RECP Best Practices Catalogue

Improvement of the hardening process

Developed within the framework of MED TEST II

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

switchmed

The SwitchMed Programme is funded by the European Union

Best Practice - Improvement of the hardening process

SECTOR:	**Metal, electrical and motor vehicle parts**
SUBSECTOR:	Manufacture of batteries and accumulators
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):	An important reason for warranty claims is the sudden drop in cold start capacity. In 2016, warranty claims due to this problem were 1,280 claims. Testing at the workshop and the destruction of samples have indicated that the hardening process should be one of the most important cause of this problem. The hardening operation consists of firing the lead oxide paste onto the grids of the battery plates in chambers at high temperature 
Description of the Solution	As a solution to improve the hardening process, it is necessary to improve the following axes: - Stacking trays/stack height - the hardening process parameters - the working procedure - the uniform state of the plates before firing • Introduce intermediate layers and reduce the height of each stack to about 80 plates (height to be determined according to formula and firing technology) • change the work procedure to prevent hardening of less than 60% of filled chambers • check the humidity of the plate before hardening as well as the drying process of the control plate (avoid overheating/drying the plates too hard) • determine the optimised process parameters by curing tracks (altering the hardening program, increasing drying after curing) • check the paste formula and the moisture content before the start of the cure, (possible: rework formula or mixing procedure)

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Economic Gain	The cost of the insurance caused by the reduction in cold start capacity is € 62,311/year Improvement of the hardening process and the hardening work protocol. The full implementation of the actions will save these costs entirely. The total energy savings equivalent to returned batteries: 26,214 KWh/year, or € 2,145/year Total savings: € 64,456/year
Environmental Gain	Preventing warranty claims saves energy. Total savings is: 26,214 KWh Or a reduction of CO_2 emissions of about 19.3 tons of CO_2e
Health and Safety Impact	None

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Investment & Financial Indicators	No new equipment is necessary Plastic spacers (install a buffer) Process investigation, plastic spacers and consulting fees: estimated at € 20,000 (Time for Return on Investment 0.3 year)
Suppliers	Local suppliers for spacers and accessories to be installed on forklifts and hardening chambers
Other aspects	Positive impact on product quality
Implementation and new indicator	Scheduled for the end of 2018