

Steel selection contributing to wear reduction of forging dies

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Every increase in tool life has positive effects towards reducing production costs of a forged part. The longer a tool lasts, the later the replacement of the tool is necessary; therefore the improved tool life means less downtime. Consequently, the constant strive to increase tool life leads the focus to minimize wear as recent studies have shown a major part for breakdown of forging dies is due to wear. Wear can be regarded as a complex collective of stress factors, but the most common approach limiting wear is increasing the hardness. However, the common increase of the material matrix hardness is only possible to a certain extent. Above a steel specific hardness maximum the tool material lacks the necessary toughness and might suffer fracture. Therefore, the second approach against tool wear is the defined use of hard phases as carbides in the steel matrix. Those carbides reduce the tool wear due to their very high hardness, whereas the advantageous effect of carbides is limited to certain parameters like evenly dispersion, the shape, size, amount and the specific kind of the carbides.

The special hot-work tool steel CR7V-L respects these two approaches. The carefully balanced alloy concept was developed by Kind & Co. Compared to established hot-work tool steels it reveals a higher hardness and wear resistance. In Europe, due to its properties CR7V-L found widespread application, especially at the very wear-intensive forging dies. This report describes the properties of the tool steel CR7V-L for demanding forging applications and will also point out some example applications.

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