

Technical Report #59

Dimensional Control Applied to Ajusa Sealing Gaskets

Technical Report

Purpose

To the necessity and relevance of dimensional control during the design and manufacturing of Ajusa sealing gaskets

Description

The search of more efficient engines, as well as the commitment to the environment, have led to stronger requirements when it comes to manufacture sealing gaskets, because an incorrect design can make the efficiency of the vehicle drop. Therefore if it is necessary for a manufacturer like Ajusa to use the latest technological tools regarding the design and verification of the product.



Illustration 1 Machine Vision Measurement

The sealing gaskets have dissimilar shapes depending on the requirements of its own application, so the mechanic might find flat gaskets or gaskets with volume, sealing systems based on the union of several layers, with different type of manufacturing, which combined with the need of using various materials will result in different manufacturing processes.

Therefore, depending on the level of accuracy required within various types of gaskets, as well as inside the gasket, it is necessary to use different dimensional means both for the development of the design and the subsequent final verification of the product.

For that reason, Ajusa has laser measurement and machine vision machines, which directly create a file usable in design, minimizing the possible measurement errors generated by conventional means and without an origin of the coordinate system.

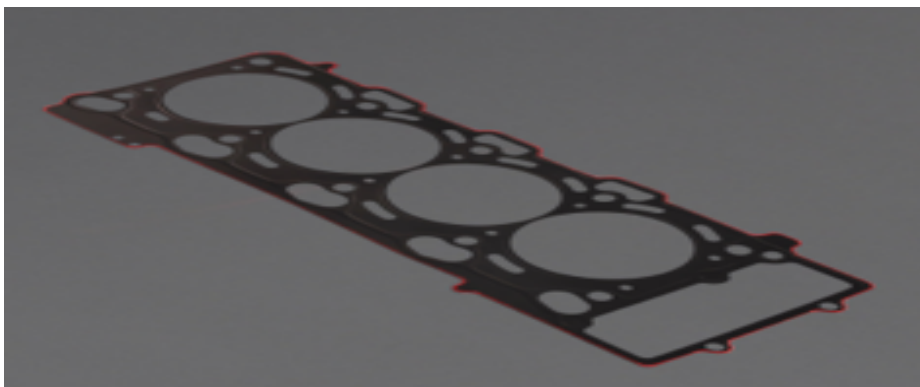


Illustration 2 Laser Measurement



Illustration 3 Profile Measurement

Another measurement and verification tool is the profilometer, which ensures a higher precision process where the gasket seals, and with this tool we can study the morphology in the embossings made in the metallic gaskets, which is the path the market is currently following, where slight changes in the embossing angles values, heights and morphology can make the gasket performance noticeably change.

Therefore, it is necessary to have a contact measurement where precision under a micron makes this tool vital for both the design and the verification of the products.

We can establish three well differentiated steps: acquisition, development and verification.

In the data acquisition stage, we identify the gasket physiognomy and which is the best measurement method for obtaining the data. When we need to study the contour of the gasket we use laser measurement machines which accurately trace the line of that contour. The file created for that measurement serves as the basis for the uniformity of the reverse engineering process carried out and its adaptation to AJUSA manufacturing systems.

The study of embossings and other elements shaped on the material, where parameters as angles, heights and geometry of that constructive element, need to be accurate in order not to change the efficiency conditions of the application where they are mounted, makes the use of high accuracy contact measurement machines necessary.

As far as the verification is concerned, the same machines used for the measurement of the elements are responsible for doing a dimensional control always in comparison with the car manufacturers design values and according to AJUSA standards, with a level of tolerance adapted to the vehicles where the substitution is going to be carried out. With this method we are able to get a feedback not only of the gasket itself, but also of the manufacturing process in which we will always pursuit the continuous improvement and the search of excellence.

Using a robust and versatile design process along with the polyvalence of all the measurement machines makes it possible to develop a big number of part numbers while achieving a high level of reliability both in the design and the manufacturing, which is one of the main points of the philosophy of AJUSA.