



Tools Standard Nitator AB

Foreword

The content of this standard has been drawn up by Technology/Purchasing. It has been inspected and approved by Technology/Purchasing at Nitator. In essence, the content reflects the requirements of Nitator AB's end customers.

The tools standard is distributed internally and to Nitator AB's suppliers of tools. This standard is designed for Nitator AB and our relevant suppliers of tools in our common objective of ensuring that the manufacturing of tools takes place with minimal disruption.

The tools standard is divided into 8 parts. Each part covers the requirements and specifications, which Nitator AB applies to its suppliers of tools. The standard will be updated as necessary.

A new edition is available on Nitator's website, www.nitator.se

Holders are required to destroy previous editions and inform the staff concerned about changes.

Nitator AB archives superseded editions for 5 years in the quality department.

Note that the content of the standard is confidential.

Approved by: Nitator Hylte AB

1: Terms and conditions of purchase

Unless otherwise agreed, the following requirements are absolute:

1. Agreed delivery dates shall apply on delivery to Nitator AB.
2. The tools must be fully productive in Nitator's production machines within five working days of PPAP.
3. Internal production problems must not affect the delivery time or the quality. In the event of problems occurring, the supplier of tools must immediately present a plan for incorporation.
4. Completed timetables must be sent to Nitator AB as agreed when ordering and must be updated during the course of the project.
5. A draft of the assembly drawing for the tool must be presented no later than on receipt of the tool order. 3D-documentation to be enclosed in conjunction with the agreement.
6. Complete 3D tools documentation to be sent together with the delivery of the tools.
7. The supplier must be able to deal with and process NUFO documentation in a functional manner.
8. Nitator pays for shipment of orders unless otherwise agreed.
9. Shipping for complaints and delays must be paid entirely by the supplier of tools.
10. Nitator's order number must always be indicated on the carrier's delivery note.
11. Payment per 60 days net of 30% when ordering, 60% on delivery, 10% on approval of the tools unless otherwise agreed. Bank guarantee to be provided and paid by the supplier where the first 30% exceeds SEK 300,000.
12. Nitator checks the delivery performance of suppliers of tools.
13. The supplier of tools works in accordance with the ISO 9000 quality system.
14. The supplier of tools should work in accordance with environmental management systems, which meet the requirements of SS-EN ISO 14001 or are certified in accordance with this.

Other:

Evaluation of supplier of tools

Nitator AB evaluates suppliers on the basis of their ability to fulfil relevant requirements such as monitoring of inquiry processing, delivery precision and function of tools.

Use of subcontractors

In cases where the provider intends to use a subcontractor, this must be indicated in the inquiry and be agreed when ordering. This applies to whole tools or tool design. Nitator should be given the opportunity to evaluate and approve the chosen subcontractors.

As with regular suppliers, Nitator shall be given the opportunity to follow up the tool manufacturing.

Verification of tools from supplier

Nitator reserves the right, on agreement, to be able to validate the supplier's tools and manufacturing together with the customer.

2: Inquiry

Nitator submits an inquiry to the supplier of tools, in which drawings/NUFO, pressing line, operations etc constitute the inquiry.

The supplier must send the following documentation to Nitator for approval:
Completed preparation layout or “stripping” where also tool dimension, number of tonnes of pressing power, detailed layout, sheet-metal holder arrangement. Where necessary, sheet-metal forming simulation is also carried out in consultation with Nitator.
Information between Nitator and the supplier of tools must not be communicated to a third party.

Inspection of sketch

Inspection of sketch “stripping” is carried out at Nitator, by the supplier or by arrangement.

3: Start of production

Design follow-up prior to start of production

Nitator carries out design follow-up, in accordance with the described procedure.
Insight and involvement on the part of Nitator shall be seen as an aid for the supplier to identify and meet the demands on the tool’s function.
However, the supplier is responsible for the design and function.
Approval of the drawing documentation does not exonerate the supplier from the responsibility for the design, function and performance of the tools to which the supplier is committed in accordance with the order.

Design review

A design review must be carried out before production begins. The “tools checklist” to be used. The spare parts requirement must be assessed at this time, using the parts list. In the parts list, all positions recommended as spare parts must be marked with an X.

Casting model inspection

The casting model (styrofoam model) must be approved by Nitator. Following approval, the casting model can be manufactured.

4: Safety regulations

Manufacturers of pressing tools must observe the following safety regulations

Regulations

Pressing tools are included under production conditions in the press and line safety system and should be adapted to these.

General information

To prevent accidents, pressing tools must be constructed and equipped in accordance with the “tools checklist”. In addition, consideration should be given to the risk of crushing from lifting devices, ejectors, etc.

Check the casting before machining so that safety zones e.g. lifting lugs, comply with the requirements.

All areas where there is a risk of crushing must be provided with protective plates, thickness < 2 mm. Pneumatic cylinders, pipes, cables, position sensors and similar items must be positioned and connected so that they are easily interchangeable and must be provided with protection against external damage.

Requirements: Safety bolts must be used on stop plates.

Noise reduction

To reduce noise from shuttles, holders and suspension screws must be designed in accordance with the “tools checklist”.

From a noise point of view, cutting steel must be fitted with wave cutters, which must not deform the part.

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Ejectors and lifting devices must be fitted with sound-attenuating material on impact surfaces and designed so that they do not damage the part.

Noise reduction material around pillar sets for shaker conveyors e.g. nylon.

Lifting and stacking devices

The tools should be designed with devices for lifting and stacking in accordance with the "tools checklist".

Threaded holes for lifting lugs must be placed approximately 50-100 mm from corners, this is so that tools get the best balance, with the right thread in relation to weight, min M16.

Parts located in "wells" must have threaded holes for lifting.

Small tool parts, weighing more than 15 kg or of such a shape/position that they are difficult to handle, to be fitted with threaded lifting holes.

Manual lifting

Doors and tool parts, which, from a maintenance point of view, may be subject to manual handling when the tool is in the press, should weigh <6 kg.

5: Checking of shared tools

The supplier must check and ensure that the tool complies with Nitator standards and other relevant documentation. This must be verified by the "tools checklist"

Checking of part

For pre-series parts (100) or as agreed, the supplier must check, measure and ensure that the resulting part is in accordance with drawings and applicable documentation.

At least 5 parts must be measured against the requirement of the drawing in the appropriate checking equipment and with specified checking methods.

Reference sample

At least 5 parts must be checked and measured regarding all partial requirements that are stated in the product-defined documentation.

Monitoring equipment and test method must be controlled, function tested and approved by Nitator.

A capability study shall be carried out in accordance with Nitator's stated requirements.

The study – unless otherwise agreed, shall be carried out by measuring the detailed outcome of at least 100 parts or as agreed by the functional testing of the tool set.

Capability shall be measured at measurement and measuring points as stipulated by Nitator.

Measurements shall be carried out in a measuring machine. Nitator specifies the dimensions at the design review.

The capability factor is **1.67** and is carried out by the supplier.

6: Checking of equipment and pressing parts

Tool testing [RUN@RATE](#) (function and production testing)

- a) Nitator shall order test material well in advance before test pressings are to be started, suppliers must have the necessary equipment for a trial run. During the pressing process the supplier must check and make sure that the tools work and produce parts according to Nitator's specification. This must be verified by the "tools checklist". To assess the resulting part and the tool function requires that the tools in **one** production run produce at least 100 approved parts as per the tool supplier's drawing or as agreed.
- b) Together with the supplier, Nitator checks the tool or the tool set's function in the pressing process, whereby the following must be met:
 - Safety for operator

- Quality – that the part is within tolerance

Pressing tools

- If appropriate, all tools for the part must be set in presses simultaneously. The supplier shall consult with Nitator.
- The tools' integrated mechanisation equipment such as feed control / ejection controls etc must be in operation.
- During the test, Nitator assesses if an efficient rate of production can be achieved in accordance with the agreement.
- The impact of the trial presses on the tool function and resulting part is assessed against Nitator's production presses. Nitator may require that critical parts should be tested in presses equivalent to Nitator's production presses or on site at Nitator.
- When an approved part has been produced, a so-called process window shall be established by increasing or decreasing the sheet metal holding power by 20% and still obtaining an approved part.
- Five parts from each operation (for transfer), and a strip as well as five finished parts on belt shall be supplied with the tools to Nitator. The parts shall be labelled with a tool number, material, material class and date of manufacture.

7: Pressing tools

General information

The design and manufacture of tools shall be carried out as follows:

No special maintenance should be required for a manufacturing batch but normally only one inspection needs to be carried out at the time of production. Tools should not need to be cleaned between each production run.

Parts subject to wear shall be designed so that they are easily accessible for maintenance and repairs, e.g. screws and guide pins must be removed from the same direction and it should not be necessary to remove the plates and risers for this service

NB it is very important that all parts of a tool are screwed together from the same direction. Concealed or semi-concealed screws/control elements are not permitted. Punches and dies with a foot or footstep or head restraints shall have radius in the seat of the part for better performance.

Given the failure risk, spare parts with long lead times or a special design shall be manufactured and supplied together with the tool

In places with heavy wear, such as jointed components, the inserts must be fitted and where such places may possibly be expected, the tool must be prepared for later installation of inserts.

Radial play in stripper plates.

0.5-1 mm = Radial 0.15 mm
 1-2.5 mm = Radial 0.25 mm
 2.5-4 mm = Radial 0.30 mm
 4-8 mm = Radial 0.35 mm.

Cut-outs must comply with the Volvo standard, or as agreed.

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Max scrap size 400x400 mm.

If possible, search in scrap, not in finished part.

Support under belt for viewfinder.

Scrap ejection (e.g. Eject tool all cutting punches)

Ideally, the part should be cut loose and fall out of the follow-up tool in the direction of the feed.

Forward feed control is a requirement and where necessary, also ejector control

Nitator's tool number must be stamped on Nitator's tool plate, which is firmly mounted on the front of the upper half of the pillar set.

For moulding/bending tools, moulding tool parts must be "coated in". This is in order to avoid the possibility of air bending in tools.

Adaptation to presses

- a) Tools must be adapted to the production press as stated in the preparation layout.
Press data to be supplied by Nitator.
- b) **Holders**
Designs with gas springs (in exceptional cases coil and in consultation with Nitator).
The press's pneumatic or hydraulic holders must be used in exceptional cases or if no other options are given, this is due to long set up times.
- c) In the event of an uneven load being placed on the holder cushion, the tool must be fitted with balancing pins.

Tool dimensions

Tool dimensions for each press, in accordance with press data and standard, with the exception of minimum tool height as stated in the pressing data.

Tools must be adjusted to the minimum possible press. Max **80%** of pressing power may be utilised.

Tool fastening

See the respective tool type/pressing data.

Pneumatics/electricity etc

Pneumatic cylinders, pipes, cables, position sensors and similar items must be positioned and connected so that they are easily interchangeable and must be provided with protection against external damage.

Handling

Holes/slots in the casting for handling by forklift truck.

Lifting equipment

When designing lifting lugs, balance must be taken into account. Welded lifting lugs must be verified for strength during construction and inspected after welding.

Safety palleting

Palleting surfaces are a safety requirement in order to obtain space for safety support in the tool during testing, adjustment and repair work when the tool is set up in a press. All unloading distances for tools must be painted in red with parking position on tools during operation.

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Distance, stacking and loading and unloading elements

Controls

In principle:

- a) Steering column must be placed asymmetrically to prevent incorrect assembly.
- b) Scraper plates on own columns to be used where possible.
- c) In tools fitted with both steering column and steering block, the steering block must be (sufficiently) engaged where there is lateral force in the tool.
- d) Guide plates must be of a stable design.

Spring elements

Alt 1

Gas springs for longer spring routes and where greater force is required.

Alt 2

In exceptional cases, coil springs are used, e.g. (only brief movements, requirements for maximum compression e.g. 20% yellow)

There must be drainage holes in wells for spring elements

Stamping punches/Small punches

Must be equipped with hardened steel plate that is larger than the punch or the bending punch/die.

Shuttles

Mechanical shuttles must be used in the first instance or by agreement.

Lubrication

Controls that are not accessible for lubrication from the outside, so-called hidden controls, must be checked and lubricated during maintenance. For very difficult to dismantle controls, e.g. shuttles, the method of lubrication and lubrication connectors to be determined in consultation with Nitator.

Materials

Material recommendations must be complied with during design and manufacture.

Consideration should be given to:

- annual volume
- quality of the sheet metal
- the shape of the part
- thickness of the sheet metal

a) Metallic construction materials

Standard material e.g. FORMAX from Uddeholm or as agreed.

b) Material qualities

The following are general suggestions for choice of materials.

Forming VTG parts.

Standard materials Rigor, Calmax, Vanadis, Sleipner, Caldie, Unimax from Uddeholm or as agreed.

Surface treated tool part should be labelled, e.g. degree of roof sanding or similar.

Shaped steel and cut steel to be hardened must be designed with adequate thickness, possible cavities in the steel, in order that the right hardness can be achieved and any crack formation avoided.

This applies to both rolled and cast material.

Labelling of castings NB! The foundry specifies the weight of the tool part.

Tool Components

All standard components which are placed in the tool shall follow ISO standard, except the gas springs only Kaller and Special Springs is allowed.

Colour, signage and labelling

a) Colour

Regulations

The tools to be painted: The paint is used both as a primer and topcoat.

Note the importance of ensuring that the material is thoroughly clean before painting!

The tools should be colour-coded to indicate the importance of the tool. (see enclosed colour-code)

b) Signs

The tools must be equipped with signs as follows:

- Sign for gas spring. Only under reduced pressure.
- Sign for surface coated castings/steel tools mounted on visible surface so that no grinding or polishing may occur following the surface treatment.
- Supplier's sign as well as Nitator's sign.
- Tool weight and centre line for centre of gravity.
- Weight of the upper part of the tool.
- Centre of gravity (lengthwise) must be marked on the base and the upper part.

c) Labelling of tool parts

To facilitate disassembly of tool parts, order of removal may be indicated if necessary.

8: Final delivery PPAP

Trial run

The supplier of tools should be involved at the trial run or by arrangement.

Final delivery of manufacturing documentation

The changes that occur during the manufacturing period shall be entered in the drawings, preparation layout, detailed layout, parts list and in the CAD/CAM documentation.

The drawings should be revised with the resulting changes up to the delivery date, or by arrangement.

9: Guarantee

Tools suppliers shall provide a warranty for their tool of at least 30% of the total annual volume at full pace. Information about the annual volume comes with RFP.