ADDENDUM
T0
CPS ENERGY SPECIFICATION NUMBER: 302-04
FOR
CROSSARM, NON-WOOD
(May 20, 2004)

This addendum shall be considered a part of the above listed specification until such time that the specification is revised. The provisions within this addendum shall take precedence over any conflicting statements within the body of the specification or preceding addenda.

***(1) Replace** entire Contents section with the following:*

CONTENTS

***(2) Replace entire** section 1.3 with the following:*

CPS Energy Material No.	Material Description
1031377	CROSSARM NONWOOD 40 IN GRAY
1031379	CROSSARM NONWOOD 40 IN BROWN
1021510	CROSSARM NONWOOD TANGENT 8 FT GRAY
1031403	CROSSARM NONWOOD TANGENT 8 FT HD BROWN
1021511	CROSSARM NONWOOD TANGENT 10 FT GRAY

1031413	CROSSARM NONWOOD TANGENT 10 FT HD BROWN
1021739	CROSSARM NONWOOD DE ASSY 8 FT HD GRAY
1031421	CROSSARM NONWOOD DE ASSY 8 FT HD BROWN
1021773	CROSSARM NONWOOD DE ASSY 10 FT HD GRAY
1031423	CROSSARM NONWOOD DE ASSY 10 FT HD BROWN

(3) Revise *section 2.2 to read as follows:*

2.2 Wood Equivalency. Equivalent standard designs for load capacity shall meet or exceed the requirements of ANSI O5.3 for each "wood equivalent" non-wood crossarm.

Crossarms shall meet, as a minimum, the following ultimate and working loads:

Non-wood Crossarm Length	Tangent (Ultimate/Working Per Side In Pounds)	Dead End Assembly (Ultimate/Working Per Side In Pounds)	Maximum Deflection At Working Load (Inches)
8 Foot	2,500/ 1,250	10,000/ 5,000	2.0
10 Foot	2,000/ 1,000	8,000/ 4,000	2.5

(4) Replace entire *section 3.0 and subsections with the following:*

3.0 MATERIALS AND CONSTRUCTION

Composite (non-wood) crossarms shall be manufactured from commercial grade E or Ecr fiberglass and thermoset resins. Crossarm materials shall be designed for exterior exposure, including exposure to ultra-violet and other natural weathering elements. Crossarms shall maintain 90% of its structural strength and shall not exhibit excessive degradation of material for a minimum of 40 years.

3.1 Drilling. Crossarms must be able to be field drilled through the centerline of each major axis and retain its structural integrity and design strength. The drawings in this specification provides layout for pre-drilled holes and associated requirements.

3.2 Water Ingress. Crossarms shall be of a homogeneous, solid material or filled to prevent water ingress. Acceptable fillers shall be a high-density closed cell foam or other pre-approved material. Filler shall completely fill the crossarm without voids.

3.3 Endcaps. Crossarms shall have UV-stable-thermoplastic end caps, permanently-affixed.

3.4 UV Protection. Crossarms shall be designed and constructed to resist UV degradation by utilizing a three-tier protection scheme; a UV-inhibited resin covered by a polyester veil that is coated with a UV-resistant outer coating.

3.5 Crush Resistance. All predrilled holes shown on drawings shall be reinforced to prevent crushing due to overtightening of through-bolts.

(5) ***Replace*** *drawing with attached.*

Originator: Tim Constanzo Digitally signed by Tim Constanzo Date: 2020.08.26 13:43:28 -05'00'

Tim Constanzo, Principal Eng. (x-3423)

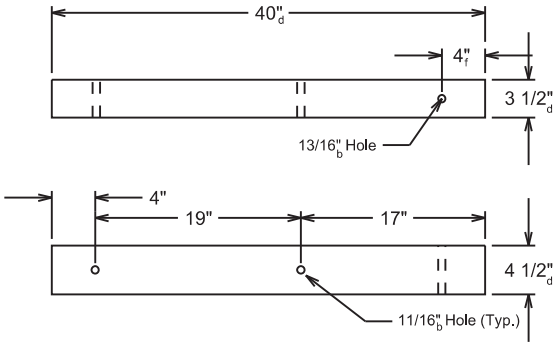
Approved by: _____ *Effective Date:* 8/26/2020

Rick Lopez
Director, Distribution Engineering Department

TABLE-1 TOLERANCES

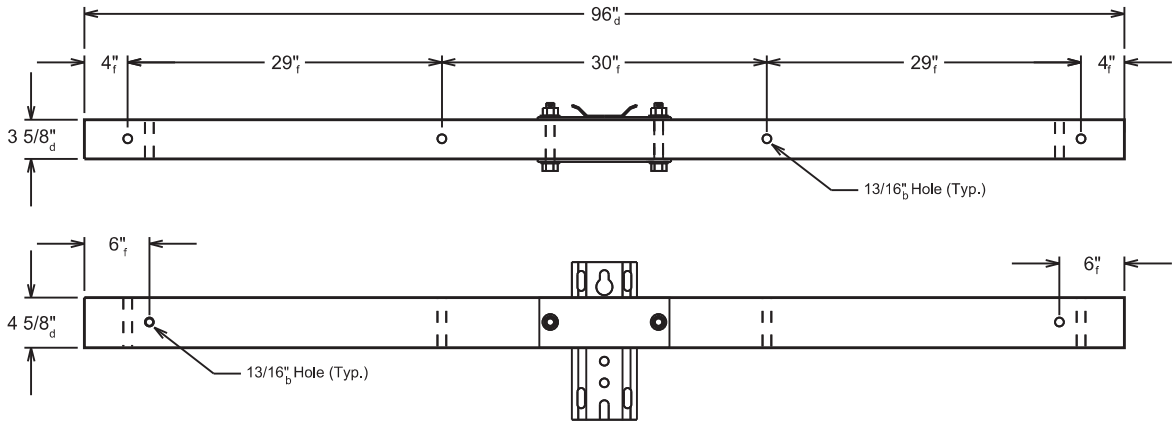
	Over/Under
b -	$\frac{1}{32}$"
d -	$\frac{1}{8}$"
f -	$\frac{1}{4}$"

NOTES:
ALL HOLES HAVE
b-TOLERANCES



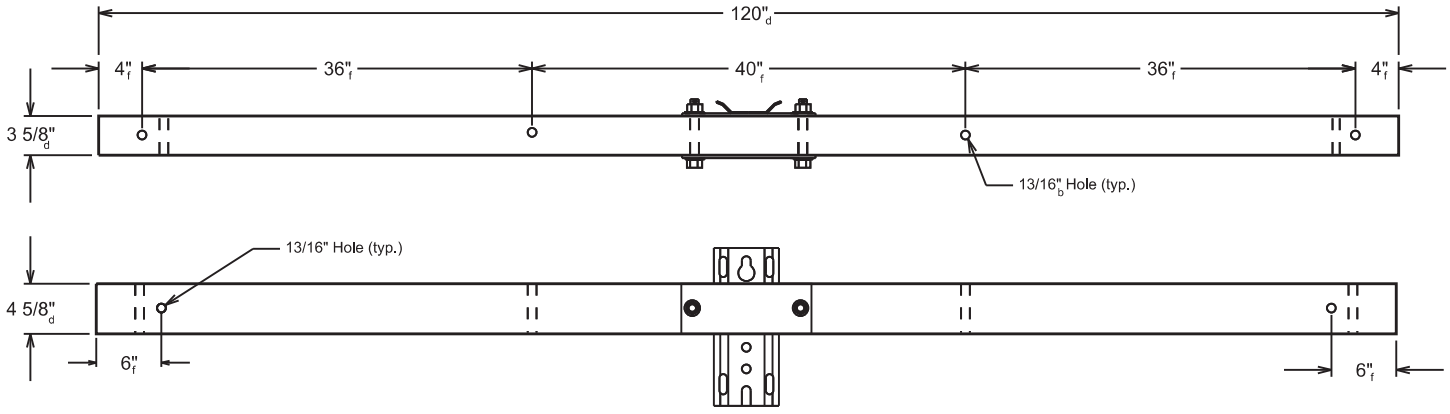
40" FRP CROSSARM

(1021511-GRAY, 1031413-BROWN)



TANGENT FRP CROSSARM 8-FT W/ CENTER MOUNT

(1021510-GRAY, 1031403-BROWN)



TANGENT FRP CROSSARM 10-FT W/ CENTER MOUNT

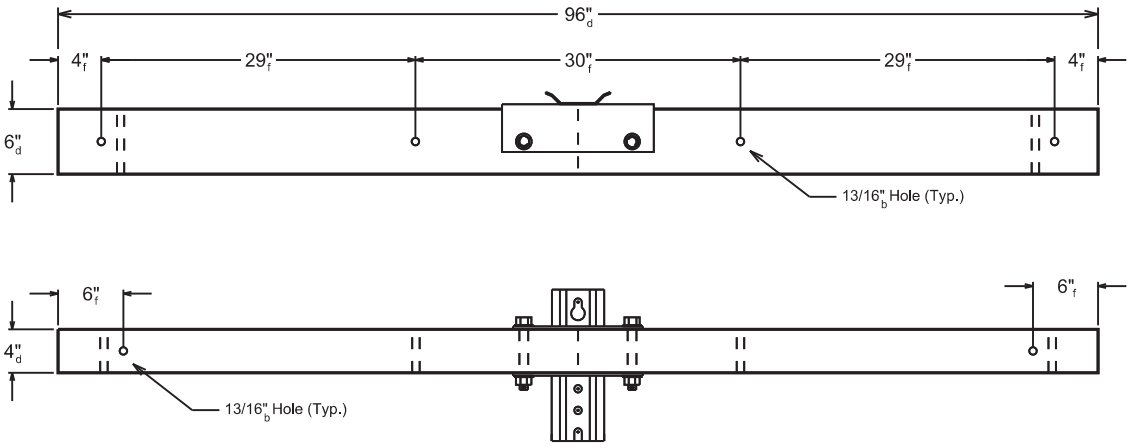
(1021511-GRAY, 1031413-BROWN)

SPECIFICATION 302-04	CPS ENERGY	APPROVED: 2020-07-14
DRAWING 1 OF 2		

TABLE-1 TOLERANCES

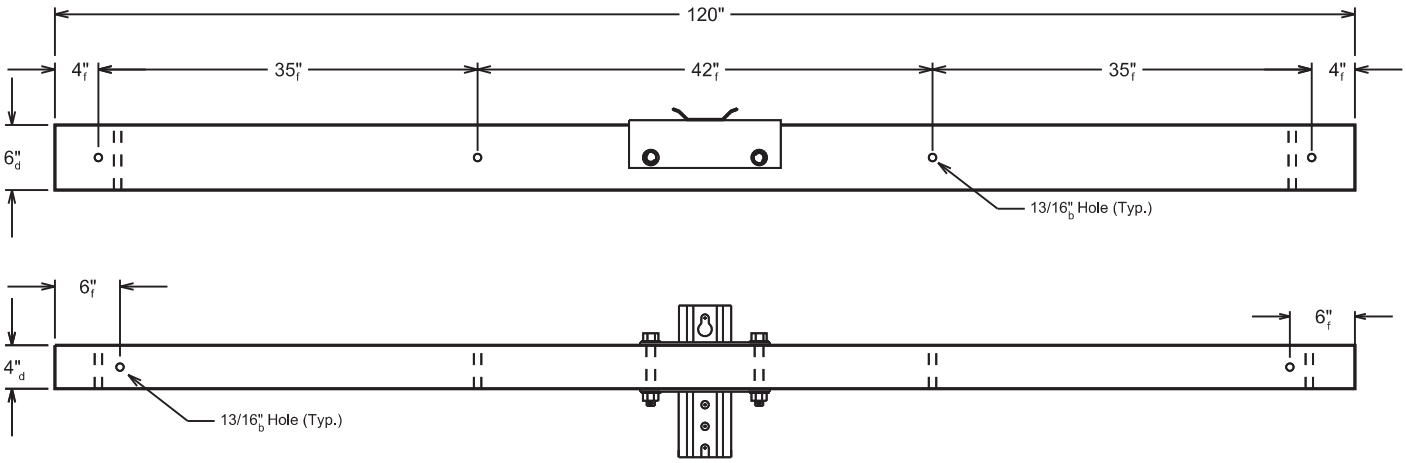
	Over/Under
b -	$\frac{1}{32}$"
d -	$\frac{1}{8}$"
f -	$\frac{1}{4}$"

NOTES:
ALL HOLES HAVE
b-TOLERANCES



DEAD-END ASSEMBLY, FRP CROSSARMS 8-FT

(1021739-GRAY, 1031421-BROWN)



DEAD-END ASSEMBLY, FRP CROSSARMS 10-FT

(1021773-GRAY, 1031423-BROWN)

SPECIFICATION 302-04	CPS ENERGY	APPROVED: 2020-07-14
DRAWING 2 OF 2		

SPECIFICATION FOR

CROSSARM, NON-WOOD

Specification Number: 302-04

Original Date: May 20, 2004

Revised Date:

CITY PUBLIC SERVICE

P. O. Box 1771

San Antonio, Texas 78296

Fred Villaseñor, Chairman
Service & Material Evaluation Committee

5-20-04
Approval Date

Specification No. 302-04

CONTENTS

1.0 SCOPE

1.1 Application. This specification covers the minimum acceptable requirements for "wood equivalent" non-wood crossarms that will be used in the overhead electric distribution system.

1.2 Applicable Standards. Crossarms covered by this specification shall comply with the national standards listed below, except where they conflict with the requirements of this specification. The order of precedence shall be this specification, then the following standards:

ANSI C135.6-1988; Zinc-Coated Ferrous Crossarm Braces for Overhead Line Construction

ANSI O5.3-2002; Solid Sawn-Wood Crossarms and Braces - Specifications and Dimensions

ASTM A153-03; Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM B308-02; Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles

ASTM D635-03; Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position

ASTM G90-98; Standard Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight

ASTM G154-00; Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

IEEE C2-2002; National Electric Safety Code

1.3 Crossarms Covered By This Specification.

CPS Material No.	Description
1021774	CROSSARM, NONWOOD, DEADEND ASSEMBLY, 6 FOOT, HEAVY DUTY, GRAY
1021739	CROSSARM, NONWOOD, DEADEND ASSEMBLY, 8 FOOT, HEAVY DUTY, GRAY

1021773	CROSSARM, NONWOOD, DEADEND ASSEMBLY, 10 FOOT, HEAVY DUTY, GRAY
1021514	CROSSARM, NONWOOD, TANGENT, 6 FOOT, GRAY
1021510	CROSSARM, NONWOOD, TANGENT, 8 FOOT, GRAY
1021511	CROSSARM, NONWOOD, TANGENT, 10 FOOT, GRAY
1031377	CROSSARM, NONWOOD, 40 INCH, GRAY
1031379	CROSSARM, NONWOOD, 40 INCH, BROWN
1031420	CROSSARM, NONWOOD, DEADEND ASSEMBLY, 6 FOOT, HEAVY DUTY, BROWN
1031421	CROSSARM, NONWOOD, DEADEND ASSEMBLY, 8 FOOT, HEAVY DUTY, BROWN
1031423	CROSSARM, NONWOOD, DEADEND ASSEMBLY, 10 FOOT, HEAVY DUTY, BROWN
1031425	CROSSARM, NONWOOD, TANGENT, 6 FOOT, BROWN
1031403	CROSSARM, NONWOOD, TANGENT, 8 FOOT, BROWN
1031413	CROSSARM, NONWOOD, TANGENT, 10 FOOT, BROWN

2.0 DESIGN

2.1 Unit Stress. Crossarm shall be designed such that the unit stress does not exceed the minimum specified yield point of the material used.

2.2 Wood Equivalency. Equivalent standard designs for load capacity shall meet or exceed the requirements of ANSI O5.3 for each "wood equivalent" non-wood crossarm.

Crossarms shall meet, as a minimum, the following ultimate and working loads:

Nonwood Crossarm Length	Tangent (Ultimate/ Working Per Side In Pounds)	Dead End Assembly (Ultimate/ Working Per Side In Pounds)	Maximum Deflection At Working Load (Inches)
6 Foot	3,000/ 1,500	10,000/ 5,000	1.5
8 Foot	2,500/ 1,250	10,000/ 5,000	2.0
10 Foot	2,000/ 1,000	8,000/ 4,000	2.5

2.2.1 Dimensions. Crossarm dimensions shall be within 10% of a wood crossarm of the same class and length. The drawings included in this specification provide standard dimensions and tolerances for crossarms.

2.2.2 Weight. Crossarm weight shall not exceed the weight of a wood crossarm of the same class and length by more than 10%.

2.3 Basic Impulse Insulation Level (BIL). Basic impulse insulation level shall be 110kV per foot or greater when measured dry.

3.0 MATERIALS

Materials used to construction the crossarm shall be of a nonconductive type. Crossarm materials shall be designed for a minimum of 30 years of exterior exposure, including exposure to ultra-violet and other natural weathering elements. Crossarm shall maintain 90% of its structural strength and shall not exhibit excessive degradation of material for a minimum of 30 years.

3.1 Drilling. Crossarm must be able to be field drilled through the centerline of each major axis and retain its structural integrity and design strength. The drawings in this specification provide predrilled hole layout and requirements.

3.2 Water Ingress. Crossarms shall be of a homogeneous, solid material or filled to prevent water ingress. Acceptable fillers shall be a high-density closed cell foam or other pre-approved material. Filler shall completely fill the crossarm without voids.

3.3 Endcaps. Endcaps shall be permanently affixed, if so equipped.

4.0 FABRICATION

4.1 Pin and Bolt Holes. Pin and bolt holes shall be smoothly bored without undue splintering where bits break through the surface. The center of any hole shall be within 1/8 inch of the centerline locations on the face in which it appears. The holes shall be perpendicular to the starting and finishing faces.

4.2 Edges. Crossarm edges shall be rounded with an arc radius of or between 1/8 and 3/8 inch (1/8 inch $\leq$ arc radius $\leq$ 3/8 inch).

5.0 ACCESSORIES

5.1 Mounting Bracket and Hardware. Mounting bracket and hardware shall be manufactured from high-strength, heat-treated aluminum alloy, hot dip galvanized

ductile iron or steel. All bolts, nuts and other hardware shall be hot dipped galvanized and conform to ASTM A153.

5.2 Dead-End Assemblies. Dead-end assembly crossarms shall include eye-nuts, double-arming bolts, washers and any other necessary hardware. These items shall be constructed using materials that allow the overall dead-end assembly to meet the strength requirements designated in this specification.

6.0 TESTING

6.1 Load and Deflection Testing. Crossarms shall meet or exceed ultimate moment capacity and deflection characteristics of equivalent wood crossarms for each of the major axis. Testing shall be done in accordance with ANSI O5.3 or as stated in this specification.

6.2 Vertical Load and Deflection Test. Crossarm shall not deflect more than the amount designated in Section 2.2.2 for the appropriate crossarm length when loaded with 700 pounds unbalanced load applied 4 inches from the end for a minimum of 30 days.

6.3 Longitudinal Pin Test. Crossarm shall pass a longitudinal load test of 700 pounds applied to a type "f" insulator pin (i.e. Hubbell Power Systems catalog number 4717 or Joslyn Manufacturing catalog number J647) with a 2-1/4 inch washer applied 4 inches from the end for a minimum of 30 days. This test is a horizontal load applied at height of conductor and applied perpendicular to conductor.

6.4 Transverse Pin Test. Crossarm shall pass a transverse load test of 750 pounds applied to a type "f" insulator pin (i.e. Hubbell Power Systems catalog number 4717 or Joslyn Manufacturing catalog number J647) with a 2-1/4 inch washer mounted on the arm 4 inches from the end for a minimum of 30 days. This test is a horizontal load applied at height of the conductor and applied parallel to conductor.

6.5 Weathering, Aging and Ultraviolet Exposure Testing. Crossarms shall be tested for accelerated weathering, aging in accordance with ASTM G90 and ultraviolet aging for a minimum of 5000 hours without any deterioration in accordance with ASTM G154.

6.6 Crush Testing. Crossarms shall be designed for a minimum-crushing load of 500 psi under 2 1/4-inch washer and 40 foot-pounds of torque without permanent deformation or damage.

7.0 MANUFACTURER'S INFORMATION

7.1 Information. Crossarms shall be permanently identified with the information shown below. The characters shall be a minimum of 3/8 inch in height.

a. Manufacturer's name or symbol

b. Month and year of manufacture

c. Crossarm size and category

7.2 Location. Nameplate shall be placed to avoid interference with normal working operations.

8.0 STORAGE

Crossarm shall be covered or stored indoors for protection from the sun and weather.

9.0 INSPECTION

9.1 Crossarms will be subject to inspection at the point of delivery by a designated CPS representative to assure compliance with CPS requirements.

9.2 Responsibility. An inspection by CPS or its representative does not release the Supplier of the responsibility of furnishing crossarms in accordance with these specifications and the referenced standards.

9.3 Supplier. Supplier shall furnish all necessary apparatus, labor, and other facilities for inspecting and testing crossarms, without cost to CPS.

10 WARRANTY

Crossarms must be warranted against material and manufacturer's defects for a minimum of 2 years from date of receipt by CPS.

11.0 SHIPPING INSTRUCTIONS

11.1 Packaging. Crossarms are to be packaged in bundles of not less than 25 pieces nor more than 60 pieces. Each bundle shall be fastened with straps to prevent the separation of the bundle in ordinary shipping and handling. Appropriate measures will be taken to prevent damage to the crossarms prior to receipt by CPS.

11.2 Loading and Shipping. Crossarm bundles shall be delivered on open, flatbed trucks.

11.3 Delivery Ticket. A delivery ticket must be furnished with each delivery by the carrier. The delivery ticket must show the CPS Purchase Order number, the number of bundles and the total number of crossarms that are being delivered to CPS.

11.4 Packing List. A packing list must be furnished with each delivery to CPS. The packing list must include the CPS Purchase Order number, a description and the total number of crossarms being delivered.

12.0 GENERAL INSTRUCTIONS

12.1 Requirements for Product Approval. Products must be approved before quotations will be considered on a manufacturer's proposed product. Products covered by this specification shall be approved in accordance with CPS Specification 000-01 and any additional requirements in this specification. Where conflicts may arise between this specification and CPS Specification 000-01, this specification shall prevail.

12.2 Ordering Information. All requisitions, Requests for Quotation, and Purchase Orders for crossarms covered by this specification shall contain the following information:

a. CPS material number

b. Number of crossarms required

c. Brief description of crossarms required

d. Method of shipment

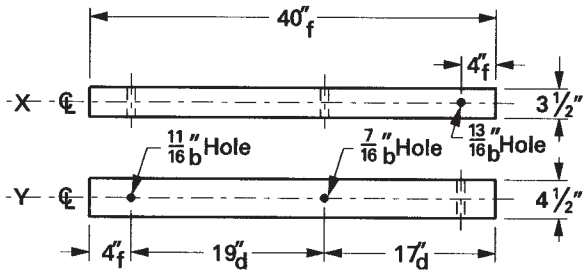
e. Reference to this specification by number and latest date

12.3 Copies Of This Specification. Copies of this specification must be obtained from the Purchasing Division of CPS.

12.4 Exceptions. Any and all exceptions to this specification must be listed individually and accompany the quotation. If there are no exceptions, the words "NO EXCEPTIONS" must be written on the quotation.

TABLE – 1 PIN HOLES

$\frac{7}{16}$"b
$\frac{9}{16}$"b
$\frac{11}{16}$"b
$\frac{13}{16}$"b



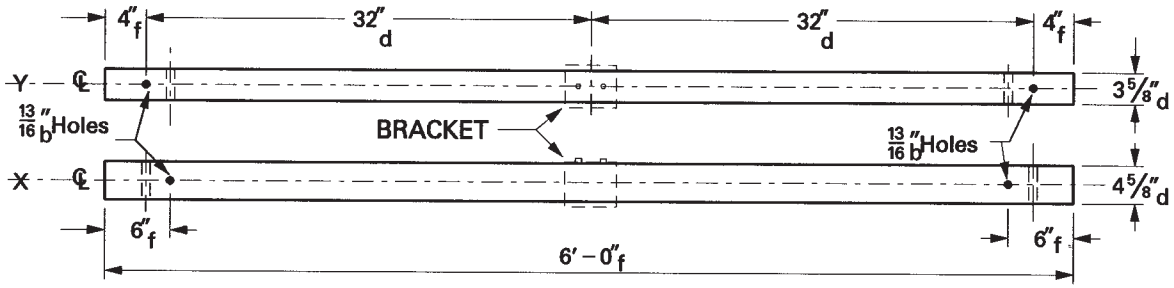
40" CROSSARM

TABLE – 2 TOLERANCES

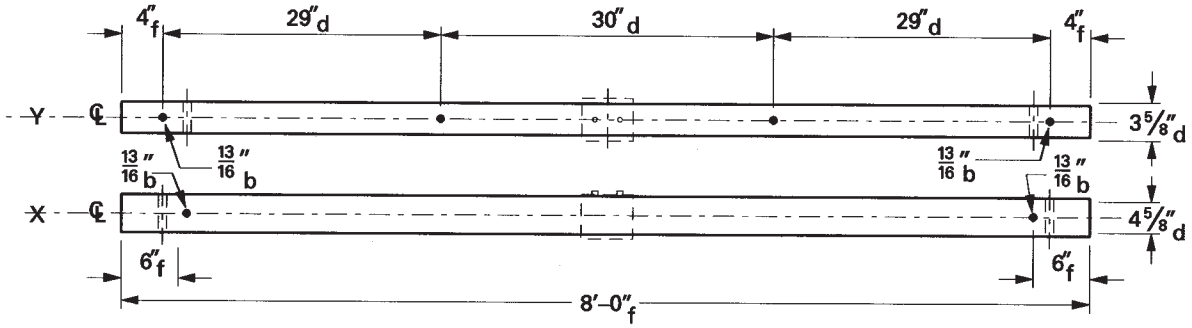
	Over	Under
b	$\frac{1}{32}$"	$\frac{1}{32}$"
d	$\frac{1}{8}$"	$\frac{1}{8}$"
f	$\frac{1}{4}$"	$\frac{1}{4}$"

NOTES:

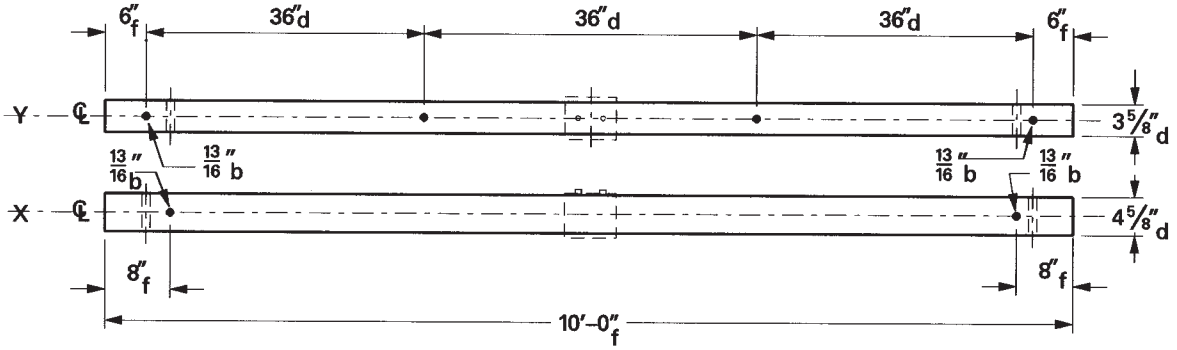
1. Cross Section Dimensions Have " d " Tolerances
2. Center Line X and Y Have "d " Tolerances



6' TANGENT



8' TANGENT



10' TANGENT

SPEC. No. 302 – 04	CITY PUBLIC SERVICE	ORIG. DATE 5 – 20 – 04
DRW. NO. 1 OF 2		REV. DATE

TABLE – 1 PIN HOLES

$\frac{9}{16}$ " b

$\frac{11}{16}$ " b

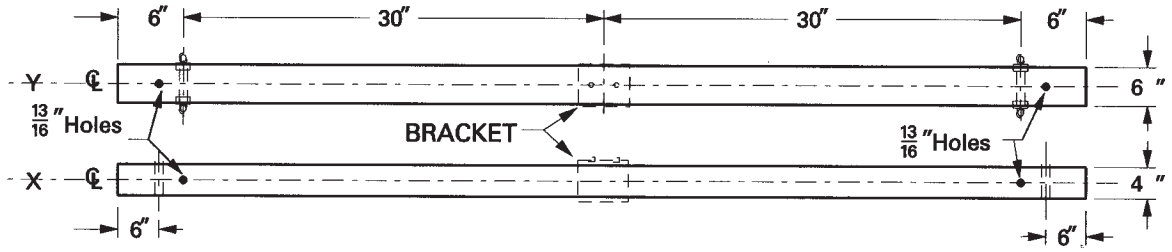
$\frac{13}{16}$ " b

TABLE – 2 TOLERANCES

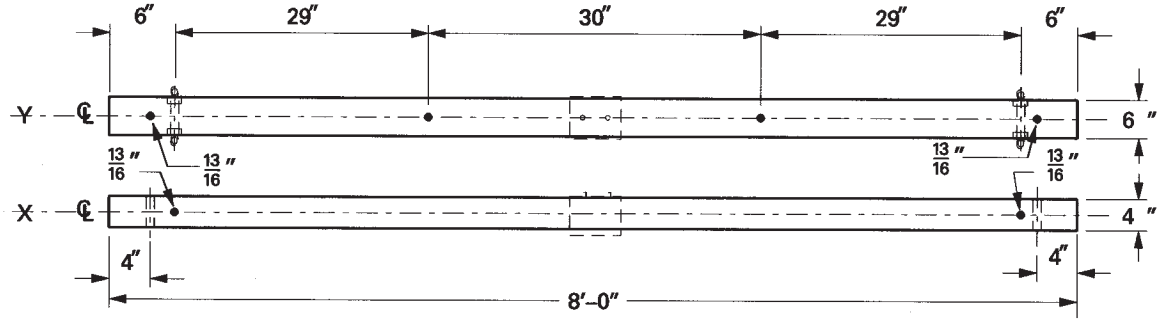
	Over	Under
b	$\frac{1}{32}$ "	$\frac{1}{32}$ "
d	$\frac{1}{8}$ "	$\frac{1}{8}$ "
f	$\frac{1}{4}$ "	$\frac{1}{4}$ "

NOTES:

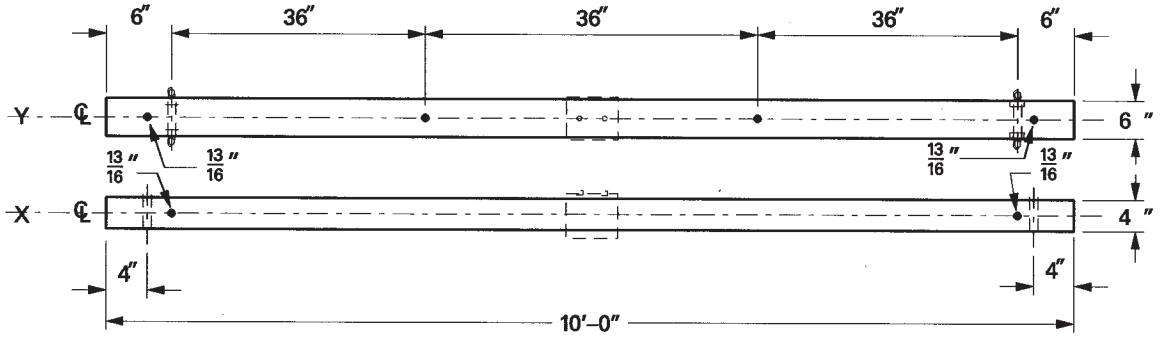
1. Cross Section Dimensions Have " d " Tolerances
2. Center Line X and Y Have "d " Tolerances



6′ DEAD – END ASSEMBLY



8′ DEAD – END ASSEMBLY



10′ DEAD – END ASSEMBLY

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DRW. NO. 2 OF 2		REV. DATE