ABEL RAMLOC™

ID / WP	5-1/8" 15k WP with 30,000 psi proof of design/concept test
Code	API-6A NACE MR01-75 ASME AISC ISO standard w/ databook COC
Service	Wireline, Coil and Snubbing
Side load capability	Calcs available upon request Axial: 500k without bending, 300k with sideload
FAILSAFE DESIGN	**6x features prevent inadvertent operations:** 1. LOCKOUT lock rams in closed position mechanically 2. LOCKOUT must be opened hydraulically 3. SHUTOFF is analog to block open pressure in the presence of WHP> 30 psi 4. Seal testing upon landing (seal is assured/tested) up to 15ksi 5. Liner position of rams displayed (like choke operations) 6. Open tool required two hand operation
Latch mechanism	2x ram blocks that bear on loading ring in the mandrel (each ram is 800k working shear load for 1600k total) SF = 2.0 (API SF is 1.5)
One ram closed	Meets API 15k SF Hydrotested to 15k in acceptance test Unit 1
Open time	Open (LOCKOUT disengage + Open) = **2 secs**
Close time	Close = **1 second**
Ram movement	Simple Hydraulic Cylinders 4" Cylinder ID, 2" Rod OD, Stroke 1.56" (open/close). 15.63 cu. in per cylinder or 256 ml or 0.25 liter or 0.72 beers
Locking security	LOCKOUT in each cylinder where lugs land in a race and one cannot retract until hydraulically disengaged
Lock visual confirmation	Cylinder rod is flush when closed and seen (yellow on black background) visually
SHUTOFF analog safety to prevent opening	WHP > 30 psi operates a needle valve in the cylinder open circuit (open pressure will not open cylinder in presence of WHP) Analog design work without power
SHUTOFF tool verification	Test manifold provided on tool for flushing WHP supply to SHUTOFF, Shell testing and proof of function off line
Panel open mechanics	Requires two hands (left to hold and disengage LOCKOUT right to operate 4-way handle)

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Seal test	**Test to 15k via test pump between seals after landing (Like quick test sub), time to 10k is 45 sec to 15k is 100 sec**
Seal port monitoring	After test seal port is monitored to know if seal failure gauge resolution 0.5% of display pressure 1 psi
Seals mounted inside hold-down	Dual Parker polypac-B Hydrogenated Nitrile seals interfaces to colmonoy #5 hard faced seal areas on mandrels
Mandrels	3x for wells 1x test stand with test flanges
Night cap	Upon request only, Instal valve with metal to metal seal
WHP and Seal Port gauge	20k electronic gauges and back up analog on test pressure
Panel design	Simple and straight forward with triple redundancy for accumulator and test circuits (2x air pumps 1x hand pump both accumulator and test) designed per API 16D BOP control. Sensors are Nicad batteries do not require power supply
Accumulator	Can open/close 6x times without accumulator recharge main air pump with 1x air and 1x hand back up
Utility display	Air Accumulator Manifold Compressor run status
Ram engagement display	Linear position indicator displays as per cent open or closed and pressure indication
Test stand	Test shipping stand for tool for offline testing in the field
Air compressor	Tier 4 final /ARB 23 hp Kohler diesel driver of a 18 hp RotorComp screw compressor 150 psi 40 cfm with 80 gal receiver with run status light & ESD on panel
Run mandrel up or down	ABEL prefers to run mandrel on well and hold-down moves well to well to save cost and complexity
Connections	API 5-1/8" 15k flange top and bottom
Equipment Spread	Panel hose basket with crash frame for storage/moving Air compressor skid with crash frame Test/Transport skid for tool Mandrel Shipping Skid with tool storage
Turn-a-round	Make ready after a 25 day job will 4 hours (checks and top up of oil, etc.) Can be made ready in field does not require return to base
1-atmospheric ball launcher	1.25 to 2.6" Ball with air operated at 140 ft from panel
Sales/Rental	For sale or Rent ABEL controls quality and training in all aspects

Note: The tool was field tested on 3x wells and performed 568+ stages, no failure and less that 0.5% NPT (all related to field operator error (client dictated who operated the tool not ABEL)).