



POLYURETHANE MIXING TECHNOLOGY

Reaction Injection Moulding

RIM – Process flow and systems technology

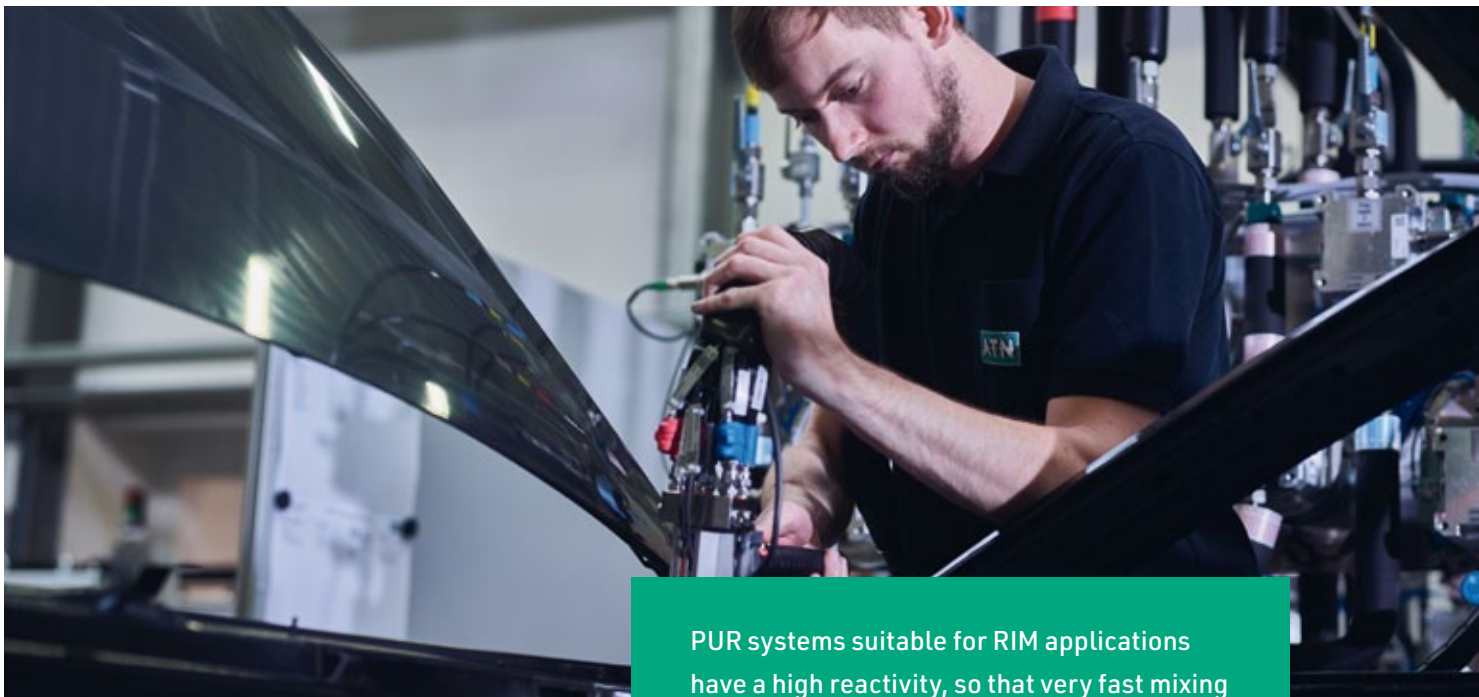
Reaction injection moulding (RIM)

In reaction injection moulding (RIM) – the filling of cavities – two liquid raw materials are conveyed in separate circuits by recirculation pumps that operate at low pressure. Only immediately before application are the components pressurized, mixed and injected into a mould or in cavities by an applicator.

A chemical reaction called polyaddition results in the formation of a new substance – mostly polyurethane – from the raw materials. Depending on how the reaction takes place, this can be in the form of either a foam or an isotropic material. The chemical process releases CO₂, which affects the compactness of the foam.

If the mixing ratio is correct, no by-products are produced. The chemical reaction (R = reaction) takes place as soon as the components are mixed in the applicator's mixing chamber. The applicator then applies or injects (I = injection) the mixed material. The reaction continues in the cavity or mould (M = mould), where the polyurethane cures.

The choice of metering technology, processing pressure and nozzle shape depend on the flow rate and viscosity of the processed material.



PUR systems suitable for RIM applications have a high reactivity, so that very fast mixing and processing are essential.

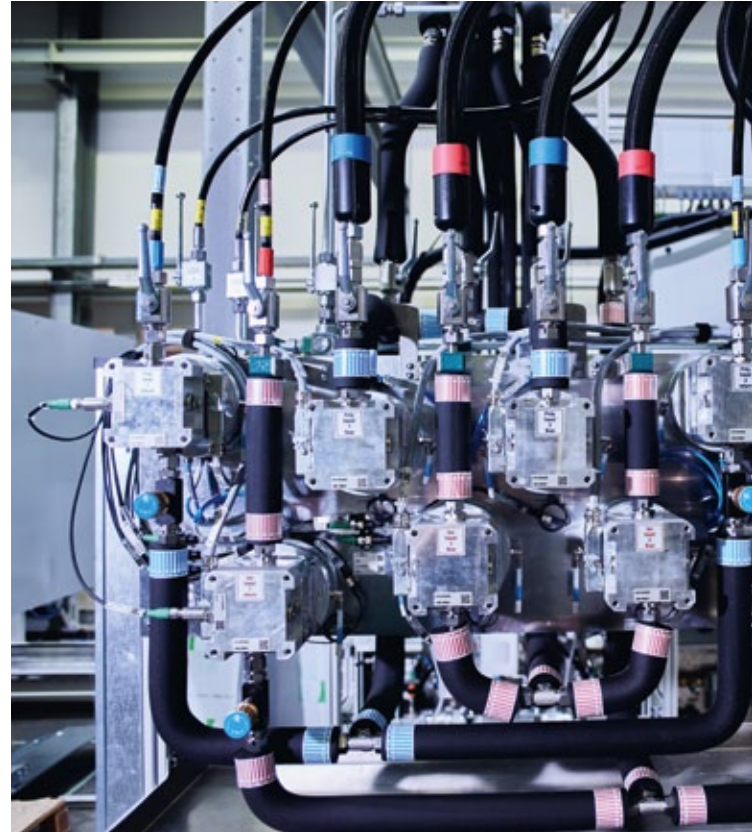
New technology for RIM application processes

Precision metering of two fluids in electronic volumetric dosing systems is the key element of the new ATN process technology.

This represents an innovative approach to processing PUR foams that is superior to other systems on the market.

ATN technology ensures unparalleled metering accuracy at all material volumes and flow rates, combined with stable, requirements-based material dosing.

The system continually keeps the material moving at the right conditions for application to ensure its availability at all times, even when no application is taking place.



Advantages of our metering technology

compared to other processing methods

01

Our innovative new system allows high-precision metering even at very low shot volumes.

02

Our dosing systems have a very long service life even when used with abrasive and filled materials.

RIM peripherals

Material supply system

The material supply system in our two-component application system is designed for continuous filling of downstream modules. Our material supply system is currently available in two sizes:



EFE 0200

for 200 L barrels



EFE 1000

for 1000 L IBCs

EFE = single barrel emptying

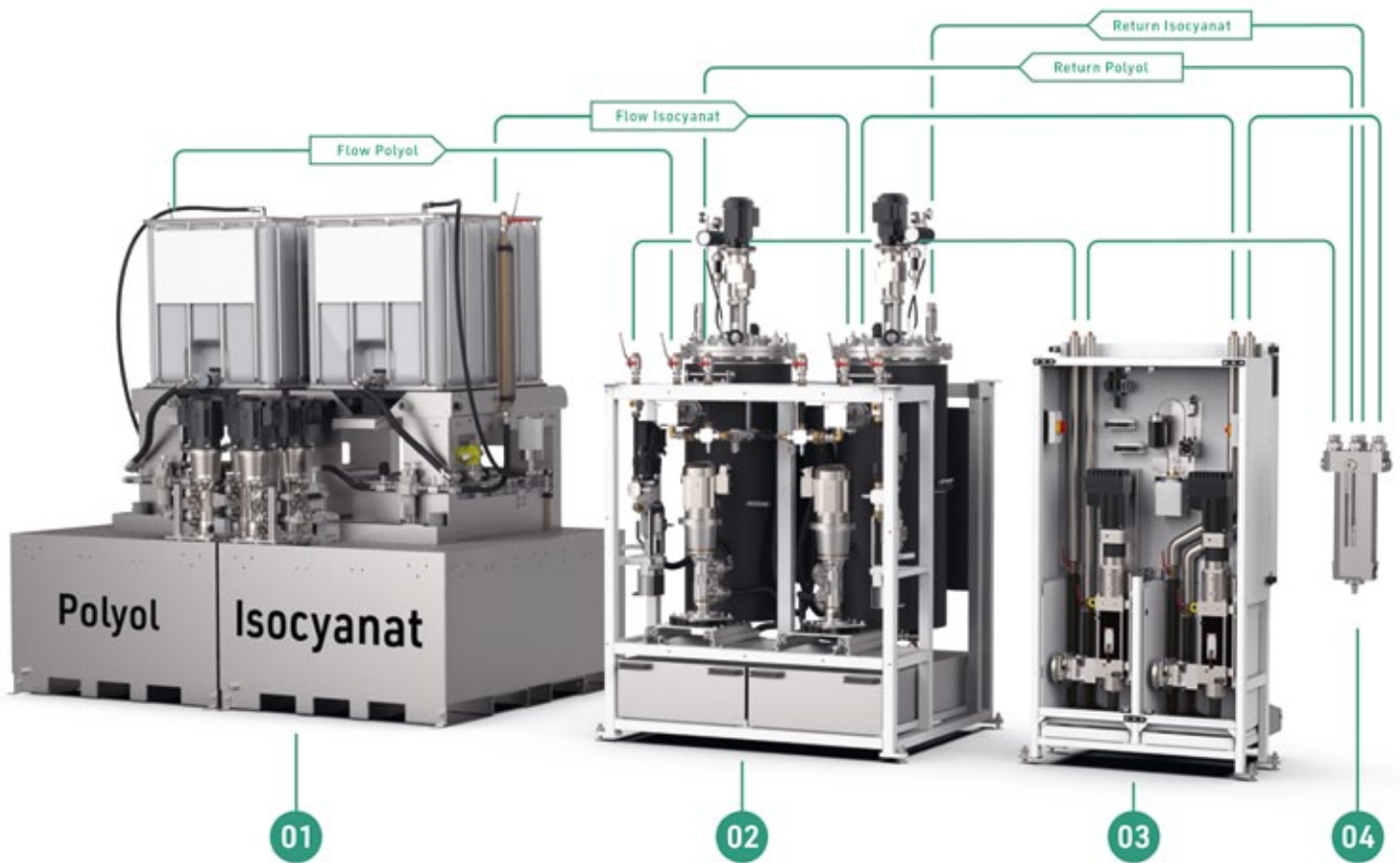
Feature enhancements for material supply systems

- Level monitoring
- Agitator for both components
- Air drier
- Electrical component heating
- Piggyback system for continuous filling of downstream modules with no barrel-change downtimes

Applicator cleaning

To avoid adhesion of residue, we work with a separating agent. A purely mechanical applicator cleaning station is also available to remove any adhering dirt.





- 01 IBC station
- 02 Day tank station
- 03 High-pressure unit
- 04 Applicator

SUPERIOR PERFORMANCE & RELIABILITY

Application components and automation systems for RIM





ATN

RIM recirculation system

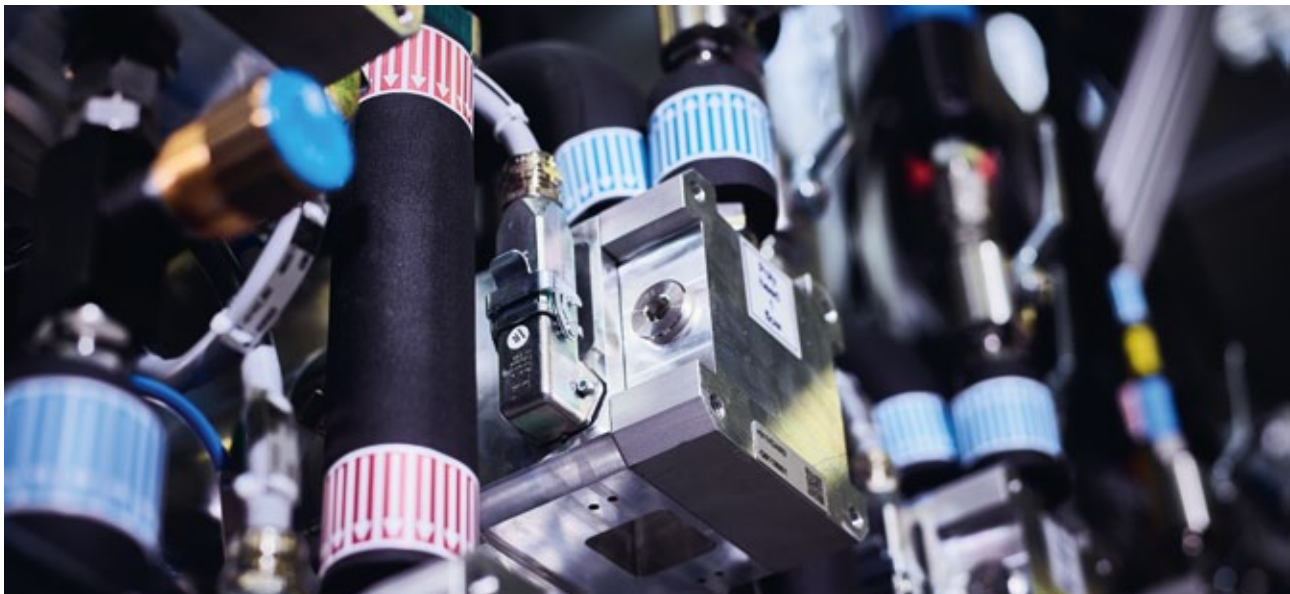
ONE OF THE BASIC REQUIREMENTS FOR ENSURING THAT TWO-COMPONENT MATERIALS HAVE THE RIGHT PROPERTIES IS PRECISE CONDITIONING OF THE COMPONENTS.

Function principle

The permanent circulation of the two components ensures that they remain at the required temperature and removes any deposits or particles from the components.

The circulation is a continuous process and takes place regardless of whether an application is taking place.

This ensures that the material is gently kept at the right temperature, always available for application. The recirculation system operates at low pressure, which minimizes noise generation and increases the system's service life.



Functions

- Heated day tanks for compact design
- Filtration
- Pipe trace heating / ATN material heating hoses
- Continuous material circulation with no downtimes
- Gentle on the material and low-emission
- Long service life
- No sealing problems through magnetic coupling

Feature enhancements

- Level monitoring & air drier
- Agitator (for both components)
- Enclosed module version available
- Redundant design improves process stability and prevents system downtimes

RIM high pressure station

Function principle

Electrically driven volumetric dosing systems offer the best control and dispensing properties for the raw materials used. They require no additional components or units and are easy to maintain since they consist of two separate parts – the material feed and the drive.

The dosing unit supplies the applicator with a continuous flow of temperature-controlled raw materials (in the case of PUR application with isocyanate and polyol).

During application, the dosing units increase the material pressure to up to 200 bars and deliver precisely metered material quantities. The streamlined design of our dosing units allows you to position them immediately next to the application point.



Technical details of the RIM dosing units

- Material flow rates from 10 to 450 g/s
- Max. shot discharge capacity 80 g/s
- For other dosing volumes please enquire

RIM applicator

The applicator

The RIM applicator is based on the impingement mixing principle, where mixing occurs as the result of a turbulent flow. During the material shot, nozzles (with a cross-section of 0.3 to 0.9 mm) feed the components to a relatively small mixing chamber.

Consequently the component flows collide at high speeds of up to 100 m/s, resulting in a homogeneous mixture. The applicator is continuously purged when not in use.

Applicator handling

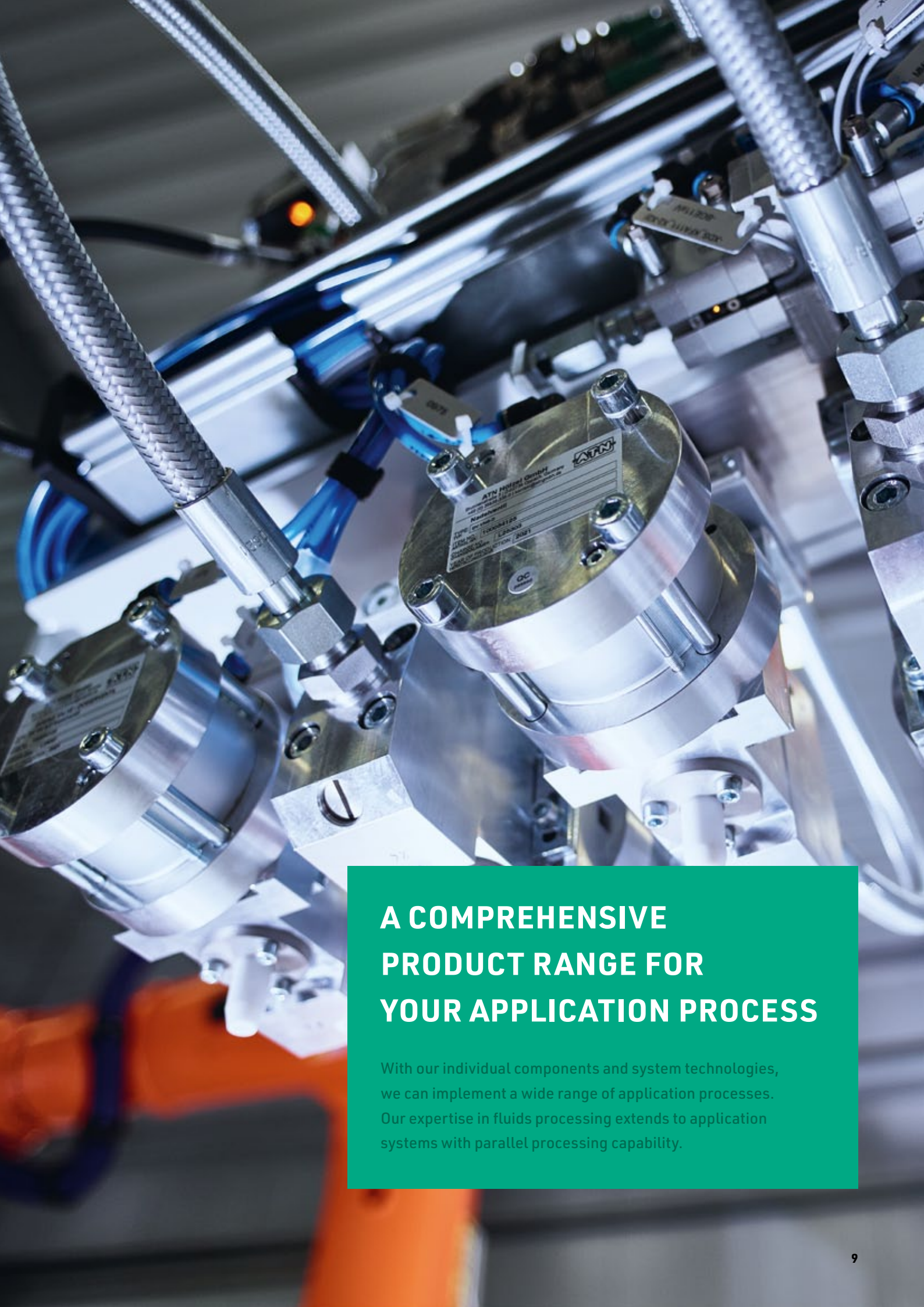
You can also use the RIM applicator manually with a hand grip and operating point or just a hand grip. The operating point stores up to 10,000 mixing recipes and the associated foaming points, which you can then select as required.

For automated application, the applicator is flange-mounted on a robot or manipulator.



Features and feature enhancements

- High-pressure mixing by the impingement mixing principle
- Shot discharge volume under industrial conditions
- Stable from 7 grams
- Dosing deviation 2 % (± 1 g)
- Nozzle outer diameter 6 mm
- Mass 3 kg
- Dimensions (L x W x H) 450 x 450 x 2000 mm



A COMPREHENSIVE PRODUCT RANGE FOR YOUR APPLICATION PROCESS

With our individual components and system technologies, we can implement a wide range of application processes. Our expertise in fluids processing extends to application systems with parallel processing capability.

ATN – Your reliable application systems partner



As a specialist for application technology, ATN is renowned for quality, reliability and innovation. Our expertise is based on more than 20 years of experience in various industries.

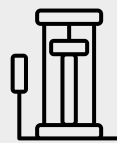
With subsidiaries and service partners in Bulgaria, Hungary, Spain, the USA, Brazil, China and South Africa, a contact partner near you can respond quickly to your needs and enquiries.

Our individual components for various application processes



APPLICATION CONTROL

Stable, intuitive control of your application processes



BARREL PUMPS

Conveying of adhesives, sealants and fillers from barrel sizes from 20 to 1000 L



DOSING SYSTEMS

Precision flow rate control for all requirements



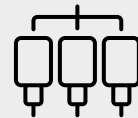
APPLICATION TOWERS

Workpiece- and robot-guided material application tailored to your process



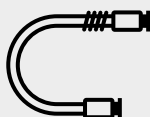
NOZZLE CLEANING UNITS

Ensuring reproducible, faultless glue bead geometries



APPLICATORS

Material discharge in required form and volume for all requirements, also with admixtures



MATERIAL HOSES

Material delivery between individual components in the application process, also temperature-controlled



MANUAL APPLICATION SYSTEMS

Cost-effective alternative for application to small batch sizes or for manual dispensing



INDIVIDUAL ADVICE

If you have any questions, please contact us at kontakt@atngmbh.de or +49 35936 335-0



Subsidiaries and service locations

.01

Germany

Oppach (Headquarter)
Dresden

.02

Spain

Valencia

.03

Bulgaria

Ruse

.04

Hungary

Budapest

.05

USA

Chattanooga

.06

Brazil

São Paulo

.07

China

Changchun
Shanghai
Beijing
Wuhan

.08

South Africa

Port Elizabeth
(Service partner)

Reference customers – application technology and automation



GERMANY

Oppach · Dresden

SPAIN

Valencia

BULGARIA

Ruse

HUNGARY

Budapest

USA

Chattanooga

BRAZIL

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CHINA

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