

RECOMMENDED PRACTICE

DNVGL-RP-B204

Edition September 2019

Welding of subsea production system equipment

4.2.4 Base materials

4.2.4.1 Base materials shall be identified by the specific alloy and supply condition in addition to grouping or classification according to the applicable standard.

4.2.4.2 Buttering consumables, when used as base materials, shall be specified and identified by the manufacturer, trade name and consumable classification per ASME BPVC-II Part C or equivalent ISO standard, and shall be considered an unlisted base material in the subsequent welding activity.

4.2.4.3 When cladding is applied to a low-alloy steel butter, the clad welding procedure shall consider the butter weld as an unlisted base material.

4.2.4.4 The chemical composition of the base material shall be evaluated based on the carbon equivalent (CE) or the critical metal parameter (Pcm), and calculated as follows:

CE (IIW) shall be used for carbon steels with carbon content greater than or equal to 0.12 wt % and calculated with Equation (4.1).

$$CE = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15} \quad (4.1)$$

Pcm shall be used for carbon steels with carbon content less than 0.12% and calculated with Equation (4.2).

$$Pcm = C + \frac{Si}{30} + \frac{Mn + Cu + Cr}{20} + \frac{Ni}{60} + \frac{Mo}{15} + \frac{V}{10} + 5B \quad (4.2)$$

Guidance note:

The correlation between systems for material grades, groups and classification can be found in ISO/TR 20172 and ISO/TR 20173.

---e-n-d---o-f---g-u-i-d-a-n-c-e---n-o-t-e---

4.2.5 Weld processes

4.2.5.1 The weld processes listed in Table 4-1 are permitted for cladding, buttering and girth welds.

Table 4-1 Permitted weld processes

<i>Weld processes</i>	<i>Cladding</i> ¹⁾	<i>Buttering</i> ²⁾	<i>Girth welds</i> ³⁾
Shielded metal arc welding, SMAW (ISO 4063 process 111)			x
Submerged arc welding, SAW (ISO 4063/process 12) ³⁾	x	x	x
Gas metal arc welding with active gas shield, GMAW (ISO 4063 process 135) ⁴⁾	x	x	x
Flux cored arc welding with active gas shield, FCAW (ISO 4063 process 136)			x
Metal cored arc welding with active gas shield, GMAW (ISO 4063 process 138)			x
Tungsten inert gas arc welding, GTAW (ISO 4063 process 141), hot and cold wire ⁴⁾	x	x	x
Plasma arc welding, PAW (ISO 4063 process 15)	x		