

Advanced Manufacturing Technology Metals

CONTAMINATION DETECTION ON WELD SURFACES

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Contamination Detection on Weld Surfaces

INTRODUCTION:

- Weld Quality Is Largely Dependent Upon the Cleaning Method.
- Cleanliness of Some Sensitive Materials Cannot Be Verified.
- Difficult to Determine the Optimum Cleaning Process for Materials Prior to Welding.
- A Relative Cleaning Comparison is Necessary To Determine the Effectiveness of Different Solvents / Detergents.
- Need to Improve the Cleaning Processes Used in Production.

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OBJECTIVE:

- Evaluate the OSEE Sensor for Its Effectiveness to Determine Cleanliness of Materials Prior to Welding.
- Determine the Relative Cleaning Capabilities of Various Processes, Techniques and Cleaning Media on Different Materials.
- Apply the Sensor on Production Applications As a Preprocess Sensor.

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RESULTS:

- The Sensor Is Effective for Determining Relative Differences in Cleaning Capabilities for Removing Contaminants.
 - Marking Pencil Evaluation.
 - Oxidation Studies for Weldalite and Other Aluminum Materials
 - Relative Capabilities of Detergents and Solvents for Removing Specific contaminants.
 - Determine / Verify the Removal of Silicone Contaminates Prior to Bonding Operations.
 - Determine the Relative Differences in Cleaning Media.

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DISCUSSION:

- AMT Designed the Data Acquisition System and Software for Maximum Versatility.
- Software Is Adaptable for Other Applications.
- Develop the System for Portable Applications and Characterize the System Output for Field Use.
- Inconsistencies of Results When Sensing Non - Conductive Surfaces. Requires Further Study.

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CONCLUSIONS:

- Standardize the Operation and Calibration of the System.
- Characterize Various Contaminants and Their Thickness.
- Develop Sensor for Use in Statistical Process Controls.
- Use Statistical Design of Experiments.
- Determine Relative Cleaning Ability of Solvents, Detergents, and Methods.
- Characterize the System for Portable Applications (E.G. Spot Checks for Known Contaminants on Large Surfaces).
- Increase Versatility and User Friendliness of System for Production Environment.