

DEVELOPMENT OF API 5L-X80 AS HOT STEEL COILS AT ARCELORMITTAL TUBARÃO

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Abstract – During last decades, API-X80 steel has been gaining importance in the world and started to be used in Brazil in 2008 in the manufacturing of pipelines produced from heavy plate. ArcelorMittal Tubarão has been developing this grade as hot coil, in order to supply the future Petrobrás demands, producing coils, with 12.7, 14.27 and 15.88mm thick, that reach the mechanical requirements of API Standard.

In order to improve the productivity of pipelines and due to the huge distances from petroleum exploration sites to the final consumers, the petroleum companies have been demanded higher mechanical properties of the pipes. In this context, the use of X80 grade increased from 0.5Mt in 90's to 2.5 Mt in this century. In Brazil, the Petrobrás, the Brazilian oil company, started to use of this grade in 2008 with a 8.5 km pipeline Project in São Paulo coastal region, called Mexilhão Project. The pipes was 19mm thick and 34"φ, produced by heavy plate process.

In order to supply the future Petrobrás demands for X80 grades (thickness ≥ 12.7 mm and $\phi_{pipe} \geq 24$), ArcelorMittal Tubarão started to develop this grade, using hot coils products, that are lower-priced product. It was used high strength low alloy steel and thermo-mechanical process control to develop this grade in order to reach tensile and toughness requirements of API Standart for X80 grade. The coils thickness produced were 12.70, 14.27 and 15.88mm and the results achieved the requirements, as showed below.

Table 1: Tensile Results.

Thickness (mm)	Yield Strength (MPa)		Tensile Strength (MPa)		Elongation (%)
	Coil Results	API Standard	Coil Results	API Standard	API Standard
12.7mm	614 to 631	555 to 705	690 to 736	625 to 825	25 to 55
14.27	587 to 635		642 to 683		
15.88	587 to 617		653 to 677		

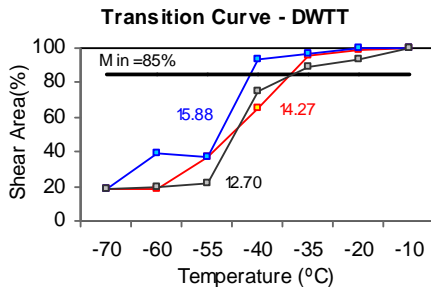


Figure 1: DWTT Transition Curve of 12.7, 14.27 and 15.88mm thick

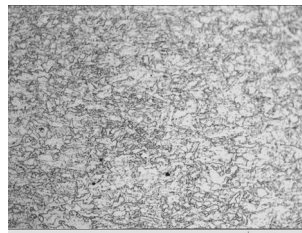


Figure 2: Coils microstructure (500x). It Acicular Ferrite and M/A Island

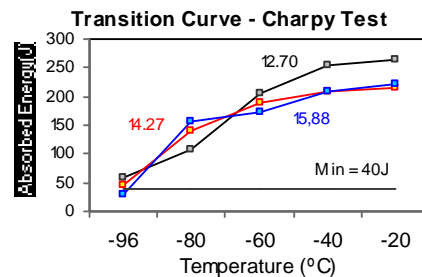


Figure 3: Charpy Transition Curve - Absorbed Energy

References

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