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Influence of object positioning on heat transfer coefficient in quenching process

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The heat transfer coefficients (HTC) on the surface of a copper disk sample during a quenching operation have been studied here. The sample is made very small so that the lumped mass approach can be applied for the measurements. Lumped heat capacitance is one of the techniques, which is advantageous due to its simplicity, but it is an approximate technique to determine the HTCs, as this method assumes temperature of the part to be constant. The change in HTC with the orientation of the sample showed that it varied with sample orientation. The HTC during quenching operation was also studied with two surfaces facing towards each other with the distance between them progressively reduced. The HTC variation for the sample surface facing each other was noticed to have a much broader variation with changing temperature, when compared to the single surface. The methodology used resulted in local variation in the HTC's and averaging was performed to obtain the mean values of HTC.

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