X-1R Global Ltd

To:	All X-1R distributors	From:	Nigel (Mac) McKenzie
Cc:		Date	7th September 2017

Subject: Restoration of lost cylinder compression using X-1R products

Anyone selling X-1R will know the frustration of having to continuously test our product to prove it works. Recently Harold Ledda was asked to do this in Qatar within the Mitsubishi Distributor there. AS a seasoned X-1R Representative Harold of course was unperturbed particularly when he was asked to undertake a compression test in a 2011 Lancer and a 2016 Outlander. The test (full version of which can be seen at the end of this bulletin) was of course a stunning success showing an improvement of 27.8% for the Lancer and 12.2% for the Outlander.

Before you start to circulate this test result though I would suggest that that you read the following explanation of what compression loss is and how X-1R Engine Treatment in particular works to improve compression readings particularly in hi-mileage older engines:

Compression Loss and How X-1R ET can help:

During the combustion process, expansion of burning fuel in the combustion chambers moves the pistons up and down inside the cylinders which produces power and delivers torque to the drive-train. In a new engine, the seal between the piston rings and cylinder wall is good enough to maintain proper compression and adequately seal during combustion. Over time the cylinders gradually wear out resulting in a less effective seal between the piston rings and cylinder walls.

To understand the mechanism of this wear, one must analyze what is happening on the microscopic scale. Both the piston rings and cylinders have small "peaks and valleys" on their surfaces which are continually sliding over each other at a high rate of speed. Normally the motor oil maintains a fluid hydrodynamic boundary layer separating the two metal surfaces, but sometimes the oil film breaks down and allows the "peaks" of the metal surfaces to collide. When this happens the peaks instantly weld together from intense heat and friction, then shear off from the metal surfaces producing microscopic wear particles.

This wear process is continuous and gradual. Eventually it reaches a point where the piston rings can no longer seal tightly against the cylinder wall. The most pronounced wear is located at TDC (Top Dead Center) where the piston reaches the top of its stroke inside the combustion chamber. This area has the least amount of lubrication, the most amount of heat, and the highest frictional force due to the horizontal directional change of the piston connecting rods.

Optimum combustion requires a tight seal between the piston rings and cylinder wall in order to have maximum compression of the intake air/fuel mixture during the compression stroke. Likewise, during

the combustion power stroke it is necessary to have a tight seal to avoid combustion gas leaking past the piston rings. Poor combustion and blow-by not only waste fuel energy that robs engine power, it also burns off oil on the cylinder walls and contaminates the oil by producing soot and sludge. Noticeable symptoms of low compression are less engine power, rough idle, and sluggish acceleration. Oil burning will cause excessive oil consumption, exhaust smoke, and increased amounts of sludge formation.

X-1R Engine Treatment repairs worn out areas in the cylinder walls to improve the seal between piston rings and cylinder walls. Metal surfaces have microscopic imperfections, tiny porous terrains, that when magnified under a microscope resembles an aerial view of a mountainous landscape, showing peaks and valleys of the metal surface. When heat is applied to a metal surface these imperfections will expand and distort slightly, causing them to be more exaggerated, increasing the factors that breakdown the oils film strength and accelerating wear and friction factors. X-1R ET counter acts this process by penetrating into these imperfections as heat and pressure are being applied through normal dynamics. The rate of activation is dependent upon the amount of pressure, heat and time, increases in any of the three principles produces faster results. The results of these reactions provide a smoother load bearing contact surface, which allows the forces and loads of operations to distribute over a wider surface. This results in a reduction of friction, when friction is reduced excessive wear; heat and energy/fuel consumption are also reduced.

X-1R Engine Treatment contains an extreme pressure (EP) agent that provides extraordinary lubricating protection beyond the range of normal motor oil. As an EP pressure lubricant, it protects the metal surface of engine components by reducing metal-to-metal contact when the liquid hydrodynamic oil film breaks down under severe loading conditions.

So X-1R ET is an advanced formulation which seals microscopic leaks in the cylinder wall. Most importantly X-1R works to seal and lubricate the area of the cylinder at TDC where it is most needed. The result is higher compression, less blow-by, and more efficient combustion that restores power to improve engine performance.

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Now with the above as an explanation, here are my comments on compression test results:

UNIT NO. 2- MITSUBISHI LANCER 2011 Model, Plate No. 341075, Mileage 135,011 Km.:

In this vehicle, the engine has high mileage and could have a lot of wear (especially in TDC of Cylinder #1) and piston rings can no longer seal tightly against the cylinder wall. So a large drop in compression in Cylinder #1 before adding X-1R Engine Treatment. Addition of X-1R ET, repaired (to great extent) worn out areas in the cylinder walls to improve the seal between piston rings and cylinder walls and hence a marked improvement in compression reading.

UNIT NO. 1 - MITSUBISHI OUTLANDER 2016 Model, Plate No. 389357, Mileage 30,188 Km:

I think in this vehicle, the engine has relatively less mileage and hence it may not have had that much wear and hence the seal between the piston rings and cylinder wall is not too bad. X-1R Engine Treatment still improved compression due to Extreme Pressure effect as mentioned in the last two paragraphs of detailed explanation on how X-1R ET works on improving compression in an engine. (EP agent is not present to a great extent in normal/conventional engine oils)

Overall it was a good test to showcase a major benefit from use of X-1R Engine Treatment. Great job!

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26 August 2017

MR. EWEN BAXTER
After Sales Director
Mitsubishi Fuso-Qatar
Qatar Automobile Company

Dear Mr. Baxter:

Pursuant to your instruction, we have conducted the compression test on 2 Mitsubishi vehicle engines last 17th August 2017 in your workshop at the Industrial Area in Doha, Qatar under the supervision and direction of Mr. Felix Macalalad, your workshop superintendent, with the undersigned as observer and witness.

We followed the simple compression test protocol whereby we first got the baseline compression reading (before X-1R product application) of the cylinders of the chosen vehicle engines. After that, we poured one 240 ml bottle of X-1R Engine Treatment each into the two (2) engines, mixing it with the lube oil (normal application ratio is 5% of sump/oil capacity) and one 240 ml X-1R Petrol Treatment each into their fuel tanks, mixing it with the petrol (normal application being 1 x 240 ml per tank of up to 100 litres, once only every 5,000 kilometers). We then let the 2 engines run for over an hour. Then finally, we got again the compression readings of both vehicles and compared that with the baseline readings to determine the improvement in compression.

Please find below the summary of the test results and attached herewith are the photographs of the related compression readings (baseline readings prior to X-1R application and readings after X-1R application):

UNIT NO. 1- MITSUBISHI OUTLANDER 2016 Model, Plate No. 389357, Mileage 30,188 Km.

	Baseline Reading (Before X-1R)	Reading After X-1R Application	**Percentage Improvement**
Cylinder # 1	Photo image blurred	210 Psi (IMG_1628)	--
Cylinder # 2	190 Psi (IMG_1589)	215 Psi (IMG_1630)	**13.16%**
Cylinder # 3	190 Psi (IMG_1590)	210 Psi (IMG_1632)	**10.52%**
Cylinder # 4	185 Psi (IMG_1591)	210 Psi (IMG_1634)	**13.51%**
Average for 4 Cylinders	**188.33 Psi**	**211.25 Psi**	**12.17%**

UNIT NO. 2- MITSUBISHI LANCER 2011 Model, Plate No. 341075, Mileage 135,011 Km.

	Baseline Reading (Before X-1R)	Reading After X-1R Application	**Percentage Improvement**
Cylinder # 1	140 Psi (IMG 1608)	220 Psi (IMG_1635)	**51.14%**
Cylinder # 2	200 Psi (IMG_1614)	230 Psi (IMG_1637)	**15.00%**
Cylinder # 3	180 Psi (IMG_1615)	235 Psi (IMG_1639)	**30.55%**
Cylinder # 4	200 Psi (IMG_1616)	235 Psi (IMG_1640)	**17.50%**
Average for 4 Cylinders	**180 Psi**	**230 Psi**	**27.78%**

The afore listed results showed a consistent improvement on all the cylinders tested, with the older engine showing a bigger improvement understandably due to the wear factor. But even a relatively new (over 1 year old) engine already showed a marked improvement as well. Therefore, X-1R can definitely improve the compression of both new and old engines. And, an improved compression results in better fuel combustion efficiency, better fuel economy and better engine performance.

Yours faithfully,

HAROLD LEDDA
General Manager, Middle East
and African Operations
X-1R Global, Ltd.

Noted: Felix Macalalad
Workshop Superintendent
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Qatar Automobile Company

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