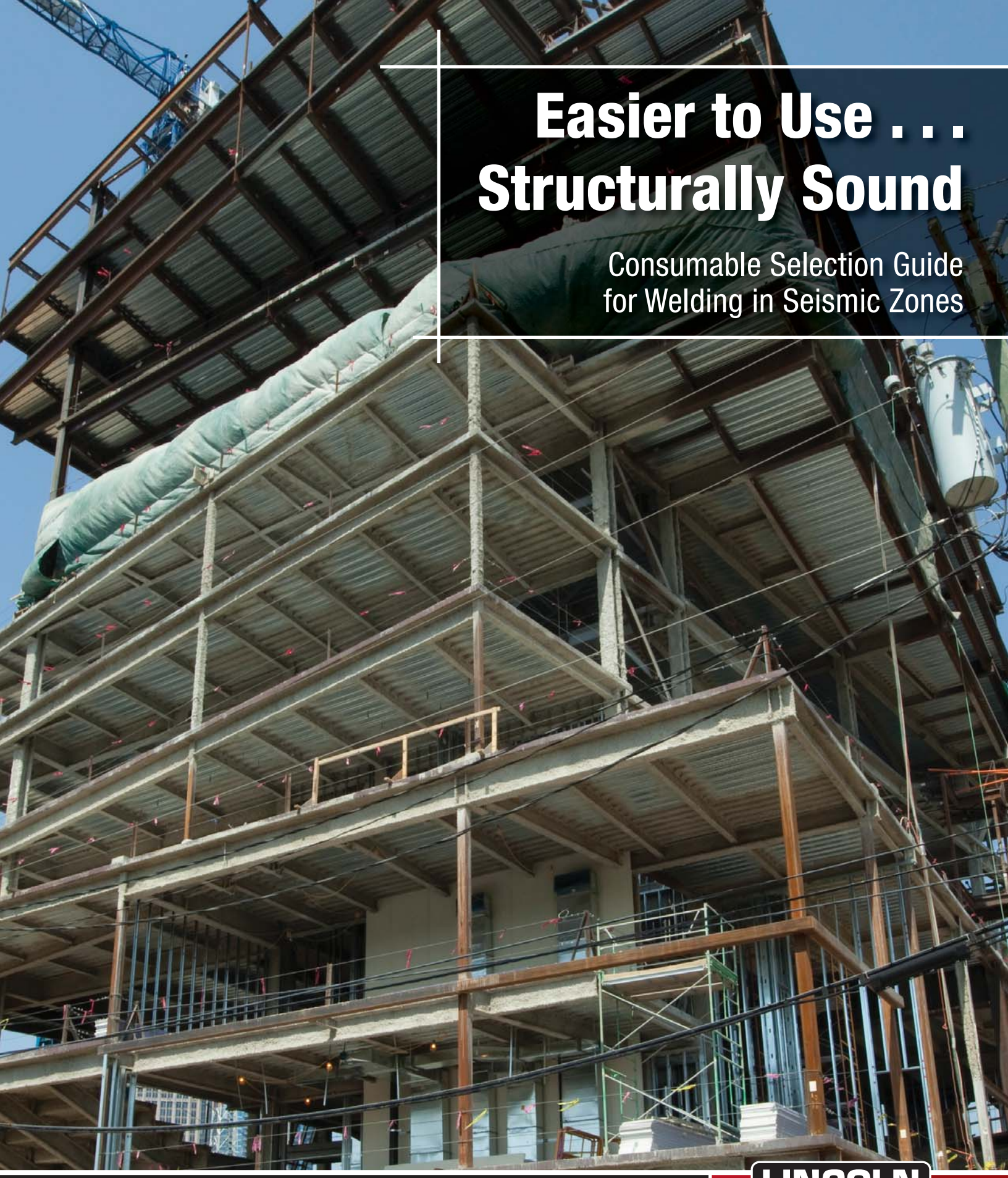


Easier to Use . . . Structurally Sound

Consumable Selection Guide for Welding in Seismic Zones

LINCOLN® ELECTRIC

THE WELDING EXPERTS®

Lincoln Electric offers the most complete portfolio of self-shielded and gas-shielded flux-cored wires, stick electrodes, metal-cored wires and submerged arc wire and flux combinations for seismic applications.

Self-Shielded Flux-Cored


Innershield®
NR®-232 & NR®-233


Innershield® NR®-305


Innershield® NR®311 Ni


Innershield® NR®-FAB-70

Gas-Shielded Flux-Cored


UltraCore®
71A85 & 71C


UltraCore®
81Ni1A75-H & 81Ni1C-H


UltraCore® 70C


Outershield® XLH-70

Stick


Excalibur®
7018 MR®, 7018-1 MR

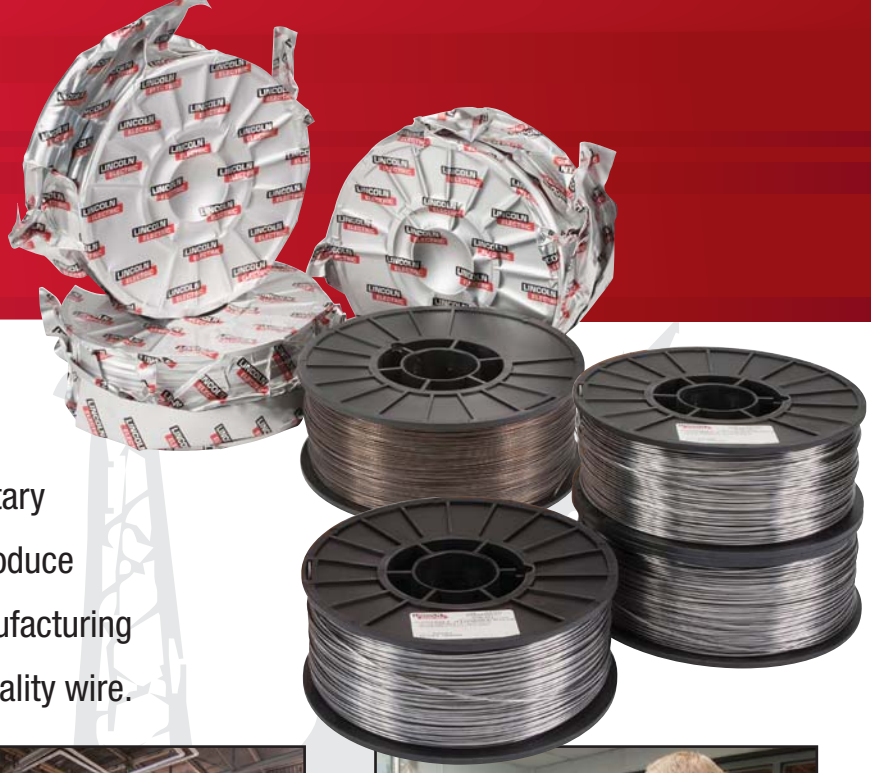

Excalibur® 8018-C3

Metal-Cored

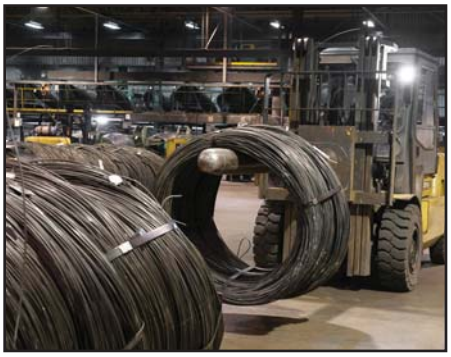

Metalshield® MC®-706

Submerged Arc

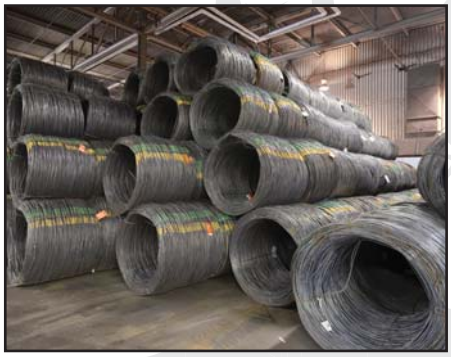

Lincolnweld®
L-61/960, L-56/960, LA-85/960



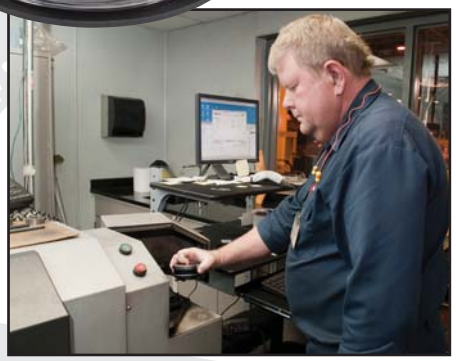
Lincoln Electric created and developed proprietary equipment and manufacturing processes to produce these innovative products. Here's how our manufacturing process gives you the most consistent, high quality wire.



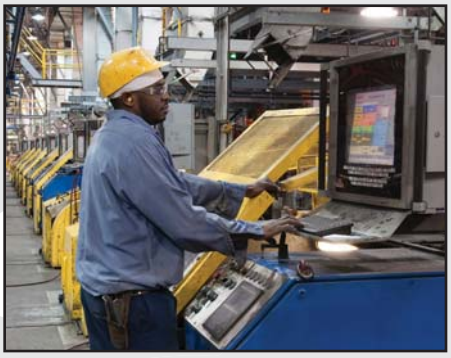
Proprietary techniques for inspecting incoming raw steel ensure the chemistry of each coil.



Steel is graded according to chemical composition and matched to the most appropriate finished product.



Steel chemistries are held to extremely higher tolerances than AWS requirements, ensuring consistency in mechanical properties and arc performance.



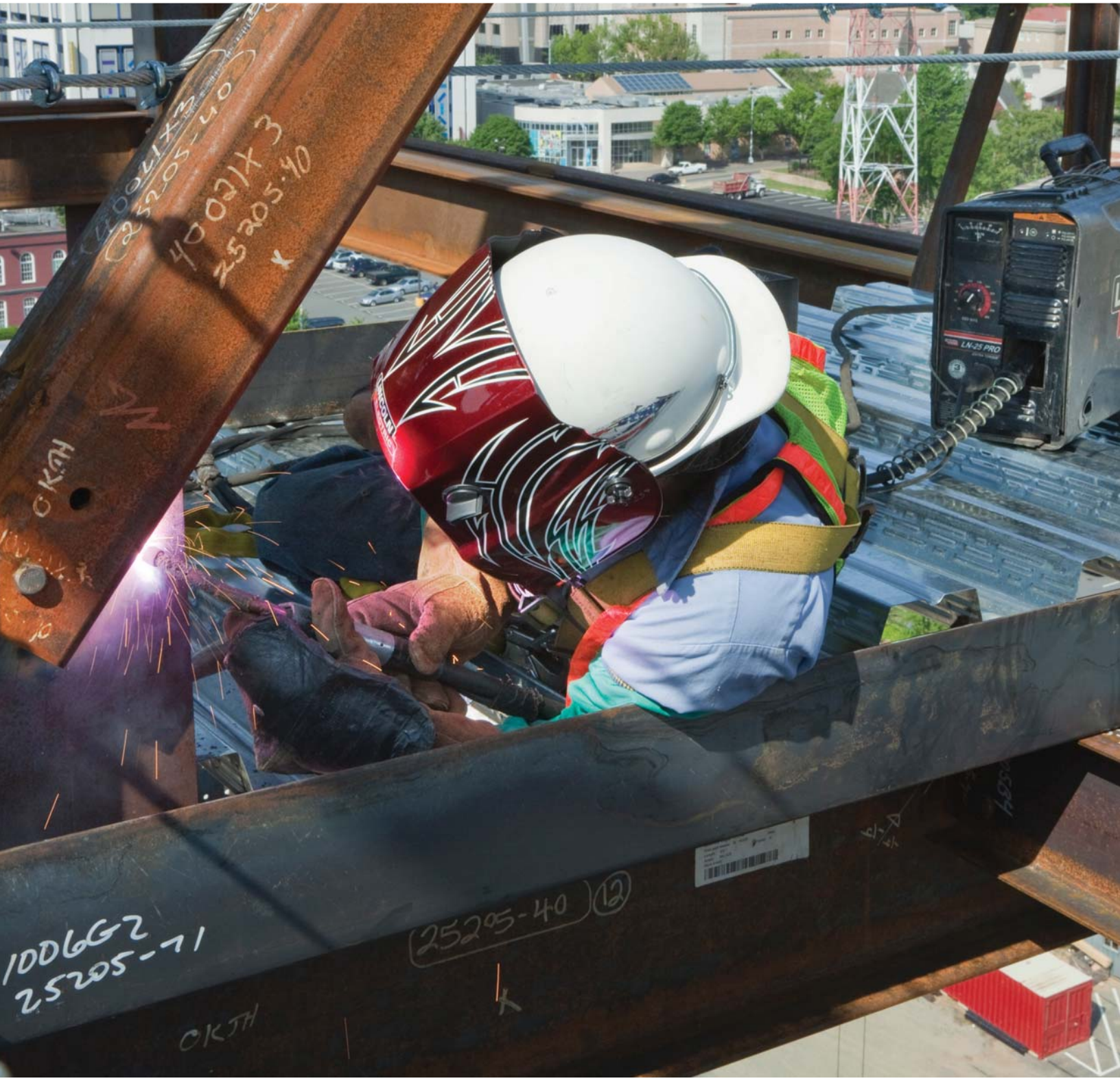
Fluxes, electrode coating and fill mixes are inspected and monitored to ensure a consistent blend of chemical elements.

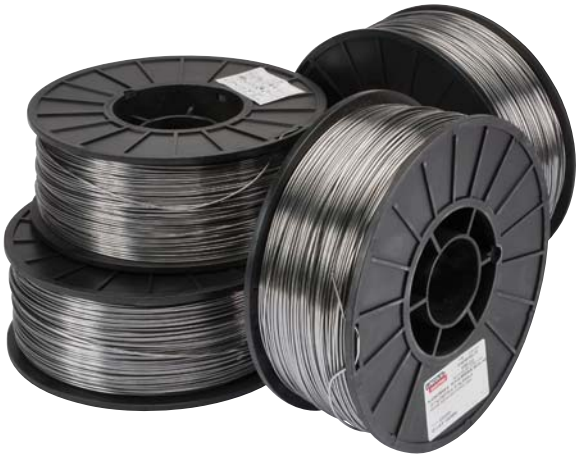
Moisture levels are monitored throughout processing, and lubricants are carefully selected to provide controlled diffusible hydrogen levels.

Unparalleled performance, quality and arc consistency.

Flux-Cored Wire

Self-Shielded





INNERSHIELD®

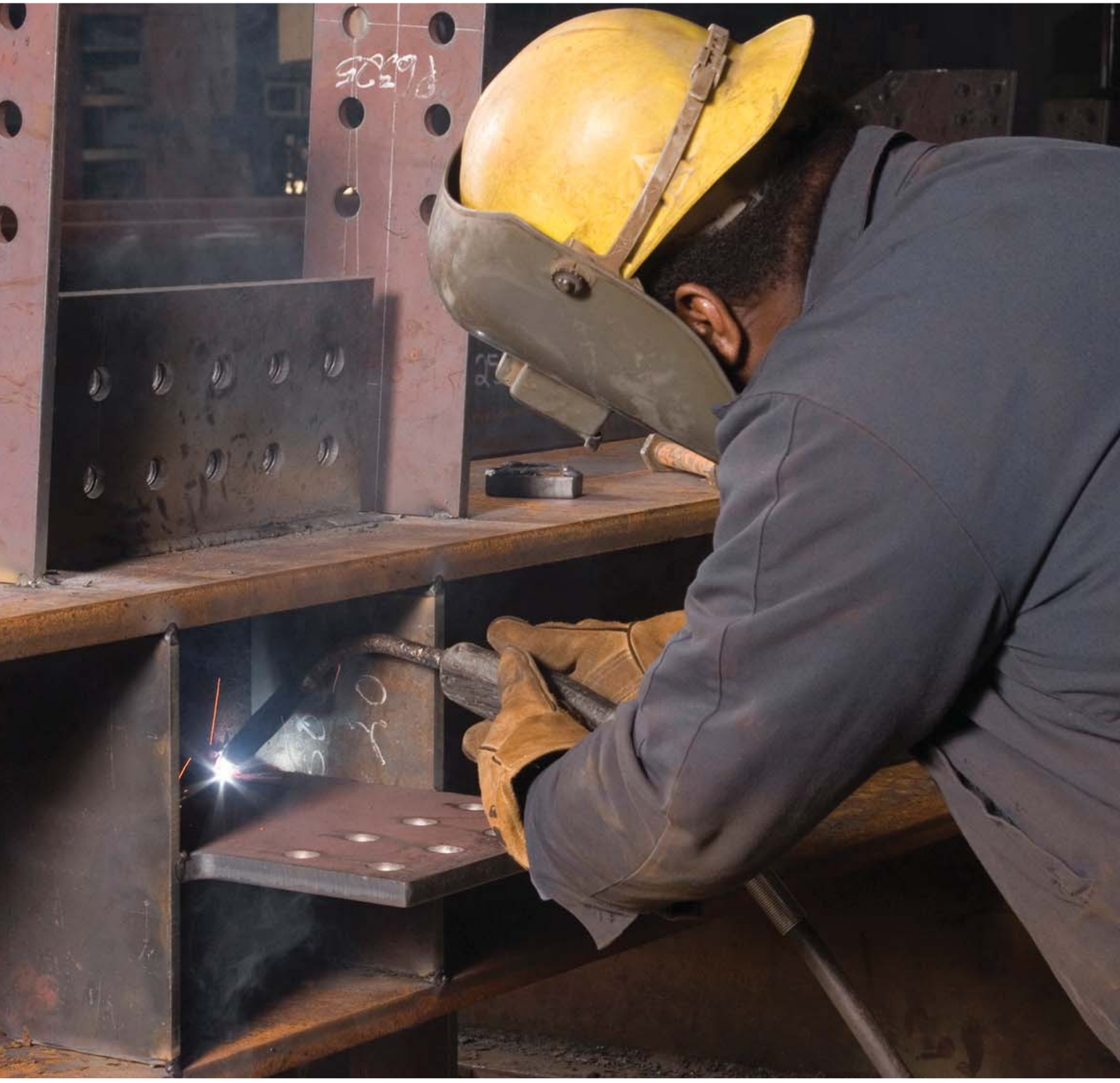
- These Innershield® wires are designed to exceed minimum impact properties and extended exposure requirements.
- Specific to the structural fabrication market, these wires have lot certified high and low heat input testing as well as intermix testing. All certificates available at www.lincolnelectric.com.
- Innershield® self-shielded wires are the fabricator's choice for general construction, shop fabrication and field erection, particularly in seismic zones.

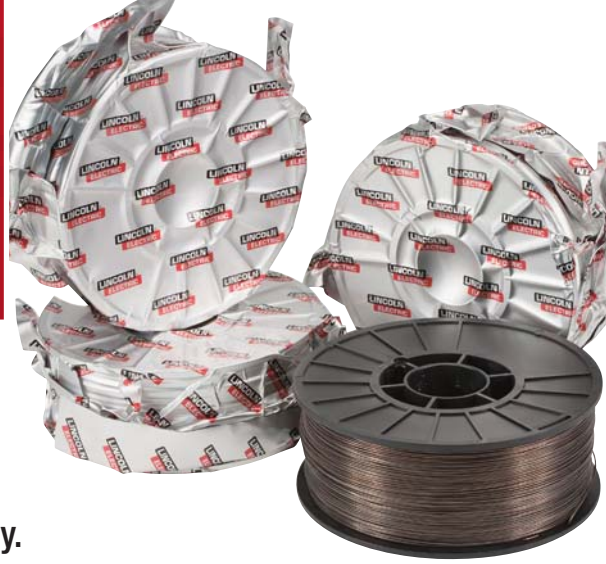
Product Name	AWS Classification	Features
All Position		
Innershield® NR®-232	E71T-8	• High deposition, out-of-position wire • High penetration • Stiff wire for improved feeding and operability
Innershield® NR®-233	E71T-8	• High deposition, out-of-position wire • Forgiving arc is easy to operate • Easy slag removal in tight grooves
Flat and Horizontal		
Innershield® NR®-305[1]	E70T-6	• Highest deposition, in position wire in the structural industry • Smooth arc and low spatter levels
Innershield® NR®-311 Ni[1]	E70T7-K2, E80TG-K2	• Produces a nominal 1.5% nickel deposit with 80 ksi (550 MPa) tensile strength • For 70 & 80 ksi base materials • Ideal for color match on weathering steels
Innershield® NR®-FAB-70[1]	E70T7-G	• Proprietary design increases wire stiffness to aid feedability and promotes a smooth arc transfer • Best in class low temperature impact properties - capable of producing weld deposits with Impact properties exceeding an average of 54 J (40 ft•lbf) at -29°C (-20°F)

Only 3/32 in. diameter recommended for seismic applications. The other diameter(s) are suitable for general fabrication and erection in non-seismic applications.

Flux-Cored Wire

Gas-Shielded





ULTRACORE

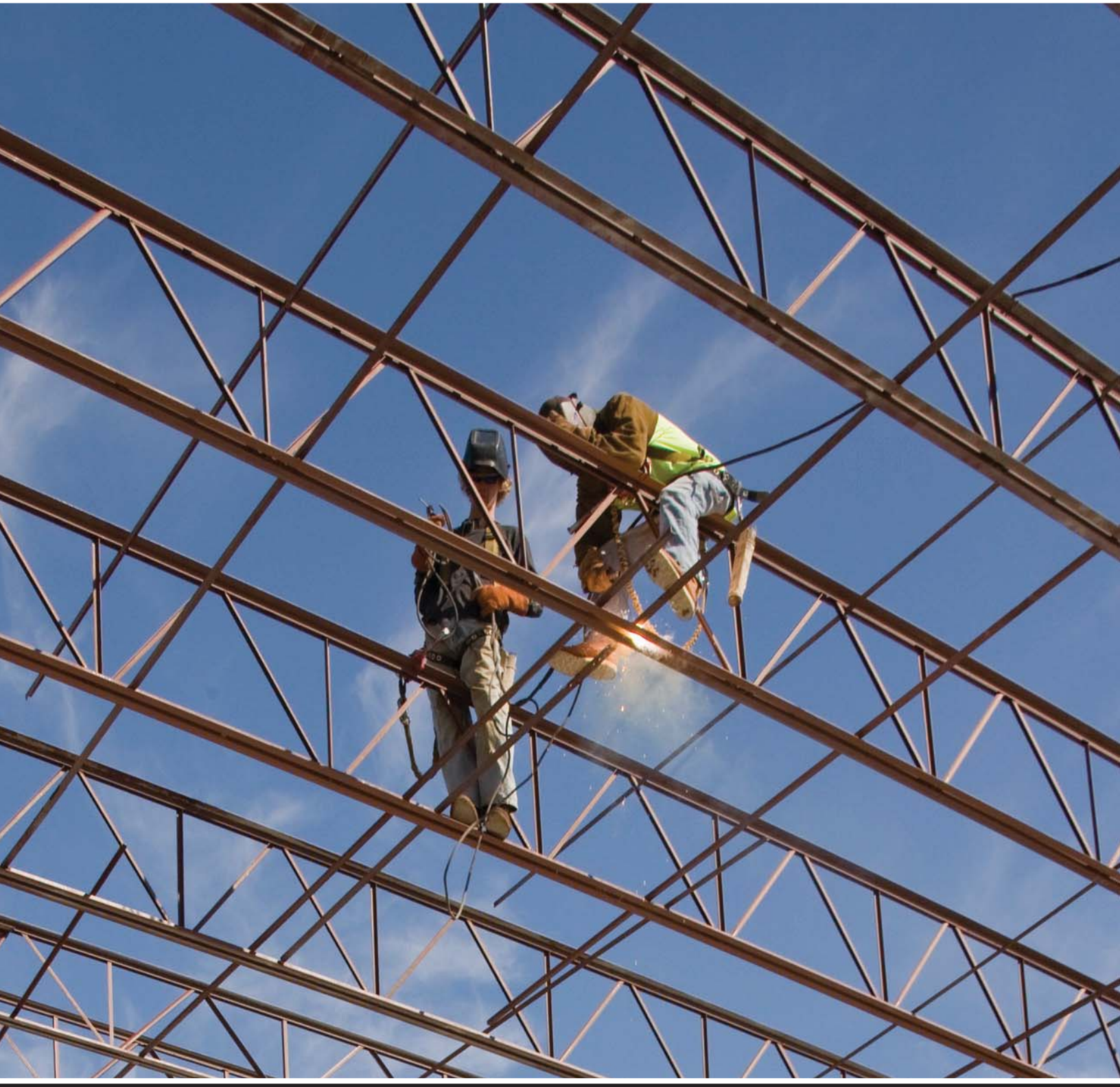
- UltraCore® wires are designed to provide unparalleled quality, performance and dependability.
- With superior arc action, bead shape, puddle control and easy to remove slag, these wires are ideal for single and multiple pass welding applications.
- With advanced sealed packaging options, these wires are designed to deliver extremely consistent mechanical properties that meet the D1.8 seismic requirements.

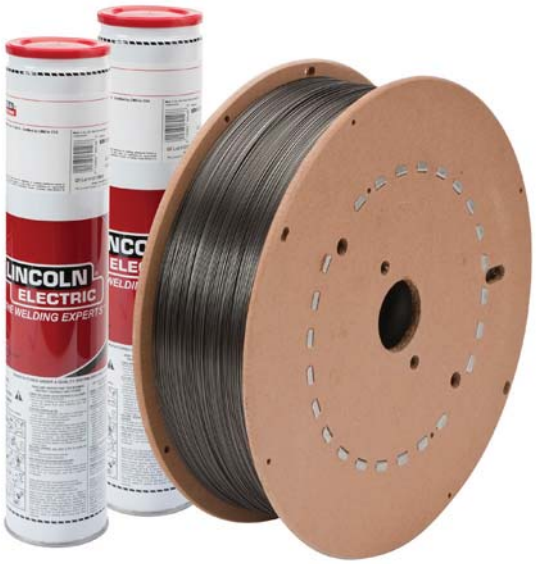
OUTERSHIELD

- Outershield® products provide best in class wire feeding performance - stiff wire enables feeding over long distances.

Product Name	AWS Classification	Features
All Position		
UltraCore® 71A85	E71T-1M-H8, E71T-9M-H8	• Fast freezing slag for high deposition rates in out-of-position welding • Shielding gas specific for optimal performance (100% CO_2 wire or mixed gas version) • Smooth, consistent arc minimizes spatter and clean-up
UltraCore® 71C	E71T-1C-H8, E71T-9C-H8	
UltraCore® 81Ni1A75-H	E81T1-Ni1M-JH4	• Capable of producing weld deposits with impact toughness exceeding 27 J (20 ft•lbf) at -40°C (-40°F) • Shielding gas specific for optimal performance (100% CO_2 wire or mixed gas version) • Ideal for color match on weathering steels
UltraCore® 81Ni1C-H	E81T1-Ni1C-JH4	
Flat and Horizontal		
UltraCore® 70C	E70T-1C-H8, E70T-9C-H8	• High deposition, flat and horizontal welding
Outershield® XLH-70	E70T-1C-H8, E70T-9C-H8	• High deposition, flat and horizontal welding • Superior wire feeding characteristics

Stick Electrode & Metal-Cored Wire





EXCALIBUR®

- A premium brand of low hydrogen, mild steel stick electrodes featuring a moisture-resistant coating. Excalibur® is designed to provide exceptional puddle control, a smooth arc, excellent strike and re-strike capabilities, self-peeling slag and extremely low spatter levels.

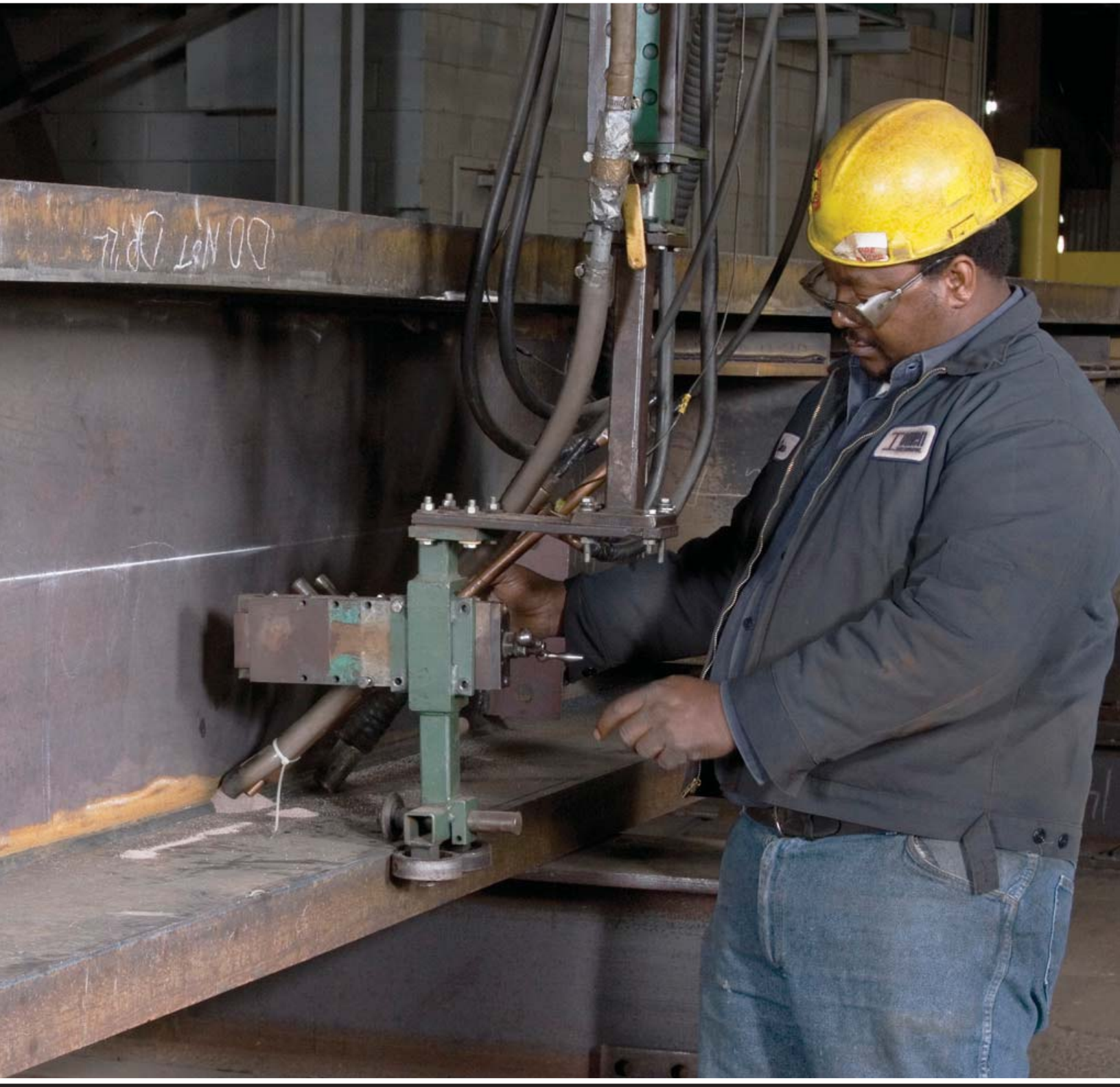
METALSHIELD®

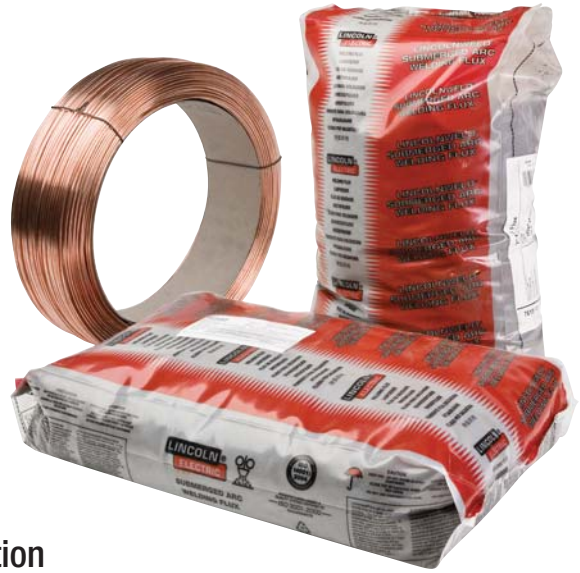
- Combines the best characteristics of solid and flux-cored wire for high deposition rates with the ability to weld over mild surface contamination.
- Metalshield® wires have low diffusible hydrogen levels and low temperature impact properties.

Product Name	AWS Classification	Features
Stick Electrode		
Excalibur® 7018 MR®	E7018 H4R	• Smooth arc and square coating burn-off for improved puddle control and visibility • Self-peeling slag for higher productivity and quality • Easy strike and re-strike
Excalibur® 7018-1 MR®	E7018-1 H4R	
Excalibur® 8018-C3 MR®	E8018-C3 H4R	
Metal-Cored Wire		
Metalshield® MC®-706	E70C-6M H4	• High deposition rates and travel speed • Superior arc wetting and bead appearance • Minimal silicon island formation results in easier post-weld clean up

Submerged Arc

Wire and Flux





Lincolnweld®

- All wires are manufactured to Schedule H and fluxes to Schedule K, meaning actual wire and flux composition results are available at www.lincolnelectric.com.
- Industry leader in submerged arc welding - Many of our facilities are ISO 9001 and 14001 certified and Lincolnweld® consumables are manufactured to standards for environmental and quality management systems. Raw material analysis and tight QA standards result in superior quality - time after time.

Electrode	Flux	Features
Lincolnweld® L-61	Lincolnweld® 960	• An industry standard for submerged arc welding applications • A good choice for a wide range of applications with single or multiple pass • General purpose electrode well suited for single or multiple pass applications and meeting 70 ksi tensile requirements
Lincolnweld® L-56	Lincolnweld® 960	• A good choice for welding over heavy scale or rust • High heat input range for production welding • General purpose electrode well suited for single or multiple pass applications and meeting 70 ksi tensile requirements
Lincolnweld® LA-85	Lincolnweld® 960	• For use on weathering steels and robust mechanical properties in the as-welded or stress-relieved condition • Recommended for higher strength steels where 80 ksi tensile is required

Important Information On Our Website

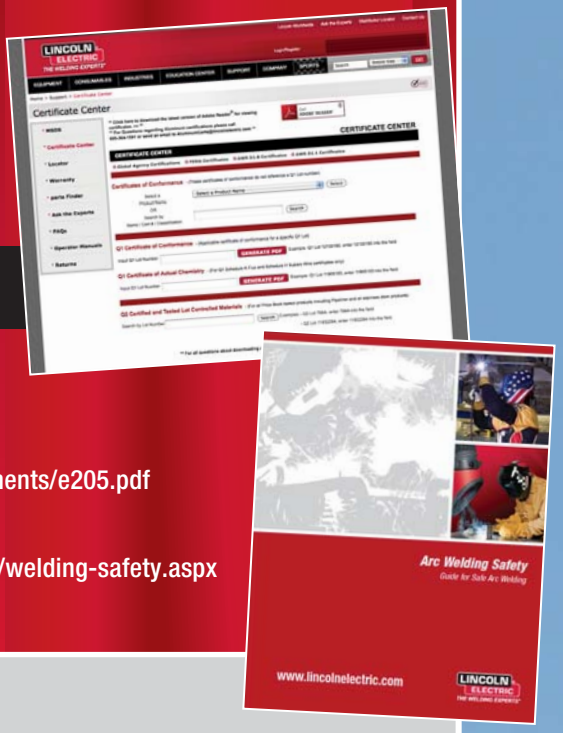
Consumable AWS Certificates:
http://www.lincolnelectric.com/LEExtranet/MyLincolnCerts/site/default.aspx

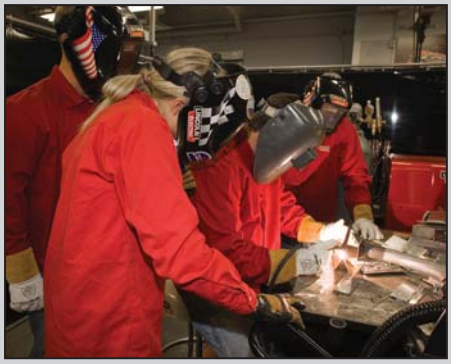
D1.8 Certificate Center:
http://www.lincolnelectric.com/LEExtranet/MyLincolnCerts/site/awsd.aspx

Material Safety Data Sheets (MSDS):
http://www.lincolnelectric.com/en-us/support/msds/Pages/msds.aspx

ANSI Z49.1, E205 Safety Booklet:
http://www.lincolnelectric.com/en-us/education-center/welding-safety/documents/e205.pdf

More Welding Safety Materials can be found at
http://www.lincolnelectric.com/en-us/education-center/welding-safety/Pages/welding-safety.aspx





Lincoln Welding School

Need Welding Training?

The LIncoln Electric Company operates the oldest and most respected Arc Welding School in the United States at its corporate headquarters in Cleveland, Ohio. Over 100,000 men and women have graduated from this premier school.

Tuition is affordable and class schedules are flexible to meet your needs. For more information on the Lincoln Welding School, please write to:

Lincoln Welding School
22801 St. Clair Avenue
Cleveland, Ohio 44117-1199
Ask for bulletin ED122

You may reach us at: 216.383.2259

FEMA 353 & AWS D1.8

This electrode has been tested in accordance with FEMA 353 & AWS D1.8 - Structural Welding Code – Seismic Supplement and is capable of depositing weld metal that delivers minimum CVN properties of 40 ft•lbf at 70˚ F (54 Joules at 21˚ C) at low and high heat input levels. As required by the AWS classification, it meets a minimum CVN of 20 ft•lbf at -20˚ F (27 Joules at -29˚ C), when tested in accordance with AWS 5.20-05. This electrode will also deposit metal that will meet the requirements for H16 as tested according to AWS A4.3. FEMA and AWS D1.8 certificates are available upon request.

TEST RESULTS

Test results for mechanical properties, deposit or electrode composition and diffusible hydrogen levels were obtained from a weld produced and tested according to prescribed standards, and should not be assumed to be the expected results in a particular application or weldment. Actual results will vary depending on many factors, including, but not limited to, weld procedure, plate chemistry and temperature, weldment design and fabrication methods. Users are cautioned to confirm by qualification testing, or other appropriate means, the suitability of any welding consumable and procedure before use in the intended application.

CUSTOMER ASSISTANCE POLICY

The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.com for any updated information.

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Phone: +1.216.481.8100 • www.lincolnelectric.com

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