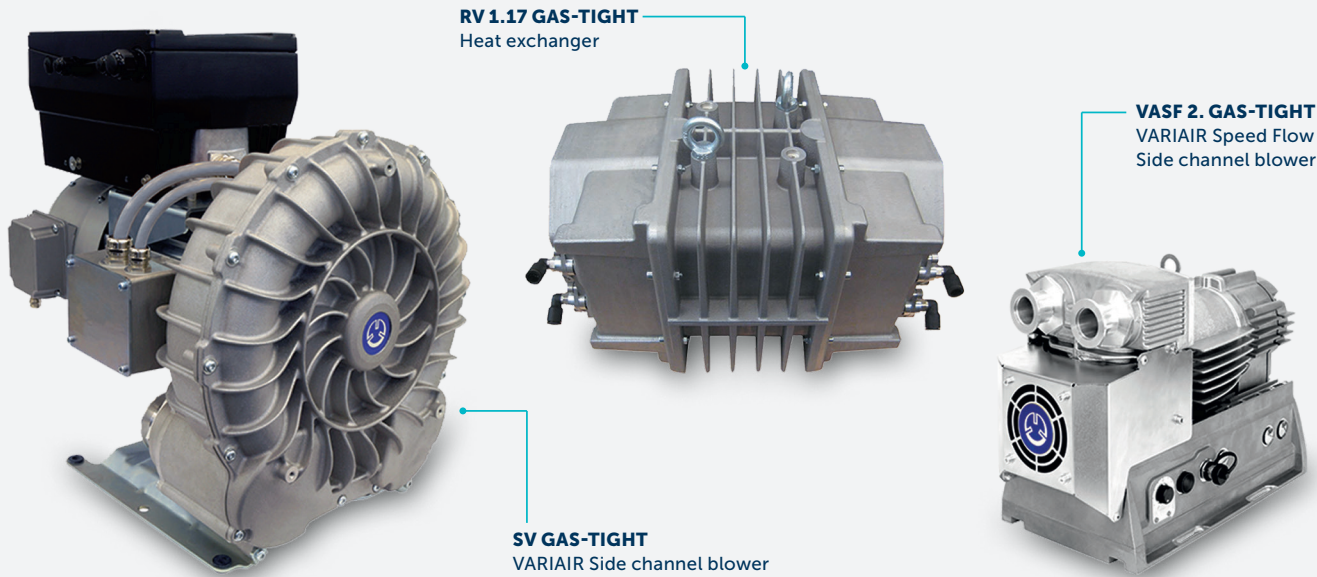


GAS-TIGHT BLOWERS & COMPONENTS FOR

# ADDITIVE MANUFACTURING

MAKE IT BECKER.



## BECKER GAS-TIGHT BLOWERS AND COMPONENTS FOR PREMIUM-QUALITY 3D METAL PRINTING

Additive Manufacturing offers huge potential and possibilities, while specifications are evermore demanding. In an optimized manufacturing process for high quality industrial metal 3D-printing, the gas recirculation and pneumatic conveying under inert conditions should meet the same high level requirements. Opt for gas-tight blowers and heat exchangers in your Additive Manufacturing machines.

## EFFICIENCY

- Reduced Total Cost of Ownership
- No loss of inert gas
- Tightness 100% leak tested
- VARIAIR frequency inverter control for optimized adaptation to variable process conditions

## CUSTOMIZATION

- Customer specific solutions for premium 3D metal printers
- Support and consulting in all project phases of AM machine R&D, design, and production

## ADVANTAGES

- Blowers and heat exchangers Made in Germany for
- Small to largest 3D metal printers
  - Optimal inert gas atmosphere without oxygen entry
  - Prevention of oxidation and lack-of-fusion defects
  - Optimal temperature level in build chamber
  - Powder transport with inert gas
  - 3D metal parts of highest quality
  - Best process quality
  - Optimal systems integration

**VARIAIR**

 **BECKER**

## SPECIFICATIONS BLOWERS & HEAT EXCHANGERS

GAS-TIGHT BLOWERS FOR INERT GAS VOLUME FLOWS (ARGON AND NITROGEN) UP TO 930 M <sup>3</sup> /H						
	VASF 2.50/1	VASF 2.80/1	VASF 2.120/1	VARIAIR SV 201/1	VARIAIR SV 300/1	VARIAIR SV 500/1
m <sup>3</sup> /h	47	91	143	370	600	930
p/p (max.)	1.29	1.28	1.23	1.3	1.38	1.315
Hz	50–300	50–250	50–200	10–100	10–100	10–100
kW	0.65	1.1	1.4	4.0	7.5	11–22
	VASF 2.50/2	VASF 2.80/2	VASF 2.120/2	SV 300/2		
m <sup>3</sup> /h	24	45	71	280		
p/p (max.)	1.56	1.57	1.46	1.52		
Hz	50–300	50–250	50–200	10–100		
kW	0.65	1.1	1.4	7.5		

GAS-TIGHT HEAT EXCHANGERS FOR NOMINAL COOLING CAPACITIES UP TO 9.5 KW			
	RV 1.17-0-114-04	RV 1.17-0-114-05	RV 1.17-0-114-06
kW (max.)	3.8	7.5	9.5

- p/p (max.) of blowers → inlet pressure ≤ 1050 mbar
- Gas-tight: leakage rate <math> < 1 \times 10^{-5} \text{ mbar l / s}</math> (<math> < 1 \times 10^{-6} \text{ Pa m}^3/\text{s}</math>) measured with a helium leak detector, integral for the complete unit
- Volume flow and pressure measured for air (VASF) and argon (SV), respectively, at reference data (1000 mbar, 20°C)

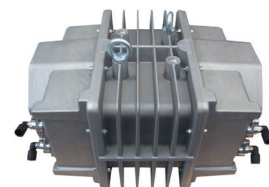
## THE BECKER SOLUTIONS

As a leader in the field of suction and blast air as well as decades of experience in gas recirculation we offer

- Gas-tight blowers and components for individual machine integration,
- Vacuum pumps (not gas-tight) for evacuation services and
- Customer focused systems solutions for high efficient inert gas recirculation and pneumatic powder conveying in Additive Manufacturing machines.



VASF 2. gas-tight



Heat exchanger RV 1.17 gas-tight



SV gas-tight

GAS RECIRCULATION- AND FILTER SYSTEM FOR

# ADDITIVE MANUFACTURING

MAKE IT BECKER.



## ENABLING THE NEXT LEVEL OF PREMIUM-QUALITY 3D METAL PRINTING

Rethinking the entire laser powder bed fusion process lead us to the development of a new gas recirculation- and filter system for AM machines.

## EFFICIENCY

Reduced cost of ownership by use of cleanable filters and by the gas-tight system.

## CUSTOMIZATION

Modular concept for customer specific stand-alone- or integrated system solutions with variable number of filter modules.

## ADVANTAGES

- Higher productivity through uninterrupted long build jobs
- Best 3D parts quality through optimal constant inert atmosphere in the build chamber
- Capable to operate with lower density inert gases

**CYCLEAM**

 **BECKER**

# THE BECKER AM SYSTEM SOLUTION

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## FEATURES OF THE NEW CYCLEAM

### Gas Recirculation- and Filter System

#### MODULAR

- Optimal system solution for medium-size to largest 3D metal printing machines

#### CLEANABLE

- Long-life filters for cleaning between, or interference-free, during ongoing build jobs

#### COOLED

- Heat exchanger for optimal temperature level in the build chamber (optional)

#### SAFE – GAS-TIGHT – VACUUM-RESISTANT

- Safe inert atmosphere
- Safe and easy removal of filtrate
- No oxygen entry from outside into the process
- Evacuation of the system possible for a faster inerting of the machine
- Capable of handling lower density inert gases

#### INTELLIGENT AND FULLY AUTOMATED

- Gas recirculation blower with flow control for constant process gas flow
- Interference-free filter cleaning process supported by integrated vacuum generation

#### CUSTOMIZED

- Customer-specific system-design and interfaces for optimized adaption to the 3D metal printing machine

### CYCLEAM

Gas Recirculation-and Filter System

## MORE BECKER AM SOLUTIONS

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With decades of experience in gas recirculation, we are among the pioneers in 3D metal printing. For individual AM machine integration we offer the following components:

- Gas-tight blowers and heat exchangers for inert gas recirculation

- Vacuum pumps (not gas-tight) for evacuation services
- Pumps and blowers for pneumatic conveying of metal powder
- Vacuum-tight filters for smaller-size 3D metal printers

**VARIAIR**  
SPEED FLOW

VASF 2.  
gas-tight

Heat exchanger RV 1.17  
gas-tight

**VARIAIR**  
UNIT

SV  
gas-tight

Filter CSL  
vacuum-tight