

To: aeroelectric-list@matronics.com
From: "Robert L. Nuckolls, III" <nuckollsr@cox.net>
Subject: Re: AeroElectric-List: Securing small wires
Cc:
Bcc:
Attached:

At 10:17 AM 5/27/2005 -0600, you wrote:

--> AeroElectric-List message posted by: "Matt Prather" <mprather@spro.net>

I've had trouble with these things falling off, unless I use a dab of 5minute epoxy to attach them. I slightly scuff-sand the place to be bonded to, mix up a blob of 5min and hold the tab in place with a piece of tape. None have dis-bonded that have been attached like this. The little sticky area in the center doesn't seem to cause any problems with epoxy. Additionally, I think you can buy these tabs without the sticky stuff, but I'll bet they are more money.

I'll bet you're right. The ones we use at RAC are 3M products fitted with their VHB (very high bond) adhesive technologies. Somebody had to look at these pretty carefully before they allowed them on the airplane and then, I'm sure their use is restricted. Any other product should be applied with caution.

I would caution also about use of any epoxy to grab onto either metal or plastic. When I did the bond-stud tests a couple of years ago we looked at various adhesives. The fast setting, pure plastic epoxies were the worst. Very moderate adhesion at room temp . . . poor at 160F.

JB Weld was a little better:

http://www.aeroelectric.com/Pictures/Bond_Stud_A.jpg

The best was E-6000 or "Sho-Goo"

http://www.aeroelectric.com/Pictures/Bond_Stud_B.jpg

This stuff hangs on well at 160F . . . the test illustrated held over 50# in sheer at 160+ degrees for the aluminum bond stud.

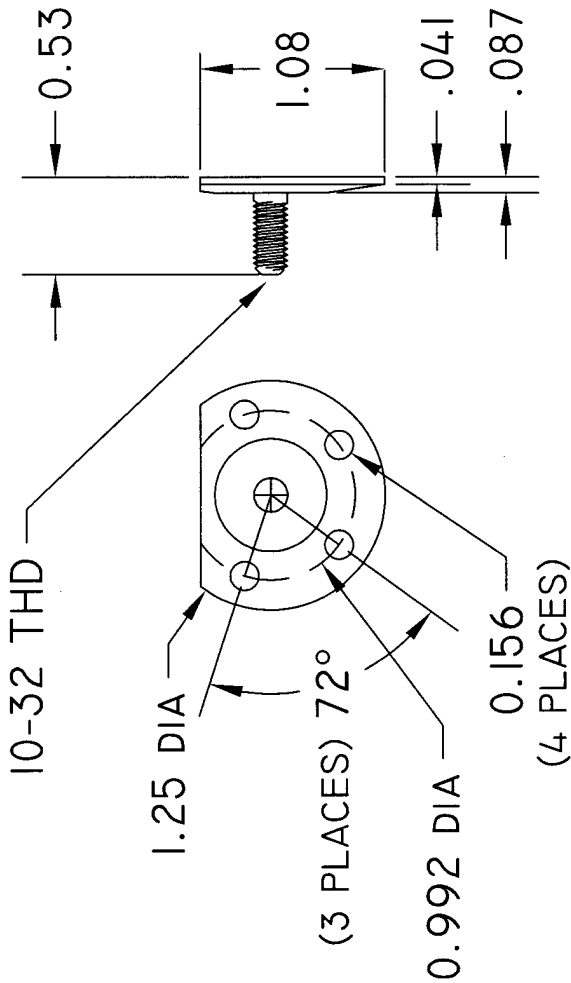
I would expect similar performance for the nylon mounts. A pop-rievet through the center is probably the best overall.

Bob . . .

The bond studs featured in this article were some manufacturer's surplus of unknown source and purpose . . . but they worked fine for this application. We quickly sold out of several thousands of the critters. I've looked at various manufacturing options for a replacement but it seems that the folks at McMaster-Carr have already solved the problem . . . in multiple sizes and materials. See last sheet of this data package.

INSTALLATION NOTES

1. CLEAN PROPOSED MOUNTING SURFACE OF DUST, OIL OR PAINT.
2. COAT BOTTOM OF BOND STUD WITH E-6000 ADHESIVE TO DEPTH OF 1/16" FOR FLAT SURFACES, DEEPER FOR CONCAVED SURFACES. E-6000 IS AVAILABLE FROM MOST HARDWARE STORES.
3. PRESS STUD INTO PLACE SUCH THAT THE ADHESIVE SQUEEZES OUT ALL AROUND THE PERIPHERY OF THE BASE AND THROUGH THE HOLES.
4. IF WORKING ON A NON-HORIZONTAL SURFACE, PUT STRIP OF DUCT TAPE OVER STUD TO HOLD IN PLACE UNTIL ADHESIVE SETS.
5. E-6000 IS A SOLVENT BASED MATERIAL. IT WILL TAKE 24 HOURS AT ROOM TEMPERATURE TO ACHIEVE 75% STRENGTH. PERHAPS A WEEK FOR FULL STRENGTH. DON'T BE IN A RUSH TO LOAD THE FITTING.
6. 3-4 HOURS AFTER FIRST ATTACHMENT, YOU CAN HASTEN CURING BY TRIMMING OFF THE ADHESIVE THAT EXTRUDES THROUGH THE HOLES FLUSH TO THE SURFACE OF THE BASE.
7. NOT RECOMMENDED FOR USE UNDER THE COWL.
8. IF INSTALLING ON A NON-METALIC, COMPOSITE SURFACE, INVESTIGATE EFFECT OF E-6000 ON SURFACE.



(-1) BOND STUD

MATERIAL: ALUMINUM ALLOY
 FABRICATION: SINGLE PIECE, COLD-FORMED

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
 TOLERANCES ARE:
 DECIMAL 0.XX = ±0.03
 DECIMAL 0.XXX = ±0.005
 ANGLES = ±2 DEGREES

NAME	DATE
DRAWN	8-28-5
CHECK	
PROJECT	
APPROVED	

AeroElectric Connection
 6936 Bainbridge Road, Wichita KS 67226-1008

TITLE

BOND STUD

DRAWING NO.

BS-1

REVISION

DATE

SCALE FULL

JOB NO.

PAGE 1 OF 1



Here we see a surplus "mystery stud" bonded to aluminum with JB Weld. This produced a satisfactory joint. Subsequent testing with E6000 solvent based adhesive was just as good but more convenient and less expensive than epoxy.

The following page is an excerpt from the McMaster-Carr website catalog that offers a variety of similar products for prices about the same as our bond-stud offer of several years ago. See <http://mcmaster.com>

Perforated Base Binding Nuts and Studs



Nut Style



Stud Style

Securely anchor a threaded nut or stud permanently or temporarily to material. The perforated base allows you to embed the nuts or studs into the material, weld them in place, or fasten them with screws or rivets.

Perforated base is 1½" dia. and 0.047" thick. Perforations are 0.157" dia. and 0.196" dia. Zinc-plated steel nuts and studs are C1008 steel with a yellow chromate finish. Rockwell hardness is B70 for Type 316 stainless steel; B66 for zinc-plated steel. Tensile strength is 65,000 psi for Type 316 stainless steel; 52,000 psi for zinc-plated C1008 steel.

Nuts—Nut height does not include base.

Thread Size	Nut Wd.	Nut Ht.	Pkg. Qty.	Type 316 SS Per Pkg.	Zinc-Plated Steel Per Pkg.
8-32.....	1 ¹ / ₃₂ "	1 ¹ / ₈ "	10	98007A013 .. \$12.48	98007A110 ... \$5.98
10-32.....	3 ³ / ₈ "	1 ¹ / ₈ "	10	98007A024 .. 12.73	98007A150 ... 5.98
1 ¹ / ₄ "-20.....	7 ⁷ / ₁₆ "	7 ⁷ / ₃₂ "	10	98007A029 .. 13.48	98007A200 ... 6.40
5 ⁵ / ₁₆ "-18 ..	9 ⁹ / ₁₆ "	1 ¹ / ₄ "	10	98007A033 ▲ 7.86	98007A250 ... 6.63

▲ Pack of 5.

Studs—Stud length listed below does not include base.

Stud Lg.	Pkg. Qty.	Type 316 SS Per Pkg.	Zinc-Plated Steel Per Pkg.
8-32			
3 ³ / ₈ ".....	10	97590A520 \$11.85	97590A110 \$7.40
1 ¹ / ₂ ".....	10	97590A526 11.85	97590A115 7.45
5 ⁵ / ₈ ".....	10	97590A531 11.93	97590A120 7.45
3 ³ / ₄ ".....	10	97590A537 11.98	97590A125 7.55
1".....	10	97590A542 13.09	97590A130 7.63
10-32			
1 ¹ / ₂ ".....	10	97590A551 12.12	97590A215 7.50
5 ⁵ / ₈ ".....	10	97590A556 12.26	97590A220 7.50
3 ³ / ₄ ".....	10	97590A561 12.40	97590A225 7.55
1".....	10	97590A567 13.18	97590A230 7.78
1 ¹ / ₄ ".....	10	97590A569 13.59	97590A235 8.23
1¹/₄"-20			
1 ¹ / ₂ ".....	10	97590A574 12.54	97590A315 7.63
5 ⁵ / ₈ ".....	10	97590A578 12.42	97590A320 7.68
3 ³ / ₄ ".....	10	97590A582 12.55	97590A325 7.68
1".....	10	97590A586 12.98	97590A330 7.83
1 ¹ / ₄ ".....	10	97590A589 13.01	97590A335 8.85
1 ¹ / ₂ ".....	10	97590A591 13.28	97590A340 8.93
5⁵/₁₆"-18			
5 ⁵ / ₈ ".....	10	97590A598 13.47	97590A420 8.20
3 ³ / ₄ ".....	10	97590A603 13.96	97590A425 8.38
1".....	10	97590A606 14.33	97590A430 8.70
1 ¹ / ₄ ".....	10	97590A609 14.97	97590A435 9.18
1 ¹ / ₂ ".....	10	97590A613 14.61	97590A440 9.95
2".....	10	97590A616 14.81	97590A445 10.10