

Micro-Miniature Component For Automotive Supplier

Abstract

An international sensors leader collaborates with a custom cold forging manufacturer to deliver a unique micro-miniature part for an environmental application in the automotive market.



FIG. 1

Challenge

A global sensors engineering and manufacturing company with U.S. headquarters faced a NPD hurdle on a critical electronic connector component. The company required design, manufacturing and five sigma process capabilities to produce a micro-electrical mechanical system (MEMS) for an automotive clean energy emissions application. Additionally, the company required 100% quality inspection and JIT inventory management to supply their global assembly operations in Asia.

Solution

Since the sensor company did not possess the capabilities in-house to manufacture the component for their assembly, they partnered with Sussex Wire, Inc., a custom cold forging specialist based in Easton PA. Sussex Wire developed the component geometry design to meet the tolerance specifications, implemented 100% in-process automated optical inspection (AOI), cleaned, plated, and integrated the final assembly, packaging, and logistics to deliver a complete solution.

The result of this collaboration, a wirebond pin component (Figure 1), was designed and produced from Copper CDA 102 with a minor OD of .03937" and overall length of .2118" with control dimensional tolerances down to +/- .00078". The key manufacturing/engineering considerations focused on maintaining the native mechanical properties of the CDA 102 substrate while achieving an end condition finish of a Ra less than five microns. Sussex Wire's cold heading design engineering and manufacturing technology uniquely met the dimensional, surface finish, mechanical strength and piece part price requirements to support a successful customer MEMS automotive emission sensor market launch.

Achieving and controlling a surface finish condition of a Ra of less than five microns on the wirebond end was possible through Sussex Wire's proprietary part and tooling progression, vertically integrated manufacturing operations (Figure #2), incorporation of finite element analysis (Figure #3) and a proprietary Automated Optical Inspection (AOI) system, developed and implemented by Sussex Wire (Figure #4).

Result

The customer receives JIT delivery to their Asia Pacific contract assembly operation executed through a MRP supported Pull Kanban inventory system (Figure #5).

Key Features

The unique manufacturing and process control capabilities contributed by Sussex Wire include:

- Competencies on collaborative engineering feasibility, project management and validation
- Vertically integrated tool and part design, and high volume production
- Application of cold heading manufacturing technology which preserves the native material's mechanical properties, even at high production velocity
- Custom, in-process automated optical inspection system
- Lean JIT Kanban pull inventory management

FIG. 2



FIG. 3

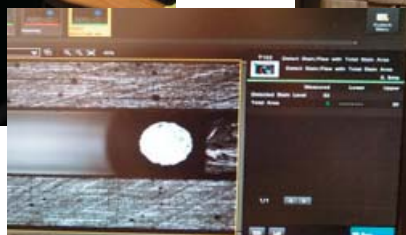


FIG. 4



FIG. 5

SussexWire
incorporated

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