

## FORMIC ACID DOSING STATION

The large part of the energy costs in a waste water treatment plant is required to create the compressed air for the aeration system. Considering possible chalk deposits in diffusers with EPDM-membrane, we recommend a periodical addition of formic acid (85%) into the compressed air, as and when required. The vital necessity of such a treatment is in particular given in industrial plants with high amount of chalky waste water, e.g. dairies.

In most cases, the chalk deposits can be removed, the pressure loss of the aeration system can be reduced and the reliability of the diffusers can be increased by cleaning the aeration system with formic acid.

The success of this step is dependent on different issues and has to be tested individually on site. The acid resistance of the system has to be checked carefully!

Supratec is offering a mobile dosing station for the optimally dosed cleaning. Ready-to-use, the dosing station can temporarily be stored and easily installed at a dosing connection at the air piping, if required.

System pressure has to be recorded and controlled/compared at site under consideration of identical operation conditions (air amount, water level) to ensure a safe and long lasting operation of the aeration system.

### 1. PARTS

The mobile formic acid dosing station is designed for mobile use in any waste water treatment plants and consists of following main parts:

- flatcar with 4 wheels, fixing brake and acid proofed dike, usable for putting 2 x 60 l container at the maximum
- pump type R204.1-10
  - o nominal capacity: about 10 l/h at an admissible counter pressure of max. 6bar
  - o suction height (max.): 3mWC

#### Remark:

The capacity is dependent on counter pressure. As a result of the counter pressure of about 1,4bar of the check valve supplied with the formic acid dosing station, a capacity of approx. 28l/h is achieved with a stroke of 100%. Please compare the following capacity diagram 204.1-10e.

- suction section:
  - o suction lance (length: 1 m) for withdrawal of formic acid out of the container
  - o connection hose between suction lance and pump (length 1,5 m)
- pressure section:
  - o hose (length: 10 m)
  - o check valve with male thread R1/2" (= supply limit of SUPRATEC) for connecting the dosing station to the connection point of the compressed air piping on site.
- chemical gas absorber (only as an option within the scope of supply for the indoor-version)

Neither any container nor any formic acid isn't within the scope of supply of Supratec.

## 2. DESIGN:

The formic acid dosing station is usable for:

- temperature at the dosing point  $\leq 120^{\circ}\text{C}$
- formic acid  $\leq 85\%$
- ambient temperature  $> 5^{\circ}\text{C}$ , since the formic acid crystallizes with lower temperatures
- for exteriorly usage out of closed rooms only (outdoor-version)

As an option an indoor-version for an operating in closed rooms is available. A subsequent upgrade of an outdoor-version to an indoor-version is optional possible.



picture: formic acid dosing station  
(option: indoor-version)

## 3. INSTALLATION SITE:

Required electrical connection: 230V, 50/60Hz

Required connection point: dosing point (ball valve with female tread  $R\frac{1}{2}$ ") at the compressed air pipe in front of the aeration system for the installation of the check valve (= supply limit of SUPRATEC)

For connecting the check valve with the dosing point, one conically sealing screwing joint with screwcap is included in the scope of supply (male thread  $R\frac{1}{2}$ " = supply limit of Supratec). Using several dosing points, further conically sealing screwing joint can be ordered.

## 4. SAFETY INSTRUCTIONS:

The safety instructions in handling with formic acid must be respected!

The piping should be made out of rust- and acid proofed material. If the aeration system is equipped with drainage or dewatering pipes, this system won't have to be opened during the cleaning procedure with formic acid in order to avoid any leakage. The hazard warnings, operating and safety instructions in the manual of the dosing station have to be respected.

## 5. DOSING:

The kind of dosing is extremely dependent on individual situation on site, the size of diffusers, type and intensity of deposits. Using the recommended formic acid (85%), the following approximately amount can be used at the beginning:

1 – 3 g formic acid per day and diffuser.

Example: 400 diffusers, cleaning period every 4 weeks (=30 days) and an assuming amount of 2g per day and diffuser:

$$400\text{diffusers} \times 30\text{day} \times 2\text{g/diffuser/day} = 24.000\text{g}$$

$$24.000\text{g}/1,2\text{g/cm}^3 = 20.000\text{cm}^3 = 20\text{l}$$

This quantity can be added within a few hours. There should be some hours before starting the next cleaning procedure so that possible not evaporated residues can be dissolved.

The check of the cleaning result is tested by pressure measurement at the compressed air piping in front of the treated aeration system before and after the cleaning procedure.

If an increased pressure loss is noted again after a while, the acid addition will have to be repeated, the used amount of formic acid and the cleaning period could be adapted, if necessary.

## 6. TIPS FOR TREATMENT:

The blowers should be operated in manual mode and the max. allowed air volume flow should be set up. In any case, the blower mustn't be operated in the automatic adjusting mode, since it will not be possible to note a consistent pressure.

Having connected the dosing station to the dosing point and having opened the bale valve, the dosing pump can be switched on (it must be ensured that suction lance can suck in the

formic acid). In case that liquid isn't transported by the pump despite of lifting noises (no liquid movement in the transparent suction-/pressure-horse): switch of the pump / put suction lance into a bucket with clear water and position the bucket above the dosing pump / switch on the dosing pump until the suction-horse is filled with liquid / switch of the pump / put the suction lance back into the formic acid and switch on the pump.

The formic acid has to be added slowly (about 8-9 l/h or less) via a dosing point at the compressed air pipe in front of the diffusers.

To check the result of the chemical cleaning, the pressure in the system should be controlled and recorded in suitable intervals (approx. every 10-30 minutes) dependent on planned total dosing time.

Generally, a reduction of system pressure can already be recognized even before the total planned amount of formic acid is added. In case that a considerable pressure reduction is already realized and there is no further reduction within one hour, the dosing process could be stopped, even before the planned total amount of formic acid has been added.

Dependent on deposits, there can be a further reduction of pressure loss, even within the next 10-12 operation hours after the dosing process.

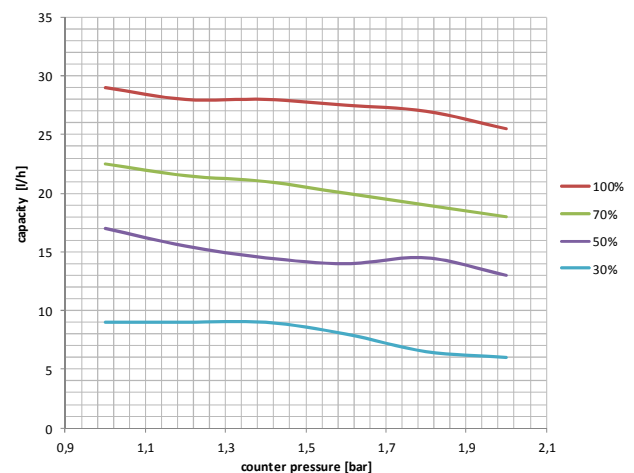
After having switched of the dosing pump, the ball valve of dosing point should be kept open for at least another 10 minutes, so that the compressed air can suck and remove any possible acid liquid remaining in the dosing point. After having closed the ball valve of the dosing point, the mobile dosing station can be disconnected from the dosing point.

## 7. STORAGE:

The mobile formic acid dosing station should be stored in a clean, frost proof and secure way. The dosing station can be cleaned just by using water. Temporarily storing, the acid container has to be hermetically, safely closed. Before putting into operation, the proper functioning has to be checked, especially after a longer stand still period.

## 8. DIAGRAM 204.1-10E

counter- pressure [bar] \ stroke	capacity [l/h]			
	100%	70%	50%	30%
1	29 l/h	22,5 l/h	17 l/h	9 l/h
1,2	28 l/h	21,5 l/h	15,5 l/h	9 l/h
1,4	28 l/h	21 l/h	14,5 l/h	9 l/h
1,6	27,5 l/h	20 l/h	14 l/h	8 l/h
1,8	27 l/h	19 l/h	14,5 l/h	6,5 l/h

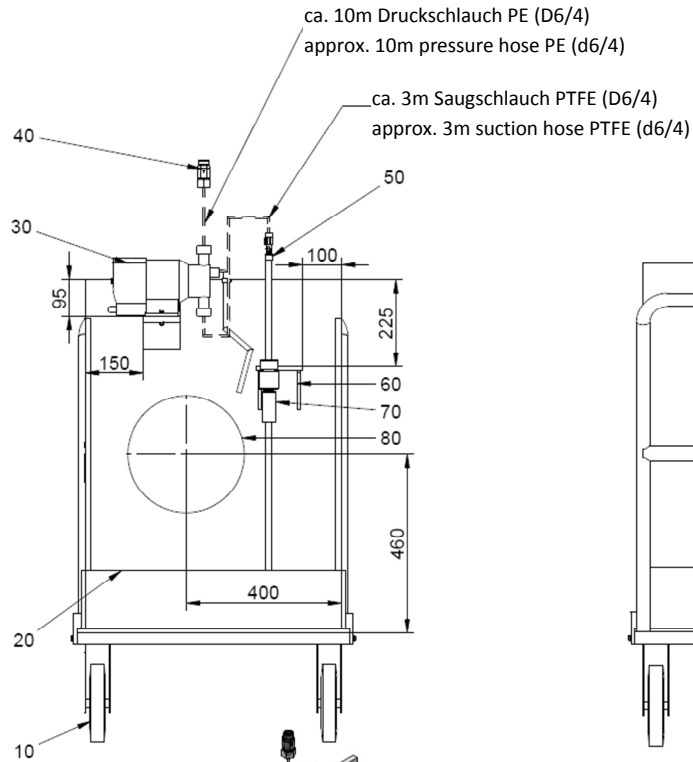


Further details and full hazard warnings resp. operating and safety instructions in the manual of the dosing station have to be respected.

Attachement:

drawing no A8774 (mobile formic acid dosing station)

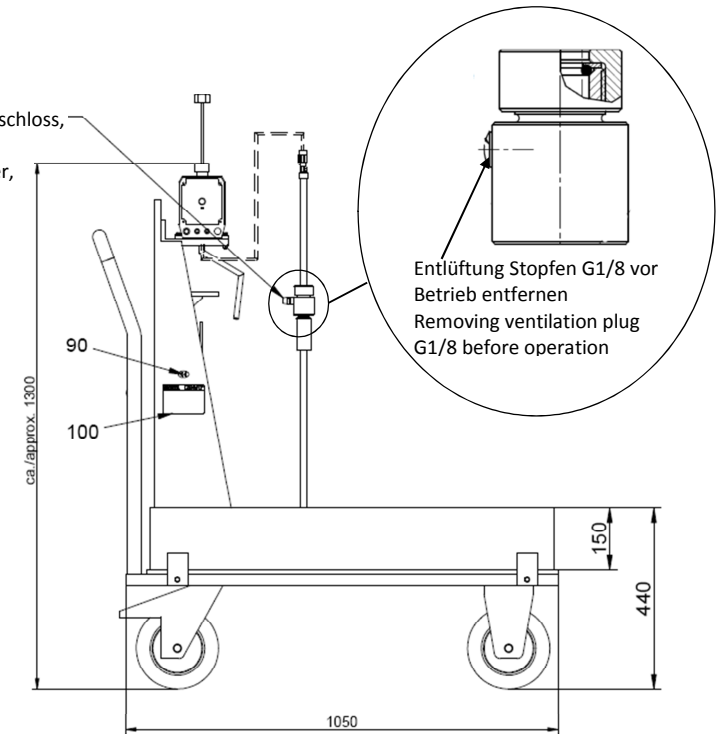
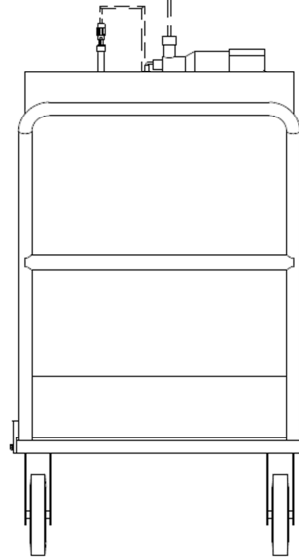
drawing 27114-DP-A01-0 (possible layout of dosing point)



Konisch dichtende Verschraubung am Anschluss Rückschlagventil, Außengewinde R $\frac{1}{2}$ "  
(=Liefergrenze SUPRATEC)  
conically sealing screwing joint for connection of the check valve, male thread R $\frac{1}{2}$ "  
(= supply limit of SUPRATEC)

Schlauchverschraubung G $\frac{3}{4}$ "  
hose screw connection G $\frac{3}{4}$ "

Anschluss optionales Chemiekaliendampfschloss,  
Schlauchverschraubung D6/4  
connection optional chemical gas absorber,  
hose screw connection d6/4



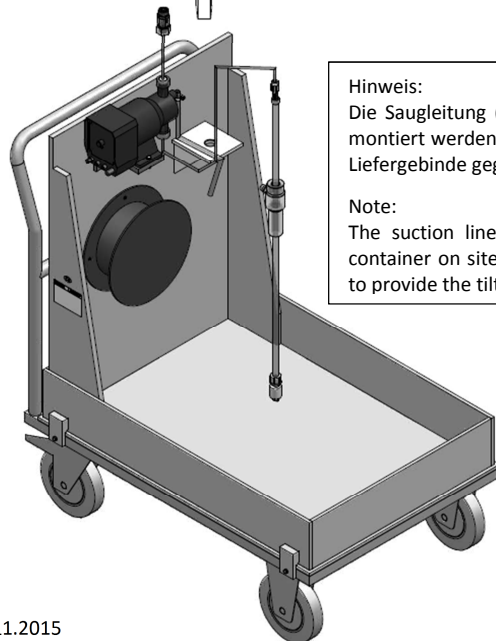
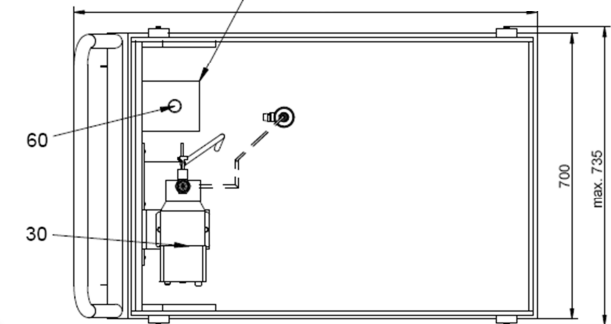
**Hinweis:**

Die Saugleitung (Pos. 50/70) muss bauseits im Deckel des Säurebehälters montiert werden. Für den Fahrbetrieb sollten bauseitig Halterungen für die Liefergebilde gegen Kipp/Rutschen vorgesehen werden.

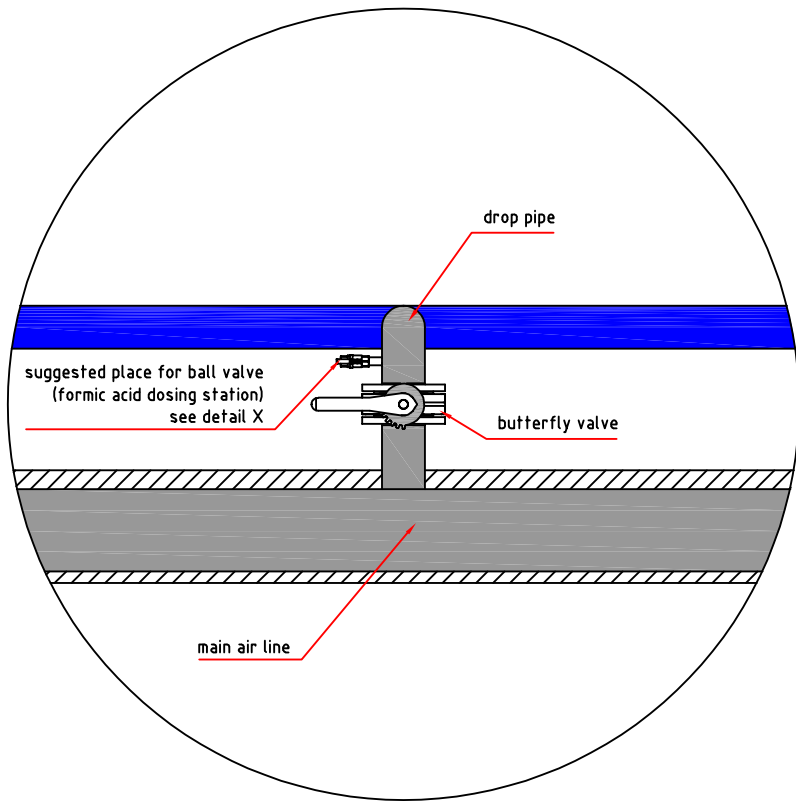
**Note:**

The suction line (item 50/70) must be installed in the lid of the acid container on site. During moving the dosing unit, you should use fixations to provide the tilt / slide of the acid container.

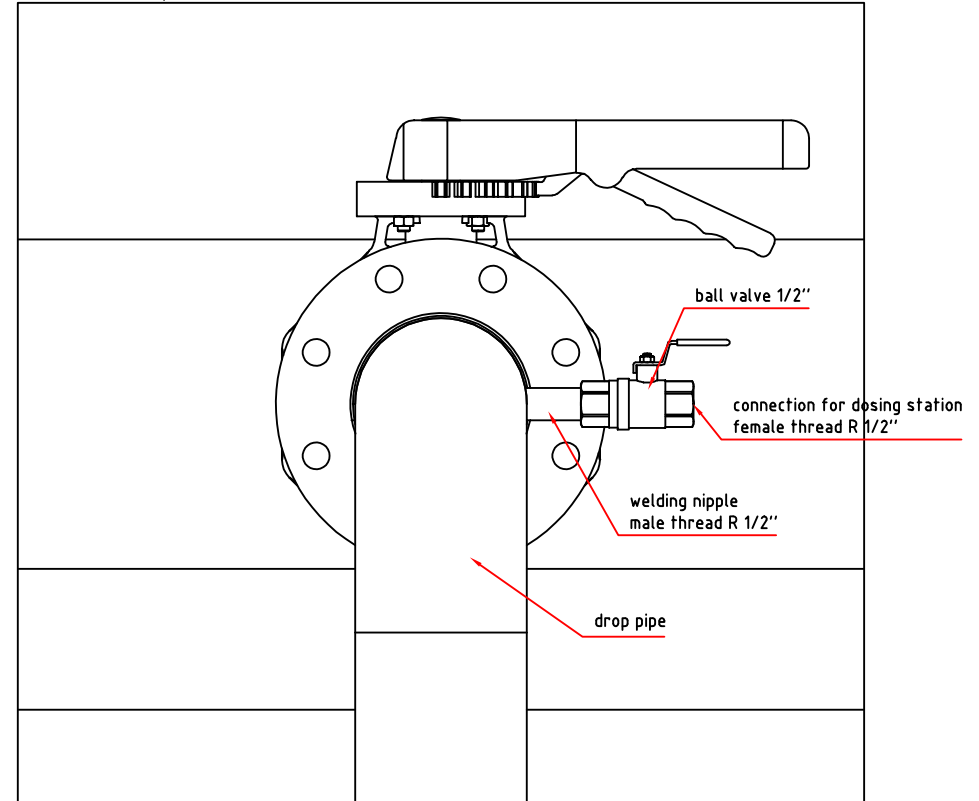
Konsole für optionales Chemiekaliendampfschloss  
console for optional chemical gas absorber




## Ameisensäuredosierstation formic acid dosing station



DETAIL X  
scale 1:2,5



 <small>Gesellschaft für Umwelt- und Verfahrenstechnik mbH</small> von-Drais-Straße 7 D- 55469 Simmern Hunsrück		Fon: *49 (0 67 61) 96509-0 Fax: *49 (0 67 61) 96509-0 e-mail: info@supratec.cc Internet: www.supratec.cc	Projekt: <b>General</b> Zeichnung: connection for formic acid dosing station ball valve 1/2"
A		Datum	Name
B		Gez.	ZB/S HP
C		Gepr.	
D			
E			
Maßstab <b>1:10</b>		Zeichnungs-Nr.: <b>27114-DP-A01</b>	
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