Conclusion

The Importance of the research, described in current paper, was mainly caused by the growing quality demand, growing competitiveness and other marketing factors, which make the manufacturers search new, innovative, more effective and cheaper ways of defect reduction and prevention while producing goods. This is one of the key elements, one of integral parts of technological progress. Though it may seem, that the paper focuses on a very narrow problem field, the solution finding the right of this very problem may result in serious progress in the whole manufacturing field, for all the branches, which require this sort of a solution. The importance of the problem becomes more visible when one gets to understand how large the numbers of production are. These numbers also require methods of testing, which would be highly dependable, since each failure may cost a manufacturer quite a serious sum of money. On the other hand the number of similar tests, which need to be held before the final product is available for the consumer, is so great, that making each one of them more expensive may lead to substantial increase of the manufacturing costs, and, therefore, to the increase of the consumers' prices. Which is, again, unacceptable under the circumstances of ever growing competition.

The particular problem, addressed by the paper, is finding an alternative to the vacuum chamber helium leak test for torque converters. The vacuum chamber helium leak test has been in use for a number of years and has been considered to be the most advantageous one in comparison to possible alternatives. However, the reality changes and nowadays the helium vacuum chamber leak test method appears to be neither economically efficient nor future oriented. One of the major circumstances, which make this problem truly up-to-date, is shortage of Helium supplies on the planet. This makes the manufacturers think about the future, when the gas will not be available, or, at least, affordable any more. On the other hand the prices for Helium are becoming higher and higher, which makes this gas less and less affordable for the manufacturers. The increasing price for Helium makes the testing process more expensive,

while growing competition requires the prices to be decreased, while the quality requirements are becoming more and stricter. Therefore a new, more precise and much cheaper method of testing are required by the industry.

Three major testing trends are being discussed by the paper in details. They are the pressure change, bubble immersion and tracer gas test methods. It can be said, that the majority of testing methods belong to either one of these three categories. However, there are such, which combine main principles of two or three of them. Many of such methods have critical disadvantages. For instance, sniffing or bubble immersion methods use very subjective data, which cannot be precisely measured. The analysis, provided in the paper, showed, that hydrogen test, as well as the method of pressure change and volume/mass flow method appear to be the most promising ones, compared to the other methods analyzed. Meanwhile, the paper does not provide the final answer to the questions set. Moreover: many questions are set by this paper and therefore further research and new experiments are required. Only further analysis and research will be able to give the answers set by the paper, and therefore will provide an opportunity of resolving the very important applied problem of modern time. This paper, though it is a very serious research attempt, is only one of the first steps in the direction of the problem solving. And quite a few need to be taken. The paper shows possible directions for the solution search. And this is exactly what comprises its value.

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