

TER HORST PROVIDES MILITARY AIR FORCE WITH SOLUTION FOR EXHAUST PROBLEM ON F16 JET FIGHTER

Ter Horst B.V., the compressed air expert in the Wiltec Group, has obtained an attractive assignment from the military air force. The compressed air specialists in Veldhoven came up with an excellent solution for a problem with the exhaust of a nitrogen reservoir during the Alternate Gear test, which is part of the standard maintenance procedure of the F16 jet fighter.

During the Alternate Gear test, the hydraulic powered landing gear of the F16 jet fighter is tested with high pressure nitrogen at 180 bar. The nitrogen reservoir, is located in one of the front compartments, has to be purged after every test. The problem is that during this test, hydraulic oil is mixed with the nitrogen in the reservoir. When the reservoir is purged, the oil will be blown into the ambient along with the nitrogen, which results in a very unsafe and unhealthy situation. Before Ter Horst came up with a solution, a standard 10 bar filter, mounted in an ancient looking wooden mobile cabinet, was used. The results: broken filter bowls, broken couplers, ruptured hoses and maintenance people who didn't use the filter at all but purged the 180 bar reservoir simply by hand with nothing more than some cleaning rags!

At the air base in Volkel they were desperately in need for an improved situation and assigned Ter Horst to provide a solution for their problem.

The demands

First of all, all components had to be suitable for a pressure up to 180 bar. In normal situations, the pressure during the exhaust process will not reach that 180 bar but they didn't want to take any risk in case filter or hoses might get clogged. Secondly, connecting the filter to the nitrogen reservoir had to be simple so, it was necessary to design a hose with as less as possible connections. An additional problem was that the hose had to go through a small hole in the F16 compartment, which could not be modified. Also the system had to be solid, steady and mobile. With these demands in mind the compressed air experts of Ter Horst went to the drawing table.

The solution

A prototype was designed consisting of a Walker Filtration (UK) AISI316 high pressure filter model 350, a hydraulic accumulator from Olaer, modified to function as an oil reservoir, a Wilkerson end stage filter / silencer model XMC, a manual drain valve and a connection hose made by Hebu (Parker components). The filter, made by Walker, has a filter element that is able to withstand pressure differences up to 180 bar. Considering the large amount of

oil in the application, a separate oil reservoir at the bottom of the filter, was necessary in order to prevent that, because of the great turbulence, the removed oil would travel along with the exhaust nitrogen to the ambient.

The Wilkerson end stage filter was required to decrease the exhaust noise level and to act as a safety buffer in case of saturation of the main filter. The connection hose exists of two parts; a thin hose connected to the nitrogen reservoir that fits through the hole in the dividing wall and a thicker hose connected to the filter.

The two hoses are connected together with a special quick disconnect coupler, which enables mechanics to connect the system with just two actions. A solid warehouse trolley was converted into a mobile filter frame, by which the lowest container was used as a oil waste reservoir (Picture 1).

The first test at the Volkel air base was a success and in the recommendation report, directed to the national government located in Den Haag the system was qualified as “ top-class solution ”. This resulted in an order for 12 Oil / Air Separators, with a net total value of approximately 26.000 Euro. The Walker filter elements have to be replaced every three to four months, with a net total of approximately 2.500 Euro for each replacement.



