

## Abstract

**Title:** Object reproduction by 3D printing in the hyperbaric environment.

**Objectives:** The bachelor thesis is designed as pilot study examining „Object reproduction by 3D printing in the hyperbaric environment“. Its aim is mainly to acquire sufficient knowledge as precursor to further research in this field.

**Methods:** Data was organized into tables and charts (based on proprietary test results). Descriptive methods and inferential statistics (T-test) were used to determine hypothesis.

**Results:** T-test did not determine a statistically significant difference in weight ( $p = 0.98026$ ) between objects printed at atmospheric pressure ( $101,7 \text{ kPa} \pm 2 \text{ kPa}$ ) and objects printed at absolute pressure of  $150 \text{ kPa} \pm 3,6 \text{ kPa}$ . The weight difference of compared build sets was well within substantive significance threshold limit  $\leq 5 \%$ ,  $\langle 0,35 \% - 4,37\% \rangle$ . All objects (build sets  $n_1 = 10$ ;  $n_2 = 10$ ) did meet the required criteria in proprietary functionality test, therefore we can assume that fairly affordable 3D printer will be capable of printing in hyperbaric environment ( $\geq 150 \text{ kPa} \pm 3,6 \text{ kPa}$ ) and objects will be able to fulfill their main purpose as well. Even though the results are meaningful, further research is needed.

**Keywords:** 3D printing, 3D digitization, hyperbaric environment, 3D printing in the unusual environment