

RECP Best Practices Catalogue

*Renovation of Welding
(compression welding)*

Developed within the framework of MED TEST II



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



The SwitchMed Programme is
funded by the European Union

Best Practice - Renovation of Welding (compression welding)

SECTOR:	Metal, electrical and motor vehicle parts
SUBSECTOR:	Manufacture of batteries and telephone cables
PRODUCTS	Starter batteries, solar energy and telephone cables
CATEGORY	Process control or modification
APPLICABILITY	Process

COMPANY SIZE	200
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Description of the Problem (Base Scenario):

Compression welding allows the connection of the different battery terminals between them (positive poles and negative poles). It has been found that 27% of all warranty claims are caused by welding defects. Absolute number of batteries claimed/year = 1,591 batteries with solder defects.

While the internal rejections at the welding machine stage are 715 batteries/year

The most common and important defects are: Loose intercellular connections, cold welding and welding with porosity and cracks/incomplete welding.

There is no ongoing quality control of welding in production (no tester installed on the line)



Description of the Solution

- Introduce regular maintenance of the welding tip/if possible, review its design to improve it
- Verify current operating procedure and parameters, perform systematic process tests, analyse parameters, and revise the operations manual
- Train the staff
- Install an ongoing process control (tester) and introduce the SPC (Statistical Process Control) scheme

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Economic Gain	<p>The insurance costs € 37,976/year (1,591 batteries x € 23.87/battery) Cost of scrap caused by internal rejection: € 33,712/year (715 batteries x € 47.15/battery, according to the numbers supplied by the company) 2 scenarios (hypotheses) to estimate potential savings: Case 1): reduce the costs by about 50% Savings: (€ 37,976 + € 33,712) x 0.5 = € 35,844/year Case 2): Reduce costs by about 90% (by optimisation and ongoing process control by SPC) Savings: (€ 37,976 + € 33,712) x 0.9 = € 64,519/year</p>
Environmental Gain	<p>Case 1): Energy savings of 24,028 KWh or 17.5 tons off CO₂/year Lead savings of 11,530 kg/year, recyclable internally Case 2): Energy savings of 43,172 KWh, or: 31.7 tons of CO₂/year Raw material: 21,080 kg/year recyclable (lead) Lead savings of 21,080 kg Pb/year recyclable</p>
Health and Safety Impact	No

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Investment and Financial Indicators	Tester: € 100,000 investment Costs of process improvement, process monitoring, operator training and consulting: € 10,000 Total: € 110,000 (Time for Return on Investment: Case 2: (machine investment included): $110,000/64,519 = 1.7$ year)
Suppliers	Imported
Other aspects	Increased reliability of the finished product
Implementation and new indicator	Scheduled for the end of 2018-2019



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