Products & Services

July 2020
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- Well Completion Systems and Services
- Drilling Tools & Remedial Services
- Expandable System for Production Casing Leak Isolation
- Supply of Equipment
- Geophysical Equipment for Onshore Seismic Data Acquisition
NewTech Services is a dynamic company aimed to have a leading position in oilfield equipment manufacturing, high-tech engineering and management services provision to companies in the oil and gas industry.

**Company operating principles:**

- Implementation of cost-effective advanced technologies
- Research, development and manufacturing of own innovative and cost-effective high technology products for the oil and gas exploration and production industry
- Provision of high quality services
- Hiring of skilled and highly qualified personnel
- Strict compliance with the highest country-specific service quality & HSE standards
- Proper planning, excellent execution and accurate reporting
Development of NewTech Services Group

New Business Segments:
- Integrated Project Management (IPM)
- Well Completion Services
- MWD spare parts manufacturing (Partnership)
- SMS Precision Tech, Houston TX, USA
- Directional Drilling Services
- Rental of MWD Systems
- Fishing Services
- Plug & Abandonment Services
- Hole Enlargement Services
- LWD (Neutron Density & RSS) manufacturing
- Wolverine Oilfield Technology, Houston TX, USA
- Directional Drilling Services
- SunDrill International, Venezuela
- Expansion operations in USA
- New Operational Region:
- Saudi Arabia, Argentina, Oman
- New Operational Regions:
- DCS
- Drilling & Control Systems

Key Milestones:
- 2009: Positive displacement mud motors and drilling jars manufacturing (Acquisition) - Hydrobur-service, LLC
- 2011: PDC type matrix and steel-body drill bits manufacturing (Partnership) - Varek NTS, LLC
- 2012: Mud-pulse MWD systems manufacturing - Frontier MWD Systems, LLC, Houston TX, USA
- 2013: Electromagnetic: MWD systems manufacturing (Acquisition) - TekhGeoBur, LLC
- 2014: Well completion equipment manufacturing - Frontier Oil Tools, LLC
- 2015: New Operational Region: Directional Drilling Services, USA
- 2016: New Business Segment:
- Expandable Casing Services
- LWD (Resistivity) manufacturing (Acquisition)
- Remote Measurement Systems Limited, Aberdeen, UK
- Exclusive distribution of GTI seismic survey equipment in Russia & CIS (Partnership)
Operational Regions

**Locations**
- Samara
- Almetyevsk
- Perm
- Orenburg
- Usinsk
- Novy Urengoy
- Noyabrsk
- Nefteyugansk
- Nizhnevartovsk
- Tomsk
- Irkutsk
- Gubkinskiy
- Nyagan
- Anaco
- Zrenjanin
- Houston
- Midland
- Argentina
- Buenos Aires
- Saudi Arabia
- Oman
- Great Britain
- Venezuela
- Siberia
- Bulgaria
- USA
- Great Britain
- Russia
- Ukraine
- Azerbaijan
- CIS

**Regional Offices**
- Romania
- PDMs, drilling Jars
- Perm
- Well completion equipment
- Kurgan
- EM MWD system
- Mir
- MWD components
- Nizhnevartovsk
- Audrey
- Irving
- NewTech Services

**Manufacturing Facilities**
- Drill Bits
- Kurgan
- PDMs, drilling Jars
- Perm
- Well completion equipment
- Perm
- EM MWD system
- Samara
- MP MWD system
- Houston
- MWD components
- Houston
- Well completion equipment
- Houston
- LWD equipment
- Houston
- LWD equipment
- Aberdeen

**Maintenance and Service Centers**
- Perm
- Almetyevsk
- Nizhnevartovsk
- Noyabrsk
- DD operation support center
- Tyumen
- DD operational base
- Nizhnevartovsk, Samara
- Drilling Jars service center
- Noyabrsk
- DT&R operational base
- Noyabrsk
- Completion service center
- Baku, Poltava

1500 employees in NewTech Services
NewTech Services Strategic Development Goals

- Development of the high-technology oilfield service company operating across the globe (including Russia, CIS, Europe, Middle East, North and South America)

- Expanding the range of services provided by:
  - developing new technologies and oilfield equipment (organic growth)
  - buying high-tech companies and/or technologies world wide (non-organic / M&A)

- Expand Company’s oilfield equipment manufacturing capabilities

- Development of R&D competences and commercialization of R&D results by attracting the best available engineers and technicians from the USA, Russia, and other countries world-wide

- Quality control along the entire process flow from equipment production to services provision
Integrated Project Management
Effective is the service that gives to the Customer the maximum efficiency of the operational process, the most complete and reliable information about work performed and transparency of relationships with all subcontractors and suppliers of materials, equipment and services.
Personnel Certification

IWCF certificate – 62 people
Sea Survival certificate – 57 people
Randy Smith Drilling Schools - 35 people
  • Drilling Supervisor
  • Combined Sub-Sea
  • True Plus Training
  • T.R.U.E. Training and Leadership skills
SOS International – 32 people
  • Offshore Medical Certificate
Herriot Watt University – 27 people
  • Directional Drilling and surveying
  • Cementing Course
  • Casing Design
  • Drilling Practices
  • Formation evaluation
  • Fishing and Sidetrack operation
Chevron Drilling Training School – 26 people
  • Drilling Engineering Schools
Dupont Science and Technologies LLC – 4 people
  • Managing Safety Systems
Tacis EAZ – 9 people
  • Managing Contracts and Contractors
Thunderbird University – 2 people
  • Senior Leadership Program
Aberdeen Drilling School – 19 people
  • Training of couch for well supervisors
# Integrated Project Management (IPM)

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multidisciplinary team of specialists</td>
<td></td>
</tr>
<tr>
<td>Coordination of all members of the project</td>
<td></td>
</tr>
<tr>
<td>Forecast and control of costs for the Customer</td>
<td></td>
</tr>
<tr>
<td>Prospective and operational planning</td>
<td></td>
</tr>
<tr>
<td>Flexible and rapid response to change in the operation</td>
<td></td>
</tr>
<tr>
<td>Protection of reputation and financial interests of the Customer</td>
<td></td>
</tr>
<tr>
<td>Transparency, Manageability, Predictability, Adjustability during the project execution</td>
<td></td>
</tr>
</tbody>
</table>

Qualitative results achieved in the planned period of time with optimum costs
## Integrated Project Management – Scope of Work

### Preparation stage
- Preparation of technical specifications and tender documents for the selection of contractors in accordance with the requirements of the Customer
- Identification and evaluation of potential contractors for different services
- Evaluation of Bids in accordance with customer requirements for all types of services
- Preparation of contracts in accordance with current legislation
- Inspection of bases, depots, routes, driveways
- Preparation of a detailed mobilization plan for personnel, equipment and materials

### Drilling stage
- Preparation of project plan execution and monitoring of its implementation
- Risk assessment of drilling phase
- Coordination of contractors
- Cost control on all work on a daily basis
- Prompt decision making in the event of a project execution plan deviation
- Optimization of work
- Protecting the interests of the Customer (reputational and financial) in contentious situations
- Preparing accounting documentation on the customer’s request

### Final stage
- Management of well testing
- After Action Review
- Development of measures to reduce drilling risks for subsequent wells in this field based on the analysis of work performed (Lessons Learn)
- Cost-effectiveness analysis
- Preparation of the final well report
- Preparation of reports on project execution process, daily reports, administrative reports and other documents required by the Customer
Integrated Project Management – Typical Structure

- Project Manager
  - Chief Project Engineer
  - HSE Manager
    - Logistics Manager (base/office)
      - Logistics specialist
    - Drilling engineer
      - Supervisor (day)
      - Supervisor (night)
    - Geologist
    - Economist
    - Well completion engineer
      - Field well completion specialist
      - Well completion supervisor

24 hour support
<table>
<thead>
<tr>
<th>Engineering Support Services</th>
<th>Supervising Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Engineering and technology audit of the well construction project</td>
<td>Services to oversee the implementation of the Customer project assignment aimed at achieving maximum efficiency of operations during well construction, as well as:</td>
</tr>
<tr>
<td>• Development of technical specifications for well design</td>
<td>• Monitoring of compliance with regulations and standards of the Industrial Safety &amp; HSE</td>
</tr>
<tr>
<td>• Adaptation of modern technologies to specific field conditions</td>
<td>• Issuance of proposals and recommendations to optimize operations</td>
</tr>
<tr>
<td>• Develop a set of technologies to increase efficiency of drilling operations</td>
<td>• Rapid decision-making in the event of deviation from the project or regulation</td>
</tr>
<tr>
<td>• Field tests of drilling technologies and their implementation in specific fields</td>
<td>• Analysis and prevention of accidents in drilling operations</td>
</tr>
<tr>
<td>• The development of methods and activities to select well completion design and techniques of reservoir stimulation to improve the quality of obtaining reliable information about the productivity of reservoir</td>
<td>• Coordination of contractors</td>
</tr>
<tr>
<td>• Engineering support of downhole equipment operation</td>
<td>• Daily monitoring of the technical and economic data</td>
</tr>
<tr>
<td></td>
<td>• Reporting</td>
</tr>
</tbody>
</table>
Personnel Experience in Well Construction Project Management

- **2009 - 2014:** Offshore Project
- **2005 - 2009:** ВАНКОР
- **2009:** УРКХАРКОСКОЕ
- **2010, 2011:** TATNEFT
- **2009:** SPD
- **2009, Urkharovskoye:**

NewTech Services
Company Experience in Russia Offshore Projects

2009 - 2011 – engineering supervision over the complex technology services in seven wells of Yuri Korchagina field, located in the northern part of the Caspian Sea

2010 – technological support of well construction in Ukatnaya field in Caspian Sea

2011 – technological support of construction of three exploration wells in the Sea of Okhotsk (Yuzhno-Kirinskaya, Mynginskaya, Pervocherdnaya structures).

2011 – deployment of the project to drill development wells on Prirazlomnoye oil field in the Pechora Sea

2012 – preparation works for the operation of ice-resistant sixth generation semisub rigs and technological support of well construction in Kirinskoye field in the Sea of Okhotsk.

2014 – technological support of development well construction # P6 in Kirinskoye field in the Sea of Okhotsk.

2014 – technological support of well construction in Rybachiya field in Caspian Sea

2013 - 2014 – integrated management of four exploration wells construction in the Sea of Okhotsk
Drill Bits & Services
A joint venture with Varel International – **Varel NTS** has built and launched the first international PDC drill bit plant in Russia.

NewTech Services is the exclusive representative of Varel International in Russia and CIS countries.

Software is used for the design and evaluation of the bits performance.

Individual approach to each Customer and manufacture of drill bits for a given drilling conditions.

Many years of experience in optimization of drill bit selection.

Fastest feedback and production of the bit to the client’s request.

During drill bit services provision we use:

- PDC drill bits, manufactured in Kurgan, Russia
- Roller Cone drill bits, manufactured in Matamoros, Mexico
Drill Bits Manufacturing in Russia

Full production cycle of PDC drill bits plant launched in August 2012 in Kurgan, Russia.

Manufacturing capacity is 1600 bits a year.
Certificate of Registration

The American Petroleum Institute certifies that the quality management system of

VAREL NTS, LLC
26A, Build. 2, Avenue Mashinostroiteley
Kurgan, Kurgan
Russian Federation

has been assessed by the American Petroleum Institute and found to be in conformance with the following:

API Specification Q1

The scope of this registration and the approved quality management system applies to the:

Manufacture, Delivery and Repair of Drilling Bits

API approves the organization’s justification for excluding:

Design and Development

Effective Date: JUNE 13, 2020
Expiration Date: JANUARY 22, 2023
Registered Since: JUNE 13, 2014

Vice President of Global Industry Services

The Certificate of Authority to use the Official API Monogram

License Number: 7-1-1174

The American Petroleum Institute hereby grants to

VAREL NTS, LLC
26A, Build. 2, Avenue Mashinostroiteley
Kurgan, Kurgan
Russian Federation

the right to use the Official API Monogram® on manufactured products under the conditions in the official publications of the American Petroleum Institute entitled API Spec Q1® and API-7-1 and in accordance with the provisions of the License Agreement.

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The scope of this license includes the following: PDC Bits

QMS Exclusions: Design and Development

Effective Date: JUNE 13, 2020
Expiration Date: JANUARY 22, 2023

To verify the authenticity of this license, go to www.api.org/compositive.
Roller Cone and PDC Drill Bits

- **Navigator Series**
- **Diamond Edge Series**
- **Tough-Drill**
- **Bi-center bits**
- **Natural Diamond**
- **Impregnated**

- **Compass Series**
- **High Energy Series**
- **Challenger**
- **Jumbo Bits**

- 3-3/4” – 6-3/4”
- 7-1/2” – 13-3/4”
- 3-7/8” – 17-1/2”
- 20” – 36”
Premium Cutter Technology

Manufacturer of PDC cutters for our drill bits:

- US Synthetic (USA)
- International Diamond Services (USA)

Very high impact resistance,
High abrasive resistance

High impact resistance
Extreme abrasive resistance
PDC Drill Bit Modeling Process

Step 1: GeoScience Initial Analysis

Step 2: SPOT

Step 2A: Existing Bit

Step 3: Pro-Engineer CAD

Step 4: Computational Fluid Dynamics

Step 5: Pro-Engineer CAM & Bit Manufacturing

Step 6: Bit Run & GeoScience Post Run Analysis
Multistage fracturing is extensively used in Russia for well stimulation. Equipment used in multistage fracturing operations (such as frac plugs, composite plugs, etc.) is often made of hard to drill composite materials.

Varel has developed a hybrid drilling bit for fast and efficient drilling of frac plugs and composite plugs.

- patented HET™ (High Energy Tumble) tungsten carbide inserts on the outer rows
- premium DuraClad™ crowned steel teeth on the inner rows
- high-speed journal bearing
- patented conical seal gland
- high temperature high lubricity grease
- patented pressure attenuator
- advanced compensation system
- hard metal teeth are short and closely spaced to generate small cuttings and provide a robust and highly durable cutting structure
**Region:** USA, Alaskosa Country, Texas

**Objective:** to drill 1 composite bridge plug and 25 composite frac plugs

**Operating parameters:**
- Pump Rate = 7 liter/sec.
- Return Rate = 10 liter/sec.
- Circulation pressure = 259 atm.
- Wellhead pressure = 157 atm.

**Result:** drilled out 1 composite bridge plug and 25 composite frac plugs for a total time of 234 minutes

An average speed of drilling = 9 min/plug

**IADC:** 1-2-WT-G-EEE-X-ER-TD

<table>
<thead>
<tr>
<th>frac plug #</th>
<th>drilling time, min</th>
</tr>
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<tbody>
<tr>
<td>bridge plug</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
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<tr>
<td>3</td>
<td>7</td>
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<td>4</td>
<td>9</td>
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<td>5</td>
<td>11</td>
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<td>6</td>
<td>15</td>
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<td>7</td>
<td>9</td>
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<td>8</td>
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<td>20</td>
<td>6</td>
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<td>21</td>
<td>5</td>
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<td>22</td>
<td>6</td>
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<td>23</td>
<td>6</td>
</tr>
<tr>
<td>24</td>
<td>8</td>
</tr>
<tr>
<td>25</td>
<td>8</td>
</tr>
</tbody>
</table>
Downhole Motors
and Other Drilling Equipment Manufacturing
LLC “Gidrobur-service“ based in Perm, is a wholly owned subsidiary of NewTech Services Group and the manufacturer of downhole drilling equipment.
- Positive Displacement Motors (ø 2 7/8” – 9 1/2“)
- Drilling jars (ø 4 1/4“ - 9 1/2“)
- Multiple activation bypass system (ø 4 1/4“, 4 3/4“)
- Oscillator (ø 4 3/4“, 6 3/4“)
- Weight on bit tool (ø 4 3/4“)

Benefits & advantages:
- manufacture of parts on CNC machines
- several types of non-destructive testing
- quality control at all stages of production
- hydrodynamic testing equipment

Service centers in Russia:
- Almetievsk
- Nizhnevartovsk
ISO and API Certificates

CERTIFICATE

This is to certify that the Quality Management System of
Limited Liability Company "Gidroobr-service"
Legal address: 54, Gostiny Lane, 61408, Perm, Russia
Actual address: MIP 162, DIP 162, Geroe Khasana Str., 614003, Perm, Russia
has been assessed and found to be in accordance with the requirements of
ISO 9001:2015
in respect of design, development, manufacture, supply, rent and service of plant of oil and gas wells

ISO 9001:2015
Certificate number: RU-19.2544.026
Issued on: 20th December, 2019
This certificate is valid until: 20th December, 2022

Certificate of Authority to use the Official API Monogram
License Number: 7-1-1514

The American Petroleum Institute hereby grants to
HYDROBUR-SERVICE, LLC.
105/162, Geroe Khasana Street
Perm, Perm Region
Russian Federation

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The scope of this license includes the following: Oil Field Sales

OASIS Exclusions: Design and Development
Effective Date: JANUARY 27, 2020
Expiry Date: JANUARY 27, 2023

To verify the authenticity of this license, go to www.api.org/verifystatus.

NewTech Services
Hydrobur-service
NewTech Services Company
Power Sections – Downhole Drilling Motors

Manufacture of own power sections

- Ø73 mm
- Ø95 mm
- Ø106 mm
- Ø120 mm
- Ø178 mm
- Ø240 mm

- even-wall power sections
- conventional power section
Benefits of stator with even-wall design

- stator tooth is made more rigid, with improved contact seal between the stator and rotor, reduced volumetric losses in power section
  
  It resulted in 50-100% higher torque delivered by the downhole motor

- a thin layer of stator elastic coating makes rubber cooling more efficient to extend service life of both stator coating and the whole downhole motor

- a thin layer of stator elastic coating provides stable power performance of the motor regardless of bottomhole temperature

Advantages of downhole drilling motors with even-wall power section:

- length of downhole motor section is 1.5 times shorter for improved BHA control due to a shorter distance between the telemetry system and the drill bit

- stator has better bending stiffness for improved BHA control

- more rigid 'torque - RPM' load performance (i.e. as braking torque increases, shaft RPM decreases more gently), making drilling with modern PDC bits more efficient

- 1.5-2 times higher torque allows operators to use high-torque PDC bits more efficiently
### Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>HJDA-105</th>
<th>HJDA-120</th>
<th>HJDA-170</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter max, mm (inches)</td>
<td>110 (4 1/3)</td>
<td>124 (4 ¾)</td>
<td>175 (6 ¾)</td>
</tr>
<tr>
<td>length (initial position is folded), mm</td>
<td>6811</td>
<td>7000</td>
<td>8500</td>
</tr>
<tr>
<td>Inner diameter max, mm</td>
<td>50</td>
<td>56,3</td>
<td>70</td>
</tr>
<tr>
<td>Torsional yield strength, kN m</td>
<td>30</td>
<td>35</td>
<td>50</td>
</tr>
<tr>
<td>Latch load, kN</td>
<td>120...180</td>
<td>200...250</td>
<td>350...550</td>
</tr>
<tr>
<td>Working load max, kN</td>
<td>300</td>
<td>350</td>
<td>800</td>
</tr>
<tr>
<td>Tensile yield strength, kN</td>
<td>1000</td>
<td>1500</td>
<td>2000</td>
</tr>
<tr>
<td>Working stroke, mm</td>
<td>190</td>
<td>230</td>
<td>230</td>
</tr>
<tr>
<td>Total stroke, mm</td>
<td>600</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>Time delay, sec.</td>
<td>20...110</td>
<td>40...150</td>
<td>40...150</td>
</tr>
<tr>
<td>Threads (top/bottom)</td>
<td>NC 31</td>
<td>NC 38</td>
<td>NC 50</td>
</tr>
<tr>
<td>Temperature max, °C</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>Temperature max for hot holes, °C</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
</tbody>
</table>

**Drilling Jars**

- elevator sub
- splined sub
- mechanical latch
- double acting hydraulic section
Circulation sub NTD is mounted above the drilling motor and MWD system. It is designed to shut off the flow below it for technological operations: hole plugging, hole cleaning. It allows to reduce round-trip operations.

<table>
<thead>
<tr>
<th>#</th>
<th>Parameter</th>
<th>NTD-106</th>
<th>NTD-120</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Length, мм</td>
<td>3000</td>
<td>3400</td>
</tr>
<tr>
<td>2</td>
<td>Diameter, мм</td>
<td>106</td>
<td>120</td>
</tr>
<tr>
<td>3</td>
<td>Number of nozzles</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Flow rate when valve is deactivated (Flow rate to bit), liters by sec</td>
<td>12 max</td>
<td>20 max</td>
</tr>
<tr>
<td>5</td>
<td>Flow rate when valve is activated (Flow rate through nozzles), liters by sec</td>
<td>20 max</td>
<td>30 max</td>
</tr>
<tr>
<td>6</td>
<td>Pressure on top while deactivating (to push plastic ball), MPa</td>
<td>15 max</td>
<td>15 max</td>
</tr>
<tr>
<td>7</td>
<td>Differential pressure while deactivating (to push plastic ball), MPa</td>
<td>5 max</td>
<td>5 max</td>
</tr>
<tr>
<td>8</td>
<td>Number of cycles</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>Threads</td>
<td>NC-31</td>
<td>NC 50</td>
</tr>
<tr>
<td>10</td>
<td>Weight, kg</td>
<td>150</td>
<td>200</td>
</tr>
<tr>
<td>11</td>
<td>Working temperature, °C, no more</td>
<td>120</td>
<td>120</td>
</tr>
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</table>
Weight on Bit Tool

<table>
<thead>
<tr>
<th>Geometrical parameters:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>length when folded, мм, no more</td>
<td>2650</td>
</tr>
<tr>
<td>diameter, мм</td>
<td>120</td>
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</table>

<table>
<thead>
<tr>
<th>Threads:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>top</td>
<td>NC 38</td>
</tr>
<tr>
<td>bottom</td>
<td>NC 38</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Working parameters:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>total stroke , мм, no more</td>
<td>400</td>
</tr>
<tr>
<td>force, N</td>
<td>30 000</td>
</tr>
<tr>
<td>flow rate, litres/sec</td>
<td>10-20</td>
</tr>
</tbody>
</table>

Weight on bit tool is mounted above the drilling motor or MWD and designed to:
- supply the bit with force of 30 kN max
- absorb shocks
Drilling & Measurements
Within directional drilling services we perform a full range of services, including work preparation, well design and provide all the necessary drilling equipment and qualified personnel.

**Directional drilling equipment includes:**
- MWD system with hydraulic / electromagnetic telemetry channel
- Non-magnetic drill collars sizes 8”- 3 5/8”
- Universal bottom hole orientation non-magnetic subs (UBHO)
- Positive displacement downhole motors (PDM)
- Drilling Jar
- MWD surface system
- Satellite communication system ViaSat
- Auxiliary equipment (string stabilizers, lifting subs, x-overs, clamps etc.)

For each directional drilling job at least the following engineering calculations we do:
- calculation of risk of crossing the wellbore
- torque & drag analysis
- hydraulic calculation
- BHA design
- optimized design of wellbore trajectory

For well planning we use Landmark & Bursoftproekt software.
TechGeoBur Ltd., part of NewTech Services Group, is the developer and manufacturer of a downhole telemetry system with an electromagnetic communication channel (Ø178 mm, Ø203 mm).

MWD telemetry system is certified as an accurate measuring tool since year 2012.

Company has a complete product cycle of the MWD tool, including all its components:
- electric splitter
- nonmagnetic extension
- turbine generator with protective housing
- an electronic unit
- rig display monitoring system
- surface equipment
In 2012, NewTech Services launched a company specializing in the manufacturing, sale and lease of MWD telemetry systems with a hydraulic communication channel.

**Measureable parameters:**
- Inclination
- Azimuth
- Tool face
- Natural Gamma Logging (GR)
- RPMS
- Shock & Vibration
- Temperature

**Features of MWD system:**
- Uses hydraulic communication channel for data transmission
- Maximum operating temperature 175° C
- Low power consumption, 400 hrs on one battery
- No limitation for numbers of battery
- Gamma sensor is 5.5 feet close to the bit
- Used in wide spectrum of hole sizes any mud type and wide flow range
- Wireline retrievable without BHA pull out of hole
- Certified as definitive survey tools
- Continuous recording of inclination
- Maximum operating temperature: 175 °C
- Sand content in the drilling fluid: up to 1%
- Minimum and maximum critical temperature: from -40 °C to 185 °C
- Types of drilling fluids: water-based and oil-based
- Check valve: installation below telemetry system
- Wireline retrievable system.
- Drill pipe filter recommended to use during circulation.

**Orifice ID**

**Poppet OD**

**TFA inches**

**Flow Range GPM**

**Flow Range LPS**

**Pulse @ Tool Min**

**Pulse @ Tool Max**

<table>
<thead>
<tr>
<th>Orifice ID</th>
<th>Poppet OD</th>
<th>TFA inches</th>
<th>Flow Range GPM</th>
<th>Flow Range LPS</th>
<th>Pulse @ Tool Min</th>
<th>Pulse @ Tool Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.28</td>
<td>1.167</td>
<td>0.217</td>
<td>&lt;200</td>
<td>&lt;12.6</td>
<td>384</td>
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<td>1.04</td>
<td>0.437</td>
<td>300-475</td>
<td>18.9-29.93</td>
<td>345</td>
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<td>1.167</td>
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<td>18.9-31.5</td>
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<td>29.93-37.8</td>
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<td>1.167</td>
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<td>1.4</td>
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<td>0.606</td>
<td>450-650</td>
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<td>29.93-44.73</td>
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<td>39.38-51.98</td>
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<td>489</td>
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<tr>
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<td>650-1000</td>
<td>40.95-63</td>
<td>309</td>
<td>525</td>
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<tr>
<td>1.6</td>
<td>1.125</td>
<td>1.017</td>
<td>725-1050</td>
<td>45.68-66.15</td>
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<td>658</td>
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<tr>
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<td>1.086</td>
<td>1.077</td>
<td>800-1150</td>
<td>50.4-72.45</td>
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<td>673</td>
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<tr>
<td>1.6</td>
<td>1.04</td>
<td>1.161</td>
<td>850-1000</td>
<td>53.55-63</td>
<td>296</td>
<td>640</td>
</tr>
</tbody>
</table>

* 1 Гал/мин = 0.063 Л/сек
1 Л/сек = 15.85 Гал/мин
- Gamma combined with the market's most proven pulser in one module, hence less time to assemble
- Enhanced circuit protection features
- Add or remove Gamma as needed
- No capacitor bank
- Incredible reliability, even in the toughest LCM environments
- Interfaces with Legacy MWD system
- Internal current consumption logged to memory
- Quality wiring inside with strain relief connectors and high temp mesh covering for wires
- Simplified Single Coil Design
Directional Module - IDM

- On-board rotation detection
- Shock, vibration & RPM pulsed to surface in real time
- Advanced internal logging
- Operational time and environment history recorded in internal memory
- Internal current usage logged to memory
- Smart power management—efficient battery switching and logging of voltage and current
- Enhanced circuit protection
- Calibration coefficients included directly into module memory
- Quality wiring inside with strain relief connectors and high temp mesh covering for wires
- Shorter, more rugged design
- Fluxgate magnetometers
- Quartz-flexure accelerometers
Logging While Drilling Technologies (LWD)

At our manufacturing facility in Aberdeen (RMS) we have developed a Multiple Frequency Propagation Wave Resistivity Tool / MFPWR (400 kHz and 2 MHz), which includes annular pressure sensor. The product was commercialized and full production started.

Advantages:
- Versatile electronics that fits all sizes
- 4 GB of built-in memory to record the data
- Design of the antennas minimizing the damages typically seen in the existing commercially available systems

The tool has a symmetric design, receivers (two Rx) are placed in the center of the tool for real-time measurement adjustments to eliminate mud effects causing measurement delays.

At our R&D center in Houston we are developing LWD tool to measure neutron porosity and formation density.
## Operational Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td>0.2 – 2,000 Ohm-m</td>
</tr>
<tr>
<td>Accuracy</td>
<td>+/- 2% до 50 ohm-m</td>
</tr>
<tr>
<td></td>
<td>+/- 10% до 200 ohm-m</td>
</tr>
<tr>
<td>Thin-bed resolution</td>
<td>8&quot; (типовое)</td>
</tr>
<tr>
<td>Depth of investigation</td>
<td></td>
</tr>
<tr>
<td>(typical with 10 Ohm-m)</td>
<td></td>
</tr>
<tr>
<td>Phase</td>
<td>26&quot; Shallow measurement</td>
</tr>
<tr>
<td>Amplitude</td>
<td>36&quot; Shallow measurement</td>
</tr>
<tr>
<td>Phase</td>
<td>40&quot; Shallow measurement</td>
</tr>
<tr>
<td>Amplitude</td>
<td>60&quot; Shallow measurement</td>
</tr>
<tr>
<td>Amplitude</td>
<td>37&quot; Deep measurement</td>
</tr>
<tr>
<td>Phase</td>
<td>49&quot; Deep measurement</td>
</tr>
<tr>
<td>Amplitude</td>
<td>53&quot; Deep measurement</td>
</tr>
<tr>
<td>Amplitude</td>
<td>76&quot; Deep measurement</td>
</tr>
<tr>
<td>Operational temperature</td>
<td>175 degC</td>
</tr>
<tr>
<td>Critical temperature</td>
<td>200 degC</td>
</tr>
<tr>
<td>Shocks</td>
<td>1000g 0.5mS</td>
</tr>
<tr>
<td>Vibrations</td>
<td>20G RMS 30-300Hz</td>
</tr>
<tr>
<td>Internal memory</td>
<td>400 hour</td>
</tr>
<tr>
<td>Power supply</td>
<td>Lithium batteries (up to 160 hour)</td>
</tr>
</tbody>
</table>
The tool can be used in all types of drilling fluids, including OBM and salt brines. Resistivity data are transmitted in real time using hydraulic pulses or electromagnetic communication channel.
NewTech Services has purchased a geosteering resistivity tool 4 ¾” O.D., which is fully integrated with NewTech MWD system.

The geosteering resistivity tool is built on the same operating principle as the lateral logging tool. As distinct from a conventional electromagnetic wave resistivity tool, the new tool has the ability to measure directional resistivity and capture formation resistivity and boundaries data within the tool depth of investigation.

NewTech Services has successfully used the geosteering resistivity tool for drilling of several horizontal wells in Russia.

### Operational Specifications

<table>
<thead>
<tr>
<th></th>
<th>165 mm (6½&quot;)</th>
<th>120 mm (4¾&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nominal Outside Diameter</strong></td>
<td>165 mm (6½&quot;)</td>
<td></td>
</tr>
<tr>
<td><strong>Tool Makeup Length</strong></td>
<td>3.52 m (11.54 ft.)</td>
<td>3.47 m (11.34 ft.)</td>
</tr>
<tr>
<td><strong>Average Resistivity Range</strong></td>
<td></td>
<td>0.2 - 20 000 Ω-m</td>
</tr>
<tr>
<td><strong>Thin-Bed Resolution</strong></td>
<td>172 mm (6.75&quot;)</td>
<td></td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>±10 % (worst-case)</td>
<td>±1.5 % (if borehole is on-gauge)</td>
</tr>
<tr>
<td><strong>Internal Memory</strong></td>
<td>400 hour (16.7 day) log including all raw and processed resistivity, gamma, inclinometer, temperature, 3-axis shock level, and internal diagnostic data</td>
<td></td>
</tr>
</tbody>
</table>
Our company created a large and functional operational base in Nizhnevartovsk, Russia, to provide maintenance, repair and diagnostic services for telemetry systems.
Primary goals and advantages:

- Well trajectory design, engineering calculations and simulation
- Monitoring and technical support in real time (24/7)
- Full access to field acquisition computer
- Simplifying procedures for decision-making on drilling
- Creation of a common information platform for well drilling management
- Constant communication with the Customer
- Accumulation of knowledge base for drilling
Drilling & Control Systems
Capabilities

Commercial Offering:

- Semi-Automated Pressure Control System
  - MPD / ECD Management / Kick Detection
  - Well Control
- Hardware, Controls, Software, Rig Integration
- Engineering, Design, Well Planning
The goal of managed pressure drilling (MPD) is to use a closed and pressurized circulating fluid system to control the pressure profile throughout the wellbore in a way that eliminates many of the drilling and wellbore stability issues that are inherent to conventional drilling.

**HSE**
- Returns-flow-control (HSE) MPD reduces risk to personnel and the environment from drilling fluids and well control incidents.

**CBHP**
- Constant bottomhole pressure MPD reduces NPT and enables drilling when pore to frac pressure gradient window is narrow.

**PMCD**
- Pressurized mud-cap drilling MPD enables drilling in extreme loss situations.

**DG**
- Dual gradient MPD enables total well depth in the right hole size in deep wells and deep water drilling.
Installation of RCD

“Rotating Control Device” on top of Rig’s Annular

Use of a multi-leg choke manifold or Single Leg Setpoint Choke Arrangement

Used to control backpressure and ECD in the well
Common/Standard Managed Pressure Drilling System

- Rotating control device (RCD)
  - Single or dual sealing elements
  - Hydraulic power unit for oil lubrication
- Dual choke manifold
  - 2 x 4-1/16” chokes with 3” trim
  - Isolation valves
  - “Gut line”
- Flow meter manifold
  - Coriolis flow meter
  - Isolation valves
- MPD Control system
  - Position, surface pressure or downhole pressure control
  - Hydraulic power and control units
  - Data acquisition system
  - Variable frequency drives, purge systems, etc.
- Pipework and valves to tie in MPD system to rig’s circulation system
What is a Rotating Control Device / Rotating Head

- Installed above an existing Blowout Preventer (BOP) and creates an annular seal between the drill string and the stripping element.

- Permits vertical and rotational pipe movement under conditions of underbalance, overbalance or near balance well conditions.

- It permits flow to be diverted at a point below the work floor which creates a barrier between well center and personnel.
**RCD Components**

**Bowl and clamp:**
- 7 1/16” API outlet for discharge
- 2 1/16” API outlet for equalization/bleed off/wellbore monitoring
- Rotating Assembly seats inside
- Clamp secures Rotating Assembly
- HPU operates the clamp

**Bearing Assembly:**
- Passive “rubber” drill pipe elements
- Creates annular seal assisted by wellbore pressure
Commercial Systems Challenges

- Large hydraulic control systems or high cost/complexity electrical systems
- Coriolis meters weakness (upstream vs. downstream)
- Protection and redundancy equipment required (junk catchers, PRVs, isolation valves)
- Highly trained personnel required (high cost)
- Large rig ups, heavy handling and transportation equipment
- Higher rental rates
- One size fits all approach leads to oversized, over specified, complex and more expensive systems
Addressing challenges...What is **TPM3**?

- TPM3 is an application-based pressure management system
- Allows for safe management of wellbore pressure and equivalent circulating density while drilling and during connections
- System choke comes with a 3” orifice for optimal control at a range of flow rates
- Choke is driven by a linear electric actuator designed for 100% availability
- Allows to set the target choke position or surface pressure. System automatically maintains the target while ensuring safe operation with its built-in safety features
- Control module comes factory-calibrated, with no adjustments required after delivery
- Flowmeter upstream of the choke valve
Flowmeter Technology

- Commercially available (off the shelf product)
- Ideal for land applications
- Tungsten Carbide and Duplex Stainless for NACE compliance
- Paddle is out of the flow path
- Easily field-serviceable
- Insert type tool, direct replacement
- Erosion is a non-issue, as is plugging with it out of the flow path
Low OPEX, Fit-for-Purpose MPD System

- Rotating control device (RCD)
  - Single or dual sealing elements
  - Hydraulic power unit for oil lubrication

- Dual choke manifold
  - 2 x 4-1/16" chokes with 3" trim
  - Isolation valves
  - “Gut line”

- Flow meter manifold
  - Coriolis flow meter
  - Isolation valves

- MPD Control system
  - Position, surface pressure or downhole pressure control
  - Hydraulic power and control units
  - Data acquisition system
  - Variable frequency drives, purge systems, etc.

- Pipework and valves
  - Tie-in MPD system to rig’s circulation system

- Fit for purpose land RCD
  - Single or dual sealing elements
  - Sealed Bearing Assembly with no oil circulation

- Fit-for-purpose Choke System
  - 1 x 4-1/16” electric choke with 3” trim
  - Integral over-pressure protection in control system

- Integrated Flowmeter
  - Robust flowmeter with minimum risk of plugging
  - Installed Upstream choke for optimal accuracy

- Ultra-compact control panel
  - Position, surface pressure or standpipe pressure control
  - Electric actuator with onboard electronics
  - Minimum complexity

- Flowline Shutoff Valve and Right-sized hardware
Low OPEX MPD System

- MPD benefits at a much lower investment
- Operated by MPD operator or Driller
  - Local and remote operator station
- Easy operation and maintenance
  - Minimum training required
  - Easy to troubleshoot
- Quick installation
True Pressure Management System (TPM³)

Setpoint Choke System:
1. Choke with electric actuator
2. Ultra-Compact Control panel with single cable connection
3. Remote Driller’s Panel
4. Choke pressure sensor

- Optional integration into rig screens
- Optional integration with 3rd party Well Models

Benefits:
- Quick installation
- Easy operation and maintenance
- Affordable, flexible, and scalable
TPM³ Hardware Components

Field Proven Components:

• Industry leading choke designs
  • 4-1/16” 5k choke with 3” trim
  • Increased debris tolerance

• Unique electric actuator
  • Robust, ruggedized design
  • Average time to factory service > 10 years
  • Continuous duty, true modulation
  • Precise, reliable performance
  • Accurate and repeatable control
# Choke Assembly Specifications

## CHOKE SPECIFICATION:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Pressure</td>
<td>5,000 PSI</td>
</tr>
<tr>
<td>Maximum Inner Diameter (“Trim”)</td>
<td>3 in.</td>
</tr>
<tr>
<td>Connections</td>
<td>4 1/16 in. 5K API RTJ</td>
</tr>
<tr>
<td>Temp Rating</td>
<td>PU (-20 F to 250 F; -28 C to 121 C)</td>
</tr>
<tr>
<td>Material Class</td>
<td>DD-NL (other material classes available on request)</td>
</tr>
<tr>
<td>Service</td>
<td>H2S (NACE MR0175)</td>
</tr>
<tr>
<td>API Specification</td>
<td>API 6A; PSL1, PR1</td>
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</table>

## CHOKE ACTUATOR SPECIFICATION:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Stroke Time</td>
<td>13 seconds</td>
</tr>
<tr>
<td>Hazardous Area Classification</td>
<td>Class 1, Division 1</td>
</tr>
<tr>
<td>Power Requirements</td>
<td>120/240 V AC 50-60Hz, 20A</td>
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<tr>
<td>Electrical Certification</td>
<td>Group C&amp;D T4A, NEC500 4X IP66/IP68, CE Marked, ATEX</td>
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## CONTROL PANEL SPECIFICATION:

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<tbody>
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<tr>
<td>Power Requirements</td>
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<tr>
<td>Electrical Certification, components</td>
<td>CE Marked, NEC/IEC/ATEX</td>
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</tbody>
</table>
System Main Operations Modes

Manual Position mode

SBP mode
Fit-for-Purpose Automation

- **User-Friendly**
  - No field calibration required
  - Optional flow schedules with flow measurement

- **Safety and Redundancy**
  - Built-in over-pressure protection with configurable High Limit
  - Optional redundant pressure sensors with disagree alert and automatic fault-handling
<table>
<thead>
<tr>
<th>Problems:</th>
<th>Solution:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced drilling window (pore pressure vs. fracture pressure)</td>
<td>Reduce mud weight</td>
</tr>
<tr>
<td>Gas (Trip Gas, Connection Gas)</td>
<td>Use a choke to apply surface backpressure to compensate for loss of ECD</td>
</tr>
<tr>
<td>Water Flows (Pumps off events)</td>
<td>Early detection of kicks and losses enabled through MPD flow meter</td>
</tr>
<tr>
<td>Lost circulation</td>
<td>Optional influx management through MPD system according to established guidelines</td>
</tr>
<tr>
<td>Influxes</td>
<td></td>
</tr>
</tbody>
</table>
Severe to Total Loss Management

Pressurized Mud Cap Drilling:
- Drilling with losses management in vugular formations
- Catastrophic losses accompanied by reservoir fluid influx
- MPD equipment enables continued drilling
  - RCD allows for monitoring of gas migration
  - Valves allow for Bullheading as required
- Suitable for this application?
Case Study 1: Drilling Performance

- **Location:** North Louisiana, USA
- **Field:** Haynesville

**Drilling Problems:**
- ROP
- Drilling performance issues
- Tripping out of hole

**Solution and Results:**
- Install TPM3 system
- Train drilling crew to operate
- Control pressure during mud displacements
- Monitor gas levels and apply choke pressure as required
Controlling U-tubing during displacement

- Displace from water based to heavy oil based mud
- Prevent bit from spinning inside casing due to u-tubing
- Avoid casing damage and potential sidetrack
- Increase pressure as heavy OBM is displacing drill string
- Prevent over-pressurizing surface equipment
- Reduce pressure as heavy OBM is displacing annulus
Case Study 2: Improved Well Control

- **Location:** East Texas, USA
- **Field:** Haynesville
- **Drilling Problems:**
  - Shallow water kicks in intermediate section
- **Solution and Results:**
  - Install TPM3 system
  - Train drilling crew to operate
  - Maintain 100psi during drilling and 125psi during connections
  - Kick volumes reduced by 80% (from 30bbls)

**Drilling & Connections:**
- 100 psi while drilling
- 125-150 psi on connections
Case Study 3: Drilling Performance

- **Location:** West Texas, USA
- **Field:** Delaware, Permian basin
- **Drilling Problems:**
  - Gas during drilling and connections
  - Drilling Performance
  - “MPD” too expensive
- **Solution and Results:**
  - Install TPM3 system
  - Train drillers to operate
  - Reduce mud weight
  - Trap 500 – 1000psi on connections
  
  → Increased ROP and less time dealing with gas

**Installation:**
- Choke mounted on RCD 4-1/16 outlet
Case Study 4: Drilling Performance

- **Location:** West Texas, USA
- **Field:** Delaware, Permian basin
- **Drilling Problems:**
  - Water and gas flow
  - Lost circulation
  - Previous “MPD” installation unsuccessful
- **Solution and Results:**
  - Install TPM3 system
  - Train drillers to operate
  - Reduced mud weight and apply choke pressure as required
  
  → Increased ROP and less time dealing with circulating out gas
Well Completion Systems and Services
Houston based manufacturing facility “Frontier Oil Tools” was established by NewTech Services group at the beginning of 2014 to design and manufacture of well completion equipment.

The completion equipment design and engineering group of Frontier Oil Tools consists of experienced and highly qualified personnel.

Frontier Oil Tools provides full cycle of design, testing and manufacturing of the completion equipment.

As per company development strategy the following well completion equipment has been designed and commercialized:

- Liner Hangers
- Multistage fracturing system
- Production packers, Swellable packers
- Formation Protection Valve system (FPV “Defender”)

Frontier RU is a manufacturing facility of Frontier Oil Tools in Perm, Russia
Swellable Packers Manufacturing in Russia

Swellable packers manufacturing since 2018 in Russia (Frontier RU)

**Swellable packer**

- ✓ Swell in a hydrocarbon / water medium
- ✓ Sleeve type or molded on base pipe
- ✓ Ease handling
- ✓ Time to swell depends on the customer's requirements and well conditions
- ✓ Ability to rotate while running
- ✓ Metal back-up rings to protect the element
- ✓ Manufacturing of a packer element of any length depends on customer requirements
- ✓ Availability of own laboratory for the selection of elastomer
Well Completion Services

- **Open Hole Completion:**
  - ✔ Cemented and non-cemented liner hangers
  - ✔ Cement stage collar, open inflatable packers
  - ✔ Screens

- **Cased Hole Completion:**
  - ✔ Production and service packers
  - ✔ Bridge plugs
  - ✔ Circulating valves
  - ✔ Completion accessories

- **Multistage fracturing systems**
  - ✔ Conventional system with mechanical-hydraulic and swellable packers
  - ✔ Selective system

- **Системы расширяющихся труб**
  - ✔ Expandable liner system
  - ✔ Re-fracturing

- **Formation Protection Valve system (FPV “Defender”)**
Liner Hanger 114 (127) / 168 (178) mm, 178 / 245 mm

Caged Slip Liner Hanger

- Maximum differential pressure 680 atm (10000 PSI)
- Working temperature 149 °C (300 °F)
- V3 certified
- Integrated hanger and packer assembly – length 2,2 m
- Rotation capability while running the liner downhole
- Hydro cylinder with a positive stop – control maximum slip extension, preventing casing damage
- The liner top packer portion of the tool is a bonded seal design provides metal to metal seal and will not swab off the packer element at the faster liner circulation rate
- Caged slip design prevents slip and premature setting while running or rotating to bottom

Proven API 19LH V1 Technology
Zero Leakage Gas Test

MANUFACTURED IN HOUSTON (USA) & PERM (Russia)
<table>
<thead>
<tr>
<th>Liner Hanger Type</th>
<th>2-3/8&quot; (60.33)</th>
<th>2-7/8&quot; (73.03)</th>
<th>3-1/2&quot; (88.9)</th>
<th>4-1/2&quot; (114.3)</th>
<th>4-1/2&quot; (114.3)</th>
<th>5&quot; (127)</th>
<th>5&quot; (127)</th>
<th>5-1/2&quot; (139.7)</th>
<th>7&quot; (177.8)</th>
<th>7&quot; (177.8)</th>
<th>7-5/8&quot; (193.7)</th>
<th>7-5/8&quot; (193.7)</th>
<th>9-5/8&quot; (244.5)</th>
<th>9-5/8&quot; (244.5)</th>
<th>10-3/4&quot; (273.05)</th>
<th>13-3/8&quot; (339.73)</th>
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<tr>
<td>Mechanical single cone</td>
<td>+</td>
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<td>Hydraulic single cone</td>
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<td>Hydraulic dual cone</td>
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<td>+</td>
</tr>
</tbody>
</table>
Multi-Stage Fracturing System with Swellable Packers and Perforated Joint

- Stinger
- Cased Hole Packer
- Swellable Packer
- Frac Sleeve
- Guide Shoe
- Perforated Joint
Multistage Fracturing System

Multi-Satge Fracturing System with Hydraulic Packers and Circulation Sleeve

- Stinger
- Cased Hole Packer
- Hydraulic Open Hole Packer
- Circulation Sleeve
- Frac Sleeve
- Hydraulic Open Frac Sleeve
- Float Shoe w/valve
Selective MSS allows to manipulate (Open/Close) fracturing valves. Two options for selective MSS is available:

**Conventional, ball opened (dissolvable and composite) and closed with Shifting Tool run on Coil Tubing**

**Advantages**
- Ability re-fracking the well
- Ability to open/close frack sleeves multiple time
- Ability to manipulate frack sleeves by shifting tool on coil tubing without milling ball seats
- Full bore ID after milling out ball seats
- Relatively cheap option

**Disadvantages**
- Necessity milling out ball seats to provide a full bore ID
- Limited number of stages (18 max for 4-1/2” system)

**Opened and Closed with Shifting Tool run on Coil Tubing**

**Advantages**
- Ability to re-fracking the well
- Ability to open/close frack sleeves multiple time
- Full bore sleeve ID
- Unlimited number of stages

**Disadvantages**
- Increased number of coil tubing run
- Overall cost increase
Cased Hole Completions

**Packer Systems**
- Permanent production packers (hydraulic, wireline set, set on tubing with setting tool)
- Retrievable packers (mechanically set, hydraulic)
- Seal assemblies (anchor type, floating type)
- On-off tools, safety joints, telescopic joints

**Flow Control Systems**
- Sliding Sleeve (up/down to open with slickline shifting tool/hydraulic shifting tool deployed on coil tubing)
- Landing nipples, blanking plugs, check valves, instrument hangers

**Safety Systems**
- Safety valves in different designs
- Accessories (separation sleeve, hold open sleeve, exercising tool, insert)
Cased Hole Completion

Application

Hydraulic Packer System for Injection/Production well

Selectiv System for 2 Reservoir Pressure Maintenance
Problems during workover operations for the wells equipped with ESP:

Well has to be killed prior ESP retrieval which cause:

- Near wellbore area is contaminated by kill fluid
- Reduced the production rate due to the kill fluid lost to the formation
- Time required to kill the well

Solution:

Set up the barrier between formation and the wellbore by using formation protection valve (FPV “Defender”)
Formation Protection Valve - FPV “Defender”

- Tubing
- On-Off disconnect
- Opened FPV w/Slick Joint
- retrievable Packer
- Pump-Out Plug
- FPV Closed
- Check Valve
- FPV opened
Drilling Tools & Remedial Services
Break out and Make up Unit
- Making up & Breaking out Unit for BHA and tubular connections from 2 7/8” up to 12” OD
- Max. Torque up to 220,000 f/lbs

Jar Test Unit
- Test of Drilling & Fishing Jars, Drilling Motors sizes ranging from 3 1/8” O.D. up to 9 ½” O.D
- Motor Power: 15 KW. 1460 R/min
- Max Working Pressure: 25 MPa
- Length: 9 meter
- Hydraulic Cylinder Stroke: 1 meter
- Max Push Force: 150 Tons
- Max Pull Force: 130 Tons

Welding Support
- Manufacture and refurbishment of all down hole milling tools
Drilling Tools & Remedial Services

- Fishing and work over of well services
  - Complete range of Fishing equipment for all hole sizes from 4 ½” thru 42”
- Casing cutting and well abandonment equipment and services
- Milling operations
  - Casing milling and Re-drill applications and services
  - Section Milling applications and services
  - Junk Milling & Tubular Milling applications and services
  - Production Packer milling and retrieving services
- Drilling Jars Rental
  - Drilling and Fishing Jars Rental
  - Bottom Hole Placement services
- Hole Enlarging Products and Services
- New Technology Products
  - BHA analysis and drill string component optimization
  - Torque Reduction products
We are working with NEW highly reliable and quality equipment manufactured by:

Equipment Manufacturers

All equipment is certified by API and ISO
Fishing Equipment

- Overshot’s Full Strength, Semi Full Strength & Slim hole variations.
- Spears: Bowen ITCO type: from 2 ¼” thru 36”.
- Spear Pack off Tools & Spear Stop Subs.
- Reverse Circulation Junk Baskets 6” hole thru 17 ½”.
- Fishing Jars, Fishing Accelerators and Fishing Bumper Subs.
- Drilling Safety Joint’s 6” hole thru 12 ¼”.
- Wash over Pipe and all associated equipment
  i.e. Wash over Shoes, Drive Subs, lift nubbins, elevators etc.
  Wash over pipe sizes 4”, 4 1/2”, 4 ¾”, 5 ½”, 5 ¾”, 7 5/8” & 8 1/8”
Double Acting Hydraulic Drilling Jars

- Intended for use in all wells and including highly deviated or high friction wells where conditions may prevent applying sufficient force to release a mechanical latch.
- Jar allows the operator to apply variable impact in both the up and down directions.
- Standard seals suitable up to 250 °F (120 °C)
- High temperature seal kits suitable up to 400 °F (200 °C)

Available in Russia:

- 4 1/4” Drilling Jars
- 4 3/4” Drilling Jars
- 6 1/2” Drilling Jars
- 8” Drilling Jars
Fixed Diameter Hole Openers manufactured from high quality steel AISI 4145 Mod H
Size ranging from 6” thru 42” hole

- **Fixed Bladed Hole Opener**
  - unique and patented blade lock system

- **Single stage IB hole opener**
  - premium PDC cutting structure

- **Heavy Duty single stage hole opener, 42”**
  - dual cutting structure enhances stability
  - 3 openers available in Russia
NewTech Services Hydraulic Borehole Enlarger

The NewTech borehole enlarger provides a simple and reliable solution for enlarging existing wellbore or reaming-while-drilling new hole. Delivering utmost in durability regardless of the formation or operating parameters, it is suitable for all formations ranging from highly abrasive to loosely consolidated and ideal for use with rotary steerable systems, extended reach drilling and back reaming requirements. Hydraulic Borehole Enlarger consistently produces a full-gauge hole and enhances overall drilling efficiency.

Designed with an exceptional mechanical force advantage, and application – specific cutter blocks, NewTech Services Hydraulic Borehole Enlarger opens completely and consistently, delivering simple, dependable and cost-effective enlargement in a single run. With hydraulic activation, through ball drop or controlled pressure drop, cutter deployment is independent of BHA weight, formation strength and operating parameters

Advantages
- Choice between fully hydraulic activation and ball drop.
- Simple and reliable expanding/retracting mechanism.
- Long cutting blocks featuring dense cutting structures and long gauges.
- Backreaming capability.
# NewTech Services Hydraulic Borehole Enlarger

## Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>UR 051 Series</th>
<th>UR 056 Series</th>
<th>UR 082 Series</th>
<th>UR 100 Series</th>
<th>UR 115 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hole opening size, in (mm)</td>
<td>5.625 - 6.375</td>
<td>6.375-7.125</td>
<td>9.125-10.5</td>
<td>11-12 ¾</td>
<td>12.75-14.875</td>
</tr>
<tr>
<td>(142.9 - 161.9)</td>
<td>(161.9 - 181)</td>
<td>(231.8 – 266.7)</td>
<td>(279.4-323.9)</td>
<td>(323.8-377.8)</td>
<td></td>
</tr>
<tr>
<td>Body diameter (BD), in (mm)</td>
<td>5.125 (130.2)</td>
<td>5.75 (146.1)</td>
<td>8.25 (209.6)</td>
<td>10 (254)</td>
<td>11.625 (295.3)</td>
</tr>
<tr>
<td>Minimum pilot hole size, in (mm)</td>
<td>5.250 (133.4)</td>
<td>5.878 (149.2)</td>
<td>8.375 (212.7)</td>
<td>10.25 (260.3)</td>
<td>11.875 (301.6)</td>
</tr>
<tr>
<td>Standard Connections (Pin Down, Box Up)</td>
<td>3-1/2 Reg</td>
<td>3 ½ Reg</td>
<td>6 5/8 Reg</td>
<td>6 5/8 Reg</td>
<td>6 5/8 Reg</td>
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<tr>
<td>Standard Cutter Size, mm</td>
<td>10</td>
<td>10</td>
<td>13</td>
<td>16</td>
<td>16</td>
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<tr>
<td>Makeup length (ML) , inch (m)</td>
<td>61.654 (1.56)</td>
<td>96.8 (1.77)</td>
<td>84.74 (2.15)</td>
<td>96.063 (2.44)</td>
<td>107.874 (2.74)</td>
</tr>
<tr>
<td>Top sub (TL) / Bottom Sub (BL) length, inch (m)</td>
<td>8.661 (0.22) / 7.874 (0.2)</td>
<td>8.661 (0.22) / 8.661 (0.22)</td>
<td>12.6 (0.32) / 11.8 (0.3)</td>
<td>14.173 (0.36) / 11.811 (0.3)</td>
<td>14.173 (0.36) / 11.811 (0.3)</td>
</tr>
<tr>
<td>Fishing neck length (FL) , inch (m)</td>
<td>19.685 (0.5)</td>
<td>20 (0.5)</td>
<td>24.41 (0.62)</td>
<td>25.984 (0.66)</td>
<td>29.921 (0.76)</td>
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<tr>
<td>Fishing neck diameter (FD) , in (mm)</td>
<td>4.750 (120.7)</td>
<td>5.253 (133.3)</td>
<td>7.5 (190.5)</td>
<td>9 (228.6)</td>
<td>10.748 (273)</td>
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<tr>
<td>Lower neck length (LL) , inch (m)</td>
<td>18.898 (0.48)</td>
<td>20.472 (0.52)</td>
<td>23.6 (0.6)</td>
<td>27.559 (0.7)</td>
<td>27.559 (0.7)</td>
</tr>
<tr>
<td>Bore diameter (ID), inch (mm)</td>
<td>1.024 (26)</td>
<td>1.024 (26)</td>
<td>1.58 (40)</td>
<td>2.252 (57.2)</td>
<td>2.598 (66)</td>
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<tr>
<td>Activation ball size, inch (mm)</td>
<td>1.102 (28)</td>
<td>1.126 (28.6)</td>
<td>1.77 (45)</td>
<td>2.375 (60.3)</td>
<td>2.375 (60.3)</td>
</tr>
<tr>
<td>Deactivation ball size, inch (mm)</td>
<td>1.181 (30)</td>
<td>1.339 (34)</td>
<td>1.97 (50)</td>
<td>2.625 (66.7)</td>
<td>2.625 (66.7)</td>
</tr>
<tr>
<td>Tool Weight, lbs (kg)</td>
<td>267 (121)</td>
<td>380 (172)</td>
<td>893 (405)</td>
<td>1950 (886)</td>
<td>2300 (1042)</td>
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## Operating Parameters

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<tr>
<th>Parameter</th>
<th>UR 051 Series</th>
<th>UR 056 Series</th>
<th>UR 082 Series</th>
<th>UR 100 Series</th>
<th>UR 115 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum recommended flow rate, gpm (L/s)</td>
<td>420 (26)</td>
<td>500 (32)</td>
<td>760 (48)</td>
<td>1100 (70)</td>
<td>1100 (70)</td>
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<tr>
<td>Minimum recommended flow rate, gpm (L/s)</td>
<td>100 (6)</td>
<td>200 (13)</td>
<td>285 (18)</td>
<td>350 (22)</td>
<td>450 (28)</td>
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<tr>
<td>Maximum operating pressure, psi (atm)</td>
<td>3000 (204)</td>
<td>3000 (204)</td>
<td>3000 (204)</td>
<td>3000 (204)</td>
<td>3000 (204)</td>
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<tr>
<td>Minimum operating pressure, psi (atm)</td>
<td>500 (34)</td>
<td>500 (34)</td>
<td>650 (44.2)</td>
<td>800 (54)</td>
<td>800 (54)</td>
</tr>
<tr>
<td>Maximum operating temperature, °C</td>
<td>177</td>
<td>177</td>
<td>177</td>
<td>177</td>
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<tr>
<td>Recommended makeup torque kNm</td>
<td>9-12</td>
<td>9-12</td>
<td>70-77</td>
<td>70-77</td>
<td>70-77</td>
</tr>
</tbody>
</table>
**Task:** Ø 426 mm surface casing milling operation using the string mill

**Well data:**
Depth of well – 521 m.
Depth of 426 mm casing: casing shoe at 519 m; 426 mm casing head at 82,7 m;

**During milling operation the string mill manufactured by NewTech Services was used**
- Total time of 426 mm casing milling is 237,5 hours (9,9 days)
- 435,1 m of casing is milled out
- Average milling ROP is 1,83 mph (43,95 meters per day)
- Maximum milling ROP is 5,0 mph.
Expandable System for Production Casing Leak Isolation
During well production the below issues might occur:

- production casing leak
- shift of production casing
- corrosive wear and critical thinning of the wall of production casing

To remedy these issues are encourage to use the expandable system.
Expandable System Installation Sequence

1. Prepare wellbore
2. Makeup expandable system
3. Deploy expandable system to depth and drop dart
4. Create pressure to expand liner
5. Cone exits leaving cased hole lined
6. Drill out shoe
Expandable System Benefits & Advantages

- All metal to metal design allow for high temperature and “life of the well” design
- Reduction of inner diameter of 146 mm casing is 15 mm
- Length of metal patch is not limited
- Premium dope less connection for “Rig Ready” makeup
- Patch rated to 150 degC
- Maximum allowable depression on the system is -247 atm. (25 MPa)
- It is possible to remove the metal patch
Expandable System Installation in Russia

Work on the production casing leak of 146 mm OD has been successfully performed in year 2015 at 3 wells in Western Siberia:

- Well #1, length of casing leak = 64 m.
- Well #2, length of casing leak = 28 m.
- Well #3, length of casing leak = 4 m.

After installation of expandable system in the well production wireline logging were recorded, confirming the isolation of production casing leak!
Re-Fracturing Using Expandable Casing

- Retrieving ESP or other downhole equipment
- Installation of **expandable casing** to cover all initial perforation intervals
- Running of mill on coiled tubing to drill all shoes of expandable casing
- Running of 89 mm production casing with stinger, connection with liner hanger
- Performing of fracturing using “plug & perf” technique
- Running of mill on coiled tubing to drill all bridge plugs
- Pulling out of 89 mm production casing with stinger
- Descent of ESP
Supply of Equipment
Downhole Drilling Motors Supply

Downhole drilling motors **DSHOTR** are designed for drilling applications at bottom hole temperatures up to 110° C. These motors run on water or drilling fluids with density up to 1.5*103 kg/m3 with abrasive content up to 1% by weight, chloride ions up to 50 kg/m3 and hydrocarbons up to 10%.

LLC “Gidrobur-service” can supply custom-made downhole drilling motors for specific applications, including:
- rotors with protection coating for high chloride ion applications
- elastomer stators with improved hydrocarbon resistance for operating in high hydrocarbon content muds
- heat-resistant elastomer stators for operating at temperatures above 110° C

Manufacturing of downhole drilling motors in Perm, Russia by LLC “Gidrobur-service”, wholly owned subsidiary of NewTech Services Group.
Available sizes: 73 mm, 95 mm, 106 mm, 120 mm, 178 mm, 240 mm

We manufacture drilling motors on the customer order, which allows to take into account the specific technical requirement of each customer.

http://www.gidrobur-s.ru/
Double-acting jars **HJDA** are designed for running in hole as part of drill string. They remain downhole throughout drilling operations to ensure failsafe operation. Using jars is most effective in rocks or downhole conditions where drilling hazards may arise, including drill string sticking. Jars can be used for both rotary drilling and downhole motors (PDM and turbodrills).

Jars are designed for drilling at bottom hole temperatures up to 110° C on water or drilling fluids with abrasive content up to 1% by weight.

Available sizes: 105 mm, 120 mm, 170 mm.

[http://www.gidrobur-s.ru/](http://www.gidrobur-s.ru/)
Supply of MWD systems with hydraulic telemetry channel

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>Outer diameter</td>
<td>47.6 mm</td>
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<tr>
<td>Wellbore size</td>
<td>95-311 mm</td>
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<tr>
<td>Operating temperature range</td>
<td>-40 ÷ +175 °C</td>
</tr>
<tr>
<td>Operation pressure range</td>
<td>up to 1360 atm</td>
</tr>
<tr>
<td>Sand content</td>
<td>less than 1%</td>
</tr>
<tr>
<td>Telemetry channel</td>
<td>hydraulic, +</td>
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<tr>
<td>Wireline retrievable &amp; reinsertable</td>
<td>yes</td>
</tr>
<tr>
<td>Batteries resource</td>
<td>up to 800 h</td>
</tr>
<tr>
<td>Tool face accuracy, axial rotation, 10 through 90 inc.</td>
<td>±1°</td>
</tr>
<tr>
<td>Accuracy of the azimuth measurements</td>
<td>±1.2°, ±1°, ±0.5°</td>
</tr>
<tr>
<td>Accuracy of the inclination measurements</td>
<td>±0.1°</td>
</tr>
<tr>
<td>Additional parameters:</td>
<td>yes</td>
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<tr>
<td>- shocks and vibrations</td>
<td></td>
</tr>
<tr>
<td>- on-board rotation detection</td>
<td></td>
</tr>
<tr>
<td>- addition internal logging</td>
<td></td>
</tr>
</tbody>
</table>

http://www.newtechmwd.com
All components we supply are precision-engineered to the highest of standards to ensure that our customers continue to get what they have come to expect from us: high quality, consistent support, and excellent value.

http://www.smsprecisiontech.com/
We supply screens from 2' to 4' in length with thicknesses ranging from 7 to 16 gauge. We know that different situations call for different screens, so we have screens for both high-flow and slow-flow applications.

http://www.smsprecisiontech.com/drill-pipe-screens/
Geophysical Equipment for Onshore Seismic Data Acquisition
Global satellite system - GPS, Glonass, Galileo

High speed seismic data download via TransferJet™

Highly visible LED indicators

Bluetooth low energy

10 Ah Lithium-ion battery
<100mWatt power consumption

Unit and sensor status

High Precision 100ppb Clock

24bit Delta Sigma

Internal high sensitivity geophone or optional external connector

NRU-1C
NRU-1C Module Competitive Advantages

<table>
<thead>
<tr>
<th>Company</th>
<th>System name</th>
<th>Weight, kg</th>
<th>Power, mW</th>
<th>Average cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>GTI</td>
<td>NRU-1C</td>
<td>0.9</td>
<td>&lt;85</td>
<td>$$</td>
</tr>
<tr>
<td>FairfieldNodal</td>
<td>Zland 1C</td>
<td>1.8</td>
<td>150</td>
<td>$$$</td>
</tr>
<tr>
<td>Wireless Seismic</td>
<td>RT2</td>
<td>3.5</td>
<td>360</td>
<td>$$$$</td>
</tr>
<tr>
<td>Geospace Technologies</td>
<td>GSX</td>
<td>3.75</td>
<td>150</td>
<td>$$</td>
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<tr>
<td>INOVA</td>
<td>Hawk - SN11</td>
<td>3.4</td>
<td>200</td>
<td>$$$</td>
</tr>
<tr>
<td>Sercel</td>
<td>Unite</td>
<td>4.6</td>
<td>820</td>
<td>$$$$</td>
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</tbody>
</table>

- Light weight
- Lower power consumption
- Decreased man hours
- Minimal environmental footprint
- Decreased operating costs
- Low cost
NRU-1C Module Automated Deployment System

**Automator Development:**

- **Automator V2 Q2 2016:** 35 second static deployment cycle, capacity before reload 48 nodes, deployment only

- **Automator V3 Q4 2016:** 15 second static deployment cycle, capacity before reload 160 nodes, deployment only

- **Automator V4 Q4 2017:** fully dynamic deployment cycle, capacity 3000 nodes, fully automated data download and power recharge, fully dynamic retrieval cycle
Thank you for your attention!

<table>
<thead>
<tr>
<th>Contacts</th>
<th>Address in the USA</th>
<th>Address in Russia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Legal Address</strong></td>
<td><strong>Frontier International LLC</strong></td>
<td><strong>NewTech Services LLC</strong></td>
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<td></td>
<td></td>
<td>Email: <a href="mailto:nts@nt-serv.com">nts@nt-serv.com</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Email: <a href="mailto:pr@nt-serv.com">pr@nt-serv.com</a> (press center)</td>
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