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MCS

TECHNICAL REPORT

Cylinder head bolts installation
in 4G1 Mitsubishi engines
81030700



PURPOSE

Inform the customer about the assembly of cylinder head bolts set 81030700, in Mitsubishi 4G13, 4G15 and 4G18 engines.

DESCRIPTION

The family of 4G1, also called “Mitsubishi Orion”, based on internal combustion engines with inline-four cylinders, have been produced by Mitsubishi Motors since the 70s.

The displacement rounds between 1.2 and 1.6 liters, and it were introduced in the Colt model and its variants. These engines were also installed in other models such as: Lancer, Mirage, Space Star, Tredia, etc.

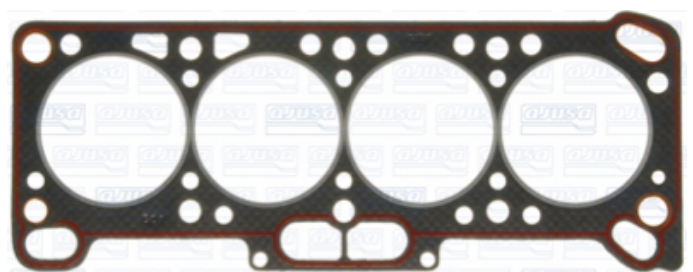
Since its introduction until its last variants of 2003, they experiment different modification and power increases, which **has lead to a change of material in the head gasket** and in the metric thread of the cylinder head bolts.

Fiber cylinder head gasket 10078500

At the beginning, the **raw material** of the cylinder head gasket **was fiber**. In the fiber gaskets, the sealing surface is produced in the entire surface of the gasket.

Because of this increased area, to achieve the effective closing pressure, **is necessary a highly tightening**.

On the other hand, **the tightening used is only for torque tightening**, so if the bolts are in good conditions, it isn't necessary to replace them. For this reason, Ajusa doesn't manufacture the bolts set for this cylinder head gasket.



MLS cylinder head gasket 10144500, 10158900, 10159000, 10188800

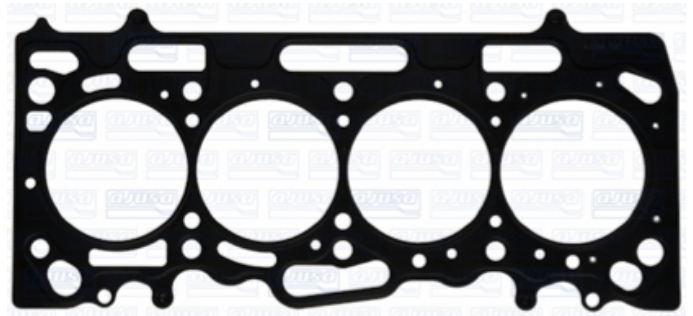
As mentioned above, with the increased power and development of new sealing technologies, this engines family began to install MLS cylinder head gasket (Multi-Layer Steel).

In the MLS gasket, **the sealing is produced mostly in the metal beads** of the external layer, being a smaller contact surface. To achieve the effective closing pressure, **is not necessary a tightening procedure as high** as in the fiber gasket case.

In a smaller tightening procedure, the cylinder head bolts have a lower metric thread (M9) than those used with the fiber gasket (M10).

The torque to yield of the final steps improves the effective closing pressure over the entire range of working operation of the engine, but on the other hand, forces the replacement of the cylinder head bolts because they are permanently deformed.

For torque to yield, Ajusa manufactures the corresponding cylinder head bolts:



10188800



81030700

Mounting Mistakes

Each vehicle must install the cylinder head gasket of the material work which was designed, that means, if the **vehicle presents fiber gasket**, its very important that **an MLS gasket is NOT installed**, and vice versa.



Apart from changing the gasket material, other factors also will vary, such as the tightening procedure, the metric thread, the sealing area, the thickness of the gasket, etc...

In the case of installing a fiber gasket on engines which must install a MLS, if **we apply the tightening procedure of the fiber gasket** to the bolts of the MLS gasket, these will not be able to experiment such a high torque and will end up stretching and even breakage.

Below, it can be seen a picture of a cylinder head bolt cracked because of this reason.



In the following table we can see which bolt must install each cylinder head gasket.

	NON-MANUFACTURED BY AJUSA	81030700
Head Type	 A	 B
Dimensions (mm)	M10 x 1,25 x 100	M9 x 1,25 x 101
Cylinder Head Gasket Material	FBX	MLS (Multi Layer Steel)
Cylinder Head Gasket Part Number	10078500	10144500
		10158900
		10159000
		10188800
Tightening Procedure		
1)	3 Kpm	2,5 Kpm
2)	6 Kpm	5 Kpm
3)	8,5 Kpm	-180°
4)	-90° + 8,5 Kpm	2 Kpm
5)	< >	90°
6)	-90° + 8,5 Kpm	90°

Never install ref 81030700 in Fiber Cylinder Head Gaskets.