



The Oventrop Quality Management System is certified to DIN-EN-ISO 9001

Technical information

Heating oil deaerator "Toc-Uno-N"

Tender specification:

Oventrop heating oil deaerator "Toc-Uno-N" for use in one pipe systems with return flow feed (suction system) for automatic deaeration of heating oil. Body of deaerator made of metal, with wall bracket. Float case made of transparent plastic for function control. Connection for suction pipe to the tank $\frac{1}{4}$ " female thread. Connection to burner $\frac{1}{4}$ " female thread or $\frac{3}{8}$ " male thread with inner taper for hose connection.

Item no. 214 29 51

Inlet port (tank side) $\frac{1}{4}$ " female thread

Outlet port (burner side) $\frac{3}{8}$ " male thread with inner taper for hose connection

Accessories: Flexible hose 300 mm, one port $\frac{1}{4}$ " male thread, one port with collar nut $\frac{3}{8}$ " with seal for the connection to a heating oil filter with male thread $\frac{3}{8}$ " on burner side

Item no. 214 29 01

Inlet and outlet port $\frac{1}{4}$ " female thread without accessories

Application:

Oventrop heating oil deaerator for use in heating oil installations (suction systems) which are operated as one pipe systems with return flow feed. A heating oil filter with isolation has to be installed in front of the "Toc-Uno-N". A return pipe back to the tank is no longer required. The "Toc-Uno-N" automatically deaerates the heating oil in heating oil installations.

Technical data:

Connections

Tank side: $\frac{1}{4}$ " female thread

Burner side: $\frac{3}{8}$ " male thread with taper for burner hoses or $\frac{1}{4}$ " female thread

Fluid: Heating oil type EL according to DIN 51603-1 (09.2003)

Max. nozzle capacity: 110 l/h

Max. return flow of heating oil: 120 l/h

Deaeration capacity: min. of 6 l/h air or gas emissions

Installation position: vertical, deaerator cap pointing upwards

Max. ambient temperature: 60°C*

Max. working temperature: 60°C*

Max. working 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:

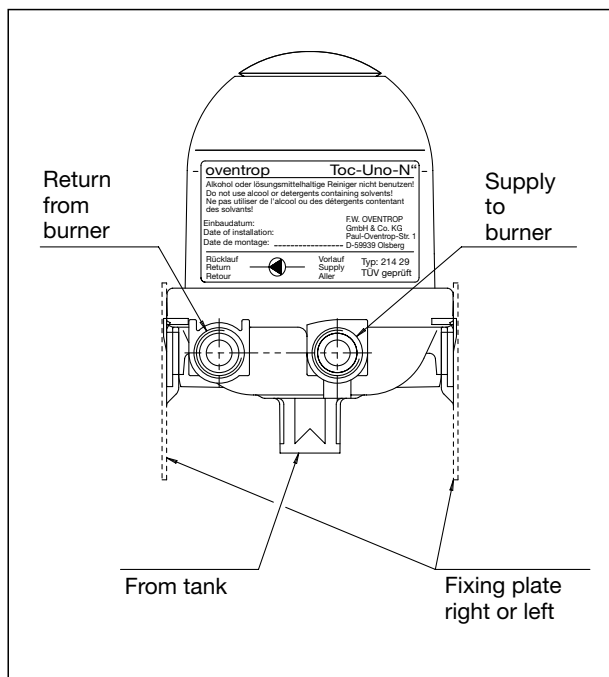
95 x 97 x 133

TÜV tested: TÜV Rhineland, No.: S137 2004 T1

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



View burner side:



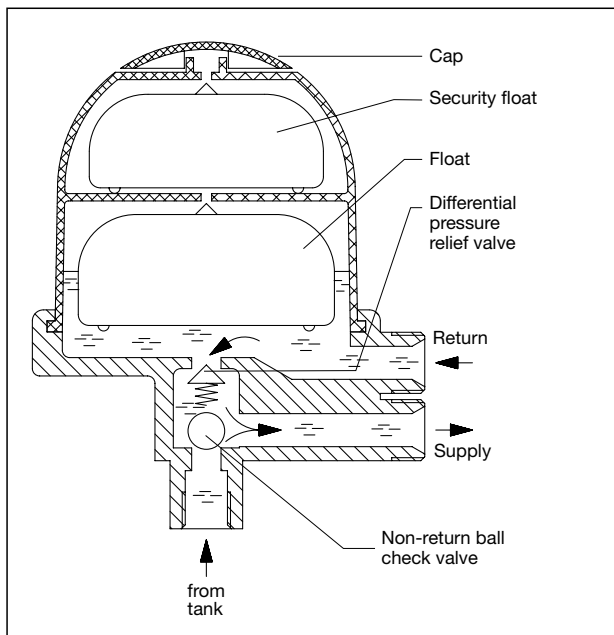
Function:

Oventrop heating oil deaerator "Toc-Uno-N" for automatic deaeration of heating oil.

The burner pump draws oil through the suction pipe via the filter mounted in front of the deaerator, the connection pipe and the check valve. Normally, a small portion of oil is pumped to the nozzle by the burner pump and is burnt (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 gas emissions rise and are expelled into the atmosphere via the float valve. The deaerated oil is fed into the supply via a diaphragm controlled valve. As a result, only the used quantity is drawn from the tank via the suction pipe and the filter. At the same time, the working temperature of the oil pump is used for pre-warming the oil.

Under working conditions, a relatively constant filling height will be present in the lower part of the float case. Depending on the working conditions, this part may even fill up completely.

If heating oil enters the upper part with the security float, the deaerator has to be replaced.

Functional scheme:**Installation:**

The heating oil deaerator is to be installed at a suitable location with the help of the enclosed fixing plate. To mount the latter on the burner wall by use of the enclosed sheet metal screws, provide 3 mm tapping points. Care should be taken that the max. ambient temperature does not exceed 60°C, i.e. not mount the "Toc-Uno-N" 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 and below the oil level.

For function control, the "Toc-Uno-N" should be installed at a location which is well visible and easily accessible.

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

If constructional conditions allow, the pipe should be installed in such a way that it acts as a "self-monitoring suction pipe" according to TRbF 50. It should then be installed with an even decline towards the tank and all check valves in front of the "Toc-Uno-N" have to be removed. If a leakage occurs, the column of liquid in the declining pipe breaks off.

The supply and return connection must not be mixed up as this may cause damage to the deaerator and the burner pump.

Pressure test:

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

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

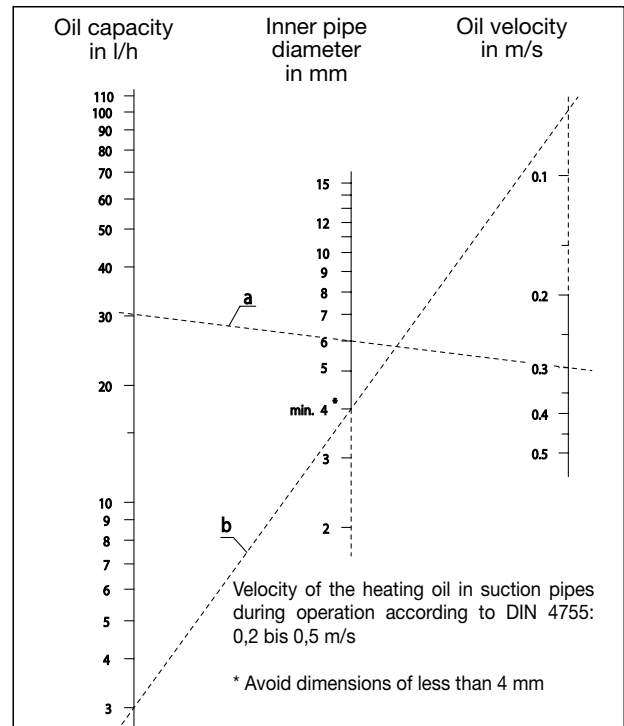
Notes:

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). 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, it may cause a malfunction.

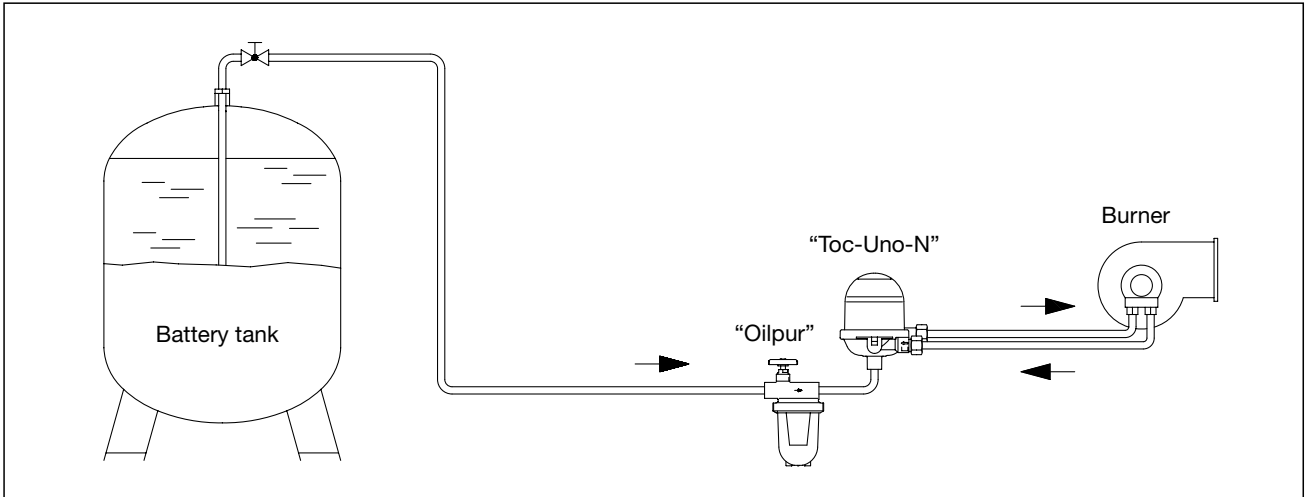
For small burner units in one or two family houses, the inner pipe dimension of 4 mm (e.g. pipe 6 x 1) is often sufficient. Apart from the velocity, the flow resistance and the suction height have to be taken into consideration.

Nomogram:**Examples:**

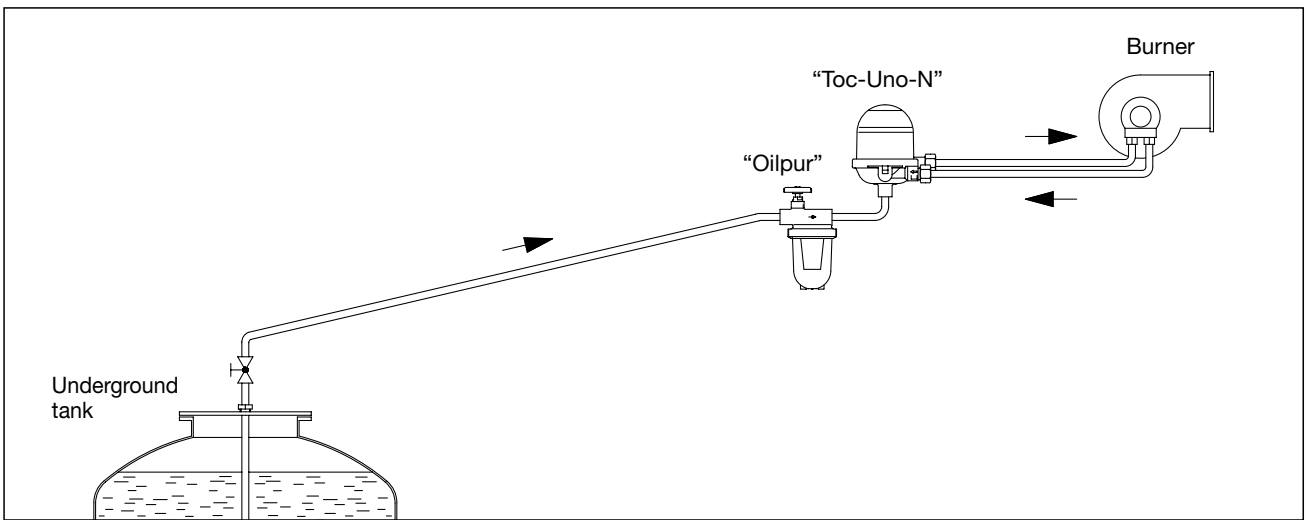
- For a pump capacity of 30 l/h (about 300 kW), with a medium suction speed of 0.3 m/s, a pipe of 8 x 1 mm with an inner diameter of 6 mm is required.
- A small installation with a heat output of 30 kW, corresponding to a flow rate of 3 l/h, is equipped with a pipe of 6 x 1 with an inner diameter of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

Exemples of installation:

Installation of the heating oil deaerator below the oil level, e.g. battery tank

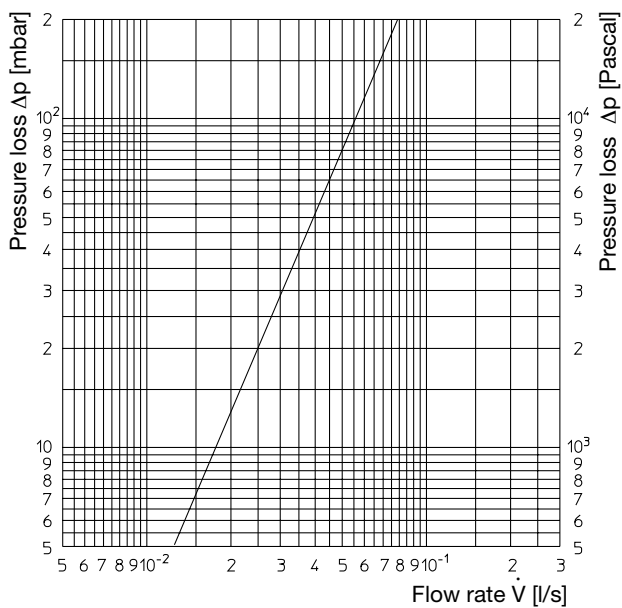


Installation of the heating oil deaerator above the oil level, e.g. underground tank



Durchflussdiagramm:

Pressure loss of the suction system



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.

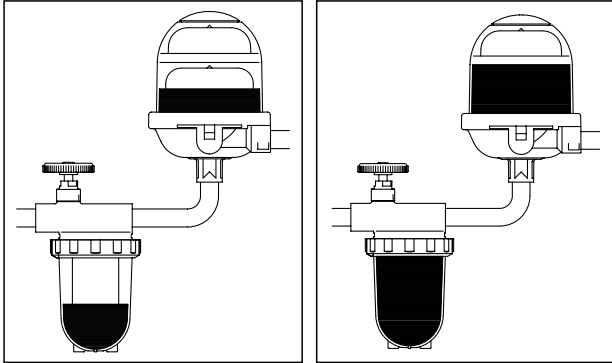
Possible reasons are:

- leakage in the suction pipe (sealing, re-tighten fittings)
- initial operation of the suction pipe (if required, fill pipe before)
- oversized suction pipe (install smaller pipe, see "Sizing of suction pipe")

Air pockets in the filter cup of the heating oil filter installed in front of the heating oil deaerator:

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.

This is especially noticeable where a large portion of air is in the oil. During burner operation, this air cushion is the cause for a sinking oil level in the filter cup when an underlying pressure is built up. However, as the inside of the filter insert is completely filled with oil, the installation continues its operation.



Filling height in the float case:

Depending on the working conditions, different filling heights may develop in the lower float case.

This chamber may also be filled completely, e.g. 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 in the circuit between the burner pump and the chamber of the deaerator.

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

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

Parallel installation of several "Toc-Uno-N":

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

Pressure operation:

The "Toc-Duo-N" must not 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 it 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 (e.g. by installing a pressure compensation device). Alternatively, closed pipe sections can be avoided by renouncing check valves.

Increased pressure can lead to damage of the heating oil deaerator or other installed equipment.

Flooding:

The Oventrop heating oil deaerator "Toc-Uno-N" 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-N" is recommended after a flooding.

Accessories:

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. Please ensure that the hose is not obturated.



Tested by TÜV Rhineland

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