

The image shows a large industrial machine, the BUHLER Fusion140, with a white cabinet and a green control panel. The machine is equipped with various hoses, pipes, and a vertical cylindrical component. The background is a light blue gradient with a large white circle on the left side. The BUHLER logo is prominently displayed on the white cabinet.

BUHLER

Fusion140

Fusion

**Maximum
performance for
highest value
creation**

5,500 to 14,000kN

Fusion - putting you in total control

Superior control, speed and efficiency

Fusion brings you the ultimate control in 5,500 to 14,000 kN die casting for aluminum and magnesium. Bühler's unique closed-loop real-time control allows you to create high quality, reliable and repeatable processes. The three-platen system with ServoDrive hydraulics delivers faster, smoother movements with energy savings. Fusion's innovative modular energy frame ensures operational efficiency and digital services provide the futureproofing you need.



7

Ready for Industry 4.0

Our Bühler Insights' Die Casting Dashboard and Downtime Analysis provide a customized overview of the performance of each machine, cell and foundry, providing the KPIs you need to drive improvements in OEE.

1

Technology for the best casting results

Bühler's powerful and unique shot control with closed-loop and real-time controlled injection gives you reproducible casting results with a stable process that preserves the die.

2

Optimized closing unit

The optimized geometry of the three-platen system supports shorter cycle times, with an enlarged tie bar spacing for your larger dies.

5

2

3

4

3

Designed for ease of maintenance

A single point of access simplifies your maintenance activities. Filters and hydraulic fluid can quickly be accessed and exchanged in full operation, as well as during routine maintenance.

4

ServoDrive reduces cycle time and energy consumption

Smoother servo-driven hydraulics can cut your cycle time and reduce energy consumption by over 40%.

6

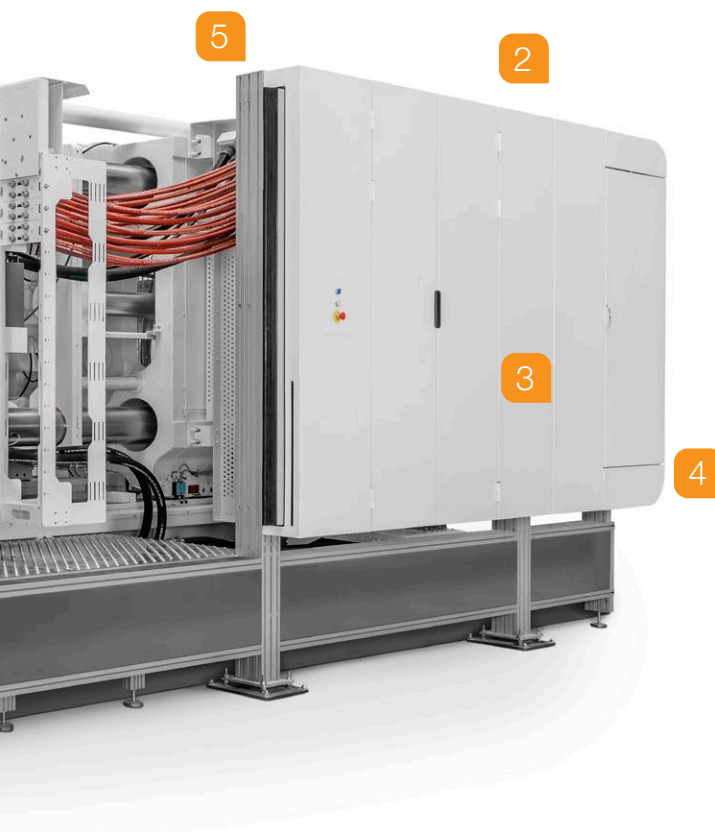
DataView gives a single point of control

DataView allows the peripherals in your cell to be centrally controlled and monitored. The system also monitors the cell and its processes in real time, and collects, analyzes, and stores the production data for better traceability.

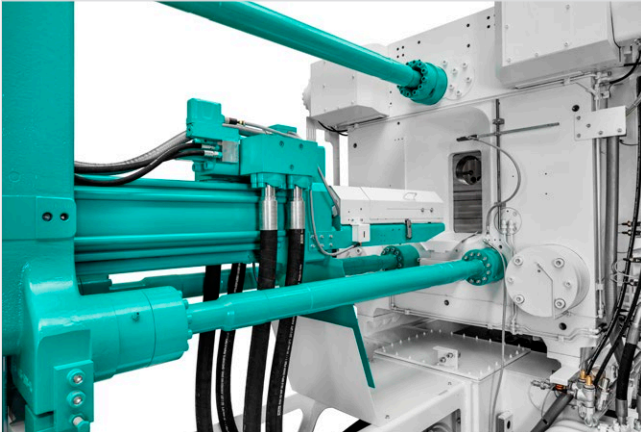
5

Modular energy frame for optimum usability

All the interfaces of the die connection are contained in a modular energy frame, making die changes and process settings easier, faster, and safer.



Advanced technologies Working towards Bühler's vision for your die-casting process



Unique injection unit improves productivity and reduces scrap

Bühler's unique real-time closed-loop die-casting technology gives you maximum quality and efficiency. Your die-casting process is continuously monitored and controlled in real time. The system automatically reacts and corrects deviations, leading to a high level of reproducibility and casting consistency that also helps to preserve your die. In addition, automated algorithms will help you to program optimal casting profiles, which results in shorter cycle times and higher part quality.

Innovative DataView control system enhances availability

Available in multiple languages, DataView's intuitive graphical interface puts your operators in complete control. An overview of the die-casting machine and all of its integrated peripherals allows central control and monitoring of the cell from one interface. The system checks your processes in real time and collects, analyzes and stores all production data for each cycle to give you total traceability. Efficient diagnostic systems work in the background, providing instant graphical alerts to enable your operators to troubleshoot as soon as situations arise.

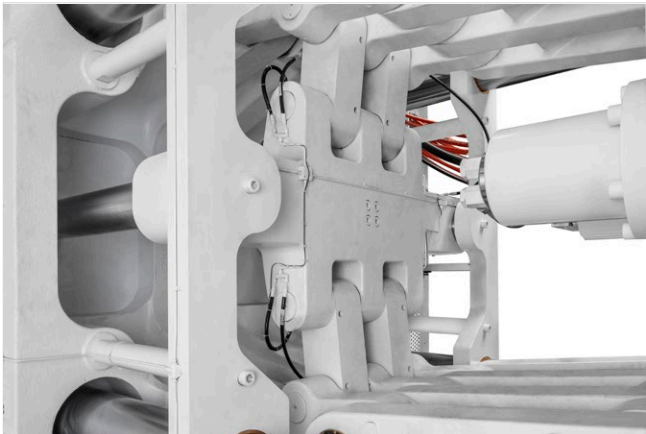
Our vision is ...

0%
scrap

40%
less cycle time

24/7
uptime

...for the future of die casting

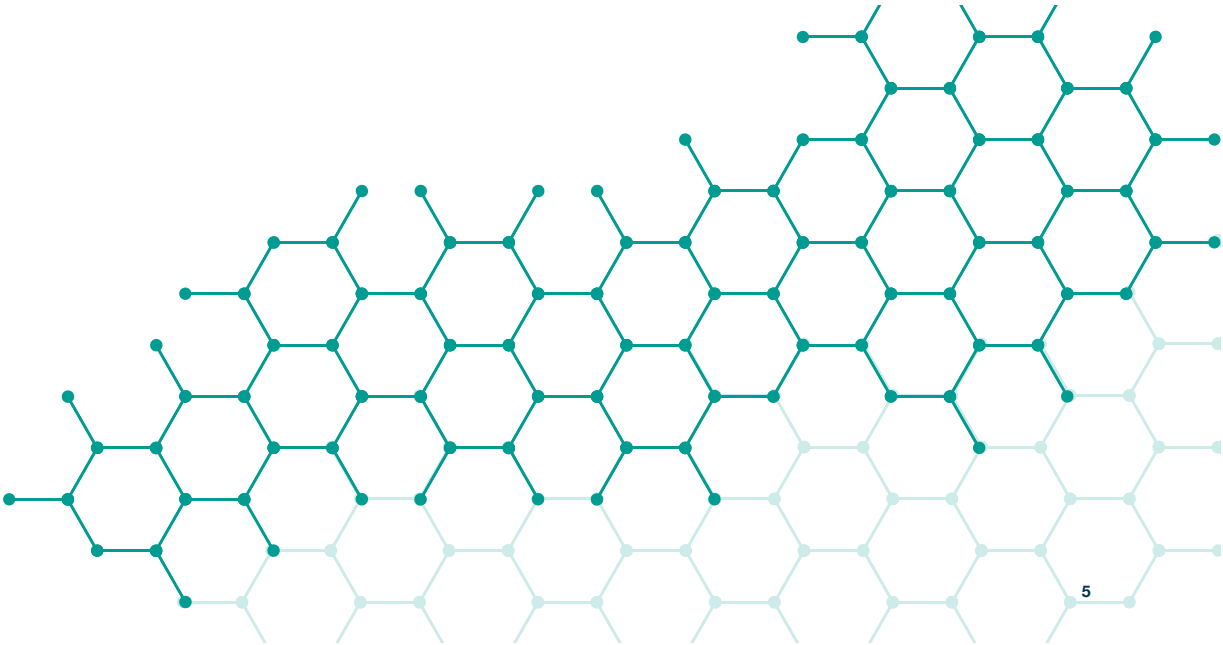


Re-engineered closing unit reduces cycle time and enables larger dies

Based on experience from thousands of installations worldwide, Fusion takes the three-platen closing unit to the next level. Improved rigidity with reduced weight gives you faster, more precise closing, while using less energy. Combined with the new smoother ServoDrive, energy savings can be over 40%. The reengineered cylinder platen design together with the optimized toggle system allows for larger dies.

Simplifying your operations

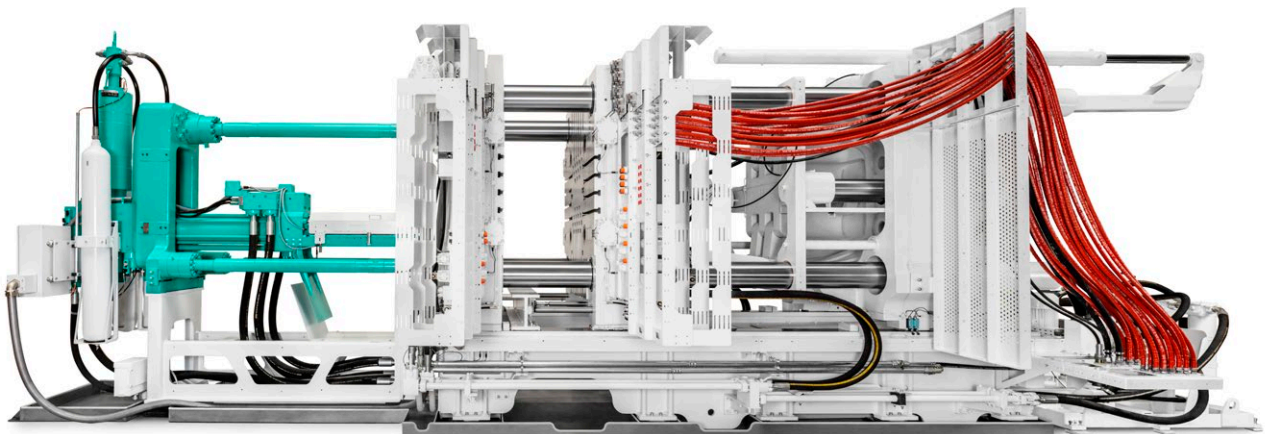
Fusion has been designed for hard-working foundry applications. The injection unit splash guard and the well-arranged die-machine interfaces provide easy access and operation. The single point of access cuts maintenance time. For example, changing the filters or re-filling hydraulic fluid is now straightforward, even during full operation. The large service doors give unimpeded access to the toggle area and the ejector system, simplifying production changes and maintenance work.



Modular energy frames

Future-proofing your investment

The unique energy frame system contains all the interfaces for your die connections. The hydraulic core pull units, squeeze pin units, intelligent water cooling circuits, tempering lines, SmartVac, jet cooling, electrical connections, and many more functions are all housed in one place, making access and maintenance easier.

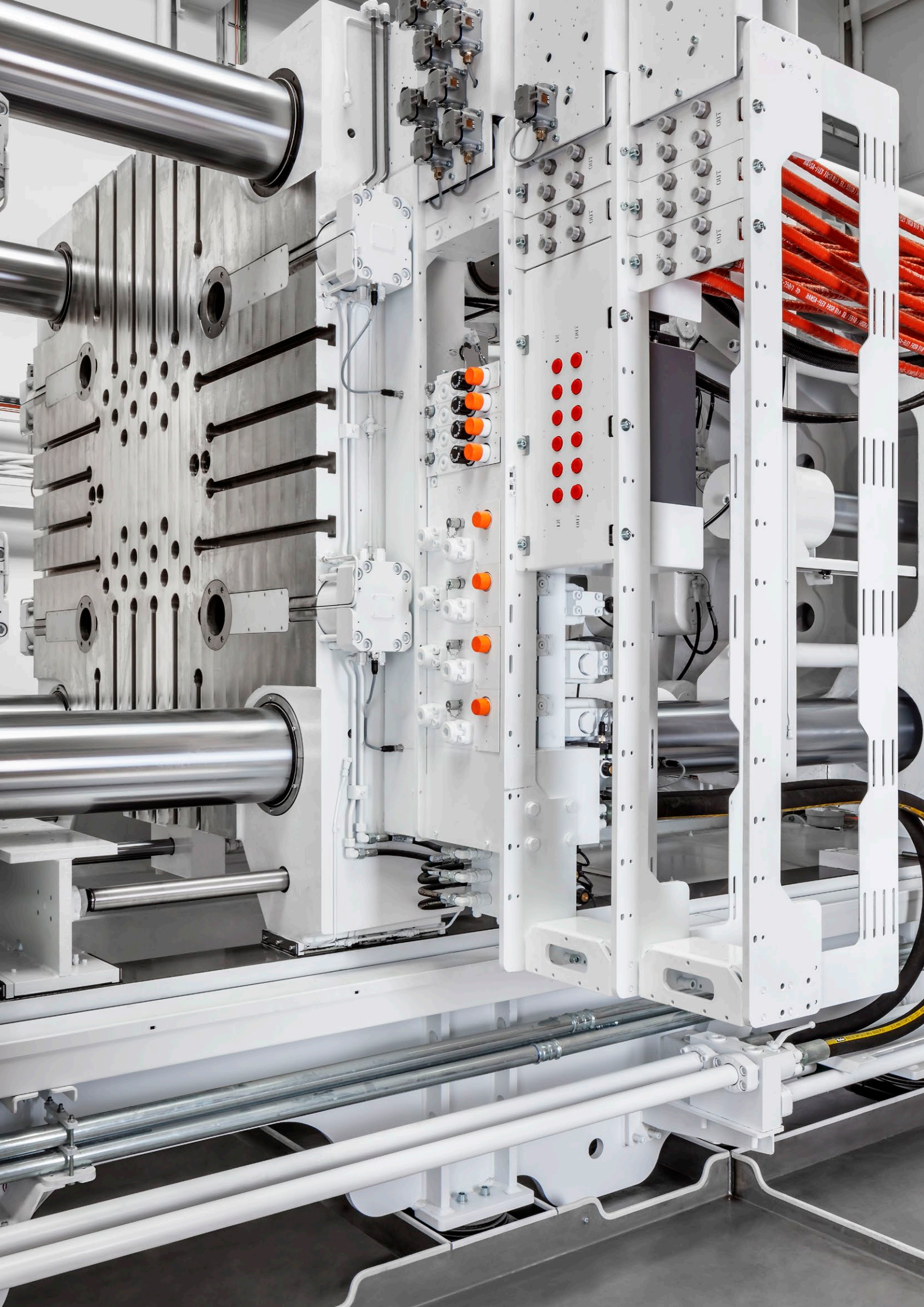


Modularity to suit your process

The modular system allows you to choose from a wider range of options to match the precise needs of your process. Each side of the machine can be equipped with up to three energy frame rows, giving you total flexibility, and enabling you to easily configure each machine for different processes.

Ready for repurposing, upgrades, and enhancements

This innovative energy frame design protects your investment too. Repurposing a machine for new applications or introducing upgrades is now simple to do, giving you greater versatility in your foundry.

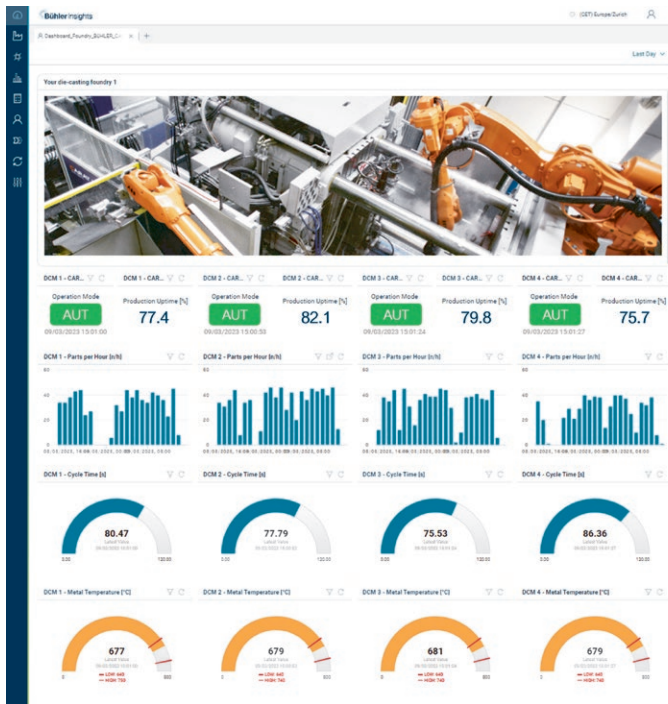


Expertise you can rely on Bühler Die Casting services

Your Bühler die-casting solution comes with a Total Care service agreement which can be tailored to your needs and is designed to help you get the maximum from your die-casting cells.

Total Care can include:

- Regular inspections and recommendation for spare parts and maintenance work provided by our experienced experts
- A choice of maintenance and support packages to complement the level of expertise you have in-house
- Remote support to always have expert help when needed
- Access to digital services to get more from your equipment
- Documentation of service and inspections on your myBühler account

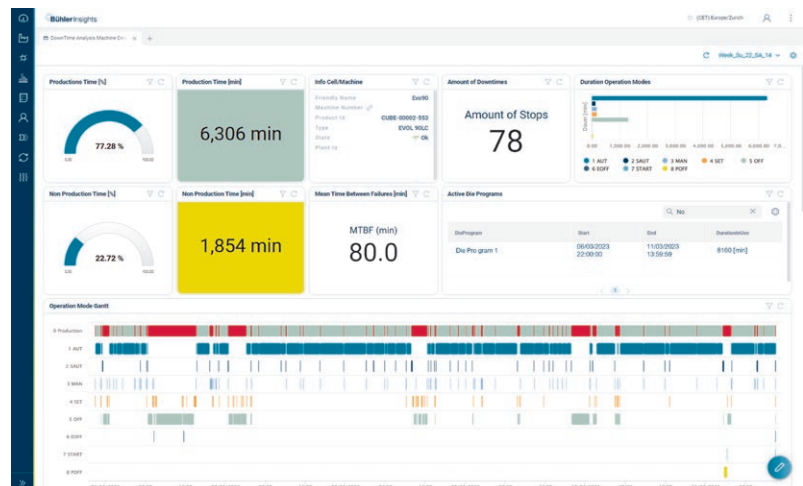


Die Casting Dashboard

Real-time data for you to keep an eye on your die-casting machine, foundry, and plant

Downtime Analysis

The tool enables you to determine the cause of interruptions of your die-casting system - giving you help improving production





myBühler

myBühler gives you an overview of your Bühler equipment, including documents such as user manuals and spare part catalogs. This makes it easy to find the parts you are looking for.

Application technology & education

To get the most from your investment you need optimal performance of your die-casting cell. Our highly qualified staff can help with:

- A wide choice of training courses every year – at dedicated centers, online or directly at your site.
- Process optimization to help drive up your OEE, from production start-up to fine-tuning during operation.
- Consulting to help you troubleshoot issues, consider future strategies and embrace industry trends.



Upgrades

Die casting is a demanding process and innovation constantly changes what's possible. It's good to know that as a Bühler customer, you have access to upgrades for machines and control units to always be up-to-date.

Focus on e-mobility

An evolving market with huge potential

The e-mobility market is driving real growth and innovation in automotive production around the world, with a new focus on high quality die-cast parts. Fusion is perfect for this challenge, reliably creating parts to the tightest tolerances.

Complex parts

E-mobility applications increasingly demand intricate component geometries from more complex and larger dies. Fusion's extended tie bar has room for larger dies. In addition, Fusion's modular energy frames provide space for a clear arrangement of all energies required for these components, including squeezers, hydraulic cores, integrated SmartVac vacuum system, integrated and automated water cooling, quick couplings for heating/cooling circuits, and much more.

Accuracy and reproducibility

The high demands on component quality, such as pressure tightness, require a high dynamic injection force, a short pressure build-up time, and maximum reproducibility of the processes and casting curves. Fusion's real-time and closed-loop injection unit with self-learning control algorithms meets all of these requirements.

Adaptability

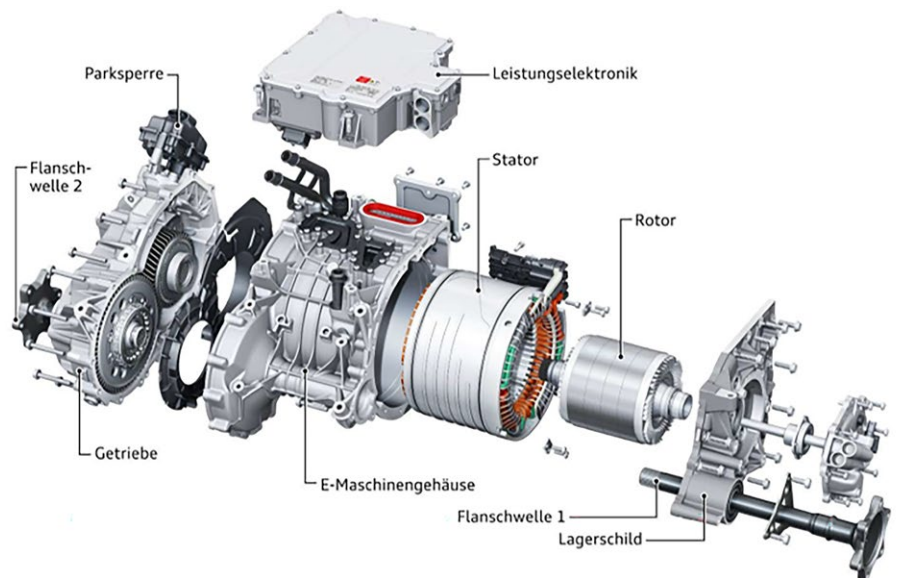
Rapid changes in market development require maximum flexibility of die-casting solutions so that new components and evolving designs can always be included in production planning. With Fusion's easily accessible energy frames, upgrades with additional energies are easy to apply at any time.



Typical e-mobility applications

Fusion offers the perfect platform for the production of numerous components typical for e-drivetrains, such as:

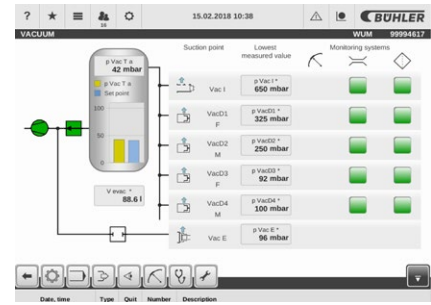
- Motor housings
- Stators
- Rotors
- Bearing shields
- Inverter housings
- Pump housings
- Gearbox housings



Source for example of EV motor: Audi



SmartVac – process transparency thanks to integration



Integrated seamlessly into your Fusion machine, the SmartVac vacuum system is controlled centrally from the DataView control unit. The activation of vacuum valves is programmed according to certain machine movements. All relevant vacuum parameters are measured, monitored and assigned to the process directly – giving you comprehensive process transparency and optimum quality in the components you are producing.

SmartVac allows the use of many commercially available vacuum valves. You can monitor and control up to four evacuation points on the die and one on the shot sleeve simultaneously, all independent of one another.

You can adjust the vacuum level and the evacuation level individually. In addition, cyclical tests allow you to quickly evaluate the current filter condition, informing proactive maintenance decisions.

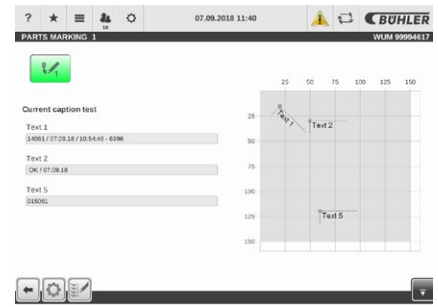
SmartVac is equipped with monitoring of chill vents, hydraulic or electric die valves, profile monitoring per evacuation channel and centralized alarm handling. You can also choose additional SmartVac options to control: mechanical die valves; shot sleeve evacuation unit; die evacuation units; ejector box evacuation unit; and larger vacuum pumps.

Technical data

| | 200/63 | 300/100 | 400/100 | 500/100 |
|--|------------------------|-----------------------------|-------------------------|-------------------------|
| Volumetric capacity of the vacuum tank | 200 | 300 | 400 | 500 |
| Vacuum pump (Busch) m ³ /h | 63 | 100 | 100 | 100 |
| Installed power kW | 2.7 | 2.7 | 2.7 | 2.7 |
| Die evacuation unit | 1 | 1 | 1 | 1 |
| Control system | DataView | DataView | DataView | DataView |
| Interface to die casting machine | Yes | Yes | Yes | Yes |
| Monitored die evacuation channels | max. 2 | max. 2 | max. 4 | max. 4 |
| Suitable for Fusion | Suitable for Fusion 55 | Suitable for Fusion 70 – 90 | Suitable for Fusion 110 | Suitable for Fusion 140 |

Subject to change without notice.

BuhlMark – complete traceability



BuhlMark gives you permanent marking for complete traceability. You can integrate our BuhlMark marking device to apply alphanumeric characters and codes in three different stamping types.

The quick and permanent marking ensures unique and constant traceability. BuhlMark is specially optimized for use in the harsh conditions in your foundry and features a completely

protected stamping unit, which ensures extremely low maintenance.

You can program marking codes directly on the control unit and save them as part of your die program. This enables error-free and quick change of your dies and ensures that all data is centrally available.

Technical data

| Font height in mm | SH 1.8 | | | SH 2 | | | SH 2.5 | | | SH 3 | | | SH 4 | | | SH 5 | | | SH 6 | | | SH 7 | | | | | |
|---------------------------------|--------|------|------|------|------|------|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---|---|---|
| | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | | | |
| Figure set | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| 2 figures | 0.4 | 0.4 | 0.7 | 0.4 | 0.4 | 0.8 | 0.5 | 0.5 | 0.9 | 0.6 | 0.6 | 0.9 | 0.7 | 0.7 | 1.1 | 0.8 | 0.8 | 1.1 | 0.9 | 0.9 | 1.2 | 1.0 | 1.1 | 1.3 | | | |
| 10 figures | 2.0 | 1.8 | 3.3 | 2.1 | 1.8 | 3.4 | 2.4 | 2.1 | 3.8 | 2.6 | 2.4 | 4.0 | 3.1 | 2.9 | 4.5 | 3.6 | 3.4 | 4.9 | 4.0 | 3.9 | 5.3 | 4.5 | 4.3 | 5.7 | | | |
| 40 figures single-spaced | 7.8 | 6.9 | 12.9 | 8.2 | 7.4 | 13.6 | 9.3 | 8.4 | 14.8 | 10.3 | 9.4 | 15.9 | 12.0 | 11.1 | 17.7 | 13.1 | 12.4 | 18.7 | 14.4 | 13.7 | 19.7 | 15.6 | 14.9 | 20.6 | | | |
| Max. figures per second | 5.15 | 5.77 | 3.09 | 4.86 | 5.44 | 2.93 | 4.30 | 4.76 | 2.69 | 3.87 | 4.25 | 2.52 | 3.32 | 3.60 | 2.26 | 3.05 | 3.22 | 2.14 | 2.77 | 2.93 | 2.03 | 2.57 | 2.68 | 1.94 | | | |

Marking times for scribing and dot embossing (approximate)*

Font set A: DIN 1451 or OCR-A – scribing

Font set B: HS (fast writing = slightly angular characters) – scribing

Font set C: 7 × 5 (dot matrix) – dot embossing only

The following marking cycle times were achieved with a marking unit 315 with marking controller EG-Box (ZAM5) with the marking heads DD20 L and R32 K.

Marking time for data matrix code ECC 200 (approximate)**

Embossing: bidirectional = forward and backward embossing

| Code size in mm | 6 × 6 | | 9 × 9 | | 10 × 10 | | 12 × 12 | | 15 × 15 | | 20 × 20 | |
|---------------------|-------|-----|-------|-----|---------|-----|---------|-----|---------|----|---------|----|
| Embossing mode | Bi | Bi | Bi | Bi | Bi | Bi | Bi | Bi | Bi | Bi | Bi | Bi |
| 10 × 10 dots | 1.7 | 1.9 | 1.9 | 2.0 | 2.0 | 2.2 | – | – | – | – | – | – |
| 12 × 12 dots | 2.3 | 2.8 | 2.8 | 2.8 | 2.8 | 3.0 | 3.3 | – | – | – | – | – |
| 14 × 14 dots | 3.2 | 3.7 | 3.7 | 3.8 | 3.8 | 4.1 | 4.5 | 5.1 | – | – | – | – |
| 16 × 16 dots | 3.7 | 4.3 | 4.3 | 4.5 | 4.5 | 4.8 | 5.2 | 5.9 | – | – | – | – |
| 18 × 18 dots | 4.6 | 5.3 | 5.3 | 5.5 | 5.5 | 5.9 | 6.4 | 7.8 | – | – | – | – |
| 20 × 20 dots | 5.5 | 6.3 | 6.3 | 6.6 | 6.6 | 7.1 | 7.7 | 8.6 | – | – | – | – |
| 22 × 22 dots | – | 7.3 | 7.3 | 7.6 | 7.6 | 8.2 | 8.9 | 9.9 | – | – | – | – |

* All descriptions are purely marking times – in-feed movements of the marking unit or marking heads as well as intermediate movements and movements towards the marking position or return to Home Position are not included. The marking times are reference values. Binding time specifications are only made by marking trial with an original workpiece. The marking speed can have a significant impact on the marking. The quality of the marking depends also on the built-in situation, rigidity of the marking unit parts (please notice our installation instructions), marking position, workpiece geometry and surface of the workpiece.

** All times stated are pure marking times, exclusive of feed travel of the marking unit or marking head or of detour travel and lengthy travel to the marking point.

Subject to change without notice.

BuhlRob – fast, reliable extraction



Our BuhlRob robot is specifically designed for part removal in your foundry. The system is based on proven ABB and KUKA technologies, offering compact design, high range and a high working load.

Additionally, BuhlRob is integrated into your die-casting system control unit, giving your operator simple graphical visualization for better handling.

Technical data

| | | Model 4600F / 45-2.05 | Model 4600F / 40-2.55 | Model 6700F / 205-2.8 |
|---|-----|--|---|---|
| Number of axes | | 6 | 6 | 6 |
| Handling weight (gripper and load) | kg | 45 | 40 | 205 |
| Maximum reach | mm | 2051 | 2552 | 2794 |
| Programming | | RAPID | RAPID | RAPID |
| Connected power | kVA | 7.8 | 7.8 | 13 |
| Interference contour robot (no gripper and load) (radius) | mm | 400 | 400 | 650 |
| Robot weight | kg | 425 | 440 | 1260 |
| Dimensions of control cabinet (LWH) | mm | 725 × 710 × 970 (1370) | 725 × 710 × 970 (1370) | 725 × 710 × 970 (1370) |
| Suitable for Fusion | | Suitable for Fusion 55 | Suitable for Fusion 70-90 | Suitable for Fusion 110-140 |
| Suitable for Fusion under certain conditions | | Suitable for Fusion under certain conditions 70-90 | Suitable for Fusion under certain conditions 55 | Suitable for Fusion under certain conditions 90 |

subject to change without notice

BuhlLadle – precise and consistent dosing



BuhlLadle gives you precise and consistent dosing of liquid aluminum. Featuring a robust design and simple handling, it is entirely integrated into the control unit of your die-casting system.

The servo technology enables you to program precise speeds and ladle angles to suit each component. Extraordinary positioning accuracy can increase your dosing consistency and reduce cycle times.

Technical data

| | | Model 1_12 | Model 2_23 |
|--|---------|--|---|
| Ladling volume per cycle | kg (Al) | 0.5 – 12 | 2 – 23 |
| Horizontal travel | mm | 2100 | 2550 |
| Bath level descent | mm | 750 | 770 |
| Connected power | kW | 3.7 | 5 |
| Dimensions of ladling unit (LWH) | mm | 1200 × 664 × 1291 | 1400 × 640 × 1700 |
| Weight of ladling unit | kg | 650 | 800 |
| Height adjustment of casting cell | mm | 350 | 420 |
| Ladling accuracy | % | +/- 1.5 | +/- 2 |
| Control system | | DataView | DataView |
| Suitable for Fusion | | Suitable for Fusion 55-90 | Suitable for Fusion 70-140 |
| Suitable for Fusion under certain conditions | | Suitable for Fusion under certain conditions 110-140 | Suitable for Fusion under certain conditions 55 |

subject to change without notice

Fusion

Technical data / dimensions

| Machine type | Injection force, dynamic (90% injection stroke) | Injection force intensified | Plunger diameter (min./max.) | Shot position | Plunger stroke | Shot weight (AI) (min./max.) filling rate 2/3 | Projected area, plunger diameter (min./max.) |
|--------------|---|-----------------------------|------------------------------|---------------|----------------|---|--|
| | kN | kN | mm | mm | mm | kg | cm ² |
| 55* | 170 | 516 | 60 / 100 | 0 / -250 | 600 | 2.83 / 7.85 | 326 / 906 |
| 70 | 302 | 769 | 70 / 120 | 0 / -300 | 700 | 4.49 / 13.19 | 350 / 1028 |
| 90 | 302 | 769 | 70 / 120 | 0 / -300 | 700 | 4.49 / 13.19 | 450 / 1322 |
| 110 | 431 | 1076 | 80 / 140 | 0 / -350 | 850 | 7.12 / 21.81 | 509 / 1559 |
| 140 | 431 | 1076 | 80 / 140 | 0 / -350 | 850 | 7.12 / 21.81 | 648 / 1984 |

* sizes will be available at a later stage

subject to change without notice



| Specific injection pressure (min./max.) | Maximum locking force | Platen size (height x width) | Distance between tie bars | Die height (min./max.) | Die opening stroke | Ejector force (min./max.) | Ejector stroke | Machine weight |
|---|-----------------------|------------------------------|---------------------------|------------------------|--------------------|---------------------------|----------------|----------------|
| bar | kN | mm | mm | mm | mm | kN | mm | kg |
| 552 / 1533 | 5500 | 1205 x 1205 | 800 | 330 / 810 | 640 | 150 / 225 | 145 | 22000 |
| 681 / 2001 | 7000 | 1365 x 1365 | 900 | 360 / 900 | 800 | 225 / 350 | 175 | 32000 |
| 681 / 2001 | 9000 | 1525 x 1525 | 1000 | 400 / 1000 | 840 | 225 / 350 | 175 | 39000 |
| 706 / 2161 | 11000 | 1700 x 1700 | 1100 | 560 / 1150 | 950 | 400 / 500 | 220 | 57000 |
| 706 / 2161 | 14000 | 1885 x 1885 | 1225 | 640 / 1300 | 1000 | 400 / 500 | 220 | 67000 |

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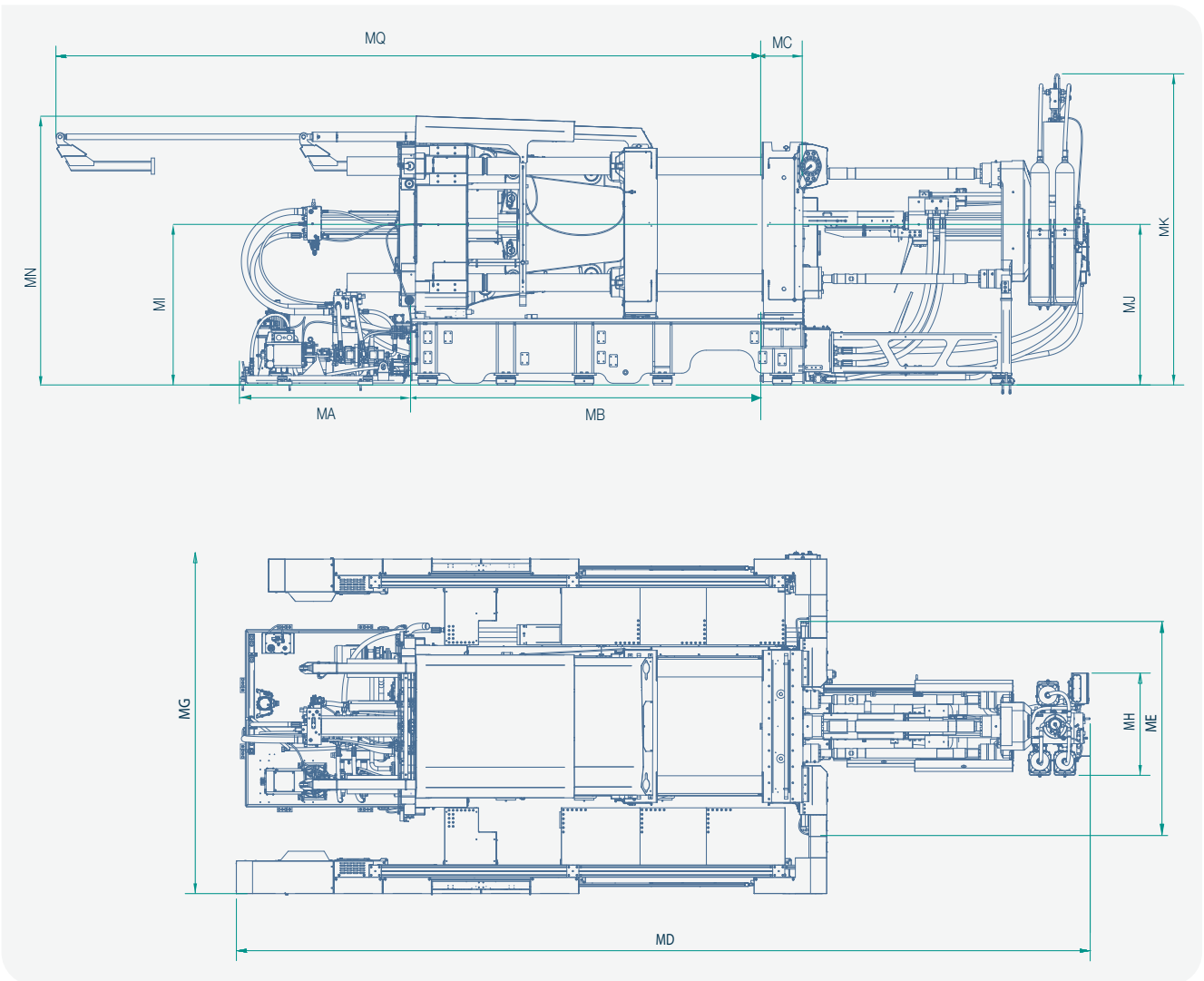
Fusion

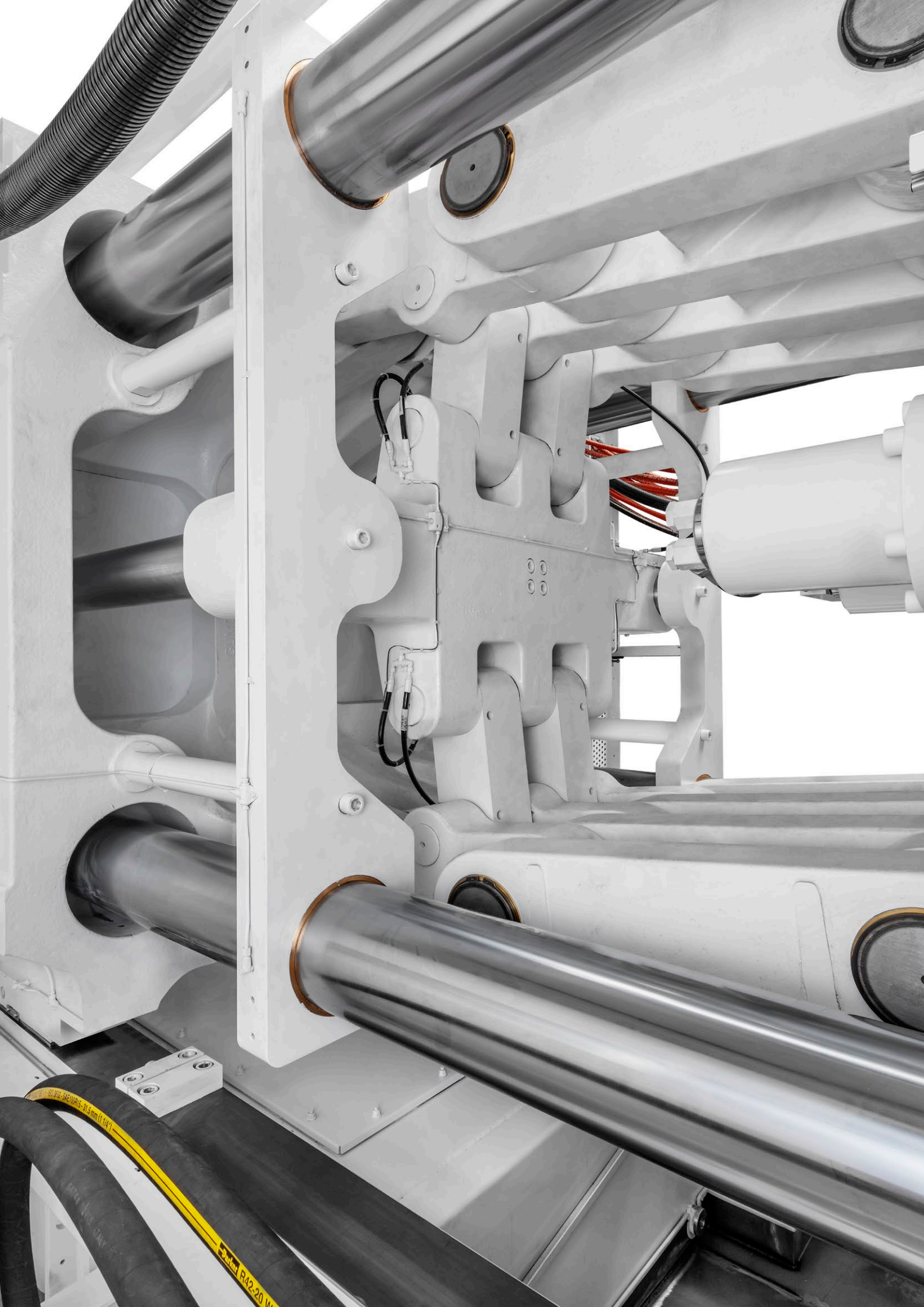
Technical data / dimensions

| Machine type | MA | MB | MC | MD | ME | MG | MH | MI | MJ | MK | MN | MQ |
|--------------|------|------|-----|-------|-------------|-------------|------|------|-------------|------|------|------|
| 55* | 1500 | 2810 | 325 | 7519 | 1800 - 2595 | 2626 - 3421 | 1200 | 1486 | 1236 - 1486 | 3500 | 2600 | 6000 |
| 70 | 1620 | 3390 | 365 | 8965 | 1961 - 2756 | 2786 - 3581 | 1237 | 1656 | 1356 - 1656 | 3632 | 2730 | 7055 |
| 90 | 1620 | 3615 | 420 | 8965 | 2121 - 3446 | 2946 - 4271 | 1237 | 1706 | 1406 - 1706 | 3682 | 2841 | 7280 |
| 110 | 1973 | 4110 | 450 | 10739 | 2295 - 3620 | 3316 - 4441 | 1363 | 1891 | 1541 - 1891 | 3756 | 3136 | 8222 |
| 140 | 1973 | 4360 | 505 | 10739 | 2481 - 3806 | 3306 - 4631 | 1363 | 1991 | 1641 - 1991 | 3856 | 3333 | 8758 |

* sizes will be available at a later stage

units in mm
 subject to change without notice





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