Type approval procedure in Russia for non-automatic weighing instruments

Rachkovskiy Alexey

Laboratory of metrological assurance of weighing instruments

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Brief history of metrology in Russia and history of VNIIMS

- 10th century: first mentions about weights and measures in Russia

- 16th century, regency of Ivan IV “The Terrible”: appeared first standards with the governmental sealing

- 18-19 centuries: New metrology laws, first depository of Russian national measures of length, mass, volume etc.

- 1893 Dmitry Mendeleev – founder of the main metrological scientific and verification organization in Sankt-Petersburg

- 1899 – First verification center opened in Moscow (further – VNIIMS)
VNIIMS activities in a field of measuring of mass

- Development of the type testing procedures for the approval tests;

- Type approval tests as well as metrological expertise of the tests, performed by other organizations;

- Verification (initial/in use) and calibration;

- Research and scientific work in special areas of measurement of mass with developing of methods of measurement, calculation of errors, recommendations about using of weighing measuring equipment;

- Organization and performing of annual conference “SCALES” for the manufacturers and users of weighing instruments as well as for metrological institutes and local (regional) metrological centers
Federal Law "On Assurance of Measurement Uniformity". Important aspects

The purposes of this Federal Law are:

1) Establishment of the legal basis for measurement uniformity assurance in the Russian Federation;

2) Protection of the rights and legitimate interests of the citizens, the public and state from negative consequences of invalid measurement results;

3) Satisfaction of the needs of citizens, the public and state in obtaining of objective, credible and consistent results of measurements when the latter are used in order to ensure protection of citizen’s life and health, preservation of the environment, fauna and flora, maintenance of defense and safety of the state, including economic safety;

4) Assistance to economic development of the Russian Federation and to scientific and technological progress.
Federal Law "On Assurance of Measurement Uniformity". Important aspects

Spheres of state regulation on assurance of measurement uniformity

- Realization of activity in the field of public health;
- Realization of veterinary activity;
- Realization of activity in the field of preservation of the environment;
- Realization of activity on safety at emergency situations;
- Performance of work aimed at maintenance of safe working conditions and insurance of labor protection;
- Realization of industrial inspection over observance of established by the legislation of the Russian Federation industrial safety requirements to the operation of dangerous industrial objects;
- Realization of trade and goods exchange operations, performance of work on prepackaging of products;
- Performance of state accounting operations;
Federal Law "On Assurance of Measurement Uniformity". Important aspects

Spheres of state regulation on assurance of measurement uniformity

- Rendering of postal services and recording of volume of telecommunication services rendered by communication operators;
- Realization of activity in the field of defense and state safety;
- Realization of geodetic and cartographical activity;
- Realization of activity in the field of hydrometeorology;
- Carrying out of bank, tax and customs operations;
- Performance of work of assessment of conformity of industrial products and products of other kinds and also other objects to obligatory requirements established by the legislation of the Russian Federation;
- Carrying out of official sports competitions, ensuring of preparation of high-class sportmen;
- Performance of commissions of court, of bodies of public prosecutors, of state executive power bodies;
- Realization of activities of the state control (supervision).
Federal Law "On Assurance of Measurement Uniformity". Important aspects

Forms of state regulation in the field of assurance of measurement uniformity:

1) Type approval of reference materials or type approval of measuring instruments;
2) Verification of measuring instruments;
3) Metrological expertise;
4) State metrological supervision;
5) Attestation of measurement procedures (methods);
6) Accreditation of legal entities and self-employed entrepreneurs to perform work and (or) render services in the field of assurance of measurement uniformity.
Type approval procedure step by step

Step 1. Manufacturer chooses testing institute and concludes the contract

Step 2. Preparing of the application form for the approval

Step 3. Performing of the tests by the chosen accredited organization

Step 4. Preparation of all necessary for the approval documents

Step 4. Metrological expertise of test results in VNIIMS

Step 5. Sending of all necessary for the approval documents to ROSSTANDART

Step 6. Issuing and signing of type approval certificate
Necessary for the approval documentation

- Operation manual
- Approval certificates, issued in accordance with OIML and/or MID requirements
- Test reports (approval reports and internal test results of the manufacturer)
- Leaflets, advertising papers and photos
- Application form
Type description of measuring instrument

- purpose of measuring instrument
- description (construction, measuring principle, modifications of the instrument, software installed)
- metrological and technical characteristics
- place for type approval sign
- delivery set
- verification procedures
- measuring methods
- regulations
Japanese companies, that already have type approval certificates for weighing instruments in Russia

"A&D Company Ltd."
"Shinko Denshi Co., Ltd."
"Shimadzu Corporation"
"TANITA Corporation"
"Teraoka Seiko Co., Ltd."
"DIGI"
"Anritsu Industrial Solutions Co., Ltd."
"Yamato Scale CO., Ltd."
"Ishida"
The new era in metrology of non-automatic (static) scales (weighing instruments) in Russia

GOST R 53228 “Non-automatic scales”

- Part 1.
  Metrological and technical requirements.
  Tests.

coming soon:
- Part 2. Test report format.
Previous regulations concerning non-automatic weighing instruments, that was in force before GOST R 53228

GOST 29329-92
Scales for static weighing. Basic technical requirements

GOST 8.453-82
Scales for static weighing. Procedures and means of verification

GOST 24104-2001
Laboratory balances. Basic technical requirements

GOST 8.520-84
Laboratory balances. Verification procedure.

GOST R 53228
“Non-automatic scales”

Part 1.
Metrological and technical requirements. Tests

Part 2.
Test report format
Maximum permissible errors, specified in new GOST R 53228-2008 in comparison with the old standards (GOST 29329-92 and GOST 24104-2001)

<table>
<thead>
<tr>
<th>Maximum permissible errors</th>
<th>For loads, m, expressed in verification scale intervals, e</th>
</tr>
</thead>
<tbody>
<tr>
<td>------------------------</td>
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<tr>
<td>Initial verification</td>
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<tr>
<td>± 1,5 e</td>
<td>± 1,5 e</td>
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</tbody>
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Note (GOST R 53223-2008): The maximum permissible errors during in use inspections (not during in-use verification) shall be twice the maximum permissible errors on initial verification.
Brief contents of GOST 53228-2008

Part 1
Main parts:
- Terminology and classification of the scales;
- Metrological and technical requirements for the different types of scales and modules;
- Requirements for marking of instruments and modules;
- Forms of metrological controls.

Important appendixes:
- Testing procedures for the scales;
- Additional testing procedures of weighing modules as modules of the scales (analog and digital load cells, indicators, etc.);
- Verification procedure for the scales

Part 2
- Test report format with the checklist and examination of the construction of the instrument procedure
Verification procedure (annex “H”)

1. Area of application
2. Safety requirements
3. Verification methods
3.1. External examination of the instrument
3.2. “Try-out”
3.3. Determination of the metrological characteristics
3.3.1. Discrimination, sensitivity, repeatability
3.3.2. Determination of the errors:
   - zero-setting device;
   - loading/unloading;
   - eccentricity;
   - tilt (for moveable scales);
   - taring device
3.4. Means of verification
3.5. Verification conditions
3.6. Performing of verification
3.7. Registration and legalization of verification results
3.8. Verification report format
Tests, that have never been performed before GOST 53228-2008 appeared

**EMC tests**
- Electrical disturbances
- AC mains voltage dips and short interruptions
- Electrical bursts
- Surges
- Electrostatic discharges
- Immunity to radiated electromagnetic fields
- Immunity to conducted radio-frequency fields
- Disturbance tests for instruments powered from a road vehicle power supply

**Damp heat test**

**Endurance test**
Special requirements for the scales, used outside (truck scales, railway scales, etc)

Load cells and junction boxes:

- Working temperature range
  from -40 °C and less
  up to +50 °C and higher

- Humidity marking ("SH", "CH", "NH")
New software requirements and appropriate checks

Devices and instruments with embedded software

Identification, securing and sealing of the legally relevant software and the legally relevant functions

Personal computers and other devices with programmable or loadable software

• Software separation into a legally relevant and a non-legally relevant parts
• Identification, securing and sealing of the legally relevant part of software
Metrological and technical characteristics that have to be specified in type description

For every model (modification) of weighing instrument:

- Maximum / Minimum capacity
- Actual scale interval (d), verification scale interval (e), number of verification scale intervals (n)
- Accuracy class
- Maximum permissible error (MPE)
- Tare range
- Working temperature range
- Power supply
- Physical dimensions and weight
- Reliability probability
Project of Technical Regulation “Non-automatic scales”


Federal Law 184 - FZ “On technical regulation“

Technical Regulation “Non-automatic scales”
(for the instruments, used in spheres of state regulation on assurance of measurement uniformity)

GOST R 53228 “Non - automatic scales”

Directive 90/384/EEC for non-automatic weighing instruments
# Overview of other regulations related to the weighing instruments and acting on territory of Russian Federation

<table>
<thead>
<tr>
<th>Name of standard</th>
<th>European analogue</th>
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<tbody>
<tr>
<td>GOST XXX “Metrological and technical requirements for load cells”</td>
<td>OIML R 60 “Metrological regulation for load cells”</td>
</tr>
<tr>
<td>GOST 10223-97 “Discontinuous filling instruments. Basic technical requirements”</td>
<td>OIML R 61 “Automatic gravimetric filling instruments”</td>
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<tr>
<td>GOST 8.523-2004 “Discontinuous filling instruments. Verification procedure”</td>
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<tr>
<td>GOST 10223-97 “Discontinuous filling instruments. Basic technical requirements”</td>
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<tr>
<td>GOST 8.005-2002 Continuous totalizing automatic weighing instruments (belt weighers). Verification procedure”</td>
<td>OIML R 50 “Continuous totalizing automatic weighing instruments (belt weighers)”</td>
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<tr>
<td>GOST 8.469-2002 “Continuous automatic filling instruments. Verification procedure”</td>
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<tr>
<td>GOST 30124-94 “Continuous scales and filling instruments. Basic technical requirements”</td>
<td>OIML R 51 “Automatic catchweighing instruments”</td>
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<tr>
<td>GOST 30414-96 “Scales for weighing vehicles in motion. Basic technical requirements”</td>
<td>OIML R 134 “Automatic instruments for weighing road vehicles in motion. Total vehicle weighing”</td>
</tr>
<tr>
<td>GOST 8.603-2003 “Scales for weighing road vehicles in motion. Verification procedure”</td>
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</tr>
<tr>
<td>GOST 8.598-2003 “Scales for weighing railway vehicles in motion. Verification procedure”</td>
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<tr>
<td>No regulation in Russia, OIML Recommendation or GOST 53228-2008 is used for approval</td>
<td>OIML R 107 “Discontinuous totalizing automatic weighing instruments (totalizing hopper weighers)”</td>
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Arigato!
Thank you for your attention!

Rachkovskiy Alexey

Laboratory of metrological assurance of weighing instruments

25th January 2011