

(Please use Stamp, Typewriter or Block Letters).

SUPPLY AND DELIVERY OF  
HARD DRAWN CADMIUM  
COPPER TROLLEY WIRE.

TENDERER'S NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

TENDERS CLOSE AT 2 P.M.

TELEPHONE NO. \_\_\_\_\_

ON \_\_\_\_\_

Please sign at end of Schedules "C" and "D".

SPECIFICATION.

1. NATURE OF CONTRACT.

101. Nature of Work.

Tenders are invited for the supply and delivery of hard drawn cadmium copper trolley wire in accordance with this specification.

102. Tests and Inspection.

The trolley wire will be inspected and tested by the Board's Assistant Chief Engineer - Investigations. Payment will not be made until the Board is satisfied that the trolley wire complies with the Contract requirements.

2. DELIVERY.

201. Delivery shall be made to the Board's Store, Miller Street, Preston.

202. The Contractor shall pay duty, primage, freight, shipping, insurance, cartage, storage and other charges and dumping duty if imposed.

3. PACKING.

301. The wire shall be wound without twists, on drums of approved design and of sufficient size to prevent sharp bends and shall be properly protected against damage in transit. The drums will be accepted without spindle hole steel plates, providing the drum is substantial enough to carry the weight. The spindle hole shall be a clearance for a 65 mm diameter shaft.

302. The minimum diameter of the barrel of drums shall be 760 mm and the outside diameter shall not exceed 1.3 m. The width of drums shall not exceed 760 mm.

303. All drums shall be plainly branded with the Maker's name, drum number, length, gauge and alloy number, weight of wire and tare, the Schedule and Item Number and the initials M.M.T.B.

304. The length of wire on each drum shall be approximately 800 metres.

4. STANDARDS.

401. The trolley wire shall conform to the requirements of B.S. 23:1970 for hard drawn cadmium copper except for wire size, shape and physical and electrical properties.

403. Table 2 of B.S. 23:1970 shall be replaced for the purpose of this Specification by the following table of physical and electrical properties:

1	2	3	4	5	6
Cross Sectional Area (mm <sup>2</sup> )	Mass Per km (kg)	Maximum Resistance Per km at (*ohms) 20°C	Minimum Tensile Strength (MPa)	Minimum Elongation in 250 mm (%)	Minimum Number of Turns in 250 mm
81.3 · 126 <sup>0.11</sup>	721	0.2515	409	3.0	6
129 · 2 <sup>0.11</sup>	1145	0.1585	386	4.0	5.5

\* (Corrected to standard mass).

404. For wire of Australian manufacture, a Works Laboratory Certificate of tests will be accepted.

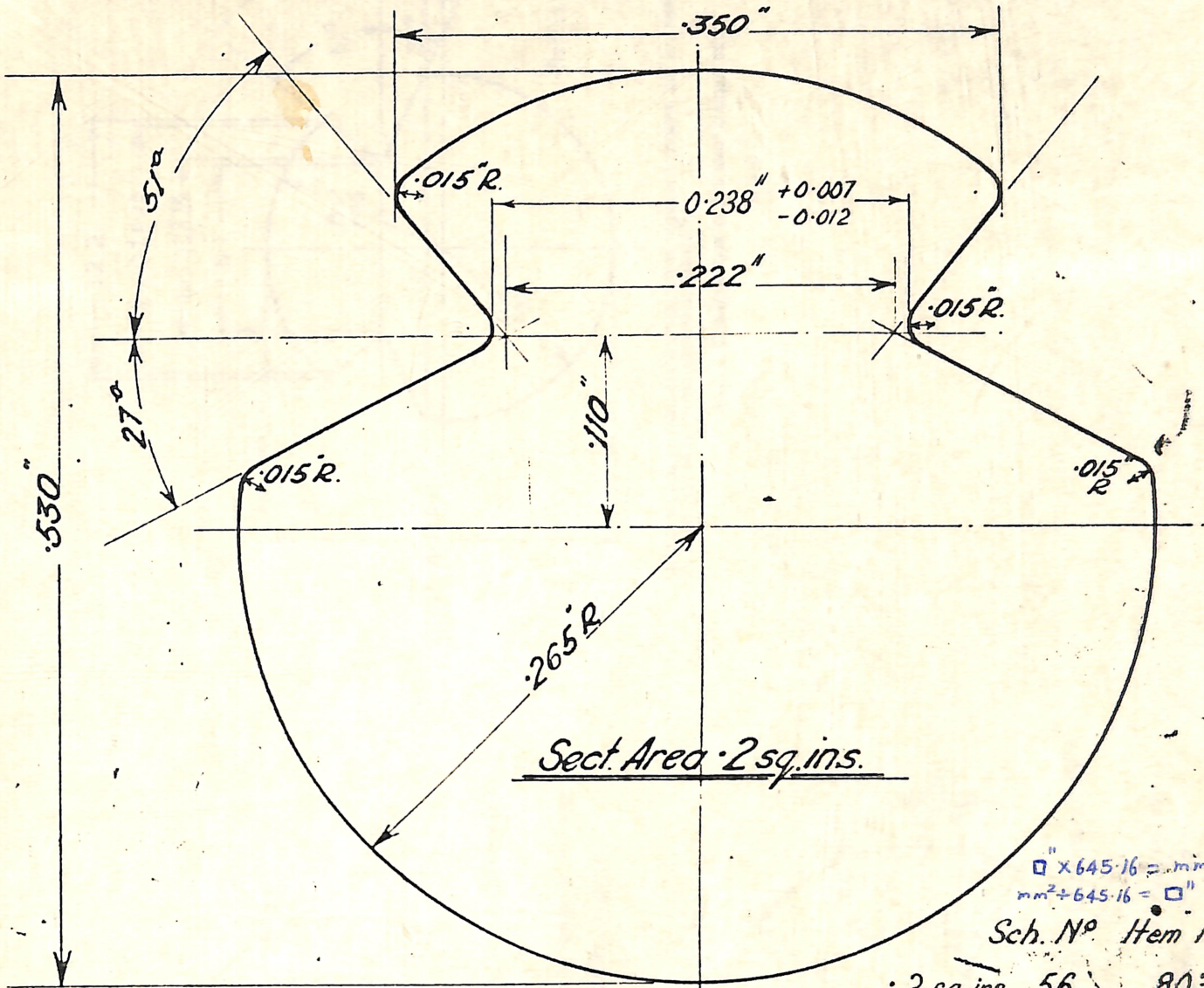
WITNESS \_\_\_\_\_

TENDERER \_\_\_\_\_

DATE \_\_\_\_\_

# BOURNE & METROPOLITAN TRAMWAYS BOARD

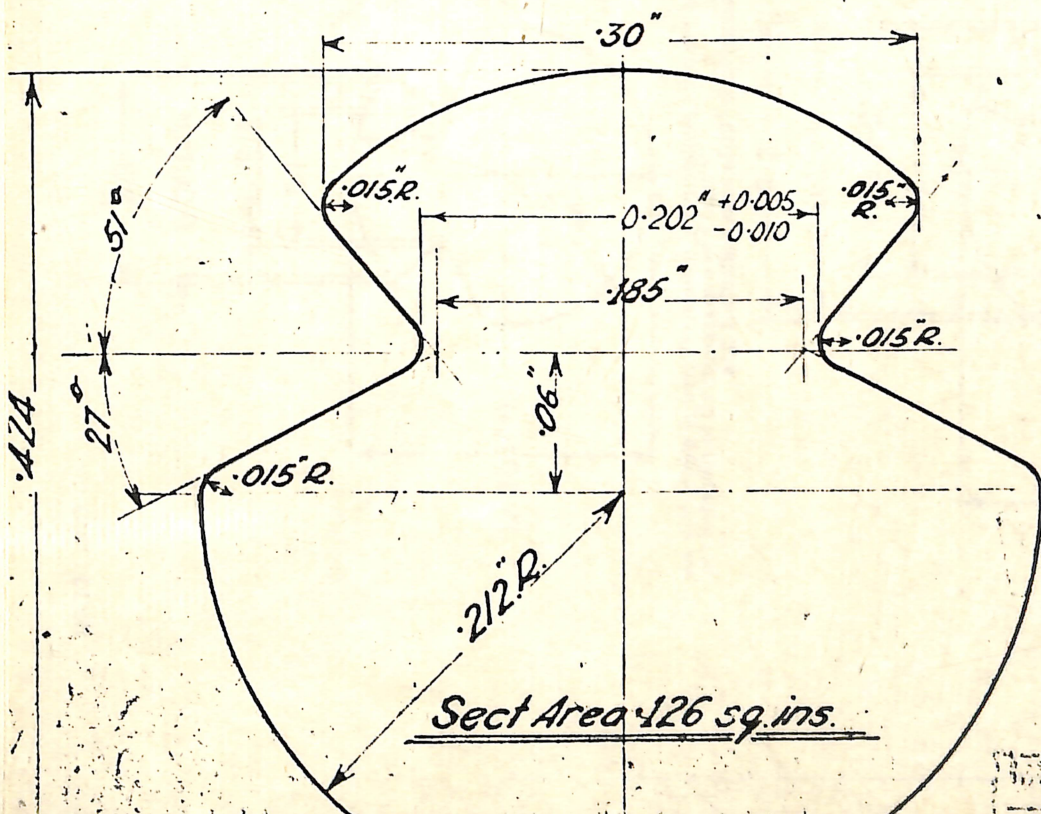
## Cross-sections of .2sq.in & .126sq.in. Trolley Wire.



$\square \times 645.16 = \text{mm}^2$   
 $\text{mm}^2 \div 645.16 = \square$

Sch. No. Item No.

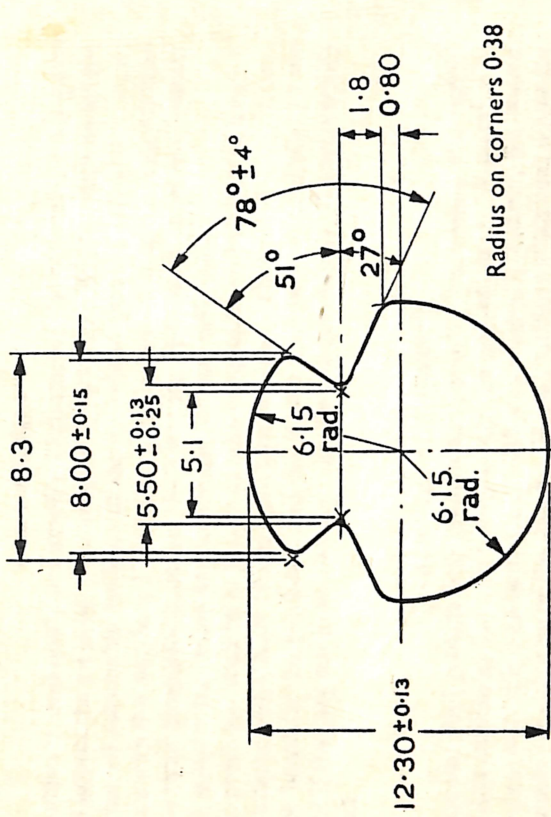
.2 sq. ins. - 56. 803.



Conversion Table	
inches	mm
.2 in <sup>2</sup>	129.032 mm <sup>2</sup>
.126 in <sup>2</sup>	81.29 mm <sup>2</sup>
.530	13.462
.424	10.7696
.350	8.89
.300	7.62
.265	6.731
.238	6.0452
.222	5.6368
.212	5.3848
.202	5.1908
.185	4.699
.110	2.794
.060	1.524
.015	0.381

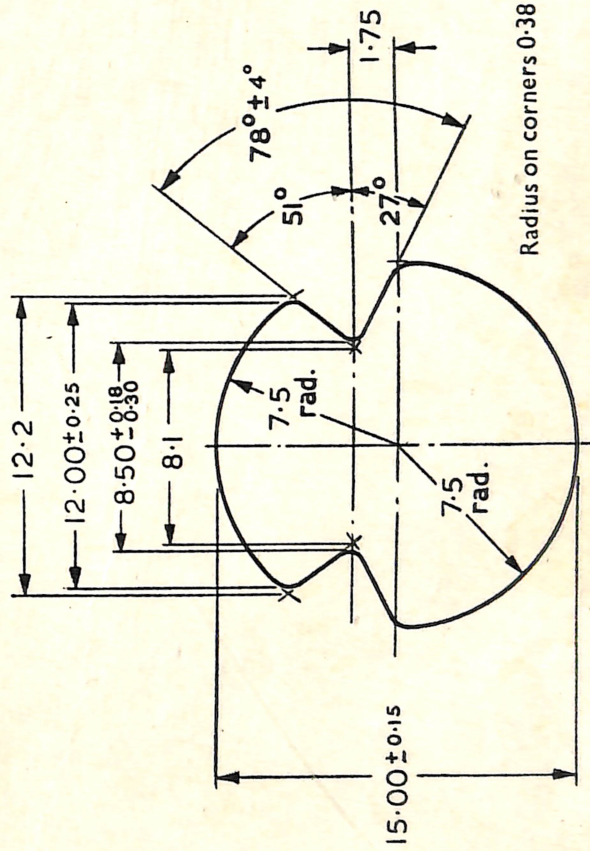
Sch. No. Item No.

.126 sq. ins. 56 801.



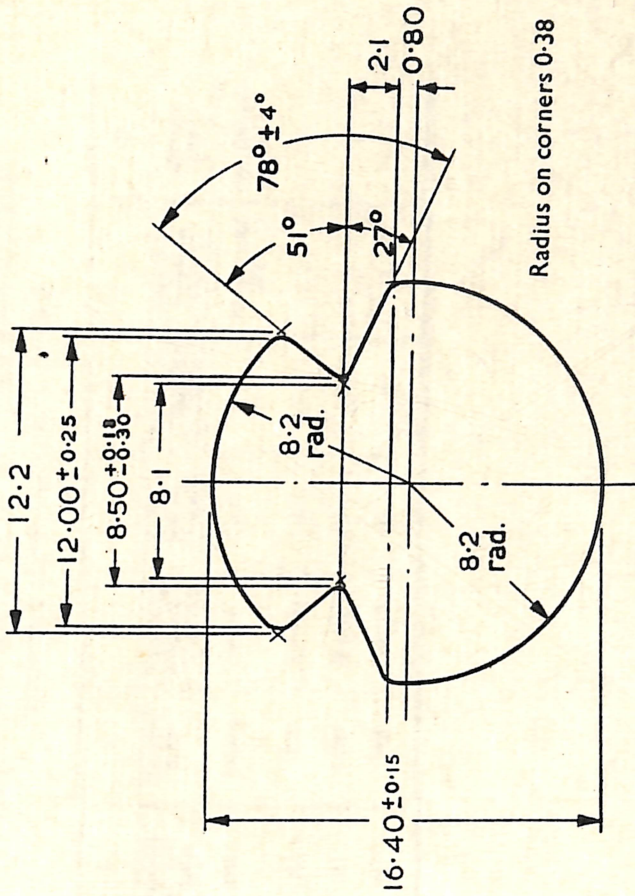
All dimensions in mm. Dimensions given without tolerance are for guidance only and do not form part of the requirements of Clause 9.

Fig. 1. Configuration of 107 mm<sup>2</sup> contact wire



All dimensions in mm. Dimensions given without tolerance are for guidance only and do not form part of the requirements of Clause 9.

Fig. 2. Configuration of 161 mm<sup>2</sup> contact wire



All dimensions in mm. Dimensions given without tolerance are for guidance only and do not form part of the requirements of Clause 9.

Fig. 3. Configuration of 193 mm<sup>2</sup> contact wire

## 16. INSPECTION

The purchaser shall notify the supplier when placing the order if it is his intention to inspect the material at the supplier's works. The supplier shall afford the purchaser all reasonable facilities to satisfy himself that the material is in accordance with this standard. For this purpose the purchaser or his representative may, by prior arrangement, attend to inspect the material, to select and identify the test samples for testing and to witness the tests being made.

The purchaser shall be at liberty to take samples from the material selected in accordance with Clause 10 and have them analysed. The cost of such analysis shall be borne by the purchaser and the results shall be communicated to the supplier if they are not in accordance with the requirements for the appropriate material.

## 17. FACILITIES FOR TESTING

The supplier shall provide and prepare the necessary test pieces, and supply labour and appliances for such testing as may be carried out on his premises in accordance with this standard. Unless otherwise agreed, material for testing shall remain the property of the supplier. Failing facilities at his own works for making the prescribed tests, the supplier shall make the necessary arrangements for making the tests elsewhere.

TABLE 1. PROPERTIES OF HARD-DRAWN COPPER TROLLEY AND CONTACT WIRES

1	2	3	4	5	6	7
Nominal section area	Nominal mass	Maximum resistance at 20 °C	Minimum tensile strength	Minimum elongation on 200 mm	Minimum twists in 250 mm	Reverse bends
mm <sup>2</sup>	kg/km	Ω/km	hbar*	%	No. through 360°	No. through 90°
107	951	0.1695	36.0	3.0	5	5
161	1430	0.1125	32.5	3.0	5	5
193	1715	0.0936	30.5	4.0	3	5

TABLE 2. PROPERTIES OF COPPER-CADMIUM TROLLEY AND CONTACT WIRES

1	2	3	4	5	6	7
Nominal section area	Nominal mass	Maximum resistance at 20 °C	Minimum tensile strength	Minimum elongation on 200 mm	Minimum twists in 250 mm	Reverse bends
mm <sup>2</sup>	kg/km	Ω/km	hbar*	%	No. through 360°	No. through 90°
165 <sup>a</sup>	957	0.1976	43.0	2.5	5	5
249 <sup>b</sup>	1440	0.1312	40.0	2.5	5	5
299 <sup>c</sup>	1726	0.1093	38.0	3.0	3	5

\* 1 hbar = 10 MN/m<sup>2</sup> = 10 N/mm<sup>2</sup>. For conversion to kgf/mm<sup>2</sup>, tonf/in<sup>2</sup> and lbf/in<sup>2</sup> see Appendix A.

Note. 1 Pascal = 1 N/m<sup>2</sup> 11