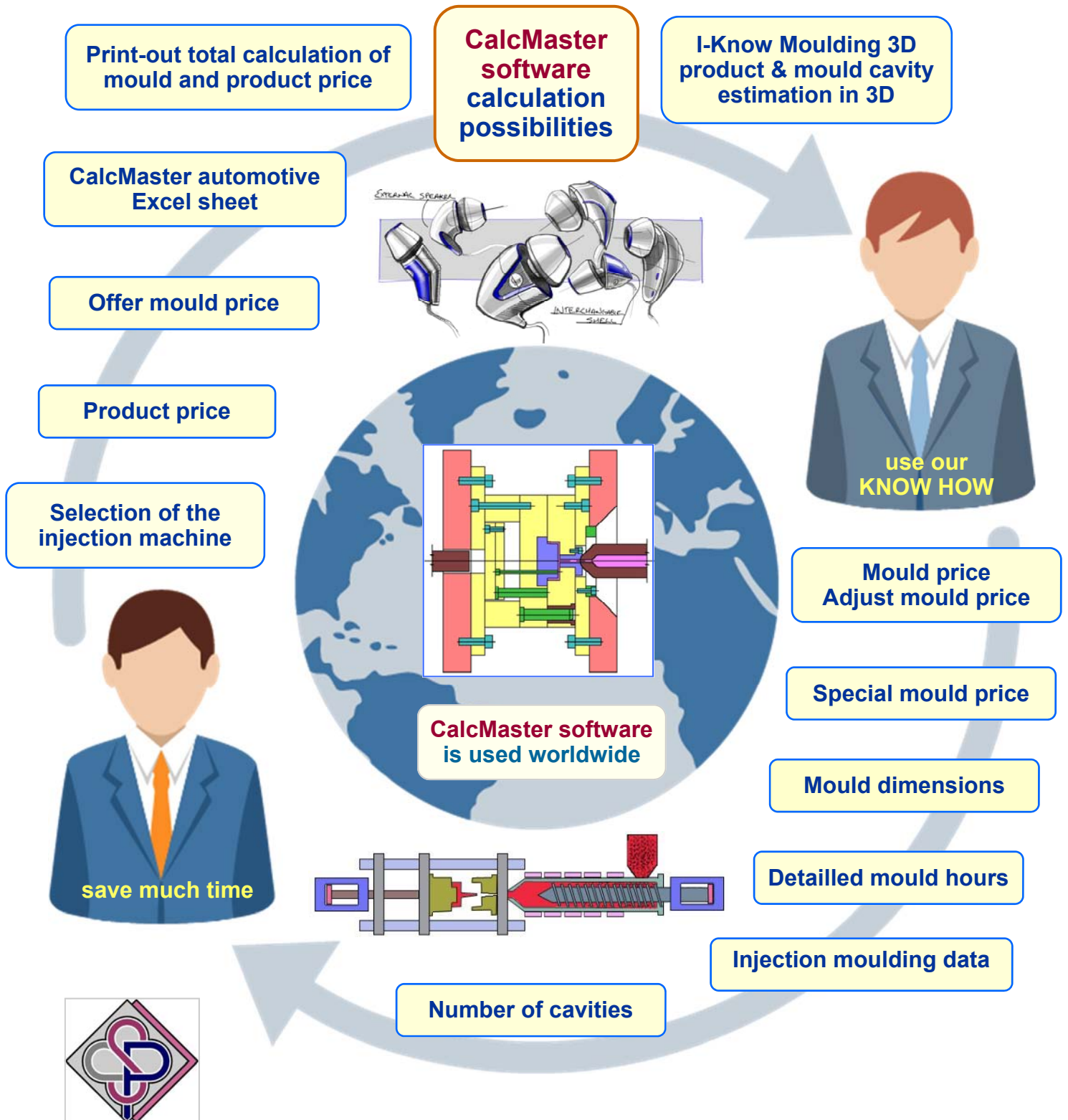# CalcMaster® advising and calculation software
"makes the mould and product calculation very easy"

Business advising & product costs optimizing
as partner on table with:

Product designer- Mould maker - Injection moulder
Purchasing - Sales - Management

Print-out total calculation of mould and product price

CalcMaster software calculation possibilities

I-Know Moulding 3D product & mould cavity estimation in 3D

CalcMaster automotive Excel sheet

Offer mould price

Product price

use our KNOW HOW

Selection of the injection machine

Mould price Adjust mould price

CalcMaster software is used worldwide

Special mould price

Mould dimensions

Detailed mould hours

save much time

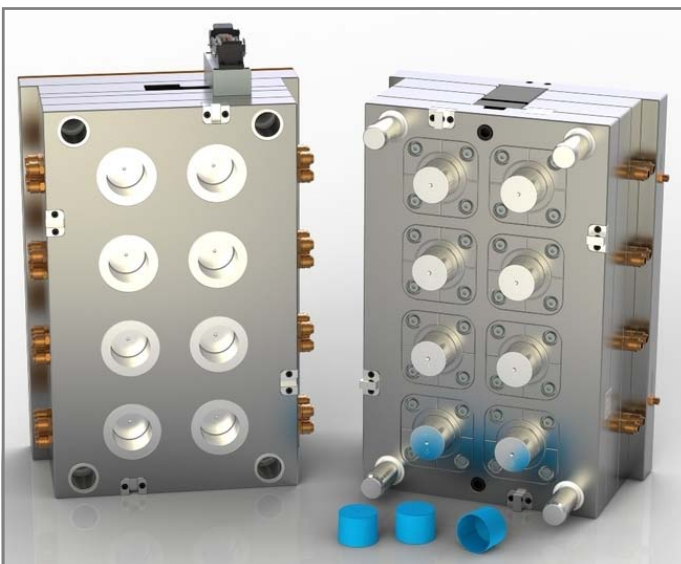**Injection moulding data**

Number of cavities

CalcMaster gives you the right puzzle pieces at the start of the project phase

With the CalcMaster software you have the 100% right communication between all your departments

Working with the CalcMaster software gives you certainty and very much Self-confidence

Don't let you restrict only by the technology which you have in the company

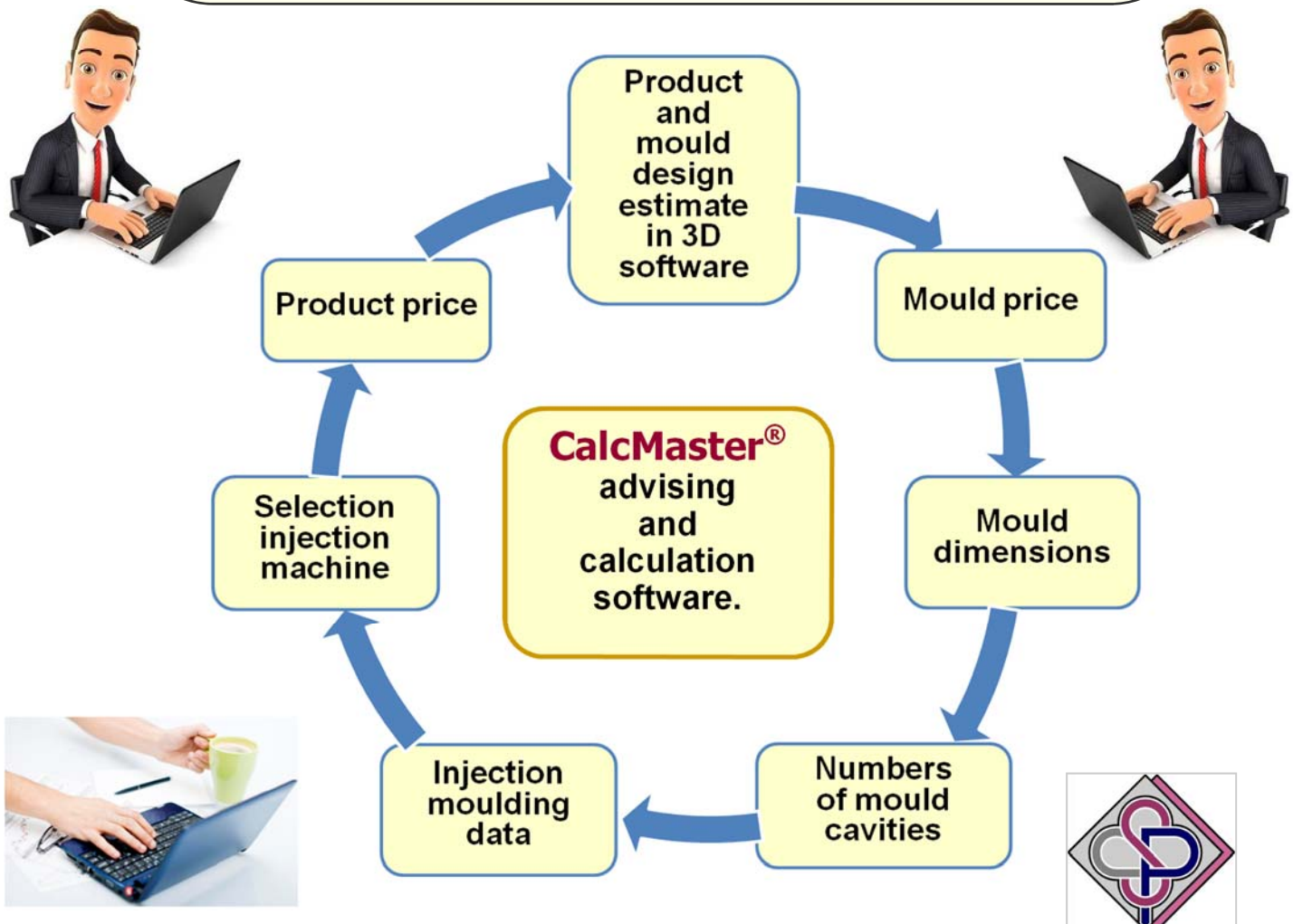# CalcMaster®

Innovative advising and calculation software
As partner on table with:

Product designer – Mould maker- Injection moulder - Purchasing - Sales and Management

New product and **mould design**

With a **new product design,**
make yourselves directly the calculation of the
mould price and **product price.**

Without direct help from the mould maker
and injection moulder
with the **CalcMaster software.**

Product
and
mould
design
estimate
in 3D
software

Product price

Mould price

CalcMaster®
advising
and
calculation
software.

Selection
injection
machine

Mould
dimensions

Injection
moulding
data

Numbers
of mould
cavities

The **CalcMaster software** is used at the start of a new project for the calculation of the **mould price** and **product price.**

In the meeting you need about **10 minutes** for the complete mould calculation.

In advance you have prepared the product information in the **CalcMaster I-Know Moulding 3D software.**

You can make a very fast and good total calculation for the **mould** and **product prices**.
You can send all the calculation data to the CalcMaster **Excel** sheet.

Compare this to the growth of a new **tree.**
You **plant** a new seed in the earth,
take good care of it and after some time you will get very **beautiful apples.**
The **same happens** if you work with the **CalcMaster software**
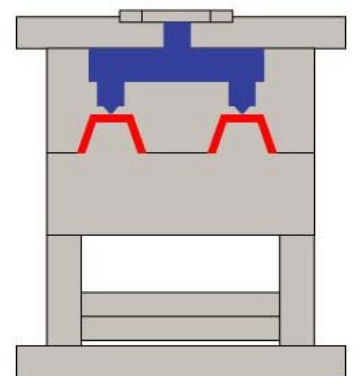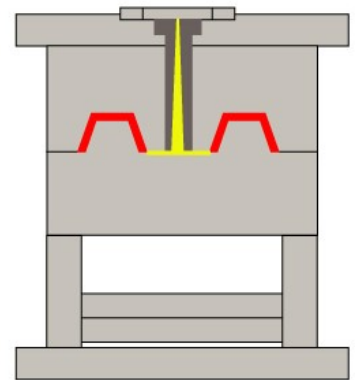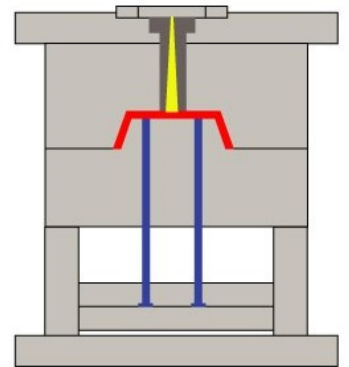
The **CalcMaster software** is used at the start of a new project for the calculation of the
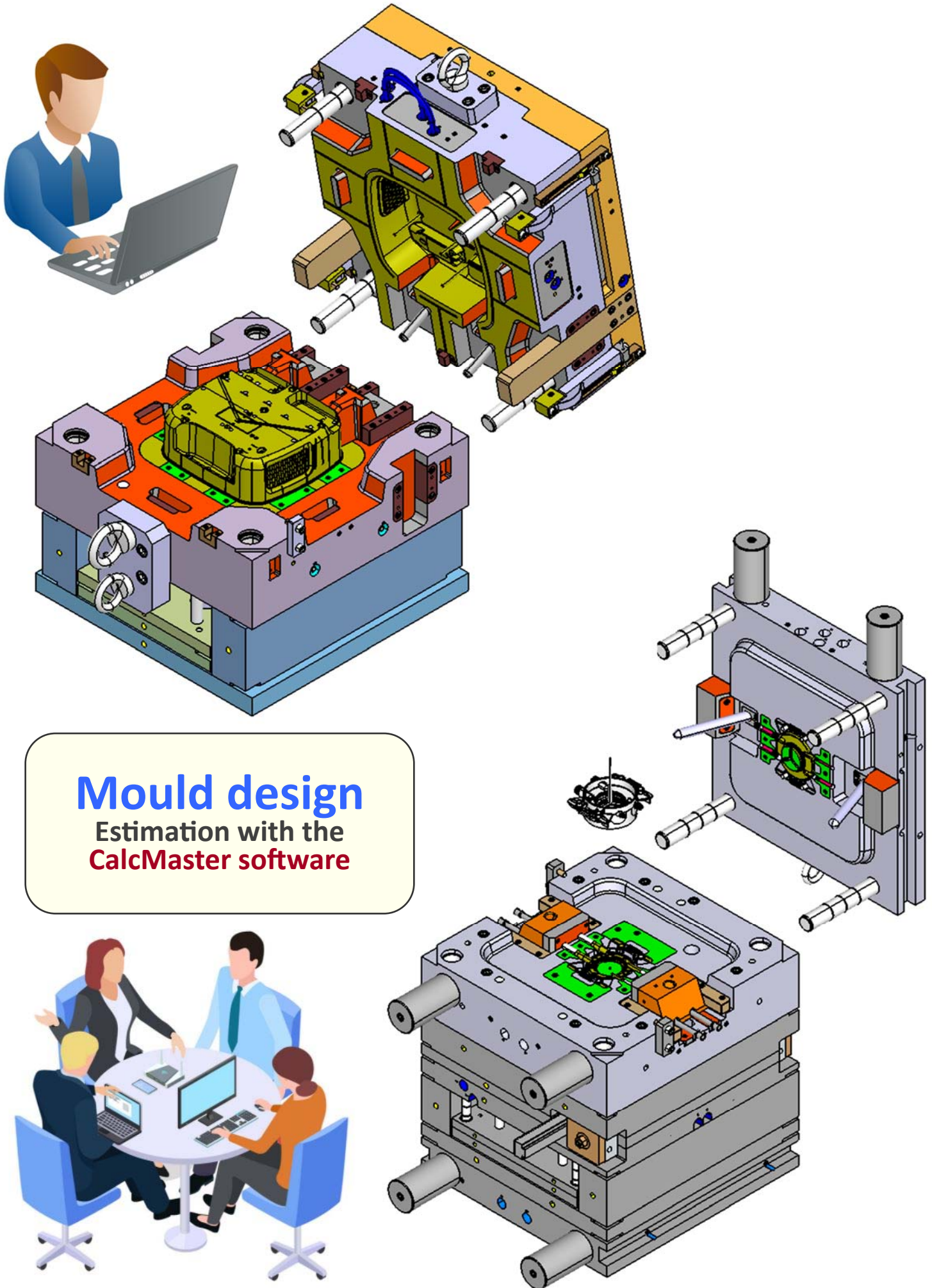**Mould price** and **Product price.**

Before you start with the mould price calculation for the complete mould, you have before prepare first the product information in the
CalcMaster I-Know Moulding 3D software.

Use the
CalcMaster software
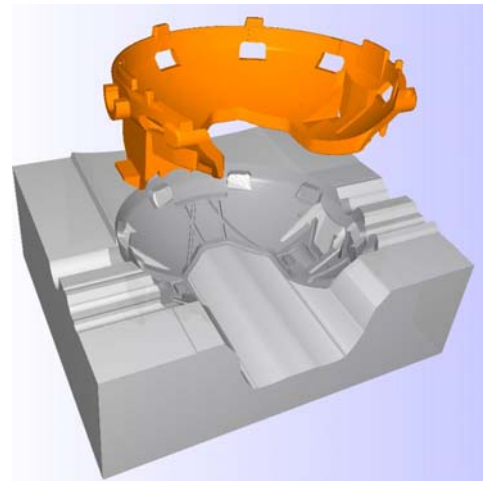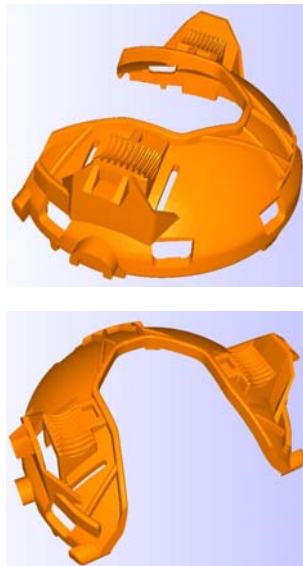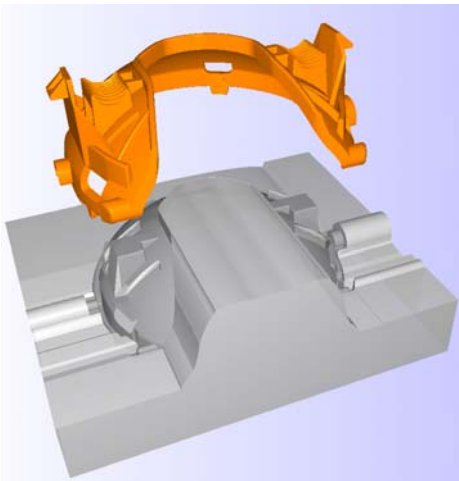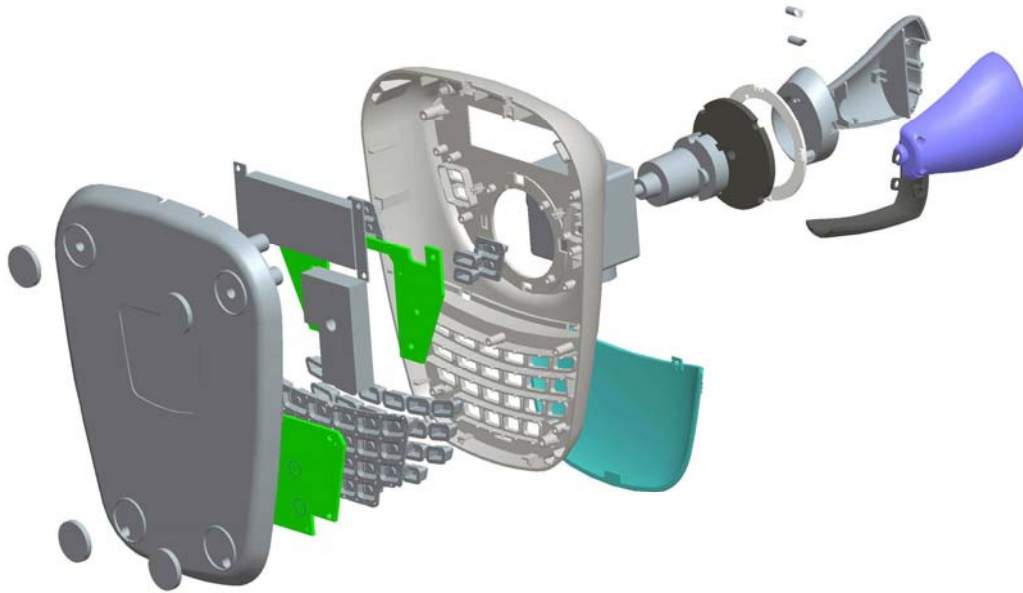
When designing a new moulding product

use the
CalcMaster software

Mould design
Estimation with the CalcMaster software

© With a new product design the mould investment and the product price must be available directly. This is possible with the innovative CalcMaster software.

Authors: Marcel Schouenberg, and Harry Schouenberg

When designing a new product the possible mould investment and the article price should be available in the designing phase. Together with marketing and sales a well-considered decision can be made to continue with the current design or to change the design. Very often the designing phase is continued too long for a new product without knowing the investments and the product price. With the **CalcMaster software** these costs can be determined within one or two days, where normally these costs are determined when the design is (almost) finished. These days one has to be more effective in this early stage of a new project.

At the moment the product designer is very much dependent on the information from the toolmaker and injection moulder. With the **CalcMaster software** he can himself calculate the mould, injection moulding and product cost. Calculating these cost with take about 15-30 minutes. Also he will get a very good insight why the costs are too high and the designer can in consult with marketing and sales change the design.

During the design phase of the product a direct connection is made between **product design, mould cost, injection moulding data, economical number of cavities and the complete product price of an injection moulded product.**
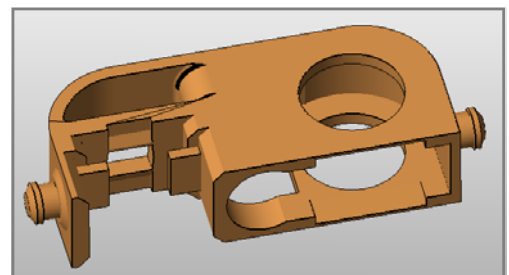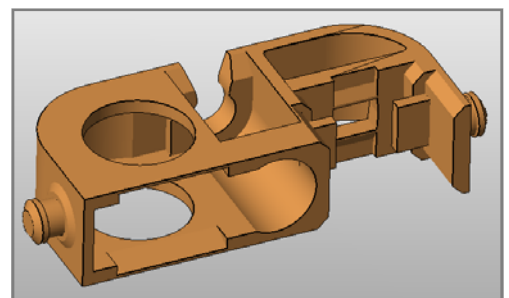

New product design
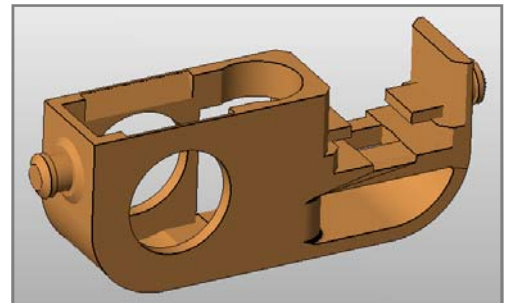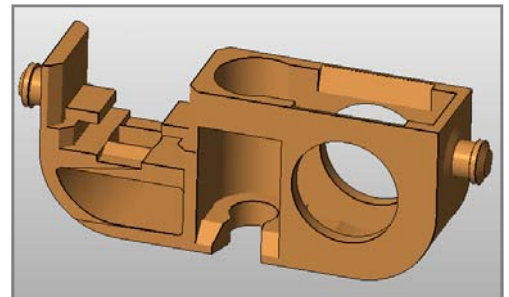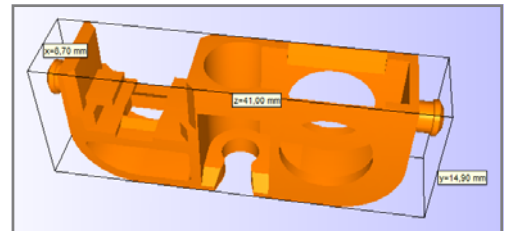Dimensions: 41 x 15 x 9 mm

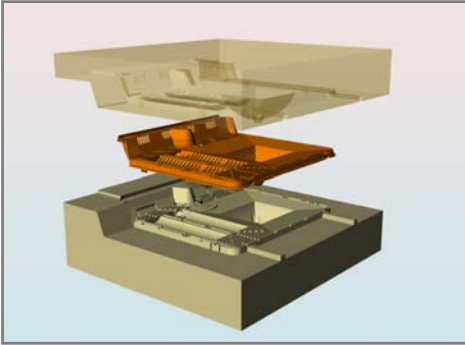

Designing injection moulded products

With a new product the designer should have a clear insight concerning the final product price. For a cylindrical product the shape is determined by the diameter and the length. For a rectangular shape this is the length x width x height. For a 3D-shaped product there are many dimensions that determine the shape. A cylindrical product will therefore be cheaper than a rectangular product and the rectangular product will be cheaper than the 3D-shaped product. By using 3D CNC milling machines many new possibilities are introduced for the designer, but he must have the possibilities to judge this.

Another important feature is the wall thickness of the product. The wall thickness determines the injection pressure and the maximum cooling time and therefore the cycle time. The designer should also mark the injection point (gate) in the product drawing. The position of the gate determines the longest flow path and together with the wall thickness and plastic grade also the injection pressure in the mould cavity. Too high injection pressures have a bad effect on extra stress in the product and with higher mechanical pressure the higher injection pressure will have a bad effect. When making a quick and clear calculation of the cooling time, the cycle time and the injection pressure at the start of the product design the designer will have the possibility to adjust the design. He is not dependent on other persons, which will save him a lot of time. The innovative **CalcMaster software** is the perfect tool to use.

i-Know Moulding 3D software

The designer can use a **3D software** which can show both core and cavity side of the mould after the CAD stl-file is opened. He can directly see possible issues with the mould design. Possible issues can be shown directly:

- show possible undercuts (slides needed)
- make correction to the main parting plane
- show demoulding angle in the product
- show steep parting line area's
- show the dimensions of the core and cavity inserts
- change the opening-closing direction in the mould
- change core and cavity dimensions

The data from the product and the suggested core and cavity inserts can be exported to an xml-file that afterwards can be imported directly in **CalcMaster** to make an automatic mould price calculation. See the product pictures in this article.

Mould price calculation

In the **CalcMaster** **software** the product has to be judged on the:
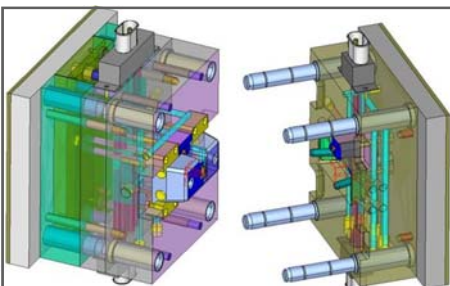
- overall shape of the product
- use of hardened or pre-hardened steel
- height of the product
- wall thickness of the product
- structure in the mould
- number of ribs in the product

- number of slides to be used
- main parting line
- shut-off area's
- tolerances of the product
- polishing quality
- type of gating
- type of ejection
- possible mechanisms in the mould
- type of cooling in the mould
- construction of the mould
- number of hotrunner nozzles

After the assessment of the product the complete mould price can be calculated. Directly calculated are:

- the number of hours for
- cavities
- mould base
- mould assembly
- cnc-programming
- work preparation
- total number of hours
- cost of the mould base
- cost of standard mould parts
- hotrunner cost
- total mould price

Also an overview is made of the mould prices for other number of cavities.

Mould price correction

After the first mould price calculation it is possible to make corrections. The corrections are dependent on the specific wishes from the customer and the workload in the mould shop. Also the personal experience of the user can be used to correct the calculated price. An user with much experience can make a fast decision where and in which way to correct the mould price. Costs for standard parts can be changed depending of the model and supplier of e.g. hydraulic cylinders and hotrunner with or without shut-off needle, etc.
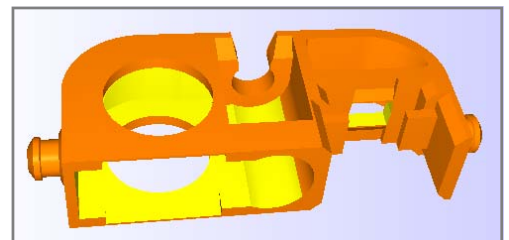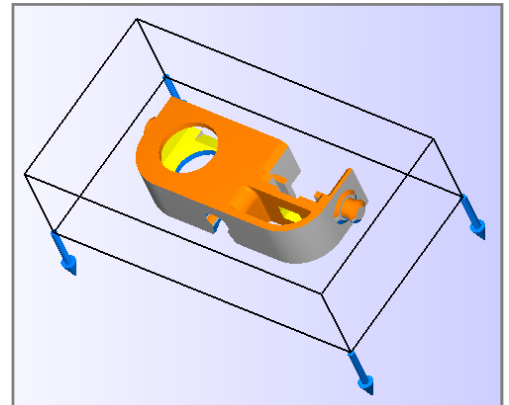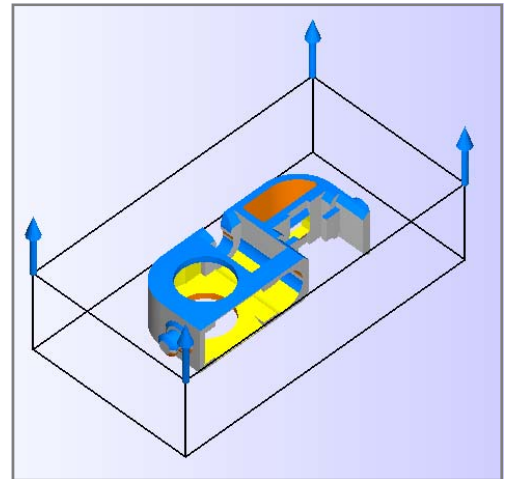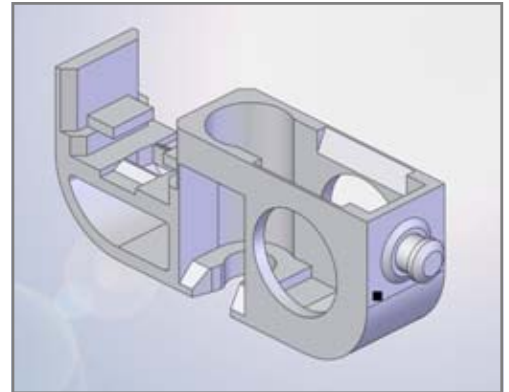
Mould dimensions
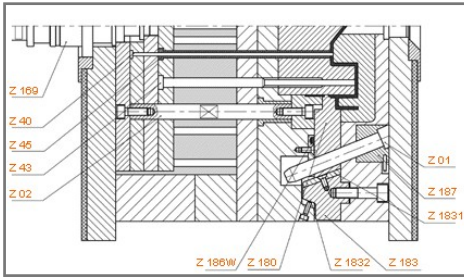
After entering the product dimensions (length x width x height) and the wall thickness the **CalcMaster software** will calculate the complete mould dimension. When using the i-Know Moulding module the product data is copied from the CAD-file. You have the option to add slides and to set the stroke of the slide. The dimensions of the virtual cavity insert are directly calculated.

The next choices can be made:
- type of mould layout
- material: steel or aluminium
- harden mould plates
- correction of dimension of inserts
- layout of the inserts in the mould
- normal mould or oversized plates

All dimensions of the mould are now calculated and shown in an overview. Afterwards corrections can be made and the total price of the mould base is calculated. The calculated data can directly be imported in the corrected mould price calculation.

Detailed overview tooling hours

For making a quick and correct planning for making the mould the **CalcMaster** **software** will calculate a detailed overview of all the hours. Also the hours are calculated for:
- optimizing of the mould after proof injections
- measuring report
- CPK-study
- mould-flow simulation and analysis

Finally the total project price is calculated.

Clamping force and cycle time
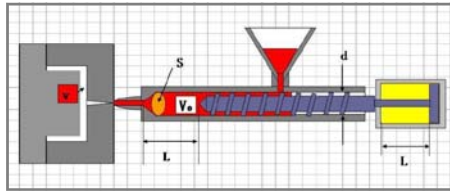
After entering the product data and the plastic grade data the next injection moulding data is calculated:
- injection time
- injection pressure
- clamping force during injection
- clamping force during holding
- theoretical cooling time
- actual cooling time
- maximum holding time
- total cycle time
- detailed cycle time

Another important feature is the wall thickness of the product. The wall thickness determines the injection pressure and the maximum cooling time and therefore the cycle time. When designing a new injection moulded product the designer could determine directly the gate(s). The gate is very important in the product design. The gate determines the longest flow length the flow length / wall thickness ratio. With this ratio and the plastic grade the injection moulding parameters are calculated. These parameters are necessary for the calculation of the product price.
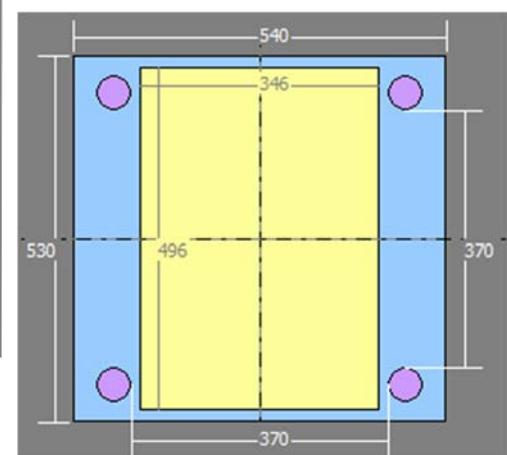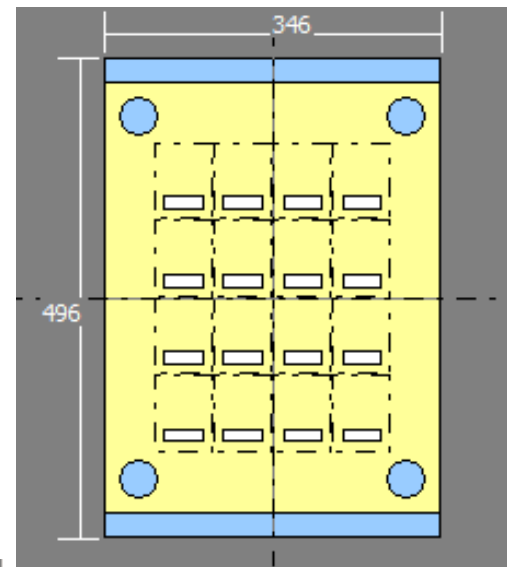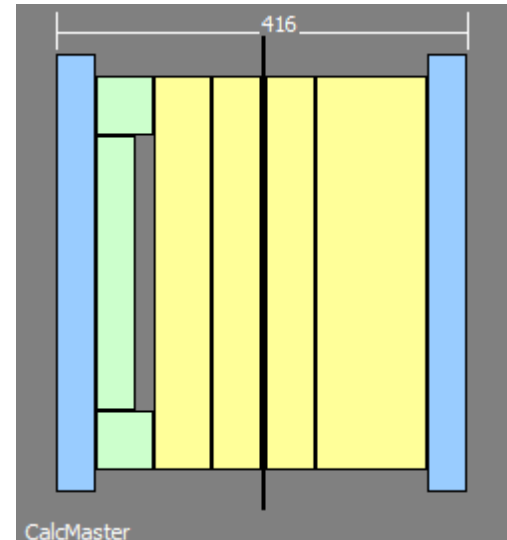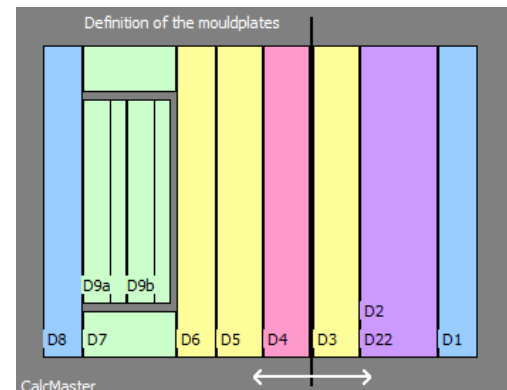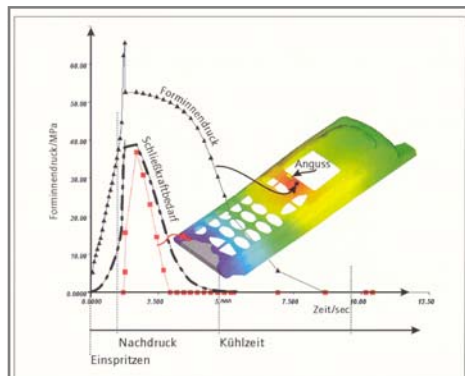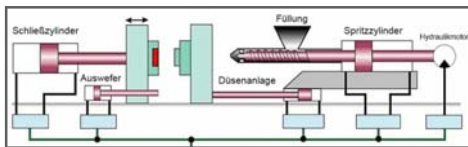
Economical number of cavaties
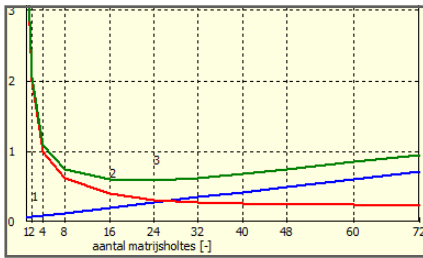
The total number of products to be made with a mould are determined by marketing and sales. For the calculation of the economical number of cavities the mould price and the injection moulding data from the other menus are necessary. For other technical reasons one can decide to choose another number of cavities.
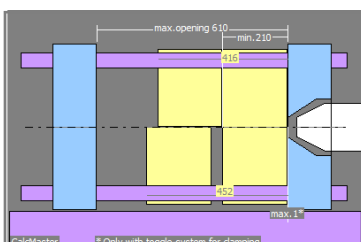
Selection of the injection moulding machine

After the calculations for the mould

price, mould dimensions, injection moulding data and the economical number of cavities are made all data is imported in the module 'Selection Injection Machine' and the right injection machine is selected from the list with standard machines or from an user-specific list with the next criteria:

- horizontal tiebar distance
- vertical tiebar distance
- mould height
- necessary mould opening
- product height
- clamping force
- cycle time
- cooling time
- shot weight
- plastic material type
- plasticizing capacity kg/hrs
- correct screw diameter

Cost price of the product

The final cost price of the product is determined by:

- mould price
- injection moulding data
- economical number of cavities
- choice of injection machine
- plastic material type
- secondary operations
- assembly
- packaging
- transportation

After entering product data, plastic material data and other necessary data the complete cost price of the product is calculated. Total number of parts to be produced with the mould is 48.000.000, the product price is the price per 100 pcs. and n is the number of cavities. See the overview.

Conclusion

n	product	mould price
1	4,80	27.503
2	2,83	34.769
4	1,86	43.917
8	1,52	61.840
16	1,38	97.533
24	1,36	133.348
32	1,40	169.295
40	1,46	204.026
48	1,53	238.842
60	1,63	290.881
72	1,73	342.779

Designing an injection moulded product with the **CalcMaster** **software** will take it to a higher professional level. Not only a well-designed product is made but also a complete costing overview is added, which will save a lot of time. The management and sales can go to a costumer with all necessary information and can give an answer to all the questions. Also an answer can be given to alternative solutions. Working with the innovative **CalcMaster** **software** makes designing fun and you will approach the market in very professional way.
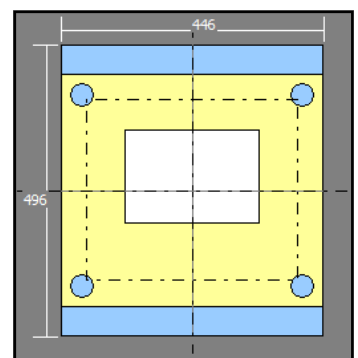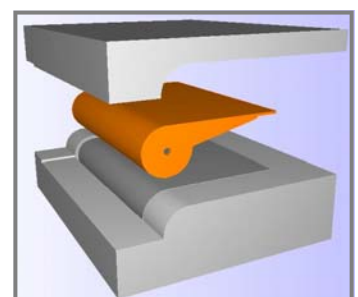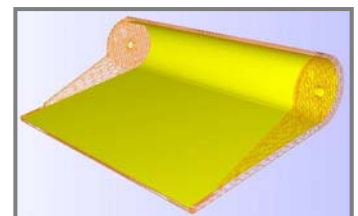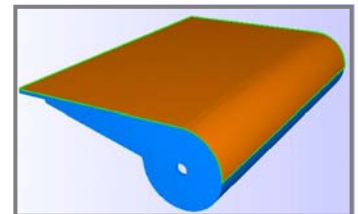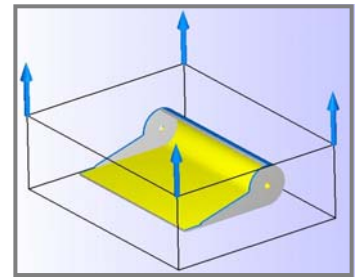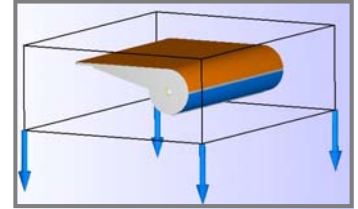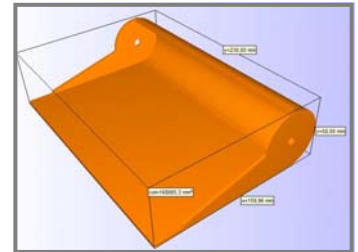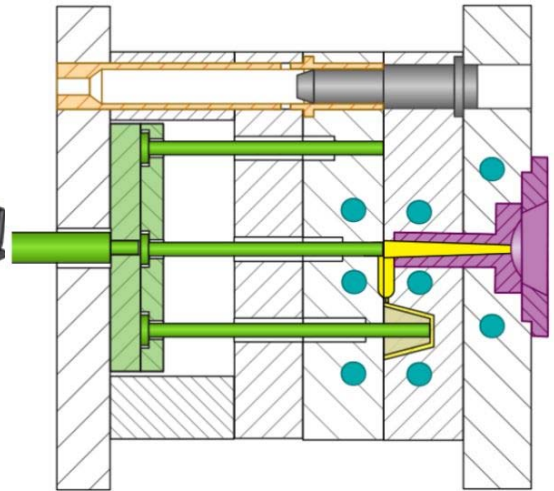
CalcMaster advising and calculation software

Makes the project, mould, moulding and product calculation very easy
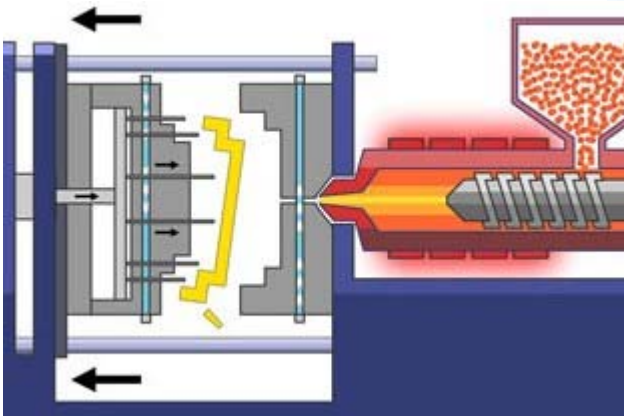
Product and Mould designer

Mould maker

CalcMaster presentation about:

- Estimate product and mould design
- Injection mould calculations
- Moulding process calculation
- Product price calculation

Injection moulder

Purchasing and Sales

CalcMaster advising and calculation software
Makes the project, mould, moulding and product calculation very easy

Product design evaluate with:
CalcMaster - I know Moulding 3D software

CalcMaster 3D Mould simulation software

The designer can use a 3D software which can show both core and cavity side of the mould after the CAD stl-file is opened. He can directly see possible issues with the mould design.

Afterwards you can make directly in the **CalcMaster software** the mould price calculation.
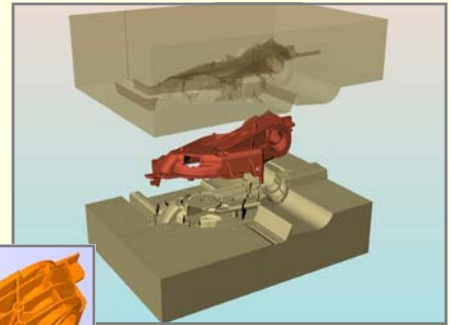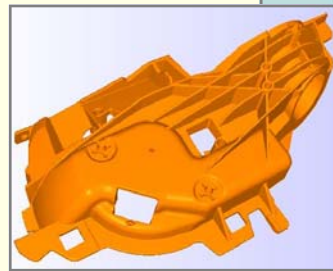
CalcMaster mould price calculation

Mould price calculation.
With a new product design you can calculate the total mould costs.
For this you only need:
* Product sketch or * Product drawing or * Hand model or * CAD-STL file

After the assessment of the product the complete mould price can be calculated.

Calculated are the number of hours for:
- cavities
- mould base
- mould assembly
- cnc-programming
- work preparation
- total number of hours

Further will be calculated:
- cost of the mould base
- cost of standard mould parts
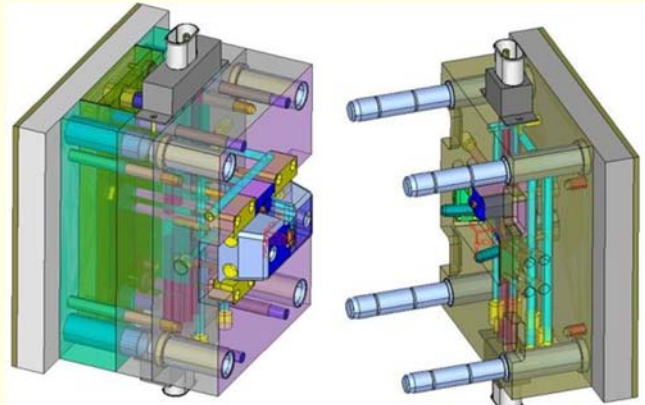- hotrunner cost
- total mould price
- Project costs
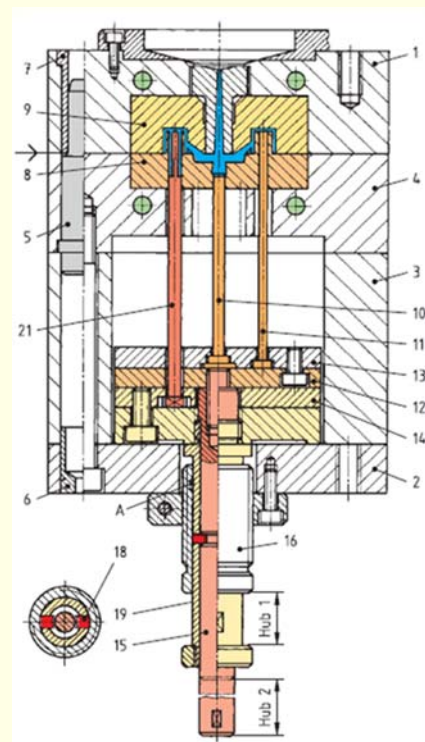
CalcMaster advising and calculation software
Makes the project, mould, moulding and product calculation very easy

CalcMaster total mould calculation

With a new product design you can calculate the total mould costs. For this you only need:

- Product sketch or
- Product drawing or
- Hand model or
- CAD-STL file

CalcMaster - special tools - mould calculation

CalcMaster Special Tools calculation from:

- 2 Component mould, 2 cavities
- 2 Component mould, 1 cavity
- Left-Right product mould
- Stack mould
- Soft tool mould
- 1+1 product mould

☐ 2-komponenten matrijs, 2 holtes	2-C2
☐ 2-komponenten matrijs, 1 holte	2-C1
☐ Links-Rechts produkten-matrijs	L+R
☐ Etage matrijs	ET
☐ Softtool matrijs	Soft
☐ 1+1 produkten-matrijs	1+1

CalcMaster calculation of the mould dimensions

After entering the product dimensions (length x width x height) and the wall thickness the **CalcMaster software** will calculate the complete mould dimension.

When using the i-Know Moulding module the product data is copied from the CAD-file.
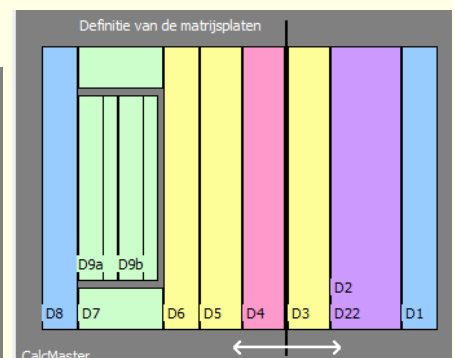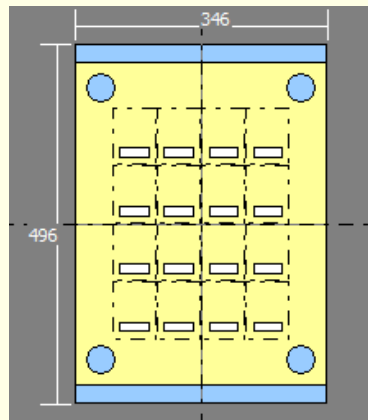
CalcMaster advising and calculation software
Makes the project, mould, moulding and product calculation very easy

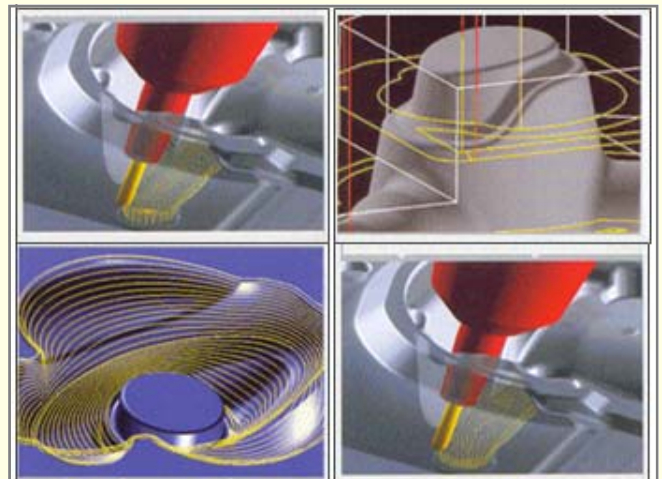## CalcMaster correction mould calculation

After the first mould price calculation it is possible to make corrections. The corrections are dependent on the specific wishes from the customer and the work-load in the mould shop.
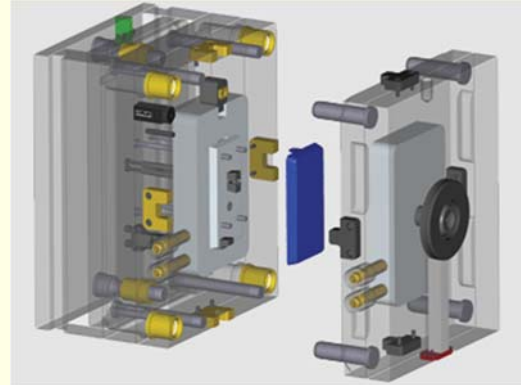
CalcMaster detailed mould overview

For making a quick and correct planning for making the mould, the **CalcMaster software** will calculate a detailed overview of all the hours. Included are the hours for:
- optimizing of the mould after proof injections
- measuring report
- CPK-study
- flow simulation and analysis

Working with the CalcMaster software means:

That you can directly use your own experience in the complete
CalcMaster mould calculation

Our philosophy is:
"That you can intervene directly in the CalcMaster mould calculation by saving in the background once-only the many extra settings with your own experience."
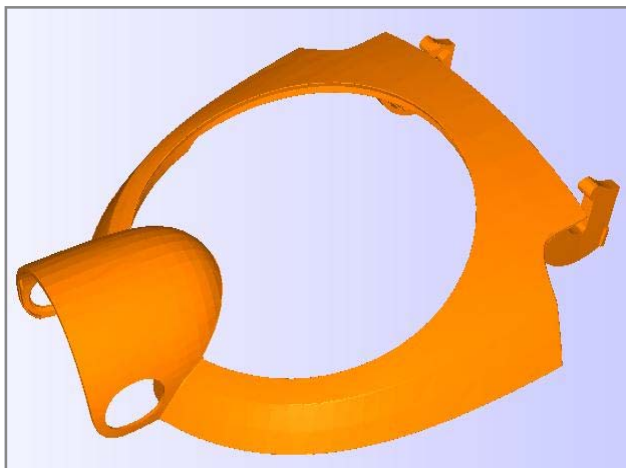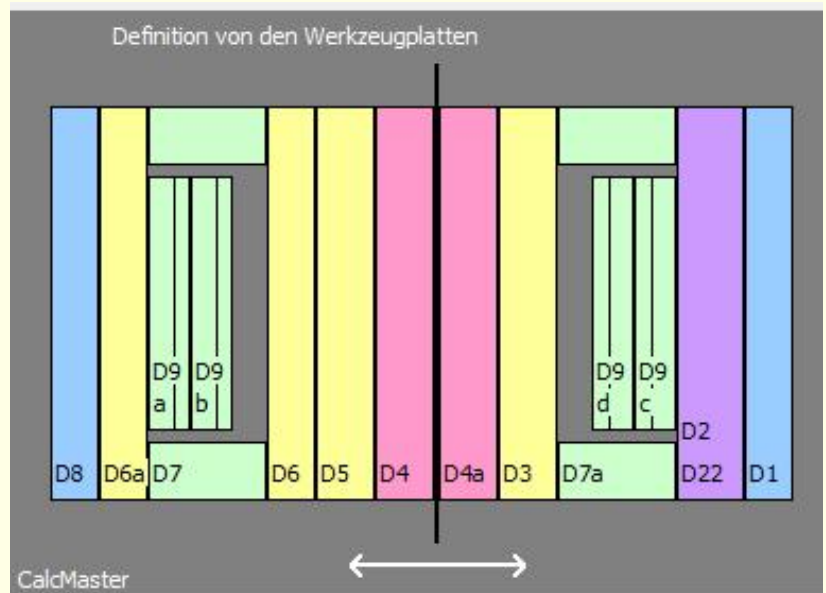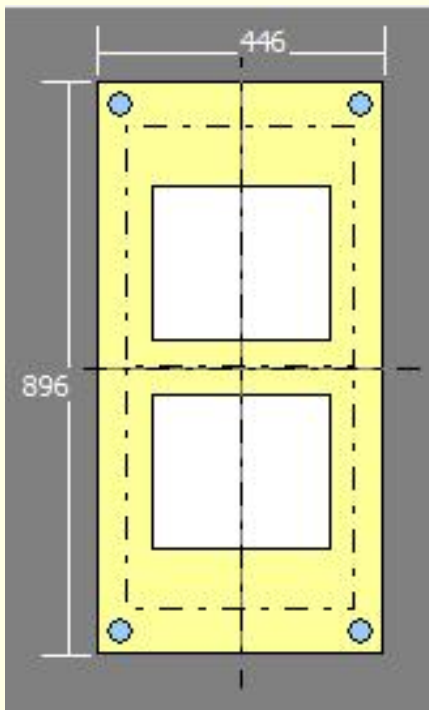
CalcMaster advising and calculation software
Makes the project, mould, moulding and product calculation very easy

CalcMaster calculation of the mould dimensions

CalcMaster mould dimensions

After entering the product dimensions (length x width x height) and the wall thickness the **CalcMaster software** will calculate the complete mould dimension. When you are using the **CalcMaster - i-Know Moulding** module the product data is copied from the CAD-file.
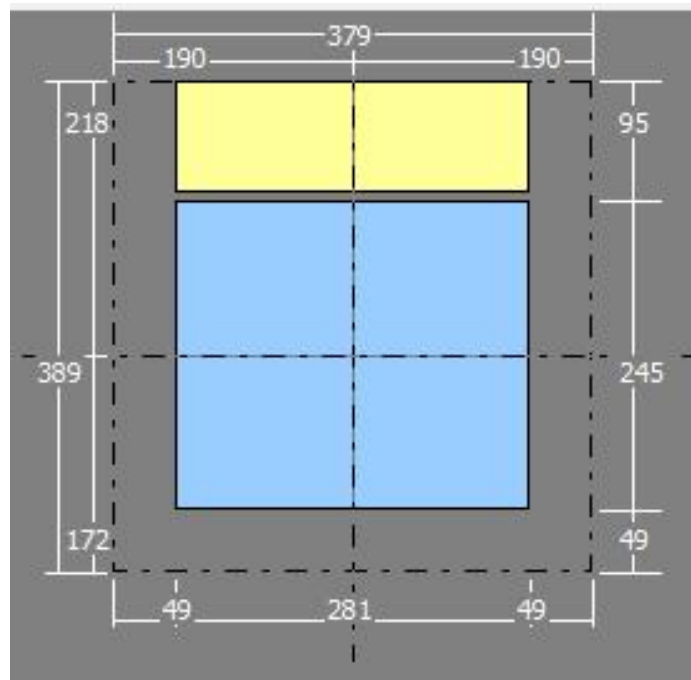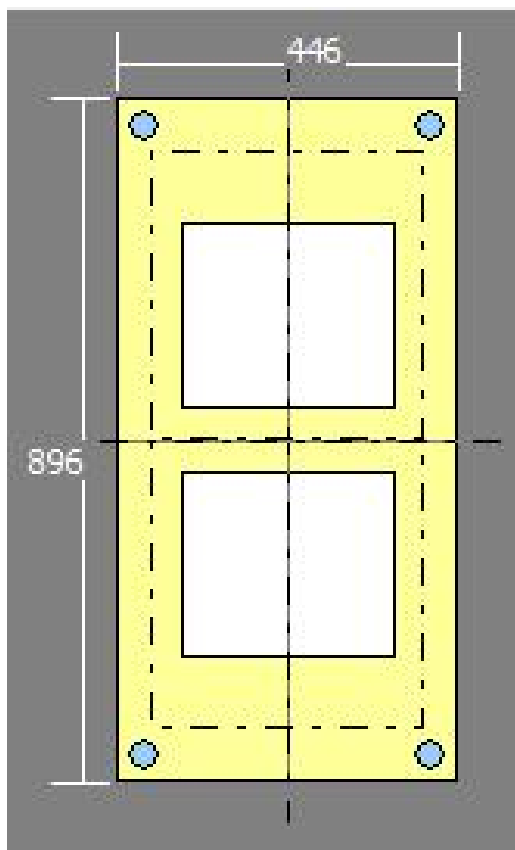
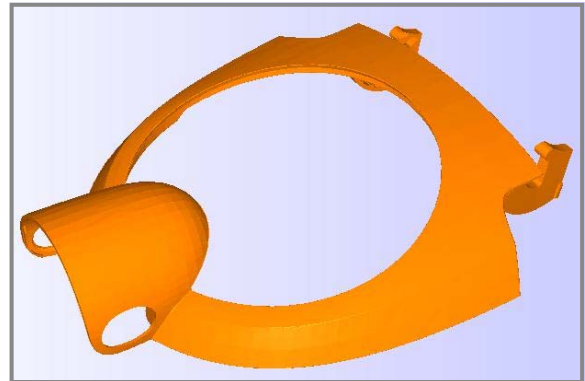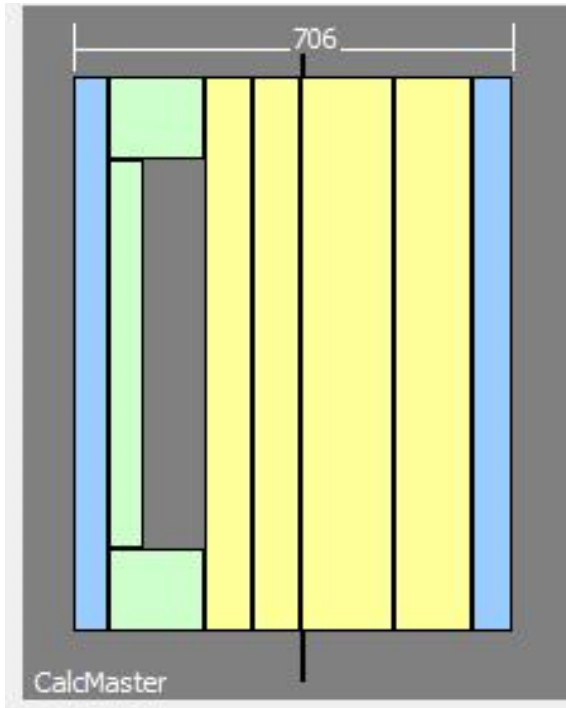

Product dimensions:
281x243x74 mm

Calculation of the mould dimensions of a 2-cavity hotrunner mould

Each cavity has 1x slide + 4x moving slides

CalcMaster advising and calculation software
Makes the project, mould, moulding and product calculation very easy

## CalcMaster calculation of the mould dimensions

CalcMaster advising and calculation software
Makes the project, mould, moulding and product calculation very easy

CalcMaster clamping force and cycle time simulation

After entering the product data and the plastic grade data the next injection moulding data is calculated:

- injection time
- injection pressure
- clamping force during injection
- clamping force during holding
- theoretical cooling time
- actual cooling time
- maximum holding time
- total cycle time
- detailed cycle time
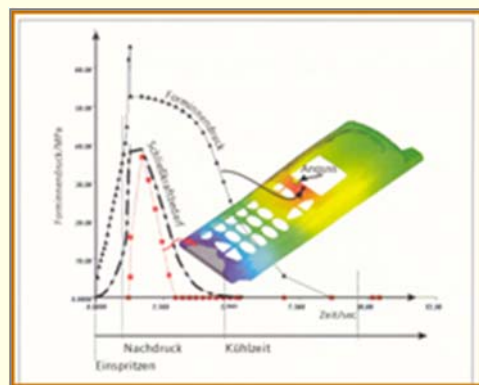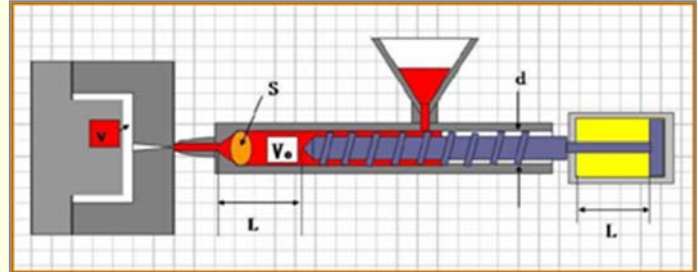
Injection time	0.50	1.00	2.00	3.00	4.00	(sec)
Injection pressure	593	499	436	417	409	(bar)
Holding pressure			300			(bar)
Clamping force	108	91	80	76	75	(ton/cavity)
Clamping force at holding pressure			73			(ton/cavity)

Thermal diffusivity	0.0702	(mm²/sec)
Theoretical cooling time	25.12	(sec)
Real cooling time	21.05	(sec)
Cycle time	32.81	(sec)
Maximum holding pressure time	16.11	(sec)

Graph Cooling profile

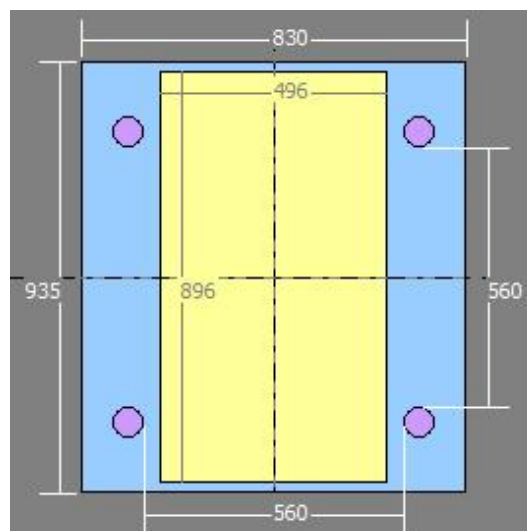Rheological model   PowerLaw
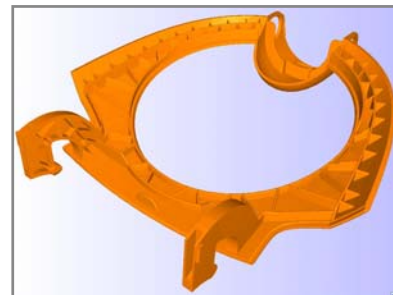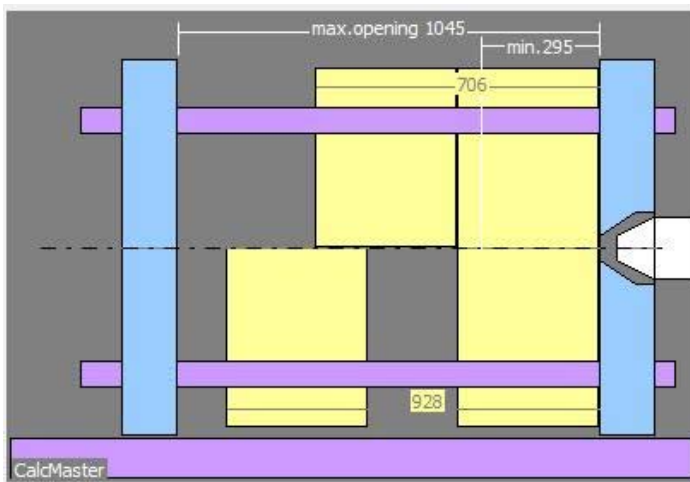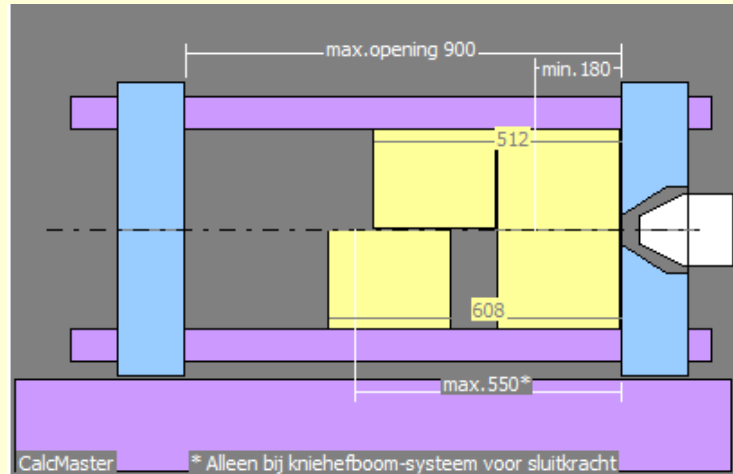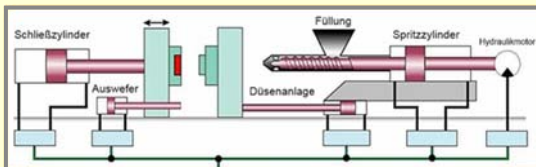
☐ Input for own clamping force

CalcMaster advising and calculation software
Makes the project, mould, moulding and product calculation very easy

CalcMaster selection of the moulding machine

After the calculations for the mould price, mould dimensions, injection moulding data and the economical number of cavities are made all data is imported in the module:

"Selection Injection Machine"

CalcMaster advising and calculation software
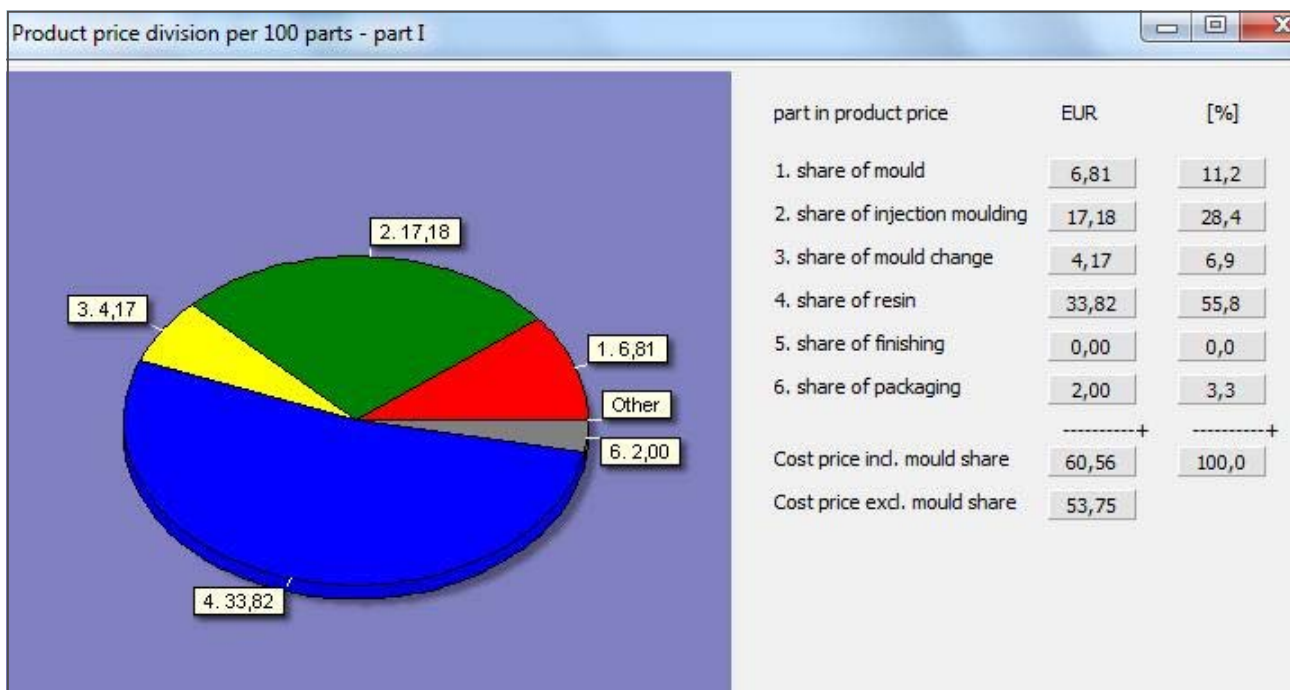Makes the project, mould, moulding and product calculation very easy

CalcMaster calculation product price

The final cost price of the product determined by:

- mould price
- injection moulding data
- economical number of cavities
- choice of injection machine
- plastic material type
- secondary operations
- assembly
- packaging
- transportation

n	product	Mould price
1	55,91	72.826
2	59,98	124.573
3	58,75	160.520
4	63,22	195.546
6	64,09	263.650
8	70,77	329.762
10	70,87	394.523
12	75,19	458.830
14	79,75	523.453
16	81,48	591.940
18	83,35	655.759

Product price division per 100 parts - part I

part in product price	EUR	[%]
1. share of mould	6,81	11,2
2. share of injection moulding	17,18	28,4
3. share of mould change	4,17	6,9
4. share of resin	33,82	55,8
5. share of finishing	0,00	0,0
6. share of packaging	2,00	3,3
Cost price incl. mould share	60,56	100,0
Cost price excl. mould share	53,75	

2. 17,18
3. 4,17
1. 6,81
Other
6. 2,00
4. 33,82

CalcMaster advising and calculation software
Makes the project, mould, moulding and product calculation very easy

CalcMaster other possibilities

**CalcMaster
Making or asking for a
mould quotation**

**CalcMaster calculation
complete printout
including pictures**

**CalcMaster Database
mould settings
for different mould makers**
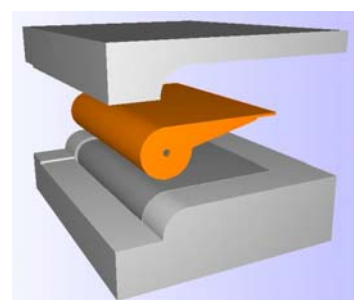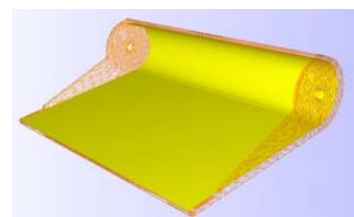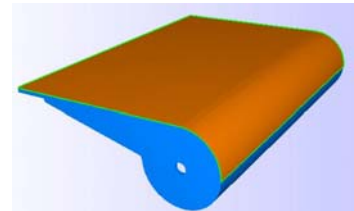
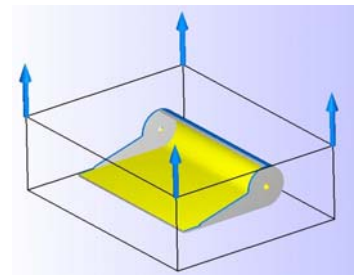**CalcMaster Database
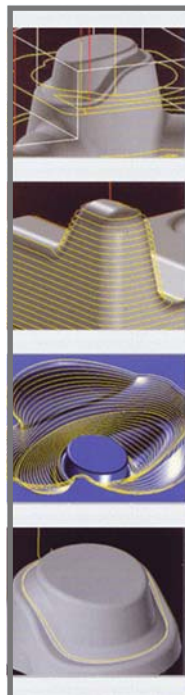save the calculations**

**CalcMaster mould costs
overview standard mould parts**

**CalcMaster data saved in an
automotive sheet**

**CalcMaster calculation from
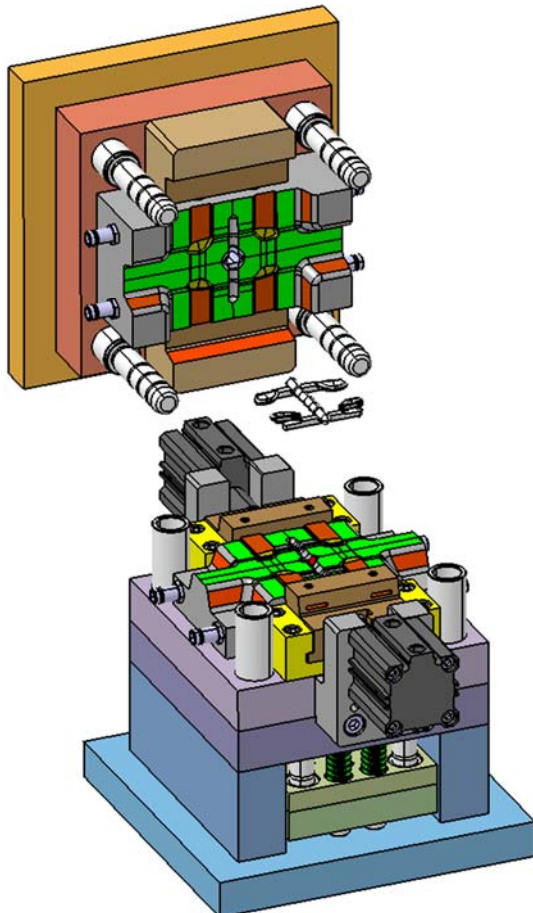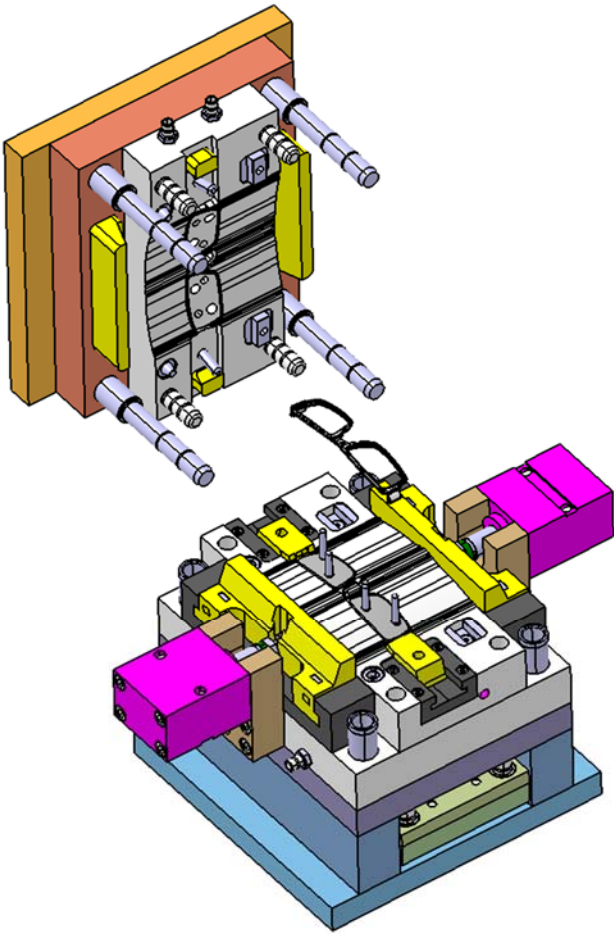injection moulding data
rheological supported**

**CalcMaster with the F1 button
direct a complete Help text**

**CalcMaster calculation
with many graphical
graphs**
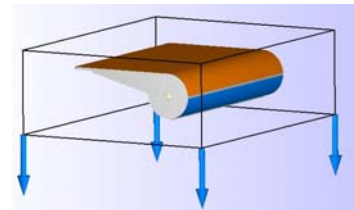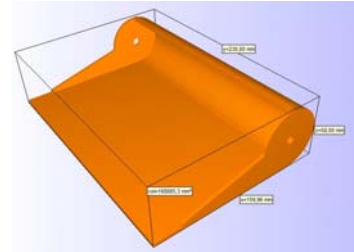
CalcMaster advising and calculation software
Makes the project, mould, moulding and product calculation very easy

During the designing
phase of the product
you have the possibility
to calculate in a simple way
directly the:

Mould price and the
Product price

**with the
CalcMaster software**

**You have then also the
possibility to make corrections
to your product design.**

**You also want to design
a cheap product.**

**Use also the
CalcMaster software**

CalcMaster advising and calculation software
Makes the project, mould, moulding and product calculation very easy

CalcMaster 3D mould simulation software

The designer can use a **3D software** which can show both core and cavity side of the mould after the CAD stl-file is opened. He can directly see possible issues with the mould design.

Afterwards you can directly make an automatic mould price calculation.with the in **CalcMaster** software.
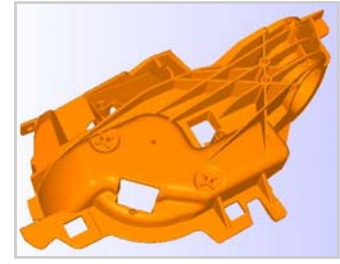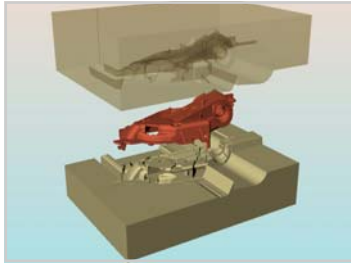
CalcMaster Mould calculation

With a new product design you can calculate the total mould costs.
For this you need only:

- CAD-STL file or
- Product sketch or
- Product drawing or
- Hand model

CalcMaster Special Tools calculation from:

- 2 Component mould, 2 cavities
- 2 Component mould, 1 cavity
- Left-Right product mould
- Stack mould
- Soft tool mould
- 1+1 product mould

|	
☐ 2-component mould, 2 cavities	**2-C2**
☐ 2-component mould, 1 cavity	**2-C1**
☐ Left-Right product mould	**L+R**
☐ Stack mould	**ET**
☐ Softtool mould	**Soft**
☐ 1+1 product mould	**1+1**

## CalcMaster calculation Mould Dimensions
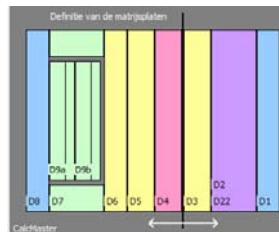
After entering the product dimensions (length x width x height) and the wall thickness the **CalcMaster software** will calculate the complete mould dimension. When using the i-Know Moulding module the product data is copied from the CAD-file.

CalcMaster correction of the mould price

After the first mould price calculation it is possible to make corrections. The corrections are dependent on the specific wishes from the customer and the workload in the mould shop.
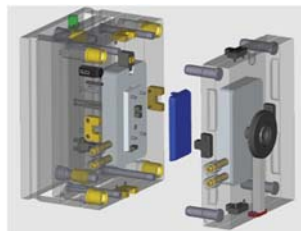
## CalcMaster detailed mould hours overview and correction
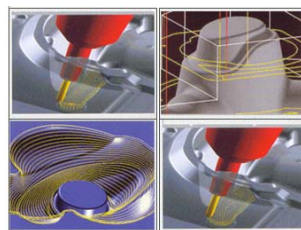
For making a quick and correct planning for making the mould the **CalcMaster** software will calculate a detailed overview of all the hours. Also the hours are calculated for:

- optimizing of the mould after proof injections
- measuring report
- CPK-study
- flow simulation and analysis

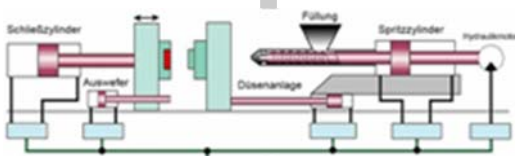# CalcMaster advising and calculation software
Makes the project, mould, moulding and product calculation very easy

CalcMaster clamping force and cycle time
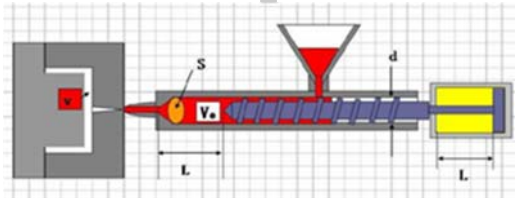
CalcMaster economical number of cavities

CalcMaster selection of the injection machine

CalcMaster calculation cost price of the product
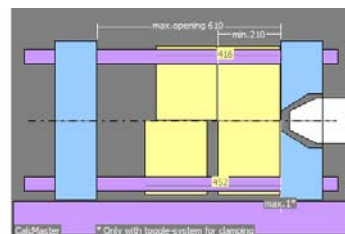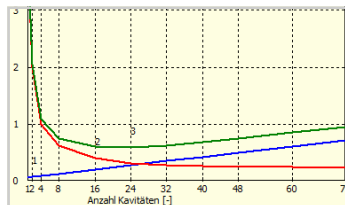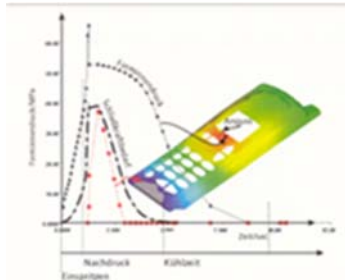
CalcMaster calculation complete printout including pictures

CalcMaster database mould settings for different mould makers

CalcMaster database save the calculations

CalcMaster mould costs overview standard mould parts

After entering the product data and the plastic grade data the next injection moulding data is calculated:

- injection time
- injection pressure
- clamping force during injection
- clamping force during holding
- theoretical cooling time
- actual cooling time
- maximum holding time
- total cycle time
- detailed cycle time

After the calculations for the mould price, mould dimensions, injection moulding data and the economical number of cavities are made all data is imported in the module **'Selection Injection Machine'**

n	product	mould price
1	4,80	27.503
2	2,83	34.769
4	1,86	43.917
8	1,52	61.840
16	1,38	97.533
24	1,36	133.348
32	1,40	169.295
40	1,46	204.026
48	1,53	238.842
60	1,63	290.881
72	1,73	342.779

The final cost price of the product is determined by:

- mould price
- injection moulding data
- economical number of cavities
- choice of injection machine
- plastic material type
- secondary operations
- assembly
- packaging
- transportation

CalcMaster data saved in an automotive sheet

CalcMaster calculation from injection moulding data rheological supported

CalcMaster with the F1 button direct a complete Help text

CalcMaster calculations with many graphical graphs

CalcMaster advising and calculation software
Makes the project, mould, moulding and product calculation very easy

i-Know Moulding 3D software
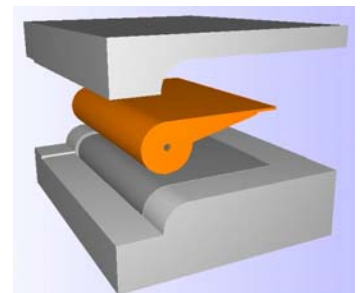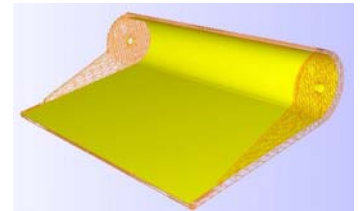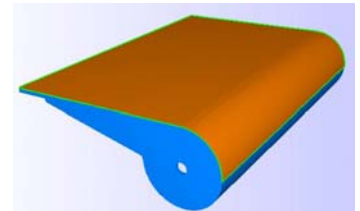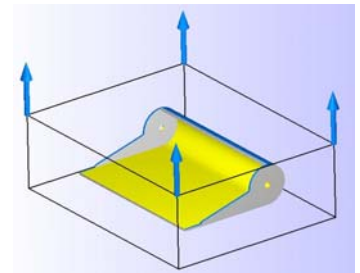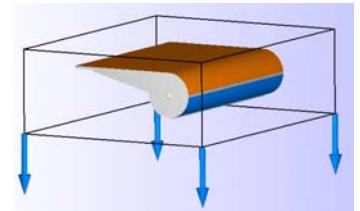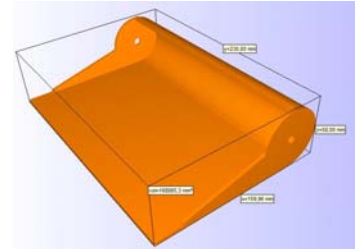### features together with the
CalcMaster Innovation advising software

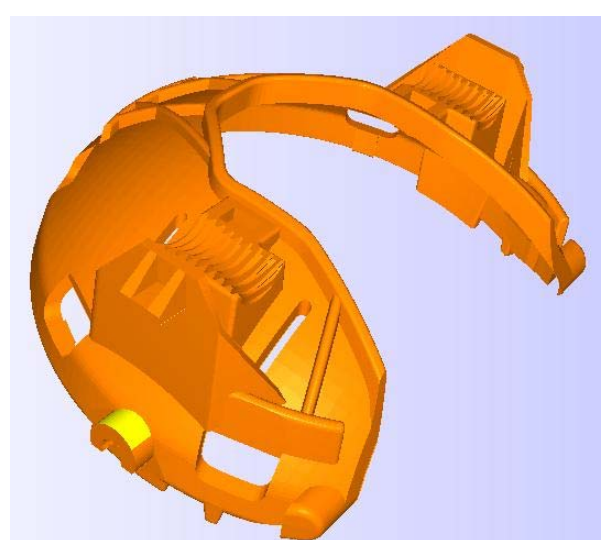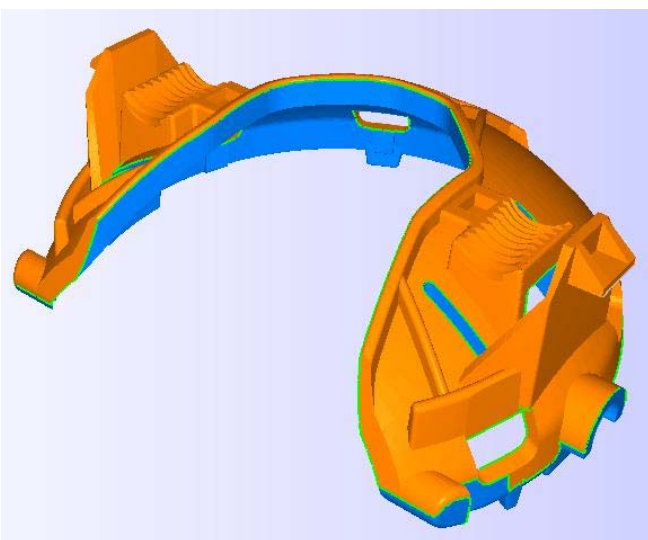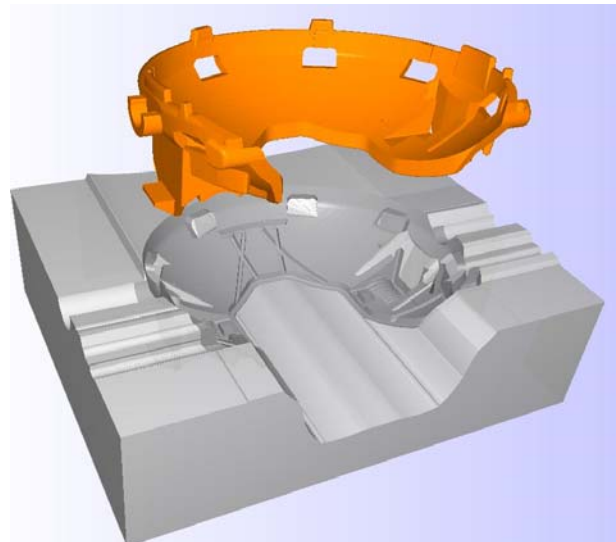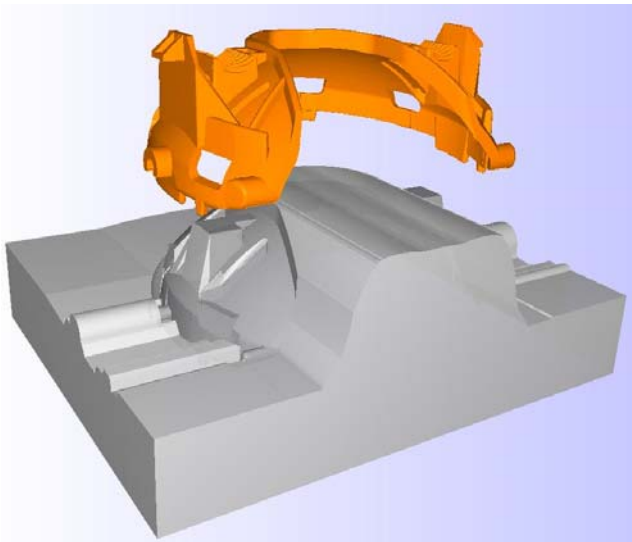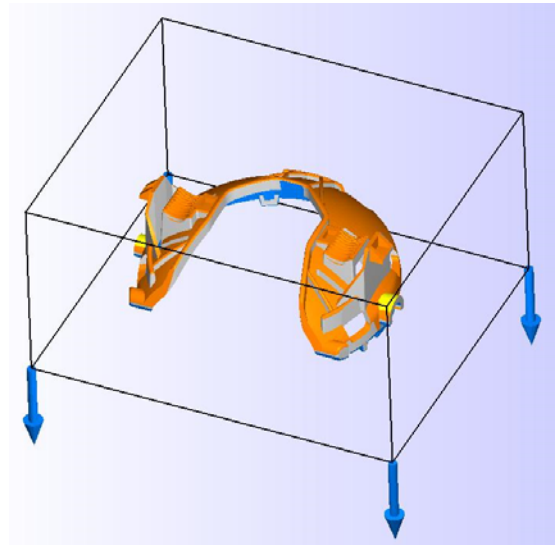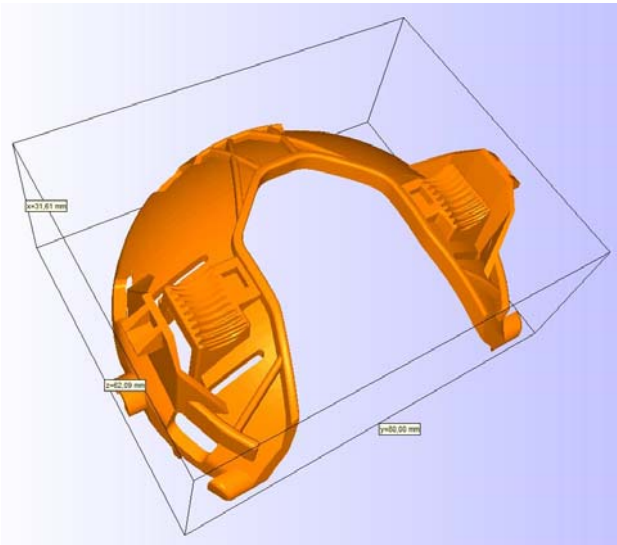**Create** a mould geometry from any 3D model within **minutes**

With a direct and complete mould calculation

CalcMaster software has a **practical** and **structured** way in making the total injection moulding calculation

Montage cap 80 x 62 x32 mm
I-Know Moulding 3D software for a direct view of
3D cavity - parting line and undercut

Parting line

Undercut

CalcMaster®

Innovative advising and calculation software
As partner on table with:

Purchasing - Sales and Management

Estimate and **calculate** the
product price and **mould price**

PRODUCT PRICE

**With a new product
design you only have
2 questions:
the mould price
and the product price.**

**The customer must have a
cheap product price.**

**And herefor he needs
an injection mould.**

**The injection mould price:
Some times a bit cheaper,
some times a bit more
expensive.**

**Dependent on many wishes,
but the product price
must be cheap.**

**For all this info use the
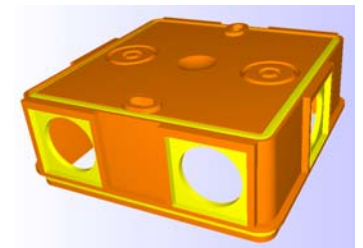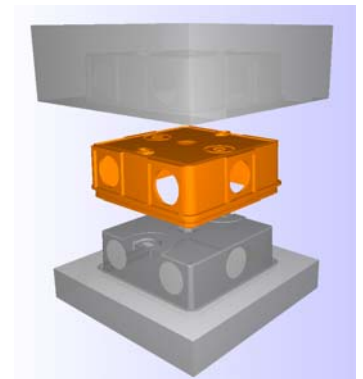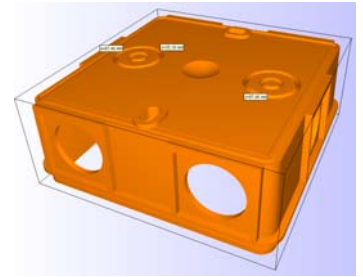CalcMaster software.**

CalcMaster Innovation software
Makes the project, mould, moulding and product calculation very easy

CalcMaster is the most comprehensive injection moulding software
The CalcMaster software calculates for you very fast and accurate:

Standard CalcMaster software part
### for the mould, moulding and product calculation

- Mould prices
- Standard and detailed hours calculation
- Detailed mould hours + Project price
- Injection moulding data (injection moulding simulation)
- Most economical quantity of mould cavities
- Complete cost price of the product
- Asking a complete quotation for the mould price
- Making a complete quotation for the mould price

- Printing the total calculation including pictures + company logo
- Export of all the CalcMaster data to an Automotive Excel sheet
- Suppliers cost overview data sheet
- 12 languages
- Mould maker user profiles
- Settings for 8 different mould makers profiles
- CalcMaster help text

Optional CalcMaster software part
for the mould, moulding and product calculation

This Optional part can only be used in combination with the Standard software.
This OPTIONAL part for the mould and injection moulding software contains:
- 2 Components in 2 cavities
- 2 Components in 1 cavity
- Left and the right product
- Stack moulds
- Soft tool mould
- 1+1 product in the mould
- **Combinations are possible** (not every combination is possible)
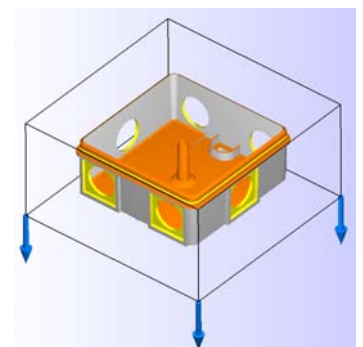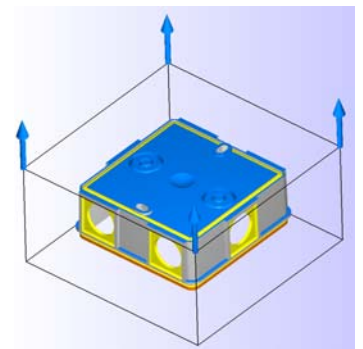
The Professional CalcMaster software is the
Standard + Optional CalcMaster part

CalcMaster Modules

- **CalcMaster - i-Know Moulding 3D software**
  i-Know Moulding Works with the STL-file CAD format.
  Wth 3D mould plates overview. Mould parting lines 3D on your screen.
  With automatic parameter transfer of data for a fast mould calculation.
  Automatic mould calculation.
- **CalcMaster Mould Dimensions**
  Mould dimensions for 1 to 96 cavities.
  Calculation of all the mould plates dimensions.
  You can select the steel type for each separate plate.
- **CalcMaster Selection of the injection machine**
  After the calculation from the CalcMaster Menus 1 - 2 - 3 and 4
  this module can automatically the right injection moulding machine.

CalcMaster® advising and calculation software

"makes the mould and product calculation very easy"

CalcMaster software

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