INSTRUCTIONS FOR THE USE OF PNEUMATIC ROCK DRILLS  
MFD90, MFD90 MAX and MFD90 MAX PLUS

READ CAREFULLY THIS MANUAL BEFORE STARTING, OPERATING, MAINTAINING OR REPAIRING PNEUMATIC ROCK DRILL.

SPECIAL ATTENTION HAS TO BE DRAWN TO THE INSTRUCTIONS FOR SAFE OPERATION AND PREVENTION OF ACCIDENTS AS SPECIFIED IN CHAPTER 2, SAFETY REGULATIONS AND PREVENTION OF ACCIDENTS.

IT IS THE RESPONSIBILITY OF THE EMPLOYER TO PLACE THE INFORMATION IN THIS MANUAL INTO THE HANDS OF THE OPERATOR.

THE FOLLOWING SIGNAL INDICATES A MAJOR HAZARD:

ALSO READ MAINTENANCE INSTRUCTIONS BEFORE STARTING, MAINTAINING OR REPAIRING PNEUMATIC DRILLS.

The term "drill" in this text refers to rock drill MFD90, MFD90 MAX and MFD90 MAX PLUS.

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Subject to change without notice!
1. Introduction and General Specification

These instructions contain 13 pages. The operator has to read them carefully and thoroughly before the first use of drills. In addition, he also has to read the Maintenance Instructions for Pneumatic Rock Drills. Drill can be used only in accordance with the instructions mentioned above. Keep the instructions in a safe and easy accessible place. They have to be within the operator’s reach at all times.

Only operators who are legally old enough, trained and properly qualified are allowed to operate the drills. The maintenance and repairs of drills can be carried out by skilled and qualified persons at properly equipped places only.

In addition to safety regulations in these instructions, it is necessary to follow all legal and other binding regulations and legal stipulations that refer to safety at work, prevention of accidents, protection of persons, life and the environment. Always follow stricter regulations.
Drill can be a source of hazard, in particular if its use and operation are not restricted to specified purposes, if it does not conform with regulations or if the drill is used by a person who is not skilled and trained for this purpose. This could represent a risk of serious injury or even death of operator or other persons. It can cause damage on objects and property.

Air hose and connections are not within the scope of delivery of drills.

2. Safety Regulations and Warnings

Apply the regulations for safe work.

Always wear approved protective clothing, safety shoes, safety goggles, safety gloves, helmets, hearing protection against noise and dustmasks. Tie up long hair and cover it under a kerchief, hairnet or head-cover.

Materials containing asbestos, flint or other substances that are hazardous to health may permanently damage the respiratory system. Therefore always wear respiratory protection while operating the drill.

Always concentrate on your work! Use common sense! Never operate the drill when you are tired, under the influence of drugs, alcohol or other substances which might affect your vision, reaction ability or judgement.

[WARNING: DANGER TO LIFE]

When operating the drills, various installations (gas, water, electric, telephone and other installations with poisonous chemicals, flammables, hot water, hot steam, etc.) can be damaged. Before starting, the drills operator has to obtain accurate information on the location of installations. A damaged installation can represent danger to life. It can lead to electric shock, explosion, poisoning and burns. The drills are not insulated against electric shock.

Before starting the operation, take all safety precautions. Secure the working area to prevent flying parts or accessories damage persons or things. Prevent endangering of persons at all times.

Increased working pressure (air) increases the noise level and vibrations of drills. This is harmful to health. Make sure that pressure does not exceed the values specified in these instructions.
Make sure that compressed air supply hose is properly connected to the drill. A loose hose can come completely off the drill and while whipping under pressure, it can injure the operator and others in the area. Make sure that compressed air supply hoses and their connections are in perfect condition and are not damaged. Be sure that all compressed air connections are tight. Attach safety cables to all hoses to prevent injury in case a hose is accidentally broken. To avoid the hazard of damage, never use compressed air to blow clothes free of dust. Never disconnect a pressurized hose. Always turn off the the air supply and bleed the drill by turning the operating lever.

Until the drill has been properly prepared for boring, the drill should be disconnected.

Before starting the drill, make sure that drill steels are properly inserted and that the drill steel retainer is in the locked position. Keep body stance balanced and firm in a safe position. Only then you can switch on the drill. Keep hands and fingers away from the trigger before all this is done. While in operation, a drill steel can break. Therefore keep your limbs and body clear of the drill steel to prevent serious injuries.

Keep the drill steel aligned with the hole. Misalignment causes severe strain and rod breakages.

Keep a uniform, constant medium pressure on the bit. Avoid hard and inadequate feed pressure.

Do not use damaged and bent drill rods, as this leads to rockdrill damage and can cause injury.

Do not drill with a worn out chuck insert, as this causes breakage of the drill steels.

Keep hands away from drill steels when operating the drill. Vibrations are much stronger on drill steels which makes them more harmful. Drill steel breaking or sudden changes in drill position may result in injuring fingers, wrists or the whole arm.

Strong vibration produced while drill is in operation is transmitted into the wrists, joints, arms and the body. This can gradually damage the operator's arms. Therefore wear protective damping gloves. As soon as you feel discomfort, tingling or pain in your arms or hands, stop using the drill. Seek medical advice before resuming use. The use of antivibration gloves is recommended.

While drilling above your head, be careful that loose material in the borehole and its surroundings does not fall on you. If possible, drill under angle. Take a safe position aside the drill.

Keep your face away from drill or drill leg during operation.

If drill gets in contact with unexpected or unknown object while in operation, switch off the drill immediately. Only after you have ascertained that there is no danger, you can resume drilling.

Do not point the drill or drill steel at yourself or other people. Do not rest it on your foot.

Never "ride" the drill with one leg over the handle. If the drill steel should break, the drill can injure you.
Do not use drill as a lever to lift rocks or other objects.

Keep the hole clean in adverse ground, by regular »blow back« and adequate water pressure.

When drilling in the very soft and broken ground, use half throttle and apply light feed leg pressure.

If troubles occur during operation (for ex. irregular blows, power loss or if unusual noise and/or vibration appears), immediately switch off the drill. Defect has to be eliminated before operation is resumed.

Before the work is interrupted or finished, shut down the stop valve at the source of compressed air. For an adjustment of the stop valve, follow the instructions of the manufacturer. After that, exhaust the air both from the drill and the inlet pipe.

When you do not use the drill that is still connected to compressed air supply (compressor), make sure that it is properly laid down in order to prevent unexpected and uncontrolled switch-on. Third, not authorized and unqualified persons have to be prevented from accessing the working area at all times.

Before changing drill steels, cleaning, servicing or repairing the drill, always turn off the compressed air supply and disconnect the air supply hose first. The air supply to the drill can be disconnected only after hose and drill have been vented. Cleaning, servicing and repairs of the drill can be carried out in workshops with adequate equipment by properly qualified and trained personnel only who strictly follow the instructions for maintenance and servicing. If defects cannot be eliminated with procedures described in the instructions, consult the producer or seller. This is the only possible way to ensure functioning, long life and safe operation of the drill.

A release of trigger has to instantly stop the drill operation. If the trigger does not function smoothly, stop the drill operation at once. Defect has to be eliminated before operation is resumed.

Do not use the drill when there is clearance in the handle. The handle could break and injure your arms, legs and other parts of body. Do not use the drill with loose screw connections. Drill parts could break which would result in dangerous situations that could endanger the operator and others in the vicinity. Before resuming the drill operation, all above mentioned defects have to be eliminated.

When retracting the rod from the hole, throttle partially in order to avoid drill bit coming off loose.

Any modification of drills without the prior written consent of the producer is not allowed. Failure to observe this procedure may result in safety hazards.

Replace worn and damaged parts in due time or additional damage may occur on drills resulting in safety hazards that could endanger both the operator and other persons in the vicinity. When replacing parts, only genuine spare parts can be used. The use of any other parts can be dangerous.

Apply only uninflammable cleaning or degreasing agents which conform to valid safety and health regulations. They can be used only in a well aired room and in accordance with producer’s instructions.
3. Use of Drills

3.1. Air Quality

Properly prepared compressed air is the most important single factor responsible for the service life of the drill. Use dry (without moisture) and clean air (without dust particles and dirt). This is possible if you use adequate air filters. Air containing impurities, moisture or other corrosion substances can prevent a normal drill operation and can even damage its elements.

Air filtering is followed by air oiling using a proper air oiler. For continuous intensive operation (8 hours a day), it is recommended to use lubricating device which has to be installed max. 3 m away from the drill (hose length). For less intensive operation, you can also use a compressor-mounted oiler, but only if the air supply hose does not exceed 6 m in length.

Oil tank has to be always filled with a high-quality oil for heavy pneumatic machines with ignition temperature between 200 and 230 °C. Oil has to contain additives which provide the specified oil film strength and additives which provide moisture emulsifying. The latter is particularly important in the environment where water and moist air are present. It is necessary to use a permanently non-corrosive oil suitable for use with steel and bronze with the contents of phosphorus as low as possible or without phosphorus at all. Every effort must be made to avoid oil contamination from water or impurities.

Check the level of oil before and during drill operation. Prevent any lack of oil in compressed air in the drill since it could cause damage to its vital elements (piston, cylinder, etc.) in a very short time. This would dramatically shorten the life of drill.

Air pressure is of essential importance. It must never exceed the values shown in table (see chapter Technical Data).

Working pressure that is higher than specified will intensify the drill's wear and increase the level of noise and vibrations which affects the health of operator and other people in the vicinity. If your source of air has a higher working pressure than specified in the chapter Technical Data, use air regulation and reduce the pressure correspondingly. To ensure a normal operation, the source of compressed air has to provide a sufficient air quantity which must be at least the same as air consumption on the drill (see chapter Technical Data).

3.2. Water Quality

The pressure of water supplied to drill must never exceed the pressure of air coming into drill or water may reach drill parts in motion and eliminate lubricant. This could increase the wear effect and reduce the life of drill parts. When possible, water pressure should be at least 1 or 2 bar lower than air pressure, however, not lower than 2.5 bar.

3.3. Connecting the Drill to the Compressed Air Supply

Before connecting the drill to air supply hoses, make sure that hoses are not under pressure. All air supply hoses have to be of adequate quality with a suitable section. Do not use any damaged, abraded or deformed hoses and connections. Periodical cleaning of hoses is necessary. All hoses and
connections have to be clean and dry before they are attached to the drill. Otherwise water, moisture, pipe scales and impurities may penetrate the drill which can damage drill parts and shorten its life.

3.4. Application of Drills

Always use drill steel with a shank only that conforms to data in the chapter Technical Data. A drill steel has to be free of damage and suitably sharpened. Otherwise the drill may get damaged or broken and the cutting edge of the drill piece may grow blunt. A drill may operate only if it has a drill steel installed. Oil in drill is vital for its operation and it ensures long life. Therefore it is necessary to check oil presence in the exhaust and shank part immediately at the beginning of drill operation. If there is no oil, check air device and eliminate deficiencies before any further use of the drill.

Drilling should be made in three consecutive steps:
- First, set the drill steel onto the place you wish to drill. Align the drill to have the drill steel axis aligned with the axis of the borehole. If you use drill legs, you have to first find a suitable support for these and then adjust a suitable angle. In this way, drill steel and the future borehole will lie in the same axis line. Slightly start the drill by shifting the engagement trigger on the drill.
- After making a small borehole, shift the trigger further forwards and then the drill will start to operate with full power.
- When the borehole is finished, pull the trigger slightly backwards to have the drill only slowly rotate and then pull the drill steel out of the borehole.

If troubles appear when operating the engagement trigger, the pneumatic drill operation has to immediately come to a standstill. The trouble has to be eliminated before drill operation is resumed. Each drill is suitable for a certain intensity of operation only. It is not allowed to press the drill to its maximum limits as this may result in overheating and reduce the life span or even damage the drill. Overheating may occur also in the normal use of a new drill. This is not so unusual. Therefore it is important that you do not apply full power in the first hours of operation but operate with half power only. Periodically, carefully check the temperature of drill with your hand by holding it on the front part of cylinder (the drill must be out of operation then). As long as you feel no discomfort while holding your hand on cylinder, it is safe to continue with the operation. When the heat is high enough to cause discomfort, you have to let the drill cool before you resume the operation. Another reason for overheating may be lack of oil in the air. Therefore check the shank for presence of oil. If there is no oil in shank, check air quality and eliminate all deficiencies before resuming the operation again. If functional problems appear during operation (for ex. irregular blows, loss of power or unusual noise of vibrations), switch off the drill immediately. The trouble has to be eliminated before drill operation is resumed.

Hold the drill firmly against the work while in operation. Avoid idle blows at all cost as they increase wear and reduce the life of drill, in particular its piston.

When you stop working, close the shut-off valve on the compressed air source (compressor – to operate the shut-off valve, follow the instructions of compressor's producer) and vent the air hose and drill by depressing the trigger. You can disconnect the air hose and pull tools out of drill only then when there is no more overpressure left in the air supply hose. When you do not use the drill, clean the outside surface and oil it, and store the drill in a dry place.
3.4.1. Drill Application without Drill Legs

The use of drill without drill legs is suitable for a vertical downward drilling only. Especially convenient are SI and SIA drills that have a suitable handle attached. Efficient drilling requires increased drill weight; therefore we recommend you to hang weights on the drill as seen in the Figure below.

![Fig. 1: MFD90 SI with weights](image)

3.4.2. Drill Application with Drill Legs

Efficient drilling is assured by using drill with drill legs. Drill legs support the drill and are used to burden the drill. This largely relieves the operator. The force upon drill depends upon the angle between drill and drill leg. The angle $180^\circ$ experiences the largest force, while the angle $90^\circ$ shows 0. Usually, the angle between pneumatic leg and drill ranges from $120^\circ$ to $150^\circ$. In this case, force upon drill amounts to 1000 N and more – depending upon angle, compressed air pressure and typ of drill leg.

Some cases require drilling with a support leg which is rigidly integrated into drill. Then the ST drill is used which is particularly suitable for a vertical upward drilling. Here, force upon drill with 6 bar compressed air pressure is about 1800 N.

3.4.3. Drill Application on a Drill Rig or Other Machines

For drill application on a drill rig or other machines, see instructions for the use of drill rig or machines. Max. contact force for the drilling hammer is 2000 N.
### 3.5. Fault Tracing Chart for Drill

<table>
<thead>
<tr>
<th>TROUBLE</th>
<th>PROBABLE CAUSE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill will not start</td>
<td>Plugged air passages; stuck piston due to improper lubrication; drill flooded with gummy or heavy oil; dirt or foreign object in the drill; broken components; side rods tightened unevenly causing binding.</td>
<td>Dismantle drill and clean out all foreign objects. Repair or replace all damaged and broken parts. Never use dirty oil, nor oil that can not provide proper lubrication. Make sure that drill is properly assembled.</td>
</tr>
<tr>
<td>Drill loses power rapidly</td>
<td>Low air pressure; restriction in air supply line; hose line to long or hose to small in diameter; restricted air passages through the system.</td>
<td>Remove sharp kinks, replace deteriorated hose, valve and connections. Check other possible restrictions in the line. As a good rule keep air line hoses below 25 meters.</td>
</tr>
<tr>
<td>Drill does not rotate or weak rotation</td>
<td>Bad drilling ground conditions; loss of drill bit gauge causing binding in hole; worn rotation mechanism components; namely: piston, rifle nut, ratchet ring chuck nut, pawls, pawl springs and pins intermediate bushing, and cylinder liner.</td>
<td>Replace worn drill bits and bent drill rods. Replace or repair any worn parts.</td>
</tr>
<tr>
<td>Overheating</td>
<td>New drills may overheat at intermediate part and front part of the drill; running on front head cushion; piston not hitting steel, shank may be short, or because machine is not kept fed up to work. Also caused by pulling steels from the hole at full throttle; wrong type of oil; hot air from the compressor.</td>
<td>Run new drills at less than full throttle until broken in; use plenty of the proper type of oil. Keep machine fed-up to work; do not use steels with short shanks. Use half throttle when pulling steels from the hole. Keep drill lubricated with correct oil. Fit one lubricator for each rock drill. Check for oil presence on steel shank during operation. Check air temperature from the compressor.</td>
</tr>
<tr>
<td>Slow drilling speed</td>
<td>Cuttings not being removed from hole; low air and water pressure; plugged drill steel or air flushing line; drill not aligned with hole, steel or bit binding in hole. Insufficient feed pressure.</td>
<td>Use control lever to blow back air to keep hole clean. Check air and water pressure. Avoid crowding the drill. Ensure that drill steel is clean. Check alignment while drilling to prevent binding and to avoid stuck steel.</td>
</tr>
<tr>
<td>Erratic or sluggish drilling</td>
<td>Oil viscosity too heavy, slowing valve action; gummed oil or dirt in the system.</td>
<td>Use recommended oil of proper viscosity for operating ambient temperature. Dismantle drill and clean out dirt gummy residues. Service drill with clean oil. Protect drill from dirt when not in use.</td>
</tr>
<tr>
<td>Stuck drill steel</td>
<td>Driving steel after bit is dull or has lost its gauge; crowding in soft formations; cuttings not being blown from hole; steel is misalign with hole, causing binding.</td>
<td>Don’t force a dull bit. Sharpen or use a new bit. Use feed pressure cautiously in soft ground. Blow back the hole frequently. Keep steel and drill aligned with hole at all times, especially when drilling steep holes.</td>
</tr>
<tr>
<td>Rapid wear of rifle nut, chuck nut and pawls</td>
<td>Often caused by poor lubrication; high flushing water pressure washing away oil, with dirt a contributing factor.</td>
<td>Keep the machine clean and use sufficient oil of correct viscosity. Ensure that flushing water pressure is below air pressure.</td>
</tr>
<tr>
<td>Condition</td>
<td>Description</td>
<td>Possible Causes</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Chipping or breakage of the piston striking face</td>
<td>Can be caused by bad shank, rounded off allowing minimum contact with piston striking face. Also caused by worn chuck permitting steel to “cock” in chuck and piston strikes a glancing low. Often caused by small heat cracks due to faulty lubrication and resulting in high frictional heat. Braking of piston neck is due to loss of cushion, piston striking intermediate part.</td>
<td>Take bad drill steels out of service. One bad shank can ruin many pistons. Replace worn chucks. Use a “chuck gauge” to check insert for wear. Keep machine well lubricated with recommended oils. Ensure that flushing water pressure is kept below operating air pressure to stop oil washout. Check cylinder, piston and intermediate bush for maximum wear tolerances.</td>
</tr>
<tr>
<td>Bronze cuttings at exhaust ports in working parts</td>
<td>Piston flutes pitted and worn, cutting rifle and chuck nuts; side rods not tightened evenly, piston binding in chuck and in rifle nut; excessive wear due to insufficient lubrication; moisture in compressed air diluting / washing oil.</td>
<td>Replace damage parts. Keep evenly tied side rods. Check functioning of line oiler. Steel shanks should be coated with oil at all times during operation. Reduce water pressure. Install moisture traps in air lines.</td>
</tr>
<tr>
<td>Chuck insert shattered, or presses in the bore easily</td>
<td>Inadequate interference between chuck and chuck insert. Worn or oversize rotation chuck bore.</td>
<td>Chuck insert must be pressed with adequate force. If chuck insert presses easy for first 15 mm. without firm interference the chuck bore is worn. Replace the chuck to avoid ongoing breakage’s.</td>
</tr>
<tr>
<td>Side rod breakage</td>
<td>Uneven tension, or loose rods. Loss of the air cushion, allowing piston to strike intermediate part with hard impact.</td>
<td>Keep the side rods evenly tight and tighten rods alternatively. Replace worn cylinder liner, piston or intermediate bushing.</td>
</tr>
<tr>
<td>Cracked or broken rifle and chuck nut</td>
<td>Rifle nut loose in ratchet ring; chuck nut loose in chuck; worn threads in ratchet ring and in chuck.</td>
<td>Replace damaged and worn parts. Ensure that the nuts are tight and that they are against the seat.</td>
</tr>
<tr>
<td>Ratchet ring and pawls breakage</td>
<td>Invariably caused by operator turning drill steel in wrong direction to free stuck steel or excessively worn pawls.</td>
<td>Replace pawls and instruct operator never to turn the drill in the hole in the opposite direction to drill rotation in order to free stuck steel.</td>
</tr>
<tr>
<td>Broken or battered air or water tube</td>
<td>Shank holes improperly punched; worn chuck insert causing misalignment and “chafing” or bending of tube.</td>
<td>Check shank to be sure center hole is large enough and deep enough to accept flushing water tube. Replace worn chuck insert.</td>
</tr>
<tr>
<td>Freezing at exhaust ports</td>
<td>Excessive moisture in compressed air line. Usually occurs due to humidity and low ambient temperatures.</td>
<td>Install moisture traps in air line stream or in very low ambient temperatures feed a small amount of anti-freeze into the air supply line.</td>
</tr>
<tr>
<td>Fogging while drilling</td>
<td>Excessive moisture in air supply line; over lubrication; flushing water pressure to high, causing water to back up in the drill.</td>
<td>Blow out moisture from compressed air line. If moisture traps are without automatic drain valve, drain water manually. Adjust the line oiler for proper feed rate, check oil viscosity and ambient temperature. Reduce flushing water pressure below operating air pressure.</td>
</tr>
</tbody>
</table>
4. Technical Data

<table>
<thead>
<tr>
<th>Drill</th>
<th>MFD90</th>
<th>MFD90 MAX</th>
<th>MFD90 MAX PLUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass [kg] *</td>
<td>29.5</td>
<td>29.5</td>
<td>29.5</td>
</tr>
<tr>
<td>Length [mm]</td>
<td>690</td>
<td>690</td>
<td>690</td>
</tr>
<tr>
<td>Working pressure [bar]</td>
<td>4-7</td>
<td>4-7</td>
<td>4-7</td>
</tr>
<tr>
<td>Blows [min⁻¹] **</td>
<td>3100</td>
<td>2750</td>
<td>2650</td>
</tr>
<tr>
<td>Free speed [min⁻¹] **</td>
<td>320</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Air consumption at 5 bar [m³min⁻¹] **</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Sound pressure level according to ISO 11201 [dB] ***</td>
<td>119</td>
<td>113</td>
<td>113</td>
</tr>
<tr>
<td>Sound power level according to ISO 3744 [dB] **** *****</td>
<td>125</td>
<td>122</td>
<td>123</td>
</tr>
<tr>
<td>Vibration level a according to ISO 8662 [m²s⁻²] *****</td>
<td>23</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Connection - air</td>
<td>BSP1&quot;</td>
<td>BSP1&quot;</td>
<td>BSP1&quot;</td>
</tr>
<tr>
<td>Connection - water</td>
<td>1/2&quot;</td>
<td>1/2&quot;</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>Rock drill shank hexagonal [mm]</td>
<td>22 x 108</td>
<td>22 x 108</td>
<td>22 x 108</td>
</tr>
</tbody>
</table>

Models SI in SIA have according to ISO 8662 vibration levels a 7 m²s⁻². *****

* The given value is valid for models DI, for other models slightly deviate.

** The value of the number of blows and air consumption can show a 15% deviation as a result of the method of measuring and deviations in the manufacture of drills.

*** The sound pressure and power level value can show a deviation of 4 dB as a result of the method of measuring and deviations in the manufacture of drills.

**** Measurement have been performed on drill rig LPB-MAX (9 352 27).

***** The value of vibration level can show a 50% deviation as a result of the method of measuring and deviations in the manufacture of drills.
5. Declaration on Conformity

Producer
SŽ Oprema Ravne d.o.o.          Tel.: ++386 (0)2 870 7953
Koroška cesta 14              Fax: ++386 (0)2 870 7980
2390 Ravne na Koroškem
Slovenia

confirms that the pneumatic drills MFD90, MFD90 MAX and MFD90 MAX PLUS with serial number XXXXX

and their accessories conform to Machinery Directive 1998/37/EC and Noise emission in the environment by equipment for use outdoors 2000/14/EC.

Signature: Managing Director Darko Jevšnikar       Date: April 2006
6. Warranty Conditions

The manufacture of pneumatic drills at SŽ Oprema Ravne is based on extensive and rich experience in the use of high-quality material. Along with normal operation conditions, this guarantees a long service life of drills.

As defects in material and manufacturing process are possible in spite of stringent inspection, we provide warranty for the product in accordance with the following general conditions:

- Warranty shall apply 12 months from the date of purchase or 2000 working hours, whichever comes first.
- Warranty applies to defects in functioning that result from deficiency in material or manufacturing process.
- Producer can eliminate found deficiencies at his option (by improvement, replacement, repair, etc.).
- Transport costs are borne by the buyer.
- Replaced parts are owned by the producer.
- Producer shall not be held liable for any indirect damage and consequential loss in production.
- Warranty can be enforced only if you inform the drill's producer of the defect immediately after its appearance; further use of the drill is not allowed as it can endanger the safety and health of its operator and other persons in the surrounding area and it can further damage the drill.

Warranty does not apply to:

- damage resulting from the use of incorrect hose connections and hoses
- damage resulting from improper use, transport or maintenance of the drill
- normal wear of drill elements
- damage on hoses and connections resulting from improper use and maintenance
- damage resulting from the use and storage of the drill in aggressive environments (acid, salt, …)

Warranty rights expire if the owner is changed, non-genuine spare parts are used, the drill is modified without a prior consent of the company SŽ Oprema Ravne or if maintenance is implemented by a person or entity who does not have the authorization by SŽ Oprema Ravne.