

**WORK INSTRUCTION**

**SUPPLY OF MOLD  
FOR METAL ELEMENTS**

**REVISIONS**

| Rev. | Reason      | Revised paragraphs | Date     |
|------|-------------|--------------------|----------|
| 0    | New edition |                    | 30/06/17 |
| 1    |             |                    |          |
| 2    |             |                    |          |
| 3    |             |                    |          |
| 4    |             |                    |          |
| 5    |             |                    |          |
| 6    |             |                    |          |
| 7    |             |                    |          |
| 8    |             |                    |          |
| 9    |             |                    |          |

|                                  |                                                               |                                    |
|----------------------------------|---------------------------------------------------------------|------------------------------------|
| Prepared by:<br>Procedures/Forms | Checked by:<br>Total Quality, Safety & Environment<br>Manager | Approved by<br>Engineering Manager |
| SONIA PESENTI                    | ** NON NECESSARIO **                                          | PIERANGELO FERRARI                 |

## CONTENTS

|       |                                                        |    |
|-------|--------------------------------------------------------|----|
| 0.    | FLOW-CHART                                             | 3  |
| 1.    | AIM                                                    | 3  |
| 2.    | RESPONSIBILITY                                         | 3  |
| 2.1   | Gewiss – Supplier relations                            | 3  |
| 2.2   | Supplier's responsibility and obligations              | 3  |
| 2.3   | Supply terms                                           | 4  |
| 3.    | ORDER DOCUMENTS                                        | 4  |
| 3.1   | mold order                                             | 4  |
| 3.2   | Drawing of the manufactured article                    | 4  |
| 3.3   | Mold specifications                                    | 5  |
| 3.3.1 | Operative sections                                     | 5  |
| 3.3.2 | Mold data                                              | 7  |
| 3.3.3 | Mold technical data                                    | 7  |
| 3.3.4 | Mold and sampling notes                                | 8  |
| 3.4   | Mold analysis                                          | 9  |
| 4.    | STANDARDIZATION                                        | 9  |
| 4.1   | Mold identification                                    | 9  |
| 4.2   | Mold handling                                          | 10 |
| 4.3   | Material and thermic treatments                        | 10 |
| 4.4   | Project execution                                      | 12 |
| 4.5   | Standardized elements                                  | 15 |
| 4.5.1 | Standardized elements for trade                        | 15 |
| 4.5.2 | Date table                                             | 15 |
| 5.    | MOLD SAMPLING                                          | 16 |
| 5.1   | Notice and Preparation                                 | 16 |
| 5.2   | Start-up                                               | 16 |
| 5.3   | Manufacturing and checking                             | 16 |
| 5.4   | Quality mold certification and post-production control | 17 |
| 5.5   | Dimensional surveys                                    | 17 |
| 5.6   | Mold adjustment                                        | 17 |
| 5.7   | Mold modification                                      | 18 |
| 5.8   | Emold pre-production and approval                      | 18 |
| 5.9   | Mold management                                        | 18 |
| 5.10  | Filling in the GW537 form                              | 19 |
| 6.    | REFERENCE DOCUMENTS                                    | 22 |
| 7.    | ANNEX                                                  | 22 |

## 0. FLOW-CHART

[not necessary]

### 1. AIM

This document concerns reference standards and methodologies to use for the designing and manufacture of **tools intended for the production of metal elements** GEWISS property (IST asset class), hereafter referred to as "mold".

It also applies to mold sharing with the supplier (ICO investment class) for the part related to the identity.

This document aims at providing the *Supplier* with operational rules for designing and manufacturing.

### 2. RESPONSIBILITY

The *Supplier* designs and manufactures:

- according to the instructions of this document;
- as indicated on the purchase order.

#### 2.1 GEWISS – SUPPLIER RELATIONS

During the mold manufacturing process, the Supplier has 3 GEWISS interlocutors according to his requirements:

- *PURCHASE DEPARTMENT* (it is responsible for formalizing and managing the contacts; sending and receiving the operational documents and it is the supplier contact reference);
- *TECHNICAL DEPARTMENT* (it is the responsible for the product and its components, it issues and updates or modified the drawings of the single components and of the product);
- *ENGINEERING DEPARTMENT*: it is responsible for the technological decisions which affect the production process, when necessary or required, it can provide the Supplier and the GEWISS parties with technical support and checks the manufacturing progresses).

#### 2.2 SUPPLIER'S RESPONSIBILITY AND OBLIGATIONS

The *Supplier* undertakes to design and manufacture according to the instructions written in this document, in the relevant mold specifications and in the purchase order. The order is governed by the "General Conditions of Supply Gewiss" applicable that the supplier undertakes to respect

Any derogation from the instructions given at the moment of the order must be formalized and authorized by GEWISS.

The *Supplier* is responsible for:

- the project and the working processes to be carried out by him;
- the material quality and relevant treatments;
- respecting the deadline scheduled in the operative plan.

The sampling (according to what has been written in the order) and any adjustment necessary to obtain the approval to the mold and to the manufactured article are Supplier's duties.

These approvals will be given only with the drawing of the manufactured article and the mold which produces according to the modalities and the cycles stated in the specifications.

The *Supplier* guarantees the high quality of the materials used, the accuracy in the supply and its good working, according to the instructions written in the technical documents.

## **2.3 SUPPLY TERMS**

The mold must be delivered ready to use, with all mechanical and, when available, the electrical, pneumatic, oil-pressure elements necessary to work, already assembled and in according to all the safety requirement required to the reference regulations.

The mold project and the 3D models used for the mold manufacture must be considered as part of the order and therefore of the supply.

The project must be delivered together with the mold and must be updated with all the modifications introduced in the original project. If the mold is manufactured abroad the cartouche and the description must be in Italian and English.

The use of steels different from those indicated in the relevant specifications must be authorized by the *ENGINEERING DEPARTMENT*, after checking the chemical features of the material and the necessary cycle of the thermic treatments.

The Supplier is authorized to use these types of material only after the delivery of the updated specification.

## **3. ORDER DOCUMENTS**

### **3.1 MOLD ORDER**

The *PURCHASE DEPARTMENT* sends the *order* to the *Supplier*. The order includes the economic and delivery terms of the goods and/or of the ordered working process. It includes the mold number and the manufactured article code to use in the official communication with Gewiss.

### **3.2 DRAWING OF THE MANUFACTURED ARTICLE**

The *drawing of the manufactured article* is delivered with three- dimensional mathematic in STEP or CATIA format and/or a bidimensional drawing in PDF and/or DXF format.

The detected dimensions on the manufactured article must correspond to the dimensions stated, considering the general and/or specific tolerances.

At the bottom of the drawing, it is given the detail table where you can find:

- the manufactured article code;
- the eventual modification index;

- the general tolerances;
- the production material;
- the general and/or specific finishing.
- the thermic/surface treatment;

### **3.3 MOLD SPECIFICATIONS**

#### **3.3.1 Operative sections**

The instructions given in the relevant mold specifications are grouped, by analogy, in main sections. In this way the instructions can be defined and traced through the relevant numeration in the copy of the form given in the following page:

1. Mold data
2. Mold technical data
3. Mold and sampling notes

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                |                                 |          |           |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------|-----------|--|
| <b>GEWISS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                | <b>EQUIPMENT SPECIFICATIONS</b> |          |           |  |
| <i>MANUFACTURING</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Date:                                                                                                                                                                          | State:                          | Classes: | Supplier: |  |
| EQUIPMENT N°                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | EQUIPMENT DESCRIPTION                                                                                                                                                          |                                 |          |           |  |
| Width<br>Length<br>Height<br>Cavity n°<br>Molding center<br>Ideal injection press<br>Cycle<br>Manufacture material<br>Shrinkage<br>Injection<br>Automatic molding                                                                                                                                                                                                                                                                                                                                                                             | Automatic clamping<br>Extraction<br>Extraction micro<br>Plates material<br>Extraction group material<br>Insert material<br>Hardeness insert<br>Hardened<br>Movements<br>Weight |                                 |          |           |  |
| MATERIAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | CAVITY Q.TY                                                                                                                                                                    | DESCRIPTION                     |          | NOTE      |  |
| NOTES:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                |                                 |          |           |  |
| <p>THE MATERIALS AND THE COMPONENTS USED WILL HAVE TO BE OF THE BEST QUALITY WITH SUITABLE THERMIC TREATMENTS.</p> <p>THE EXECUTION WILL HAVE TO BE ACCURATE AND CARRIED OUT PERFECTLY THUS GUARANTEEING THE CYCLE MANUFACTURING OF THE PIECES.</p> <p>THE PROCESS MUST RUN AT FULL CAPACITY BEFORE CONSIDERING THE MANUFACTURED ARTICLES VALID.FOR THE OTHER SUPPLY SPECIFICATIONS ( STANDARDISATION, GUARANTEE,PROJECT ETC.) PLEASE REFER TO THE RELEVANT GENERAL SPECIFICATIONS AND TO THE TECHNICAL SPECIFICATIONS HEREWITH ENCLOSED.</p> |                                                                                                                                                                                |                                 |          |           |  |
| Filled in by                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                | Engineering dept signature      |          |           |  |

## EQUIPMENT SPECIFICATIONS

Date:

State:

**Classes:**

Supplier

EQUIPMENT N°

### EQUIPMENT DESCRIPTION

Width  
Length  
Height  
Cavity n°  
Molding center  
Ideal injection press  
Cicle  
Manufacture material  
Shrinkage  
Injection  
Automatic molding

Automatic clamping  
Extraction  
Extraction micro  
Plates material  
Extraction group material  
Insert material  
Hardness insert  
Hardened  
Movements  
Weight

## MATERIAL

CAVITY Q.TY

### DESCRIPTION

## NOTE

NOTES:

THE MATERIALS AND THE COMPONENTS USED WILL HAVE TO BE OF THE BEST QUALITY WITH SUITABLE THERMIC TREATMENTS.  
THE EXECUTION WILL HAVE TO BE ACCURATE AND CARRIED OUT PERFECTLY THUS GUARANTEERING THE CYCLE MANUFACTURING OF THE PIECES.  
THE PROCESS MUST RUN AT FULL CAPACITY BEFORE CONSIDERING THE MANUFACTURED ARTICLES VALID.FOR THE OTHER SUPPLY SPECIFICATIONS ( STANDARDISATION, GUARANTEE,PROJECT ETC.) PLEASE REFER TO THE RELEVANT GENERAL SPECIFICATIONS AND TO THE TECHNICAL SPECIFICATIONS HEREWITH ENCLOSED.

Filled in by

Engineering dept signature

N.B.: THIS FORM IS HEREWITH ENCLOSED, IN PHOTOCOPY, ONLY AS AN EXAMPLE. THE CURRENT UPDATED VERSION IS AVAILABLE IN INTRANET.

THIS TRANSLATION IS CONFORMABLE TO ORIGINAL ITALIAN VERSION  
PAPER COPY FOR INTERNAL USE. THE DOCUMENT IN FORCE IS AVAILABLE IN INTRANET

### 3.3.2 Mold data

- A) *Date*  
The date in the specifications is the issue date. When the specifications are updated, the date will be updated too.
- B) *State*  
It explains if the mold specifications are provisional or definitive.
- C) *Class*  
It stands for the mold class.
- D) *Supplier*  
It stands for the mold manufacturer.
- E) *Mold number*  
It is the identification code.
- F) *Mold definition*  
It corresponds to the mold description written in the order.
- G) *Issue*  
The issuing department to contact for any change or updating is always the *ENGINEERING DEPT.*

### 3.3.3 Mold technical data

- A) *Plate width (mm) indicative*  
Mold plates dimension (binding the assembly in the machine).
- B) *Plate length (mm) indicative*  
Mold plates dimension (not binding the assembly in the machine)
- C) *Mold height /width/length (mm) indicative*  
Total dimension of the mold closed between the 2 backing plates to the press.
- D) *Number of cavities*  
The total number of cavities in the mold.
- E) *Ideal press*  
Usually indicates only the minimum usable tonnage. Any other binding characteristics (for example: fine blanking, vertical, high-speed, electric, hydraulic, etc.) Are indicated in the notes.
- F) *Cycle*  
The scheduled production cycle, according to the manufactured article, to the material and to the foreseen costs. It is a necessary indication for the technological design of the mold which has to be checked during the sampling. The mold will be considered as suitable for the production only if this indication is respected.
- G) *Manufactured article material*  
It corresponds to the Material as stated in the drawing of the manufactured article.
- H) *Moulding methods*  
The following methods are foreseen:
- automatic;
  - manual.

- I) *Material of the die-support*  
Type of material used to manufacture the die-plates, the elements surrounding the die which are subject to high stress.
- L) *Material of male and female die:*  
Type of material used to manufacture the dies and, if necessary, the other elements which are not part of the cavity, but require specific features.
- M) *Material*  
It stands for the code of the element which has been manufactured by the cavity.
- N) *Cavity*  
Identified by a capital letter, it stands for the type of cavity to manufacture.
- O) *Quantity*  
It stands for the number of cavities of the same type to be manufactured.
- P) *Description*  
It stands for the element manufactured by the cavity.

In case of changes in these instructions, the supplier must indicate them at the beginning of the negotiation. Once the manufacturer has been defined, GEWISS checks the data when the mold is finished and inputs them in the information sheet.

In case of doubt, please refer to the given analysis or contact the *ENGINEERING DEP.* for explanations.

### **3.3.4 Mold and sampling notes**

#### *Notes*

In this section, you can find the data relevant to the following subjects:

- Number of pieces to be manufactured with the first sampling and any specified requirements
- Changes of material  
Alternative material for the sampling or for the manufacturing of different versions.
- Changes of versions  
Instructions on the modalities to be used to change the versions.
- Movements  
General instructions to free the undercut of the shape or to favour the piece calibration.
- Inboard machinery adjustments
- Life of the mold dies  
The dimension, the types of steel used and the surface coverings, if there are any, must *GUARANTEE* the minimum production quantity specified, without remaking them.
- Dies relieving
- Dies cutting
- Threading device



- Mold safety measures
- Band dimensions
- Electro-welded parts
- Assembly with other elements
- Precautions and security measures for following working processes.
- Sequence of in-and-out-machine-operations
- Definition of piece removing
- Inboard machinery working processes
- Gauges for checking and testing of the manufactured article

### **3.4 MOLD ANALYSIS**

If the *Engineering* Dept. considers it useful, it provides a copy of the drawing of the manufactured article with all necessary information to correctly set the cavity or an mold analysis.

Particularly, in these documents you can find:

- mold closing line;
- movement closing line;
- conditioning path;
- dies cutting;
- dies orientation on the band;
- dimensions of the die-support and attachments;
- handling devices, development;

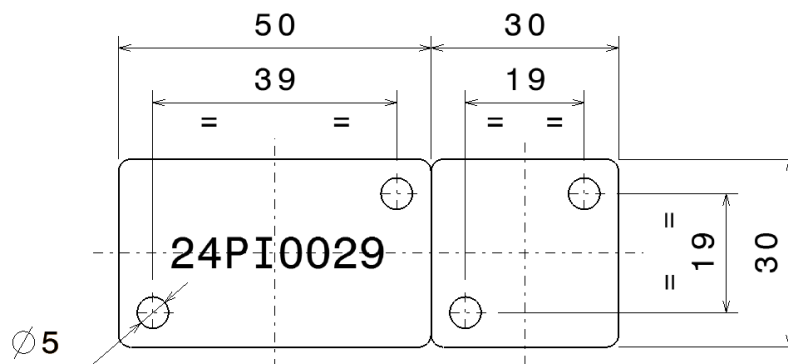
These documents are binding for both the parties involved.

## **4. STANDARDIZATION**

### **4.1 MOLD IDENTIFICATION**

The mold is identified by its own number which corresponds to the number quoted in the relevant specifications, in the order and in all the relevant documents. This number must be written in every document exchanged between the *Supplier* and GEWISS.

An identification label must be applied on the mold. The label must be in stainless steel and of the same type as shown in picture n° 1:



**Pict. 1 – MOLD IDENTIFICATION LABEL**

The label carries the mold number and must be fixed on the upper part of the die-support by two self-tapping screws for steel or by self-tapping rivets UNI 7346-74 D. 3.5 x 8.

Moreover, on the upper side of the die-support, on the opposite side of the label, the following information must be stamped (characters height from mm 4 to mm 6):

GEWISS – mold code

Manufactured article denomination      manufactured article code

example:

GEWISS

FIXED CONTACT

5001.335.8

## 4.2 MOLD HANDLING

On the lower and upper sides, the mold must have some tapped holes for the assembly of the lifting rings.

For the holes dimensions, the relative machining allowances and the maximum permissible loads refer to the UNI-ISO 3266 tables that require the adoption of ISO 261 and ISO 965 for General Planes and Tolerances of the ISO Metric Thread. The thread tolerance must be Class 8g (ISO 965).

**Always stamp the "M XX" mark next to the holes to avoid misuse.**

## 4.3 MATERIAL AND THERMIC TREATMENTS

Here below you can find a table containing all the necessary references for the standard materials used to manufacture the mold.

| <i>Type of Application</i>                                                     | <i>Material features</i> | <i>Werkstoff number</i> | <i>Hardness</i> | <i>Commercial definitions</i> | <i>Suppliers</i>                           |
|--------------------------------------------------------------------------------|--------------------------|-------------------------|-----------------|-------------------------------|--------------------------------------------|
| Male and female dies for pressure die-casting of light metals                  | Steels for hot-working.  | 1.2343                  | 44:46- HRC      | Vidar Supreme,USN, W300.      | Uddeholm.<br>Thyssen, Kind & Co.<br>Bohler |
| High stress inserts or parts of mould for pressure die-casting of light metals | Steels for hot-working.  | 1.2367                  | 44:46- HRC      | UHB QRO 90, RPU, W303, TQ 1.  |                                            |

| <b>Type of Application</b>                                                | <b>Material features</b> | <b>Werkstoff number</b> | <b>Hardness</b> | <b>Commercial definitions</b> | <b>Suppliers</b>    |
|---------------------------------------------------------------------------|--------------------------|-------------------------|-----------------|-------------------------------|---------------------|
| Deep drawing (drawing) male and female dies, for medium and large sizes   | Steels for cold-working. | 1.2080                  | 54:63- HRC      | UHB, Sverker 1, K100, CH.     |                     |
| (as above), but for small sizes                                           | Steels for cold-working. | 1.2379                  | 60:64- HRC      | UHB, Sverker 21, CH16V, K110. |                     |
| For medium and large sizes shearing machine, high thickness bending       | Steels for cold-working. | 1.2767                  | 54:56- HRC      | UHB, Grane, N400, K600        |                     |
| (as above), but for small sizes                                           | Steels for cold-working. | 1.2842                  | 62:64- HRC      | UHB AROS, K720, MKST          |                     |
| Male and female dies for high stress and wear                             | Steels for cold-working. | 1.2884                  | 63:65- HRC      | K108, Chco, C12ss             |                     |
| Parts for high production subject to wear or for high abrasive materials. | Fine grain hard metal    | -                       | 1350-1900 HV-10 |                               | Bidurit, F.i.l.m.s. |
| Parts for high production subject to wear or for high abrasive materials. | Medium grain hard metal  | -                       | 900-1400 HV-10  |                               |                     |
| Parts for high production subject to wear or for high abrasive materials. | Coarse grain hard metal  |                         | 800-1100 HV-10  |                               |                     |
|                                                                           |                          |                         |                 |                               |                     |
| Mold holder<br>Low production                                             | C- steel                 | 1.0503                  | 210 HB          | C 45                          |                     |
| Mold holder<br>Medium-high production                                     | C- steel                 | 1.2311                  | 250 HB          | 1.2311                        |                     |

| <b>SURFACE THERMOCHEMIC TREATMENTS</b> |                      |                 |                                                                            |
|----------------------------------------|----------------------|-----------------|----------------------------------------------------------------------------|
| <b>Symbol</b>                          | <b>Description</b>   | <b>Hardness</b> | <b>Use</b>                                                                 |
| TiN                                    | PVD Titanium Nitride | 2300 HV         | Surface covering for dies subject to wear, high production mold. (BALZERS) |

For the characterisation of the steels, please consider all the following parameters:

- chemical composition certificate;
- grain texture in annealed state (micrography x 500);
- hardness when supplied;
- hardness and textures you can obtain according to the CCR and TTT diagrams;
- steel properties according to the ASTM E 45 D method (A method as an alternative);
- Werkstoff number;
- tensile strength;
- yield strength;
- Charpy strength KCV method in J/cm<sup>2</sup>;
- hardness/strength/tempering point diagrams;

- thermic cycles suggested considering also further treatments (PVD, etc.);

#### Further Considerations:

- For thermal treatments (T.T and T.T.S.) and TIG welding bearings only adopt methodologies and materials indicated by the respective steel suppliers, use Qualified Companies who undertake vacuum treatments.
- in order to be able to trace back to the original supply, in the event of any "post-processing" problems, reference the documents accompanying the goods or the number of castings to the batch of materials;
- In the case of large mould cavity made of full steel blocks (pre-treated or treated), always carry out a specific ultrasonic analysis to detect any internal imperfections;
- the warranty on the compatibility of a steel of other Brands, other than those indicated in the table, is borne by the Supplier of the mold, which must specify all the above mentioned characteristics;
- materials and treatments carried out by any new supplier must be tested by suitable tests (Charpy tests).

#### Thermic treatments

|                                         |                                                                                                                                                                     |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Die-casting (dies )</b>              |                                                                                                                                                                     |
| Hardening and Tempering                 | Type of hardening treatment, number of tempering treatments from 2 to 4. Please follow the instructions given by the Supplier.                                      |
| Treatment after the finishing processes | Carry out the stress relieving after mechanical working (type: plunge/wire grinding, milling, erosion) at a temperature of 50 degrees less than the last tempering. |
| Treatment after pre-production          | Stress relieving with the last tempering readings                                                                                                                   |
| Treatment after production              | Carry out the stress relieving every 20.000 beats with the last stress relieving readings                                                                           |
| <b>Blanking (dies )</b>                 |                                                                                                                                                                     |
| Hardening and Tempering                 | Type of hardening treatment, number of tempering treatments. Please follow the instructions given by the Supplier                                                   |
| Treatment after the finishing processes | Carry out the stress relieving after mechanical working (type: grinding, EDM, wire cut) as in the last tempering.                                                   |
| Treatment after sharpening              | Carry out the stress relieving after sharpening at a temperature lower than the last tempering.                                                                     |

#### 4.4 PROJECT EXECUTION

The project mold must be entirely made with CAD systems, different ways are possible only if indicated in the specific specifications.

The project consists of:

- 3D CAD Files
- CAD Files 2D

- c) BOM mold
- d) Photo of the two half parts of the mold (in JPEG format)

### 3D CAD files

Files must be provided in native format and in one of the following 3D formats arranged in preference order:

1. CatProduct / CatPart version CATIA 5R26 or lower.
2. STEP (check with Engineering conversion settings for proper import into CATIA).

Are required:

1. Semi-finish product mathematics obtained by subtracting the inserts (male or female)
2. Mould assembly
3. Components

**Each position must be represented by a file.**

### CAD Files 2D

Starting from the solid 3D, all the 2D technical drawings needed to build the individual components must be realized

Files must be provided in one of the following formats, arranged in order of preference:

1. CatDrawing version CATIA 5R26 or lower;
2. DXF version AUTOCAD 2006 or lower;
3. DWG versions of AUTOCAD 2006 or lower;

#### *2D Project General Rules:*

1. Must comply with relevant ISO standards;
2. the assembly shall state the position of each component (including the normalized ones);
3. the designs must not exceed the standard UNI A0 format; In the case of assembly mold it tolerates the elongated format A1 x 3 (841 x 1783);
4. a drawing must be a single detail, only in the case of drawings of the extraction group it is allowed to carry more than one (f.e. extraction plates);
5. if a component differs from another only for symmetry or a small detail requires a dedicated design, there are no indications of type 1 right and 1 left part with highlighted differences;
6. if a normalized component is to be subjected to a rework, it must be represented by a relative design (f.e. extractor with special work on the head);
7. the drawing scale must match the plotting format;
8. all drawings must bear the duly filled GEWISS cartouche (see All 7 I504 instruction) or neutral cartridge (no logo) containing all the indications in the GEWISS cartouche. The cartouche is available in DXF format.
9. the sheets will be numbered progressively starting from number 1; It is important that the hardness test after the heat treatment and the temperature of the steel to be exposed is found on the cartouche, which is to be taken from the certificate issued by the heat treatment supplier.

#### *Detail table*

The following fields must be filled in (see annex 7 – I504 work instruction)

A) Relevant to the mold element:

1. Position (reference to the system);

2. Quantity (n° pieces to manufacture);
3. Denomination (reference to the table and to the element under discussion);
4. Material;
5. Dimensions;
6. Thermic treatment;
7. tempering temperature
8. Hardness required (after treatment).
9. Hardness detected (after treatment).

B) Relevant to the element to be printed:

1. Name of the element;
2. Name of the manufactured article;
3. Material (of the manufactured article);
4. Eventual mold shrinkage adopted

C) Relevant to the mold:

1. Mold number (first field " drawing n° ");
2. Manufactured article (second field " drawing n° ");
3. Number of seats (total);
4. Designer;
5. Date of the project;
6. Sequence number of the table;
7. Total number of the tables;
8. Scale/s.

### ***GEWISS logo***

The logo is available, on request, in the following formats:

- DXF or IGES format;
- CAD 2D (DXF) and CAD 3D (STEP) format

Please observe the proportions in case of enlargements or reductions.

### ***3D and 2D file naming:***

The filename must be composed of the following concatenated information:

1. code mold (f.e. **20MP0001**)
2. "-" character (less character on the keyboard)
3. Component position is a progressive number ranging from 1 to 999 (f.e. **4**)
4. "-" character (less character on the keyboard)
5. uppercase description of the detail defined into the BOM (f.e. **CAVITY**)
6. file type extension (f.e. **.stp**)

Ex: file name **20MP0001-004-CAVITY.stp**

Into the mould's BOM, the names of the file are automatically defined (see All 8 Instructions I504 or supplier's XLS file with the same information).

## BOM of mold

The list of component mold must be placed in the XLS file in the All. 8 instruction I504. By entering the location and the naming you get the names of the files automatically. Material and hardness must be specified for the construction components, and the supplier must be specified for the purchase components. The file is complete with examples and instructions for use.

## Delivery of the project

The project must only be delivered electronically via one of the following media:

- CDR
- DVD
- when dimensions allow (<10MB), it can be emailed to Industrialization Gewiss (industrialization@gewiss.com) using WINZIP for compression.
- • Other secure online sharing systems (f.e. workspace gewiss, we-transfer, dropbox, etc).

In the case of a first supply or a change in the CAD systems in use, Industrialization cooperates with the supplier in verifying the readability of 3D and 2D files to obtain full use of the files from Gewiss.

## 4.5 STANDARDIZED ELEMENTS

### 4.5.1 Standardized elements for trade

During the selection, refer to the catalogs of suitable and reliable Suppliers by putting in the BOM all the information necessary for their traceability.

### 4.5.2 Date table

For die-casting mold there is a grid annual dater (of limited sizes, suitable for the manufactured article) with a sequence number between 0 and 5 on x-axis and 12 squares without headings on y-axis for the sequence "punching" (see pict. 2). "Zero" always corresponds to the year in which the production started.

|   |   |   |  |  |  |  |  |  |  |  |  |  |
|---|---|---|--|--|--|--|--|--|--|--|--|--|
| 0 | * | * |  |  |  |  |  |  |  |  |  |  |
| 1 |   |   |  |  |  |  |  |  |  |  |  |  |
| 2 |   |   |  |  |  |  |  |  |  |  |  |  |
| 3 |   |   |  |  |  |  |  |  |  |  |  |  |
| 4 |   |   |  |  |  |  |  |  |  |  |  |  |
| 5 |   |   |  |  |  |  |  |  |  |  |  |  |

**Pict. 2 – Date Table**

For the remaining metal mold, any information requests relating to:

- date
- production batch
- lot of material
- No. of cavities
- SL modification index

- mould

are indicated by *TECHNICAL DEP.* on the design of the part and to be verified / confirmed by the SUPPLIER on offer.

## 5. MOLD SAMPLING

This chapter presents the instructions to:

- prepare, carry on and check the mold sampling;
- check the mold conditions at the end of sampling or pre-production lots;

These instructions must be carefully followed in order to:

- get the *approval to the mold*;
- get the *dimensional approval of the manufactured article*;
- guarantee that the supply terms (to deliver therefore the mold at the best conditions) will be honoured

### 5.1 NOTICE AND PREPARATION

The *Supplier* informs the *Purchase DEPARTMENT* (and also the *ENGINEERING DEPARTMENT*) by e-mail or by fax about the scheduled date of sampling at least 5 working days early.

The Supplier must arrange for the press, the mold, the material and any other auxiliary foreseen tools necessary to print in the best conditions, in order to check the mold in the typical production conditions.

### 5.2 START-UP

Please connect the conditioning circuits in order to check any leaks (for pressure die-cast elements).

It is **ABSOLUTELY NECESSARY** to put the pressure die-casting mold in the “thermic condition” before starting the sampling.

The mold must run at slow speed with a number of empty cycles depending on the type.

Proceed in this condition for 30-60 minutes. At the end of this idle time, please check slips, grips and etc. before going on with the sampling.

### 5.3 MANUFACTURING AND CHECKING

The sampling must be manufactured according to the methods and cycles scheduled in the relevant mold specifications; this document carries also the number of pieces to manufacture.

The pieces have to meet the agreed aesthetic and technical requirements.

If required to the Supplier, the *ENGINEERING DEPT.* has a role of technical support with the possibility, anyway, to witness the sampling when necessary.



## 5.4 QUALITY MOLD CERTIFICATION AND POST-PRODUCTION CONTROL

The mold is self-certified by the Supplier by filling in and signing the GW537 form "Sampling equipment" in state "Planned"; this self-certification is valid providing:

- it corresponds in each part to the mold specifications;
- the mold produces in cycles and as requested;
- the mold is designed and constructed "in accordance with the rules of the art" according this instruction.

At the end of the sampling, the mold must be checked by the *ENGINEERING DEPT.* at the Supplier's premises, in order to identify and solve any problem.

Only if the test is successful, the *ENGINEERING DEPT.* gives its approval to the mold as indicated in Annex 1.

Information concerning the conditions of operational criticality, the elements (of which we advise you to have a stock), the special operations of assembly, disassembly, equipping, production begin or end must be reported into the sampling form GW537 for the update of the mold information sheet in our Information Technology System.

## 5.5 DIMENSIONAL SURVEYS

The pieces valid from the aesthetic point of view and obtained:

- with the mold at full capacity;
- at cycle and as requested;
- with the foreseen material;

can be subjected to dimensional survey.

This survey can be made by:

- A. *TECHNICAL DEPARTMENT* within the deadlines foreseen in the relevant internal procedures;
- B. *SUPPLIER*, in case there have been taken previous agreements in this way.

The pieces, whose dimensions are included in the foreseen tolerances, get a *dimensional approval* apart from the possible needs of modification occurred after the order.

In case B), the detected quotas are reported on a document of the *SUPPLIER* that must contain the information and data of the parts highlighted in yellow in the examples of Measuring Protocols Gewiss - GW515 Module (see Annex 2).

This copy must be given to the *PURCHASE DEPARTMENT* with the pieces similar to those surveyed, according to the quantity foreseen in the specifications.

## 5.6 MOLD ADJUSTMENT

This term stands for the adjustment operations of the mold, in order to bring it into the condition of producing at cycle and in the way foreseen in the relevant specifications.

These operations are always carried out by the Supplier, unless they are requested by the *ENGINEERING DEPT.*

In this case, the *ENGINEERING DEPT.* checks the possibility of respecting the foreseen cycles and, if necessary, changes the relevant specifications.

We reassert that the sampling valid for the self-certification and the dimensional surveys is always and anyway the one obtained at cycle and in the way foreseen in the updated specifications.

## 5.7 MOLD MODIFICATION

This definition stands for all the dimensional, functional and technological variations to the mold demanded by GEWISS, in order to adapt the manufactured article, with the dimensional approval, to the new requirements.

These variations are quantified in percentage compared to the amount of the original order. The Supplier undertakes to carry them out within the scheduled time, as shown in the table, starting from the delivery date of the intervention remarks.

| Cost of the modification in % on the mold order | Max execution time | Remarks                            |
|-------------------------------------------------|--------------------|------------------------------------|
| 5 %                                             | 2 weeks            | Male and female die modification   |
| 10 %                                            | 4 weeks            | Male and female dies manufacturing |
| 20 %                                            | 6 weeks            | Cavity remaking                    |

## 5.8 MOLD PRE-PRODUCTION AND APPROVAL

The *ENGINEERING DEPT.* is willing to provide the technical support during the pre-production.

The Supplier must complete a copy of the mod. GW537 "Sampling Equipmet" in which the stamping conditions adopted are recorded.

At the end of the pre-production, the *ENGINEERING* confirms its approval to the mold writing down any remark coming out of the IT system.

## 5.9 MOLD MANAGEMENT

- a) **Mold belonging to Gewiss (investment class IST)**; the supplier guarantees the correct use of the mold and the careful management of the ordinary repairs (carried out by him) in order to guarantee the duration of the dies as stated in the relevant specifications.
- In case of modifications and/or extraordinary repairs, the *ENGINEERING*, together with the *PURCHASE DEPARTMENT*, assesses the technical/economic feasibility and regularizes the intervention.

- b) **Mold jointly with the supplier ((investment class ICO)**; The mold belongs to the *SUPPLIER*, with the OBLIGATION of using it solely for *GEWISS*, guaranteeing the correct use of the mold and carefully managing the ordinary repairs (carried out by him) in order to ensure the duration of the dies as stated in the relevant specifications.

In case of modifications and/or extraordinary repairs, the *ENGINEERING DEPT.*, together with the *PROCUREMENT DEPARTMENT*, assesses the technical/economic feasibility and regularizes the intervention.

If *GEWISS* and the *SUPPLIER* break off their relation, *GEWISS* can ask for the scrapping (with clear evidence) and/or the mold buying off. In case of replacement/scrapping from the supplier's side, the latter has to inform officially the *PURCHASE DEPARTMENT*. Afterwards the *PURCHASE DEPARTMENT* informs the *ENGINEERING DEPARTMENT* which updates the SAP information sheet and disables the mold.

## 5.10 FILLING IN THE GW537 FORM

The instructions written in the GW537 "Sampling equipment" form are grouped, by analogy, in main sections. In this way the instructions can be defined and traced through the relevant numeration in the copy of the form given at the end of the paragraph:

1. Form data;
2. Semifinished products manufactured through the mold;
3. Raw materials used by the mold;
4. Summary data;
5. Sampling technical data;
6. Notes;
7. Samplings delivery;
8. Approval.

To fill in section 1 please follow the instructions given for section 1 in the specifications for the mold manufacturing GW543, except for:

- **State**  
It indicates the state of the sampling:  
Under creation:            the form is being prepared;  
Issued:                      the planning considers the samples to be planned;  
Planned:                    the sampling is planned;  
Exec.Appr.\_YES:            Execute with approval YES;  
Exec.Appr.\_NO:            Execute with approval NO;  
Exec. Appr.YES\_R:        Execute with approval YES after settling open question;
- **Exec. Date**  
Indicate: in state creation/issued the date of request for sampling, in state "Planned" the date foreseen for the sampling, in state "execute" the real date of execution of the sampling.
- **Executor**  
The body asked to carry out the mold sampling.

The semifinished products that the mold can produce are listed in section 2.

The raw material used by the mold to produce the sampling is listed in section 3.

To fill in section 4 please follow the instructions given for the mold manufacturing GW543.

The data to be written in section 5 are those found on the press working.

The observations are reported in section 6. They can be filled in whether by sampling applicant or sampling executor.

The sampling executor fills in section 7 by indicating the sampling delivery.

Section 8 covers the synthesis of mold testing completed by the sampling dep., which may be:

Eseg.Ben\_SI: Runs with YES

➔ Sampling considered valid for the delivery to GEWISS of the required parts because the mold is produced in the manner prescribed by the specification and the part conforms to the drawing.

Eseg.Ben\_NO: Completed with NO approval

➔ Sampling considered NOT valid for deliveries to GEWISS of the required parts because the mold DOES NOT produce as specified in the specification and / or part does NOT conform to the drawing; The compiler must clearly specify, within the observation field, the actions necessary to arrange the mold and repeat the sampling.

Eseg.Ben.SI\_R: Executed by approving SI before placing open points

➔ Sampling considered valid for the delivery of the required parts to GEWISS even if the mold does NOT produce as specified in the specifications and / or the part is NOT completely compliant with the drawing: the compiler must clearly specify, within the observation field, the Variations found to be expected and, with the words "Open Points:", the actions to be taken to resolve the reserve.

Subsequently it will be verified by INDUSTRIALIZATION DEPT. to confirm the functional approval.

|                                                                                                                                                                                                                                                                                                                                                            |                  | <h1>EQUIPMENT SAMPLING</h1>                          |                        |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------------------------------------|------------------------|--------------------------------------|------------------|-----------------------------------|---------------------------------------------------------------|------------------|----------------------------------------|------|-----------------|-----------|--------|--------|----------|------|--------|--------|--------|---------|------------|---|-------|--------|----------------------|---------|
| <b>MANUFACTURING</b>                                                                                                                                                                                                                                                                                                                                                                                                                        |                  | N°: 10000038856.000                                  | Exec. Date: 25.11.2003 | State: CONF. APPR. YES               | Activity: SET-UP | Exec.: O&B (FONPRESS)             |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| EQUIPMENT N°:<br><b>84MF0009</b>                                                                                                                                                                                                                                                                                                                                                                                                            |                  | EQUIPMENT DEFINITION:<br><b>LOOM OF TITANO GLASS</b> |                        |                                      |                  | SUPPLIER: 3856                    |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| <table border="1"> <thead> <tr> <th>MATERIAL</th> <th>CAV.</th> <th>Act.</th> <th>Tot.</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>56327224</td> <td>AX</td> <td>1</td> <td>1</td> <td></td> </tr> </tbody> </table>                                                                                                                                                                                                          |                  |                                                      |                        |                                      |                  |                                   | MATERIAL                                                      | CAV.             | Act.                                   | Tot. | DESCRIPTION     | 56327224  | AX     | 1      | 1        |      |        |        |        |         |            |   |       |        |                      |         |
| MATERIAL                                                                                                                                                                                                                                                                                                                                                                                                                                    | CAV.             | Act.                                                 | Tot.                   | DESCRIPTION                          |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| 56327224                                                                                                                                                                                                                                                                                                                                                                                                                                    | AX               | 1                                                    | 1                      |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| <table border="1"> <thead> <tr> <th>FIRST MATTERS</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>3B90001</td> <td></td> </tr> </tbody> </table>                                                                                                                                                                                                                                                                                  |                  |                                                      |                        |                                      |                  |                                   | FIRST MATTERS                                                 | DESCRIPTION      | 3B90001                                |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| FIRST MATTERS                                                                                                                                                                                                                                                                                                                                                                                                                               | DESCRIPTION      |                                                      |                        |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| 3B90001                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |                                                      |                        |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| <table border="1"> <thead> <tr> <th colspan="4">MOULD TECHN. DATA</th> </tr> </thead> <tbody> <tr> <td>Local</td> <td>CTO.TERZI</td> <td>Length</td> <td>760 mm</td> </tr> <tr> <td>Location</td> <td>3856</td> <td>Height</td> <td>490 mm</td> </tr> <tr> <td>Weight</td> <td>1929 KG</td> <td>Inserts n°</td> <td>1</td> </tr> <tr> <td>Width</td> <td>740 mm</td> <td>Ideal moldin machine</td> <td>600 ton</td> </tr> </tbody> </table> |                  |                                                      |                        |                                      |                  |                                   | MOULD TECHN. DATA                                             |                  |                                        |      | Local           | CTO.TERZI | Length | 760 mm | Location | 3856 | Height | 490 mm | Weight | 1929 KG | Inserts n° | 1 | Width | 740 mm | Ideal moldin machine | 600 ton |
| MOULD TECHN. DATA                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                                                      |                        |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| Local                                                                                                                                                                                                                                                                                                                                                                                                                                       | CTO.TERZI        | Length                                               | 760 mm                 |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| Location                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3856             | Height                                               | 490 mm                 |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| Weight                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1929 KG          | Inserts n°                                           | 1                      |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| Width                                                                                                                                                                                                                                                                                                                                                                                                                                       | 740 mm           | Ideal moldin machine                                 | 600 ton                |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| <table border="1"> <thead> <tr> <th colspan="2">PROCESSING DATA</th> </tr> </thead> <tbody> <tr> <td>Molding NR.</td> <td>200</td> </tr> <tr> <td>Molding machine</td> <td>900T</td> </tr> </tbody> </table>                                                                                                                                                                                                                                |                  |                                                      |                        |                                      |                  |                                   | PROCESSING DATA                                               |                  | Molding NR.                            | 200  | Molding machine | 900T      |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| PROCESSING DATA                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |                                                      |                        |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| Molding NR.                                                                                                                                                                                                                                                                                                                                                                                                                                 | 200              |                                                      |                        |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| Molding machine                                                                                                                                                                                                                                                                                                                                                                                                                             | 900T             |                                                      |                        |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| <h2>NOTES</h2>                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |                                                      |                        |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| <table border="1"> <tbody> <tr> <td> Samples Receivers<br/> RES.QL (LEGRENZI)<br/> RES.IL (CANTAMESSA) </td> <td> Q.ty<br/> 200<br/> 5 </td> <td> Date<br/> 15.01.2004<br/> 15.01.2004<br/> .. </td> </tr> </tbody> </table>                                                                                                                                                                                                                |                  |                                                      |                        |                                      |                  |                                   | Samples Receivers<br>RES.QL (LEGRENZI)<br>RES.IL (CANTAMESSA) | Q.ty<br>200<br>5 | Date<br>15.01.2004<br>15.01.2004<br>.. |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| Samples Receivers<br>RES.QL (LEGRENZI)<br>RES.IL (CANTAMESSA)                                                                                                                                                                                                                                                                                                                                                                               | Q.ty<br>200<br>5 | Date<br>15.01.2004<br>15.01.2004<br>..               |                        |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| <b>Check Ottimization Equipment: Positive</b>                                                                                                                                                                                                                                                                                                                                                                                               |                  |                                                      |                        |                                      |                  |                                   |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |
| Executor Signature<br><br>FONPRESS                                                                                                                                                                                                                                                                                                                                                                                                          |                  | Responsible Signature<br><br>BELLINI G.              |                        | Engineering Signature<br><br>FERRARI |                  | Production Signature<br><br>ZANGA |                                                               |                  |                                        |      |                 |           |        |        |          |      |        |        |        |         |            |   |       |        |                      |         |

## **6. REFERENCE DOCUMENTS**

- Form GW515 "Measurement report"
- Form GW537 "Sampling equipment"
- Form GW543 "Equipment Specifications"
- Annex 7 " GEWISS cartouche " instruction I504 "Supply of mold for thermoplastic materials"
- Annex 8 "BOM" instruction I504 "Supply of mold for thermoplastic materials"

## **7. ANNEX**

- Annex 1 "Mold conformity check"
- Annex 2 "Examples of compilation of measurements report"