How to Use CEPA Z-41 High Speed Centrifuge

References:
1. Instruction from manufacture  
   (from Ernie Allsopp, New Brunswick Scientific Inc.)
2. Picture taken by Sung-Hye

Prepared by Sung-Hye H. Grieco  
Single Cell Fermenter Suite  
Centre for Blood Research  
University of British Columbia  
2350 Health Sciences Mall  
Vancouver, BC, V6T 1Z3  
Office Tel: 604-827-4356  
sunghye@interchange.ubc.ca  
www.cbr.ubc.ca/fermenter.htm

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General picture

Headbearing Z41
Housing nut for clamping seal
Spindle protective sleeve
Outlet compl. DN25
Bowl for clarifying Z41
Footbearing bush
Footbearing with inlet
Housing

Assembly kit- motor
Protective hood above
Protective hood below
Motor

Assembly kit- tension pulley
Tension pulley complete
Protective cap

Assembly kit- protective hood
Belt 1400*25
Pulley

Assembly kit- pulley
Footbearing with inlet
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Tool (inventory on Sept 2007)

Hexagon socket screw key WS 5 (don’t have)
Hexagon socket screw key WS 6 (don’t have)
Hexagon socket screw key WS 8 (don’t have)

Coupling wrench SW 20
Cylinder wrench SW 20

Brush for cylinder cleaning (don’t have)
Scraper Z41 for cleaning cylinder
Shaver Z41 for cleaning cylinder

Wrench for cylinder bottom Z41

Wrench for pivot ring Z41 with tommy screw

Hook spanner size 40/42 for opening footbearing body
Hook spanner size 30/32 for opening footbearing cap
Hook spanner size 52/55 for footbearing nut (don’t have)

Wrench for accelerating gyro (don’t have)
A: with bottom valve: wrench (a) for bottom valve
B: with accelerating gyro: wrench (b) for acc. gyro

Cleaning box Z41 (don’t have)
A: collecting tray open version
B: collecting tray closed version

Hook spanner size 68-75 for separating ring nut (don’t have)
Coupling wrench SW 20
Cylinder wrench SW 20

Scaper Z41 for cleaning cylinder
Shaver Z41 for cleaning cylinder

Wrench for cylinder bottom Z41
Wrench for pivot ring Z41 with tommy screw

Hook spanner size 40/42 for opening footbearing body
Hook spanner size 30/32 for opening footbearing cap
Clarifying cylinder

1. Clarifying bowl (Head + Tube)
2. Protective cap
   For cylinder thread PVC
3. Bottom Seal asbest-free
4. Cylinder bottom with bottom valve
5. Pivot ring
6. Accelerating gyro with Valve box
7. Valve
8. Valve Gasket
9. Foil made of PTFE
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- Clarifying bowl (Head + Tube)
- Protective cap
- For cylinder thread PVC (Not shown here)???
- Foil made of PTFE (don’t have)
- Accelerating gyro with Valve box
- Bottom Seal asbest-free
- Cylinder bottom with bottom valve
- Valve Gasket
- Valve
- Pivot ring
Cylinder cover

1. Cover Z41 SS 316
2. Lower Tray
3. Sleeve Seal
4. Tray Seal

Dimensions:
- Cylinder cover: 720 x 410
- Tray: 300 x 375
- Sleeve Seal: 1170 x 400
- Lower Tray: 380 x 375
- Tray Seal: 392 x 375
- Ø29,7 Ø50,5
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Sleeve Seal
Cover Z41 SS 316

Tray Seal
Lower Tray
Tray Seal
Headbearing

- Spindle pulley
- Flat head screw
- Head bearing cover
- Ball bearing girder
- Nilos ring
- Housing of head bearing

1. Spindle screw
2. Coupling star with outer cone
3. Coupling star with inner cone
4. Coupling rubber
5. Disk spring
6. Distance ring for head bearing
7. Seeger circlip ring
8. Spindle Z41
9. Coupling nut Z41
How to use CEPA Z-41 High Speed Centrifuge prepared by Sung-Hye

- Spindle pulley
- Flat Head Screw
- Head bearing cover
- Housing of head bearing
- Spindle Z41
- Coupling nut Z41
Footbearing (with inlet)

Foot bearing sleeve — 5
Guide ring — 4
Disc — 3
Foot bearing body — 2
Footbearing — 1

Nozzle
Safety regulations

Operation of Centrifugal machines of the type Z41 is only permitted with fitted trays and locked spindle protective sleeve.

Electro-automatic lock is fitted to the casing head.

Electrical locking

After connecting to power supply and switching the main switch on, the Centrifugal machine can only be put into operation if the spindle protection sleeve has been locked. Upon standstill of the cylinder, the time relay for deceleration time bonding must have elapsed or, in the event of built-in sandstill monitoring, the signal for cylinder standstill must have been tripped. If the cylinder is moving, safety regulations require that the spindle protection sleeve must be locked.

After actuating the main switch or the button, “ON” and during operation in white signal lamp is lightening.

![Attention]

Do not open spindle protection sleeve by force!

In spite of its high speed, the CEPA High Speed Centrifuge is an insensitive machine. The centrifuge is equipped with cylinders with a content of 2 – 10 dm³.
Application

According to the accessories and execution the High Speed Centrifuge is suitable for continuous clarifying of liquids, or separating of 2 liquids with different specific density.

The centrifuge may only be used for materials which are cleared with the manufacturer. Before using any other materials, it is necessary to obtain written approval from the manufacturer!!

Assembly/ Installation

The centrifuge must be assembled in such a way, that it can be comfortably operated from the front as well as from all sides. By means of a water level it must be adjusted an fixed with heavy-duty bolts.

Connection

In the case of designs without control cabinet, the electric cables for the centrifuge are to be wired to the terminal box mounted on the centrifuge casing. The control required for operation is to be installed by the operator in accordance with the latest version of “EN 60 204, part 1” and any applicable local regulations. (The terminal plan is attached to these operating instructions.)

In the case of designs with control cabinet, the electrical connection must be carried out according to circuit diagram in the control cabinet. The control cabinet must be located in the vicinity of the centrifuge so that the main switch is easily accessible at a height between 0.6 and 1.9 m above the access level.

Any chance of explodable atmospheres occurring at the point of installation must be eliminated. This does not apply if the centrifuge has been constructed for such conditions!!
Rotational direction of the cylinder

The rotational direction of the cylinder is clockwise, i.e. to the right if one views the centrifuge from above. The rotational direction is marked on the operator side of the centrifuge by a black arrow.

⚠️ Attention

Before checking the sense of rotation, the belt protective hood has to be disassembled, and the belt be removed, to avoid damage of the spindle !!!

Locking of the spindle protective sleeve

The centrifuge is fitted with an electro-magnetic lock of the spindle protective sleeve in compliance with latest safety regulations. It can only be operated when the trays are assembled and the protective sleeve is locked. The protective sleeve may only be released, on standstill of the cylinder, resp. the run-down time is run down. Due to security reasons, on execution with run-down relay, after each switch-on of the main switch, a complete run-down time is effected. The protective sleeve is locked in currentless condition (power failure).

⚠️ Attention

On failure of the run-down relay the spindle protective sleeve can be released before stanstill of the cylinder. In this case please stop the machine immediately and contact the service department.
Inspect, assemble, and grease the footbearing
## Table of Grease

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>605-13812</td>
<td>Bearing grease &quot;Lycos MZ 3H&quot;</td>
<td>for lubrication of the pivot ring and the guide ring; for footbearing between guide ring girder and footbearing body (Z 61 – Z 101); for lubrication of the cylinder bottom thread. Identification: lidded box with label &quot;Spezial-Lagerfett&quot;</td>
</tr>
<tr>
<td>605-13064</td>
<td>Grease &quot;KLÜBER&quot;</td>
<td>Usage only in foodstuff industry; otherwise bearing grease &quot;Lycos MZ 3H&quot;. Identification: 20 g tube with label.</td>
</tr>
</tbody>
</table>
Assembly of the cylinder

The cylinder consists of two main parts. The **cylinder tube with cylinder head** and the **cylinder bottom**.

The cylinder is balanced together in a particular attitude of the two parts, which are marked with a ‘V’.

On execution with three-wing insert also the insert is marked with ‘V’. The insert shall be installed into the cylinder in such a way, that the marked wing is accurately under the ‘V’ mark of the cylinder tube and the spiky end of the insert stand proud of the tube.
Depending on the condition of the cylinder bottom gasket, the ‘V’ mark of the cylinder bottom may vary up to 30 mm of the ‘V’ mark of the cylinder tube (anti-clockwise with new gasket, clockwise with worn down gasket). On variety of more than 30 mm (clockwise) the gasket should be replaced.

The cylinder bottom shall be tightened firmly by means of the cylinder bottom wrench supplied (Short hammer blow to the shaft of the wrench).
Before installing the cylinder into the centrifuge, please check the **pivot ring** at the cylinder bottom and replace it in case of erosion. To avoid damages of the replaced pivot ring, it is necessary to mount it with the special wrench (with tommy screw).

The **pivot ring** and the **thread of the cylinder bottom** must be **greased (same grease for footbearing)** before each assembly of the cylinder.
Assemble the centrifuge

1. Switch-on the **main switch**, that the locking of the **spindle protective sleeve** will be released. *(Nevertheless the centrifuge cannot be started unattended, as the position of the locking pin will be interrogated).*

2a. Push the complete (inspected and assembled) **footbearing** carefully from beneath into the **housing**.

2b. Arrest it by screwing-in the **footbearing** into the **housing** (lefthanded thread) and tighten with supplied hook key *(SH’s note: use 40/42).*
Nozzle 3 mm

Footbearing Inlet

Hook spanner 40/42
3a. Lodge the cleaned and complete assembled cylinder carefully from above into the centrifuge housing.

5. Remove the protective cap (spindle protective sleeve) from the cylinder head and screw upwards into the headbearing. *(SH’s note: Also, Spindle is pushed up to the cylinder head).*

3b. The pivot ring in the cylinder bottom must be located in the guide ring of the footbearing *(SH’s note: Push down the cylinder and see if you can feel the spring (foot bearing body)).*
4. Assemble the **tray** with tray **cover**. Please pay attention to centrical seat of the trays.

5. A light knock to the superior **spindle** with the flat hand and let it fall into the other hand beneath. The spindle may not fall to the plane face of the cylinder, as a proper running of the cylinder is only ensured with proper **coupling face**!

6. Verify the **coupling face** on **spindle** and **cylinder**, if necessary clean it.
8. Screw and tighten the coupling nut and the cylinder with the provided wrench. The coupling star at the upper part of the spindle must rest in the corresponding hollow of the counterpart of the headbearing.

9. Unscrew the spindle protective sleeve from the headbearing to the tray cover.

Now the centrifuge is ready for operation
Operation (specified for Rm4.332 in LSI building)

1. Turn on **main switch** (behind of the centrifuge toward computer for F#5, F#6, and F#7).

![Image of main switch](image1)

2. **Press-in** the key attached to the cylinder head to lock the spindle protective sleeve. Then, **key can be released** from the centrifuge.

![Image of key attachment](image2)

3. Put the **very same key** released from the centrifuge into the **control cabinet** (right side of the door).

![Image of control cabinet](image3)
4. Press the button ‘**CENTRIFUGE ON**’.

![Image of a control panel with a button highlighted]

5. The cylinder accelerates to **operation speed**.
6. **Feed the product** via a connection through the nozzle in the footbearing.

If the liquid does no longer achieve the requested percentage purity, please stop the feeding of the centrifuge.
If no liquid flows from the collecting trays, the centrifuge must be stopped.

**Stopping the centrifuge:**
1. By actuating the button ‘**CENTRIFUGE OFF**’. or
2. By actuating the button ‘**EMERGENCY STOP**’

![Image of a control panel with buttons highlighted]

Collecting box must be placed beneath the footbearing to collect the remaining liquid in the cylinder.
Product feeding and regulation of the throughput capacity

1. The feeding will be effected by natural gradient or by a pump. The vertical stream from the nozzle must reach a height of 200 mm. This preventing that a part of the liquid does not reach the cylinder and drops out at the bottom of the footbearing.

2. In order to avoid friction losses, the conduits have to be chosen as large as possible and reduction must be made shortly in front of the centrifuge by an adjustable valve. With this valve the throughput capacity can be regulated.

3. To the centrifuge 3 nozzles with different diameters are enclosed. The choice of the nozzle depends on the viscosity of the product and the required throughput capacity. If centrifugation is to be effected at a low capacity, a small nozzle is chosen, if a satisfactory result can be reached at a high capacity, a big nozzle is chosen.
Removal of the cylinder

1. Actuate button “CENTRIFUGE OFF’ from the control cabinet.

2. Release key from the control cabinet and put into centrifuge.

3. Push the key in to rotate it to release the locking of the spindle protective sleeve.

4. Screw the spindle protective sleeve upwards into the headbearing.
5a. Disconnect the **spindle** from the cylinder with the two spanners.

5b. Push the spindle upwards with the hand, where it is retained in the cone of the hollow axle.
If the cylinder is equipped with a bottom valve, it is filled with liquid on removal. Therefore the cylinder should be removed rentically and discharged at suitable place!!

6a. Lift the collecting trays

6b. Push the cylinder to the left and remove cover (together with collecting trays).

7. Remove the cylinder upwards.
Cleaning of the cylinder

1. Put the cylinder on a table.
2. The cylinder bottom should be loosened by a slight hammer blow on the shaft of the cylinder bottom wrench.

3. If available, remove the **three wing insert** (optional) from the cylinder with a hook. When very hard sediments are involved, a special drawing out device can be supplied on request.

4. Clean carefully the cylinder, bottom valve and insert with the provided **scraper**, **shaver** and brush. Only a properly cleaned cylinder will enable a smooth running of the centrifuge.
5. Clean the separating ring resp. the clarifying sleeve.

⚠️ **Attention**

Clean the cylinder immediately after use !!
Clarifying cylinder

The clarifying cylinder serves for separating of solids from a liquid. At the cylinder head some discharge holes are available. The clarifying cylinder is ready for operation after proper assembly and insert into the centrifuge.
Separating cylinder

The separating cylinder serves for separating of two liquid phases. Two different diameters are available, situated at the cylinder head. The upper discharge holes with the smaller borings are for the light liquid phase, the lower discharge holes with the larger borings are for the heavy liquid phase. The separating cylinder is delivered with a clarifying sleeve, which close the lower discharge holes completely. Therefore the cylinder can be used as a clarifying cylinder. The assembly of the clarifying sleeve correspond to the assembly of the separating rings mentioned thereafter.

Depending on the different density of the liquid phases to be separated, the lower discharge hole at the cylinder head has to be equipped with a separating ring. The separating rings are different in it’s inner diameter. To choose the suitable ring for a proper separation, proceed as follows:

• Unscrew the separating ring nut (lefthanded) with the delivered hook key.
• Install first the gasket than the separating ring with middle diameter.
• Screw on the separating nut and tighten it with a short hammer blow to the shaft of the key.
• Assemble the centrifuge as described in chapter 6.
• Start the centrifuge until operating speed.
• Feed the cylinder with the heavy phase, until it flows to the lower collecting tray.
• Fill in the mixture to be separated.
• If in the heavy phase are still particles of the light phase after discharge of the lower collecting tray, the separating ring has to be changed against a ring with a smaller diameter, as long as the heavy phase remains only.
• If in the light phase are still particles of the heavy phase after discharge of the upper collecting tray, the separating ring has to be changed against a ring with a smaller diameter, as long as the light phase remains only.

If the suitable separating ring is chosen, from the lower collecting tray may only flow-out the heavy phase and from the upper collecting tray the light phase only !!