

# EWI COOPERATIVE RESEARCH REPORTS AND RESEARCH BRIEFS

## 2009

MR0901/50815GTO <b>High Deposition Rate Narrow-Groove Gas Metal Arc Welding Processes</b> B. Nagy, M. Purslow	<i>Summary Report = Y Detailed Report = Y</i> January 2009
MR0902/50813GTO <b>An Examination of Electric Servo-Guns for the Resistance Spot Welding of Complex Stack-Ups</b> J. Gould, W. Peterson, J. Cruz	<i>Summary Report = Y Detailed Report = Y</i> February 2009
MR0903/49243GTO <b>Ultrasonic Brazing</b> D. Hauser	<i>Summary Report = Y Detailed Report = N</i> February 2009

## 2008

SR0801/50503IRD <b>Evaluation of GRCo-84 as a Candidate Electrode Material for Resistance Spot Welding</b> J. Cruz, J. Gould	<i>Summary Report = Y Detailed Report = N</i> January 2008
SR0802/49231GTO <b>Single Sensor Differential Thermal Analysis Technique</b> B. Alexandrov, J. C. Lippold	<i>Summary Report = Y Detailed Report = N</i> March 2008
MR0803/49230GTO <b>Material Behavior during Magnetic Pulse Welding</b> S. Babu, G. Daehn, Y. Zhang	<i>Summary Report = Y Detailed Report = Y</i> March 2008
MR0804/49919GTO <b>Magnetic Pulse-Assisted Forming</b> P. Zhang, G. Daehn, S. Golowin	<i>Summary Report = Y Detailed Report = Y</i> March 2008
MR0805/49843GTO <b>2-D Matrix Ultrasonic Phased-Array Examination of Advanced High-Strength Steel Resistance Spot Welds</b> M. Lozev, R. Spencer, T.C. Huang, W. Peterson, J. Cruz	<i>Summary Report = Y Detailed Report = Y</i> April 2008
MR0806/50816GTO <b>Fluxless Ultrasonic Lead-Free Soldering for Electronics Applications</b> S. Srinivasan	<i>Summary Report = Y Detailed Report = Y</i> May 2008
MR0807/47416GTO <b>Improved Ultrasonic Inspection and Assessment Methods for Pipeline Girth Welds and Repair Welds</b> M. Lozev, R. Spencer, T.C. Huang, P. Patel	<i>Summary Report = Y Detailed Report = Y</i> May 2008
MR0808/48250GTO <b>Internal Coil Development for Magnetic Pulse Technologies</b> H. Shao, P. Zhang	<i>Summary Report = Y Detailed Report = Y</i> October 2008
MR0809/50915GTO <b>Reciprocating Wire Feed GMAW Additive Manufacturing</b> N. Kapustka	<i>Summary Report = Y Detailed Report = Y</i> October 2008
MR0810/51217GTO <b>Hermetic Seals for Organic Semiconductors</b> S. Flowers, P. Berger, W.-J. Yoon	<i>Summary Report = Y Detailed Report = N</i> October 2008

## 2007

MR0701/48243GTO <b>Modeling of Eddy Current Techniques for Manufacturing and In-Service Inspections</b> E. Todorov	<i>Summary Report = Y Detailed Report = Y</i> January 2007
MR0702/48242GTO <b>Phased-Array Ultrasonic Inspection of Clad Piping</b> M. Lozev, P. Patel, R. Spencer	<i>Summary Report = Y Detailed Report = Y</i> January 2007
MR0703/49251GTO <b>Development of an Advanced FE Structural Analysis Tool</b> Y-P. Yang	<i>Summary Report = Y Detailed Report = Y</i> February 2007
MR0704/49354IRD <b>Ultrasonically Assisted Hot Plate Welding of Glass Fiber-Reinforced Polymers</b> S. Flowers, M. St. John	<i>Summary Report = Y Detailed Report = Y</i> February 2007
MR0705/49239IRD <b>Fracture Toughness Properties of Spot Welds in DP 590 Steel</b> W. Peterson, F. Orth	<i>Summary Report = Y Detailed Report = Y</i> March 2007
MR0706/49849GTO <b>Improved Methods for High-Alloy Buildups</b> N. Kapustka, M. Short, K. Graff	<i>Summary Report = Y Detailed Report = Y</i> June 2007
SR0707/49846GTO <b>Automated Weld Modeling Tool Framework</b> S. Khurana, W. Zhang, W. Gan, S. Babu	<i>Summary Report = Y Detailed Report = N</i> July 2007
SR0708/49844GTO <b>Thermomechanical Fatigue Tester</b> A. Shukla, W. Mohr, F. Orth, A. Channell	<i>Summary Report = Y Detailed Report = N</i> July 2007
SR0709/49916GTO <b>Resistance Welding Hole Repair for Titanium Structures</b> J. Cruz, J. Gould, D. Workman	<i>Summary Report = Y Detailed Report = N</i> July 2007
MR0710/49850GTO <b>Advanced Eddy Current Inspection of Steel Structures</b> E. Todorov, W. Mohr	<i>Summary Report = Y Detailed Report = Y</i> July 2007
SR0711/49848GTO <b>New Joining Technologies for Lightweight Automotive Structures</b> J. Troyer, P. Zhang, W. Peterson, R. Dull	<i>Summary Report = Y Detailed Report = N</i> July 2007
SR0712/49847GTO <b>Evaluation of Patterned Joint Designs for Ultrasonic Welding of HDPE Nanocomposites</b> S. Flowers, G. Ritter, A. Benatar	<i>Summary Report = Y Detailed Report = N</i> July 2007

**2007**

SR0713/48241GTO <b>FEA Model of Powerful Ultrasonic Transducer</b> P. Zhang, K. Graff	<i>Summary Report = Y Detailed Report = N</i>  August 2007
SR0714/50705IRD <b>Advanced Welding Repair and Remediation Methods for In-Service Pipelines</b> C. Reichert-LaMorte, M. Boring, N. Porter	<i>Summary Report = Y Detailed Report = N</i>  September 2007
SR0715/49911GTO <b>Mechanism and Detection of Hydrogen Induced Cracking in Fossil Fuel Power Plant Steel Weldments</b> P. S. Patel, J. C. Lippold, C. E. Albright	<i>Summary Report = Y Detailed Report = Y</i>  September 2007
SR0716/49235GTO <b>Arc Welding of Advanced High Strength Steel Sheet</b> N. Kapustka, S. Babu, C. Conrardy, C. E. Albright	<i>Summary Report = Y Detailed Report = Y</i>  October 2007
SR0717/45750IRP <b>Repair Weldability of Service-Exposed Heat-Resistant Stainless Steel Castings - HP45Nb, HP50Nb and 20-32Nb Alloys</b> S. Shi, J. C. Lippold, J. Ramirez	<i>Summary Report = Y Detailed Report = N</i>  October 2007
SR0718/49226GTO <b>Development of the Ultrasonic Additive Manufacturing (UAM) Process</b> M. Short, K. Graff	<i>Summary Report = Y Detailed Report = Y</i>  November 2007

## 2006

MR0601/48244GTO <b>Friction Stir Welding of Steels</b> T. Li	<i>Summary Report = Y Detailed Report = Y</i> January 2006
MR0602/49234GTO <b>Keyhole Stabilization during Pulsed Fiber Laser Welding</b> B. Victor	<i>Summary Report = Y Detailed Report = Y</i> June 2006
MR0603/49227GTO <b>Biocompatible Adhesives</b> G. Ritter, M. Ruegsegger	<i>Summary Report = Y Detailed Report = Y</i> June 2006
SR0604/49232GTO <b>High Speed Laser Welding of Thin Metals</b> S.Ream	<i>Summary Report = Y Detailed Report = N</i> June 2006
MR0605/49228GTO <b>Fuel Cell Bonding</b> D. Speth	<i>Summary Report = Y Detailed Report = Y</i> June 2006
MR0606/47414GTO <b>Development of a Weldability Test for High Performance Nickel-Base Alloys</b> B. Alexandrov, N. Nissley, S. Norton, J.C. Lippold, Q. Lu	<i>Summary Report = Y Detailed Report = Y</i> July 2006
SR0607/49599GTO <b>Numerical Simulation of Forming of Advanced Materials</b> W. Gan	<i>Summary Report = Y Detailed Report = N</i> July 2006
SR0608 / 47712GTO <b>Friction Stir Lap Joining with Sealant</b> T. Li, G. Ritter, N. Kapustka	<i>Summary Report = Y Detailed Report = Y</i> August 2006
SR0609 / 49238GTO <b>Assessment of Friction Stir Welding Refractory Tool Materials</b> T. Li,	<i>Summary Report = Y Detailed Report = N</i> August 2006

## 2005

MR0501/48246GTO <b>Fiber Laser Processing</b> J. Eastman	<i>Summary Report = Y Detailed Report = Y</i>  January, 2005
MR0502/47415GTO <b>Development of Analytical Tools for Magnetic Pulse Welding</b> P. Zhang, M. Kimchi	<i>Summary Report = Y Detailed Report = Y</i>  February 2005
MR0503/48247GTO <b>Modeling and Prediction of Weld Pool and Bead Shape for Fusion Welding Applications</b> W. Zhang, S. Khurana, R. Yancey	<i>Summary Report = Y Detailed Report = Y</i>  February 2005
SR0504/48243GTO <b>Modeling of Eddy Current Techniques for Manufacturing and In-Service Inspections</b> E. Todorov	<i>Summary Report = Y Detailed Report = N</i>  April 2005
SR0505/48233GTO <b>Split-Coil Development for Magnetic Pulse Technologies</b> H. Shao, P. Zhang	<i>Summary Report = Y Detailed Report = N</i>  May 2005
MR0506/48245GTO <b>Laser Hybrid Welding of Aluminum</b> S. Ream, B. Shinn	<i>Summary Report = Y Detailed Report = Y</i>  May 2005
SR0507/45750GTO <b>Weldability Study of Service-Exposed Austenitic Stainless Steel - 304H</b> S. Shi, J. C. Lippold, J. Ramirez	<i>Summary Report = Y Detailed Report = N</i>  May 2005
MR0508/47411GTO <b>Laser GMAW Hybrid Welding Process Monitoring</b> D. Farson, Z. Chen, T-C. Huang	<i>Summary Report = Y Detailed Report = Y</i>  May 2005
MR0509/45735IRP <b>Characterization and Mechanical Properties of High-Strength Steel Weld Metals</b> J. Ramirez	<i>Summary Report = Y Detailed Report = Y</i>  May 2005
MR0510/45739IRP <b>Process Monitoring for Small-Scale Resistance Spot Welding</b> D. Farson, J. Chen, K. Ely, T. Frech	<i>Summary Report = Y Detailed Report = Y</i>  June 2005
MR0511/47412GTO <b>Scanning Hybrid Laser GMAW Welding for Sheet Metal and Filler Passes on Plate</b> D. Farson, M. Cho, H. Choi, Y. Lim, P. Denney, I. Harris	<i>Summary Report = Y Detailed Report = Y</i>  June 2005
SR0512/47253GDE <b>Virtual Reality Welder Training</b> N. Porter, J. Cote, T. Gifford	<i>Summary Report = Y Detailed Report = N</i>  July 2005
SR0513/49543IRD <b>Fatigue Performance of Strap Plates with Longitudinal Fillet Welds</b> W. Mohr	<i>Summary Report = Y Detailed Report = N</i>  August 2005

MR0514/49590IRD-46547IRP

*Summary Report = Y Detailed Report = Y*

**Investigation of Fiber Reinforced Composite Liners for Pipeline Repair**

W. Bruce

December 2005

SR0515/48565GTH

*Summary Report = Y Detailed Report = N*

**High Speed Narrow Groove Submerged Arc Welding for Thin Steel Panels**

B. Baughman, J. Russell, C. Conrardy, N. Porter,  
Nick Evans, L. Kvidahl, H. Sadler, D. Barton

December 2005

## 2004

- MR0401 / 45750IRP *Summary Report = Y Detailed Report = Y*  
**Reheat Cracking and Elevated Temperature Embrittlement of Austenitic Alloys: Literature Review**  
J. C. Lippold, H. Zhang, S. Shi, J. Ramirez January 2004
- MR0402 / 41711IRP *Summary Report = Y Detailed Report = Y*  
**Standardization of the Transvarestraint Test: A Statistical Study using Austenitic Stainless Steels and Nickel-Base Alloys**  
T. L. Finton, J. C. Lippold January 2004
- MR0403 / 44633IRP *Summary Report = Y Detailed Report = Y*  
**6 Sigma™ Methods Development and Application to Welding Processes**  
W. Ittiwatanna, T. Allen, D. Harwig January 2004
- MR0404 / 45738IRP *Summary Report = Y Detailed Report = Y*  
**Hybrid Surface Tension Transfer (STT) with Backside Heating**  
P. Kinney, D. Farson, P. Denney February 2004
- SR0405 / 46521IRP *Summary Report = Y Detailed Report = N*  
**Hybrid Laser + GMAW Process for Fatigue-Resistant Welding**  
M. H. Cho, D. Farson, P. Denney March 2004
- SR0406 / 47424GTO *Summary Report = Y Detailed Report = N*  
**Micro to Nano Scale Laser Processing**  
K. Fenner, T. Frech April 2004
- MR0407 / 45733IRP *Summary Report = Y Detailed Report = Y*  
**Characterization of Adaptive Arc Length Controls for Pulsed-GMAW**  
B. Baughman, R. Richardson, D. Harwig April 2004
- MR0408 / 47420GTO *Summary Report = Y Detailed Report = Y*  
**Laser-GMAW-P-Hybrid Welding of Titanium**  
B. Shinn, P. Denney June 2004
- SR0409 / 47422GTO *Summary Report = Y Detailed Report = N*  
**Laser Weld Process Modeling**  
G. Jung, S. Ream, B. Yancey May 2004
- SR0410 / 47414GTO *Summary Report = Y Detailed Report = N*  
**Evaluation of Resistance Welding Hole Repair Technique for Aerospace Alloys**  
D. Workman, J. Reynolds June 2004
- MR0411 / 47422GTO *Summary Report = Y Detailed Report = Y*  
**Microstructure Prediction in the Heat-Affected Zones of Welds**  
S. Khurana, R. Yancey July 2004
- MR0412 / 47421GTO *Summary Report = Y Detailed Report = Y*  
**Thermionic Cleaning Applications**  
J. Reynolds, B. Green, M. Boring, S. Manring, G. Ritter, D. Holdren, C. Conrardy July 2004
- MR0413 / 45732IRP *Summary Report = Y Detailed Report = Y*  
**High Power Direct Diode Laser Welding of 5754-0 Aluminum**  
W. Dawson, C. Albright, P. Denney July 2004

MR0414 / 41716IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Ultrasonic Prototype Device for Nondestructive Characterization of Heat-Sealed Laminates - User's Guide</b>	
S. Rokhlin, Z. Xie, C. Gui, B. Xie	August 2004
MR0415 / 47413GTO	<i>Summary Report = Y Detailed Report = Y</i>
<b>FEA Modeling and Joint Optimization of Ceramic-to-Metal Joints for Fuel Cell Applications</b>	
P. Hall, G. Jung, J. Lannutti	October 2004
MR0416 / 47419GTO	<i>Summary Report = Y Detailed Report = Y</i>
<b>Vision-Based In-Process Inspection using Complex Structured Light</b>	
C. Reichert, S. Ream	October 2004
MR0417 / 1255IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Mechanical Properties and Hydrogen Induced Stress Corrosion Cracking of Super 13Cr Steel Welded Joints</b>	
J. Ramirez	October 2004
MR0418 / 47414GTO	<i>Summary Report = Y Detailed Report = Y</i>
<b>Assessment of Repair Technologies for Gas Turbine Engine Components</b>	
J. Reynolds, D. Holdren, Q. Lu, J. Eastman, J. Didion, S. Shira, C. Conrardy	November 2004
MR0419 / 46521IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Hybrid Laser + GMAW Process for Fatigue-Resistant Welding</b>	
D. Farson, M. Cho, P. Denney	December 2004
MR0420 / 47413GTO	<i>Summary Report = Y Detailed Report = Y</i>
<b>Status of Manufacturing and Manufacturability for Fuel Cell Systems</b>	
F. Jakob	December 2004
MR0421 / 45731IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>NDE of Heavy-Walled Reactors</b>	
Lozev, Spencer	December 2004
MR0422 / 47420GTO	<i>Summary Report = Y Detailed Report = Y</i>
<b>Development and Assessment of Joining Methods for Aluminum Aircraft Structures</b>	
J. Bernath, J. Gould	December 2004
MR0423 / 47417GTO	<i>Summary Report = Y Detailed Report = Y</i>
<b>Phased-Array Ultrasonic Inspection for Heavy Manufacturing Applications</b>	
M. Lozev, R. Spencer, V. Thyagarajan	December 2004
MR0424 / 47482GTO	<i>Summary Report = Y Detailed Report = Y</i>
<b>Investigation of Dissimilar Material Self-Piercing Riveting using Warm Technologies</b>	
H. Shao, J. Gould	December 2004
SR0425 / 47414GTO	<i>Summary Report = Y Detailed Report = N</i>
<b>Development of Repair Weldability Test for High Performance Base and Filler Metals</b>	
B. Alexandrov, N. Nissley, S. Norton, J. Lippold, Q. Lu	December 2004

**2003**

MR0301 / 1245IRP <b>A Statistical Process Design Procedure for GMAW Optimization</b> T. Allen, R. Richardson, D. Tagliabue, G. Maul, D. Yapp	<i>Summary Report = Y Detailed Report = Y</i> <i>Detailed Avail in Hard Copy Only</i> January 2003
MR0302 / 44642IRP <b>Modulated Laser Welding Process</b> D. Farson, M. H. Cho, P. Denney	<i>Summary Report = Y Detailed Report = Y</i> February 2003
MR0303 / 43656IRP <b>Inspection of Thin-Walled Pipe and Shell for Environmental Cracking</b> M. Lozev, R. Spencer, and B. Grimmatt	<i>Summary Report = Y Detailed Report = Y</i> March 2003
MR0304 / 44646IRP <b>Inspection of Superaustenitic Stainless Steel Welds using Phased-Array Ultrasonic Testing</b> M. Lozev, E. Shell, R. Spencer, and B. Grimmatt	<i>Summary Report = Y Detailed Report = Y</i> April 2003
SR0305 / 42629IRP <b>Improved Data Acquisition System for Arc Welding Analysis</b> T.-C. Huang	<i>Summary Report = Y Detailed Report = N</i> May 2003
MR0306 . 41713IRP <b>Geometry Effect on Fatigue Life of Fillet Welds under Tension -Compression Loading</b> C. Tsai, C. Tso, W. Mohr	<i>Summary Report = Y Detailed Report = Y</i> June 2003
SR0307 / 46446IRD <b>Fusion Welding Nitinol to Stainless Steel</b> Peter Hall	<i>Summary Report = Y Detailed Report = N</i> July 2003

2002

SR0201 / 44637IRP & 43565IRP *Summary Report = Y Detailed Report = N*  
**Simulation of Measurement of Joint Stiffness for NVH Concepts for Hydroformed Tubular Type Automotive Structures**  
M. Tiwari, M. Young, R. Singh, J. S. Crompton October 2001

SR0202 / 42631IRP *Summary Report = Y Detailed Report = N*  
**Electrical Measurements and Heat Input Calculations for the GMAW-P Process**  
A. Joseph, D. Harwig November 2001

MR0203 / 41725IRP *Summary Report = Y Detailed Report = Y*  
**Automated Surface Profile Inspection**  
C. Reichert, T-C. Huang March 2002

MR0204 / 1247IRP *Summary Report = Y Detailed Report = Y*  
**Microstructure and Mechanical Performance of Thermal Spray Coatings - Part 2 - Mechanical Property Characterization**  
I. Harris March 2002

MR0205 / 41711IRP *Summary Report = Y Detailed Report = Y*  
**Comparison of Weld Hot Cracking Tests - Summary of an IIW Round Robin Study**  
T. L. Finton, J. C. Lippold March 2002

MR0206 / 41712IRP *Summary Report = Y Detailed Report = Y*  
**The Effect of Multiple Post-Weld Heat Treatment Cycles on the Weldability of Waspaloy**  
M. Qian, J. C. Lippold April 2002

SR0207 / 41712IRP *Summary Report = Y Detailed Report = N*  
**Degradation of Alloy 718 Weldability by Repair Heat Treatment Cycles**  
R. Bowers April 2002

MR0208 / 42639IRP *Summary Report = Y Detailed Report = Y*  
**Effect of Crack Front Curvature on CTOD Fracture Toughness in A707 Steel**  
J. Zhou, W. Soboyejo, J. S. Crompton May 2002

MR0209 / 42639IRP *Summary Report = Y Detailed Report = Y*  
**A Statistical Model for the Prediction of Brittle Fracture**  
J. Zhou, W. Soboyejo, J. Crompton May 2002

MR0210 / 41712IRP *Summary Report = Y Detailed Report = Y*  
**An Investigation of the Repair Weldability of Waspaloy and Alloy 718**  
M. Qian, J. C. Lippold June 2002

MR0211 / 42631IRP *Summary Report = Y Detailed Report = Y*  
**Assessing the Effects of GMAW-P Parameters on Arc Power and Weld Heat Input**  
A. Joseph, D. Harwig, D. Farson, R. Richardson June 2002

MR0212 / 44639IRP *Summary Report = Y Detailed Report = Y*  
**Weldable 13Cr Steels for Subsea Flow Lines**  
J. Ramirez June 2002

MR0213 / 42630IRP *Summary Report = Y Detailed Report = Y*  
**Evaluation of Two-Wire GMAW Technology for Problematic Steel Welding Applications**  
D. Ketron, R. Longenecker, S. Brown July 2002

MR0214 / 42645IRP *Summary Report = Y Detailed Report = Y*  
**Laser Welding of Plastics - Colors, Invisible Joints, and Less Common Joint Types**  
R. Grimm, K. Hartke, J. Robinson, J. Fallara July 2002

SR0215 / 44647IRP *Summary Report = Y Detailed Report = N*  
**Ultrasonic Real-Time Monitoring of Wire Bonding Process**  
S. Rokhlin, A. Baltazar, B. Grimmer, T. Frech July 2002

SR0216 / 42644IRP *Summary Report = Y Detailed Report = N*  
**Expert Systems for Laser Weld Diagnostics**  
D. Farson, K. R. Kim, P. Denney August 2002

MR0217/ 43657IRP *Summary Report = Y Detailed Report = Y*  
**Magnesium Joining for Automotive Applications**  
W. Chuko August 2002

SR0218 / 44635IRP *Summary Report = Y Detailed Report = N*  
**Thermal Cycle Effects on Alpha Case Characteristics in Titanium Welds**  
M. Robinson, D. Harwig, J. Lawmon, J. Lippold August 2002

MR0219 / 42637IRP *Summary Report = Y Detailed Report = Y*  
**Development of a Gleeble-Based Test for Postweld Heat Treatment Cracking Susceptibility**  
S. J. Norton, J. C. Lippold August 2002

MR0220 / 41724IRP *Summary Report = Y Detailed Report = Y*  
**A Comparison of Arc Welding Parameter Optimization Methods** *Detailed Avail in Hard Copy Only*  
C. Ribardo, D. Yapp, D. Harwig, T. Allen, R. Richardson September 2002

SR0221 / 44633IRP *Summary Report = Y Detailed Report = N*  
**A Desirability Function for Addressing Process Variability Under Six Sigma Assumptions**  
D. Ribardo, D. Yapp, D. Harwig, T. Allen, R. Richardson September 2002

MR0222 / 43567IRP *Summary Report = Y Detailed Report = Y*  
**The Effect of Oxygen as an Assist Gas during Low-Power Pulsed Nd:YAG Laser Welding of Copper**  
E. Biro, D. C. Weckman, Y. Zhou, K. Ely September 2002

MR0223 / 43564IRP *Summary Report = Y Detailed Report = Y*  
**SSC Resistance of Welded High-Strength Pipeline Steels in Sour Environments**  
G. Omweg, G. Frankel, G. Koch, W. Bruce, J. Ramirez October 2002

MR0224 / 1214IRP *Summary Report = Y Detailed Report = Y*  
**Infrared Welding of High-Melting Polymers**  
A. Quan, Y. Chen, A. Benatar October 2002

MR0225 / 41727IRD *Summary Report = Y Detailed Report = Y*  
**Joining of Metals to Polymers: Aluminum and Galvanized Steel to Polyethylene and Polypropylene**  
R. Grimm October 2002

MR0226 / 42646IRP <b>Conductive Adhesives</b> G. Ritter	<i>Summary Report = Y Detailed Report = Y</i>  November 2002
MR0227 / 44368IRD <b>Joining of Silicon</b> D. Hauser	<i>Summary Report = Y Detailed Report = Y</i>  December 2002
SR0228 / 42631IRP <b>Melting Rate Analysis of the VP-GMAW Process</b> D. Harwig, J. Dierksheide, D. Yapp, S. Blackman	<i>Summary Report = Y Detailed Report = Y</i>  December 2002
MR0229 / 44638IRP <b>Improved Prediction of Burnthrough for In-Service Welding</b> W. Bruce, M. Boring	<i>Summary Report = Y Detailed Report = Y</i>  December 2002

## 2001

SR0101 / 42633IRP <b>Spot Weld Process Modeling</b> K. Koppenhoefer, J. S. Crompton, Z. Feng, P. Wung	<i>Summary Report = Y Detailed Report = N</i> January, 2001
MR0102 / 40380IRP <b>Generation of Optical and Acoustic Emissions by Laser Weld Plumes</b> D. F. Farson, K. R. Kim, C. Rickert	<i>Summary Report = Y Detailed Report = Y</i> January, 2001
PR0103 / 42634IRP <b>Arc Welding of Tubular Space Frames</b> B. Green	<i>Summary Report = Y Detailed Report = N</i> February, 2001
MR0104 / 40639IRP <b>Metallurgical and Process Characterization of Interstitial-Free Steels for RSW</b> D. Workman, J. E. Gould	<i>Summary Report = Y Detailed Report = Y</i> February, 2001
MR0105 / 41727IRP <b>TTIR -- Fiber-Optic Tooling</b> R. Grimm	<i>Summary Report = Y Detailed Report = Y</i> March, 2001
MR0106 / 1231IRP <b>Development of a G-BOP Test Procedure and Assessment of Weld Metal Hydrogen Cracking</b> M. Johnson, C. Marianetti, J. C. Lippold	<i>Summary Report = Y Detailed Report = Y</i> March, 2001
MR0107 / 42651IRP <b>Metallurgical Interpretation of Electrode Life Behavior in Resistance Spot Welding of Aluminum Sheet</b> W. Chuko, J. E. Gould	<i>Summary Report = Y Detailed Report = Y</i> April, 2001
SR0108 / 1225IRP <b>RSW Wear on Galvannealed Steels</b> M. Kimchi, F. Lu, C. L. White	<i>Summary Report = Y Detailed Report = N</i> April, 2001
PR0109 / 43623IRP <b>FSW of Aluminum Metal-Matrix Composites</b> W. L. Stellwag, T. J. Lienert	<i>Summary Report = Y Detailed Report = N</i> May, 2001
MR0110 / 41714IRP <b>Compact Focus Heads for High-Power Nd:YAG Laser Processing</b> D. Farson, Y. Guo, P. Denney	<i>Summary Report = Y Detailed Report = Y</i> June, 2001
MR0111 / 01210IRP <b>Alloy 718 Heat-Affected Zone Microstructural Evolution After Multiple Repair and Postweld Heat-Treatment Cycles</b> Q. Lu, J. C. Lippold, R. Bowers	<i>Summary Report = Y Detailed Report = Y</i> June, 2001

MR0112 / 43658IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Development of Tempering Practice During Resistance Spot Welding of Transformation-Hardened Steels</b>	
W. Chuko, J. E. Gould	July, 2001
MR0113 / 43567IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Evaluation of Laser Spot Welding of Thin Metallic Sheet</b>	
E. Biro, Y. Zhou, D. D. Weckman, K. J. Ely	July, 2001
MR0114 / 40640IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Characterization of Annual Projection Capacitive Discharge Welds</b>	
B. Girvin, J. Gould, T. Stotler	July, 2001
MR0115 / 42645IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Laser Welding of Plastics - Extinction Coefficients</b>	
B. Grimm, K. Hartke, S. Hartke, M. Fallara, B. Christel	September, 2001
MR0116 / 40628IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Thermal Spraying of Stainless Steel Coatings Using a High Energy Plasma Spray (HEPS) System</b>	
M. Scholl, R. McGrann, I. Harris	September, 2001
MR0117 / 43565IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Influence of Joint Stiffness on the Vibration Behavior of Hydroformed Tubular Type Automotive Structures</b>	
R. Singh, M. Tiwari, M. Young, J. Crompton	September, 2001
MR0118 / 01256IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>An Investigation of Porosity Formation in Titanium Gas-Tungsten Arc Welds</b>	
R. Pathak, J. Lippold, W. Baeslack, T. Paskell	September, 2001

## 2000

- MR0001 / 01253IRP *Summary Report = Y Detailed Report = Y*  
**Influence on Microstructure and Heat Treatment on the Tensile** *Detailed Avail in Hard Copy Only*  
**Properties of Friction Stir Welds in Alloys 6061-T6, 5454-H34, and 2195-T8**  
P. Ditzel, J. C. Lippold January, 2000
- SR0002 / 43651IRP *Summary Report = Y Detailed Report = N*  
**Prediction of Microstructure and Mechanical Properties in Welds**  
M. Victor Li and Zhili Feng February, 2000
- MR0003 / 01247IRP *Summary Report = Y Detailed Report = Y*  
**Effects of Spray Angle and Distance on Steel Coatings**  
I. Harris and C. Laban March, 2000
- SR0004 / 41717IRP *Summary Report = Y Detailed Report = N*  
**Statistical Characterization of Coarse-Grained Heat-Affected Zone Toughness Data for an**  
**Offshore Steel**  
S. Mulia, R. Warke March, 2000
- MR0005 / 01215IRP *Summary Report = Y Detailed Report = Y*  
**Welding Fume Formation Rates in Gas-Shielded Metal Arc Welding** *Detailed Avail in Hard Copy Only*  
G. Ulrich April, 2000
- PR0006 / 42630IRP *Summary Report = Y Detailed Report = N*  
**Assessment and Development of Twin Wire GMAW**  
D. Ketron May, 2000
- MR0007 / 01256IRP *Summary Report = Y Detailed Report = Y*  
**GTAW and RSW Results in Weldability of Dissimilar 5000 and 6000 Aluminum Alloy Combinations**  
M. Atwell and J. C. Lippold June, 2000
- MR0008 / 01208IRP *Summary Report = Y Detailed Report = Y*  
**Reliability of Engineering Structures**  
H. Shen, R. Warke July, 2000
- SR0009 / 01225IRP *Summary Report = Y Detailed Report = N*  
**Mechanisms of Electrode Wear During Resistance Spot Welding Hot-Dipped Galvanized Steel**  
M. Kimchi, M. Gugel, C. White July, 2000
- SR0010 / 41727IRD *Summary Report = Y Detailed Report = N*  
**Through-Transmission Infrared Welding (TTIR) of Colored Acrylic Plastics**  
R. Grimm August, 2000
- MR0011 / 40630IRP *Summary Report = Y Detailed Report = Y*  
**Charpy Requirements for TMCP Steels**  
K. Koppenhoefer August, 2000
- PR0012 / 43623IRP *Summary Report = Y Detailed Report = N*  
**Friction Stir Welding of Ti-6Al-4V Alloys**  
T. J. Lienert, W. L. Stellwag September, 2000

MR0013 / 41712IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Metallurgy, Welding, and Repair of Waspaloy for Gas Turbine Engine Applications</b>	
M. Qian, J. C. Lippold, R. Bowers	September, 2000
MR0014 / 42016IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Welding of High-Temperature Thermoplastics</b>	
A. Savitski	September, 2000
MR0015 / 40380IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Laser Weld Penetration Monitoring with Multiple Emission Signal Measurements</b>	
D. F. Farson, A. Ali, C. Rickert	October, 2000
SR0016 / 42633IRP	<i>Summary Report = Y Detailed Report = N</i>
<b>Measurement of Material Properties of Spot Welds</b>	
K. Koppenhoefer, J. S. Crompton, P. Wung	November, 2000
SR0017 / 42633IRP	<i>Summary Report = Y Detailed Report = N</i>
<b>Failure of Spot Welded Coupons</b>	
K. Koppenhoefer, J. S. Crompton, P. Wung	November, 2000
SR0018 / 42649IRP	<i>Summary Report = Y Detailed Report = N</i>
<b>Microstructures in Friction Stir Welds on Al 6061-T651 Alloy</b>	
T. J. Lienert, R. J. Grylls	December, 2000
SR0019 / 43623IRP	<i>Summary Report = Y Detailed Report = N</i>
<b>Determination of Load, Torque, and Tool Temperatures During Friction Stir Welding of Aluminum Alloys</b>	
T. J. Lienert, W. L. Stellwag, H. Shao	December, 2000
SR0020 / 42633IRP	<i>Summary Report = Y Detailed Report = N</i>
<b>Modeling of Spot Welded Components</b>	
K. Koppenhoefer, J. S. Crompton, P. Wung	December, 2000

1999

MR9901 / 01252IRP <b>Development of Projection Design Guidelines for Annular Projection Welding</b> B. Girvin, J. Gould	<i>Summary Report = Y Detailed Report = Y</i> January, 1999
MR9902 / 40634IRP <b>Analytical Models for the Mechanical Response of a Resistance Spot Welding Machine</b> J. Gould, Z. Feng, J. Chou, M. Kimchi	<i>Summary Report = Y Detailed Report = Y</i> February, 1999
MR9903 / 42749IRD <b>Friction Stir Welding of Mild Steel</b> T. J. Lienert	<i>Summary Report = Y Detailed Report = N</i> March, 1999
MR9904 / 41719IRP <b>Dual-Beam Laser Welding</b> J. Xie	<i>Summary Report = Y Detailed Report = Y</i> March, 1999
MR9905 / 01241IRP <b>Trends in High Temperature Performance of 2-1/4Cr-1Mo Steel Weldments</b> R. Warke	<i>Summary Report = Y Detailed Report = Y</i> May, 1999
PR9906 / 42643IRP <b>Single-Sided Laser Welding of Galvanized Steel</b> J. Xie, P. Denney	<i>Summary Report = Y Detailed Report = N</i> June, 1999
MR9907 / 41723IRP <b>Variable Polarity GMAW</b> J. Talkington, D. Richardson, C. Conrardy	<i>Summary Report = Y Detailed Report = Y</i> July, 1999
PR9908 / 42647IRP <b>Evaluation of Ultrasonic Sizing Methodologies and Their Applicability to Environmental Cracking</b> R. Spencer	<i>Summary Report = Y Detailed Report = N</i> August, 1999
PR9909 / 42626IRP <b>Conductive Adhesives</b> G. Ritter	<i>Summary Report = Y Detailed Report = N</i> September, 1999

1998

- MR9801 / 01256IRP *Summary Report = Y Detailed Report = Y*  
**Porosity in Titanium Welds: A Literature Review**  
R. Pathak, J. Lippold, W. Baeslack, T. Paskell January 1998
- PR9802 / 01214IRP *Summary Report = Y Detailed Report = N*  
**Through-Transmission Infrared Welding: Effect of Glass Reinforcing Fiber**  
R. Grimm February 1998
- PR9803 / 01241IRP *Summary Report = Y Detailed Report = N*  
**Continuous Through-Transmission Infrared Welding Speed with Dual Spot Heaters**  
R. Grimm, B. Danison, J. Russell March 1998
- MR9804 / 01244IRP *Summary Report = Y Detailed Report = Y*  
**A Review of the Weight Function Approach to Compute Stress Intensity Factors**  
F. Orth March 1998
- MR9805 / 01234IRP *Summary Report = Y Detailed Report = Y*  
**Adhesives for Microelectronics**  
G. Ritter April 1998
- MR9806 / 01218IRP *Summary Report = Y Detailed Report = Y*  
**Monitoring of Weld Quality During Thin-Sheet GMA Welding**  
D. Barborak, C. Conrardy April 1998
- MR9807 / 40379IRP *Summary Report = Y Detailed Report = Y*  
**Theoretical Analysis of Bonding Characteristics During Resistance Mash Seam Welding Sheet Steels**  
J. Gould May, 1998
- MR9808 / 40382IRP *Summary Report = Y Detailed Report = Y*  
**Development of Rapid Adhesive Bonding Technology for Structural Applications**  
G. Ritter May, 1998
- MR9809 / 01206IRP *Summary Report = Y Detailed Report = Y*  
**Microstructure/Property Relationships in Dissimilar Welds Between Duplex Stainless Steels and Carbon Steels**  
E. Barnhouse, J. C. Lippold, W. Lin June, 1998
- MR9810 / 41722IRP *Summary Report = Y Detailed Report = Y*  
**Effects of Welding Parameters and Electrode Atmospheric Exposure on the Diffusible Hydrogen Content of Gas Shielded Flux Cored Arc Welds**  
D. Harwig, D. Longenecker, J. Cruz June, 1998
- MR9811 / 40627IRP *Summary Report = Y Detailed Report = Y*  
**Oxygen Equivalent Effects on the Mechanical Properties of Ti and Ti-6Al-4V Welds**  
D. Harwig, C. Fountain, H. Castner July, 1998

MR9812 / 41727IRD	<i>Summary Report = Y Detailed Report = Y</i>
<b>Exploration of Joint Designs Weldable by Through-Transmission Infrared Welding</b>	
R. Grimm	August, 1998
MR9813 / 40381IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Localized Corrosion and Stress Corrosion Cracking Resistance of Friction Stir Welded Al Alloy 5454</b>	
J. Gould, Z. Xia, G. Frankel	August, 1998
MR9814 / 01258IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Micro-Resistance Spot Welding of Sheet Metals, Part I: Process Parameter Study</b>	
Y. Zhou, P. Gorman, K. Ely	September, 1998
MR9815 / 01258IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Micro-Resistance Spot Welding of Sheet Metals, Part II: Effects of Ni or Ni/Au Plating Materials</b>	
Y. Zhou, P. Gorman, K. Ely	September, 1998
MR9816 / 01208IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Development of Reliability-Based Fitness-for-Service</b>	
D. Lanning, M.H. Shen, R. Warke	October, 1998
MR9817 / 41726IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Conductive Weldbonding</b>	
G. Ritter	October, 1998
SR9818 / 40633IRP	<i>Summary Report = Y Detailed Report = N</i>
<b>Development of New Modeling Procedures for 3D Welding Residual Stress and Distortion Assessment</b>	
Z. Feng, W. Cheng, Y. Chen	November, 1998
MR9819 / 01251IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Fracture Mechanics Analysis of HAZ and Interfacial Cracks</b>	
Y.Y Wang	November, 1998
MR9820 / 01262IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Ultrasonic Characterization of Heat-Sealed Laminates</b>	
S. Rokhlin, Q. Xie, B. Farahbakhsh	December, 1998
MR9821 / 01263IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Inertia Welding</b>	
V. Balasubramanian, Y. Li, N. Katsube, W. O. Soboyejo, T. Stotler, J. Crompton, J. Gould	December, 1998

1997

MR9701 / 01662IRD <b>Fracture Toughness Estimation Procedures for SE(B) Specimens with Weld Metal Mismatch</b> Y-Y Wang, M. Kirk, J. R. Gordon	<i>Summary Report = Y Detailed Report = Y</i> <i>Detailed Avail in Hard Copy Only</i>  October 1997
MR9702 / 01648IRD <b>Finite Element Simulation of Ultrasonic Welding</b> C.H. Chou, R. Grimm, K. Laverty	<i>Summary Report = Y Detailed Report = Y</i> <i>Detailed Avail in Hard Copy Only</i> May 1997
MR9703 / 01708IRP <b>Welding of Nitinol to Stainless Steel</b> G. Wang	<i>Summary Report = Y Detailed Report = Y</i>  October 1997
MR9704 / 01226IRP <b>In-Process Laser Welding Monitoring Techniques: A Survey</b> D. Farson, C. Rickert, S. Nasla-Cook	<i>Summary Report = Y Detailed Report = Y</i>  October 1997
MR9705 / 01261IRP <b>Improving the Performance of Conventional NDE Used in Engineering Critical Assessment Phase II</b> D. Holdren	<i>Summary Report = Y Detailed Report = Y</i> <i>Detailed Avail in Hard Copy Only</i>  December 1997
PR9706 / 01250IRP <b>Quantification of Weld Solidification Cracking</b> Z. Feng	<i>Summary Report = Y Detailed Report = N</i>  October 1997
MR9707 / 01650IRP <b>Effect of Interpass Temperature on the Heat-Affected Zone Performance of Simulated Multipass Welds in Duplex and Superduplex Stainless Steels</b> S. Brandi, J. Lippold, W. Lin	<i>Summary Report = Y Detailed Report = Y</i>  November 1997
MR9708 / 01242IRP <b>Fracture Mechanics to Justify the Minimum Thickness for PWHT</b> B. Mohr	<i>Summary Report = Y Detailed Report = Y</i>  December 1997
MR9709 / 01253IRP <b>Microstructure Evolution During Friction Stir Welding of Aluminum Alloy 6061-T6</b> P. Ditzel, J. Lippold	<i>Summary Report = Y Detailed Report = Y</i>  November 1997
MR9710 / 01207IRP <b>Forming of Tailor-Welded Aluminum Blanks</b> M. Stasik, R. Wagoner	<i>Summary Report = Y Detailed Report = Y</i>  December 1997

1996

- MR9601  
**Evaluation of Leadless Solders**  
E. Park, W. Baeslack, R. Kapoor January 1996
- MR9602/01178IRP  
**Morphological Development During Flash Butt Welding Light Gauge Steels**  
Jerry E. Gould and Timothy V. Stotler January 1996
- MR9603/01152IRP  
**Chemical Thermodynamics as a Predictive Tool in the Active Metal Brazing of Ceramics**  
John Lannutti, Ge Wang, Rakesh Kapoor February 1996
- MR9604/01195IRP *Summary Report = Y Detailed Report = Y*  
**The Relationship between Microstructure and Cracking** *Detailed Avail in Hard Copy Only*  
**Behavior in ...TiAl Friction Weld Heat and Deformation Zones**  
Mary Juhas, William Baeslack, and Hamish Fraser May 1996
- MR9605 *Summary Report = Y Detailed Report = Y*  
**Sound Measurements of the Pulsed Current GMAW Process** *Detailed Avail in Hard Copy Only*  
Harvey Castner, Rajendra Singh June 1996
- MR9606 *Summary Report = Y Detailed Report = Y*  
**A Study of Hot Gas Welding of Polyethylene** *Detailed Avail in Hard Copy Only*  
Bob Grimm June 1996
- MR9607/01176IRP *Summary Report = Y Detailed Report = Y*  
**A Literature Review of Hot Plate Welding of Thermoplastics** *Detailed Avail in Hard Copy Only*  
H. M. Lu, J. Y. Nieh, Avraham Benatar, L. J. Lee, R. A. Grimm July 1996
- MR9608/01176IRP *Summary Report = Y Detailed Report = Y*  
**Simulation of Radiographs and 3-D Tomographs** *Detailed Avail in Hard Copy Only*  
S. Rokhlin October 1996
- MR9609 *Summary Report = Y Detailed Report = Y*  
**Fatigue Performance of Plate Attachments Welded by GTAW** *Detailed Avail in Hard Copy Only*  
William Mohr, Randy Bowers August 1996
- MR9610  
Withdrawn
- MR9611 *Summary Report = Y Detailed Report = Y*  
**The Effect of Long-Time PWHT on the Temper Embrittlement** *Detailed Avail in Hard Copy Only*  
**Susceptibility of a Modified 9Cr-1Mo Weldment**  
L. Friedman October 1996
- MR9612 *Summary Report = Y Detailed Report = Y*  
**Resistance Welding of a Superelastic NiTi Alloy** *Detailed Avail in Hard Copy Only*  
S. Brandi October 1996

MR9613/01235IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Performance of Joints in Thin-Shell Structures</b>	
J. Chou	November 1996
MR9614/01199IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>A Design of Experiments Evaluation of Resistance Spot Welding</b>	<i>Detailed Avail in Hard Copy Only</i>
<b>Manufacturability Part II: Multiple-Factor Effects</b>	
J. Gould, L. Lehman	November 1996
MR9615/01236IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>The Incorporation of Residual Stresses in Fracture</b>	<i>Detailed Avail in Hard Copy Only</i>
<b>Assessment Models</b>	
P. Michaleris	November 1996
MR9616/01214IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Infrared Welding of Thermoplastics: Practical Characterization</b>	<i>Detailed Avail in Hard Copy Only</i>
<b>of Polymers, Colored Pigments, and Carbon Black Levels on</b>	
<b>Transmission of Infrared Radiation</b>	
R. Grimm, H.-J. Yeh	December 1996
MR9617/01213IRP	<i>Summary Report = Y Detailed Report = Y</i>
<b>Statistical Process Control for Gas Metal-Arc Welding</b>	
R. Richardson, G. Maul, B. Jones	December 1996

1995

- MR9501  
**Ventilation for Control of Arc Welding Fumes**  
Harvey Castner January 1995
- MR9502  
**Determination of Joint Stiffness Through Vibration Analysis of Beam Assemblies**  
Rajendra Singh, Mean-Liang Liaw, Jerry E. Farstad, Shih-Wei Kung February 1995
- MR9503  
**Computer Simulation of Weldment Fatigue Life**  
C.Y. Hou, N. Chen, F.V. Lawrence March 1995
- MR9504  
**CO2 Laser Beam Welding of Aluminum 5754-O and 6111-T4 Alloys**  
S. Venkat, C.E. Albright, S. Ramasamy, J.P. Hurley April 1995
- MR9505  
**The Effect of Weld Metal Mismatch on Fracture Toughness in Testing and Analysis Procedures**  
J.R. Gordon, Y.-Y. Wang June 1995
- MR9506  
**Ultrasonic Evaluation of Fatigue Damage in Metal Matrix Composites**  
S.I. Rokhlin, Y.C. Chu, W. Huang July 1995
- MR9507  
**A Study of the Creep Damage Distribution in 316 Stainless Steel Weldments Due to Multiaxial Stress**  
Yu-Hsian Hsiao, Honyang Zhang, and Glenn S. Daehn August 1995
- MR9508  
**Development of a Fracture Mechanics Assessment for the Performance of Plastic Joints**  
V.H. Kenner, C.H. Popelar, and J.G. Johnson, Jr. September 1995
- MR9509  
**An Effective Finite Element Procedure for Residual Stress Predictions in Multi-Pass Welds**  
C. Tsai, P. Dong, and J. Hong September 1995
- MR9510  
**Analysis of Vibration Transmission Through Joints in Machine Assemblies Using Component Modes**  
Jerry E. Farstad, Rajendra Singh December 1995

**1994**

MR9401

**Sigmajig Weldability Testing: The Effect of Specimen Strength and Thickness on Cracking Susceptibility**

John C. Lippold, Sassan Shademan, William A. Baeslack III

January 1994

MR9402 / 01651

**Weld Repair Without Postweld Heat Treatment of Thick-Section Carbon Steel Components**

L. M. Friedman

February 1994

MR9403

**Laser and Electron Beam Welding of a SiC-Reinforced Aluminum Metal-Matrix Composite**

T.J. Leinert, J.C. Lippold

May 1994

MR9404

**Low Temperature Solid-State Bonding of Materials Using Compliant Ag Interlayers**

Kenneth D. Challenger, Thomas W. Cordea

June 1994

MR9405

**Acoustic Emission Monitoring of Plasma Sprayed Tubes**

M. Scholl, C. Steinkamp, W.E. Wood

July 1994

MR9406

**Fume Generation Rates for Pulsed Current Gas Metal Arc Welding of Stainless Steel, Nickel, Aluminum Alloys**

Harvey R. Castner

August 1994

MR9407

**Evaluation of the Circular Patch Test for Assessing Weld Solidification Cracking**

T. Nelson, J.C. Lippold, and W.A. Baeslack

November 1994

MR9408

**A Design-of-Experiments Evaluation of Resistance Spot Welding Manufacturability, Part 1: Single-Factor Effects**

Lawrence R. Lehman and Jerry E. Gould

November 1994

**1993**

MR9301

**Nonlinear Ultrasonic Strength Assessment of Plastics, Plastic Joints, and Adhesive Bonds**

Peter B. Nagy, Laszlo Adler

January 1993

MR9302

**Dissimilar Friction Welding of Titanium Alloys to Alloy 718**

M. Kuo, C.E. Albright, W.A. Baeslack

February 1993

MR9303

**Measurement of Residual Stresses After Implant Welding of Polycarbonate, Part I: Photoelastic Techniques**

Joon Boo Park, Avraham Benatar

April 1993

MR9304

**HAZ Toughness of Duplex Stainless Steels at -20 C**

John C. Lippold, Ilhan Varol, William A. Baeslack, III

May 1993

MR9305

**Gas Metal Arc Welding Fume Generation using Pulsed Current and Steady Current**

Harvey Castner

June 1993

MR9306

**Mechanical Property Degradation of 316 Stainless Steel Weldments due to Creep and Thermal Aging**

Yu-Hsian Hsiao, Glenn S. Daehn

July 1993

MR9307

**Development of a Crack Closure Model to Simulate the Fatigue Behavior of Notched Components and Weldments**

C.Y. Hou, F.V. Lawrence

August 1993

1992

- MR9201  
**The Effect of Weld Metal Mismatch on Structural Integrity Assessments-A Preliminary Investigation**  
Pingsha Dong, J. Robin Gordon January 1992
- MR9202  
**Preliminary Results from the Ultrasonic Welding of Dissimilar Materials using Polymer Alloying Agents (Compatibilizers) in the Bond Line**  
R. A. Grimm, Z. Cheng February 1992
- MR9203  
**Fracture Mechanics Evaluation for the Life Expectancy of Polyethylene Butt Fusion Joints**  
Carl Popelar, V.H. Kenner, S.F. Popelar, M.C. Pfeil April 1992
- MR9204  
**Area Implant Welding as a Technique for Universal Ultrasonic Joining of Dissimilar Materials**  
R.A. Grimm, Z. Cheng June 1992
- MR9205  
**Characterization and Modeling of Polymers in the Vicinity of Welded Joints**  
J.-Y. Nieh, V.C. Tirumalai, L. James Lee June 1992
- MR9206  
**Joining Carbon-carbon Composites**  
P. Dadras June 1992
- MR9207  
**CO<sub>2</sub> Gas Shielding Effects in Laser Welding Mild Steel**  
D. Abbot, C. Albright July 1992
- MR9208  
**Real-time Monitoring for Arc Welding Control**  
S.I. Rokhlin, A.C. Guu August 1992
- MR9209  
**Determination of Critical J for Polyethelene Butt Fusion Joints**  
M.C. Pfeil, C.H. Popelar, V.H. Kenner December 1992

1991

- MR9101  
**Expert System for Diagnosis of Discontinuities in Gas Metal Arc Welds**  
Harvey R. Castner, Darren Barborak January 1991
- MR9102  
**Development of an Integrated Robotic Arc Welding System**  
Phillip K. Wadsworth, Richard W. Richardson February 1991
- MR9103  
**Investigation of "Ghost" Indications in Al-Cu Welds**  
John C. Lippold, Mark Cola March 1991
- MR9104  
**Effects of Plume Suppression on Heat Transfer Efficiencies in Argon-shielded Laser Beam Welding**  
S. Chiang, Charles Albright April 1991
- MR9105  
**Silicate Brazing of a High-purity Alumina**  
Jeffrey T. Knapp, James D. Cawley May 1991
- MR9106  
**Effects of Shielding Gases on Heat Transfer Efficiencies in Laser Beam Welding**  
Shichan Chiang, Charles E. Albright May 1991
- MR9107  
**A Technique for Simultaneously Measuring Weld Pool Surface Geometry and Arc Force in Real Time**  
Stanislav I. Rokhlin, Adam C. Guu June 1991
- MR9108  
**Inertia-friction Welding of a 6061-T6/AL2O3/15P Metal-matrix Composite**  
Mark Cola, Gary S. Martin, Charles E. Albright June 1991
- MR9109  
**An Experimental Study of Weld Pool Oscillations**  
Choong D. Yoo, Richard W. Richardson July 1991
- MR9110  
**An Investigation of Weld Microstructure in Fully Austenitic Stainless Steels**  
Murali Tumuluru, John C. Lippold, William A. T. Clark September 1991
- MR9111  
**A Method for Predicting HAZ Liquation Cracking using the Gleeble Hot Ductility and Spot-Varestraint Tests**  
Wangen Lin, William A. Baeslack III, John C. Lippold October 1991
- MR9112  
**Resistance Seam Weldability of Coated Steels, Part I: Weldability Envelopes**  
Jerry E. Gould, Menachem Kimchi, Craig A. Leffel, David W. Dickinson November 1991

1990

- MR9001  
**Computerized Radiographic Weld-Penetration Control with Weld-Pool-Depression Feedback**  
Adam C. Guu, Stanislav I. Rokhlin January 1990
- MR9002  
**Survey of Weld-penetration Control Techniques**  
R. Bruce Madigan and Harvey R. Castner January 1990
- MR9003  
**Coaxial Vision-Based GMAW Initial Design and Test**  
Richard W. Richardson, Christopher C. Conrardy February 1990
- MR9004  
**Characterization of Polystyrenes in the Vicinity of Hot-Plate-Welded Joints**  
V.C. Tirumalai and L. James Lee April 1990
- MR9005  
**Weld-Pool Oscillation Modeling**  
Choon D. Yoo, Richard W. Richardson April 1990
- MR9006  
**Feasibility of the Scanning Acoustic Microscope for Nondestructive Evaluation**  
Laszlo Adler and Peter B. Nagy May 1990
- MR9007  
**Weldability Testing of Al-Mg-Si Alloys**  
William A. Baeslack III, Dennis D. Harwig, John C. Lippold June 1990
- MR9008  
**Fluid Flows and Temperature Fields in a Weld Pool**  
Seppo A. Korpela, Natarajan Ramanan, V. Babu July 1990
- MR9009  
**Creep Crack Growth in Joints of a Thermoplastic**  
Scott F. Popelar, Carl H. Popelar, Vernal H. Kenner August 1990
- MR9010  
**An Investigation of Arc Force Effects in Submerged-arc Gas Tungsten-arc Welding**  
Y. Adonyi, William A. Baeslack III, Richard W. Richardson September 1990
- MR9011  
**Development of Optical Remote Sensing Instrumentation for Ultrasonic Nondestructive Evaluation**  
Peter B. Nagy, Laszlo Adler September 1990
- MR9012  
**Solid State Bonds Strength Using Ultrasonic Spectroscopy**  
Peter B. Nagy, Laszlo Adler November 1990

## 1989

- MR8901  
**The Effect of Weld Parameter Variations on Pool Oscillations in Full-Penetration Welds**  
R.W. Richardson, H.K. Ludewig January 1989
- MR8902  
**Ultrasonic Welding of Thermoplastics - Part 1, Near-Field**  
A. Benatar, R.V. Eswaran, S.K. Nayar February 1989
- MR8903  
**Ultrasonic Welding of Thermoplastics - Part 2, Far-Field**  
A. Benatar, Z. Cheng April 1989
- MR8904  
**The Relationship Between Ultrasonic Measurements and Microstructural Characteristics of Type 308 Stainless Steel Welds**  
W. Wang, S.I. Rokhlin, J.C. Lippold, L. Adler May 1989
- MR8905  
**Fatigue Strength of Laser-welded Lap Joints**  
C.E. Albright, C. Hsu, R.O. Lund July 1989

## 1988

- MR8801  
**The Resistance Spot Welding of Some One-side Coated Sheet Steels**  
J. Gould, M. White, R. Adamczyk July 1987
- MR8802  
**Resistance Welding Research Evaluations of Coated Steels - Part One, Weldability Lobe Analysis**  
J.E. Gould, W.A. Peterson August 1987
- MR8803  
**Fatigue Strength of Laser Welded Lap Joints: A Progress Report**  
R.O. Lund, C.E. Albright, J.G. Wylde September 1987
- MR8804  
**Prediction of Fatigue Crack Growth Behavior in Fillet Welded Joints**  
C.L. Tsai, D.S. Kim, J.K. Chiang December 1987
- MR8805  
**High-speed Laser Welding Discontinuities**  
C.E. Albright, S. Chiang December 1987
- MR8806  
**Ultrasonic Evaluation of Spot Welds**  
S.I. Rokhlin, S. Meng, L. Adler March 1988

MR8807	<b>Nondestructive Evaluation of Solid-State Weld Quality</b>	March 1988
	L. Adler, P. Nagy, S. Rokhlin	
MR8808	<b>Field-Assisted Diffusion Bonding of Partially Stabilized Zirconia</b>	March 1988
	T.J. Trick, J.D. Cawley	
MR8809	<b>Resistance Welding Evaluations of Coated Steels - Part 2, Dynamic Resistance Studies</b>	March 1988
	J.E. Gould, W.A. Peterson	
MR8810	<b>Weld Pool Mechanics And Heat Transfer</b>	May 1988
	S.A. Korpela, N. Ramanan, C.L. Tsai, J.Y. Lee	
MR8811	<b>Weldability of High-Strength, Low-Expansion Superalloys</b>	June 1988
	W.A. Baeslack III, S. Ernst, J.C. Lippold	
MR8812	<b>Development of a Welding Heat Flow Simulation For Control Applications</b>	July 1988
	D.F. Farson, R.W. Richardson, R.J. Mayhan	
MR8813	<b>Real-time Radiographic Monitoring of Weld Processes</b>	July 1988
	S.I. Rokhlin, A.C. Guu, K. Cho, D.E. Applegate	
MR8814	<b>Resistance Welding Research Evaluations of Coated Steels - Part 3, Nugget Development Studies</b>	August 1988
	J.E. Gould, W.A. Peterson	
MR8815	<b>Submerged GTA Welding of Stainless Steels</b>	August 1988
	Y. Adonyi, A.J. Campos, W.A. Baeslack III	
MR8816	<b>Remote Sensor Development for Ultrasonic NDE</b>	September 1988
	L.Adler, P.B. Nagy, S.I. Rokhlin	
MR8817	<b>A Review of Light/material Interactions During Laser Material Processing</b>	October 1988
	S. Chiang, C.E. Albright	
MR8818	<b>Hydrogen Cracking And Related Effects in Low-Carbon Structural Steels</b>	November 1988
	D.G. Howden, S.M. Park	

## 1987

- MR8701  
**NDE of Welds, Materials Characterization and Manufacturing Process Control**  
L. Adler, S. Rokhlin, P. Nagy, C. Fiedler and S. Meng September 1986
- MR8702  
**A Vision-Based Adaptive System for Aerospace Applications**  
R.W. Richardson September 1986
- MR8703  
**Assessment of Weld Wire-to-joint Positional Tolerance for Robotic Arc Welding**  
P. Wadsworth September 1986
- MR8704  
**A Survey of Education and Training Needs of Welding Personnel**  
P.M. Thomas, J.W. Altschuld January 1988

## EWI Research Briefs

- N/A  
D. Hauser, J. Chakravarty  
**Development of a Literature Data Base for Dissimilar Materials Joining** December 1988
- N/A  
**Defect Formation and Control During High-Speed Gas Metal Arc Welding**  
T.D. Paskell January 1989
- N/A  
**A Conceptual Observer-Based Arc Weld Thermal Cycle Control**  
Richard W. Richardson, D.F. Farson, R.J. Mayhan March 1989
- B8904  
**Analysis of Distortion in Gas Tungsten Arc Welds**  
H.W. Mishler June 1989
- B8905  
**Hot-Ductility Testing of High-Strength, Low-Expansion Superalloys**  
Wangen Lin, William A. Baeslack III, and John C. Lippold August 1989
- B9001  
**Silicate Brazing of Alumina Ceramics**  
James D. Cawley and Jeffrey T. Knapp February 1990
- B9002  
**The Limit of Penetration in High Energy Density Beam Welding**  
C. Albright March 1990

- B9003  
**Thermal and Residual-Stress Formation during Plastic Welding**  
 A. Benatar May 1990
- B9004  
**Evaluation of Strain-Induced Cracking Resistance of Thermal-Spray-Deposited Coatings**  
 W. Wood May 1990
- B9005  
**Computer-Aided Tomography of Welds**  
 Stanislav I. Rokhlin, Michael J. Donahue, Ligu Wang July 1990
- B9006  
**Interpretation of Coaxial Weld Images by Vision Analysis**  
 Richard W. Richardson, Wayne A. Penix, Kim L. Boyer August 1990
- B9007  
**An Experimental System for Full-Penetration Gas Tungsten-Arc Welding**  
 Richard W. Richardson, Paul Taylor September 1990
- B9008  
**A Diagram for Predicting the Weld Solidification Cracking Susceptibility of Pulsed-Laser Welds in Austenitic Stainless Steels**  
 G. Pacary, M. Moline, John C. Lippold September 1990
- B9009  
**Joining Studies of Carbon-Carbon Composites**  
 Parviz Dadras November 1990
- B9010  
**Improved Flaw Detection in Composites by Ultrasonic Leaky Lamb Waves**  
 Laszlo Adler, Peter Nagy December 1990
- B9101  
**A Review of the Welding Metallurgy and Weldability of Ferritic Stainless Steels**  
 John C. Lippold January 1991
- B9102  
**Engineering Thermoplastics as Bonding Agents**  
 Dave Grewell April 1991
- B9103  
**The Effect of Gauge Length on Lap-Shear Strength of Reinforced Thermoplastic Composite**  
 Stephen P. Molnar August 1991
- B9201  
**Active Metal Brazing of Ceramic Matrix Composites**  
 John J. Lannutti, James D. Cawley August 1992
- B9202  
**Interface Characteristics of Solid-Phase Welds between Ti-6Al-2Sn-4Zr-2Mo-0.1 Si and Ti-14Al-21 Nb Titanium Aluminide**  
 Mary Juhas, W.A. Baeslack III, H.L. Fraser, P. Threadgill, D. Phillips, T.F. Broderick October 1992

- B9301  
**Transmission Electron Microscopy as a Tool for Microstructural Probing of Ultrasonic Wirebonds**  
 Nikhil Murdeshwar September 1993
- B9401  
**Ultrasonic Assessment of Fatigue Damage of Titanium MMCs**  
 S.I. Rokhlin, Y.C. Chu, A.I. Lavrentyev June 1994
- B9402  
**Induction Hot Pressure Welding - An Overview**  
 Timothy Stotler and Dr. Jerry E. Gould August 1994
- B9403  
**Application of Statistical Process Control to a Simulated Gas Tungsten-Arc Welding Production Run**  
 Richard W. Richardson, Stacey D. Pullins September 1994
- B9404  
**Finite Element Simulation of Residual Stresses in Multi-Pass Welds**  
 J.K. Hong, P. Dong, C.L. Tsai October 1994
- B9501  
**State of the Art in Fluxless Soldering**  
 Ge Wang, Daniel Hauser March 1995
- B9502  
**Plasma Torch Activation of Polymer Surfaces for Adhesion**  
 J. Adams, T. Frech, R. Grimm, T. Paskell April 1995
- B9503  
**Nonlinear Ultrasonic Method for the Detection of Delaminations in SMC Plates and Joints**  
 Laszlo Adler, Peter B. Nagy May 1995
- B9504  
**Analysis and Optimization of Weakly Coupled Thermo-Elastic-Plastic Systems with Applications to Weldment Design**  
 Panagiotis Michaleris, Daniel A. Tortorelli, and Creto A. Vidal July 1995