

# PLASTIC ENCLOSURES BY APRA-PLAST

INNOVATIVE. INDIVIDUAL. UNIQUE.



Kunststoffgehäuse-Systeme GmbH

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# THE PERFECT SHELL FOR VALUABLE ELECTRONICS



Highly developed electronics require customised packaging. apra-plast designs and implements individual, distinctive enclosures with optimum functionality: from prototype to small batches and series production with several thousand items. Technically mature, visually attractive and with an excellent price-performance ratio – **even without tooling costs.**

We rely on the precision and efficiency of our time-tested technologies for the production of our customised enclosures: INKUG milling/bending technology, SYNPRO vacuum casting technology or injection moulding. apra-plast is a company of the apra Group and works in tandem with its sister company apra-norm on the construction of metal enclosures.

# YOUR IDEAS - OUR ENCLOSURE

1

## CONSULTANCY

Consistent customer focus from the outset: you explain your problem to us using sketches, technical drawings, CAD data, draft designs, models or components. We will provide you with detailed advice about possible functions and properties of the enclosure when combined with your product and about process options for its manufacture, suitable materials and appropriate designs.



2

## DESIGN

Individual, ergonomic, functional: our design engineers will draft the optimum enclosure for your product and all its functions in line with your requirements. We put all our expertise into solutions that have been well thought-out and employ state-of-the-art CAD/CAM technology for absolute perfection.



3

## PRODUCTION

This is where we score on precision: to achieve the highest dimensional accuracy in the production of your enclosure, we use the latest NC and CNC machines and in tricky cases we fall back on the careful manual work of our highly-qualified, trained staff. It goes without saying that we carry out continuous quality control during the manufacturing process. The end result is a perfect shell for your product.

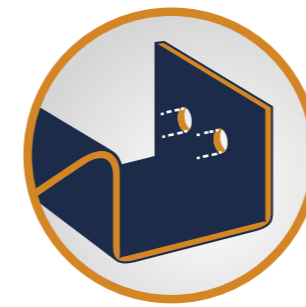


# INNOVATIVE TECHNOLOGIES FOR SMART PRODUCTS

We design and produce our enclosures exclusively in line with the individual requirements and expectations of our customers. We can also fulfil demanding and unusual requests with extensive in-house expertise, technical and design skills and innovative technologies.

You choose from a wide range of materials and colours for the design and specify the style and configuration of your enclosure. From this we will create the optimum shell for valuable electronics – as functional as it is distinctive. Our special tools for CNC machining enable us to create virtually any geometry and special circular bending technology allows us to produce any conceivable bending angle.

All our products contain mounting options – such as solid threaded inserts, strips, bolts, snap locks, recesses, drilled holes and cutouts in every shape and size – for ease of installation.



## INKUG

### OUR MILLING/BENDING TECHNOLOGY

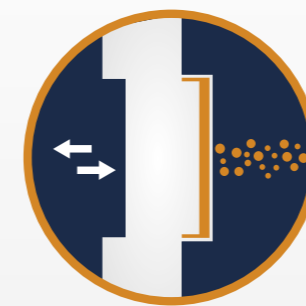
The INKUG milling/bending technology enables cost-efficient implementation of an individual design. With the help of this high-performance precision process, we can produce even small quantities for you flexibly, quickly and without additional tooling costs. We provide an extensive range of materials, colours and accessories when using INKUG to implement enclosures.



## SYNPRO

### OUR VACUUM CASTING TECHNOLOGY

The SYNPRO vacuum casting technology is the optimum process for manufacturing prototypes as well as for pilot or small batches without high tooling costs. SYNPRO makes it possible to realize a customised design, by reproducing a 3D-printed model.

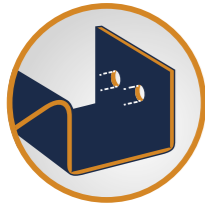


## INJECTION MOULDING

State-of-the-art injection moulding enables freedom of design in shape, colour and function. Using 3D data created in the CAD process, we produce customised injection moulds in our tool making department in different designs depending on the targeted quantities. The desired plastic components are then manufactured on special injection moulding machines – quickly, precisely and cost-efficiently.

### CRITERIA FOR SELECTING THE TECHNOLOGY PROCESSES:





## COST-EFFECTIVE ALL ROUND INKUG MILLING/BENDING TECHNOLOGY

The trend towards individual, professional designs – particularly for small to medium batch sizes – has made alternative production technologies an important factor in the construction of enclosures. apra-plast relies on the INKUG milling/bending technology to ensure reasonable production costs even for small quantities. It uses a range of state-of-the-art NC and CNC machines to achieve optimum results, maximum flexibility and rapid implementation without additional tooling costs. Various bending techniques and assembly steps complete the process.

INKUG is used to create plastic enclosures that stand out for their individual design, sophisticated materials and ergonomic, functional components. In addition to the standard bending processes for small bending radii, we have also optimised circular bending. This means that we can implement almost any radii – even 180° bends are possible – with high process reliability and without the need for forming tools.





# MATERIALS AND COLOURS

Overview of materials and colours for producing enclosures using INKUG technology.

- All materials can be supplied with EMC copper coating.
- Other colours or paint finishes are available at the customer's request.
- UL approvals for most materials in accordance with UL 94.

## POLYSTYRENE (PS) UL94H

Material thicknesses from 2 - 10 mm  
In the standard colours:

- PS04, light grey, similar to RAL 7035
- PS05, grey, similar to RAL 7042
- PS06, warm grey, similar to RAL 7032
- PS12, red, similar to RAL 3000
- PS15, blue, similar to RAL 5015
- PS18, grey-white, similar to RAL 9002
- PS24, black, similar to RAL 9004
- PS31, turquoise, similar to RAL 5018
- PS34, anthracite, similar to RAL 7016
- PS35, traffic white, similar to RAL 9016
- PS36, brilliant blue, similar to RAL 5007
- PS37, light green, similar to RAL 6027

## POLYCARBONATE

### 1. GEPAX UL94 V2

Material thicknesses 3 / 4 / 6 mm  
In the colours:

- GEPAX04, agate grey, similar to RAL 7038
- GEPAX24, signal black, similar to RAL 9004

### 2. TRANSPARENT PC

Material thicknesses from 2 - 8 mm

## ACRYLIC GLASS

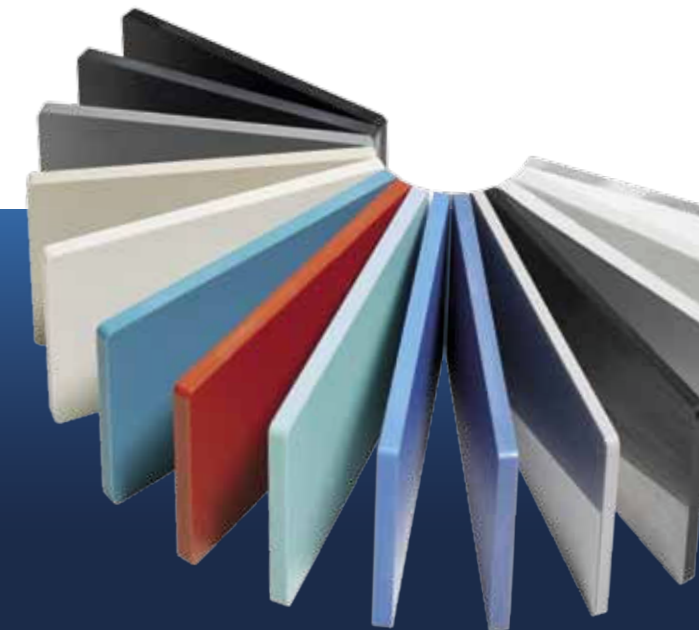
Material thicknesses from 2 - 10 mm  
Various surfaces  
Large colour choice

## ABS UL94HB / UL94V0

Material thicknesses from 2 - 6 mm  
In the colours:

- ABS03, stone grey, similar to RAL 7030
- ABS04, light grey, similar to RAL 7035
- ABS18, grey-white, similar to RAL 9002
- ABS24, signal black, similar to RAL 9004
- ABS24, brushed aluminium
- ABS27, metallic grey
- ABS34, anthracite, similar to RAL 7016
- ABS35, traffic white, similar to RAL 9016

Subject to changes.  
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## OUR ONLINE COLOUR CHARTS

You will find a wide range of colours for your product on our website at [www.apra-plast.de](http://www.apra-plast.de). To make your personal choice, simply use the adjacent QR code which will take you directly to our online colour charts.



## SYNPRO VACUUM CASTING TECHNOLOGY FOR PROTOTYPES, PILOT AND SMALL BATCHES

The SYNPRO vacuum casting technology is a particularly cost-efficient process for producing prototypes and pilot or small batches. We produce even minimum batch sizes using SYNPRO in pilot and small batches, without high tooling costs, in the desired design and 'just in time'. Our special SYNPRO vacuum casting technology is particularly suitable for producing plastic components with special requirements and for encapsulating components. Different materials that can be combined with each other ensure additional flexibility in the design process.

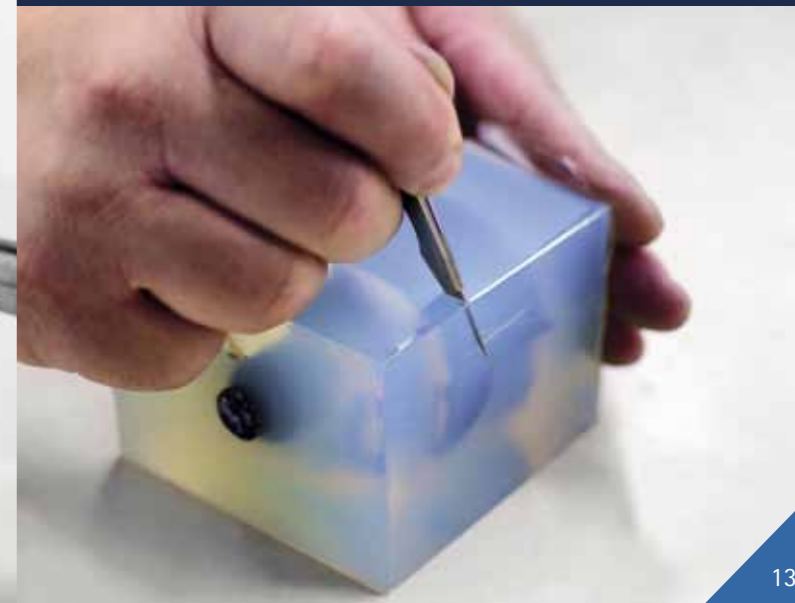
We will develop 3D design proposals or 3D final designs in line with your ideas and use our state-of-the-art 3D printing process to produce a customised pattern model. The casting mould is created by encapsulating the finished pattern model in silicone. The mould cavity is then filled under vacuum with a PU-based, 2-component casting resin.

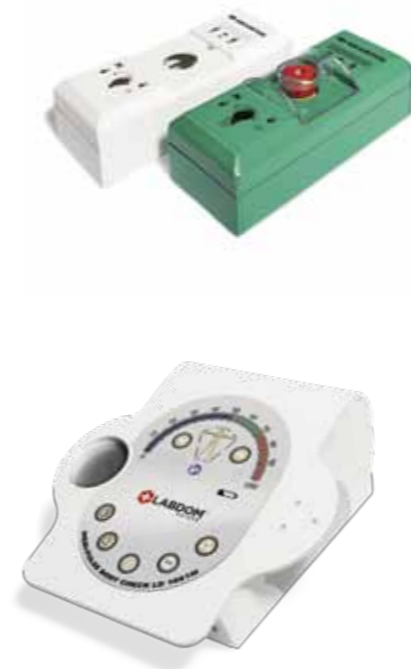
The materials used have a wide range of different properties such as Shore hardness, temperature-resistance, impact strength, fire behaviour and a variety of approvals (FDA, etc.). All the materials can be supplied in an almost infinite variety of colours; it is even possible to supply transparent variants. Sprues, cut-off points and material residues are carefully removed during subsequent machining. Drilled holes and threads can easily be inserted later.



### 3D PRINTING PROCESS

Our rapid prototyping and mould construction service is based on a 3D printing process. We develop 3D design proposals in line with your ideas and produce a customised pattern model. The mould is created by silicone encapsulation. The mould cavity is then filled with a PU-based, 2-component casting resin.

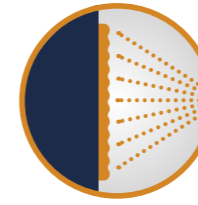




A SMART CORE NEEDS A  
 PERFECT SHELL.  
 INNOVATIVE TECHNOLOGY IN A  
 CUSTOMISED ENCLOSURE.







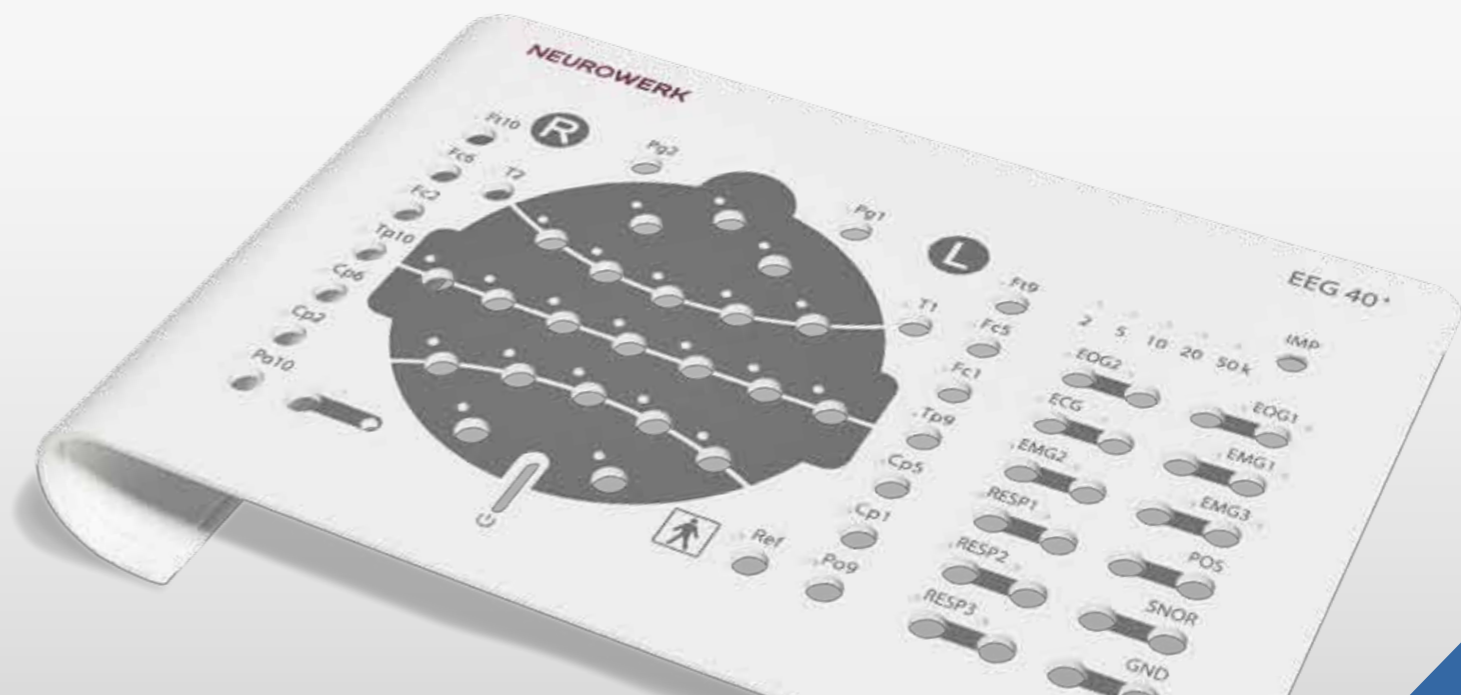
## INDIVIDUAL SURFACES ENHANCE YOUR PRODUCT

A visually attractive surface which meets stringent requirements for ergonomics and provides effective protection against external impacts is an absolute necessity for valuable electronics. Finishing processes by apra-plast will lend your product individual style and make it more attractive while still retaining optimum functionality. You can choose the finish that's right for you from a number of different processes: silk screen printing, digital printing, engraving, EMC coating with conductive varnish or painting in the colours you request.



### OUR FINISHING PROCESSES

- Silk screen printing
- Digital printing
- Engraving
- EMC coating with conductive varnish
- Painting in the colours you request





## FOIL TECHNIQUE – THE ADDED EXTRA TO FUNCTIONALITY AND AESTHETICS

Individual front foils and membrane keypads will provide the perfect finish to your product's design, both aesthetically and functionally. The foil technique is often used for entering information in electronically controlled devices. We can offer you the whole range from decorative foil and front foil to membrane keypad. We use inlay milling technology to produce control panels, front foils or membrane keypads that are flush with the surface.

### OUR SERVICES

- Decorative foils
- Front foils for the use of short or long stroke keys
- Membrane keypads with
  - key embossing (with or without metal dome)
  - back printing in silk screen and digital printing
  - coloured filters
- EMC shielding (also in display areas)
- LEDs integrated in the foil, single and multi-coloured insert pockets for individual labelling strips
- various sockets for ZIF, non-ZIF or crimpflex connectors

And much more.

## THE WHOLE IS GREATER THAN THE SUM OF ITS PARTS

Knowing what matters: we use our wealth of experience to assemble your enclosure so that it is ready to install, including all the accessory parts required. We use standard components, such as threaded inserts or bolts, PCB fixings or adjustable feet, as much as customised components, such as display screens, hinges or put-up hinges. When required we integrate additional parts in other materials, such as metal or glass, and also parts provided by the customer. The plastic components are joined together with time-tested welding and bonding processes.





## INJECTION MOULDING – FREE SHAPES, PERFECT DESIGN


For larger quantities, professional injection moulding ensures optimum cost efficiency and premium surface quality. Based on decades of experience, our design engineers use CAD/CAM programs to create customised tool designs to your specifications.

The injection moulds are manufactured in our in-house tool making department – as aluminium or steel tools in various designs depending on the targeted quantities. Tooling costs can be further reduced if we can make use of our in-house modular tool systems and principal forms for your enclosure.

We produce plastic components with an injection weight of 0.5 – 700 g in a wide variety of materials and colour variations on injection moulding machines, some of which are fully automated. As part of its own range, including DIN 43700/IEC 61554-compliant panel instrument enclosures and top hat rail enclosures, the apra Group offers an extensive standard assortment in virtually all sizes with coordinating accessories. Customer-specific adjustments can also be implemented here at reasonable cost.

## SYNERGIES FULFIL UNUSUAL REQUIREMENTS

“The optimum shell for your valuable electronics” – everything from one source: Whether plastic, sheet steel, stainless steel, aluminium or a mixture of materials – the companies of the apra Group will work closely together to design and manufacture your product. Creative and experienced employees will combine a wide range of manufacturing processes and tailor them to your requirements.



Enclosure components by apra-norm in stainless steel, aluminium and sheet steel



# WHAT OUR CUSTOMERS APPRECIATE ABOUT US...

... the extremely comprehensive service, individual advice, excellent price-performance ratio, high-quality technical equipment and, of course, the expertise and experience of our employees.

Highly skilled, creative engineering, in addition to precise production sequences employing high-tech controls, also plays a significant role. Based on this, we can offer you exceptional designs that meet your requirements and your expectations down the last detail and that we can implement with maximum precision.

## APRA-PLAST – AN INDUSTRY OVERVIEW

|   |                                    |
|---|------------------------------------|
| Medical technology                          | Measurement and control technology |
| Rail systems                                | Telecommunication                  |
| Machine and plant construction              | Computer technology                |
| Aerospace                                   | Military engineering               |
| Automation technology                       | Beauty and wellness equipment      |
| Airlines                                    | Modelling                          |
| Electrical industry/switchboard engineering | Control technology                 |
| Automotive industry                         |                                    |



We use our state-of-the-art machining facilities purposefully and efficiently to implement our innovative solutions. Our quality and environmental management system, which is **DIN ISO 9001:2008** and **DIN EN ISO 14001:2009** compliant, ensures continuous improvement of products and processes at all production sites.



## EXPERTISE. EXPERIENCE. CUSTOMER FOCUS.

From consultation and the initial draft design to perfect production, assembly and on schedule delivery, we take maximum care of our customers. We pride ourselves on making the most of our creativity, experience and enthusiasm for attractive and functional products.

# THE APRA GROUP



Your point of contact for customised enclosures or plastic components.

apra-plast  
Kunststoffgehäuse-Systeme GmbH  
Hamsterweg 9  
D-54550 Daun-Pützborn  
Tel.: +49 (0)6592 95 02-0  
Fax: +49 (0)6592 95 02-10  
[www.apra-plast.de](http://www.apra-plast.de)  
[vertrieb@apra-plast.de](mailto:vertrieb@apra-plast.de)



One of the market leaders in 19" technology. A household name for more than 40 years for modular cabinet, rack and enclosure systems of sheet metal, aluminium, stainless steel and plastic.

apra-norm  
Elektromechnik GmbH  
Bei der untersten Mühle 5  
D-54552 Mehren/Vulkaneifel  
Tel.: +49 (0)6592 204-0  
Fax: +49 (0)6592 204-100  
[www.apra.de](http://www.apra.de)  
[vertrieb@apra.de](mailto:vertrieb@apra.de)



Specialist for innovation in the network sector: from cable distribution cabinet systems to fibre optics.

apraNET  
Network Technology Division  
of apra-norm Elektromechnik GmbH  
Bei der untersten Mühle 5  
D-54552 Mehren/Vulkaneifel  
Tel.: +49 (0)6592 95 12-0  
Fax: +49 (0)6592 95 12-50  
[www.apranet.de](http://www.apranet.de)  
[vertrieb@apranet.de](mailto:vertrieb@apranet.de)



Special enclosure solutions are our inherent strength: production of displays and terminals in addition to special solutions for all areas of application.

apra-gerätebau  
GmbH u. Co. KG Chemnitz  
Südstrasse 15  
D-09221 Neukirchen  
Tel.: +49 (0)371 28 124-0  
Fax: +49 (0)371 28 124-20  
[www.apra-geraetebau.de](http://www.apra-geraetebau.de)  
[vertrieb@apra-geraetebau.de](mailto:vertrieb@apra-geraetebau.de)

ALL PRODUCTS MADE IN GERMANY.



Version: October 2014

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