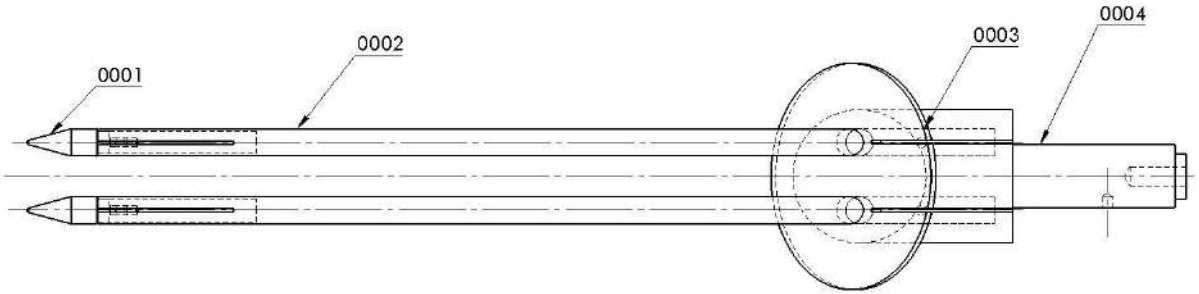
MECHANICAL ENGINEERING PORTFOLIO

Angga Surya Anggana, B.S.M.E.

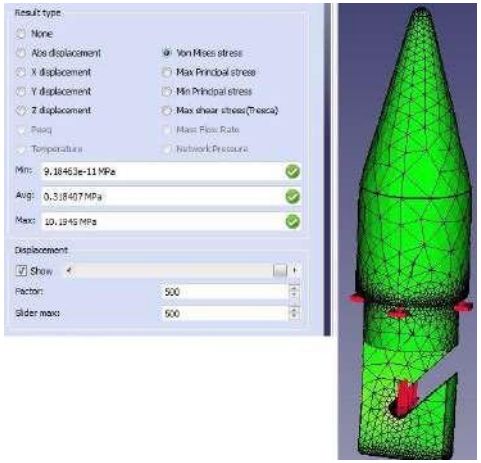
Auto Meganetoshi (New Development)

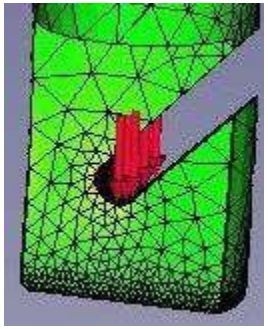
Automation can reduce labour costs and avoid human work accidents. Precise production equipment for automation is needed for the constant desired quality of the product made.



Projected Assembly Drawing

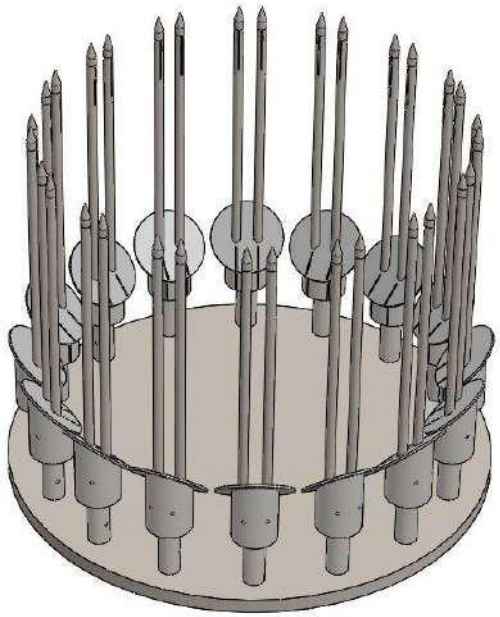
0004	Bar Holder
0003	Plate Guide Bar
0002	Indexed Bar
0001	Guide Pin
Part no.	





Minimum Factor of Safety (FoS) = 21.1

Stress Distribution on Guide Pin (SUS 304) when Handling Calculated with CalculiX



Perspective View Made with SolidWorks

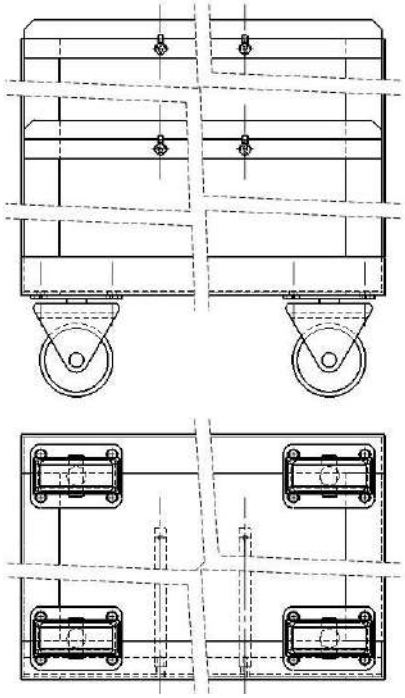
Services Include

Mechanical Concept Development, Detailed Design for Manufacturing, Material Selection, Analysis, Prototyping, Trial, and Vendor Liaison.

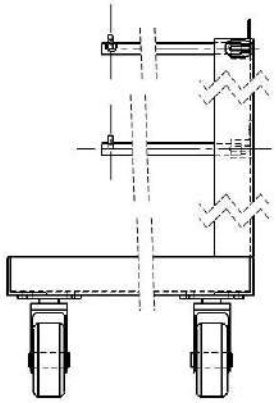
Rack Tube Silicon (New Development)

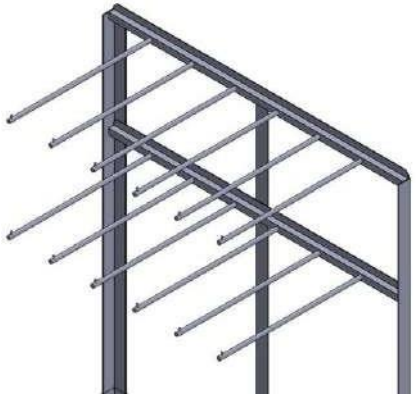
The proper place for placing process equipment can make longer usage ages of its equipment. Space availability on the production floor has become a common issue for layout.

Save spacing production floor mostly needed for an efficient layout.

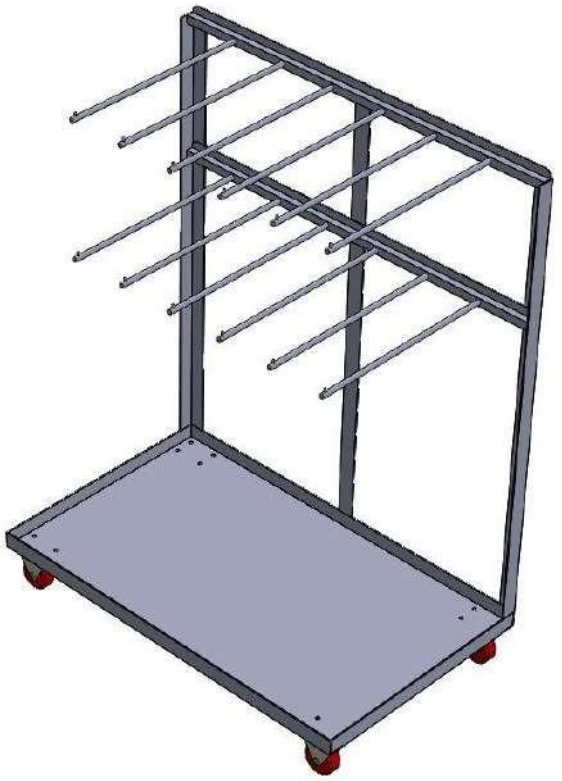


Standard Three Views Created





Two Rows Hanger Position Designed Instead of Single Row for Save Spacing Production Floor



Perspective View Made with SolidWorks

Services Include

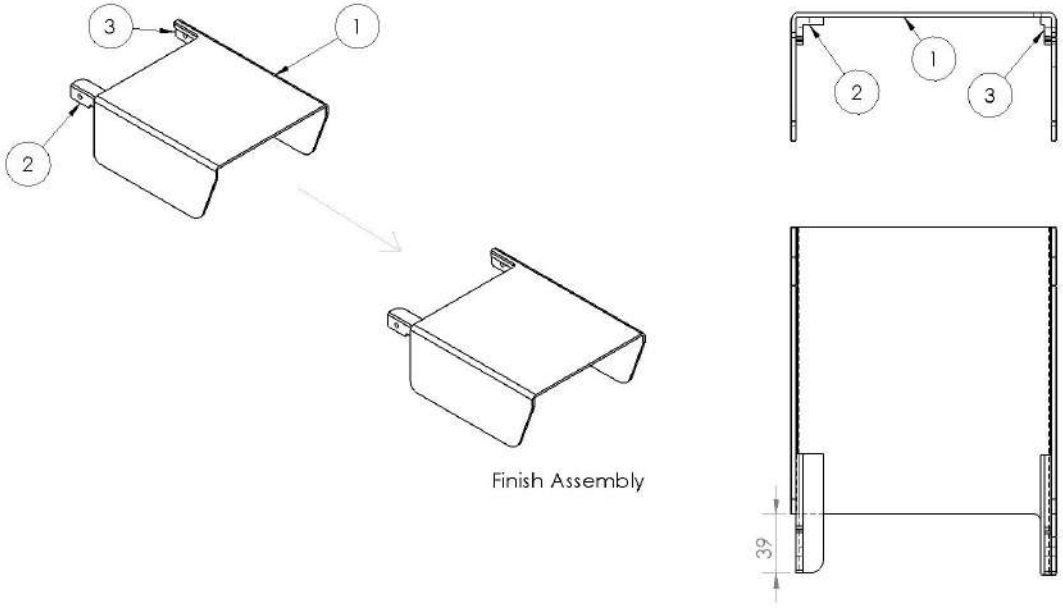
Mechanical Concept Initiation and Development, Detailed Design for Manufacturing, Material Selection, Trial, and Vendor Liaison.

Cover NC Grip (Renewal/Localization)

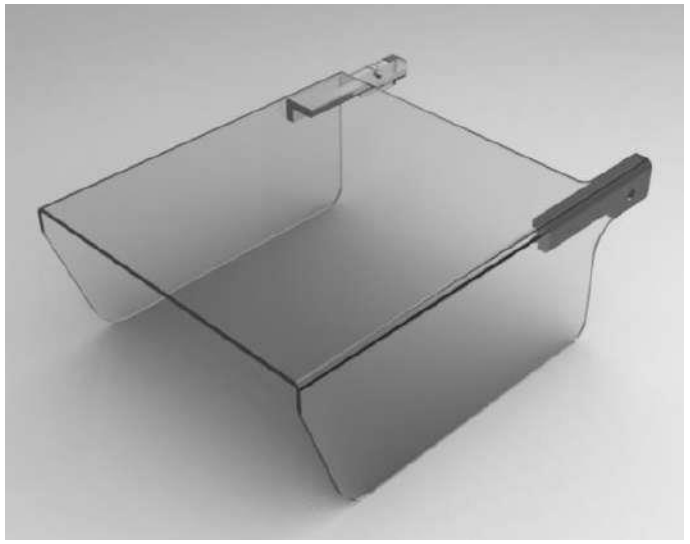
Cover NC Grip is part of the machine attachment enclosure. When this component brake out, it needs reparation if possible. Otherwise making of renewal component needed for replacement.

Measurement, modelling, and drawing from the existing physical object was taken due to the unavailable of drawing in Toyo Seal Indonesia. SolidWorks was used for modelling and drawing.

All parts components use fibreglass material.



Isometric View with Finish Assembly Shown with Three Parts Joined



Rendered Perspective View

Services Include

Reverse Engineering, Detailed Design for Manufacturing, and Vendor Liaison.

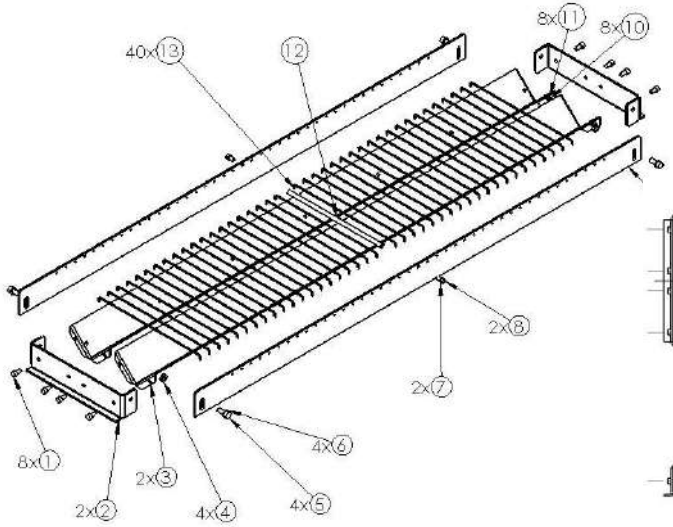
Rubber Seal Jig Dryer (Renewal/Localization)

Due to lack of quantity available of specific process equipment regarding of increase order from an external customer for Rubber Seal AMNR type, Toyo Seal Indonesia needs extra additional jig quantity. The jig is already available in small quantities but the drawing is not available yet.

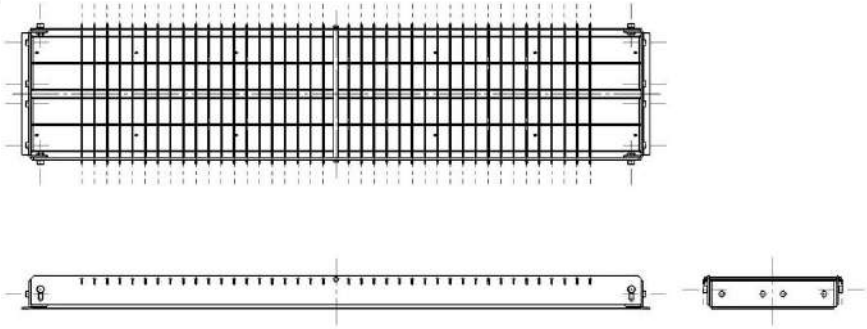
New drawing needed to produce this jig, so measurement was taken and modeling of physical object with its drawing done with SolidWorks.

Rendered Perspective View

No.	Part Name	Qty.
1	L-Bolt M5	8
2	Holder	2
3	V Plate	2
4	Hexagonal Nut M6	4
5	L-Bolt M6	4
6	Washer M6	4
7	Washer M4	2
8	L-Bolt M4	2
9	Side Frame	2
10	Hexagonal Nut M5	8
11	Spring Washer M5	8
12	Center Shaft	1
13	Round Bar	40



Exploded View with Bill of Material of Rubber Seal Jig Dryer Shown for Clarity of Its Component

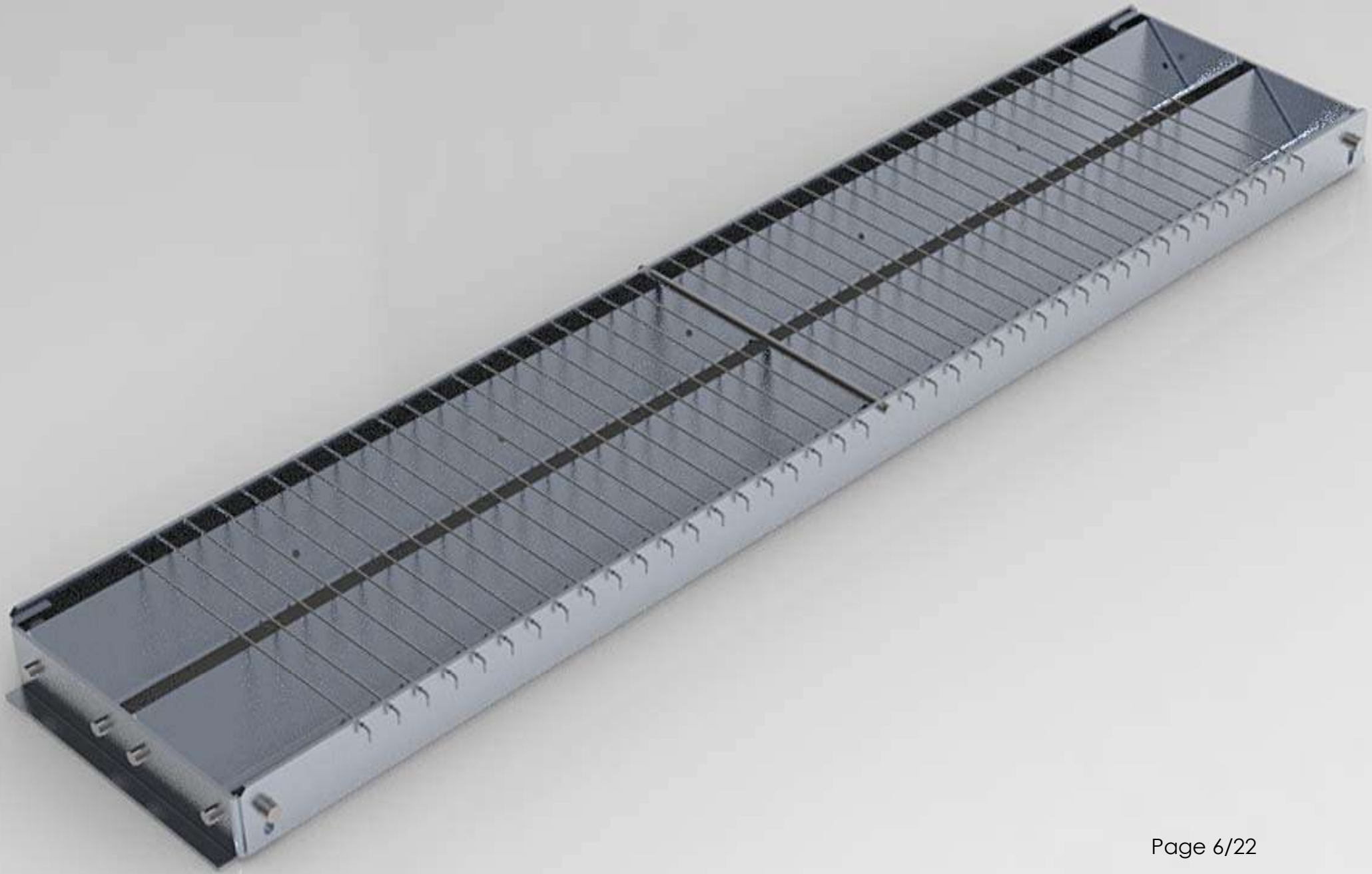


Standard 3 Views

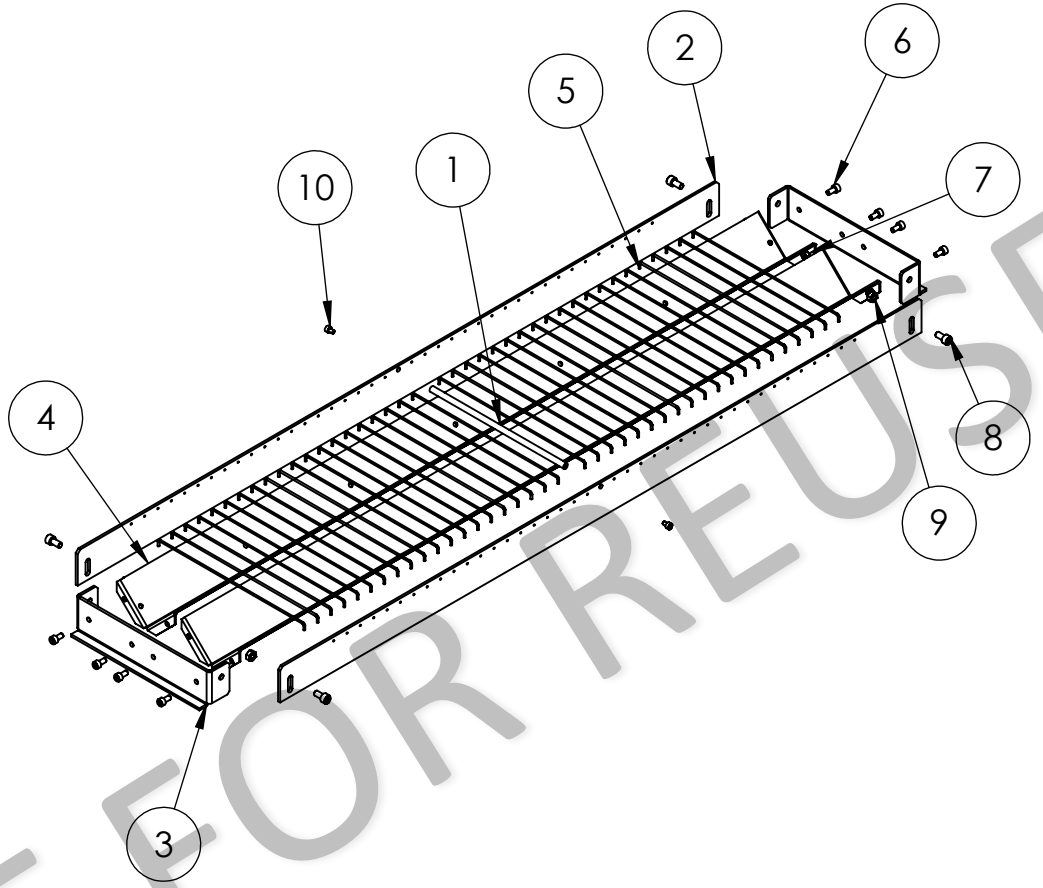
All sheet metal parts are made from aluminium alloy, fasteners from carbon steel, and other parts from stainless steel. No issues were encountered during process of using this renewal jig.

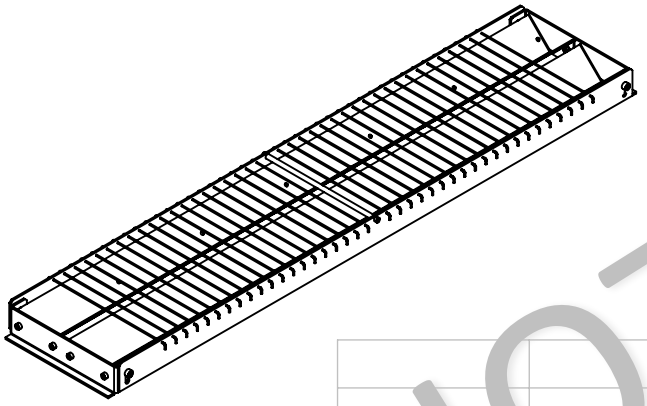
Services Include

Reverse Engineering, Detailed Design for Manufacturing, Material Selection, Trial, and Vendor Liaison.



ITEM NO.	PART NUMBER	QTY.
1	Center Shaft	1
2	Side Frame	2
3	Holder	2
4	V Plate	2
5	Round Bar	40
6	ISO 4762 M5 x 10 - 10N	8
7	ISO - 4032 - M5 - W - N	8
8	ISO 4762 M6 x 12 - 12N	4
9	ISO - 4032 - M6 - W - N	4
10	ISO 4762 M4 x 6 - 6N	2





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			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL	COMMENTS:		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

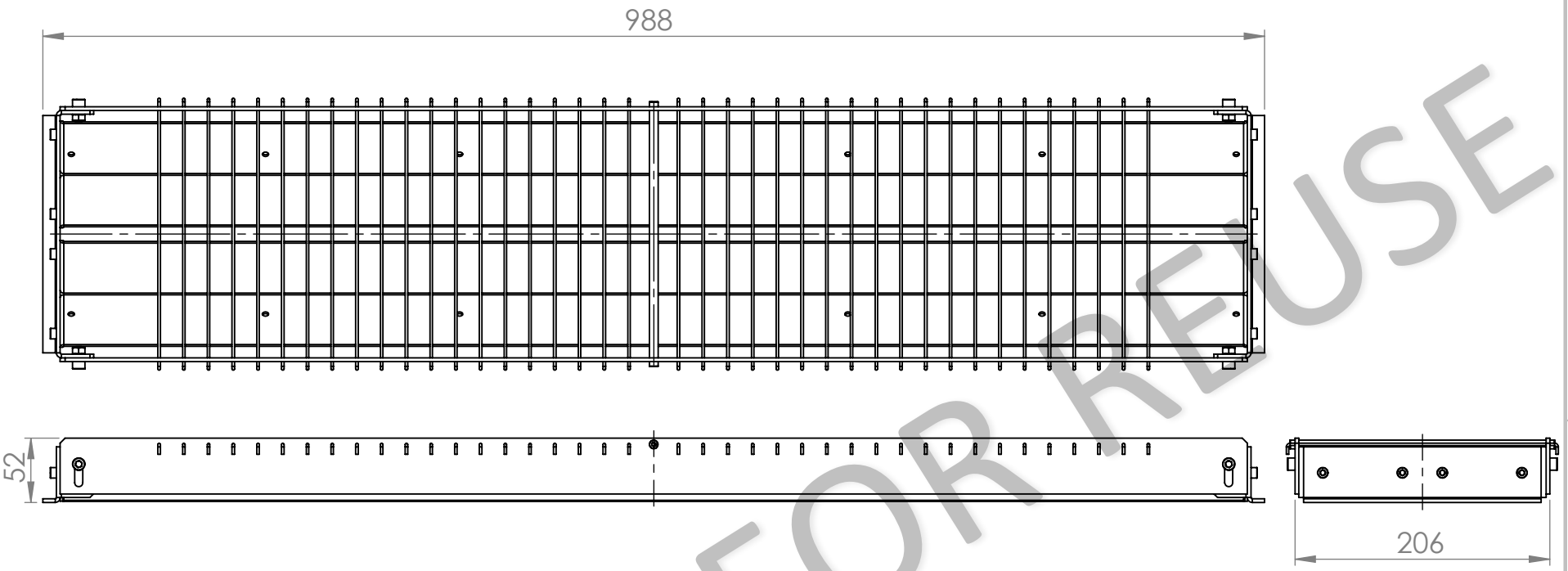
SEAL POST CURE DRAINER

TITLE:

GENERAL ASSEMBLY

SIZE	DWG. NO.	REV
A		

SCALE: FREE | SHEET 1 OF 7



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			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL	COMMENTS:		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

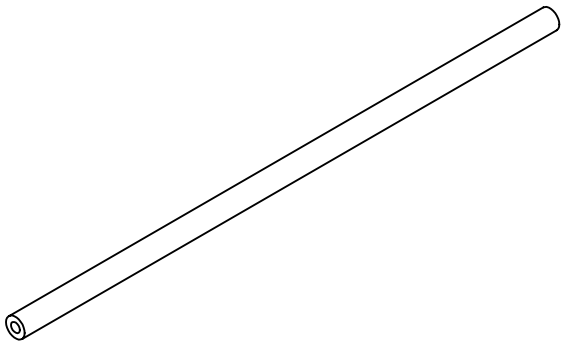
SEAL POST CURE DRAINER

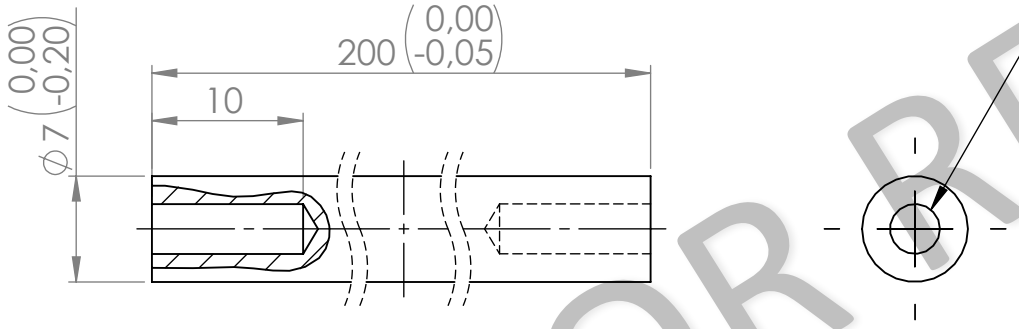
TITLE:

STANDARD 3 VIEWS

SIZE	DWG. NO.	REV
A		

SCALE: FREE | SHEET 2 OF 7





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			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL SUS 304	COMMENTS:		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

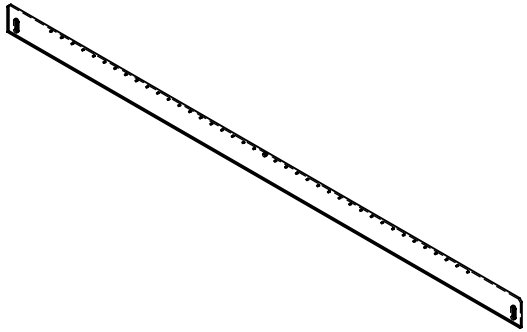
SEAL POST CURE DRAINER

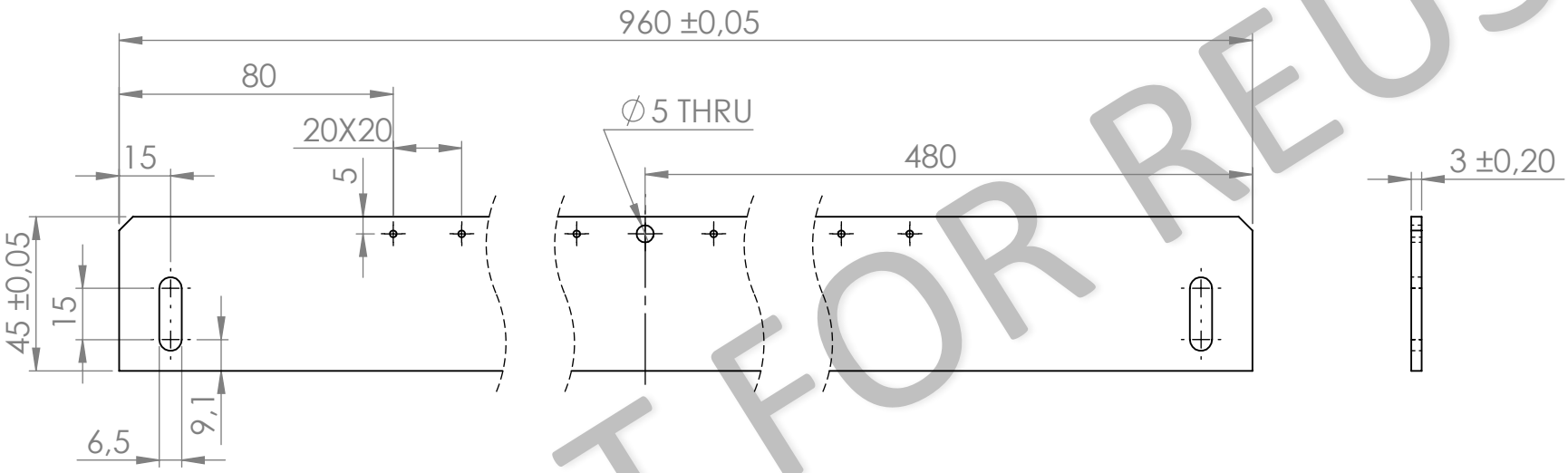
TITLE:

CENTER SHAFT

SIZE	DWG. NO.	REV
A		

SCALE: FREE | SHEET 3 OF 7





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		MATERIAL AL 6063	
NEXT ASSY	USED ON	FINISH	
APPLICATION		DO NOT SCALE DRAWING	

	NAME	DATE
DRAWN	ANGGA	23/09/19
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		

COMMENTS:

SEAL POST CURE DRAINER

TITLE:

SIDE FRAME

SIZE	DWG. NO.	REV
A		

SCALE: FREE | SHEET 4 OF 7

Tag	Direction	Angle	Inner Radius
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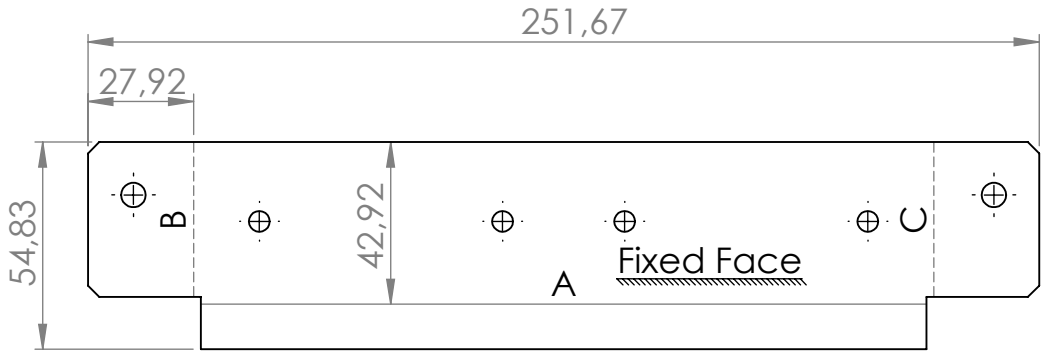
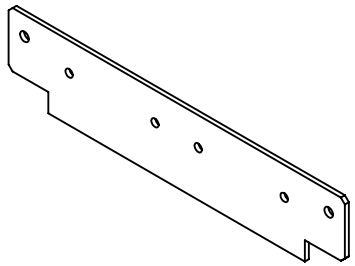
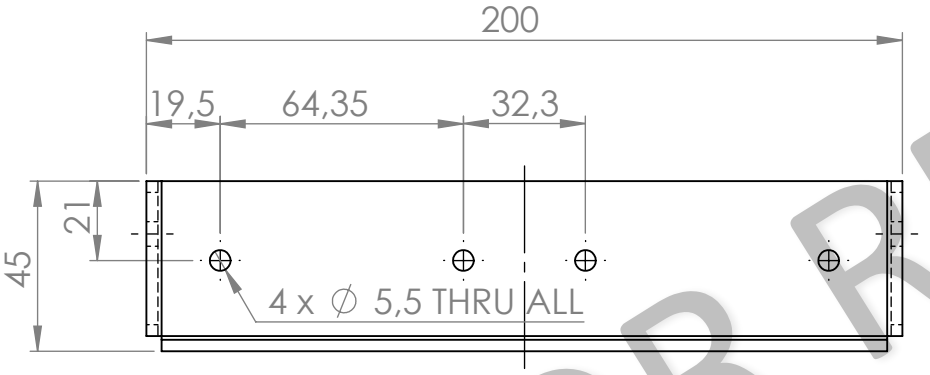
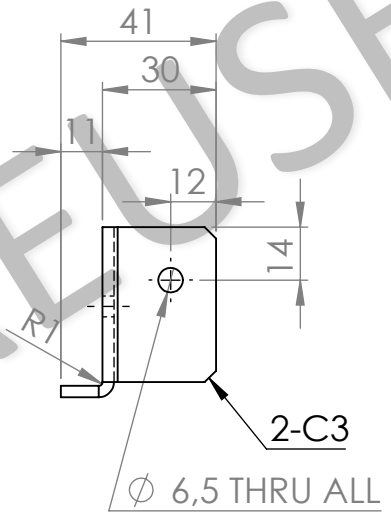
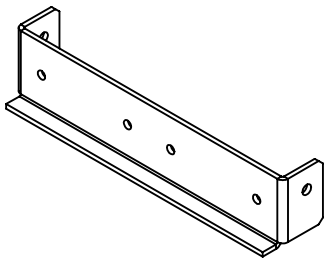
B	DOWN	90°	1
C	DOWN	90°	1

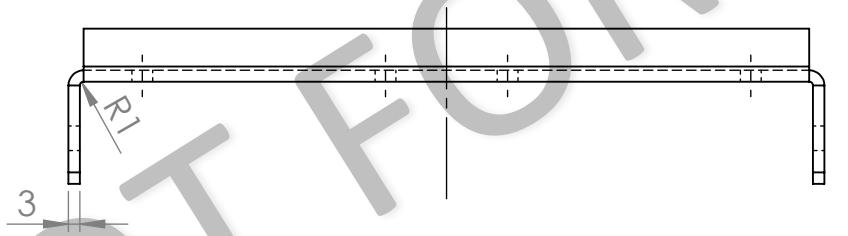












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			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL AL 6063	COMMENTS:		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

SEAL POST CURE DRAINER

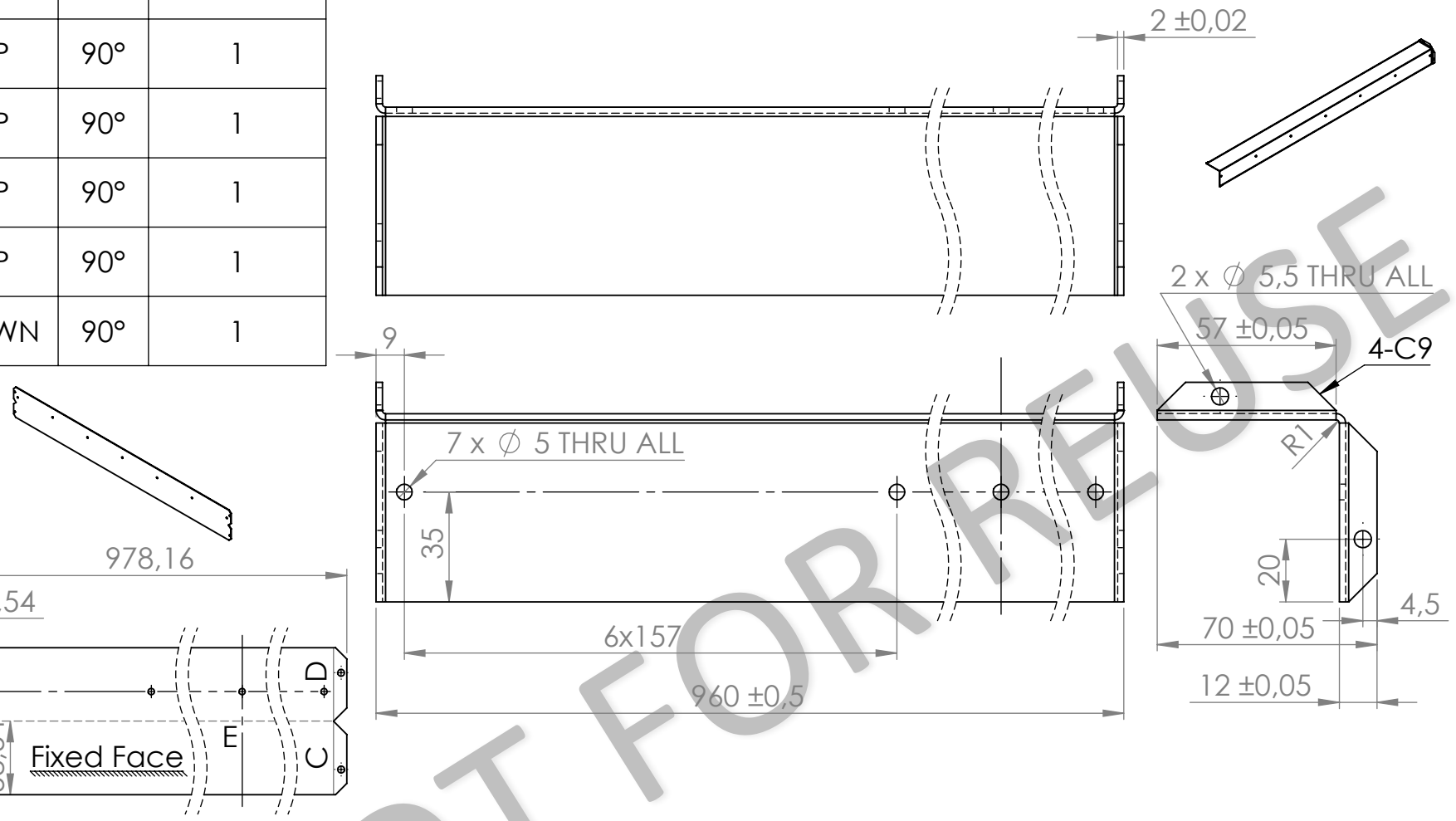
TITLE:

HOLDER

SIZE	DWG. NO.	REV
A		

SCALE: FREE | SHEET 5 OF 7

Tag	Direction	Angle	Inner Radius
A	UP	90°	1
B	UP	90°	1
C	UP	90°	1
D	UP	90°	1
E	DOWN	90°	1



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INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
MATERIAL AL 6063	COMMENTS:		
FINISH			
NEXT ASSY / USED ON			
APPLICATION / DO NOT SCALE DRAWING			

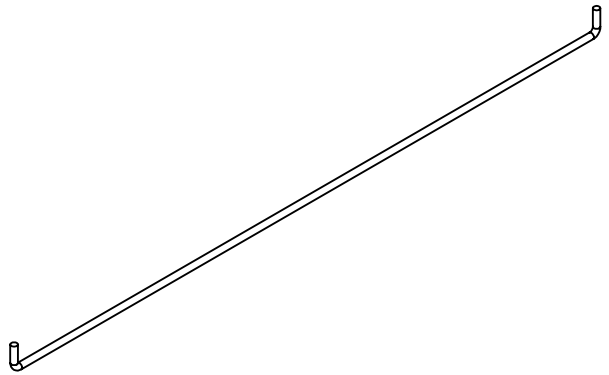
SEAL POST CURE DRAINER

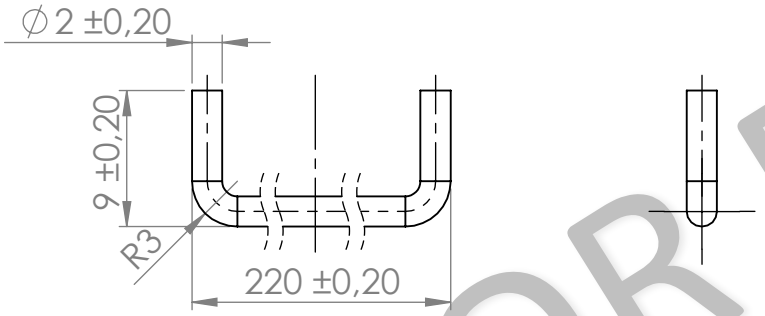
TITLE:

V PLATE

SIZE	DWG. NO.	REV
A		

SCALE: FREE | SHEET 6 OF 7





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		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL SUS 304	COMMENTS:		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

SEAL POST CURE DRAINER

TITLE:

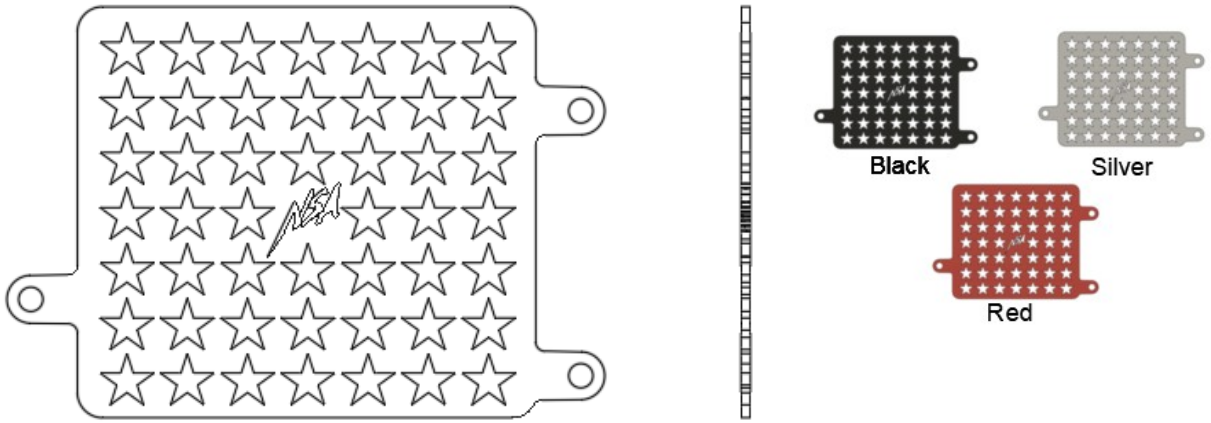
ROUND BAR

SIZE	DWG. NO.	REV
A		

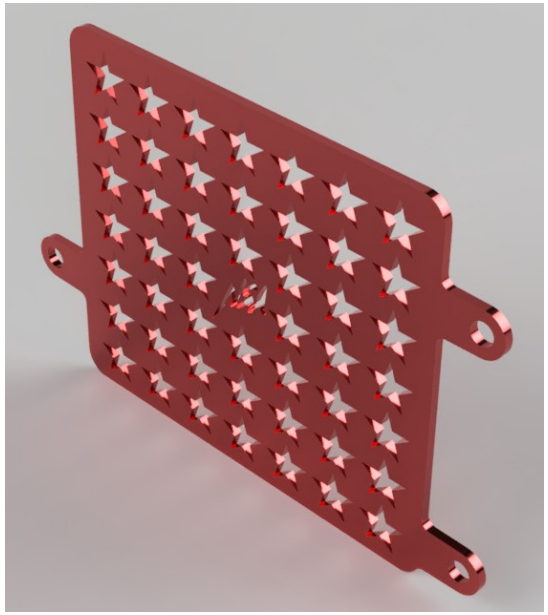
SCALE: FREE | SHEET 7 OF 7

Cover Radiator (New Development)

A motorcycle radiator needs protection from external matters that can create physical or functional damage. For overcome this requirement, cover radiator is used and also to prevent accidental contact with the hot radiator.
Many mesh implemented to channel airflow efficiently with aesthetic design and branding (NSA) with aluminum as based material. Used as replacement variation of standard OEM parts.



Standard 2 (Two) Views with Colors Illustration

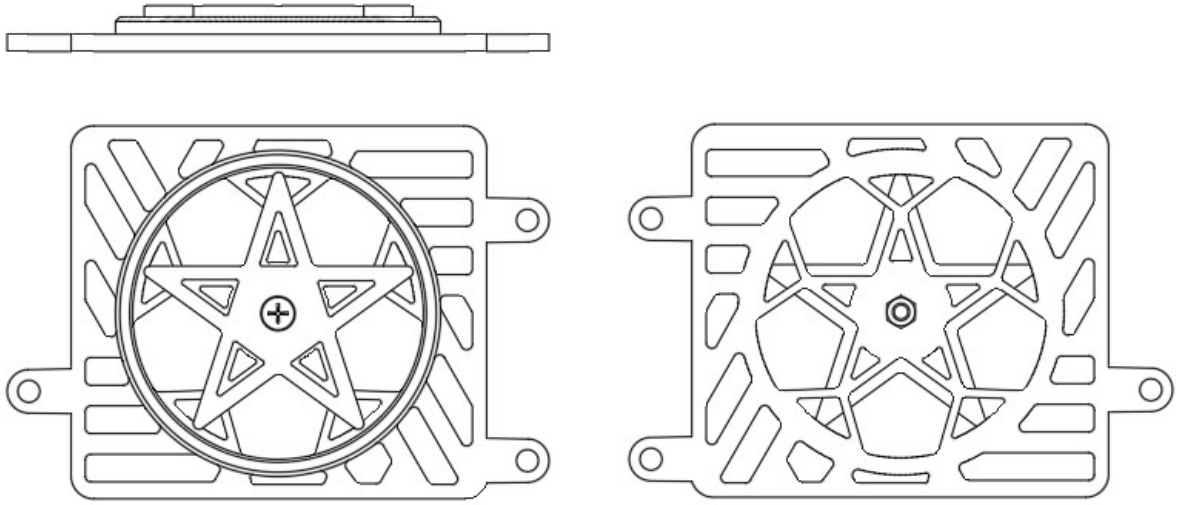


Rendered Perspective View
Made with Fusion 360

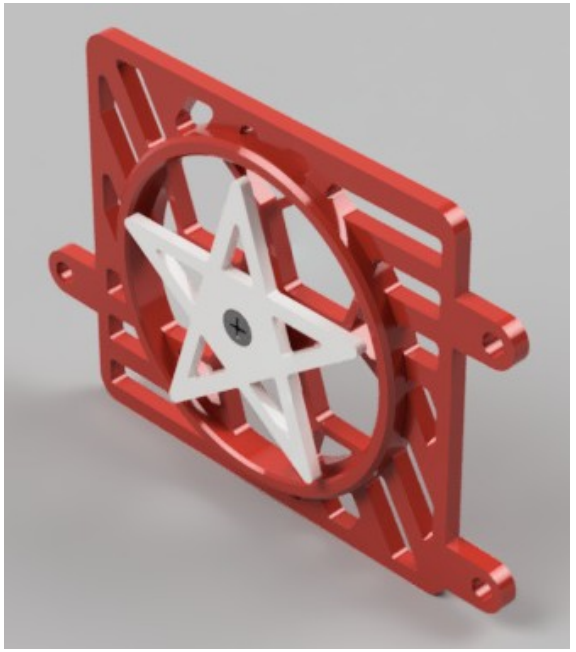
Services Include
Product benchmark, feasibility study, and preliminary design.

Cover Radiator with Spinner (New Development)

Cover radiator with additional spinner adds more aesthetic look for motorcycle and dynamic feel impression to attract attention when riding while still maintain cover radiator function as well. Use aluminum as base material with color combination. Used as replacement variation of standard OEM parts.



Standard 2 (Two) Views with Back View

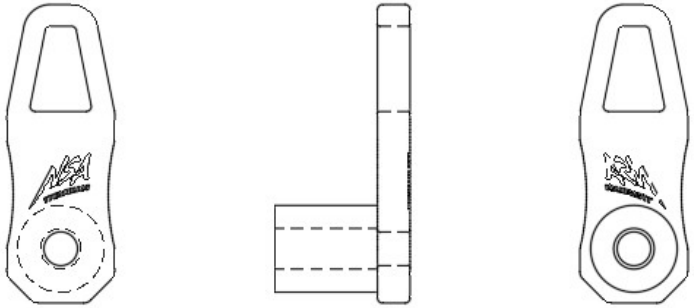


Rendered Perspective View
Made with Fusion 360

Services Include
Product benchmark, feasibility study, and preliminary design.

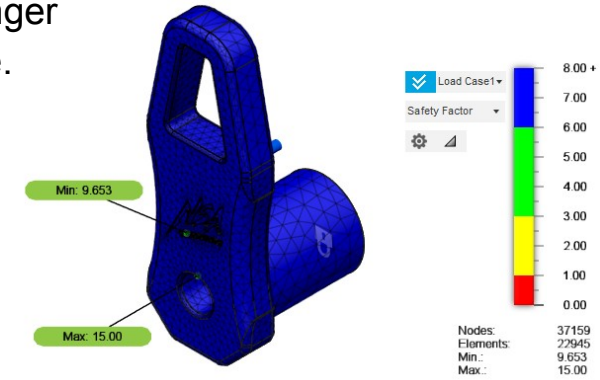
Goods Hanger (New Development)

When small items need spillage or damage prevention and are carried safely on a motorcycle, it needs goods hanger that located in adequate position. This hanger uses titanium premium material for aesthetic look and for more durable usage. Used with branding (NSA) as replacement variation of standard OEM parts.

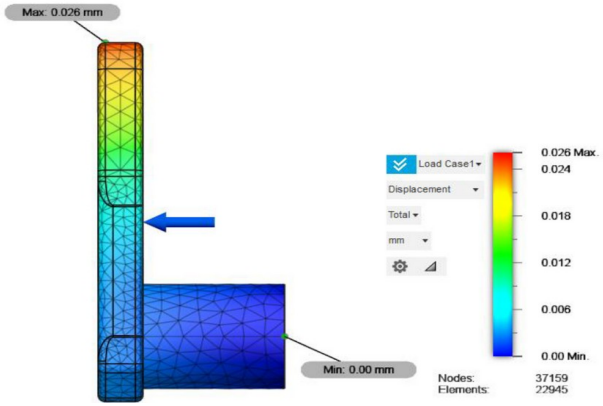


Standard 3 (Three) Projection Views

Rendered Perspective View Made with Fusion 360



Minimum Factor of Safety (FoS) = 9.6



Maximum Displacement = 0.03 mm

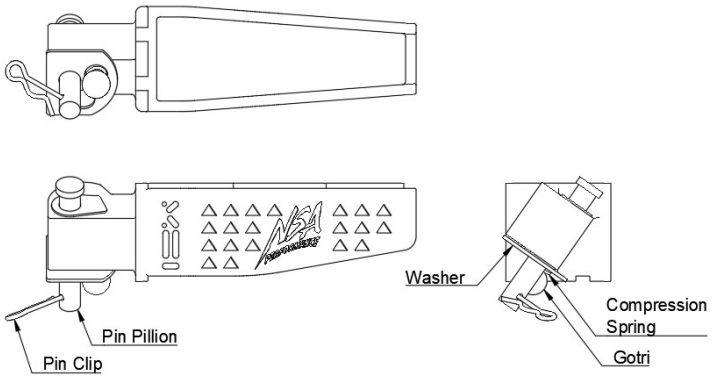
Numerical simulation when hanger handling goods (expected max. load 15 kg) carried by Fusion 360.

Services Include

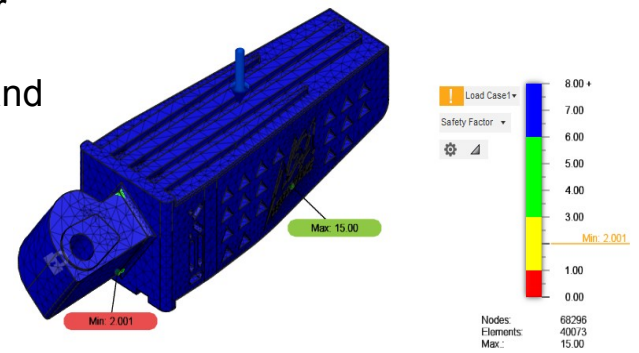
Market research, product benchmark, feasibility study, finite element analysis, and preliminary design.

Pillion Footrest (New Development)

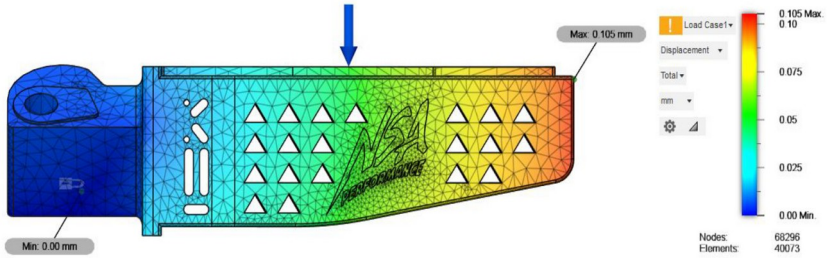
A motorcycle passenger needs a stable place to rest their feet and helps for balance, comfort, and safety. Pillion footrests used to accommodate those. Aluminum is used as the material for pillion footrests due to its lightweight and strength. Used with branding (NSA) as replacement variation of standard OEM parts.



Standard 3 (Three) Projection Views with Shown Attached Parts

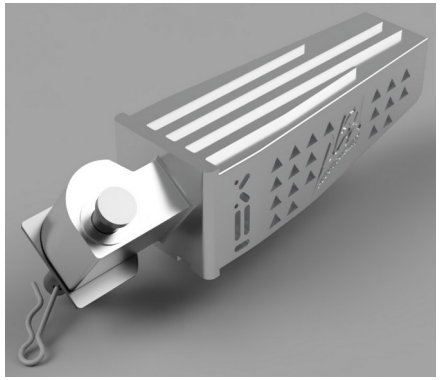


Minimum Factor of Safety (FoS) = 2



Maximum Displacement = 0.1 mm

Numerical simulation when a footrest withstands the expected maximum load of 40 kg carried by Fusion 360.



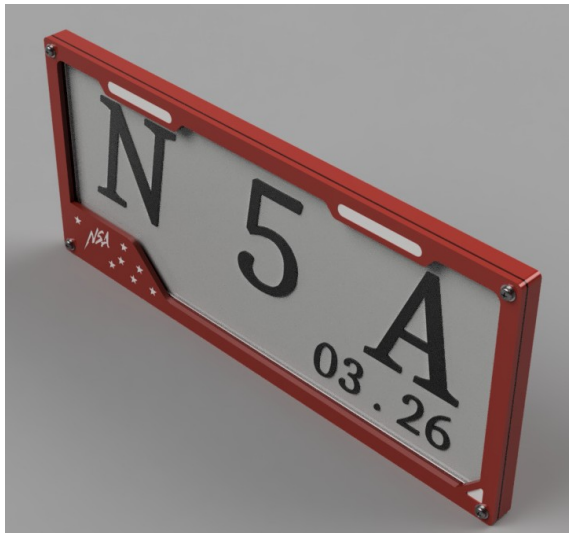
Rendered Perspective View Made with Fusion 360

Services Include

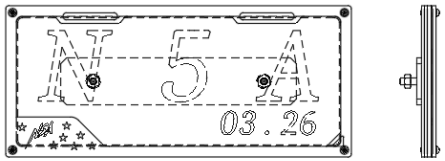
Market research, product benchmark, feasibility study, finite element analysis, and preliminary design.

License Plate Cover (New Development)

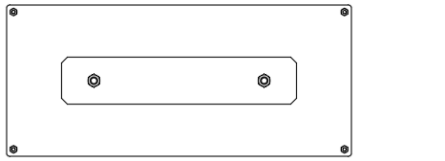
Over time and use, motorcycle license plates can become dirty, peeled, and faded. To avoid these risks, a cover is needed as a protector. However, it is important to note that the license plate remains clearly visible.
Acrylic with branding (NSA) is used to make this cover with an aesthetic appearance as an additional accessory.

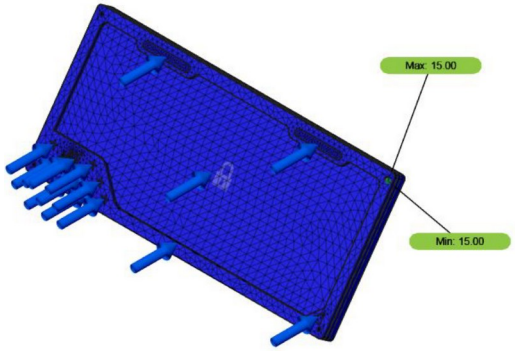


Rendered Perspective View Made with Fusion 360

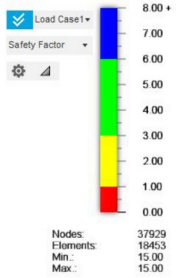


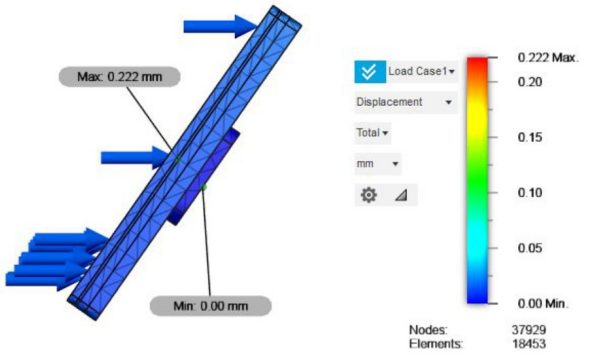
Standard 3 (Three) Projection Views





Minimum Factor of Safety (FoS) = 15





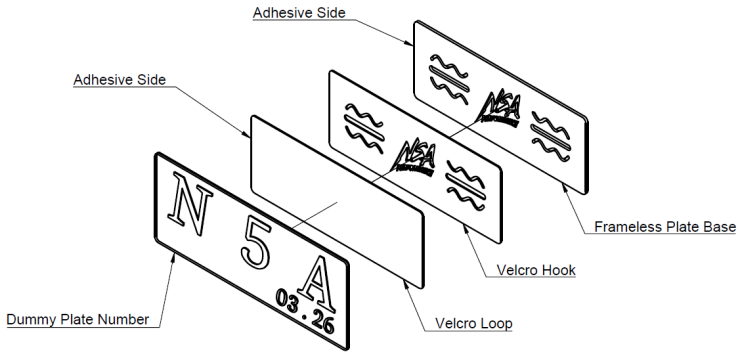
Maximum Displacement = 0.22 mm

Services Include
Market research, product benchmark, feasibility study, finite element analysis, and preliminary design.

Numerical simulation when cover withstands on 120 km/h when rain carried by Fusion 360.

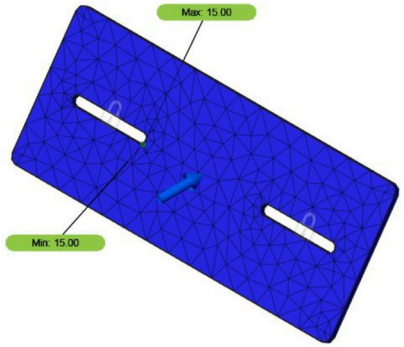
Frameless License Plate (New Development)

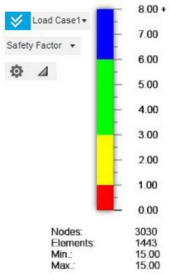
When a floating appearance is desired for a license plate, a frameless plate is used. Aluminum and Velcro with adhesive are used as materials due to its lightweight and strength. Branding (NSA) and pattern add an aesthetic impression for this additional accessory.



Isometric Exploded View
Shown Components

Rendered Perspective View Made with Fusion 360





Minimum Factor of Safety (FoS) = 15

Numerical simulation when cover withstands on 120 km/h when rain carried by Fusion 360.

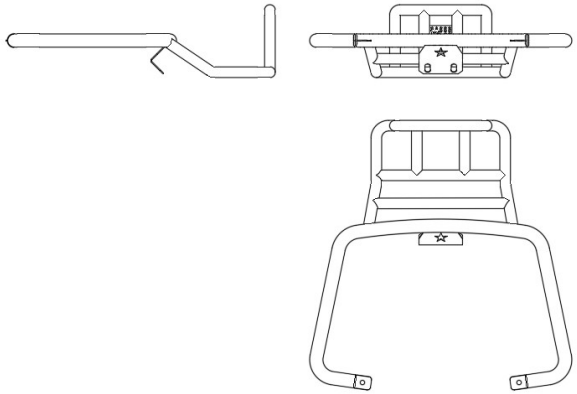
Services Include

Market research, product benchmark, feasibility study, finite element analysis, and preliminary design.

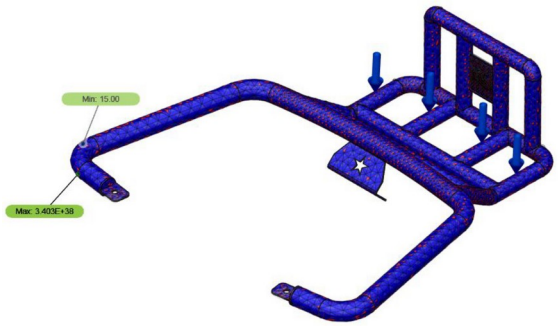
Grab Rail (New Development)

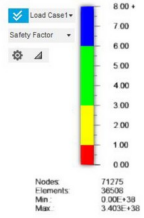
Motorcycle passengers need safety and convenience when riding. A grab rail is used to accommodate those needs. Also, it helps riders to move their bike when not to ride and can be used for securing luggage.
Titanium with branding (NSA) is used as premium material due to its strength and elegance. Used as replacement variation of standard OEM parts.

Rendered Perspective View Made with Fusion 360

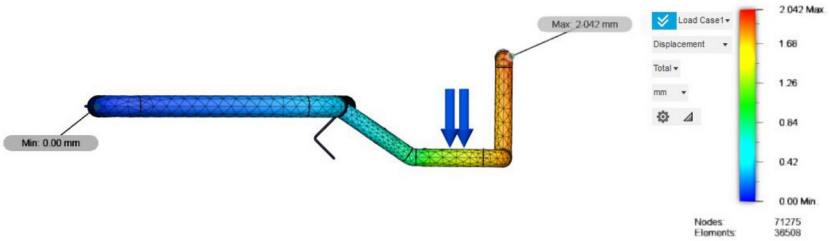


Standard 3 (Three) Projection Views





Minimum Factor of Safety (FoS) = 15

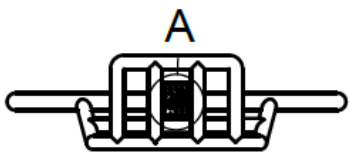


Maximum Displacement = 2 mm

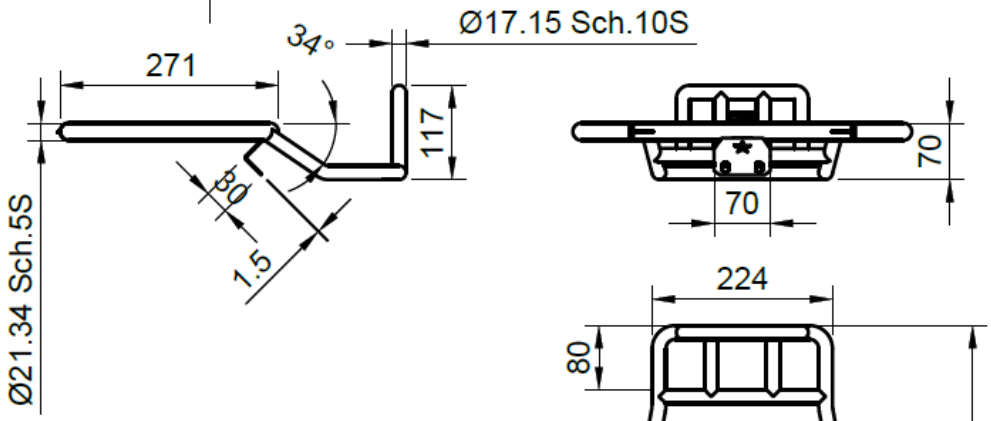
Numerical simulation when the grab rail withstands expected max. load of 25 kg carried by Fusion 360.

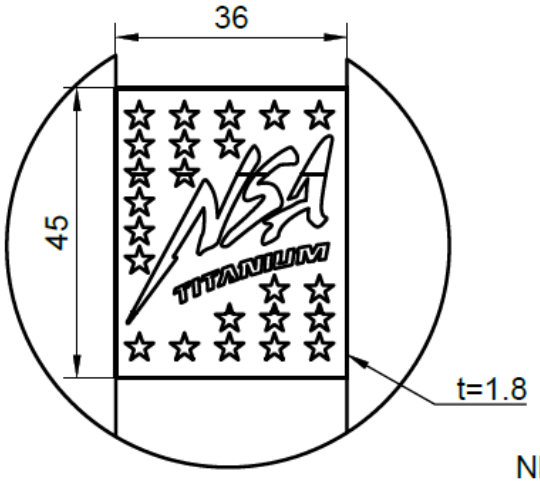
Services Include

Market research, product benchmark, feasibility study, finite element analysis, and preliminary design.



Back View





A (1:1)

Nb. : Surface finish by anodize
Pipe wall thickness as per ASME B.36.19M-1985
Max. load 25 kg

For variants :
Vespa Sprint, Primavera,
Lx, S, Lxv, Gts, Gtv, Gtl

Dept.	Unit	Created by	Weight (est.)
R&D	mm, g, s	Angga Surya Anggana	1023
		Document type: Initial Design	Material: Titanium
		Title: Behel Titanium Vespa Matic	Technical reference: Kebutuhan Pasar & Product Planning Feb. 2025 Benchmark Behel Jok Titanium Vespa Matic Studi Kelayakan Behel Vespa Matic Study Report Behel Vespa Matic
			Rev. / Date of issue: 11/03/2025 / Sheet: 1/1