

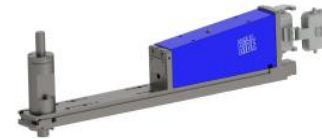
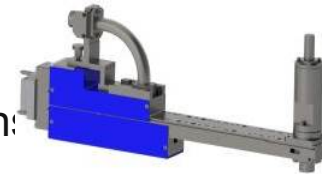
Optimizing the Clinched Fastener/ Clinched Component Design and Interface to Meet Required Reduced Mass Applications

Viral Varshney

Who is Rifast Systems, LLC ?

Rifast Systems, LLC is your complete source for clinching solutions.

- Clinching Products
- Engineering Experience Providing Customer Solutions
- Applications Lab
- In die/off Line Installation Equipment
- Service and Training



Vehicle Lightweighting – Our Role

Develop clinching fasteners & installation equipment to support customer applications

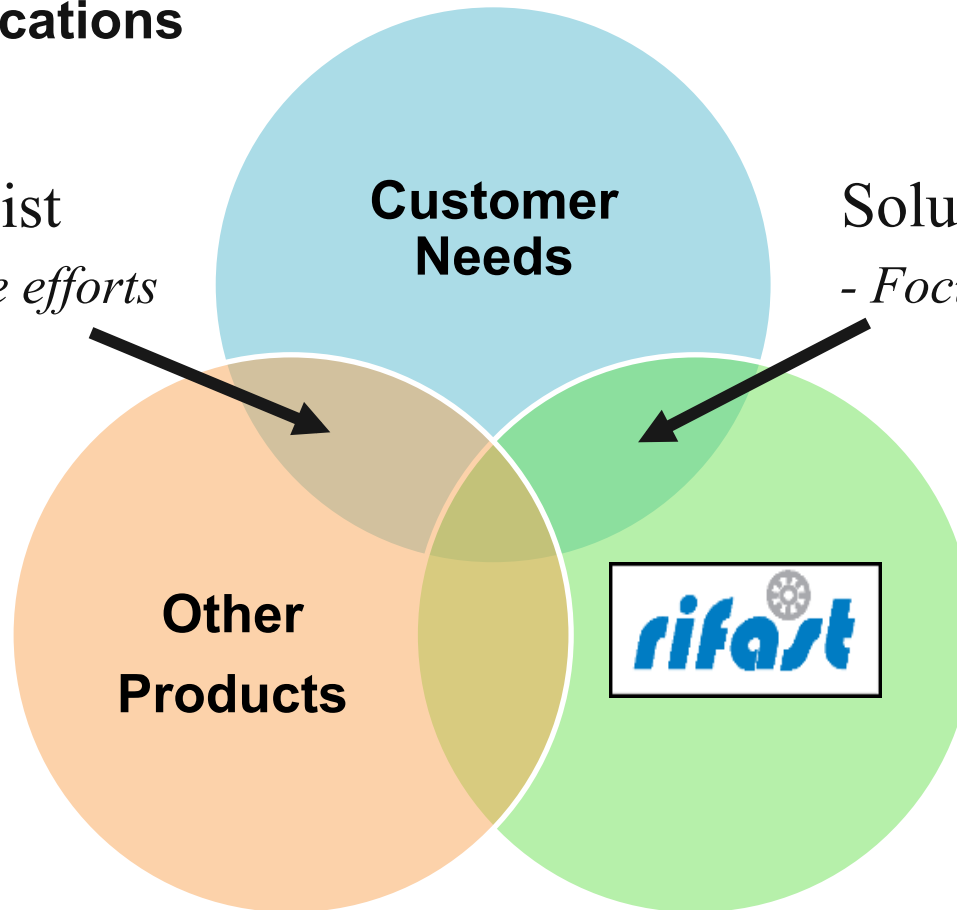
Solutions Exist

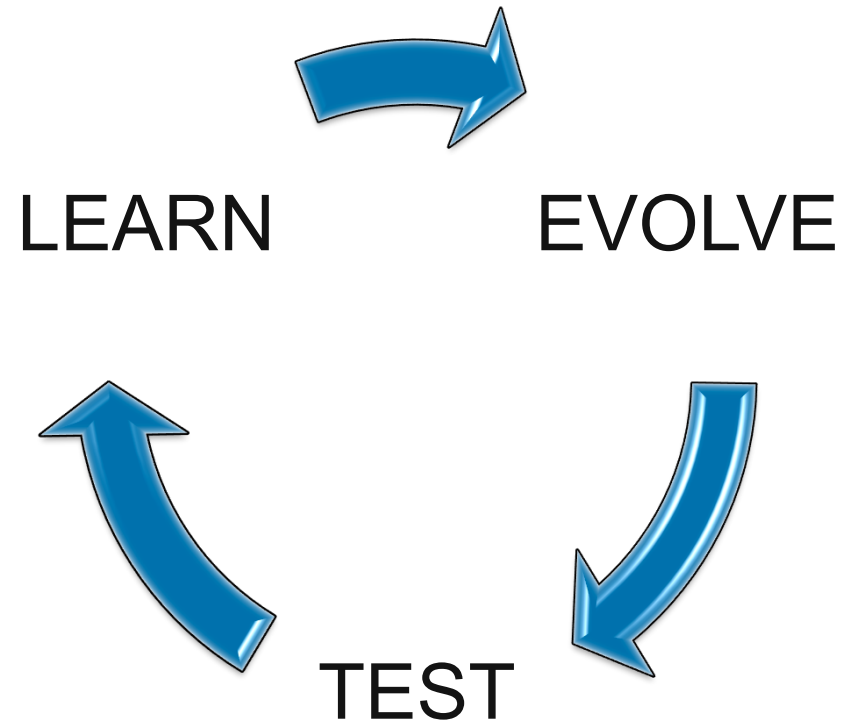
- Why duplicate efforts

Customer Needs

Solutions Required

- Focus of development





Example – Audi Q7 Door Panel

Application Information:-

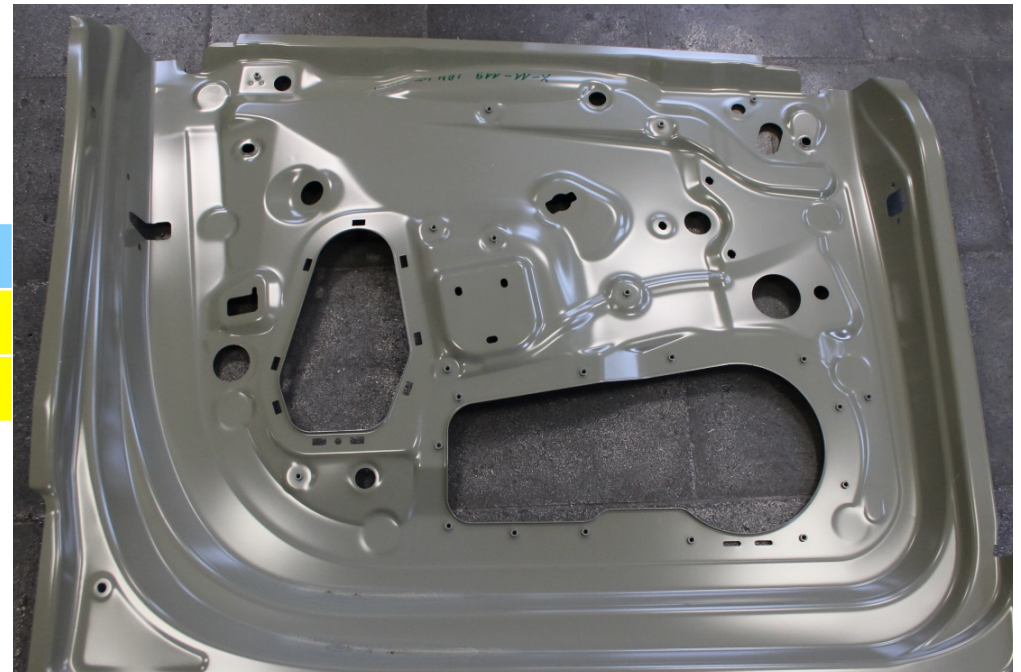
Sheet Metal	1.2 mm Al 6061-T6
# of attachment point	22
Previous fastener Wt.	4.53 g

Total Fastener Weight 99.7 g per door

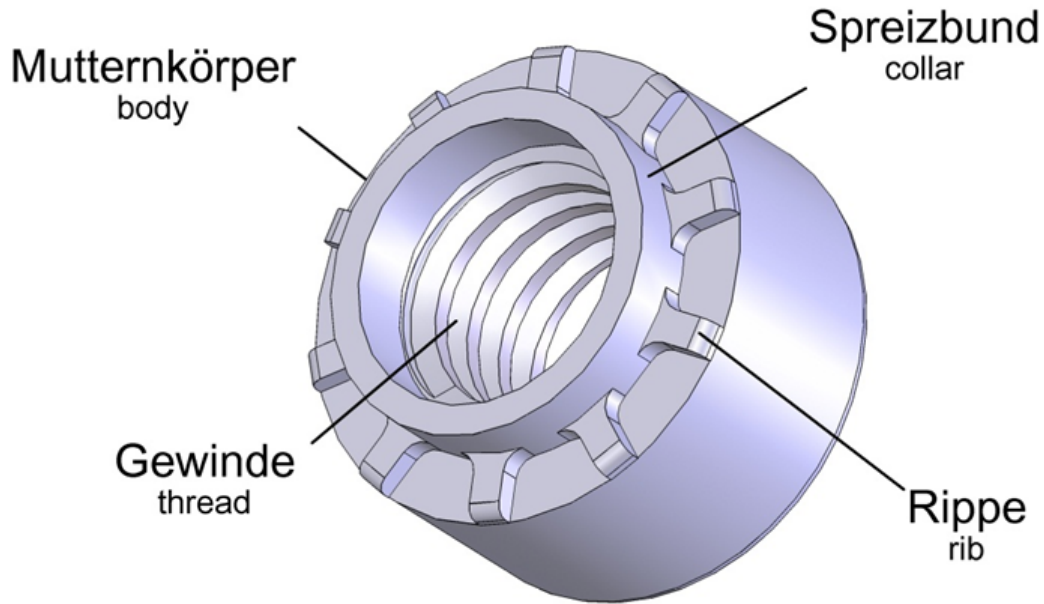
Total Fastener Weight 0.4 kg. (0.88 lbs) per vehicle

Joint Performance Requirement:-

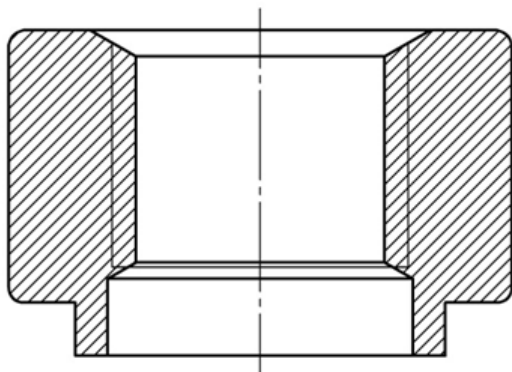
Push Out Force	> 400 N
Break Loose Torque	> 7N.m



Evolve – LBM (Light Weight Nut)

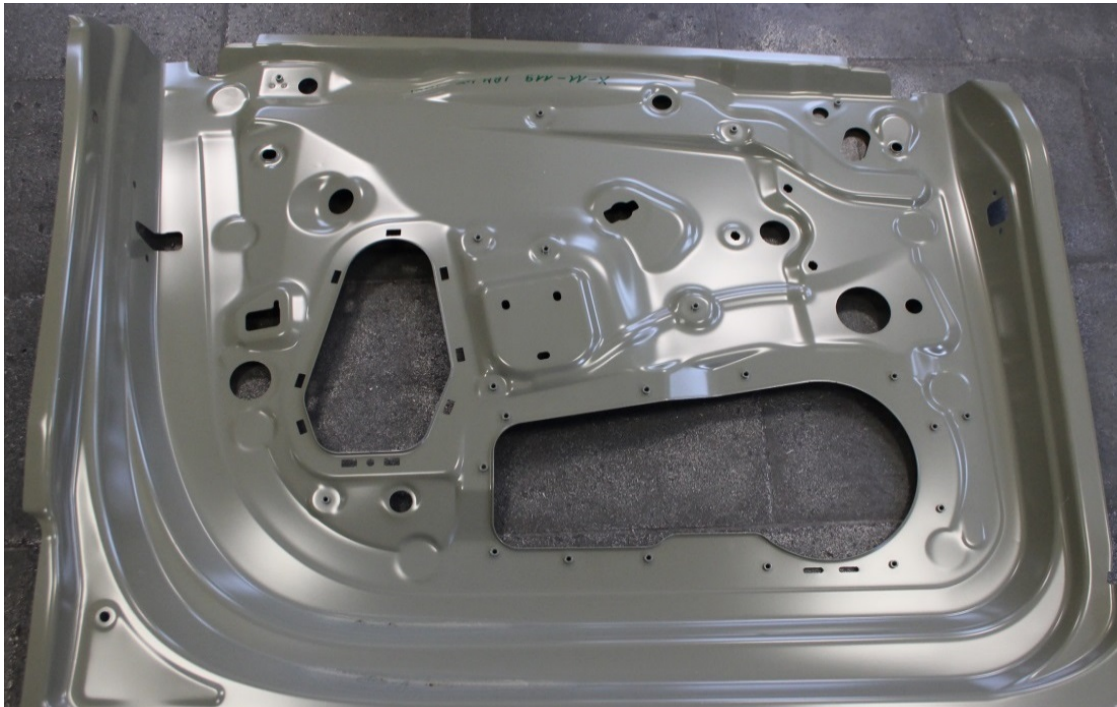


Element	LBM M5
Material	Steel
Weight	1.5 g
Internal Thread	Metric M5 6H
Thread Engagement	0.8 x D
Property Class	Class 10
Material Range	1 – 5mm



Product characteristic	Current fastener	Requirement	Result
Outer Diameter	Ø 14 mm	< Ø 14 mm	Ø 8.5 mm
Weight	4.53 g	< 4.53 g	1.50 g
Push Out Force	> 3,300 N	> 400 N	930 N
Breakloose Torque	> 40 Nm	> 7 Nm	9.5 Nm

Result –Audi Q7 Door Panel



67% Weight Reduction in Fastening Elements

Sheet Metal	1.2 mm Al 5083-H32		WEIGHT SAVED
# of attachment point	22		
Fastener Wt.	4.53 g	1.50 g	3.03 g
Fastener Weight per door	99.7 g	33 g	66.7 g
Total Fastener Weight per vehicle	0.4 kg. (0.88 lbs)	0.13 kg. (0.29 lbs)	270 g (0.59 lbs)

RIFAST - One System every Possibility

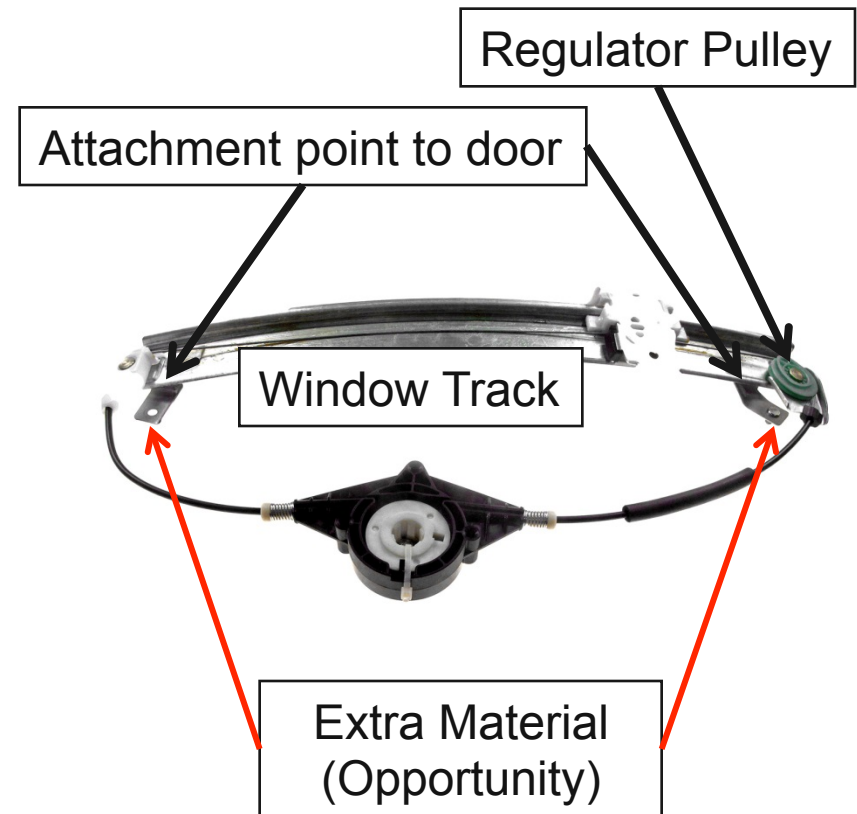
© RIFAST LLC
April 2014

Learn – Window Regulator assembly review



Application Information:-

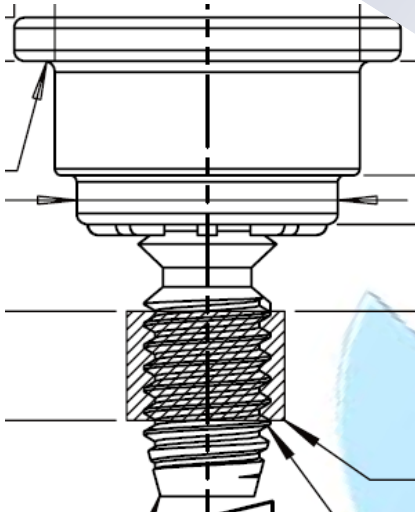
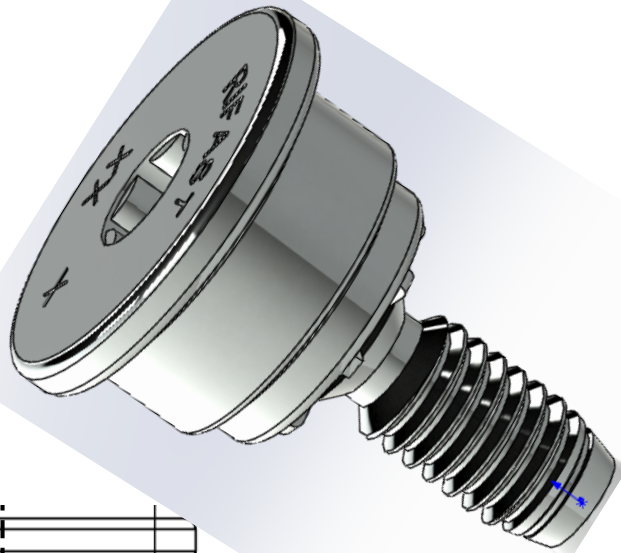
Sheet Metal	1.0 mm Al 5083
	1.4 mm Al 5083
	1.0 mm Cold Rolled Steel
# of attachment point	2
Previous fastener Wt.	43 g
Previous Assembly Wt.	144 g



Can we reduce attachment points?

If yes, we can remove excess material at these locations and reduce weight

Evolve – M6 Special EPB



Element	Special EPB M6
Material	Steel
Weight	13.8 g
External Thread	Metric M6 6H
Property Class	Class 9.8
Material Range	1 – 2.5 mm

- Integrated the attachment point fastener with the pulley spacer.
- Single component solution for pulley support and door rail attachment
- Two components reduced

Test – Application testing and results



Sheet Metal	1.4 mm Al 5083		WEIGHT SAVED
# of attachment point	2		
Fastener Wt.	43 g	27 g	16 g
Assembly weight per door	144 g	126 g	18 g
Total Assembly Weight per vehicle	576 g	504 g	72 g

RIFAST - One System every Possibility

© RIFAST LLC
April 2014

Thank You



RIFAST - One System every Possibility

© RIFAST LLC
April 2014