ABOUT
IMPRESSION TECHNOLOGIES

Championing continuous innovation through our advanced light-weighting technologies, we enable lighter, stronger, aluminium solutions that helps to shape our world.

Impression Technologies has been instrumental in developing HFQ® Technology, which is revolutionising the exploitation of aluminium.

We provide the knowledge and expertise to support HFQ® technology, empowering you to transform your project. Impression Technologies offer a fully tailored service according to your engineering needs from concept to production.

RACEForm: HFQ® in High Volume Production

Impression Technologies Ltd has been awarded with £4.8 million funding by the Advanced Propulsion Centre UK Ltd (‘APC’) as part of the £9.5 million project. The RACEForm project focuses on validating the HFQ® Technology for the mass production of complex, deep drawn, high strength aluminium structures for body in white and chassis applications and help establish the technology as a global standard for aluminium light-weighting worldwide.

Impression Technologies is leading the project with a world class consortium including; Gestamp Washington UK Limited (a wholly owned subsidiary of Gestamp Automoción), Innoval Technology Limited, Imperial College London and Brunel University London. The RACEForm project will help position the UK as a leader in aluminium light-weighting and establish a strong supply chain capability for the development of low cost, mass production low emission vehicles.
HFQ® Technology enables a wide range of benefits, including cost-effective light-weighting, reduced investment, and improved performance for the manufacture of aluminium pressings.

HFQ® Technology is a hot forming production method for stamping complex-shaped aluminium components from high and ultra-high strength alloys. The HFQ® process press forms hot aluminium blanks at high speed, which are quenched in the press tool, followed by artificial ageing to achieve full strength. HFQ® enables extremely complex aluminium parts to be formed in a single press operation, whilst achieving high levels of strength in the finished part using standard grades of aluminium.

Overview of HFQ® Process

- Blank Feed
- Solution Heat Treatment
- Hot Form Quench (HFQ)
- Panel Racking & Cleaning
- Ageing Oven

Typically 5-10s cycle time from sheet entering press to form & quench.

LIGHTER › COST-EFFECTIVE › STRUCTURES
BENEFITS OF HFQ®

Reduced Piece and Investment Cost
HFQ® Technology enables part cost reduction through down gauging of panels, and by combining multiple conventionally formed and assembled panels into a single HFQ® pressing. Examples of part integration include A/B Pillars, Lamp Cans and Drain Channels. HFQ® Technology enables investment reduction by the deletion of multiple forming tools and reduced part count, which also drives assembly savings.

Reduced Springback
HFQ® Technology enables negligible panel springback. Zero springback compensation is required for the part or press tool design, leading to reduced try-out and development time and repeatable panel dimensional tolerances.

Increased Design Freedom
HFQ® Technology provides engineering teams with enhanced design freedom, an example of which includes the ability to achieve tight radii for the design of slender A Pillars with improved occupant vision. HFQ® also enables high levels of part integration with reduced part count whilst achieving high levels of strength. This reduces overall part and assembly costs in addition to reduced investment.

Increased Light-weighting
HFQ® Technology is being used to reduce vehicle weight by enabling the manufacture of deep drawn complex panels with high-strength aluminium grades. HFQ® panels deliver ≈20% weight reduction compared to some conventionally pressed aluminium grades for strength dominated applications. Additional weight reduction is achieved through part integration and the deletion of joining flanges.
ABOUT OUR SERVICES

Design
We work closely with your engineering teams, from the outset of the project to maximise the benefits that HFQ® Technology has to offer. We conduct design feasibility studies and will be on hand to assist you in maximising cost-effective light-weighting opportunities.

Development
We design HFQ® tools and conduct forming simulation to optimise part integration and light-weighting opportunities, and to validate forming feasibility. Die surface design is utilised by the tool maker to construct prototype and production tools with minimum try-out and development time.

Prototyping
Our UK based facility, includes a fully equipped HFQ® production cell, for in-house prototyping and production runs to support customer programmes.

Production
We produce parts either as a niche volume supplier, or for initial runs leading to medium/high volume production, which we transfer to our global network of tier 1 HFQ® partners.

Technology Transfer
Impression Technologies transfer HFQ® technology to tier 1 suppliers on a global basis, to offer choice and consistency of quality supply, wherever HFQ® parts are purchased from.
HFQ® AIRCRAFT
SEAT ARMREST

Objective:
- Developed as part of the EU funded LoCoLite project
- Selected to evaluate the high level of formability and strength enabled by HFQ® technology
- Selected to manufacture lightweight low-cost pressings

Features and Benefits:
- Complex deep drawn design, formed in a single HFQ® draw operation
- Produced from ultra-high strength 7XXX aluminium
- Significant weight reduction at 1.2mm gauge, whilst achieving performance targets
- Manufacturing cost significantly reduced by elimination of process steps
HFQ® HIGH STRENGTH DB11 A PILLAR
**HFQ® HIGH STRENGTH**
**DB11 A PILLAR**

**Objective:**
- The first production car to adopt HFQ® Technology for high strength A Pillar pressings

**Features and Benefits:**
- A deep drawn part formed in a single HFQ® draw operation
- Low investment
- Tight radii minimise the width of the A Pillar to maximise occupant vision
- Produced from high strength 6XXX aluminium for roof crush performance
- No springback compensation for either the part or tool, for improved dimensional control
- Includes integration of the Front Header connection, which is often a separate pressing
**HFQ® HIGH-STRENGTH DOOR INNER**

**Objective:**
- Developed as part of the EU funded LoCoLite project
- Selected to evaluate the high level of formability and strength enabled by HFQ® technology
- Selected to manufacture lightweight low-cost pressings

**Features and Benefits:**
- Produced in a single HFQ® draw operation to a depth of 200mm
- High strength 6XXX material (yield strength 300 MPa)
- Formed as a single piece component
HFQ® FRICTION STIR WELDED (FSW)
MORGAN CROSS MEMBER
HFQ® FRICTION STIR WELDED
MORGAN CROSS MEMBER

Objective:
- Developed as part of an Innovate UK funded project
- Complex Friction Stir Welded (FSW) part formed using HFQ® Technology enables cost effective weight reduction

Features and Benefits:
- Complex panel with variable tailored thicknesses of 3-2-3mm
- Thickness variance enabled by friction stir welding and formed using HFQ® technology
- 5 parts formed in a single tool and press operation (including the FSW tailor welded pressing)
- Assembly part count reduction from 11 (baseline) to 8 parts with HFQ® FSW technology
- Mass reduction of 32% or 2.36 Kg for the HFQ® FSW Cross Member assembly