



# SURFACE TREATMENT ENGINEERING FOR INDUSTRY

Machining and finishing of aluminium



SURFACE TECHNOLOGY

# FOR INDUSTRY

## SURFACE CONVERSION PROCEDURES



*BWB carries out a very wide range of surface finishing procedures for industrial components in order to satisfy a variety of requirements regarding function, aesthetics and corrosion protection – in the automotive industry, for aerospace, medical technology and the consumer goods sector.*



### **Aluminium anodising**

Anodising is an electrochemical process: the surface of the aluminium structural component is converted into aluminium oxide. This oxide layer is solidly attached to the substrate, and an accurate topographical copy of the original structure is created.

The multitude of anodising procedures offered by BWB make it possible to produce surfaces with very different properties and layer thicknesses.

- Anodising / electrolytic oxidation (GS)
- Hard anodising / hard electrolytic oxidation (GSX) with and without PTFE coating
- Chromic acid anodising (CAA)
- Tartaric sulphuric anodising (TSA)
- Ematal anodising / Hard ematal anodising
- Bilateral anodising
- Colouration (Sanodal)

### **Aluminium chromating**

Chemical conversion coatings (hexavalent chromium or RoHS-compliant) are suitable for use as bonding agents for additional coatings and adherent surfaces, or as minimum protection against corrosion in dry conditions. Depending on the process, the coatings are yellowish or transparent.

- Chromating (hexavalent chromium)
- Chromating (trivalent chromium or chromium-free / RoHS-compliant)



# PRE-TREATMENTS AND POST-TREATMENTS

FOR ANODISING - ALL FROM A SINGLE SOURCE

*A clean surface on the work piece is a precondition for an even and stable surface finish. BWB offers competent advice, for optimal fulfilment of the customer's wishes and ideas.*



#### **Mechanical pre-treatments**

In order to achieve special effects and for the correction of irregularities in a surface, we recommend mechanical pre-treatment. The surface finish ranges from matt to fully polished, depending on the selected procedure:

- Grinding /grinding-brushing
- Brushing /scotching
- Polishing
- Glass bead blasting
- Vibratory grinding /rotofinishing

#### **Chemical pre-treatments**

Contamination or residues of processing oils must be removed in a chemical pre-treatment. In addition, a chemical pre-treatment enables an even matt or polished surface finish. To this end, the BWB Group offers the following pre-treatment procedures:

- Degreasing
- Etching /matt etching
- Chemical polishing
- Electrolytic polishing

#### **Sealing**

With electrochemically produced oxide layers, the pores of the oxide layer are closed in a subsequent operation. The well-sealed oxide layer is enormously important for a top-quality surface on the work piece (Haptics/corrosion resistance)

- Sealing (hot water sealing)
- Sodium dichromate/nickel acetate sealing

#### **Selective anodising**

If a certain surface of the component is not to be treated, it will be masked before the finishing process according to the preference of the client. In some cases selective anodising may also be necessary to ensure a flawless finish. Selective anodising is achieved with appropriate techniques such as lacquer or mechanical masks.



# THE ADVANTAGES OF ANODISING



*The BWB anodising procedures (electrolytic oxidation) combine the advantages of the electrochemically produced aluminium oxide layer with the technical properties of aluminium applications in industry.*



#### **Corrosion resistance**

Anodising produces a resilient and corrosion-resistant protective layer. This enables value to be retained over decades.

#### **Coating characteristics**

Coating characteristics are developed for a very wide range of application areas by means of special procedures or procedural parameters.

- Hardness
- Electrical insulation
- Thermal insulation
- Dimensional accuracy
- Sliding characteristic
- Wear resistance
- Corrosion resistance
- Gloss level
- Mattness
- Chemical resistance
- Abrasion resistance

#### **Investment in the future**

The mechanical strength of anodised aluminium is very high. Even during slightly abrasive cleaning of the anodised aluminium component, the surface is not damaged.

Anodised aluminium components retain their functional properties, decorative appearance and metallic nature for years.

#### **Ecology**

Comprehensive evaluation of economic and ecological aspects speaks in favour of the use of anodised aluminium as a material in industry.



YOUR PARTNER  
COMPETENT, RELIABLE, EXPERIENCED





*As a construction engineer, designer or product manager, your requirements vary with regard to surfaces. Whether for purely functional aspects, aesthetic criteria, or both combined: BWB offers you comprehensive advice on material, colour, machining and structural design.*

#### **Material selection and structural design**

Selecting and obtaining the right aluminium alloy is a decisive factor for optimal coating characteristics. Bringing BWB experts into the project at an early stage guarantees a more successful implementation of surface finishing. This enables typical peculiarities of the respective procedures to be accounted for in the structural design and integrated into the project in good time.

The bath sizes limit the dimensions of the work pieces to be finished. The BWB sales team will gladly advise you. Special attention is also paid to welded structures.

#### **Treatment procedures**

BWB offers various surface finishing procedures. We analyse your requirements with regard to the components and suggest suitable procedures, as well as appropriate pre-treatments.

#### **Special effects**

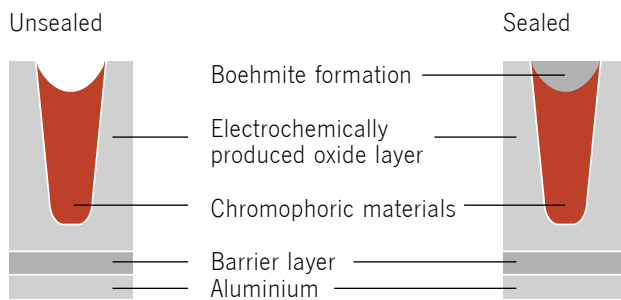
The interplay between mechanical and chemical pre-treatments and the different anodising procedures enables various special effects to be achieved. The BWB advisors are happy to help you.

#### **Sampling**

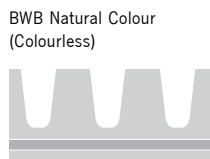
The colour chart on the next page can be used for initial colour selection. For specific component sampling, it is advisable to define not only the mechanical and chemical pre-treatment, but also the anodising and colouration with the designated original aluminium alloy.

*We advise you on our procedural options, the colour palette and the characteristics of surface treatment engineering.*

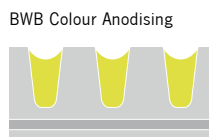
**The procedural principle (schematic)**



Natural-colour anodising is a precondition for colouration. The colouration takes place in additional procedural steps.



- Layer thicknesses 10, 15, 20, 25 µm
- Maximum durability, environmentally friendly procedure



- Adsorptive colouration procedure
- Layer thicknesses 15, 20, 25 µm
  - Bright colours, no chalking

**Colouration**

The actual colouring of the original sample is influenced by various factors:

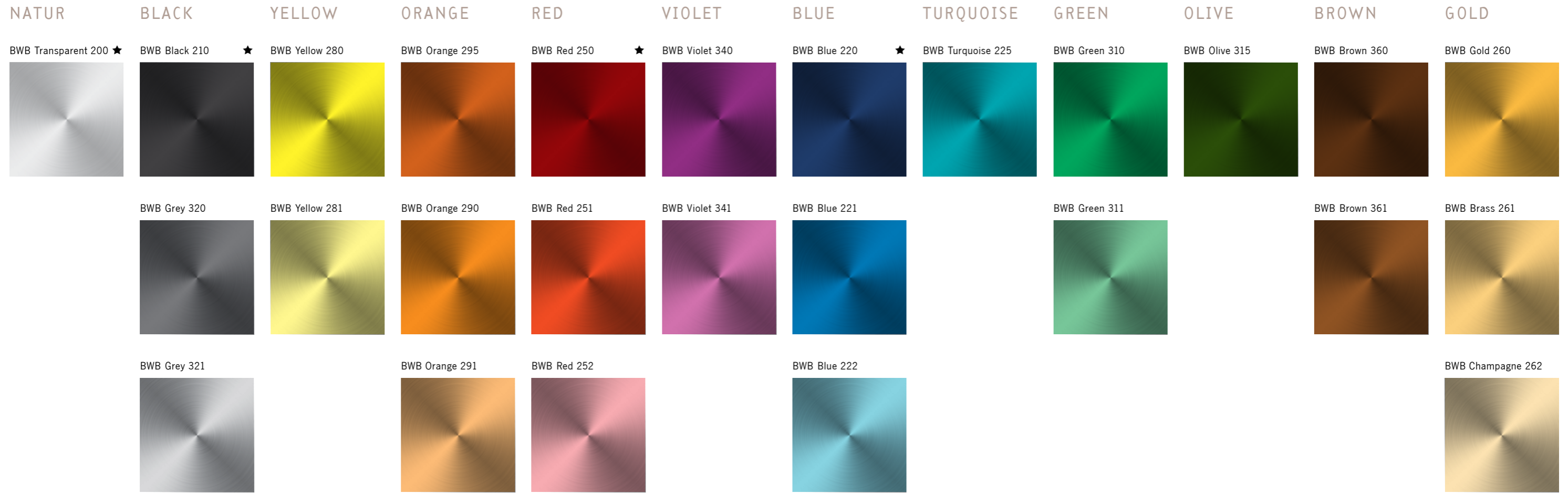
- The type of semi-finished product, the composition of the alloy and the composition of the material's structure
- The mechanical processing and surface roughness
- The mechanical and/or chemical pre-treatment
- The layer thickness

Due to their layer structure, GS-anodised layers form an excellent basis for colouration. The colouration procedure takes place between the anodising and the final sealing. Here, the dye is embedded in the pores and the sealing process gives it optimal protection.

The colouration procedures used in industry are suitable for indoor applications.

**Colour selection**

The BWB Group provides you with a broad palette of colours. The colour palette is shown in our colour chart for industry. For correct evaluation of colours, we recommend that you get us to carry out sampling with the envisaged original alloy and the planned surface finish.



The standard colours marked with a star (★) are available at all times.  
All other colours are sampled on a customer-specific basis.

## FINISHES

<p><b>E0</b></p> <p>The raw character Degreasing &amp; Deoxidising</p>	<p><b>E1</b></p> <p>The fine matt effect Grinding</p>	<p><b>E2</b></p> <p>The light structure Brushing</p>	<p><b>E4</b></p> <p>The elegant structure Grinding &amp; brushing</p>
<p><b>E6</b></p> <p>The extreme matt effect Etching &amp; matting</p>	<p><b>E7</b></p> <p>The brilliant shine Chemical polishing</p>	<p><b>F1</b></p> <p>The velvety surface Decorative blasting</p>	<p><b>F2</b></p> <p>The BWB special treatment Pralox® surface treatment</p>

BWB Surface technology offers you a wide range of colours to choose from. For a correct colour evaluation, we recommend that you have a sample of the original parts and the intended aluminium alloy supplied to us.

## YOUR CONTACT PARTNERS

BWB is happy to advise you on material selection and procedures

### The BWB Group is your partner for the machining and finishing of aluminium and nickel chromium steel

Due to our wealth of experience in surface treatment engineering, we offer economical all-in-one solutions for architecture, industry and design – from competent advice, to material procurement, right through to implementation, delivery and assembly. With our production sites, we have good regional support and are always where you need us.



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