

## Technical Delivery Conditions for Turning and Milling Work

According to the ASSOCIATION OF THE GERMAN TURNED PARTS INDUSTRY  
Version 3.0 – 05/2019

### 1. Scope of Application

These technical delivery conditions apply in the event of missing or unclear drawing specifications, as a supplement to the customer's drawing. In the aforementioned case, these technical delivery conditions are to be considered as a co-valid document. Drawing specifications and any additional documents provided by the customer always take precedence.

We point out that we do not assume any liability for requirements beyond these technical delivery conditions if they are not clearly communicated by the customer.

### 2. Execution

#### 2.1 Dimensional Tolerances

For dimensions without tolerance indication, **DIN ISO 2768-m** applies.  
If dimensions without tolerance indication are smaller than 0.5 mm, they will also be treated according to **DIN ISO 2768-m** (like dimensions 0.5–3 mm).

#### 2.2 Form and Positional Tolerances

According to **DIN ISO 2768-K**.  
Key surfaces, hexagons, slots, cross holes, etc. cannot be aligned to one another unless angle specifications are given.

#### 2.3 Angular Tolerances

For all angles without tolerance indication: tolerance  $\pm 2^\circ$ .  
For chamfers and edge breaks with edge lengths  $\geq 0.5$  mm: angular tolerance approx.  $\pm 5^\circ$ .  
For chamfers and radii without tolerance indication, the following length tolerances apply:

Nominal Size	Tolerance
up to 0.2 mm	$\pm 0.1$ mm
over 0.2–0.5 mm	$\pm 0.2$ mm
over 0.5–1.0 mm	$\pm 0.3$ mm
over 1.0 mm	$\pm 0.4$ mm

## 2.4 Un-dimensioned Workpiece Edges

For all non-dimensioned workpiece edges:

- External edges: 0.2 mm
- Internal edges: +0.4 mm

According to **DIN ISO 13715**.

Edge designations such as “sharp-edged burr-free”, “sharp-edged” and “burr-free” are assumed to mean  $\pm 0.05$  mm in accordance with **DIN 6784**. This means that both minimal material removal and minimal burrs are permissible.

Intersecting holes may have a burr of max. +0.1 mm. If a burr-free transition is required, the chamfer size is not defined.

## 2.5 Testing Conditions for Fits

A slight chamfering on the reject side at the beginning of a fit bore is acceptable when testing with plug gauges.

If fits become out-of-round due to workpiece instability, internal fits are checked at the smallest point and external fits at the largest point of the out-of-roundness. The specified tolerances apply to these points.

## 2.6 Threads

Execution may be cut, blasted, fluted, rolled, or whirled.

The execution of thread run-ins and run-outs depends on the manufacturing process, usually chamfered. Thread run-outs to the shoulder are normally executed according to **DIN 76 Form A**.

Thread accuracy begins only with the third turn, i.e. the reject side of limit gauges may engage in this area.

## 2.7 Milling

Milled surfaces may be executed either as plunge-milled or continuous-milled.

## 2.8 Surface Finish

### 2.8.1 General Surface Finish

Unless otherwise specified, surfaces shall have an average roughness value of **Ra 3.2** according to **DIN EN ISO 1302** and an average roughness depth of **Rz 25**, provided the measuring length is sufficient.

The obsolete roughness symbols according to **DIN 140** (“triangles”) are converted to DIN EN ISO 1302 / Series 2 / value Ra.

#### Surface Symbol Roughness

v	Ra 12.5
vv	Ra 3.2
vvv	Ra 0.8
vvvv	Ra 0.1

### 2.8.2 Surface Finish in Bores

#### Tolerance field according to DIN ISO 286-1 Roughness

Bores without ISO fit tolerances	Ra 12.5
Fits IT 11, e.g. H11	Ra 6.3
Fits IT 10, IT 9, IT 8	Ra 3.2
Fits IT 7, IT 6, IT 5	Ra 0.8

## 2.9 Burrs

Unless the drawing explicitly requires removal, turned parts may have burrs at their end faces (plan surfaces). This also applies in the case of a generally valid machining symbol in or near the title block.

The burr size is defined according to **DIN 6785**.

## 2.10 Raw Material / Supplied Material

Tolerance of the outer dimension for bar, ring, and coil material: **h11 according to DIN EN 10277**.

## 2.11 Heat Treatment / Surface Treatment

### 2.11.1 Dimensional Changes

For all dimensions, the layer thickness of the subsequently applied surface treatment must be taken into account, as well as dimensional changes due to heat treatment. Excluded are commercial stock sizes defined by the raw material, unless otherwise indicated in the drawing.

### 2.11.2 Case Hardening Depths

If grinding or reworking is required after case hardening, the case depth refers to the reworked area. In other areas, the depth will be exceeded by the respective machining allowance.

### 3. Quality Certificates

Written quality certificates are only supplied upon request.

Inspection certificates for raw materials are issued as works certificates **2.2 according to DIN EN 10204**, unless otherwise agreed.

We assume incoming **goods inspection** at the customer's premises **in accordance with § 377 of the German Commercial Code (HGB)**.