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Application of Surface-softened, Two-layer Clad Steel Plates to Liquid Ammonia Tank

(Taketo Okumura) (Yuji Mishiro) (Yoichi Nakai)
(Yasuharu Uesugi) (Masao Hirai)

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⁄ ∏ Δ ┐ ⌡ ｏ 2) Ⴗ ℵ ♠ ╓ ▌ ╓ ≠ ╩ ≢ → ╓ = ∫ ▌ ├ →
⌡ ∏ ╓ ┤ ← ┐ ⌡ ｏ3) ╓ SCC = ≢ ▌ ∫ ╓ mm ┤
┤ ← ┐ ⌡ ｏ 4) = ≠ ├ = ▀ ▌ ╓ ┤ ← ▌ ｏ
5) ▌ ╓ ⌡ ╥ ╓ PWMT ╓ = ∂ → ├ ╓ ┼ → ｏ

Synopsis :

The present paper describes the record of a ten-ton liquid ammonia spherical tank made of surface-softened, two layer clad steel plates constructed in Chiba Works, together with research works performed concerning the actual tank. The main results were obtained as follows: (1) No difference was found in properties between enshrouding roll clad and welding roll clad steel plates. (2) No cracking was observed by the in-service inspection of the experimental tank, which ha

表面軟化二層クラッド鋼板の液体アンモニアタンクへの適用

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奥村 健人* 三代 祐嗣** 中井 揚一*** 上杉 康治**** 平井 征夫*****

Application of Surface-softened Two-layer Clad Steel Plates to Liquid Ammonia Tank

Takato Okumura, Yuji Mishiro, Yoichi Nakai, Yasuharu Uesugi, Masao Hirai

要旨

Synopsis:

The present paper describes the record of a ten-ton liquid am-

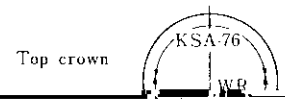
t：胴板の最小厚さ（mm）

p：設計圧力（kgf/cm²）

D：腐れ代を含む胴の内径（mm）

っている。

設計圧力10kgf/cm²，腐れ代1 mmとして許容引張応力の異



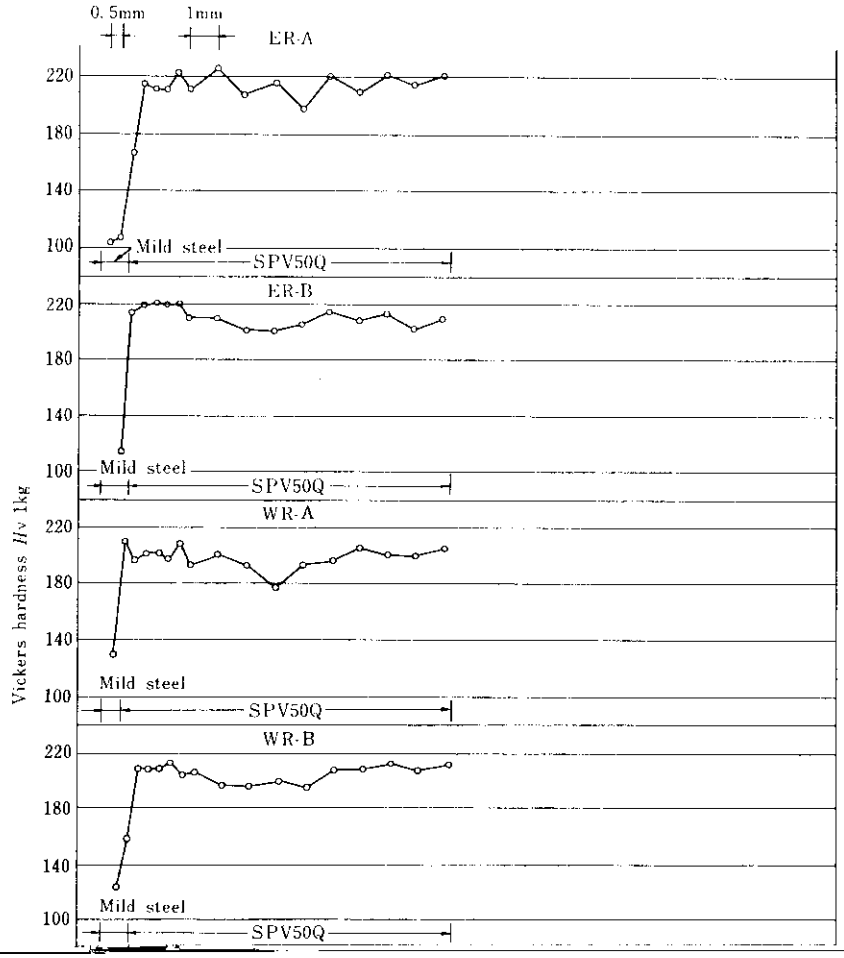
ER : Enshrouding roll clad
WR : Welding roll clad

(5) 溶接金属部の液安 SCC を防止するため，各種の溶接部軟層処理を試みる。

(6) 溶接作業は母材鋼板相互の溶接はすべて自動溶接とする。

Table 6 Mechanical properties

Cladding method	Plate (Thickness)	Specimen type	Tensile test			V Charpy impact test (kgf·m)	
			Y.P. (kgf/mm²)	T.S. (kgf/mm²)	El (%)	C-direction	L-direction


0.5mm
1mm
ER-A
220
180
140
100
Mild steel
SPV50Q
ER-B
220
180
140
100
Mild steel
SPV50Q
WR-A
220
180
140
100
Mild steel
SPV50Q
WR-B
220
180
140
100
Mild steel
SPV50Q
Vickers hardness Hv 1kg


base

Table 8 Chemical composition of welding electrode (wt %)

Welding rod	C	Si	Mn	P	S	Mo	Standard	Application

Fabrication in mill

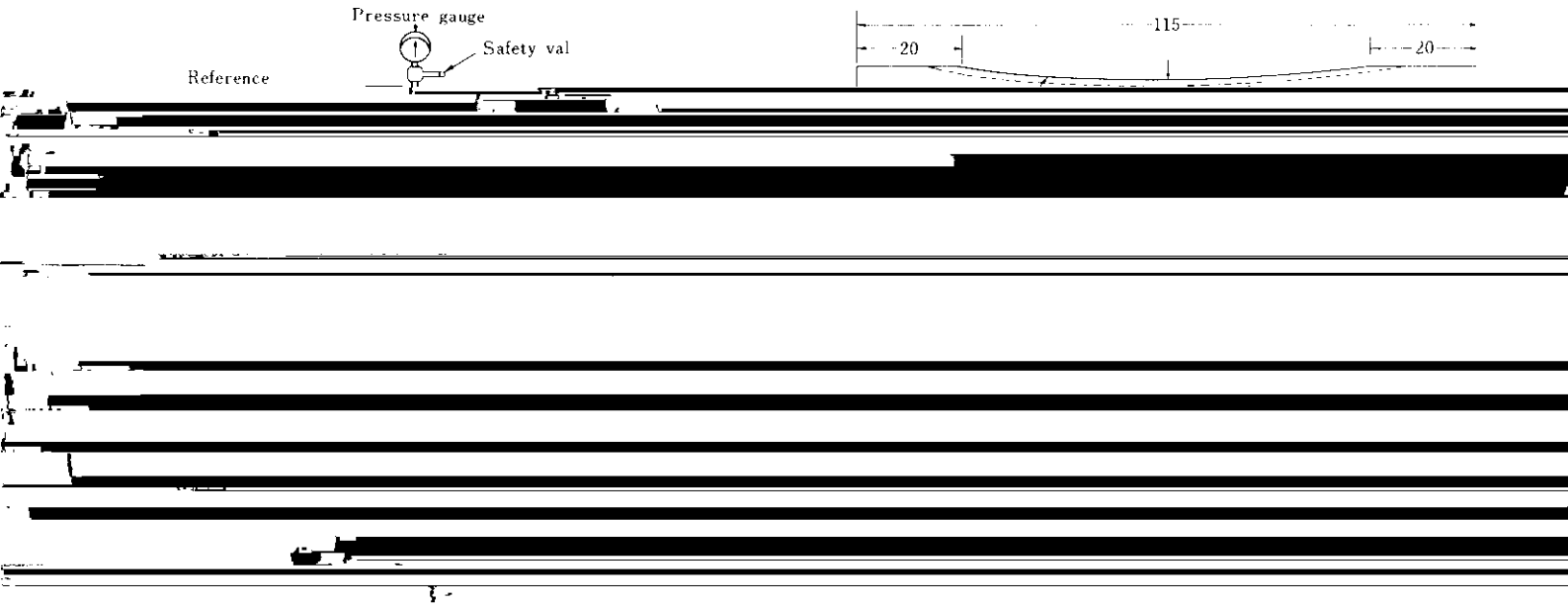
Center ring

(to field)

Crown plate

Installing Installing Inner welding

	Composition(%)	Using	Electrode


Pressure gauge
Safety val
Reference
115
20
20