THE BENEFITS OF USING HIGH QUALITY BRAKE PADS AND FLUID

Brake Dust

This is horrid stuff, unsightly & damaging and difficult to remove. It is a relatively modern phenomenon.
Modern quality brake pad compounds are a complex mix of sometimes more than 30 different elements - each of which is there to do a specific job: - temperature control, friction level, abrasion etc. The whole has to wear and perform well under all conditions; it can be surprising how a small change in one element can affect compound performance. Details of compounds/mixture formulae are very closely guarded secrets. However much of the binding material used is of organic origin (petro-chemical based resins), which will literally burn, as pads get hot. This 'burning' is known as carbonisation and is a main source of black dust.

Brake Fade

At these temperatures wear rate will increase significantly. Carbonisation also causes gases to be released - these gases cause the pads to 'aqua plane' on the gas film between the pad and the disc. This phenomenon is called brake fade and with some (cheap) pads will occur at surprisingly low temperatures (as low as 200° c!). Quality pads such as Mintex will usually be good for 500° c or higher.
In road use temperatures rarely exceed 350° c but in race use 500-600° c is common in smaller cars but longer races and/or heavier cars can see 1000° c +. Pads are available to cope with these temperatures but usually do not work well enough when cold thus making them unsuitable for road use. Moral - do not choose race pads because a driver thinks he is a hot-shot!

Compounds

At one time asbestos fibres were used to bind the compound - this is now illegal so the substitutes are steel fibres or, uniquely to one manufacturer, aramid fibres such as Kevlar. Aramid fibres have a high unit of strength (6 times as strong as steel) and produce a high quality non-ferrous compound but of course this is only one of up to 30 compounds making up the friction material that must work as a whole. A surprising amount of wheel dust is actually ferrous particles from the disc - this is due in part to the ferrous/ferrous pad/disc contact and also the softer metals used in modern car discs. The old asbestos pads were largely non-ferrous - do you remember dust such as we see today? Not me.
Interestingly it is the ferrous content of the dust that reacts with the aluminium wheels or paint lacquer and makes it so difficult to remove. It all makes non-ferrous pads seem all the more a desirable option.
In braking performance terms the single most important factor is the quality of the friction material. Compounds can vary considerably, as above, but so can the sheer "grip" of the pad. Grip is measured as the co-efficient of friction (measured as a µ value). Typical friction levels of original pads vary from 0.25µ to 0.35µ. Cheap aftermarket pads may not even reach these values but the quality pads described above usually have values of 0.40µ or higher as an average across the whole operating temperature range. You can definitely feel the difference. As with most things in life you get what you pay for…. spend wisely! Always buy quality pads from a well-known brand preferably with significant motor sport history.

Mintex Pads

From our experience in motorsport and road testing, we use Mintex as our pad of choice.

Bedding in and Maintenance

Brakes are a safety critical item - after fitting new pads drive with caution to allow pads to 'bed-in'. It can take up to 500Km (300 miles) for pads to bed in properly. Follow the following procedure to ensure you get the best from you pads and discs: -

- Make 3 light brake applications from 80 to 50 km/h (approx 50 to 30 mph) using normal acceleration up to 80 km/h (50 mph).
- Make 3 medium brake applications from110 to 60 km/h, (approx 70 to 40 mph) using normal acceleration up to 110 km/h (approx 70 mph).
- Make 2 hard brake applications from high speed down to 50 km/h, (approx 30 mph) again using normal acceleration.
- Drive for a further 8 kilometres (5 miles) with minimal brake use.
- Stop and allow the brakes to cool.
- Drive a further 8 kilometres (5 miles) with normal brake use.

Pads should be checked for wear every 5000km (approx 3000 miles) and replaced when the friction material reaches 3mm (1/8^{h} inch) thick. Pad life can vary enormously depending on quality, load, use and not least driver style! Never fit new pads onto worn or scored discs - bedding in will be extended by hundreds of Kilometres and braking will be poor whatever pad is used. When fitting new pads always clean the friction surface of the disc to remove any previous pad deposits and contamination. If it comes to new discs then always use new pads. Any scoring from old discs will be transferred to the new discs by reusing the old pads - so it's back to square one i.e. always new pads please. These days it is hardly worthwhile having discs skimmed - the labour & machining charges will probably approach the cost of new discs.

Disc wear allowances are low enough to mean that any skimming will reduce the disc to its minimum thickness anyway.
As an example a TR disc new is 12.7mm thick - it's replacement thickness is 11mm - at or below that level the disc will heat up too quickly. This is wear of only 1.7mm i.e. 0.85mm each side; not much at all!

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Track days

More popular than ever - we are often asked to advise on pad selection - we can usually find an answer but pad choice can be different for the same model car, same circuit - it's usually the driver style that makes the difference - you need to be honest! Drivers are getting quicker, cars more specialised and track time sessions longer so a trend now is for keen drivers actually to buy two sets of pads:

a) Fast road for general use.
b) Race pads for the track day.

Remember to bed in your race pads. You can do this on the road for a few days then take them out and only refit immediately prior to the track day. Do remember that the initial 'bite' of the race pads from cold will be poor so make allowances. Check pads regularly during the track session and certainly before the drive home.

Brake fluid

Condition of fluid is very important. Use high quality fluid Polyglycol Dot 3 or Dot 4 for road use and use the same grade for top up or replacement. Always use proprietary grade fluids. If you are competing or using the car in arduous conditions such as track days or alpine work, then use Girling SRF fluid (order part number RTR5116). Silicon brake fluid should only be used in light duty applications. It does of course have the advantage of not ruining your paintwork if spilt. REVINGTON TR supply silicone brake fluid in 0.5ltr bottles under part number RTR4052 and in 1.0 ltr bottles under part number RTR4053.

Brake fluid typically deteriorates (contaminates) by approx 15% per year. Polyglycol fluid is hydroscopic meaning it can (and will) absorb water. Silicone fluid is not hydroscopic, but the water that enters the hydraulic system during use will live in the lines separately as it is not miscible with silicone fluid. Either way the system should be flushed through and filled with new fluid at least once every two years. Old fluid (with maybe 30% water) will boil easily (dangerous), and/or give a spongy pedal (not good).

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