The Crystallographic Texture Standards

Texture analysis based on experimental pole figures registered by the X-ray diffraction techniques using both the transmission method (Decker, Asp and Harker, 1948, J.Appl. Phys., 19, 388) and the back-reflection method (Schulz, 1949, J.Appl. Phys., 20, 1033) requires appropriately prepared input data. Background of diffraction signal (non-coherent scattering), changeable penetration depth (statistics of counts etc.) and suitable correction of experimental data should be assured due to the defocusing effects. This refined dataset in a form of experimental, corrected and normalized pole figure(s) makes a basis for texture analysis. The application of suitable calculating procedures enables you to calculate the orientation distribution function (ODF). Then the complete pole figures or the inverse ones can be obtained. The verification of the experimental conditions for the measurement and correction of the rough texture data should be done on the basis of the collected data from the texture standards. The kits of texture standards are made in cooperation with "Bonet" Company.

Types of texture standards and their denotations

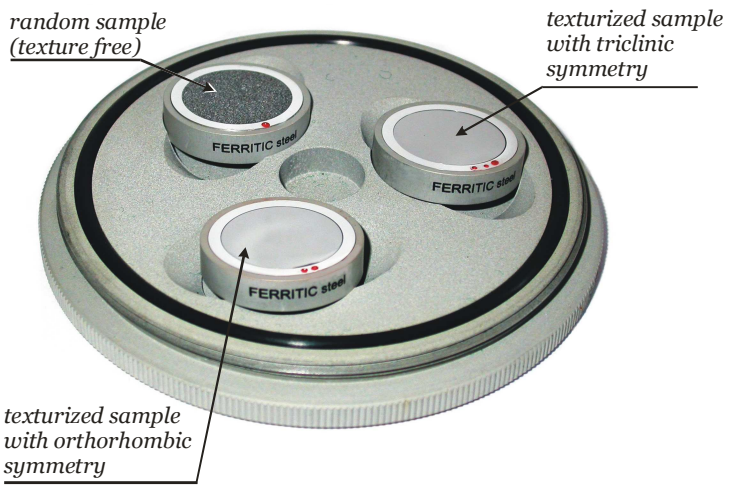
(the markers' colours are placed on the metal rings surrounding the reference samples)

Colour code	Material	Letter code
● *Blue*	AUSTENITIC stainless steel	Bonet-ASS
● *Red*	FERRITIC stainless steel	Bonet-FSS
● *orange*	COPPER alloys	Bonet-COA
● *Green*	TITANIUM (α-Ti)	Bonet-TIA
● *Black*	ALUMINIUM alloys	Bonet-ALA

The measurable areas of the reference samples (the top of the sample surface) are homogeneous from the texture point of view. They are ready for registering the diffraction effects in the back-reflection mode using the Schulz method. The recommended beam size (the largest dimension of its cross section) should not exceed the values given in the table below. That is due to the measurement technique of the back-reflection pole figures which uses tilting the sample and its rotation around the normal directions.

Range of pole figure (alpha angle)	Recommended beam size [mm]
0 ÷ 75°	5.1
0 ÷ 80°	3.4
0 ÷ 85°	1.7

The crystallographic texture of the reference samples are analyzed by our partner Accredited Testing Laboratory specialized in the field of texture analysis. The Laboratory meets the requirements of the European Norm EN ISO/IEC 17025. The application of the Integrating Method (IM) for registration and correction using a random (texture free) sample assures obtaining reliable **"device-independent"** pole figures for quantitative texture analysis. The reference samples and the attached results enable you to evaluate the correctness of the texture analysis used in your laboratory. The measurement details, the files with the data in the LaboTex format and the results of the texture analysis can be found on the attached CD and in the manual. The CD also contains the files with pole figures data received using the Peak Intensity Method (PIM). For more information see www.labosoft.com.pl or www.labotex.com.



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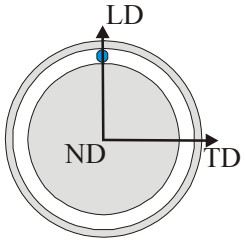
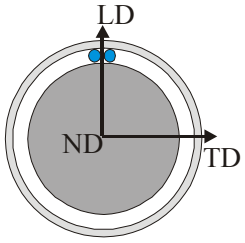
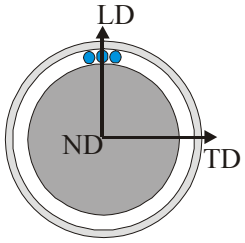
Texture Standards - Reference Samples

The imperfections of the geometrical arrangement of texture goniometer, the correctness of the beam optics set-up and the regularity of detection of the diffraction effects can be verified using our reference samples. Each set of the texture standards contains the following reference samples for analysis of crystallographic texture:

1) powdered sample: texture free - random orientation distribution;
2) massive sample: texturized with orthorhombic sample symmetry;
3) massive sample: texturized with triclinic sample symmetry.

Each set of the texture standards has its own unique serial number. The sets are shipped in hermetic containers. The samples are in a form of metal disks of 27 mm diameter and ca. 6 mm thickness. The reference samples are in a form of a circle of 20 mm diameter. Each sample is placed in a metal ring with a suitable colour marker (dots) on its co-sample surface. The markers indicate the Longitudinal Direction which together with the Transverse and Normal Direction determine the sample framework (LD, TD, ND). The sample frameworks are described in the table below. The table also contains others details using the example of the austenitic stainless steel standards.

Schematic view with ascribed framework (LD, TD, ND)	Type of marker	Description of Figures	Related Filenames (LaboTex format)*	Crystallographic Lattice	Sample Symmetry
 **powdered (texture free)**	**one dot**	**Austenite-powder**	**Austenite-powd_.epf Austenite-powd.epf Austenite-powd_.pow Austenite-powd.pow**	**cubic**	**arbitrarily chosen**
 **massive (texturized)**	**two dots**	**Austenite-ort**	**Austenite-ort_.epf Austenite-ort.epf**	**cubic**	**orthorhombic**
 **massive (texturized)**	**three dots**	**Austenite-tri**	**Austenite-tri_.epf Austenite-tri.epf**	**cubic**	**triclinic**

***) FileName_ - denotes the experimental data corresponding to the intensity of the diffraction peak (by PIM).**
FileName - denotes the experimental data corresponding to the integrated intensity of the peak profile (by IM).

In the case of the powdered reference sample the LD direction can be chosen arbitrarily during measurement and data processing procedures. That is due to the lack of any planar anisotropy. The marker on powdered samples indicates direction of mounting goniometer similarly to LD direction for massive samples.

Standard samples with a container weigh about 300 g.