

DEVELOPMENT OF CORRUGATED METAL GASKETS MADE OF ALUMINUM TO PREVENT LEAKAGE OF PIPE CONNECTIONS

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ABSTRACT

SUS304 corrugated metal gaskets are well developed. This gasket can function well in preventing pipe connection leaks. The best gasket design is to coat the surface of the corrugated metal gasket made of SUS304 with a softer material, namely nickel or copper. However, the process of making this gasket becomes complicated because the coating does not become a single unit with the core material. The purpose of this study was to develop and test corrugated metal gaskets made of aluminum. The aluminum surface is softer than SUS304 so that the aluminum surface will cover the roughness of the flange made of SUS304. Closing the surface roughness is expected to increase the contact area between the gasket and the flange and prevent leakage. The stiffness of the corrugated metal gasket is maintained according to the stiffness of the corrugated metal gasket made of SUS304 by increasing the thickness of the gasket. The dimensions of the corrugated metal gasket in the form of wave height, wave radius, flat section length are maintained the same as gaskets made of SUS304. The gasket design was carried out using ANSYS software to determine the optimal dimensions of the aluminum gasket. The aluminum material is A356 and A6061. After finding the optimum dimensions, then proceed with the process of forming gaskets with cold forming. This process is in the form of forming three times to avoid the springback effect. The corrugated metal gasket made of aluminum was then tested for leaks using a water pressure test. This activity is in the form of providing pressurized water to the gasket-flange-pipe system. Water leaks are identified by applying white paper at the bottom of the gasket-flange-pipe system. If there is a leak, the water will drip and be caught by the white paper. The results of this study will produce a prototype corrugated metal gasket made of aluminum. There is no significant difference between the thickness of gaskets made from A356 and A6061 through FEM simulation. Thicknesses of 3, 4, and 5 mm can be used as gasket materials. The cold forming process for gasket materials with a thickness of 3, 4, and 5 mm is almost the same, but the pressing force requires 1000 kN, 1150 kN, and 1200 kN. The results of the leak test using the water pressure test were the same for both aluminum materials with a thickness of 3, 4, and 5 mm.

Kata Kunci: *Development, corrugated metal gasket, aluminum, leakage*