



# REAL RACING HEAD GASKETS



HOW MLS HEAD GASKETS ARE MADE, AND HOW THEY WORK

BY SAM LOGAN

**C**urrent engine design is being transformed by the arrival of GDI (Gasoline Direct Injection). GDI requires high-pressure injectors to inject gasoline directly into the cylinder rather than the intake port. In so doing they improve fuel atomization, promote cleaner burn, boost fuel efficiency, and more importantly for the racing brain, improve performance.

Twenty-four years ago a similar transformation took place in head gasket design when the term MLS entered our speech. The revolutionary multi-layer steel gaskets featured three or four layers of thin stainless steel sheets. Spring loaded, the top and bottom layers of the MLS gasket push against the center core to combat high combustion pressures. It was the gasket's spring pressure that created the improved seal for the running engine.

To complete the seal, the top and bottom surfaces were embossed and coated. A decade later most of the major automotive engine producers had abandoned the traditional steel core design with gasket paper attached in favor of the MLS.

Racing products are measured by whether they achieve their goals and JE's Pro series MLS gaskets have fared well, thanks to their well-judged range of three and four layer constructions. Racing engines need racing gaskets and the Ohio gasket maker

has pioneered several innovative measures, including the use of AISI 304 stainless steel and multi-stage embossing. Their embossing technology also provides a consistent inner-flange spacing (minimum of 0.040") from the edge to the embossed start that results in a superior seal in the embossed areas.

The embossing process refers to the forming of the raised beads that surround critical sealing areas, particularly combustion openings and water jackets holes. Like proper forging practices, embossing the top and bottom gasket layers is performed slowly as is the precision of their heat treating notably the tempering process, which is required to maintain the new shape.

The genius of the MLS gasket is that it relaxes and compresses with the firing cycles of the engine. If the temper is defective and the gasket material is too soft, it fails; if too hard it cracks. With some sealing pressures exceeding 1,200psi, a proven tempering process dramatically increases the long-term durability and reliability of the MLS head gasket.

Some MLS gaskets use a single-layer sealing compound on their upper and lower surfaces. But JE's experience with racing engines suggested only multiple layers would be reliable and developed a proprietary coating, which includes fluoroelastomer (FKM), a special purpose fluorocarbon-based synthetic rubber with Viton.

FKM has excellent resistance to chemicals and extreme temperatures. In fact, they use the material to encapsulate the entire gasket, leaving no exposed metal and providing an entire seal between the head and block mating surfaces. Importantly, these coatings will normally eliminate the need for additional deck surfacing. They also allow easy gasket removal, even after extreme temperature exposure. After the coatings are applied the layers are hand-assembled.

Finally, here are two quick tips when installing head gaskets:

1. Heat expands metal. Before removing head bolts in reverse torque sequence, ensure the engine is cool. Cylinder heads particularly aluminum heads can warp if removed while hot.
2. Debris can damage the new gasket or casting. Use a non-metallic scraper on aluminum surfaces and a metal scraper and wire brush on cast iron. ■

## SOURCE:

### JE PRO SEAL GASKETS

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