

The potential of alginate

Thanks to the latest developments and advanced production methods, this tried and tested impression mass is increasingly enjoying a deserved popularity.

The Dutch company Cavex has been developing and manufacturing alginates for more than 60 years. Decades of know-how about quality-focused production, continuous improvement of product composition, exclusive use of outstanding raw materials and striving to deliver perfect processing properties for users; these are the mainstays of the current fast-growing clinical use of these biologically benign impression masses from Cavex.

A look at the history of alginates

Along with hydrocolloids, alginate impression masses belong to the irreversible, rubbery, elastic impression masses that have been used the longest in the dentistry business.

Alginates – as a substance which can be mixed with water – have always been exceptionally popular thanks to their marked hydrophilic properties during the taking of impressions in the moist environment of the oral cavity. Their outstanding stability in the blended state is combined with their seamlessly connected reproduction of detail, both of complex intra-oral soft tissue structures and



Picture 1: Detailed view of an impression taken with Cavex Cream Alginate. The excellent detail reproduction, approaching 5µm, is clearly visible.

morphologically unyielding hard dental structures. This explains why alginates have become – not only among circles of quality-minded dental laboratory technicians – the material of choice for functional impressions that reproduce complex anatomical given situations. Clinical advantages – for patient and practitioner alike – include the ease with which the cured impression is released and removed. From a dental-technical perspective, it was clear from the first use of alginates that these supple, water-based impressions were easy to cast using all types of dental plaster. The disadvantages previously ascribed to alginates, or to impressions made using them – less than perfect capture of structural detail; a tendency to tear when the impression is released from underlying dental structures; hard to recover in the event of disturbed impression layers; inadequate disinfectability; little or no shelf life and limited capacity for repeat casting in plaster – can no longer be said to apply to the modern alginates available these days.

Biologically inert, ecologically harmless

From a chemical perspective, hardened alginate impression masses consist of a steady structure of calcium alginate, incorporating amounts of sodium alginate, potassium alginate, water and fillers. This mixture is approximately two-thirds water by volume. Seen from the perspective of waste disposal, dealing with an alginate impression is therefore not a 'specific waste issue'. As opposed to other imprint masses, the biodegradability of alginates is guaranteed, and is a fast and exceptionally environmental-friendly process.

Physical properties

High-quality alginates, such as the products supplied by Cavex, have a tear resistance of approximately 1.5 N/mm, which clearly exceeds the criteria set by ISO standards and those of the ADA (American Dental Association).

Reproduction of detail varies from 50 µm to 5 µm depending on the product. Just as with any other impression material, care should

be taken to avoid 'bruising' during removal of the impression whenever possible. In that context, when selecting the size of tray to be used it is strongly recommended that a space of at least 5mm is ensured between the surfaces of the teeth to be imprinted and the tray wall.

The use of non-perforated trays of the rim-lock type and the application of an appropriate adhesive to the tray are further measures which will improve the quality of alginate impressions. These measures should not be omitted, especially with the newly-developed alginates, which have a shelf life of nine (!) days as a maximum without loss of dimensional stability.

The consistency of a correctly blended alginate mass – in terms of powder to water ratio – may, dependent upon the product and the application purpose of the impression, range from medium viscous to heavily putty-like. But, from a practical point of view, it is essential to realise that not just



Picture 2: Impression taken with Cavex ColorChange: the Fast-Set alginate features a detail reproduction of 25 µm and can be stored for up to nine days without loss of dimensional stability, provided the processing guidelines of the manufacturer are met.

the amount of water, but also the temperature of the water used will have a major impact on the consistency of the blended alginate impression mass. Even alginate of the highest quality will flow excessively and cure badly if too much water is added (> 20 percent of the specified amount of millilitres) and/or if that water is too cold (clearly below 21° Celsius).

The time required to blend the alginate powder with the water (either by hand or using a mixer) is about 30 seconds, which is similar to the time required for the blending of other impression masses such as silicones and polyether.

With an intra-oral curing time of as little as 60 seconds (2.5 minutes as a maximum), alginates are a particularly agreeable and cost-



Picture 3: All Cavex alginate products can be disinfected simply and without loss of quality with ImpreSafe, a product specially developed for these alginates.

positive impression material for patients and practitioners alike. Other positive properties such as patient-friendly fragrance or taste additives and a change of colour which indicates the product has been correctly blended have also become something of a clinical standard for alginates. On the basis of their chemical capacity and materially reliable surface structure, alginates can also be subjected to unrestricted scanning, and can therefore be incorporated without any problem into the production flow of CAD/CAM-based dental work.

Product range of Cavex alginates

The Cavex alginate impression products discussed here form part of an outstandingly efficient and well thought-out range of products which combine with supplementary agents and resources to constitute a total product system.

- **Cavex CA37**

The 'gold standard' of the Cavex range. A stable alginate, available in a fast or normal set. This versatile product forms the basis of the worldwide success of the largest alginate developer and producer.

- **Cavex Orthotrace**

Because of its **exceptionally fast curing and stable consistency**, this alginate will not flow into the

pharynx and is therefore ideally suited to taking impressions from children who must undergo orthopaedic jaw surgery. Its pleasant fragrance and 'cool' red colour also definitely contribute to the overall appeal of this special alginate.

- **Cavex Impressional**

Thanks to the exceptional combination of **outstanding elasticity**, compression resistance and detail reproduction (25 µm) this material is ideally suitable for taking impressions of metal frames and/or undercuts.

And just as with other Cavex alginates, around 35 imprints can be made from a 500 gram package of Cavex Impressional.

- **Cavex ColorChange**

This material – with a 25 µm detail reproduction and a colour change system (from lilac to white) – cures in the mouth within 60 seconds. Being a 'fast set' alginate, it is particularly elastic and crack resistant. It can also be stored for no fewer than **nine days** without any loss of dimensional stability, making it a reliable alginate for cases when the length of time the impression is in transit may need to be slightly longer, for example, if a foreign laboratory is involved.

- **Cavex Cream Alginate**

This is the latest product to join the Cavex alginate family. It mixes to a smooth and creamy mass which ensures a **detail reproduction of 5 µm**; approaching the performance of silicone-based products thanks to its imprint-technical and physical properties.

This alginate can be scanned, and even if used as a 'normal setting' product it cures in the mouth in only 90 seconds, thereby meeting all the essential requirements of current dental practice.

Accessories for the Cavex range of alginates include not only a practical mixing device (Cavex Alginate Mixer II) but also all the tools required for mixing by hand, as well as an easy-to-operate water measuring bottle and a disinfection bath developed



Picture 5: Clinical situation of a preparation which is not yet one of the traditional domains of alginate impressions, but which the newest generation of alginates bring within reach.

especially for alginate impressions.

A versatile range of applications

Alginate impression materials can be deployed for virtually all types of single stage, one-sided impression procedures.

- The traditional domain of taking situation impressions of jaws with total or partial dentition has been extended with a number of new possibilities of application, and it is not only the above-mentioned scannability of alginate situation and preparation impressions – supporting CAD/CAM technology – which has contributed to this.

- High-quality alginates have earned an excellent reputation, especially as an impression mass within the total prosthesis discipline. This is due, in particular, to their outstandingly efficient hydrophilic properties, combined with their consistency: smooth and creamy to putty-like with a high viscosity, depending upon the product and water content of the blended alginate impression mass. Alginate impression masses are hard to beat when it comes to dealing with extremely complex and highly individual – both functionally and anatomically – situations. This is because the material is stable, yet moulds itself into the finest detail along the natural movements of the oral mucosa and the muscular structure of the oral cavity.





Picture 4: Cavex ImpreSafe, specifically developed for disinfection purposes, is suited to all impression materials and its use is permitted without restriction.

It is therefore not surprising that (according to research conducted by the author) about 15% of the relevant impressions taken in a northwest-German dental laboratory working for approximately 250 dental practices are analogue, i.e. traditionally/conventionally produced alginate impressions.

- Alginate impressions are also ideally suited to dental prosthetic applications involving treatment of the gingiva.

In this context, we refer to the proven method of direct provisional treatment of prepared teeth with regard to crowns, partial crowns

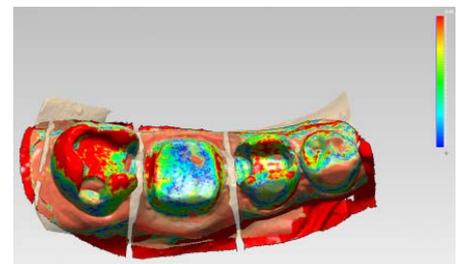


Picture 6: The cut gypsum model which resulted from the alginate impression of the clinical situation shown in picture 5: complex pieces of dental work such as crowns and inlays can be produced on the basis of such a model

and inlays. This technique, which can be applied directly during the treatment, can be refined even further by the injection of alginate impressions with, for example, a silicone mass, thereby providing an instantly available working model for the production of inlays or partial crowns. Admittedly, this method is currently used only incidentally in Germany, but in many other countries it forms part of the standard programme of preservative dental care through extra-orally manufactured restorations.

The future of alginates

The high-quality alginate impression materials that are available nowadays demonstrate material properties for which they have become serious competitors for silicone and polyether impression masses, both for clinical use in dental practices and within the workflow of dental laboratories, and what is more, the biological and environmental friendliness of alginates is unequalled. Last but not least: the price/quality ratio per



Picture 7: Precision of the alginate impressions: the clinical-digital comparison of alginate impressions with A-silicone impressions clearly shows that alginates are no longer an inferior choice when it comes to impression material.

impression cannot be matched by any other current impression product.

All in all, there is an abundance of reasons to guarantee a continued increase of the popularity of this ingredient, which has been gaining ground for so long.

You Tube Cavex on YouTube

Videos in various languages (authorised by Cavex) about the use of Cavex hand- or machine blended alginates and the associated special impression procedures can be found at:

- www.youtube.com/user/Cavex1908 under Uploads.

Please also check for informative videos about individual procedures, resources and devices for standardised high-quality disinfection using Cavex products.

Pictures 5/7: Dr.med.dent R. Schiefelbein with cooperation of Scharnau Zahntechnik GmbH

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