

**Geometrical product specifications (GPS) –**  
**Squares 90° -**  
**Part 2: Granite squares 90°**

## Foreword

DRAFT

## 1. Scope

This standard applies to flat squares made of natural hard stone with a square of 90° and a side length of up to 1,000 mm. It defines the main design and metrological characteristics and their testing.

## 2. Normative references

DIN 875-2:2008-01 Geometrical product specifications (GPS) – Squares 90° - Part 2: Granite squares 90°

SASO ISO 1, Geometrical Product Specification (GPS) — Reference temperature for geometrical product specification and testing.

SASO ISO 1101, Geometrical product specifications (GPS) - Geometrical tolerancing - Tolerancing of form, direction, location and run-out.

SASO ISO 14253-1, Geometrical Product Specifications (GPS) - Testing by Measurement of work pieces and measuring instrument - Part 1: Decision Rules for Conformity Assessment and Verification of Specifications.

SASO ISO 2768-1, General tolerances - Tolerances for linear and angular dimensions without individual tolerance entries.

## 3. Definitions

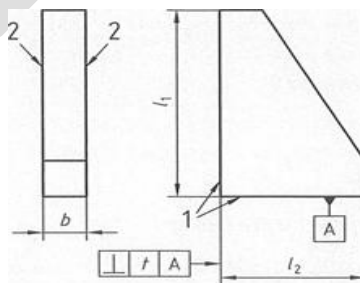
The terms defined in SASO ISO 1101 apply to the application of this document.

## 4. Dimensions, Designation

### 4.1 Dimensions

Dimensions according to picture 1 and Table 1.

The squares do not need to correspond to the pictorial representation; only the specified dimensions must be adhered to. Unspecified details should be chosen appropriately for the intended purpose.



## Legend

1. Test surface
2. Side face

**Picture 1- Squares Made of Natural Hard Stone.**

**Table 1 — Dimensions**  
**Dimensions in millimeters**

| /1    | Cross-sections for tolerance classes 000 and 00 |                     |
|-------|-------------------------------------------------|---------------------|
|       | /2                                              | <i>b</i><br>minimum |
| 300   | 200                                             | 50                  |
| 400   | 250                                             | 50                  |
| 500   | 300                                             | 70                  |
| 600   | 400                                             | 70                  |
| 800   | 500                                             | 80                  |
| 1 000 | 600                                             | 100                 |

General Tolerances: ISO 2768-c

Form and positional tolerances according to section 5.

## 4.2 Description

Designation of a 90° square made of natural hard stone (H) with side lengths  $l_1 = 300$  mm and  $l_2 = 200$  mm, tolerance class 00, according to section 5.

Angle DIN 875 - 300 x 200 - 00 – H

## 5. Requirements

### 5.1 Reference temperature

20°C according to SASO ISO 1

Relative humidity of 55%.

### 5.2 Form and Positional Tolerances

#### 5.2.1 Squareness tolerance for interior and exterior angles

For the rectangularity tolerances, the test surfaces of the short side are used as the reference plane.

The squareness tolerances of the test surfaces forming a 90° square result from the formulas in Table 2.

Table 2 — Formulas for squareness tolerance of test surfaces

| Tolerance class | Rectangularity tolerances $/_1$                          |
|-----------------|----------------------------------------------------------|
| <b>000</b>      | <b><math>1 \mu\text{m} + 5 \cdot 10^{-6} /_1</math></b>  |
| <b>00</b>       | <b><math>2 \mu\text{m} + 10 \cdot 10^{-6} /_1</math></b> |

The squareness tolerances given in Table 3 are obtained using the formulas in Table 2.

Table 3 — Rectangularity tolerances

| $/$<br><br>mm | Perpendicularity tolerance $/_1$ for<br>tolerance class |                     |
|---------------|---------------------------------------------------------|---------------------|
|               | 000<br>$\mu\text{m}$                                    | 00<br>$\mu\text{m}$ |
| <b>300</b>    | <b>2,5</b>                                              | <b>5</b>            |
| <b>400</b>    | <b>3</b>                                                | <b>6</b>            |
| <b>500</b>    | <b>3,5</b>                                              | <b>7</b>            |
| <b>600</b>    | <b>4</b>                                                | <b>8</b>            |
| <b>800</b>    | <b>5</b>                                                | <b>10</b>           |
| <b>1000</b>   | <b>6</b>                                                | <b>12</b>           |

### 5.2.2 Flatness tolerance/ $t_2$

Flatness tolerances of the test surfaces result from the formulas in Table 4.

| Tolerance class | Flatness tolerance $t_2$                      |
|-----------------|-----------------------------------------------|
| 000             | $1 \mu\text{m} + 2 \cdot 10^{-6} \cdot l_n^a$ |
| 00              | $2 \mu\text{m} + 4 \cdot 10^{-6} \cdot l_n^a$ |
| a               | $n = 1; 2.$                                   |

The flatness tolerances given in Table 5 result from the formulas in Table 4.

Table 5 — Flatness Tolerances

| /    | Flatness tolerance $t_2$ for tolerance class |                  |
|------|----------------------------------------------|------------------|
|      | 000 $\mu\text{m}$                            | 00 $\mu\text{m}$ |
| mm   |                                              |                  |
| 200  | 1                                            | 3                |
| 250  | 2                                            | 3                |
| 300  | 2                                            | 3                |
| 400  | 2                                            | 4                |
| 500  | 2                                            | 4                |
| 600  | 2                                            | 4                |
| 800  | 3                                            | 5                |
| 1000 | 3                                            | 6                |

The test surface of the short side must have a concave shape (see also section 6 "Testing").

**Note:** As the rectangularity tolerance of the side faces to the test surfaces and the flatness tolerance of the side surfaces are not specified, the angle should be placed in a lying position in such a way that it rests unambiguously, e.g. on three points.

### 5.3 trimming

A margin drop of 4 mm from the edges of the test surfaces is permissible for angles with a minimum side width of up to 60 mm, and 8 mm for angles with a minimum side width over 60 mm, including the chamfers.

### 5.4 Material

Error-free, fine-grained, and homogeneous natural hard stone of a type chosen by the manufacturer or as agreed upon.

### 5.5 Execution

The test surfaces are lapped.

## 6. Testing

### 6.1 Rectangular deviation or flatness deviation

The test surface of the short side of the angle made of natural hard stone forms the reference plane. It must have a concave shape. To carry out the test, it is placed on a test board or supported on three points. It is also permissible to calculate the reference plane according to SASO ISO 1101 with probed measuring points determined by a coordinate measuring machine.

In case the short side is placed on a test board, the flatness deviation of the test board in the considered area (partial test surface) must be less than 50% of the flatness tolerance of the test surface of the short side. The test board must also have a concave shape.

Compliance with the squareness or flatness tolerance is checked by comparison with a squareness standard or flatness standard. As normal z. B. suitable:

- Test board with cylindrical test column;
- Test board with square aligned straight line;
- The axes of a coordinate measuring machine;
- Inclinator with squareness standard.

The influences of the shape and position deviations of the test surfaces of the angle to be tested made of natural hard rock and the measuring device are due to the measuring method, e.g. B. turnover method, to be eliminated or to be included in the measurement uncertainty budget.

### 6.2 Demonstration of Conformance to Specification

SASO ISO 14253-1 applies to proof of compliance and non-compliance with the specification.

## 7. Identification

Angles made of natural hard stone that comply with this standard must be legibly and permanently marked with:

- The name or trademark of the manufacturer or distributor;
- The tolerance class.

Angles made of natural hard stone must be provided with an individual alphanumeric identification.