



MultiMaterial-Welding[®]

InWVerse[®] Fastener - Technical Data Sheet

BOSSARD

Proven Productivity

MULTIMATERIAL-WELDING®

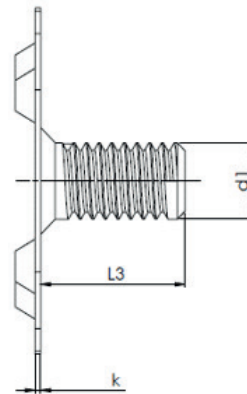
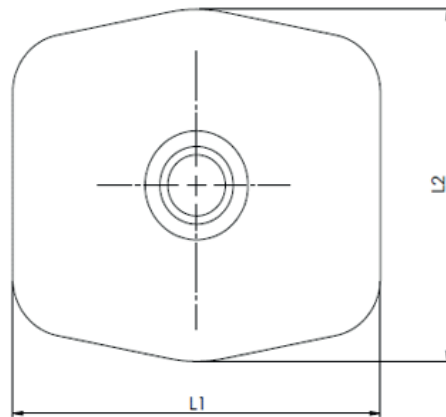
InWVerse® Fastener

MULTIMATERIAL-WELDING®

MM-Welding® is an innovative fastening technology platform that uses ultrasonic energy to partially melt thermoplastic materials into porous materials to create a functional and strong form-lock connection in fractions of a second.

INWVERSE® FASTENER

Based on the innovative MultiMaterial-Welding process, the InWVerse® Fastener Technology takes the industry proven advantages and features to another exciting field of applications. MultiMaterial-Welding has developed a novel fastening system which allows to precisely establish an immediately loadable connection point onto thermoplastic substrates.



InWVerse® Fastener Dimensions

PRODUCTS

InWVerse® Fastener		BN 56114	
Function	Rapid fixation to thermoplastic materials		
Color	Metallic		
Material	Inox Steel		
Substrate geometry	Min. thickness	1.5 mm	
Thread type	Size (d1)	M4	M5
	Thread type	M4 X 0.7-6g	M5 X 0.7-6g
	Available lengths (L3)	8,10,15,20 mm	8, 10, 15, 20 mm
Fastener geometry	Base length (L1)	20 mm	21 mm
	Base width (L2)	18 mm	19 mm
	Base thickness (k)	0.3 mm	0.3 mm



MECHANICAL PROPERTIES

These properties are reached immediately after insertion, no curing time necessary.

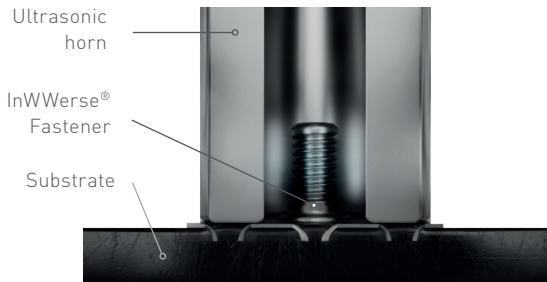
Substrate	M4				M5
	Pull Out (23°C)	Max Shear	Pull Out (80°C)	Pull Out (after 1h cooling)	Pull Out (23°C)
SMA GF30% (Xiran SGH60)	630N	1900N	-	-	-
PC/ABS (Bayblend 2953)	450N	1350N	380N	430	450N
PVC (Kydex 100)	375N	1125N	220N	375	375N
PP Talc 10-25% (Sabic PP compound 7500)	200N	600N	100N	160	200N

* values are subject to substrate composition and substrate geometry variations
See page 5 for applied test procedures

The information in this document are for guidance purposes and do not represent a warranty or guarantee of any kind. The physical characteristics represent typical or average values. All information and recommendations are given to the best of our knowledge and experience. The user is responsible for determining the application fit. Please consult Bossard for support and specific advice.

INSTALLATION & ASSEMBLY GUIDELINES

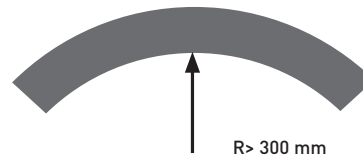
Step 1: Placement



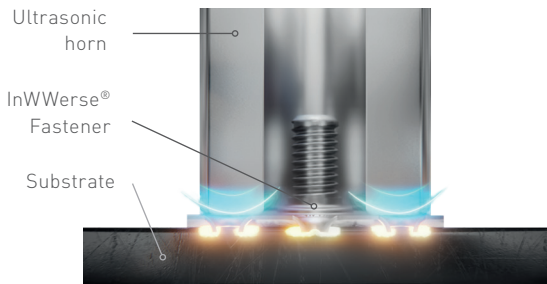
Once the substrate is fixed and in position, the InWVerse® Fastener can be inserted into the vacuum sonotrode to be in the right position.

Curved Surfaces

Can join to flat and curved surfaces with up to **300 mm radius** without class A marks.



Step 2: Insertion



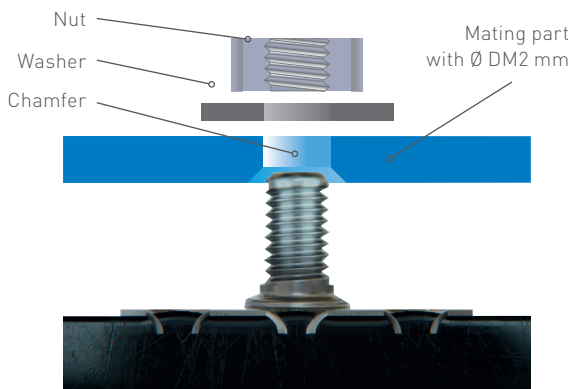
Fastener is inserted into the thermoplastic using ultrasonic welding process.

Welding time: 0.3s
Cycle time: 1s

Step 3: Post-Welding assembly



Immediately after the welding process. The fixation can be used and assembled with mating parts. The mating parts require a chamfer as shown in the diagram or a through hole of **DM2**.



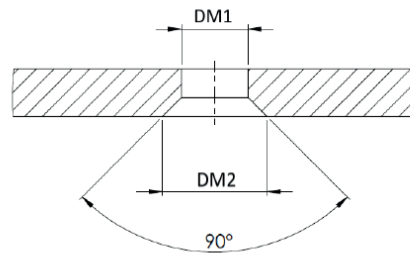
For further recommendation on tightening torques and assembly it is recommended to consult the Bossard team for support and advice.

Using a standard washer and nut the part should be assembled to the correct tightness. This can vary depending on the substrate and application, however for plastics and metals we recommend a tightening torque of **2Nm [M4]** and **2.5Nm [M5]**.

InWVerse® Fastener substrate assembly

Step 3: Post-Welding assembly

	DM1	DM2
M4	4.2-4.3	6.6-6.7
M5	5.2-5.3	7.6-7.7



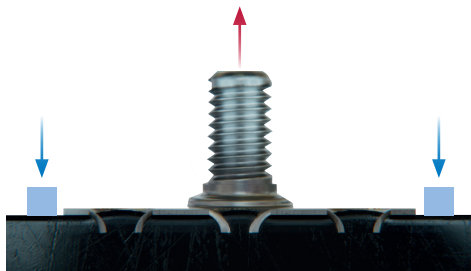
InWVerse® Fastener tightened



InWVerse® Fastener fully assembled

Test procedures

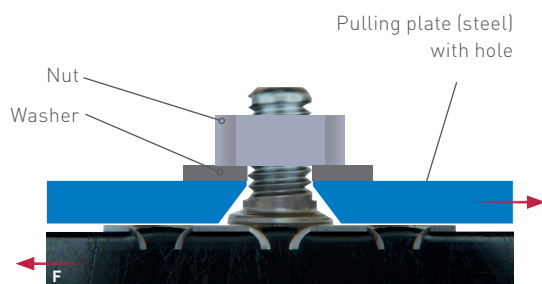
Axial pull-out



Maximum axial force needed to extract the InWVerse® Fastener from the substrate.

Test speed: 20 mm/min
Holding ring: diameter 50 mm

Shear test

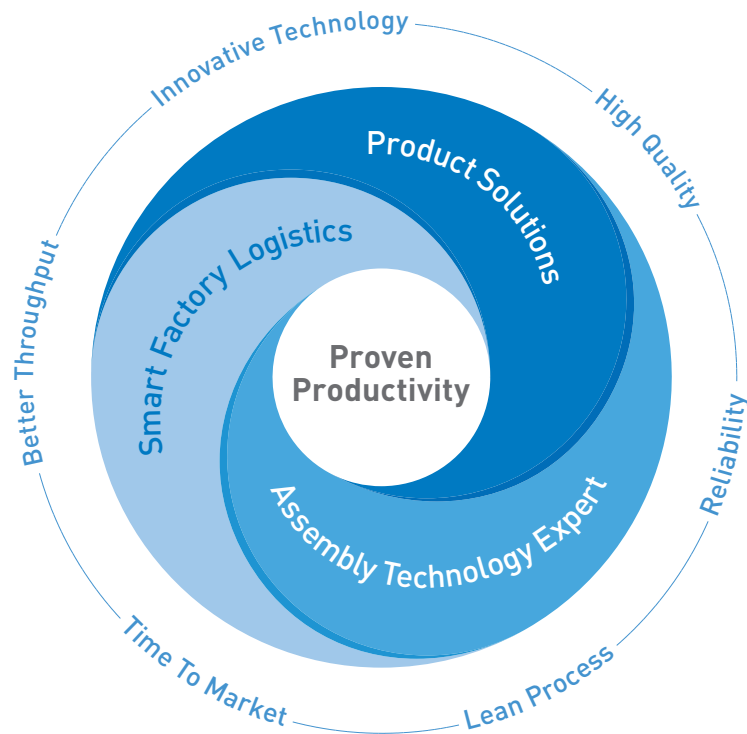


Test speed: 20 mm/min

The individual assembly situation may lead to adapted values. With our proven testing capabilities, Bossard is able to support your best design and assembly conditions.

PROVEN PRODUCTIVITY – A PROMISE TO OUR CUSTOMERS

The strategy for success



From years of cooperation with our customers we know what achieves proven and sustainable impact. We have identified what it takes to strengthen the competitiveness of our customers. Therefore we support our customers in three strategic core areas.

Firstly, when finding optimal **Product Solutions**, that is in the evaluation and use of the best fastening part for the particular function intended in our customers' products.

Second, our **Assembly Technology Expert** services deliver the smartest solutions for all possible fastening challenges. Our services cover from the moment our customers developing a new product, to

assembly process optimization as well as fastening technology education for our customers' employees.

And thirdly, optimising our clients' productions in a smart and lean way with **Smart Factory Logistics**, our methodology, with intelligent logistics systems and tailor-made solutions.

Understood as a promise to our customers, "Proven Productivity" contains two elements: Firstly, that it demonstrably works. And secondly, that it sustainably and measurably improves the productivity and competitiveness of our customers.

And this for us is a philosophy which motivates us every day to always be one step ahead.

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