For countless years, Jon Kaase Racing Engines has dominated 820cu in Pro Stock Mountain Motor competition in the States. A quiet, unassuming man, Kaase has a formidable reputation for wringing every pound-foot of torque from a Ford-based big-cube hemi. Based in Winder, Georgia, his specialist firm has claimed a dozen or more IRA Pro Stock championships, an NHRA Pro Stock championship, and four unprecedented victories in the Engine Masters Challenge, an annual competition held each October in Ohio, where leading race engine builders compete in a power war against each other with approximately 6,000 full-service engine shops in the States and around 15,000 engine builders, it is Kaase’s name that fields prominence.

But his prominence was greatly extended by those four victories in the Engine Masters Challenge; it brought Kaase huge credibility and exposure to the hot rod and street-strip markets, mass markets that Kaase knew little of. Unsurprisingly, news emerged last year that, though the illustrious firm would continue to maintain their Pro

Because cylinder bore diameters on these Nine engines are available from 4.360in and increase to 4.600in, bare block castings arrive with bore sizes usually around 4.340in. Hence the first step in building every Boss Nine engine is boring the engine to almost the designated size. Correct cylinder bore sizes are achieved in the second step, honing.

The boring process of each cylinder typically involves eight or nine cutting operations, each cut removing approximately 0.030in of metal. Once all the machining procedures are complete, the block is de-burred, particularly around the bottom of the cylinder bores. If this vital step is missed, the piston, while at bottom-dead-centre, could abrade itself on a burr and suffer severe damage. The oil passages are also checked and deburred, especially in the area of the lifter bores. De-burring the oiling passageways not only protects the engine from the detrimental effects of swarf but also improves oil pressure.

The next step involves washing the block, the internal bores, and the galleys with mineral spirits, using long-handled wire brushes. Finally, the block is washed again with hot soapy water then dried with compressed air.
Stock race engine programs, they would not be seeking new customers. Instead, they would develop a new range of hot rod and street/strip engines. These engines would be constructed from cast iron or cast aluminium crankcases, they would be 365-series Ford-based with standard 10.3:1 deck height and hemi cylinder heads. They would contain all of the technology gained from a quarter century of racing achievement, and they would be called the Kaase Boss Nine.

These engines are specifically constructed to produce the power output, the displacement, and the characteristics that appeal most to the customer. Hot rodders, for example, usually prefer 300 to 700 bhp on pump fuel with hydraulic roller camshafts and street drivability. In contrast, street/strip users might prefer more power and boat racers are likely to demand in excess of 2,000 bhp.

Here are the first pictures of Boss Nine motors being prepared and assembled. Though there are three different types of crankcase employed (the standard cast-iron 365-series, the latest Ford Racing SVO cast-iron, and the cast aluminium), most of the photographs depict the Ford Racing SVO block.

The advantage of the SVO cast-iron crankcase over the standard 365-series Ford cast-iron crankcase is strength. The SVO is enormously robust and fitted with screw-in freeze plugs to prevent any water leaks on track. It is designed to transmit over 2,500 horsepower. The advantages of the standard 365-series crankcase over the SVO option are numerous. It is lighter in weight, it is readily available, and it costs much less to acquire (typically US$350). Incidentally, the 365-series nomenclature was originally adopted by Ford because of its stroke length which measured 3.850 inches. The advantage of the cast-aluminium block is obvious, it is 85 to 105 pounds lighter than its cast-iron counterparts and is ideally suited for track-day cars like the AC Cobra. At the other end of the power spectrum the aluminium block has the strength to transmit 2,500 horsepower, but it is the most expensive of the three options. However, it has no discernible power advantage over its cast-iron options. In fact, the structure of the two cast-iron versions might be a little...
more stable as they are subject to lower expansion rates. Though engine displacements are available from 429 to 600 cubic inches, the most popular displacement is 520ci because the parts are readily available. It is the most cost-effective Boss Nine to build. Finally, these engines bristle with advanced features, not least their high-flowing hemispherical cylinder heads. Kaase’s production director, Cliff Moore, comments, “The Boss Nine heads feature three-quarter-inch-thick decks, which are indispensable if you have high compression or if you’re using a power adder (nitrous oxide, turbo, or blower). Substantial deck surfaces protect cylinder heads from warping or burning.” Stacey David, TV host of the popular US hot rod magazine show, Gearz, says, “The Boss Nine is going to blow people’s minds when it hits the air waves. Installed in a ’67 Cougar, our project is called the V8 Interceptor. Its theme is based on the movie Mad Max.” Stacey is quick to explain, “This is not a clone, but it is the flavour of a Mad Max car, the ‘baddest’ machine on the road! And the Boss Nine fits the bill better than anything I know.”

Silicone sealer is applied on both sides and on both ends of the cylinder head gaskets around the oil drain-back holes to ensure a leak-proof seal. Then the cylinder heads are installed. Ten tough 12-point Grade-10 cylinder head bolts are coated with assembly lube on their threads and under their heads and tensioned to 110 lb ft.

Camshaft specifications vary. Most hot rodders use a hydraulic roller while the racers use a solid roller. For supercharged applications, a camshaft is chosen that minimizes inlet plenum jerking and bucking at off-idle and part throttle in the lower gears. For Boss Nine-powered boats a camshaft with wide lobe separation is necessary to ensure a low idle speed. This feature enables easy dock maneuvering and trailer backing. Note: Aluminum Boss Nine crankcase pictured.

The timing gears and chain are installed with an optional eccentric fuel pump drive cup. Five types of intake manifold are available for the Boss Nine: 4150 or 4500 or Tunnel Ram-style carburettors, Keith Wilson’s EFI conversion, or Hilborn stack injection. Four-barrel carburettors are still used in hot rods and driven most weekends with enthusiasm.

Here you can see the trial fitment of the Boss Nine in the 1967 Cougar engine bay. The project page has its own page on Stacey’s website: www.staceydavid.com/projects/cougar.htm

SOURCE
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