

Table 7.19 Sample QW-406, Preheat for PQR # Q134 (Table 5.2).

QW-406.1	Preheat	70°F
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QW-406.1 was created because preheat may have an effect on the properties of the weldment. For example, a test coupon welded at 300°F preheat does not provide evidence that a weld to be made, using a 70°F preheat, will produce a sound weld.

When the Subcommittee IX developed QW-406.1, there was no tolerance on the range of preheat which could be used, based upon the actual value recorded on the PQR. The preheat used on the PQR was the minimum preheat temperature which the PQR was allowed to support.

Code users commented that when they needed a 200°F preheat on their WPS, they established a 200°F preheat on their PQR, but the actual PQR results varied above the 200°F, pass after pass. Therefore, to allow for a normal tolerance, the variable was changed to state:

“A decrease of more than 100°F in the preheat temperature qualified.”

The phrase “In the preheat temperature qualified” means the preheat temperature based on the actual temperature used during the welding of the PQR test coupon. If a PQR test coupon is welded, starting with a 250°F preheat, and during the welding of the test coupon the actual preheat temperatures rose steadily within a normal tolerance of not more than 100°F, the WPS should specify a preheat of 250°F minimum, even though some actual preheat temperatures may have reached, for example, 275°F or 325°F.

It was the intent of Subcommittee IX to allow this normal range of temperature variation on the PQR test coupon, and to allow the Code user to specify, as a minimum, the actual starting preheat temperature, provided the actual starting temperature was not more than 100°F below the highest temperature recorded on the PQR. This is a technically sound position. It was not the intent of Subcommittee IX to allow a Code user to record a starting preheat of 250°F on the PQR, then observe the normal preheat temperature rise of approximately 100°F, and then allow the Code user to specify a preheat on the WPS at 150°F. The 150°F is 100°F below the starting preheat temperature of 250°F, but may be closer to 200°F below the preheat which actually occurred on many of the final passes. The intent of Subcommittee IX was to allow the Code user to establish a target minimum preheat for the PQR, to allow for a possible range above this target minimum preheat temperature during the welding of the PQR test coupon. And then to allow the Code user to specify the target minimum preheat as the minimum preheat to be used on the WPS, provided the actual preheat does not range more than 100°F above the target minimum preheat.

QW-407.4 Post Weld Heat Treatment (PWHT)

Table 7.20 QW-407, PWHT Rules.

QW-253 Welding Variables Procedure Specifications (WPS) Shielded Metal-Arc Welding (SMAW)			
Paragraph		Brief of Variables	Essential
QW-407	.1	ϕ PWHT	E
PWHT	.4	T limits	E