



Toase-e Park Sanati Gohar Ofogh
Petrochemical Co.
**CONCEPTUAL, BASIC and DETAIL DESIGN
ENGINEERING OF STYRENE PARK OFFSITE**



ARKAN SANAT PAYDAR
Procurement & Construction

Document Title:
WPS & PQR For Steel Structure

Rev. R0

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WPS & PQR For Steel Structure

| Rev. | Date | Status | Description | Prepared | Checked | Approved | AC |
|------|------------|--------|---------------------|----------|---------|----------|----|
| 00 | 8-Jan-2025 | F1 | Issued for Approval | F.M | M.Y | GH.A | |

WELDING PROCEDURE SPECIFICATION (WPS)

Conforming To AWS D1.1

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| <p>Welding Process(es) : GMAW</p> <p>WPS No. : W06 Supporting PQR No. : Prequalified</p> <p>JOINT DESIGN USED of weld:B-U3-GF</p> <p>Type : Double V Groove Weld(Butt joint)</p> <p>Single <input type="checkbox"/> Double Weld <input checked="" type="checkbox"/></p> <p>Backing: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p> <p>Backing Material : N/A</p> <p>Root Opening :0-3 (-,0mm) Root Face :0-3 (-,0mm)</p> <p>Groove Angle : $\alpha=\beta=60^\circ (+10^\circ,-0^\circ)$ Radius(J-U) : N/A</p> <p>Back Gouging : Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Method : Grinding</p> <p>BASE METALS</p> <p>Material Spec. : S235JR/ST37.2</p> <p>Type or Grade : ASTM A36</p> <p>Thickness Groove :40 mm ~ 60mm</p> <p>Diameter (pipe) : N/A</p> <p>FILLER METALS</p> <p>Specification No (SFA) : 5.18</p> <p>AWS No (Classification) : ER70S-6</p> <p>Size: 1.2mm</p> <p>SHIELDING</p> <p>Flux : N/A</p> <p>Gas : Ar + CO₂ Flow Rate : 14~18 L/min</p> <p>Composition :80%Ar+20%CO₂ Gas Cup Size :15~25mm</p> <p>Electrode Flux (Class) : N/A</p> <p>Others :</p> <p>PREHEAT</p> <p>Preheat Temp & Interpass., Min : (38<T1≤65 65°C)</p> <p>Interpass Temp., Max : 200°C</p> <p>TECHNIQUE</p> <p>Stringer or Weave Bead : Both</p> <p>Multi-pass or Single pass(per Side) : Both</p> <p>Number of Electrodes: N/A</p> <p>Electrode Spacing: N/A Max Oscillation:N/A</p> <p>Longitudinal : N/A Lateral : N/A Angle : N/A</p> | <p>Type : Manual <input type="checkbox"/> Semi-Automatic <input checked="" type="checkbox"/></p> <p>Machine <input type="checkbox"/> Automatic <input type="checkbox"/></p> <div style="text-align: center;"> </div> <p>Note : Backgouge root to sound metal before welding second side.</p> <p>POSITION</p> <p>Position of Groove : 1G Fillet : N/A</p> <p>Vertical Progression : N/A Up <input type="checkbox"/> Down <input type="checkbox"/></p> <p>ELECTRICAL CHARACTERISTICS</p> <p>Transfer Mode (GMAW):</p> <p>Spray <input checked="" type="checkbox"/> Globular <input type="checkbox"/> Short-Circuiting <input type="checkbox"/></p> <p>Current : AC <input type="checkbox"/> Pulsed <input type="checkbox"/></p> <p>DCEP <input checked="" type="checkbox"/> DCEN <input type="checkbox"/></p> <p>WIRE FEED SPEED:5~8 m/min</p> <p>Other:</p> <p>Tungsten Electrode (GTAW): N/A</p> <p>Type : N/A Size: N/A</p> <p>POSTWELD HEAT TREATMENT</p> <p>Temp. : N/A</p> <p>Time : N/A</p> <p>Contact Tube to Work Distance : 15~20mm</p> <p>Peening : N/A</p> <p>Interpass Cleaning : Brushing and /or grinding</p> |
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WELDING PROCEDURE

| Pass or Weld Layer(s) | Process | Filler Metals | | Current | | Volts | Travel Speed (cm/min) |
|-----------------------|---------|---------------|------------|-----------------|-----------|---------|-----------------------|
| | | Class | Diam. (mm) | Type & Polarity | Amps | | |
| 1ST.Pass | GMAW | ER70S-6 | 1.2 | DCEP | 200 ~ 250 | 25 ~ 27 | AS REQUIRED |
| 2 ~ N | GMAW | ER70S-6 | 1.2 | DCEP | 200 ~ 250 | 25 ~ 27 | AS REQUIRED |
| Back weld | GMAW | ER70S-6 | 1.2 | DCEP | 200 ~ 250 | 25 ~ 27 | AS REQUIRED |
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WELDING PROCEDURE SPECIFICATION (WPS)

Conforming To AWS D1.1

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| <p>Welding Process(es) : GMAW</p> <p>WPS No. : W20 Supporting PQR No. : Prequalified</p> <p>JOINT DESIGN USED of weld: B-U2-GF</p> <p>Type : Single V Groove Weld(Butt joint)</p> <p>Single <input type="checkbox"/> Double Weld <input checked="" type="checkbox"/></p> <p>Backing: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/></p> <p>Backing Material : N/A</p> <p>Root Opening : 0-3 (-,0mm) Root Face : 0-3 (-,0mm)</p> <p>Groove Angle : $\alpha = 60^\circ$ (+10°, -0°) Radius(J-U) : N/A</p> <p>Back Gouging : Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Method : Grinding</p> <p>BASE METALS</p> <p>Material Spec. : S235JR/ST37.2</p> <p>Type or Grade : ASTM A36</p> <p>Thickness Groove : 20 mm ~ 38mm</p> <p>Diameter (pipe) : N/A</p> <p>FILLER METALS</p> <p>Specification No (SFA) : 5.18</p> <p>AWS No (Classification) : ER70S-6</p> <p>Size: 1.2mm</p> <p>SHIELDING</p> <p>Flux : N/A</p> <p style="padding-left: 40px;">Gas : CO₂ Flow Rate : 14~18 L/min</p> <p>Composition : 99.99%CO₂ Gas Cup Size : 15~25mm</p> <p>Electrode Flux (Class) : N/A</p> <p>Others :</p> <p>PREHEAT</p> <p style="padding-left: 40px;">Preheat Temp & Interpass., Min : (20 ≤ T₁ ≤ 38 10°C)</p> <p>Interpass Temp., Max : 200°C</p> <p>TECHNIQUE</p> <p>Stringer or Weave Bead : Both</p> <p>Multi-pass or Single pass(per Side) : Both</p> <p>Number of Electrodes: N/A</p> <p>Electrode Spacing: N/A Max Oscillation: N/A</p> <p>Longitudinal : N/A Lateral : N/A Angle : N/A</p> | <p>Type : Manual <input type="checkbox"/> Semi-Automatic <input checked="" type="checkbox"/></p> <p style="padding-left: 40px;">Machine <input type="checkbox"/> Automatic <input type="checkbox"/></p> <div style="text-align: center;"> <p style="text-align: right;">BACKGOUGE</p> <p style="text-align: center;">R = 0 to 3 f = 0 to 3 $\alpha = 60^\circ$</p> </div> <p>Note : Backgouge root to sound metal before welding second side.</p> <p>POSITION</p> <p>Position of Groove : 1G Fillet : N/A</p> <p>Vertical Progression : N/A Up <input type="checkbox"/> Down <input type="checkbox"/></p> <p>ELECTRICAL CHARACTERISTICS</p> <p>Transfer Mode (GMAW):</p> <p>Spray <input type="checkbox"/> Globular <input checked="" type="checkbox"/> Short-Circuiting <input type="checkbox"/></p> <p>Current : AC <input type="checkbox"/> Pulsed <input type="checkbox"/></p> <p style="padding-left: 40px;">DCEP <input checked="" type="checkbox"/> DCEN <input type="checkbox"/></p> <p>WIRE FEED SPEED: 5~8 m/min</p> <p>Other:</p> <p>Tungsten Electrode (GTAW): N/A</p> <p>Type : N/A Size: N/A</p> <p>POSTWELD HEAT TREATMENT</p> <p>Temp. : N/A</p> <p>Time : N/A</p> <p>Contact Tube to Work Distance : 15~20mm</p> <p>Peening : N/A</p> <p>Interpass Cleaning : Brushing and /or grinding</p> |
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WELDING PROCEDURE

| Pass or Weld Layer(s) | Process | Filler Metals | | Current | | Volts | Travel Speed (cm/min) |
|-----------------------|---------|---------------|------------|-----------------|-----------|---------|-----------------------|
| | | Class | Diam. (mm) | Type & Polarity | Amps | | |
| 1ST.Pass | GMAW | ER70S-6 | 1.2 | DCEP | 200 ~ 250 | 25 ~ 27 | AS REQUIRED |
| 2 ~ N | GMAW | ER70S-6 | 1.2 | DCEP | 200 ~ 250 | 25 ~ 27 | AS REQUIRED |
| Back weld | GMAW | ER70S-6 | 1.2 | DCEP | 270 ~ 290 | 26 ~ 28 | AS REQUIRED |
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WELDING PROCEDURE SPECIFICATION (WPS)

Conforming To AWS D1.1

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|---|--|
| <p>Welding Process(es) : GMAW WPS No. : W23 Supporting PQR No. : Prequalified</p> <p>JOINT DESIGN USED of weld:B-U3-GF Type : Double V Groove Weld(Butt joint) Single <input type="checkbox"/> Double Weld <input checked="" type="checkbox"/> Backing: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Backing Material : N/A Root Opening : 0-3 (-,0mm) Root Face : 0-3 (-,0mm) Groove Angle : $\alpha=\beta=60^\circ (+10^\circ,-0^\circ)$ Radius(J-U) : N/A Back Gouging : Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Method : Grinding</p> <p>BASE METALS Material Spec. : S235JR/ST37.2 Type or Grade : ASTM A36 Thickness Groove : 40 mm ~ 60mm Diameter (pipe) : N/A</p> <p>FILLER METALS Specification No (SFA) : 5.18 AWS No (Classification) : ER70S-6 Size: 1.2mm</p> <p>SHIELDING Flux : N/A Gas : CO₂ Flow Rate : 14~18 L/min Composition : 99.99%CO₂ Gas Cup Size : 15~25mm Electrode Flux (Class) : N/A Others :</p> <p>PREHEAT Preheat Temp & Interpass., Min : (38<T1≤65 65°C) Interpass Temp., Max : 200°C</p> <p>TECHNIQUE Stringer or Weave Bead : Both Multi-pass or Single pass(per Side) : Both Number of Electrodes: N/A Electrode Spacing: N/A Max Oscillation:N/A Longitudinal : N/A Lateral : N/A Angle : N/A</p> | <p>Type : Manual <input type="checkbox"/> Semi-Automatic <input checked="" type="checkbox"/> Machine <input type="checkbox"/> Automatic <input type="checkbox"/></p> <div style="text-align: center;"> </div> <p>Note : Backgouge root to sound metal before welding second side.</p> <p>POSITION Position of Groove : 1G Fillet : N/A Vertical Progression : N/A Up <input type="checkbox"/> Down <input type="checkbox"/></p> <p>ELECTRICAL CHARACTERISTICS Transfer Mode (GMAW): Spray <input type="checkbox"/> Globular <input checked="" type="checkbox"/> Short-Circuiting <input type="checkbox"/> Current : AC <input type="checkbox"/> Pulsed <input type="checkbox"/> DCEP <input checked="" type="checkbox"/> DCEN <input type="checkbox"/> WIRE FEED SPEED:5~8 m/min</p> <p>Other: Tungsten Electrode (GTAW): N/A Type : N/A Size: N/A</p> <p>POSTWELD HEAT TREATMENT Temp. : N/A Time : N/A Contact Tube to Work Distance : 15~20mm Peening : N/A Interpass Cleaning : Brushing and /or grinding</p> |
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WELDING PROCEDURE

| Pass or Weld Layer(s) | Process | Filler Metals | | Current | | Volts | Travel Speed (cm/min) |
|-----------------------|---------|---------------|------------|-----------------|-----------|---------|-----------------------|
| | | Class | Diam. (mm) | Type & Polarity | Amps | | |
| 1ST.Pass | GMAW | ER70S-6 | 1.2 | DCEP | 200 ~ 250 | 25 ~ 27 | AS REQUIRED |
| 2 ~ N | GMAW | ER70S-6 | 1.2 | DCEP | 200 ~ 250 | 25 ~ 27 | AS REQUIRED |
| Back weld | GMAW | ER70S-6 | 1.2 | DCEP | 200 ~ 250 | 25 ~ 27 | AS REQUIRED |
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WELDING PROCEDURE SPECIFICATION (WPS)

Conforming To AWS D1.1

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|---|---|
| Welding Process(es) : GMAW WPS No. : W25 Supporting PQR No. : Prequalified | Type : Manual <input type="checkbox"/> Semi-Automatic <input checked="" type="checkbox"/> Machine <input type="checkbox"/> Automatic <input type="checkbox"/> |
| JOINT DESIGN USED : T -Joint Type : Fillet Single <input checked="" type="checkbox"/> Double Weld <input type="checkbox"/> Backing: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Backing Material : N/A Root Opening : N/A Root Face : N/A Groove Angle : N/A Radius(J-U) : N/A Back Gouging : Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Method : ... | <p style="font-size: small;">leg size: According to drawing and min T</p> |
| BASE METALS Material Spec. : S235JR/ST37.2 Type or Grade : ASTM A36 Thickness Fillet : 25mm~38mm Diameter (pipe) : N/A | POSITION Position of Groove : N/A Fillet : 2F Vertical Progression : N/A Up <input type="checkbox"/> Down <input type="checkbox"/> |
| FILLER METALS Specification No (SFA) : 5.18 AWS No (Classification) : ER70S-6 Size: 1.2mm | ELECTRICAL CHARACTERISTICS Transfer Mode (GMAW): Spray <input type="checkbox"/> Globular <input checked="" type="checkbox"/> Short-Circuiting <input type="checkbox"/> Current : AC <input type="checkbox"/> Pulsed <input type="checkbox"/> DCEP <input checked="" type="checkbox"/> DCEN <input type="checkbox"/> WIRE FEED SPEED: 5~8 m/min |
| SHIELDING Flux : N/A Gas : CO ₂ Flow Rate : 14~18 L/min Composition : 99.99%CO ₂ Gas Cup Size : 15~25mm Electrode Flux (Class) : N/A Others : | Other: Tungsten Electrode (GTAW): N/A Type : N/A Size: N/A |
| PREHEAT Preheat Temp & Interpass., Min : (20<T1≤38 10°C) Interpass Temp., Max : 200°C | POSTWELD HEAT TREATMENT Temp. : N/A Time : N/A Contact Tube to Work Distance : 15~20mm Peening : N/A Interpass Cleaning : Brushing and /or grinding |
| TECHNIQUE Stringer or Weave Bead : Both Multi-pass or Single pass(per Side) : Both Number of Electrodes: N/A Electrode Spacing: N/A Max Oscillation: N/A Longitudinal : N/A Lateral : N/A Angle : N/A | |

WELDING PROCEDURE

| Pass or Weld Layer(s) | Process | Filler Metals | | Current | | Volts | Travel Speed (cm/min) |
|-----------------------|---------|---------------|------------|-----------------|-----------|---------|-----------------------|
| | | Class | Diam. (mm) | Type & Polarity | Amps | | |
| 1~N | GMAW | ER70S-6 | 1.2 | DCEP | 200 ~ 250 | 25 ~ 27 | AS REQUIRED |
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