



With help from a dedicated light laboratory, **ALLAN WHITING** and some *4X4 Australia* staff assessed the relative merits of the most popular aftermarket lights. ProComp's Paul van Winkel oversaw the evaluation

Our driving light tests over the years have shown that price is often a poor guide to light performance, because some of the most expensive lights on the market are average in performance and some of the cheaper ones perform brilliantly.

It's clear that 4X4 owners need more information from light makers than wattage and references to reflector and lens shape that only lighting engineers understand.

Looking at a light will tell you if it seems to be well made and if its mounting bracket is substantial, but it won't tell you much about its performance.

The most confident light-makers have supporting literature that shows approximate light patterns on the road surface and pattern distances in metres. The less-informed ones have similar diagrams, but there are no distance marks on the pictures. However, even such diagrams can be 'fiddled' because light intensity is very difficult to quantify.

When evaluating auxiliary lights, it's important to remember that your headlights should illuminate the road out to 200 metres-plus. If they don't, you should start your light-improvement job with a pair of replacement headlights or upgraded globes. Leave the weak headlights as they are and add a pair of brilliant auxiliaries and you'll be plunged into near darkness every time you have to flick down from high beam.

The most popular aftermarket lights are medium-sized round units and that was what we asked for from the country's major light suppliers. Most quickly supplied what we wanted, but Cibie and Bosch declined to participate.

The black art of lighting up the backblocks has produced a vast array of driving lights, but selecting a pair of night vision aids is not as easy as it should be. As with the purchase of wheels or tyres, appearance often influences the buyer, rather than real-world performance.

Here we have tested the aftermarket lights to see which can cut through the darkness efficiently and which cannot.

▶ PICS BY STUART GRANT

REFLECTORS AND LENSES

■ Unlike a household light globe, a 4X4 headlight or auxiliary light needs to be directional. The light from the bulb acquires a specific direction and shape, to illuminate the road and its edges well ahead of the vehicle.

A pencil beam usually relies solely on reflector shape and finish for beam direction, and has a plain lens. The best spread-beam lights we've tested over the years use shaping of the lens – fluting or bars moulded into the glass – to bend the light from the reflector into a shorter, wider shape. Achieving these specific beams is up to the skill of the light designer and the quality of the manufacturing process. Plain-lens spread beams are available, but our testing shows that they aren't as controlled as moulded or fluted lens beams.

Projector driving lights are a recent development. These designs use an elliptical reflector and a magnifying lens to produce the light beam. The principal advantage of projector lights is their small diameter, enabling them to fit into the low-profile front of modern cars.

Projector lights produce an even light beam, but the penetration is limited.

Free-form lights are now de rigueur in new 4X4 vehicles. Fashion dictates that modern headlights have clear lenses, so in this design type the reflector does all the beam shaping. Free-form lights give a reflector shape that produces a low-beam light without the need for a restricting cut-off shield or shaped lens (used in conventional lights to avoid dazzling oncoming drivers). Thus, a free-form light produces more low-beam power from the same-sized bulb.

However, as our testing shows, free-form lights lack the beam precision necessary in long-distance spread-beam lights.



WHAT WE TESTED

■ By far the most popular choice of 4X4 owners is the medium-sized round pair. These lights have a diameter that's less than 200mm and that's what all but one of our light suppliers provided. The exception was the rectangular KC set.

Most light-makers recommend a pair that combines a pencil-beam light for maximum-distance illumination and a spread beam, to light up the road edges. Some four-wheel drive owners prefer a pair of pencil beams.



→ Hella 160

■ Hella's price-leading, medium round light is the 160 model. Its housing is made of plastic, with a linear mounting bolt and a press-in, glass lens bonded to a polished, metallic reflector. The lens and reflector assembly is held in place by a hinged plastic tab at the base, with an attachment screw. The test pair looked identical in reflector and lens shape and came with the same 100-watt globes.

The Hella 160s are packaged with opaque covers, wiring, a relay, dashboard switch and a wiring diagram.

■ The 160 pair has a RRP of \$219.



→ KC 69

■ The test pair consisted of a pencil-beam and a spread-beam, both fitted with H3 100W globes. The KC 69 rectangular lights have chromed metal housings and glass lenses. The lenses are retained by screw-on metal bezels. The KC mounting is a 12mm bolt, set in a spherical mount that's rivetted to the housing and fitted with fat metal and plastic washers.

The KCs had no wiring kit, but were packaged with padded vinyl covers.

■ The KC pair has a RRP of \$300, plus \$50 for the loom kit.



→ Narva Ultima 175

■ We tested Standard and Blue Ultimas with 100W globes: each a pencil-beam and spread-beam pair.

The Ultimas have a plastic housing and moulded spherical mounting foot with a 10mm bolt. The glass lens and bonded metal reflector assembly presses into the housing and are locked in by a top-mounted tab and screw.

The Narvas come with wiring, relay, connectors and an installation diagram.

The standard clear polycarbonate covers can be used to protect the lenses when lights are on, provided there is airflow to stop them overheating.

■ The Narva Ultima 175 Standard pair has a RRP of \$180 and the Blues have a RRP of \$225, including clear protective covers.

WHAT WATTS?

■ Most auxiliary light buyers and light sellers rely on the wattage rating of a driving light or spread-beam when rating aftermarket equipment.

If vehicle lights were similar to household lights that would be a reasonable procedure to follow, but vehicle lights differ in a very significant way from house lights. When you buy a new globe for your house, you don't expect it to be 'directional', unless you're buying outside spotlights or indoor 'down' lights. Vehicle lights need to be directional, in a precise way, and that's where the science comes in.

This directional shaping is done by the reflector, in its finish and shape and, in the case of most spread beams, from the lens fitted to the front of the light.

Our test showed that the 65-watt-powered IPFs gave superior all-around performance to the 100-watt models.



It is crucial that vehicle lights are directional in a precise way



→ IPF 900XS

■ The IPF pair came with 65-watt globes. The new GE globes are unlike any of the others we evaluated. The test pair came as a pencil beam and a spread.

These lights have metal housings and bezels, with glass lenses. The mounting is linear, by way of a captive bolt inside a cap that's rivetted to the housing.

The installation kit is comprehensive, including a complete loom, relay, two fuses, connectors, cable ties, a stylised dashboard switch and instructions and diagrams for positive and negative high-beam switching.

Because of the unique globes and relay it would be advisable to carry spares in the vehicle.

■ The IPF 900XS pair sells for a RRP of \$399, plus \$35 for the clear covers.



→ Lightforce 170

■ Lightforce lights allow beam focusing. They also have clip-on 'filters' or lenses that can further customise the light pattern.

The housings and mountings are moulded glass-filled polyamide and polycarbonate and the lenses and filters are Lexan polycarbonate. The watertight housings also have GORE-TEX membrane breathers.

The mounting is linear and the light foot is reversible, to allow for installation in tight situations.

The Lightforce 100W globes are different from conventional ones, having two push-in terminals, so it would be advisable to carry spares.

■ The 170 pair comes with globes and wiring for RRP\$359. A loom with relay, switch, waterproof fuse and a wiring diagram is available for \$55.



→ Hella Rallye 1000

■ The Hella Rallye 1000s have metal housings and bezels, with plain glass lenses and free-form reflectors. Although one light was a spread beam and the other a pencil the reflectors looked the same, but there are subtle, inbuilt differences. The lights are numbered to allow correct identification.

The Rallyes came with 100W globes, a choice of plastic or aluminium mountings, 10mm bolts and Allen keys to adjust the alignment. An optional accessories kit includes wiring, relay, switch and fuse.

■ The Rallye 1000 pair has a RRP of \$310.

Unfortunately, we couldn't get hold of a pair of the forthcoming Rallye 4000, 170mm lights, but we'll evaluate them as soon as they're released.

→ PINK IS 'HOT'

■ The old adage – the camera doesn't lie – no longer applies in this digital age. The laboratory photos should be used as illustrative images only, not as a light 'map', because the camera 'sees' differently from our eyes.

The best performing lights show up in the photos as noticeably pink, but that's not what your eyes see out on the open road.

If you 'think pink' when comparing the beam photos you're on track to select the most powerful lights.



Think pink when you're comparing the beam photos



HOW THEY PERFORMED

■ The light laboratory we used for comparison had a light stand at one end and a white wall at the opposite end. In between, the floor, ceiling and walls were dark, non-reflective surfaces. The height and width of the white wall represents the useful limits of long-distance and spread-beam lighting.

From our previous experience with testing laboratory light patterns we know that the best pencil-beam lights have a

definite 'hot spot' in the centre of the combined-light beam, with little diffusion into the bands of lesser intensity. The best spread-beams show flattish concentrations of light around a shallow-oval centre, fanning out to around 10 degrees either side of centre.

Less effective pencil-beams have a wider diffusion of light, without a central hot spot, while some of the less effective wide-spreads spray light over a very wide angle, losing intensity in the process.

LIGHTBEAM 001



→ Hella 160

■ As we expected, the Hella 160s displayed two identical beams, without much central 'heat', making them fine for middle-distance illumination.

LIGHTBEAM 002



→ KC 69

■ The KC pair is a good pencil and spread combination, with more distance penetration than the Hella 160s, but less spread definition.

LIGHTBEAM 003



→ Narva 175

■ The Narva 175s gave a central hot spot and medium-width spread that made them suitable for middle- to long-distance lighting. The Blue versions had more distance and better spread definition than the standard lenses, but slightly less spread area.

LIGHTBEAM 004



→ IPF 900XS

■ The IPFs were the stand-out pair of lights, with a 'hot' pencil beam and a wide, well-defined spread. This pair was the best set of IPF lights we've tested over the past 20 years.



→ MAKE SURE THEY'LL FIT

■ There's not much point settling on a pair of spotties and then discovering they won't fit your bar.

Vehicle registration authorities in some states are policing light fitments that project beyond the front profile of the vehicle or the bullbar.

The spirit of this policing is to ensure that there are no sharp projections that could harm pedestrians in a collision, so if you want to stay within the letter of the law and be a good 4X4 citizen, you should ensure that your new lights will



comfortably fit within the profile of your bullbar profile.

It seems that part of a light may project ahead of the bullbar, provided it can bend back freely within the bar profile in the event of a 'knock'.

Another fitment factor you should consider when choosing a set of driving lights is the difficulty of adjusting and tightening them on some bullbars. Make sure you're going to be able to access the adjustment nut(s) or capscrews once the light is in place.

You should ensure that your new lights will fit within the bullbar profile



→ Lightforce 170

■ There are many options with these lights. For example, one pencil and a combo filter on the other light gave a hot centre with a diffused spread. Changing the focus broadened and weakened the centre spot and tightened the spread beam diffusion. Two pencil-beams gave two hot beams with good middle-distance combo of pencil and spread functions.



→ Hella Rallye 1000

■ The free-form reflectors in the Hella lights didn't control the beams as well as the conventional lenses and reflectors used by IPF and Narva. The centre hot spot was bright enough for good middle-distance performance, but the spread was somewhat diffused.



TEST SUMMARY

■ For bush-touring 4X4 applications the best performer was the IPF 900XS pencil- and spread-beam combination. The IPFs had the 'hottest' long-distance centre spot and the brightest, best-controlled spread beam.

Next best in the touring light category

was the Narva Ultima 175 'blue' version, with slightly less penetration and spread. This pair sells for less than \$200 – around half the price of the IPFs – making the Narvas our value-for-money choice.

The Lightforce 170s offer flexibility and legendary competition-bred durability; these are qualities that endear the

Lightforce range to people who want to tailor their light patterns – particularly in multiple-driving-light installations.

In Part 2 of our light test, we'll look at the kings of off-road lighting – high-intensity discharge (HID) driving lights. This light test will appear in the October 2005 issue of *4X4 Australia*.