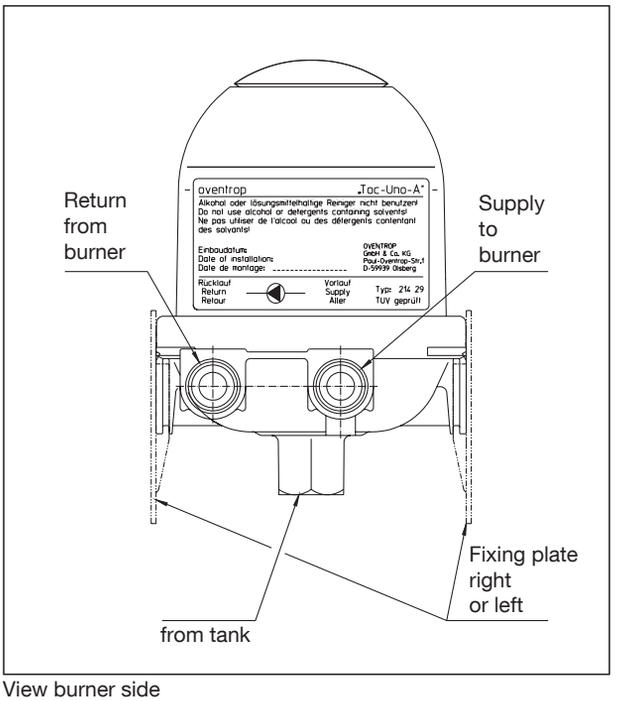
Tender specification:

Oventrop heating oil deaerator “Toc-Uno” for use in one pipe heating systems with return flow feed (suction system) for automatic deaeration of heating oil. Deaerator body made of metal, with wall bracket. Deaerator cap made of transparent plastic, for “Toc-Uno-B” made of metal.

Connections for the suction pipe to the tank G ¼ female thread. To the burner G ¼ female thread or G ⅜ male thread with inner taper for hose connection.

Models:	Item no.:
“Toc-Uno-A”	2142951
- tank side G ¼ female thread, with flexible hose for connection to heating oil filter, G ¼ male thread x G ⅜ collar nut, 300 mm long - burner side G ⅜ male thread with inner taper for burner hoses with G ⅜ collar nut	
“Toc-Uno-A”	2142901
- tank and burner side G ¼ female thread, without accessories	
“Toc-Uno-A”	2142900
- tank and burner side G ¼ female thread, with the following accessories: 2 double nipples G ¼ male thread x ¾ male thread with inner taper for burner hoses with G ⅜ collar nut	
“Toc-Uno-B” metal model	2152951
similar to item no. 2142951 but deaerator cap made of metal	

“Toc-Uno”

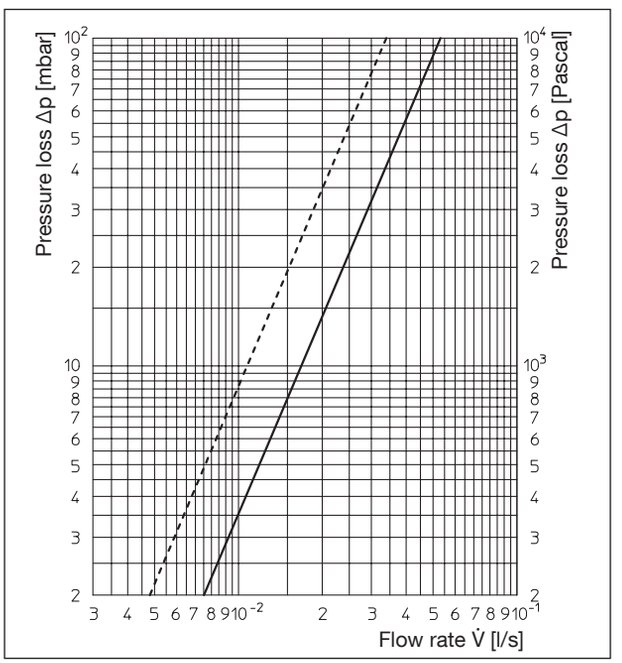


View burner side

Technical data:

Connections	
Tank side:	G ¼ female thread
Burner side:	G ¼ female thread or G ⅜ male thread with inner taper for hose connection
Medium:	EL type of heating oil according to DIN 51603-1, heating oils with “alternative additives” or with a bio proportion up to 20%, e.g. heating oil EL A Bio 20 according to DIN SPEC 51603-6. The metal model “Toc-Uno-B” is recommended for heating oils with higher “alternative additives”, thin vegetable oils as well as FAME according to DIN EN 14214.
Max. nozzle capacity:	110 l/h
Max. flow of returned heating oil:	120 l/h
Min. deaeration capacity:	6 l/h air or gaseous vapours
Installation position:	vertical , deaerator cap pointing upwards
Max. ambient temperature:	60 °C *
Max. operating temperature:	60 °C * (“Toc-Uno-B” up to 70 °C)
Max. operating pressure:	0.7 bar corresponding to a static column of oil of 8 m for tanks located at a higher level
Max. suction pressure:	-0.5 bar
Max. test pressure:	6 bar
Dimensions [mm]:	107 x 97 x 133
(L x D x H)	with female thread: 95 x 97 x 133
TÜV tested:	TÜV Rhineland, No.: S138 2014 E5

*according to DIN 4755, the max. permissible temperature of heating oil in heating oil installations is 40 °C

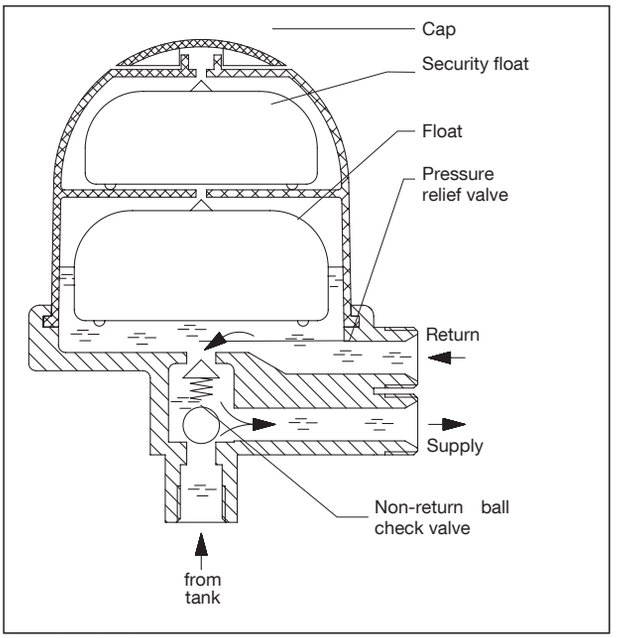


Flow chart (EL type of heating oil):
——— Pressure loss during suction
- - - - “Toc-Uno”with heating oil filter and connecting hose

Function:

Oventrop heating oil deaerator “Toc-Uno” for an automatic deaeration of heating oil.

The burner pump draws oil through the suction pipe via the filter mounted in front of the deaerator and the check valve. The filter retains dirt particles. Normally, a small portion of oil is pumped to the nozzle by the burner pump (per 10 kW of heat output about 1 litre of oil per hour). The excess is fed into the deaerator via the return pipe. Air and gaseous vapours rise and are expelled into the atmosphere via the float valve. The deaerated oil is fed into the supply pipe via the pressure relief valve. As a result, only the used quantity is drawn from the tank via the suction pipe and filter. At the same time, the working temperature of the oil pump is used for pre-warming the oil.



Functional scheme

During operation, a relatively constant filling height will be present in the lower part of the deaerator cap. Depending on the working conditions, this part may even fill up completely.

If heating oil enters the upper part with the security float, the “Toc-Uno” has to be replaced.

Installation:

The heating oil deaerator is to be installed at a suitable location with the help of the enclosed fixing plate. To mount the “Toc-Uno” on the burner wall with the help of the enclosed sheet metal screws, provide 3 mm bore holes. Care must be taken that the max. ambient temperature does not exceed 60 °C, i.e. do not mount the “Toc-Uno” near an un-insulated part of the boiler or the exhaust pipe or above flaps of the heating which can be opened.
The heating oil deaerator is to be installed vertically.

It can be installed above or below the oil level.

For function control, the “Toc-Uno” is to be installed in a prominent position which is easily accessible.

When converting two pipe systems to one pipe operation, the pipe dimension has to be reduced if required, see “Sizing of the suction pipe”.

The supply and return connection must not be mixed up as this may cause damage to the “Toc-Uno” and the burner pump.

Note:

For technical reasons, deaerators filled with oil must not be inclined too heavily or be laid down. Please drain off the oil first.

If constructional conditions allow, the pipe should be installed in such a way that it acts as “self-monitoring suction pipe”. It has to be installed with an even decline towards the tank and all check valves in front of the “Toc-Uno” have to be removed. If a leakage occurs, the column of liquid in the declining pipe breaks off.

Pressure test:

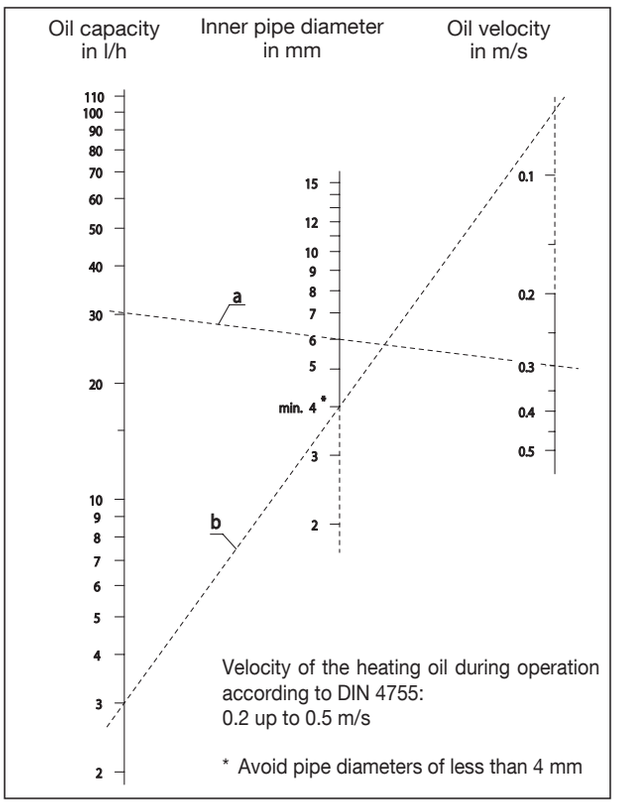
When carrying out a pressure test of the suction pipe, the pressure test device must not be connected to the “Toc-Uno” as the integrated check valve will prevent the pressure transmission on the tank side.

Moreover, the float valves of a new, unfilled “Toc-Uno” are open so that it should not be included in the pressure test.

Note:
Do not use detergents containing alcohol or solvents as these may damage the plastic parts.

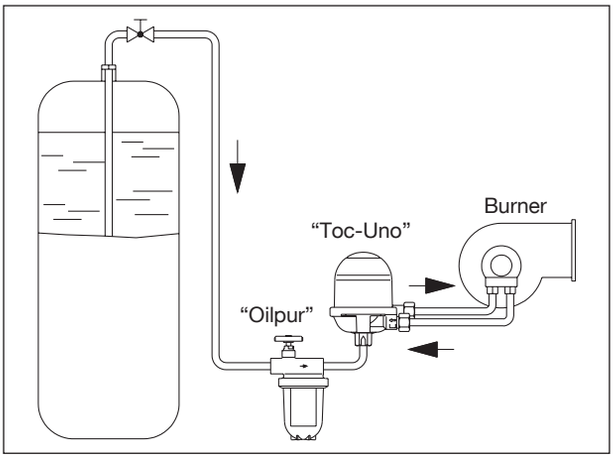
Sizing of the suction pipe:
The suction pipe towards the tank should be sized in such a way that the velocity of the heating oil during burner operation is between 0.2 and 0.5 m/s (DIN 4755). This is especially valid for pipe sections leading downwards. If the suction pipes are oversized, velocity is reduced in such a way that the gas emissions are not transported constantly and gather as big air bubbles in upper pipe sections. If a big air bubble reaches the burner pump, it may cause a malfunction.

For small burner units in detached and semi-detached houses, the inner pipe dimension of 4 mm (e.g. pipe 6 x 1) is often sufficient. Apart from the velocity, the flow resistance and the suction height have to be taken into consideration.

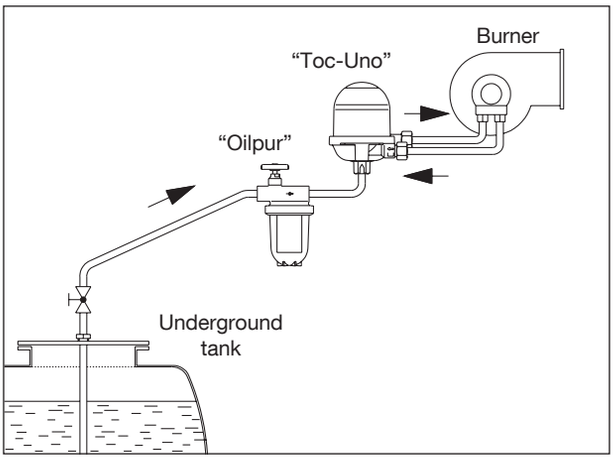


Nomogram

Examples:
a) For a pump output of 30 l/h (about 300 kW), with a medium suction speed of 0.3 m/s, a pipe of 8 x 1 with an inner diameter of 6 mm is required.
b) A small installation with a heat output of 30 kW, corresponding to a flow rate of 3 l/h, is equipped with a pipe 6 x 1 with an inner diameter of 4 mm. The velocity is very low then (about 0.07 m/s), but possible airlocks are very small and do not cause malfunctions.



System illustration:
Installation of the “Toc-Uno” below the oil level



System illustration:
Installation of the “Toc-Uno” above the oil level

Formation of oil froth and possible malfunctions:
Oil froth may develop if large quantities of air are delivered via the burner pump together with the heating oil. These may lead to malfunctions of the burner.

Possible reasons are:

– Leakage in the suction pipe
(seal, re-tighten fittings)
– Initial operation of the suction
(if required, fill pipe before)
– Oversized suction pipe
(install smaller pipe, see “Sizing of the suction pipe”)
– Storage tank empty
(refill heating oil)

Pressure operation:
The “Toc-Uno” must <u>not</u> be used under pressure, i.e. behind a feed pump in the supply pipe. This is not sensible as air is only emitted in suction operated systems .

According to DIN 4755 is must be ensured that in closed pipe sections a rise in pressure due to an increase in temperature of the heating oil must be balanced off (for instance by installing a pressure compensation device, e.g. Oventrop pressure compensation device “Olex”, item no. 2107003). Alternatively, closed pipe sections can be avoided by renouncing check valves.

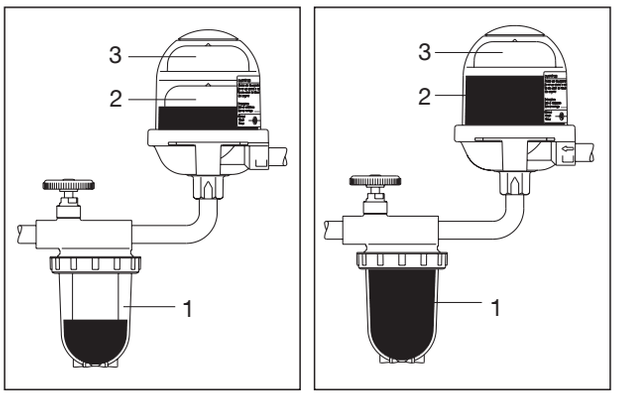
Increased pressure may lead to damage to deaerators and other installed equipment.

Air pockets in the filter cup:

The heating oil is filtered before deaeration and during this process it is possible that some of the air in the oil is retained by the oil moistened filter insert so that an air pocket forms in the filter cup (1). As the inside of the filter cup is filled with oil, the installation continues its operation.

This is especially noticeable where a large portion of air is in the oil or only small quantities of oil are consumed (10 kW ~ 1 l oil/h).

A sinking of the oil level is also possible during burner operation.



Filling height in the deaerator cap:

Depending on the working conditions, different filling heights may develop in the lower part of the deaerator cap (2).

This chamber may also be filled completely, for instance if no gas emissions exist in case of a tank located at a higher level. The existing air may then dissolve in the heating oil between the burner pump and the chamber of the deaerator.

If working conditions change, for instance by a sinking oil level in the tank, a new air cushion may grow.

In case of heating oil in the upper part (3) with the security float, the heating oil deaerator has to be replaced.

Parallel installation of several “Toc-Uno”:

If higher nozzle capacities than 110 l/h are required, it is possible to install two or several heating oil deaerators in parallel. It must be ensured that the maximum return flow does not exceed 120 l/h per installed heating oil deaerator. The return flow is the pump output minus the volume of burnt oil.

Flooding:

The Oventrop heating oil deaerator “Toc-Uno” may also be installed in areas prone to flooding with the height of flooding not exceeding 5 m.

As dirt may block the vent bores which may lead to malfunctions, a replacement of the “Toc-Uno” is recommended after a flooding.

Smell of oil:

The deaerator expels gas emissions into the atmosphere which may lead to smell nuisances in badly ventilated boiler-rooms. In this case, a hose may be pushed onto a hose nipple and the air may be expelled (see accessories). Please ensure that the hose is not obturated.

Accessories:	Item no.:
Bracket with screws	2142892
Hose nipple with 10 mm hose	2142990
Flexible hose according to DIN EN ISO 6806 with ring gasket, G ¼ male thread x G ⅜ collar nut NI 8 300 mm	2142993

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Subject to technical modifications without notice.

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