

# WPS & PQR CHECK LIST

## PARAGRAPH

|  | SMAW |  |   | SAW |  |   | GMAW/<br>FCAW |  |   | GTAW |  |   |
|--|------|--|---|-----|--|---|---------------|--|---|------|--|---|
| <b>QW-402 JOINTS</b>                     |      |  |   |     |  |   |               |  |   |      |  |   |
| .1 $\phi$ in groove design               |      |  | N |     |  | N |               |  | N |      |  | N |
| .4 - of backing in single sided weld     |      |  | N |     |  | N |               |  | N |      |  | N |
| .5 + of backing and chemical composition |      |  |   |     |  |   |               |  |   |      |  | N |
| .10 $\phi$ in root spacing               |      |  | N |     |  | N |               |  | N |      |  | N |
| .11 $\pm$ nonfusing retainers            |      |  | N |     |  | N |               |  | N |      |  | N |

|  |   |   |  |   |   |  |   |   |  |   |   |  |
|--|---|---|--|---|---|--|---|---|--|---|---|--|
| <b>QW-403 Base Metal</b>                   |   |   |  |   |   |  |   |   |  |   |   |  |
| .5 $\phi$ in group number QW-422           |   | S |  |   | S |  |   | S |  |   | S |  |
| .6 T Limits impact                         |   | S |  |   | S |  |   | S |  |   | S |  |
| .7 T/t Limits > 8 in. (203 mm)             | E |   |  | E |   |  | E |   |  | E |   |  |
| .8 $\phi$ T Qualified                      | E |   |  | E |   |  | E |   |  | E |   |  |
| .9 t pass > 1/2 in. (13 mm)                | E |   |  | E |   |  | E |   |  |   |   |  |
| .10 T Limits Qualified (Short Circuit Arc) |   |   |  |   |   |  | E |   |  |   |   |  |
| .11 $\phi$ P-N° Qualified                  | E |   |  | E |   |  | E |   |  | E |   |  |
| .13 $\phi$ P-N° 5/9/10                     | E |   |  | E |   |  | E |   |  | E |   |  |

|  |   |   |   |   |   |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|---|---|---|---|---|
| <b>QW-404 Filler Metals</b>                                      |   |   |   |   |   |   |   |   |   |   |   |   |
| .3 $\phi$ Size   |   |   |   |   |   |   |   |   |   |   |   | N |
| .4 $\phi$ F-N°   | E |   |   | E |   |   | E |   |   | E |   |   |
| .5 $\phi$ A-N°   | E |   |   | E |   |   | E |   |   | E |   |   |
| .6 $\phi$ Diameter   |   |   | N |   |   | N |   |   | N |   |   |   |
| .7 $\phi$ Diameter > 1/4 in. (6 mm)                              |   | S |   |   |   |   |   |   |   |   |   |   |
| .9 $\phi$ Flux/Wire Classification                               |   |   |   | E |   |   |   |   |   |   |   |   |
| .10 $\phi$ Alloy flux  |   |   |   | E |   |   |   |   |   |   |   |   |
| .12 $\phi$ AWS classification                                    |   | S |   |   |   |   |   | S |   |   | S |   |
| .14 $\pm$ Filler   |   |   |   |   |   |   |   |   |   | E |   |   |
| .22 $\pm$ Consumable insert                                      |   |   |   |   |   |   |   |   |   |   |   | N |
| .23 $\phi$ Filler metal product form (Solid/metal or flux-cored) |   |   |   |   |   |   | E |   |   | E |   |   |
| .24 $\pm$ $\phi$ Supplemental Filler Metal                       |   |   |   | E |   |   | E |   |   |   |   |   |
| .25 $\pm$ Supplemental Powder Filler metal                       |   |   |   | E |   |   | E |   |   |   |   |   |
| .26 > Supplemental Powder Filler metal                           |   |   |   | E |   |   | E |   |   |   |   |   |
| .27 $\phi$ Alloy elements  |   |   |   | E |   |   | E |   |   |   |   |   |
| .29 $\phi$ Flux designation                                      |   |   |   |   |   | N |   |   |   |   |   |   |
| .30 $\phi$ t   | E |   |   | E |   |   | E |   |   | E |   |   |
| .32 t Limits (Short Circuit Arc)                                 |   |   |   |   |   |   | E |   |   |   |   |   |
| .33 $\phi$ AWS Classification                                    |   |   | N |   |   | N |   |   | N |   |   | N |
| .34 $\phi$ Flux Type   |   |   |   | E |   |   |   |   |   |   |   |   |
| .35 $\phi$ Flux/Wire Classification                              |   |   |   |   | S | N |   |   |   |   |   |   |
| .36 Recrushed Slag   |   |   |   | E |   |   |   |   |   |   |   |   |
| .50 $\pm$ Flux   |   |   |   |   |   |   |   |   |   |   |   | N |

|   |  |   |   |  |  |   |  |   |   |  |   |   |
|---|--|---|---|--|--|---|--|---|---|--|---|---|
| <b>QW-405 Positions</b>                         |  |   |   |  |  |   |  |   |   |  |   |   |
| .1 + Position                                   |  |   | N |  |  | N |  |   | N |  |   | N |
| .2 $\phi$ Position                              |  | S |   |  |  |   |  | S |   |  | S |   |
| .3 $\phi$ $\uparrow\downarrow$ Vertical Welding |  |   | N |  |  |   |  |   | N |  |   | N |

|                                 |   |   |   |   |   |   |   |   |   |   |   |  |
|---------------------------------|---|---|---|---|---|---|---|---|---|---|---|--|
| <b>QW-406 Preheat</b>           |   |   |   |   |   |   |   |   |   |   |   |  |
| .1 Decrease > 100°F (56°C)      | E |   |   | E |   |   | E |   |   | E |   |  |
| .2 $\phi$ Preheat maintenance   |   |   | N |   |   | N |   |   | N |   |   |  |
| .3 Increase > 100°F (56°C) (IP) |   | S |   |   | S |   |   | S |   |   | S |  |

# WPS & PQR CHECK LIST

## PARAGRAPH

| PARAGRAPH                                  | SMAW |   | SAW |   | GMAW/<br>FCAW |   | GTAW |   |
|--|------|---|-----|---|---------------|---|------|---|
| <b>QW-407 PWHT</b>                         |      |   |     |   |               |   |      |   |
| .1 $\phi$ PWHT                             | E    |   | E   |   | E             |   | E    |   |
| .2 $\phi$ PWHT ( Time & Temperature Range) |      | S |     | S |               | S |      | S |
| .4 T Limits                                | E    |   | E   |   | E             |   | E    |   |

### QW-408 Gas

|   |  |  |  |  |   |  |   |   |   |
|---|--|--|--|--|---|--|---|---|---|
| .1 $\pm$ Trailing or $\phi$ composition |  |  |  |  |   |  | N |   | N |
| .2 $\phi$ Single, mixture or %          |  |  |  |  | E |  |   | E |   |
| .3 $\phi$ Flow rate                     |  |  |  |  |   |  | N |   | N |
| .5 $\pm$ or $\phi$ Backing flow         |  |  |  |  |   |  | N |   | N |
| .9 - Backing or $\phi$ composition      |  |  |  |  | E |  |   | E |   |
| .10 $\phi$ Shielding or trailing        |  |  |  |  | E |  |   | E |   |

### QW-409 Electrical Characteristics

|                               |  |   |   |   |   |   |  |   |   |
|-------------------------------|--|---|---|---|---|---|--|---|---|
| .1 > Heat input               |  | S |   | S |   | S |  | S |   |
| .2 $\phi$ Transfer Mode       |  |   |   |   | E |   |  |   |   |
| .3 $\pm$ Pulsing I            |  |   |   |   |   |   |  |   | N |
| .4 $\phi$ Current or Polarity |  | S | N | S | S | N |  | S | N |
| .8 $\phi$ I & E Range         |  |   | N | N |   | N |  |   | N |
| .12 $\phi$ Tungsten electrode |  |   |   |   |   |   |  |   | N |

### QW-410 Technique

|   |  |  |   |   |   |   |   |   |   |
|---|--|--|---|---|---|---|---|---|---|
| .1 $\phi$ String/Weave                      |  |  | N | N |   |   | N |   | N |
| .3 $\phi$ Orifice cup, or nozzle size       |  |  |   |   |   |   |   |   | N |
| .5 $\phi$ Method of cleaning                |  |  | N | N |   |   | N |   | N |
| .6 $\phi$ Method of back gouge              |  |  | N | N |   |   | N |   | N |
| .7 $\phi$ Oscillation                       |  |  |   | N |   |   | N |   | N |
| .8 $\phi$ Tube to Work distance             |  |  |   | N |   |   | N |   |   |
| .9 $\phi$ Multi to single pass per side     |  |  | N | S | S | N |   | S | N |
| .10 $\phi$ Single to multi electrodes       |  |  |   | S | S | N |   | S | N |
| .11 $\phi$ Closed to out of chamber welding |  |  |   |   |   |   |   | E |   |
| .15 $\phi$ Electrode spacing                |  |  |   | N |   |   | N |   | N |
| .25 $\phi$ Manual or Automatic              |  |  | N | N |   |   | N |   | N |
| .26 $\pm$ Peening                           |  |  | N | N |   |   | N |   | N |

## LEGEND

**+** Addition                      > Increase/greater than                       $\uparrow$  Uphill                       $\leftarrow$  Forehand                       $\phi$  Change  
**-** Deletion                        < Decrease/less than                         $\downarrow$  Downhill                         $\rightarrow$  Backhand

**E** = Essential Variables which must be indicated on both the WPS and recorded on the PQR. Any changes to these variables require requalification of WPS.

**S** = Supplementary Essential Variables must be indicated on the WPS and Recorded on the PQR when Impact Testing is required. Changes to these variables when Impact testing is performed require requalification of WPS.

**N** = Nonessential variables must be indicated on the WPS but when changed do not require requalification of WPS.

**NOTE:** WPS's are to indicate **all** Essential, Nonessential and Supplementary Essential variables. **Do not** indicate variables which are not used as **NA** they are applicable and should be entered on the WPS as None or Not used.