LS-19

U.S.Department
of Transportation

**Federal Highway
Administstmtion**

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

AUG 6 199

Refer to: HNG-14

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

Dear Mr. Sik:

This is in response to your July 13 letter to Mr. Artimovich requesting acceptance by the Federal Highway Administration (FHWA) of your company's cast aluminum transformer bases for use on Federal-aid highway projects. Tests were conducted to assess compliance of the bases with FHWA breakaway requirements, which cite Section 7 of the 1985 American Association of State Highway and Transportation Officials' (AASHTO) Standard Specifications for Structural Suooorts for Hishwav Sians. Luminaires and Traffic Siqnals. The Southwest Research Institute forwarded copies of the five crash test reports (Project No. 06-3116-516), dated June 1990, containing results of the pendulum tests on various aluminum and steel poles with these bases. Fully dimensioned drawings and material test reports on the aluminum castings had been received from you on May 31.

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. Impact speed was 20 mph. A summary of the tested hardware is presented below:

Test Number	Akron Foundry Number	Height of Base	Pole Tvoe
Test-l	TB-AF-6-9	9 inches	8 inches Aluminum
Test-10	TB-AF-6-9	9 inches	9 inches Steel
Test-11	TB-AF-6-9	9 inches	8 inches Aluminum
Test-12	TB3-AF-1517-17 I.W.	17 inches	10 inches Steel
Test-14	TB-AF-5-9	9 inches	10 inches Steel
Test-16	TB-AF-5-9	9 inches	10 inches Steel

Details of the tested hardware are shown in Enclosure I. Test parameters and measured and extrapolated test results and are shown on Enclosure II **as** part of Test Series IV. This information shows that the tested pole-base combinations will meet the change in velocity and stub-height requirements adopted by the FHWA.

The 17.1 fps and 16.8 fps calculated changes in velocity of Tests 12 and 14, respectively, exceed FHWA requirements. However, as the calculated changes in velocities nearly always over estimate the 60-mph results, we will consider

the Test 14 results as meeting the new FHWA requirements. However, in the absence of other test evidence, we believe the calculated 60-mph change in velocity for Test 12 is beyond the limit we should accept without qualification.

Thus, the transformer bases manufactured by your company and distributed under the product numbers shown above, as shown on the enclosed drawings, are acceptable for use on Federal-aid highway projects within the range of conditions tested, if proposed by a State, except that for base TB3-AF-1517-17 I.W. for which our acceptance is limited to use were the combined supported weight of the pole, mast arm, and luminaire does not exceed 900 pounds. 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 limitations and on installation requirements to ensure proper performance. We anticipate that States will require certification from Akron Foundry that bases furnished have essentially the same chemistry, mechanical properties, and geometry as those used in the tests, and that supports with those bases will meet the FHWA breakaway requirements.

Since your company's breakaway support designs are proprietary items, to be used in a Federal-aid highway project they; (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the State highway agency must certify that they are essential for synchronization with existing highway facilities, or that no equally suitable alternate exists; or (c) they 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 was provided with prior correspondence.

Your letter also requested acceptance for TB-1 and TB-2 bases tested with heavier pole hardware. Enclosure III is a copy of our letter of acceptance dated May 30, 1990, sent in response to an earlier request.

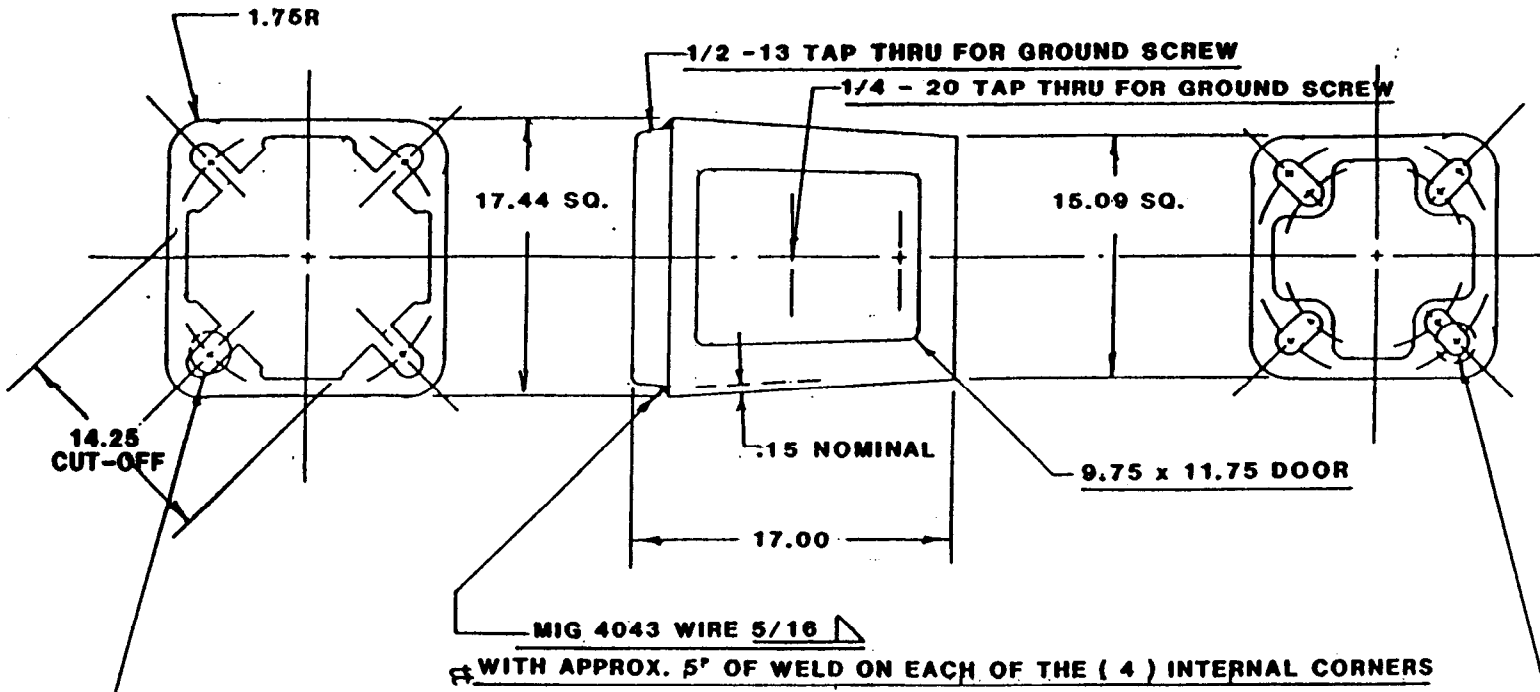
Sincerely yours,

L. A. Staron

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

Enclosures

Endorsement to FHWA field offices: All of the transformer bases covered by this letter and Geometric and Roadside Design Acceptance Letters LS-17 and LS-18 were manufactured by Akron Foundry Company. For marketing purposes Akron Foundry has requested these three acceptance letters to cover what is essentially two 9-inch high transformer base models that will be manufactured by Akron Foundry and sold by three firms: Feralux, Pole Lite, and Akron Foundry. One model has top and bottom bolt circle ranges of 11.5 inches to 12.5 inches. It will carry a marking of CS-300 for Feralux, F-1300 for Pole Lite, and TB-AF6-9" for Akron. The other has top and bottom bolt circle ranges of 14.5 inches to 15.25 inches. It will carry a marking of CS-370 for Feralux, F-1302 for Pole Lite, and TB-AF5-9" for Akron. A separate series of tests was run to cover the Feralux model designations, while another series was run to cover the combined Pole Lite and Akron designations. It is our understanding that in production the Feralux bases will only be marked with Feralux's base numbers. On the other hand, bases to be marketed by either Pole Lite or Akron will be manufactured showing both suppliers' model numbers and before being shipped, one model number will be removed so that only the nominal supplier's model number will remain.



DOOR SUPPLIED/BLANK OR LOGO IN ALUMINUM OR PLASTIC WITH OR WITHOUT HINGE

ST'D 1/4 -20 S.S.HEX. SCREW OR VANDAL SCREW TO FIT YOUR SPECIFICATIONS

ALL WASHERS TO BE ZINC MECHANICAL COATED PER ASTM B 695 - 85 CLASS 50

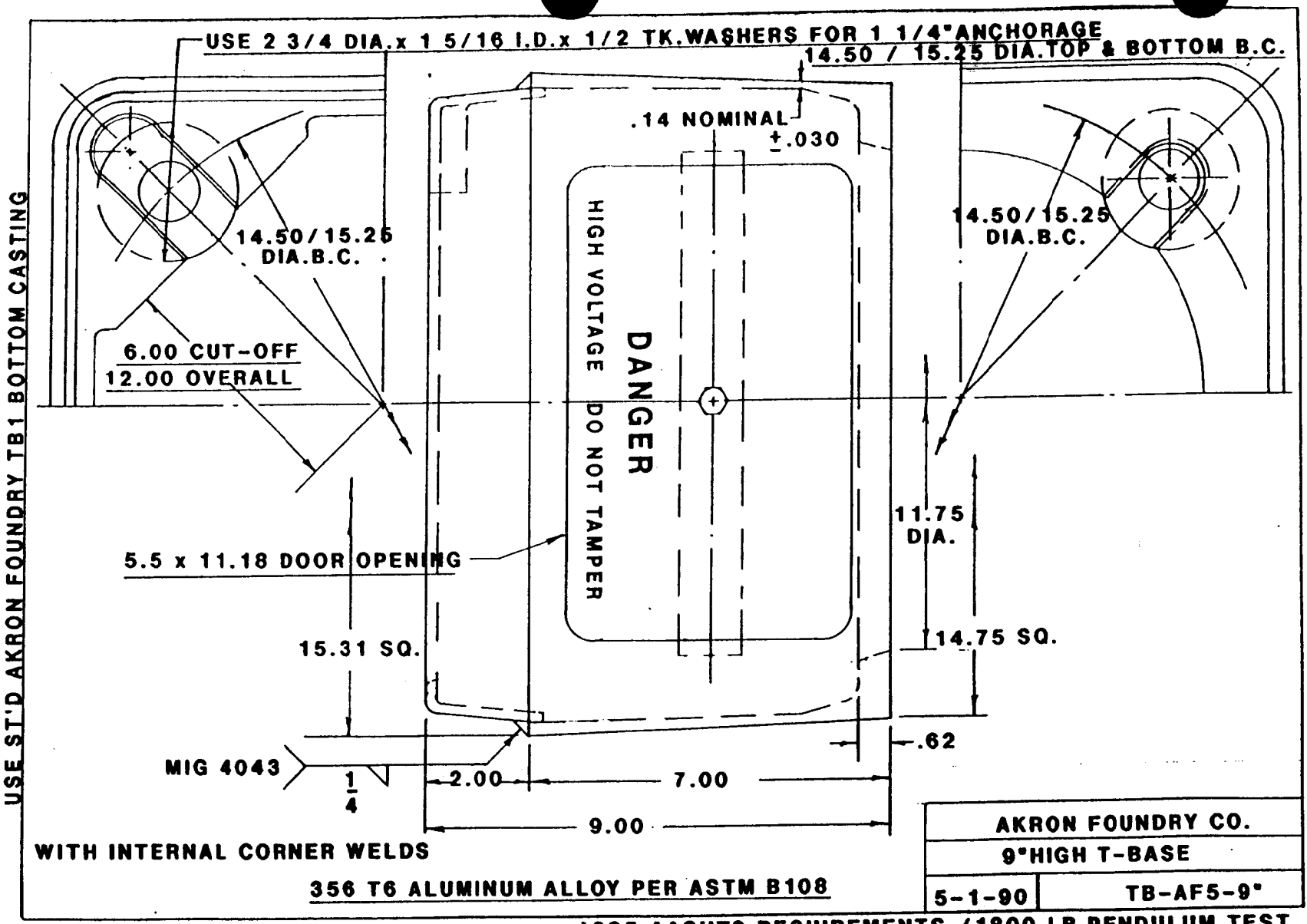
356 T-6 ALUMINUM ALLOY / S.S. WHEELABRATED FINISH CHEMICAL AND PHY. CERTS TO BE SUPPLIED WITH EACH SHIPMENT

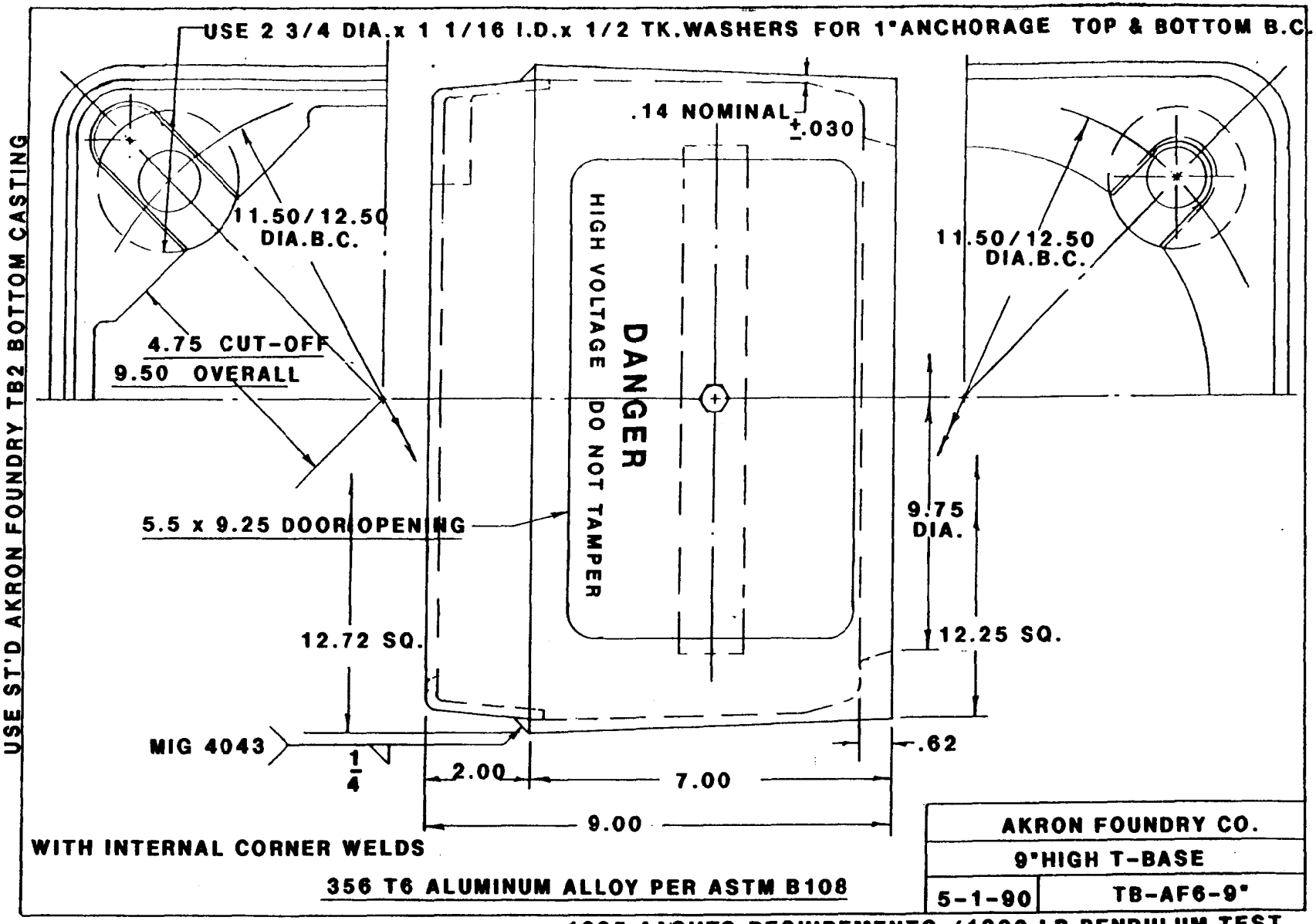
ADHESIVE BREAKAWAY AND CAUTION LABELS TO APPEAR
ON INSIDE WALL OPPOSITE DOOR OPENING

AKRON FOUNDRY CO.	
1985 AASHTO T-BASE	
1-25-88	TB3 - AF 1517 - 17 I.W.

MATERIAL MELTED AND MANUFACTURED IN THE USA. CASTINGS PRODUCED IN THE USA.

SPECIAL CUT-OFF 17.25 DIA.GROUND MOUNT ONLY


USE 2 3/4 DIA.x 1 5/16 I.D.x 1/2 TK.WASHERS FOR 1 1/4"ANCHORAGE
14.50 / 15.25 DIA.TOP & BOTTOM B.C.
.14 NOMINAL
±.030
14.50/15.25
DIA.B.C.
14.50/15.25
DIA.B.C.
6.00 CUT-OFF
12.00 OVERALL
DANGER
HIGH VOLTAGE DO NOT TAMPER
5.5 x 11.18 DOOR OPENING
11.75
DIA.
15.31 SQ.
14.75 SQ.
.62
MIG 4043
1/4
2.00
7.00
9.00
USE ST'D AKRON FOUNDRY TB1 BOTTOM CASTING
WITH INTERNAL CORNER WELDS
356 T6 ALUMINUM ALLOY PER ASTM B108
AKRON FOUNDRY CO.
9"HIGH T-BASE
5-1-90
TB-AF5-9"
1985 AASHTO REQUIREMENTS /1800 LB PENDULUM TEST


USE 2 3/4 DIA.x 1 1/16 I.D.x 1/2 TK.WASHERS FOR 1"ANCHORAGE TOP & BOTTOM B.C.
USE ST'D AKRON FOUNDRY TB2 BOTTOM CASTING
.14 NOMINAL ±.030
11.50/12.50 DIA.B.C.
11.50/12.50 DIA.B.C.
4.75 CUT-OFF
9.50 OVERALL
DANGER
HIGH VOLTAGE DO NOT TAMPER
5.5 x 9.25 DOOR OPENING
9.75 DIA.
12.72 SQ.
12.25 SQ.
MIG 4043
1/4
.62
2.00
7.00
9.00
WITH INTERNAL CORNER WELDS
356 T6 ALUMINUM ALLOY PER ASTM B108
AKRON FOUNDRY CO.
9"HIGH T-BASE
5-1-90
TB-AF6-9"
1985 AASHTO REQUIREMENTS /1800 LB PENDULUM TEST

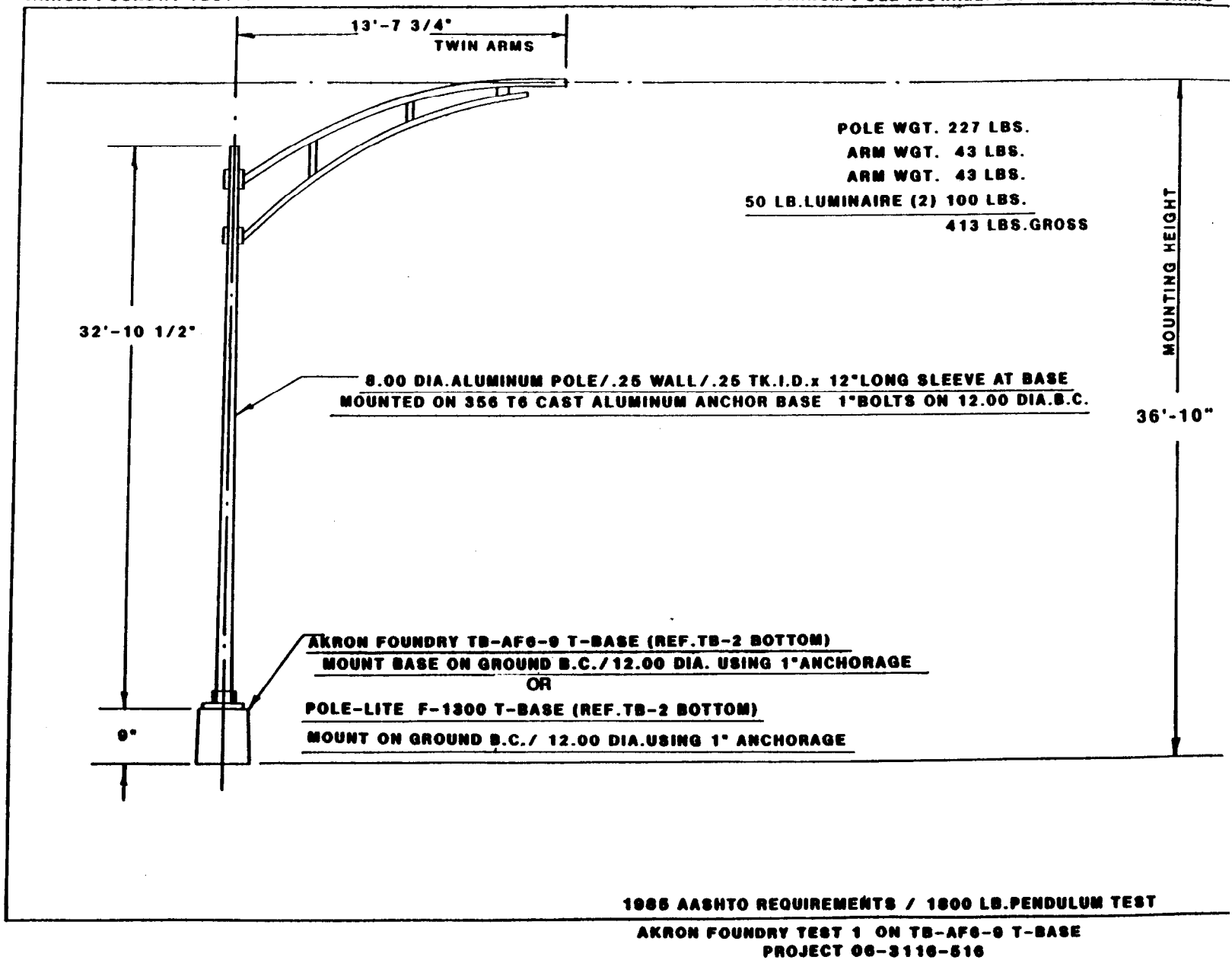


Figure 3. Assembly Drawing, Akron Foundry Test 1

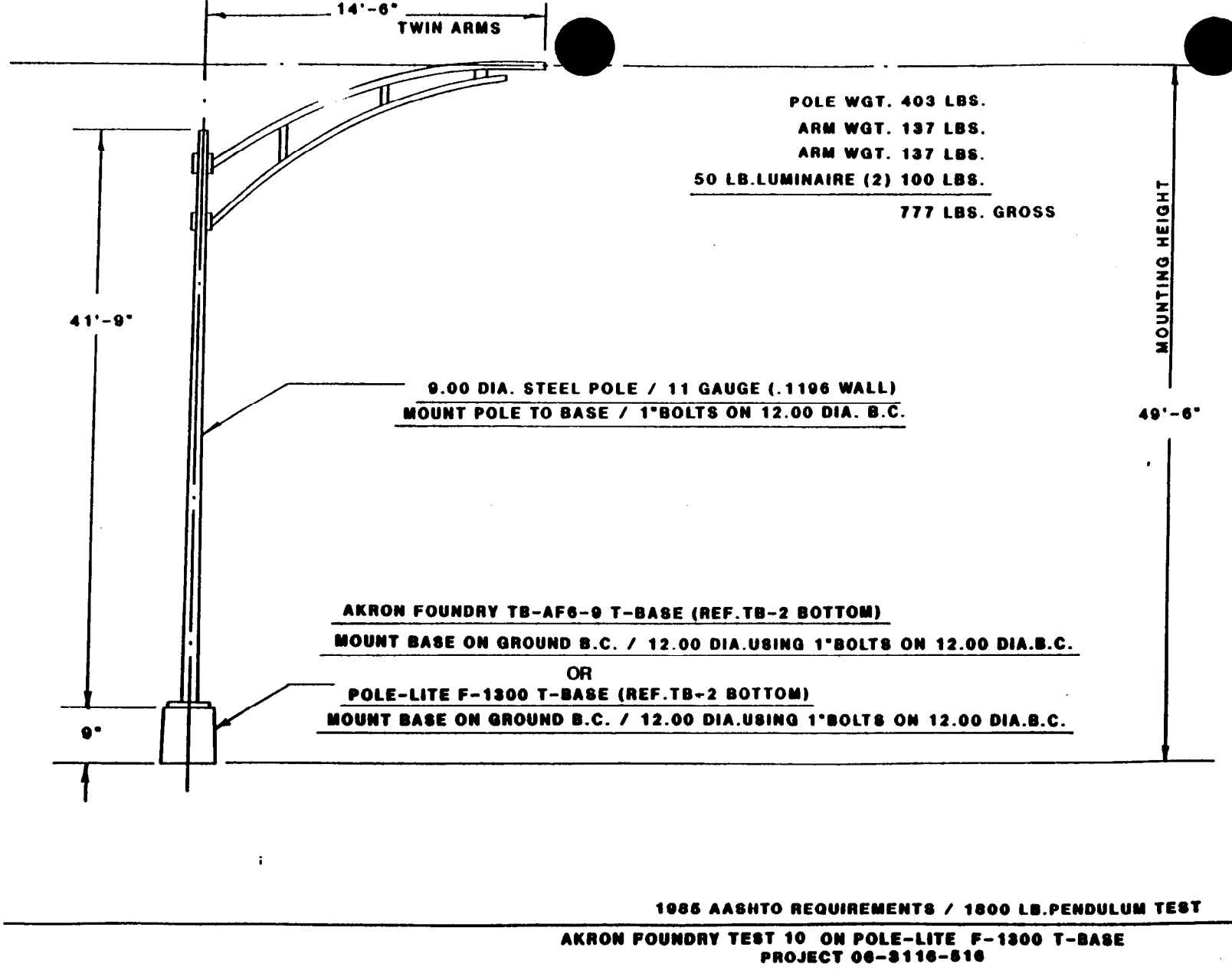


Figure 3. Assembly Drawing, Akron Foundry Test 10

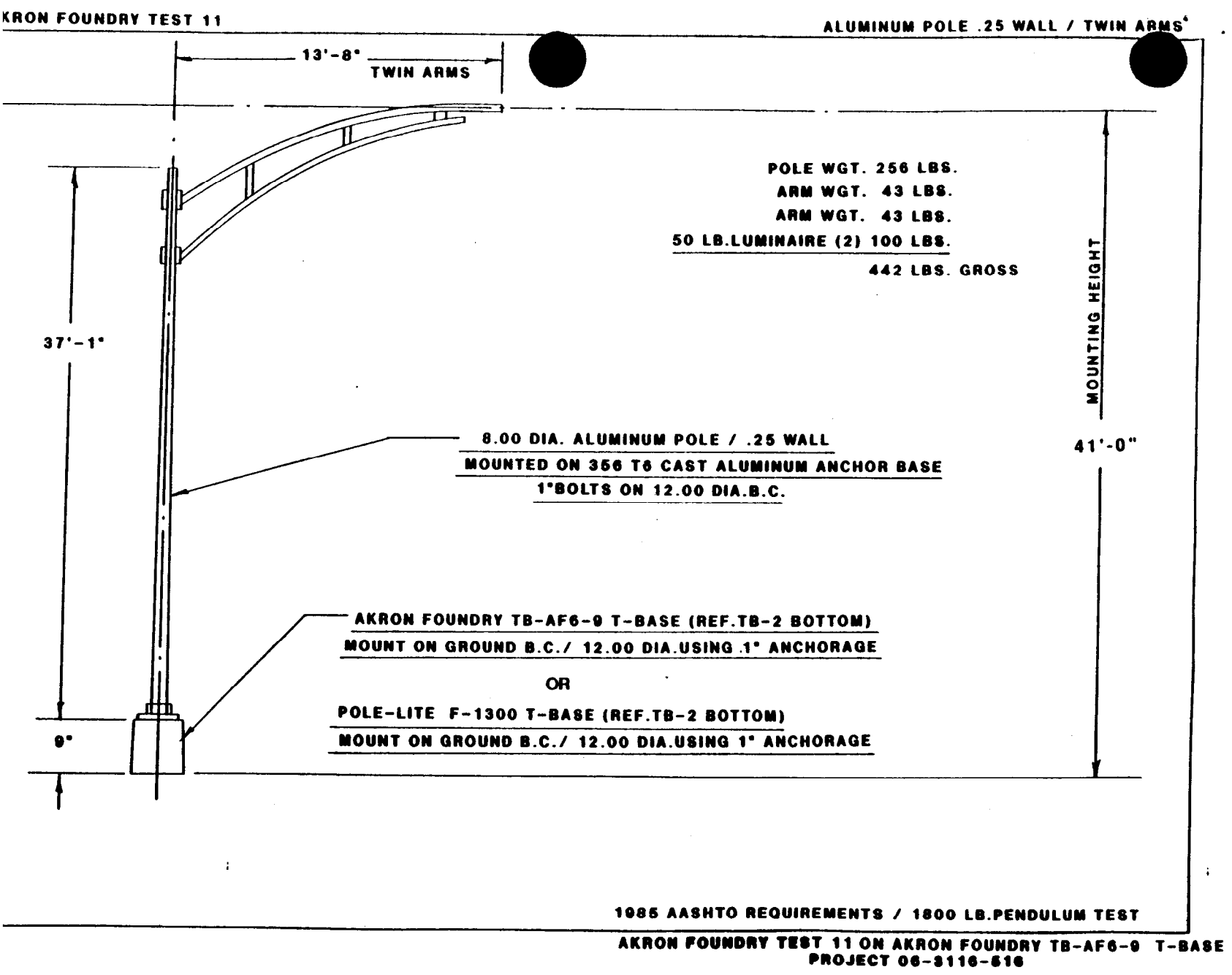


Figure 3. Assembly Drawing, Akron Foundry Test 11

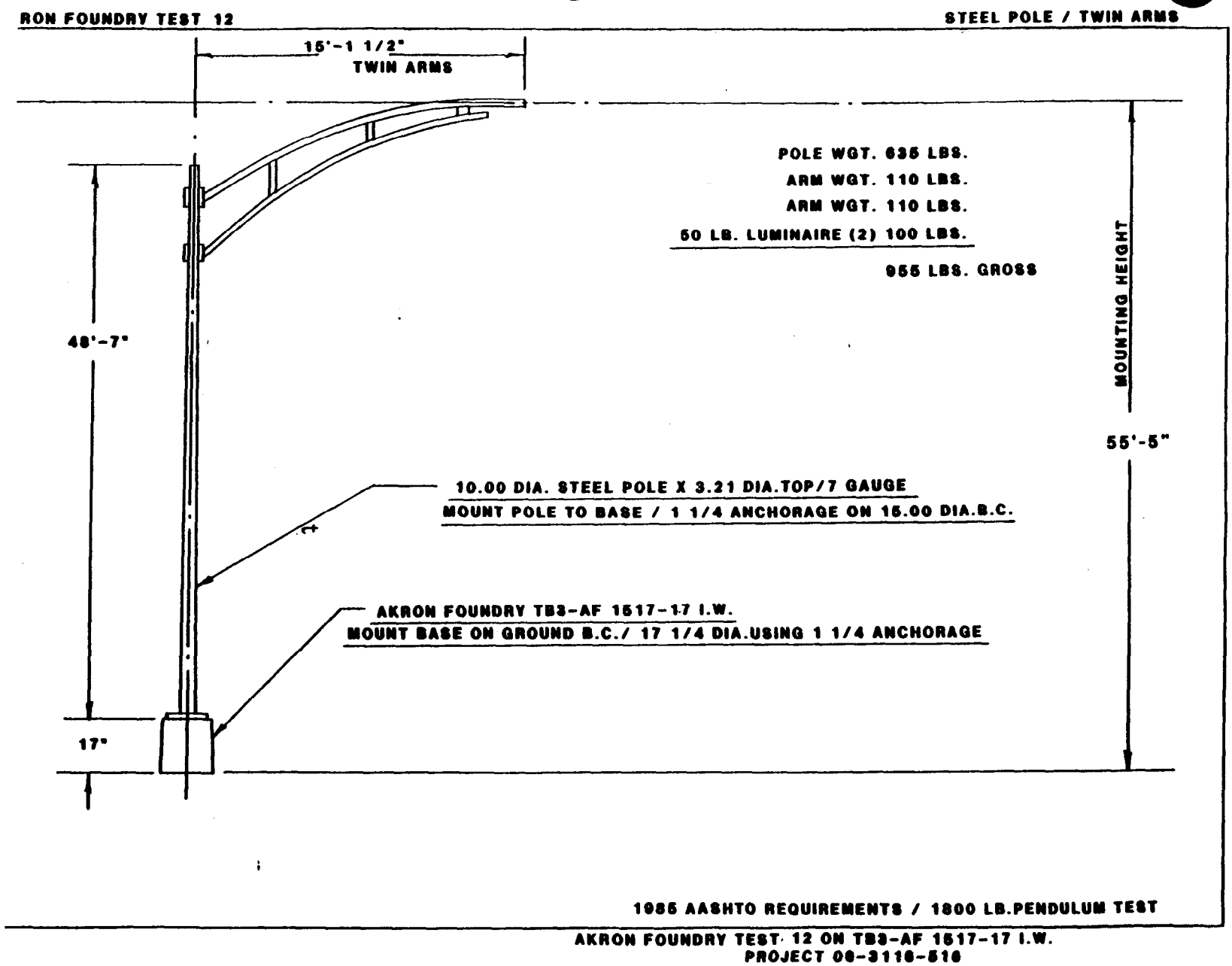


Figure 3. Assembly Drawing, Akron Foundry Test 12

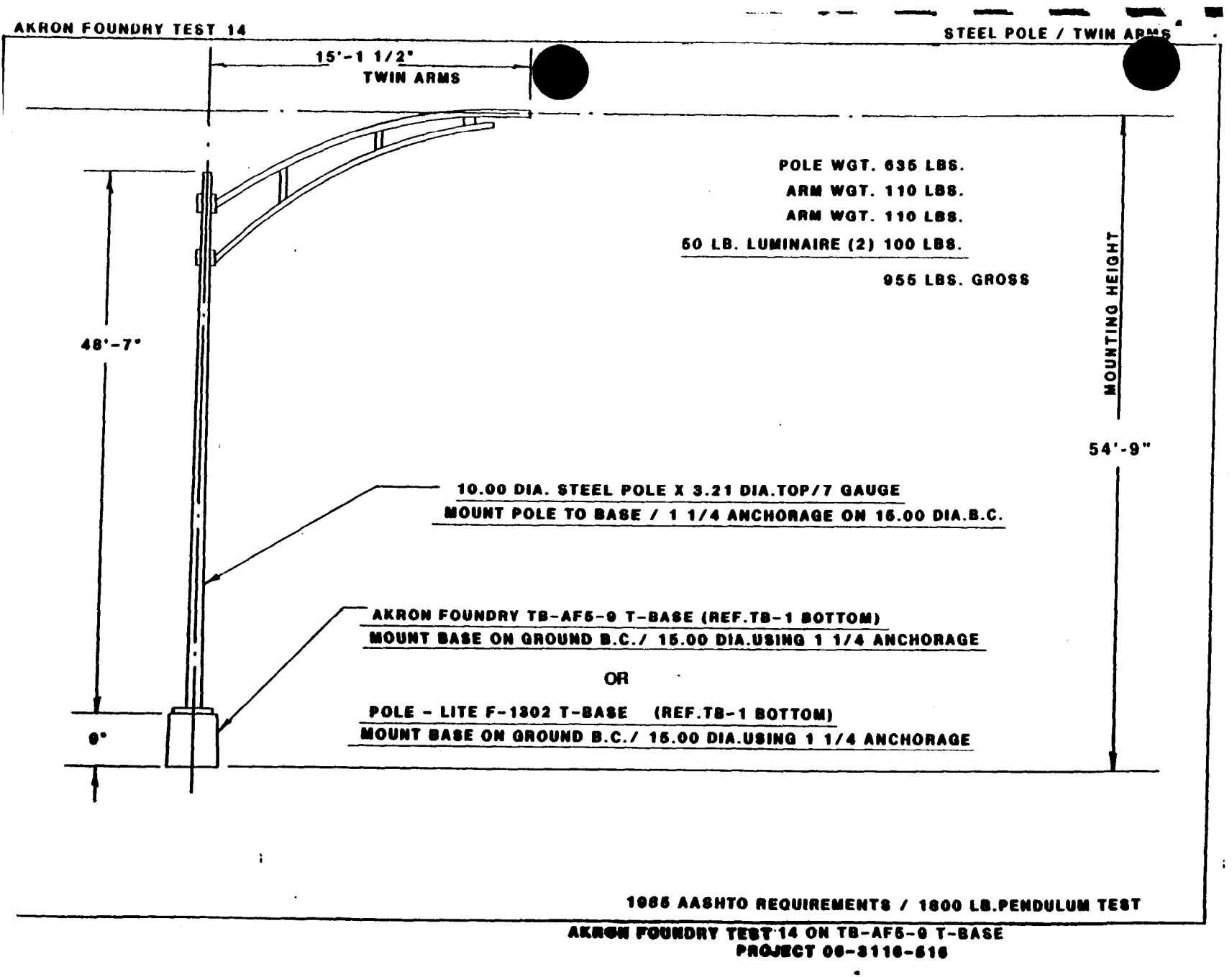


Figure 3. Assembly Drawing, Akron Foundry Test 14

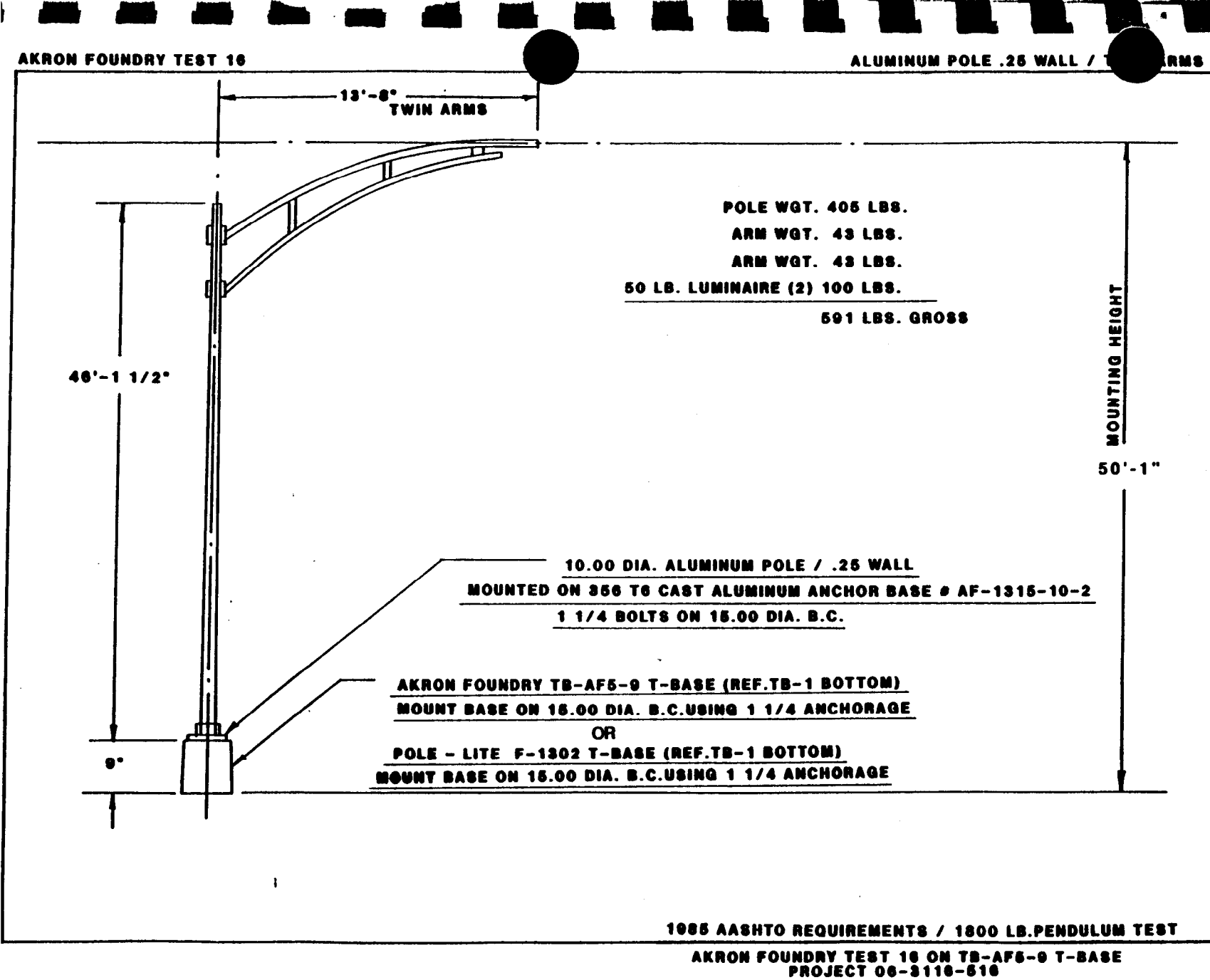


Figure 3. Assembly Drawing, Akron Foundry Test 16

Test Series	Test Number	Base Number	Test Delta V @ 20mph (fps)	Calc'd Delta V @ 60mph (fps)	Stub Height (in.)	Pole Weight W/arm & Dummy (pounds)	Pole Type	Nominal Luminaire Mounting Height (feet)	Mast Arm Length (ft) ++	Base Bottom Bolt Circle Diameter (in.)	Bottom Bolt Diameter (in.) *	Bottom Washer Outside Diameter (in.)	Bottom Washer Thick-ness (in.)	Base Top Bolt Circle Diameter (in.)	Top Bolt Diameter (in.)	Top Washer Outside Diameter (in.)	Top Washer Thick-ness (in.)
IV	AF-1	FERALUX CS-300	3.4	6.4	2.0	413	ALUMINUM	36.83	13.65	12	1	2 3/4	1/2	12	1	2 3/4	1/2
IV	TEST-1	TB-AF-6-9 POLE LITE F-1300	4.7	6.8	2.0	413	ALUMINUM	36.83	13.65	12	1	2 3/4	1/2	12	1	2 3/4	1/2
IV	TEST-2	FERALUX-CS-300	5.3	11.1	2.0	777	STEEL	49.50	14.50	12	1	2 3/4	1/2	12	1	2 3/4	1/2
IV	TEST-10	TB-AF-6-9 POLE LITE F-1300	5.0	11.0	2.0	777	STEEL	49.50	13.65	12	1	2 3/4	1/2	12	1	2 3/4	1/2
IV	TEST-11	TB-AF-6-9 POLE LITE F-1300	4.9	7.0	2.0	442	ALUMINUM	41.00	13.65	12	1	2 3/4	1/2	12	1	2 3/4	1/2
IV	TEST-12	TB3-AF-1517-17 I.W.+	7.9	17.1	2.0	955	STEEL	55.42	15.13	15	1.25	2 3/4	1/2	15	1.25	2 3/4	1/2
IV	TEST-13	FERALUX CS-370	6.6	16.5	2.0	955	STEEL	54.75	15.13	15	1.25	2 3/4	1/2	15	1.25	2 3/4	1/2
IV	TEST-14	TB-AF-5-9 POLE LITE F-1302	7.6	16.8	2.0	955	STEEL	54.75	15.13	15	1.25	2 3/4	1/2	15	1.25	2 3/4	1/2
IV	TEST-15	FERALUX CS-370	6.9	10.5	2.0	591	ALUMINUM	50.08	13.65	15	1.25	2 3/4	1/2	15	1.25	2 3/4	1/2
IV	TEST-16	TB-AF-5-9 POLE LITE F-1302	5.8	10.1	2.0	591	ALUMINUM	50.08	13.65	15	1.25	2 3/4	1/2	15	1.25	2 3/4	1/2
IV	TEST-17	FERALUX CS-300	4.5	6.9	2.0**	442	ALUMINUM	41.08	13.65	12	1	2 3/4	1/2	12	1	2 3/4	1/2

+ I.W. signifies Internal Weld

++ All tests run with twin mast arms.

* Anchor bolt nuts should not be torqued over 150 foot - pounds.

** A small shard of aluminum remained between 2 and 3 inches above the base plate.