LS-9

U.S. Department
of Transportation
Federal Highway Administration

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

JAN 24 1990

REFER TO:
HNG-14

Mr. Robert A. Sik
Vice President, Permanent Mold Division
Akron Foundry Company
2728 Wingate Avenue
P.O. Box 27028
Akron, Ohio 44319-0009

Dear Mr. Sik:

Your June 14, 1989, letter to Mr. David K. Phillips "former Director of Office of Engineering" requesting acceptance by the Federal Highway Administration (FHWA) of your company's TB-2 and TB-3 series luminaire support transformer bases for use on Federal-aid highway projects was not acted on because you requested that we suspend our review. Recently you requested that we complete our review, which we have done. With your June 14 letter you enclosed four Southwest Research Institute reports (Project No. 06-2128-107), dated May 1989, containing results of pendulum tests on the bases. The tests were conducted to assess the compliance of these bases with FHWA requirements, which cite Section 7 of the 1985 American Association of State Highway and Transportation Officials' (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

The tests used an instrumented 1,800-pound pendulum fitted with a 10 stage crushable nose which simulates the left quarter point of a 1979 Volkswagen Rabbit. Details of the tested hardware and the measured and extrapolated results are summarized in the enclosed table. That information shows that the actual tests and calculated changes in velocity of the pole-base combinations shown in the enclosure meet the change in velocity and stub-height requirements adopted by the FHWA. Nominally, the 16.3 f.p.s. calculated change in velocity of test AF-3 exceeds FHWA requirements by 0.3 f.p.s. However, we believe the calculated changes in velocities nearly always over estimate the 60 m.p.h. results and that the accuracy of the testing and extrapolation procedure does not justify the precision reported. Thus, we have rounded the reported value to 16 f.p.s., which is the upper limit of acceptability under the new FHWA requirements. In addition, the test of the TB2 base (Test AF-1) used a bottom bolt circle diameter of 10.5 inches, whereas the hardware can accommodate a bolt circle of up to 12 inches. Until further testing of the TB2 base confirms satisfactory breakaway performance with the larger bottom bolt circle, its use should be limited to installations with a bolt circle no greater than 10.5 inches.

Thus, the TB2 bases with bottom bolt circle diameters up to 10.5 inches, and the TB3 bases, as shown on the enclosed drawings, are acceptable for use on Federal-aid highway projects, when used with poles weighing no more than those used in their respective qualifying tests, if proposed by a State. This acceptance is limited to breakaway characteristics of the bases and does not cover their 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 the Akron Foundry Company that the castings furnished have essentially the same chemistry, mechanical properties, and geometry as the castings used in the tests, and that the castings will meet the FHWA change in velocity requirements.

Sincerely yours,

L. A. Staron

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

Enclosures

Test Number	Base Number	Test Delta V @ 20mph (fps)	Calc'd Delta V @ 60mph (fps)	Stub Height (in.)	Pole W/arm & Dummy Weight (pounds)	Pole Type	Nominal Luminaire Mounting Height (feet)	Mast Arm Length (ft)	Base Bolt Circle Diameter (in.)	Base Bolt Diameter (in.)	Base Bottom Washer Outside Diameter (in.)	Base Bottom Washer Thickness (in.)	Base Top Bolt Circle Diameter (in.)	Top Bolt Diameter (in.)	Top Washer Outside Diameter (in.)	Top Washer Thickness (in.)
AF-1	TB2-AF 1012 I.W.-17	6.4	12.0	*	494	steel	40.8	15.0	10.5	1.00	2.75	0.50	12	1.00	2.5 2.75	0.375
AF-2	TB3-AF 1517-17	8.3	15.6	2.0	778	steel	50.0	15.0	17.25	1.25	2.75	0.50				0.5
AF-3	TB3-AF 1517 I.W.-17	10.3	16.3	*	778	steel	50.0	15.0	17.25	1.25	2.75	0.50	13	1.25	2.75	0.5
AF-4	TB3-AF 1517 I.W.-17	6.4	15.0	*	778	steel	50.0	15.0	15	1.00	2.75**	0.375**	13	1.25	2.75	D.5

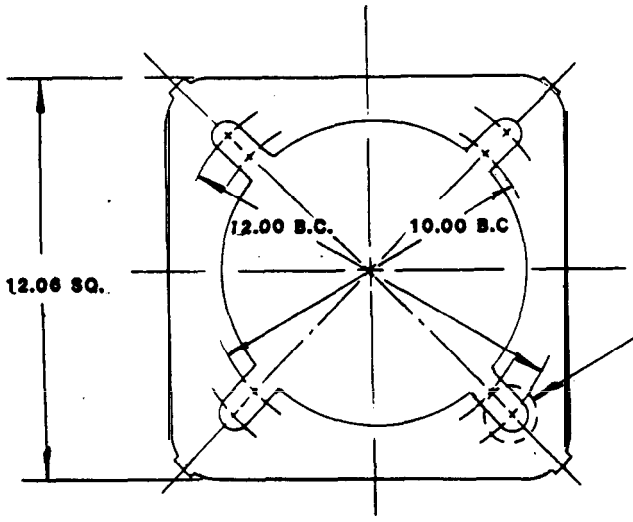
I.W. SIGNIFIES INTERNAL WELD

• Only mounting bolts remained.

** In addition, 2.75 inch X 4.25 inch X 0.625 inch thick rectangular washers were also used.

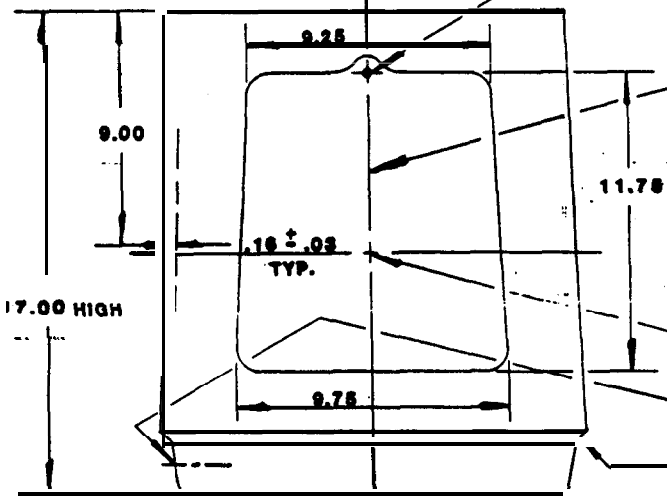
* ALL WASHERS TO BE ZINC MECHANICAL COATED PER ASTM A 595-85 CLASS 50

, CHEMICAL & PHI. CERTS TO BE SUPPLIED WITH EACH SHIPMENT



* 2 1/2 DIA. X 3/8 THK. 1 1/16 I.D. STEEL WASHER FOR 1" DIA. CONNECTING BOLTS

1/4-20 HEX HD . . . . 1/2" LG. 8.8. SCREW

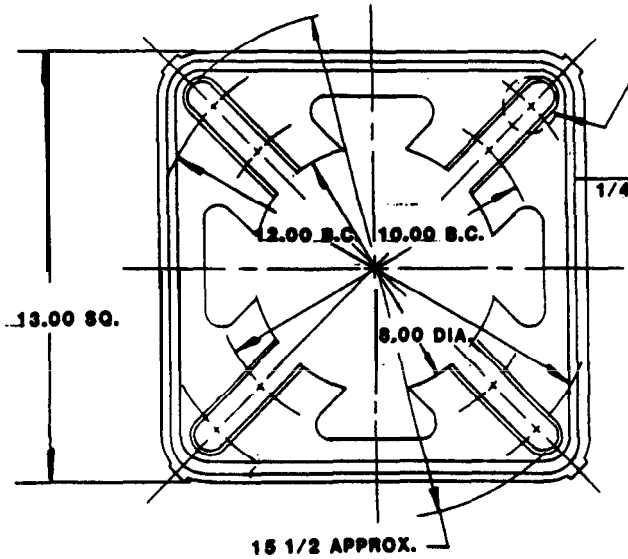


ADHESIVE BREAKAWAY AND CAUTION INSTRUCTION LABELS APPEAR INSIDE WALL OPPOSITE DOOR OPENING

GROUND SCREW HOLE 1/4 - 20 TAP THRU

GROUND SCREW HOLE 1/2 - 13 TAP THRU

1/4 V MIG 4043 WIRE



* 2 3/4 DIA. X 1/2 THK. 1 1/16 I.D. STEEL WASHER FOR 1" DIA. ANCHORAGE

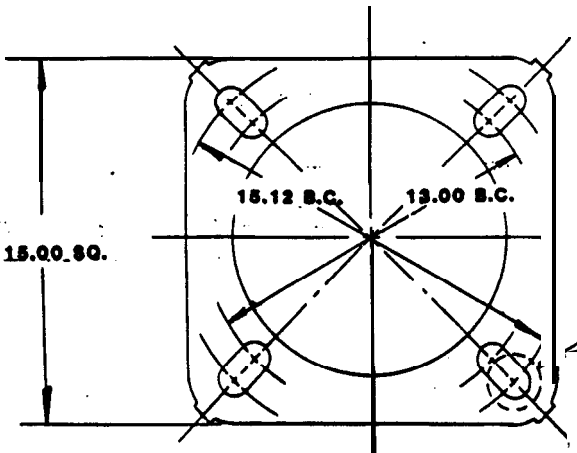
1/4 4043 WIRE WITH APPROX 6" OF WELD ON EACH OF THE (4) INTERNAL CORNERS

S.S. WHEELABRATED FINISH
304-TG

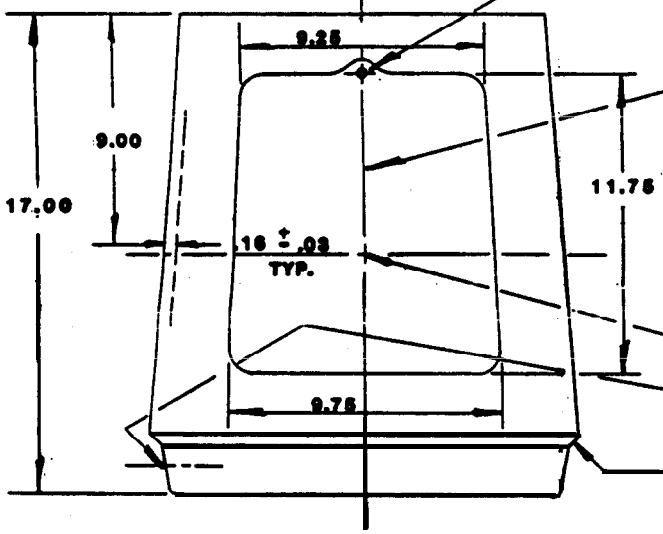
AKRON FOUNDRY CO.	
AL. BREAKAWAY TRANSFORMER BASE	
DATE 1-26-88	TB2-AF1012 LW.-17
DWN. SIK	REVISED con 1800 • IWDULUM

* ALL WASHERS TO BE ZINC MECHANICAL COATED • ERASTM B 633-85 CLASS SC

CHEMICAL & WY. CERTS TO BE SUPPLIED WITH EACH SHIPMENT



* 2 3/4 DIA. X 1 5/16 I.D. X 1/2 THK. STEEL WASHERS FOR 1 1/4 DIA. CONNECTING BOLTS
OR
2 3/4 DIA. X 1 1/16 I.D. X 1/2 THK.
STEEL WASHERS FOR 1 . DIA. CONNECTING BOLTS



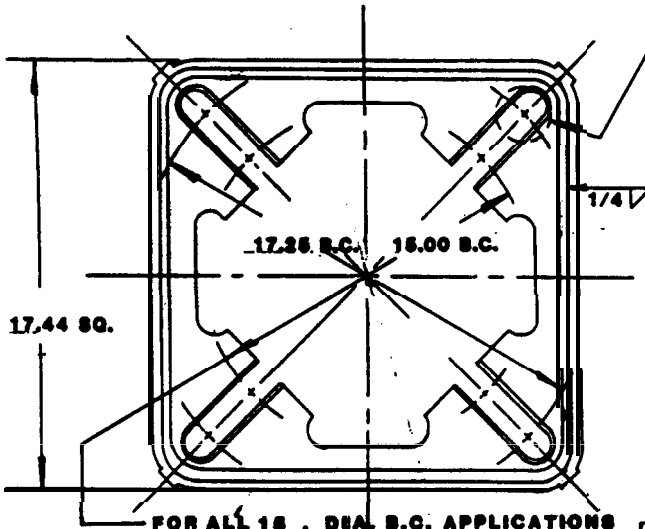
1/4-20 HEX HD. 1/2" LG. S.S. SCREW

ADHESIVE BREAKAWAY AND CAUTION INSTRUCTION LABELS APPEAR INSIDE WALL OPPOSITE DOOR OPENING

GROUND SCREW HOLE 1/4 - 20 TAP THRU

GROUND SCREW HOLE 1/2 - 13 TAP THRU

5/16 MIG 4043 WIRE



* 2 3/4 DIA. x 1 5/16 I.D. x 1/2 THK. STEEL WASHERS FOR 1 1/4 DIA. ANCHOR CONNECTING BOLTS

1/4 WHEN INTERNAL WELD IS REQUIRED: 4043 WIRE WITH APPROX. 5" OF WELD ON EACH OF THE (4) INTERNAL CORNERS ORDER PART NO. WITH SUFFIX I.W. FOR INTERNAL WELDED CORNERS, AS FOLLOWS:

TB3-AF1517 I.W.-17.

S.S. WHEELABRATED FINISH
356-T6

FOR ALL 15 . DIA. B.C. APPLICATIONS USE 1" ANCHOR BOLTS WITH ST'D " STACK PAGE " WASHERS 2 3/4 X 4 1/4 X 5/8 TK. RECTANGULAR WASHERS WITH 2 1/2 O.D. X 1 1/16 I.D. X 3/8 TK. WASHERS

AKRON FOUNDRY CO.	
AL. BREAKAWAY TRANSFORMER BASE	
DATE 1-25-88	TB3-AF1517-17
DWN. SIK	REVISED FOR 1.000 ø PENDULUM