

Avinox® XT

- Stainless Steel Fastener 1/4" (6.4 mm)



Placed in Soft Materials

Joint Sample Ref.	t (mm)	P (mm)	Plastic Description (Colour)	Rivet Part No. OBE61-	Photo Blind side	Photo Cross Section	Comments on placed rivet blind side appearance	Rating ¹⁾
1	N/A	3.0	Quadrant Ertalon® 66-GF30 Virgin Polyamide 30% Glass Fibre Reinforced (PA 66 - GF30)	00815			Large footprint sitting on top of plastic. Minimal distortion of the plastic close to the rivet bulb. Plastic around the bulb is substantially flat.	*****
2	3.0	3.0		00819				*****
3	N/A	3.0	Elder Engineering Fire Retardant ABS	00815			Large footprint sitting on top of plastic. Slight distortion of the plastic beneath the bulb. Plastic around the bulb is substantially flat.	****
4	3.0	3.0		00819				Large footprint sitting on top of plastic. Distortion of the plastic creates a concave surface.
5	N/A	3.0	Quadrant PC1000 Clear Polycarbonate (virgin)	00815			Large footprint sitting on top of plastic. No visible distortion of the plastic surfaces. Evidence of multiple tiny cracks on both faces of the plastic radiating outwards. These developed over several days after placing the rivet.	*
6	3.0	3.0		00819				*
7	N/A	3.0	Elder Engineering High Density Polyethylene HDPE (HD300)	00815			Large footprint pulling slightly into the surface of the plastic. Distortion of the plastic beneath tail bulb creates a concave surface.	****
8	3.0	3.0		00819				Large footprint pulling down into the surface of the plastic. Significant compression of the plastic beneath tail bulb creates a concave surface.
9	N/A	3.0	Quadrant Ertacetal® C Polyacetal (POM-C)	00815			Large, tapered footprint pulling down into surface of plastic. Some radial distortion of the plastic beneath the rivet tail bulb. Plastic around the bulb is substantially flat.	***
10	3.0	3.0		00819				Large footprint sitting on top of plastic. Slight compression of the plastic beneath the tail bulb.

¹⁾ Star ratings out of 5:

Below 3 may be unsuitable to most customers, without application development and/or introduction of washers to spread clamp loads on the blindside.

Test configuration and summary see last page.



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11	N/A	3.0	Quadrant PE 500 High Molecular Weight Polyethylene (PE-HMW)	00815			Large footprint pulling down into surface of plastic. Some compression of the plastic beneath the rivet tail bulb. Plastic around the bulb is substantially flat.	****
12	3.0	3.0		00819			Large footprint pulling down into the surface of the plastic. Significant compression of the plastic beneath tail bulb creates a very concave surface.	**
13	N/A	3.0	Elder Engineering Ultra High Molecular Weight Polyethylene UHMW-PE 1000 R	00815			Large footprint pulling slightly into the surface of the plastic. Distortion of the plastic beneath tail bulb creates a concave surface.	****
14	3.0	3.0		00819			Large footprint pulling down into the surface of the plastic. Significant compression of the plastic beneath tail bulb creates a very concave surface.	**
15	N/A	3.0	Quadrant Ertalon [®] 66 SA Polyamide (PA 66)	00815			Large footprint sitting on top of plastic. Minimal distortion of the plastic beneath to the rivet bulb. Plastic around the bulb is marginally concave.	****
16	3.0	3.0		00819			Large footprint sitting on top of plastic. Slight distortion of the plastic beneath to the rivet bulb. Plastic around the bulb is substantially flat.	****
17	N/A	3.0	Quadrant Nylatron [®] GS Polyamide (PA 66 + MOS2)	00815			Large footprint sitting on top of plastic. Minimal distortion of the plastic close to the rivet bulb. Plastic around the bulb is substantially flat.	*****
18	3.0	3.0		00819				*****
19	N/A	3.0	Elder Engineering Virgin PTFE	00815			Large footprint pulling down into the surface of the plastic. Compression of the plastic beneath tail bulb creates a concave surface.	***
20	3.0	3.0		00819			Large footprint pulling down into the surface of the plastic. Extreme compression of the plastic beneath tail bulb creates a very concave surface.	*

¹⁾ Star ratings out of 5:

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Test configuration and summary see next page.



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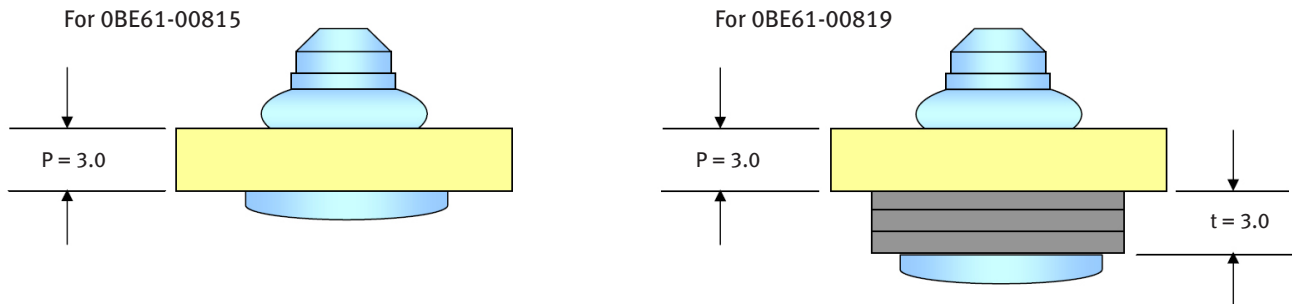
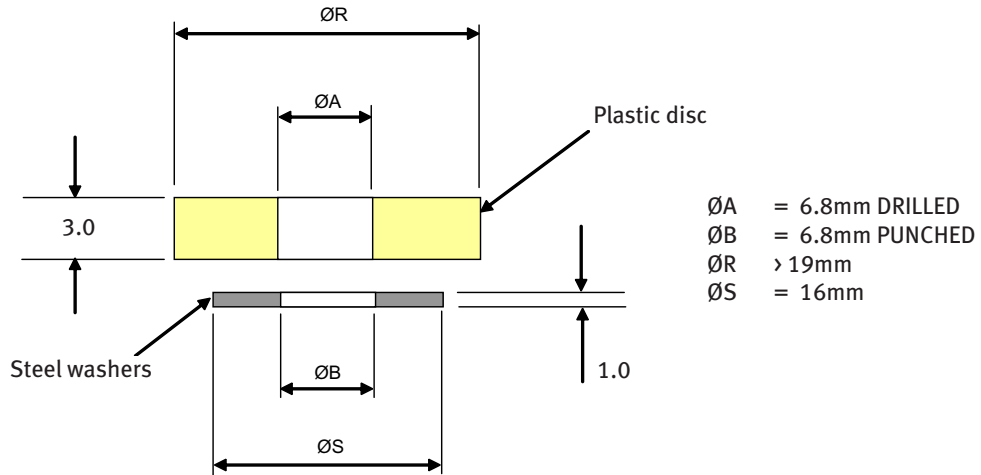
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Test Configuration



Summary

The above tests represent joints in which the softer material is positioned at the blind side corresponding to the rivet tail bulb. Normal engineering design practice however would be to arrange for the rivet head to bear on the softer material due to its larger bearing area. So the above tests are relatively severe.

Nevertheless in most cases the tail formation created by Avinox[®] XT 1/4" offers a large footprint area with relatively minor or no visible distortion of the plastic beneath. This behaviour is beneficial for load bearing in-service or resisting destructive tensile loads. It compares favourably with the tail formation of common "nail rivets" and other non-bulbing and hole-filling rivet designs which do not offer a large footprint. Rivet expansion within the joint will dilate the hole in the plastic excessively, risking fracture, while offering a small effective footprint to resist tensile loads.

Axial compression of the plastic beneath the tail bulb produces a concave surface to the small discs used here, but the distortion of larger plastic sheets or panels is reduced.

The above tests indicate that the Avinox[®] XT 1/4" is suitable for applications where the blindside material is of an Engineering grade plastic such as nylon, ABS, acetal or glass-fibre-reinforced nylon composite. In some other plastics the grip thickness and rivet length can make a significant difference between a well-formed and a distorted joint. Results suggest that polycarbonate should not be used on the blindside of the riveted joint due to the cracking of the surface over time.

In all instances it would still be recommended that Avdel Application Engineering is engaged to review parameters such as hole size, material thickness and fastener length in order to optimise the joint design. For softer plastics like polypropylenes, polyethylene, polyurethanes and rubber, it is likely that the rivet head should bear on the softer material or that supplementary washers be employed where this is not possible.



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