A hydraulic ALLROUNDER 820 S uses long-fibre direct injection moulding to produce the housing. The finished parts are removed by a MULTILIFT SELECT vertical robotic system and placed in a palletising system with container changer. The result is an autonomous process that enables great part strength at low unit costs:

- Cavities: 2
- Moulded part weight: 330 g and length 280 mm
- Cycle time: 70 s
- Material: PP + glass-fibre roving

A six-axis robotic system heats up two organic sheets in the gripper and positions them in the LIPA (Lightweight Integrated Process Application) mould at the forming temperature. Inserts are moulded there and functional and reinforcement elements are added simultaneously with the long-fibre direct injection moulding. The result is a high-strength, lightweight composite component:

- Cavities: 1
- Moulded part weight: 202 g and length 500 mm
- Cycle time: 40 s
- Material: PP + glass-fibre roving + organic sheet

Example: Airbag housing

Example: Combination with organic sheet

Example: Combination with organic sheet

**At a glance**

- Innovative lightweight construction process
- Substitution of metals through plastics
- Fibres are added directly to the melt
- Low material and therefore unit costs
- Significantly improved mechanical properties
- For even greater strength: Combination with organic sheets

**Long-fibre direct injection moulding**

High-strength lightweight construction

**In cooperation with:**

ARBURG GmbH + Co KG
Postfach 11 09
72286 Lossburg
Germany
Tel.: +49 (0) 74 46 33-0
Fax: +49 (0) 74 46 33 65
E-mail: contact@arburg.com
www.arburg.com

SKZ - Das Kunststoff-Zentrum
Friedrich-Bergius-Ring 22
97076 Würzburg
Germany
Tel.: +49 (0) 931 41 04-433
Fax: +49 (0) 931 41 04-707
E-mail: kfe@skz.de
www.skz.de

**In cooperation with:**

SKZ - Das Kunststoff-Zentrum
Friedrich-Bergius-Ring 22
97076 Würzburg
Germany
Tel.: +49 (0) 931 41 04-433
Fax: +49 (0) 931 41 04-707
E-mail: kfe@skz.de
www.skz.de

**In cooperation with:**

SKZ - Das Kunststoff-Zentrum
Friedrich-Bergius-Ring 22
97076 Würzburg
Germany
Tel.: +49 (0) 931 41 04-433
Fax: +49 (0) 931 41 04-707
E-mail: kfe@skz.de
www.skz.de

**In cooperation with:**

SKZ - Das Kunststoff-Zentrum
Friedrich-Bergius-Ring 22
97076 Würzburg
Germany
Tel.: +49 (0) 931 41 04-433
Fax: +49 (0) 931 41 04-707
E-mail: kfe@skz.de
www.skz.de
Example: Airbag housing

- Cavities: 2
- Moulded part weight: 330 g and length 280 mm
- Cycle time: 70 s
- Material: PP + glass-fibre roving

A hydraulic ALLROUNDER 820 S uses long-fibre direct injection moulding to produce the housing. The finished parts are removed by a MULTILIFT SELECT vertical robotic system and placed in a palletising system with container changer. The result is an autonomous process that enables great part strength at low unit costs:

- Cycle time: 70 s
- Moulded part weight: 330 g and length 280 mm
- Material: PP + glass-fibre roving

Example: Combination with organic sheet

- Cavities: 1
- Moulded part weight: 202 g and length 500 mm
- Cycle time: 40 s
- Material: PP + glass-fibre roving + organic sheet

A six-axis robotic system heats up two organic sheets in the gripper and positions them in the LIPA (Lightweight Integrated Process Application) mould at the forming temperature. Inserts are moulded there and functional and reinforcement elements are added simultaneously with the long-fibre direct injection moulding. The result is a high-strength, lightweight composite component:

- Moulded part weight: 202 g and length 500 mm
- Cycle time: 40 s
- Material: PP + glass-fibre roving + organic sheet

At a glance

- Innovative lightweight construction process
- Substitution of metals through plastics
- Fibres are added directly to the melt
- Low material and therefore unit costs
- Significantly improved mechanical properties
- For even greater strength: Combination with organic sheets

Long-fibre direct injection moulding

High-strength lightweight construction

ARBURG GmbH + Co KG
Postfach 11 09
72286 Lossburg
Germany
Tel.: +49 (0) 74 46 33-0
Fax: +49 (0) 74 46 33 65
e-mail: contact@arburg.com
www.arburg.com

SKZ - Das Kunststoff-Zentrum
Friedrich-Bergius-Ring 22
97076 Würzburg
Germany
Tel.: +49 (0) 931 41 04-433
Fax: +49 (0) 931 41 04-707
e-mail: kfe@skz.de
www.skz.de

In cooperation with:

Metal
Composite component

533 g
202 g

ARBURG - SKZ
Long fibres – high-strength part

In long-fibre direct injection moulding, fibres up to 50 mm long are added directly to the liquid melt. This enables lightweight moulded parts with thinner wall thicknesses to be produced with the same strength, or metals to be replaced with plastics.

The longer the fibres in the component, the better the mechanical properties. Until now, direct processing of longer glass fibres failed due to limitations during material preparation and dosage, as well as the granulate form. The long-fibre direct injection moulding process developed by ARBURG and SKZ enables the inline feeding of longer glass fibres, opening up new ways of reinforcing plastics.

Long fibres – low costs

Long-fibre direct injection moulding offers several advantages in comparison with long-fibre granulates:
- Targeted influence on component properties thanks to individual adjustment of fibre length, fibre content and material combinations
- Reduced destruction of fibres during melt preparation
- Increased strength through the use of longer fibres in the component
- Use of less expensive base materials

**Long fibre granulate**
- PP LGF 30: 2.65 EUR/kg

**Long fibres**
- PP: 1.40 EUR/kg

**Glass-fibre roving**
- 1.35 EUR/kg

**Bonding agent**
- 3.50 EUR/kg

**Cost benefit**
- 1.19 EUR/kg

Long fibres – specialised technology

The cutting and inline feeding of fibres into the liquid melt requires specialised technology:
- A servo-electric side feeder on the injection unit cuts continuous fibre strands into 15 to 50 mm lengths and adds them directly to the liquid melt
- Special cylinder module for size 2100 injection unit – other sizes available on request
- A two-stage screw homogenises the fed-in fibres and prepared melt
- The SELOGICA machine control system makes for simple programming and detailed quality control

Cost-effective production at reduced unit costs was the main concern during process development:
- Large material variety: individual reinforcement of all common plastics with glass fibres; other fibre types, such as carbon, available on request
- Low investment costs: used on standard injection moulding machines with clamping forces of 2,500 kN and higher
- Fast reconfiguration: universal application on various ALLROUNDERs thanks to the enclosed construction of the side feeder
- Maximum flexibility: conventional injection moulding via a thermoplastic cylinder module possible at any time
- Highly resilient lightweight parts: automation with robotic system for combination with organic sheets
Example: Airbag housing

- Cavities: 2
- Moulded part weight: 330 g and length 280 mm
- Cycle time: 70 s
- Material: PP + glass-fibre roving

A hydraulic ALLROUNDER 820 S uses long-fibre direct injection moulding to produce the housing. The finished parts are removed by a MULTILIFT SELECT vertical robotic system and placed in a palettising system with container changer. The result is an autonomous process that enables great part strength at low unit costs:

- Material: PP + glass-fibre roving

---

Example: Combination with organic sheet

- Cavities: 1
- Moulded part weight: 202 g and length 500 mm
- Cycle time: 40 s
- Material: PP + glass-fibre roving + organic sheet

A six-axis robotic system heats up two organic sheets in the gripper and positions them in the LIPA (Lightweight Integrated Process Application) mould at the forming temperature. Inserts are moulded there and functional and reinforcement elements are added simultaneously with the long-fibre direct injection moulding. The result is a high-strength, lightweight composite component:

- Material: PP + glass-fibre roving + organic sheet

---

At a glance

- Innovative lightweight construction process
- Substitution of metals through plastics
- Fibres are added directly to the melt
- Low material and therefore unit costs
- Significantly improved mechanical properties
- For even greater strength: Combination with organic sheets

Long-fibre direct injection moulding
High-strength lightweight construction

In cooperation with:

SKZ - Das Kunststoff-Zentrum
Friedrich-Bergius-Ring 22
97076 Würzburg
Germany
Tel. +49 (0) 931 41 04-433
Fax +49 (0) 931 41 04-707
e-mail: kfe@skz.de
www.skz.de

ARBURG GmbH + Co KG
Postfach 11 09
72286 Lossburg
Germany
Tel.: +49 (0) 74 46 33-0
Fax: +49 (0) 74 46 33 65
e-mail: contact@arburg.com
www.arburg.com

Example: Combination with organic sheet

- Cavities: 1
- Moulded part weight: 202 g and length 500 mm
- Cycle time: 40 s
- Material: PP + glass-fibre roving + organic sheet

A six-axis robotic system heats up two organic sheets in the gripper and positions them in the LIPA (Lightweight Integrated Process Application) mould at the forming temperature. Inserts are moulded there and functional and reinforcement elements are added simultaneously with the long-fibre direct injection moulding. The result is a high-strength, lightweight composite component:

- Material: PP + glass-fibre roving + organic sheet

---

At a glance

- Innovative lightweight construction process
- Substitution of metals through plastics
- Fibres are added directly to the melt
- Low material and therefore unit costs
- Significantly improved mechanical properties
- For even greater strength: Combination with organic sheets

Long-fibre direct injection moulding
High-strength lightweight construction

In cooperation with:

SKZ - Das Kunststoff-Zentrum
Friedrich-Bergius-Ring 22
97076 Würzburg
Germany
Tel. +49 (0) 931 41 04-433
Fax +49 (0) 931 41 04-707
e-mail: kfe@skz.de
www.skz.de

ARBURG GmbH + Co KG
Postfach 11 09
72286 Lossburg
Germany
Tel.: +49 (0) 74 46 33-0
Fax: +49 (0) 74 46 33 65
e-mail: contact@arburg.com
www.arburg.com

Example: Combination with organic sheet

- Cavities: 1
- Moulded part weight: 202 g and length 500 mm
- Cycle time: 40 s
- Material: PP + glass-fibre roving + organic sheet

A six-axis robotic system heats up two organic sheets in the gripper and positions them in the LIPA (Lightweight Integrated Process Application) mould at the forming temperature. Inserts are moulded there and functional and reinforcement elements are added simultaneously with the long-fibre direct injection moulding. The result is a high-strength, lightweight composite component:

- Material: PP + glass-fibre roving + organic sheet

---

At a glance

- Innovative lightweight construction process
- Substitution of metals through plastics
- Fibres are added directly to the melt
- Low material and therefore unit costs
- Significantly improved mechanical properties
- For even greater strength: Combination with organic sheets

Long-fibre direct injection moulding
High-strength lightweight construction

In cooperation with:

SKZ - Das Kunststoff-Zentrum
Friedrich-Bergius-Ring 22
97076 Würzburg
Germany
Tel. +49 (0) 931 41 04-433
Fax +49 (0) 931 41 04-707
e-mail: kfe@skz.de
www.skz.de

ARBURG GmbH + Co KG
Postfach 11 09
72286 Lossburg
Germany
Tel.: +49 (0) 74 46 33-0
Fax: +49 (0) 74 46 33 65
e-mail: contact@arburg.com
www.arburg.com