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BORING METHOD ON AISI 4140 STEEL BASED ON FE2B IN DRY POWDER AND PRESSURE

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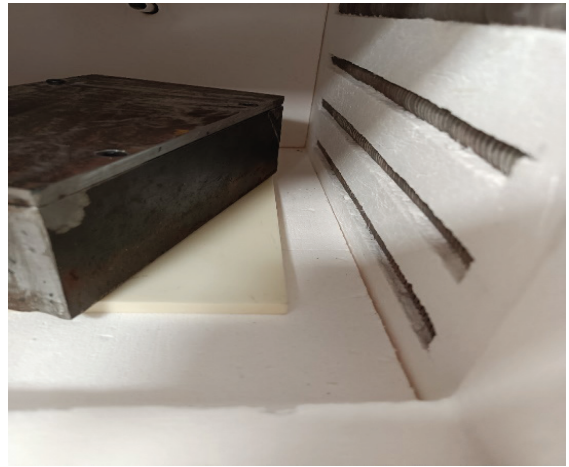
Abstract: The present work studies the properties of an AISI 4140 steel subjected to the process of thermochemical surface treatment, borided with Fe₂B in dry powder with a variable compaction that helped to correlate the compaction of Fe₂B with surface hardness, and diffusion of the boron layer on the surface of the steel.

METHODOLOGY

Specimens H and L of AISI 4140 steel of identical geometry were placed in boxes of the same steel, covered below and above with Fe₂B powder 5-10 μm particle size, covered with steel plates and the lids were closed with controlled pressure by 4 screws. L specimen 50 Ncm cover bolt torque and H specimen 10 Ncm.



They were placed in the muffle for 20 hours, at a working temperature of 900°C, with an incremental temperature adjustment of 1 hour prior to the cycle. Same decremental adjustment finished the cycle.



Muffle Brand: MELLEEN/Model: SX2-6-12-TP
Metallographic Test Equipment/
Brand: PACE// Microscope Invert/Brand:
Nikon/Model: MA100/Series: 102762

RESULTS

1) Coating thickness of 13.35 μm of Fe₂B was observed by applying a torque of 10 Ncm to the cap screws.

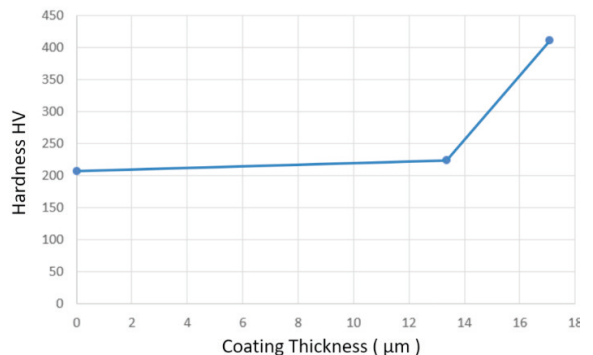
Coating thickness of 17.05 μm of Fe₂B was observed by applying a torque of 50 Ncm to the cap screws

2) Taking the reference of the material without coatings with a

hardness equivalent HV of 207.5

An increase in surface hardness was observed in sample L of 8.2%

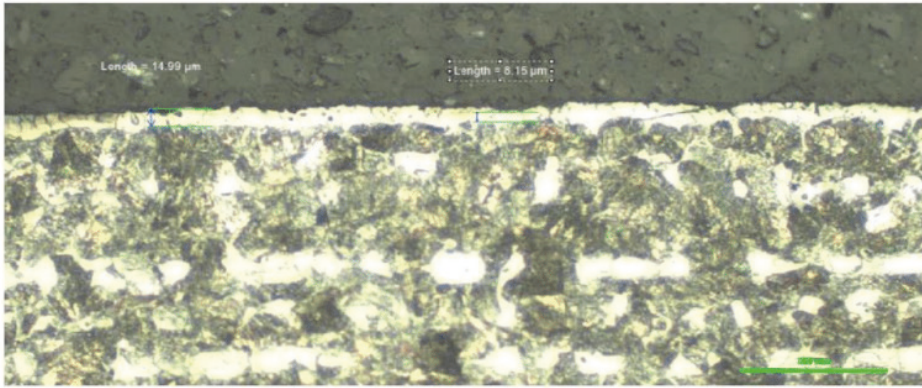
An increase in surface hardness was observed in sample H of 98.7%



CONCLUSION

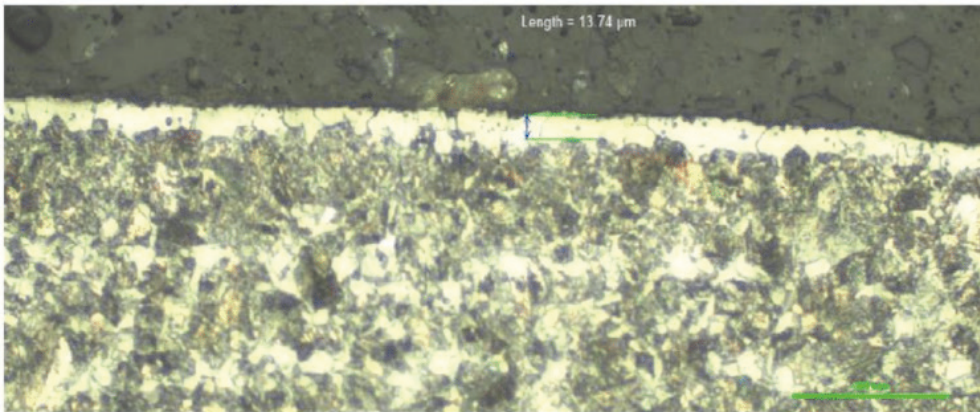
The present work shows a correlation between pressure, coating thickness and surface hardness. This correlation is shown by

1 reference material and 2 analyzed samples, it is estimated in later stages of this investigation to be able to count on greater ranges of the variables analyzed.



Sample ID	Espesor de Recubrimiento/Coating Thickness μm										Prom. Ave.
	1	2	3	4	5	6	7	8	9	10	
H	14.99	8.15	13.74	13.09	20.94	9.82	9.02	17.62	12.43	13.74	13.35

HV average 224.7



Sample ID	Espesor de Recubrimiento/Coating Thickness μm										Prom. Ave.
	1	2	3	4	5	6	7	8	9	10	
L	11.78	15.7	17.67	13.09	16.04	17.68	22.25	16.36	20.29	19.63	17.05

HV average 412.5