



A Project Approach to Delivery Jaguar Land Rover – high performance fuel filter



Jaguar Land Rover (JLR) is a world-leading designer and manufacturer of luxury cars and rugged all-terrain vehicles (see <http://www.jaguarlandrover.com>)

All JLR vehicles contain precision-made fuel filters to avoid damage to the engine and parts that could be caused by fuel contamination. If abrasive particles of dirt, sand and rust present in contaminated fuel come into contact with fuel injectors and surrounding components they can cause damage leading to a rise in emissions and reduction in power and fuel economy. The problem of contaminated fuel is particularly critical in some overseas countries.

To ensure the robustness of the fuel system in wider markets, and the ability of JLR vehicles to survive and thrive in the harshest environments sometimes requires the inclusion of an additional fuel filter to remove contaminants even at the microscopic level.

JLR is in the process of designing a new fuel filter for their vehicles. The design is shown below. The filter casing is made as a two-part injection moulded PA66 GF35 plastic enclosure which is friction welded together after the filter element has been inserted. It has relatively simple geometry with a central connecting point at one end and an offset connector at the other end. Critical parts of the geometry are the push-fit connectors at either end which are a close tolerance with a fine surface finish.



The design process requires prototypes and pre-production versions of the filter casing to be manufactured for testing before the final filter design is committed to production. A pre-production version of the filter casing could be made using aluminium or other suitable material.

JLR outsource the final production of many of their components, and this part will be manufactured using injection moulding processes in India to strict quality standards. The filter casing is then friction welded closed once the filter element has been inserted. Filters are inspected and leak tested.

JLR require the production of prototype and pre-production versions of the fuel filter casing. They also require an investigation of how lean and quality principles could be used in the production of the fuel filter, and how inspection and testing techniques can be used to guarantee the quality of finished parts.

Your tasks are to:

- produce a prototype using additive manufacturing
- produce a pre-production version of the fuel filter casing using Computer Numerical Control (CNC) machining ready for testing
- investigate how the principles of lean and quality can be applied to production of the fuel filter casing
- investigate how inspection and testing techniques can be used to ensure the accuracy and quality of the fuel filter.

In order to do this, you will need to:

- investigate how computers are used in manufacturing systems
- produce a prototype fuel filter casing using additive manufacturing methods

- produce a prototype fuel filter casing using Computer Numerical Control (CNC) machining
- investigate how lean and quality principles can be applied to manufacture of the fuel filter
- produce a plan for manufacture which incorporates lean and quality principles
- investigate how inspection and testing methods can be used for the pre-production prototypes and production versions of the fuel filter casing
- investigate how defects could impact on the filter during manufacture and once in-service.

This work can be undertaken as an individual or within a team. If working within a team learners are expected to contribute to each of the areas (and be able to evidence this contribution) in order to gain the experience and knowledge required to successfully complete the Cambridge Technicals Engineering Level 3 (Manufacturing pathway).

This work can be undertaken as an individual or within a team. If working within a team learners are expected to contribute to each of the areas (and be able to evidence this contribution) in order to gain the experience and knowledge required to successfully complete the Cambridge Technicals in Engineering Level 3 (Manufacturing Pathway).

