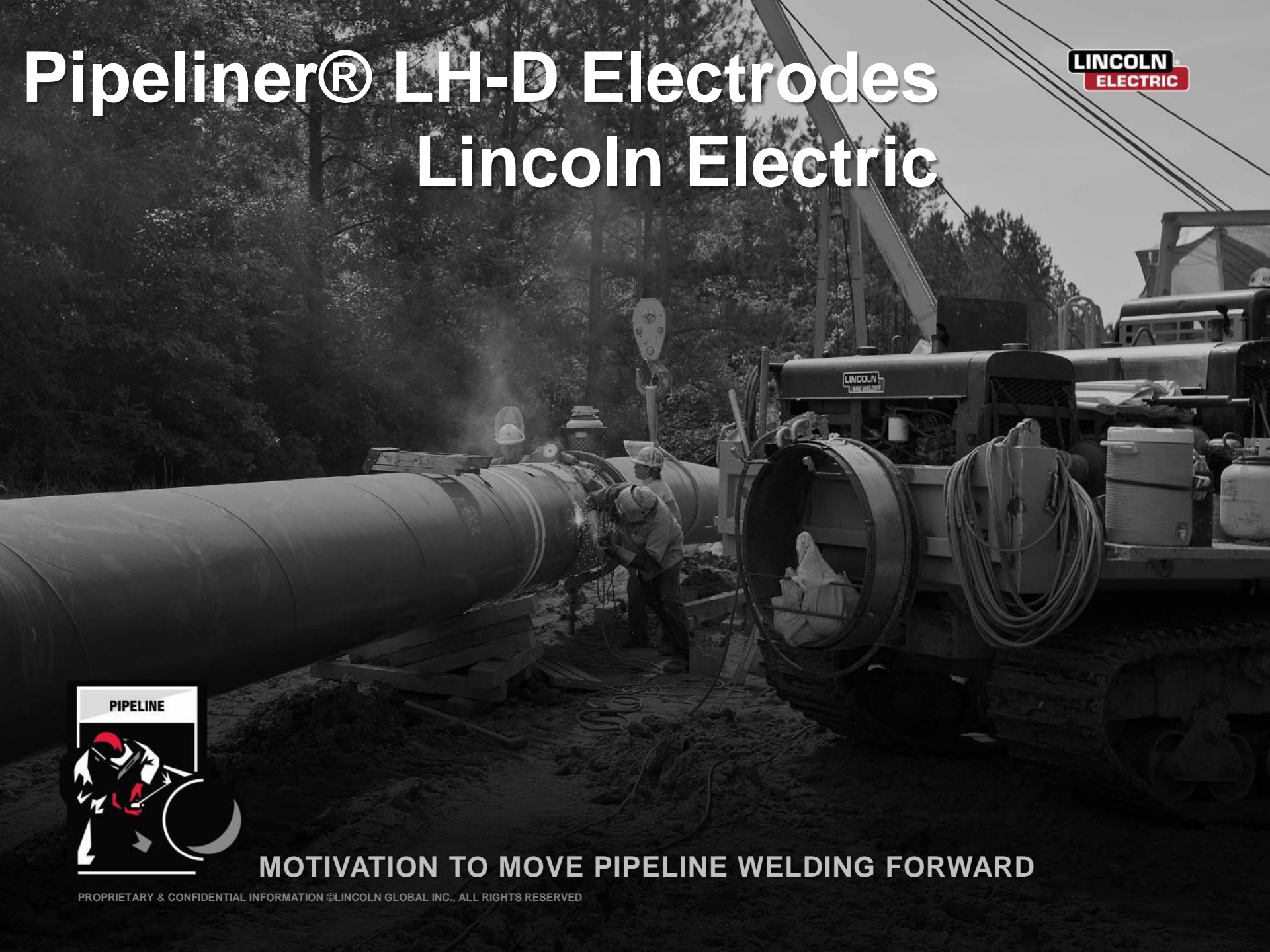


# Pipeliner® LH-D Electrodes Lincoln Electric



**MOTIVATION TO MOVE PIPELINE WELDING FORWARD**

# The Lincoln Electric Company

For over 125 years, Lincoln Electric has been the world leader in the design, development and manufacture of arc welding products, automated joining, assembly and cutting systems, plasma and oxy-fuel cutting and has a leading global position in brazing and soldering alloys.

Renowned as The Welding Experts® , our solutions are used across diverse industry sectors in over 160 countries. Headquartered in Cleveland, Ohio, we operate 55 manufacturing locations in 18 countries and generated \$2.7B in revenue in 2020.



# What is Pipeliner® LH-D?

- Manual Metal Arc Welding (MMAW) or Shielded Metal Arc Welding (SMAW) Electrode
- Specifically designed for pipeline work
  - Downhill travel
  - High productivity
- **Higher strength** compared to most cellulosic electrodes with much lower diffusible hydrogen levels
  - E8045-P2, E9045-P2, E10045-P2 AWS classifications
  - H4R classification: 4 mL of hydrogen / 100 g of weld metal
    - 9 hour moisture resistance outside of the sealed can or oven
    - **Reduces the risk of hydrogen cracking**





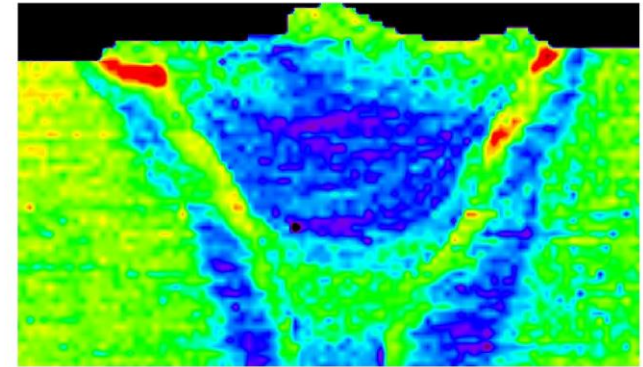
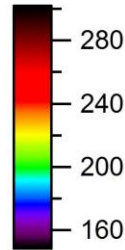
# What is Pipeliner® LH-D?

- These types of electrodes have been commercially available for years
  - Technique is critical; many welders used to typical cellulosic electrodes struggle
- Pipeliner® LH-D has been reformulated to make welders' jobs easier
  - Clearer puddle
  - Tapered tip technology improves starts
  - Easier to clean the slag

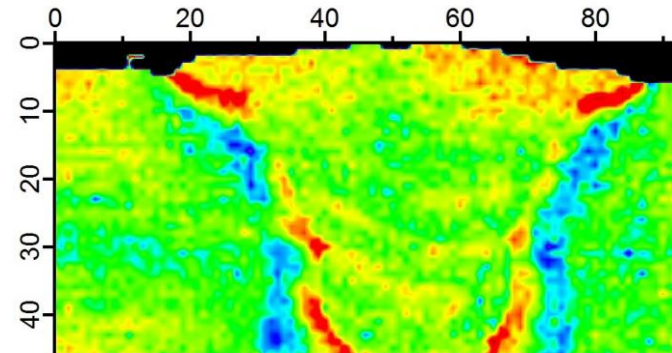
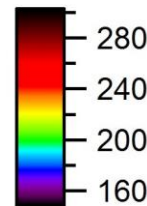


# Why is Pipeliner® LH-D Important?

- Some pipeline owners are requiring higher strength electrodes
  - Will not allow cellulosic electrodes root to cap due to heat affected zone softening
- Pipeliner® LH-D gives traditional MMAW/SMAW welders an option for these types of jobs



X70 Pipe  
E6010 Root & Hot,  
E8010 Fill & Cap



X70 Pipe  
E6010 Root  
E 8010 Hot  
E9045 Fill & Cap

# Pipeliners® LH-D in the Field

- Various pipeline projects have used these improved electrodes
  - Many claim lower repair rates with Pipeliners® LH-D compared to the competition
- Customized Pipeliners® LH-D training is available from Lincoln Electric
  - “I would say we are a year and a half ahead of where we would have been if we were out there by ourselves winging it trying to figure it out,” said Dudley Swortz, a senior welder for Enbridge who attended a spring training session at Lincoln Electric. “[The training] just speeds it up.”

