wiedemann

# Collapsible cores

## A simple and brilliant solution

for demoulding undercuts

# About us…

**Wiedemann GmbH was established by its managing director Rudolf Wiedemann in 1984. In its capacity as service provider for the tool making sector, Wiedemann GmbH has made the extraordinary its day-to-day business and thus the yardstick for the daily efforts. Wiedemann soon delivered top performance in the fields of wire-electro discharge machining and ram electrical discharge machining, which still inspires the quality of the company until this very day.**

**Since 1994, customer-specific solutions for undercuts which are difficult to demould as well as solutions for circumferential female threads have been produced at the production site in Ingelfingen/Swabia. Having gained vast experience in tool and mould making, Rudolf Wiedemann developed the collapsible core in 1994 as a vendor part for the plastic and zinc pressure die casting industry. With this innovative product, the company has gained great achievements in the world market.**

**Thomas Wiedemann**
Managing Director

**Patents prove our constant innovations:**

Bundesrepublik Deutschland

Urkunde

über die Erteilung des
Patents Nr. 10 2012 208 563

Bezeichnung:
Einfallkern
IPC:
B29C 45/33
Inhaber/Inhaberin:
Wiedemann GmbH, 74653 Ingelfingen, DE
Erfinder/Erfinderin:
Wiedemann, Rudolf, 74653 Ingelfingen, DE
Tag der Anmeldung:
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Die Präsidentin des Deutschen Patent- und Markenamts

Cornelia Rudloff-Schäffer

München, 18.05.2015

Bundesrepublik Deutschland

Urkunde

über die Erteilung des
Patents Nr. 10 2016 100 477

Bezeichnung:
Werkzeug mit gekühltem Einfallkern
IPC:
B29C 45/33
Inhaber/Inhaberin:
Wiedemann GmbH, 74653 Ingelfingen, DE
Erfinder/Erfinderin:
Wiedemann, Thomas, 74653 Ingelfingen, DE
Tag der Anmeldung:
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Die Präsidentin des Deutschen Patent- und Markenamts

Cornelia Rudloff-Schäffer

München, 09.02.2017

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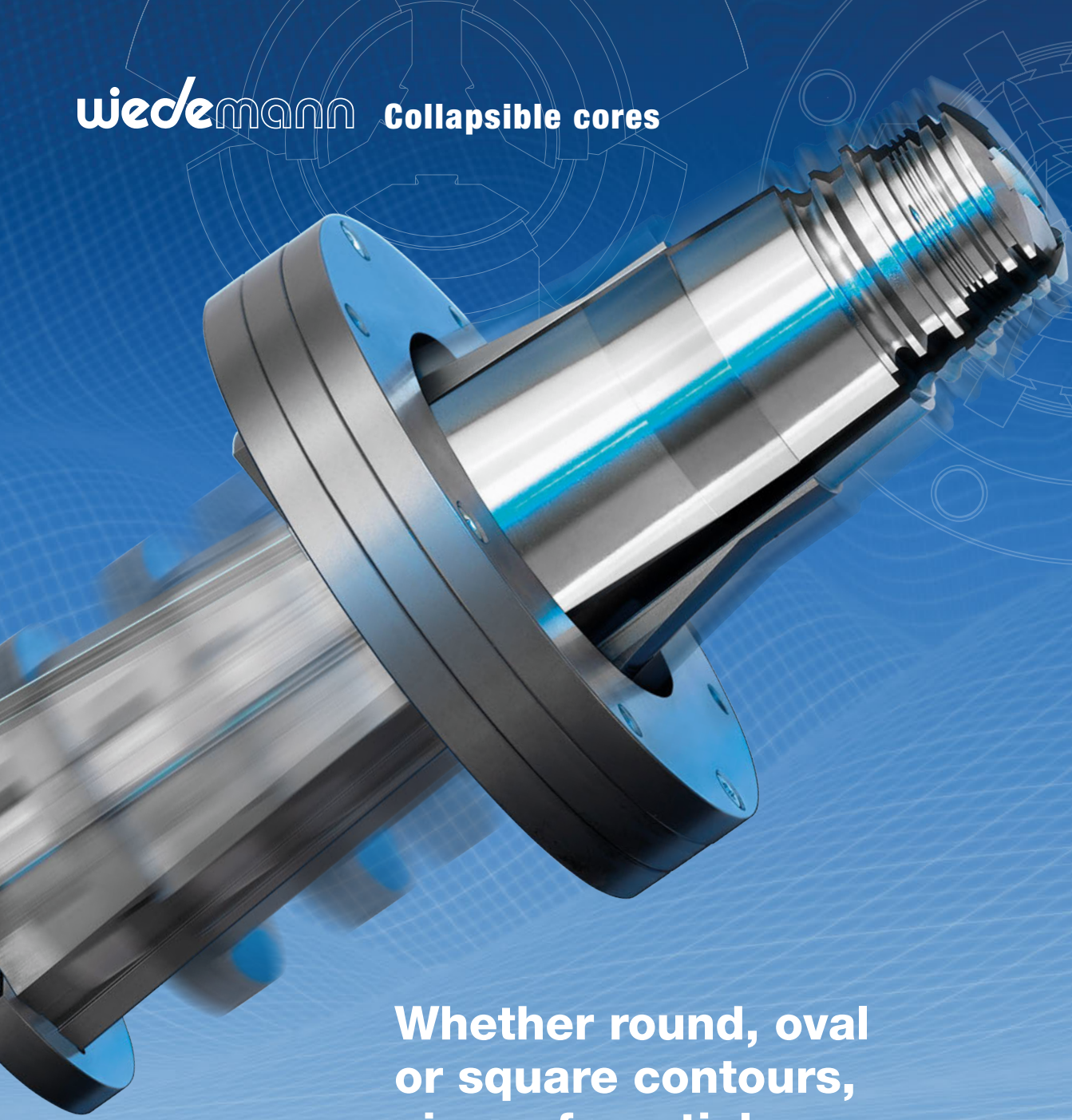
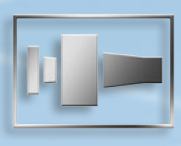


## Whether round, oval or square contours, circumferential or interrupted undercuts ...

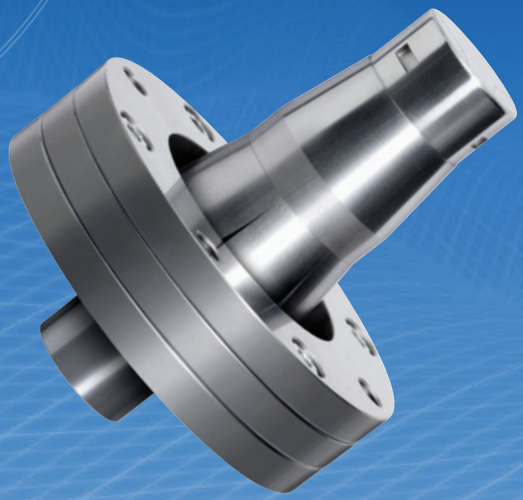
## We make many things possible!

**All collapsible cores are positively controlled in parallel to the centre via the dovetail guide. This is to avoid stuck parts and allows for rectangular undercuts.**

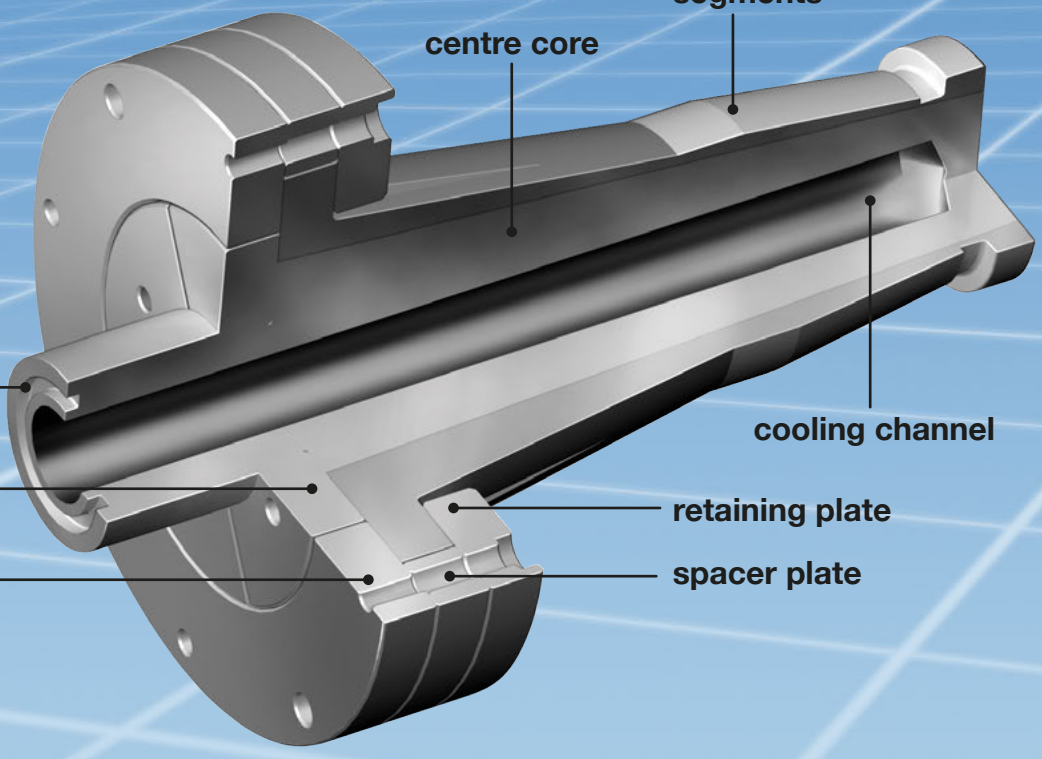


# Collapsible cores

wiedemann



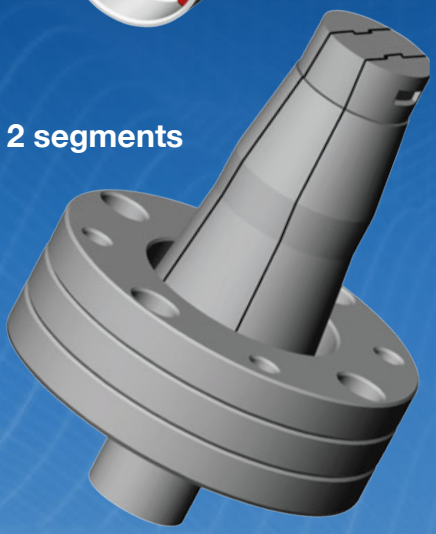
Collapsible cores consist of a centre core with heating-cooling channel, external segments and retaining rings.




wedemann **Einfallkerne**

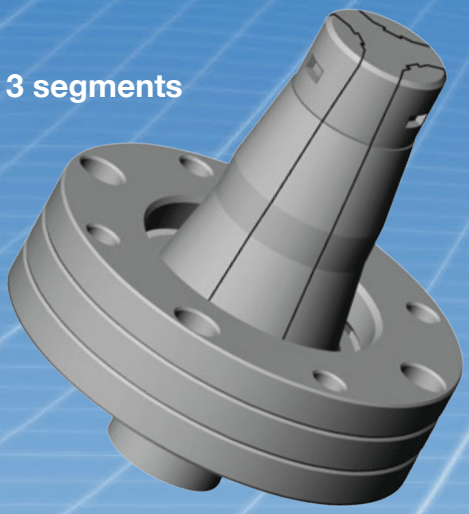
# Variable designs with many options

2 segments

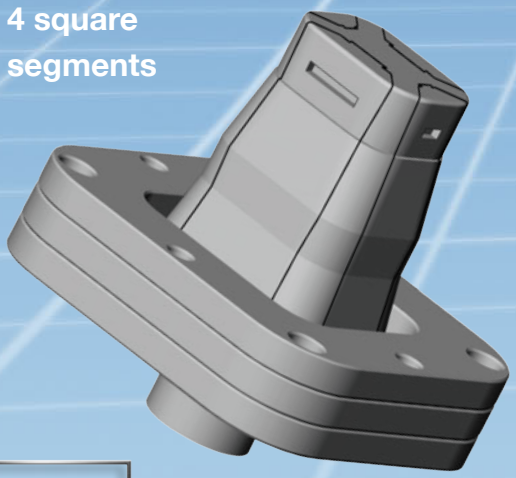


- 2, 3 and 4... segments / collapsible core adjusted to your part
- demoulds up to approx. 23 % of interrupted undercuts
- centre core with heating-cooling channel

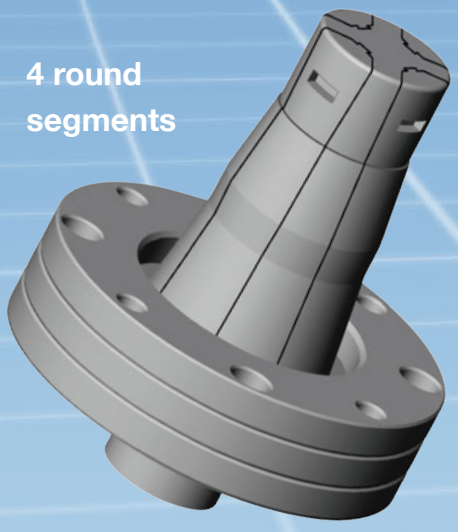
3 segments

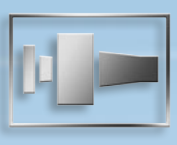


4 square segments

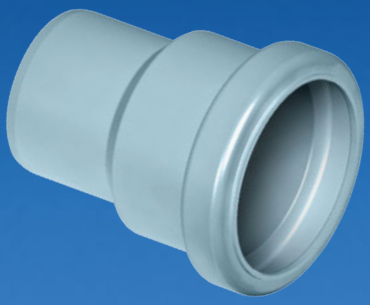


4 round segments





# Einfallkerne wiedemann

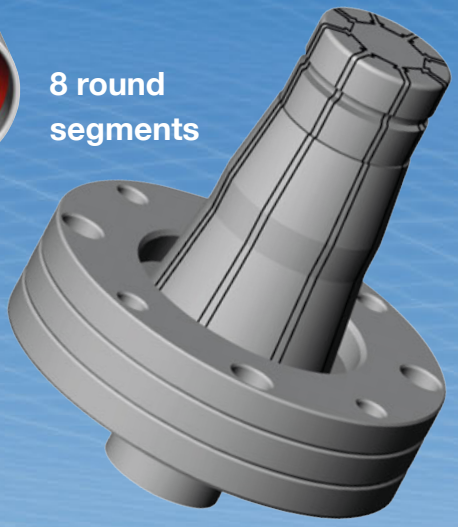


12 segments

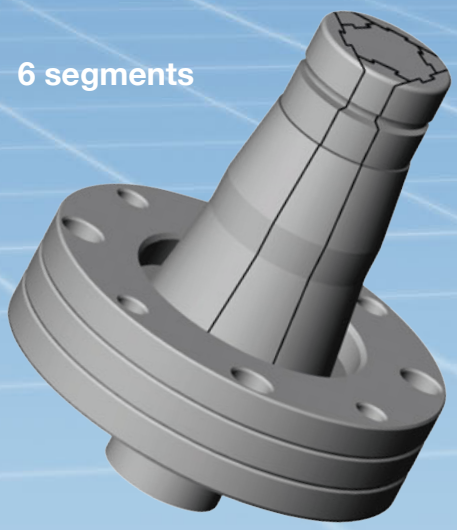


- 6, 8 and 12 segments / collapsible core adjusted to your part
- demoulds up to approx. 12 to 17 % of circumferential undercuts
- centre core with heating-cooling channel

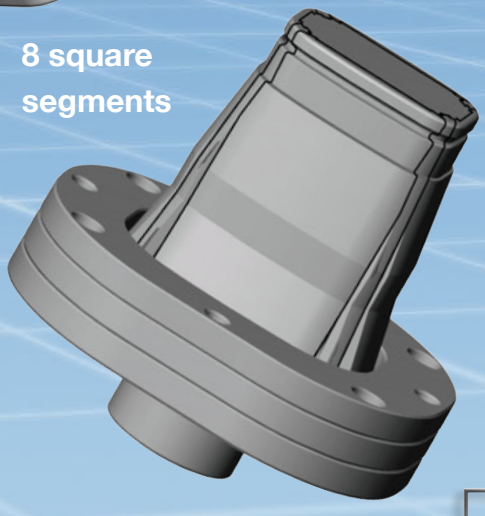
8 round segments



6 segments



8 square segments



# Collapsible core sizes and materials

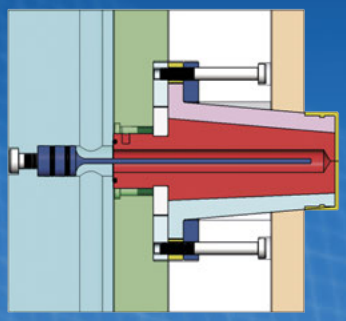
**Collapsible core diameter from 8 mm to 240 mm**

- Any contours available ready for installation
- Any types of **plastic** with 60 % of glass fibre
- Tool temperatures up to approx. 190 degrees
- Compound temperatures of up to approx. 300 degrees
- Zinc **pressure die casting** approx. 400 degrees
- Sinter metals
- Composites
- Ceramics

…and many more

# Demoulding types and installation options

**Standard demoulding by opening and closing the tool**

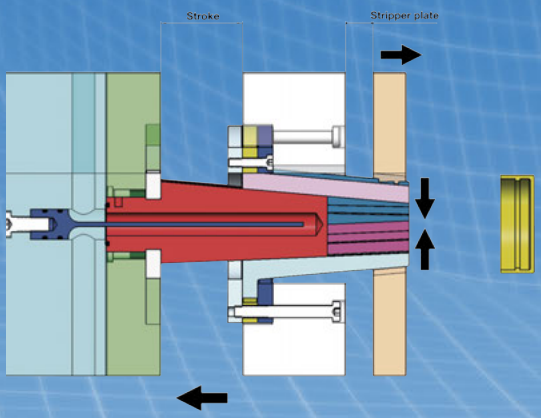


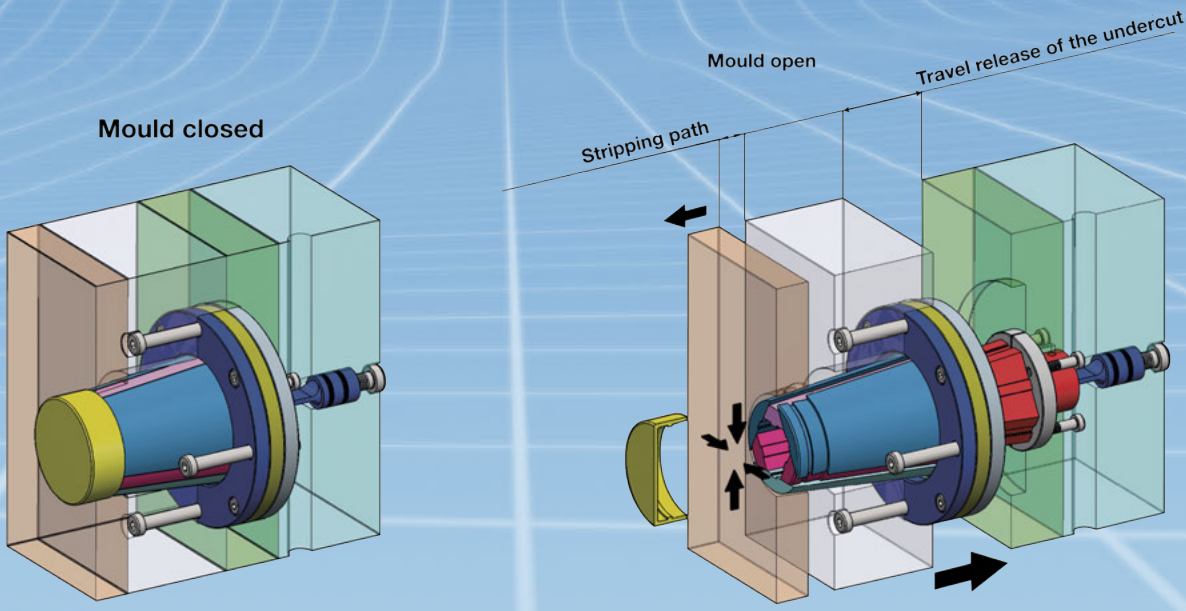
1. Open the separating level

2. Travel release of the undercut

3. Stripping path

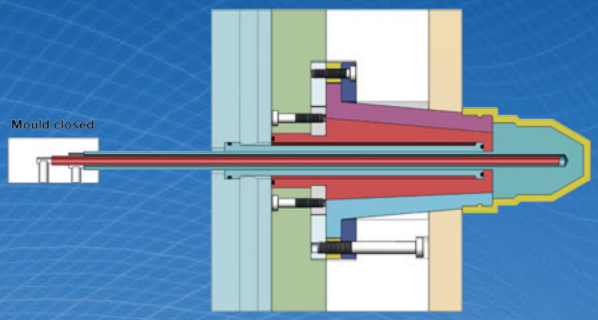
Operated via latch locking unit or
2-step ejector.
Temperature control of the centre core

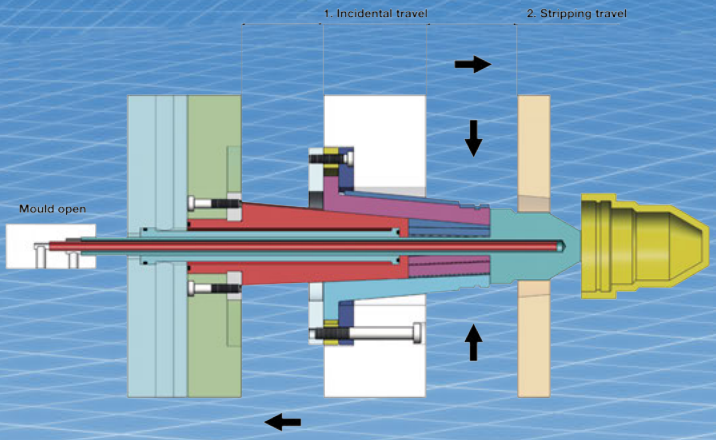


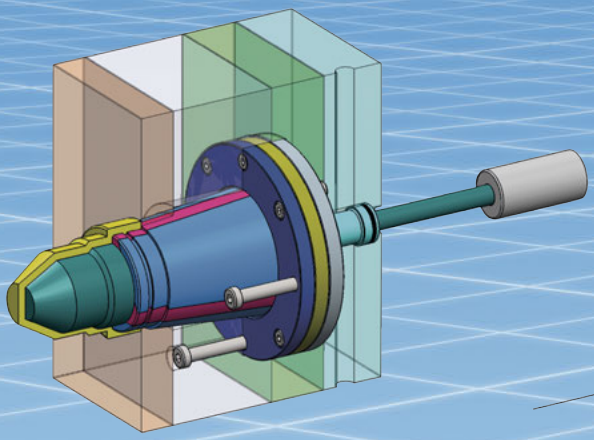
# Demoulding with cap

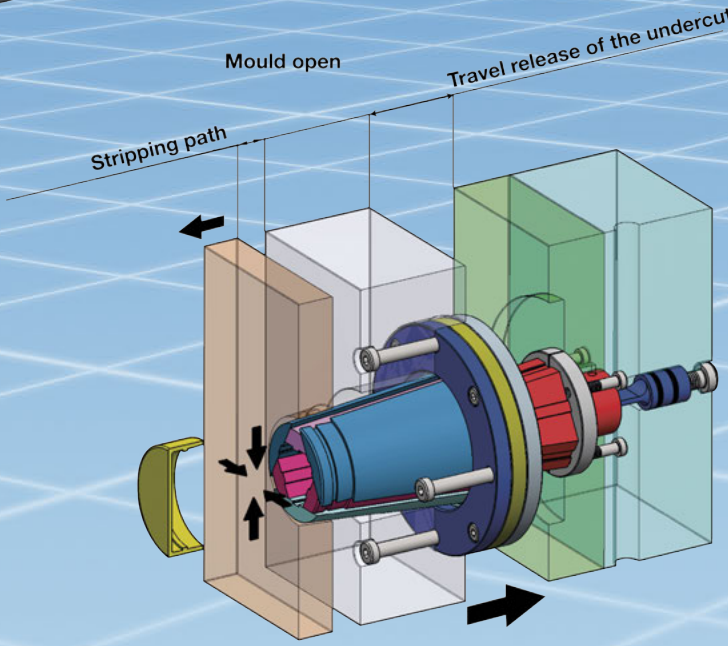
- Open the separating level
- Travel release of the undercut
- Stripping path
- Operated via latch locking unit or 2-step ejector
- The cap is guided through the centre core
- Temperature control of the centre core + cap
- For frontal contours and undercuts
- No parting line at the cap



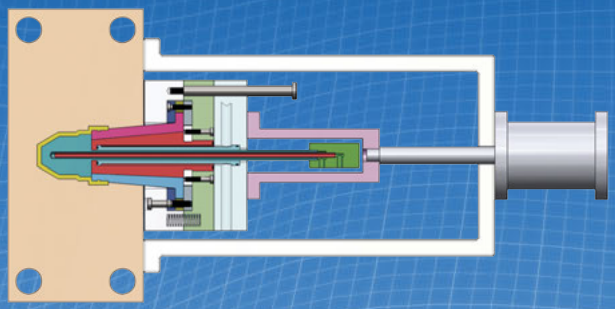

Mould closed



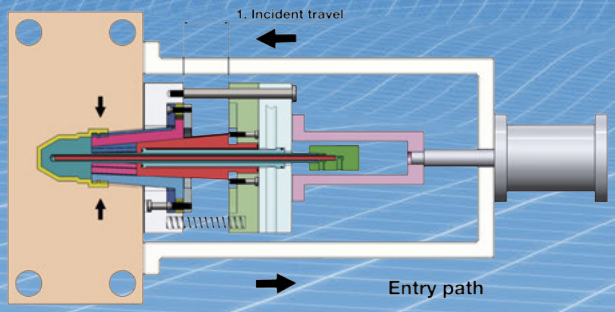


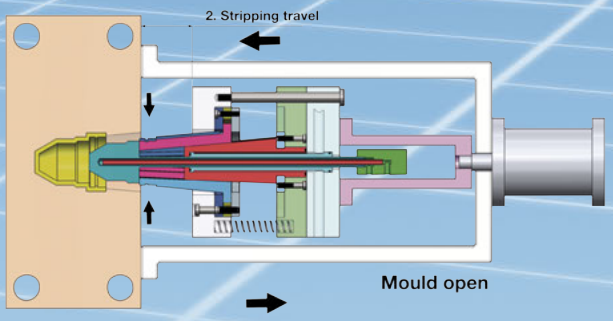

# Lateral demoulding with / without cap operated with hydraulic cylinder and others

- Open the separating level
- Travel release of the undercut
- Stripping path + return from the cavity in one movement



- Temperature control of the centre core + cap
- For undercut contours which are not in the open/close movement of the tool



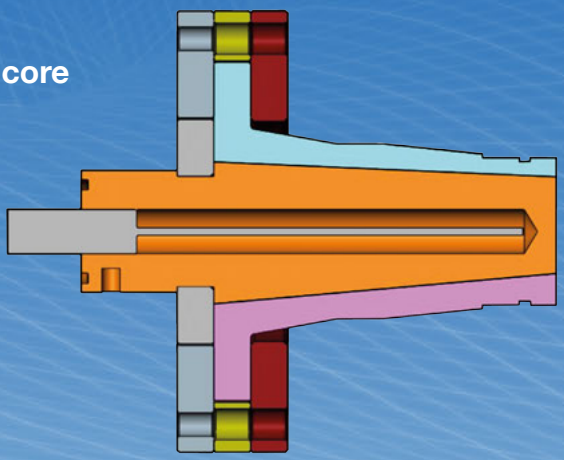



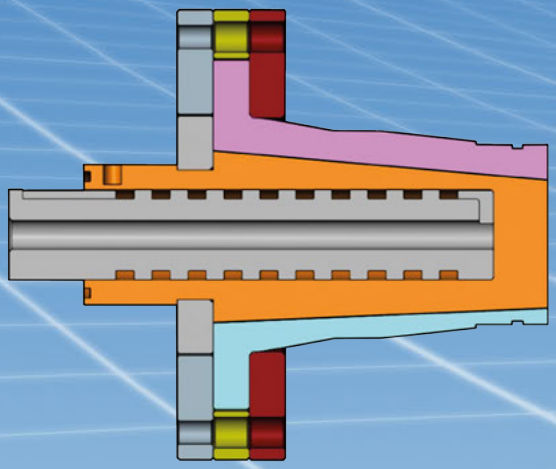

# Temperature control of the collapsible cores

In order to achieve good component quality at short cycle times and low energy costs, efficient temperature control is also possible and necessary for collapsible cores.

The following examples show different temperature control options.

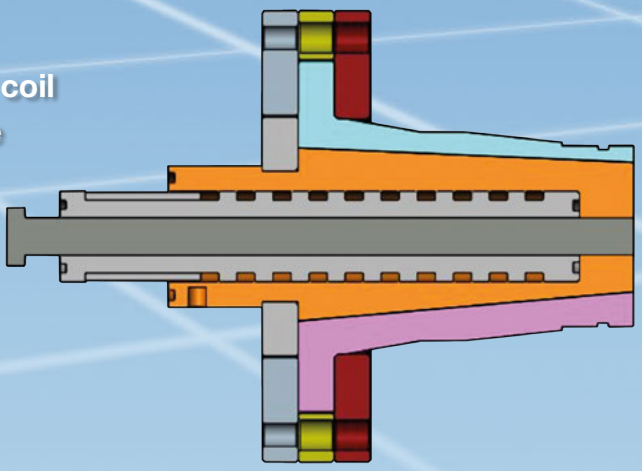
1. Temperature control bore in the centre core
   - bypass via separating plate or riser
   - possible from a diameter of 2 mm



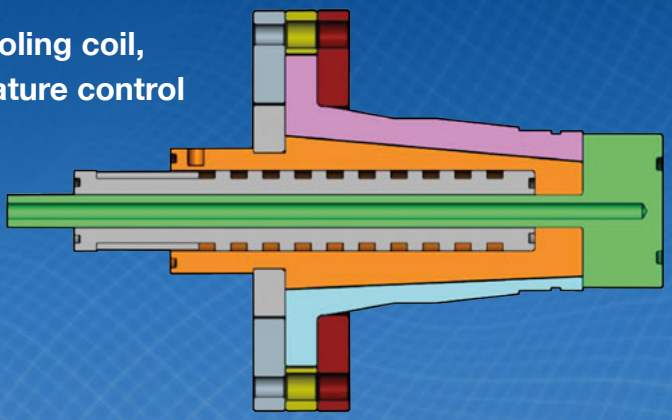


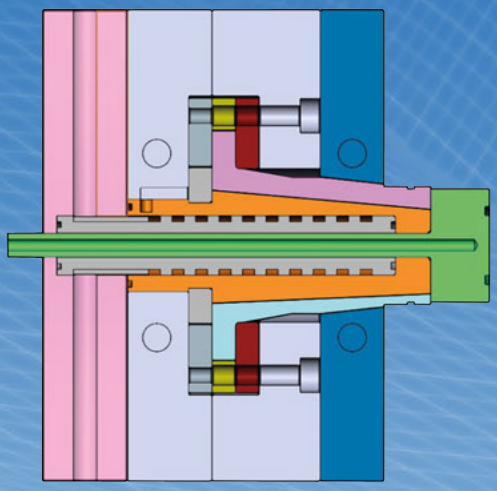
2. Temperature control via a cooling coil
   - standard spiral cores can be used
   - possible from a diameter of 2 mm

3. Temperature control via a cooling coil with central ejector to support the ejection of the plastic part or sprue



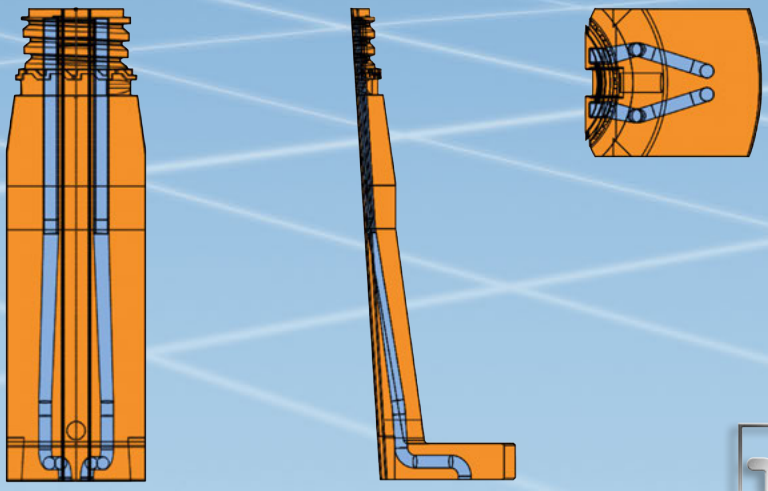
4. Temperature control via a cooling coil, as well as additional temperature control of guide rod and cap





5. Temperature control of the centre core, guide rod and cap as well as of all plates adjacent to the incident core

6. Temperature control of individual segments via the patented cooling system



wiedemann **Collapsible cores**

## Coating

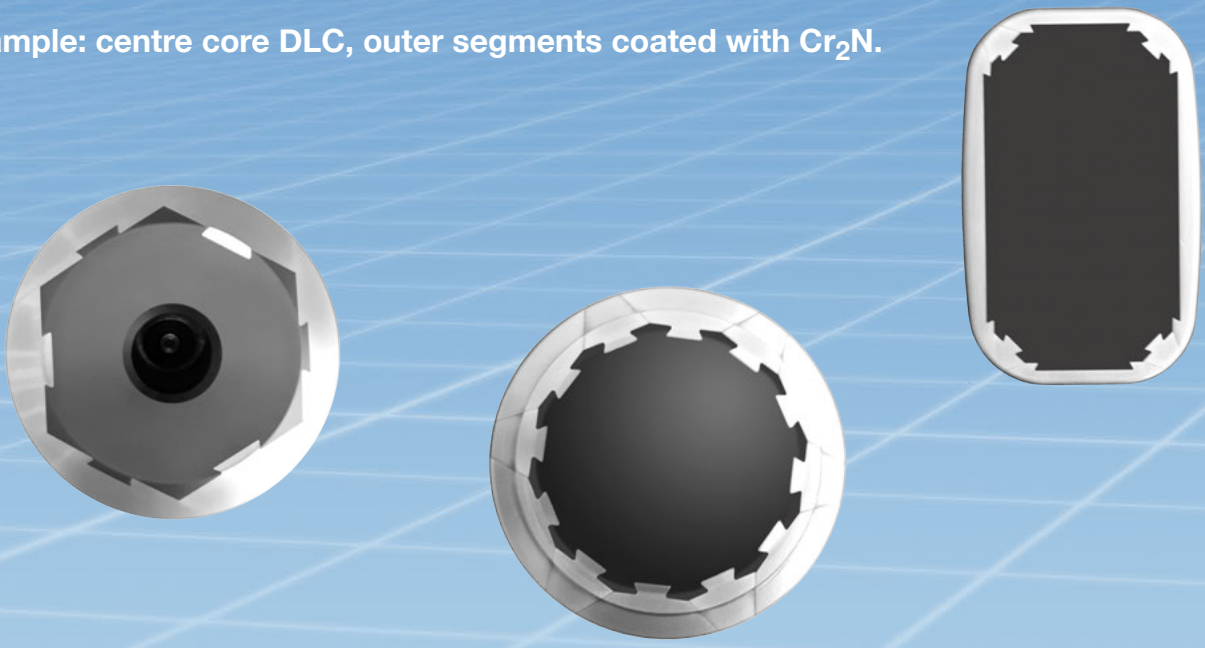
In order to improve the reliability and wear resistance of our collapsible cores, they are coated with different layers depending on their intended use prior to series production.

On the basis of different types of heat treatment, we offer you the appropriate layer for your application which we apply immediately after production or mould proving.

The centre core is coated with a sliding layer, the outer segments with an non-stick coating. These coatings are applied in the micrometre range and have a surface hardness of up to 3500 HV.

The coatings have high wear resistance, a low friction value, very good corrosion characteristics and are designed for high quantities.

Example: centre core DLC, outer segments coated with $Cr_2N$.

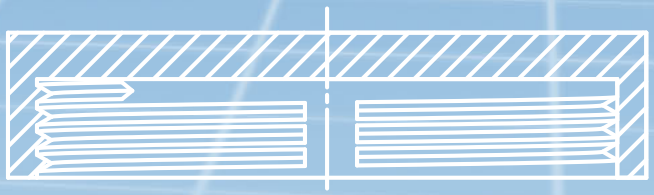


# Application examples

cut thread

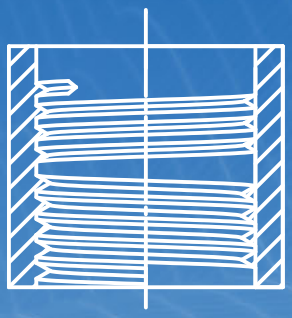
2-pitch thread

buttress thread, both sides

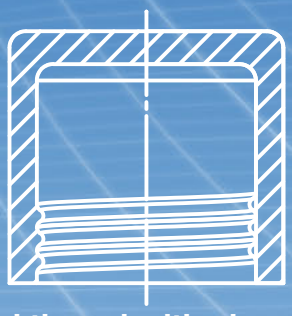


large thread with interruption

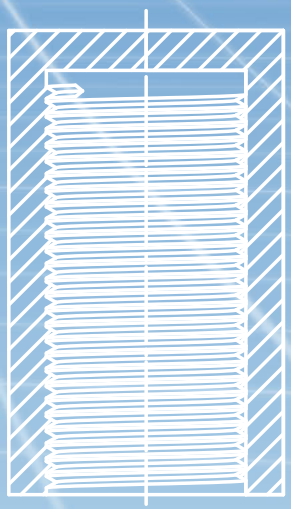
bayonet fitting



left-right thread



round thread with clearance



long cylindrical thread

wiedemann **Collapsible cores**

# Application samples

## Threads – free-forming surfaces – contours

- **profile-ground**
- **sink-eroded**
- **HSC-milled**

These options are possible for each design, and the desired shapes are produced by Wiedemann to suit the customer part.

# Collapsible cores

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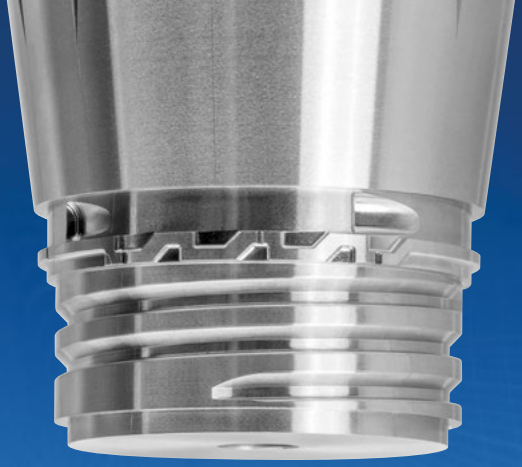
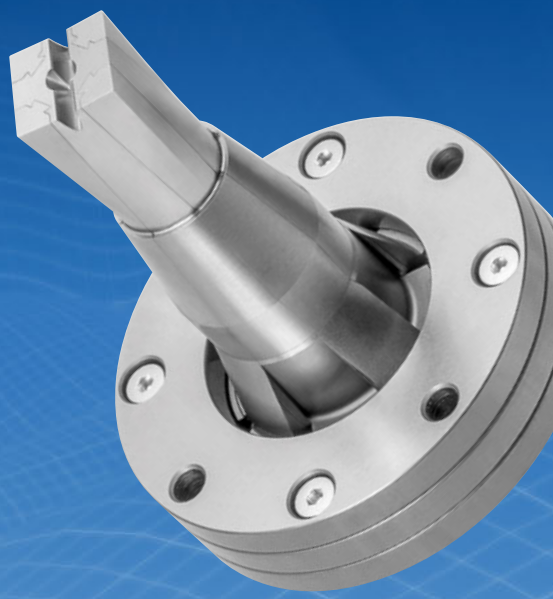
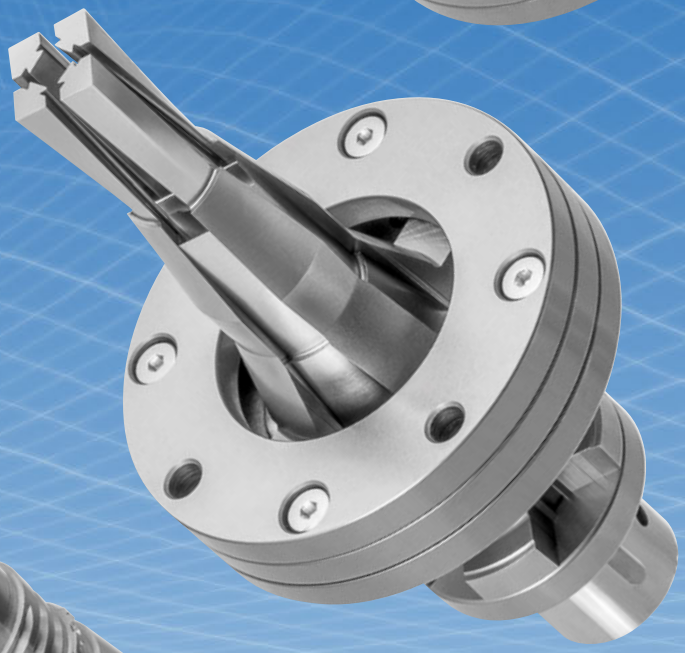


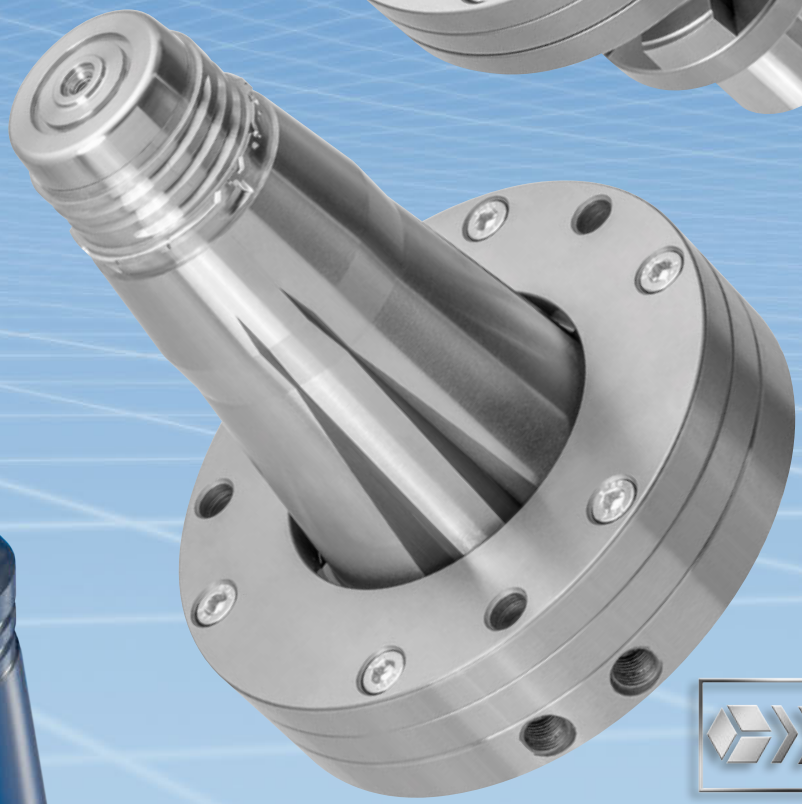


All contours can be optimised additionally.

Collapsible cores offer completely new design opportunities for product designers.



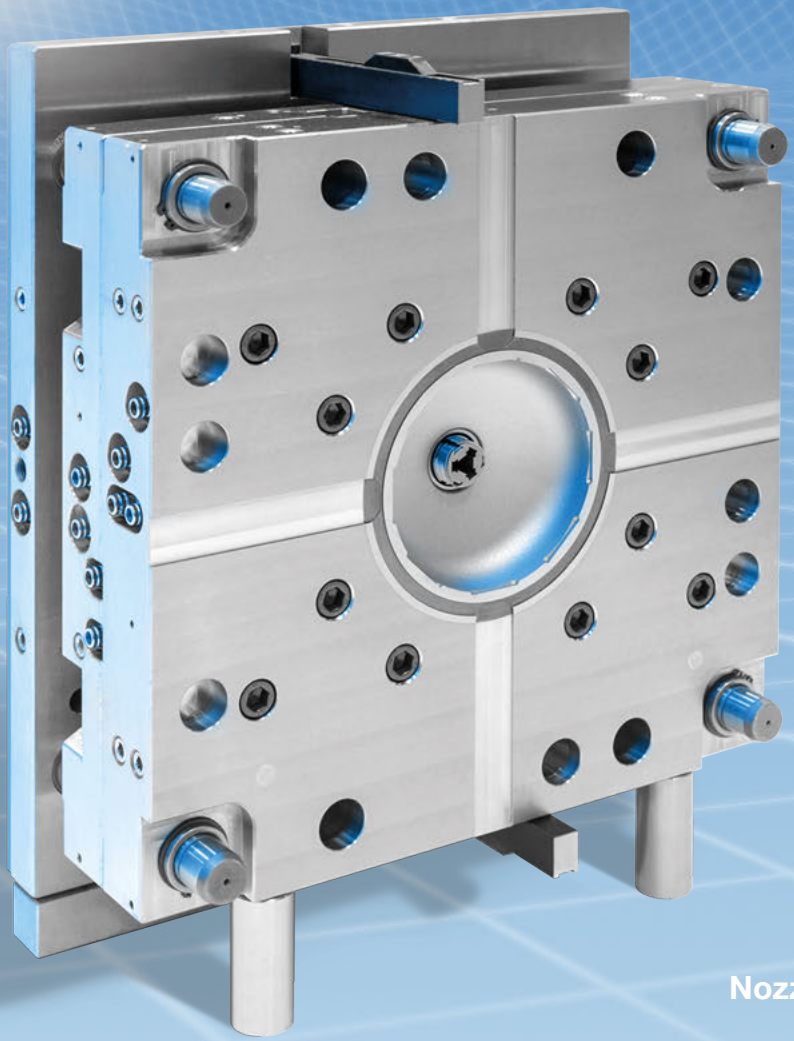
In many cases, there is no need for side shifting devices, and all contours can be demoulded by the collapsible core.



# Customer application

## Collapsible core at the ejector side + at the nozzle side

- Thread size at the ejector side: 146 mm, double-threaded
- Thread size at the nozzle side: 37 mm
- Cap for frontal undercuts and fins
- Sprue gate through collapsible core at the nozzle side
- Temperature control of the centre core
- Temperature control of the segments
- Plastic with 50 % of glass fibre
- Latch locking unit at the ejector and nozzle side



Nozzle side

# Collapsible cores

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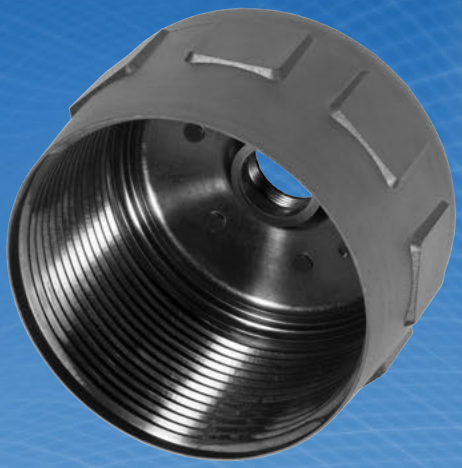

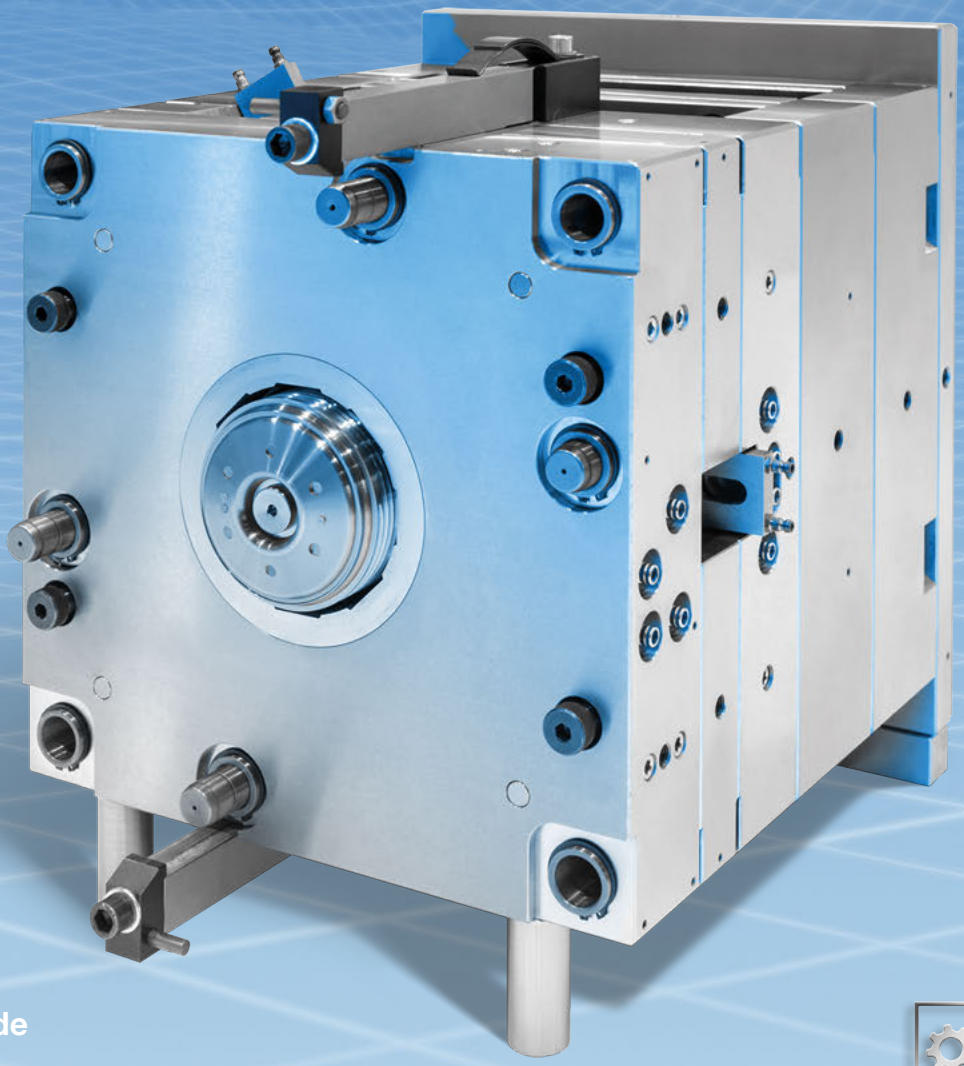

Ejector side

wiedemann **Collapsible cores**

# Product examples of our customers

Collapsible cores are used in various industrial sectors in order to allow for the demoulding of undercuts.
Using collapsible cores, internal geometries are applied to the most complex plastic items.

# Collapsible cores

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- Automotive industry
- Electrical industry
- Food industry
- Medical technology
- Furniture industry
- Sanitary engineering
- Fittings industry
- Toy industry
- Control and regulation technology
- Packing industry

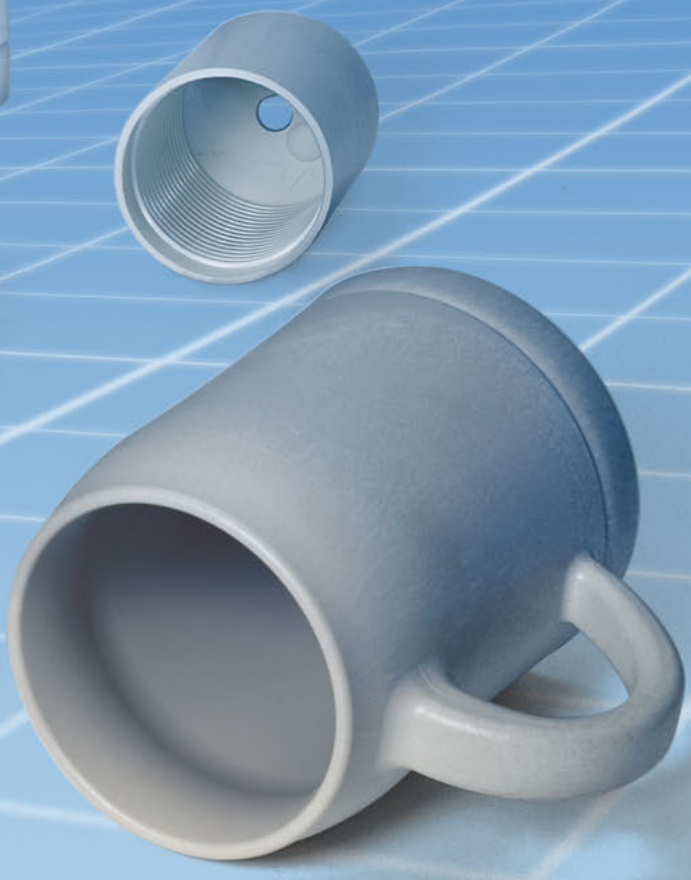
...and many more









# Benefits

## using Wiedemann collapsible cores

Your **tool designer** will find a fast and simple solution. Due to the round recesses, smaller moulds can be designed.

Your **mould maker** does not have to install complicated and expensive spindle units but can install the completely ground collapsible core.

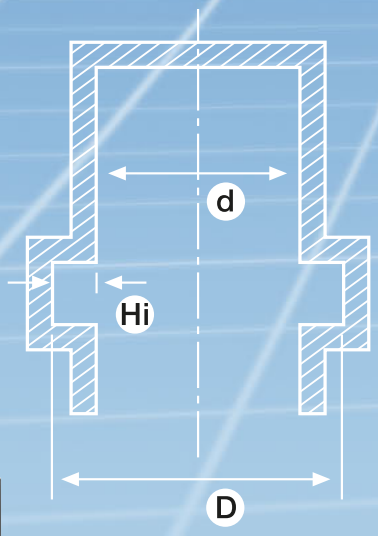
Your **operator who is setting the injection moulding machine** will also be happy about the easy set-up. No limit switches, cables and hydraulic oil thanks to smaller moulds and hence smaller machines!

Your **plastic mould designer** will save time with each shot since it is no longer necessary to insert and remove the parts from the spindle.

Your **construction engineer** can check the calculation:
The supposedly expensive collapsible core will pay off in many ways:

| Parameter | [Unit] | Thread cutting | Collapsible core |
|---|---|---|---|
| Cycle time, injection moulding | [sec] | 15 | 15 |
| Time for thread cutting | [sec] | 10 | 0 |
| Total time | [sec] | 25 | 15 |
| Moulded parts per hour | [part/h] | 144 | 240 |
| Total target quantity | [parts] | 20000 | 20000 |
| Processing time for total quantity | [h] | 1388,9 | 833,3 |
| Specific hourly rate | [€/h] | 35,0 | 35,0 |
| Arising costs | [€] | 48.611,11 | 29.166,67 |
| **Savings per target quantity** | **[€]** | **19.444,44** | |

Customer item




The total circumferential undercut D relative to d is 12 %
Special cores achieve up to 24 %

# Advice & service

Our long years of experience offer you many benefits:

We offer advice, design, production and distribution from one hand.
For many years, our customers around the world have been producing millions of parts.
After having received your inquiry data, we check feasibility and immediately send you our non-binding offer including price and delivery time.
Once you have placed an order, we will send you the precise construction data of the collapsible core as well as our installation and maintenance instructions.
After successful mould proving, we immediately coat you part.

We ensure the operability of the supplied collapsible cores, we however do not ensure quantities since we do not have any influence on customer production.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