European Vacuum Drainage Systems

EVAC Stainless Steel Model

TECHNICAL DATA SHEET

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**VACUUM TOILET**

5327002  EVAC 90, FLOOR MODEL, STAINLESS STEEL, *SHOCK TESTED*

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**Materials**

- Bowl: Stainless steel EN 1.4404
- Seat: White plastic laminated wood
- Cover: White plastic laminated wood
- Pneumatic push button: White plastic, ABS

**Operating data**

- Water pressure: 200 ... 1000kPa
- Operating vacuum: -30 ... -50kPa
- Water consumption: 1.2 ±0.15 litres/flush, ( water pressure: 400kPa, vacuum: -40kPa )
- Air consumption: 60 ±10 litres/flush (normal atmospheric air)

**Connections**

- Water supply: 1/2" MPT
- Discharge: 90° rubber elbow to pipe size 48...52mm O.D.

**Shipping data**

- Net weight: 20.2 ±0.5kg
- Shipping weight: 22.2 ±0.5kg
- Shipping volume: 0.168m³

* Passed by the MIL-SPEC 901D (Navy) Grade B, Class 1, Type A shock test with addition:

For passing the test the push button cover has to be fastened by means of self tapping screws. Screws do not include in the toilet assembly P/N 5327002. (See installation document 2:01015C)
VACUUM TOILET
6542534  EVAC 90, FLOOR MODEL, STAINLESS STEEL, SEAT WITHOUT COVER,* SHOCK TESTED

Materials
- Bowl: Stainless steel EN 1.4404
- Seat: White plastic laminated wood
- Pneumatic push button: White plastic, ABS

Operating data
- Water pressure: 100 ... 1000kPa
- Operating vacuum: -30 ... -50kPa
- Water consumption: ~1.2 litres/flush
- Air consumption: ~60 ±10 litres/flush (normal atmospheric air)

Connections
- Water supply: 1/2” MPT
- Discharge: 90° rubber elbow to pipe size 48...52mm O.D.

Shipping data
- Net weight: 18.4 ±0.5kg
- Shipping weight: 20.4 ±0.5kg
- Shipping volume: 0.168 m³

* Passed with shock test requirements as per NES814, NES1004, DS28 Code “AB” (Captive)
VACUUM TOILET
5900204  PNEUMATIC PUSH BUTTON KIT

Materials
Pneumatic push button: White plastic, ABS
Protecting pipe: PVC

Connections
Hose nipple Ø4/Ø2

Shipping data
Net weight: 0.2kg
VACUUM TOILET
5327002 EVAC 90, FLOOR MODEL, STAINLESS STEEL, SHOCK TESTED
6542534 EVAC 90, FLOOR MODEL, STAINLESS STEEL, SEAT WITHOUT COVER, SHOCK TESTED

! NOTE: Recommended place for the push button.
If the place is changed consult Evac.

Fixing to the deck with welded bolts
Rubber plate
Welded bold M8 (not included)
Section A

Optional discharge connection
5433572 Connection hose

Installation kit P/N 5433243 consists of:
Pneumatic push button 1 pc
Rubber bend 1 pc
Connection hose 1 pc
Hose clamp 2 pcs
Washer 4 pcs
Cap nut M8 4 pcs
Shut-off valve 1/2" 1 pc
Strainer 1 pc
Vacuum breaker 1 pc
Mounting instruction 1 pc
Rubber plate 1 pc
Recommended place for the pneumatic push button

! NOTE: Make sure, that cover does not hit the push button when opened. If the place is changed, consult EVAC.

Protecting pipe installation
Thread the plastic hose through the protecting pipe.
Install the protecting pipe under the discharge pipe.
Install the protecting pipe using installation clamps and screws.

Pneumatic push button installation
Install the plastic hose to the bellow.
Put the plastic hose on clip behind the bottom plate.
Install the bottom plate on the wall.

Remove the film out from the cover for protecting pipe.
Put the slide guide tap to the groove on a cover.
Snap the cover with the bellow on to the bottom plate.

Installation of pneumatic push button in shock tested toilet

! NOTE: **Screws are needed only for a shock tested toilet installation.

! NOTE: *Holes are drilled when the push button is installed.
**VACUUM TOILET**

5327002  EVAC 90, FLOOR MODEL, STAINLESS STEEL, SHOCK TESTED  
6542534  EVAC 90, FLOOR MODEL, STAINLESS STEEL, SEAT WITHOUT COVER, SHOCK TESTED  
5327004  EVAC 90, FLOOR MODEL USPH, STAINLESS STEEL

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**Start-up**

- Clean the bottom of the toilet bowl.
- Check that the mini-check valve and discharge valve are clean and working correctly.
- Check that the water supply hose and the filter of water valve are not blocked.
- Check that sufficient vacuum (-30kPa) is available.
- Open the water supply valve in water supply piping.
- Press the toilet push button: the discharge valve opens, the bowl contents are extracted and the bowl is rinsed with water.
- Once the discharge valve has closed, the water level is restored in the bowl from water valve with it’s closing time delay.

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**Monitoring the vacuum toilet in normal operation**

- Check that the water valve provides the rinse water to the bowl at the same time as the discharge valve extracts the bowl contents when the push button is pressed.
- Check that the push button returns to its non-activated state.
- Check that after the discharge valve closes, the water valve continues to provide water to the bowl. If the water valve time delay is correctly adjusted, there should be a pool of water at the bottom of the bowl.
- Check that there are no water or air leaks.

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**NOTE:** Water consumption is dependent on water supply pressure.

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**Preparation for a toilet not to be used for a long period**

- Close the water supply valve.
- Run a flush cycle by pressing the push button.
- Close the toilet seat cover.
**VACUUM TOILET**

5327002  EVAC 90, FLOOR MODEL, STAINLESS STEEL, SHOCK TESTED
6542534  EVAC 90, FLOOR MODEL, STAINLESS STEEL, SEAT WITHOUT COVER, SHOCK TESTED
5327004  EVAC 90, FLOOR MODEL, STAINLESS STEEL USPH

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**Operation**

The toilet is flushed by pressing the push button. The pneumatic push button is connected to control mechanism with a control hose, which transports the air pulse from push button to control mechanism. The air pulse starts the flushing cycle and connects the vacuum to water valve and discharge valve.

The water valve opens and lets rinsing water into the bowl through a flushing ring. After a short delay, the vacuum acts in discharge valve housing and forces the rubber diaphragm in discharge valve to open, thus connecting the bowl to vacuum sewer. The contents of bowl are forced into the vacuum sewer by a pressure difference between the bowl and vacuum sewer.

The flushing cycle in the control mechanism starts the closing cycle. Atmospheric air pulse enters the discharge valve, which closes. After a short delay, atmospheric air pulse reaches water valve, which closes and lets a certain level of water at the bottom in the bowl.

After the flushing cycle has stopped, the push button and system will be ready for next flush.

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Date: 31 Jul 2007  Doc. 301011E
OPERATION AND MAINTENANCE
Description of flushing sequence

In the standby position FIG.1

Control valve 1 is closed. Vacuum in chambers 2 and 3 is equalized by the jets 4 and 5. Spring force 6 holds the mechanism in the non-activated position.

In the just switched position FIG.2

Air pressure applied from the flush button to chamber 7 has lifted the lever 8 and opened control valve 1. Atmospheric air has entered chamber 3 through filter 9 and valve 1. The force from the pressure difference between 2 and 3 has moved the shaft 10 to the left and the following sequence of events has occurred:

The inlet valve 11 has closed. Vacuum valve 12 has opened. Vacuum is distributed via check valve 13 to discharge valve 18 and water valve 19 which will both open. Chamber 14 is also subjected to vacuum through check valve 21.

This vacuum will pull lever 8 and close valve 1 and the timer function will start. Chamber 3 will be evacuated through jet 5 and the pressure difference 2-3 equalizes. At a certain level, the counterforce from spring 6 will outweigh and the cycle will go in the opposite direction:

The vacuum valve 12 will close. The air inlet valve 11 will open and atmospheric air enters discharge valve, water valve and chamber 14. The discharge valve 18 will close and somewhat later (because of the jet 17), the water valve 19 closes when a suitable water level has been reached at the bottom of the bowl.

Returning to standby position FIG. 3

The whole system goes to standby position ready for another VT-flush.

! NOTE: Diaphragm 16 has the same effective area as the air inlet valve 11 to balance the vacuum forces. FIG.3

! NOTE: Check valve 13 ensures that connected valves in activated position are unaffected by changes in the vacuum supply level.

! NOTE: If vacuum is too low or absent the function is delayed. Control valve 1 stays open until chamber 14 is subject to vacuum.
Operation

The functioning of the vacuum toilet is entirely controlled by the control mechanism. Vacuum in the sewage piping system is the actuating medium. Description of flushing sequence see document 3:01012D.

Jet 1 (document 3:01012D pos 5) controls the discharge valve opening time.
Jet 2 (see document 3:01012D pos 4) counters the effect of quick changes in the vacuum supply.
Jet 3 (document 3:01012D pos 15) delays the vacuum changes in chamber 14 (see document 3:01012D). This prevents a new flushing procedure to start before the previous procedure has stopped.

Maintenance

Check that the air filters 4 and 5 are not blocked.
Check hoses and pipe connections for leaks.

Toilet discharge time

Jet 1
- Short discharge period: Red jet, 1.5 sec.
- Normal discharge period: Blue jet, 2.0 sec.
- Longer discharge period: White jet, 2.5 sec.
- Less restriction shortens the time

Water valve opening time

Jet 6
- Normal bowl water level: White jet
- Low bowl water level: Blue jet
**VACUUM TOILET**

5435015 DISCHARGE VALVE, EVAC 90, FLOOR MODELS, STAINLESS STEEL

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**Operation**

**Closed condition:**
In the closed position, the control valve shuts off the connection between the vacuum piping and the discharge valve housing. As the valve housing then is under atmospheric pressure, the spring-loaded closing mechanism closes the rubber diaphragm and isolates the bowl from the vacuum piping.

**Flushing condition:**
As the control valve opens, the discharge valve housing is subjected to vacuum, thus forcing the closing mechanism to open. This in turn allows the rubber diaphragm to open, and connects the bowl to the vacuum pipe line.

**Maintenance**

See document 3:01009G for scheduled maintenance.
Cleaning instruction for the seat

- The seat is easy to clean, with just a few simple directions for you to observe.
- Use a mild soap solution or biological cleaners.
- Seat and hinges should not be left damp, but be dried with a soft cloth.
- When using abrasive, corrosive or chlorine based cleaners for the bowl, avoid contact with the seat and hinges. Therefore, when cleaning the bowl, make sure that seat and cover are in an upright position until all the cleaner has been flushed away.

Scheduled maintenance program

Every year:
- Change Mini-check valve 5959902 if toilet is connected to the riser pipe.
- Check operation, push button, seat and cover, rinse pattern, discharge pattern.
- Check possible water and vacuum leakage.
- Clean Strainer in water supply.

Every 5 years:
- Change Mini-check valve 5959902 in every toilet.
- Open and clean Water valve filter 5774150.
- Clean Control mechanism air filter 5778600.
- Check operation, push button, seat and cover, rinse pattern, discharge pattern.
- Check possible water and vacuum leakage.
- Check Flushing ring 5433471 and flushing operation.

Every 10 years:
- Change Mini-check valve 5959902 in every toilet.
- Change Discharge valve rubbers: Rubber sleeve 5435181 (2pcs), Rubber diaphragm 5435169.
- Change Water valve diaphragm 5774400.
- Open and clean Water valve filter 5774150.
- Clean Control mechanism air filter 5778600.
- Check possible water and vacuum leakage.
- Check Flushing ring 5433471 and flushing operation.

! NOTE: Use only genuine Evac spare parts
## VACUUM TOILET

**5327002** EVAC 90, FLOOR MODEL, STAINLESS STEEL, SHOCK TESTED  
**6542534** EVAC 90, FLOOR MODEL, STAINLESS STEEL, SEAT WITHOUT COVER, SHOCK TESTED  
**5327004** EVAC 90, FLOOR MODEL USPH, STAINLESS STEEL

### TROUBLE SHOOTING

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| Toilet is discharging continuously (discharge valve open) | • Foreign object in the bowl or in the discharge valve | • Shut off the problematic branch line valve hoses  
• Remove the foreign object  
• Change discharge valve  
• Check and if necessary change the control mechanism. |
| Bowl is not emptying, but water run (high water in bowl)       | • Blocked bowl  
• Blocked discharge valve  
• Loose / clogged hoses | • Clean Bowl  
• Clean discharge valve with by-pass  
• Check / connect hoses.          |
| No water, but otherwise flushing or too little rinsing water | • Water shut-off valve closed  
• No water pressure  
• Filter in water valve full of dirt  
• Flushing ring loose  
• Flushing ring clogged  
• Strainer (not in USPH models) blocked up | • Open valve  
• Provide water pressure  
• Clean filter  
• Check / connect flushing ring  
• Clean flushing ring  
• Clean strainer          |
| Toilet is overflowing                                | • Water valve jammed in open position  
• Bowl clogged or discharge valve not operating  
• Misuse (buckets of water thrown in the bowl)  
• Too low vacuum (less than 30kPa) to flush | • Close water shut-off valve  
• Clean / change water valve, nozzles, springs, rubbers  
• Clean bowl, check / replace discharge valve  
• Discharge bowl, valve and piping with normally flushing  
• Check vacuum level, remove blockage in piping |
| Toilet does not flush.                               | • Too low vacuum (less than 30kPa)  
• Clogged mini-check valve  
• No impulse from flush knob  
• Jammed control mechanism | • Check vacuum level, remove blockage in piping  
• Clean / change mini-check valve  
• Check hoses and flush knob membrane  
• Change the control mechanism |

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**Discharge valve**  
**Control mechanism**  
**Pneumatic push button**  
**Shut-off valve**  
**Strainer**  
**Vacuum breaker**  
**Water connection hose**  
**Flushing ring**
VACUUM TOILET
5435015   DISCHARGE VALVE, EVAC 90, FLOOR MODELS, STAINLESS STEEL

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bowl does not become empty when flushed</td>
<td>• Discharge valve blocked</td>
<td>• Clear stoppage, if any, in discharge valve</td>
</tr>
<tr>
<td></td>
<td>• Leak in discharge valve housing</td>
<td>• Sharp tools may damage rubber</td>
</tr>
<tr>
<td></td>
<td>• Discharge pipe clogged</td>
<td>• Check that rubber sleeves are</td>
</tr>
<tr>
<td></td>
<td>• Rubber sleeves leaking</td>
<td>undamaged and correctly fitted</td>
</tr>
</tbody>
</table>

Dismantling of the discharge valve:
1. Compress the closing mechanism (Fig. 1).
2. Remove the rubber diaphragm (Fig. 2).
3. Release the rubber sleeve; free and remove the mechanism (Fig. 3).
4. Unscrew the locking screws and take the assembly apart. Lightly spread upper piston retainers to free lower piston (Fig. 4).

The triangle must face upwards and the tip of triangle must point towards the sewage piping.

N.B When assembling, better sealing of rubber diaphragm is achieved if a screwdriver handle is inserted as shown. Also check that rubber diaphragm is in right position. (See picture above).
VACUUM TOILET

5327002  EVAC 90, FLOOR MODEL, STAINLESS STEEL, SHOCK TESTED
6542534  EVAC 90, FLOOR MODEL, STAINLESS STEEL, SEAT WITHOUT COVER, SHOCK TESTED

See recommended spare part kits in documents:
Doc no 6:110E
Doc no 6:131H

5900204  Pneumatic push button
          (See doc 6:159E)

5980800  WATER SUPPLY KIT
5431884  Shut-off valve
5432728  Gasket
6543414  Filter
5432548  Vacuum breaker
5778995  Connection hose
5328200  Cover plate complete
5328210  Cover plate
5434522  Wing nut
5433583  Rubber elbow
5433594  Hose clamp
5433572  Straight connection
5433471  Flushing ring
5435015  Discharge valve
          (document 6:110E)
5435331  Console
5433358  O-ring
5434203  Hinge
5434483  Washer
5805900  Hose
5481006  Hose
5778991  Nipple
6510202  Flush unit
          (See doc 6:152D)
5430318  Screw
5432701  Toilet bowl
          (in P/N 6542534)
5432702  Seat with hinges
          (in P/N 6542534)
5327031  Toilet bowl
          (in P/N 5327002)
5328220  Lock plate
5328221  Screw
2715210  Nut
2722008  Washer
5433244  Rubber plate
5433225  Fastening rod
5434519  Outlet pipe
2618001  Screw
5328220  Lock plate
2618001  Screw
6541056  Nut
5434519  Fastening plate
5435015  Discharge valve
          (document 6:110E)
5435015  Discharge valve
          (in P/N 5327002)
5433414  Filter
5441201  Seat and cover with hinges
          (in P/N 5327002)

See recommended spare part kits in documents:
Doc no 6:110E
Doc no 6:131H
P/N 43501.3 and P/N 5435013 are replaced by P/N 5435014

P/N 5435015 Discharge valve (see drawing below).
P/N 5435014 Discharge valve includes Discharge valve P/N 5435015 + Hose (L=210mm) P/N 5736314.

6543029 RECOMMENDED SPARE PART KIT:
1 x 5435169 Rubber diaphragm
2 x 5435181 Rubber sleeve
VACUUM TOILET
5610202  FLUSH UNIT, EVAC 90, FLOOR MODELS, STAINLESS STEEL

5805900  Hose to push button
5990760  Hose clip
5774000  Water valve
5778994  Console
5775500  VT-control
5472708  Screw
5481102  Hose
5433277  Hose + elbow
5433278  Vacuum hose with check valve

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6543030 RECOMMENDED SPARE PART KIT:
1 x 3790009  V-ring
1 x 5774150  Filter
1 x 5774400  Diaphragm
1 x 5774701  Valve washer + Jet
P/N 5775500 Control mechanism

5778001 Jet carrier complete (as standard), which controls flushing period

Alternative for this jet available:
5778000 Jet carrier complete*
5778002 Jet carrier complete*
5778004 Jet carrier complete*

*Jet Carrier identification:

<table>
<thead>
<tr>
<th>P/N</th>
<th>Colour</th>
<th>Size</th>
<th>Effect</th>
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<tbody>
<tr>
<td>5778004</td>
<td>Yellow</td>
<td>0.20</td>
<td>Extra long flushing period</td>
</tr>
<tr>
<td>5778000</td>
<td>White</td>
<td>0.30</td>
<td>Long flushing period</td>
</tr>
<tr>
<td>5778001</td>
<td>Blue</td>
<td>0.40</td>
<td>Normal flushing period</td>
</tr>
<tr>
<td>5778002</td>
<td>Red</td>
<td>0.50</td>
<td>Short flushing period</td>
</tr>
</tbody>
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NOTE: See also document 3:111C, Control mechanism for Evac 900 model toilets.
See also document 002032-1, Control mechanism for Evac 910 model toilets.

P/N 5881000 Spare part kit for the control mechanism:

<table>
<thead>
<tr>
<th>P/N</th>
<th>Description</th>
<th>Pcs</th>
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<tbody>
<tr>
<td>5778600</td>
<td>Air filter</td>
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</tr>
<tr>
<td>5778001</td>
<td>Jet carrier complete</td>
<td>2</td>
</tr>
<tr>
<td>5778000</td>
<td>Jet carrier complete</td>
<td>1</td>
</tr>
<tr>
<td>5778700</td>
<td>Filter</td>
<td>1</td>
</tr>
<tr>
<td>5959902</td>
<td>Mini-check valve</td>
<td>1</td>
</tr>
</tbody>
</table>
VACUUM TOILET
5900204  PNEUMATIC PUSH BUTTON, EVAC 90, FLOOR MODELS, STAINLESS STEEL

- 5900200 Push button, complete
- 3510100 Bellow
- 5430105 Installation kit
- 5430108 Protecting pipe