

Milwaukee-Eight 107

Displacement	1745cc
Bore	100mm
Stroke	111.1mm
Compression ratio	10.0:1



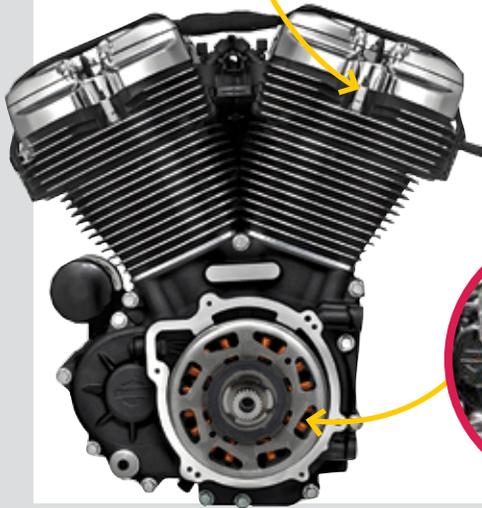
**8 VALVES**

New engine gets two inlet and two outlet valves for each cylinder.



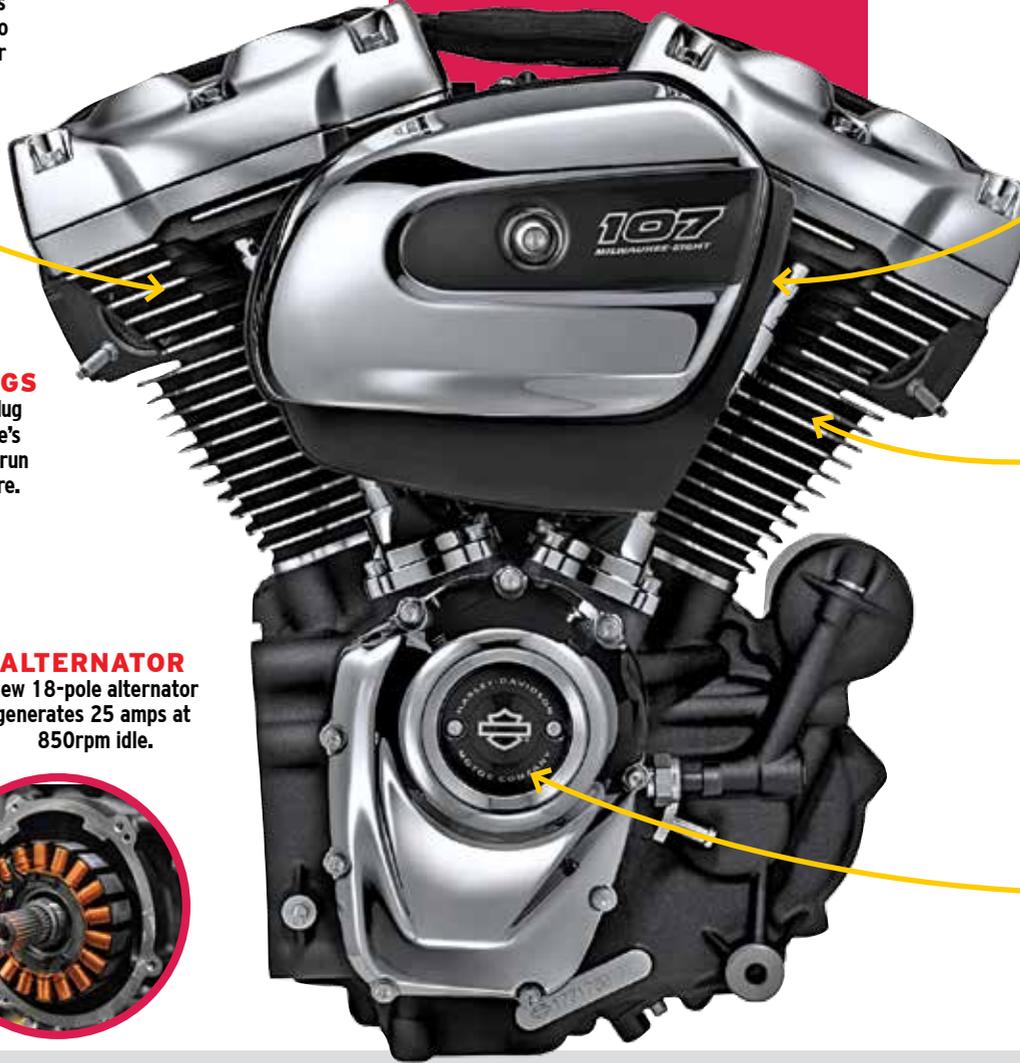
**SPARK PLUGS**

New twin spark-plug design help engine's heads and pistons run cooler than before.



**ALTERNATOR**

New 18-pole alternator generates 25 amps at 850rpm idle.



# The Magnificent **Eight**

The Milwaukee-Eight is the latest and greatest motor from Harley-Davidson.

**Rishad Saam Mehta** rides two of the models armed with the new engine through picturesque Rajasthan.



**AIRBOX**  
New air intake has less intake noise with increased air volume.



**COOLING FINS**  
Revised cooling fins on the cylinder head have larger surface area and dissipate heat better.

**CAMSHAFT**  
New single four-lobe camshaft with primary drive chain that has automatic hydraulic tensioner.



**L**ike the legendary Harley-Davidson board track (wooden race ovals) racers from almost a century ago, the company's new Milwaukee-Eight engine gets eight valves too. But that is where the similarity ends, because this is "... a brand-new motor, tip to tail," as Alex Bozmoski, Harley-Davidson chief engineer of the new products, says.

The new Milwaukee-Eight engine (the 107 cubic inches or 1,750cc variant) will be introduced on all the motorcycles in Harley-Davidson's touring line-up for India, which includes the Road Glide, the Street Glide and the Road King.

When a company builds an all-new engine it is big news. And in this case, even more so, since it's Harley-Davidson and this is only its third all-new Big Twin in 80 years. In fact, it's just the ninth Harley engine, considering all its other engines.

Harley-Davidson's engines have sort of run parallel to the evolution of the US highway system. When roads were all dirt and gravel and speeds were low, the Knucklehead's iron cylinder heads and cylinders handled heat adequately. As roads became better and the demands on motorcycles increased in terms of speeds, time and distance, better cooling became a necessity as power increased, and so the cylinder heads and then the cylinders themselves were replaced by aluminum that dissipates heat better. The cornerstone of the design upgrade of the last-generation Twin Cam was improved cooling capability.

The new engine gets its name from the fact that it is born in Milwaukee and it features eight valves. It gets two inlet and outlet valves per cylinder as compared to the single inlet and outlet valves of the previous engine.

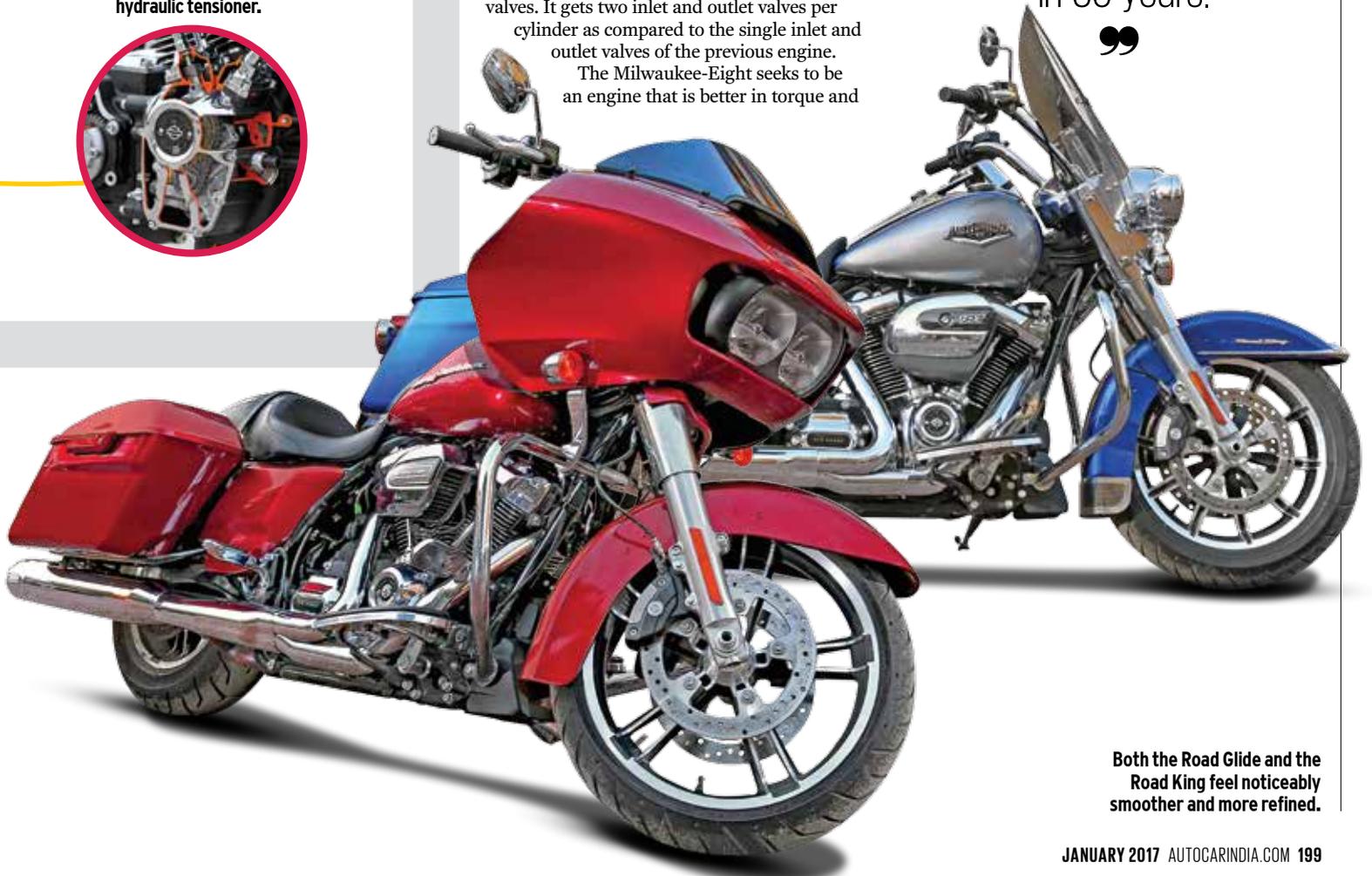
The Milwaukee-Eight seeks to be an engine that is better in torque and

power delivery which it partly achieves via a new 55mm throttle body and improved air flow to the cylinders. And while doing this it also meets emission norms, feels far more refined and is more fuel efficient. It idles at 850rpm as compared to the 1,000rpm of the older engine. This not only saves fuel but also brings back the faint 'potato potato' burble that disappeared when Harleys went from carburetted to fuel injected. To compensate for the reduction of electric 'juice' that might result from this lower rpm idle, the new engine features a big new external-rotor 18-pole alternator that generates 25amps at the 850rpm idle. At cruising rpm the current it supplies is about 37amps – quite enough to run all accessories.

Harley-Davidson's approach in building the new engine was not just an internal affair. In fact, the market research conducted before, covering about a thousand riders across seven cities told the company that there is a growing population of Harley-Davidson riders who don't want to go in →

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”



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← for a single seat. And these riders want more power for two-up riding, less vibrations and smoother power delivery.

Another result that the market research threw up was the wish for cooler operation. Externally, this has been marginally achieved by relocation of exhaust components, including keeping the catalytic converter away from the rider and the passenger. But there has been a lot of intricate designing in the cylinder to keep the heat down.

The new engine has a shallower four-valve combustion chamber that picks up less combustion heat. Cooling fins on the cylinder heads have a large surface area and dissipate heat quicker. Also with the twin spark plug design, the heads and the pistons are exposed to the flame for a shorter time, hence lesser heat. In a four-valve-per-cylinder design, that narrow region that separates the two exhaust valves on each

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cylinder, called the exhaust bridge, has to be kept cool, and in the Milwaukee-Eight this is achieved by pumping oil through the exhaust bridge which takes away the heat and is cooled by going through a little radiator ahead of the crankcase.

A by-product of this improved heat dissipation and improved cooling of exhaust valves is a higher combustion ratio that translates into higher power and torque. And in the case of the Milwaukee-Eight, it's 10 percent higher than its

predecessor, which results in a two to three bike-length difference in a 0 to 100kph dash between the 2016 and the 2017 Road King. Finally, since more of the energy of the fuel being exploded in the cylinder head is being used to dunk the pistons into the cylinder rather than being dissipated in heat, the fuel efficiency of the new engine is also better than its predecessor.

Then there is the matter of refinement. Lesser moving parts mean lesser noise and vibration, just



cancelling out this large chunk will attract new customers because intense vibrations can become painful on long rides. Retaining 25 percent is seemingly perfect because the handlebars vibrate in relation to the moving parts at idle, but while riding the vibrations are cut down to such a large extent that reflections in the rear-view mirror appear pin-sharp.

Other tweaks include a new 1.6kW starter instead of the older 1.2kW one and a self-torque-boosting clutch with Brembo hydraulic actuation that results in a lighter clutch lever to pull.

So what do the new Milwaukee-Eight-powered Harleys feel like on our roads? Both the Road Glide and the Road King feel noticeably smoother and more refined. The vibrations have been largely taken away, the clutch lever can be operated by just an index finger and power delivery is buttery smooth with the rich torque spread across the rev range like Nutella on toast.

I found the suspension of the Road Glide to be pretty stiff, presumably because it had been so adjusted. The new rear suspension on the bikes gives them an inch of preload adjustment by way of 23 turns of a single knob.

The Road King on the other hand was damped just a smidgen short of perfect for the roads I rode the bikes on – from Deogarh to Jaipur. Both the rear and suspension come with damper pistons larger than before and this equates to giving these straight-line behemoths a little agility.

Those who ride the old and new Road Kings back to back will agree that the new heart has changed the very persona of the motorcycle. While the old and much-loved idiosyncrasies have been retained, the undesirable by-products of these very quirks have been effectively reduced or eliminated. And that is what will keep loyalists happy and, as the company hopes, attract other riders into the Harley coral. **AI**

as the famous Harley quote from the time when the Evo engine first appeared goes, “We’re killing the noise so we can keep the music”. This means, the less the clicking, clacking and whining noises from moving parts and grinding gears within the engine, the more appreciable the exhaust burble – the music, so to speak.

So the new engine has a single four-lobe camshaft instead of a pair of camshafts as was the case with the Twin Cam engine. The camshaft is driven with a chain with an automatic hydraulic tensioner that eliminates backlash and distributes the load evenly across many sprocket teeth making operation noticeably quieter.

A single counter-rotating internal balancer is used to cancel 75 percent of the engine’s primary vibrating force. It could have been 100 percent but the market research showed that loyalists still want some of that unique Harley vibration. But

	HARLEY-DAVIDSON ROAD GLIDE	HARLEY-DAVIDSON ROAD KING
<b>Price</b>	Rs 32.81 lakh (ex-showroom, Delhi)	Rs 26.49 (ex-showroom, Delhi)
<b>Engine</b>	1750cc, 45-degree, V-Twin	1750cc, 45-degree, V-Twin
<b>Power</b>	NA	NA
<b>Torque</b>	150Nm at 3250rpm	150Nm at 3250rpm
<b>Gearbox</b>	6-speed manual	6-speed manual
<b>Kerb weight</b>	379kg	379kg
<b>Length</b>	2430mm	2450mm
<b>Wheelbase</b>	1625mm	1625mm
<b>Ground clearance</b>	120mm	135mm
<b>Seat height</b>	685mm	705mm
<b>Fuel tank</b>	22.7 litres	22.7 litres
<b>Suspension (f/r)</b>	Telescopic/Twin shock-absorber	Telescopic/Twin shock-absorber
<b>Brakes (f/r)</b>	32mm, 4-piston, fixed-disc	32mm, 4-piston, fixed-disc
<b>Tyres (f/r)</b>	130-60B19 61H/180-65B16 81H	NW 130-80B17 65H/NW 180-65B16 81H
<b>Rim size (f/r)</b>	19/16 inches	17/16 inches
<b>Lean angle (r/l)</b>	32/31-degrees	33/31-degrees