

# A Comprehensive Technical Guide to the Atlas Copco ROC L8 Surface Drill Rig: Engineering, Performance, and Operational Excellence

Published: August 2, 2025 | Index ID: #272

In the demanding world of open-pit mining, quarrying, and large-scale civil engineering, the efficiency of blast-hole drilling is often the primary determinant of downstream productivity. The **Atlas Copco ROC L8** (now transitioned under the Epiroc brand) represents a milestone in **Down-The-Hole (DTH)** crawler technology. Designed to deliver high penetration rates in hard rock while maintaining exceptional fuel economy and hole straightness, the ROC L8 has become a staple for operators requiring high-pressure air and robust mechanical reliability. This article provides an exhaustive technical analysis of the ROC L8 series, exploring its mechanical architecture, hydraulic systems, and the engineering principles that distinguish it from its predecessors like the ROC L6.

## The Evolution of Surface Drilling: The ROC L8 Paradigm

The **Atlas Copco ROC L8** was engineered to bridge the gap between medium-sized crawler rigs and large-scale rotary drills. Historically, the industry struggled with balancing the portability of a crawler with the power required for deep-hole, large-diameter drilling. The ROC L8 addressed this by integrating a high-pressure, two-stage screw compressor and a powerful Tier 3 (or Tier 4 in later iterations) diesel engine into a versatile, mobile chassis.

The "L" in the series designates its primary application in large-hole production drilling, while the "8" signifies its position in the hierarchy of power and capacity. With a focus on **penetration rate** and **rod handling efficiency**, the ROC L8 utilizes a unique cylinder-operated feed system that optimizes the weight on the bit, a critical factor when operating DTH hammers in varying geological strata.

## Core Technical Specifications and Engine Dynamics

At the heart of the ROC L8 is a power plant designed for high-altitude and high-load environments. Most units from the late 2000s, such as the **2008 ATLAS COPCO ROC L8**, are equipped with the Caterpillar C11 or C13 ACERT engines. These engines provide the high torque required to drive both the hydraulic pumps and the massive air compressor simultaneously.

### 1. Power Plant and Compressor Output

The synergy between the engine and the compressor is the defining characteristic of the ROC L8. DTH drilling relies on air volume and pressure not just for the percussive action of the hammer, but for the efficient flushing of cuttings from the borehole. The ROC L8 typically features a 25-bar (363 psi) compressor capable of delivering approximately 405 liters of air per second (858 cfm). This high pressure allows for the use of larger hammers (up to 6 inches) and ensures that even at depths of 50+ meters, the hole remains clear of debris.

### 2. The Feed and Boom System

The ROC L8 utilizes a robust aluminum feed profile, which offers a high strength-to-weight ratio. This choice of material reduces the center of gravity of the rig during tramming, enhancing stability on uneven terrain. The feed system is powered by a hydraulic cylinder and cable arrangement, providing a maximum feed force of 20 kN and a pull force of 30 kN, ensuring the rig can handle the weight of heavy drill strings during extraction.

# Mechanical Deep Dive: The Gearbox GFT 24 T3 5157

---

One of the most critical components for the mobility and operation of the ROC L8 is the **Gearbox GFT 24 T3 5157**. This planetary gearbox is responsible for the tramming power of the crawler tracks. In the context of **Atlas-Copco ROC L8 and ROC L6 drilling rigs**, this gearbox must withstand immense torque loads when the machine is navigating steep inclines or muddy quarry floors.

The GFT series gearboxes are designed with a multi-stage planetary arrangement that provides high reduction ratios in a compact space. This allows the hydraulic motors to operate at high speeds and low torque while the tracks receive the high torque necessary for movement. Maintenance of the GFT 24 is vital; technical manuals, such as the **9852 1671 01 Operator's Instructions**, emphasize regular oil changes and seal inspections to prevent catastrophic failure in the field.

## Comparison of ROC L6 vs. ROC L8 Specifications

To understand the position of the ROC L8, it is helpful to compare it with its smaller sibling, the ROC L6. The following table highlights the key differentiators in their technical profiles.

| Feature             | Atlas Copco ROC L6   | Atlas Copco ROC L8      |
|---------------------|----------------------|-------------------------|
| Compressor Pressure | 20 bar (290 psi)     | 25 bar (363 psi)        |
| Engine Power        | Approx. 287 kW (C11) | Approx. 328 kW (C13)    |
| Max Hole Depth      | 28 - 36 meters       | Up to 54 meters         |
| Hammer Size         | 3" - 5"              | 4" - 6"                 |
| Application         | Medium Quarrying     | Heavy Production/Mining |

## The Mechanics of Down-The-Hole (DTH) Drilling

The ROC L8 is fundamentally a DTH rig. Unlike top-hammer rigs where the striking energy is generated at the top of the drill string and transmitted through the rods, DTH drilling places the percussive hammer directly behind the drill bit at the bottom of the hole. This provides several technical advantages:

The ROC L8 optimizes this process through its **Rod Handling System (RHS)**. The rig features a carousel-style rod changer that can hold up to 8+1 rods, allowing for automated drilling cycles that reduce manual labor and improve operator safety.

## Operational Workflow: A Technical Guide

Operating a ROC L8 requires a deep understanding of the **Rig Control System (RCS)**. Modern versions of this rig utilize a digital interface that allows the operator to monitor all vital signs of the machine in real-time. The operational sequence for a standard production hole is as follows:

1. Positioning and Levelling: The rig is moved into position using the GFT 24 gearboxes. The hydraulic jacks are deployed to ensure the rig is level, preventing deviation during the start of the hole.
2. Collar Initiation: The operator starts the drilling process at reduced air pressure and feed force to establish the "collar" or the mouth of the hole. This prevents the bit from wandering.
3. Full Power Drilling: Once the first meter is established, the compressor is switched to high pressure (25 bar). The RCS manages the balance between feed force and rotation speed based on the feedback from the rock.
4. Rod Addition: When the first rod is fully submerged, the RHS automatically swings a new rod into position. The hydraulic break-out table ensures the joints are tightened to the correct torque.
5. Dust Collection: Throughout the process, the DCT (Dust Collector Tank) uses a high-suction fan to extract rock dust, which is then filtered and discharged. This is critical for both environmental compliance and mechanical longevity.

## Maintenance and Troubleshooting: Ensuring Machine Longevity

The **Atlas Copco ROC L8 Phintl** and similar variants require a rigorous maintenance schedule. According to the **9852 1671 01 Operator's Instructions**, the most common points of failure are related to hydraulic contamination and air system leaks. Technical personnel should focus on the following maintenance domains:

### 1. Hydraulic System Integrity

The ROC L8 uses a series of variable displacement piston pumps. Contamination is the leading cause of pump

failure. Regular oil sampling and filter replacements (every 500 hours) are mandatory. Operators should watch for "spongy" controls, which often indicate air in the hydraulic lines or a failing pump seal.

## **2. Compressor Maintenance**

The two-stage screw compressor is the most expensive component to repair. It is cooled by the engine's cooling system but has its own dedicated oil circuit for lubrication and sealing of the screws. The **oil separator element** must be replaced regularly to prevent oil carry-over into the hammer, which can damage internal seals in the DTH hammer.

## **3. Common Troubleshooting Scenarios**

| Issue                | Probable Cause                              | Technical Solution                                            |
|----------------------|---------------------------------------------|---------------------------------------------------------------|
| Low Penetration Rate | Worn bit buttons or low air pressure.       | Regrind or replace bit; check compressor valves.              |
| Excessive Vibration  | Loose feed motor or worn centralizer.       | Tighten mounting bolts; replace centralizer bushings.         |
| Overheating Engine   | Clogged radiator fins or fan belt slip.     | Clean cooling package with high-pressure air; adjust tension. |
| Drill Rod Jamming    | Inadequate flushing air or collapsing hole. | Increase air volume; use foaming agents if in wet ground.     |

## Environmental and Economic Impact

In the modern mining landscape, the **Atlas Copco ROC L8** is evaluated not just on its speed, but on its **Total Cost of Ownership (TCO)**. The rig's **FuelXperts** system is a significant engineering feat; it electronically regulates the engine speed and compressor load based on the actual demand of the hammer. This can result in fuel savings of up to 20% compared to older, non-regulated systems.

Furthermore, the high penetration rate of the L8 means fewer rigs are required to meet the same production quota. This reduces the "footprint" of the drilling operation, requiring fewer operators and lower support infrastructure. In large-scale quarries, the ability of the ROC L8 to drill larger holes (up to 165mm) allows for wider blast patterns, which significantly reduces the cost per ton of blasted rock.

## Scale Models and the Industrial Legacy

The cultural and industrial impact of the ROC L8 is evidenced by its presence in the scale model community, such as the **48044 Atlas Copco 1:50, ROC L8** made in China. These models are often used by mining engineering students and professionals to study the rig's unique boom geometry and rod handling mechanics. Beyond the physical machine, the name "ROC" (Rig on Crawler) has become synonymous with reliability in the drilling industry, a legacy that continues under the Epiroc brand today.

As we analyze the technical trajectory of surface drilling, the Atlas Copco ROC L8 remains a pivotal case study in mechanical integration. By combining high-pressure pneumatics with advanced hydraulic control and a robust crawler chassis, it solved the fundamental challenge of delivering heavy-duty drilling power in a mobile package. Whether it is a used **2008 ROC L8** still working in a secondary quarry or a newer model equipped with the latest automation software, the engineering foundation remains the same: a commitment to penetration efficiency, hole precision, and mechanical durability. For operators and technical managers, mastering the complexities of this rig—from the **GFT 24 gearbox** to the **RCS control system**—is essential for achieving peak performance in the world's harshest environments.

Tags: #Atlas Copco ROC L8 #DTH Drilling #Mining Equipment #Surface Drilling #Drill Rig Maintenance









