Portable Diffractometers RIKOR-5(5a) of x-ray measuring complex RIKOR

They are designed for controling resilual and effective stresses at the stage of manufacture and operation of parts and structures made of fine-grain and coarse-grain steels and alloys with the curvature radius of not less than 150 mm

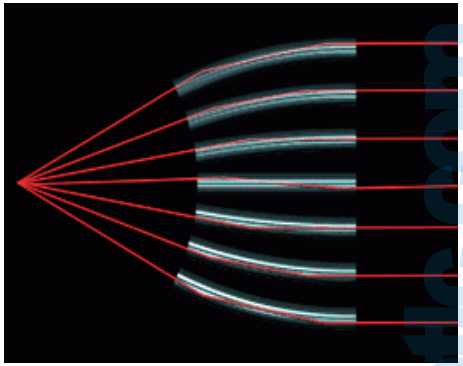
RIKOR complex is certified with the Federal Agency for Technical Regulation and Metrology (Certificate RU.C.38.002.A №23217) as measuring means type, is registered with the State Registry of Measurement Means under №31025-06, and permitted for application in the Russian Federation.

RIKOR-5 is a representative of a new generation of portable x-ray diffractometers developed by IRO specialists.

The instrument allows performing non-destructive direct stress condition control of parts and structures made of usual and macrocrystalline steels and allows, unavailable earlier for XRD analysis.

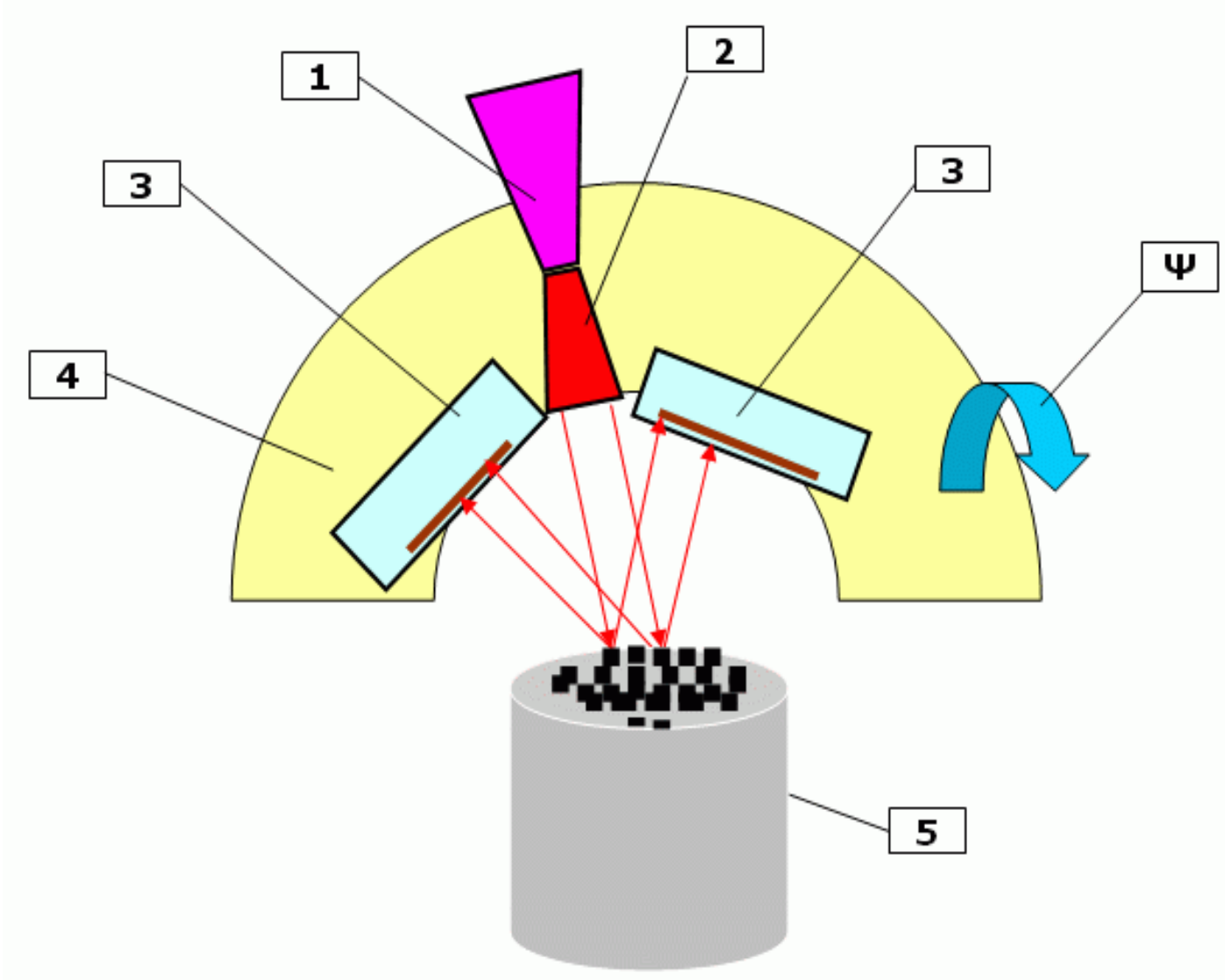
Comparison of residual stresses in samples made of usual steel, which values were received using diffractometers **RIKOR-5** and DRP-3 (divergent beam) has shown high correlation between the results.

Application of a collimation system representing a ***polycapillary half-lens with outer diameter of 15 mm*** allows creating a wide spatially-collimated beam of practically parallel x-rays (with divergence of ~10^{-3} rad.), which, compared to diffractometer RIKOR-4**,** features higher information density (larger quantity of x-ray reflexes in diffraction peak formation). Therefore, **RIKOR-5** provides **determining residual and effective stresses in parts with grain size of the order of several millimeters**, which cannot be achieved with the help of PRIKOR-4 or other portable x-ray diffractometers.



Wide parallel beam is accompanied with laser targeting beam thus enabling fast and precise positioning of the sample. Since a wide parallel beam analyzes large surface area, this **drastically improves the time and accuracy of analysis**.

Thanks to optics **the power of the x-ray source is significantly decreased**.
This also leads to drastic decrease in dimensions and weight of the whole device. **The apparatuses of RIKOR series are the most miniature stress-analyzers in the world**. These are manual portable instruments. Thanks to low power of the x-ray source, there are no problems as regards radiation safety, neither is there a necessity in the x-ray tube cooling. Because of this, the **working life of the instruments becomes much longer**.



The goniometer of the instrument consists of the arc [4], onto which one (**RIKOR-5**) or two (**RIKOR-5a**) detectors [3] are mounted, as well as the irradiator with the x-ray tube [1] and a polycapillary half-lens [2], a mechanisms tilting the arc by angle Ψ (implementation of the «$Sin^2\psi$» method), a laser system determining the focal distance, and support.

The implemented x-ray scheme and contemporary interface provide high-precision determination of stresses in material both in terms of value and in terms of directions.

BASIC TECHNICAL CHARACTERISTICS

General

Type of detector	Gas-filled, position-sensitive,
Number of detectors	RIKOR-5 – one RIKOR-5a – two
Power consumption	220V, 50-60Hz,125W

X-ray Tube

Power	10 W
Anode	Cr (Mo, Fe, Cu - options)
Focus size	0.2x2 mm
Cooling	Air

Parameters

Total instrument weight	RIKOR-5 – 14.8 kg max RIKOR-5a – 17.0 kg max
Control unit weight	RIKOR-5 – 5.8 kg RIKOR-5a – 7.0 kg
Total goniometer	9.0 kg

APPLICATION AREAS

Application of **RIKOR-5** series instruments provides the following advantages, compared to other instruments, as regards analysis of materials that have earlier been unavailable for XRD analysis without their destruction:

1. Cast Materials

- Cast Iron: beds of high-precision metal-working machines, crankcases and basic blocks of automobile, locomotive, and ship engines, cast iron separators in chemical and nuclear industry
- Aluminum Alloys: pistons and connecting rods of combustion engines
- Steel Casting Items: underframe and wheel trucks of locomotives and cars

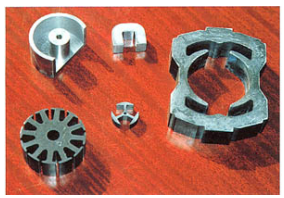
2. Cermet

- Special purpose items

3. Composite Materials

- Aluminum multi-layer construction structures
- Composite materials on the basis of polymer matrices reinforced with high-strength fibers (carbon, glass, aramide, boric, silicon-carbide)
- F1 Bolide monocoque and head cowlings of carrier rockets of new generation. Introduction into the composite fiber material of crystalline witness phases allows performing x-ray diffractometry studies on real products using the parallel beam method.

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