

MERIT İS MAKİNA SANAYİ LİMİTED ŞİRKETİ

HYDRAULIC BREAKER RAMMER 9033 – PISTON

TECHNICAL DATA SHEET 28 AUGUST 2026

Application	Hydraulic Breaker / Rammer 9033
Component	Piston
Material	SAE / AISI 4340 Alloy Steel (UNS G43400)
Compatibility	100% compatible with Rammer 9033 hydraulic breaker

1. DIMENSIONAL SPECIFICATION

Parameter	Specification
Maximum piston diameter	Ø 237.88 mm
Overall piston length	1303 mm
Dimensional tolerance	Manufactured to approved production drawing / OEM interface dimensions
Surface condition	Precision machined; functional sliding and impact surfaces finished according to production drawing

2. MATERIAL SPECIFICATION

Parameter	Specification
Material grade	SAE / AISI 4340 nickel-chromium-molybdenum alloy steel
UNS	G43400
Typical density	7.85 g/cm ³
Typical elastic modulus	≈ 200 GPa
Typical chemical composition	C 0.37–0.44%; Mn 0.55–0.90%; Si 0.10–0.35%; Ni 1.55–2.00%; Cr 0.65–0.95%; Mo 0.20–0.35%; P/S controlled to applicable material specification

3. RECOMMENDED HEAT TREATMENT – HEAVY-DUTY PISTON

Parameter	Specification
Preheat / stress relief	Controlled heating; avoid excessive thermal gradients in the large-section component
Austenitizing	830–850 °C; soak after core temperature equalization
Quenching	Oil quench, controlled agitation; quench immediately after austenitizing
Tempering	540–600 °C, preferably double tempering for heavy-section service; minimum 2 h per temper cycle after full temperature equalization
Cooling after temper	Still-air cooling to room temperature
Target core hardness	Approx. 32–38 HRC, subject to final design and service validation
Surface hardness	To be controlled separately where a surface-hardening treatment is specified by the production drawing
Heat-treatment control	Temperature uniformity, quench medium condition, distortion control and hardness mapping to be recorded for each production batch

Note: The heat-treatment values above are recommended manufacturing parameters for a large-section 4340 piston and should be confirmed by production trials, hardness mapping and mechanical testing on the actual 237.88 mm × 1303 mm geometry. Published 4340 data show that properties vary significantly with section size and tempering temperature.

4. TARGET MECHANICAL PROPERTIES AFTER HEAT TREATMENT

Parameter	Specification
Core hardness	32–38 HRC target
Ultimate tensile strength	Typically approximately 1,000–1,200 MPa for the proposed toughened condition; final certified value to be established by production test

Yield strength	Typically approximately 850–1,050 MPa; final certified value to be established by production test
Elongation	Target $\geq 12\%$ where verified by material/test specification
Impact toughness	Recommended verification by Charpy V-notch testing for production qualification
Hardness uniformity	Hardness survey across representative locations; no abnormal soft zones or quench cracks permitted

5. MANUFACTURING & QUALITY CONTROL

Parameter	Specification
Raw material certification	Material Test Certificate (MTC) / EN 10204 3.1 or equivalent, with heat/lot traceability
Dimensional inspection	100% inspection of critical diameters, length, interfaces and concentricity according to approved drawing
Hardness inspection	Core and representative surface hardness measurements after final heat treatment
NDT recommendation	Magnetic Particle Inspection (MPI) after final machining / heat treatment for crack detection on critical surfaces
Ultrasonic inspection	Recommended for large-section forged/bar stock to verify internal integrity
Final inspection	Visual, dimensional, hardness and NDT inspection before shipment

6. SERVICE & WARRANTY

Parameter	Specification
Application	Rammer 9033 hydraulic breaker
Compatibility	100% compatible – based on supplied application specification
Warranty	3,000 operating hours
Warranty basis	Subject to correct installation, lubrication, operating conditions and compliance with applicable maintenance requirements

7. MANUFACTURER

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8. TECHNICAL REFERENCE

Reference basis: Published AISI/SAE 4340 material data and heat-treatment references. 4340 is commonly supplied in quenched-and-tempered condition and is selected for high strength and toughness in large sections. Final production properties must be verified on the actual component.

DOCUMENT STATUS: MANUFACTURING TECHNICAL DATASHEET