GAS INJECTION TECHNOLOGY
INNOVATIVE AND COMPLETE SOLUTIONS
BRIEF OVERVIEW OF GIT

A procedure similar to GIT was described for the first time in 1972. This technology has proven reliability and has shown market growth from the 1980s onwards.

GIT denotes the method of blowing gas, especially nitrogen, into plastic to create a hollow tubular pipe. In previous methods plastic was melted and injected into a mould; however, this method was unable to produce a thick-walled flattened bubble.

GIT TECHNIQUES

There are at least 10 variants of GIT, based on the type of piece produced and its needs. In brief, the two most commonly used techniques are as follows:

› The partial fill method – the original process – which involves filling 50%-90% of the cavity with plastic. Gas is then introduced to fill the cavity completely, distributing the mass of hot plastic to create a hollow tubular channel. Gas pressure is maintained during the holding phase, which is part of the cooling phase, and is only relieved immediately before the mould is opened.

› The overflow cavity method, which requires the addition of an annex cavity in the tool. The part cavity is completely filled with polymer and gas is injected under pressure; the excess plastic is displaced into the overflow cavity. Gas pressure is maintained during the holding phase, which is part of the cooling phase, and is only relieved immediately before the mould is opened.

BENEFITS OF GIT

The use of gas injection technology allows technical parts of superior quality to be produced. The manufacturing process is also more efficient, improving productivity and thus significantly increasing profitability.

› Higher quality of the injected part
  - High strength and rigidity
  - Dimensional stability, no warpage
  - Elimination of sink marks
  - No assembly, single parts

› Simplification of tools

› Greater freedom in design

› Lower clamping force (in partial method)

› Reduced cycle time

› Material savings

› Possibility of producing hollow (tubular) parts
Our outstanding expertise in purifying gases, coupled with software-based control technology developed by our BAUER specialists, assures you outstanding product quality which will improve your profitability.

**HIGH PRESSURE COMPRESSOR AND BOOSTER UNITS**

- Ready for use; compact and autonomous.
- Compression of high-quality nitrogen with our P-Purification system.
- Booster units with low power consumption by using the inlet pressure of a nitrogen generator or evaporator.
- Safe, secure operation by the integrated control unit (B-CONTROL).

**FCC CONTROL UNIT**

- Compact mobile panel.
- Adaptive control for ultra-precise results (reactivity adjustable).
- Easy and intuitive programming.
- Full connectivity for file transfer (USB and Ethernet).
- Continuous process monitoring with quality data storage.

**EXCELLENT SERVICE ASSURED**

For BAUER, “quality” does not end with the production and delivery of the system. Independently of the location of the installation, our customers benefit from our excellent and comprehensive after-sales service support:

- All major spare parts, including wearing parts, for all models are permanently in stock and available for immediate dispatch. Parts are available for up to 25 years after delivery of the GIT system.
- An integrated distribution network comprising 22 subsidiaries plus 360 support distributors is continually available to support our customers.
- Maintenance kits for all systems are available worldwide.
BAUER KOMPRESSOREN offers Gas Injection Technology as a solution to the problems of plastic part production. End-users will benefit from BAUER’s years of manufacturing experience in the field of GIT and compressor technology with tailor-made systems from a single source. BAUER’s products range from starter packs to complex large-scale systems.

1. Nitrogen source: Nitrogen bottles, nitrogen generator or liquid tank
2. A high-pressure compressor with a suitably sized gas receiver facility for compression and safe storage of nitrogen at high pressures
3. High-pressure lines to transport the nitrogen
4. Distribution panel that generates a pressure/time profile for nitrogen dispensing

STRUCTURE OF THE SYSTEM

1. Nitrogen source: Nitrogen bottles, nitrogen generator or liquid tank
2. A high-pressure compressor with a suitably sized gas receiver facility for compression and safe storage of nitrogen at high pressures
3. High-pressure lines to transport the nitrogen
4. Distribution panel that generates a pressure/time profile for nitrogen dispensing
5 Gas injectors to fill nitrogen into plastic parts for hollowing

6 Bypass valve available to prevent ingress of dirt into the proportional regulating valve

7 Flushing module assures quick cooling, which in turn reduces cycle times

8 VC I Volume Control for exact measurement of nitrogen consumption
The new generation of stationary compressors from the MINI-VERTICUS and VERTICUS series once again demonstrates BAUER’s leading-edge technological status.

The MINI-VERTICUS and VERTICUS series has been developed and built specifically to meet high performance requirements in continuous operation in professional applications. The new MINI-VERTICUS and VERTICUS combine the legendary BAUER compressor blocks with improved components and ultra-modern design! During the redesign, the focus was on ergonomics, making operation as easy as possible, reducing noise and boosting efficiency.

The advanced B-CONTROL MICRO is more powerful and ready to communicate with the B-APP for remotely controlling and monitoring the compressor.

MINI-VERTICUS & VERTICUS FOR NITROGEN COMPRESSION

MINI-VERTICUS - Super Silent

- 3 – 7.5 kW
- 85 – 475 l/min
- 30 – 365 bar

VERTICUS - Super Silent

- 7.5 – 15 kW
- 240 – 800 l/min
- 90 – 525 bar
### FEATURES

› Now significantly quieter: thanks to the new anti-vibration frame and noise-optimised Super Silent housing

› Fully automatic B-CONTROL MICRO compressor control with colour display

› Long system life: all materials used are high quality and optimised for continuous operation

› Very easy to maintain: The tension of the V-belt does not have to be adjusted

› Multi-stage piston compressor/booster units, lubricated, with a final separator and P61/P81 purification system to produce high-purity compressed gas.

› Complete system mounted on skids with up to two HP cylinders.

### BOOSTER

<table>
<thead>
<tr>
<th>Type</th>
<th>F.A.D.¹</th>
<th>Number of stages</th>
<th>Intake pressure</th>
<th>Speed</th>
<th>Power consumption</th>
<th>Net weight approx.</th>
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<tr>
<td>GIB 12.2-5.5-MV</td>
<td>200-475²</td>
<td>12-28.5</td>
<td>2</td>
<td>5-11</td>
<td>1230</td>
<td>3.3-5.1</td>
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<tr>
<td>GIB 15.3-11-V</td>
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<td>30.6-45</td>
<td>2</td>
<td>7-10</td>
<td>1140</td>
<td>6.6-8.2</td>
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<tr>
<td>GIB 15.41-15-V</td>
<td>450-800²</td>
<td>27-48</td>
<td>3</td>
<td>2-4</td>
<td>1320</td>
<td>7.6-12.2</td>
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### COMPRESSOR

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<th>Type</th>
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<th>Number of stages</th>
<th>Speed</th>
<th>Motor power</th>
<th>Power consumption</th>
<th>Net weight approx.</th>
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<td>900</td>
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<td>3.3</td>
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<tr>
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<tr>
<td>I 180-15-V</td>
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<tr>
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<tr>
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</table>

1 Measured according to ISO 1217
2 Maximum capacity according to the combination of intake and final pressure.
THE FCC 5 - OUR LATEST FIRST-CLASS CONTROLLER

BAUER distribution panels have been in operation worldwide for the past 20 years. Their mature and well-proven control systems deliver maximum reliability with minimum downtime for users. The fifth generation of distribution panels from BAUER provide improved “easy to use” characteristics: the user interface has been simplified using graphic user guidance and single assignment of the control keys, thus making the units simpler and easier to learn how to operate.

INTERFACE AND CONTROL

› 10” colour touchscreen display
› Seven time/pressure levels with ramp function
› Password protection (3 profiles)
› Cleaning cycle with clogged injector detection
› Leakage detection
› Graphic displays of pressure versus time
› Display of relevant current values an last 100 cycles
› Alarms (message, sound, cycle stopped) with log
› Programs and data quality storage on internal Compact Flash memory, USB key or via Ethernet
› Screen service with maintenance log and display technician diagnosis system
› Real-time Internet-based support and diagnosis

CONNECTIONS

› Start signal: screw position or start of plastic injection
› 1 to 4 independent valves
› Compatible with all injection moulding machines including EUROMAP 62 standard.

OPTIONS

› Sequential piloting to control up to 4 external hydraulic actuators (with control of oil level and temperature and 8 position sensors in the mould)
› Volume control VC to monitor gas consumption, and thereby part quality
› Interface allows one FCC 5 to be used with 2 moulding machines at the same time
› Flushing to increase cooling effect and reduce cycle time
ALL INFORMATION AT A GLANCE!

The high-resolution touchscreen shows all relevant parameters. It provides clear user guidance and can display a comprehensive range of settings for controlling and monitoring the process.

REGULATING MODULE

This rugged high-precision proportional valve has delivered proven reliability for over 15 years.

- Electrical proportional regulating valve.
- Piloted by PLC with a numeric closed loop.
- Adjustable reactivity and autotuning.
- High precision from 5 to 400 bar.
- The standard module has 2 valves; a 1-valve version is optionally available.
- Module can be built into FCC 5 or positioned close to the mould.
- Integrated filtration of 25 µm.
- Low maintenance costs with fast service support.

Time/pressure levels are easy to program.

The actual graph provides information about the process quality.

Regulating Module inside FCC 5
The FM I Flushing Module accelerates cooling of the mould by up to 50%, thus decreasing cycle times of GIT parts.

- Two injectors are needed to flush, one at each end.
- Initially, an injector introduces nitrogen as found in the classical GIT process. A second injector is then used to introduce gas through the channel thus created; it is released through the first injector.
- This movement generates heat exchange by forcing convection inside the the hottest zone of the part. This is considerably more effective than conduction through the mould with a mass of highly insulating plastic.
- The FM I is easy to integrate into an existing process and requires only the installation of a second gas injector. The flushing module is driven directly by the FCC 5.
- Additional cooling of the flushing gas is not necessary!

The process is regulated under patent law by a licence agreement between BAUER COMPRESSEURS S.A.S. and LINDE AG.
GAS INJECTORS

These injectors can be used for all gas injection processes.

- No penetration of melt
- Diameter: 2 – 12 mm
- Quick and easy-clean
- Compact
- Optional with seal
- Specific size on demand

VOLUME CONTROL

Your process under control.

- Monitors nitrogen consumption and process repeatability.
- Alarms & curves of the last 100 cycles are saved in the memory.
- Nitrogen costs per part and flow rate can be estimated.
- Detects leaks and gas nozzle blockages, saving nitrogen costs and reducing defective parts numbers.
- Mobile versions of Volume Control - VC I & VC II - are connected at the gas inlet of FCC 5 or other GIT controllers.
- The VC III option integrated into the valves of the FCC 5 enables each channel to be measured independently.

BYPASS VALVE

The bypass valve is placed between the mould and the distribution panel.

- Protects the valve module from plastic degassing pollution
- No external energy needed
- Increases system availability
ARE YOU INTERESTED IN ONE OF OUR PRODUCTS?
PLEASE GET IN TOUCH – WE WILL BE HAPPY TO ASSIST YOU.