

108

# TECHNICAL REPORT

New catalog Motorsports &  
Performance head gaskets



## 01

### INTRODUCTION

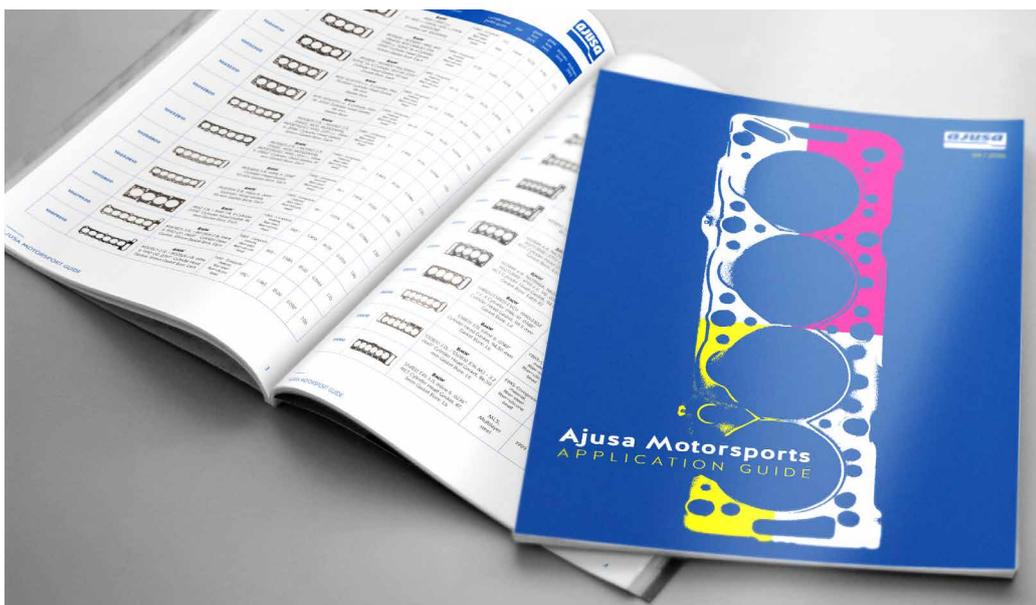
Ajusa introduces a new line of **Motorsports & Performance Head Gaskets**.

**High performance engines** need specific and improved parts due to **extreme conditions** they work. Ajusa Performance head gaskets ensure a perfect seal in high performance and modified engines.

The standard range of Ajusa products follows the same **specifications of original components**, but sometimes, when an engine is modified, it is necessary to advance a little more and to **design a specific product** from specifications demanded by customer.

This is the case of most of the products included in this Ajusa new catalog Motorsports & Performance, where **we offer all of our products with a special design** and also those products that are assembled in the most popular Motorsport engines.

You can **download the catalogue** in this link: <https://ajusa.es/catalogue>



## 02

### MAIN BRANDS

In this catalog we can find a wide variety of brands of the most used vehicles **for competition or for engine modification** with the aim of getting better benefits. These brands can be

BMW, GM, ALFA ROMEO, DODGE, FIAT, PSA, FORD, VOLVO, HONDA, HYUNDAI, LAND ROVER, JAGUAR, MAZDA, MITSUBISHI, NISSAN-INFINITI, RENAULT, SUBARU, TOYOTA y VOLKSWAGEN, among others.



## 03

### MAIN MODIFICATIONS

Modifications and improvements of our products have the aim **to adapt to modifications** made by customer on the engine block, cylinder head, camshaft, pistons, turbocharger, etc.

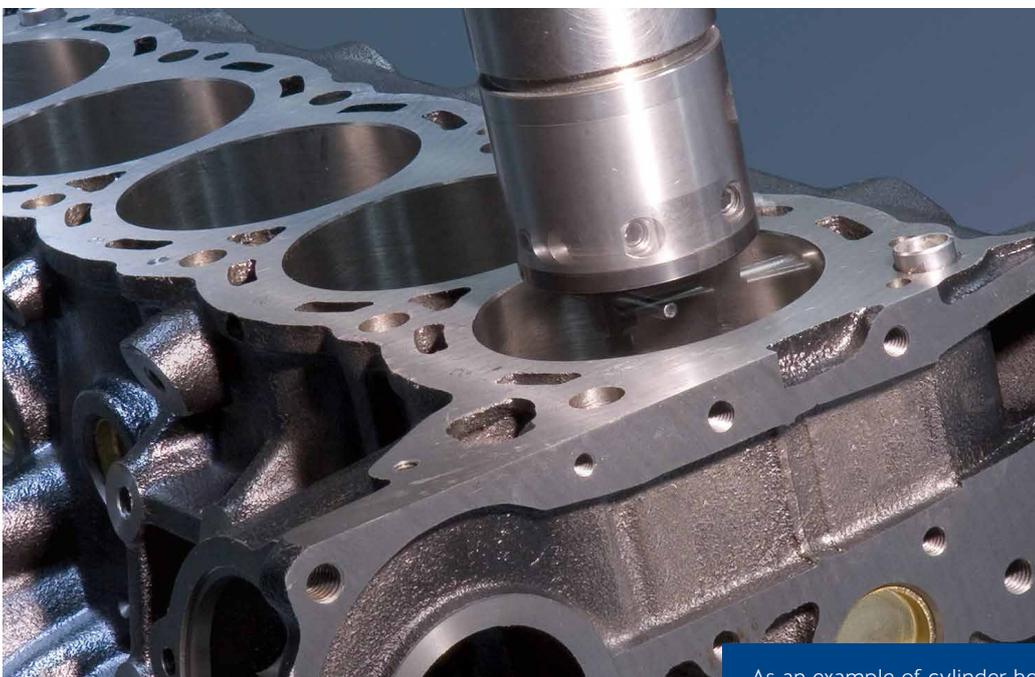
Combustion engine performance improvement is not achieved by a single modification, but **it is necessary more than one.**

Now, we indicate the **main changes of the cylinder head gasket** and the engine improvements which make necessary these modifications.

## 1. BIGGER DIAMETER OF CYLINDERS HOLES

This allows the **increase of the diameter of pistons and cylinders**, increasing the cylinder capacity of engine. This and the increasing of injected fuel quantity will cause a higher engine power.

On the other hand, this allows the cylinder grinding in case of wear.



As an example of cylinder head gasket with different diameters of cylinders we have part number **10092700 for Honda B-series Vtec** engines. The standard diameter of this cylinder head gasket is 81.5mm but we also have diameters of 81.25 / 81.75 / 82.25 / 83.25 / 84.25 / 84.75 / 85.25 mm.



## 2. BIGGER DIAMETER OF BOLT HOLES

This allows the use of bolts with a bigger diameter. When engine power is increased, a **bigger tightening must be applied to** hold the increasing of pressures produced inside cylinders.

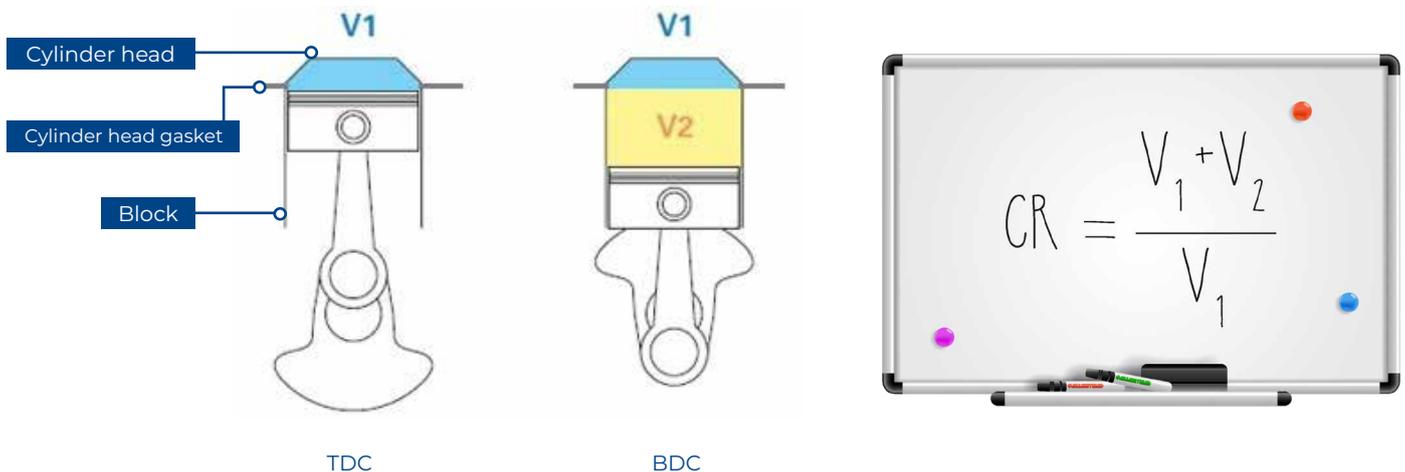
In many cases, original bolts are not going to be able to hold these pressures so it will be necessary **to use bolts made by alloys** that bear higher tensile stress and/or with a bigger diameter.



## 3. THICKNESS DECREASING

In aspirated engines, a technique to improve the performance is to increase **the compression ratio** (CR onwards).

What is CR? It is the **volume difference of air/fuel mixture** (only air in diesel engines since diesel is injected later) when mixture is compressed ( $V_1$ ) and when mixture is ignited inside cylinder ( $V_1 + V_2$ ).



The **cylinder head gasket** is **part of  $V_1$** , so if we modified its thickness, we are changing the CR. If we decrease its thickness, we are increasing its CR and otherwise, if we increase its thickness, we are decreasing the CR.

**The higher the CR, the higher engine performance we will get**, so that means it will be a more effective use of fuel and therefore, more power.

This technique has limitations, and this obligates you **to use a fuel with a higher octane** or to delay turning on, etc, to avoid self-ignitions and the famous **rod-cut**.

## 4. THICKNESS INCREASING

There are some reasons to increase the thickness of the cylinder head gasket, as **increasing the pressure supply** of turbocharger or volumetric compressor, using camshafts with a higher height, compensating the grinding of engine block, etc.

### INCREASING OF TURBO BOOST PRESSURE

If we want **to increase the turbo boost pressure** slightly, we can do it with the original thickness of the head gasket but if we want something more, we must **to reduce the CR** with the aim of avoiding the early auto-ignition of air-fuel mixture.

This decreasing of CR can be achieved assembling a cylinder head gasket with a higher thickness, machining the piston, replacing by other with lower compression etc.



## ENGINE CONVERSION FROM ASPIRATED TO TURBOCHARGED

In this case it happens the same thing. An aspirated engine has a very high CR regarding a turbocharged engine so it will be necessary **to reduce it before conversion**. Among other techniques we have the increasing of the cylinder head gasket thickness.

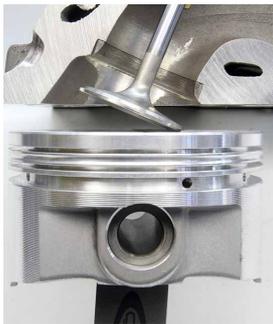


## CAMSHAFTS WITH BIGGER LOBES AND OPENING DURATION

Other modification that an engine is made commonly to increase his performance is **to set camshafts with a more lobe lift and crossing**. This makes the valves have a bigger opening and lasting longer, improving the filling and evacuation of cylinder gases.



In this case it would be necessary **a thicker cylinder head gasket** to avoid valves hitting the piston since they are going to be open longer and with a higher height. We can also avoid this collision **using machined pistons** to house the head of the valves.



Housing of piston for the valve head.

## 5. IMPROVEMENT OF SEALING IN SPECIFIC AREAS

With the use of metal reinforcements, **applying an elastomer cord** around oil holes and/or bolt holes.



We also find **reinforcements in other areas** as the bridge between cylinders, the timing chain, etc.

