

# Flexweld<sup>®</sup>

## Flexweld<sup>®</sup> resistance element welding

- + Significant weight saving with multi-material mix
- + Joins lightweight materials to high-strength metals
- + [www.arnold-fastening.com](http://www.arnold-fastening.com)
- + Joining materials with conventional spot welding
- + Process requires no extra qualification of additional or new procedures on the car body assembly line















## Flexweld® – reliably joining multi-material mixes, with massive weight savings



Until recently it has always been impossible to join aluminium to hot-formed steel. Now this is possible with Flexweld® – the unique resistance element welding technology from ARNOLD UMFORMTECHNIK. The new process has just been implemented for the first time in high-volume production, manufacturing the parcel shelf for the VW’s Passat B8 limousine, saving over a kilogram in weight in this component alone.

### A COMPARISON OF CURRENT JOINING PROCEDURES

|  |   |  |  |  |  |
|--|---|--|---|--|--|
|  |   | Able to use existing plant on car body assembly line                               | Assembly workers sufficiently qualified for the process                             | Joins lightweight materials to high-strength metals                                  | Fastening properties   |
| Flexweld®                                  |  | <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/>   | <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/>  |
| Direct screw fastening                     |  | <input type="checkbox"/>   | <input type="checkbox"/>  | <input type="checkbox"/>   | <input checked="" type="checkbox"/>  |
| Fully and semi-hollow self-piercing rivets |  | <input type="checkbox"/>   | <input type="checkbox"/>  | <input checked="" type="checkbox"/>  | <input type="checkbox"/>   |
| High-speed bolt setting                    |  | <input type="checkbox"/>   | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/>   |
| Clinching                                  |  | <input type="checkbox"/>   | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/>   |
| Friction welding                           |  | <input type="checkbox"/>   | <input type="checkbox"/>  | <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/>  |
| Resistance spot welding                    |  | <input type="checkbox"/>   | <input type="checkbox"/>  | <input type="checkbox"/>   | <input type="checkbox"/>   |
| Blind riveting                             |  | <input type="checkbox"/>   | <input type="checkbox"/>  | <input checked="" type="checkbox"/>  | <input checked="" type="checkbox"/>  |

Source: LWF® – Laboratorium für Werkstoff und Fügetechnik

### Flexweld<sup>®</sup> – the automotive industry has been waiting for this

The automotive industry faces many challenges: pressure on costs, particularly for the smaller and medium-sized vehicle classes – i.e. the majority of all cars, is constant, while the requirements to reduce fuel consumption become ever stricter. The solution lies in lightweight construction, because every gram counts.

In Flexweld<sup>®</sup> you have a joining technology that is forging new paths in weight reduction and processing, and with unimagined potential.



iStock-ID: 538617741 | © Rainer Plendl

#### Areas of application

- + hybrid fasteners
- + multiple sheets
- + Fibre-reinforced applications
- + high-strength metals



Multi-material mix



No pre-drilling





## The future is lightweight – with Flexweld®

Flexweld®, the unique joining process, offers countless benefits, with one of the biggest advantages being the considerable weight reduction in the age of lightweight construction. Moreover, no additional machinery is required to incorporate it into an existing car body assembly line.

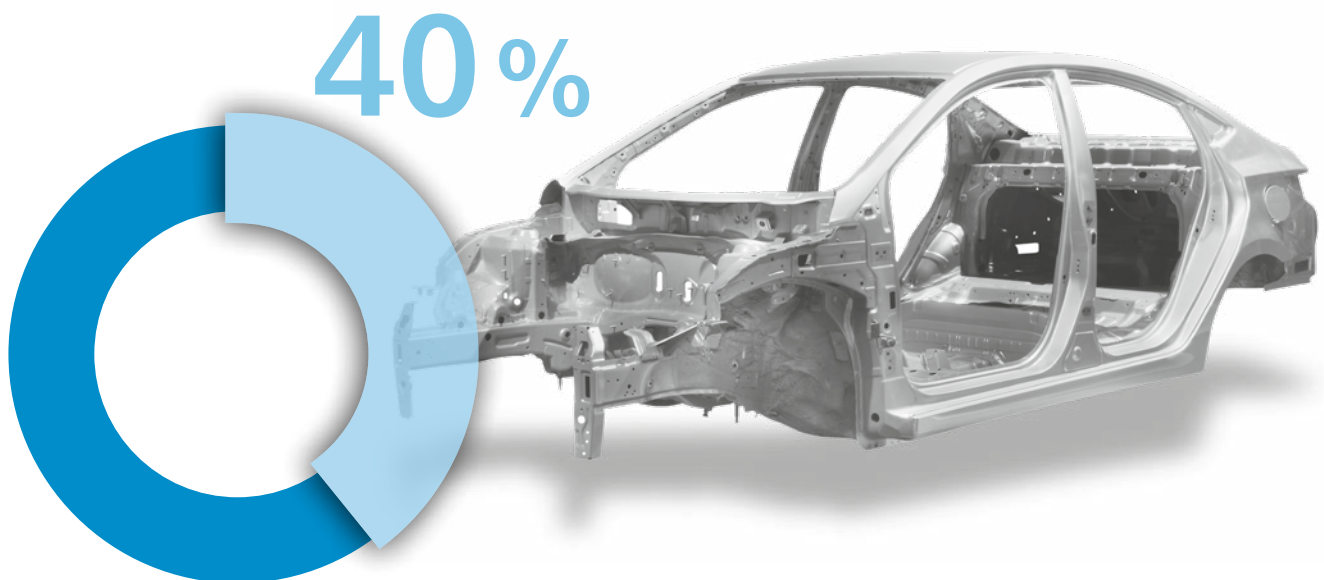
### Flexweld®

- ⊕ significant weight saving, which provides long-term reduction in CO<sub>2</sub> emissions
- ⊕ joins lightweight materials to high-strength metals
- ⊕ can be incorporated into existing assembly lines since it is possible to use the same production and welding equipment
- ⊕ no additional qualification for workers needed
- ⊕ complete system including full feeder and processing technology
- ⊕ mixed production possible by adapting the spot weld gun software

Steel continues to be the most important material used in car bodies, and high-strength steels in particular play an increasingly important role in automotive lightweight structures. They can be used to develop and produce thinner walled and lighter components. That cuts down weight and is good for the environment because they also help to greatly reduce CO<sub>2</sub> emissions. In Flexweld® for the first time we have an innovative joining technology that is optimised to the demands that high-strength steels bring with them.

## Flexweld<sup>®</sup> – the first technology that can join aluminium to hot-rolled steel

It takes time and a huge amount of skill to develop and implement lightweight construction solutions that can be used in series production. It's well worth making the effort to reduce weight, particularly in the bodywork, because the car's body makes up around 40 percent of its weight.



40% of a car's total weight is in the body. So it is a key element in moving car production towards more lightweight construction.

shutterstock-ID: 60300172 | © Vereshchagin Dmitry

Flexweld<sup>®</sup> is the only joining procedure that makes it possible to join aluminium to deep-drawn steels and heat-hardened martensitic steel.

Flexweld<sup>®</sup> elements are inserted into the aluminium sheet. This makes it possible to use the traditional spot welding process within existing production systems to join the aluminium sheets

to steel. In the case of the VW rear parcel shelf 51 Flexweld<sup>®</sup> elements are firmly impressed into the aluminium sheet. This sheet is then welded to steel components, using conventional resistance spot welding guns, and then bonded with adhesive. The process uses conventional spot welding guns.

### Advantages in production

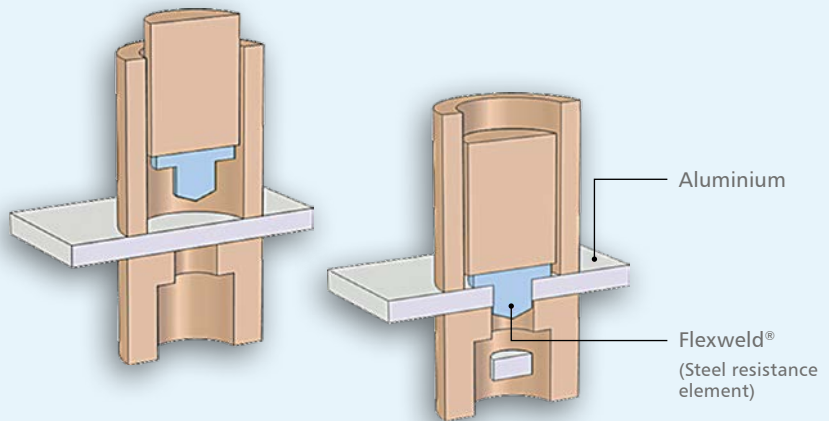
- + Reliable high-volume production
- + Can use standard operating materials

# Flexweld® – the joining process in detail

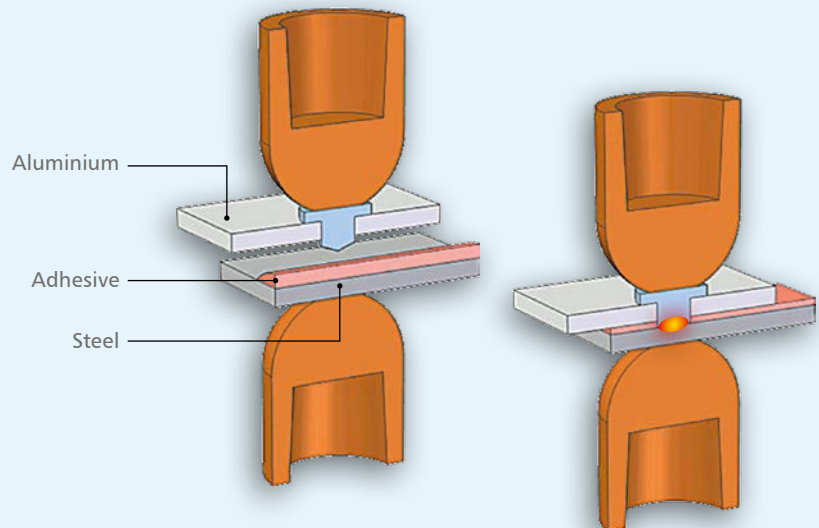
## This how Flexweld® works

Flexweld® elements are self-punched and embedded into the aluminium sheet. This sheet is then welded to steel components, using conventional resistance spot welding guns, and then bonded with adhesive.

## Producing the subassembly Preparing the aluminium joints



## Producing the core line Adhesive bonding and resistance welding



Graphics: Volkswagen, Dr. Th. Franz



Using the new technology it has been possible to **save over one kilogram in weight** from the parcel shelf alone.

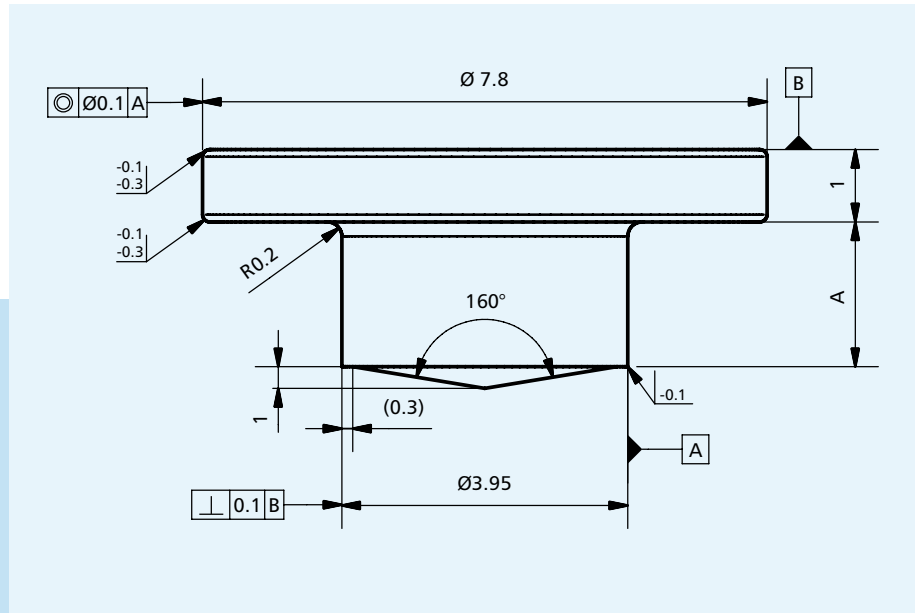
## What we offer

### The Flexweld<sup>®</sup> element

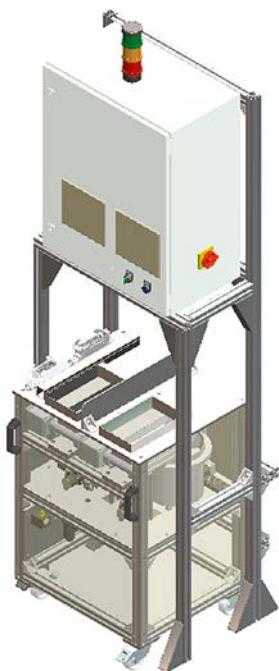


#### Available surfaces

- ⊕ bright
- ⊕ zinc transparent
- ⊕ zinc nickel with sealant
- ⊕ thick layer passivated zinc without sealant
- ⊕ zinc nickel without sealant

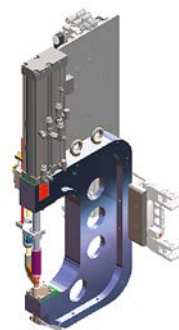


## The processing technology



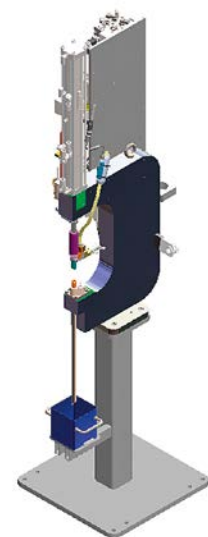
#### Flexweld<sup>®</sup> feeder device

Modular feeder device – versions available for one or several sizes of Flexweld<sup>®</sup> elements. The operating panel and the PIC 2000 process monitor can be integrated into the control cabinet or available as a mobile panel.



#### Flexweld<sup>®</sup> C-bracket unit

C-bracket presses with the integral Flexweld<sup>®</sup> punch tool can either be stationary or operated while fastened to the robot. The system is independent of the punch direction and operates at any angle position.



# The ARNOLD GROUP

Wherever customers need us.

## The ARNOLD GROUP

ARNOLD – this name is internationally renowned for efficient and sustainable fastening systems on the highest level. With a foundation of many years of expertise in the production of intelligent fastening systems and very complex extruded parts, the ARNOLD GROUP has developed over a number of years into a comprehensive supplier and development partner for complex fastening systems. With our positioning of “BlueFastening Systems” this development process will continue under a united and harmonized structure. Engineering, fasteners, and functional parts, together with feeding and processing systems, all from a single source – efficient, sustainable and international.



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