

Development of QCM64-HARMOTEX[®]

Cold-Work Tool Steel that Combines the High Hardness of 64 HRC Class and the Superior Toughness
~ Excellent properties achieved through the use of advanced technology—contributing to a longer service life and cost savings in cold-work tool ~

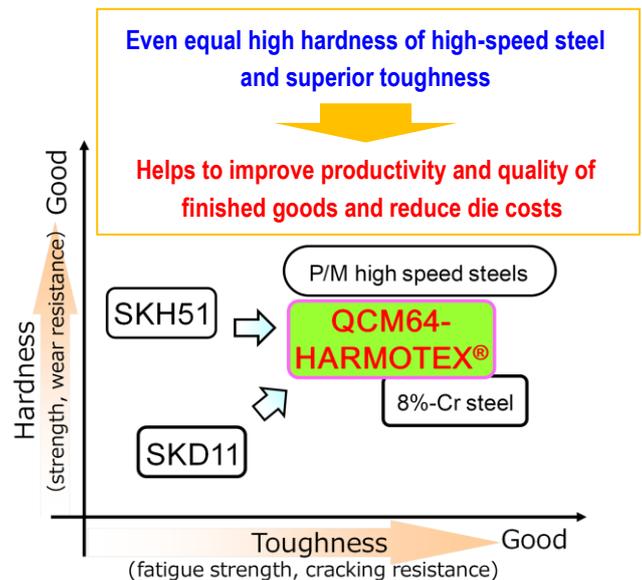
In response to the ever-increasing demand in recent years for cold-work tool steel (die steel) with higher performance properties, Sanyo Special Steel Co., Ltd. has developed the cold-work tool steel QCM64-HARMOTEX[®]—a steel that combines the high hardness of 64 HRC Class and superior toughness.

HARMOTEX[®], the brand name of Sanyo Special Steel's high-performance tool steel, is derived from "HARMO," an abbreviation of Harmony (signifying harmony with customer needs and the social environment), and "TEX," which denotes technological advancement. QCM64-HARMOTEX[®] is the third in the HARMOTEX[®] series, following the already popular QT41-HARMOTEX[®] and QDX-HARMOTEX[®].

QCM64-HARMOTEX[®] helps to not only improve productivity and the quality of finished goods but also to reduce tooling costs through better fatigue life and resistance to wear and cracking in punches, pressing dies, and rolling tools, etc. that are used for cold working in harsh conditions.

We are currently at the stage where sample shipments have started and some customers have already carried out sample evaluations. The product has been gaining a good reputation, with positive results noted in improvements to quality of finished surface on stainless steel tube rolling and reduced chipping in cold-work punching.

With this addition to the HARMOTEX[®] series lineup, Sanyo Special Steel is responding to the diverse needs of its customers while aggressively promoting product development and sales activities to expand use of its products in the future.



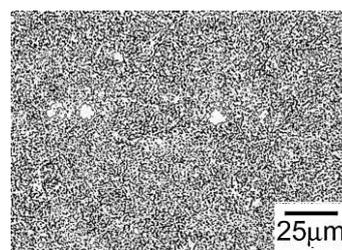
■ Background to the Development of QCM64-HARMOTEX[®]

In recent years, due to increasing tendency of near-net-shape production that approximate the finished shape with fewer steps and adoption of high-strength materials such as high-tensile steel in the manufacture of automobiles and components for home appliances, etc., cold-work tools such as punches, pressing dies, rolling tools, etc. are required to better fatigue life and resistance to wear and cracking.

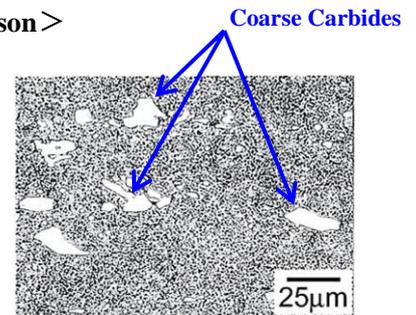
In particular, general purpose cold-work tool steel such as the JIS SKD11 is not sufficiently hard when used under harsh conditions. Therefore, in these conditions, high-grade materials with high hardness and excellent wear resistance such as high-speed steel represented by JIS SKH51 and P/M(Powder Metallurgy) high-speed steel are used. However, the problem was that these high-quality materials contain high amounts of rare metals such as tungsten, molybdenum, and vanadium, making them expensive in terms of material costs as well as the heat treatment costs required for the performance of cold-work tools.

Sanyo Special Steel has taken advantage of its outstanding precipitated carbides control technology to discover the optimum alloy composition to control crystallization in coarse carbides that characteristically leads to deterioration in toughness and fatigue strength of tool steels. This has allowed Sanyo Special Steel to successfully develop QCM64-HARMOTEX[®], which displays the high hardness of the 64 HRC Class—comparable to the JIS SKH51 under the heat treatment conditions as general purpose cold-work tool steel, and which is at least twice as tough as JIS SKD11 and JIS SKH51.

<Micro-structure Comparison>



【QCM64-HARMOTEX[®]】



【JIS SKD11】

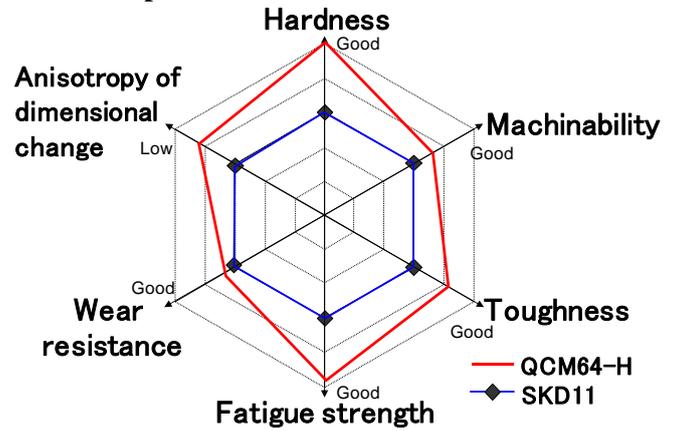
■ Features of QCM64-HARMOTEX®

(1) Superior performance that helps to improve the service life of cold-work tools and the quality of finished products

QCM64-HARMOTEX® features levels of hardness and toughness that are far excellent than the JIS SKD11 used in ordinary cold-work tool steel.

This outstanding feature helps to increase productivity and the quality of finished products by improving the fatigue life as well as the wear and cracking resistance of cold-work tools.

< Comparison Chart of Characteristics >



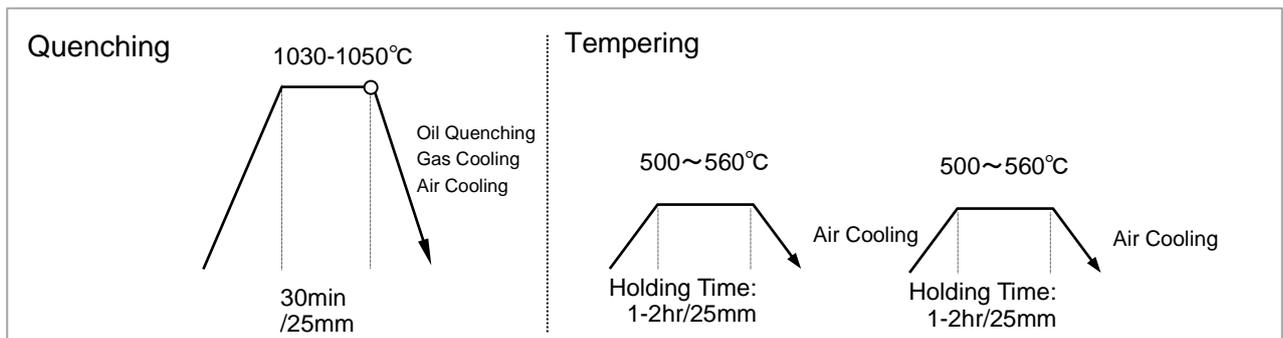
(2) Displays outstanding performance under the heat treatment conditions as general purpose cold-work tool steel

High-speed steel represented by JIS SKH51 needs high-temperature heat treatment in order to provide the required hardness.

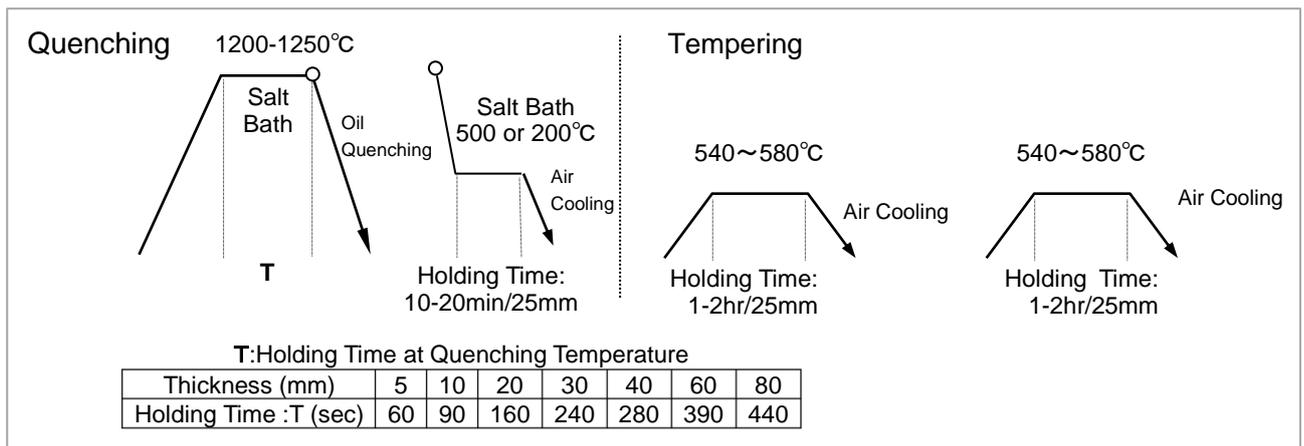
QCM64-HARMOTEX® displays the outstanding performance under the heat treatment conditions as general purpose cold-work tool steel, helping to save on the manufacturing costs for cold-work tools.

An Example of Heat Treatment Conditions

【QCM64-HARMOTEX®】



【JIS SKH51】



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【Reference】

■Explanation of Terms

• HRC

HRC is a unit that expresses the hardness of steel on the Rockwell hardness scale. The hardness of annealed material is typically around 20 HRC.

• Toughness

The tenacity of a material, or the characteristic property that denotes how difficult it is to destroy a material. Low toughness indicates that a material is fragile, making it easy for cracks to advance (become larger), whereas the higher the toughness the more tenacious the material, making it less likely that cracks will advance.

• High-speed Steel

High-speed steel is a grade of steel that was originally made for tools used to cut steel—a grade that exhibits a high level of hardness and outstanding wear resistance. However, it is not easy to make, as material costs are high and the steel needs to be processed using a high-temperature heat treatment.

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