The Russian Network for Testing of Agricultural Machinery

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Head of laboratory of the Volga State Machinery Testing Station
The Association of Test Engineers of Agricultural Machinery and Technologies of the Russian Federation (ATEAM)

FORMATION AND DEVELOPMENT OF TESTING IN RUSSIA

1907 year. Beginning of work testing stations in Russia

1948 year. Creating a system of machine-stations of the 16 stations

2013 year, June 11. 65 years anniversary
- 11 machine-zonal stations
- 970 employee

1975 year. First test of grain seeder

HISTORICAL REFERENCE
DISTRIBUTION OF TESTING STATIONS IN RUSSIA

Central Black Earth TS
Kursk city

North-Western TS
Saint-Petersburg city

Podolsk TS
Podolsk city

Vladimir TS
Vladimir city

Kirov TS
Kirov city

Volga TS
Samara city

Kuban TS
Krasnodar city

Siberian TS
Omsk city

Altai TS
Barnaul city

North-Caucasian TS
Rostov-on-Don city
VOLGA MACHINERY TESTING STATION

99 employees

STAFF

9 workers with advanced degrees
53 dipl. engineers

14 °C +20 °C

CLIMATE

250 - 500 mm rainfall
2.26 t / ha grain yield

4562.5 ha

LAND Resources

12.5 ha under buildings
4550 ha of arable land

100-120 machines

annual number of tests

Machinery for crop, livestock, electrical installations

20 km from Samara city

TERRITORY OF ACTIVITY

VOLGA Federal district
14 regions
KUBAN MACHINERY TESTING STATION

- **17 employees**
- **3 workers with advanced degrees**
  - 37.3% dipl. engineers

- **4 °C +23 °C**
- **500 – 600 mm rainfall**
- **5.18 t / ha grain yield**

- **29,1 ha**
- **29.1 ha under buildings**

- **90-100 machines**
- **Machinery for crop production, horticulture, viticulture**

**TERRITORY OF ACTIVITY**

- **NORTH-CAUCASIAN Federal district**
- **7 regions**

180 km from Krasnodar city
NORTH-CAUCASIAN MACHINERY TESTING STATION

<table>
<thead>
<tr>
<th>Staff</th>
<th>58 employees</th>
<th>3 workers with advanced degrees 41.7% dipl. engineers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate</td>
<td>7 °C +23 °C</td>
<td>400 – 650 mm rainfall 2.68 t/ha grain yield</td>
</tr>
<tr>
<td>Land Resources</td>
<td>9.15 га</td>
<td>9.15 ha under buildings</td>
</tr>
<tr>
<td>Annual number of tests</td>
<td>100-120 machines</td>
<td>Machinery for crop production, horticulture, viticulture</td>
</tr>
</tbody>
</table>

TERRITORY OF ACTIVITY

SOUTHERN Federal district
6 regions

60 km from Rostov-on-Don city
CENTRAL BLACK EARTH MACHINERY TESTING STATION

23 employees

1 worker with advanced degrees
31.8% dipl. engineers

8 °C +19 °C

470 – 640 mm rainfall
4 t /ha grain yield

291.4 га

9.4 ha under buildings
282 ha of arable land

90 machines

Machinery for plant growing, vegetable growing, animal husbandry

10 km from Kursk city

TERRITORY OF ACTIVITY

CENTRAL Federal district
17 regions
NORTH-WESTERN MACHINERY TESTING STATION

- **90 employees**
- **STAFF**: 2 workers with advanced degrees, 28% dipl. engineers
- **9 °C +17 °C**
- **CLIMATE**: 600 – 700 mm rainfall, 3 t/ha grain yield
- **4331,6 ha**
- **LAND Resources**: 5,6 ha under buildings, 4326 ha of arable land
- **90-110 machines**
- **annual number of tests**: Equipment for plant growing, cattle breeding and processing of grain

**60 km from Saint-Petersburg city**

**TERRITORY OF ACTIVITY**

NORTH-WESTERN
Federal district
10 regions
SIBERIAN MACHINERY TESTING STATION

- **56 employees**
- **STAFF**
  - 49% dipl. engineers
- **20 °C +18 °C**
- **CLIMATE**
  - 300 – 500 mm rainfall
  - 1,72 t / ha grain yield
- **9,25 ha**
- **LAND Resources**
  - 9,25 ha under buildings
- **-60 machines**
- **annual number of tests**
  - Equipment for plant growing and processing of grain

**TERRITORY OF ACTIVITY**

- **URALS and SIBERIAN**
  - Federal districts
  - 12 regions

30 km from Omsk city
ALTAI MACHINERY TESTING STATION

- **37 employees**
- **38% dipl. engineers**

- **22 °C +27 °C**
- **230 – 600 mm rainfall**
- **1,38 t / ha grain yield**

- **4697,2 ha**
- **15 ha under buildings**
- **4682 ha of arable land**

- **60 annual number of tests**
- **Equipment for plant growing and processing of grain**

200 km from Barnaul city

**TERRITORY OF ACTIVITY**

SIBERIAN and FAR EASTERN Federal district
12 regions
VLADIMIR MACHINERY TESTING STATION

STAFF
56 employees
1 workers with advanced degrees
45% dipl. engineers

CLIMATE
9 °C +19 °C
550 – 600 mm rainfall
2 t / ha grain yield

LAND Resources
3,53 ha under buildings

annual number of tests
90-110 machines
Equipment for plant growing and processing of grain

TERRITORY OF ACTIVITY
CENTRAL Federal district
12 regions

80 km from Vladimir city
KIROV MACHINERY TESTING STATION

<table>
<thead>
<tr>
<th>STAFF</th>
<th>51 employees</th>
<th>44,6% dipl. engineers</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLIMATE</td>
<td>14 °C +18 °C</td>
<td>500 – 680 mm rainfall</td>
</tr>
<tr>
<td>LAND Resources</td>
<td>210,88 ra</td>
<td>2 t / ha grain yield</td>
</tr>
<tr>
<td>Equipment for plant growing and processing of grain</td>
<td>annual number of tests</td>
<td></td>
</tr>
<tr>
<td>TERRITORY OF ACTIVITY</td>
<td>40 km from Kirov city</td>
<td>Regions of the NORTH-WEST and VOLGA Federal districts 7 regions</td>
</tr>
<tr>
<td>LAND Resources</td>
<td>6,28 ha under buildings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>204,6 ha of arable land</td>
<td></td>
</tr>
<tr>
<td>-60 machines</td>
<td>Equipment for plant growing and processing of grain</td>
<td></td>
</tr>
</tbody>
</table>
PODOLSK MACHINERY TESTING STATION

- **86 employees**
- **51,2% dipl. engineers**
- **10 °C +19 °C**
- **500 – 700 mm rainfall**
- **2,78 t /ha grain yield**
- **957,8 ha**
- **5 ha under buildings**
- **952,8 ha of arable land**
- **annual number of tests**
- **-80 machines**
- **Equipment for livestock production, electrical installation**

**5 km from Podolsk city**

**CENTRAL Federal district**

**12 regions**
Scientific Research Institute ROSINFORMAGROTECH

30 employees

23 workers with advanced degrees
61.2% dipl. engineers

10 °C +19 °C

500 – 700 mm rainfall
2.78 t /ha grain yield

2212.1 ra

19.7 ha under buildings
2190.4 ha of arable land

-20 machines

annual number of tests

Product innovations of agricultural machinery

30 km from Moscow city

ACTIVITIES

METHODOLOGIES OF TESTS;
INFORMATION AND PUBLISHING
# TYPES OF ASSESSMENTS

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
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<tr>
<td>1</td>
<td>Technical expert examination</td>
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<tr>
<td>2</td>
<td>Evaluation of design safety</td>
</tr>
<tr>
<td>3</td>
<td>Agrotechnical (zootechnical) evaluation</td>
</tr>
<tr>
<td>4</td>
<td>Energy parameters assessment</td>
</tr>
<tr>
<td>5</td>
<td>Operational and technological evaluation</td>
</tr>
<tr>
<td>6</td>
<td>Evaluation of design reliability</td>
</tr>
<tr>
<td>7</td>
<td>Evaluation power and fuel-economic properties of tractors</td>
</tr>
<tr>
<td>8</td>
<td>Evaluation of traction properties of tractors</td>
</tr>
<tr>
<td>9</td>
<td>Analysis of quality fuel and lubricants</td>
</tr>
<tr>
<td>10</td>
<td>Evaluation of economic indicators</td>
</tr>
</tbody>
</table>
TECHNICAL EXPERT EXAMINATION

1. Technical characteristic
2. Quality of manufacturing
3. Accompanying documents

Assessment of the coating quality
Load distribution measurement
Dimensional measurement
EVALUATION OF DESIGN SAFETY

- Static and dynamic stability
- Cabin and operator workplace ergonomics
- Observability and manageability
- Mounting of attached equipment
- Safety during transportation
- Design evaluation in operation environment

Evaluation of the sustainability

Evaluation of lighting devices

Operator workplace ergonomics
## AGROTECHNICAL ASSESSMENT

<table>
<thead>
<tr>
<th>Harvesters</th>
<th>Seeders</th>
<th>Tillage machine</th>
<th>Sprayers</th>
</tr>
</thead>
</table>
| -losses of grain;  
  -crushing;  
  -contamination;  
  -throughput;  
  -grinding straw | -irregularity of seeding;  
  -instability of seeding;  
  -norm;  
  -crushing;  
  -depth of seeding | -crushing of soil;  
  -depth;  
  -quality of stubble;  
  -smoothness of arable land | -norm of consumption and irregularity;  
  -drops size;  
  -density of coverage drops;  
  -concentration of the working fluid;  
  -damage to plants |
ENERGY PARAMETERS ASSESSMENT

- tractive resistance;
- consumed power;
- specific power consumption
OPERATIONAL AND TECHNOLOGICAL EVALUATION

- production rate;
- fuel consumption;
- consumption of time on operations

Instant fuel consumption.

Fuel consumption per hectare
EVALUATION OF DESIGN RELIABILITY

- mean time to failure;
- repair time;
- wear of the working elements;

Reliability is estimated in operating hours not less than:
- 100 hours for agricultural machinery;
- 1000 h for tractors.

Assessment of the wear of the working elements
ENGINE TESTS

- collecting regulatory characteristics;
- power engine;
- torque;
- specific fuel consumption

Test engine power up to 400 kW
DRAWBAR POWER AND FUEL CONSUMPTION

- maximum Drawbar Pull;
- power at the Drawbar;
- slipping;
- traction efficiency;
- range of operating speeds

Drawbar Pull up to 200 kN
FUEL AND LUBRICANTS QUALITY ANALYSIS

- Content of acids and alkalis
- Fractional composition
- Octane or cetane number
- Kinematic viscosity
- Flash point
- Coefficient of filterability
- Water content
- Density at 20 °C
- Content of mechanical impurities
ECONOMIC INDICATORS EVALUATION

• amortization;
• wage;
• repair costs;
• fuel costs;
• cost of works

Kirovetz-744R3 (287 kW)

18640 RUR/kW
1618 RUR/h

Structure of cost of technology
PRESENTATION OF THE TEST RESULTS
LEGISLATIVE AND REGULATORY FRAMEWORK

FEDERAL LAW
«ON TECHNICAL REGULATION»

International and national standards (GOST R, GOST R ISO and others)

Standards ATEAM- **160 PCs**

[Logos for international standards bodies]
AGRICULTURAL TESTING SYSTEM

Certification body

Test sample

Test sample

Manufacturer

Testing laboratory
QUALITY CONTROL OF TESTING STATIONS

Accreditation and confirmation every 2 years

Certification body

Testing laboratory
Volga TS is a base for Annual Federal Volga Agricultural exhibition. Participated more than 400 companies and more than 50 000 visitors last year.
REGULAR PUBLICATION ON THE WEBSITES

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- www.povmis.ru
- www.altmis.ru
- www.kirovmis.ru
- www.sibmis.ru
- www.kubmis.ru
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