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## **Analysis and Diagnosis Using the Tools of Statistical Process Control on Force Measuring Springs of Monoblock Head Intake Valves**

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**Abstract:** Due to the high demand on product quality and consequently on the approval process of a part, nowadays it is essential to have a tool in order to control quality. When it comes to the pre-release process of manufacturing automotive parts the valve springs of the monoblock head is vital and therefore critical to control the data quality. This is why quality tools which help keep the parts under certain criteria are essential for the company.

In order to verify if the springs meet the demanded requirements, Statistical Process Control (SPC) is used to evaluate and diagnose the behavior of the measurement results issued by a testing machine. The problem implies a high number of springs out of specification is what motivated the development area to optimize and guarantee that the delivered product by the supplier would be under the right conditions. Immediately it was decided to analyze the process applying stratification tools and Pareto which demonstrated the main reasons why the springs did not meet the requirements. For these reasons the first step was to pre-analyze 9 engine series collecting results using 2 part numbers (intake and exhaust) and a total of 72 springs measured at two different heights. Finally, the data analysis was carried out using SPC (Statistical Process Control) in order to verify if the parts would meet the customer specifications.

*Keywords:* Statistical Process Control, Cp, Cpk, Spring, Monoblock Head