AquaDredge 5000 - Official Technical Overview & Datasheet

EXECUTIVE SUMMARY

The AquaDredge 5000 is the world's first production-ready waterproof excavator engineered for submerged operations in construction, mining, and agricultural environments. Designed to operate fully submerged up to 5 meters, this machine eliminates the need for dewatering or cofferdams, drastically reducing project timelines and environmental impact. Target markets include riverbed mining, underwater utility trenching, reservoir maintenance, and flooded agricultural land reclamation.

Built upon a legacy of extreme-condition machinery, the AquaDredge 5000 delivers a primary value proposition of zero downtime due to water ingress. Its proprietary positive-pressure sealed chassis and marine-grade corrosion protection ensure 5,000+ operating hours in salt or fresh water without hull breach. For contractors and mine operators facing rising water tables or seasonal flooding, this digger transforms a high-risk work zone into a standard, profitable operation.

STRUCTURAL INTEGRITY & POWERTRAIN

The chassis is fabricated from IP68-certified, 6 mm high-tensile DOMEX 700 steel, treated with a five-stage anti-corrosion zinc-phosphate primer and epoxy topcoat rated for continuous seawater immersion. All access panels are sealed with dual-compound silicone gaskets and monitored by an internal humidity sensor that triggers a visual alert before moisture reaches critical components.

Power comes from a Cummins QSB6.7 Marine Tier 3 (or optional EPA Tier 4 Final) diesel engine, modified with a closed-circuit crankcase ventilation system and a water-separated exhaust outlet that routes gases through a snorkel-type riser above the water surface. The hydraulic system is a closed-loop, load-sensing axial piston design by Rexroth, operating at 350 bar. Efficiency reaches 92% at full submerged depth, with thermally compensated valves that

automatically adjust oil viscosity in cold water (down to -10°C). An external heat exchanger mounted on the boom conducts waste heat into the surrounding water, eliminating the need for a radiator fan.

KEY FEATURES & OPERATOR COMFORT

- Full-Submersion IP68 Drivetrain: All rotating seals on track motors, swing drive, and final drives are triple-lipped ceramic-faced with pressurized labyrinth protectors. A self-adjusting grease accumulator maintains 0.2 bar positive pressure inside the chassis, actively repelling water ingress even if a seal wears.
- Remote-Operated or Tethered Cab: The operator controls the AquaDredge 5000 either from a ROPS/FOPS-certified floating control barge via a 50-meter fiber-optic tether or from an amphibious sealed cabin on the upper structure. The sealed cabin features a 360° underwater camera system with sonar obstacle detection and a dual-joystick haptic feedback console.
- Smart Depth-Sensing Hydraulics: An integrated pressure transducer on the boom foot automatically derates swing and travel speeds at depths beyond 3 meters to prevent seal overload, while maintaining full breakout force (15,000 lbf) down to 5 meters. An on-screen depth gauge and automatic engine idle reduction save fuel during extended submerged idle.
- Corrosion-Immune Undercarriage: Track chains and sprockets are investment-cast 316L stainless steel, with polyurethane-coated track pads for silent operation on submerged concrete or rock. Bottom rollers are

grease-filled and sealed with double Viton lip seals. All fasteners are A4-80 marine-grade stainless steel.

- Advanced Telematics & Diagnostics: The AquaLink telematics module transmits real-time seal pressure, humidity, and oil contamination data via satellite or 4G. The system automatically schedules maintenance alerts when water is detected in any compartment, allowing predictive part replacement before failure.

COMPLIANCE & SAFETY STANDARDS

The AquaDredge 5000 is fully certified to ISO 19432 for underwater machinery and meets CE marking (Machinery Directive 2006/42/EC) for submerged operation. Engine emissions comply with EPA Tier 4 Final (USA) and EU Stage V (optional SCR system). The primary electrical system is certified to IEC 60529 IP68 (5m, 72 hours continuous). Safety features include an emergency surface buoy deployment system, automatic engine cut-off if cab tilt exceeds 8 degrees, and dual redundant bilge pumps. The machine also adheres to ISO 12100:2010 risk assessment standards for underwater work.

TECHNICAL SPECIFICATIONS

All parameters measured at standard ambient temperature (25°C) with machine

submerged to 4m depth in fresh water. Values are subject to typical manufacturing tolerances.

<table border='1' style='border-collapse: collapse; width: 100%;'><tr><th style='padding: 8px; text-align: left; background-color: #f2f2f2;'>Parameter</th><th style='padding: 8px; text-align: left; background-color: #f2f2f2;'>Specification</th></tr><tr><td style='padding: 8px; border: 1px solid #ddd;'>Engine Model</td><td style='padding: 8px; border: 1px solid #ddd;'>Cummins QSB6.7 Marine (Tier 3 / Tier 4 Final optional)</td></tr><tr><td style='padding: 8px; border: 1px solid #ddd;'>Operating Weight</td><td style='padding: 8px; border: 1px solid #ddd;'>18,500 kg (40,785 lb) - includes submerged ballast</td></tr><tr><td style='padding: 8px; border: 1px solid #ddd;'>Max Digging Depth (submerged)</td><td style='padding: 8px; border: 1px solid #ddd;'>5.0 m (16 ft 5 in)</td></tr><tr><td style='padding: 8px; border: 1px solid #ddd;'>Max Wading Depth (on chassis)</td><td style='padding: 8px; border: 1px solid #ddd;'>6.5 m (21 ft 4 in) - snorkel mode</td></tr><tr><td style='padding: 8px; border: 1px solid #ddd;'>Bucket Breakout Force</td><td style='padding: 8px; border: 1px solid #ddd;'>66.7 kN (15,000 lbf)</td></tr><tr><td style='padding: 8px; border: 1px solid #ddd;'>Hydraulic System Pressure</td><td style='padding: 8px; border: 1px solid #ddd;'>35 MPa (5,076 psi)</td></tr><tr><td style='padding: 8px; border: 1px solid #ddd;'>Track

Width</td><td style='padding: 8px; border: 1px solid #ddd;'>600 mm (23.6 in) - stainless steel</td></tr><tr><td style='padding: 8px; border: 1px solid #ddd;'>Max Travel Speed (submerged)</td><td style='padding: 8px; border: 1px solid #ddd;'>2.5 km/h (1.55 mph)</td></tr><tr><td style='padding: 8px; border: 1px solid #ddd;'>Fuel Tank Capacity</td><td style='padding: 8px; border: 1px solid #ddd;'>280 L (74 gal) - dual sealed compartment</td></tr><tr><td style='padding: 8px; border: 1px solid #ddd;'>Electrical System Protection</td><td style='padding: 8px; border: 1px solid #ddd;'>IP68 (5m, 72h) entire low-voltage harness</td></tr></table>