summarizes the mechanical properties of the two grades drawn from their traction curves (FIGS. 5, 6, 7). It is clear that the rich NV10 grade is more resistant than the lean shade but from the point of view of ductility it is Conversely, because of the same reasons cited above (grain size precipitation, solid solution effect).

Table 2. The mechanical properties of the two shades

	E (KN /mm²)	Re (MPa)	Rm (MPa)	A%
NV10 direction Riche of rolling	22,3	372,8	604,9	25,89
NV10 Transverse Rich direction	19,6	366,6	625	22,68
NV10 Transverse Poor direction	16,6	336,2	601,5	36,65

The mechanical properties of the two grades Each of the traction curves exhibits a linear elastic (reversible) behavior managed by the famous Hooke law, whose slope is given by Young's modulus E, which estimates the stiffness of the material and depends on the intensity of the chemical bonds. This elastic character begins with a low stress value and ends when a stress threshold is reached, called the elastic limit. When this threshold is crossed, it passes to a plastic behavior (irreversible) or the deformations become permanent. In the first phase, the deformations are homogeneous over the entire sample and then the appearance of the neck or the mode of plastic deformation becomes localized or heterogeneous and the deformation process continues until the sample breaks [4]. The passage from elastic mode to plastic mode is made by activating the sources of Frank-Reed [5], where each dislocation emitted, encounters several obstacles: Frank's network or other emit dislocations, solute atoms which induce Symmetrical and asymmetric distortions of the crystal lattice, the grain boundaries and ultimately the precipitates.

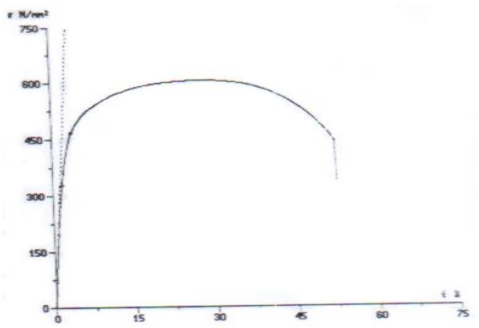

Figure 5. Tension curve No. 01 for steel X60 (direction of rolling)

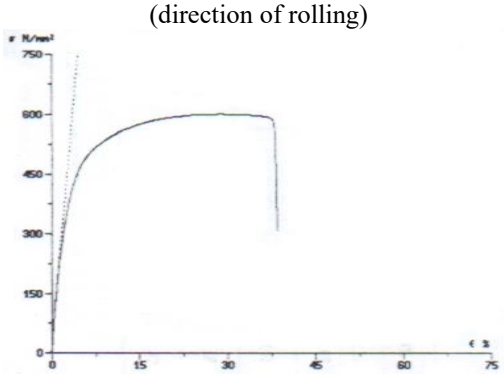

Figure6. Tension curve No. 01 for steel X60 (transverse direction)

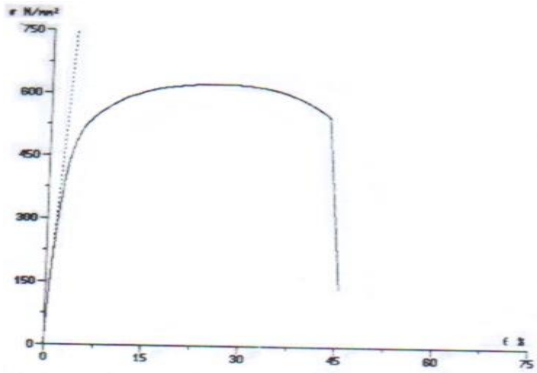

Figure7. Tension curve No. 01 for steel X52 (transverse direction)

4. CONCLUSIONS

The steels studied have a ferrito-pearlitic structure in strip due to controlled rolling. They possess fine grain sizes, hence of the thermomechanical treatment applied. On the other hand, the ferritic matrix is hardened by means of dispersing elements NB, V, Ti (in the form of carbonitride). The resilience curves show that the poor Nv10 grade is the most ductile, while the tensile curves and hardness show that the rich NV10 grade is the most resistant

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