

<<Preheat Guides for ASME B31.3 Code>>

The need for and the temperature of preheat are dependent upon a number of factors such as chemical analysis, degree of restraint of the parts being joined, elevated temperature mechanical properties, and material thicknesses.

**ASME B31.3 Process Piping Code:**

**Min. Preheat Temperature provided in Table 330.1.1**

The WPSAmerica.com software supports ASME B31.3 Code, and includes references to preheat data of Table 330.1.1. When choosing this code from drop-down feature in WPS or PQR form, for any material and P-Number grouping that you select from the database, recommended preheat temperature will be added to your form automatically!

**Note:** All materials listed by **P-Number grouping of QW-420 of ASME Section IX**

**Clause 330.1.1:** The thickness intended in Table 330.1.1 is that of the thicker component measured at the joint.

**Clause 330.2.3:** When parts of two different P-Numbers are joined by welding, the minimum preheat temperature required shall be the higher temperature shown in Table 330.1.1 for the materials to be welded.

<<Postweld Heat Treatment Guides for ASME B31.3 Code>>

**ASME B31.3 Process Piping Code:**

**PWHT provided in Table 331.1.1**

The WPSAmerica.com software supports ASME B31.3 Code, and includes references to PWHT data of Table 331.1.1. When choosing this code from drop-down feature in WPS or PQR form, for any material and P-Number grouping that you select from the database, recommended postweld heat treatment will be added to your form automatically!

**Note:** All materials listed by **P-Number grouping of QW-420 of ASME Section IX**

**Exemptions to Mandatory PWHT Requirements provided in Table 331.1.3**

**ASME B31.3 Process Piping Code:**

**Clause 331.1.3 Definition of Thicknesses Governing PWHT:**

The term **Control Thickness**, **Nominal Thickness** used in Table 331.1.1 and Table 331.1.3:

**Control thickness** is the lesser of (1) the thickness of the weld or (2) the thickness of the materials being joined at the weld or the thickness of the pressure-containing material, if the weld is attaching a nonpressure-containing material to a pressure-containing material.

**Thickness of the weld detailed in Clause 331.1.3 (b) for groove, fillet, repair, branch, and partial penetration welds:**

Definition of **thickness of the weld** (T), which is a factor in determining the control thickness, is defined as follows:

- For Groove welds, T is the thicker of two abutting ends after weld preparation, including I.D. machining
- For Fillet welds, T is the throat thickness of the weld
- For Partial penetration welds, T is the depth of the weld groove
- For Material repair welds, T is the depth of the cavity to be repaired
- For Branch welds, See Clause 331.1.3 (b) (5) for formula and figure description

The term **nominal material thickness** as used in Table 331.1.3 (Exemptions to Mandatory PWHT Requirements) is the thicker of the materials being joined at the weld.

**Clause 331.2.3 Dissimilar Materials:**

-Heat treatment of welded joints between dissimilar ferritic metals or between ferritic metals using dissimilar ferritic filler metal shall be at the higher of the temperature ranges in Table 331.1.1 for the materials in the joint.

-Heat treatment of welded joints including both ferritic and austenitic components and filler metals shall be as required for the ferritic material or materials unless otherwise specified in the engineering design.

<<Preheat and Postweld Heat Treatment Guides for ASME IX Code>>

ASME Section IX (Welding and Brazing Qualifications)

**QW-406: PREHEAT** Preheat, as one of the Essential Variables, is addressed for each welding processes for the purpose of qualification or re-qualification of a welding procedure (any increase or decreases of preheat temperature qualified, changes to interpass temperature qualified, etc.).

ASME Section IX (Welding and Brazing Qualifications)

**QW-407: POSTWELD HEAT TREATMENT (PWHT)**

PWHT, as one of the Essential Variables, is addressed for each welding processes for the purpose of qualification or re-qualification of a welding procedure for any of the conditions like: with PWHT, no PWHT, changes to PWHT time and temperature range, performance method of PWHT based on P-Number grouping [PWHT below the lower transformation temperature, above the upper transformation temperature (normalizing), between the upper and lower transformation temperature, PWHT above the upper transformation temperature followed by heat treatment below the lower transformation temperature (i.e. normalizing or quenching followed by tempering) or PWHT within a special temperature range, etc.]

**Note:** All heat treatment data should be recorded during performance of PQR test(s). All essential and non-essential variables, minimum preheat temperature, maximum interpass temperature, as well as PWHT (when performed in PQR) should be shown in WPS.