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Production of Deep Drawing Quality Steel Sheets for Porcelain Enameling by Continuous Casting

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Synopsis :

A deep drawable cold rolled steel sheet for enameling use was developed. The steel sheet was made from continuously cast Ti bearing steel with extremely low C content. Processing conditions of the steel sheet are discussed in this paper. Fishscaling is more effectively prevented by the use of TiN precipitates rather than TiC precipitates. TiN in steels less deteriorates press formability under any hot rolling condition that TiC. Smut deposited on the steel surface increases during pickling for enameling pretreatment with increasing Ti content in steel, resulting in poor enamel adhesion. The amount of Ti in steel must be restricted to less than 0.06% to obtain excellent enamel adhesion.

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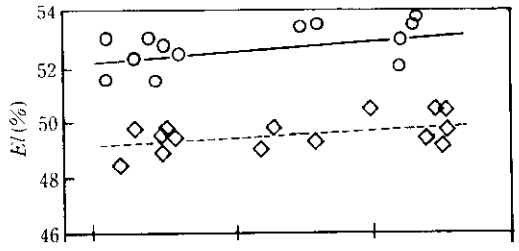
holes on the slab surface. Therefore, good steel surfaces

Table 1 Chemical composition of steel


54
52
50
48
46
El (%)

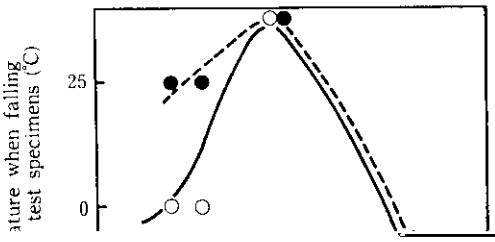

25
0
ature when falling
test specimens (°C)

Table 2 Change in solute P (wt %)

Steel	CT	C	S	N	Ti	P_{total}[1)]	P_{ppt}[2)]	P_{sol}[3)]
	550	0.002	0.009	0.0035	0.021	0.010	<0.0003	0.010

and a low-SRT steel. The TiC precipitates in the steel reheated to an SRT of 1 100°C are coarser than those in

Steel	A (Low C, low N)	B (High C, low N)	C (Low C, high N)
Area fraction	0.118%	0.129%	0.174%

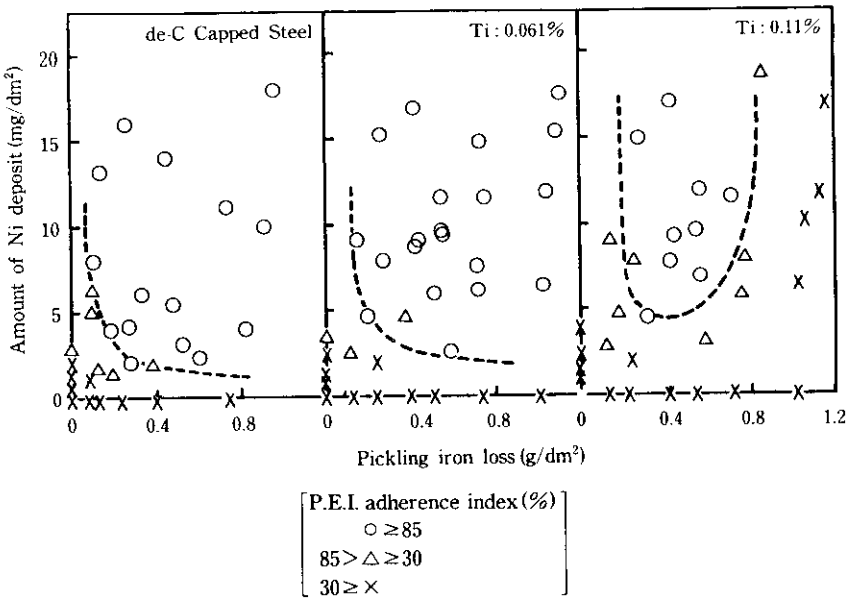


Fig. 8 Enamel adhesion of steels in direct-on enameling

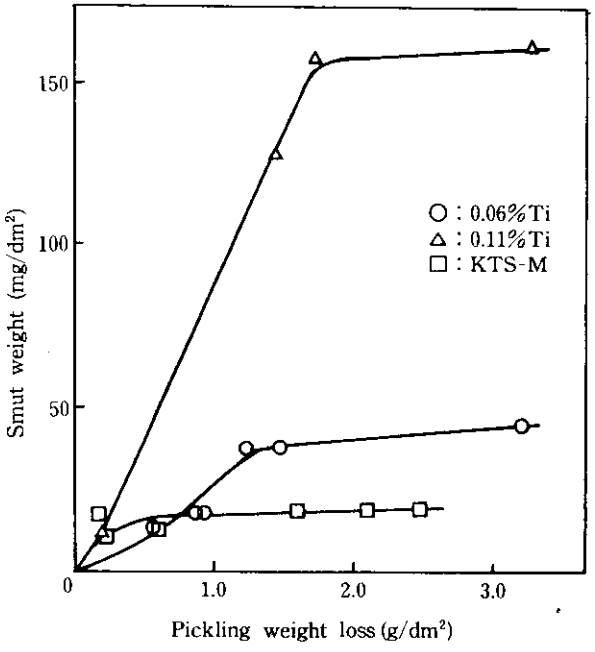
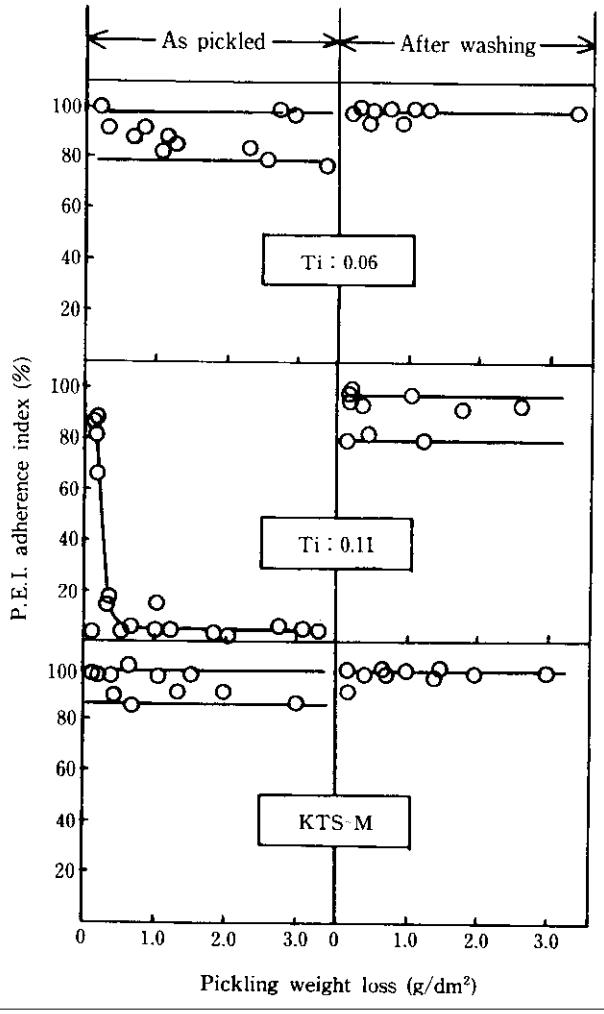
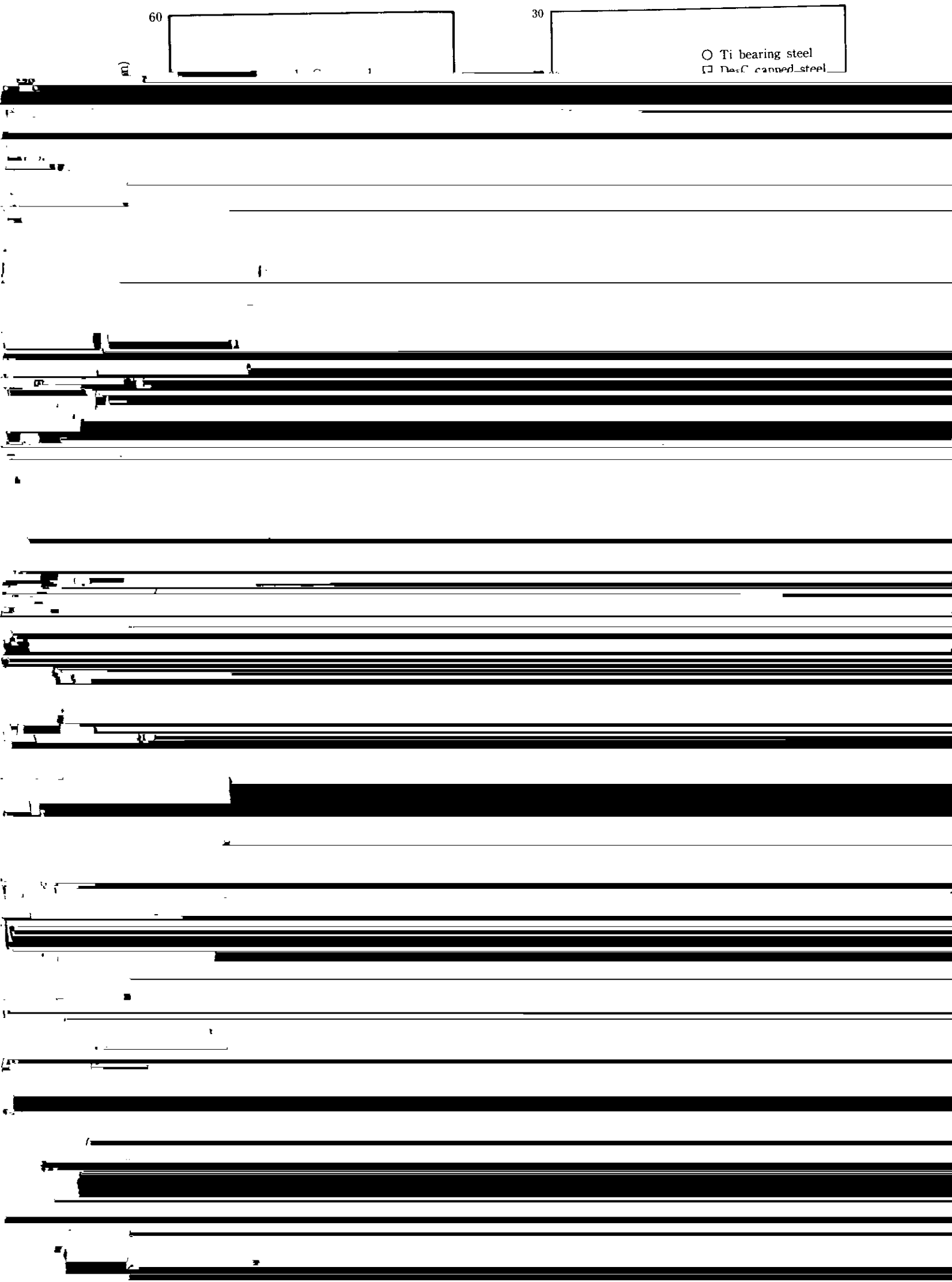


Fig. 9 Influence of pickling on smut deposition



sion of the steel of 0.06%Ti and decarburized capped steel becomes excellent. In the steel of 0.11%Ti also, the enamel adhesion at large pickling weight losses shows a substantial improvement although there are variations.

It was found from the above-mentioned results that a large amount of smut is generated at high Ti contents of steel, thereby deteriorating enamel adhesion, while the


60
30
○ Ti bearing steel

decarburized capped steel sheets so far widely used for porcelain enameling in press formability and warping

Fishscale Susceptibility of Enameling sheet steel", *Kawasaki Steel Giho*, 7(1975)2, 189-200
2) A. Yasuda, K. Ito, Y. Matsumoto, M. Nishida, and I. Taka-