



DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
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IN REPLY REFER TO
9070
Ser 05P/046
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From: Commander, Naval Sea Systems Command (SEA 05P)
To: Commander, Naval Sea Systems Command (SEA 05D)
Commander, Naval Sea Systems Command (SEA 05V)

Subj: RECOMMENDATED ALLOWANCE FOR USE OF ADHESIVELY BONDED FASTENERS
ON SURFACE SHIPS

Ref: (a) Ingalls Shipbuilding Test Report No RPT-2018-015 Rev -

1. SEA 05P received a request from Ingalls Shipbuilding through SEA 05D to evaluate reference (a) and provide recommendation on the expanded use of adhesively bonded fasteners.

2. SEA 05P has provided a review of reference (a) and concurs that the use of specific stud and adhesive combinations in specific applications is a technically viable alternative to welded studs provided proper installation procedures are utilized and specific restrictions are maintained. The use of the studs is appropriate in applications where hot work is not possible or is disproportionately expensive. This letter will provide guidelines for recommended approved applications.

3. The only adhesive and stud combination that has been evaluated and deemed acceptable for use is Clickbond CB420-50 (white) or CB420-50E (Blue) adhesive with CB9715-CRM-6-x-P studs. The use of the adhesively bonded fasteners to steel or aluminum substrates will be limited to items which are well under the maximum payload ratings determined during shock testing and detailed below.

4. Restrictions for use of the CB420 adhesives and CB9715 studs will be in dry, interior spaces on surface ships only:

a. 3/8" diameter Clickbond CB9715-CRM-6-x-P studs up to 4" long may be installed on 3/16" thick or greater steel or aluminum substrates with the total payload not to exceed 3.5 lb (total item weight).

b. 3/8" diameter Clickbond CB9715-CRM-6-x-P studs up to 2" long may be installed on 3/16" thick or greater steel or aluminum substrates with the total payload not to exceed 6 lb (total item weight).

c. Payloads must have a center of gravity (C.G.) less than or equal to 2" away from its attachment to the stud.

d. Studs may be adhesively bonded to interior bulkheads and decks. They may also be installed on horizontal/vertical stiffeners located on bulkheads. **Installation on exterior surfaces is prohibited.**

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e. Single adhesively bonded studs may be used to mount cable hangers, however every third cable hanger must be installed using legacy welded methods due to hazard concerns in fire conditions. The welded studs shall be capable of supporting the entire cable weight if the adhesive studs fail.

f. Adhesively bonded studs shall not be used for fastening safety equipment such as fire extinguisher, stokes litter, axes, emergency breathing apparatus, flammable materials storage containers, heat/smoke/flame detectors and their cabling, or any fire protection system component.

g. Adhesively bonded studs shall not be installed more than six feet above the deck level and shall not be mounted in the overhead.

h. Adhesively bonded studs shall not be used to support hanging or swinging weights.

i. Adhesives shall not be used to mount electrical boxes unless a separate Naval Sea Systems Command (NAVSEA) approved electrical grounding method is incorporated. Adhesively bonded electrical equipment shall be electrically grounded in accordance with MIL-STD-1310 and incorporate a Class (C) bond through the use of a flexible conducting bond strap connecting the equipment to ground. The bond strap shall meet the requirements of MIL-DTL-24749 and shall establish a contact resistance of 0.1 ohm or less. An electrical safety ground may not meet MIL-STD-464 requirements for EMC/RF grounding and therefore, the more stringent requirements of MIL-STD-464 shall apply.

j. Adhesively bonded studs may not be used aboard Submarines and In-Plant application aboard Nuclear Aircraft Carriers.

k. Adhesively bonded studs may not be used for installation of fire insulation.

l. For quality assurance, a visual examination of each stud shall be performed along with a proof load test of the first and last stud of each adhesive cartridge.

5. A shipbuilder must develop an installation procedure that has been reviewed and approved by NAVSEA before they may install adhesively bonded fasteners. As part of reference (a), Ingalls Shipbuilding has included a procedure within NSRP DRWG No. SVSKTCH-2019-002 Rev B which is an acceptable process for installation.

6. When Clickbond studs are used, an official document should be drafted with location of the studs and dates that the studs were installed. This document should be provided to the planning yards for maintenance. Although aging tests have been completed, we do know that adhesives harden with time. The hardening will affect the strain-rate sensitivity of the studs. These changes have not been evaluated for shock so to mitigate risks associated with this,

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maintenance should include replacement of these studs at a 10 year periodicity. It should be noted that these studs are replacing a "standardized" and "certified" fastening technology. Since the adhesively bonded stud technology does not have the same rigor as the current technology, locking down the installation procedures along with having the additional documentation and periodic replacement is warranted.

7. Currently, the shock qualification forms only qualify the stud adhesive combination for CG, CVN, DDG, LCS, LHA, LHD, and LPD classes. Thus, this approval only applies to the aforementioned ship classes. Additional testing or modified shock qualification forms will be required if studs are to be used in other combatants.

8. Questions related to the recommended uses of the adhesively bonded fasteners should be addressed to SEA 05P2, Mr. David Owen at 202-781-0651, david.owen@navy.mil.



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By direction

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