**“TYPHOON” PNEUMATIC IMPACT MACHINES**

**Description**

The pneumatic percussive machines «Typhoon» are designed for driving steel pipes into ground in driving of underground pipelines and for driving rabbets, double-T beams, channel bars, etc., in particular construction works.

The percussive device reciprocates in the casing and delivers an impact to the anvil of the casing under the action of compressed air fed to the front and back chambers of the machine. The head fixed on the conical surface of the casing or anvil transfers the impact momentum to the end of the pipe being driven. The basic technical parameters are presented in the table below.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Typhoon 70</th>
<th>Typhoon 100</th>
<th>Typhoon 130</th>
<th>Typhoon 190</th>
<th>Typhoon 320</th>
<th>Typhoon 500</th>
<th>Typhoon 740</th>
<th>Typhoon 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact energy at a pressure of 0.6 MPa, J</td>
<td>700</td>
<td>1000</td>
<td>1300</td>
<td>2000</td>
<td>3000</td>
<td>4000</td>
<td>6000</td>
<td>9000</td>
</tr>
<tr>
<td>Impact frequency*, min⁻¹</td>
<td>120-230</td>
<td>120-240</td>
<td>140-200</td>
<td>100-150</td>
<td>90-130</td>
<td>60-90</td>
<td>60-90</td>
<td>50-85</td>
</tr>
<tr>
<td>Air flow rate, m³/min</td>
<td>2-4.5</td>
<td>3-6</td>
<td>4.5-7</td>
<td>5-7.5</td>
<td>7-10</td>
<td>6-10</td>
<td>9-13</td>
<td>11-18</td>
</tr>
<tr>
<td>Working pressure of air, MPa</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Weight of the percussive device, kg</td>
<td>70</td>
<td>100</td>
<td>130</td>
<td>190</td>
<td>320</td>
<td>500</td>
<td>740</td>
<td>1000</td>
</tr>
<tr>
<td>Weight of the machine, kg</td>
<td>140</td>
<td>230</td>
<td>280</td>
<td>380</td>
<td>650</td>
<td>1350</td>
<td>1750</td>
<td>2500</td>
</tr>
<tr>
<td>Machine dimensions, mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>1340</td>
<td>1150</td>
<td>1330</td>
<td>1630</td>
<td>1920</td>
<td>2000</td>
<td>2650</td>
<td>2670</td>
</tr>
<tr>
<td>Diameter</td>
<td>160</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>270</td>
<td>400</td>
<td>400</td>
<td>450</td>
</tr>
<tr>
<td>The greatest** diameter of driven pipes, mm</td>
<td>273</td>
<td>325</td>
<td>325</td>
<td>530</td>
<td>630</td>
<td>820</td>
<td>1020</td>
<td>1220</td>
</tr>
</tbody>
</table>

* The smaller value of the impact frequency corresponds to the smaller value of the air flow rate.

**Technical appraisal and economic benefits**

As compared to pneumatic punches, the machines proposed have the following advantages:
- the highest impact energy - air flow rate ratio;
- maintenance of the certificate air flow rate during the whole service life;
- reduced technological requirements for production of basic elements;
- possibility of controlling air flow rate and impact frequency at a constant impact energy;
- absence of machine frosting under winter conditions;
- easy starting.

These advantages are ensured by the original designs and enable machine operation with the minimal expenses for compressed air production.
Laying of a steel jacket 820 mm in diameter under a highway in Lithuania with the help of the “Typhoon-740” percussive machine.

**Application area**
Driving of steel pipes into ground in the horizontal direction during trenchless laying of underground pipelines, as well as driving pipes, rabbets, double-T beams, and channel bars in the vertical direction in particular construction works.

**Development stage**
Experimental production is performed at the Institute of Mining of the Siberian Branch of the Russian Academy of Sciences. The “Typhoon” pneumatic percussive machines are employed in:
- Lithuania (Vilnyus, 3 machines, since 1997),
- Ukraine (Odessa, 1 machine, since 1998),
- and in Russia:
  - Moscow (4 machines, since 1997);
  - Irkutsk (1 machine, since 1996);
  - Tobol’sk (2 machines, since 1998);
  - Nizhnevartovsk (1 machine, since 1999);
  - Novoural’sk (1 machine, since 2000);
  - Krasnoyarsk (3 machines, since 2000);
  - Naberezhnye Chelny (1 machine, since 2001);
  - Barnaul (1 machine, since 2002).
Since 1994, all machine prototypes are subjected to industrial tests in Novosibirsk.

**Patent situation**

**Commercial offers**
- Production and procurement contract;
- Joint production;
- License agreement.

**Estimated cost**
From 5000 to 50,000 USD per one machine.
Contacts
Cand.Sc. Vladimir P. Boginsky, Innovation Secretary
Institute of Mining, Siberian Branch of the Russian Academy of Sciences
54, Krasny Prospekt, Novosibirsk, 630091, Russia
Phone: (383) 217-07-68
Fax: (383) 217-06-78
E-mail: innotdel@misd.nsc.ru
http://www.misd.nsc.ru/