



PRODUCTION AND QUALITY STANDARDS (PQS)

PROTECH Sp. z o.o.

§ 1. General provisions

- 1.1 These Production and Quality Standards (PQS) define the tolerances on dimensions, shape and roughness of Goods by the means of § 1.2 Lit. e) General Terms and Conditions of Sale of PROTECH Sp. z o.o. from May 19, 2014 (GTS) delivered by PROTECH to the Buyer under Agreements concluded in accordance to § 2 GTS.
- 1.2 Definitions provided under § 1.2 GTS shall apply also to this PQS. Whenever these PQS provide "DIN", a relevant standard adopted by the German Institute for Standardization is meant (Deutsches Institut für Normung).
- 1.3 These PQS shall apply in case of complete or partial lack of data in Technical Documentation regarding tolerances provided under § 2 PQS or when the data provided in the Technical Documentation is unclear. Any requirements eventually included in the Technical Documentation shall supersede provisions of § 2 below accordingly.

§ 2. Tolerances

- a) Linear dimensions are acceptable in accordance with DIN ISO 2768-m. For dimensions less than 0.5 mm applies DIN ISO 2768-m as for a range of 0.5-3mm.
- b) Dimensions of shape and position are tolerated in accordance with DIN ISO 2768-K.
- c) For the chamfers and fillets without specified tolerances, the following tolerances of linear dimensions shall apply:
- for nominal dimensions up to 0.2 mm applies a tolerance of **±0,1mm**;
 - for nominal dimensions from 0,2 to 1mm applies a tolerance of **±0,2mm**;
 - for nominal dimensions above 1 mm applies a tolerance of **±0,3mm**.
- d) For angular dimensions given on a drawing without specified tolerances applies an angular dimensions tolerance of **±2°**. For chamfers and bevelled edges applies an angular dimensions tolerance of **±5°**.
- e) For all undefined edges, the following parameters shall apply:
- for outer edges **-0,2mm**;
 - for inner edges **+0,4mm**.

For edges marked as "sharp edge" or "sharp edge without burr" applies **±0.05 mm**.

- f) The shape of bores (holes) and cylindrical fragments may deviate from a circle because of the instability of the workpiece. In such a case, for bores (holes) the smallest diameter and for cylindrical fragments the largest diameter shall be taken into account. Fittings and tolerances of linear dimensions shall apply there (in case of bores (holes) to the smallest diameter and in case of cylindrical fragments to the largest diameter) respectively.



- g) The beginning of threads are usually chamfered, in order to facilitate their use. Dimensional accuracy of threads starts with the third revolution, therefore NoGo thread gauges can be screwed in to this fragment.
- h) Surfaces, for which no roughness has been provided, can have a maximum surface roughness average of **Ra 3.2** and a maximum height of roughness up to **Rz 25**. Roughness in bores (holes), for which the surface roughness was not defined in the Technical Documentation, may have following values (according to the tolerances and the fit given under DIN ISO 286-1):
 - i. for bores (holes) without a provided fitting applies a maximum average roughness of **Ra 12,5**;
 - ii. for bores (holes) manufactured with an accuracy of maximum IT11 applies a maximum average roughness of **Ra 6,3**;
 - iii. for bores (holes) manufactured with an accuracy of IT8 to IT10 applies a maximum average roughness of **Ra 3,2**;
 - iv. for bores (holes) manufactured with an accuracy of IT5 to IT7 applies a maximum average roughness of **Ra 0,8**.
- i) If the Technical Documentation does not expressly require the removal of a spigot, the rotating parts produced may have a spigot at their top surfaces. The maximum dimensions of the spigot are specified by DIN 6785.
- j) For all linear dimensions, any eventually applied coating on the details should be considered. Dimensional changes can also occur during heat treatment.
- k) For metallic materials used for the production, material certificates 2.2. as provided under DIN EN 10204 are issued. We assume that the buyer inspects delivered Goods.
- l) For all tolerances specified under lit. a) to k) methods of measurement approved in PROTECH and described in the management system compliant with the ISO 9001:2008 shall apply.

§ 3. Final provisions

These PQS were adopted by resolution of the Management Board of PROTECH No. 2 of May 19, 2014 and are valid from the date of their adoption. In case of differences between the various language versions of these PQS, the Polish language version shall prevail.