

Inductive Line for Steel Quenching and Tempering

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Steels with higher added value are by all means priority in the long-term strategy of our company. Heat treatment of steel by quenching and tempering is besides peeling, cutting and centering one of ways to increase added value.

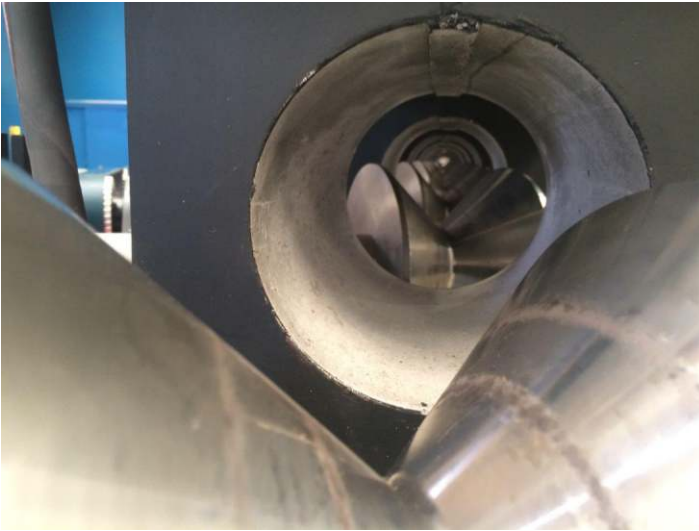
A line for inductive heating, quenching and tempering is included in our 5-year development plan. The investment plan for this period has been confirmed by our owners; its realisation depends on financial means, company priorities and market situation.

Quenching and tempering as one of steel heat treatments represents an increase of steel mechanical properties for a class or two by thermal procedures when compared with the properties in the rolled condition. This is achieved by heating and quickly cooling the steel (tempering). Tempering alone would yield a very hard steel, which would be brittle as glass. This anomaly is eliminated by quenching.

The so-called quenching temperature depends on chemical composition of steel. This is different for various steels. For spring steel, such as 51CrV4, is the quenching temperature 450 oC. Quenching temperatures depend on time too. That is why we adapt the chemical composition of spring steel to different customers and their quenching and tempering procedures.

By quenching and tempering procedures, we get steel with high hardness and at the same time high toughness. Steels appropriate for quenching and tempering are those with carbon content from 0.3 % to 0.6 % or even more. Besides carbon, these steels can be alloyed with Cr, Mo, V or other elements. Each of the elements has a different role. Hardness is increased by building hard and stable carbides that influence the crystal grain size, which consequently affects the toughness.

Photos: presentation of inductive lines from producers web page



Products intended for quenching and tempering can be forged or treated mechanically. After quenching and tempering there may be a grinding stage, where grinding and product cleaning additives must be taken into consideration. A straightening operation may follow heat treatment with some complicated products.

Quenching and tempering of finished products is a lot more expensive (grinding additives, extra grinding, cleaning and straightening) than processing quenched and tempered steel (mechanical processing is more demanding due to increased mechanical properties).

Development of modern processing centres as well as specialised cutting tools has essentially changed possibilities of mechanical processing of quenched and tempered steel. It is true that the processing of quenched and tempered steel is more demanding and

tool wear is higher, but there are fewer operations on the other hand. The cost difference is in the end in favour of product manufacturing from quenched and tempered steel.

Results of machinability examinations have proven that our EXEM steels (steels with increased machinability) have a big advantage after heat treatment when compared to conventional steels. Machinability of EXEM steel is not lost by heat treatment.

Quenching and tempering steel line investment has a big potential to expand the range of products and get customers in demand for quenched and tempered steel. We could not service this completely new customer segment until now.

Miran Prezelj, Head of Sales



Photos: from visiting the producer of the inductive lines