# Fabrikasi Fantom *Computed Tomography Dose Index* (CTDI) Kepala dengan Variasi Komposisi Resin Polyester dan *Methyl Ethyl Ketone Peroxide* (MEKP)

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## Abstrak

Pembuatan fantom CTDI kepala dengan material alternatif telah dilakukan. Fantom dibuat dengan metode sederhana menggunakan material resin polyester dan methyl ethyl ketone peroxide (MEKP) telah dievaluasi pada penelitianini. Fantom CTDI kepala yang dikembangkan dibuat dengan berbagai variasi komposisi volume material. Variasi yang digunakan merupakan rasio volumeresin dan MEKP. Pada penelitian ini variasi komposisi yang digunakandiantaranya adalah 150:1, 200:1, 250:1 dan 300:1. Prosedur pada penelitianini dimulai dengan pembuatan fantom yang meliputi pencetakan dan pengeboran, selanjutnya dilakukan pengukuran massa jenis dan pemeriksaan CT scan. Fantomdibuat dengan dimensi silinder berdiameter 160 mm dan tinggi 150 mm. Padapengukuran massa jenis dilakukan penimbangan massa fantomdan mengukur volume dimensi fantom. Untuk pengujian CT number fantom digunakan CTscandengan metode helical scanning. Nilai CT number yang didapatkan dari masing- masing variasi fantom berbahan resin kemudian dibandingkan dengan nilai CTnumber fantom CTDI standard. Hasil perbandingan nilai CT number padaseluruh fantom menunjukkan nilai yang relative sama. Nilai CT number danstandard deviasi dari fantom berbahan resin bernilai 3-6%lebih tinggi dibandingkan dengan fantom standard berbahan PMMA. Selain itu, p-valueantara fantom standard PMMA dan fantom resin dengan komposisi 300:1menunjukkan hasil yang paling mendekati sama. Hasil ini menunjukkkan bahwamaterian resin polyester dengan MEKP sebagai katalisator dapat dijadikansebagai material alternative fantom. Selain itu, salah satu kelebihan resin polyester sebagai fantom adalah biaya produksi yang relatif rendah.

**Kata kunci**: fantom CTDI kepala, resin polyester, CT number, CT scan

# Fabrication of Head *Computed Tomography Dose Index (CTDI)* Phantom with Variation of Polyester Resin and *Methyl Ethyl Ketone Peroxide* (MEKP) Composition

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## Abstract

Synthesized of head CTDI phantom with alternative material have been carried out. In this study, developed phantom made with a simple method using polyester resin and methyl ethyl ketone peroxide (MEKP) material has been evaluate. The CTDI phantom head developed was made with a variety of material volume compositions. The variations used are volume ratio between resin and MEKP. In this study, variations in the composition used 150: 1, 200: 1, 250: 1 and 300: 1. The procedure in this study began with making phantoms which include printing and drilling, then the density measurements and CT scan measurements were performed. Fantom is made with cylindrical dimensions of 160 mm in diameter and 150 mm high. In measuring the density of mass carried out weighing phantom mass and measuring the volume of phantom dimensions. For the phantom CT number examination, CT scan is used by helical scanning method. The comparisons of CT numbers measured in the polyester resin CTDI phantom and the standard PMMA phantom in each composition variation showed that CT numbers were relatively same. The CT number and standard deviation of the developed

phantoms were about 3-6% higher than the standard PMMA. Moreover, p-value between the standard PMMA phantom and the 300:1 resin-MEKP phantom was achieved. This finding revealed that the polyester resin could be used as the CTDI phantom. It might be considered as an alternative CTDI phantom for the hospitals do not own the standard PMMA phantom. One advantage of the polyester resin CTDI phantom is its effective cost.

**Keywords**: head CTDI phantom, polyester resin, CT number, CT scan

**Pembimbing Akademik**

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