LEOPARD™ DI650i
TIME FOR A NEW LEADER
For over 50 years, we have claimed widespread expertise in developing drill rigs to meet your expectations. With that expertise, we have engineered an entirely new high-pressure down-the-hole (DTH) drill rig to complete the offering in the upper hole size range: Leopard DI650i.

Built on proven Sandvik engineering solutions and components, Leopard DI650i offers solid productivity and advanced automation options for challenging rock conditions. We strive to maximize your success. The new Leopard DI650i helps in turning that success into a tangible reality.

**SAFETY**

Safety is a fundamental value for us and an intrinsic characteristic of all our drill rigs. On top of the proactive work to improve operational safety, we turn requirements into technical solutions – as a results the Leopard DI650i applies the drill rig safety standard EN16228 and fulfills the Tier 3 / Tier 4F / Stage V emission regulations depending on selected model.

“Leopard DI650i offers solid productivity and advanced automation options for challenging rock conditions.”
LEOPARD DI650i
TIME FOR A NEW LEADER

Leopard DI650i offers long-term productivity and superior stability: trustworthy and robust main components integrated with the latest technical solutions. The new Leopard has been designed for scalable automation, easy maintenance and efficient operation. Our new iCab offers the most silent and ergonomic cabin in DTH drill rig. The cabin is spacious, silent and safe. Also, iCab is designed to provide clear and improved visibility to the drilling area.

TECHNICAL DATA

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended hole diameter</td>
<td>115–203 mm (4½”–8”)</td>
</tr>
<tr>
<td>Pipe diameter</td>
<td>89, 102, 114, 127 and 140 mm* (3½”, 3 7/8”, 4½”, 5” and 5 ½”)</td>
</tr>
<tr>
<td>DTH-hammer size</td>
<td>4”, 5”, 6”</td>
</tr>
<tr>
<td>Rotary head type</td>
<td>HTRH6, MRH6 (heavy duty option)</td>
</tr>
<tr>
<td>Maximum hole depth</td>
<td>53.6 m with up to 114 mm pipes</td>
</tr>
<tr>
<td>Engine type</td>
<td>Caterpillar C15 (Tier 3, Tier 4F / Stage V)</td>
</tr>
<tr>
<td>Engine output power</td>
<td>403 kW / 1800 rpm</td>
</tr>
<tr>
<td>Flushing air capacity</td>
<td>28.3 m³/min (1000 cfm), working pressure up to 30 bar (435 psi)</td>
</tr>
<tr>
<td>Operator cabin</td>
<td>iCab</td>
</tr>
<tr>
<td>Certificate</td>
<td>ROPS and FOPS</td>
</tr>
<tr>
<td>Transport Length</td>
<td>12.4 m (40.7 ft)</td>
</tr>
<tr>
<td>Transport Width</td>
<td>3.00 m (9.8 ft)</td>
</tr>
<tr>
<td>Transport Height</td>
<td>3.50 m (11.5 ft)</td>
</tr>
<tr>
<td>Weight approx.</td>
<td>25100 kg (55336 lb) **</td>
</tr>
</tbody>
</table>

* Available only with MRH6 rotary head
** Dry weight without options and drilling tools
SCALABLE AUTOMATION
ADAPTING TO YOUR NEEDS

LEOPARD DI650i INTELLIGENT AND SCALABLE

The scalable automation concept offers an intelligent drill rig platform where automation options and digital services can be selected to speed up your production process and support your mine operations. All the options can be also easily added and expanded afterwards according to future automation demands.

HIGH LEVEL AUTOMATION OPTIONS:
- AutoMine® Surface Drilling
  - Line-of-sight control for 1 to 3 drill rigs
  - On-site control center for 1 to 3 drill rigs
  - Customized control solution

INFORMATION MANAGEMENT:
- My Sandvik digital services
- Driller’s Office
- Measuring while drilling (MWD)
- Wireless data transfer
- OptiMine® for Surface Drilling
- 3rd party system interfaces

ON BOARD AUTOMATION OPTIONS:
- TIM3D drill navigation system
- Driller’s Notes
- Full cycle one hole drilling automatics
- Feed auto-aligning and positioning
- Feed to tramming support assist
- iFlow control system

INTELLIGENT LEOPARD DI650i DRILL RIG PLATFORM:
Sandvik SICA control system including advanced Torque drilling control, compressor management and flushing control system. It also contains sophisticated fuel saving features and easy trouble-shooting.

High technology level drill rig, which can be extended with additional advanced automation options.

Off-board high-level automation systems.

Off-board automation options and digital services, which are communicating with the Leopard DI650i drill rig wirelessly.

Automation options that can be integrated on the intelligent drill rig platform.
In addition to its intelligent drilling control system, Leopard DI650i offers solutions with GPS based navigation and data collecting from basic to advanced systems.

**TIMI INCLINATION SYSTEM**
TIMI angle-measurement system for vertical holes and depth measurement is a standard for DI650i. The system can be expanded with additional options for inclined holes, GPS-aligned holes, feed auto-aligning and TIM3D readiness. All different options are operated with modern touch-screen display, including automation and troubleshooting features. You can choose the system that matches your current needs and easily upgrade it, if necessary.

**TIM3D DRILL NAVIGATION SYSTEM**
The highly advanced TIM3D drill navigation system will guide the operator in all stages of precision drilling process from tramming, hole positioning and feed alignment to actual drilling and reporting. The system enables a two-way wireless connection: transferring drill plans and surface models to the drill rig and hole-quality reports back for analyzing purposes.

**Sandvik TIM3D drill navigation system**

| ✔ | TIM3D drill navigation system (option) | Fast and accurate drilling navigation for improved drilling results. Accuracy within 10 centimeters/4 inches. Surface model and drilling plan can be used concurrently. |
| ✔ | Driller’s Notes (option) | Logging of measurement while drilling (MWD) data including operator’s markings and comments. |
| ✔ | SanRemo Premium (option) | Wireless transfer of drill plans, quality reports and MWD data. |
| ✔ | Driller’s Office (option) | Office software for fast and easy drill plan creation and MWD data analyzing. |

The TIM3D drill navigation system is tailor-made for Sandvik and it has been successfully utilized by mines and quarries worldwide over the last decade. The high-resolution navigation system with accuracy within 10 centimeters is based on GNSS positioning signals and a correction signal – either through a base station or a mobile network (VRS).

TIM3D is using components tested and approved by Sandvik which ensures seamless functionality with the Leopard DI650i drill rig. The system is also fully integrated into the Sandvik SICA control system, meaning that there is no need for any extra displays. All measurements are done using robust integrated sensors built into the hydraulic cylinders. Satellite antennas are mounted only on the carrier, making them less exposed to vibration and dust.

TIM3D offers a solid base for many operator-assisting and fully autonomous machine automation options, such as feed auto-positioning and Automine® Surface Drilling remote operating systems.
DRILLING APPLICATIONS

Excellent boom reach, collaring height, feed drilling angles combined with tramming power of 168 kN and excellent stability ensure the best possible drilling coverage area in difficult terrain. These features make the Leopard DI650i an essential choice for different production and pre-split DTH drilling applications.

Outstanding tramming force-weight ratio and stability.

Pre-splitting
Production drilling
De-watering holes
Boom reach: 4188 mm

Collaring height: 714 mm

Coverage area

FEED SWING DRILLING ANGLES

30° 30°

FEED TILT DRILLING ANGLES

58° 58°
ROTATION HEAD OPTIONS

Rotation head is one of the key components in DTH drill rig that ensures the high availability and reliability of the drill rig. For Leopard DI650i there are two rotation head models available to fit your needs: a standard HTRH6 and a heavy-duty version MRH6 as an option. The HTRH6 is designed for 115-178 mm hole sizes and MRH6 for 127-203 mm hole sizes. Both are robust, extremely reliable and easy to maintain.

HTRH6
HTRH6 is designed for 4", 5" and 6" DTH hammers and 115-178 mm hole sizes. It is both modular and easy to maintain.

HTRH6 is divided into four main modules all designed to perform optimally. The drive module generates high torque required by 6" DTH drilling. The bearing module is optimized to carry high loads. The separate air inlet module makes the sealing maintenance easy and the separated floating spindle provides good serviceability. The modular design of HTRH6 makes it easy to maintain as all service points are easy to access.

MRH6
The MRH6 rotation head is optimized for 6" & 6.5" DTH hammers and 127-203 mm hole sizes. It is heavy in weight for extra power and extremely durable.

The rotation head is designed for heavy duty work and has especially robust design. The gearbox is designed to carry high loads and enhance reliability in heavy duty mining applications. Patented bearing pretention mechanism eases bearing service and enhances durability. A separate floating spindle provides good serviceability. The carriage is also separated for quick replacement and maintenance.

TECHNICAL DATA
Rotation head type Sandvik HTRH6
Hole diameter 115-178 mm
Hammer size 4", 5" and 6"
Rotation torque (max) 4300 Nm
Operating pressure 30 bar (Air inlet)
180 bar (rotation max.)
Drill tubes 89, 102, 114, 127 mm

TECHNICAL DATA
Rotation head type Sandvik MRH6
Hole diameter 127-203 mm
Hammer size 5", 6" and 6.5"
Rotation torque (max) 5 800 Nm
Operating pressure 30 bar (Air inlet)
200 bar (rotation max.)
Drill tubes 102, 114, 127, 140 mm
DRILL FASTER AND
SUCCEED HARDER

Built on our proven i-series intelligent drill rig platform and our scalable automation design the Leopard DI650i is the perfect match for our RH560 6” DTH hammer, making it uniquely productive while keeping fuel consumption and operating costs to a minimum.

The all-new RH560 hammer helps you to drill faster because of its improved air cycle. Less air is required, making the penetration rate higher. RH560 is your reliable and powerful drilling companion with proven Sandvik technology.

**ROTATION UNIT ADAPTER**
* D: 89 mm (3 1/2”) L: 300 mm
  * Male thread: M80*3
  * Female thread: API 2 3/8”
  * 52-089-11516555

**ROTATION UNIT ADAPTER**
* D: 114 mm (4 1/2”) L: 300 mm
  * Male thread: M80*3
  * Female thread: API 3 1/2”
  * 52-114-11505151

**DRILL PIPE**
* D: 89 mm (3 1/2”) L: 6000 mm
  * Thread type: API 2 3/8”
  * 6.3 mm thick: 52-089-10505952
  * 8.8 mm thick: 52-089-10505106

**RH560g 4”**
* Top Sub thread: API 2 3/8”
  * 32-5645-GTA-165

**560-4 SHANK BITS**
* 42-4HFA115-S48. 115 mm FF XT48
  * 42-4HFB127-S48. 127 mm FF XT48

**DRILL PIPE**
* D: 114 mm (4 1/2”) L: 6000 mm
  * Thread type: API 3 1/2”
  * 6.3 mm thick: 52-114-10505147
  * 8.8 mm thick: 52-114-102072

**RH560g 5”**
* Top Sub thread: API 3 1/2”
  * 32-4655-GQA-04C

**QL50 SHANK BITS**
* 42-5019146-S48. 146 mm CC XT48
  * 42-502D152-S48. 152 mm FF XT48

**DRILL PIPE**
* D: 127 mm (5”) L: 6000 mm
  * Thread type: API 3 1/2”
  * 6.3 mm thick: 52-127-10505190

**RH560g 6”**
* Top Sub thread: API 3 1/2”
  * 32-5665-GQA-04C

**560-6 SHANK BITS**
* 42-632E165-S48. 165 mm FF XT48
  * 42-63DE172-S48. 172 mm CC XT48

**560-4 SHANK BITS**
* 42-4HFA115-S48. 115 mm FF XT48
  * 42-4HFB127-S48. 127 mm FF XT48

**ROTATION UNIT ADAPTER**
* D: 114 mm (4 1/2”) L: 300 mm
  * Male thread: M80*3
  * Female thread: API 3 1/2”
  * 52-114-11505151

**ROTATION UNIT ADAPTER**
* D: 127 mm (5”) L: 300 mm
  * Male thread: M80*3
  * Female thread: API 3 1/2”
  * 52-127-11516261

**DRILL PIPE**
* D: 114 mm (4 1/2”) L: 6000 mm
  * Thread type: API 3 1/2”
  * 6.3 mm thick: 52-114-10505147
  * 8.8 mm thick: 52-114-102072

**RH560g 6”**
* Top Sub thread: API 3 1/2”
  * 32-5665-GQA-04C

**560-6 SHANK BITS**
* 42-632E165-S48. 165 mm FF XT48
  * 42-63DE172-S48. 172 mm CC XT48

*ALL LENGTHS ARE SHOULDER TO SHOULDER MEASURE*
ENJOY THE SILENCE IN NEW iCAB CABIN

New iCab cabin offers the best driller experience with excellent visibility to the drilling area. iCab is FOPS & ROPS certified with HEPA and optional HEPA H13 filter. It is also the most silent and ergonomic cabin in DTH drill rigs. All machine information is seamlessly integrated on one touch display. There is also room for the trainer or service technician behind the operator seat.

Significantly low noise level – 78 dB during drilling

Control system

- **User interface**
  Touchscreen, all parameters can be adjusted from cabin.

- **Sandvik iTorque**
  Drilling control system, different drilling recipes for different rock conditions.

- **Troubleshooting functions**
  Easy to use flow chart type of troubleshooting features for all system functions.

- **Full cycle one hole drilling automatics (option)**
  Automatic drilling to preset depth, coupling and uncoupling automatics.

- **Sandvik iFlow (option)**
  Flow control ensures maximum drilling performance in difficult rock conditions.

- **Automatic aligning and positioning (option)**
  Faster and more accurate hole to hole setup.

- **Feed to tramming support assist (option)**
  Automated folding of the boom and feed to tramming position.
SERVICEABILITY TAKEN TO THE NEXT LEVEL

The new Leopard DI650i offers easy ground level access to every daily maintenance and service points. Additionally, the modular design of the rig ensures the main components can be easily reached, repaired and changed if needed. These features maximize uptime and provide safer working environment for the service personnel.

DAILY CHECKS FROM THE GROUND LEVEL