

# GRAFORM

Zakład Produkcji Form, Narzędzi Specjalnych  
i Przetwórstwa Tworzyw Sztucznych

# HISTORY

# GRAFORM



Establishment of company – injection molding

Transfer to current location

ISO 9001 certification

Start of building the new location

1986

1988

1993

1995

2000

2007

2010

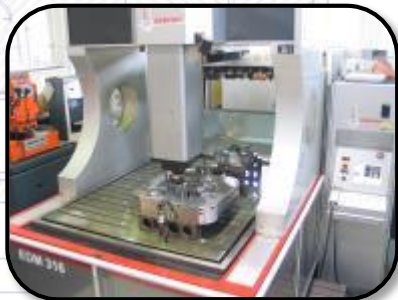
2012

Establishment of toolshop

First project with automotive industry

ISO/TS 16949 certification

Start of production in the new location





# CUSTOMERS LOCATION

# GRAFORM

Germany  
France  
Great Britain  
Hungary  
Russia  
Denmark  
Sweden

Poland:  
Gorzów  
Skawina  
Wieleń

Mexico  
Brazil

India



# PRODUCTION STRUCTURE

# GRAFORM

- ✓ Toolshop
- ✓ Injection moulding
- ✓ Automation and assembly

Total staff: 410 osób

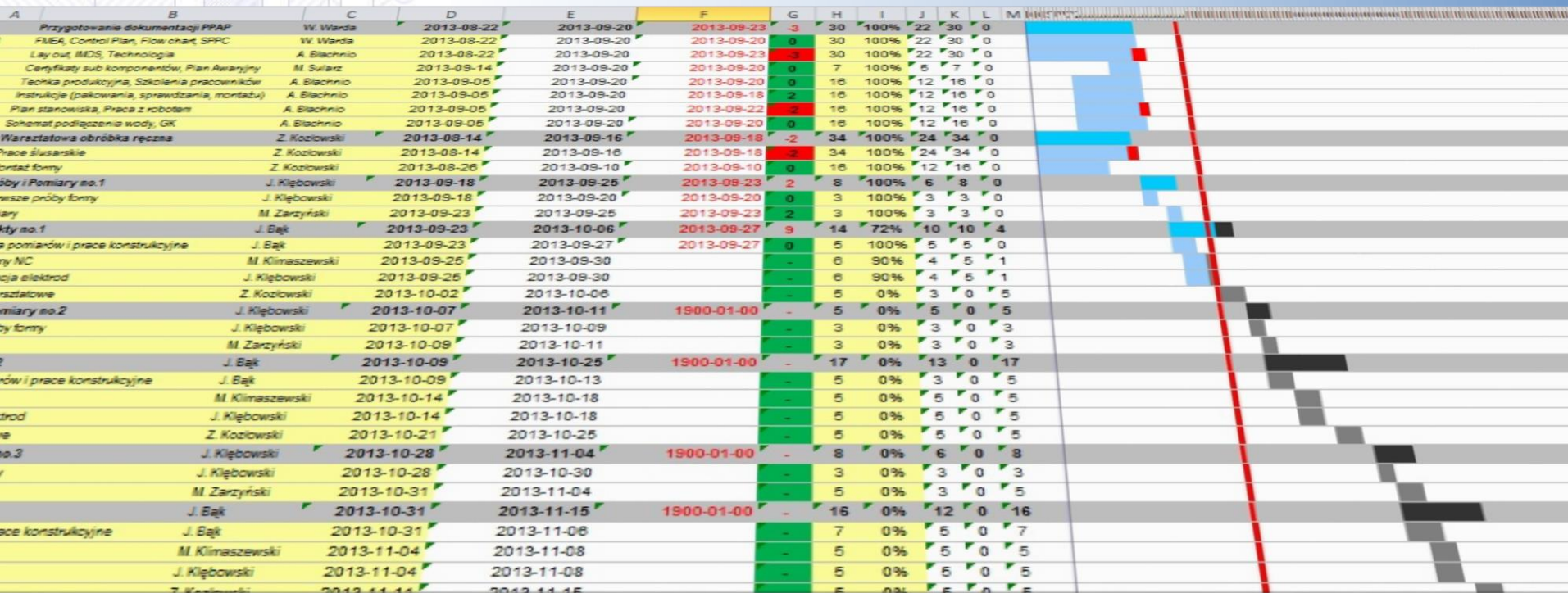




# PROJECT MANAGEMENT

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- ✓ detailed planning from purchase order to full acceptance of customer
- ✓ detailed planning between all milestones
- ✓ qualified staff that understand the automotive industry requirements
- ✓ knowledge of the product approval process PPAP
- ✓ project managers PRINCE2 certificated

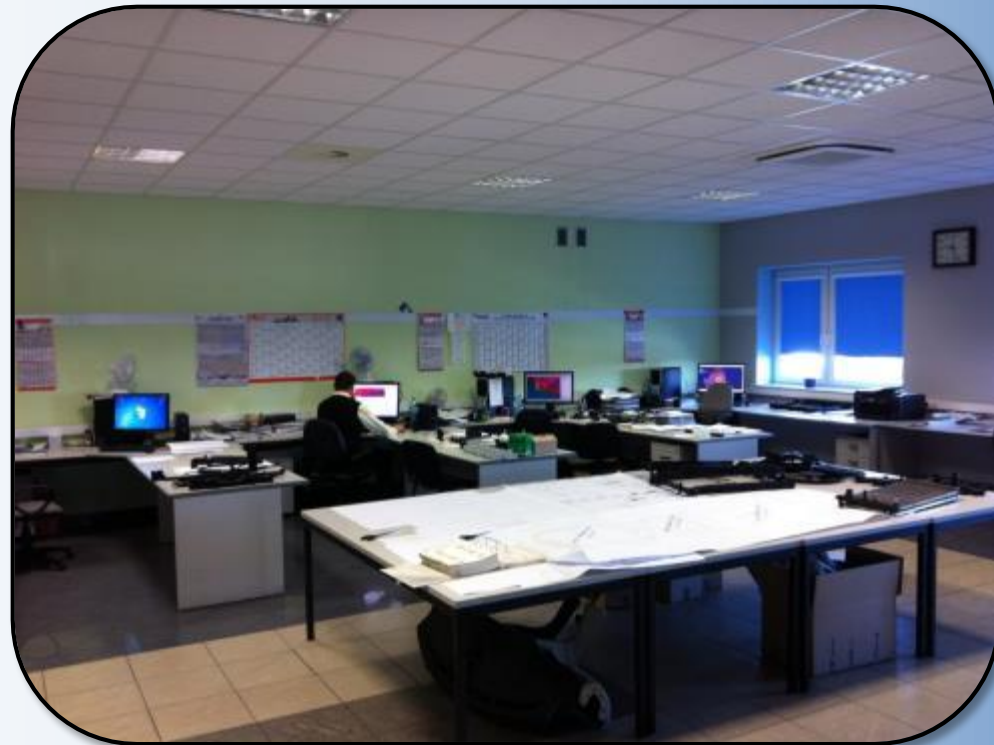




# DESIGNERS ROOM

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- ✓ 7 designers stations (II shifts work) + external designers
- ✓ 5 CNC programmers
- ✓ Full 3D design of moulds
- ✓ Files in any format
- ✓ Moldflow station





# TOOLSHOP

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- ✓ 800 moulds from beginning of existence
- ✓ About 50 different moulds per year, max to 10 tons.
- ✓ 36 machines for:
  - milling
  - lathing
  - EDM
  - drilling
  - welding
- ✓ High specialisation and qualified staff
- ✓ 85% moulds stay in Graform for production
- ✓ Repairs and other services



## Toolshop capacity:

### ✓ Milling:

2260x1100x700 (3 axis), 4 000kg

1300x1200x650 (5 axis), 10 000kg

### ✓ EDM:

1400x1100x900

### ✓ Wire Cutting:

740x490x600, 800kg

### ✓ Grinding:

2000x800x290

### ✓ Grinding rollers/holes:

Ø440x1000

### ✓ Drilling:

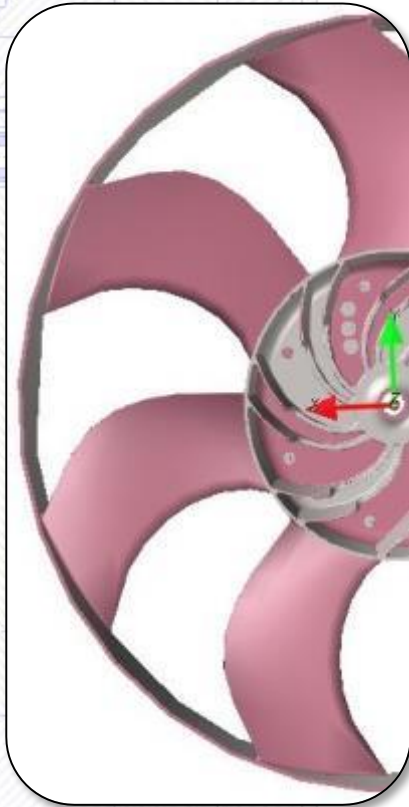
800x1000, 2 000kg

## 5 axis milling machine FIDIA HSC typ KR199

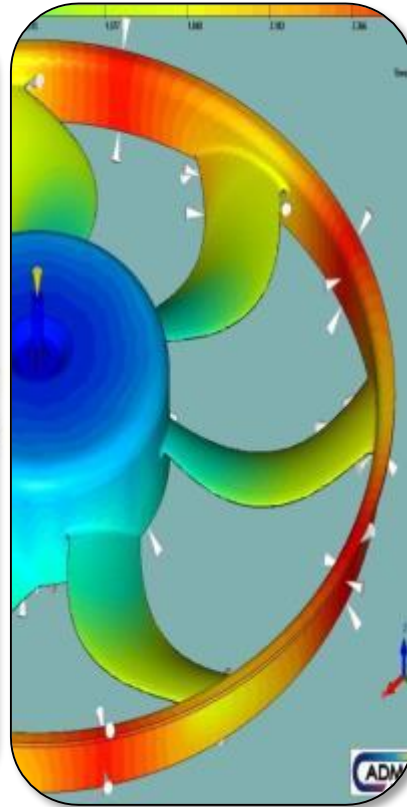




Example of implementation:



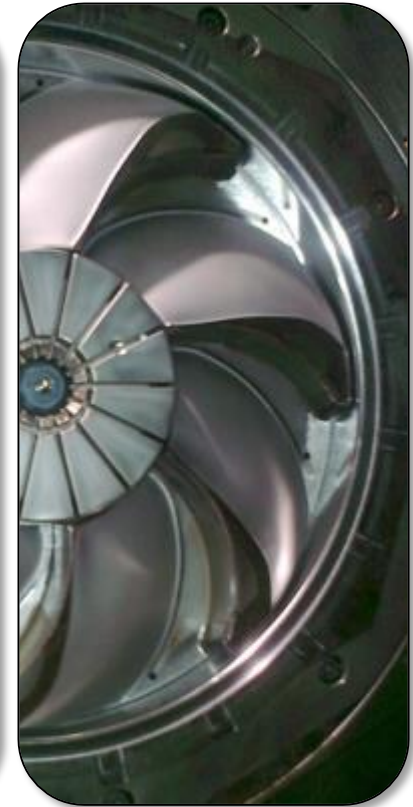
3D model from customer



Moldflow in GRAFORM



Design of mould



Toolshop work



# TOOL WAREHOUSE

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Total of about 350 moulds for production

✓ Graform - Bydgoszcz



✓ Graform - Kruszyn



# PRODUCTION

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- ✓ Productions area:
  - Bydgoszcz – 5200m<sup>2</sup>
  - Kruszyn – 7000m<sup>2</sup>
- ✓ Machines:
  - 40 injection moulding from 50-800T
  - 3 blow molding machines (Kruszyn)





# PRODUCTION - INJECTION AUTOMOTIVE

**GRAFORM**

## Interior Components



## HVAC components



## Engine Cooling components



## Exterior Parts



## Connectors



## Interior Components

### Instrument Panel Components

- Glove Box Lid
- Non Knee Airback
- Concealing panel
- Air Defrost Inlet



### Console Components

- Armrests



## Interior Components

### Door Panels

- Sound screen



### HVAC Components

- HVAC Fan components



## Interior Components

### HVAC Duct Components

- Instrument Panel Ducts
- Rear Floor Ducts
- Roof/Console Ducts
- Defroster Ducts



## Engine Cooling components

### Water cooler

- Water Tanks
- Frames
- Covers



### Air cooler

- Shrouds
- Fans





## Exterior components

### Roof Rails

- Covers
- Rails Foot
- Seals



### Others

- Step Pad
- Table Holder
- 



### Lamp housing



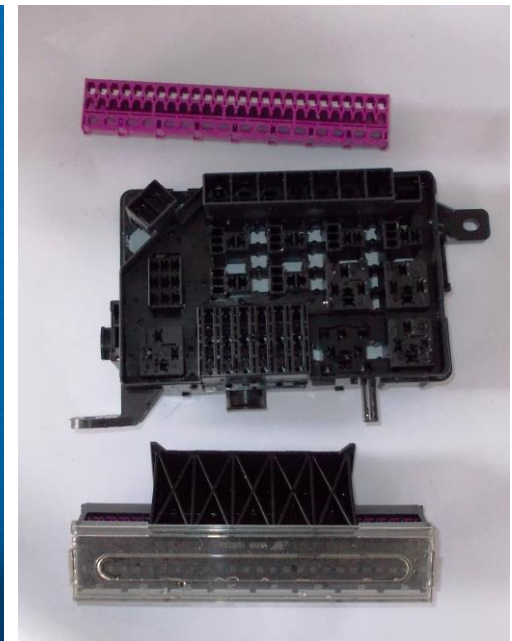


**PRODUCTION - INJECTION  
AUTOMOTIVE**

**GRAFORM**

# Connectors

Connectors



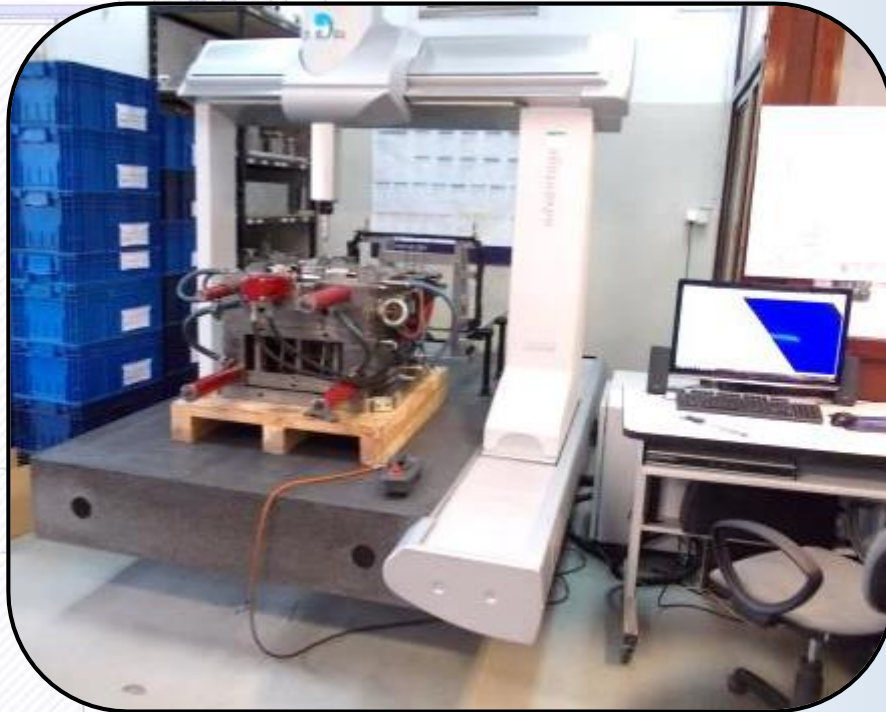


- ✓ Approximately 1000 units of measurement and control in daily use
  
- ✓ Fully equipped laboratory:
  - 3D measuring machine DEA1200x1500x1000
  - 3D measuring machine DEA 700x700x500
  - Optical measuring machine BATY VI Venture XL 3030 3D
  - Balancing machine SCHENCK Reva 0020
  - Thermal imaging camera FLIR E50
  - Altimeters Mitutoyo LH1000 i LH600
  - Measuring microscope VISION Hawk
  - Gloss NOVO-GLOSS
  
- ✓ Full certification TÜV - ISO 9001:2008 and ISO/TS 16949:2009



# QUALITY - MEASUREMENTS

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**DEA 1200x1500x1000**  
**PC DMIS CAD ++ 2012 MR1**



**DEA 700x700x500**  
**PC DMIS CAD ++ 2011 MR1**



- ✓ Design and production of automatic assembly lines and robots for internal and external production





# AUTOMATION IN PRODUCTION

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- ✓ Design and production of semi-automatic assembly lines and automatic gauges for internal and external production





**CUSTOMERS**



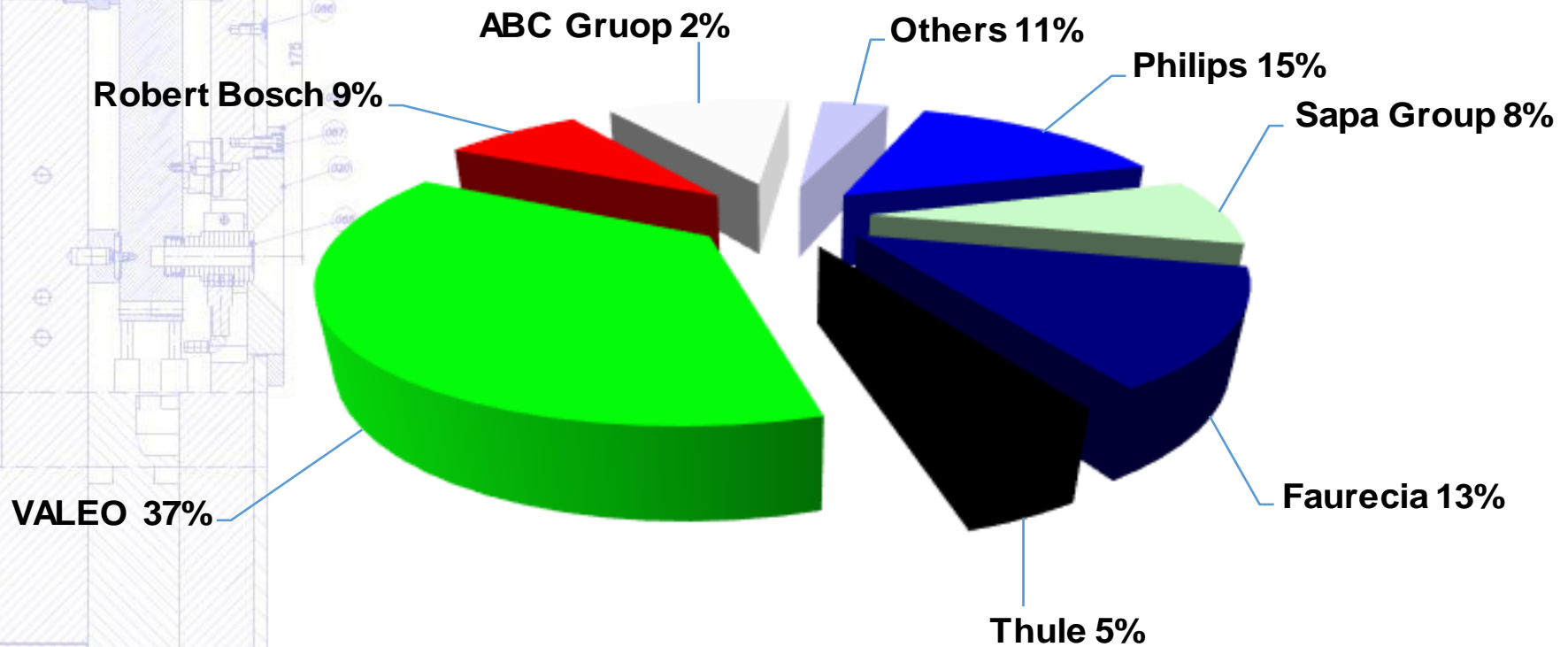
**GRAFORM**





# CUSTOMERS IN 2016

**GRAFORM**

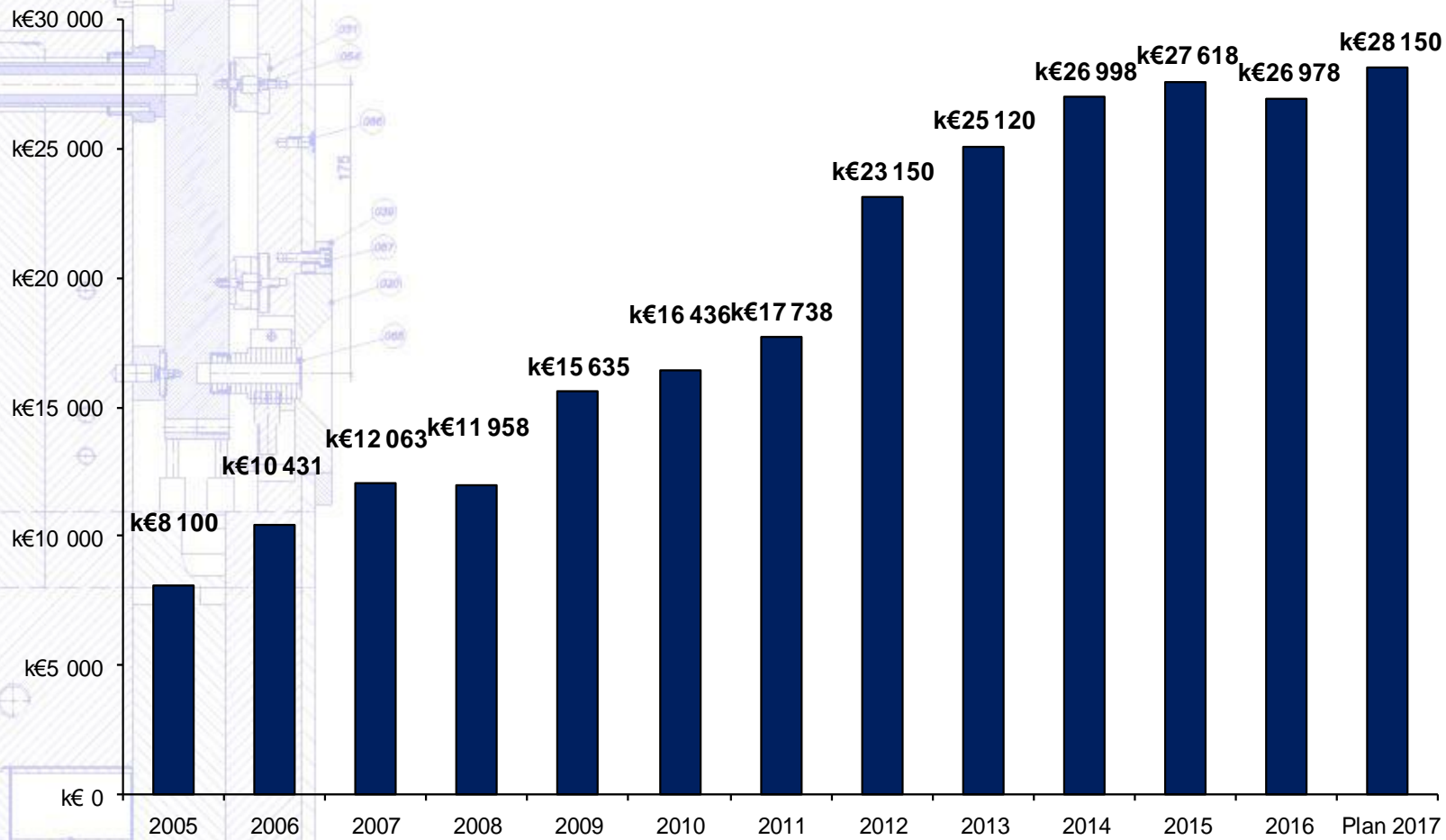




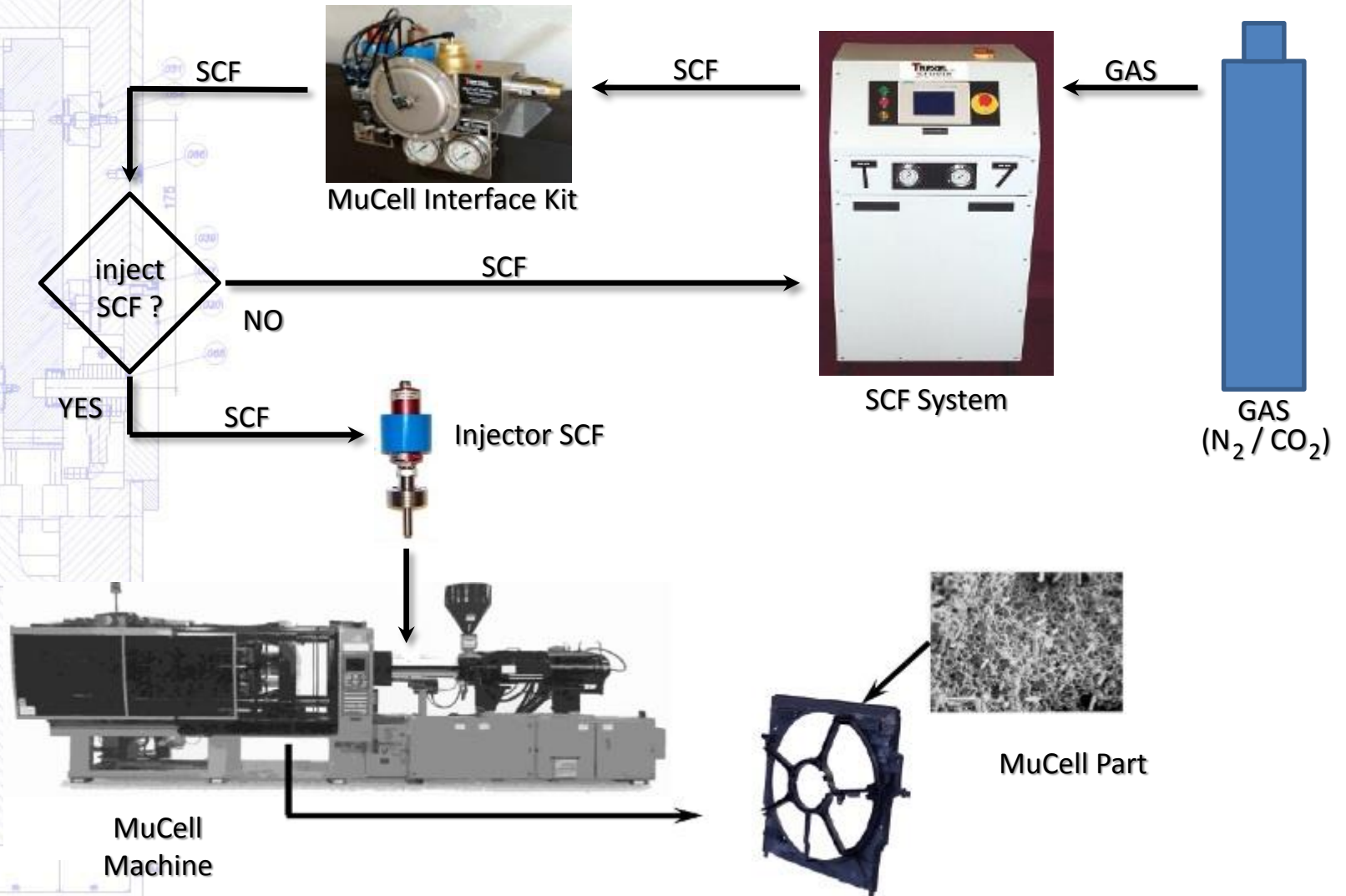


# TOTAL SALES

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## The MuCell Injection Moulding Process





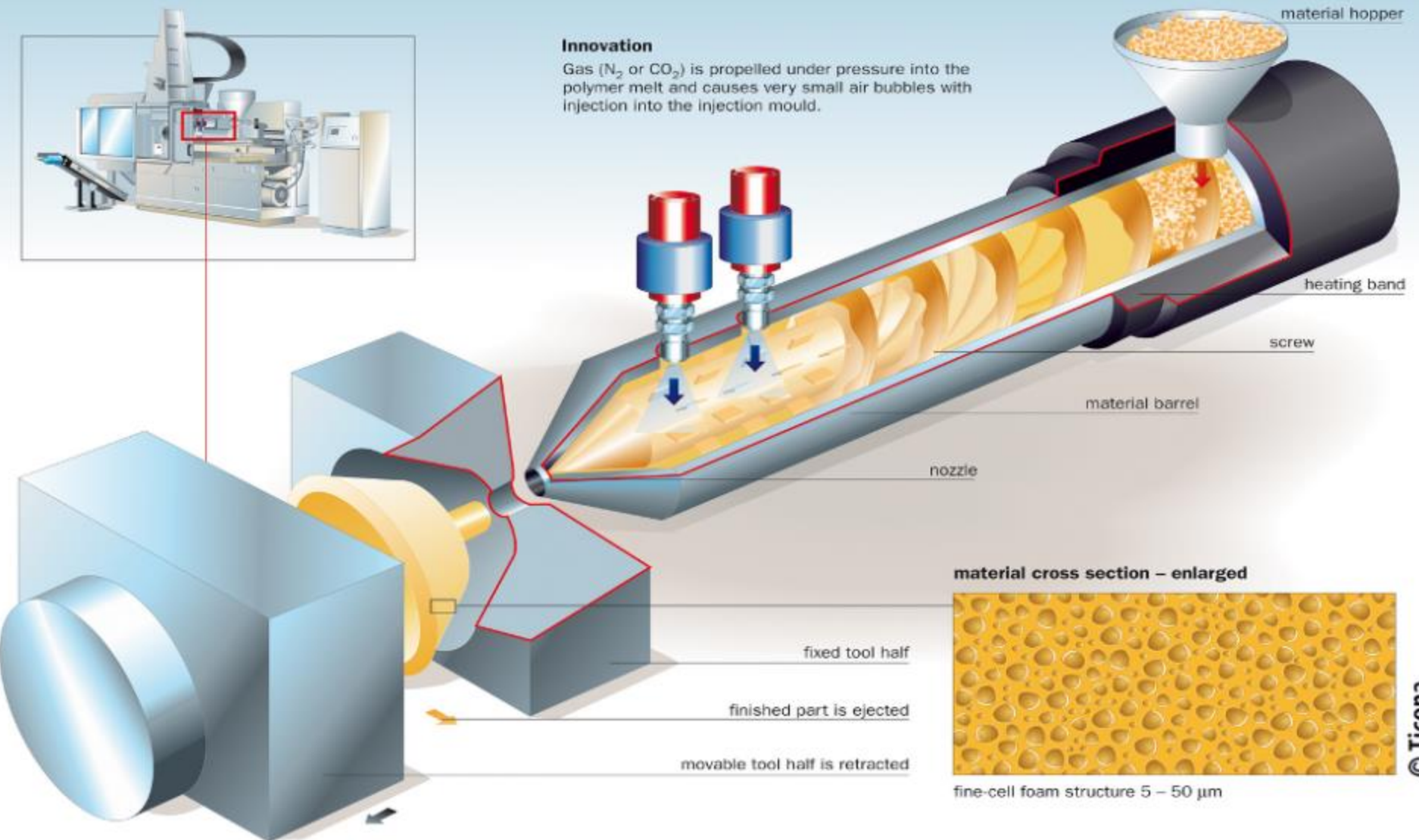
# NEW TECHNOLOGIES– MUCELL

# GRAFORM



## Innovation

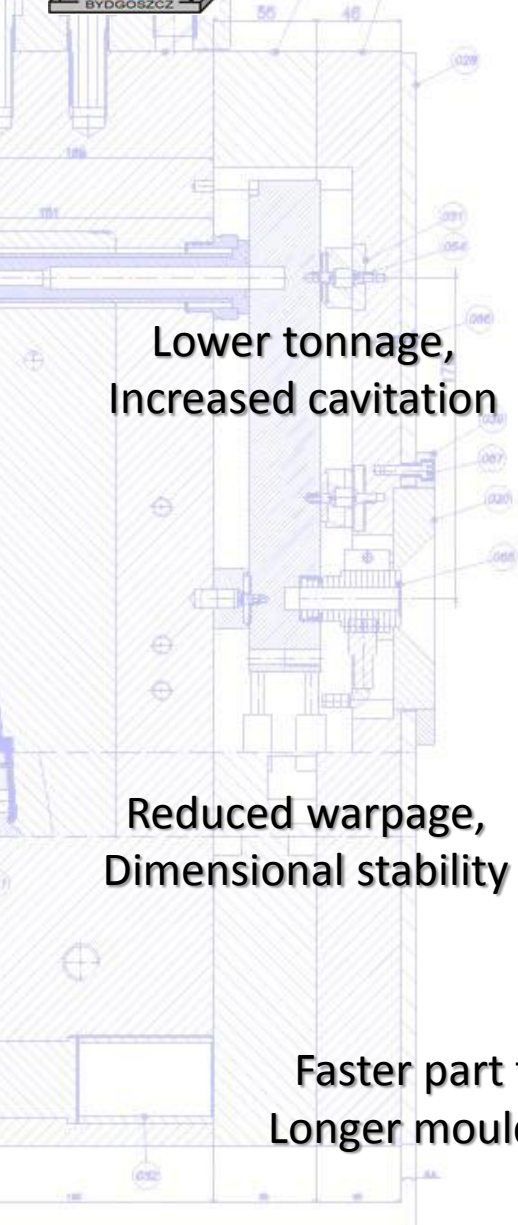
Gas ( $N_2$  or  $CO_2$ ) is propelled under pressure into the polymer melt and causes very small air bubbles with injection into the injection mould.





# NEW TECHNOLOGIES— MUCELL

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Weight reduction  
(density)

New design options

Lower tonnage,  
Increased cavitation

Shorter cycle time,  
Higher capacity use

**Project  
Requirements,  
goals**

Reduced warpage,  
Dimensional stability

Substitute materials

Faster part to steel,  
Longer mould lifetime

CO<sub>2</sub> Emissions Reduction



Thank you  
For your time and attention