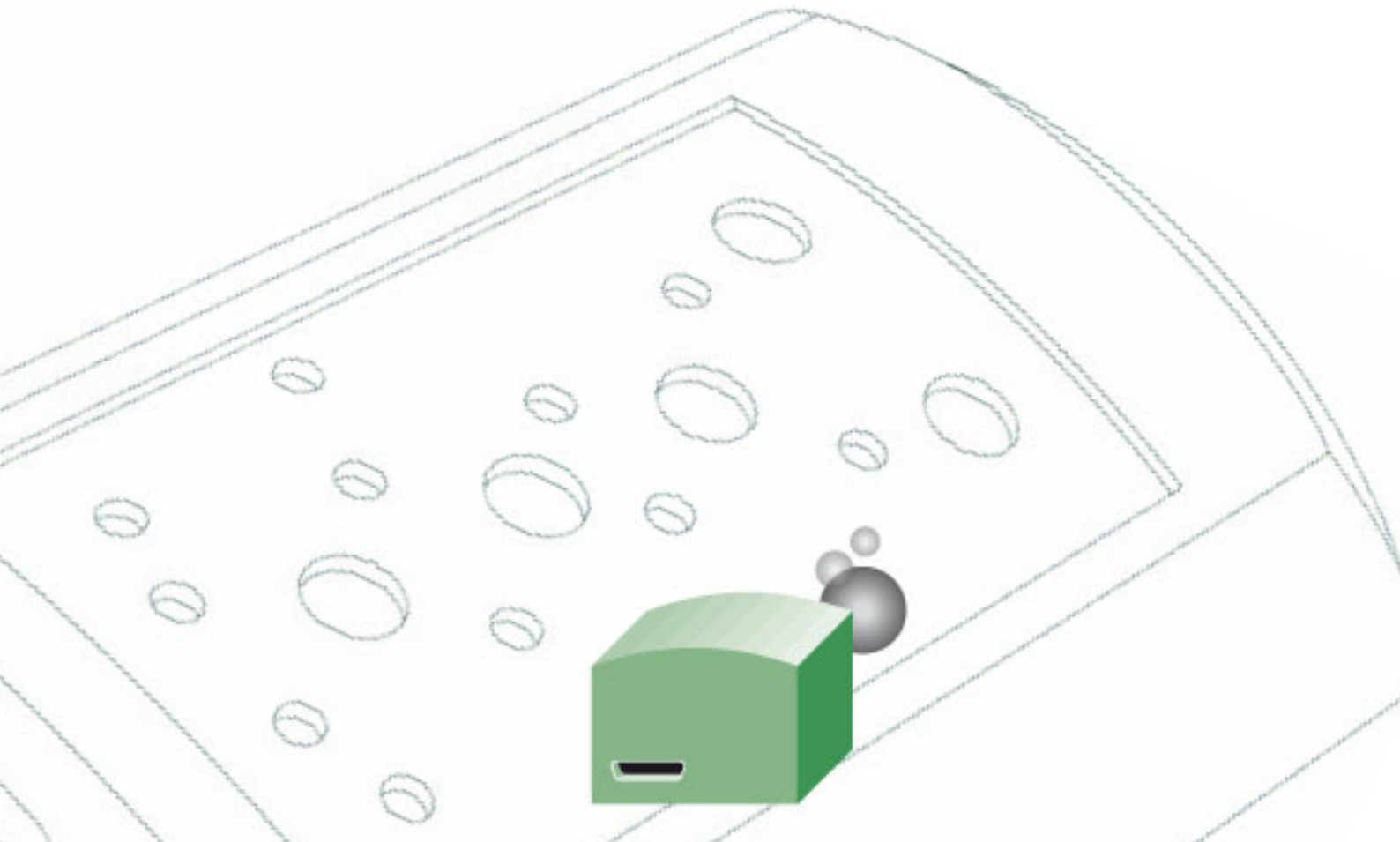




## RAPID PROTOTYPING



## SERVICES

With RAPID prototyping, exact, accurate parts with an outstanding surface finish can be realised quickly and easily. This means that in many cases the parts can be used without any further postprocessing.

Besides the production of prototypes and models for the appraisal of the design and for functional tests, we also produce cases from our standard range with individual modifications, e.g. recesses for interfaces, displays etc. as approved samples for you. Depending on the material used, we can also finish the parts individually to meet your requirements, e.g. painting, vapour-plating with aluminium etc.

The available materials are characterised by mechanical properties, different colours and various degrees of elasticity for many different areas of application.

Allow us to present the process to you in the following, and to inform you of the options available.

## DESIGN EXAMPLES



Material: FullCure  
Intermediate part "Handle"



Material: FullCure  
Modified standard part  
(button cell cover), Minitec



Material: FullCure  
Case and display window,



Material: FullCure  
Modified standard part  
(top part), Soft-Case



Material: FullCure  
Wall support with snap-in mechanism



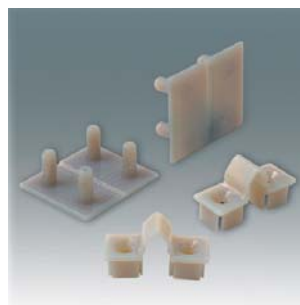
Material: FullCure  
Hinge (one-piece)



Material: Tango Gray  
Protector for Smart-Case



Material: Tango Gray  
Rubber button cover



Material: Tango Gray  
Film hinges

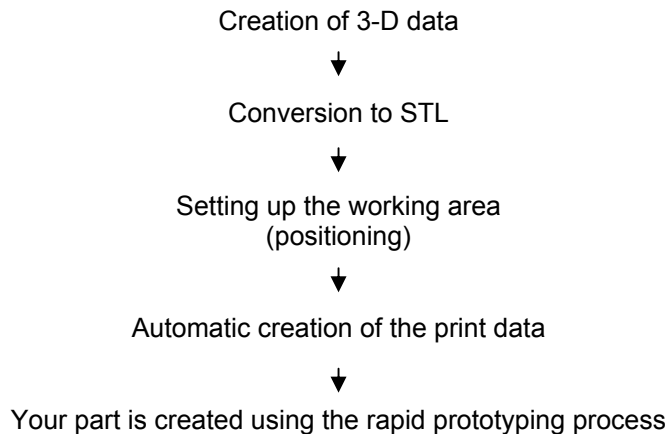
## PROCESS

The parts are built up layer by layer from photopolymers. In this process, the print head, similar to that in an inkjet printer, moves back and forth along the x-axis and applies the wafer-thin photopolymer layers - resulting in an absolutely flat surface. Each layer is hardened by UV lamps that are mounted on the print head. Particularly fine walls are held by applying supporting material, which is subsequently easy to remove with a jet of water.

### Technical data

- High level of accuracy of up to 0.1 mm.
- Extremely thin layer thicknesses of 0.016 mm guarantee smooth surfaces.
- Very thin wall thicknesses for particularly fine, thin-walled geometry possible ( $\geq 0.75$  mm).
- Max. dimensions of 350 x 350 x 200 mm
- Special features: cavities, overhangs, undercuts as well as snap-in functions (Vero material)

### Process flow



## CAD DATA

Readable file format for importing data: Solid Works (closed paths)  
Alternatively: Creation of model by OKW Gehäusesysteme at customer's expense.

Data medium: E-mail, CD-ROM, DVD, Zip (100 MB)

## MATERIAL

### VeroGray – FullCure850

Opaque, solid material for extremely durable parts resistant to deformation, with outstanding detail reproduction.

Property	ASTM	Results (metric)		Results (imperial)	
Tensile strength	D-638-03	MPa	60	psi	8700
Modulus of elasticity	D-638-04	MPa	3000	psi	435000
Breaking elongation	D-638-05	%	15	%	1.5
Bending strength	D-790-03	MPa	95	psi	13775
Flexural modulus	D-790-04	MPa	300	psi	435000
Notch resistance	D-256-06	J/m	25	ft lb/in	0.5
Shore hardness	Scale D	Scale D	86	Scale D	86
Rockwell hardness	Scale M	Scale M	49	Scale M	49
Heat distortion temperature at 0.45 MPa	D-648-06	°C	49	°F	120
Heat distortion temperature at 1.82 MPa	D-648-07	°C	47	°F	117
Glass transition temperature	DMA, E''	°C	56	°F	134
Residual ash	USP 28	%	0.3	%	0.3
Moisture absorption	D570-98 24 Hr	%	1.1	%	1.1

### Tango materials

Rubber-like, elastic material with various elasticity levels, wall thickness  $\geq 0.75$  mm.

### TangoPlus – FullCure930

Property	ASTM	Results (metric)		Results (imperial)	
Tensile strength	D-412	MPa	1.5	psi	211
Modulus of elasticity at 20 % load	D-413	MPa	0.1	psi	21
Modulus of elasticity at 30 % load	D-414	MPa	0.2	psi	27
Modulus of elasticity at 50 % load	D-415	MPa	0.3	psi	38
Flexural modulus	D-412	%	218	%	218
Compression set	D-395	%	4	%	4.4
Shore hardness A	D-2240	Scale A	27	Scale A	27
Ross flex	D-1052		> 150,000		> 150,000
Tear strength	D-624	kg/cm	3	lb/in	20
Glass transition temperature	DSC (-80°C+100°C)	°C	-10	°F	15

### TangoGray – FullCure950

Property	ASTM	Results (metric)		Results (imperial)	
Tensile strength	D-412	MPa	4	psi	632
Breaking elongation	D-412	%	47	%	47
Compression set	D-395	%	1	%	1
Shore hardness A	D-2240	Scale A	75	Scale A	75
Tear strength	D-624	kg/cm	10	lb/in	54
Glass transition temperature	DSC (-80°C+100°C)	°C	3	°F	37

## SUBSEQUENT PROCESSING

On request we can perform the following subsequent processing for you on parts made of the material VeroGray – Fullcure850:

- Painting
- Printing
- Bonding
- Milling
- Sinking
- Punching
- Al vapour-plating

## QUALITY

Painted surface (paint adhesion: test according to the "GT2" cross cut method).

## DIMENSIONAL TOLERANCES

Accuracy of up to 0.1 mm.

## DELIVERY PERIOD

After the 3-D data have been released, from only 24 h – depending on size and complexity.

## FIXED COSTS

In accordance with quotation.

## PACKAGING

Parts are packed in poly bags and/or in layers in cardboard boxes.  
Special arrangements possible.

Quantity variations of + 10 % possible.

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