PHMSA

DISTRIBUTION CONSTRUCTION WORKSHOP

St. Louis, Missouri

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Industry Perspectives on Installation of Steel Materials

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Laclede Gas

29 years with Laclede

23 years in Standards

10 as Superintendant

Degrees in Chemistry and Biology

ASTM F17 Plastic Piping Systems

NACE Internal Corrosion Technologist

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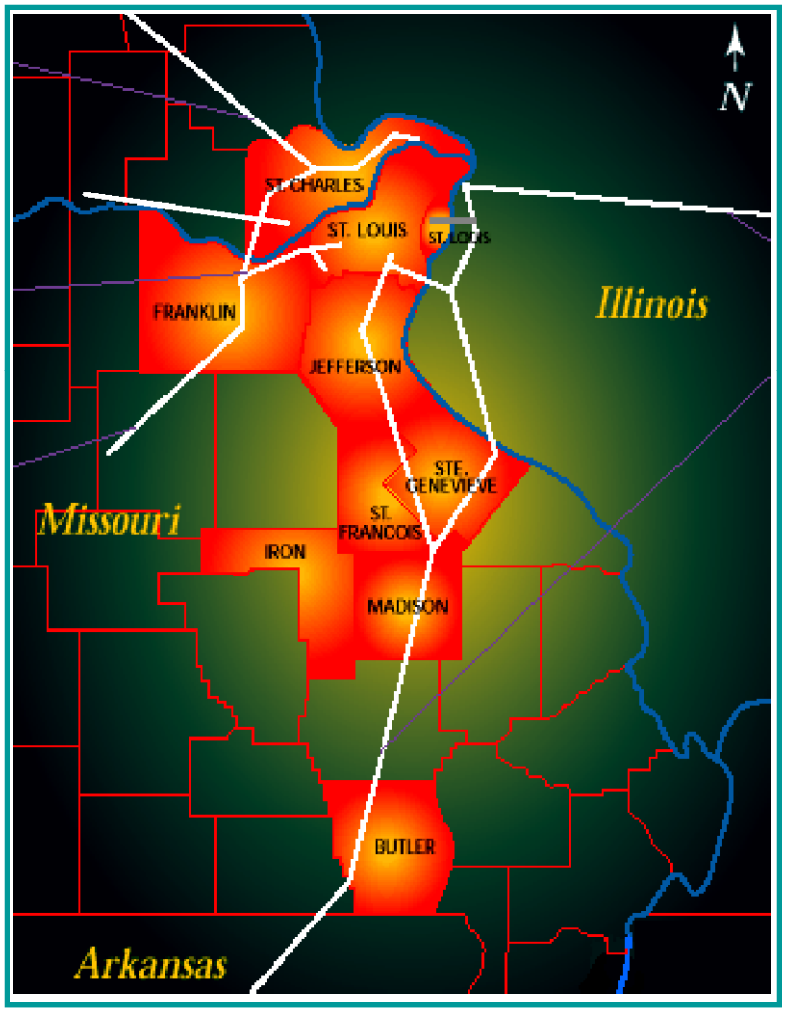
Our System

- Largest Gas Distribution System in Missouri
- Customers predominantly residential
  - We serve 630,000 customers
- More than 16,000 miles of gas main and related service pipe
- Distribution system is primarily coated and protected steel, polyethylene and cast iron pipe.



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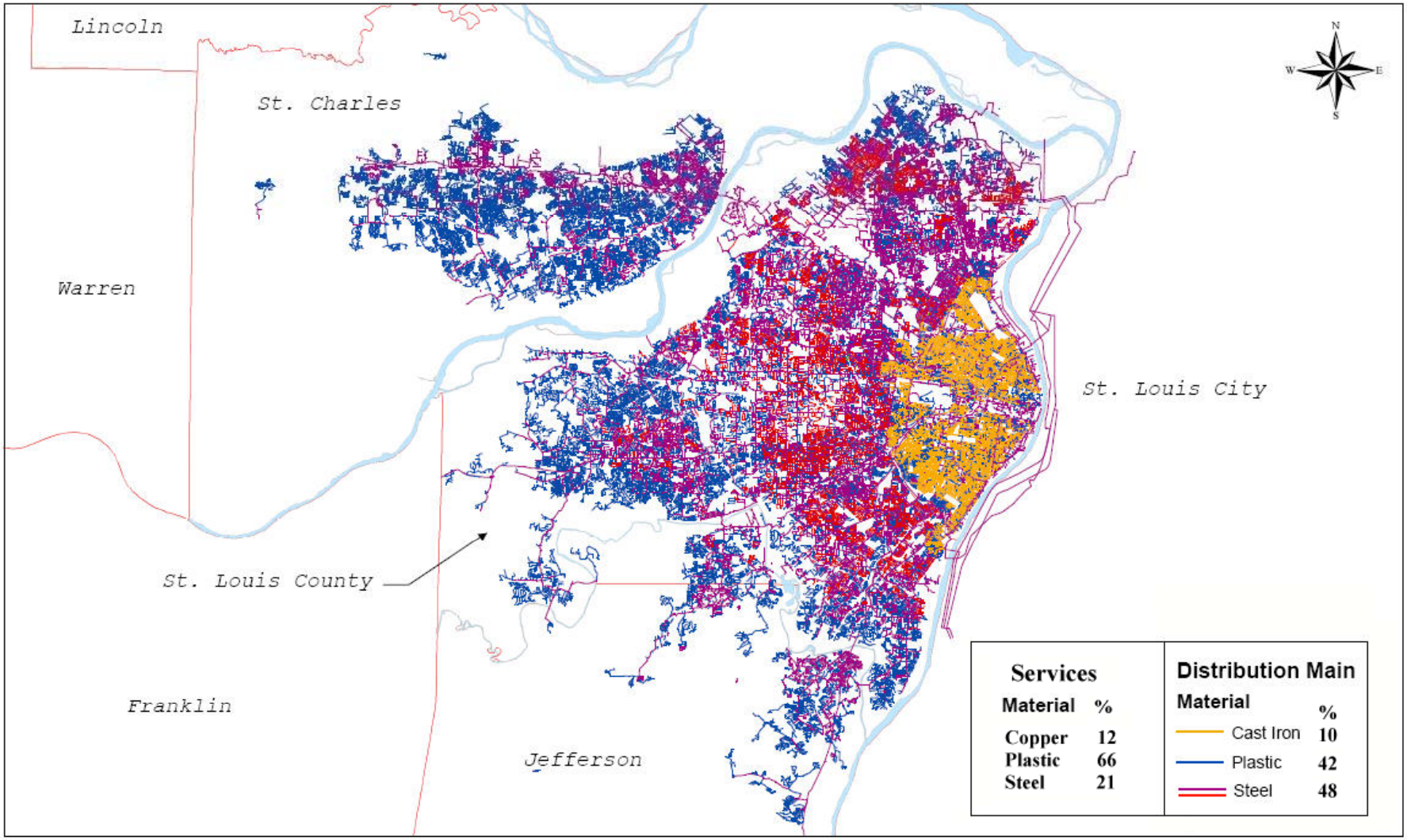
LACLEDE GAS CO. DISTRIBUTION SYSTEM



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Material Choice Considerations

- Availability
- Pressure
- Size
- Historic
- Current

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- Installation of Steel and PE are different, but there are many similarities
  - Contractors used on limited basis
  - Training/OQ
  - Design
  - Written Standards
  - Material Quality
  - Pre-installation Activities
  - Excavation
  - Installation Activities
  - Post-installation Activities

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PE/Steel Similarities

- Contractors – Other than NDT
  - Very Limited
  - Prequalify Review OQ
  - Company Inspector on site

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PE/Steel Similarities

- Training/OQ – Quality of Employees

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PE/Steel Similarities

- Training/OQ
  - Include New Construction
  - MO has had a Personnel Qualification Requirement since 1989
  - Initial Training - 1 Week
  - 3 yr Refreshers - 2 Days
  - Annual Training - 1 Day
    - Classroom
    - Open Discussion
    - Field Training/Observation
    - Written
    - Hands On
  - Weather day

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PE/Steel Similarities

- Training/OQ Cont.
  - "*Standards & Testing Notes*"

- Insulation of Meter Sets
- Trace Wire
- Isolated metallic fittings
- Description of print line and D2513 for PE pipe.
- Meter Location and Vent Lines
- Natural Gas
- Pipe Joining Methods
- Coating
- Applicable Codes
- Use of Stainless Steel Clamps
- Electrofusion
- Regulators and Overpressure Protection
- Excess Flow Valves
- Definitions of the Gas Industry
- ANSI Pressure Ratings
- Pipeline Expansion & Contraction
- Color Coding
- Pipe Dimensions
- Static Electricity & Squeeze-off
- Steel Pipe Print Line

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PE/Steel Similarities

- Design
  - Use of ARC GIS and Designer
  - Includes Standardized Material Lists and Compatible Units (CUs)
  - Reviewed by various Departments
    - Design Supervision
    - Engineering
    - Construction
  - Checklists

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PE/Steel Similarities

- MapFrame
  - Electronic Maps in Field
    - Valve Isolation
    - Field Notes (As-Built)
  - Material Catalog
  - MSDSs
  - Shoring Information
  - Work Zone Safety
  - Standards Manual

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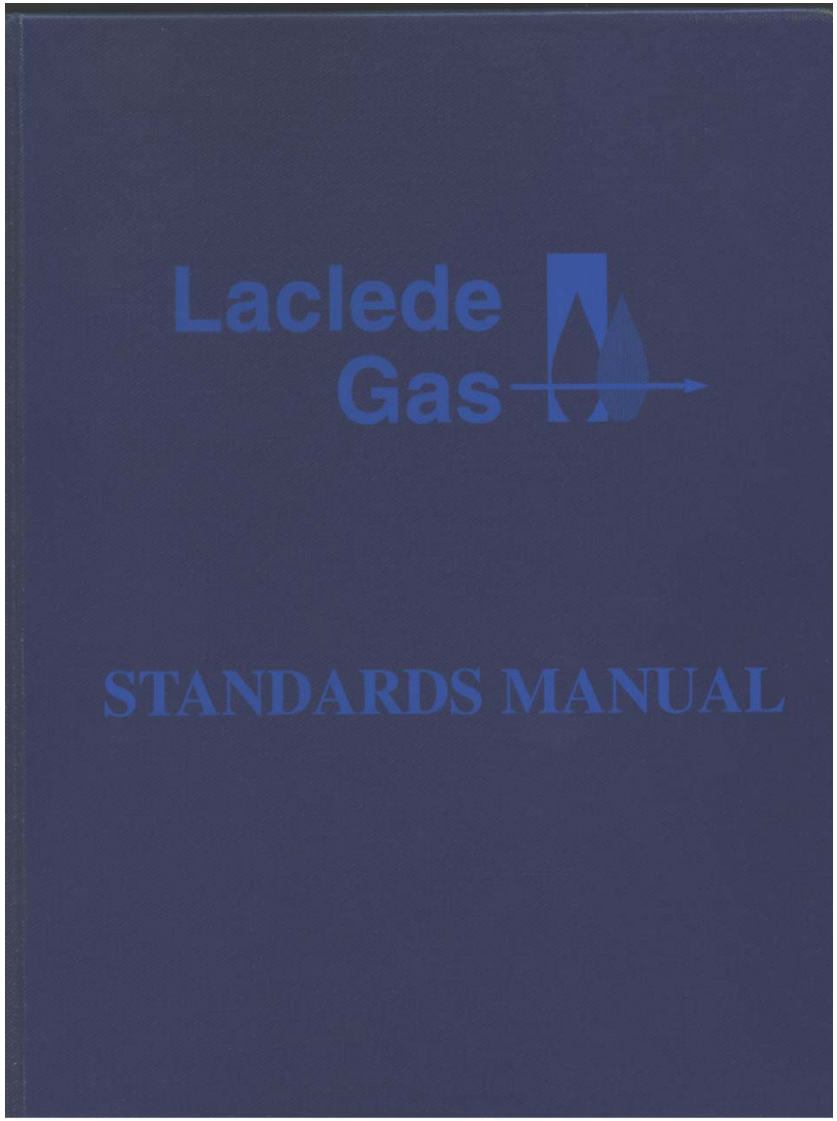
PE/Steel Similarities



- Written Standards
  - Hardcopy/Electronic
  - General
  - Material Specific
  - Joining Procedures
  - Welding
  - Inspection
  - Testing

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PE/Steel Similarities

- Material Quality
  - Clear Specifications
  - New Product Testing prior to purchase
  - QA Inspection of Incoming Material
    - Visual
    - Physical
    - Destructive
- Pre-installation Activities
  - Locates
  - Design modifications due to site conditions

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PE/Steel Similarities

- Excavation
  - Depth
  - Soil Conditions
- Installation Activities
  - Pipe Protection/Handling
  - Clearance from other structures
  - Testing
  - Backfill/Rock Shield
  - Field Inspectors

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PE/Steel Similarities

- Post-installation Activities
  - Record Collection/Documentation
  - As-Built
  - Pressure Test Data

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Steel Specific

- Design
  - Reviewed by various Departments
    - Checklist
    - Cathodic Protection
    - Pig Capability Requirements
    - Water Collection (Drips) / Internal Corrosion
  - Special Considerations
    - Boring
    - Casings
    - Exposed Pipe

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Project Checklist for Environmental and Maintenance Review

Project Description	

Initials		4/12/2010

Environmental 1

☐ Does the pipeline project require a creek, stream, or river crossing, or will it cross through or adjacent to "wetlands".

Environmental 2

☑ Does the pipeline project require a hydrostatic discharge in excess of 1000 gallons?

Length of Feeder or Propane Piping, ft.	0
Inside Diameter of Piping, in.	0
Gallons of Test Water	0

Environmental 3

☐ Will the pipeline project disturb one (1) acre or more of land (excluding any area within a development)?

Length of Main not in a Development	0
Width of Easement (or use 15 feet)	15
Acres Assumed Disturbed	0.0

Environmental 4

☐ Will the pipeline project cross through an area with contaminated soil, such as an old gas station or a FUSRAP site?

Environmental 5

☐ Will piping be abandoned, either left in the ground or to be removed by the proposed construction?

☐ Are there any drips within the section of main expected to be abandoned?

☐ If there is steel pipe to be removed (by Laclede or others) <pre-1990>, does it contain any millwrap coating?

Maintenance

☐ Will 8" and larger supply feeder main or any size transmission feeder main be installed, relocated, or abandoned?

☐ Will any steel main need to be installed, relocated, or abandoned, which would trigger a review of cathodic protection facilities?

☐ Is the proposed project expected to abandon any cast iron main?

☐ Will the proposed construction project place any cast iron main within the "angle of repose" as defined by code?

☐ Are there sections of bare steel main or copper main within the limits of the proposed construction project?

☐ Are there any copper services (hard or soft) within the limits of the proposed construction?

☐ Is any existing main to be upgraded in pressure?

☐ Are mains to be abandoned for demolition or redevelopment?

☐ Are IP services involved in a main relocation (EFV notifications required)?

☐ Are mains to be installed above grade?

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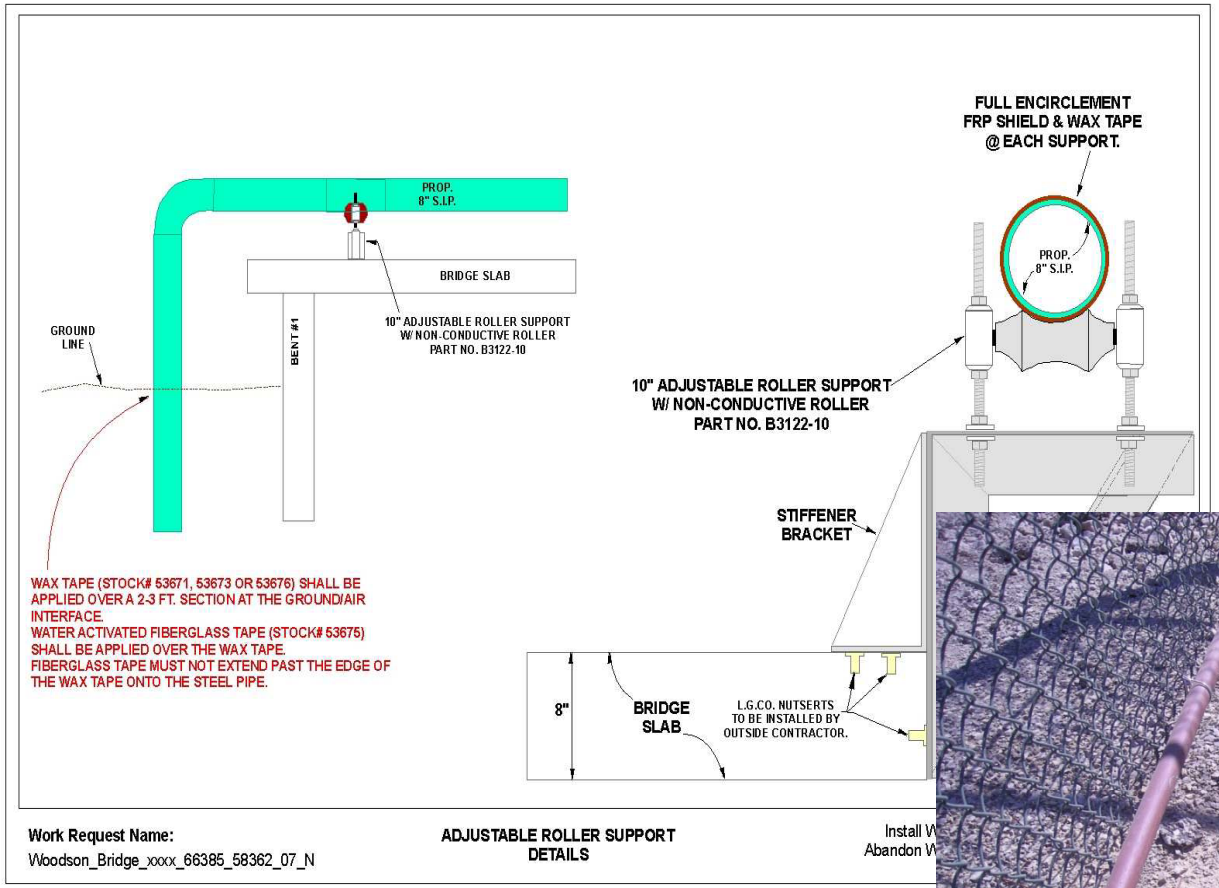
PROP.
8" S.I.P.
BRIDGE SLAB
10" ADJUSTABLE ROLLER SUPPORT
W/ NON-CONDUCTIVE ROLLER
PART NO. B3122-10
GROUND
LINE
BENT #1
WAX TAPE (STOCK# 53671, 53673 OR 53676) SHALL BE
APPLIED OVER A 2-3 FT. SECTION AT THE GROUND/AIR
INTERFACE.
WATER ACTIVATED FIBERGLASS TAPE (STOCK# 53675)
SHALL BE APPLIED OVER THE WAX TAPE.
FIBERGLASS TAPE MUST NOT EXTEND PAST THE EDGE OF
THE WAX TAPE ONTO THE STEEL PIPE.
FULL ENCIRCLEMENT
FRP SHIELD & WAX TAPE
@ EACH SUPPORT.
PROP.
8" S.I.P.
10" ADJUSTABLE ROLLER SUPPORT
W/ NON-CONDUCTIVE ROLLER
PART NO. B3122-10
STIFFENER
BRACKET
8"
BRIDGE
SLAB
L.G.CO. NUTSERTS
TO BE INSTALLED BY
OUTSIDE CONTRACTOR.
Work Request Name:
Woodson_Bridge_xxxx_66385_58362_07_N
ADJUSTABLE ROLLER SUPPORT
DETAILS
Install W
Abandon W

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Steel Specific

- Training/OQ
  - Annual Training All Employees
    - Coating Types/Application
    - Hydrotesting
    - Insulation
    - Specific Fitting Issues
    - General Tapping

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Steel Specific

- Training/OQ
  - Cathodic Protection Technicians
    - Hands On
    - Anodes
    - Jeeping
    - Locating
    - Locating/Clearing Shorts
    - Use of Multimeter
      - Pipe/Soil Readings
      - Instant Off

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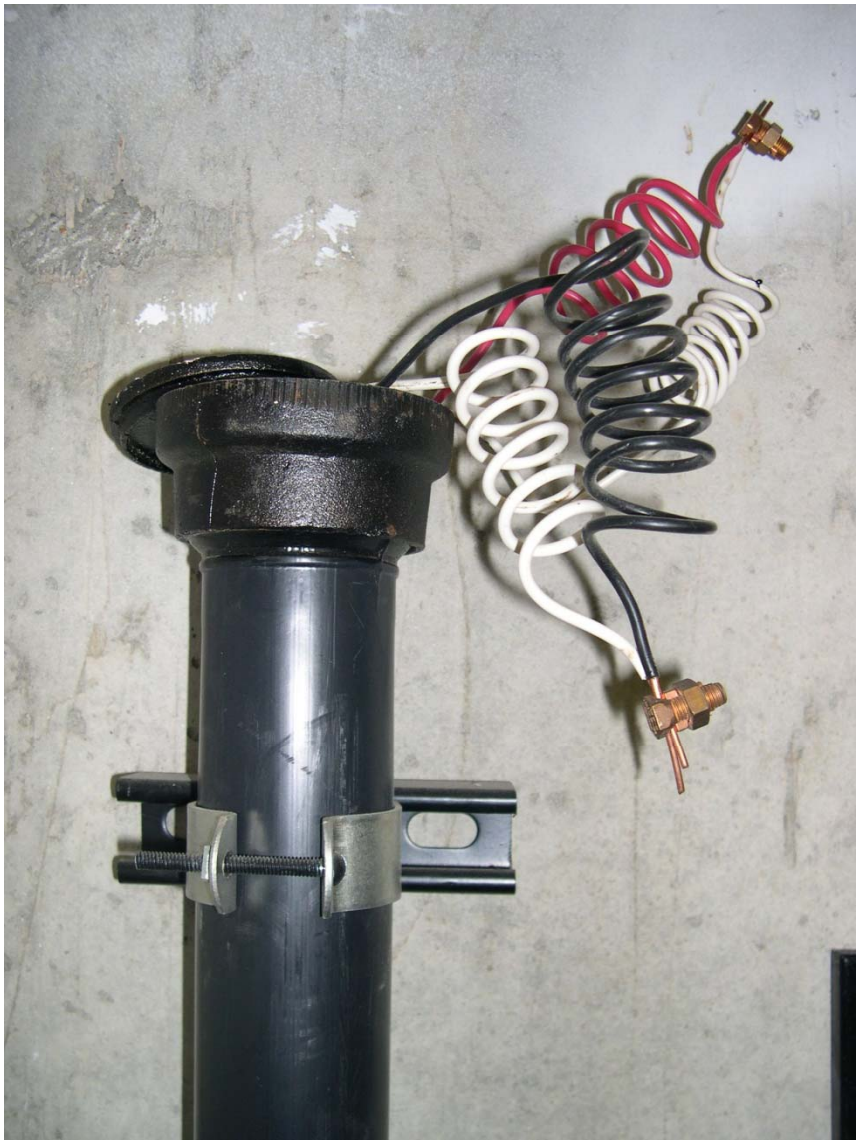

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VOLTAGE SETTING SUGGESTIONS

Coating	Thickness	Voltage	Applicable Detectors
Paints, Epoxy	1 - 10 Mils	67 DC (. 5mm -.25mm)	670, 673 (67-AC) w/wet sponge electrode
Fusion bonded epoxies	10 - 30 Mils (.25mm -.75mm)	1600 - 3000	715, 915, 725, 925, 115, 121 780, 785
Rosscote, Tarset, Protogol UT310L, etc.	15 - 30 Mils (.38mm -.75mm)	2400 – 3000	715, 915, 725, 925, 115, 121 780, 785
Coal tar on concrete	16 - 60 Mils (.41mm -1.52mm)	2000 – 10000	725, 925, 121, 125, 780, 785, 790
Vinyl ester	21 - 40 Mils (.53mm - 1.02 mm)	3000 – 4000	715, 915, 725, 925, 115, 121 780, 785
Polyester/Fiberglass	50 - 60 Mils (1.27mm-1.52mm) 90 - 125 Mils (2.29mm-3.18mm)	3000 - 6000 8000 - 10000	725, 925, 115, 121, 780, 785 790 725, 925, 125, 790, 121 785 790
Tapes	Polyken Greenline Tapecoat Polygard (1000 or RDX50)	6000 - 8000 6000 10000 8000 – 12000	725, 925, 125, 790, 121, 785 725, 925, 125, 790, 121, 785 725, 925, 125, 790, 121, 785 725, 925, 125, 790, 121, 785
Extruded, heatshrink	Xtrucoat Pritec - 60 Mil (1.52mm)	8000 – 14000 14000 – 15000	725, 925, 125, 790, 121, 785 725, 925, 125, 790, 121, 786
Coal tar, Asphalt, Enamels, Yellow jacket, Other heavy coatings	3/32" - 2.3mm (94 Mil) 5/32" - 3.9mm (156 Mil) 3/16" - 4.8mm (187 Mil) 1/4 " - 6.35mm (250 Mil) 1/2 " -12.7 mm (500 Mil) 5/8 " -15.9 mm (625 Mil) 3/4 " -19.0 mm (750 Mil)	12500 15000 17000 20000 25000 30000 35000	725, 925, 125, 790, 121, 785 725, 925, 125, 790, 121, 785 735, 125, 790, 121, 785 735, 125, 790, 121, 785 735, 125, 790, 121, 785 735, 790, 121, 785 735, 790, 121, 785

NACE SPECIFICATION EQUATIONS

Thin Film Epoxies

V = 525 x √ (T, in Mils)

OR

V = 3294 x √ (T, in mm)

EXAMPLE: Epoxy, 0.016" thick
.016" = 16 Mils
√ (16) = 4
V = 525 x 4 = 2,100 volts

Asphalt/Coal Tar

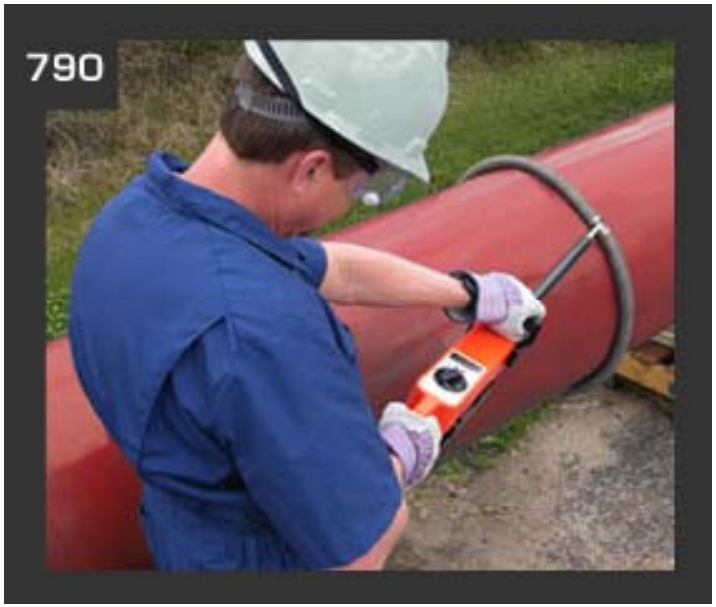
V = 1250 x √ (T, in Mils)

OR

V = 7843 x √ (T, in mm)

EXAMPLE: Coal Tar, 1/8" thick
1/8" = 0.125" = 125 Mils
√ (125) = 11.2
V = 1250 x 11.2 = 14,000 volts

V = Test Voltage
T = Thickness
v = Square Root
1 Mil = .001 inches



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Steel Specific

- Training/OQ Cont.
  - Drill and Stop
    - Annual – 1 Day
      - Classroom
      - Written
      - Hands On
    - OJT – Supervisor on site for all Tap/Stop >2”
    - Supervisors 20+ Yrs.

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Steel Specific

- Training/OQ Cont.
  - Welding
    - All Company Welders
      - 18 Contract 13 weld routinely
      - 2 Supervisors
      - 1 – 24 Years Experience Average 13 yrs
      - Qualification
        - Initial Qualification API 1104 Multiple Qualification Destructive testing
        - 2 times/yr SMAW Radiography
        - Oxy-Acetylene
          - Single Qualification 2” and <2”
          - ¾” Tee
      - Track all Radiography by Welder
      - Inspection Requirements by Pressure and Size

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Steel Specific

- Training/OQ Cont.
  - Welding Contractor
    - Copies of Procedure Qualifications
    - Copies of Welder Qualification
      - Multiple
      - Single – Keep in mind Essential Variables
    - Welding in Process

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Steel Specific

- Welding
  - 3rd Party NDT
    - Company 40 yrs old
    - 5 – 40 Years Experience Average 22+ yrs
    - ASNT Level III or II
    - AWS CWI
    - OQ ISN and Veriforce (Include New Construction)
    - Review/Audit Annually

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Steel Specific

- Other Considerations
  - Crews Outfitted for Steel Generally Stay on Steel
  - Welders Experience

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Concerns

- Aging Workforce
  - Welding - Fewer workers entering the field
  - NDT
- Work Ethic

Final Thoughts

- Many Similarities
- Experience

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Questions?

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