

A Tool Steel is a Tool Steel is a Tool Steel

This is a very common misconception when it comes to tool steels. The quality of the tool steel which will directly affect the total life of the tool as well as your profitability will depend on the Tool Steels:

- Chemical Composition
- Melting Technology
- and Heat Treatment

Steel producers must have advanced melting and production equipment as well as the know how of producing the finest grades of tool steels. If one is not sure what this statements means, one only needs to look at how the “major players” in the tool steel market services their customers in order to get an informed idea. A steel plant with these characteristics is able to consider the needs of its customers and that of the markets that they are supplying into in order to supply them with “customized” steel.

Hot Work Tool Steel:

Through research and development, these steels are continually being improved with respect to:

- Homogeneity
- Degree of Purity
- Toughness
- Working Hardness

Such improvements yield large benefits to manufacturers in the hot work sector such as improved polishability, improved workability, higher thermal endurance, higher heat strength, high tempering stability, higher heat toughness, higher hot wear resistance, better thermal conductivity and a lower sticking tendency. The above all yields a longer running die which increases profitability.

Significantly improved characteristics as listed above can be obtained through peculiar secondary metallurgy processes which yields a premium quality tool steel.

In practice, hot work tool steel productions range from conventional production routes to re-melted production routes which are able to produce their superior premium grades.

The production routes includes:

- Hot work steels produced via conventional methods followed by a specialized heat treatment.
- Hot work steels produced via the ESR (Electro Slag Re-melting) execution followed by a specialized heat treatment.

- Hot work steels produced via the VMR (Vacuum Arc Re-melting) execution followed by a specialized heat treatment.

Specific operations require specialized tool steel properties, and therefore ... “A tool steel is a tool steel is a tool steel” is defiantly NOT the case as specific tool steels have been designed to meet the needs of specific “unique” applications.

Extrusion:

This is a very important forming process of Ferrous and Non-Ferrous alloys. It is an established trend that both tool makers and tool users are viewing their tools as investments. By utilizing the best possible tool steel for a specific application, even if the tool steel grade carries a higher price per kilogram, it will ensure the best possible production run. This better production run is achieved by the tool being able to run for longer with fewer maintenance activities being needed which ultimately results in a cheaper price per part being produced.

The above holds true for other hot working applications such as forging, die casting, etc.

Grain flow is also an important consideration of the tool which is to be manufactured when the tool is to be manufactured from a conventionally produced tool steel. However when using a ESR (Electro Slag Remelted) material this consideration becomes less important due to the refined grains which are produced during this production process.

Tool steel gets its performance properties through a combination of its chemical composition and the process by which it is produced. Once the material is produced, it is through research and development that it is improved. By refining the tolerance of the chemical composition of the steel, it is possible to achieve optimal performance of the specific grade.