

# Capabilities of industrial computed tomography in the field of dimensional measurements

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## ABSTRACT

The paper discusses the capabilities of industrial computed tomography (CT) in the field of dimensional measurement of products with close tolerances. Computed tomography is a method that allows inspection and measurements of both reachable and unreachable characteristics which makes it very desirable and interesting for application in wide range of industries. In order to evaluate the quality of measurement results obtained by industrial CT, two objects with the same geometry, and made from different materials, were measured. Results obtained with CT were compared with the results obtained by coordinate measuring machine, which were considered to be reference values, and deviations between the results have been analysed. Measurements were repeated five times under repeatability conditions. Repeatability is expressed quantitatively in terms of the dispersion characteristics of the results. Statistical analysis showed that in majority of cases, there were no statistically significant differences between measurement results of equal characteristics obtained at different materials. Obtained deviations in the research could be explained by the fact that the measurements were performed at the industrial CT for general applications. Much better results can be achieved by using a metrology CT device.

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## Zmožnosti industrijske računalniške tomografije na področju dimenzijskih meritev

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### POVZETEK

Prispevek obravnava zmogljivosti industrijske računalniške tomografije (CT) na področju merjenja dimenzij izdelkov z natančnimi tolerancami. Računalniška tomografija je metoda, ki omogoča pregledovanje in merjenje tako dosegljivih kot nedosegljivih lastnosti, zaradi česar je zelo uporabna in zanimiva za uporabo v številnih industrijskih panogah. Da bi ocenili kakovost merilnih rezultatov, pridobljenih z industrijskim CT, smo merili dva predmeta z isto geometrijo, izdelana iz različnih materialov. Rezultate, dobljene s CT, smo primerjali z rezultati, ki smo jih dobili s koordinatnim merilnim strojem. Slednje smo obravnavali kot referenčne vrednosti za analizo odstopanja med rezultati. Meritve smo ponovili petkrat, in sicer pod ponovljivimi pogoji. Ponovljivost se izrazi kvantitativno glede na disperzijske lastnosti rezultatov. Statistična analiza je pokazala, da v večini primerov med rezultati meritev enakih lastnosti, dobljenih pri različnih materialih, ni statistično značilnih razlik. Ugotovljena odstopanja je mogoče pojasniti z dejstvom, da so meritve opravljene na industrijskem CT za splošno uporabo. Boljše rezultate je mogoče doseči z uporabo CT naprave prilagojene za meroslovje.

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### PODATKI O ČLANKU

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