

ROTH high-pressure laboratory autoclave, Models 0 and I 50 ml, 100 ml working volume

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Operator's manual

Please read carefully before use !

1. Description

Models 0 and I laboratory autoclaves are made of V4A-stainless steel and are predominantly used for pretesting. They are designed for max 100 bar working pressure and max. +300 °C working temperature. The autoclave consists of a cylinder and a screw-on head. The head has a G ¼" threaded opening on the top for connecting an adapter (Dia. 1) to attach the bursting disc, indicator manometer and valve. The threaded opening can also be plugged with a screw-on stopper. When working under pressure it is essential for safety reasons to equip the laboratory autoclave with a bursting disc locking device, manometer and valve.

The autoclaves are sealed with flat gaskets made of PTFE (for max. +180 °C working temperature) or fine silver (for max. +300 °C working temperature).

2. Unpacking

Please unpack the unit carefully and check for any possible damage. It is essential that any signs of transport damage are recognized upon unpacking or, if applicable, the details of any damage are recorded by the carrier (post, forwarding agent or railway).

Please make sure that the threads are not damaged or soiled.



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Assembly and Operation

3.1 Assembly Instructions

To save and protect the threads, they should be treated with PTFE-spray before screwing (max +260 °C).

The adapter (T-adapter) should be screwed together first in the following order:

a. Bursting disc

First place the fine silver gasket, No. 15 (2) in the opening (1), then place the bursting disc 8-100 E (3) on top with the camber facing outwards. Take care that it is lying in the middle of the opening. Then screw in the locking screw (4) and tighten it as firmly as possible with screw-wrench No.19. Please make sure that the bursting disc does not slip. Screw the safety cage over the bursting disc holder.

Attention: The bursting disc must be replaced when full load has been applied.

b. Manometer

Second place gasket No. 18/20 into the top opening of the adapter, screw in the manometer and tighten slightly with screw-wrench No. 22.

c. Valve

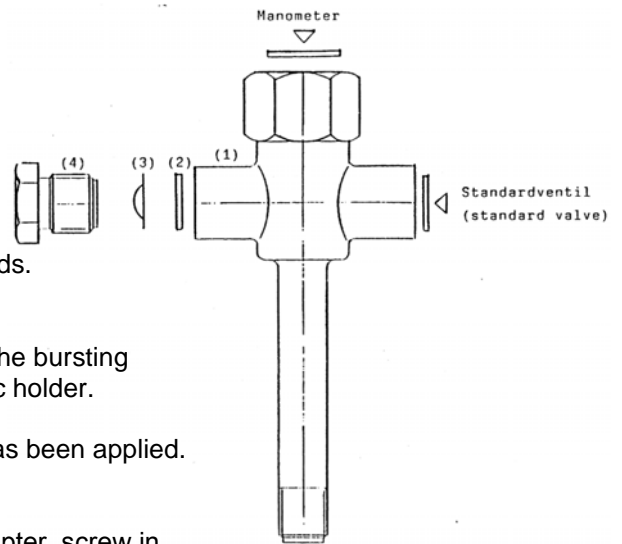
Third place gasket No. 12 into the side opening, screw in the valve and tighten slightly with screw-wrench No. 17.

When tightening valve:

Do not close the valve with force. The needle valve will close even after only being slightly turned.

d. Adapter

The entire adapter with the bursting disc, manometer and valve can now be screwed into the adapter opening of the autoclave head (place gasket No. 12 underneath) and tighten slightly with screw-wrench No. 27.

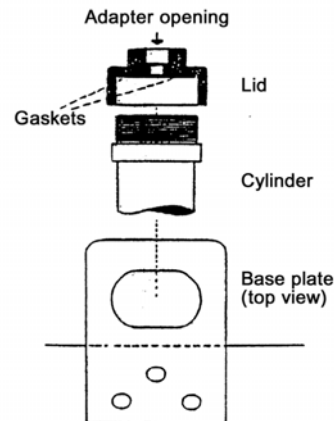


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Finally place the large gasket 40/42 into the autoclave head and then screw the head plus adapter to the autoclave cylinder. Slightly tighten the head and cylinder with screw-wrenches No. 27 and No. 41.

The diagram shows assembly of the autoclave with the correct position of the gaskets. The bursting disc, valve and manometer adapter should be screwed into the top adapter opening.

Screw the part for assembly onto the worktop as illustrated opposite. Placing the autoclave into the appropriate opening, enables it to be screwed together easily with a screw-wrench.



3.2 Screw joints

a. Bursting disc

A fine silver gasket should always be placed under the bursting disc for safety reasons. Because the silver gasket is relatively hard, the locking screw for the bursting disc must be screwed tightly to prevent the bursting disc from being pressed out when under pressure. Bursting disc 8.100 bursts at 110 bar $\pm 10\%$. It is naturally very sensitive and can no longer be used even after being only slightly damaged. Please make sure during assembly that the camber points are positioned in the direction of the pressure.

b. Adapter, manometer, valve, autoclave cylinder and head.

To protect the threads they should be treated with PTFE-spray before screwing. When attaching the screw-on parts, care should be taken that the thread is not screwed on slantwise, which can cause the threads to seize (cold-welding). The parts should be screwed in and, when using PTFE-gaskets, slightly tightened with the appropriate screw-wrench. We recommend not screwing too tightly when using PTFE-gaskets at the beginning, otherwise deep indentations from the pressure will form and the gaskets can no longer be used after a short time. However, when using fine silver gaskets the parts must, because of the relatively hard fine silver, be screwed as tightly as possible to obtain a perfect seal.

The autoclave may not be clamped in a vice. The support rod used for fixing the autoclave has proved to very useful when screwing the autoclave cylinder.

Damaged gasket rims and threads may not be used. They should also always be cleaned carefully when dirty.

c. Gas distribution

Gas is distributed in the autoclaves directly via the valve. The PTFE-high-pressure tube is connected to the valve on one side and to the gas bottle through the reducing screw joint (place gasket No. 12 underneath) on the other.



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3.3 Sealing

The autoclave and all screw-in accessories such as bursting disc, manometer, valve are sealed with flat gaskets made of PTFE (max. +180 °C working temperature) or of fine silver (max. +300 °C working temperature).

For safety reasons the bursting disc must be sealed with a fine silver gasket.

The threads are subjected to high mechanical stress, therefore to protect and lubricate (stainless steel on stainless steel is hard running) the individual parts PTFE-spray should be used when screwing them. The PTFE-spray, e.g. PTFE-spray, Roth Art. No. K007.1, can be applied to max. +260 °C.

When using the relatively soft PTFE-flat gaskets, it is sufficient to slightly tighten the screw-on parts with the appropriate screw-wrench. However, when using fine silver gaskets, it is necessary to screw the parts as tightly as possible, because of the relatively hard fine silver, to obtain a perfect seal.

Damaged gasket rims and threads may not be used. They should always be cleaned carefully when dirty.

If you are unable to seal the laboratory autoclave, please localize the untight spot, then check the position of the gasket and its condition. If necessary, retighten with a screw-wrench.

3.4 Safety

The high-pressure laboratory autoclave is manufactured, tested and coded in accordance with the safety regulations for pressure chambers. The laboratory autoclave undergoes a compression test of 300 bar at 20 °C. In accordance with engineering standards TRB 403, the autoclave is to be operated with a bursting protection, a valve and a pressure measuring device. The named safety devices are to be mounted to the autoclave lid via an adapter. The autoclave is heated with heating jacket 10 S. To obtain optimal heat distribution and utilization, the heating jacket has been adapted exactly to the dimensions of the autoclave.

The laboratory autoclave offers a great degree of safety because of its construction, the rigid test conditions and the bursting disc. Nevertheless, working at high pressure remains dangerous. The laboratory autoclave must, therefore, be set up in such a way that no-one can be injured through decomposition or overpressure caused by overheating or due to unexpected reactions. We also advise setting up the operating elements of electrical attachments in such a way that they can always be switched off.

3.5 Operation

High-pressure laboratory autoclaves are to be operated in accordance with the safety regulations for pressure chambers. Our laboratory autoclaves are experimental autoclaves. The engineering standards for pressure chambers TRB 801, in particular pressure chambers defined in Paragraph 12 of the regulations for pressure chambers, must be observed.

Experimental autoclaves must be checked by a specialist after each application.



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Experimental autoclaves must be set up in special chambers or behind protective walls designed in such a way that the autoclaves are protected against outside influences and that all employees or third parties are protected should the autoclaves be overcharged. Safety and measuring equipment must be controlled and operated from a safe place. Pressure and temperature must be continuously controlled and recorded when operating experimental autoclaves in accordance with safety requirements.

For safety reasons, the autoclave should be subjected to a compression test regularly depending on the mechanical strain.

Attention: The bursting disc must be replaced when full load has been applied.

4. Heating and Stirring

The high-pressure laboratory autoclaves are heated with heating jacket 10 S specially constructed for the autoclave. The heating jacket has been adapted according to the dimensions of the autoclave to obtain optimal heat distribution and utilization. The heating jacket has a temperature control of max. +300 °C. Stirring in the autoclave cylinder is performed by a magnetic stirrer built-in into the heating jacket. This stirrer will activate a PTFE-coated stirring magnet inserted in the autoclave via a rotary magnetic field and will produce infinitely adjustable stirring without direct drive in the closed autoclave.

5. Maintenance and Cleaning

The high-pressure laboratory autoclaves must be checked by a specialist after each application. Autoclave cylinder and head should be unscrewed and taken apart for storing as the material in combination with the thread can lead to cold-welding of the parts. V4A-steel laboratory autoclaves can, depending on the soiling and substances used, be cleaned with a suitable solvent or with Roth RBS®-Neutral special cleansing agent, Art. No. 0180.1. The RBS®-Neutral concentrate has an excellent cleaning effect and should be added to water at a concentration of 4-6 %.

6. Technical Specifications

	Model 0	Model I
Inner volume:	75 ml	135 ml
Working volume:	50 ml	100 ml
Height:	approx. 135 mm	approx. 220 mm
Weight:	approx. 835 g	approx. 1210 g
Material: V4A-stainless steel	1.4571	1.4571
Working temperature:	from -60 °C to +300 °C	from -60 °C to +300 °C
Working pressure:	max. 100 bar	max. 100 bar
Test pressure:	300 bar at 20 °C	300 bar at 20 °C
Outer diameter of cylinder:	40 mm	40 mm
Inner diameter of cylinder:	30 mm	30 mm
Outer diameter of head:	54 mm	54 mm
Base form: outside and inside	flat	flat
Adapter opening in head f:	G ¼"	G ¼"



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7. Warranty

The high-pressure laboratory autoclave has been manufactured with extreme care and has been subjected to a pressure test of 300 bar (20 °C).

The guarantee period covers 6 months according to the terms below:.

We shall eliminate all defects arising from material and/or manufacturing errors within the guarantee period either by repairing or exchanging the parts or by replacing the unit. Replaced parts or units will fall under our ownership. The warranty does not cover damages which have occurred as a result of incorrect handling and use. Faults which only have an insignificant effect on the value of the unit or its efficiency during use are also not covered.

The warranty expires if the machine has been tampered with by non-authorized persons, or if other than original spare parts and accessories have been used.

The warranty period is not affected by the performance of any guarantee services. The warranty for replaced parts ends with the expiration date of the guarantee period for this laboratory autoclave.

Should you have a warranty claim, please send us the laboratory autoclave or the faulty part with an exact description of the complaint together with the invoice number and date. We will not accept liability for any other defects or claims for damages unless liability on our part is mandatory.



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