



Manufacturers, including Stihl and Husqvarna, will always recommend their own brand two-stroke oils. In the past, it could be argued that any 'quality' alternative could be used, but these days it can pay to stick with the oil recommended by the manufacturer, particularly with Stihl 4-Mix and Husqvarna E-tech power units. Why? Simply because the power units are tested with these oils, different additive packages within modern oils helping to meet certain engine features

DIFFERENT STROKES FOR DIFFERENT FOLKS

By James de Havilland

The engines that power brushcutters, and increasingly other items of kit like hedge trimmers and blowers, continuously evolve. Modern two-strokes seem to get quieter, smoother and more fuel-efficient almost year on year, and there is also a choice of true four-stroke and 'hybrid' two/four-stroke power to consider.

True four-stroke engines in this category are no longer big news, but there is still reluctance to buy into these engines among professionals. The reasons why can include power delivery and costs; four-stroke power doesn't come cheap, with a brushcutter of say £400 competing with a two-stroke equivalent that could be perhaps £100 or more cheaper for the same power and performance.

That said, a four-stroke powered brushcutters tends to be cheaper to fuel with the added advantage of doing away with the need to pre-mix the fuel. Having the lubricating oil in a sump, however, poses its own set of problems. Forget to check the oil or neglect change intervals and the engines longevity is compromised. Some engines also need to be stored horizontal to avoid the problem of oil filling up the cylinder; this can lead to some frustration when the machine refuses to turn over, let alone start.

It is also clear that a significant proportion of professionally operated four-stroke brushcutters are fuelled with a two-stroke petrol mix. It is too risky to have different fuels in use when the brush cutter fleet is made up of two- and four-stroke powered machines. This may be at odds with the aim of cutting down emissions as oil in the mix will increase a four-strokes emissions, but practicalities take priority. In fact many dealers suggest running a four-stroke brushcutter on a two-stroke mix is a good idea as it helps keep the engine lubricated if the sump oil level drops below optimum levels.

A useful compromise are 'hybrid' engines that run like a four-stroke but are lubricated like a two-stroke. Now well established in the market, pre-mix four-stroke motors, such as the Stihl 4-Mix offer the fuel economy of a four-stroke with the ease of care associated with a two-stroke. For many they are a happy compromise between the two.

Emissions and the future

Emission wise, two-strokes struggle to match both conventional and pre-mix four-strokes because even the best engines are unable to have as clean a combustion cycle. It is just a factor of their design. Pre-mix

four-strokes are cleaner running, but as they rely on oil in the fuel for lubrication it follows that they too will not match a 'pure' four-stroke for cleanliness.

Emissions are important as these determine how modern engines are designed. In some instances, modern clean running units are actually more fuel-efficient and powerful than the 'dirty' designs they have replaced; a case in point are modern automotive diesel engines. But this is not quite the case in all engines, particularly small petrol power units where carburettors have to be used.

Manufacturers have cleaned up smaller engines by refining combustion chamber and port designs plus fitting tamper proof, precision engineered carburettors. But this can only go so far. Although there are those who suggest two-strokes are likely to be phased out because they will never be clean enough, talk of their demise is misleading.

'traditional' mineral based 25:1 oils. Modern two-stroke oil formulations mix well with unleaded petrol and will clean, lubricate and cool an engine that may be running at speeds in excess of 14,000 rpm. Older mineral oils could separate out of the petrol mix if not agitated and it would not be suitable for use in a modern close tolerance, high speed two-stroke power unit.

The problem is that there are some low purchase cost oils on offer that claim to offer modern 50:1 oil advances but are inferior to branded alternatives recommended by engine manufacturers. In some cases, these low cost oils are pretty similar in specification to the 40:1 oil developed as an alternative to 25:1 mineral oils commonly used into the early 1980's.

In a 'low-tech' two-stroke, these 'cheaper' oils may well be acceptable. Use them to lubricate a modern professional brushcutter or chainsaw, and the oil will not be up to the job. The engine may not seize and it



Honda have long championed four-stroke power, the company offering this type of power unit in traditional two-stroke sectors, such as outboard motors, long before anyone else. The company was among the first to put a four-stroke engine on a brushcutter too, the company's current UMK 435 model featuring a 1.6hp power unit that is a true four-stroke designed to operate on straight petrol. It is priced around £420 inclusive

Certain applications may see the gradual phasing out of two-strokes, as is already tending to be the case with pedestrian mowers. But two-stroke chainsaws and professional brushcutters are a long way from being confined to the history books. Legislators may well set out the emission rules and targets but they cannot ban a certain type of power unit if there are not alternatives to viably replace them.

Two-stroke engine exhaust catalytic convertors, incidentally, can make working with this type of power unit less unpleasant. They are not really aimed at cutting emissions in the same manner as automotive systems.

The right oil

Two-stroke oil is one of those subjects that is often discussed but frequently ignored. Quality 50:1 two-stroke oil is far removed from

could appear that all is well right up until the engine starts to misbehave. But signs of poor oil performance can include smoke in the exhaust emissions, residues forming around the silencer outlet, uneven idling, hot running leading to fuel vapour lock and poor starting from hot.

When buying two-stroke oil, it is important to check its specification meets the demands of the engine it is to lubricate. Where possible, stick with the same brand for the life of the engine. Although there are those who argue otherwise, it also pays to buy 'quality' petrol. The additives present in brands like Shell and Texaco do differ to those used by some supermarkets. Although these are designed to improve a car engine performance and particularly keep fuel injection systems clean, a decent petrol may improve hot starting performance and engine idling because it is less liable to 'go off'. On the flip side, using higher-octane super unleaded petrol with a will not bring any benefits.

Pre-mix four-strokes – how they operate

In outline, a pre-mix four-stroke engine operates on a conventional four-stroke cycle but does away with the oil sump. Lubrication is provided by using a conventional two-stroke petrol oil mix. Instead of this mix entering the engine directly via the inlet valve, it is drawn from the carburettor into the crankcase where it lubricates the crank and valve gear. The mix then passes via a port up to the intake valve, which opens to let it into the engine.

This simplifies what is a somewhat more complex process; there are subtle differences between the Shidaiwa and Stihl designs too. But the basics are the same, and from the end users standpoint the engines can be operated pretty much like a conventional two-stroke. This means they can be run, and equally importantly, stored at extreme angles without problem.

Why legislation has helped boost dependability

The need to both clean the emissions and noise generated by small air-cooled two- and four-stroke petrol engines may have cost manufacturers a great deal of money, but for the end user the results have led to more than just cleaner and quieter powerplants. Modern units are more reliable and fuel-efficient too.

Although it would be wrong to suggest the small petrol engines that power everything from clearance mowers and brushcutters through to generators and small ride-on mowers are perfect, most users would agree that these engines are typically reliable and, as a result, almost taken for granted.

Interestingly legislation can, in a way, be thanked for this. Modern power units run on a lean fuel mixture to ensure emissions are kept to a minimum; by burning less fuel, fewer pollutants are produced and consumption is also cut. To achieve this, modern carburettors are produced to exacting tolerances and, in most cases, are also 'tamper proof'. This, in itself, can boost reliability as it reduces the chances of the carburettor being set-up incorrectly.

Add the almost complete disappearance of contact breaker ignition systems, which need routine attention to ensure reliable sparking and perfect timing, and it is little wonder a modern small petrol engine is less likely to give trouble. In most cases, clean oil and filters, plus the odd sparking plug, are all that are needed to keep an engine running sweetly.

When modern carburettors do need attention, however, they can be more difficult to service. Small drillings and jets will always be liable to block or gum up with deposits from the fuel. With an old style carb, a blast of compressed air could be used to clean it out and not do any damage. Doing this on a small and delicate modern carburettor may still work, but it can be ineffective and actually damage the fine drillings and jets now in use.

Ultrasonic equipment, such as the Ultrawave system, is now accepted as the best way to clean a modern carb. The carburettor is immersed in a cleaning solution, with ultrasonic waves creating millions of bubbles within the fluid that 'explode' within the fine drillings and jets of the carburettor. Because they are minute, the bubbles can reach every nook and cranny of the carb and really clean it thoroughly.

There is no 'physical' abrasion with these systems either, so the carburettor is not subjected to any wear that can enlarge any of the apertures. In most cases, a carb cleaned by this type of system will perform 'as new' on replacement. Where it does not, a new unit will typically need to be fitted. Apart from fitting new diaphragms, repairing a faulty carb is increasingly no longer viable or possible.



Stihl offers its 4-Mix power unit on brushcutters with power outputs from 1.3 to 1.9hp, with prices starting at around £320 for its entry level FS 87 and topping out with the FS 310 at £550. The pictured KM 100 R power unit is part of the Stihl CombiEngine line-up. It can be used to power brushcutter, hedge trimmer and brush attachments. Prices from £300 plus attachment