

## INTRODUCTION

Tearing or deformation of an alginate impression can result in inaccuracy of the gypsum cast that forms the initial base for a prosthetic appliance. Therefore, strength and elasticity of alginate impression materials are important material characteristics determining the performance of these products.

In ISO standard #1563, "Dental Alginate Impression materials", a Compressive Strength test is described for evaluation of the strength of the impression material. It was hypothesized that a Tear Strength test, which is also being used in other standards for hydrocolloid based impression materials, has more clinical significance than a compressive strength test.

## AIM

The aim of this study was to evaluate the merit of a Tear Strength test for characterising alginate-based impression materials, by comparing its results with those obtained by the existing tests for Compressive Strength and Elastic Recovery.

## METHODS

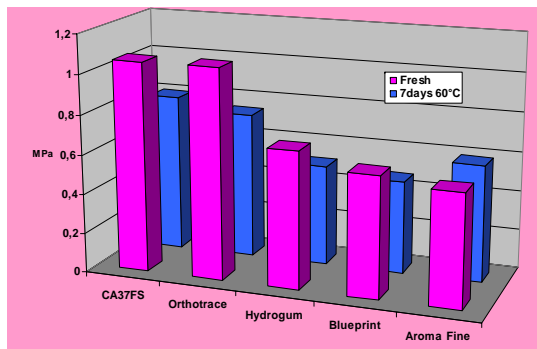
Tear Strength, Compressive Strength and Elastic recovery of five different alginate impression materials were measured (CA37; Cavex, Orthotrace; Cavex, Hydrogum; Zhermack, Aroma Fine; GC, Blueprint; Dentsply). The tests were performed on freshly manufactured products and after accelerated aging during 7 days at 60°C. The Compressive Strength (n=5) and Elastic Recovery (n = 5) were determined using the standard testing methods described in the ISO1563:1990. For the Tear Strength (n = 10) a new test based upon ASTM D624 was performed. The mould (4 x 19 x 102 mm with V-notch in the middle) was filled with mixed alginate impression material and 90 s after setting, the force at failure was measured in a tensiometer (Zwick) at a crosshead speed of 500 mm/min. The results were statistically evaluated using 2-way ANOVA.

Product	Supplier	Lotnr
CA37	Cavex Holland BV	060105
Orthotrace	Cavex Holland BV	051204
Hydrogum	Zhermack S.p.A.	31716
Aroma Fine	GC corporation	050101
Blueprint	Dentsply DeTrey	0509000879

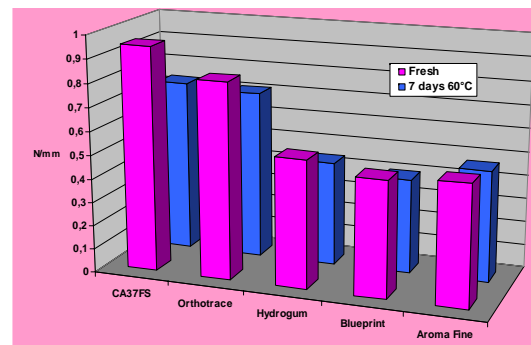


## RESULTS

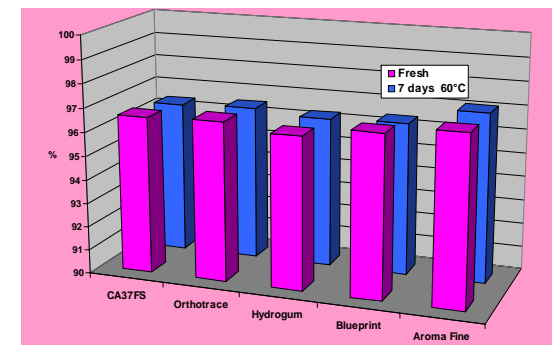
Tear Strength and Compressive Strength for CA37 (0,95 N/mm – 1,06 MPa) and Orthotrace (0,83 N/mm – 1,06 MPa) were significantly higher than for Hydrogum (0,54 N/mm – 0,69 MPa), Aroma Fine(0,51 N/mm – 0,57 MPa) and Blueprint(0,49 N/mm – 0,61 MPa). Significant decreases in Tear Strength and Compressive Strength were found after accelerated aging.



Compressive Strength



Tear Strength



Elastic Recovery

## CONCLUSION

The Tear Strength test is a valuable addition to the existing tests of the ISO1563:1990. Correlation was found between Tear Strength and Compressive Strength, both for the freshly manufactured materials and for the materials after accelerated aging. No correlation was found between Tear Strength and Elastic Recovery. [R.Woortman@cavex.nl](mailto:R.Woortman@cavex.nl)