

TSB GEN 0006

TECHNICAL SERVICE
BULLETIN

WELDING AR PLATE



GENERAL DESCRIPTION

AR400 is a quench and tempered steel and may be difficult to weld due its high strength and harden ability. The base steel around the weld rapidly heats and cools during welding, resulting in a heat affected zone (HAZ) with high hardness. Any hydrogen in the weld metal may diffuse into HAZ and may cause hydrogen embrittlement, resulting in delayed under-bead or toe cracks outside of the weld. To minimize heat affected zone cracking:

1. Use low hydrogen consumable with an -H4 or -H2 designation (non SS filler rod) with proper shielding gas for consumable/material combination.
2. Use the lowest strength filler metal meeting design requirements.
 - If making fillet welds, the weld can be oversized to give the specified strength
3. Due to the large difference in yield strength between the AR400 plate and the filler material, minimizing weld restraint is critical to control cracking of weld.
4. Preheat to 150°F-300°F (66°C-149°C) in order to slow the cooling rate.
 - Note that excessive preheat may anneal the base material. The maximum temperature allowed between passes is 400°F (204°C).
5. Slow cool. More time at elevated temperatures allows the dissolved hydrogen to escape.
6. Peen the weld beads to minimize residual weld stresses.

AR235 is a high carbon and manganese, abrasion-resistant steel. It can be welded with a low hydrogen rod. The procedure described above can also be utilized for AR235.

TECHNICAL INFORMATION

TRADE NAME	ROCKWELL "C" VALUE	B.H.N. VALUE NEAR
HARDFACE	52 C	500 BHN
AR500F	50 C	477 BHN
AR400	48 C	444 BHN
400F	44 C	415 BHN
JALLOY	42 C	388 BHN
AR360	39 C	363 BHN
4340Q&T	37 C	341 BHN
T-1:321	34 C	321 BHN
HY-80	32 C	302 BHN
T-1:REG	28 C	269 BHN
AR-235	22 C	235 BHN
656-80	18 C	217 BHN
1045AR	12 C	192 BHN
572-50	8 C	179 BHN
A36-MILD	("B" 79)	143 BHN