Manufacturing guideline for internal and external parts and assembly production

This English translation is for information only. If the English meaning differs from the German meaning, the German meaning shall apply.

The listed manufacturing guideline is valid for:

Suppliers of individual parts and assemblies for tools, devices, welding assemblies and the like.

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Suppliers and service providers make a significant contribution to the market success of **WELSER PROFILE** and have an important role in the value chain. Compliance with high quality standards is an essential contribution to the quality of our profiles, both for internal and external parts production.

The following manufacturing guideline is to be seen as a supplement to the existing Business Partner and Supplier Code and describes the following points:

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1. General tolerances and standards

DIN ISO 2768 f	Turned, milled and eroded parts
DIN EN ISO 13920 BF	Welded construction
DIN EN ISO 9013 Tolerance class 1	= Standard case Production of sheet metal blanks by laser or water jet cutting
DIN EN ISO 9013 Tolerance class 2	= Special case, only with extra drawing note Production of sheet metal blanks by oxyfuel or plasma cutting
DIN ISO 2768-mK	Sheet metal edge part

If the drawing note "with sheet metal shears" is present, a tolerance of +/-1.0 mm applies to all outer contours.

In the previously valid drawings, ISO 2768-f was specified directly in the header for all part types mentioned. This information is therefore invalid, as only the general tolerances listed apply.

2. Part condition

Undimensioned workpiece edges according to DIN ISO 13715 (precisely noted in the header)

3. Drill holes

Fitting holes

H6 fitting holes must be eroded.

H7 Fitting holes must be reamed, spindled or produced with a solid carbide fine drill.

Fitting bores as well as various openings and cut-outs that contain shape tolerances must be produced without exception with a positional accuracy of +/- 0.02 mm without exception.

Threaded holes

General:

For through threaded holes, both sides must have a chamfer of at least thread diameter + 0.5 mm.

The hole depth or thread depth is specified for blind hole tapped holes.

Thread depth = bore depth - 5 mm.
Bore depth = thread depth + 5 mm.

If both the bore depth and the thread depth are dimensioned on the drawing, these specifications apply.

Threaded holes for hydraulic components:

Every threaded hole with a circular plane surface is subject to a position tolerance (perpendicularity). > **See DIN EN ISO 1101**

The perpendicularity deviation "t" of the bore axis to the circular plane surface must not exceed 0.1 mm.

The threaded hole must be burr-free or have a chamfer of max. 0.1 mm.

4. Surfaces

The arithmetic mean roughness value Ra is used for surface specifications.

Polished workpiece surfaces with Ra = 0.1 must be prefinished to a surface with Ra = 0.2. The polishing process takes place in internal production.

5. Punch lengths

If a punch length is specified on the drawing (standard tolerance 0/-2mm), the largest dimension must always be produced.

6. Cut edges

Dimensions on production drawings that are marked as cut edges are subject to a shape tolerance of +/-0.01 mm and must be produced with sharp edges and free of burrs.

All surfaces forming a cutting edge are subject to a roughness of Ra = 0.25

The cut edge is marked with a rectangular framed dimension. (▭)

7. Shape and position tolerances

Surfaces that have a tolerance of <= +/-0.05 mm to each other are subject to a directional tolerance (parallelism).

The parallelism deviation "t" of the surfaces may be +/-0.02 mm
> see DIN EN ISO 1101

8. Parts labeling

Marking engravings on workpieces must be made with a ball nose end mill with max. Ø2 mm and a depth of max. 0.2 mm.

9. Oil grooves

Oil grooves on workpieces must be produced with a ball nose end mill ~Ø4mm and a depth between 0.15 and 0.3mm.

10. Test dimensions

If a dimension is declared as a test dimension (Zeppelin frane ⬭), it must be tested and documented separately. > **siehe DIN 406**

11. Standard parts

The Welser company only uses trombone neck stamps of type D.

12. Strength class of screws & nuts

Screws & nuts must only be installed in the strength class specified in the production parts list!

If this strength class information is missing in individual cases, the following applies:

- for screws made of unalloyed & alloyed steels:
  install in strength class 10.9
- for nuts made of unalloyed & alloyed steels:
  install in strength class 10
- for stainless steel screws:
  install in strength class A2-50
- for stainless steel nuts:
  install in strength class A2-50

13. Metal paint

The quality/finish complies with DIN EN ISO 12944 - C3K.

Preparation of the substrate

The metal surface must be free of grease, dust, loose parts and rust.

Remove rust by mechanical removal or chemical dissolution or conversion with the aid of a rust remover or rust converter.

Also remove rolling and casting skin, scale and drawing and lubricating agents incorporated in the surface.

Also remove old coats that are not stable.

Stable, firmly adhering old coatings only needs to be roughened a little and can then be painted over.

Sand the surface using an appropriate sanding pad/fleece (e.g. 240 to 1000 grit).

Apply silicone remover or appropriate cleaning or degreasing agents.
This can be done with a brush, wipe, sponge or by spraying (e.g. Sopero Seviclean S1).

Structure of the paintwork

In principle, the following applies:

- Application thickness at least 120µm (>80 µm primer, >40 µm top coat)
- Painting, rolling and spraying permitted
- All top coats in "glossy - silk matt" finish

These requirements are achieved by using e.g:

- 2K primer -> Standofleet Industrie 2K thick-film primer
- 2K-PUR topcoat -> Standofleet 2K topcoat; Sopero 2K-Pur Plus textured coating or equivalent products.

Painting specifications:

The specific painting specifications can be found in the header of the production drawing on the right in the “Coating” cell as follows:

- **RALXXXX designation**
  e.g.: RAL6011-Reseda green
  Meaning:
  All surfaces of the component or assembly must be painted uniformly in the specified RAL color.

- **Paint finish according to CAD model**
  The specific paint finish of the component or assembly can be seen in the 3D model and may look as follows, for example:
  - There may be surfaces that remain “bare,” i.e., unpainted, and must therefore be masked off.
    and/or:
  - Individual surfaces or partial surfaces of a component or assembly may need to be painted in different RAL colors.

Regardless of the paint information listed in the “Coating” cell, the following surfaces must **never be painted:**

- External threads
- Fitting holes
- Fitting surfaces

14. Hot-dip galvanizing

The note “Hot-dip galvanizing” in the letterhead on the production drawing on the right in the “Coating” cell indicates that hot-dip galvanizing, or more precisely, piece galvanizing in accordance with DIN EN ISO 1461 – t Zn o (=hot-dip galvanizing), must be carried out for the component or assembly in question.

The abbreviation “t Zn o” stands for “hot-dip galvanizing without requirements” in relation to post-treatment (corresponds to the standard case). In this case, it is up to the hot-dip galvanizing company to decide whether and what type of post-treatment is selected.

However, if one of the following notes is found in the letterhead (= entry in the PRO_BEMERKUNG parameter), this means:

- DIN EN ISO 1461 — t Zn k:
  (means “no post-treatment permitted”)

  If hot-dip galvanized steel parts are to be coated externally at a later date (duplex systems), the galvanizing plant must be instructed not to take any measures that could negatively affect the adhesion and properties of the coatings.

- DIN EN ISO 1461 — t Zn b:
  (means “hot-dip galvanizing and coating”)

If hot-dip galvanized steel parts are to be coated subsequently by the galvanizing plant (duplex systems), the galvanizing plant must be instructed not to take any measures that could negatively affect the adhesion and properties of the coatings.

If, in individual cases, the number, position, or size of the zinc circulation openings and/or ventilation openings do not correspond to a design suitable for galvanizing, the respective designer must be consulted in any case to determine at which positions the creation of additional openings is permissible.

15. Electrogalvanizing

The wording “electrogalvanizing” in the letterhead on the production drawing on the right in the “Coating” cell indicates that electrogalvanizing in accordance with DIN EN ISO 19598 must be carried out f

16. Load handling attachments

Depending on whether the lifting accessory to be manufactured is to be used in Europe and/or in the USA, which is defined in the respective WELSER production drawing, the manufacturer of the lifting accessory must comply with the following:

Load handling attachments for use in EUROPA

The lifting accessory must be designed in accordance with DIN EN 13155. The manufacturer of the load handling attachment must supply a test log consisting of

- Operating instructions
- CE Declaration of Conformity
- At the choice of the manufacturer:
    - Strength verification via FEM (Finite Element Method) calculation documented in the inspection logbook
      OR
    - Practical initial acceptance test actually carried out and documented in the test logbook

The entire documentation must be in the following format:

- Paper form in German and English
- Digital format (PDF) in German and English

Load handling attachments for use in the USA

The lifting accessory must be designed in accordance with ASME B30.20 and ASME BTH-1. The manufacturer of the lifting accessory must supply a test log book consisting of

- Operating instructions
- At the choice of the manufacturer:
    - Strength verification via FEM (finite element method) - calculation documented in the test logbook
      OR
    - Practical initial acceptance test actually carried out and documented in the test logbook

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