

文
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Fine and advance ceramic





What are ceramic?

- Oxide
 - ZrO_2 , Al_2O_3
 - 絕緣/耐溫
- Nitride
 - TiN , CrN , AlN , Si_3N_4
 - 外觀/高導熱
- Carbide
 - WC , SiC , CrC , TiC
 - 硬化/耐磨

Pottery 陶

Ceramic 磁

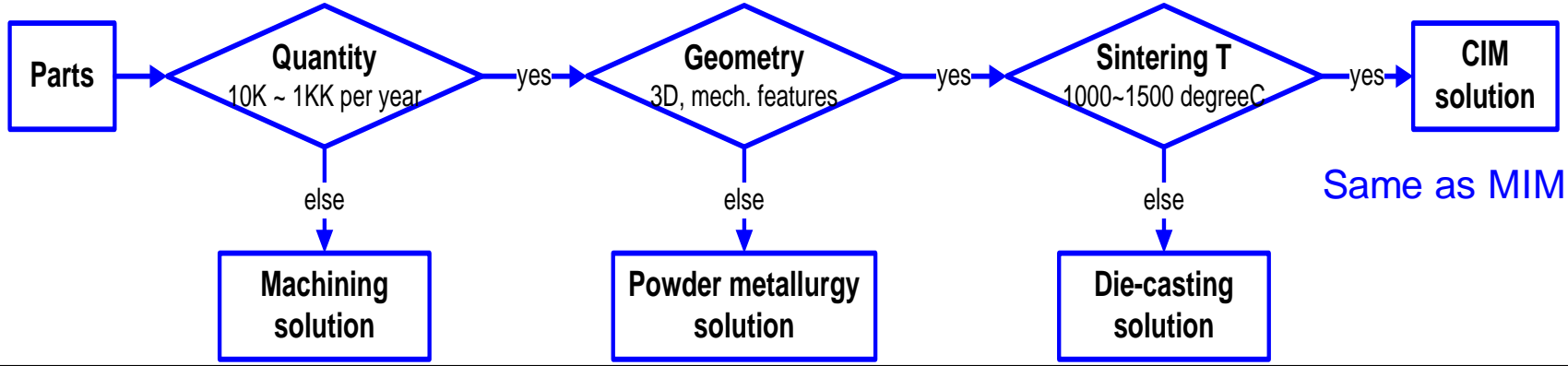


Why CIM?

A cost effective method of producing small & complex ceramic components in high volume.

Candidates for adopting CIM solution

- 1) Relative small in size (Under 30x30X5mm) parts and weighting light or less makes better cost effectiveness
- 2) Complex in shape nearly net-shape, molding mechanical features with tight tolerance in one shot]
- 3) High volume production

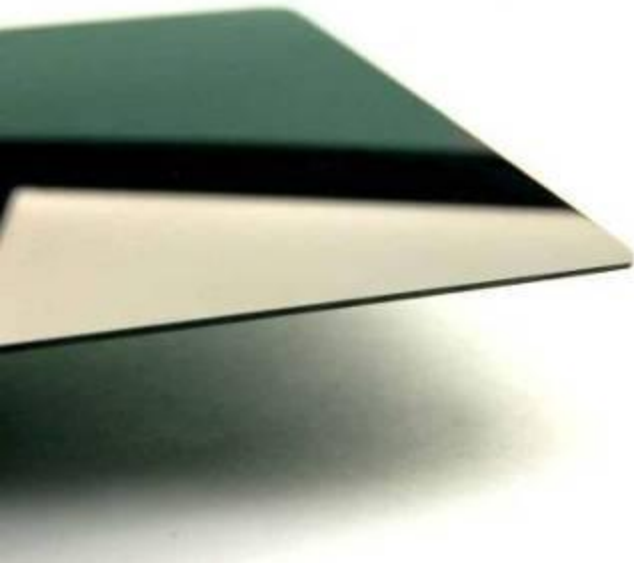




- 1. CIM Advantages***
- 2. CIM Application***
- 3. CIM Key Process***
- 4. CIM Lead time***
- 5. CIM Covering***
- 6. CIM Decoration***
- 7. CIM Road Map***
- 8. CIM Design Rule***

1. CIM Advantages

Mirrored glass / glass look



Lacquer look



Jewelry effect



1. CIM Advantages

- 
- Advantage of Ceramic :***
- Cool feel***
 - Hard & soft touch***
 - Corrosion resistant***
 - Fire resistant***
 - Wear resistant***
 - Heat insulation***
 - RF (Radio Frequency) transparent***

2. CIM Application

2.1 Housing & Cover



A collage of mobile phone screens and keyboards. The top left shows a 'WIFI' button. The top center shows a screen with the number '32'. The top right shows a screen with 'NEW communication' and various icons.

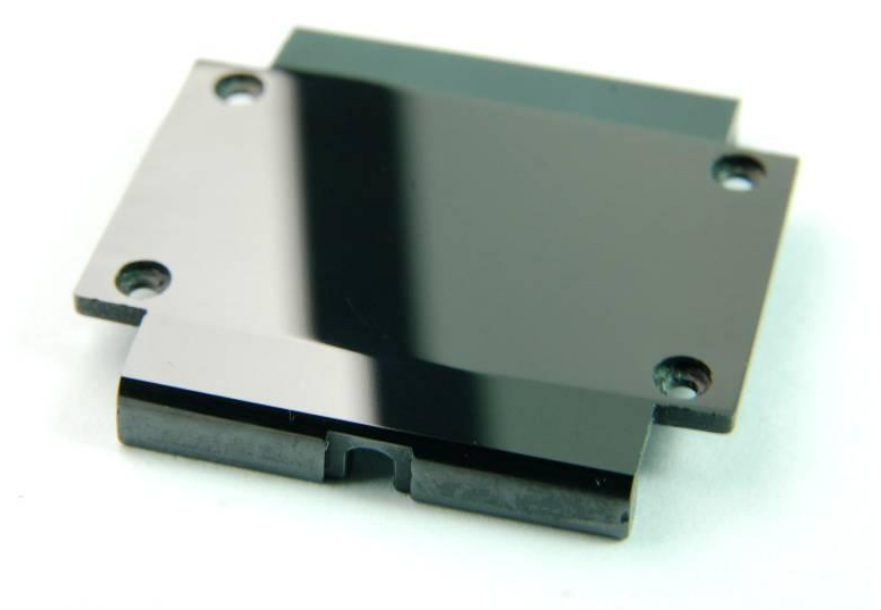
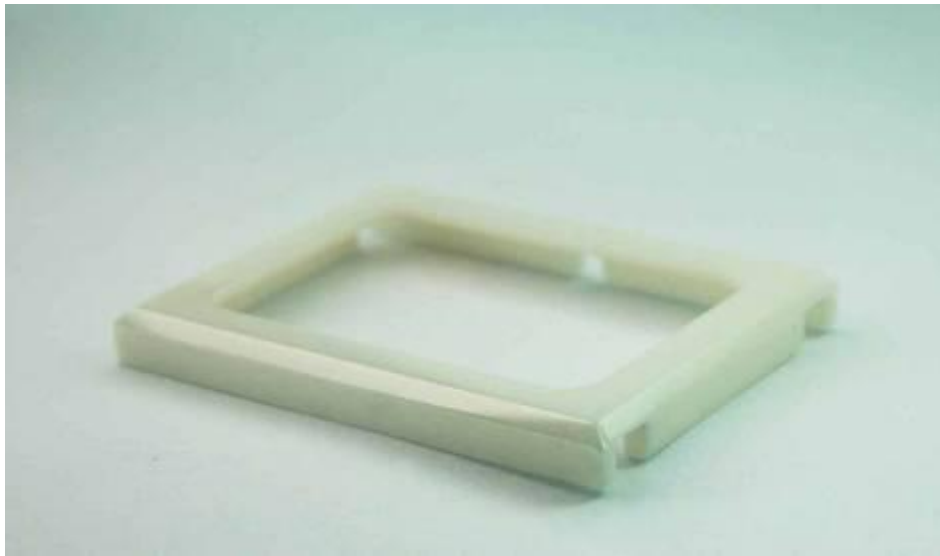
2. CIM Application

2.1 Housing & Cover



2. CIM Application

2.1 Housing & Cover



2. CIM Application

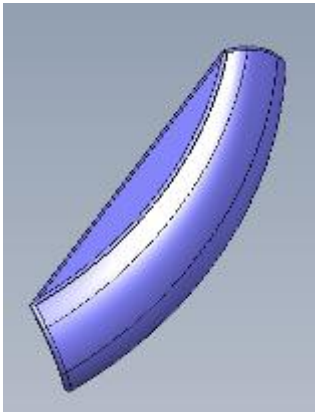
2.1 Housing & Cover

PART A : Ceramic * 1

PART B : Plastic * 2



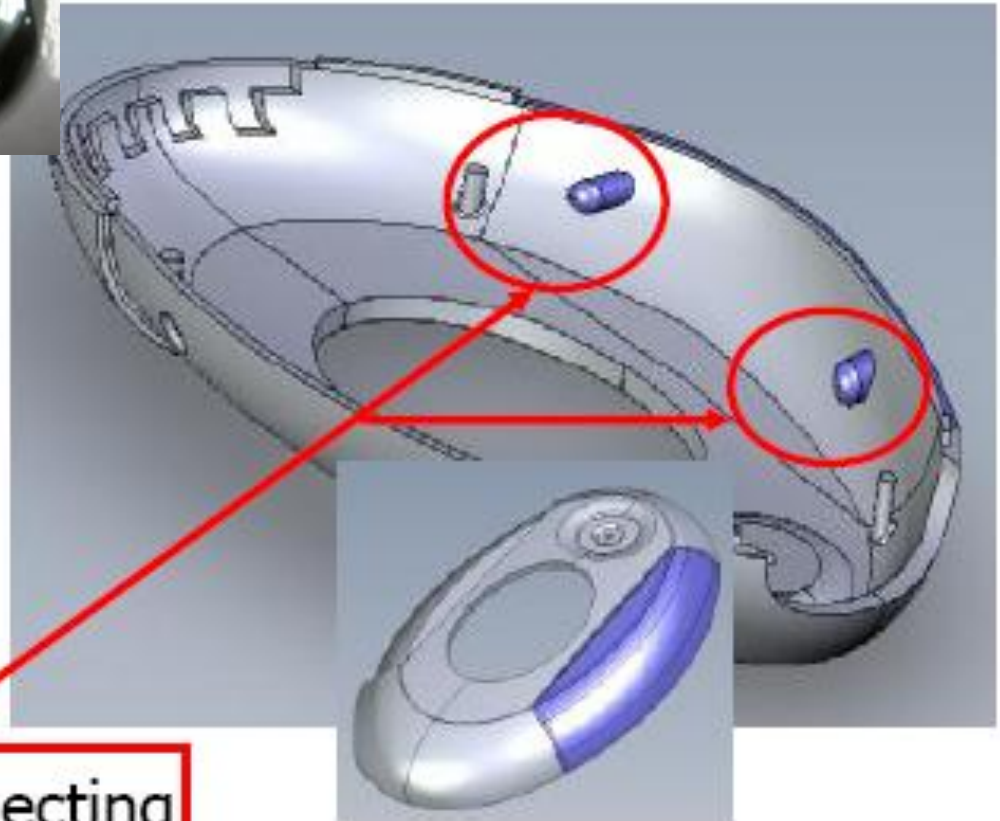
PART A



PART B

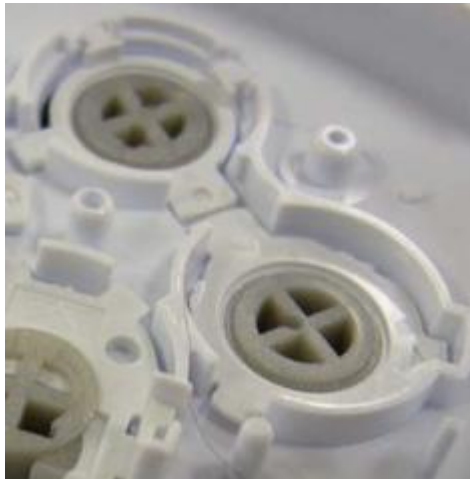
Plastic Connecting

Thermal melting connection



2. CIM Application

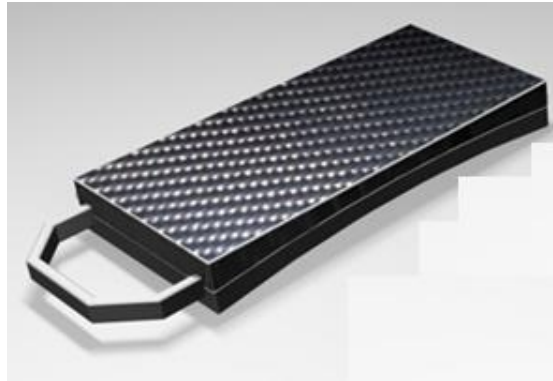
2.2 Key and Button



2. CIM Application

2.3 Decoration

1) Key chain:
MIM + CIM



2) Insert :

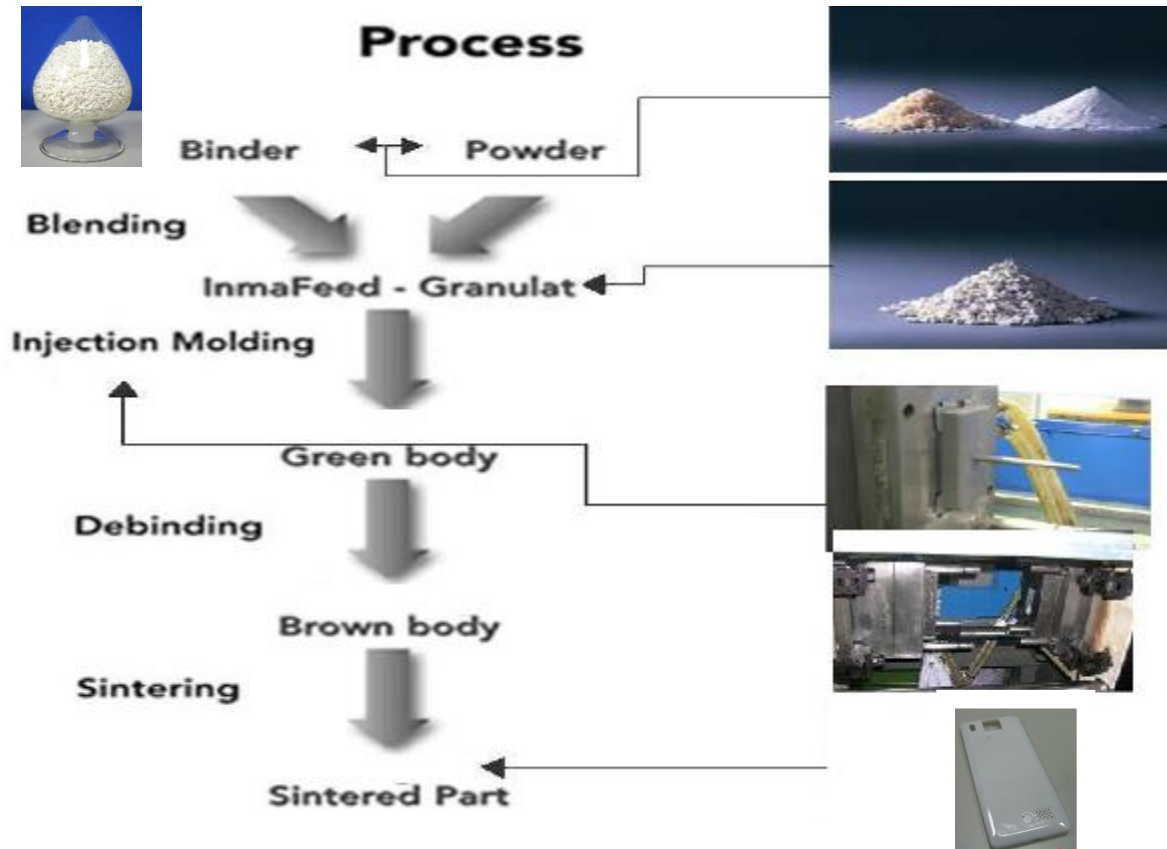


3. CIM Key Process

CIM = Ceramic Injection Molding

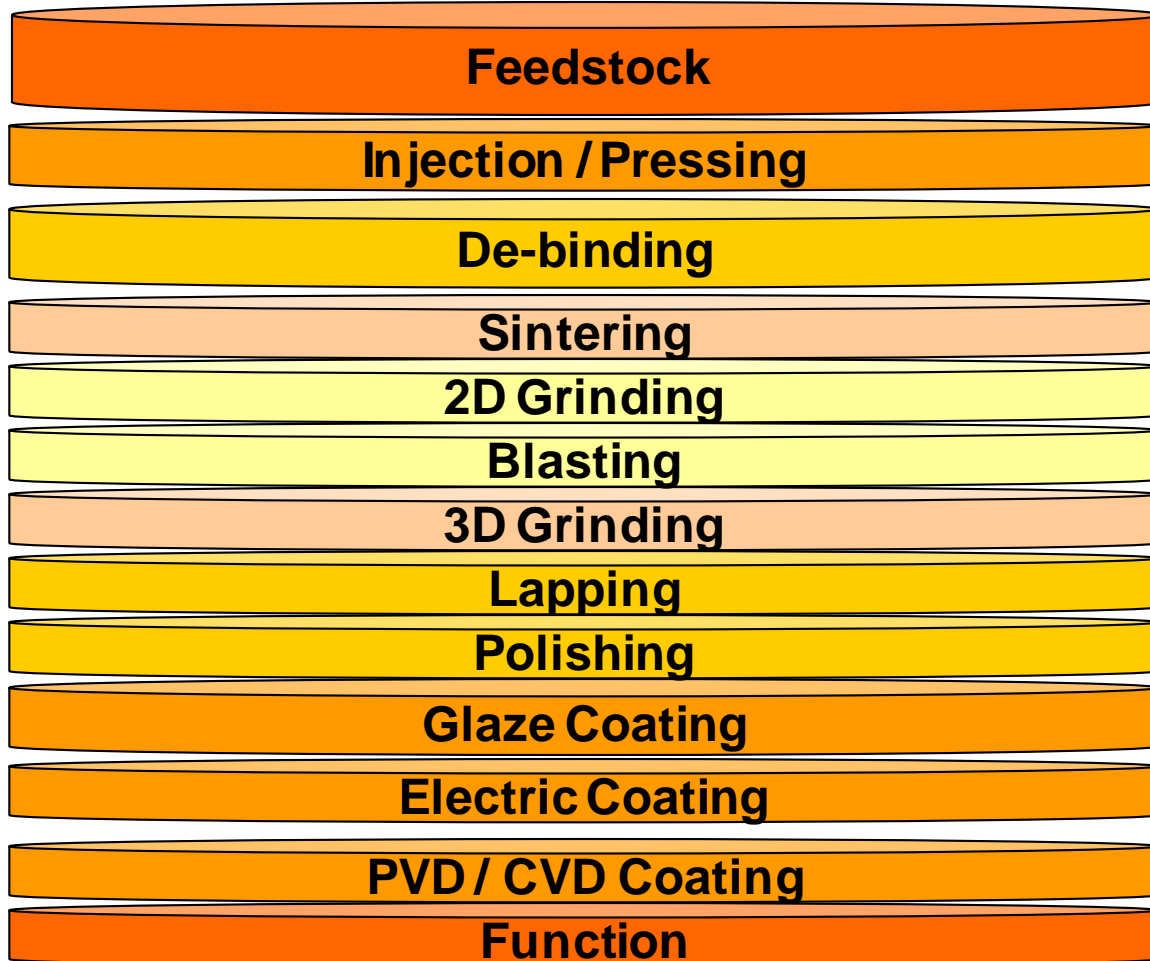
3.1 Molding:

Feedstock → Injection → De-binding → Sintering



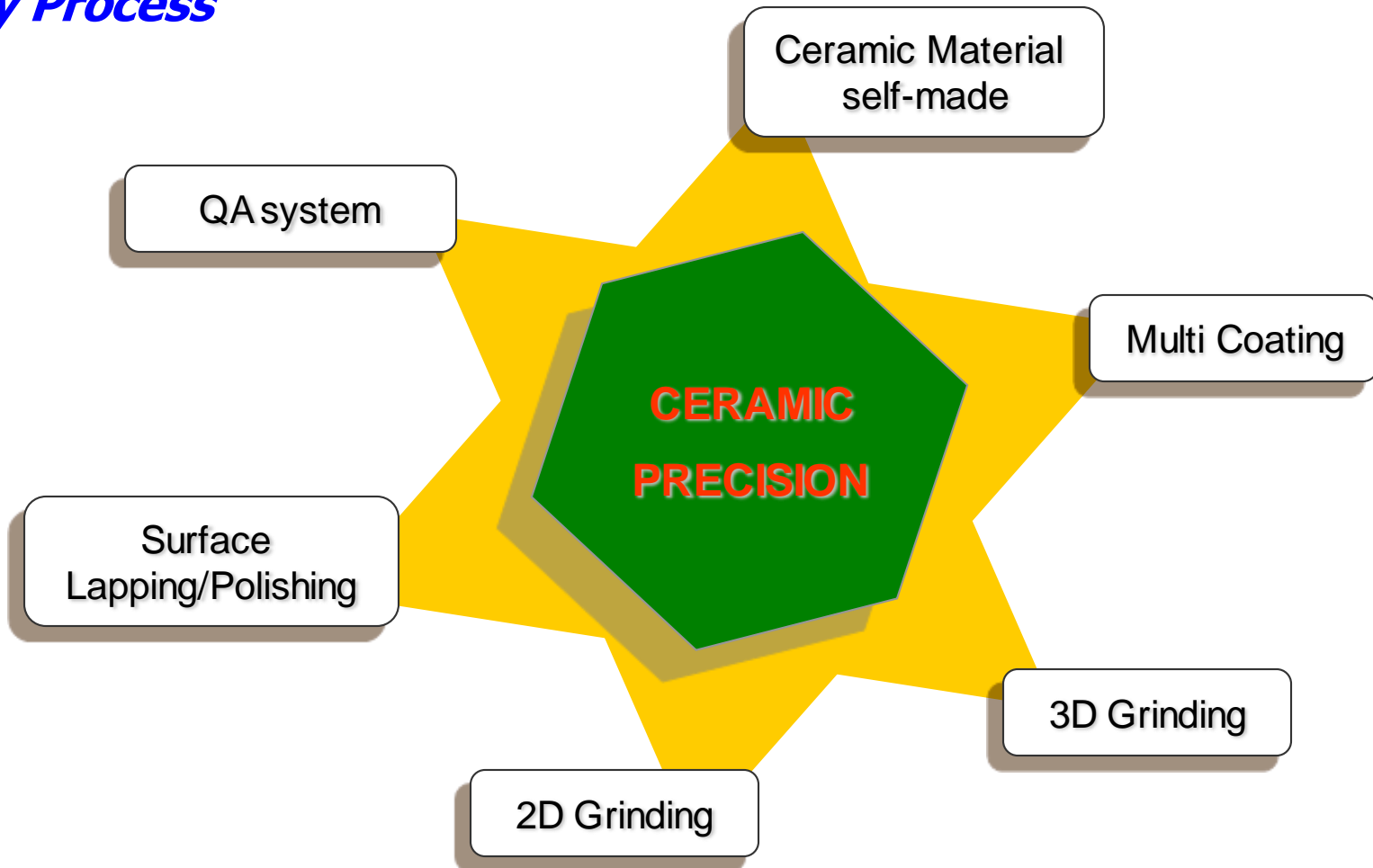
3. CIM Key Process

Ceramic Molding Manufacturing Process



3. CIM Key Process

Key Process



3. CIM Key Process

3.2 Grinding :



Plane grinding :

Segment :



3. CIM Key Process

3.2 Grinding :

Segment :

1 mm

Plane grinding :

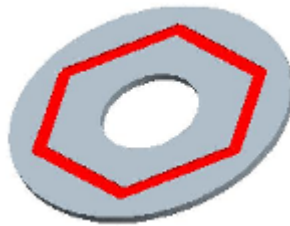
Min 0.4 mm

3. CIM Key Process

3.3 Cutting : 2D / 3D cutting for light effect



2D Cutting

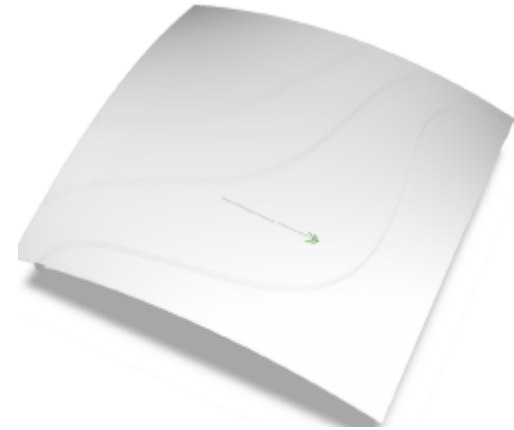
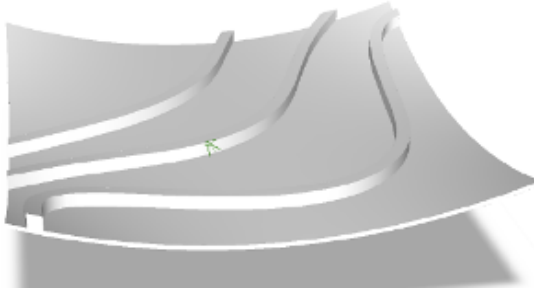


3D Cutting



3. CIM Key Process

3.3 Cutting : 2D / 3D cutting for light effect



3. CIM Key Process

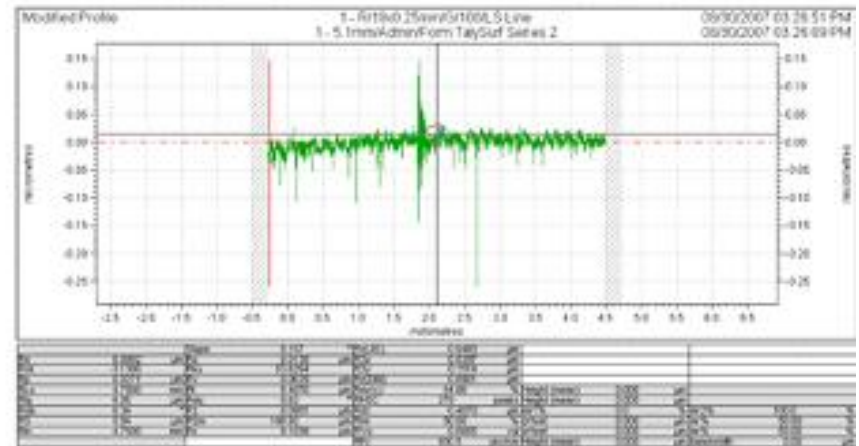
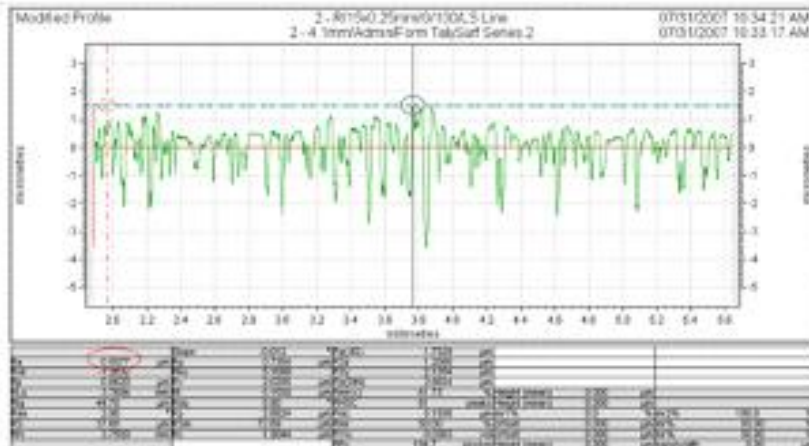
3.4 POLISHING :

Step1 : SUFACE PLAT → Step 2 : DEADEN → Step 3 : LUSTER

Reference only :

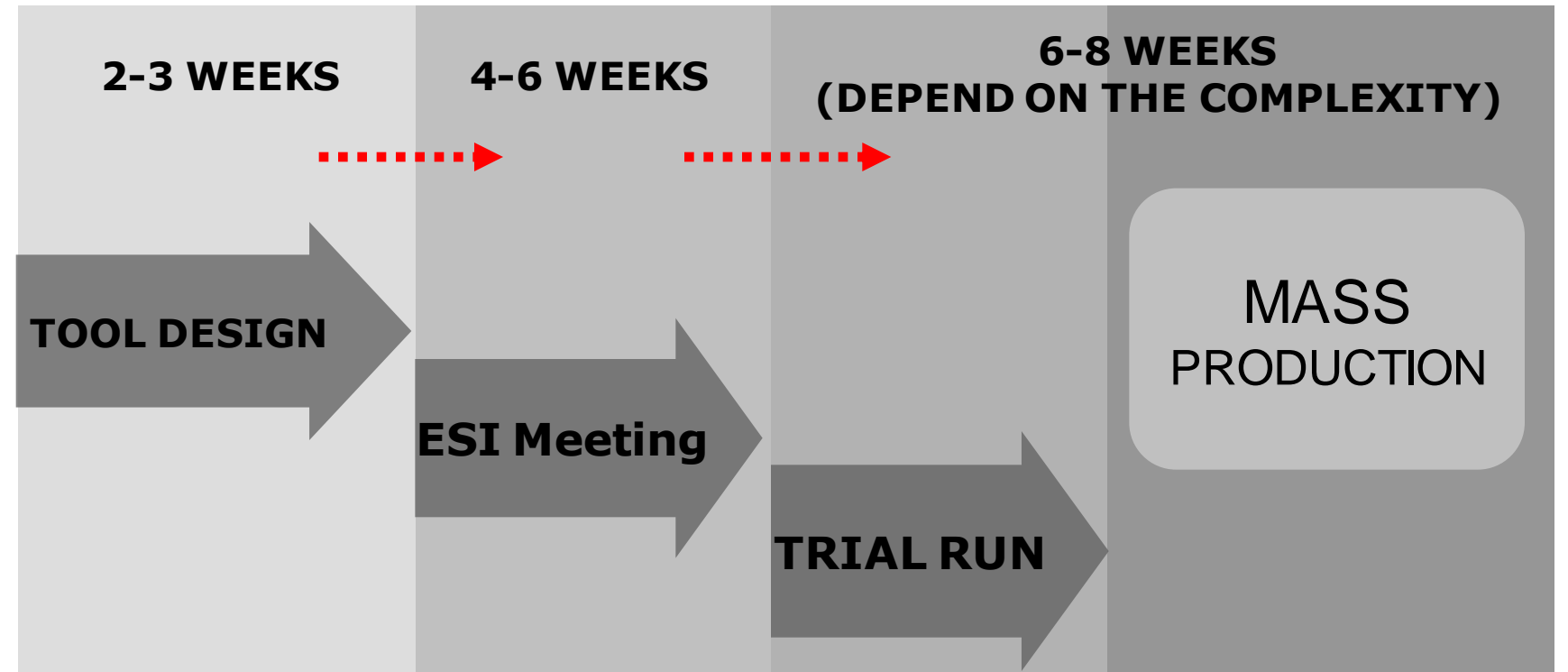
BEFORE POLISHING Ra0.55um

AFTER POLISHING Ra0.0092um



4. CIM LEAD TIME

TOOL LEAD TIME : 2-4 MONTHS



5. CIM Covering

5.1 COVERING :



Using the cover, input the ceramic part in the part that will cover the side with MIM or Metal stamping.



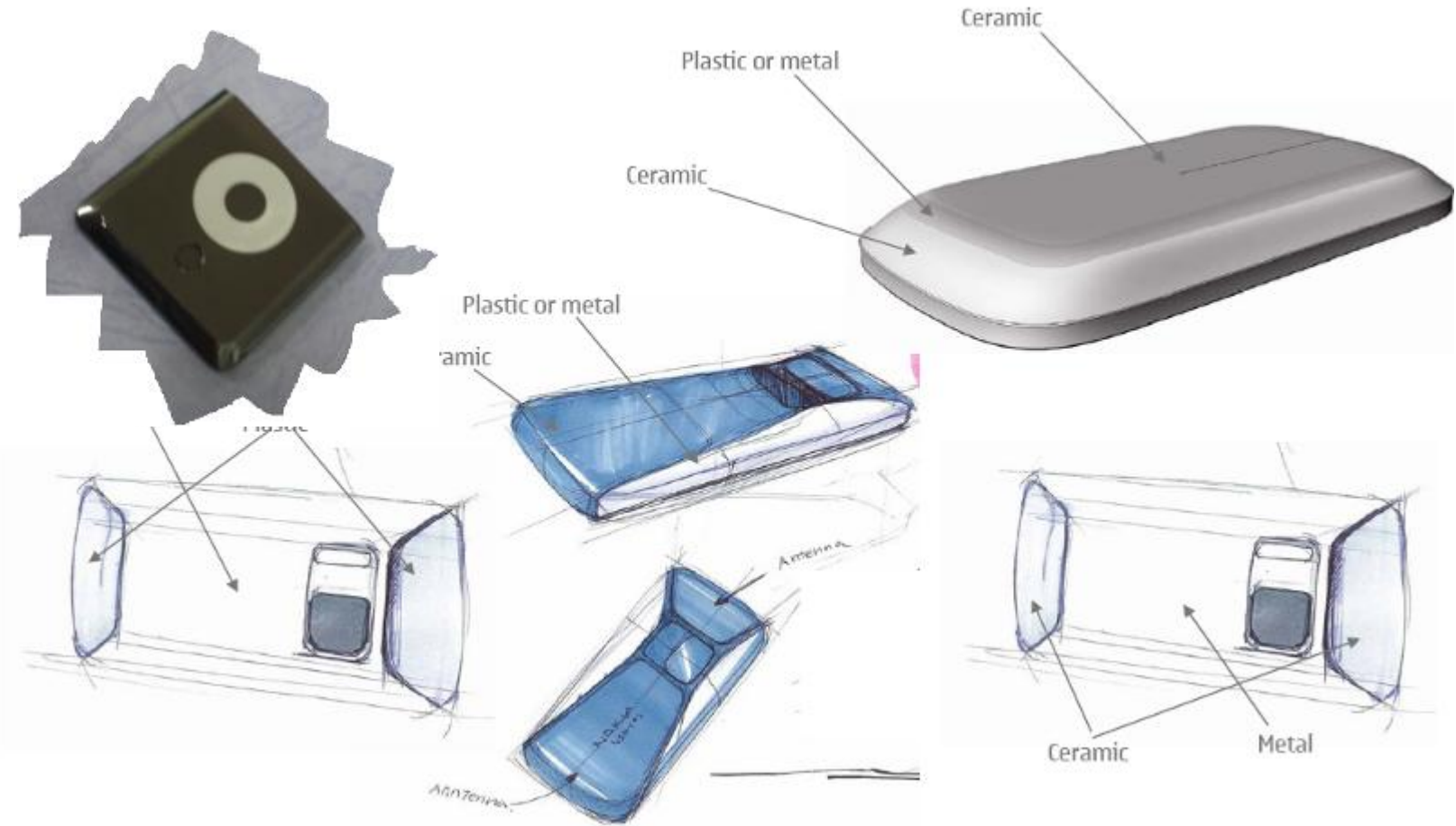
5. CIM Covering

5.2 Ceramic Bonding :



5. CIM Covering

5.2 Ceramic Bonding :

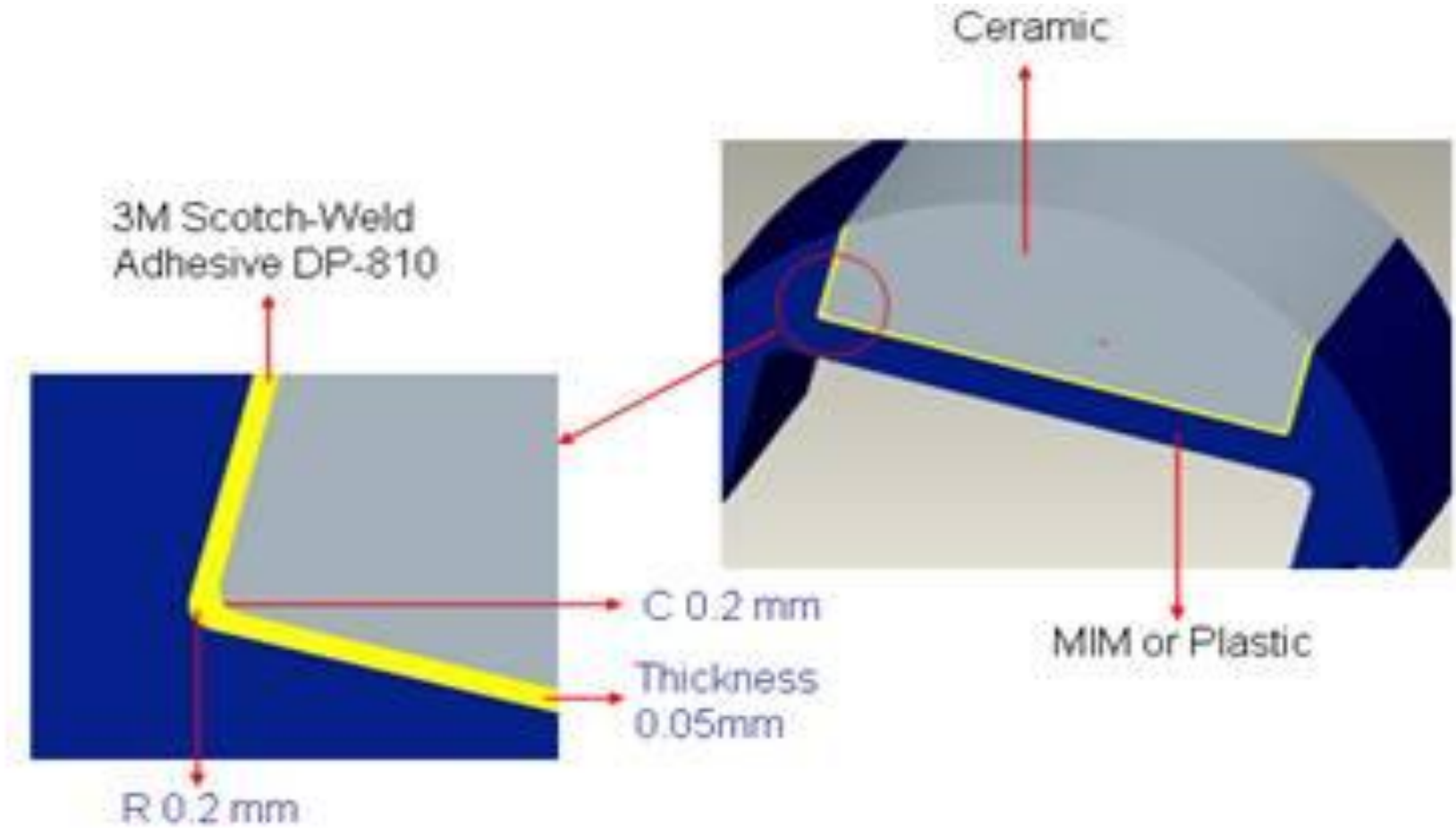


Idea : Ceramics can insert ceramic / MIM (SUS)/Plastic part

Company Confidential

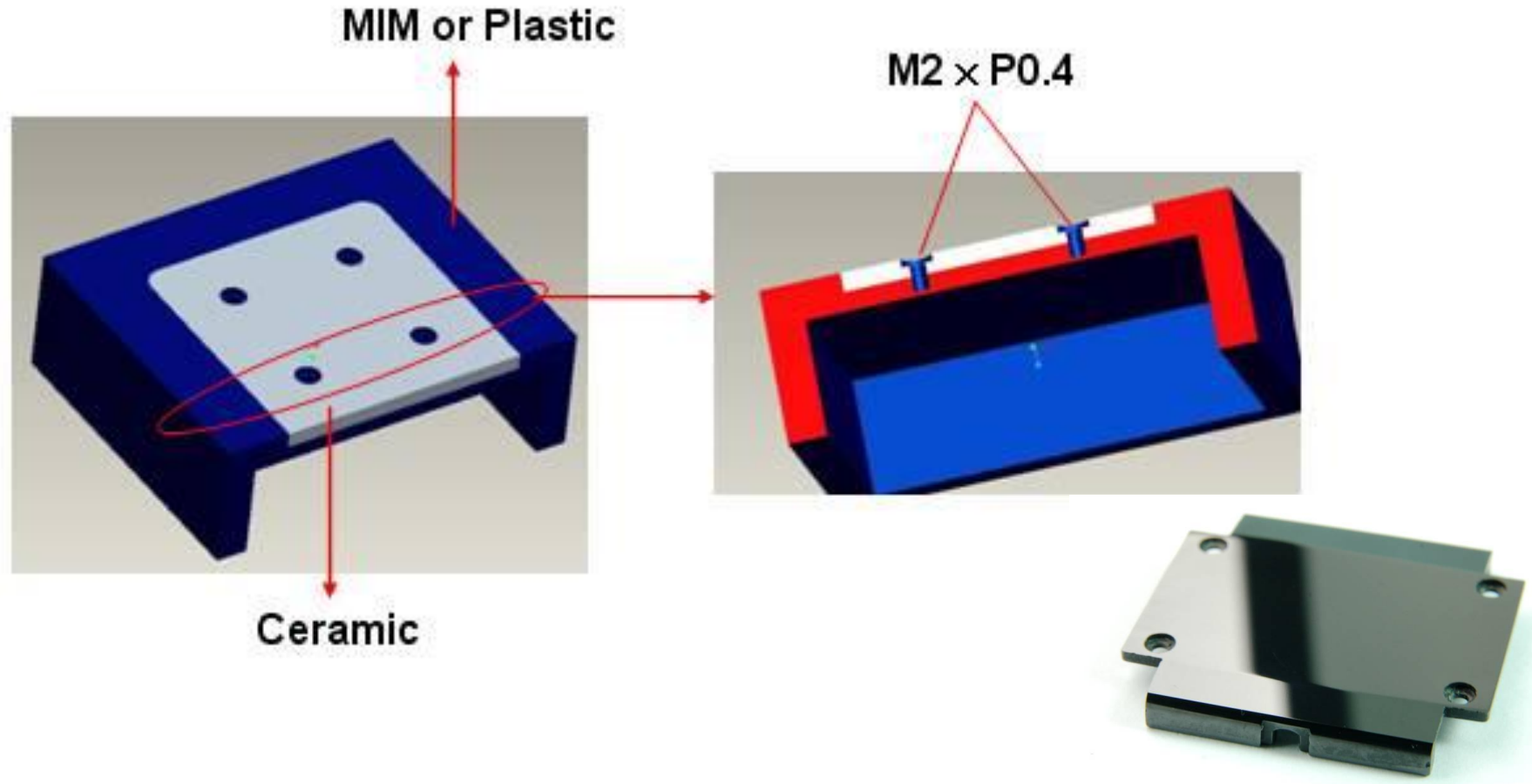
5. CIM Covering

5.2 Ceramic Bonding :



5. CIM Covering

5.2 Ceramic Bonding :



5. CIM Covering

5.2 Ceramic Bonding :



6. CIM DECORATION

6.1 Glaze Print coating



6. CIM DECORATION

6.2 Glaze coating



6. CIM DECORATION

6.3 PVD coating :

Coating the metal such as Ti, Nitrides on ceramic.



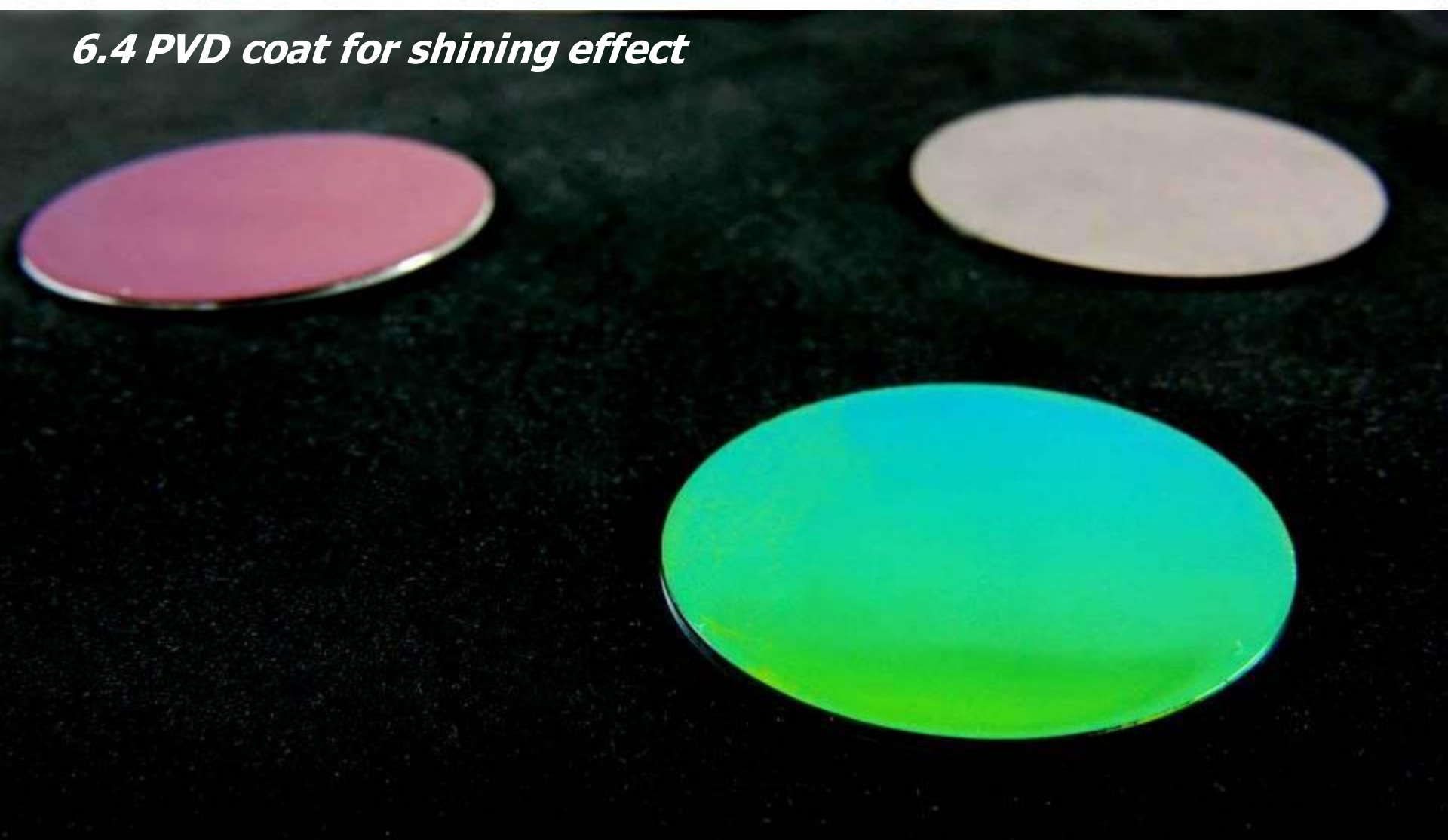
6. CIM DECORATION

6.4 Anole coat : Use the PVD coat for shining effect



6. CIM DECORATION

6.4 PVD coat for shining effect

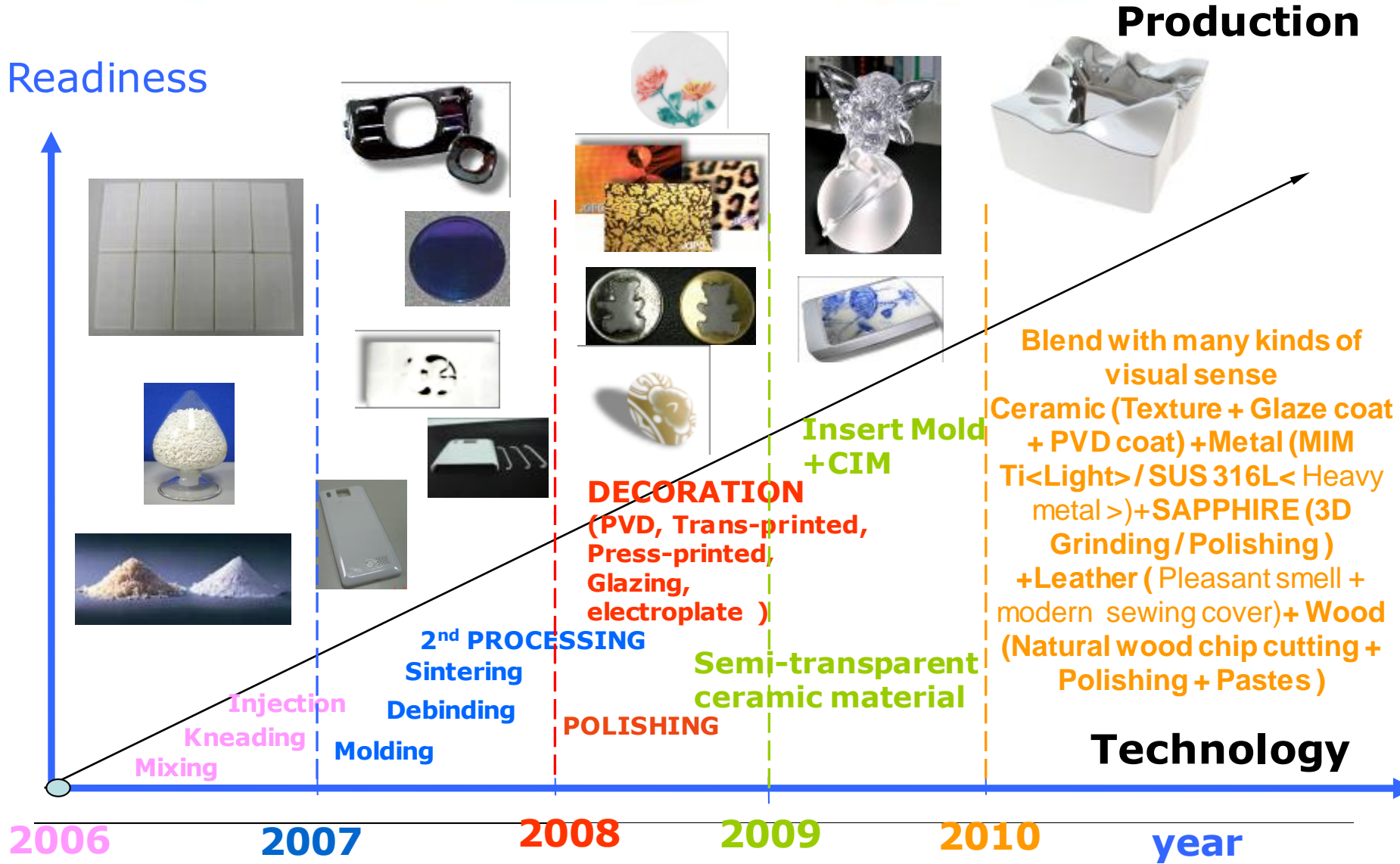


6. CIM DECORATION

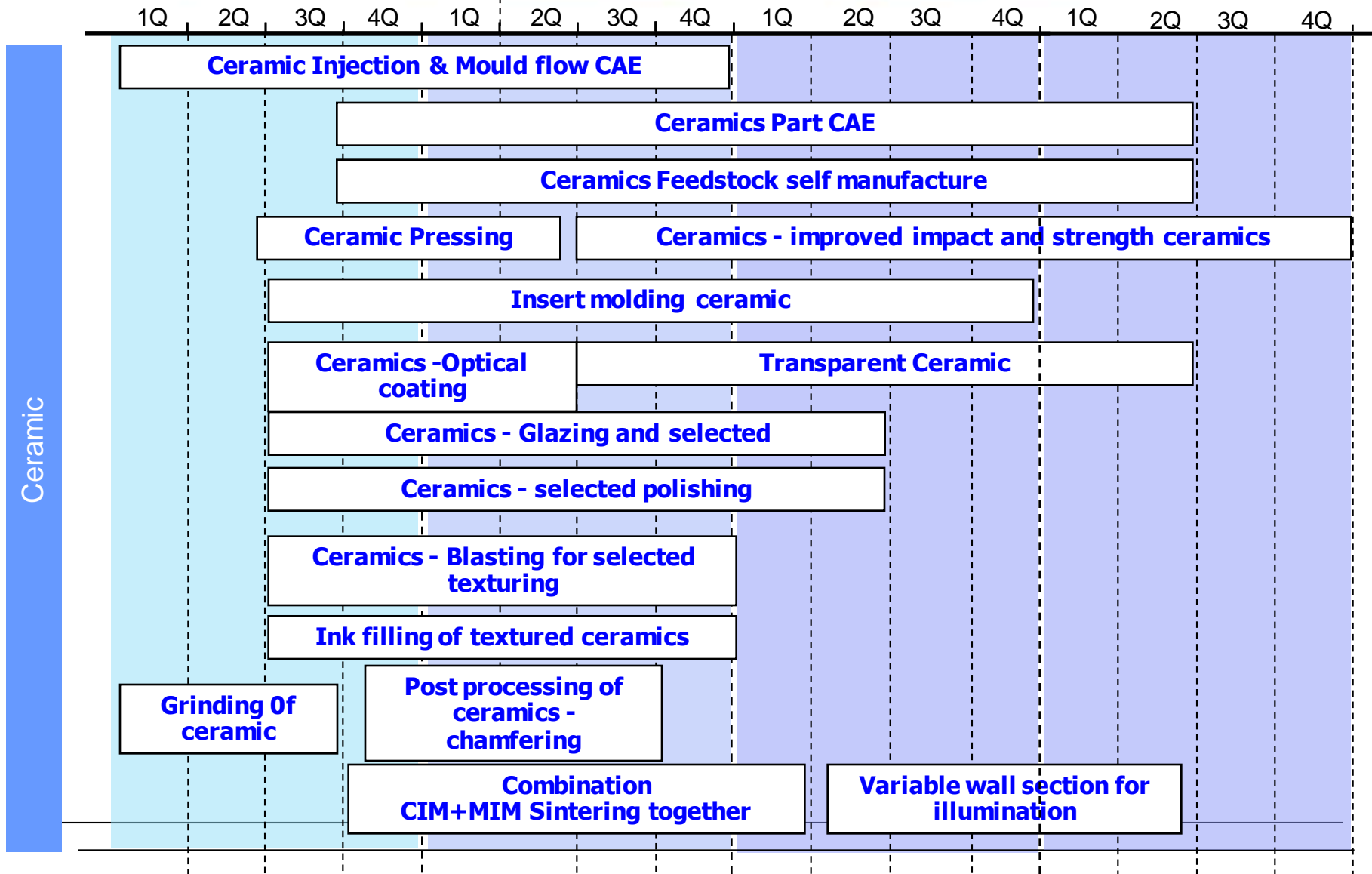
6.5 Blasting:



7. CIM ROAD MAP



7. CIM ROAD MAP



8. CIM DESIGN RULE

Design guide:

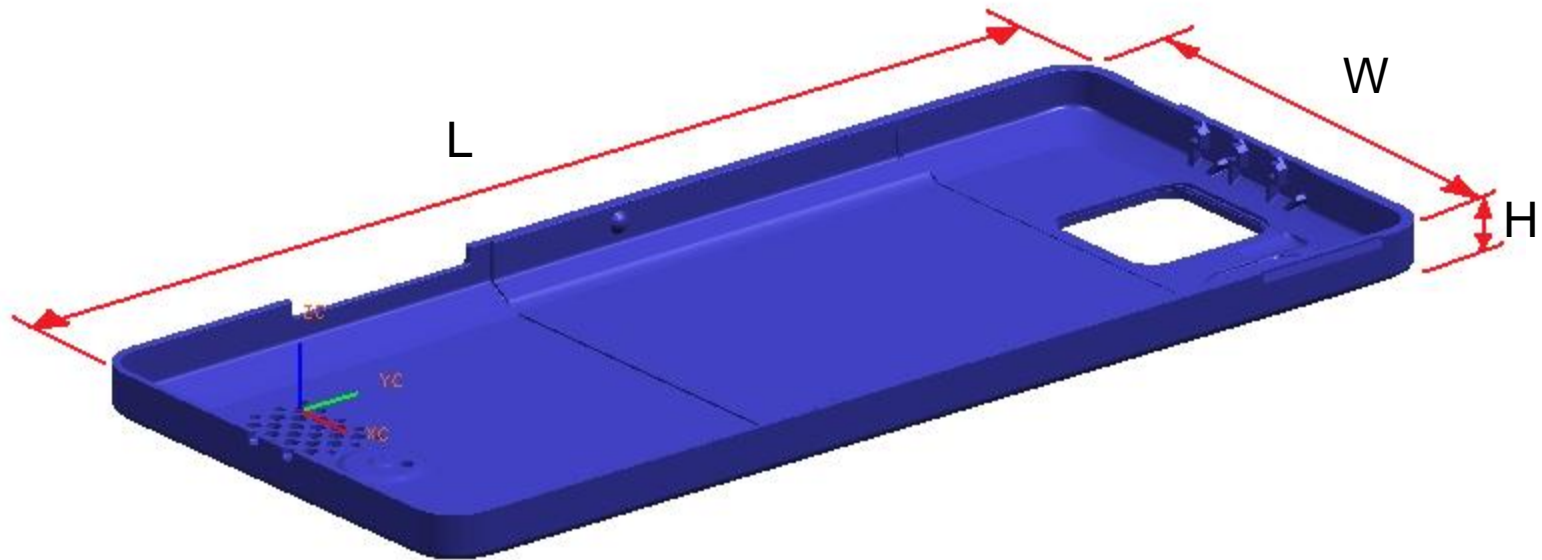
Dimensional tolerance (\pm mm)	dimension	standard	special
	~5	0.05	0.02
	5~10	0.10	0.04
	10~20	0.15	0.07
	20~30	0.25	0.12
	30~50	0.30	0.18
Angle	$\pm 3^\circ$		
Surface roughness	$R_{\max} : 6S \sim 12S$		

8. CIM DESIGN RULE

Design guide of CIM – SIZE

Suggestion : Largest dimension below 50 mm

$L_{\max} \leq 50\text{mm}$ / $W_{\max} \leq 40\text{mm}$ / $0.5 \leq H \leq 5\text{mm}$

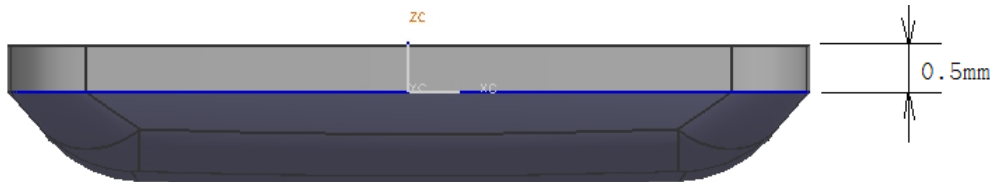
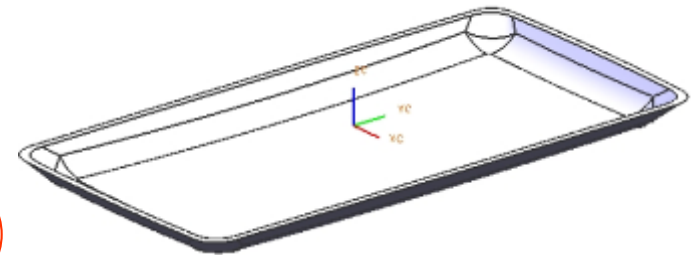


8. CIM DESIGN RULE

Design guide of CIM – Edge

Suggestion : Edge too sharp that easy to break when polishing

must keep wall min 0.5mm

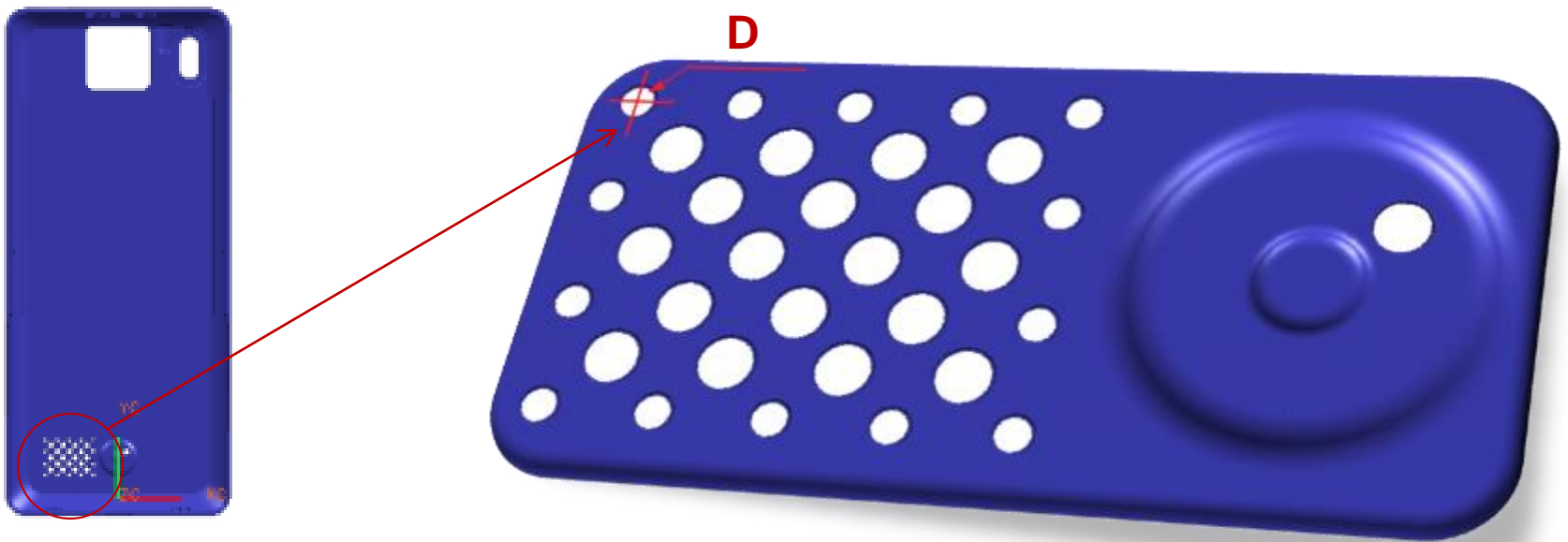


8. CIM DESIGN RULE

Design guide of CIM – Hole

Suggestion : Smallest hole diameter 0.5mm

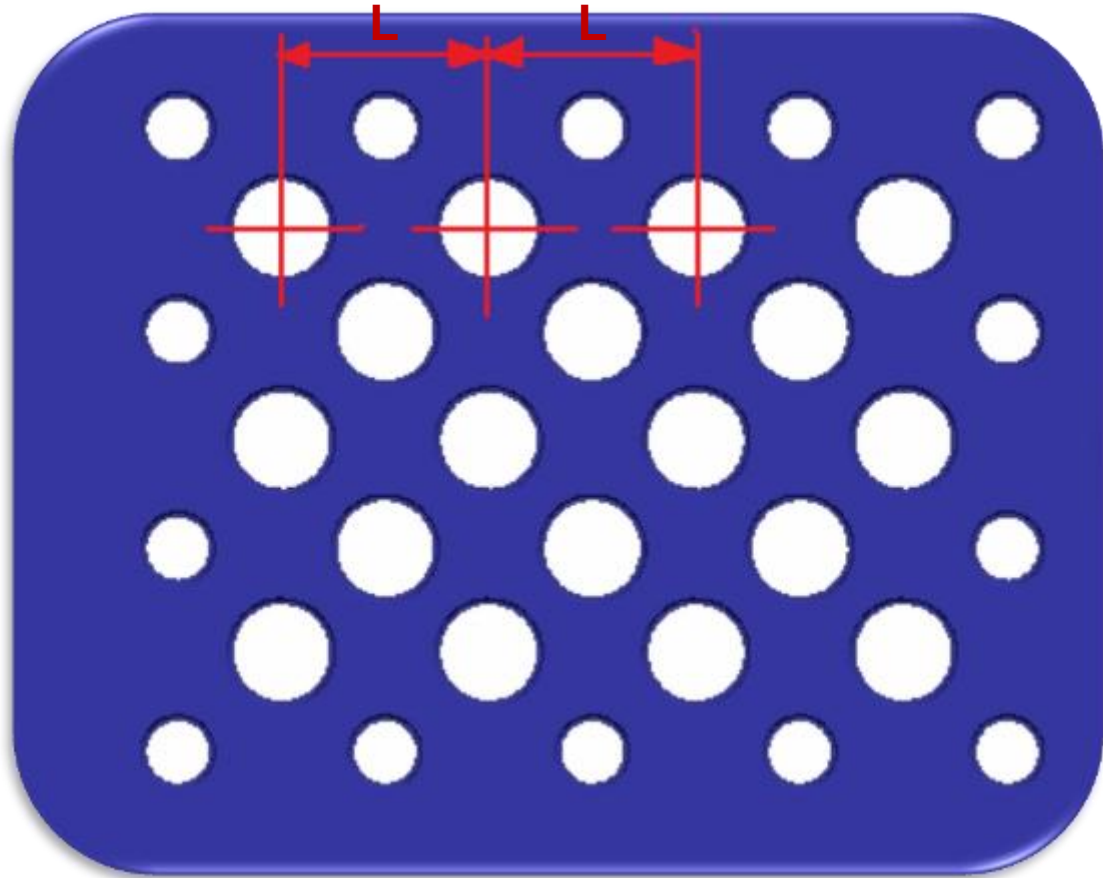
$$D_{\min} \geq 0.5\text{mm}$$



8. CIM DESIGN RULE

Design guide of CIM – Distance for hole

$$L_{\min} \leq 2.5\text{mm}$$

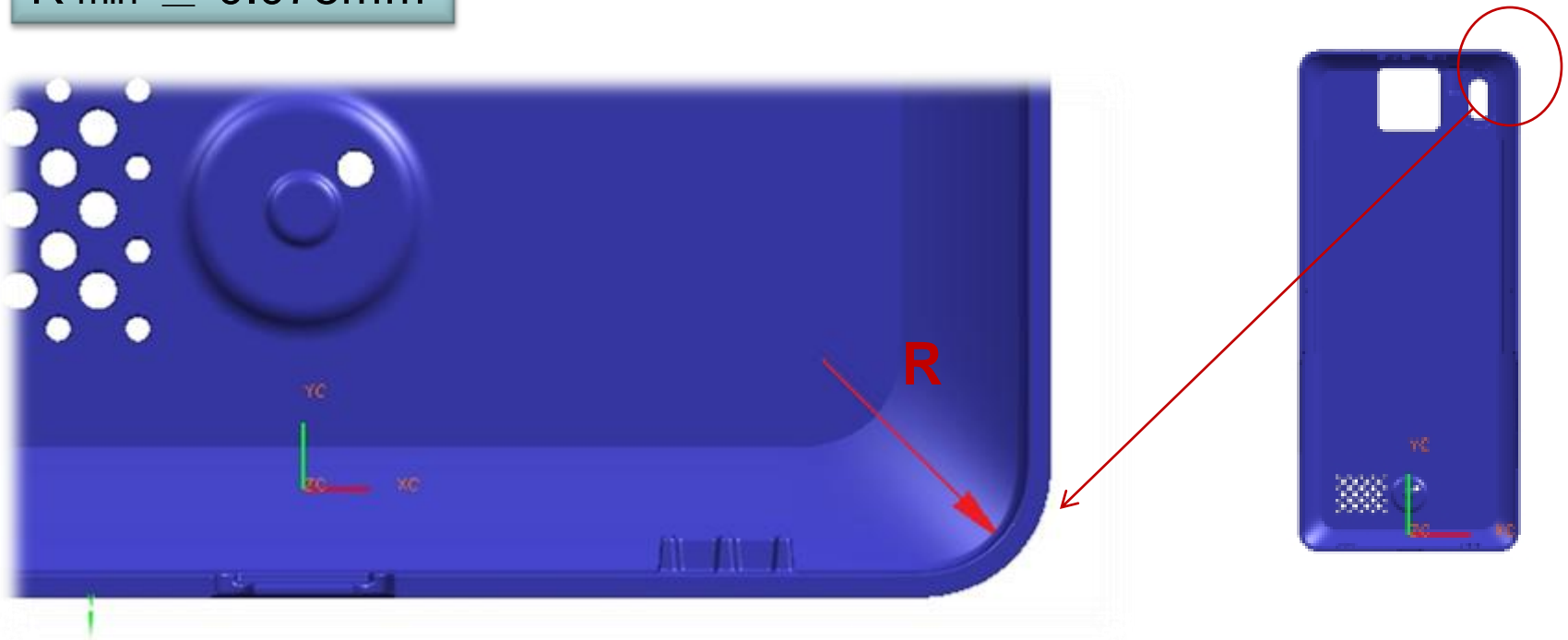


8. CIM DESIGN RULE

Design guide of CIM – Radius

Suggestion : Corner radius greater than 0.075 mm

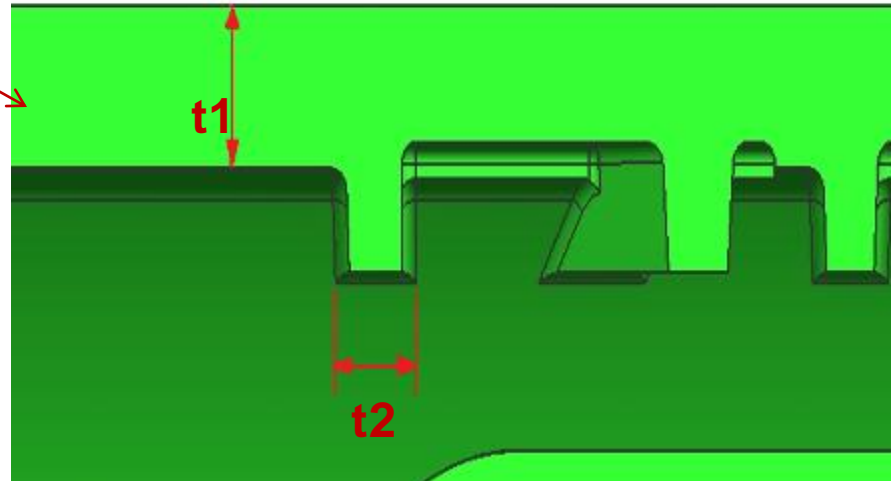
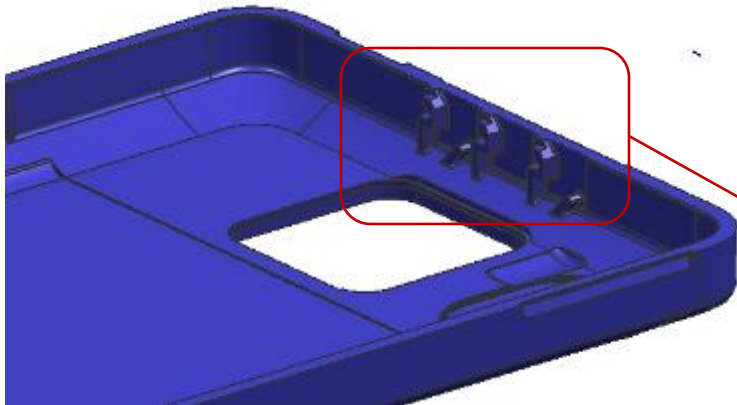
$$R_{\min} \geq 0.075\text{mm}$$



8. CIM DESIGN RULE

Design guide of CIM – Rib

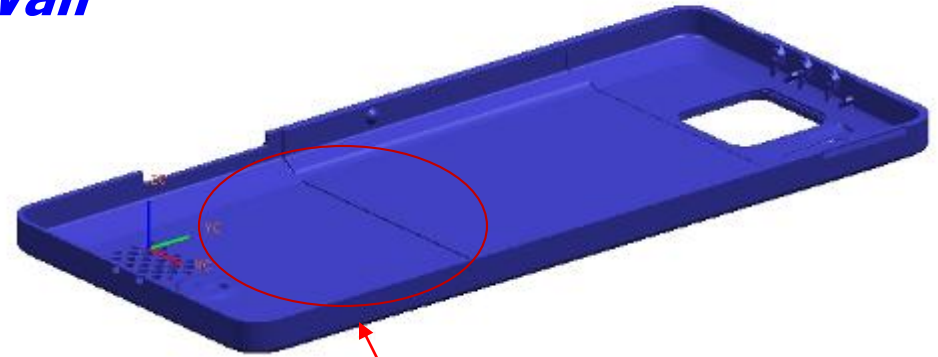
$$t2 = 2/3t1 \sim 3/4t1$$



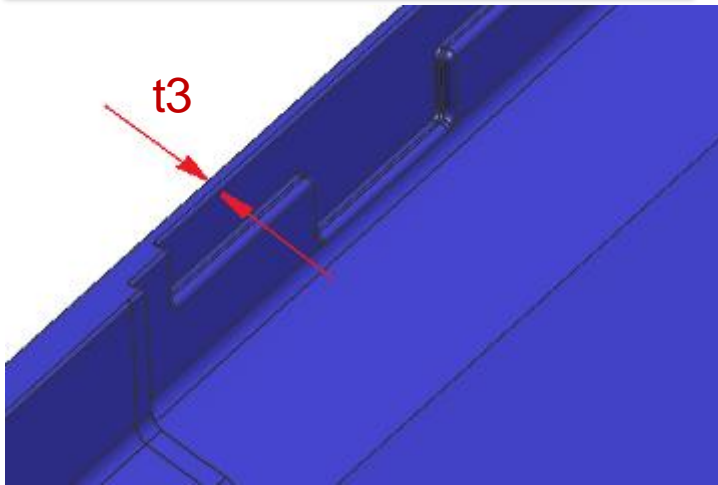
8. CIM DESIGN RULE

Design guide of CIM – Stage / Wall

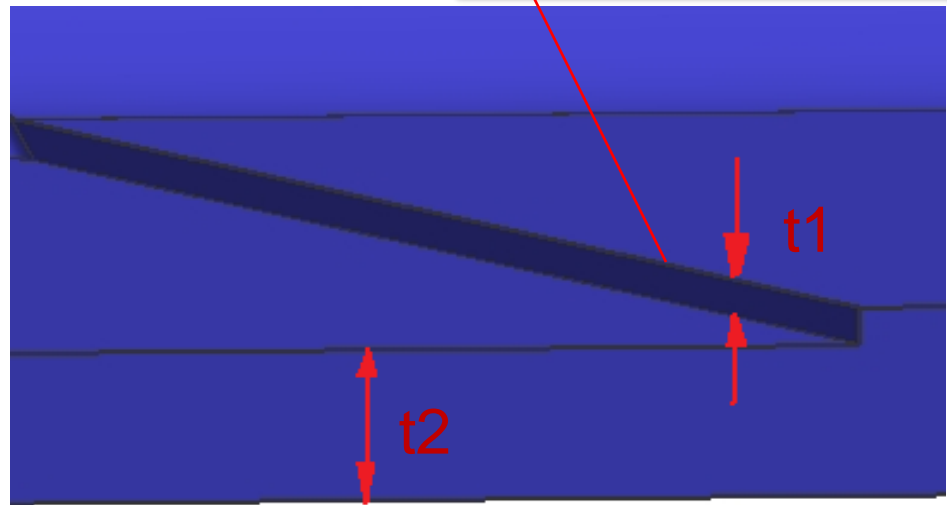
Suggestion : Minimum thickness 0.5mm (finished product thickness)



wall min = $t3 \geq 0.5\text{mm}$



$t1 \leq 1/2t2$





Thanks!
