Enigma Colour Tones
Part of the Enigma Denture System

A professional guide to custom shade matching of gingival tissue
Enigma & Natura Teeth and Denture Systems
so good they received a Queen’s Award

In 2004 Schottlander were honoured to receive the Queen’s Award for the Enigma and Natura teeth and denture systems.

Schottlander’s Innovation Recognised

The official citation from the Queen’s Awards Office read:

“The award to Davis Schottlander & Davis Ltd recognises this company’s success in continuously improving a range of teeth and dentures. The Company has created Enigma and Natura, two ranges of teeth and dentures that not only look more natural but also function better. This has been achieved by using advanced acrylic materials, a wider range of colours and better mechanical design, to give an improved “bite”. Options available now take account of the different characteristics of ethnic groups. Continuous innovation in design and professional marketing have enabled this award winner to achieve a substantial share of the market and considerable commercial success whilst providing customers with better looking and performing dentures”.
## Contents

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### Custom Shade Matching of Gingival Tissue, Part 1

In this first part, Ruth Bourke uses a case study to demonstrate Custom Shade Matching of natural gingiva using the application of Enigma Colour Tones on complete and partial dentures.

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### Custom Shade Matching of Gingival Tissue, Part 2

In this second part, Ruth Bourke describes matching and making custom shade guides for gingival tissue and suggested formulas for a generic set of guides as well as demonstrating techniques for the application of Enigma Colour Tones.

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## The Enigma System

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It is impossible to underestimate the importance of dentures to the wearer yet they remain one of the most challenging aspects of modern dentistry.

It was in response to this need and challenge that Schottlander developed the Enigma Denture System, to put into the hands of the dental professional the materials and systems needed by them.

The Enigma Denture System has been so successful that it’s innovative programme has been officially recognised by the receipt of a Queen’s Award – a unique occurrence in dentistry.

The Enigma Denture System comprises of Enigma Denture Teeth, Enigma High-Base impact resistant acrylic, Enigma Colour Tones (the subject of these articles), measuring instruments, World of Difference Training Seminars and Programmes and a growing range of support products, presenting you with a range of aesthetic possibilities which is almost endless.

To find out more about the innovative Enigma Denture System - see pages 18-21 or contact Schottlander on 0800 97 000 79
**Introduction**

The success of complete dentures can be interpreted by the patient from two distinct viewpoints: function and appearance. Most often the dentist’s primary concern is with the function in the oral environment (e.g. stability, fit, retention and mastication), and aesthetic considerations such as the size, shade, and shape of the teeth, tooth position, denture base contours and colour become secondary. The patient, however, may view their relative importance quite differently, and in recent years a more ‘patient-centred’ treatment regime has evolved.

Today, Dr. John Besford, a specialist in dental aesthetics is perhaps the most well-known advocate of patient-centred treatment in England and Europe and believes that denture aesthetics play a larger role in the patient’s perceived needs. Dr. Besford’s philosophy of treatment can be summarised in the concept of ‘prosthodontic privacy’, which he defines as follows: “A denture wearer should have the option of keeping secret from other people the fact of having to wear a denture.”

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**The Reproduction of Living Tissues in Dentures**

**The Emergence of Colour Pigments for Dentures**

In the 1950’s the American Dr. Earl Pound innovated many techniques for creating natural looking dentures. Adopting Frank Lloyd Wright’s working philosophy that “form and function are one”, Pound advanced the concept that function in the oral environment should not exist without aesthetic form, as is often seen in dentures. *Personalised Denture Procedures*, the manual Pound wrote to document his techniques, is still used as a reference today.

Dr. Pound cited three distinct characteristics of his ‘new look dentures’:

1. The natural setting of teeth,
2. The development of an entirely new concept of denture form, and
3. The reproduction of the natural colour of living tissues. (ref; 1)

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**Notes on Gingival Pigmentation**

The gingivae are the most frequently pigmented of the intra-oral tissues, as well as the most readily seen. Dummett (1968) questioned the frequently used description of normal gingiva as ‘coral pink’ and suggested a more accurate statement of the patterns of normal gingival pigmentation in the following definition:

“The colour of healthy gingivae varies from a pale pink to a bluish purple. Between these limits of normalcy are a large number of colours which depend primarily upon the intensity of melanogenesis, the degree of epithelial cornification, the depth of epithelisation and the arrangement of gingival vascularity. Moreover, colour variations may be uniform, unilateral, bilateral, mottled, macular, or blotched, and may involve the gingival papillae alone or extend throughout the gingivae and into other oral tissues. Non-pigmented gingivae are found more often in fair-skinned individuals, while pigmented gingivae are usually seen in dark-skinned persons” (1,2 & 3)

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With the renewed interest in providing custom stained gingiva, this article discusses Dr. Pound’s third phase, assuming that phases 1 and 2 have been completed and that a denture with the correct tooth positions has been anatomically waxed.

Surface Layer Stains

Dr. Pound introduced Replident stains along with a staining technique that applied the pigmentation onto the surface layer of the denture base and was processed as an integral part of the denture. This became one of the most widely used of all the documented systems and later became known universally as Dr. Earl Pound’s Kayon Staining Kit (consisting of 5 colours and named after Kay See Dental, the company that produced them commercially). Kayon stains are quality products still available today.

Employment of Rare-Earth Pigments for a Greater Range of Shades

Various other techniques were developed that frequently incorporated or modified Pound’s original technique: Winker et al., Gerhard, Choudhary et al., Johnson, and Kemnitzer. Though the system Pound described was the most universally accepted, its colour range was inadequate for rendering darker pigmentation. The result was that doctors and technicians supplemented the Kayon system using complicated recipes of rare-earth pigments, as described more recently by Zimmerman et al. (1982). Because the techniques for producing such pigmentation are somewhat complex, only a small number of patients have received dentures that match their unique gingival pigmentation.

Enigma Colour Tones

The author’s own experience confirms this deficiency in the Kayon staining system. In 1995 the author, in working partnership with Dr. John Besford, consulted with Davis Schottlander & Davis Ltd to develop a new product for internal staining that includes darker pigmentation colours. This collaboration resulted in the creation of the Enigma Colour Tone System (fig 4). The Enigma System consists of eight colours designed to yield consistent results across the spectrum of gingival pigmentation without the need for rare-earth pigment recipes. These colours are:

- IP  Ivory Pink
- LP  Light Pink
- MP  Medium Pink
- NP  Natural Pink
- DP  Dark Pink
- BP  Blue Pink
- LB  Light Brown
- DB  Dark Brown

Part I of this article presents a clinical case study which illustrates the use of the darker pigments in heavily pigmented gingival tissue. Part II of this article, will explain the laboratory techniques and materials used to produce custom shade tabs to match the colour of the patient’s natural gingival tissue.

Clinical Case Study

A Challenging Patient

The patient presented with a poorly-matched existing temporary removable partial denture (TRPD) (fig 5) that replaced teeth # 9, #10 and #11 lost due to trauma. The new cast partial framework had already been fabricated and the clinician treating this patient (Dr. Val Lim D.D.S., MSc) consulted with the author to achieve a custom match of the gingiva.
The intra-oral records of the labial (fig 6) and palatal oral tissues (fig 7) and gingiva were recorded. Chairside notes were taken by the technician mapping out suggested positions and effects of the Enigma Colour Tones using all eight colours (note: If it is not possible to see the patient slides, photographs or digital pictures can be used to make the map). This map was then used as a guide to fabricate a custom shade tab which correlated to the colour-matched areas. For example, layering Ivory Pink over Dark Brown imitates the opaque grey colour in the tissue (fig 8), and the granularity of the Dark Brown reproduces the mottled colours of the palatal tissue (fig 9). A more detailed explanation of this technique will be provided in Part 2 of this article.
Natural Teeth and Gums

A wax setup was made in accordance with phases one and two of Pounds’ Parameters regarding natural tooth position and colour (fig 10). Enigma denture teeth were chosen for their lifelike appearance in the mouth and their improved hardness and abrasion resistance. These characteristics made it possible to grind and re-polish the teeth into a shape that perfectly matched the patient’s own teeth. Natural root eminences, boney contours, and convex interdental papillae were achieved in the wax by copying the anatomy on the right maxillary arch.

Processing and Application of Internal Pigments

The RPD was carefully invested after approval by both patient and dental team during the try-in stage. The first stage flasking was completed to expose the full coverage of the wax flange to create a seamless transition of the pigmented flange in the mouth (fig 11).
Enigma Colour Tones were then placed into the mould based on the shade tab and the mapping information, (this technique will be detailed in Part 2 of the article). The internal pigmentation technique was used and the denture processed according to the manufacturer’s instructions. It was then deflasked and placed in an ultrasonic cleaner with plaster stone remover.

The Completed Partial Denture

Very little polishing was required in the finished denture; once the flash was removed, only the peripheral borders were lightly pumiced and polished. The light reflected off the finished denture highlights the sponge stippling used to create the matt surface (fig 12). The pigmentation is seen to extend to the flange and onto the interdental papillae. The flange profile exposes the thinness of the flange as it transitions onto the tissue; this apparent knife edge does not irritate the mucosa and can be tolerated by the patient because the design is tooth-borne. The integrity and depth of colour with the Enigma Colour Tones can be maintained down to a thickness of 1-2 mm while still obscuring the metal and not affecting the strength of the acrylic flange (fig 13).
Conclusions

The completed partial denture conforms to Pound's three phases of aesthetic denture fabrication:
(I) The natural setting of the denture teeth on the patient's left profile closely mimic the natural teeth on the right in shape, colour, contour, and position (figs 14 & 15). The effect of surface texturing the individual Enigma teeth can clearly be seen on tooth #9. Also the blue-white opalescence and fluorescence of the incisal tip of Enigma tooth #10 matches the blue translucency of tooth #7 (fig 16). In contrast, the previous denture’s teeth can be seen to lack vitality (fig 17).
(II) The development of a new denture form that is anatomically correct (fig 18). Using the information derived from the right side of the patient’s anatomy. The gingival levels, domed root eminences, and convex (not concave) interdental papillae follow the natural form.
(III) The reproduction of the natural colours of living tissues was achieved using the Enigma Colour Tones and a custom shade tab without the need for complex pigmentation formulas (fig 19).
Introduction

Part 1 of this article introduced the concept of Prosthodontic Privacy and underscored the importance of patient-centred treatment emphasising the role of denture aesthetics. The article also discussed the three distinct characteristics of personalised or ‘biographical’ dentures outlined by Dr. Earl Pound, namely:

(I) The natural setting of teeth;
(II) The development of an entirely new concept of denture form; and
(III) The reproduction of the natural colour of living tissues.

To illustrate the third characteristic of Pound’s personalised dentures, the author presented a clinical case study of a denture that used dark pigments to colour match heavily pigmented gingival tissue. Part 2 of this article explains the laboratory techniques and materials used to produce dentures that match the colour of the patient’s natural gingival tissue.

Colour Mapping of Intra-Oral Tissues

Visual Aids

To master the art of seeing and translating gingival pigmentation to the denture base, it is useful to study cases where the patient’s gingiva is healthy. To aid in this, keep a file that has example pictures taken from journal articles and books. Take pictures of your patient’s mouths and even your own. Having pictures of the gums of edentulous patients is not particularly helpful, if not also a rare occurrence! Partial dentures are easier to fabricate because you can match to the patient’s existing natural tissue.

Correlation between Gingival and External Pigmentation

As discussed in Part 1, Dummett not only expanded the definition of gingival pigmentation, but also reported definite correlations that exist between colour tone within the oral cavity and the individual’s external pigmentation. For example, fair and light-skinned individuals typically have pale-coloured oral mucosa. In Asians, light brown pigmentation with some blue/red and violet tones tend to predominate, while in Africans and Indians, the oral mucosa varies from light to dark brown/purple and even black. This general rule can be helpful in determining colour tones for the edentulous patient.

Custom Shade Tabs

Based on these general correlations, the author has made a series of ‘standard’ shade tabs to be used in treating edentulous patients (a matching set of shade tabs must also be made for the dentist’s office.) [Fig. 1]

First, the dentist chooses a shade tab that correlates to the patient’s skin tone and checks the match intra-orally [Fig. 2]. Then, after a suitable match has been made, the dentist specifies which shade tab is to be used in fabricating the denture. A custom shade tab may be required when a partial denture needs to be matched to the existing dentate arch. Custom shade tabs can be created by seeing the patient personally, or by working from slides, photographs, or digital images of the patient’s face and gums. After the custom shade tab is made, it should be matched to the patient’s mouth so that the technician can make any necessary final adjustments and confidently achieve a shade match on the resulting prosthesis.

Procedure

Getting Started

The Enigma Colour Tone kit has detailed instructions and an example chart that demonstrates a simple 3 or 4 colour technique for a Caucasian pale pink case. The best place to start is to make your own set of shade tabs, documenting your techniques and procedures carefully so that you can achieve consistent matches between the tabs and final dentures. The author used 6 average anterior teeth from the Enigma tooth line and poured a silicone mould to facilitate multiple duplications of the wax model. Flasking, colour placement, and finishing techniques will now be described.

1. Standard shade tabs for edentulous patients

2. Intraoral tissue matching
Investing the Denture

When care is taken to meticulously prepare the denture for investing, very little work is required to finish the denture after it is deflasked. After finishing and checking the wax work before sealing it down, be very careful to trim the land area of the model, particularly in the anterior section [Fig. 3]. Trimming the model to a minimal point exposes the maximum area of the labial flanges, thus placing the flash or finishing line of the Enigma Colour Tones in the optimum place [Fig. 4].

The denture is flaked using a three-stage technique. Flask the first section in the usual manner. Then top the second section with white diestone and vibrate around the wax denture to expose the incisal edges of the teeth [Fig. 5]. When this is set, apply a separating medium before placing the last section. This makes deflasking easy, and shows exactly where the incisal positions of the teeth are that have been locked in with the diestone. Always use vacuum-mixed white diestone
when flasking the denture. This both adds strength to the mould and accurately reproduces all of the carving detail. Also, it is easier to see the applied Colour Tones against the white diestone than against yellow stone.

Boil the wax out in the conventional manner, taking care not to leave the flasks in the boil-out tank too long. Allow the moulds to cool, but do not apply separator at this stage.

**In-Flask Correction**
Because the Colour Tones are cured in place, extensive adjustments or grinding cannot be done after the denture is deflasked. Therefore the integrity of the mould is very important. Check for any voids, bubbles or flash between the teeth [Fig. 6]. Mix a small amount of white plaster and fill any of the voids. It is not necessary to use white diestone; the plaster will set quickly, whereas the diestone will take considerably longer to set. Once the plaster has set you can paint the
mould with separating solution [Fig. 7]. Use a medium paintbrush to paint around each individual tooth, taking care not to apply excess separator [Fig. 8]. The completely cooled mould is now ready for the application of Colour Tones.

**Colour Tone Placement**

To achieve the greatest effect, study the mould and apply the Colour Tones as indicated by the anatomy. For example, root eminences being concave depressions in the negative mould require light colours, whilst convex protrusions imply darker red colours. In the oral cavity the labial and buccal alveolar areas contain two basic colour zones:

(I) In caucasians the attached and marginal gingival tissues surrounding the teeth and extending over the alveolar root prominences generally require a light pink colour with stippled orange-peel texturing. In ethnic cases this area can also have patches of pigment.

(II) The alveolar mucosa consists of smooth and shiny non-keratinised tissue with a translucent screen revealing the deeper investing tissue. This tissue is a darker red/blue in most caucasians, with some blue or brown also intermixed throughout the mucosa in more heavily pigmented individuals.

A ‘gingival halo’ of colour that mimics the free and attached gingival junction can commonly be seen around the gingival roll. Your ‘portfolio’ of pictures will help you decide whether to colour this halo using a light pink (to blend with the overall attached gingiva) or a darker colour.

**Enigma Colour Tones**

Enigma Colour Tones are available in eight colours. Below is a description of each colour and their suggested uses:

Ivory (IP) is the lightest colour and is used mostly to mix custom colours or where an opaque layer is needed.

Light Pink (LP) is used for root eminences and the thin layer over the gingival roll when a darker gingival halo is not required.

Medium Pink (MP) is used in the places where bony buccal prominences transition from the roots on pale healthy gums, and also around the gingival margins when a darker gingival halo is needed in place of the light pink.

Natural Pink (NP) is a principal colour and blends well with other colours. It is also used as a base canvas to match base mucosal colours in all but the dark pigmented cases.

Dark Pink (DP) is used for enhancing other colours, and can be used specifically for vascularity in areas of attached gingivae, and inflammation in papillae.

Blue Pink (BP) is used to accent vascularity or inflammation on patients with darker red tones. It is also recommended in gingivae layered under Dark Pink in buccal and labial areas. However it is not routinely recommended for papillae.

Light Brown (LB) is used when natural gums have brownish patches and is often recommended in conjunction with Dark Pink. It can also be used on papillae.

Dark Brown (DB) is for used heavier pigmentation. In areas of greater vascularity, apply Dark Brown to the surface of the flask, and then layer over with Dark Pink so that on the denture the Dark Brown colour has added depth with the Dark Pink showing through. Alternatively Blue Pink can be layered in place of the Dark Pink to create a different effect [Fig. 9].

The colour of the acrylic base can also affect the overall colour of the resulting denture. Enigma High-Base acrylic is available in 3 shades: Translucent, Translucent Veined and Pink Veined. The Pink Veined acrylic enhances light pink shades, while the Translucent Veined enhances blue shades.
Sequence of Applications

Apply the Colour Tones to a completely cool flask by sprinkling the various acrylic polymer beads into areas surrounding the teeth. If the flask is warm, the surface monomer evaporates when it contacts the stone. In turn the Colour Tones are set in place prematurely and become difficult to manipulate. The Enigma Colour Tones flow freely from, rather than ‘slumping’ against the side of the bottle, as regular PMMA does. Therefore you should ‘tap’ a fine layer out of the nozzle rather than squeeze the bottle [Fig. 10]. The depth of the application should vary from in depth from 1-2mm depending on the desired colour effect. Sprinkle and blend the Colour Tones in groups of three to four teeth, typically keeping the posterior and anterior segments separate.

Apply drops of monomer whenever enough loose polymer powder has accumulated to warrant holding it in place. Apply the monomer so that it seeps into the
polymer from the peripheral edge of the mould towards
the teeth. Excessive flooding with monomer can
displace and muddle the Colour Tones. To prevent this,
add the monomer drop-by-drop using the end of a
paintbrush [Fig. 11]. This usually gives good control.

Demonstration Cases
(explanation of the cases demonstrated in Part 1)

Light Pigmentation Case P
(4 colour layers, base acrylic of Enigma High-Base Pink
Veined)[Fig. 12]
• A wax denture is made to copy the dentate
anatomy and teeth.
• A colour map is constructed using a custom shade
tab [Fig. 13] and is adjusted for the final match
[Fig. 14].

- NP is applied as a gingival halo around the necks
  of the teeth and the fraenum attachment.
- LP is then placed in the depressions of the root
  eminences [Figs. 15, 16].
- LB is sprinkled on the mucosal borders of the
denture as well as the interstitial and bony
transition areas, as indicated on the colour map
and shade tab [Figs. 17, 18]
DP is then sprinkled over the LB (more heavily at the mucosal borders), giving depth to the Light Brown Colour Tone polymer [Figs. 19, 20].

Finally, MP is used as a backing canvas and is placed over all the colours [Figs. 21, 22].

Caucasian Case E
(3 colour layers, base acrylic of Enigma High-Base Pink Veined) [Fig. 23]
• MP is placed around the necks of the teeth to create a light gingival halo.
• LP is sprinkled around the teeth in the depressions of the root eminences.

• DP is placed to replicate mucosal vascularity and the centre fraenum [Fig. 24].
• MP is then used in the final base application [Figs. 25 & 26].

Medium Pigmentation Case K
(5 colour layers, base acrylic of Enigma High-Base Translucent Veined) [Fig. 27]
• BP is placed as gingival halo [Fig. 28]. Note that the shade tab actually uses DP; this was adjusted to BP in the final denture.
• LB transitions are placed over the root eminences.

• DB is sprinkled across the bony ridge as it transitions into the LB.
• BP is placed along the mucosal borders.
• DP is layered on top of BP and placed interstitially into some of the gingival crevices according to the colour map and shade tab.
• Finally, NP is layered over all of the colours as the base canvas [Fig. 29].
23. Caucasian Pigment (Case E)

25. Final thickness 1-2mm

27. Medium Pigmentation (Case K)

28. Gingival halo modified on finished denture

24. Three colour layers

26. Shade tab and final denture

29. Multi-coloured dark pigmentation
After applying the Colour Tones, cover the flask with a separating sheet and set it aside. Only then mix the denture base resin according to the manufacturer’s instructions [Fig. 30]. Pack the acrylic in the early ‘snap dough’ stage to reduce the risk of displacing the Colour Tones during packing and trial closure. Place one or two small rolls of acrylic to just fill the mould not a large ball that will compress under pressure and possibly move the Colour Tones. If the Colour Tones do move in the flask, it is still possible to pull the whole denture base out of the mould and re-apply the Colour Tones when it is in the later snap stage [Fig. 31]. It is also possible to use the Enigma Colour Tones with injection packing systems, provided that you allow adequate time for the Colour Tones to set before placing them in a quick cure cycle. Usually a minimum of 30 minutes is adequate to delay curing this also allows the Colour Tones to set in the flask before injecting the acrylic.
Finishing the Denture

Deflask the denture when it has completely cooled down after breaking off the top section of the mould, the anterior teeth can be clearly seen and the surrounding diestone breaks cleanly away [Fig. 32]. Although the diestone sometimes appears to be stuck between the teeth as it is held interstitially in the proximal undercuts formed on the wax carving, gently teasing the stone with a sharp instrument flicks it away. At this point place the dentures (still on the master cast) back on the articulator and complete any remaining occlusal refinement.

Lastly, break out the model to completely deflask the denture. Place the denture in an ultrasonic cleaner with stone and plaster remover for 10 to 20 minutes. Then rinse the denture in tap water and remove any stone from proximal undercuts with a scalpel. Floss between all anterior contacts, check the gingival margins for imperfections, and (if necessary) place the denture back into the ultrasonic cleaner for a final cleaning.

Final Trimming

Trim, pumice, and polish the peripheral borders of the denture in the normal manner. The labial contours of the denture may be lightly buffed and polished if desired, but can also be left untouched for a more natural appearance. The time spent in detailed waxing along with the care in flaking is rewarded in minimal finishing time and a natural beautiful denture.

Conclusions

Even with all of the advances in materials and automation systems, nothing available in dental technology today can substitute for the skilled hand and eye of the technician when it comes to achieving excellent results in creating aesthetically pleasing and natural looking dentures. Ultimately, the technician is also an artist, and the results are subject to the artistic interpretation of the technician and are thus not wholly quantifiable. Between the steps of choosing the Colour Tones and deflasking the finished denture, there remains a ‘human’ element that may yield results that are slightly different from what was originally envisaged. Practice and experience can certainly diminish, but never completely eliminate this ‘unknown’ factor in denture fabrication.

I developed my skills while working for Dr. John Besford, who at the time had more experience in this area than I did, and whose critical eye and invaluable feedback helped me to hone my techniques. Later on I introduced the concept of “denture shade tabs” and sample dentures to enable both patients and dentists to see the value of aesthetically correct dentures. I eventually developed the colours for the Enigma Colour Tone System, which offers a full range of colour combinations and provides a great palate for colour matching without the need to resort to complex formulas. I must confess though, that like all technicians I still do my ‘own thing’ and create personal formulas on occasion.

In conclusion, once you get started, keep on going and follow the suggestions previously made. Keep notes, do use an adequate amount of separating solution but do not use too much monomer. The Colour Tones achieve their greatest effect only when the whole denture is made ‘real’, as Dr. Pound points out. Finally, never lose sight of the fact that what you are fabricating is not just a denture, but a prosthesis that has the ability to greatly impact the person’s whole life. The care which you and your dental team take will be noticed and appreciated by the patient, and hopefully (in fulfilling the principle of Prosthodontic Privacy) by no one else!
Materials and Equipment

Application of Enigma Colour Tones requires the following equipment and materials:

1. White diestone for investing.
2. Vacuum pot and mixer.
3. Plaster for flask editing.
4. Two or three small mixing pots or dapens glass.
5. Sodium alginate separating solution (cold mould seal)
6. Medium brush for applying separating solution
7. Small brush for applying acrylic monomer.
8. Enigma Colour Tone kit.
9. Special monomer (included with Enigma kit).
10. Polyethylene separating sheets.
11. Colour map or diagram, and/or custom shade tab.
12. Denture base polymer and monomer of appropriate colour.
13. Mixing pot with lid.

Enigma High-Base

Enigma High-Base is a true high impact acrylic with excellent flexural and impact strength together with a superior bond strength to acrylic teeth compared to competitor products.

With excellent flow and packing characteristics Enigma High-Base remains at a workable consistency throughout its optimum working time, even at varying temperatures, allowing multiple packings to take place.

Enigma High-Base trims up and polishes to a high gloss finish. Available in three aesthetic shades, Translucent, Translucent Veined and Pink Veined. Conforms to EN ISO 1567 Type1 Class1.

Schottlander Isolating Solution

Schottlander Isolating Solution is applied either to a hot or cold mould in the normal way and is absorbed into the surface. Unlike traditional cold mould seals there is no film formed. Such films are easy to displace on closure of the flask.

Schottlander Isolating Solution reduces significantly the time required to finish a denture and can protect any surface contouring and stippling that may have been built into the wax-up.

Available in 1 or 5 litre bottles.
Enigma Colour Tones

Beautiful teeth are only shown off to their best advantage when framed by an equally beautiful acrylic base which replicates the appearance of the natural gingival tissue. The natural gingival tissue is, however, not uniform in colour. For instance, the thicker epithelium on bound gingivae or the bone showing through thin mucosa is ivory pink in colour. Areas of greater vascularity, where the epithelium is thinner as well as papilae are a darker pink. The gingival tissue of many ethnic groups have a bluish or brownish tinge. To reproduce these and other colourations Enigma Colour Tone has been produced as a range of eight colours for application as layers of acrylic in the denture flask.

Enigma Colour Tone Kit

Contains
- 8 x 15g powders in the shades:
  Ivory
  Light Pink
  Natural Pink
  Medium Pink
  Dark Pink
  Blue Pink
  Light Brown
  Dark Brown
- Video - A World of Difference
- 1 x 100ml liquid
**Enigma Colour Tone - Examples of Use**

(Drawings are schematic and do not represent actual layer thickness. Read full directions before use)

1. **(LP) Light Pink**
2. **(DP) Dark Pink**
3. **(NP) Natural Pink**

**Three Colour on Enigma High-Base Pink Veined**

1. **(L) Ivory then (LP) Light Pink**
2. **(DP) Dark Pink**
3. **(NP) Natural Pink**

**Four Colour on Enigma High-Base Pink Veined**

1. **(LP) Light Pink**
2. **(DP) Dark Pink then (LB) Light Brown**
3. **(NP) Natural Pink**

**Brownish Pigmentation on Enigma High-Base Pink Veined**

**Three Colour on Enigma High-Base Translucent Veined**

**Four Colour on Enigma High-Base Translucent Veined**

**Dark Brownish Pigmentation on Enigma High-Base Pink Veined**

- **Ivory**
- **Light Pink**
- **Natural Pink**
- **Dark Pink**
- **Light Brown**
After more than five years research and development Schottlander created Enigma - a new range of teeth that means in future denture-wearing can be a secret shared only between dentist and patient. Enigma teeth not only accurately reproduce the wide range of shades, translucencies and vitality of natural teeth but also assure exceptional strength and durability in the mouth.

Their many advantages include:

- Natural colour blending through advanced tooling and precise computer control of multiple colour layers.
- Naturally occurring blue/white opalescence and fluorescence.
- Canines darker mesially and more translucent laterally.
- Anteriors also available in pairs of centrals, laterals and canines.
- A wide range of Anterior moulds.
- CE marked and manufactured under ISO 9000 quality standard, and in accordance with EN ISO 3336 standard for artificial teeth and ANSI/ADA specification number 15.
- Vitality across the 17 standard shades, A1 - D4 in every mould as well as the latest Hollywood shade HBO, which answers patients requests for younger looking restorations or to match existing adjacent bleached teeth. The same vitality can be found across the whole of the enigma shade range even the very light shades A1 and B1.
- Superior physical properties.

With enigma only you and your patients need know they’re wearing dentures.
About the Author

Ruth E. Bourke B.Sc

Ruth has over 25 years of experience and knowledge as a dental technician. Her career began in England where she has held positions at Guy’s Hospital, Eastman Post-graduate Institute, the Royal London Hospital and Manchester Metropolitan University.

Ruth moved to the United States in 1996 to accept the post of prosthetic and oral maxillofacial technician at the University of Washington Dental School. From 2002 until 2004, Ruth managed the removable department at Protea Dental Studio, and now owns and operates her own dental laboratory in Redmond, Washington that specialises in removable denture aesthetics and implants. Ruth's interest in removable prosthodontics began under the guidance of Dr. John Besford of London with whom she continues to lecture and teach "hands-on" seminars in England and Europe. In conjunction with Dr. Besford, Ruth provided consultation for Davis Schottlander and Davis UK, in the development of the Colour Tones for the Enigma Denture System.

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Ruth Bourke regularly presents courses at the Schottlander Training Centre with Dr John Besford on the techniques demonstrated in this brochure. Please contact her directly for information on upcoming Enigma System lectures and hands-on training seminars in North America.

References

Besford, J., Chapter 9, "Authentic Gums," in unpublished manuscript.
Besford, J. and Bourke, R., Enigma Course Manual, 2001

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