



ULTIMATE ADJUSTABLE UPPER CONTROL ARM

DEVELOPMENT & MECHANICAL TESTING



NCOP VSB14 COMPLIANT

The Australian government Department of Infrastructure, Transport, Regional Development, Communications, and the Arts, is the government department responsible for managing vehicle compliance within Australia. In 2011, the department laid down the National Code of Practice (NCOP) for Light Vehicle Construction and Modification (VSB14) which provides the technical requirements that need to be met when modifying or constructing a vehicle. In VSB14, there are 4 load cases that a steering, or suspension component must surpass for compliance, these are:

1. SUSTAINED BUMP LOAD
2. SKID LOAD
3. OVERTURNING LOAD
4. FATIGUE LOAD

These load cases have been developed to replicate a catastrophic event and are based on the vehicle-specific axle load, for example, the original Toyota Landcruiser 200 series specification is 1630 kg, while the maximum GVM upgrade capacity is 1960kg.

Blackhawk always uses the maximum available axle capacity known (1960 kg in the above example) as the foundation of all calculations and analysis. This ensures our product is not only legal but more importantly safe for every user.

UNSURPASSED DEVELOPMENT AND MECHANICAL TESTING

The Blackhawk Ultimate range of upper control arms has gone through more testing than any other UCA on the market.

Each Blackhawk Ultimate Adjustable UCA has been through an extensive process of design and refinement to perfect the steering geometry, suspension/vehicle clearance and fitment. This process utilises 3D scanning to develop a dynamic suspension model, the model in conjunction with real world wheel alignment is used to identify the required caster and camber changes, as well as the spatial constraints for the UCA. The resulting design is then 3D printed and fitted to the vehicle to confirm fitment, clearance and validate the steering geometry.

The final Blackhawk Ultimate UCA design then go through multiple Finite Element Analysis (FEA) simulations and an extensive adjuster focused physical and destructive testing regime. This testing ensures that the Blackhawk Ultimate UCA's not only comply with VSB14 but are the strongest adjustable UCA on the market.

Blackhawk Ultimate Adjustable UCA passing fundamental testing processes.



FEA result of the UCA showing Von Mises stress distribution illustrating the product design mitigates stress loading before material yield.



Simulated suspension for Finite Element Analysis showing all contact points to comply with NCOP VSB14 requirements.



Independent test results from a NATA accredited facility are sought. By using an external testing service this validates the work & materials sourced without any bias.

Item identification	Specimen ID	Dimensions (mm)	Max force (kN)	Fracture position	UTS (MPa)	0.2% Proof Stress (MPa)	% E	% ROA	Test result
BHU3841T-101	Specimen 1	8.18 Ø	18.35	Outer third	349	328	13.3	NA	RP
				Requirements	Minimum	NA	NA	NA	NA
					Maximum	NA	NA	NA	NA

Laboratories for Materials Advanced Testing Services is an independent NATA accredited facility.
 Legend: C - Comply, DNC - Did Not Comply, NA - Not Applicable, RP - Report Findings, UTS - Ultimate Tensile Strength, PS - Proof Stress, ROA - Reduction of Area, E - Elongation

THE ADJUSTER HAS BEEN THROUGH 4 DIFFERENT DESTRUCTIVE TESTS

- 1 A skid load simulation returned a result 47% above the VSB14 maximum value.
- 2 An overturning load simulation returned a result at least 24% above the VSB14 maximum value. The test jig failed before the Blackhawk Ultimate UCA!
- 3 A fatigue analysis in skid and overturn produced a result that reached 100000 cycles with no degradation.
- 4 A torsional load test of the threaded insert to failure, which resulted in the shear failure of a 30mm bolt and no sign of failure in the joint.
- 5 Sectioning of the arm to validate bonding to insert

The result of these tests shows that the Blackhawk Ultimate Adjustable UCA far exceeds the regulatory minimum and can handle the worst terrain your 4wd can negotiate.



SUPERIOR QUALITY AND STRENGTH

Blackhawk has gone to the next level to ensure that the Blackhawk Ultimate UCA is the market leader, by utilising premium materials, treatments, and coatings.

The main arm section is manufactured out of heat treated forged 6082 Aluminium. The arm is then CNC machined and finished with a highly durable black E-Coat. This gives you unparalleled strength to weight, dimensional consistency, and long-lasting appeal.

The adjustment and locking mechanism are manufactured out of high-strength nitrided 4140 Chromoly alloy steel, this gives you a strong, hard, and durable locking mechanism with a finish that can withstand the harsh off-road environment.

The bush apertures are manufactured out of high-strength 4140 Chromoly alloy steel then precisely CNC machined which is finished in highly durable black E-Coat.

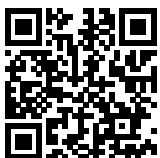
All these components have been through rigorous chemical, mechanical, and salt spray testing to ensure they are up to the job of providing you with the absolute best product on the market.



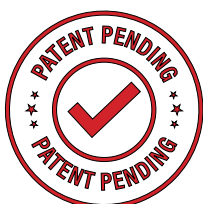
ADDITIONAL COMPONENTRY

These arms are complemented with a high-quality sealed CNC machined 6061 Aluminium ball joint cap, rubber bushes that maintain OE level NVH characteristics and durability, and a custom ABS lead mounting system.

The arms are supplied with their own alignment rod for on bench adjustment and a pair of 4140 custom spanners for turning and locking the adjustment mechanism.



SCAN TO VIEW THE
BLACKHAWK ULTIMATE
ADJUSTABLE UCA IN ACTION



ENGINEERED TO PERFORM
OFF ROAD READY

