and mechanical flow controller. These elements are described in chapter "5. Additional equipment. " of this manual.

3. Properties of the vacuum chamber.

The vacuum chambers used in vacuum sets vary in size and material. Photo 2 shows an example of a vacuum chamber. The vacuum chamber body is made of aluminium, powder coated steel or stainless steel depending on its type. The lid of the chamber is made of thick polycarbonate or tempered glass. The tank is provided with a silicone seal which is durable and has a low susceptibility to mechanical deformation. Excellent transparency of lid allows observation of the degassing process. The two ball valves allow to adjust the degassing process, and the mounted vacuum gauge indicates current vacuum in the chamber. The chamber is equipped with an intake air filter, which effectively prevents dirt getting into a degassing material. The chamber is attached to the pump with a barb, on which is fitted a reinforced hose with an internal diameter of 8 mm and a length of 1.5 m. The whole product is made from materials of the highest quality and a branded thread sealant.



1. Vacuum gauge.
2. Barb fitting for 8mm hose.
3. Exhaust air valve.
4. Silicone gasket.
5. Lid.
6. Tank.
7. Air filter.
8. Intake air valve.

Photo 2: Vacuum chamber.

Elements 1 to 5 together with pneumatic fittings form an air manifold. It also includes the washer and nut needed for its assembly. The manifold is mounted on a tank or lid, but due to the risk of damage during transport, it can be attached to the vacuum set separately. In that case, the customer should mount the manifold on the tank or lid by following the instructions in this manual.

4. Before the first use.

A. Air manifold assembly.

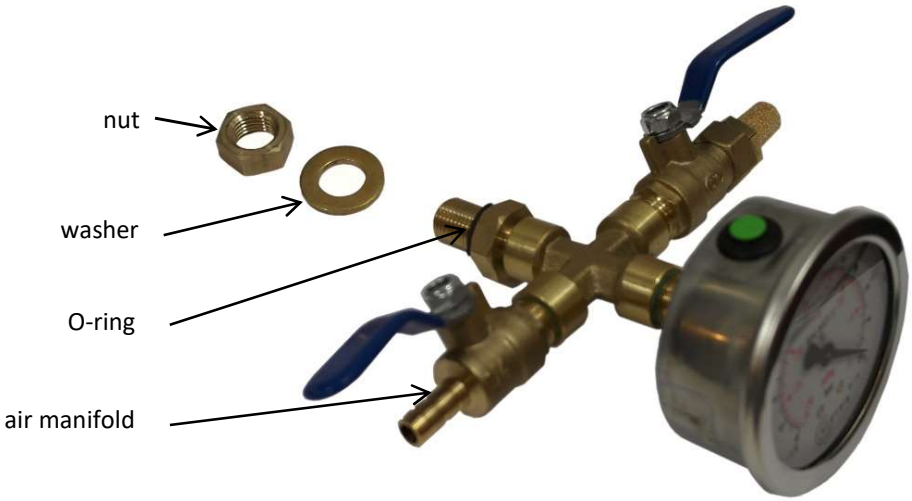


Photo 3: Air manifold.

If the air manifold (Photo 3) is supplied separately, unpack it and remove the nut and washer. Do not remove the O-ring. The pneumatic fitting, from which the nut and the washer were removed, should be placed in the hole. Depending on the model of the vacuum chamber, the hole is located in the wall of the tank or in the lid of the vacuum chamber. The manifold should be located on the outside of the chamber (Photo 4) or on the top of the lid (Photo 2).

Photo 4: Air manifold inserted into the hole.

The washer and nut should be placed on the fitting on the internal side of the tank or on bottom side of the lid. Smooth washer edges should touch the tank wall (or lid wall). Use one spanner to tighten the connection and the other spanner (or your hand) to hold the fitting. Tighten the nut until you feel resistance. It is important to place the O-ring and the nut concentric. Incorrect positioning may result in a lack of tightness in the chamber. Photo 5 shows the incorrect position of the sealing ring. Do not tighten the O-ring too hard or you will deform it and lose its properties.

Photo 5: Incorrect position of the O-ring.

Photo 6: Air manifold correctly installed.

Photo 6 shows a correctly mounted air manifold on the tank wall. The green stopper plug, visible in the photo, is used to protect the vacuum gauge against spilling glycerine during transport or assembly. It should be removed after all components of the vacuum set have been assembled. Leaving the stopper plug in the vacuum gauge may result in incorrect pressure indications.

B. Preparation of the vacuum pump.

1) Before the first use necessarily fill the vacuum pump (Photo 7) with the oil provided with the set. To do that, place the pump on the flat, horizontal surface, unscrew the red plug (1) and pour the oil through the oil feed hole. For some models of pumps (when there is no red cap), the oil should be poured through the hole in the pump housing after the blue oil filter cylinder (2) has been unscrewed. Oil pour gradually at the same time control the oil level by observing the oil sight glass (4).

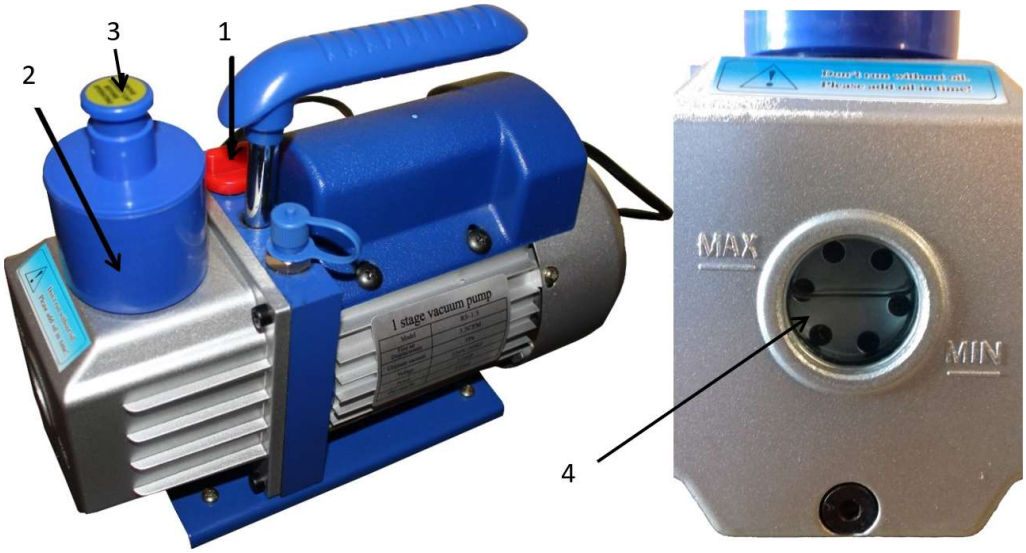


Photo 7: Elements of the vacuum pump and correct oil level.

The pump delivered to the client is never filled with oil. A little amount of oil in the oil sight glass indicates only the fact that the pump was tested before the shipment. The pump must necessarily be filled with oil before use.

2) Remove the plug (3), protecting the air filter, placed on the exhaust of the vacuum pump. Not applicable to the VP1RS-0.5 model.

C. Connection of elements of the vacuum set.

1) Screw the connector tighten in the pneumatic hose to the vertical fitting on vacuum pump. Screw the connector gently until the resistance is felt, using spanner.

Photo 8: Pneumatic hose mounted on the barb of the ball valve, secured with worm drive hose clamp.

2) Put the spare end of the pneumatic hose on the barb of the ball valve in the chamber. Secure this connection using a worm drive hose clamp.

3) Remove the green plug of the rubber plug on the vacuum gauge.

It is recommended to connect the vacuum set only with parts and products supplied by VacuumChambers.eu. If the customer connects the vacuum set or its parts with elements or devices from other manufacturers, the customer is solely responsible for the appropriate selection of these elements, their compatibility and quality of their connection. The manufacturer is not responsible for any damage or losses caused by incorrect selection, matching, use or combination of the products. The above principles apply in particular to vacuum pumps purchased from other suppliers.

5. Additional equipment.

Depending on the selected model or on the customer's individual order, the vacuum set can be equipped with: fitting muffler, stirrer mechanism, vacuum trap or vacuum feedthrough with pouring hose and mechanical flow controller.

A. Fitting muffler.

Photo 9: Fitting muffler and air manifold with mounted muffler.

The fitting muffler (Photo 9) disperses the airflow getting into the chamber while balancing the vacuum. It prevents casting materials from spilling inside the chamber. This accessory should be screwed manually (not using any tools) onto the mounted air manifold on the internal side of the tank or on the bottom side of the lid. The diffuser is not included as a standard accessory to all the vacuum sets.

B. Vacuum feedthrough with pouring hose and mechanical flow controller.

The feedthrough integrated with the vacuum chamber (Photo 10) enables to supplying of flooding materials from the external container directly into the interior of the chamber under vacuum. The mechanical flow controller (4) included in the set allows to precise process control. To regulate the process of collecting material into the chamber, operate the wingnut located on the regulator. It allows to reduce or block pouring hose capacity.

When using the vacuum set, the pouring hose becomes dirty with the supplied materials. This situation is a natural wear and tear and is not subject to warranty. The customer is obliged to always replace a dirty hose in accordance with instructions below.

To remove the hose from the vacuum feedthrough (1), loosen the nut (2) with a spanner. The hose should be at ease removed from the feedthrough. The next step is to remove the flow regulator (4) from the hose after loosening the wing head screw.

Put the mechanical flow regulator (Photo 11) on the new hose. The hose should be centrally located under the regulator stamp, between the stamp and the opposite wall. Tighten the regulator with the wing head screw as needed.

Photo 10: Vacuum feedthrough with pouring hose and flow controller mounted on the tank.

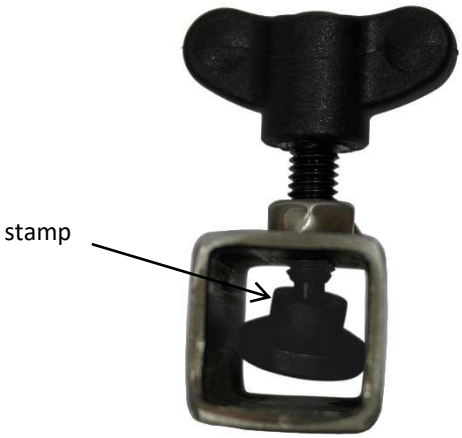


Photo 11: Mechanical flow controller.

The spare end of the hose should be placed in the vacuum feedthrough (Photo 10). Sufficiently long section of the hose should be inside the tank. Use one spanner to tighten the feedthrough nut and other spanner to hold the feedthrough.

C. Stirrer mechanism.

The stirrer mechanism is an additional accessory of the vacuum chamber. It facilitates and speeds up the degassing process. The stirrer mechanism can only be installed in the chamber provided for this purpose. Photo 12 shows the chamber lid (1) with the agitator (4) attached to it.

Photo 12: Agitator mounted on the lid.

The lid is made of stainless steel. The agitator is ended with an ISO metric screw thread (M14), which allows it to be screwed into the coupling (3). This connection is secured with a lock nut. The coupling has a hole on the upper side of the lid to which the agitator drive can be connected. The hole also has an M14 thread. A bolt with a nut may be inserted therein. The lid of the vacuum chamber with the stirrer mechanism is additionally equipped with two polycarbonate windows (2), which enable the observation of the degassing process. They are protected for transport with a protective foil.

The chamber adapted to the installation of the stirrer mechanism (Photo 13) has a metal lid (1) and additional elements. Those are:

1. Lid.
2. Clamps.
3. Legs.
4. Castors with brake.
5. Stainless steel drain valve 1 ¼ inches.

Photo 13: Vacuum chamber with stirrer mechanism.

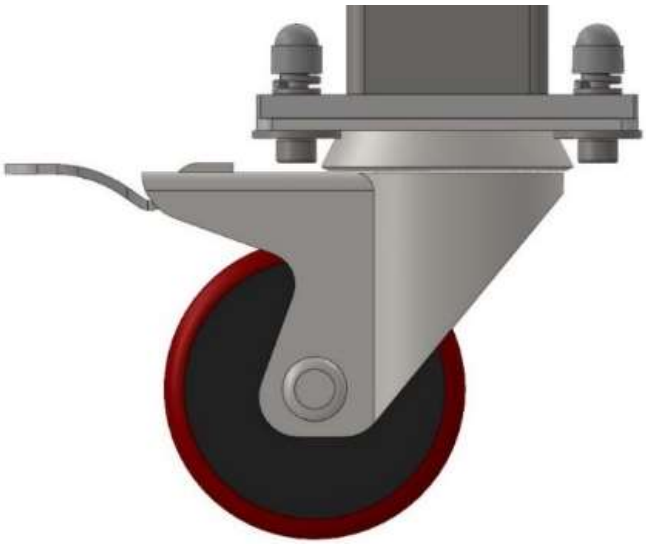
The legs (3) and the castors (4) allow free movement of the chamber and allow to place a container under the tank. The clamps (2) are used to close the chamber. The drain valve (5) allows the chamber to be drained.

The lid should be mounted centrally in the middle of the chamber (Photo 14). The lid should be secured with clamps. Make sure that the elements of the clamps of the lid are located directly above the corresponding elements of the clamps on the chamber. Additionally, it is important that the label "THIS SIDE TO VACUUM GAUGE" is placed next to the vacuum gauge.

Photo 14: Correct location of the lid on the chamber.

If it is difficult or impossible to close at least one clamp, make sure that the lid is correctly positioned. If necessary, the length of the clamps can be adjusted.

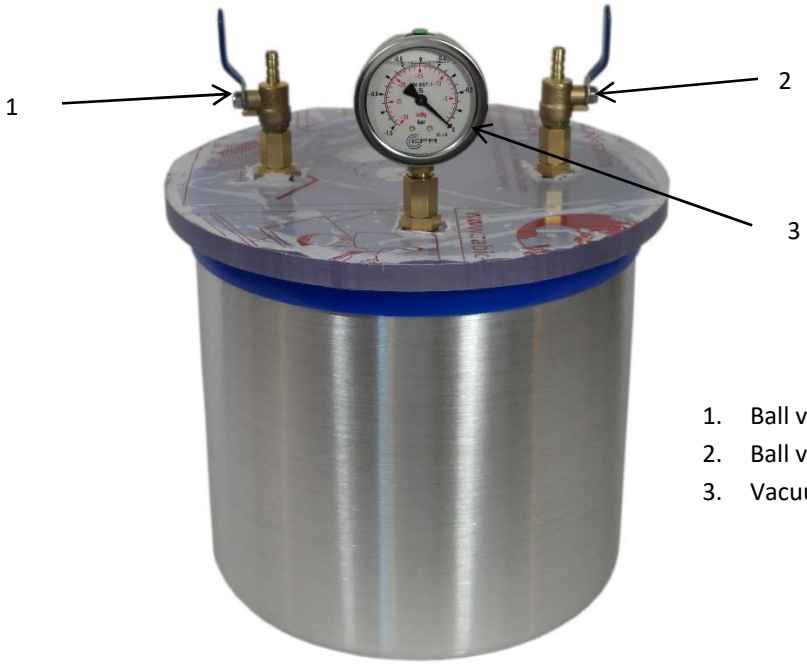
In order to avoid damage of the chamber during transport, the castors usually are included loosely. The manufacturer attaches to the package a set of bolts, washers and nuts that allow the customer to assemble the castors by himself. Their correct installation is shown in the picture below.



Picture 1: Correct installation of the castor to the tank leg.

D. Vacuum trap.

The vacuum trap (Photo 15) is a vacuum chamber with a modified configuration. It is used in the infusion process as a protection for a vacuum pump.



1. Ball valve.
2. Ball valve.
3. Vacuum gauge.

Photo 15: Vacuum trap.

Two ball valves (1,2) and a glycerine vacuum gauge (3) are mounted on the lid of the vacuum trap. The valves allow to control the process and are suitable for connecting pneumatic hoses. The vacuum gauge shows the current pressure in the tank. The separate use of valves and vacuum gauge instead of the air manifold (used in standard chambers) makes vacuum trap cleaning easier.

After getting inside the trap, the liquid flooding material falls to the bottom by gravity, which prevents it from getting inside the vacuum pump. It protects against contamination of the trap elements and the pneumatic hose leading to the pump. During proper use, the resin only comes into contact with the hose leading to the bag (mould) and the ball valve of the trap lid connected to it. In order to simplify cleaning of the vacuum trap, it is recommended to place a container inside the tank to hold excess resin that gets inside the trap.

6. User manual.

1) Place degassing material in the additional container into the chamber.
2) Place the lid on the chamber. Make sure it's placed centrally on the tank.
   In the case of a metal lid with clamps (chamber with a stirrer mechanism), place the lid on the tank in accordance with paragraph "4C. Stirrer mechanism." of this manual.
3) Switch the intake air valve to the OFF position (valve handle perpendicular to the valve).
4) Switch the exhaust air valve to the ON position (valve handle parallel to the valve).
5) Turn on the vacuum pump.
6) In the first phase of the suction it may be necessary to press the lid to the tank until the increasing vacuum in the chamber is noticed.
7) At the time of degassing casting products significantly increase their volume, note that opening the intake air valve prevents leakage of these products when too small container is used. The operator should control the process and react appropriately to increase in products volume, so that they do not get into the lid of the chamber and contaminate the connections there.
8) Degassing should continue until the degassing material stops increasing its volume and rapidly drops and reduces its volume. The material will have a homogeneous, clear appearance.
9) Before turning off the pump, close the exhaust air valve.
10) Turn off the vacuum pump.
11) Slowly open the intake air valve to balance pressure inside a chamber. After this step, lid can be removed.
12) The process above can be repeated for the filled forms in order to obtain the best results.

7. Notes about use.

- Proper work of the vacuum chamber can only be guaranteed by using a vacuum pump which allows to achieve a vacuum of at least 0.1mbar (10Pa). It is recommended to use vacuum pumps tested and recommended by VacuumChambers.eu.
- Before starting work, make sure that the oil level in the pump is suitable. The pump can't work without oil (possible seizing of the pump) or with its excessive amount (possible oil splashing at the pump outlet).
- In case of using the vacuum pumps without the protection against oil return (such as one-way solenoid valve or mechanical valve), disconnect the pump from the chamber after reaching the required vacuum. Remember to close the exhaust air valve first. All VacuumChambers.eu pumps are equipped with one-way valve.
- When operating vacuum pumps that do not come from the VacuumChambers.eu offer, please refer to the operating instructions supplied with the pump by the manufacturer.
- Casting products placed in the chamber should be placed in an additional container that is large enough to avoid the spillage inside of the chamber.
- The vacuum gauge with removed green stopper plug shouldn't be rotated downwards as it can cause glycerine leaking.
- The chamber lid should only be taken off after the pressure in the chamber is balanced. In the case of a very strong lid suction, waggle the lid from side to side, while the other hand gently hold the gasket. Raising the lid quickly can cause ripping off the gasket. Especially in the case of new silicone gaskets there may be an occurrence of its strong adherence to the lid. It is recommended to protect new gasket surface with, for example by technical talc.
- Chambers with polycarbonate lid are not designed for wood stabilization or to work with alcohol, ethanol, acetone and monomers or polymers based on acrylic. For these purposes, we recommend using chambers with tempered glass lid.
- If you use a vacuum chamber for degassing the aggressive resins, additional filter should be placed between the chamber and the pump, in case if degassing exceeds more than 10 minutes. Not using a filter can lead to the pump damage, which is not subject to warranty later.
- The vacuum pump must always be set below the vacuum tank.
- The time of continuous operation of the vacuum pump shouldn't exceed 15 minutes with the connected load in the form of a tank or installation.
- Time of continuous operation of the vacuum pump must not exceed 3 minutes in conditions of free air circulation, without connected load.
- Do not allow the vacuum pump to overheat. Exceeding the temperature of 75°C on the motor housing significantly shortens the life of the pump, and in some cases can lead to its complete damage.
- RS series of rotary, oil sealed vacuum pumps are not designed for continuous operation. The recommended mode of use is intermittent work S3 25%.

- Oil change in the vacuum pump should be carried out every 20 work-hours. One of the symptoms of the need to replace oil is not reaching the maximum vacuum. Turbid and dark colour oil should be replaced with a new one.
- In the case of using a vacuum set for processes that cause strong contamination of the oil, for example wood stabilization, it is recommended to pour the oil after each process. The poured oil can be re-used as long as it has returned to its original properties. Failure to adhere to this point may cause corrosion and accelerated wear of pump mechanisms.
- Old oil must be drained entirely from the vacuum pump. To do this, unscrew the drain plug located below oil sight glass.

8. WARNING! Safety Instructions.

- **Read the operating instructions before use.**
- **Perform servicing and maintenance of the vacuum kit periodically.**
- **Before each use of the vacuum set, it is necessary to check its technical condition, in particular the supply cable of the vacuum pump, as well as the technical condition of the tank.**
- **The general rules for the use of equipment working under voltage must be observed.**
- **Be sure to use product in safe, well-ventilated area, on flat, stable surface.**
- **Avoid excessive pollution of the working environment by dust, powders, small solids or water, as heavy contamination can damage the pump.**
- **Make sure, that the chemicals used by the customer will not damage the materials the vacuum set is made of. The customer is responsible for choosing the right vacuum set for the intended purposes and technology.**
- **Don not put any additional weight on the lid of the chamber, do not set any vacuum pumps or other items that are not a part of the vacuum system on it.**
- **The lid must be properly placed on the tank. It is not permissible for the gasket to extend beyond the outline of the lid at any place. This situation can lead to a sudden unsealing of the chamber.**
- **In the case of lid cracking or other damage immediately exclude it from use.**
- **In the case of cracking, abrasion or other mechanical damage to the gasket, immediately exclude it from use.**
- **In the case of deformation or any other mechanical damage of the tank immediately exclude if from use.**
- **Do not apply additional forces on the chamber wall, for example by setting it on the grips, as this may cause deformation.**
- **Do not move, do not transport chambers being under vacuum.**
- **Do not assemble or disassemble individual parts of the vacuum set while the vacuum pump is operating or if the vacuum set is under vacuum.**
- **Some parts of the vacuum pump get very hot during operation. To prevent burns, never touch the body and pump motor. Be careful when changing hot oil.**
- **Never put fingers or other objects inside the pump impeller cover. Keep your hair, clothing, gloves and other objects that could get into the impeller away from moving parts.**
- **Do not expose the device to rain or excessive moisture.**
- **Do not leave the vacuum set unattended during operation.**
- **Do not place live organisms in vacuum tanks.**
- **Do not subject any parts of the human body to under pressure.**
- **Keep children, people with disabilities and animals away from the operating area of the device.**
- **During work, use personal protective equipment: face shields, protective gloves, clothing and footwear.**
- **Be foreseeable, watch what you are doing, and be reasonable when using the device. Do not use the device when you are tired or under the influence of drugs, alcohol or medication.**
- **The device should be operated by trained technicians, mentally and physically able to operate the vacuum set and its individual components.**
- **Do not use the device or any of its parts for purposes other than those for which it was intended. Do not make any modifications or changes to the vacuum set or its individual components. Any modifications and changes are made by the customer under his sole responsibility and will void the warranty.**

9. Maintenance.

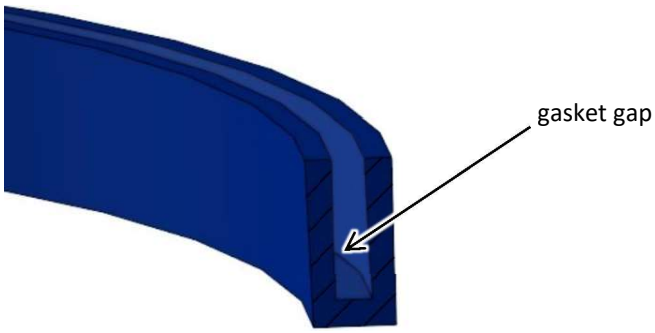
Vacuum chamber must be kept clean and the pneumatic components must be taken care of so that the extraneous objects don't get into them and as a result block and damage the chamber.

The chamber tank can be cleaned with water and a light detergent like the liquid dishwashing detergent. Polycarbonate lid of the chamber should be cleaned only by using a soft cloth moistened with warm water. Using detergents to clean polycarbonate lid may cause fogging or scratching. Glass lid may be cleaned with any detergents, unless they cause it to be scratched. Do not clean the vacuum system with flammable liquids, solvents or by spraying it with a stream of water.

A. Tank gasket replacement.

The silicone gasket on the tank is a consumable item and its wearing out is a natural process. Excessive use of the gasket or its damage may cause leakage of the chamber. If there are visible signs of wear, damage, dirt or leakage of the chamber, it must be replaced. The gasket may lose its elasticity or harden as a result of contact with the materials used by the customer. In that case it should also be replaced.

For replacement, the old gasket must be removed. Take it with hand and pull it off the tank wall. The gasket should be completely removed, and no contamination should be left in the place of its installation.



Picture 2: Gasket - sectional view.

The new gasket should be placed on the tank in place of the old one. Installation should begin with the positioning of a short section of the gasket on the edge of the tank. It is necessary to open the gasket gap locally (Picture 2), so that it can be easily placed on the wall. When the first section of the gasket is on the edge, hold it with hand and slide the rest of the gasket on. Application should continue along the gasket. Finally, press the gasket with hand down to the tank along its entire length. Do not apply too much pressure or hit the gasket with hard objects. Hitting the gasket can damage it, which can cause leakage in the vacuum set.

10. Warranty.

VacuumChambers.eu guarantees that the vacuum set will be operational and free of defects for a period of 12 months from the date of purchase. In the event of a breakdown during this period, VacuumChambers.eu will repair or replace any damaged system element on the terms described in the warranty card included in the kit.

This limited warranty does not cover damage to the system caused by improper use, maintenance or use not in accordance with this manual. Any use of the device which is not in accordance with the intended purpose given above is forbidden and will void the warranty and the manufacturer's liability for any resulting damage. Any modifications of the device made by the user release the manufacturer from liability for damage and damage caused to the user and the environment. Proper use of the device also applies to maintenance, storage, transport and repair.

VacuumChambers.eu is not liable for damages, nor does it cover them under the warranty, for any kind of losses resulting from the breakdown of this product. In the case of a claim, VacuumChambers.eu's sole responsibility is to accept a return or exchange of the product itself.

11. CE declaration of conformity.

CE

DEKLARACJA ZGODNOŚCI CE
CE DECLARATION OF CONFORMITY

Vacuumchambers.eu

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Polska, 16-001 Ignatki-Osiedle, Jodłowa 3A/34

deklaruje z pełną odpowiedzialnością, iż produkty:

declares with full responsibility, that the products:

Komory próżniowe

Vacuum chambers

VC4550SSG, VC4550S, VC4040SSG, VC4040SS, VC4040S, VC3028AF, VC3028AG, VC3028A, VC2523AG, VC2523A, VC1621SG, VC1621SSG, VC1621S, VC2509AG, VC2509A, VT2523A, VT1621S, VC0918SS, VC2506GG, VC2506G

są zgodne z następującą normą i innymi dokumentami normatywnymi:
PE-EN ISO 12100:2012 norma – bezpieczeństwo maszyn, ogólne zasady projektowania, ocena ryzyka i zmniejszanie ryzyka
oraz spełniają przepisy:
DYREKTYWY 2006/42/WE PARLAMENTU EUROPEJSKIEGO I RADY
z dnia 17 maja 2006 r.

are in conformity with the following standard and other normative documents:
PE-EN ISO 12100: 2012 standard – safety of machinery, general principles for design, risk assessment and risk reduction
and comply with the provisions:
DIRECTIVE 2006/42 / EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 May 2006.

Pieczęć firmowa i podpis:

Company stamp and signature:

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