

## **ViscoTec Pumpen- u. Dosiertechnik GmbH**

Amperstr. 4

D-84513 Töging a. Inn

Tel.: +49 8631 / 393-400

Fax: +49 8631 / 393-500

mail@viscotec.de

www.viscotec.de



# **Comparison of structural design of different dosing systems: dispenser-, piston-, gear- batcher**

created by:

**Dipl.-Ing (FH) Bernd Frohn**

DVS-EWF European Adhesive Engineer (EAE)

bernd.frohn@viscotec.de

Tel: 036376 / 53359



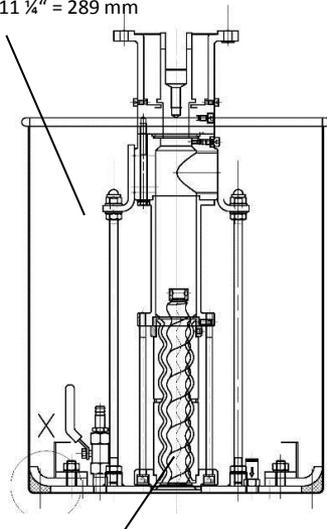
# Comparison: dispenser-, piston-, gear-batcher

## Basic construction: material supply

### dispenser – dosing system

#### Barrel emptying system ViscoMT-XS

Barrel from Valtech 5  
gallon pail  
ID 11 ¼" = 289 mm



- emptying pump is flush with UK follower plate
- plate can be run to the bottom of the barrel with an inline degassing

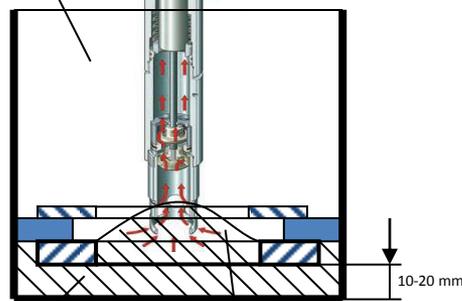
**Residue in barrel:**  
≤ 0,16 l (0,8% of 20 Liter)

### piston – dosing system

#### Barrel hook with scoop piston pump

Barrel from Valtech 5  
gallon pail  
ID 11 ¼" = 289 mm

ID=289 mm  
 $V_1 = 3,14/4 \times 280^2 \times 20$   
 $V_1 = 1.230 \text{ cm}^3$



$V_1 \approx 1,23 \text{ l}$        $V_2 \approx 1,0 \text{ l}$

- emptying pump is not flush with UK follower plate. Space below the pump is necessary to draw out the fluid.
- plate can not be run to the bottom of the barrel, otherwise it comes to interrupt and air entrapment.

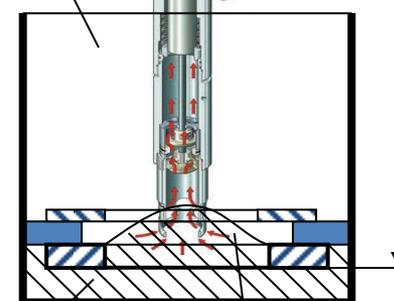
**Residue in barrel: estimated:**  
2,3l (1,23l +1,0l)

### gear – dosing system

#### Barrel hook with scoop piston pump

Barrel from Valtech 5  
gallon pail  
ID 11 ¼" = 289 mm

Di=280 mm  
 $V_1 = 3,14/4 \times 280^2 \times 20$   
 $V_1 = 1.230 \text{ cm}^3$



$V_1 \approx 1,23 \text{ l}$        $V_2 \approx 1,0 \text{ l}$

- emptying pump is not flush with UK follower plate. Space below the pump is necessary to draw out the fluid.
- plate can not be run to the bottom of the barrel, otherwise it comes to interrupt and air entrapment.

**Residue in barrel: estimated:**  
2,3l (1,23l +1,0l)

# Comparison: dispenser-, piston-, gear-batcher

## Basic construction: material treatment

### dispenser – dosing system

Inline-Degassing: ViscoTreat-Inline



- developed for degassing of medium- to high viscous materials.
- suitable for liquids with viscosity up to 1,000,000 mPas
- material is degassed immediately at admission
- the dosing process is not interrupted while refilling

Continuous operation

### piston – dosing system

vacuum treatment



- developed for the degassing of low viscous materials, in particular potting
- suitable for liquids with viscosity up to ? mPas
- after filling, the material has to be stirred and degassed before dosing process can start

Batch operation

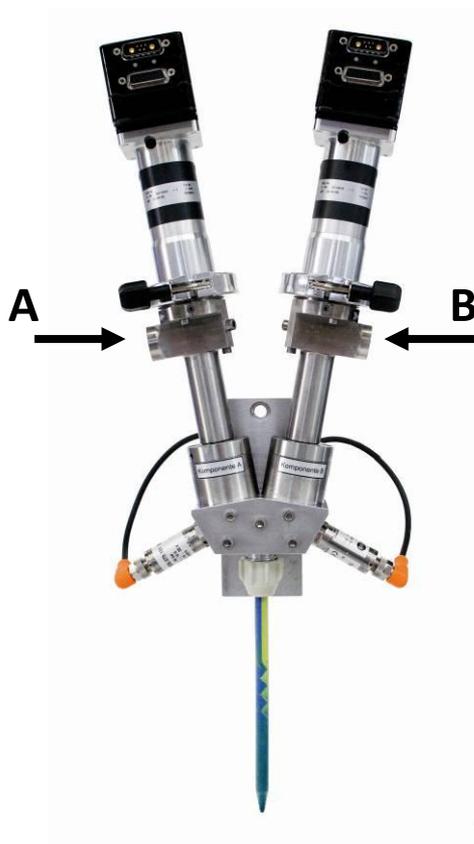
### gear – dosing system

??

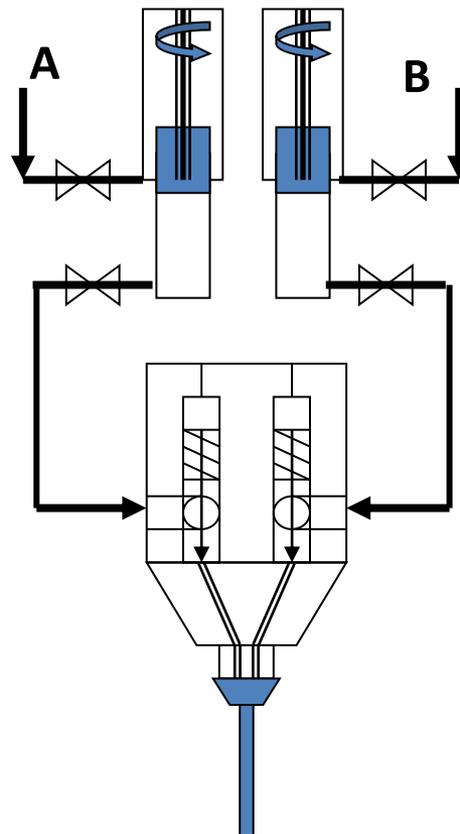
# Comparison: dispenser-, piston-, gear-batcher

## Basic construction: material supply

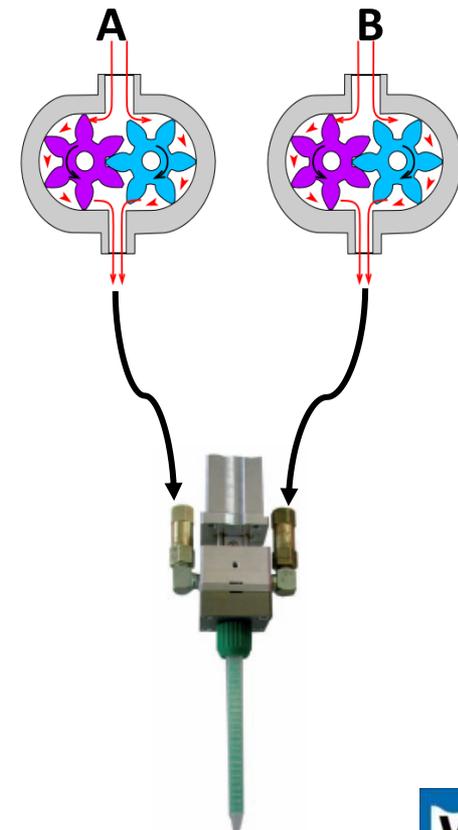
dispenser – dosing system



piston – dosing system



gear – dosing system



# Comparison: general features dispenser-, piston-, gear-batcher

	ViscoDuo-V dispenser	Piston pump	Gear pump
<b>dosage</b>	<ul style="list-style-type: none"> <li>• continuous</li> <li>• endless dosage possible</li> </ul>	<ul style="list-style-type: none"> <li>• discontinuous</li> <li>• refilling of piston necessary</li> <li>• interruption of dosage with big quantities</li> <li>• compensation possible by double stroke (risk of pulsation)</li> </ul>	<ul style="list-style-type: none"> <li>• continuous</li> <li>• endless dosage possible</li> </ul>
<b>construction of mixing head</b>	<ul style="list-style-type: none"> <li>• dispenser meters directly into the mixing tube</li> </ul>	<ul style="list-style-type: none"> <li>• piston meters through outlet valves into the mixing tube</li> </ul>	<ul style="list-style-type: none"> <li>• gear pump meters through hoses and outlet valves into the mixing tube</li> </ul>
<b>valves</b>	<ul style="list-style-type: none"> <li>• not necessary</li> <li>• completely valve less design</li> </ul>	<ul style="list-style-type: none"> <li>• inlet- and outlet valves necessary</li> </ul>	<ul style="list-style-type: none"> <li>• outlet valves necessary</li> </ul>
<b>design</b>	<ul style="list-style-type: none"> <li>• design free of dead space</li> <li>• first in – first out</li> <li>• no bottlenecks</li> <li>• laminar flow</li> <li>• separator plate on mixer outlet</li> </ul>	<ul style="list-style-type: none"> <li>• Dead space exists in the valve seats and diverge points</li> <li>• Piston pushes the material only at full strokes out</li> <li>• Laminar and turbulent flow regions</li> <li>• Danger of residue of aged material</li> </ul>	<ul style="list-style-type: none"> <li>• Dead space exists in the valve seats and diverge points</li> <li>• Laminar and turbulent flow regions</li> <li>• Danger of residue of aged material</li> </ul>

# Comparison: general features

## dispenser-, piston-, gear-batcher

	ViscoDuo-V dispenser	Piston pump	Gear pump
<b>leakage</b>	<ul style="list-style-type: none"> <li>no backflow if pressure limits are complied</li> </ul>	<ul style="list-style-type: none"> <li>high leakage in the piston pump</li> <li>at higher pressures in the mixing head, backflow through valves and piston seal possible</li> </ul>	<ul style="list-style-type: none"> <li>high leakage in the gear pump – flow meter is required - it has also backflow</li> <li>at higher pressures in the mixing head, backflow through valves and piston seal possible</li> </ul>
<b>pressure relief in the static mixing tube</b>	<ul style="list-style-type: none"> <li>Changing of direction on the dispenser possible after each dosing shot</li> <li>Thus pressure reduction may set according to the mixer and the properties of the material</li> </ul>	<ul style="list-style-type: none"> <li>not possible</li> </ul>	<ul style="list-style-type: none"> <li>By default not possible</li> <li>Possibly feasible when using snuff-back valve</li> <li>Adjustment of snuff-back on setscrew</li> </ul>
<b>dripping / cut-off string</b>	<ul style="list-style-type: none"> <li>can counteracted by programming</li> </ul>	<ul style="list-style-type: none"> <li>not possible</li> </ul>	<ul style="list-style-type: none"> <li>Possible under certain conditions</li> <li>Adjustment only with setscrew</li> </ul>
<b>bead start and -stop</b>	<ul style="list-style-type: none"> <li>No accumulation of material, since ramps are set be the servo motor</li> </ul>	<ul style="list-style-type: none"> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>Accumulation of material at stat/stop due to the opening and closing of the valves</li> <li>Pressure variations across the tube length have to be observed</li> </ul>

# Comparison: general features dispenser-, piston-, gear-batcher

	ViscoDuo-V dispenser	Piston pump	Gear pump
<b>mixing ratio (mr)</b>	<ul style="list-style-type: none"> <li>• mr selectable</li> <li>• can be switched to another mr only on parameters in the PLC</li> <li>• very fine adjustment possible</li> <li>• compliance of mr also given at start/stop</li> </ul>	<ul style="list-style-type: none"> <li>• mr depending on piston proportions</li> <li>• change of mr only by changing the piston</li> <li>• mr can differ during opening and closing of the valves at different viscosities</li> </ul>	<ul style="list-style-type: none"> <li>• mr adjustable via speed of gear pump</li> <li>• mr can differ during opening and closing of the valves at different viscosities</li> </ul>
<b>switch between dot- or bead dosage</b>	<ul style="list-style-type: none"> <li>• no problem, since no pressure must be built up because direct dosage into the mixing tube</li> </ul>	<ul style="list-style-type: none"> <li>• very costly because a defined pressure on the valves must be present first</li> <li>• attention has to be paid to switching times of the valves</li> </ul>	<ul style="list-style-type: none"> <li>• very costly because a defined pressure on the valves must be present first</li> </ul>
<b>change in discharge</b>	<ul style="list-style-type: none"> <li>• possible any time just by changing the dispenser speed with analog value 0-10V</li> </ul>	<ul style="list-style-type: none"> <li>• ?</li> </ul>	<ul style="list-style-type: none"> <li>• only possible elaborately with pressure monitoring before and after the mixing head</li> <li>• costly controlling process required</li> </ul>

# Comparison: general features

## dispenser-, piston-, gear-batcher

	ViscoDuo-V dispenser	Piston pump	Gear pump
<b>maximum allowed pressure decrease along static mixing tube</b>	<ul style="list-style-type: none"> <li>max. 17 to 24 bar depending on construction</li> </ul>	<ul style="list-style-type: none"> <li>max. 17 to 24 bar depending on construction</li> </ul>	<ul style="list-style-type: none"> <li>max. 17 to 24 bar depending on construction</li> </ul>
<b>Acquisition of the current pressure on the mixing tube</b>	<ul style="list-style-type: none"> <li>actual value acquisition without additional influences</li> </ul>	<ul style="list-style-type: none"> <li>indirect actual value acquisition by pressure on pistons possible with additional influences from valves and constrictions</li> </ul>	<ul style="list-style-type: none"> <li>indirect actual value acquisition by pressure on pistons possible with additional influences from valves, constrictions and hoses</li> </ul>
<b>required feeding pressure</b>	<ul style="list-style-type: none"> <li>approx. 1 to 6 bar</li> </ul>	<ul style="list-style-type: none"> <li>approx. 5 to 30 bar</li> </ul>	<ul style="list-style-type: none"> <li>approx. 20 to 100 bar</li> </ul>
<b>allowed pressure</b>	<ul style="list-style-type: none"> <li>max. 40 bar</li> </ul>	<ul style="list-style-type: none"> <li>? bar</li> </ul>	<ul style="list-style-type: none"> <li>? bar</li> </ul>
<b>pressure peaks</b>	<ul style="list-style-type: none"> <li>not existing, since no valves and turning points</li> </ul>	<ul style="list-style-type: none"> <li>partial present through the influence of valves and turning points in the pistons</li> </ul>	<ul style="list-style-type: none"> <li>partial present through the influence of valves and turning points in the pistons</li> </ul>

# Comparison: general features

## dispenser-, piston-, gear-batcher

	ViscoDuo-V dispenser	Piston pump	Gear pump
<b>influence on the adhesive</b>	<ul style="list-style-type: none"> <li>• shear-poor supply</li> <li>• no bottlenecks</li> </ul>	<ul style="list-style-type: none"> <li>• very high shear of the adhesives through narrow passages on the valves seats and piston in the pump</li> </ul>	<ul style="list-style-type: none"> <li>• Very high shear of the adhesive through narrow passages to the valve seat and the gear and piston pump</li> </ul>
<b>fillers</b>	<ul style="list-style-type: none"> <li>• trouble-free dosage of very high filled materials, which may also contain spacers</li> </ul>	<ul style="list-style-type: none"> <li>• dosage of filled material only limited possible</li> <li>• adjustment of the hardness of parts required</li> <li>• high wear on the valve needle and valve seats possible</li> </ul>	<ul style="list-style-type: none"> <li>• dosage of filled material only limited possible</li> <li>• adjustment of the hardness of parts required</li> <li>• high wear on the valve needle and valve seats possible</li> </ul>

# Comparison: general features

## dispenser-, piston-, gear-batcher

	ViscoDuo-V dispenser	Piston pump	Gear pump
<b>maintenance</b>	<ul style="list-style-type: none"> <li>• few components required – so easy maintenance</li> <li>• easy and fast exchange of the entire mixing head with the dispensers</li> <li>• duration: approx. 10 to 15 min.</li> </ul>	<ul style="list-style-type: none"> <li>• many small and filigree components such as plungers, packing, and valve seats</li> <li>• exchange of a piston batcher very costly due to a lot of sensor cables and the high dead load of structure</li> <li>• duration: approx. ? Hours</li> </ul>	<ul style="list-style-type: none"> <li>• exchange of the gear pumps and flow meters are required</li> <li>• exchange of the valve head is required</li> <li>• duration: approx. ? Hours</li> </ul>
<b>components</b>	<ul style="list-style-type: none"> <li>• small and compact</li> <li>• no wires between the dispenser and the mixing head</li> </ul>	<ul style="list-style-type: none"> <li>• compact design</li> </ul>	<ul style="list-style-type: none"> <li>• mixing head is compact and handy is only effective in combination with gear pump</li> <li>• hose line must be observed</li> </ul>
<b>operation cost</b>	<ul style="list-style-type: none"> <li>• only very low electrical power of approx. 0.5 – 1 kW required</li> <li>• no permanent air consumption since no valves must be switched</li> </ul>	<ul style="list-style-type: none"> <li>• drive power of 2 to 3 kW required</li> <li>• permanent air consumption for switching the valves and pumps in the scoop piston pump of barrel emptying system</li> </ul>	<ul style="list-style-type: none"> <li>• drive power of 2 to 3 kW required</li> <li>• permanent air consumption for switching the valves and pumps in the scoop piston pump of barrel emptying system</li> </ul>

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# **Thank you for your attention**

created by:

**Dipl.-Ing (FH) Bernd Frohn**

DVS-EWF European Adhesive Engineer (EAE)

bernd.frohn@viscotec.de

Tel: 036376 / 53359

The ViscoTec logo, featuring the company name in white text on a blue background with a wavy bottom edge.