



Discovery Session : Sheet Plastic Bending Technology

A process that will make you save time and money !



**D&E
EVENT**



Hardware



Software



Test & Measurement



Engineering



Research & Development

Het ontwerpen van
innovatieve elektronica

Woensdag 19 april 2023
1931 Congrescentrum 's-Hertogenbosch

PLASTICS PROCESSING TECHNOLOGIES

WITH MOULD	NO MOULD or NO SPECIFIC MOULD
Injection	3D Printing
Thermoforming	Plastics Sheet Bending
Vacuum and Gravity Casting	

PLASTICS SHEET BENDING: La Tôlerie Plastique - LTP

- ✓ **NO INVESTEMENT:** A custom designed project without the investment in any specific mould or tooling
- ✓ **FLEXIBILITY:** Without any specific mould or tooling, it is the milling programs and working instructions, that are bespoke. They can be modified between each production run.
- ✓ **RAPID TRANSFER FROM R&D to MASS PRODUCTION:** Without any specific tooling, a finalised part from 5 working days in a final finishing without any post production treatment., via the same process that the mass production.



PLASTICS SHEET BENDING: La Tôlerie Plastique - LTP



LET'S DIVE INTO THE TECHNICAL DETAILS

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Presentation of Speaker

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Why and When Choose What

03

Wide Solution Range

04

Innovative Plastic Processing Technology

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Key Points to Collect

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Questions



LTP
La Tôlerie Plastique

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01

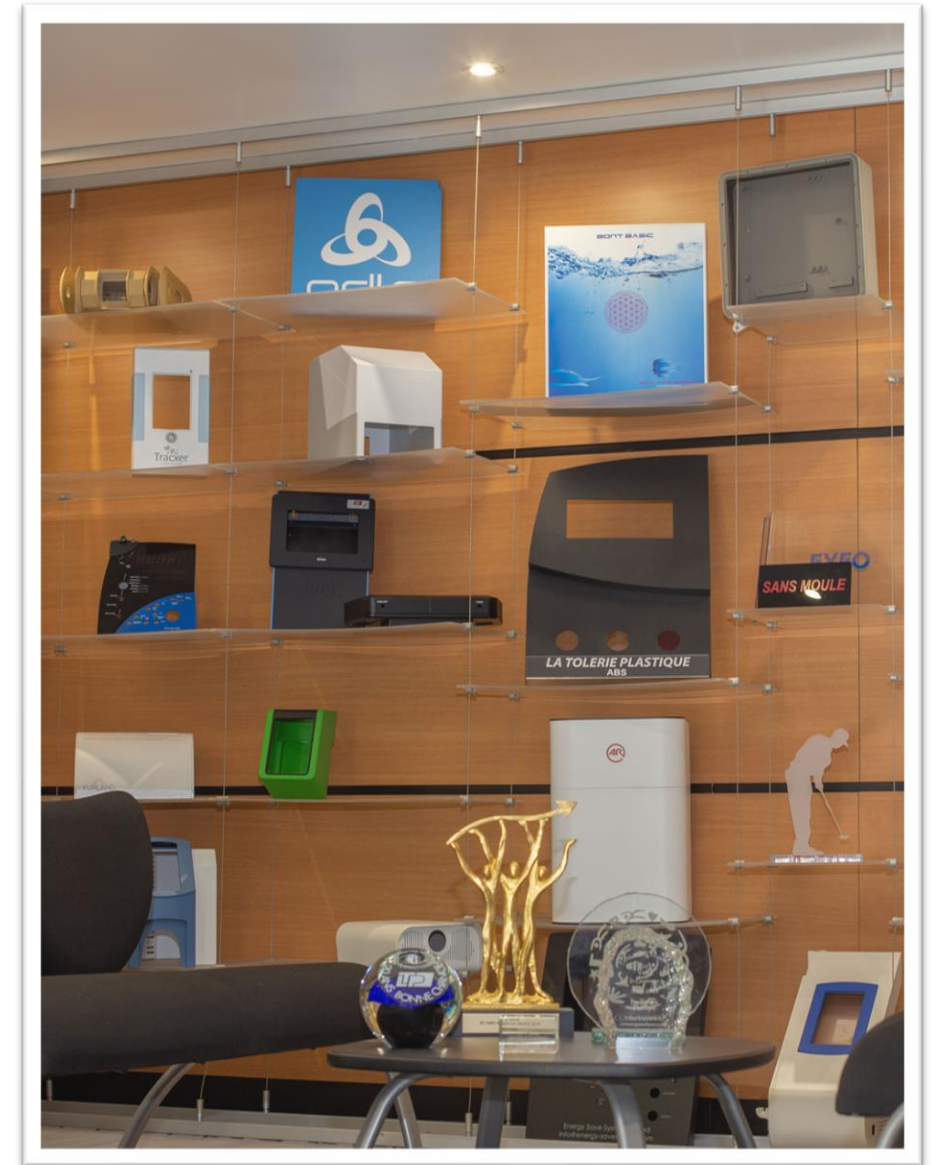
PRESENTATION OF SPEAKER

D&E EVENT

THE TECHNOLOGY: History

The “Sheet Plastic Bending” is an innovative and in-house "manufacturing process". It was developed by the founder of LTP France in 1985. It is based on technologies from METAL and WOOD PROCESSING.

- **METAL** (sheet metal working of the elementary parts: bending, folding and round bending).
- **WOOD** (From furniture making - i.e. tongue and groove assembling).



THE PROCESS: Project types

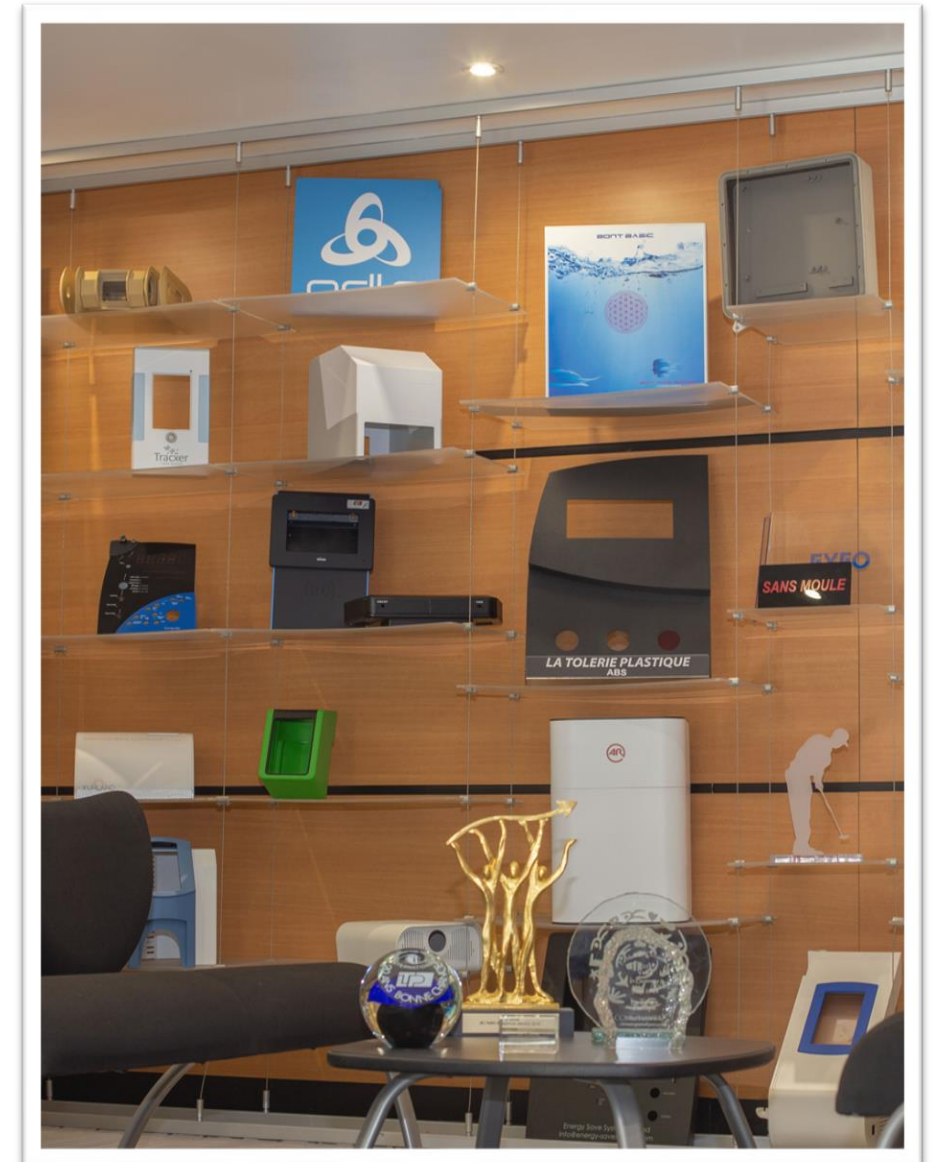
This technology provides solutions for:

- enclosures
- covers
- parts

...to protect, embellish or cover your electronics.

Requiring no specific tooling, it is the most economic technology for medium size production runs.

✓ PROTOTYPE & MASS PRODUCTION



02

WHY AND WHEN CHOOSE WHAT?

WHY AND WHEN CHOOSE WHAT?

STANDARD

VERSUS

PRE-DESIGNED to
CONFIGURE

FIBOX
Enclosing innovations

TAKACHI

M
W
HAMMOND
MANUFACTURING®

ELECTRONICASE

LTP pre-designed to configure

WHY AND WHEN CHOOSE WHAT? Design possibilities

	LTP / Sheet Plastic Processing	3D printing	Injection Molding	Vacuum or gravity casting	Thermo forming or vacuum forming
<u>Suitable quantities</u>	1 – 5000	1 – 100	1.000 >	1 – 100	10 - 500
<u>Double curved surfaces</u>	–	✓	✓	✓	✓
<u>Variable wall thicknesses</u>	✓	✓	✓	✓	–
<u>Mounting features (clips, bosses, guides etc.)</u>	✓	✓	✓	✓	–
<u>Choice of engineering-grade materials</u>	++	+	+++	+	+

WHY AND WHEN CHOOSE WHAT?

Prototyping
Proof of Concept
Pre-Serie

	LTP / Sheet Plastic Processing	3D printing	Injection Molding	Vacuum or gravity casting	Thermo forming or vacuum forming
What is the timeline for my project prototype?	2-4 weeks But no technology transfert towards mass production	1-5 days	2 – 3 months	2-4 weeks	2 – 3 months
Does the technology allow me to make Design modifications ?	✓	✓	–	–	–
Is the technology suitable for mass production ?	✓	–	✓	✓	✓
Is the technology suitable for prototyping?	✓	✓	–	–	–

WHY AND WHEN CHOOSE WHAT?

Mass production

	LTP / Sheet Plastic Processing	3D printing	Injection Molding	Vacuum or gravity casting	Thermo forming or vacuum forming
Suitable quantities	1 – 5.000	1 – 100	1.000 >	1 – 100	10 - 500
Tooling costs	None	None	High	Moderate	High
Tooling life cycle	n/a	n/a	10.000 – 100.000+	30 – 50	1.000 – 50.000
Finishing	+++	+	+++	+++	+++



03

WIDE SOLUTION RANGE

THE PROCESS: Application Sectors

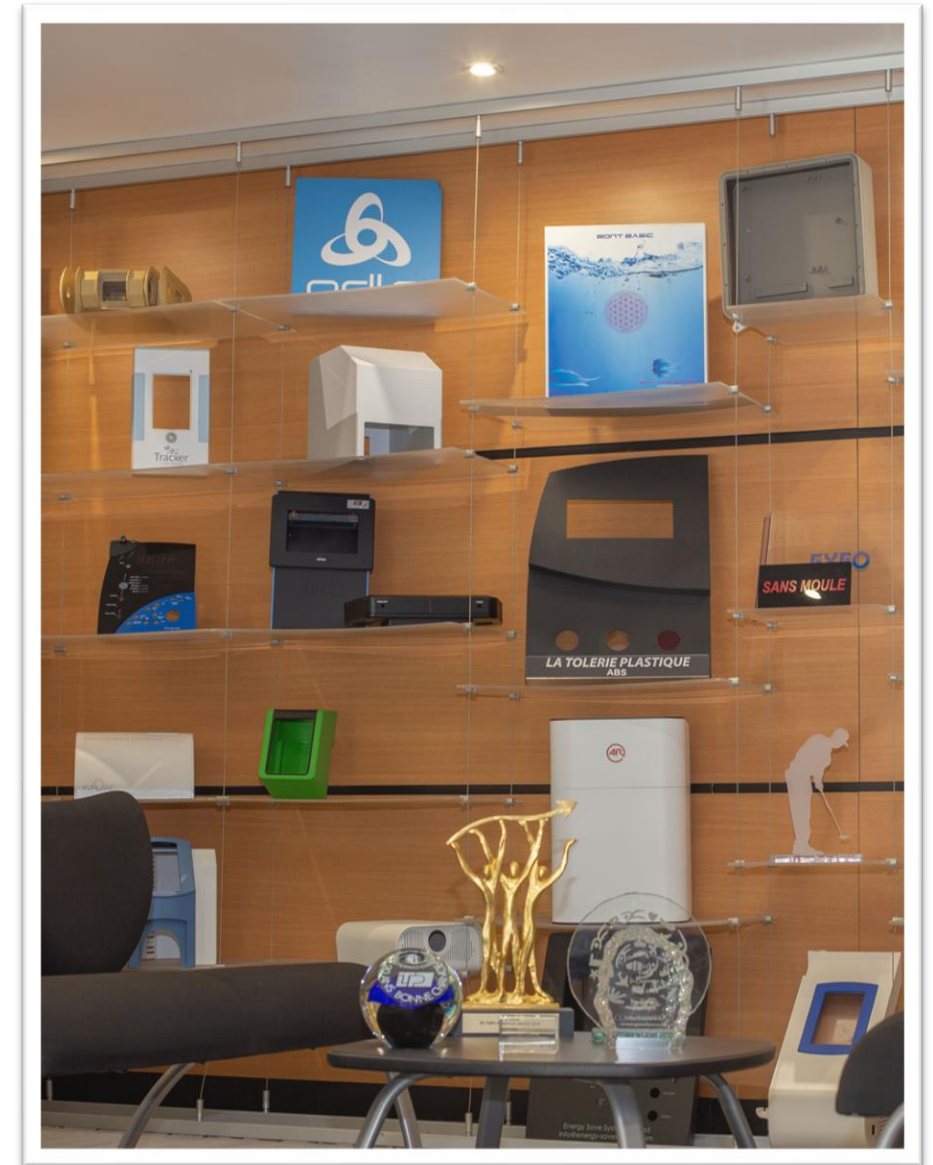
- Health & beauty
- Industry
- IoT service devices & applications
- Etc.

... Highly valued by designers and engineers

- OEMs
- Subcontractors

... ISO 9001 and sound knowledge about ISO 13485

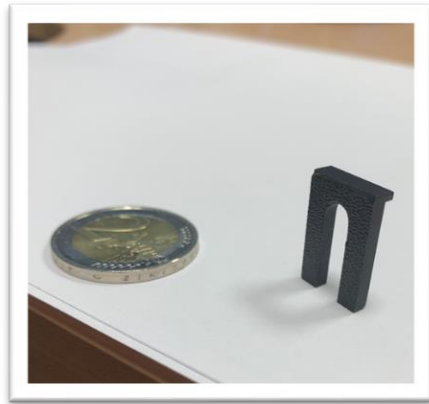
... Raw material tracability & CoC supplied



Solution Range: Size

SMALL

BIG



→ Conical Cold Bending



Solution Range: Complexity

1 – 2 piece PUZZLE

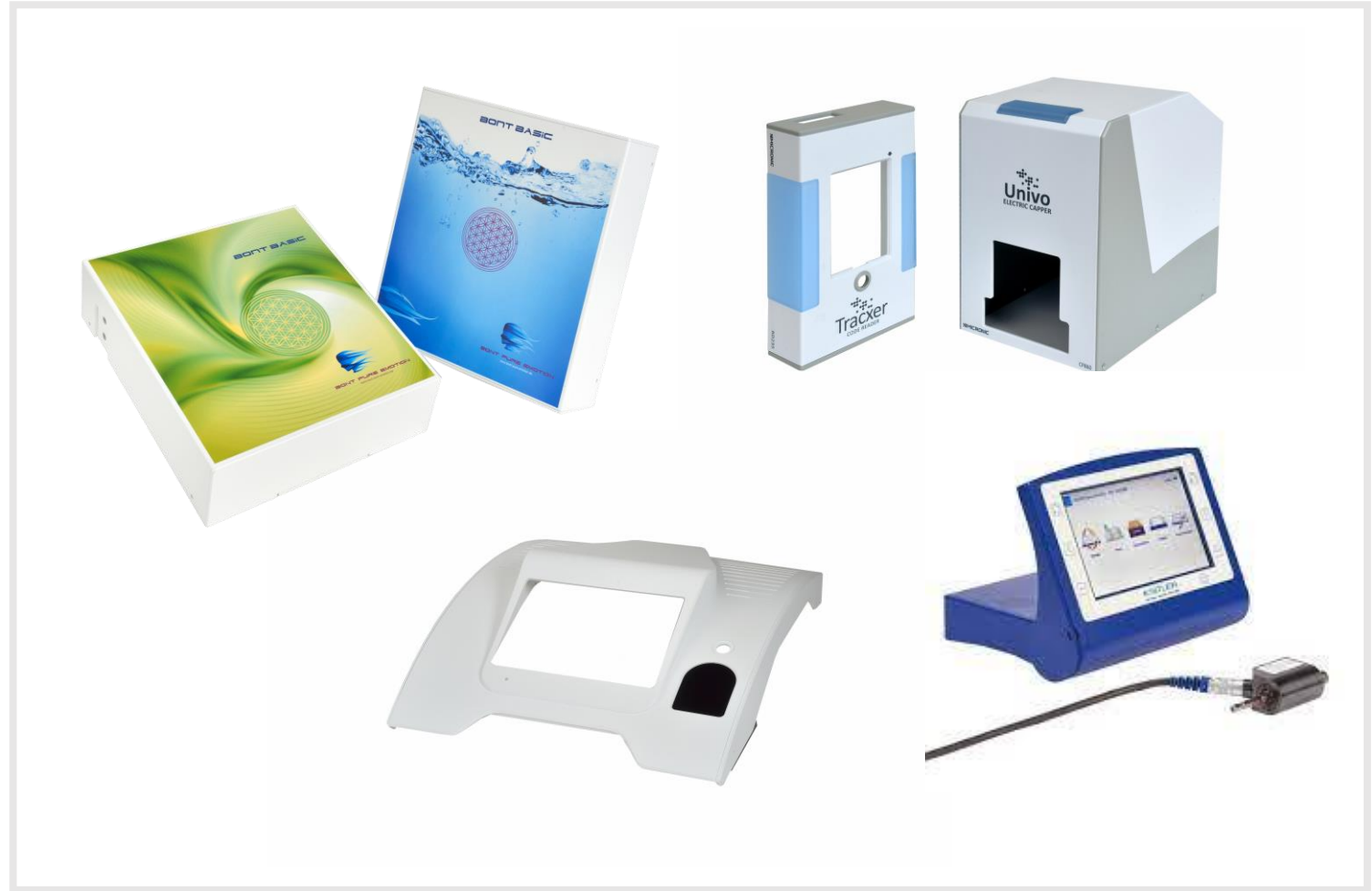
Up to 110 pieces PUZZLE



Solution Range: Design

Bulky – Square / Mono colour Design

Round/ Multicolour Design





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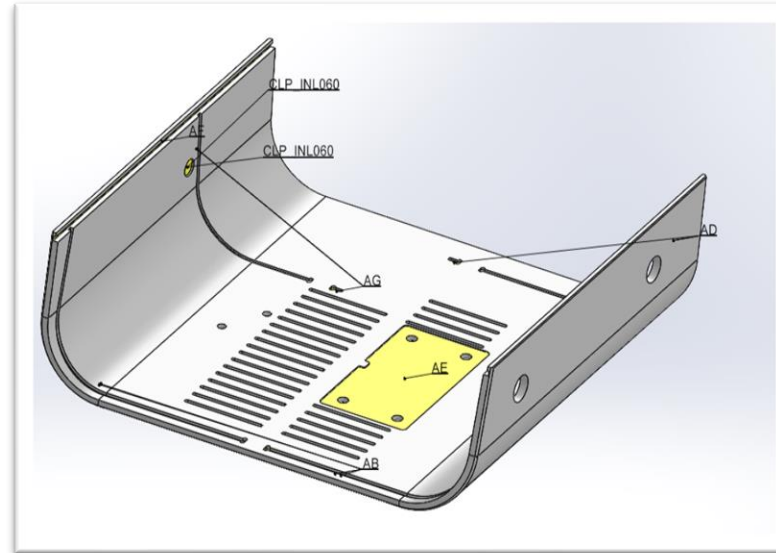
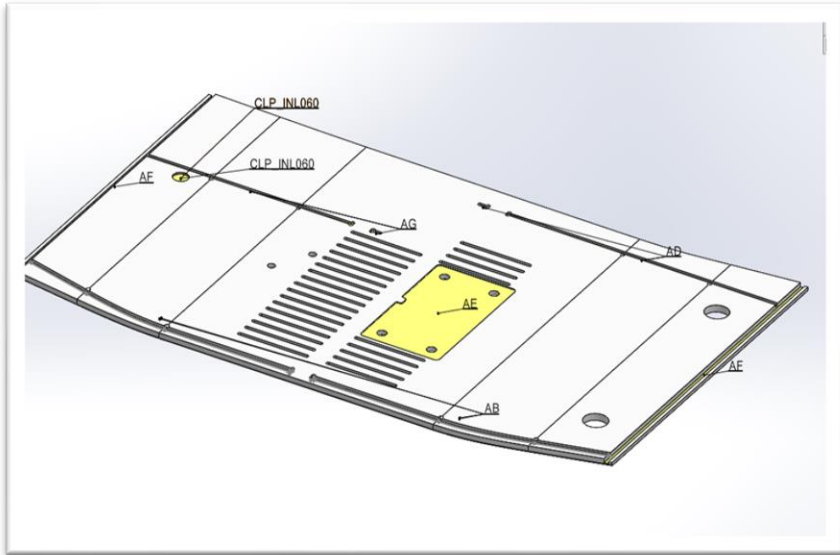
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04

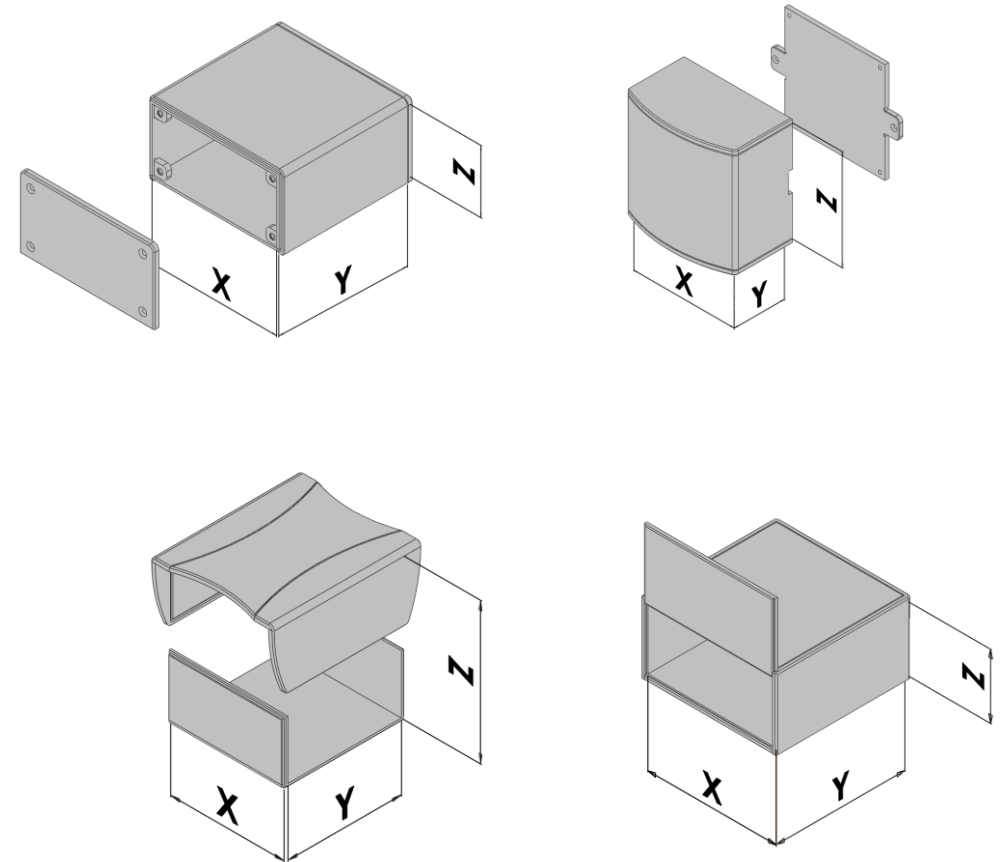
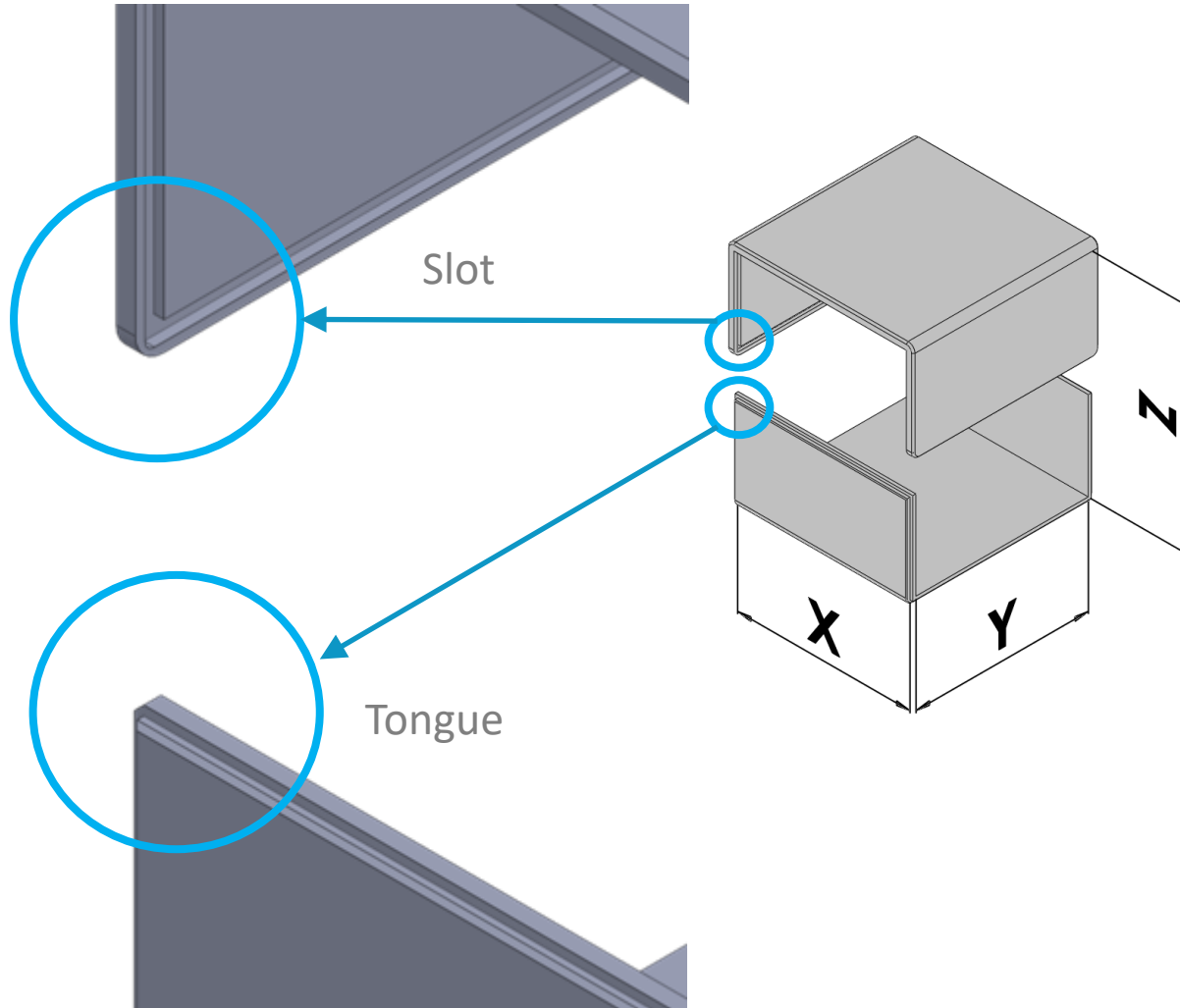
INNOVATIVE PLASTIC PROCESSING TECHNOLOGY

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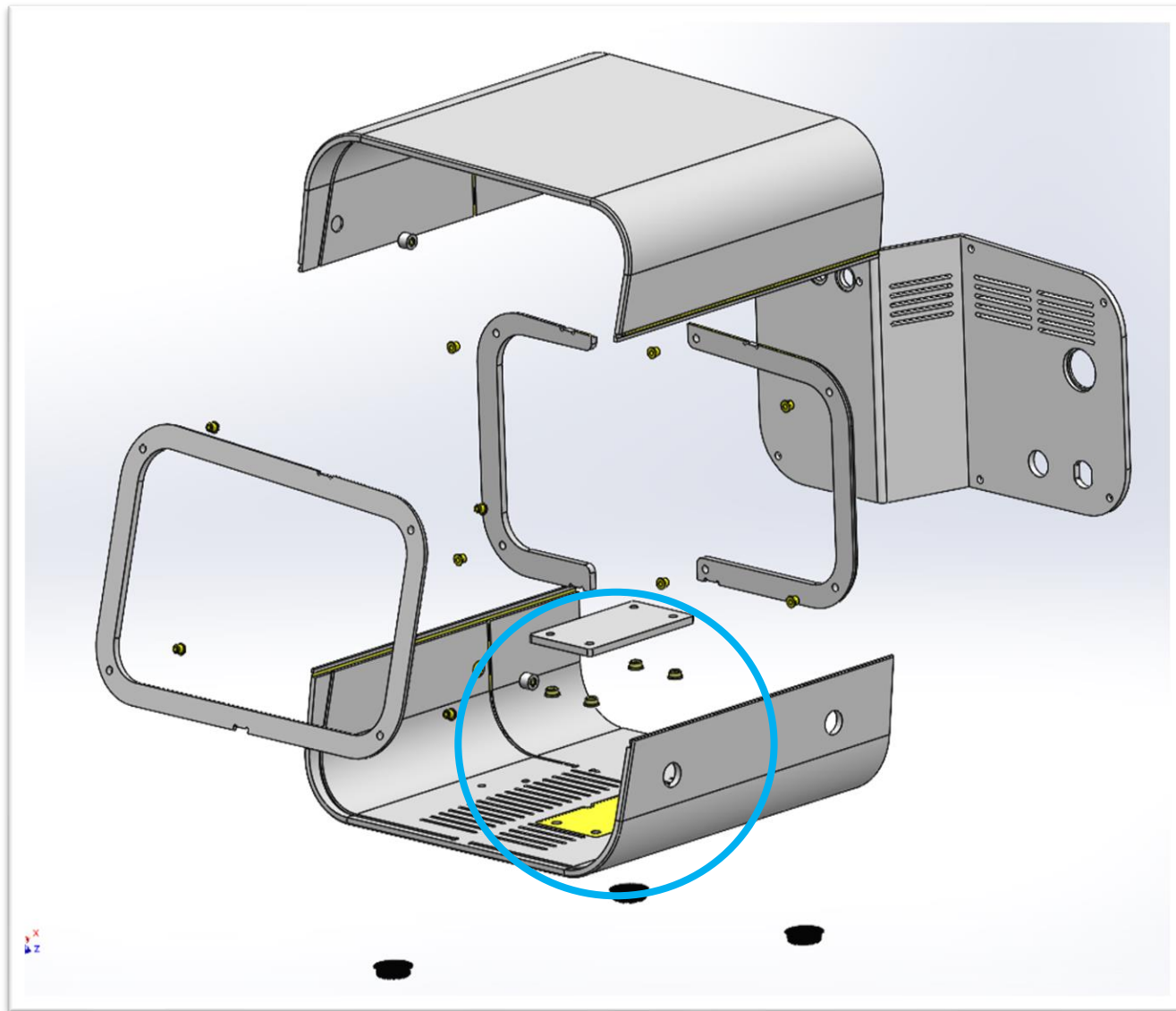
PLASTICS SHEET BENDING: Metal = Shaping



PLASTICS SHEET BENDING: Wood = Assembly

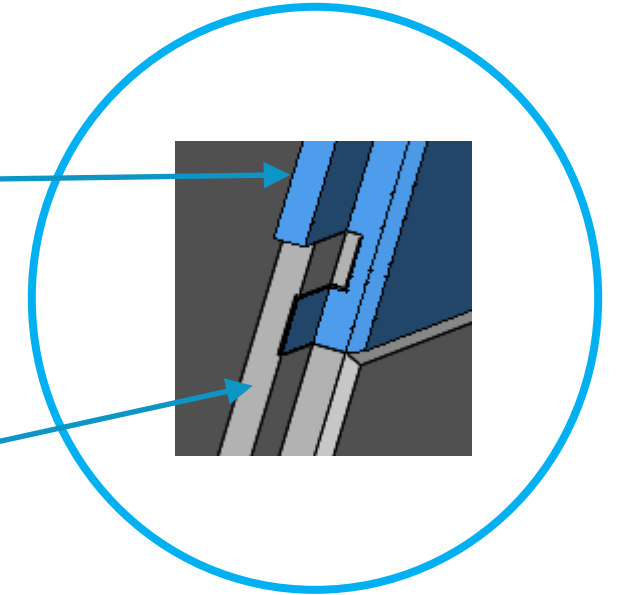
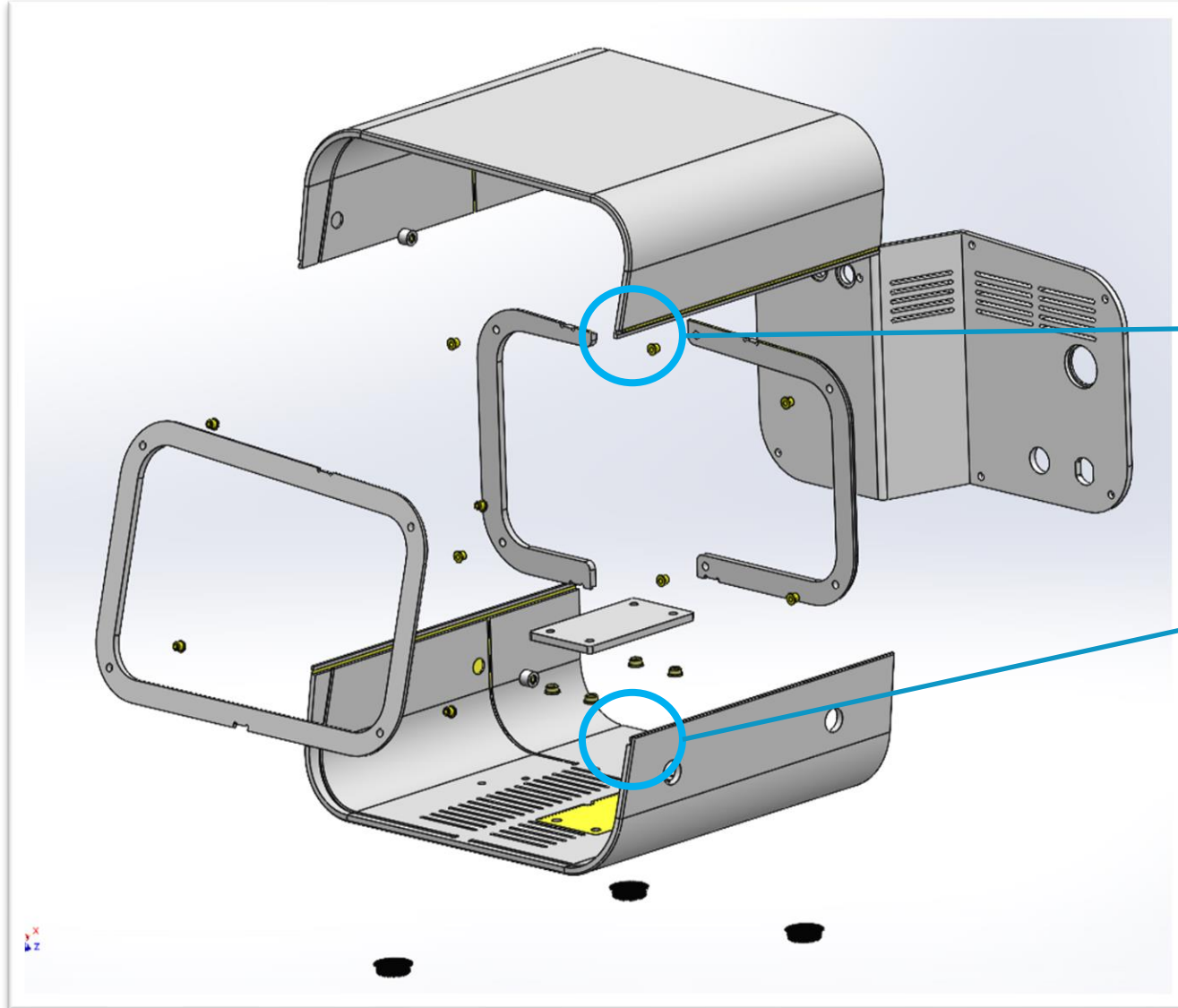


PLASTICS SHEET BENDING: Wood = Assembly



Recess Machining to place fixing parts

PLASTICS SHEET BENDING: Wood = Assembly



S-Shape Click System



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04.1

INNOVATIVE PLASTIC PROCESSING TECHNOLOGY – **DESIGNING STEPS**

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DESIGNING STEPS

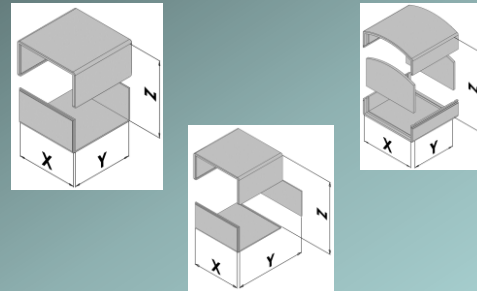
Theoretical Design : Free of charge , no commitment

CAD Design and Prototyping after purchase order



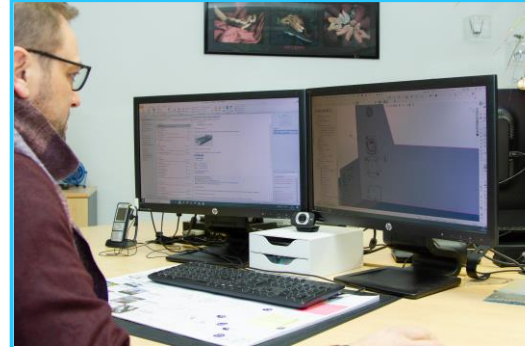
Confirm:

- TECHNICAL NEEDS
- BUDGET
- DESIGN



Technical sales contact splits or builds up the hollow body or part into a «PUZZLE»:

- L-SHAPES
 - U-SHAPES
 - BLOCS, RAILS
- Those are NO extruded profiles



Technical Design contact draws the various parts from the «PUZZLE» differencing in:

- SHAPES
- DIMENSIONS
- FIXING ELEMENTS



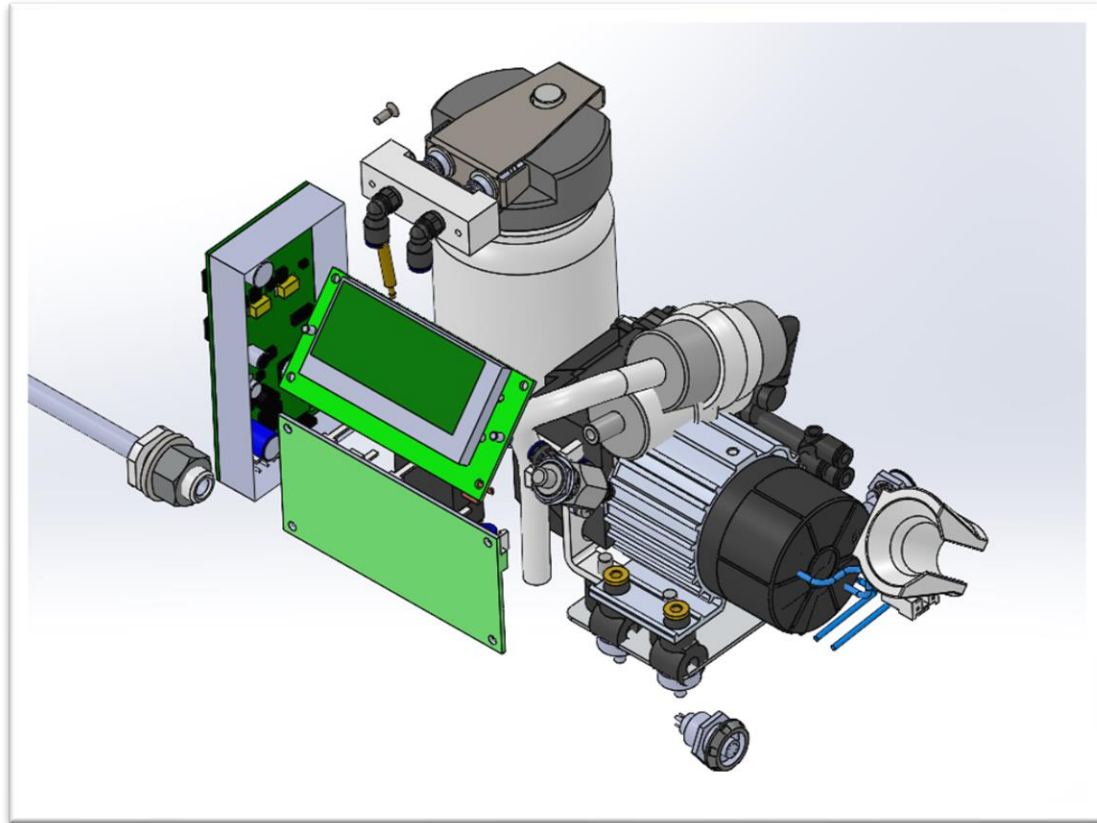
After validation of the technical 3D, expert manufactures the prototype (1 st of series).

- 3D
- 1 st of SERIES / PROTO
- MASS PRODUCTION

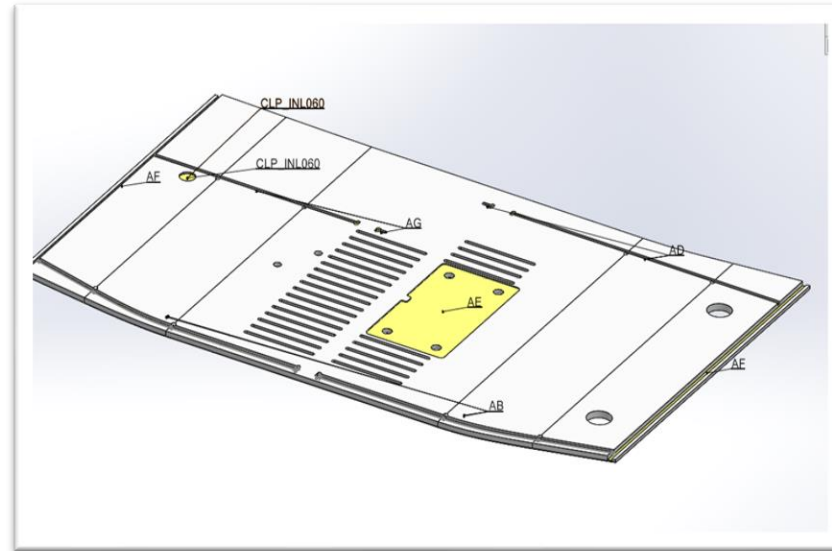
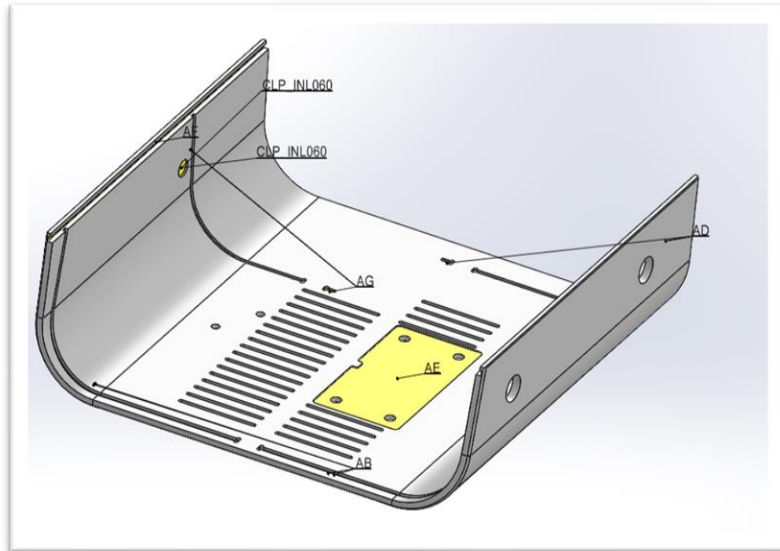
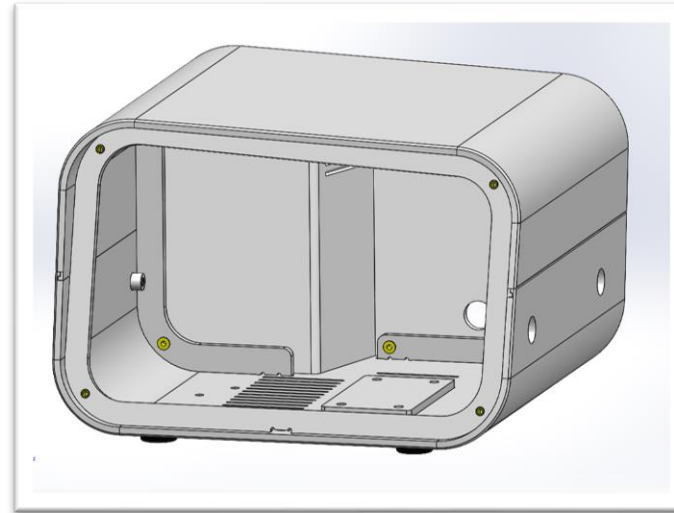
UNDERSTANDING THE NEED OF A CUSTOMER (technical, budget, design)

1. Customer, device, project (planning, cost structure, budget)
2. Application environnement, restrictions (outside/inside, HMI)
3. Project type (enclosure, part, cover)
4. Technical specifications (fire resistance, watertightness max. IP65)
5. Design & aesthetical specifications (finishing)
6. Customer service (documentation, logistics)

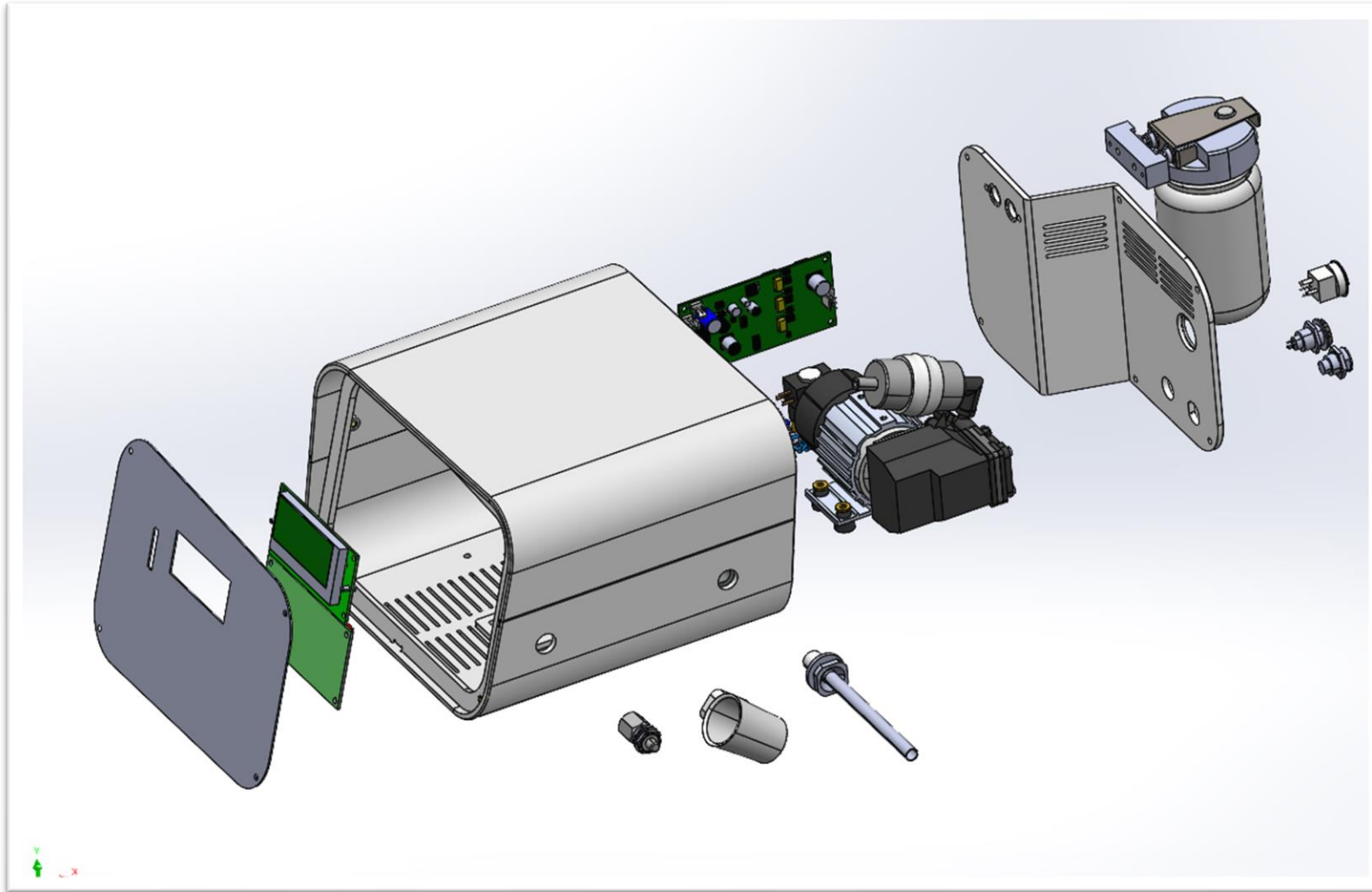
SHEET PLASTIC BENDING: Covering Electronics



SHEET PLASTIC BENDING: Reproducing a design



SHEET PLASTIC BENDING: Finalised concept



THE GENERAL TOLERANCES OF LTP

Dimensional (assembly-folding):

Dimensions and tolerances in mm			
Dimension	0 to 100	100 to 200	Dimension over 200
Tolerance	± 0.5	± 0.7	NF EN ISO286

NF EN ISO286 (<http://www.boutique.afnor.org>)

Machining – Drilling – Recess Machining

Dimensions and tolerances in mm				
Dimension	0 to 100	100 to 200	200 to 400	Dimensions over 400
Tolerance	± 0.2	± 0.3	± 0.4	NF EN ISO22768

For dimensions over 400, tolerances are in accordance with classification “C” of norm NF EN 22768 (<http://www.boutique.afnor.org>)

Chamfers - Bevelled edges

Dimensions and tolerances in mm				
Dimension	0.5 to 1.5	1.5 to 3	3 to 6	Over 6
Tolerance	± 0.2	± 0.4	± 0.7	± 1.4

Adaptation of the production measurements to the processes

In order to adapt these technical definitions to its processes, the LTP company applies over dimensions in its manufacturing files according to the surface treatments and CNC machining processes.

The dimensions of the functional holes can be increased by 0.2 to 0.3 mm.

Specific customer requirements

The customer must inform LTP of any special requirements outside the limits indicated above.



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04.2

INNOVATIVE PLASTIC PROCESSING TECHNOLOGY – **MANUFACTURING STEPS**

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MANUFACTURING STEPS: PROTOTYPE & SERIAL / MASS PRODUCTION



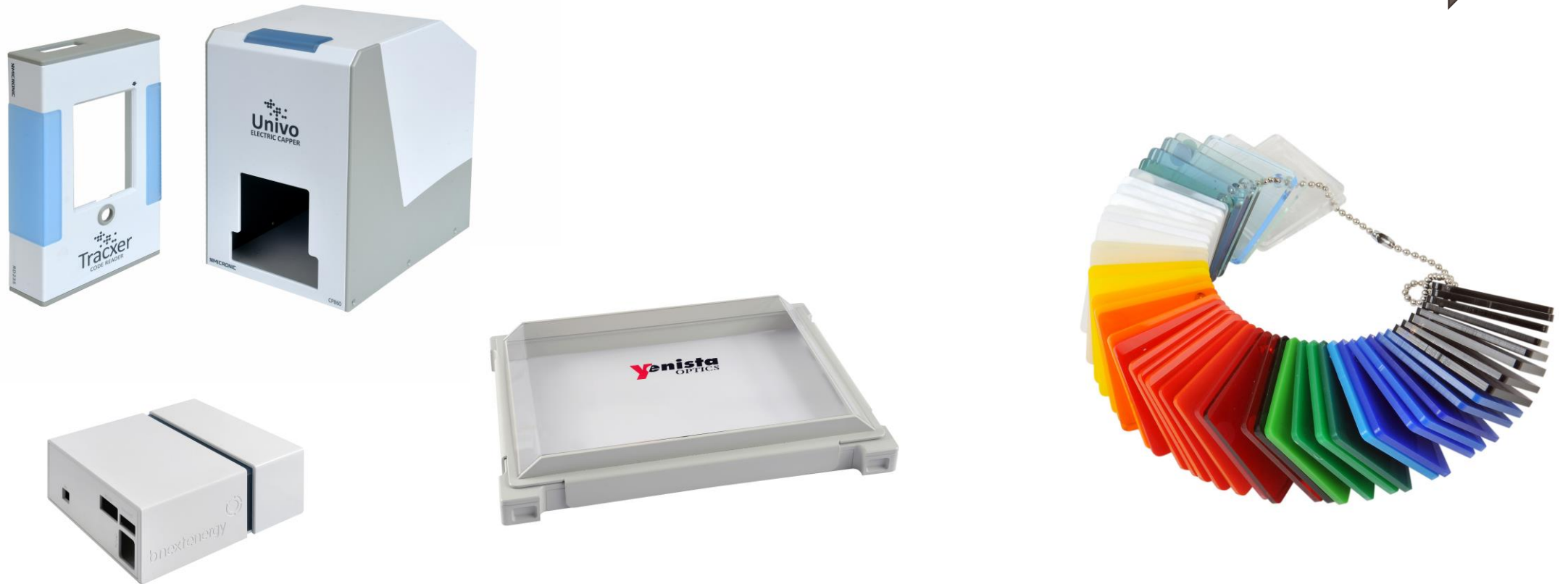
Our standard RAW MATERIALS: ABS, PC, PMMA, PVC (Sheets)



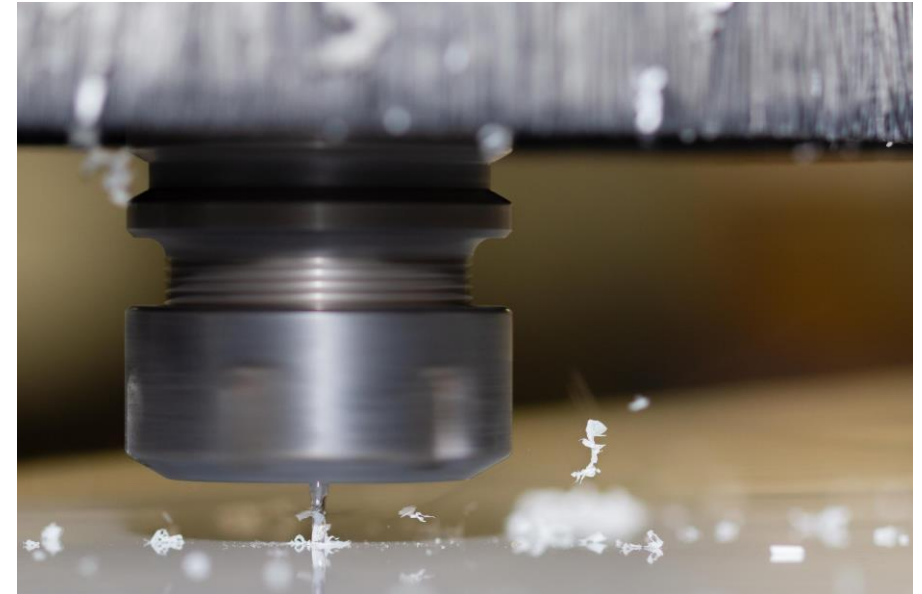
For specific
Information and
technical data:
www.ltp.fr

Upon request: **available UL V-0 certified** ou **GREEN raw materials**

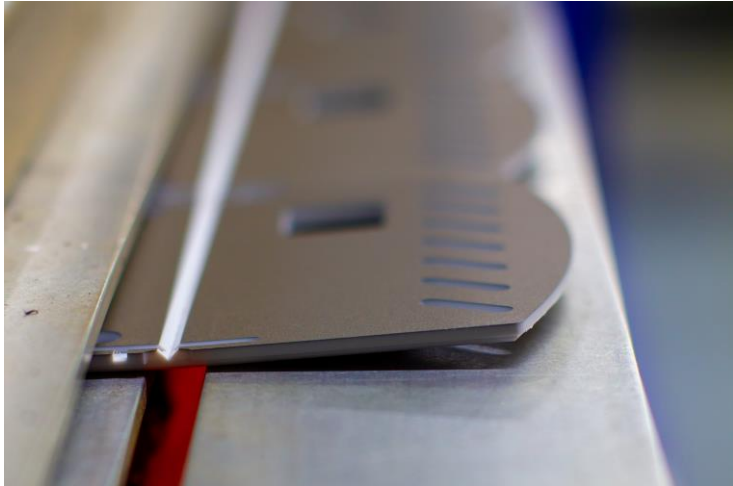
Our special RAW MATERIALS: Transparent, Translucid (Sheets)



Milling flat 2D and 2,5D elementary parts



Bending of “Ls” and “Us” from “flat” parts



INFO bending radius:

Outer radius :

Angled bending : radius = material thickness

Inner radius :

Round hot bending : mini radius = 10mm

Round cold bending : > 200mm



Assembly by chemical welding or gluing or thermo welding

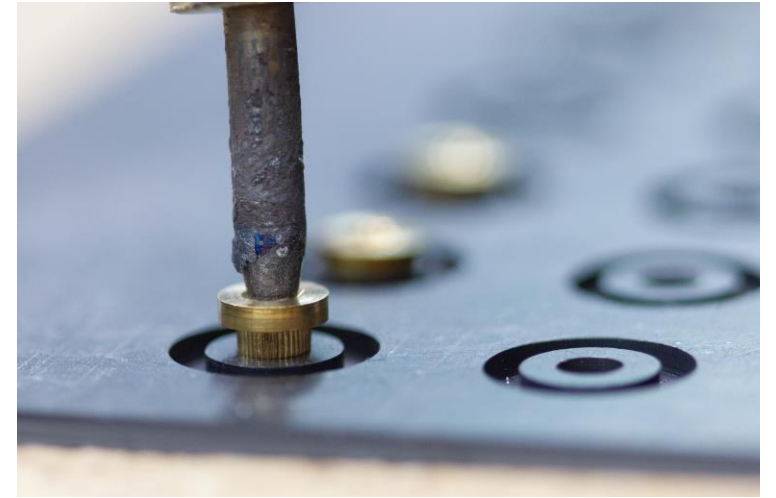
This technology is not adapted for a requirement over IP65!



Chemical Welding

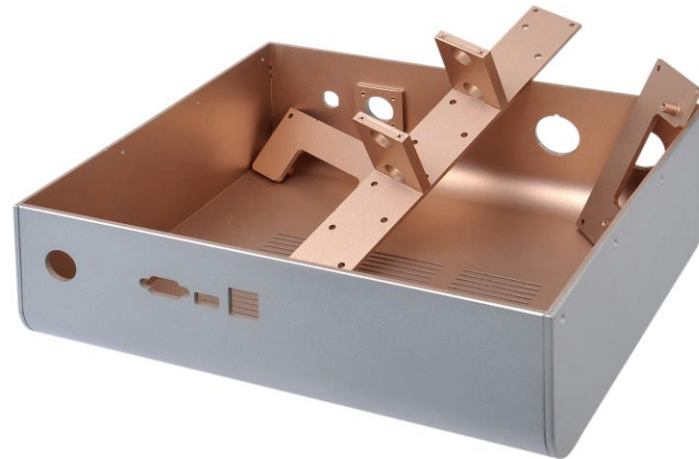


Gluing



Thermo Welding

EMI Copper Paint: Faraday Cage or conductivity





Solutions for electrostatic discharge: ESD clear varnish

- Polyetherimid (PEI)
- Polyetheretherketon (PEEK)
- Polytetrafluorethylen (PTFE)
- Polyamidimid (PAI)

> **Cannot be glued in the plastic sheet bending technology. As an alternative, we can apply a clear anti-static varnish.**

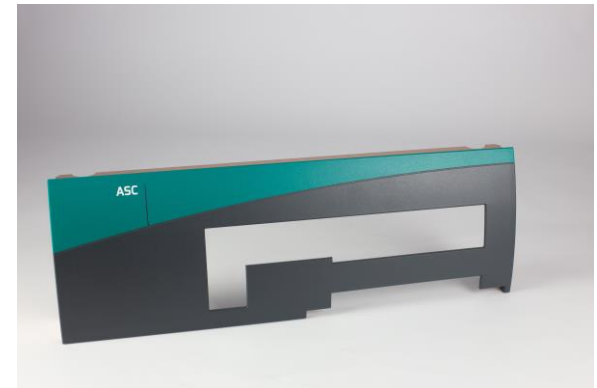


Solutions for watertightness: IP = Ingress Protection

MAXIMUM that can be achieved: IP 65

- Adapted design and mounting of the L & U parts based on the working direction
- Additional seals and gaskets
- Additional sealing paste
- Specific blind inserts

Branding: paint, marking, engraving or accessories





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05

KEY POINTS TO COLLECT

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KEY POINTS TO COLLECT (technical, budget, design)

RELEVANT TO ANY
PLASTIC PROCESSING
TECHNOLOGY

1. Customer, Device, Project (planning, cost structure, budget)
2. Application environnement, restrictions (outside/inside, HMI)
3. Project type (enclosure, part, cover)
4. Technical Specifications (Fire resistance, watertightness max. IP65)
5. Design & Aesthetical Specifications (Finishing)
6. Customer Service (Documentation, Logistics)

THE LTP METHODS for key point collection:

ELECTRONICASE

LTP pre-designed to configure

- ✓ Choose from over 40+ pre-designed models
- ✓ Configure online
- ✓ Generate price offer immediately and online
- ✓ Receive your custom enclosure (proto) from 5 working days



DESIGNCASE

LTP 100% custom designed

- ✓ Fill in the online Checklist
- ✓ Further discuss your project with our technical sales team
- ✓ Receive a price offer within 48hours
- ✓ Receive your custom enclosure (proto) within 2 – 4 weeks.





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06

PROJECTS & QUESTIONS

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Custom design...
...is what we do !

Visit us at booth 17 and
find out more about our technology!

1/ JOINT LINE: The main and inevitable characteristic

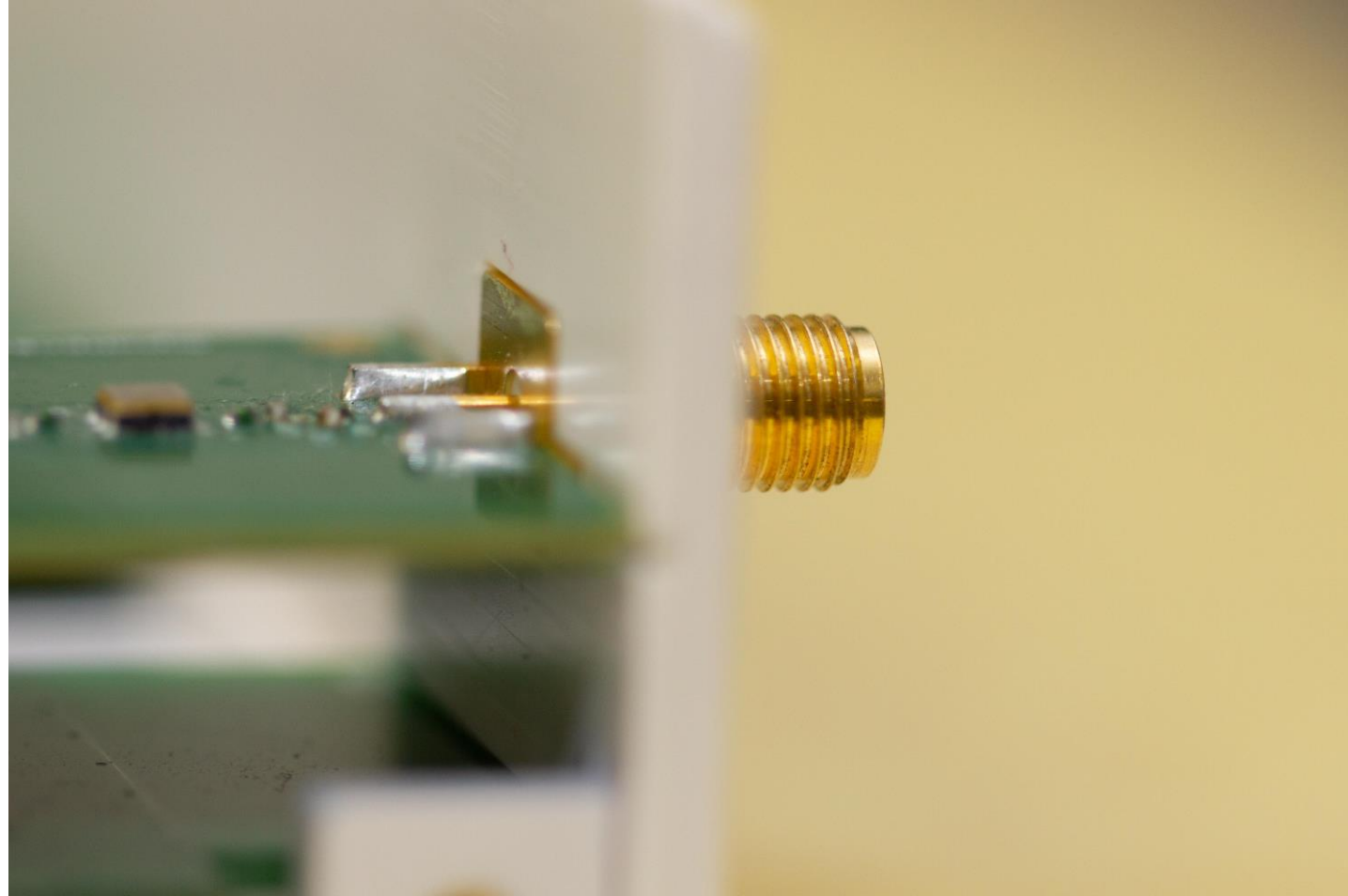


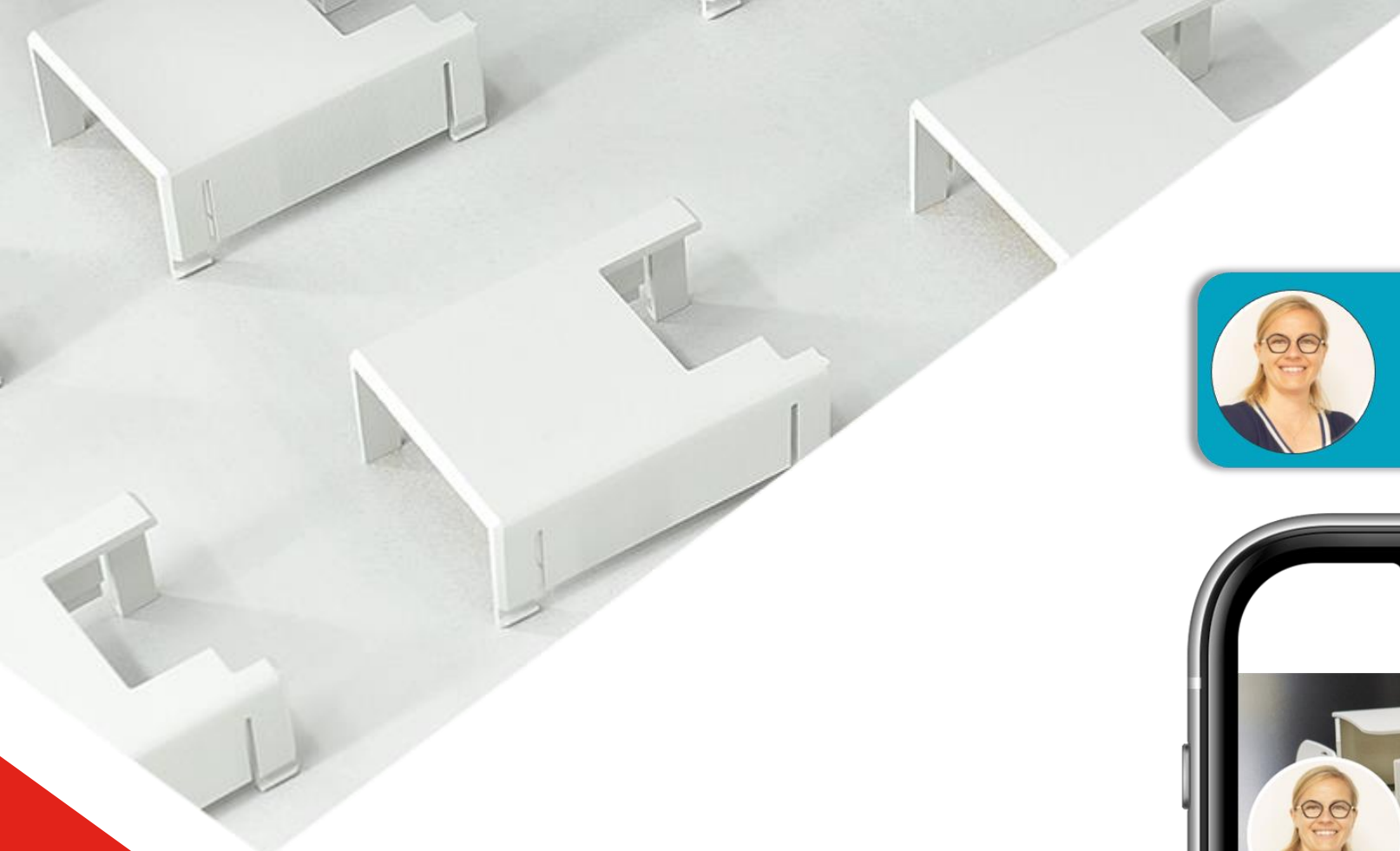
For medical devices : It is important to specify the working direction of the device to adapt the location of the joint line and facilitate cleaning.

2/ Industry: Fixing and anti-vibration solutions

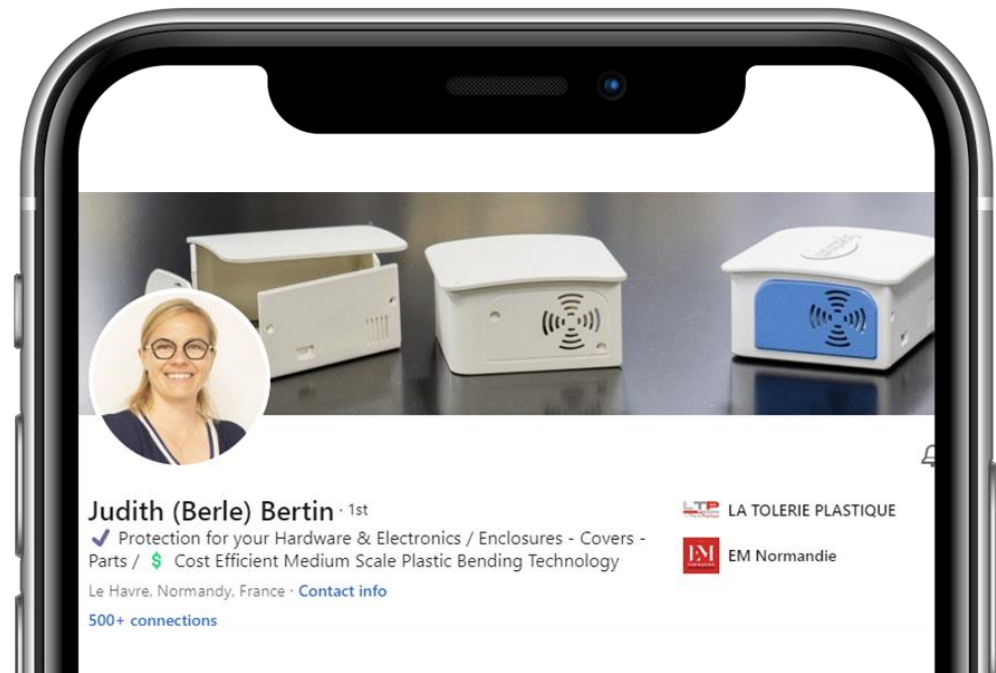


3/ Service & IoT: Space Optimisation





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1931 Congressentrum 's-Hertogenbosch

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