MAG-FORM® THREAD-FORMING FASTENERS

MINIMIZE DEBRIS GENERATION IN CRITICAL APPLICATIONS

BREAKTHROUGH SOLUTION

Acument® worked with one of the world's largest Tier automotive suppliers, a supplier devoted exclusively to the production of magnesium castings, to help them install the first magnesium shift tower in a production vehicle.

The Tier supplier faced several design, engineering and assembly decisions for the four fastening points where the shift tower would be installed in the steel floor of the vehicle's "body-in-white" frame. These would be the only holes in the part, and the holes and the fastening system all had to be perfect. Rather than drilling the holes after the casting process – a high cost and time-consuming procedure – the holes in the shift tower were molded during casting.

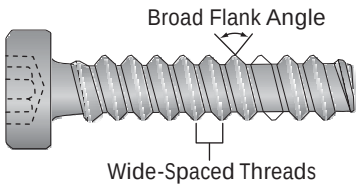
The Tier supplier chose Acument® to develop the perfect fastener solution – a thread-forming Mag-Form® fastener developed specifically for the shift tower application: one that would fit the specs for the shift tower holes and allow follow-up removal and reinstallation over the life of the vehicle.

Standard thread-forming fasteners with a 60° flank angle create excess debris when driven into low-ductile materials. They can easily exceed the ductility limits of the material, causing damage to the formed threads.

Mag-Form® fasteners are specifically designed with a broader flank angle to eliminate tapping operations while forming strong threads in conventional magnesium die-castings and similar materials. The design also minimizes debris, making Mag-Form® fasteners the optimal solution for critical applications such as electronics and air bag modules.

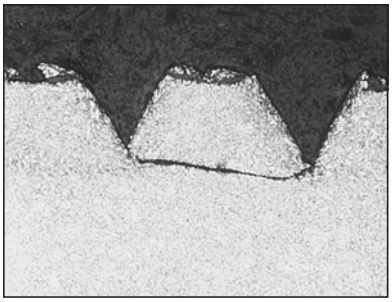
Features

- Lobular configuration
- Wide-spaced thread design
- Broad flank angle that compresses, rather than roll-forms threads into the mating material

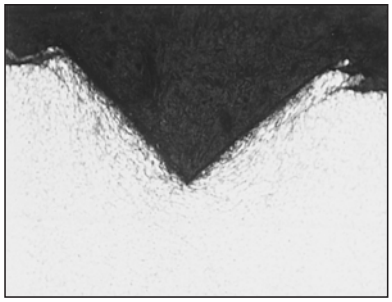


Benefits

- Minimizes debris generation
- Forms strong threads in materials with low ductility
- Allows multiple removals and reinsertions, unlike standard fasteners
- Easily removed and reinserted for field service



Standard 60° Flank Angle Thread-Forming Fasteners
May exceed ductility limit of the material, causing damage to formed threads

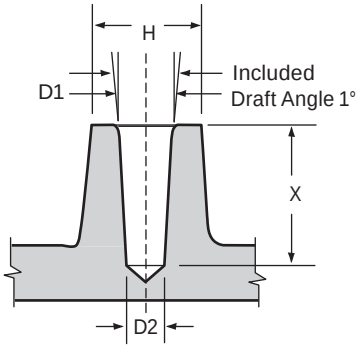


Mag-Form® Thread-Forming Fasteners
Compressive action forms strong threads in low-ductile materials

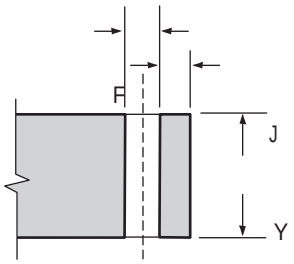
Standard Design Guidelines

Sizes:	MG1.0 to MG16
Thread Design:	Wide-spaced thread with broad flank angle
Head Design:	Can be used with any external or internal head designs
Drive System:	Can be used with all systems, including the TORX PLUS® Drive System
Finish:	zinc and chromate to minimize galvanic corrosion

Suggested Hole Sizes for Die-Cast Magnesium*



Cored Blind Hole



Drilled Hole

In order to utilize as much available screw strength as possible, the minimum length of thread engagement, excluding the two lead threads, should be equal to 2-1/2 times the basic screw size. Blind holes should be deep enough to allow a two-thread lead, with clearance, at the bottom of the hole. The included draft angle is 1.0°.

* NOTE: Fastener sizes MG1.0 to MG2.5 and those used in squeeze-cast magnesium materials require different hole sizes than those shown here. please contact an Acument® Global Technologies engineer for assistance.

Screw Size (metric)	HOLE DIA. AS CAST STD. TApER				F Hole Dia. As Drilled Depth Nom.	Y Through Hole Depth Nom.	X Blind Hole Core Min.	H Boss Dia. Min.	J Distance to Edge w/o Measurable Distortion Min.
	Top D1		Bottom D2						
	Max.	Min.	Max.	Min.					
	mm	mm	mm	mm	mm	mm	mm	mm	mm
	in	in	in	in	in	in	in	in	in
MG3 x 1.0	2.85	2.77	2.72	2.64	2.75	7.50	10.50	6.75	2.00
	0.112	0.109	0.107	0.104	0.108	0.295	0.413	0.266	0.079
MG3.5 x 1.2	3.28	3.20	3.13	3.05	3.17	8.75	12.35	7.83	2.33
	0.129	0.126	0.123	0.120	0.125	0.344	0.486	0.308	0.092
MG4 x 1.4	3.70	3.62	3.52	3.44	3.57	10.00	14.20	8.90	2.67
	0.146	0.142	0.139	0.136	0.141	0.394	0.559	0.351	0.105
MG4.5 x 1.5	4.13	4.05	3.94	3.86	4.00	11.25	15.75	10.00	3.00
	0.163	0.160	0.155	0.152	0.157	0.443	0.620	0.394	0.118
MG5 x 1.6	4.58	4.50	4.36	4.28	4.43	12.50	17.30	11.10	3.33
	0.180	0.177	0.172	0.169	0.175	0.492	0.681	0.437	0.131
MG6 x 2.0	5.46	5.38	5.20	5.12	5.29	15.00	21.00	13.29	4.00
	0.215	0.212	0.205	0.202	0.208	0.591	0.827	0.523	0.157
MG7 x 2.0	6.49	6.41	6.18	6.10	6.29	17.50	23.50	15.63	4.67
	0.255	0.252	0.243	0.240	0.248	0.689	0.925	0.615	0.184
MG8 x 2.5	7.33	7.25	6.98	6.90	7.12	20.00	27.50	17.78	5.33
	0.289	0.285	0.275	0.272	0.280	0.787	1.083	0.700	0.210
MG10 x 3.0	9.20	9.12	8.76	8.68	8.94	25.00	34.00	22.27	6.67
	0.362	0.359	0.345	0.342	0.352	0.984	1.339	0.877	0.262
MG12 x 3.5	11.06	10.98	10.54	10.46	10.76	30.00	40.50	26.76	8.00
	0.436	0.432	0.415	0.412	0.424	1.181	1.594	1.054	0.315
MG14 x 4.0	12.93	12.85	12.32	12.24	12.59	35.00	47.00	31.25	9.33
	0.509	0.506	0.485	0.482	0.495	1.378	1.850	1.230	0.367
MG16 x 4.0	14.97	14.89	14.28	14.20	14.59	40.00	52.00	35.92	10.67
	0.590	0.586	0.562	0.559	0.574	1.575	2.047	1.414	0.420

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