



U.S. Department of Transportation
Federal Highway Administration

400 Seventh St., S.W.
Washington, D.C. 20590

MAY 15 1990

Refer to: HNG-14

Mr. Joseph J. Brindlinger
Manager Engineering Services
Union Metal Corporation
P. O. Box 9920
Canton, Ohio 44711

Dear Mr. Brindlinger:

Thank you for your letter of March 1 to Mr. Thomas O. Willett requesting the Federal Highway Administration's (FHWA) acceptance for your company's transformer base shown on the enclosed drawing, (drawing A2850-C1, revision 10, dated 1-10-90). You enclosed the Pendulum Test Report No. UMC-B by the Southwest Research Institute (SWRI) which detailed the test article and impact results for the 20 mph test. A 20 to 60 mph extrapolation of the velocity change was also included. Your subsequent letter of March 26 responded to our telephone request for information on the stub height and the aluminum alloy used in the castings.

The test used an instrumented 1,800-pound pendulum fitted with a 10-stage crushable nose, which simulates a 1979 Volkswagen Rabbit. The results are summarized below:

- Test speed 20 mph
- Velocity change 6.9 fps
- Stub height (actual)* 6.4 in.
- Base tested** A2850-C1R10 12.5-inch bottom bolt circle.
Nuts torqued to 200 foot-pounds.
- Pole used 111-9.0" x 4.82" x 41'9" steel.
- Mast arm lengths 15 feet, (two mounted perpendicular to the direction of impact.)
- Luminaire mounting height 50 feet
- Test article weight 810 pounds
- Calculated 60 mph velocity change 11.9 fps

*The reported stub height was 2.4 inches, which is the measurement to the top of the anchor bolt. A shard of aluminum from the transformer base remained in place to a height of 6.4 inches. We concur with the SWRI conclusion that the protrusion above the 4-inch maximum does not constitute "substantial remains" as referred to in Section 7 of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

**The tested base was cast using a special aluminum alloy, 356.0-T55. The specified mechanical properties are as follow: 25.0 ksi minimum tensile, 17.0 ksi minimum yield, and 0.5 percent to 3 percent' elongation.

This information shows that the actual test and calculated change in velocity of the subject pole-base combination meet the change in velocity and stub-height requirements adopted by the FHWA.

Thus, this base, with a bottom bolt circle diameter of up to 12.5 inches and maximum bolt torque of 200 foot-pounds, as shown on the enclosed drawing, is acceptable for use on Federal-aid highway projects, if proposed by a State when used with poles weighing up to 900 pounds. The use of this base with heavier poles is unacceptable without further justification. This acceptance is limited to breakaway characteristics of the base and does not cover its structural features. Presumably, you will supply potential users with sufficient information on structural design and installation requirements to ensure proper performance. We anticipate that the States will require certification from Union Metal Corporation that the bases furnished have essentially the same chemistry, mechanical properties, and geometry as the base used in the tests, and that the bases will meet the FHWA change in velocity requirements.

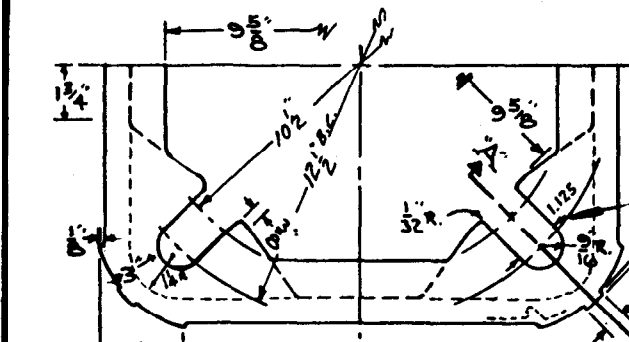
Since your company's transformer base design is a proprietary item, to be used in a Federal-aid highway project it; (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the State highway agency must certify that it is essential for synchronization with existing highway facilities, or that no equally suitable alternate exists; or (c) it must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411, a copy of which is enclosed for your information.

Sincerely yours,

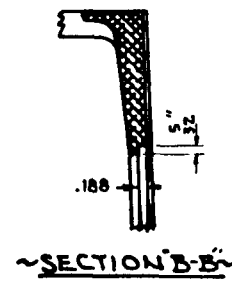
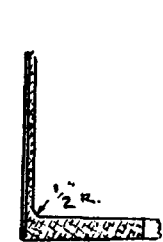


L. A. Staron
Chief, Federal-Aid and Design Division

Enclosures



MUST CLEAR GAGE OF FOUR 1" DIA. PINS EQUALLY SPACED ON 17 1/2" CIRCLE

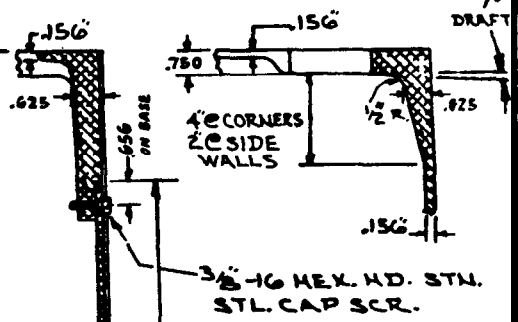


13" SQ. ± 1/16

RAISED LETTERS (INSERT) RAISED LETTERS "8 SF"

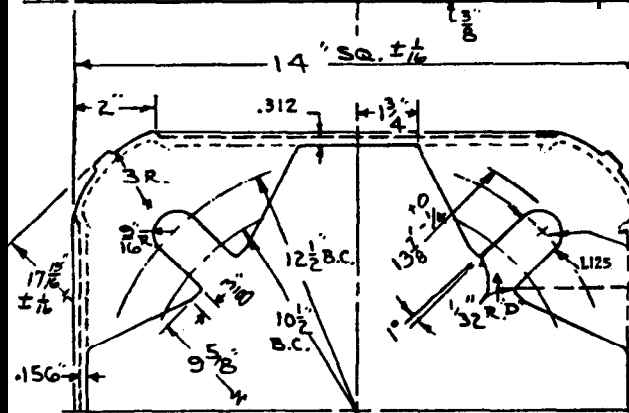
UNION METAL

DOOR DRG. A-2851-G2 TO BE USED, BASE TO ACCEPT



BASE PATTERN NO INSIDE BASE OPPOSITE DOOR 3/8" RAISED LETTERS

DOOR SIZE - 7 3/32" x 9 1/8" x 13 1/8"



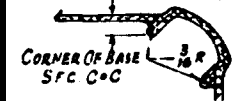
~ SEC. THRU DOOR AT C. OF BASE ~

~ SECTION A-A ~

FOR DOOR LUG AND MISC. FIT DIM'S. REF. TO U.M. DRG. 1A-AZ851-F1 MUST CLEAR GAGE OF FOUR 1 1/2" DIA. PINS EQUALLY SPACED ON 12 1/2" CIRCLE

CONTROL NO.	1/2-13 TAP	USE 356-T35 ALLOY THIS CONT. NO. ONLY (ASSY A2850-G107)
79069	YES	

INTERNAL RIBS, 3/8" @ CENTER OF BASE - TAPERS TO 0" AT 2" FROM TOP & AT 4" FROM BOTTOM



"RFG" ONAL. DIMS. NOT TOLERANCED OR E DIM'S FOR PART CONSTRUCTION NOT FOR INSPECTION OF PRODUCTION CASTINGS.

REV	DESCRIPTION	DATE	BY	CHKD
R10	ADD 1/2" R. RAISED LETTERS			
R9	ADD 1/2" R. RAISED LETTERS			
P-8	ADD 1/2" R. RAISED LETTERS			
R7	GAGE PINS AT BOTTOM WEAR (.914)			
R6	TRK. DPT. TO DEC. ADD INSP. NOTE			
R5	INCREASED 1/2" GAGE NOT TO BE USED			
R4	INCREASED 1/2" GAGE NOT TO BE USED			
R3	ADDED INTERNAL RIB AT CORNERS			
R2	ADDED INSERT, ADDED 1/2" R. RAISED LETTERS			
R1	INCREASED 1/2" GAGE NOT TO BE USED			

CLASS. No. 051.04
FRANGIBLE ALUMINUM BASE
PATT. NO. APA-2850
THE UNION METAL MFG. CO. CANTON, OHIO
DWG. NO. A2850-C1

REV. 10/20