



# PRINT HEADS FOR VISCOUS FLUIDS & PASTES IN ADDITIVE MANUFACTURING

We focus on the delivery of the print heads and their supply for industrial and professional AM applications of viscous fluids and pastes.





# TECHNOLOGY USING THE ENDLESS PISTON PRINCIPLE

## ADDED VALUE FOR THE CUSTOMER

Our tried and tested endless piston principle offers numerous advantages to the customer. Apart from the feasibility of non-component-dependent sizes, the precision of the technology is a high priority.

In addition, the endless piston principle is a technology for a wide range of product materials. Not to be disregarded is the fact that a wide range of material properties can be covered.

## OUR TECHNOLOGY

Volumetric dispensing and filling systems are based on the ENDLESS PISTON PRINCIPLE and are used in low to high viscosity fluids.

At the heart of each application is a dosing pump which is purely volumetrically fed. The interaction between the rotor and the stator results in a feeding and dosing characteristic which is the same as an endlessly moving piston.

This results in a pressure-stable linear pump characteristic curve. It allows a clear statement about the ratio of revolution, time and dosed volume. Therefore, a constant volume can be dosed either via the time function or via the number of revolutions function, and give a dosing accuracy at the pump outlet of  $\pm 1\%$  (depending on the material), which in practice falls below this.



# PRODUCT OVERVIEW



## 1-COMPONENT PRINT HEAD – VIPRO-HEAD 3

The print head impresses with its unique precision and is suitable for nearly all 1-component fluids.

Theoretical volume flow: 0.03 to 3.3 ml/min  
Weight: approx. 750 g



## 1-COMPONENT PRINT HEAD – VIPRO-HEAD 5

The print head creates new possibilities in a wide range of applications. A consistent and accurate print result – coupled with a high printing speed – is guaranteed.

Theoretical volume flow: 0.05 to 6.0 ml/min  
Weight: approx. 750 g



## 1-COMPONENT PRINT HEAD – VIPRO-HEAD COLOR

This optional print head allows to add a component (e.g. color) to the print process. The modular design makes the integration and combination with other print heads very convenient.

Theoretical volume flow: 0.03 to 3.3 ml/min  
Weight: approx. 600 g



## 2-COMPONENT PRINT HEAD – VIPRO-HEAD 3/3

The print head allows a wide range of applications for viscous 2-component fluids. The desired mixing ratio can be adjusted via the speed ratio of the drive units.

Theoretical volume flow: 0.03 to 3.3 ml/min per mixing head part  
Weight: approx. 1200 g



## 2-COMPONENT PRINT HEAD – VIPRO-HEAD 5/5

The fluids and pastes are conveyed volumetrically and separately from each other into the static mixer.

Theoretical volume flow: 0.05 to 6.0 ml/min per mixing head part  
Weight: approx. 1200 g

## MATERIAL SUPPLY

Everything from one source – that is the guiding principle of ViscoTec. Therefore, the customer not only has the possibility to purchase print heads from ViscoTec; but also the appropriate emptying and degassing systems are the customer's choice. OEM products are available on request.



# 1-COMPONENT PRINT HEAD WITH HEATING FUNCTION

## CARTRIDGE HEATER

- Capacity of 55 ml
- Fixation with a mounting plate on the print head

## CARTRIDGE ADAPTER & BLEEDING SCREW

- Uncomplicated bleeding after each cartridge replacement
- Optimum heat distribution due to print head and product material

## HEATING UNIT FOR PRINT HEAD

- Heating of viscous fluids and pastes
- Heatable up to 70 °C (158 °F)

## ENDLESS PISTON PRINCIPLE

- Continuous dispensing
- High precision dispensing results also for heated materials

## DISPENSING NEEDLES

- Optimum heat distribution due to metal needles
- A wide range of metal needles available



# 2-COMPONENT PRINT HEAD

## MOTOR

- Control via 3D print signals
- Compact design with parallel arrangement of the individual motors

## MATERIAL SUPPLY & BLEEDING SCREW

- Easy product handling
- Optional bleeding screw for uncomplicated bleeding

## ENDLESS PISTON PRINCIPLE

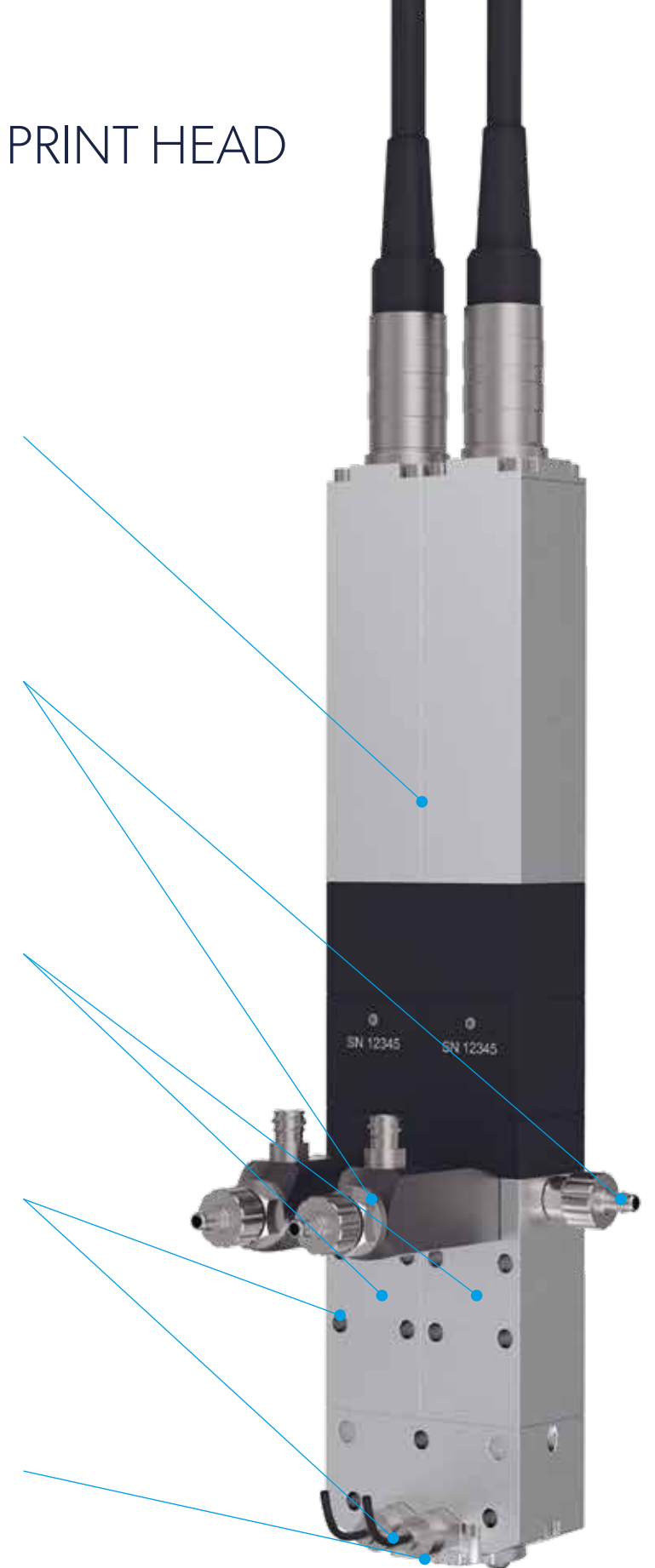
- Continuous dispensing
- For almost all viscous 2-component fluids and pastes

## MONITORING & CONNECTION

- Optional monitoring via pressure sensor (material inlet and outlet)
- Different opportunities to connect print head with 3D printer

## STATIC MIXER

- A wide range of different static mixers
- Optimum mixing of 2-component fluids and pastes





# 1-COMPONENT PRINT HEAD VIPRO-HEAD COLOR

## MOTOR

- Controlled with stepper motor signals
- Equal technology as in the 2-component printhead (modular)
- High resolution enables precise control of material flow

## SUPPLY OF FLUID VIA CARTRIDGE

- Color (e.g LSR color masterbatch)
- Additive (e.g. for changing the mechanical properties)

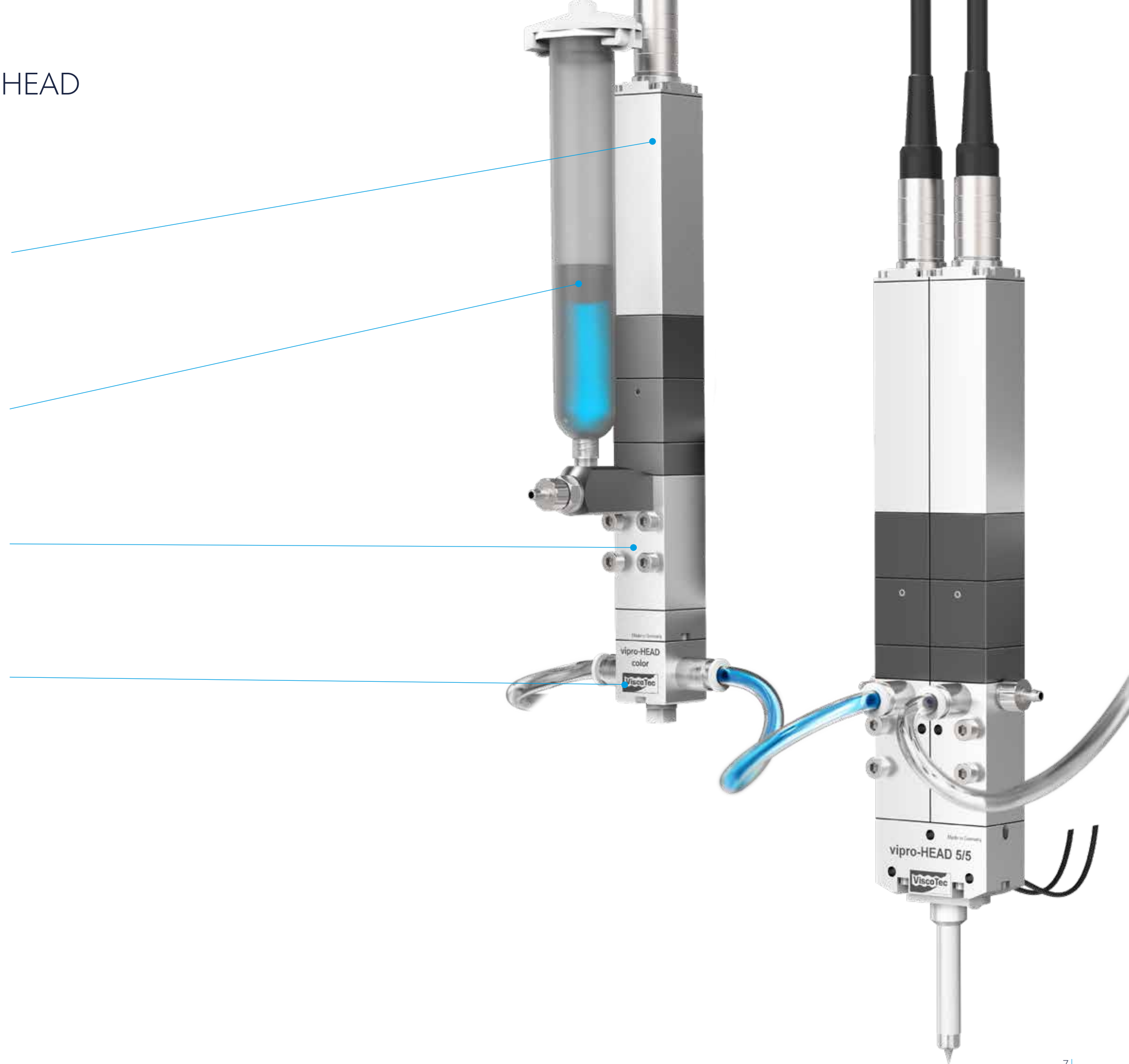
## ENDLESS PISTON PRINCIPLE

- Continuous dispensing
- High reliability and accuracy leading to perfect dispensing results

## COLOR INFEEED INSIDE OF ADAPTER

- Perfect supply by dispensing into the center of the volume flow
- Precise supply of 1 to 3 % color into material flow
- Homogeneous color infeed leads to constant color fidelity

The vipro-HEAD color can also be used in the field of 1-component applications (modular system).





# MATERIALS

## 1-COMPONENT MATERIALS

A selection of possible materials:

- UV adhesives
- Epoxy resins
- Acrylate
- SiliconeGrease
- Inks
- Waxes
- Abrasive pastes
- Bio-technical suspensions
- Advanced, high-performance and technical ceramics
- ...

## 2-COMPONENT MATERIALS

A selection of possible materials:

- Silicone
- Epoxy resins
- Polyurethane
- Acrylate
- Polyester resins
- ...

The viscous fluids are cross-linked and give the component the properties that they need for production.

## CURING METHODS



UV, humidity, heat and a combination of these.



# AN EXAMPLE OF POSSIBLE APPLICATIONS



## GENERAL INDUSTRY

**Game-Changer:** Use of individual solutions in rapidly changing ambient conditions

**Example:** Attachments for robot grippers



## AUTOMOTIVE

**Game-Changer:** Mechanical material properties increase the component strength of relevant components

**Example:** Sealing lip



## ELECTRONICS

**Game-Changer:** Creation of prototypes and small series of complex electronic components

**Example:** Ultrasonic transducers



## AEROSPACE

**Game-Changer:** Targeted weight reduction of components reduces energy and resources

**Example:** Electromagnets



## MEDICAL TECHNOLOGY

**Game-Changer:** Personalized medical products provide a targeted treatment process

**Example:** Ventilation units



## RESEARCH & DEVELOPMENT

**Game-Changer:** A variety of viscous fluids and pastes providing a competitive edge

**Example:** Printing of textiles

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