



Ministry of Defence

Defence Standard 

59-96(Part 1)/Issue 2

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**FUSE-LINKS ELECTRICAL
PART 1: SPECIFICATIONS**

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This Part of Defence Standard 59-96 has been updated and includes additional tests and revised tables and lists

Historical Record

This Defence Standard supersedes Defence Standard 59-96 (Part 1) Issue 1 dated 4 July 1980.

Defence Standard 59-96 (Part 1)/Issue 1 superseded Defence Specification 63A dated January 1969;
Defence Standard 59-14 (Part 1)/Issue 1 dated 24 June 1968;
Defence Standard 59-14 (Part 2)/Issue 1 dated 9 August 1971 and
Defence Standard 59-14 (Part 3)/Issue 1 dated 2 August 1973

FUSE-LINKS ELECTRICAL

PART 1: SPECIFICATIONS

PREFACE

<p>This Part of Defence Standard 59-96 supersedes Defence Standard 59-96 (Part 1)/Issue 1 dated 4 July 1980</p>

i This Part of the Standard has been prepared because there is no suitable British or CECC Standard acceptable to the Ministry of Defence. When a suitable British or CECC Standard becomes available this Defence Standard will be amended to implement the British or CECC Standard for Ministry of Defence use.

i This Standard has been agreed by the authorities concerned with its use and is intended to be used whenever relevant in all future designs, contracts, orders etc and whenever practicable by amendment to those already in existence. If any difficulty arises which prevents application of the Defence Standard, the Directorate of Standardization shall be informed so that a remedy may be sought.

iii Any enquiries regarding this Standard in relation to an invitation to tender or a contract in which it is incorporated are to be addressed to the responsible technical or supervising authority named in the invitation to tender or contract.

iv This Standard has been devised for use by the Crown and its contractors in the execution of contracts for the Crown. The Crown hereby excludes all liability (other than liability for death or personal injury) whatsoever and howsoever arising (including, but without limitation, negligence on the part of the Crown or its servants or agents) for any loss or damage however caused where the Standard is used for any other purpose.

v Drawings referred to in section two are now associated with this Standard, any alteration to them affecting function, material, or interchangeability shall also be reflected in this Standard. Therefore, holders of such drawings should endorse them accordingly and notify the Directorate of Standardization of any change requiring the amendment of this Standard.

vi Users of this Standard shall note that these items and procedures may be claimed to be subject to patent/copyright/design rights in this or other countries.

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SPECIFICATION FOR FUSE-LINKS ELECTRICAL
PART 1: SPECIFICATIONS

Section One. General

0 Introduction

0.1 This Part of the Defence Standard specifies the test methods and general requirements for Qualification Approval for fuse-links, electrical for Ministry of Defence use.

0.2 For Aircraft, the requirements of BS G176 shall apply for fuse-links to be used in all future designs. The requirements of section two of this Standard shall apply for the maintenance of existing items.

0.3 Fuse-links specified herein for service equipment may also be suitable for other purposes or applications at the users discretion.

0.4 Since cartridge fuse-links may be capable of being used in fuse-holders other than those for which they were designed particular care should be taken to ascertain whether the use of these fuse-links in different types of equipment affects the capabilities of fuses or fuse-links to comply with the requirements of this Standard.

1 Scope

1.1 This Part of the Standard details the test methods and general requirements for Qualification Approval of fuse-links, electrical, of the cartridge type for circuits of voltage rating up to 1000 volts intended for the several categories specified on alternating current of up to 2500 Hz and on direct current. It deals with normal instantaneous time delay and quick acting types of fuse-link.

1.2 Some items specified in section two of this Part of the Standard are physically and electrically in accordance with BS 88 Part 2, having their environmental performance specified herein.

1.3 Some items specified in section two of this Standard are physically and electrically to BS EN 60127 having their environmental performance and dc breaking capacity specified herein.

1.4 These items are not suitable for aerospace applications.

2 WARNING

This Standard calls for the use of substances and/or test procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and in no way absolves either the designer, the producer, the supplier or the user from statutory and all other legal obligations relating to health and safety at any stage of manufacture or use.

3 Related Documents

3.1 Reference is made in this Standard to:

BS 88	Cartridge Fuses for Voltages Up To and Including 1000 V ac and 1500 V dc
BS 89/IEC 51	Direct Acting Indicating Electrical Measuring Instruments and their Accessories
BS 381C	Colours for Identification, Coding and Specific Purposes
BS 410	Test Sieves
BS 441	Rosin-cored Solder Wire
BS 1872	Electroplated Coating of Tin
BS 2011/IEC 68	Basic Environmental Testing Procedures
BS 5772: Part 2	General Examination, Electrical Continuity and Contact Resistance Tests, Insulation Test and Voltage Stress Tests
BS 6001	Sampling Procedures and Tables for Inspection by Attributes
BS EN 29453	Soft Solder Alloys-Chemical Compositions and Forms
BS EN 60127 Part 1	Definitions for Miniature Fuses and General Requirements for Miniature Fuse-links
BS EN 60127 Part 2	Cartridge Fuse-links
BS EN ISO 9001	Quality Systems - Models for Quality Assurance in Design, Development Production, Installation and Servicing
BS EN ISO 9001	Quality Systems - Models for quality assurance systems in Installation and Servicing
Def Stan 00-9	General Requirements for Qualification and Quality Assurance of Electronic Components for Ministry of Defence Use
Def Stan 05-123	Technical Procedures for the Procurement of Aircraft, Weapon and Electronic Systems
Def Stan 59-100	Fuse Holders, Carriers and Bases Electrical Fuse (Block and extractor post types)
DEF-175	Packaging of Cartridge Fuse-Links
DTD 599A	Non Corrosive Flux for Soft Soldering

3.2 Reference in this Part of the Standard to any related document means, in any tender or contract, the edition current at the date of such tender or contract unless a specific edition is indicated.

3.3 Copies of Related Documents are available from the issuing authorities listed below:

DOCUMENT	SOURCE
British Standards	BSI Sales Department Linford Wood MILTON KEYNES MK14 6LE
Defence Standards	Directorate of Standardization Kentigern House 65 Brown Street GLASGOW G2 8EX

4 Definitions

For the purpose of this part of the Defence Standard the definitions given in BS 88 and BS EN 60127 apply together with the following:

5 Drawings

5.1 Drawings specifying size and performance characteristics of BS 88 type fuse-links are to be found in BS 88: Part 2.

5.2 Drawings specifying size and performance characteristics of Joint Service - Normal Instantaneous and Time Delay Fuse-links are to be found in section two of this Part of the Standard.

5.3 Drawings specifying the size and performance characteristics of Quick Acting - High Breaking Capacity Fuse-Links are to be found in BS EN 60127: Part 1.

6 Materials

6.1 The manufacturer shall be responsible for the selection of materials and methods of construction of fuse-links to comply with the performance requirements of this Part of the Standard.

6.2 For Joint Service - Normal Instantaneous and Time Delay Fuse-links, the following particulars are given as a guide and have been found acceptable through quality approval tests and satisfactory service.

6.2.1 Fuse elements - normal instantaneous. These shall be fabricated from silver of purity not less than 99.97%, except for ratings of less than 2 Amperes (A) when preferred materials as shown in table L shall be used. Suitable dimensions for the fuse elements are also given in table L. Where more than one size of wire is incorporated, the wires shall be first silver soldered together with an overlap of 1.6 mm minimum on the dimensions given in table L. The elements of fuse-links of very low current ratings require special manufacturing techniques and for this reason dimensions of these fuse elements are not given.

6.2.2 Fuse elements - time delay. These require special techniques and materials, and for these reasons dimensions and methods are not given, but all wires and metals used shall comply with the relevant British Standard governing such materials.

6.2.3 Body. With the exceptions detailed below, the fuse-link body shall be of a high grade ceramic capable of withstanding the high simultaneous thermal, mechanical and electrical stresses to which a fuse-link is subjected, and be physically and chemically stable and resistant to destruction from electric arcs, for the duration of the arcs. The material should not suffer deterioration when connected in service or left in storage.

The bodies of all current ratings of the time delay fuse-links shall be coloured Grass Green (No 218) to BS 381(C). Time delay fuses 5 x 20 mm qualified to BS EN 60127 standard sheet 3 rated below 1 Amp may be glass.

6.2.4 Fuse contacts - normal instantaneous. These comprise the ferrule end caps with or without contact tags or discs as specified. They should be made from fine grain soft copper suitable for deep and even drawing and finished by electro tinning to BS 1872, classification No Sn 12C. The caps should be copper-riveted and soldered, or welded to the fuse elements and to the tags, where applicable, using a solder of 60% tin and 40% lead to BS 219 with soldering flux to DTD 599A or cored solder wire to BS 441.

6.2.5 Fuse contacts - time delay. The ferrule end caps shall be suitably plated and capable of withstanding the effects of the breaking capacity tests specified. Methods of soldering and attaching elements to the ferrule caps may vary with different element construction but before using solders and fluxes which do not comply with DTD 599A, BS 219 and BS 441, approval must be obtained from the Approving Authority.

6.2.6 Filling - normal instantaneous. The body should be filled with powdered quartz or the equivalent in the form of pure silver sand which will pass through a sieve of 850 μ m aperture size. Sieves should be in accordance with BS 410.

The filling should be clean, free from metallic, organic and salt impurities, ie not more than 0.02% magnetic iron, not more than 0.06% non-magnetic iron (Fe O_2) and not more than 0.3% organic matter (loss on ignition). It should be dried out for a minimum period of 12 hours at 80 °C by a suitable approved continuous process or spread in trays to maximum depth of 38 mm and used within 12 hours of drying. The cavity or cavities within the body of the fuse-link containing the fuse element should be completely filled with the filling material whilst on a vibrating surface, care being taken that the sand is compacted to avoid air pockets. The filling material may be retained in the body of the fuse-link by tight fitting ARC Inhibiting Sealing Discs at each end of the body.

6.2.7 Finish. All external contact surfaces shall be free from flux and surplus solder.

7 Marking

Each fuse-link shall be permanently marked with the following easily readable particulars as described in **13.17**.

8 Packaging and Labelling

This shall be standard trade packaging unless otherwise specified in the contract. Each package shall bear a durable label and shall have the information required in clause 7 and the year of manufacture.

9 Delayed Delivery (Validity of Release)

Fuse-links when held for a period exceeding 2 years following acceptance inspection shall be re-examined before release by applying the sampling test as detailed in 15.2.3 (Group A tests excluding dimensions).

10 Qualification Approval

The Qualification Approval Authority for fuse-links, electrical, to this Standard is the Defence Electronic Parts Committee (DEPCO).

11 Qualification Approval Procedures

11.1 Qualification Approval shall be as stated in Def Stan 00-9, with the exception of the amendments detailed below:

11.1.1 For Section B substitute: A manufacturer's quality management system shall meet the requirements of BS EN ISO 9001 or BS EN ISO 9002 with an appropriate scope.

11.1.2 All reference to the Defence Standard Approval Registrar (DSAR), DCVD MOD(PE) shall be amended to:

Defence Standards Approval Secretariat (DSAS)
Defence Research Agency (DRA)
Professional Component Services (PCS)
Aquila
Golf Road
Bromley
KENT BR1 2JB

Section Two. Qualificaiton Approval Tests, Routine Production Tests and Batch Sampling Tests12 Qualification Approval Requirements

12.1 Fuse-links, type BS 88. A manufacturer seeking approval shall demonstrate that the fuse-links conform to the current edition of BS 88, Parts 1 and 2 and then select samples for additional tests as set out below.

12.2 Fuse-links, type Joint Service - Normal Instantaneous
 Joint Service - Time Delay.

12.2.1 A manufacturer seeking approval shall demonstrate that the fuse-links conform to this specification by selecting samples for tests as set out below.

12.3 Fuse-links, type quick acting, high breaking capacity.

A manufacturer seeking approval shall demonstrate that the fuse-links conform to BS EN 60127-2, Standard Sheet 1, and then select samples for additional tests as set out below.

Table ASamples required for Qualification Approval testing

TEST NO	TEST TYPE	SPECIMEN DESCRIPTION	NUMBER OF SPECIMENS REQUIRED			
			FUSE-LINK TYPE			
			BS 88	JOINT SERVICE NORMAL INSTANT-ANEOUS	JOINT SERVICE TIME DELAY	QUICK ACTING HIGH BREAKING CAPACITY
1	General Examination	All Specimens	All	All	All	All
2	Millivolt Drop	All Specimens	All	All	All	All
3	Dimensions	All Specimens	All	All	All	All
4	AC Breaking Capacity	Maximum Current Rating for each Body	Nil	4	Nil	Nil
		Maximum Current Rating	Nil	Nil	5	Nil
		Minimum Current Rating	Nil	Nil	5	Nil

(Continued on Page 11)

Table A - Continued

TEST NO	TEST TYPE	SPECIMEN DESCRIPTION	NUMBER OF SPECIMENS REQUIRED			
			FUSE-LINK TYPE			
			BS 88	JOINT SERVICE NORMAL INSTANT-ANEOUS	JOINT SERVICE TIME DELAY	QUICK ACTING HIGH BREAKING CAPACITY
5	DC Breaking Capacity	Maximum Current Rating for each Body	Nil	4	Nil	Nil
		Maximum Current Rating	Nil	Nil	5	5
		Minimum Current Rating	Nil	Nil	Nil	5
6	AC Characteristics, Curves and Minimum Fusing Current	Each Body Size and Each Current Rating	Nil	8	Nil	Nil
		Maximum Current Rating	Nil	Nil	10	Nil
		Maximum Current Rating	Nil	Nil	10	Nil
7	AC Discrimination	Each Major and Each Minor or Ratings Listed in table B	Nil	6 or 8	Nil	Nil
8	DC Discrimination	Each Major and Each Minor of Ratings Listed in table C	Nil	6 or 8	Nil	Nil
9	Endurance	Maximum Current Rating of Each Body Size	Nil	1	5	Nil
		Minimum Current Rating of Each Body Size	Nil	Nil	Nil	Nil

(Continued on page 12)

Table A - Continued

TEST NO	TEST TYPE	SPECIMEN DESCRIPTION	NUMBER OF SPECIMENS REQUIRED			
			FUSE-LINK TYPE			
			BS 88	JOINT SERVICE NORMAL INSTANT-ANEOUS	JOINT SERVICE TIME DELAY	QUICK ACTING HIGH BREAKING CAPACITY
10	Security of End Caps	Maximum Current Rating of Each Body Size	Nil	3	5	Nil
		Minimum Current Rating in Each Body Size				
		Specimens Retained for Test 11				
11	Vibration	Specimens used in Test 10 shall be used and then retained for Test 12	3			
12	Acceleration	Specimens used in Test 11 shall be used and then retained for Test 13				
13	Climatic	Specimens used in Test 12 shall be used				
	Damp Heat Cycle	Maximum Rating	Nil	Nil	5	Nil
14	Bump	Maximum Current Rating of Each Body Size	3	3	5	3
		Minimum Current Rating of Each Body Size	3	3	Nil	3

(Continued on Page 13)

Table A - Concluded

TEST NO	TEST TYPE	SPECIMEN DESCRIPTION	NUMBER OF SPECIMENS REQUIRED			
			FUSE-LINK TYPE			
			BS 88	JOINT SERVICE NORMAL INSTANT-ANEOUS	JOINT SERVICE TIME DELAY	QUICK ACTING HIGH BREAKING CAPACITY
15	Shock	Maximum Current Rating of Each Body Size	3	6	Nil	3
		Minimum Current Rating of Each Body Size	3	6	Nil	3
16	Mould Growth	Each Body Size	1	3	Nil	Nil
		Maximum Rating	Nil	Nil	5	Nil
		50 mA Current Rating	Nil	Nil	Nil	3
		6.3A Current Rating	Nil	Nil	Nil	3
17	Marking	All specimens	All	All	All	All

13 Test Methods

13.1 Test 1 - General examination

Fuse Type BS 88 - Partially certified to BS 88
 Joint Service, Normal Instantaneous
 Joint Service, Time Delay
 Quick Acting, High Breaking Capacity - Partially certified by
 BS EN 60127-2, Standard Sheet 1

13.1.1 BS 88, Joint Service; time delay and quick acting; high breaking capacity. All fuse-links submitted for Qualification Approval shall be visually examined for workmanship, assembly, finish and marking in accordance with BS 5772, Part 2.

13.1.2 Joint Service, normal instantaneous. All fuse-links submitted for Qualification Approval shall be visually examined and ratings above 0.25A subject to radiographic examination. The workmanship, assembly, finish and marking shall be in accordance with BS 5772: Part 2.

NOTE: Test 17 describes the tests specifically applied to marking of fuse-links.

13.2 Test 2 - Millivolt drop

Fuse Type BS 88
 Joint Service, Normal Instantaneous
 Joint Service, Time Delay
 Quick Acting, High Breaking Capacity

13.2.1 BS 88. These fuse-links are certified to BS 88, but millivolt drop testing is carried out in association with several of the following tests in accordance with BS EN 60127-1 Clause 9.1.

13.2.2 Joint Service, normal instantaneous. The millivolt drop tests shall be carried out across all fuse-links in accordance with the requirements stated below and shall be within the limits stated in tables H and J. The millivolt drop across the fuse-links, while carrying the nominal rated current (dc) and after having done so for a period of 5 ± 0.25 seconds, shall be within the limits shown in the appropriate tables.

13.2.2.1 Test equipment

(a) Current source. The current source shall be a constant voltage dc supply with a maximum rms ripple not exceeding 1%, and of a capacity adequate to withstand the current drain imposed without any appreciable change in potential during the test.

(b) Load resistance cables and connections. The load resistance, cables and connections shall be capable of carrying the test current without any appreciable change in resistance during the test.

(c) Methods of mounting. The fuse-links shall be mounted horizontally, without a fuse carrier. Tag-type fuse-links shall be bolted to suitable fixed contacts. Ferrule-type fuse-links shall be mounted in suitable open clips of substantial and robust construction.

(d) Points of measurement of millivolt drop. The points of measurement of millivolt drop shall be at the mid-point of the side face of each end cap, along the vertical centre-line when the fuse-link is mounted horizontally.

13.2.2.2 Method of test. Since individual fuse-links of the same type and current rating will have a slightly different resistance which will affect the current in the circuit, and since it is impracticable to adjust the current satisfactorily during the short period of the test, the following procedure should be adopted:

(a) Adjust the current in the circuit using a fuse-link of similar type and rating to those being tested. This procedure should also be adopted for any subsequent current adjustment.

(b) Take instrument readings of current and millivolts after 5 ± 0.25 seconds, with test fuse-links in circuit.

13.2.2.2 (Contd)

(c) Correct the readings of amperes and millivolts obtained in (b) for the errors in both instruments and shunts at the point of scale at which each instrument is reading.

Should the current not be within $\pm 3\%$ of the nominal current rating of the fuse-links being tested, it should be adjusted and the fuse-links re-tested after an adequate time for cooling.

(d) Multiply the corrected value of millivolts obtained in (c) by the ratio of the nominal current rating of the fuse-link to the corrected value of current obtained in (c).

13.2.3 Joint Service, time delay. The millivolt drop across the fuse-link when measured in accordance with the requirement of BS EN 60127-1, Clause 9.1 shall be within the maximum limits shown for the current rating in table G.

13.2.4 Quick acting, high breaking capacity. The millivolt drop across the fuse-link shall be measured in accordance with, and comply with, the requirements of BS EN 60127-1, Clause 9.1, Standard Sheet 1.

NOTE: The above procedure shall be used, as appropriate, in tests 9, 10, 11, 12, 13, 14, 15 and 16 of table A.

13.3 Test 3 - Dimensions

Fuse Type BS 88 - Certified to BS 88
 Joint Service, Normal Instantaneous
 Joint Service, Time Delay
 Quick Acting, High Breaking Capacity - Certified to
 BS EN 60127-2, Standard Sheet 1

13.3.1 Joint Service, normal instantaneous and time delay. The external dimensions of all fuse-links submitted for Qualification Approval shall be measured and be within the limits specified in the relevant drawings, figures 4, 5 and 6 for Normal Instantaneous and figure 7 for Time Delay fuse-link.

13.4 Test 4 - AC breaking capacity

Fuse Type BS 88 - Certified to BS 88
 Joint Service, Normal Instantaneous
 Joint Service, Time Delay
 Quick Acting, High Breaking Capacity - Certified to
 BS EN 60127-2, Standard Sheet 1

13.4.1 Joint Service, normal instantaneous. Fuse-links of maximum current rating in each body size shall be tested for the appropriate Category of Duty given in tables H and I. The tests shall be conducted in accordance with BS 88 but with the fuse-links at a temperature of 85 ± 5 °C. There shall be no failure as defined in BS 88.

13.4.2 Joint Service, time delay. Fuse-links of the maximum current rating of each method of element construction shall be tested in accordance with BS EN 60127-2, Clause 9.3.

13.5 Test 5 - DC breaking capacity

Fuse Type BS 88 - Certified to BS 88
Joint Service, Normal Instantaneous
Joint Service, Time Delay
Quick Actions, High Breaking Capacity

13.5.1 Joint Service, normal instantaneous. Fuse-links of the maximum current rating in each type and body size shall be tested for the appropriate Category of Duty given in tables H and I. The tests shall be carried out in accordance with BS 88 but with the fuse-link at a temperature of 85 ± 5 °C. For fuse-links of ratings less than 6 amps, the reduced prospective current shall be computed taking the resistance of the fuse link into account. There shall be no failure as defined in BS 88.

13.5.2 Joint Service, time delay. Fuse-links of the maximum current rating for each method of element construction shall be tested in accordance with BS EN 60127-2.

13.5.3 Quick acting, high breaking capacity. Five specimens of the maximum and five specimens of the minimum current rating shall be tested in accordance with BS EN 60127-1, Clause 9.3 except that direct current shall be used for the testing, the time constant of the test circuit shall not be less than 0.004 and the rated breaking capacity shall be 750A.

13.6 Test 6 - AC characteristic curves and minimum fusing currents

Fuse Type BS 88 - Certified to BS 88
Joint Service, Normal Instantaneous
Joint Service, Time Delay
Quick Acting, High Breaking Capacity - Certified to BS EN
BS EN 60127-2, Standard Sheet 1

13.6.1 Joint Service, normal instantaneous. Characteristic curves shall be produced showing the pre-arcing time of each rating of fuse-link in an external ambient temperature of 55 ± 5 °C with alternating currents ranging from the minimum fusing current to that corresponding to a pre-arcing time of 0.01 sec. The curves so produced shall be within the envelope curves shown in figures A.1 to A.50 in annex A. The fusing factor at 55 ± 5 °C shall be determined in accordance with BS 88, for fuse times stated in tables H and I of this Standard.

13.6.2 Joint Service, time delay. Fuse-links shall be tested in an ac circuit at the voltage laid down in table J and the virtual pre-arcing time found shall be within the current characteristic curves as shown for the fuse-link under test at figures B.1 to B.13 inclusive in annex B. All 20 fuse-links shall be tested at approximately equally spaced intervals of current between 1.7 times the rated current and 10 times the rated current. Ten fuse-links with minimum current rating and 10 fuse-links with maximum rating of each method of element construction are to be tested.

13.7 Test 7 - AC discrimination

Fuse Type BS 88 - Certified to BS 88
Joint Service, Normal Instantaneous
Joint Service, Time Delay
Quick Acting, High Breaking Capacity

13.7.1 Joint Service, normal instantaneous (where applicable). The fuse-link shall be tested as major and minor fuses in comparison with approved fuse-links in each of the combinations listed below. In each case the minor fuse shall interrupt the test current, the major fuse remaining intact. The tests shall be carried out at 440 volts ac rms at 50 or 60 Hz. Fuse-links shall be tested in the combination shown in table B with the prospective currents shown.

Table B

AC Discrimination Testsfor Normal Instantaneous Fuse-links

MAJOR FUSE		MINOR FUSE		rms PROSPECTIVE CURRENT ON MINOR FUSES (AMPERES) (SEE PARA 5)			
BODY SIZE NO	NOMINAL RATING	BODY SIZE NO	NOMINAL RATING				
(a)	(b)	(c)	(d)	(e)			
1	30A	1	10A	40*	100	1,000	10,000
2	15A	1	7A	25*	100	1,000	10,000
2	30A	1	10A	50*	100	1,000	10,000
2	60A	1	20A	70*	1,000	10,000	
3	40A	2	15A	70*	1,000	10,000	
3	60A	2	20A	100*	1,000	10,000	
3	80A	1	30A	120*	1,000	10,000	
3	125A	2	40A	180*	1,000	10,000	30,000
3	150A	2	60A	250*	1,000	10,000	30,000
3	200A	3	80A	300*	1,000	10,000	30,000
4	125A	3	40A	200*	1,000	10,000	30,000
4	160A	3	60A	280*	1,000	10,000	30,000
4	200A	3	80A	350*	1,000	10,000	30,000
5	250A	3	100A	400*		10,000	30,000
5	300A	4	125A	550*		10,000	30,000

* See 13.7.1.7

13.7.1.2 Three tests shall be made at each prospective current, with samples disposed as follows:

S = specimen of fuse-link under test.

QA = QUALIFICATION approved sample.

	TEST 1	TEST 2	TEST 3
Major Fuse	QA	S	S
Minor Fuse	S	QA	S

13.7.1.3 Samples used in the major fuse shall be used for one test only and shall then be discarded.

13.7.1.4 The power factor of the circuit shall be not greater than 0.3 for prospective current above 1000 amperes and the lowest practicable for prospective currents of 1000 amperes or less.

13.7.1.5 In all tests the major fuse shall be in an ambient temperature of $65 \pm 5^{\circ}\text{C}$ and the minor fuse shall be at room temperature.

13.7.1.6 The faults shall be applied at a rising voltage of between 35% and 65% of the peak value.

13.7.1.7 In tests with prospective currents marked * in table B, when the fault is applied to the minor fuse, the major fuse shall be carrying a steady resistive load current equal to 80% of the difference in nominal ratings of the major and minor fuses. The steady load current shall be applied immediately before and maintained for 30 seconds after the initiation of the fault.

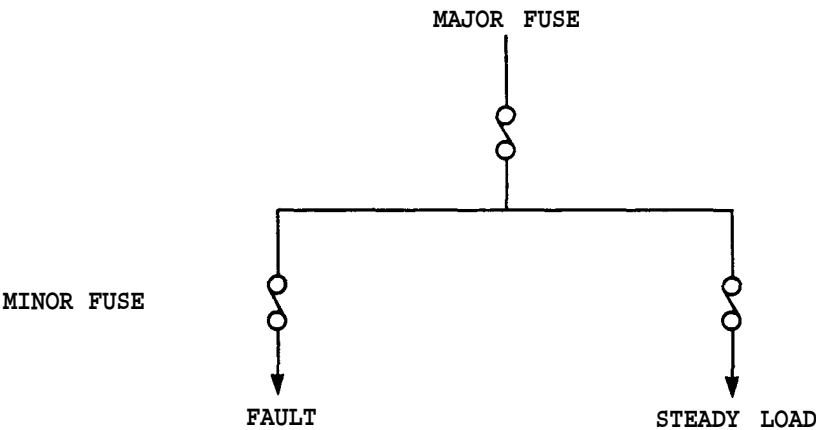


Fig 1 AC Discrimination Test

13.7.2 Joint Service, time delay. Not tested.

13.7.3 Quick acting, high breaking capacity. Not tested.

13.8 Test 8 - DC discrimination

Fuse Type BS 88 - Certified to BS 88
 Joint Service, Normal Instantaneous
 Joint Service, Time Delay
 Quick Acting, High Breaking Capacity

13.8.1 Joint Service, normal instantaneous. Fuse-links shall be tested as major and minor fuses in comparison with approved fuse-links in each of the combinations listed in table C in each case the minor fuse shall interrupt the test current, the major fuse remaining intact.

13.8.1.1 DC discrimination tests normal instantaneous fuse-links. The tests shall be carried out at 220 volts dc. Fuse-links shall be tested in the following combination shown in table C with the prospective currents shown.

Table C
DC Discrimination Tests
for Normal Instantaneous Fuse-links

MAJOR FUSE		MINOR FUSE		rms PROSPECTIVE CURRENT ON MINOR FUSES (AMPERES) (SEE PARA 5)			
BODY SIZE NO	NOMINAL RATING	BODY SIZE NO	NOMINAL RATING				
(a)	(b)	(c)	(d)	(e)			
1	10A	1	5A	20*	100	1,000	
1	30A	1	15A	45*	100	1,000	
2	15A	1	7A	25*	100	1,000	
2	30A	2	15A	50*	100	1,000	10,000
2	60A	1	30A	100*	1,000	10,000	
3	40A	2	25A	70*	1,000	10,000	
3	60A	2	30A	100*	1,000	10,000	
3	80A	3	40A	140*	1,000	10,000	
3	125A	2	60A	240*	1,000	10,000	30,000
3	200A	3	100A	400*	1,000	10,000	30,000
4	125A	3	60A	200*	1,000	10,000	30,000
4	160A	3	80A	280*	1,000	10,000	30,000
4	200A	3	100A	360*	1,000	10,000	30,000
5	300A	3	150A	600*	1,000	10,000	30,000

* see 13.8.1.6

13.8.1.2 Three tests shall be made at each prospective current, with samples disposed as follows:

S = specimen of fuse-link under test.

QA = QUALIFICATION approved sample.

	TEST 1	TEST 2	TEST 3
Major Fuse	QA	S	S
Minor Fuse	S	QA	S

13.8.1.3 Samples used in the major fuse shall be used for one test only and shall then be discarded.

13.8.1.4 The time constant of the circuit shall be between 0.0075 and 0.015 (with a link of negligible impedance in circuit) for perspective currents above 1000 amperes and the highest practicable for prospective currents of 1000 amperes or less.

13.8.1.5 In all tests the major fuse shall be in an ambient temperature of 65 ± 5 °C and the minor fuse shall be at room temperature.

13.8.1.6 In tests with prospective currents marked * in table C, when the fault is applied to the minor fuse, the major fuse shall be carrying a steady resistive load current equal to 80% of the difference in nominal ratings of the major and minor fuses. The steady load current shall be applied immediately before and maintained for 30 seconds after the initiation of the fault.

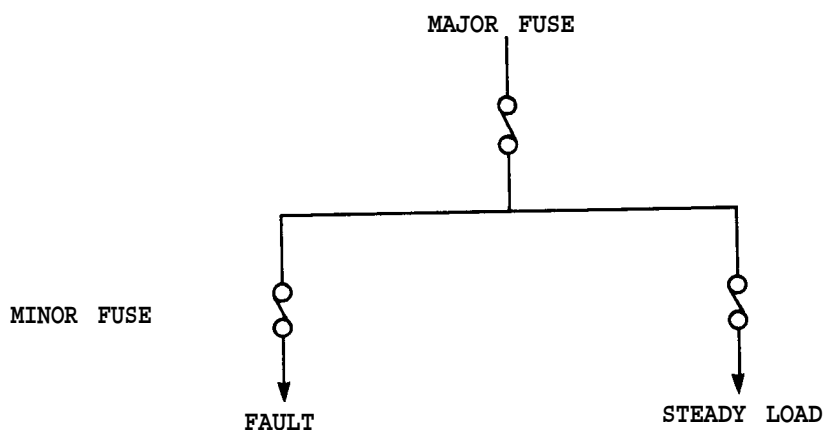


Fig 2 DC Discrimination Test

13.8.2 Joint Service, time delay. Not tested.

13.8.3 Quick acting, high breaking capacity. Not tested.

13.9 Test 9 - Endurance

Fuse Type BS 88
 Joint Service, Normal Instantaneous
 Joint Service, Time Delay
 Quick Acting, High Breaking Capacity

13.9.1 BS 88. Not tested.

13.9.2 Joint Service, normal instantaneous and time delay. The tests shall be preceded by carrying out a millivolt drop test in accordance with test 2 with the fuse-links at their test temperature of 85 ± 5 °C. The millivolt readings shall be noted.

13.9.2.1 Normal instantaneous. A fuse-link of the maximum current rating in each body size shall carry an alternating current of 80% of its nominal rating for 1000 hours at a temperature of 85 ± 5 °C.

13.9.2.2 Time delay. Five fuse-links of the maximum current rating in each body size shall carry an alternating current of 1.05 times its nominal rating for one hour. The current shall be removed for a period of 15 minutes. This cycle is to be repeated 100 times. Each fuse-link shall then be subject for a further one hour to an alternating current of 1.15 times the nominal rated current.

13.9.3 The test shall be concluded by again carrying out a millivolt drop test (with the fuse-links at a temperature of 85 ± 5 °C), in accordance with test 2 and the millivolt values shall be noted.

13.9.4 The final millivolt drop values of each fuse-link shall not vary from that obtained in **13.9.2** by more than:

5% for body sizes No 1 to 8 inclusive
 5% for body size No 0 (0.25A and above)
 10% for body size No 0 (below 0.25A)
 10% for body size No 00

13.9.5 Quick acting, high breaking capacity. Not tested.

13.10 Test 10 - Security of end-caps

Fuse Type BS 88 - Certified to BS 88
 Joint Service, Normal Instantaneous
 Joint Service, Time Delay
 Quick Acting, High Breaking Capacity - Certified to
 BS EN 60127-2, Standard Sheet 1

13.10.1 Joint Service normal instantaneous and time delay. The tests shall be preceded by carrying out a millivolt drop test in accordance with test 2 at ambient conditions. The millivolt reading shall be noted.

13.10.1.1 Normal instantaneous. A steady axial pull of 66.6 Newtons shall be applied for 10 seconds between the two end caps of fuse-links of sizes 0 and above; for size 00 an axial pull of 44.5 Newtons shall be applied for 10 seconds. The test shall be applied to three samples of the maximum and three samples of the minimum current rating in each size of body.

13.10.1.2 Time delay. A steady axial pull of 5 Newtons shall be applied for one minute between the two end ferrules. The test shall be applied to five samples of the maximum current rating and five samples of the minimum current rating for each method of element manufacture submitted.

13.10.1.3 After the test, the fuse-links shall be examined and there shall be no mechanical derangement. The method of testing shall not have the effect of increasing end cap adhesion to the body.

13.10.1.4 The final millivolt drop test values for each fuse-link shall not vary from that obtained in **13.10.1** by more than:

Normal Instantaneous 5%
Time Delay 10%

13.10.1.5 Fuse-links used in this test will be retained for the vibration test 11.

13.11 Test 11 - Vibration

Fuse Type BS 88
Joint Service, Normal Instantaneous
Joint Service, Time Delay
Quick Acting, High Breaking Capacity

13.11.1 Fuse-links of tagged construction shall be rigidly mounted by their normal fixing points. Ferrule fuse-links shall be mounted in panel mounting fuse-holders. All fuse-links are to carry their rated current throughout the tests. Each fuse-link shall be tested in each of three mutually perpendicular planes for a total of 6 hours.

13.11.2 The test shall be preceded by carrying out a millivolt drop test in accordance with test 2 and the millivolt drop test values shall be noted.

13.11.3 The vibration tests shall be as specified below:

13.11.3.1 BS 88: Joint Service, normal instantaneous and time delay.
BS 2011: Part 2.1 Fc, Procedure A over a range of 5 to 150 Hz with a peak of 0.75 mm/10g, sweep rate 1 octave per 2 minutes for 2 hours in each of three mutually perpendicular planes.

13.11.3.2 Quick acting, high breaking capacity. BS 2011: Part 2.1 Fc, Procedure A over a range of 5 to 2 Hz, the rate of change not to exceed one octave in 2 minutes. The amplitude shall be 0.75 mm/10g for a duration of 2 hours in each of three mutually perpendicular planes.

13.11.3.3 The test shall conclude by again carrying out a millivolt drop test in accordance with test 2. The millivolt values shall be noted.

13.11.3.4 Each fuse-link shall be examined and there shall be no mechanical derangement.

13.11.3.5 The millivolt drop values for each fuse-link shall not change by more than 5% of its initial value. Furthermore, both initial and final millivolt drop values for Joint Service fuse-links shall be within the tolerances laid down in tables H, I and J. For the Quick Acting fuse-links, the millivolt drop test values shall not exceed those specified in BS EN 60127-1, Clause 9.1.

13.11.3.6 Most fuse-links used in this test shall be subjected to test 12, Acceleration.

13.12 Test 12 - Acceleration

Fuse Type BS 88
 Joint Service, Normal Instantaneous
 Joint Service, Time Delay
 Quick Acting, High Breaking Capacity

13.12.1 Joint Service, time delay. Not tested.

13.12.2 BS 88, Joint Service, normal instantaneous and quick acting, high breaking capacity

13.12.2.1 Fuse-links shall be mounted as in test 11 and shall carry their normal rated current.

13.12.2.2 The test shall be preceded by carrying out a millivolt drop test in accordance with test 2 and the millivolt drop test values shall be noted.

13.12.2.3 The fuse-links shall be subjected to the tests specified in BS 2011: Part 2.1, Test Ga, Clause 6 to a level of 196 m/s.

13.12.2.4 The test shall be concluded by again carrying out a millivolt drop test in accordance with test 2 and the millivolt values shall be noted.

13.12.2.5 Each fuse-link shall be examined and there shall be no mechanical derangement.

13.12.2.6 The millivolt drop values for each fuse-link shall not change by more than 5% of its initial value. Furthermore, both initial and final millivolt drop values for Joint Service fuse-links shall be within the tolerances laid down in tables H and I. For the Quick Acting, High Breaking Capacity fuse-links, the millivolt drop test values shall not exceed that specified in BS EN 60127-1, Clause 9.2.

13.12.2.7 Fuse-links used in this test will be retained for test 13.

13.13 Test 13 - Climatic

Fuse Type BS 88
 Joint Service, Normal Instantaneous
 Joint Service, Time Delay
 Quick Acting, High Breaking Capacity

13.13.1 The test shall be preceded by carrying out a millivolt drop test in accordance with test 2 and the millivolt value shall be noted. The fuse-links shall be introduced into the test chamber in the unpacked ready for use state and shall not carry current during the test.

13.13.2 BS 88 and Joint Service, normal instantaneous

13.3.2.1 Low temperature/low pressure test. The test will be in accordance with BS 2011, Part 2.1, Test Z/AM to a pressure of 4400 Pa and a temperature of 65 ± 3 °C for a period of 16 hours.

13.13.2.2 Damp heat test. The test will be in accordance with BS 2011: Part 2.1, Test Db with an upper temperature of 40 °C for six cycles.

13.13.2.3 On completion of the Climatic tests the fuse-links shall be examined and there shall be no mechanical derangement. After the removal of surface moisture, the test shall be concluded by carrying out a millivolt drop test in accordance with test 2 and the millivolt values shall be noted.

13.13.2.4 The millivolt drop values of each fuse-link shall not change by more than 5% of its initial value. Furthermore, both initial and final millivolt values for the Joint Service, Normal Instantaneous fuse-links shall be within the tolerances laid down in tables H and I.

13.13.2.5 All fuse-links shall, on completion of the millivolt drop test, be operated (blown) at up to 40 KA at rated voltage and the resistance measured at 500 V dc between the end caps shall be greater than 10 Kohms.

13.13.3 Joint service, time delay

13.13.3.1 Low temperature/low pressure tests. The test will be in accordance with BS 2011: Part 2.1, Test M to a pressure of 4400 Pa and a temperature of $65 \text{ °C} \pm 5 \text{ °C}$ for 16 hours.

13.13.3.2 Damp heat test. The test will be in accordance with BS 2011, Part 2.1, Test Db with an upper temperature of 40 °C for six cycles.

13.13.3.3 On completion of the Climatic tests the fuse-links shall be examined and there shall be no mechanical derangement. After the removal of surface moisture the test shall be concluded by carrying out a millivolt drop test in accordance with test 2 and the millivolt values shall be noted.

13.13.3.4 The millivolt drop values of each fuse-link shall not change by more than 5% of its initial value. Furthermore the initial and final millivolt values shall be within the limits laid down in table J.

13.13.3.5 All fuse-links shall, on completion of the millivolt drop test, be operated (blown) at twice the rated current and shall comply with the time/current curve for the rating shown in figures B.1 to B.13 of annex B. The value of the resistance measured at 500 V dc between the end caps shall not be less than 10 Kohms.

13.13.4 Quick acting, high breaking capacity

13.13.4.1 Fuse-links shall be subjected to tests in accordance with BS 2011, Part 2.1, Test Z/ABDM, Procedure 1. The severity shall be for climatic category 55/085/21 and at a low air pressure of 4400 Pa. At the conclusion of the test sequence and following completion of the recovery period, the next three tests shall be carried out within 30 min.

13.13.4.2 Each fuse-link shall be examined and there shall be no mechanical derangement.

13.13.4.3 A millivolt drop test shall be carried out on each fuse-link in accordance with test 2 and the millivolt value shall be noted. The millivolt value shall not change by more than 5% of the initial value. Furthermore, the millivolt value shall be within the values laid down in BS EN 60127-1, Standard Sheet 1.

13.13.4.4 Each fuse-link shall be operated (blown) at 4 times its rated current and shall comply with the Time/Current figures given in BS EN 60127-1 Standard Sheet 1. The insulation resistance measured at 500 Vdc between the end caps shall be greater than 10 Kohms.

13.13.5 Joint service, time delay

13.13.5.1 Damp heat cyclic. In addition to the above tests, Joint Service, Time Delay fuse-links shall be subject to tests in accordance with BS 2011, Part 2.1, Test Da, Clauses 1, 2 and 3 for a six-cycle period. The specimen shall be tested in a ready to use state and shall carry no current. Each fuse-link shall be examined and there shall be no mechanical derangement. Each fuse-link shall be operated (blown) at twice its rated current and shall comply with the Time/Current curves for the ratings shown in figures B.1 to B.13 of annex B. The insulation resistance measured at 500 Vdc between the end caps shall be greater than 10 Kohms.

13.14 Test 14 - Bump

Fuse Type BS 88
 Joint Service, Normal Instantaneous
 Joint Service, Time Delay
 Quick Acting, High Breaking Capacity

13.14.1 All fuse-link types. Fuse-links of tagged construction shall be rigidly mounted by their normal fixing points. Ferrule fuse-links shall be mounted in panel mounting fuse holders. All fuse-links shall carry their rated current throughout the test.

13.14.2 BS 88 and Joint Service, normal instantaneous

13.14.2.1 The test shall be preceded by carrying out a millivolt drop test in accordance with test 2 and the millivolt drop test values shall be noted.

13.14.2.2 Fuse-links shall be tested in accordance with BS 2011, Part 2.1, Test Eb, Clause 4.3. Specimens shall be mounted in the three mutually perpendicular planes and subjected simultaneously to 4000 bumps at 390 m/s². (Each fuse-link shall receive a total of 4000 bumps in one plane only.)

13.14.2.3 The test shall conclude by again carrying out a millivolt drop test in accordance with test 2 and the millivolt values shall be noted.

13.14.2.4 Each fuse-link shall be examined and there shall be no mechanical derangement.

13.14.2.5 The millivolt drop values for each fuse-link shall not change by more than 5% of its initial value. Furthermore, both initial and final millivolt drop values for Joint Service fuse-links shall be within the tolerance laid down in tables H and I of this Part of the Standard.

13.14.3 Joint Service, time delay and quick acting, high breaking capacity

13.14.3.1 The fuse-links shall be tested in accordance with BS 2011, Part 2.1, Test EB, Clause 4.3. Specimens shall be mounted in the three mutually perpendicular planes and subjected simultaneously to 4000 bumps at 390 m/s^2 . (Each fuse-link receives a total of 4000 bumps in one plane only.)

13.14.3.2 Each fuse-link shall be examined and there shall be no mechanical derangement.

13.14.3.3 The fuse-links shall be caused to operate (blow) at twice the rated current for Time Delay fuse-links or four times the rated current for Quick Acting fuse-links. The characteristics shall conform with the curves shown in figures B.1 to B.13 of annex B, Time Delay and Standard Sheet 1 of BS EN 60127-1 for the Quick Acting fuse-links.

13.15 Test 15 - Shock

Fuse Type BS 88
 Joint Service, Normal Instantaneous
 Joint Service, Time Delay
 Quick Acting, High Breaking Capacity

13.15.1 Joint Service, time delay. Not tested.

13.15.2 All other fuse-link types. Fuse-links of tagged construction shall be rigidly mounted by their normal fixing points and supported on pillars to allow all-round movement of the fuse-link barrel. Ferrule fuse-links shall be mounted in panel mounting fuse-holders. All fuse-links shall carry their rated current throughout the test. Each fuse-link shall be tested in all three of the mutually perpendicular planes. The test shall be preceded by carrying out a millivolt drop test in accordance with test 2 on the BS 88 and Joint Service Normal Instantaneous fuse-link and the millivolt drop test values shall be noted.

13.15.2.1 The fuse-links shall be subjected to the shock test in accordance with BS 2011, Part 2.1, Test 1 Ea at the following severities:

13.15.3 BS 88 and quick acting, high breaking capacity. Pulse shape shall be half sinusoidal with a peak acceleration of 981 m/s^2 having a corresponding duration of 6 ms.

13.15.4 Joint Service, normal instantaneous. Pulse shape shall be half sinusoidal with a peak acceleration of 981 m/s^2 having a corresponding duration of 6 ms.

13.15.4.1 Each fuse-link shall be examined and there shall be no mechanical derangement.

13.15.4.2 For the BS 88 and Joint Service, Normal Instantaneous fuse-link, the test shall be concluded by again carrying out a millivolt drop test in accordance with test 2 and the millivolt drop values shall be noted.

13.15.4.3 The millivolt drop values for each fuse-link shall not change by more than 5% of its initial value. Furthermore, both the initial and final millivolt drop values for Joint Service, Normal Instantaneous fuse-links shall be within the tolerance laid down in tables H and I.

13.15.4.4 The Quick Acting, High Breaking Capacity fuse-links shall be operated (blown) at 4 times the rated current and shall comply with the Time/Current table for the rating shown in BS EN 60127-1, Standard Sheet 1.

13.16 Test 16 - Mould growth

<u>Fuse Type</u>	BS 88
	Joint Service, Normal Instantaneous
	Joint Service, Time Delay
	Quick Acting, High Breaking Capacity

13.16.1 BS 88 and Joint Service, normal instantaneous

13.16.1.1 The test shall be preceded by carrying out a millivolt-drop test in accordance with test 2 and the millivolt values shall be noted.

13.16.1.2 The specimen shall be subjected to mould growth tests in accordance with BS 2011, Part 2.1, Test J. Specimens shall not support mould growth visible to the naked eye after 28 days exposure. The fuse-links shall not carry current during the test.

13.16.1.3 The test shall be concluded by again carrying out a millivolt drop test in accordance with test 2 and the millivolt values shall be noted.

13.16.1.4 The millivolt drop values for each fuse-link shall not change by more than 5% of its initial value. Furthermore, both the initial and final millivolt drop values for the Joint Service fuse-links shall be within the tolerances laid down in tables H and I of this Part of the Standard.

13.16.2 Joint Service, time delay and quick acting, high breaking capacity

13.16.2.1 The fuse-links shall be subjected to mould growth tests in accordance with BS 2011, Part 2.1, Test J. The fuse-links shall not support mould growth visible to the naked eye after 28 days exposure. The fuse-link shall not carry current during the test.

13.16.2.2 The fuse-links shall then be caused to operate (blown) at twice the rated current for Time Delay fuse-links and four times the rated current for Quick Acting fuse-links.

13.16.2.3 Each fuse-link caused to operate shall comply with the relevant Time/Current curve for the rating. Time Delay characteristics are illustrated at figures B.1 to B.13 of annex B. Quick Acting tables are shown in BS EN 60172-2, Standard Sheet 1.

13.16.2.4 The insulation resistance of blown fuse-links shall be measured at 500 Vdc, between the end caps, and shall not be less than 10 Kohms.

13.17 Test 17 - Marking

Fuse Type BS 88
 Joint Service, Normal Instantaneous
 Joint Service, Time Delay
 Quick Acting, High Breaking Capacity

13.17.1 Each fuse-link shall be permanently marked with the following, easily readable particulars:

- (a) nominal current rating (motor circuit fuse-links as BS 88);
- (b) voltage, AC and/or DC where applicable;
- (c) manufacturer's identity;
- (d) fuse type code. These symbols are:

FF: denoting very quick acting
F : denoting quick acting
M : denoting medium time-lag
T : denoting time-lag
TT: denoting long time-lag

- (e) NATO Stock Number (last seven digits minimum);
- (f) year of manufacture.

13.17.2 The requirement of (c), (d) and (f) may be met by the use of the appropriate manufacturers code (see Joint Services Manufacturing Codes) and date code (see Def Stan 00-9). If (a), (c) and (f) cannot be accommodated on the fuse-link, they shall be marked on the package and the NATO Stock Number shall be shown in full (eg all 13 digits).

14 Routine Production Tests

14.1 Joint Service, normal instantaneous

14.1.1 General examination. Procedure as laid down in test 1 and test 17 above.

14.1.2 Resistance. The resistance of each fuse-link shall be measured and the value shall be within the limits stated by the manufacturer, who shall have submitted details of the method of test and the limits of resistance values obtained in production when applying for Qualification Approval.

NOTE: The method of testing and the resistance limits are at the manufacturer's discretion and need not necessarily be in accordance with test 2 of Qualification Approval tests, although the fuse-links shall be capable of meeting the requirements of that test.

14.1.3 Dimensions. Each fuse-link shall be checked for dimensional accuracy, using Service Drawing Number (SDN) 006 050 069 to 006 050 073 inclusive, as guidance. Gauges may be manufactured to check fuse-links of the ferrule contact type, and these gauges may be used to check the fuse-link for correct overall length, diameter of the fuse contacts, parallelism and concentricity of the ferrules. For fuse-links of the tag type, the gauges may be manufactured to ensure the correctness of the following details:

- (a) maximum overall length of body, thickness of tags and any other projection on the fuse body;
- (b) dimensions of holes in the fuse contacts (tags);
- (c) correct centre-distance of holes in the fuse contacts and their correct positioning with respect to the centre lines of the fuse-links;
- (d) width of tags;
- (e) correct alignment of the fuse contacts.

14.2 Joint Service, time delay and quick acting, high breaking capacity

14.2.1 General examination. Procedure as laid down in test 1 and test 17 above.

14.2.2 Resistance. The resistance of each fuse-link shall be measured and the value shall be within the limits stated by the manufacturer on their detailed drawings.

14.2.3 Dimensions. The fuse-link shall be checked for dimensional accuracy with approved gauges to check the overall length, diameter and axial alignment of the fuse contacts.

15 Batch Acceptance Tests

15.1 Joint Service, normal instantaneous

15.1.1 The batch sampling tests in **15.1.2** and **15.1.3** shall be applied. The sampling procedure shall be in accordance with Def Stan 00-9, Clause 18(c). The incidence of any failures in these tests shall not exceed the limits stated in the relevant tables of BS 6001 for an inspection level S4 and an AQL of 4%.

15.1.2 Each fuse-link in the inspection lot shall be subjected to routine production tests in accordance with clause **14** of this Part of the Standard.

15.1.3 Further tests on a fuse-link or links, selected at random from the samples, shall be carried out at the discretion of the representative of the Approving Authority. The fuse-links selected shall be opened in such a manner that the elements are not damaged, the filling material shall be removed and the following points checked:

- (a) the joints (if any) in the elements shall be sound;
- (b) the soldered joints to the end caps shall be sound;

15.1.3 (Contd)

- (c) details of the wires of the elements shall be as specified on the manufacturing drawings;
- (d) the general standard of workmanship shall be to the satisfaction of the Approving Authority.

15.2 Joint Service, time delay

15.2.1 Fuse-links shall be submitted for batch acceptance in accordance with Def Stan 00-9. Fuse-links shall be subjected to the following tests.

15.2.2 100% acceptance tests

- (a) general examination 13.1
- (b) resistance 13.2
- (c) dimensions 13.3

15.2.3 Sampling tests

- (a) tests bracketed together in a group are considered as a sequence and must be performed as such, using the sample throughout;
- (b) information on the re-submission of rejected batches is given in BS 6001, Clause 6.4.

Table D

Group 'A' tests

DEF STAN 59-96 (PART 1)/2 SECTION TWO CLAUSE NO	TEST TRIALS	AQL	INSPECTION LEVEL	TEST CATEGORY
13.1	General examination	1 %	II	Non-destructive
13.2	Resistance			
13.3	Dimensions			

Table E

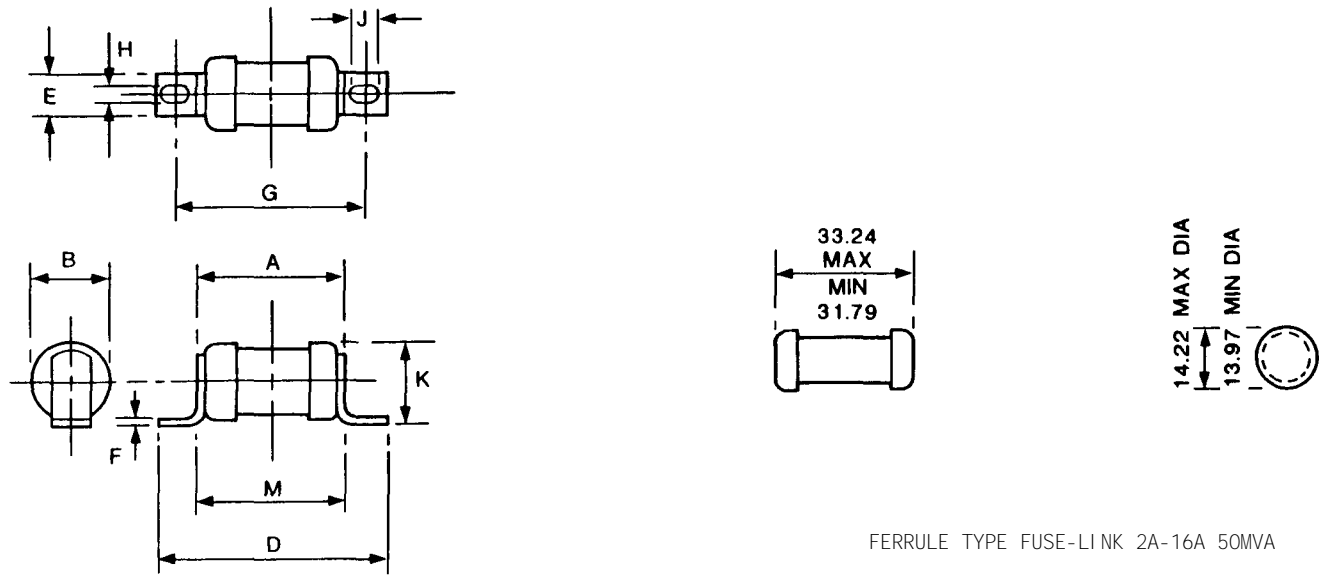
Group 'B' tests

DEF STAN 59-96 (PART 1)/2 SECTION TWO CLAUSE NO	TEST TRIALS	AQL	INSPECTION LEVEL	TEST CATEGORY
13.10	Security of End Caps	4%	4	Destructive

15.3 An occasional check on the standards of workmanship and materials shall be carried out at the discretion of, and in the presence of, the Approving Authority Representative on a fuse-link or links selected at random, up to a limit of five fuse-links from a consignment which has passed the tests as specified in clause **14**. The fuse-links selected shall be opened in such a manner that the elements are not damaged and shall be examined to ensure that where applicable:

- (a) the joints in the element shall be sound;
- (b) the soldered joints to the end caps or discs shall be sound;
- (c) the diameters and types of the wires in the elements shall be as specified on the manufacturer's drawings against which Qualification Approval has been granted;
- (d) the general standard of workmanship shall be to the satisfaction of the Approving Authority.

15.4 Quick acting, high breaking capacity. Fuse-links shall be submitted for batch acceptance in accordance with Def Stan 00-9, Inspection Level S4 and AQL 4%. Components shall be subjected to the millivolt drop test, test 2 of this Part of the Standard.



FUSE-LINKS FOR BOLTED CONNECTION, BS 88 SECTION 2.2 1988 REFERENCE A1.A3

FUSE REFERENCE	MAX PREFERRED CURRENT RATING (AMPERES)	MAX POWER DISSIPATION (WATTS)	DIMENSIONS (mm)										
			A MAX	B MAX	D MAX	E MAX	F		G NOM	H NOM	J MIN	K MAX	L MAX
							MIN	MAX					
A1	20	2.7	36.5	14.5	56	11.2	0.8	1.5	44.5	4.2	5.5	14.5	36.5
A2	32	4.4	57	24	86	9.2	0.8	1.5	73	5.5	7	25.5	60
A3	63	6.9	58	27	91	13	1.2	1.6	73	5.5	7	28	61

NOTES:

1. In all references, dimension (A) includes any projections such as rivet heads, but the design of the tags between dimensions (A) and (L) is limited by a line drawing at 45° to the contact surface.
2. All fixing holes are elongated as indicated by (J) to allow for manufacturing tolerances on dimension (A).
3. Dimensions (E) and (F) are nominal material sizes and subject to manufacturing tolerances as specified in the relevant standards for the raw materials.
4. For A1 to A3 reference fuse links, the fixing holes may be extended either axially or laterally to form open ended slots.
5. The power dissipation values given represent the maximum power dissipation to the fuse-links when tested in the power dissipation test rig.

Fig 3 Cartridge Fuse-Link Tag Contact Type BS 88, Section 2.2 1988 Reference A1, A2 and A3 and 50 MVA

Table F

BS 88 Range of Fuse-links for RN Use

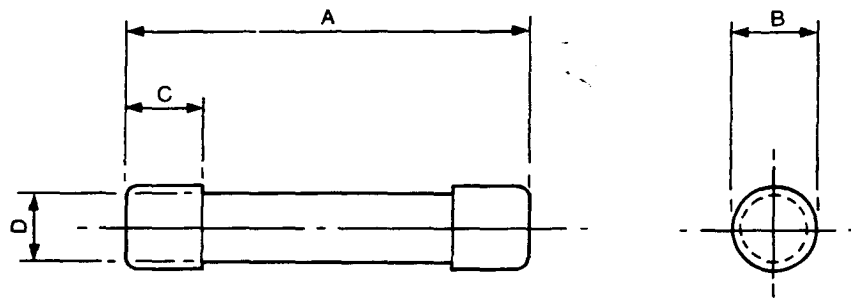
NSN 5920-99- NS CAT NO 0559	BODY SIZE REF	CURRENT RATING (A)	VOLTAGE AND FAULT CAPACITY	FERRULE OR TAG	APPLICATION	USE AND REMARKS
923-4052 923-4053 923-4054 923-4055 923-4056	See Note	2 4 6 10 16	[550 V ac 80 kA] [250 V dc 40 kA]	Ferrule	General (Maintenance only)	Elect Spec to BS 88 Pt 2
741-7148 741-7149 741-7150 741-7151 741-7152 741-7153	A1 A1 A1 A1 A1 A1	2 4 6 10 16 20	[550 V ac 80 kA] [250 V dc 40 kA]	Tag	General	BS 88 Pt 2
741-7154 741-7155	A1 A1	20M25 20M32	415 V ac 80 kA		Motor Start ac only	
741-7156 741-7157 741-7158 741-7159 741-7160 741-7161 741-7162 741-7163	A2 A2 A2 A2 A2 A2 A2 A2	2 4 6 10 16 20 25 32	[660 V ac 80 kA] [460 V dc 40 kA]	Tag	General	BS 88 Pt 2
539-1899 537-5168	A2 A2	32M50 32M63	[660 V ac 80 kA] [460 V dc 40 kA]		Motor Start	
932-4367 741-7164 741-7165 741-7166	A3 A3 A3 A3	35 40 50 63	[660 V ac 80 kA] [460 V dc 40 kA]	Tag	General	BS 88 Pt 2
545-0472 208-5357	A3 A3	63M80 63M100	660 V ac 80 kA		Motor Start ac only	

NOTE: These are part of the 50 MVA range with fuses of similar body size to ref A1 and without tags.

Table G

Replacement Table - Fuse-links, BS 88

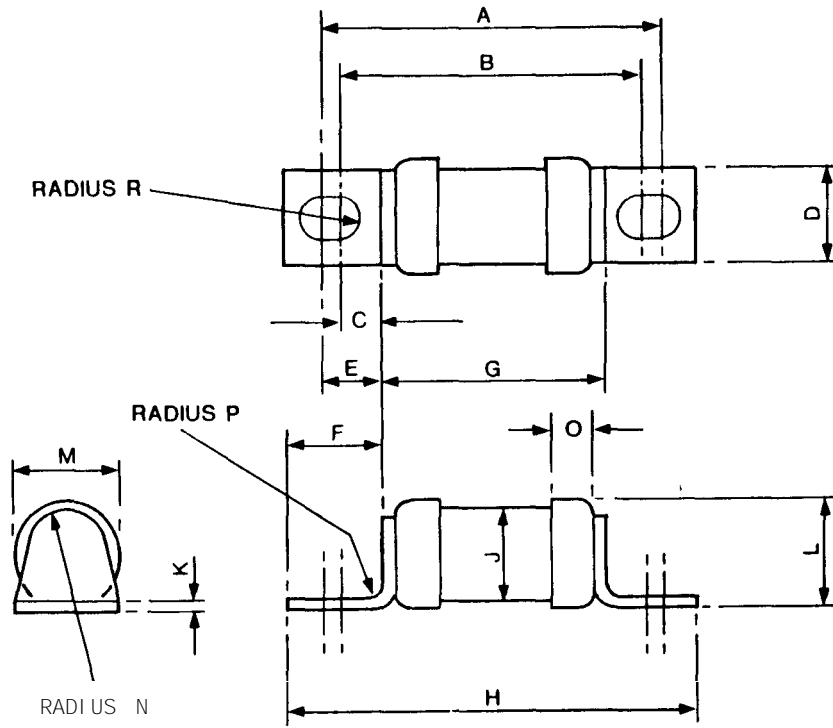
REF	(AMPS)	NSN	REPLACES, SUPERSEDES (MAN CODE NOT NEEDED)
A1	2	741-7148	626-7848 107-8905 651-7628
A1	4	741-7149	534-0217 954-7444 952-4690 651-7629
A1	6	741-7150	142-7276 001-2987 651-7630
A1	10	741-7151	971-2352 110-8434 001-2988 648-3032 651-7631
A1	16	741-7152	(626-7847 940-1629 634-5448 971-2353 ALL 16 AMP) 953-3362 107-8906 648-3033 651-7632 115-9424 526-5100 651-7633 971-2354
A1	20	741-7153	625-7848
A1	20M32	741-7154	-
A1	20M32	741-7155	
A2	2	741-7156	972-6966 651-7634
A2	4	741-7157	940-1633 970-6639 651-7635
A2	6	741-7158	715-6531 940-1634 204-2681 941-6398 651-7636
A2	10	741-7159	900-2884 651-7637 636-9916 940-1635 204-2682
A2	16	741-7160	940-1636 900-2886 651-7638
A2	20	741-7161	633-6068 102-4526 651-7639 711-9333 940-1637
A2	25	741-7162	648-3034 634-4318 651-7640 195-0376
A2	32	741-7163	(204-2683, 30 Amp) 940=1630 933-0875 651-7641
A2	32M50	539-1899	-
A2	32M63	537-5168	-
A3	35	932-4367	-
A3	40	741-7164	923-4050 651-7642 940-1639
A3	50	741-7165	648-3035 933-0870 651-7643 634-4319
A3	63	741-7166	(059-0127 940-1640 60 Amp) 940-1631 915-1568 651-7644
A3	63M80	545-0427	
A3	63M100	208-5357	



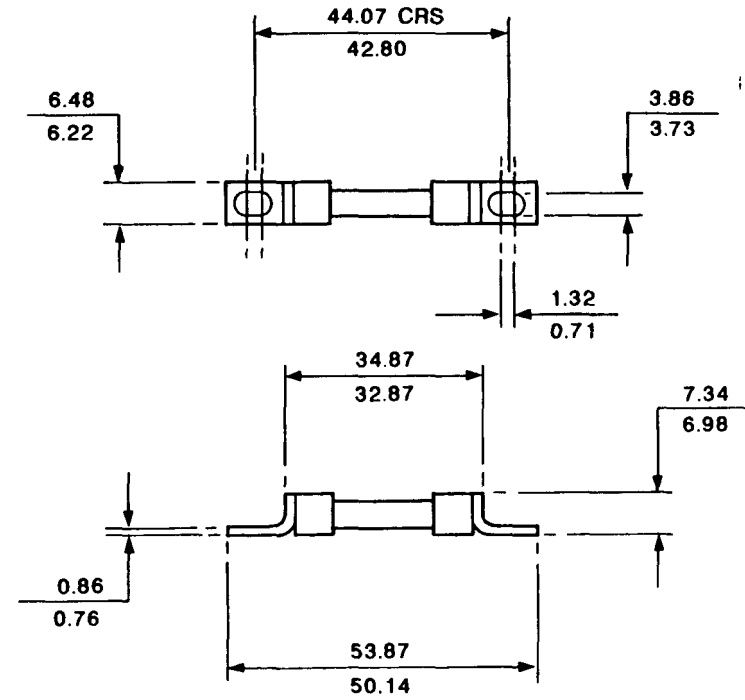
OUTLINE DRAWING

BODY SIZE NUMBER	LIMIT	DIMENSIONS (mm)			
		A	B	C	D (NOMINAL)
00	MAXIMUM	16.66	4.90	4.75	4.27
	MINIMUM	15.49	4.62	3.17	
0	MAXIMUM	32.77	6.50	6.35	5.84
	MINIMUM	31.34	6.22	4.75	
1	MAXIMUM	34.34	12.04	7.92	11.10
	MINIMUM	32.79	11.68	6.35	
2	MAXIMUM	38.33	16.87	9.50	15.87
	MINIMUM	36.80	16.54	7.92	
3	MAXIMUM	48.74	33.50	12.67	31.75
	MINIMUM	47.07	33.07	11.10	

Fig 4 Cartridge Fuse-links Contact Type Size 00 to 3 Outline Drawing



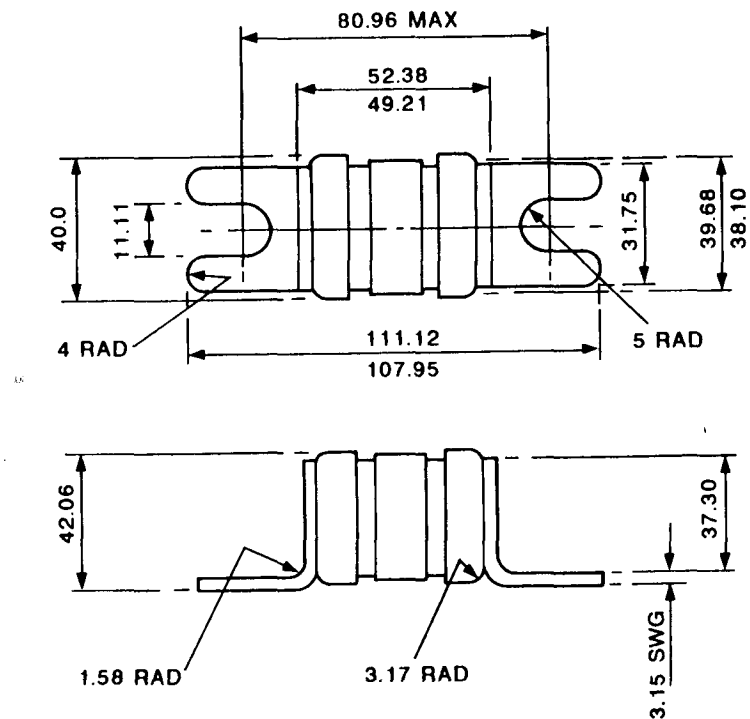
SIZE 1, 2 AND 3 OUTLINE DRAWING



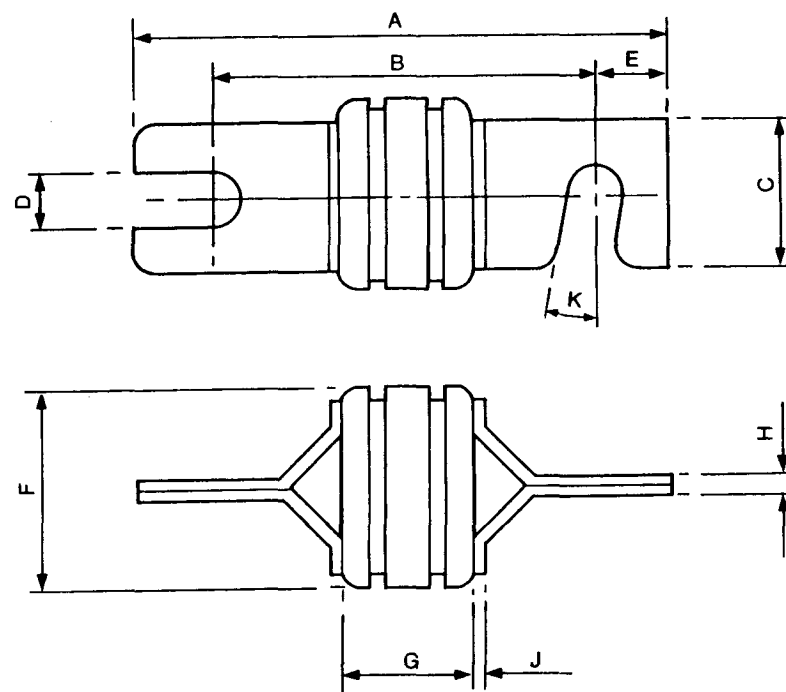
SIZE 0 OUTLINE DRAWING

BODY SIZE NUMBER	LIMIT	DIMENSIONS (mm)															
		A	B	C	D	E	F	G	H	J	K	L	H	N	O	P	R
1	MAXIMUM	47.65	43.99	4.47	10.31	6.30	11.18	34.80	57.20	11.10	0.81	12.70	12.19	4.75	6.35	0.76	2.59
	MINIMUM	45.31	41.66		9.52		10.92	33.02	54.66		21 SWG	12.07	11.76		5.84	-	2.46
2	MAXIMUM	58.50	54.94	8.33	16.00	10.11	16.89	38.23	72.01	15.87	1.22	18.29	17.02	6.35	7.82	0.76	3.43
	MINIMUM	56.74	53.19		15.24		16.38	36.58	69.34		18 SWG	17.88	16.66		7.32	-	3.25
3	MAXIMUM	73.00	69.34	12.19	26.16	12.19	20.73	46.26	89.97	31.75	1.60	35.10	33.68	14.27	10.72	0.76	4.24
	MINIMUM	70.21	66.55		25.40		19.96	46.23	87.17		16 SWG	34.54	33.17		10.21	-	4.04

Fig 5 Cartridge Fuse-Links, Tag Contact Type Sizes 1 to 3



SIZE 4 OUTLINE DRAWING



SIZE 5, 6, 7, 8 OUTLINE DRAWING

TOLERANCES ± 0.25 EXCEPT WHERE OTHERWISE STATED

BODY SIZE NUMBER	DIMENSIONS (mm)									
	A	B	C	D	E	F	G	H	J	K*NO ML
5	142.87 MAX	101.6 ± 0.79	38.10	14.28	19.05	52.19 MAX	46.03	3.96	2.00 14 SWG	6
6	161.92 MAX	130.17 ± 0.79	38.10	14.28	15.87	74.61 MAX	46.03	6.35	3.15 10 SWG	6
7	222.25 MAX	165.10 ± 0.79	50.80	17.46	25.40	82.55 MAX	82.55	6.35	3.15 10 SWG	6
8	254.00 MAX	184.15 ± 0.79	63.50	17.46	31.75	82.55 MAX	82.55	6.35	3.15 10 SWG	6

Fig 6 Cartridge Fuse-Links, Tag Contact Type Sizes 4 to 8

Table H

Specification for Joint Service Cartridge Fuse-links - Ferrule Contact Type Normal Instantaneous

NATO STOCK NO 5920-99	BODY SIZE NO	CURRENT RATING NOMI NAL (AT NORMAL AND LOW TEMPERATURE)	VOLTS AND CATEGORY OF DUTY						*MILLIVOLT DROP		DURATION OF TEST FOR MINIMUM FUSING CURRENT HOURS	FIGURE NO	
			AC			DC							
			VOLTS	PROSPECTIVE CURRENT OF TEST CIRCUIT	POWER FACTOR (LAGGING) OF TEST CIRCUIT NOT GREATER THAN	VOLTS	PROSPECTIVE CURRENT OF TEST CIRCUIT	TIME CONSTANT OF TEST CIRCUIT NOT LESS THAN	MEAN VALUE LIMITS OF ANY BATCH				TOLERANCE ON BATCH MEAN VALUE
									MIN	MAX			
AMPERES				AMPERES		AMPERES	(mS)				HOURS		
059-0136 059-0137 059-0138 059-0139	00	0.25 0.50 1.0 2.0	250	4,000	0.4	230	4,000	0.004	1450 1700 250 190	1850 2100 385 275	± 15	1.0	4
059-0107 059-0108 059-0109 059-0110 059-0111 059-0112 059-0113 011-9925 011-9926	0	0.25 0.50 1.0 2.0 3.0 5.0 7.0 10.0 15.0	440	33,000	0.3	230	33,000	0.015	3000 2100 420 300 200 220 160 120 125	3960 2500 2700 370 360 300 190 170 185	± 15 ± 12½ ± 10 ± 7½	1.5	4
059-0140 059-0141 059-0142 059-0143 059-0144 059-0145 059-0146 059-0147 011-9483	1	0.50 1.0 2.0 3.0 5.0 7.0 10.0 15.0 20.0	440	33,000	0.3	230	33,000	0.015	3000 2500 370 430 490 265 165 140 160	3420 3250 450 550 615 380 190 155 175	± 12½ ± 10 ± 7½	1.5	4
059-0148 059-0149 059-0150 059-0151	2	10 15 20 30	440	33,000	0.3	230	33,000	0.015	155 140 155 105	175 155 170 125	± 7½	2	4
059-0152 059-0153 059-0155	3	40 60 100	440	33,000	0.3	230	33,000	0.015	135 125 99	150 140 110	± 7½	2	4

* Mean value of millivolt drop shall be ascertained for each individual batch and this mean value shall be within the limits shown. The percentage tolerances apply to the individual mean.

Temperature Derating. Fuse-links are intended for use in an ambient temperature up to 85°C. At ambient temperatures between 50°C and 85° fuse-links should be detated by 0.4 per cent for every one degree increase in ambient temperature above 35°C. At temperatures between 35°C and 50°C the same derating procedure applies but in practice may be ignored.

Table I

Specification for Joint Service Cartridge Fuse-links - Tag Contract Type Normal Instanteous

NATO STOCK NO 5920-99-	BODY SIZE NO	CURRENT RATING NOMI NAL (AT NORMAL AND LOW TEMPERATURE) AMPERES	VOLTS AND CATEGORY OF DUTY						*MI LLI VOLT DROP			DURATION OF TEST FOR MI NI MUM FUSI NG CURRENT HOURS	FIGURE NO
			AC			DC							
			VOLTS	PROSPECTIVE CURRENT OF TEST CIRCUIT AMPERES	POWER FACTOR (LAGGING) OF TEST CIRCUIT NOT GREATER THAN	VOLTS	PROSPECTIVE CURRENT OF TEST CIRCUIT AMPERES	TIME CONSTANT OF TEST CIRCUIT NOT LESS THAN (ms)	MEAN VALUE LI MITS OF ANY BATCH		TOLERANCE ON BATCH MEAN VALUE %		
									MI N	MA X			
012-0069 012-0070		0.1 0.15	250	4 000	0.4	230	4 000	0.004	1800 1600	3100 3500	± 20		
012-0071 012-0072 012-0073 012-0074 012-0075 012-0076 012-0077 012-0078 012-0079 012-0080	0	0.25 0.5 1.0 2.0 3.0 5.0 7.0 10.0 15.0 20.0	440	33 000	0.3	230	33 000	0.015	3000 2000 420 300 200 220 160 120 125 230	3960 2500 2700 370 360 300 190 170 185 250	± 15 ± 12½ ± 10 ± 7½	1.5	5
059-0114 059-0115 059-0116 059-0117 059-0118 059-0119 059-0120 059-0121 011-9679 012-0140	1	0.50 1.0 2.0 3.0 5.0 7.0 10.0 15.0 20.0 30.0	440	33 000	0.3	230	33 000	0.015	3 000 2 250 370 430 490 265 165 140 160 115	3 420 3 250 450 550 615 345 190 155 175 145	± 12½ ± 10 ± 7½	1.5	5
059-0122 059-0123 059-0124 059-0125 012-0067 011-9127 012-0141	2	10 15 20 30 40 50 60	440	33 000	0.3	230	33 000	0.015	155 140 155 105 90 90 75	175 155 170 125 150 150 145	± 7½	2.0	5
059-0126 059-0127 059-0128 059-0129 011-9128 011-9129 011-9927	3	40 60 80 100 125 150 200	440	33 000	0.3	230	33 000	0.015	135 125 110 99 63 57 181	150 140 120 110 98 83 181	± 7½	2.0	5

Continued on Page 40

*Mean value of millivolt drop shall be ascertained for each individual batch and this mean value shall be within the limits shown. The percentage tolerance apply to the individual mean.
†Value obtained by one manufacturer.

Temperature Derating. Fuselinks are intended for use in an ambient temperature up to 85°C. An ambient temperatures between 50°C and 85°C fuse links should be derated by a 0.4% for every one degree increase in ambient above 35°C. At temperatures between 35°C and 50°C the same derating procedure applies but in practice may be ignored.

Table I - Concluded

Specification for Joint Service Cartridge Fuse-links - Tag Contract Type Normal Instantaneous

NATO STOCK NO 5920-99-	BODY SIZE NO	CURRENT RATING NOMI NAL (AT NORMAL AND LOW TEMPERATURE) AMPERES	VOLTS AND CATEGORY OF DUTY						*MILLIVOLT DROP			DURATION OF TEST FOR MIN I MUM FUS I NG CURRENT HOURS	FIGURE NO
			AC			DC							
			VOLTS	PROSPECTIVE CURRENT OF TEST CI RCUIT AMPERES	POWER FACTOR (LAGGING) OF TEST CI RCUIT NOT GREATER THAN	VOLTS	PROSPECTIVE CURRENT OF TEST CI RCUIT AMPERES	TIME CONSTANT OF TEST CI RCUIT NOT LESS THAN (ms)	MEAN VALUE LIMITS OF ANY BATCH		TOLERANCE ON BATCH MEAN VALUE %		
									MIN	MAX			
012-0081 012-0082 012-0083	4	125 160 200	400	33 000	0.3	230	33 000	0.015				2.5	6
012-0084 012-0085	5	250 300	440	33 000	0.3	230	33 000	0.015				2.5	6
012-0086 012-0087	6	400 500	440	33 000	0.3	230	33 000	0.015				3.0	6
012-0088	7	600	440	33 000	0.3	230	33 000	0.015				3.5	6
012-0089	8	800	440	33 000	0.3	230	33 000	0.015				3.5	6

*Millivolt drop requirements are not applicable.

Temperature Derating. Fuse-links are intended for use in an ambient temperature up to 85°C. At ambient temperatures between 50°C and 85°C fuse-links should be derated by 0.4 per cent for every one degree increase in ambient above 35°C. At temperatures between 35°C and 50°C the same derating procedure applies but in practice may be ignored.

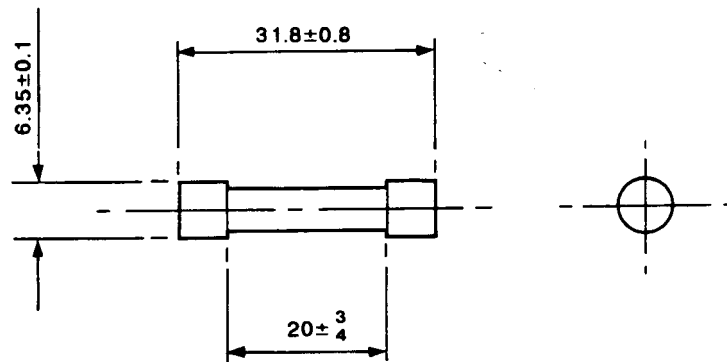


Fig 7 Dimensions (mm) for Joint Service Time Delay Fuse-links

Table J

Joint Fuse-links, Electrical, Joint Service, Time Delay 32 mm x 6.3 mm

DEF STAN 59-96 (PART 1)/2

PAGE ITEM NO	NATO STOCK NUMBER 5920-99-	ITEM NAME	DESCRIPTION						
			NOTIONAL CURRENT RATING		MAXIMUM WORKING VOLTAGE		MAXIMUM MILLIVOLT DROP	BREAKING CAPACITY AT MAXIMUM WORKING VOLTAGE	
			NOMINAL UP TO 35°C	ELEVATED UP TO 70°C	ac	dc		ac	dc
1	014-9569	FUSE-LINK CARTRIDGE	50 mA	42 mA		250 V	2500	100 A	79 A
2	014-9570		100 mA	85 mA			1500		
3	014-9571		150 mA	127 mA			1000		
4	014-9572		250 mA	212 mA			820		50 A
5	014-9573		500 mA	425 mA			540		
6	014-9574		750 mA	637 mA			350		
7	014-9575		1 A	850 mA			300		
8	014-9576		1.5 A	1.3 A			210		
9	014-9577		2 A	1.7 A			180		
10	014-9578		3 A	2.5 A			100		
11	014-9579		5 A	4.2 A			80		
12	014-9580		7 A	6 A		50 V	80		100 A
13	014-9581		10 A	8.5 A			70		

Table K

Fuse-links, Electrical, Joint Service, Quick Acting20 mm x 5 mm Ferrule Contact Type

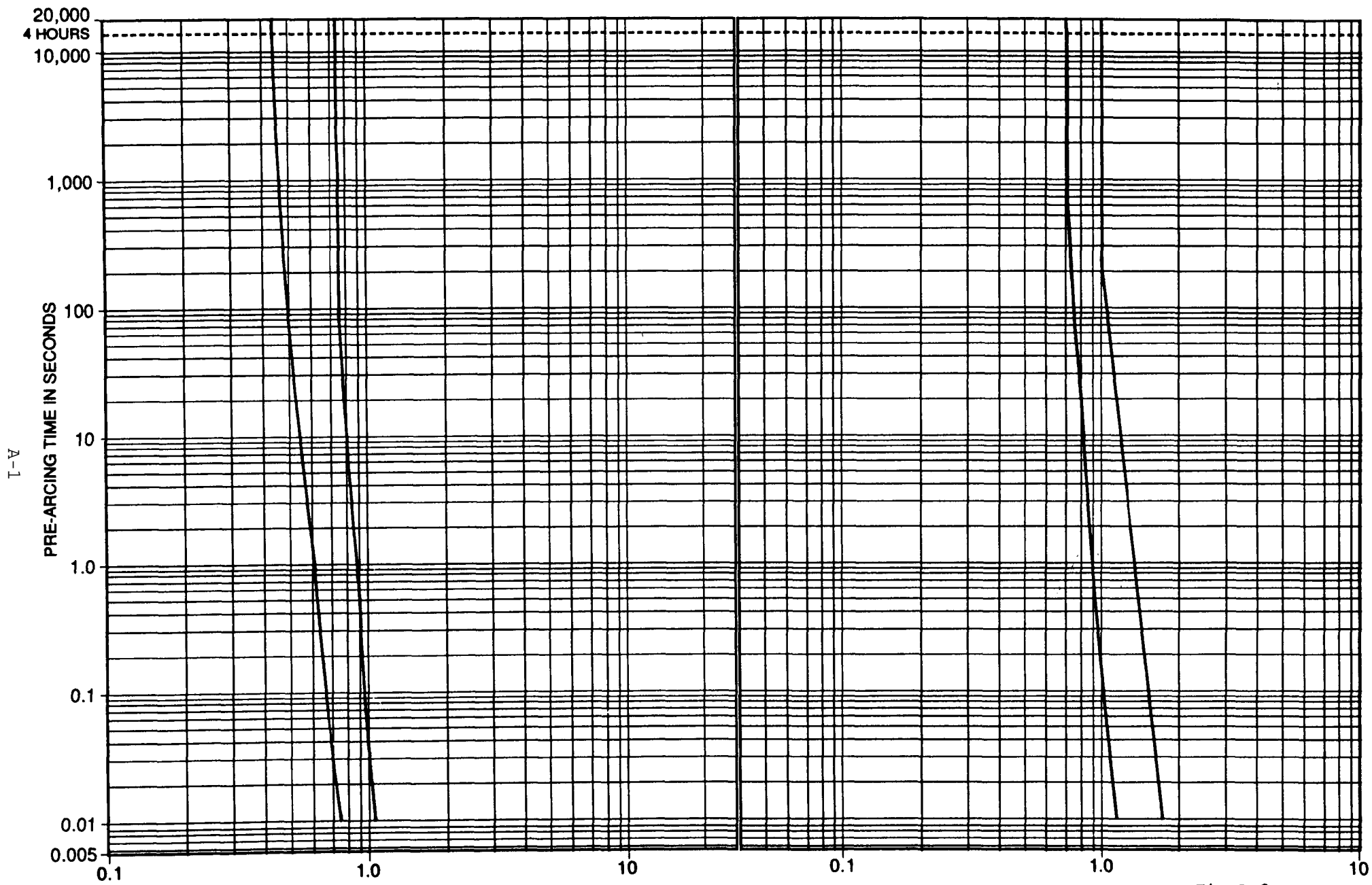
PAGE ITEM NO	NATO STOCK NUMBER 5920-99-	NOMINAL CURRENT RATING	ac		dc	
			VOLTS	RATED BREAKING CAPACITY AMPS	VOLTS	RATED BREAKING CAPACITY AMPS
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	640-9021	50 mA	250	1500	250	750
2	640-0520	100 mA				
3	529-2075	200 mA				
4	618-0829	500 mA				
5	529-2076	1 A				
6	618-0830	2 A				
7	529-2077	2.5				
8	622-1242	3.15 A				
9	114-1687	5 A				
10	631-3556	6.3 A				

Table L

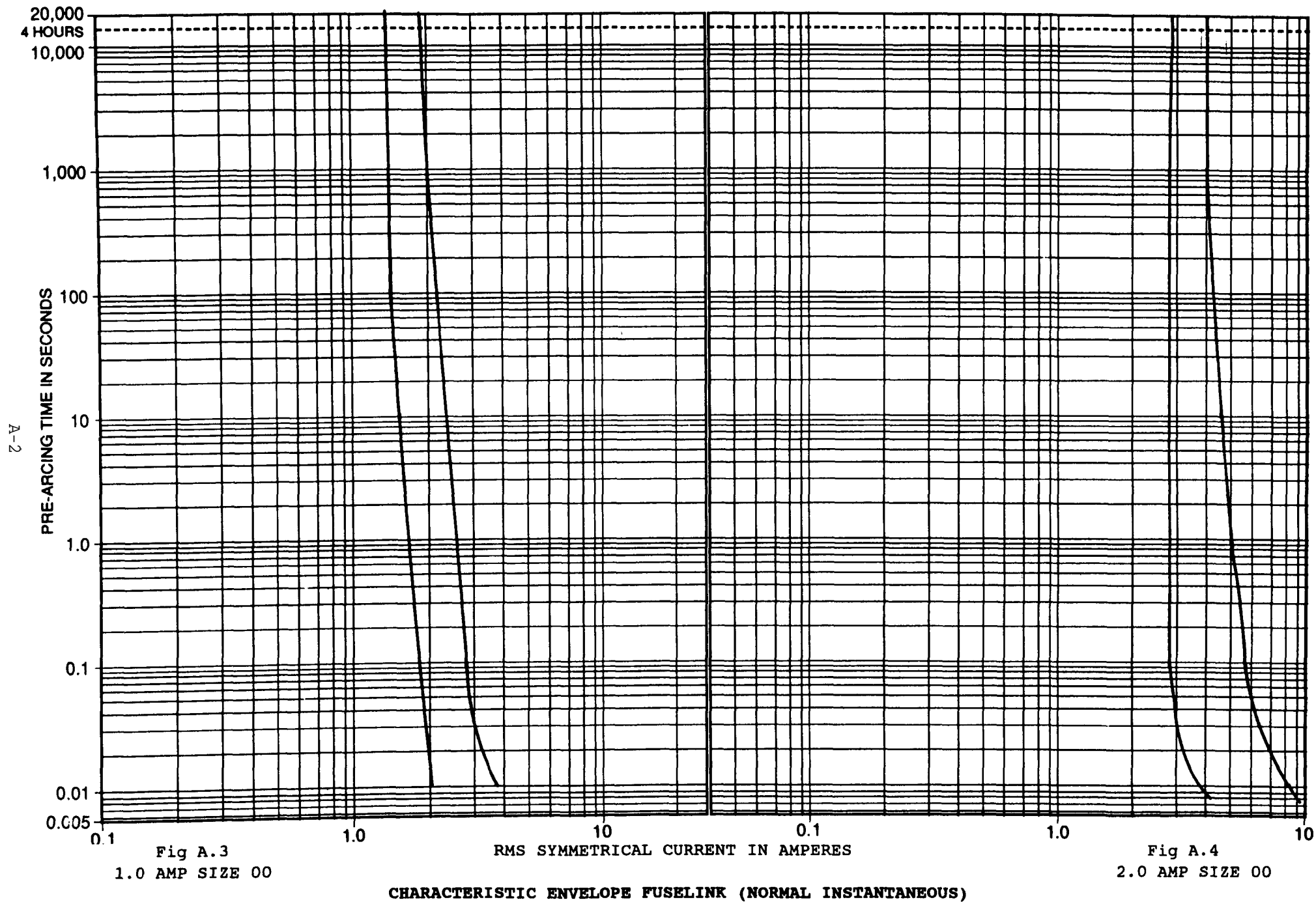
MATERIALS RECOMMENDED FOR FUSE ELEMENTS
(NORMAL INSTANTANEOUS)

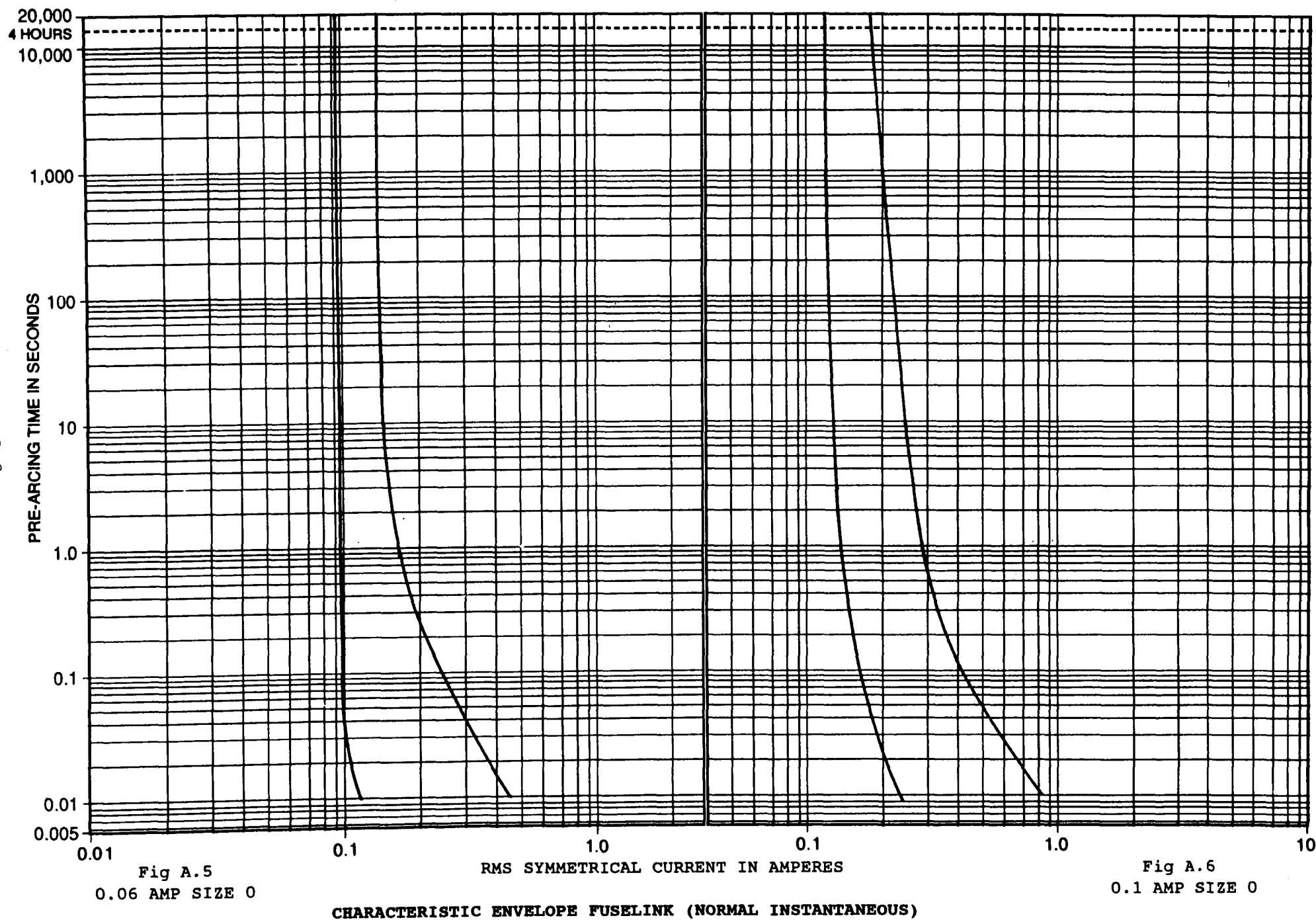
(Applicable to both tag and ferrule-contact types)

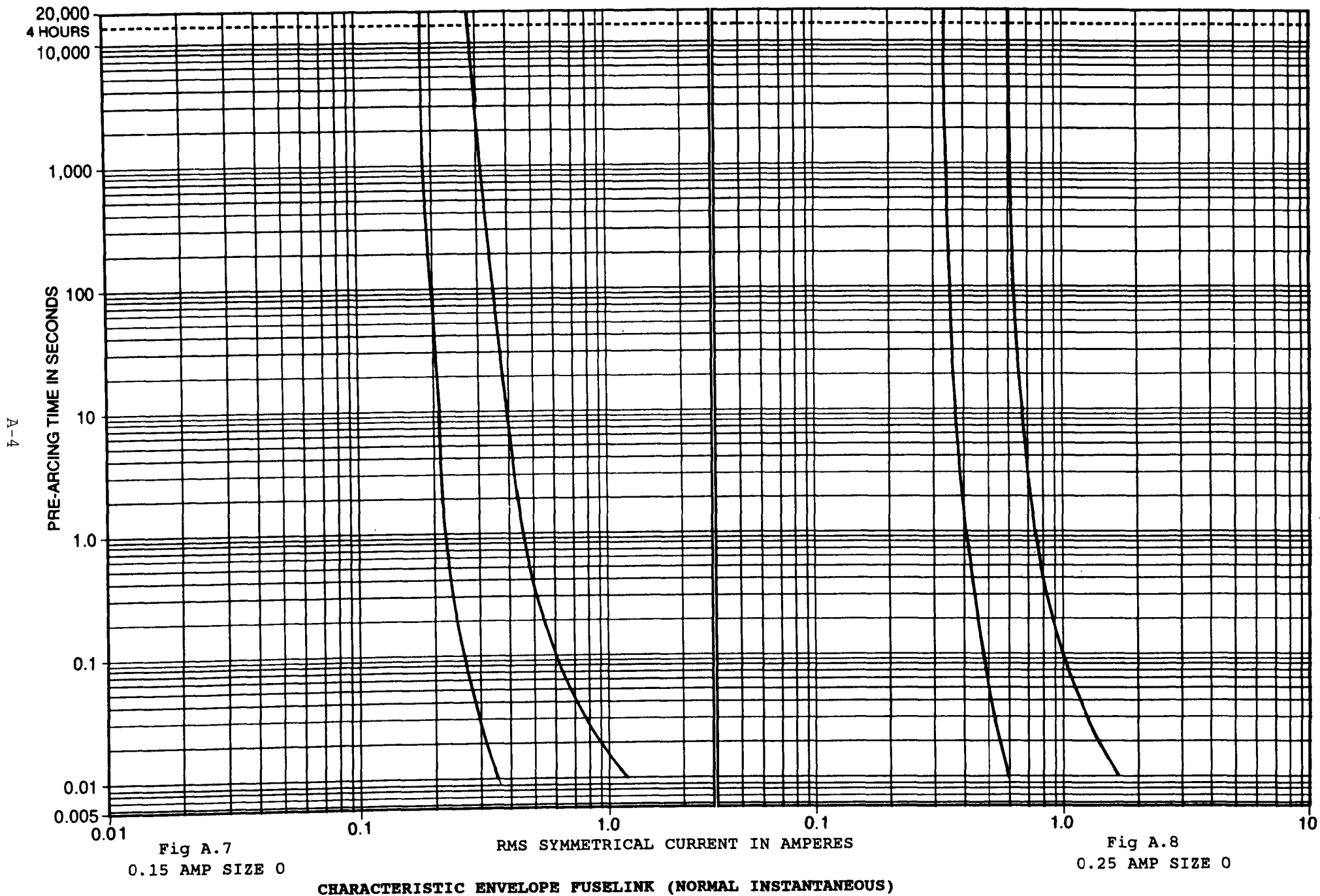
BODY SIZE NO	NOMINAL RATING AMPERES	ELEMENTS				
		QUANTITY	DIA OF CENTRE PORTION in	DIA OF END PORTION in	LENGTH OF CENTRE PORTION in	MATERIAL
0	0.25	1	0.0012	-	-	33% Platinum silver
0	0.5	1	0.0018	-	-	5% Iridium platinum
0	1	1	0.003	-	-	5% Iridium platinum
0	2	1	0.0028	-	-	Silver 99.97% pure
0	3	1	0.0035	-	-	Silver 99.97% pure
0	5	1	0.0052	-	-	Silver 99.97% pure
0	7	1	0.007	-	-	Silver 99.97% pure
0	10	1	0.009	-	-	Silver 99.97% pure
0	15	1	0.008	0.024	0.5	Silver 99.97% pure
0	20	1	0.009	0.024	0.5	Silver 99.97% pure
1	0.5	1	0.0016	-	-	5% Iridium platinum
1	1	1	0.0025	-	-	5% Iridium platinum
1	2	1	0.0026	-	-	Silver 99.97% pure
1	3	1	0.003	-	-	Silver 99.97% pure
1	5	1	0.004	-	-	Silver 99.97% pure
1	7	1	0.056	-	-	Silver 99.97% pure
1	10	1	0.007	0.015	0.625	Silver 99.97% pure
1	15	1	0.008	0.018	0.375	Silver 99.97% pure
1	20	1	0.009	0.020	0.375	Silver 99.97% pure
1	30	2	0.009	0.020	0.5	Silver 99.97% pure
2	10	1	0.068	0.0136	0.5	Silver 99.97% pure
2	15	1	0.009	0.018	0.5	Silver 99.97% pure
2	20	2	0.007	0.014	0.5	Silver 99.97% pure
2	30	2	0.010	0.020	0.5	Silver 99.97% pure
2	40					
2	50	3	0.010		0.5	Silver 99.97% pure
2	60	3	0.013		0.5	Silver 99.97% pure
3	40	2	0.012		0.625	Silver 99.97% pure
3	60	3	0.0124		0.625	Silver 99.97% pure
3	80	3	0.015		0.625	Silver 99.97% pure
3	100	4	0.015		0.625	Silver 99.97% pure
3	125	4	0.018		0.625	Silver 99.97% pure
3	150	4	0.021		0.625	Silver 99.97% pure
3	200	6	0.021		0.625	Silver 99.97% pure



CHARACTERISTIC ENVELOPE FUSELINK (NORMAL INSTANTANEOUS)







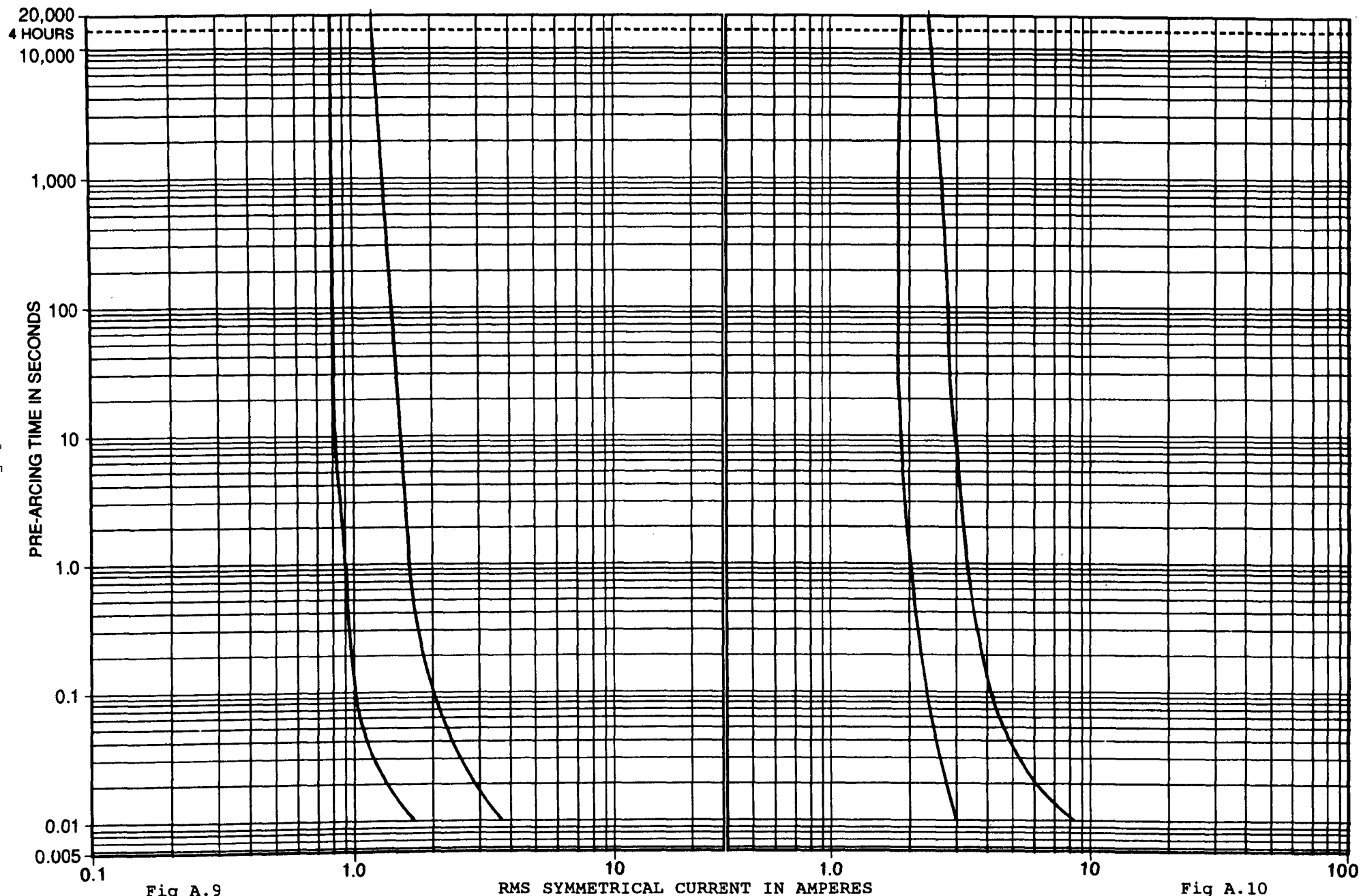
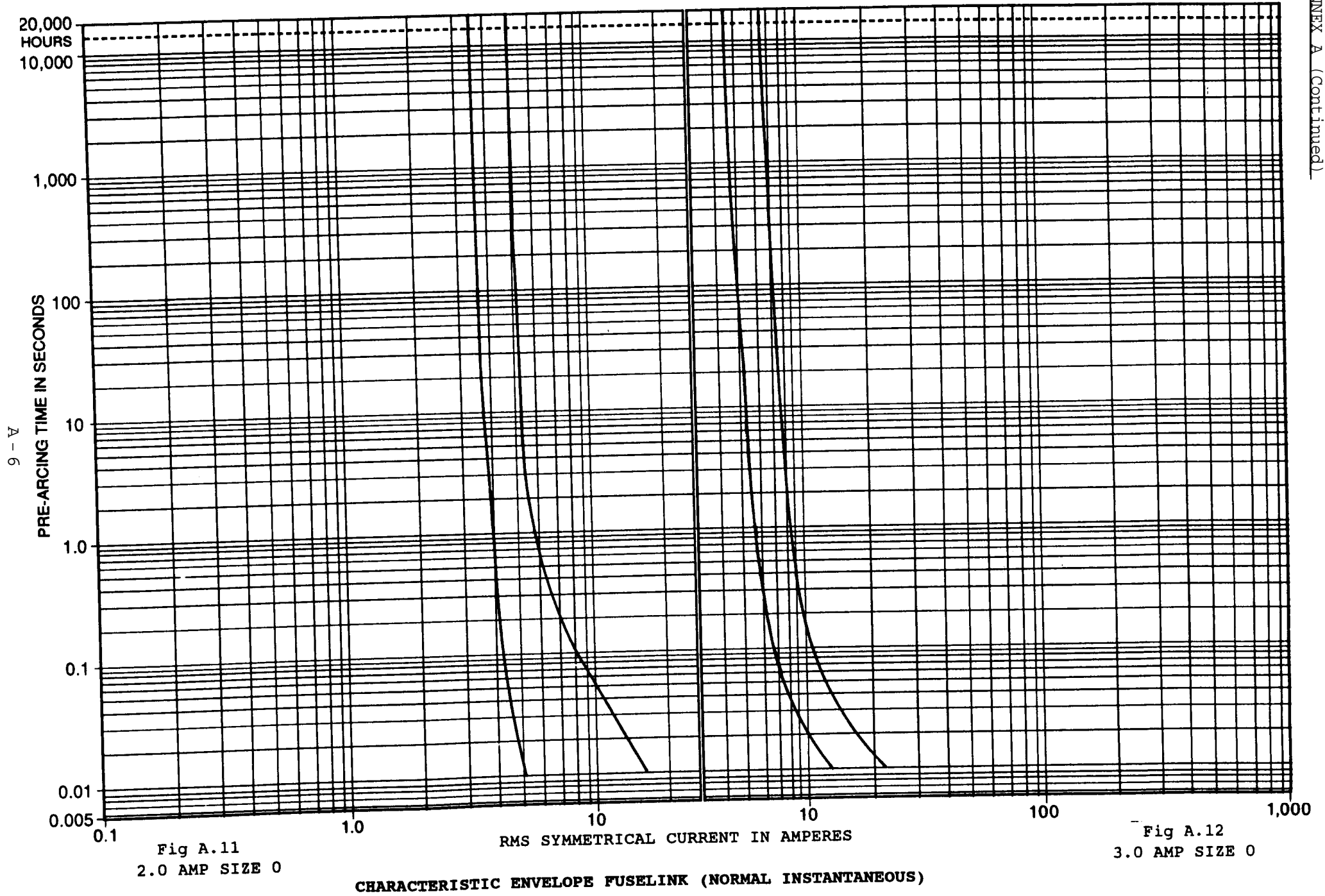
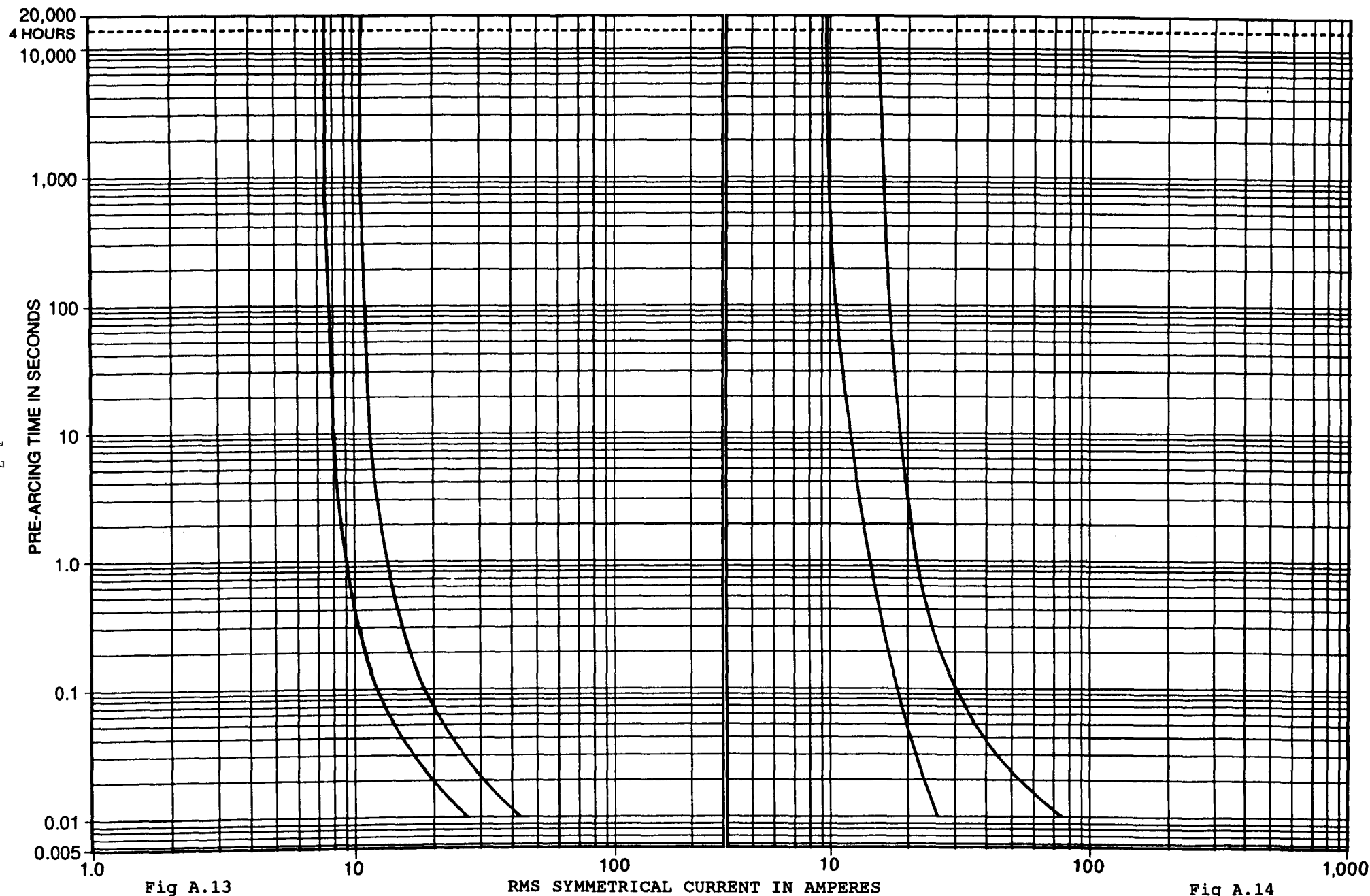


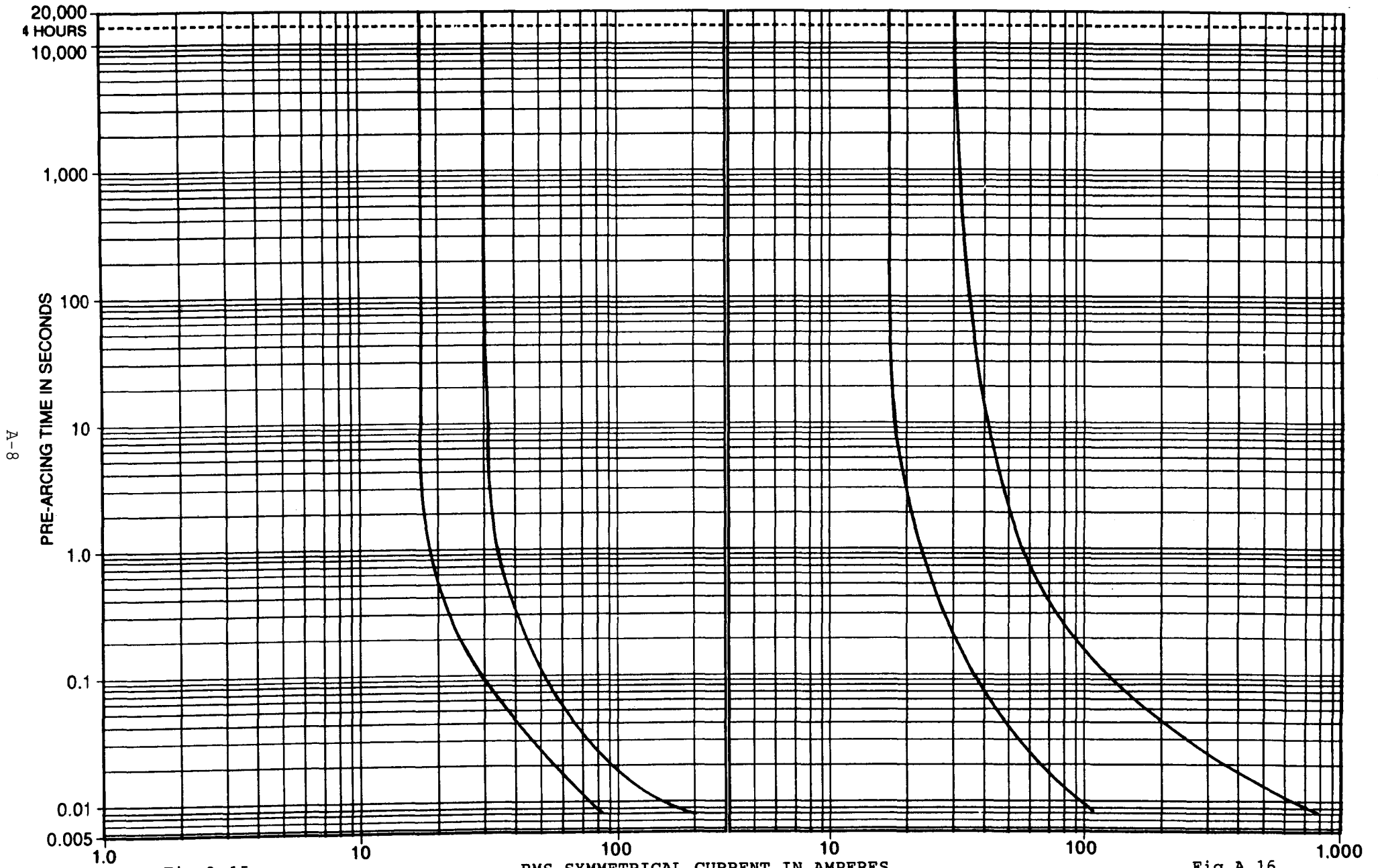
Fig A.9
0.5 AMP SIZE 0

CHARACTERISTIC ENVELOPE FUSELINK (NORMAL INSTANTANEOUS)

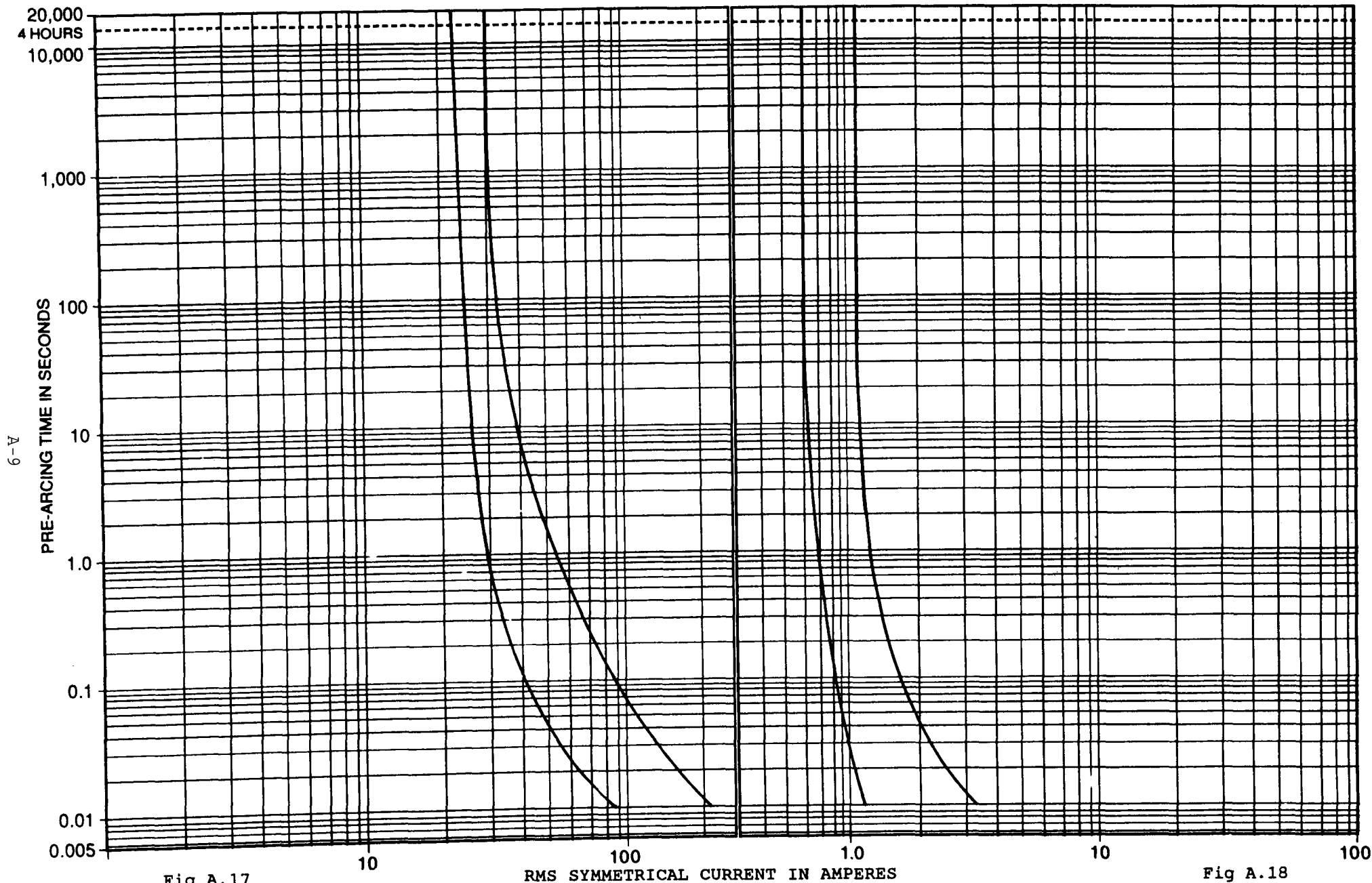
Fig A.10
1.0 AMP SIZE 0

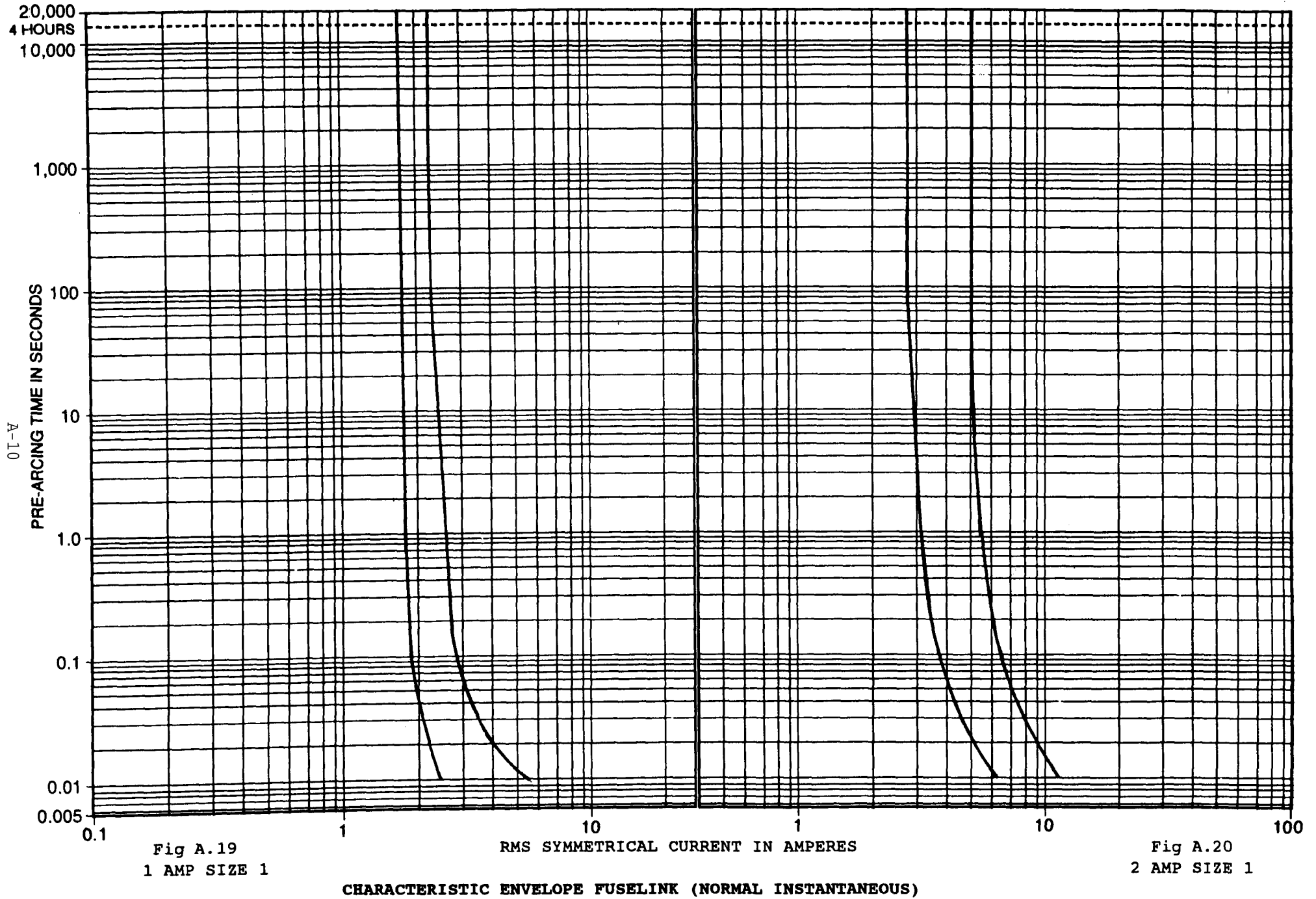






CHARACTERISTIC ENVELOPE FUSELINK (NORMAL INSTANTANEOUS)





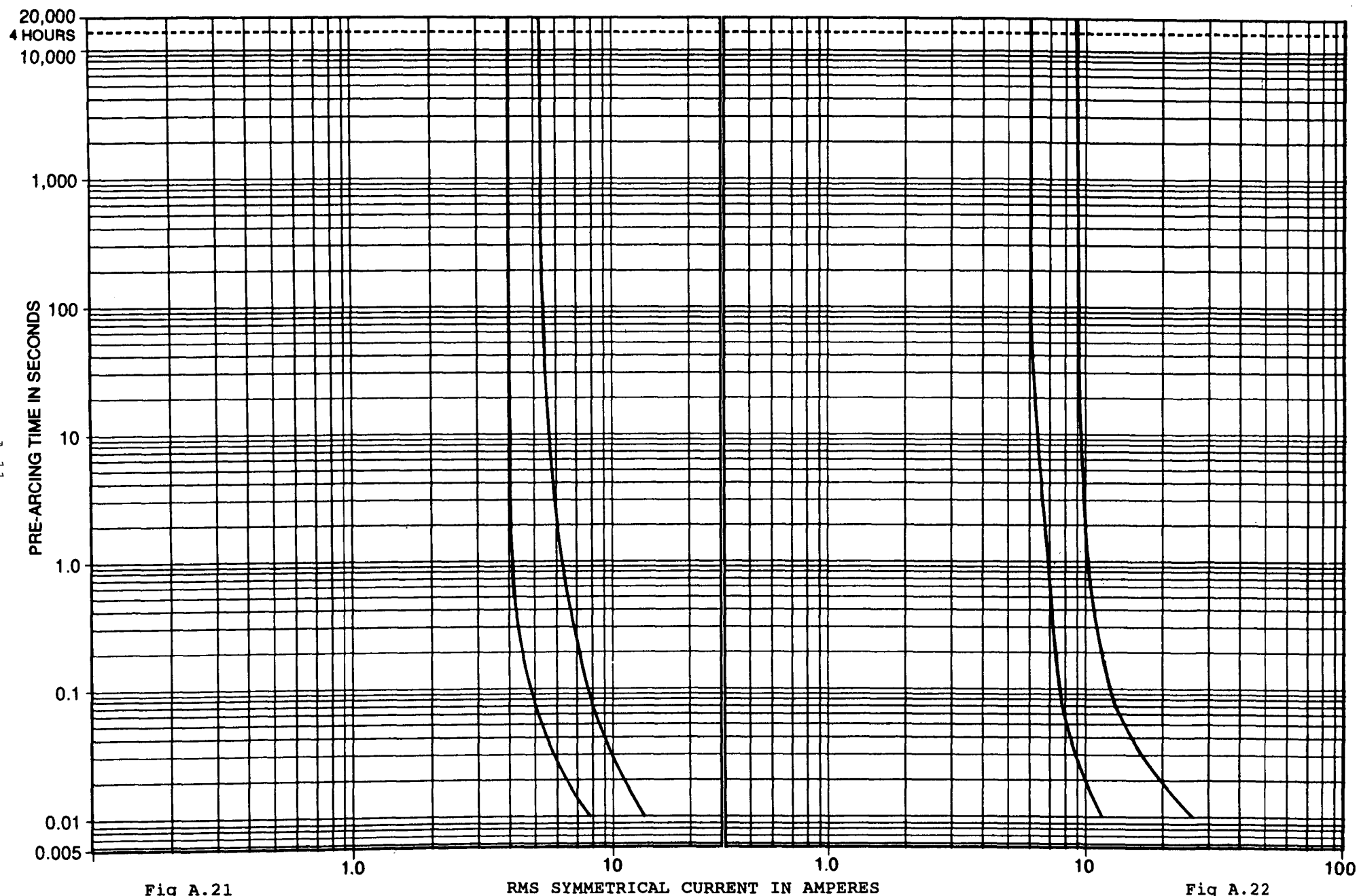
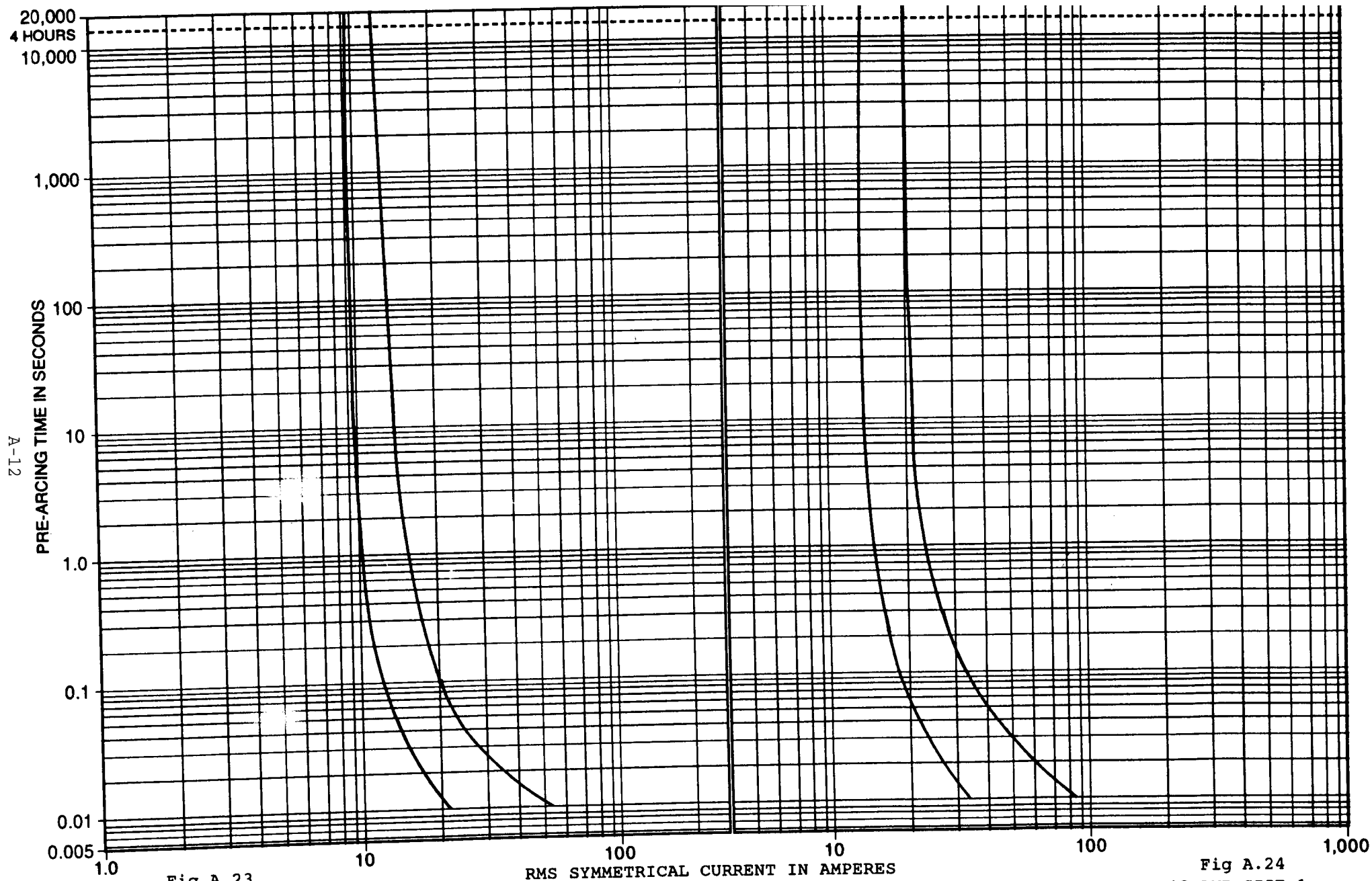


Fig A.21
3 AMP SIZE 0

CHARACTERISTIC ENVELOPE FUSELINK (NORMAL INSTANTANEOUS)

Fig A.22
5 AMP SIZE 1



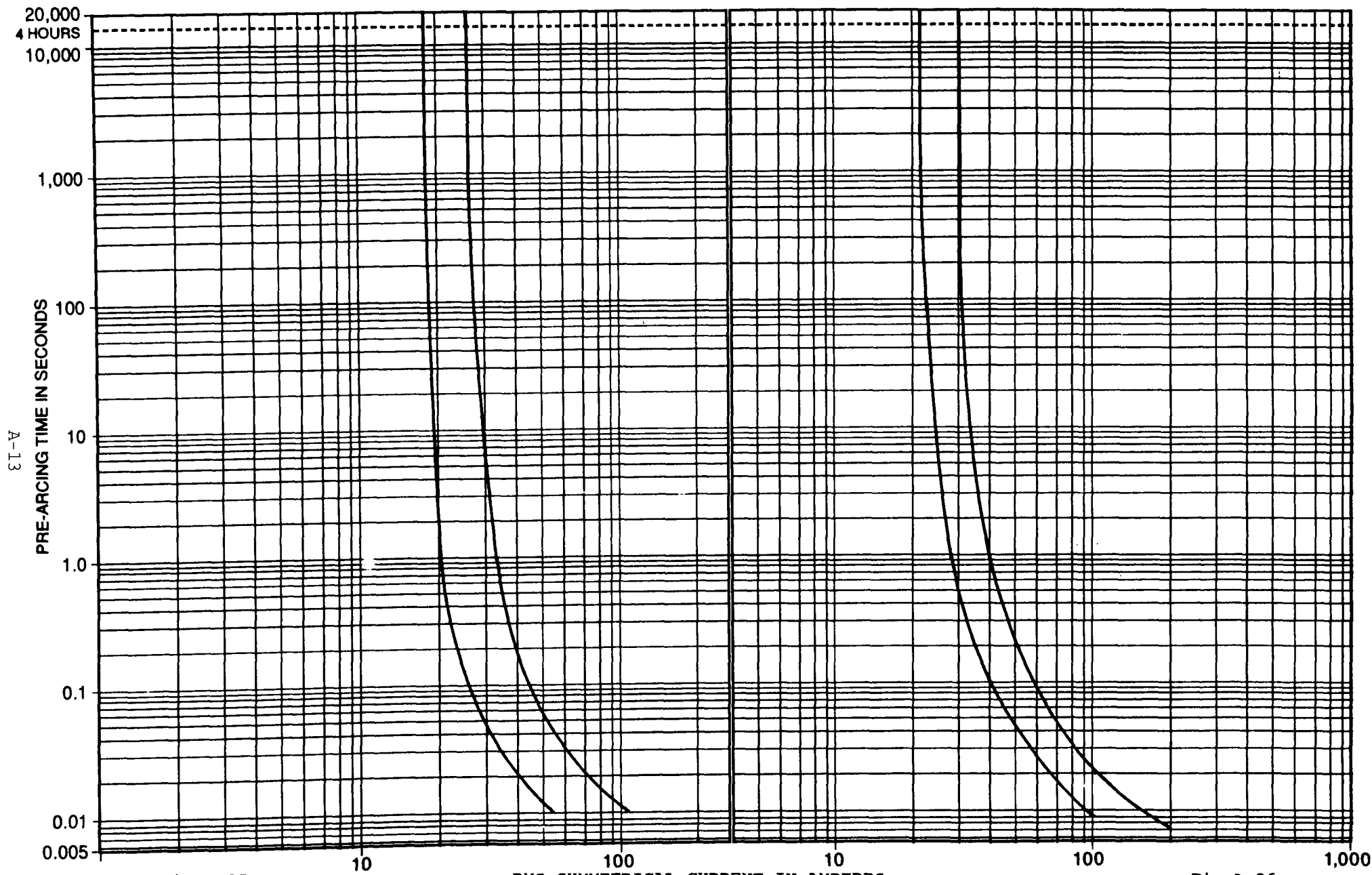


Fig A.25
15 AMP SIZE 1

CHARACTERISTIC ENVELOPE FUSELINK (NORMAL INSTANTANEOUS)

Fig A.26
20 AMP SIZE 1

A-14

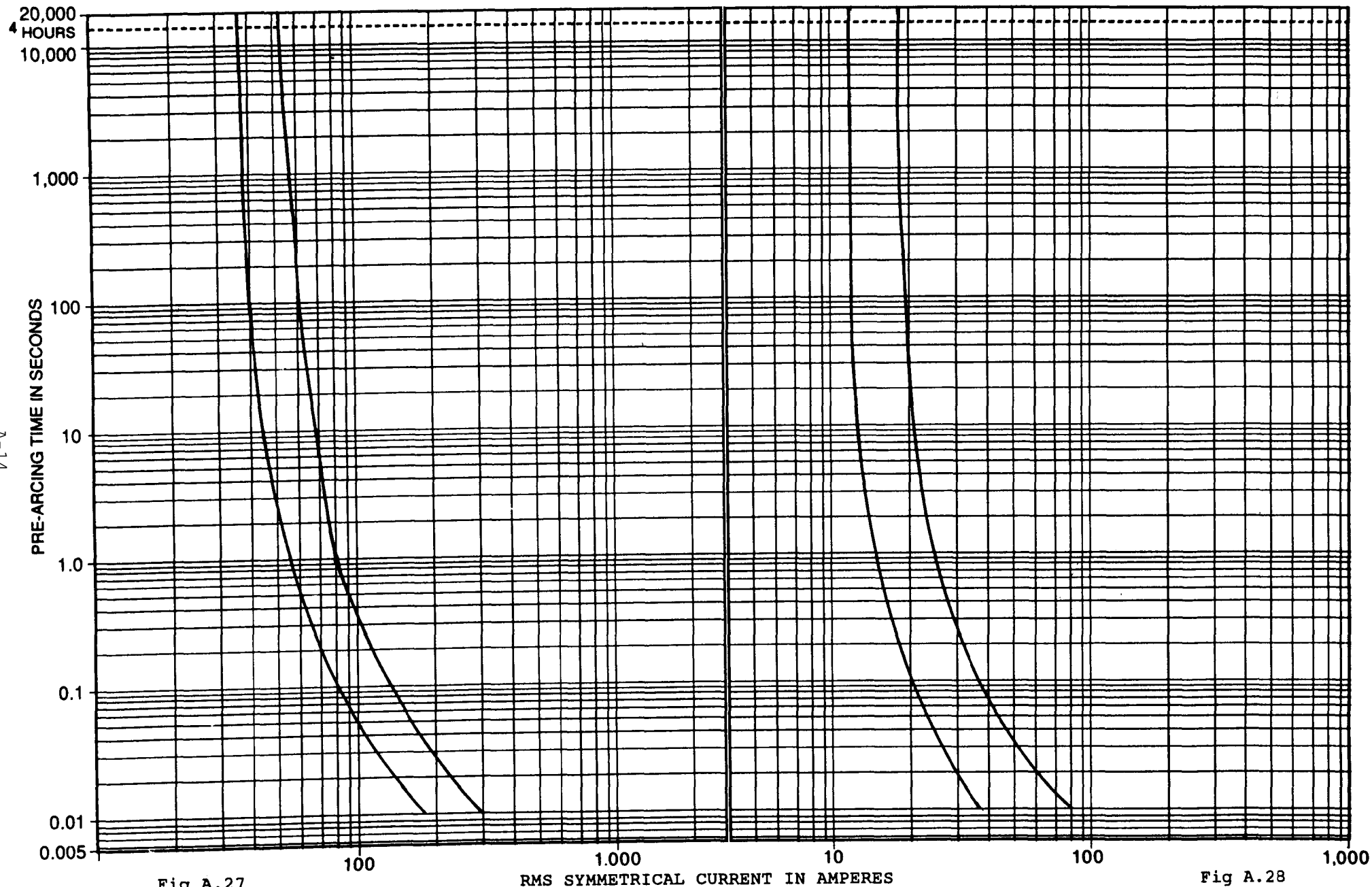
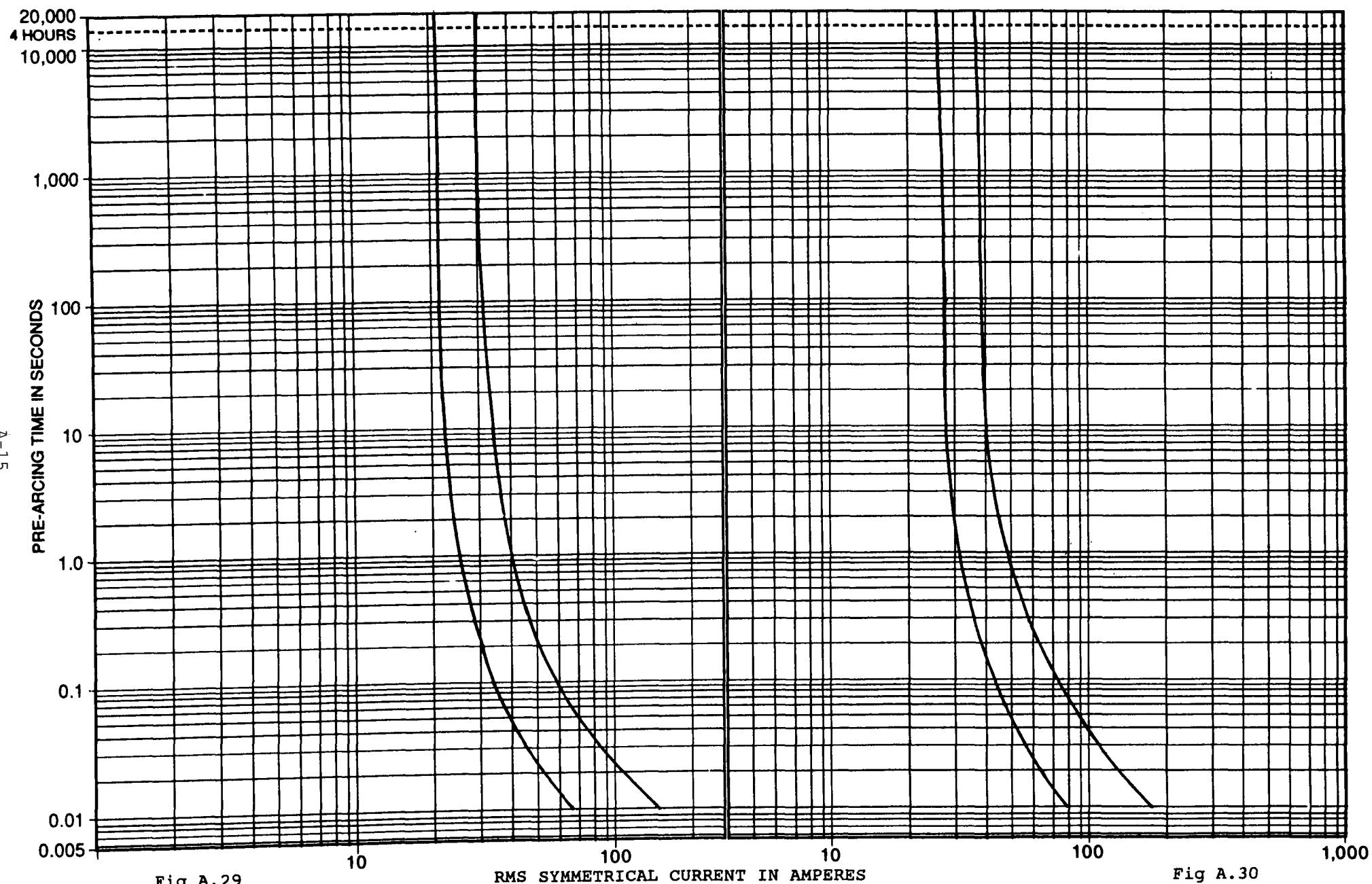


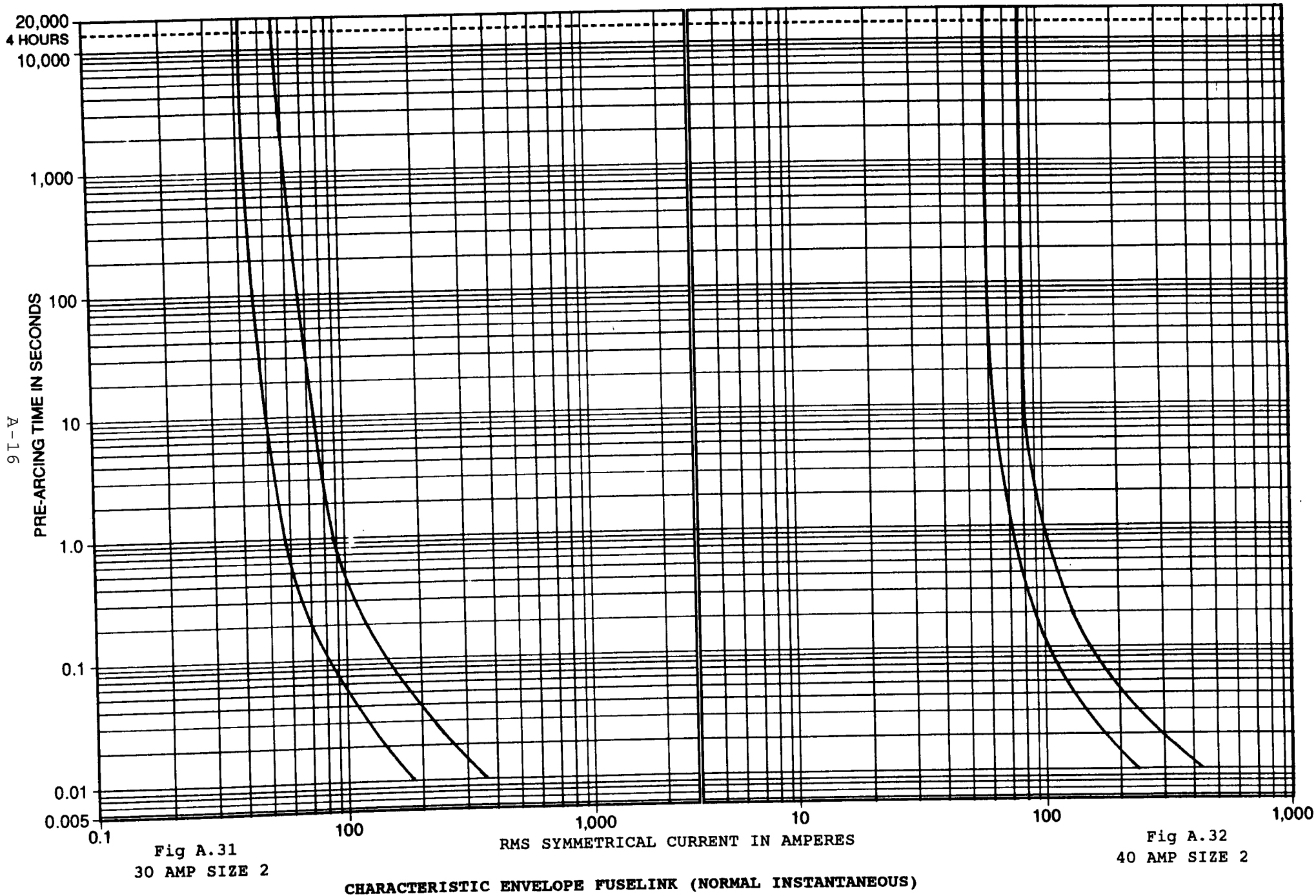
Fig A.27
30 AMP SIZE 1

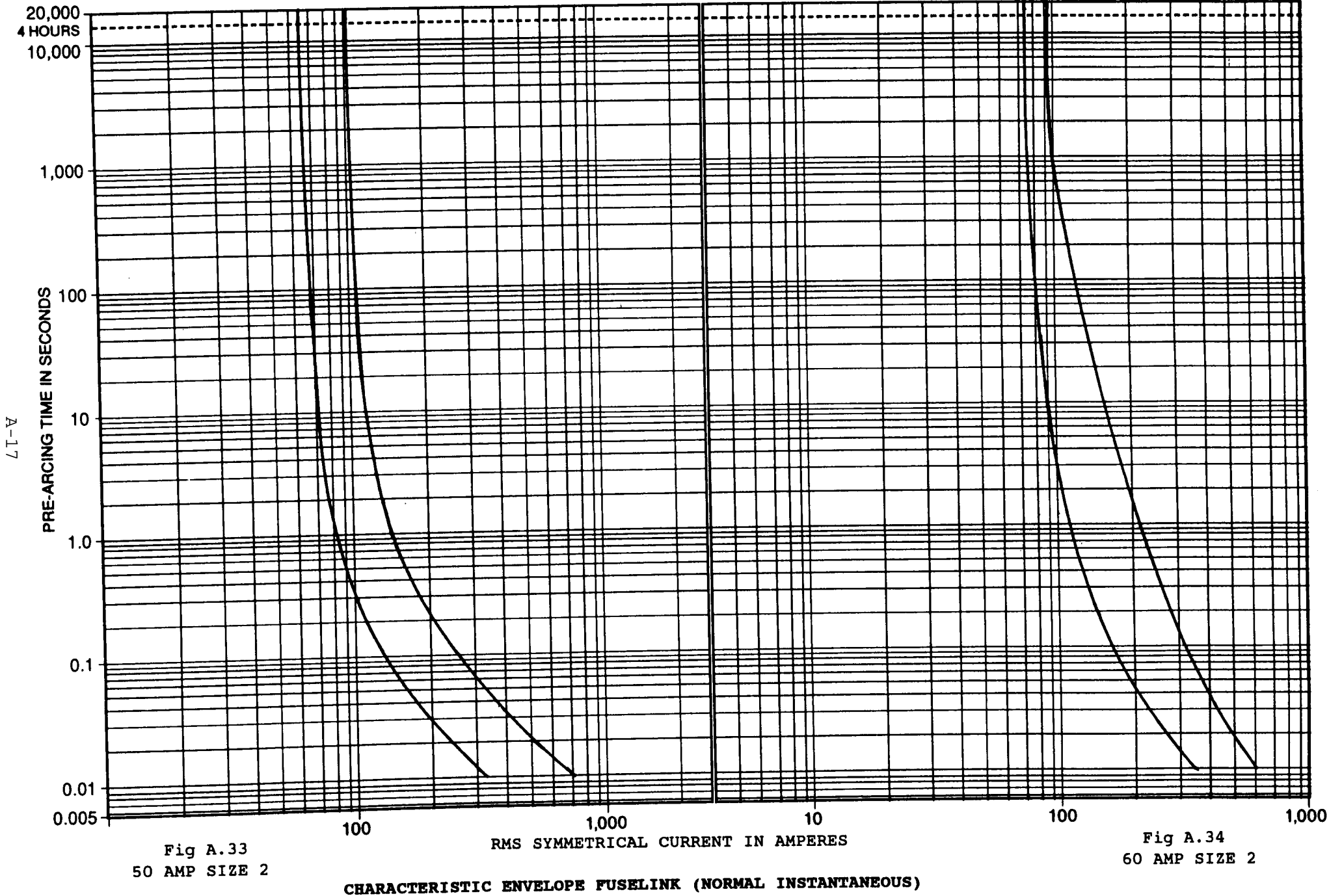
Fig A.28
10 AMP SIZE 2

CHARACTERISTIC ENVELOPE FUSELINK (NORMAL INSTANTANEOUS)



CHARACTERISTIC ENVELOPE FUSELINK (NORMAL INSTANTANEOUS)





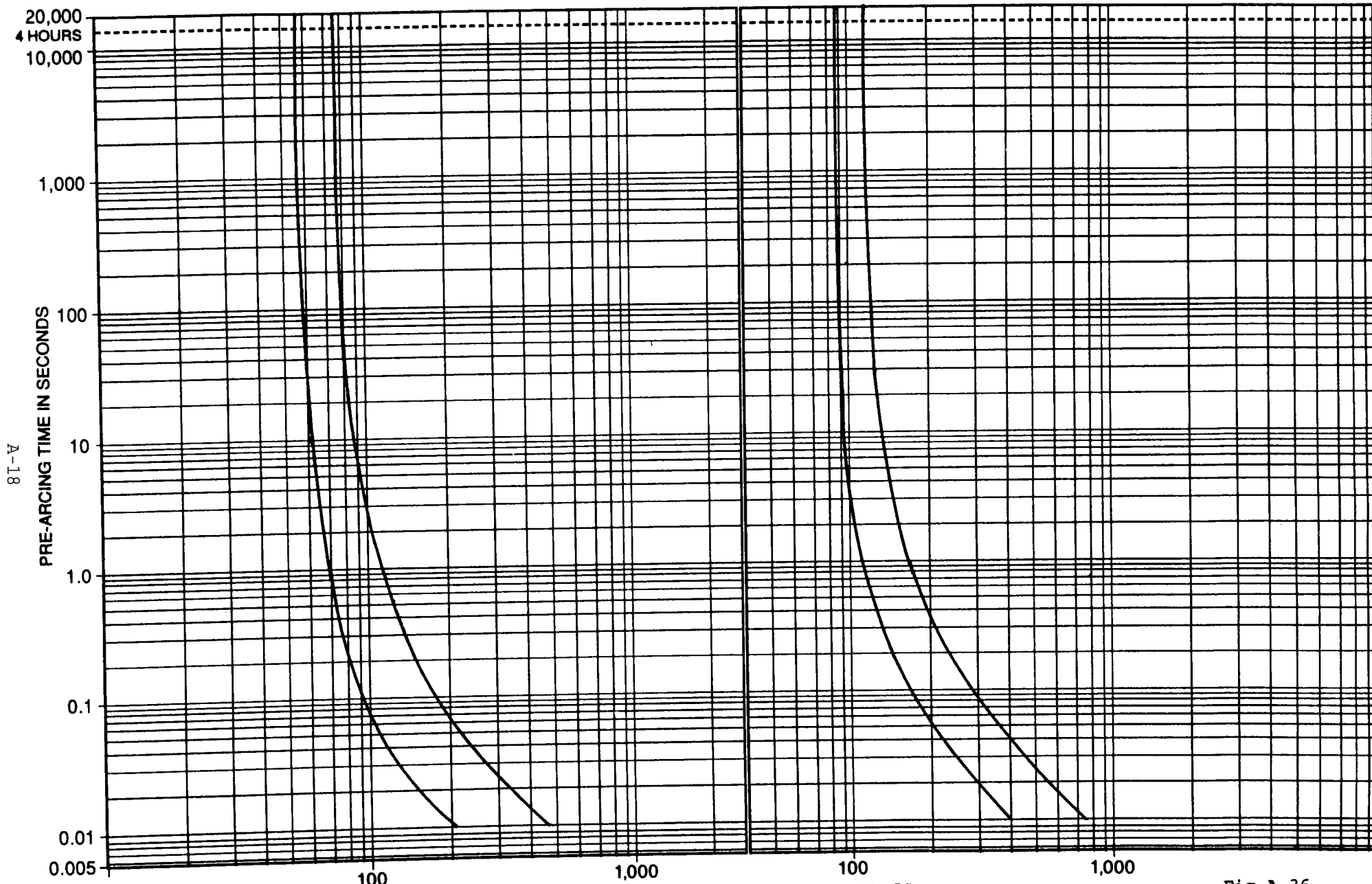
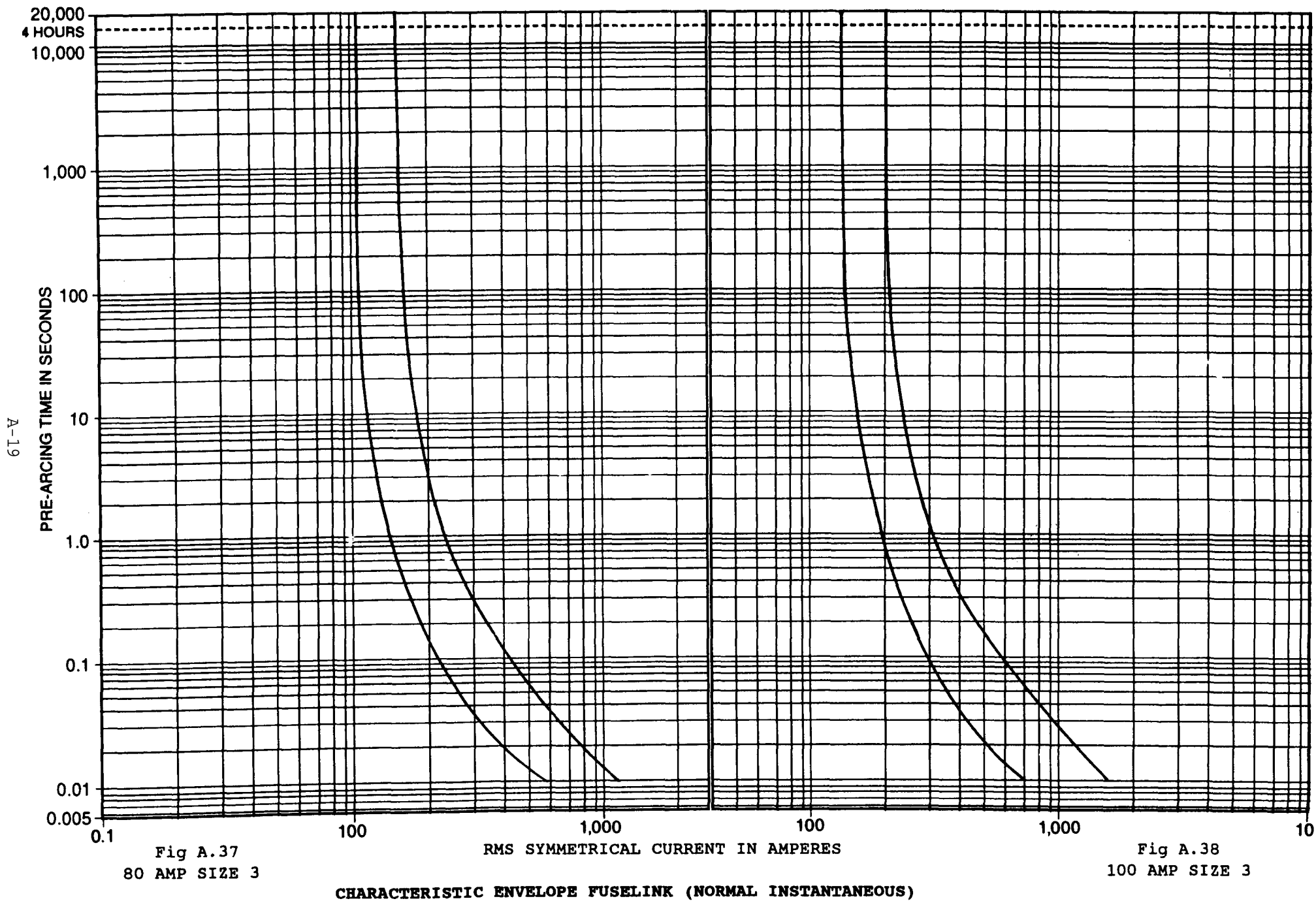
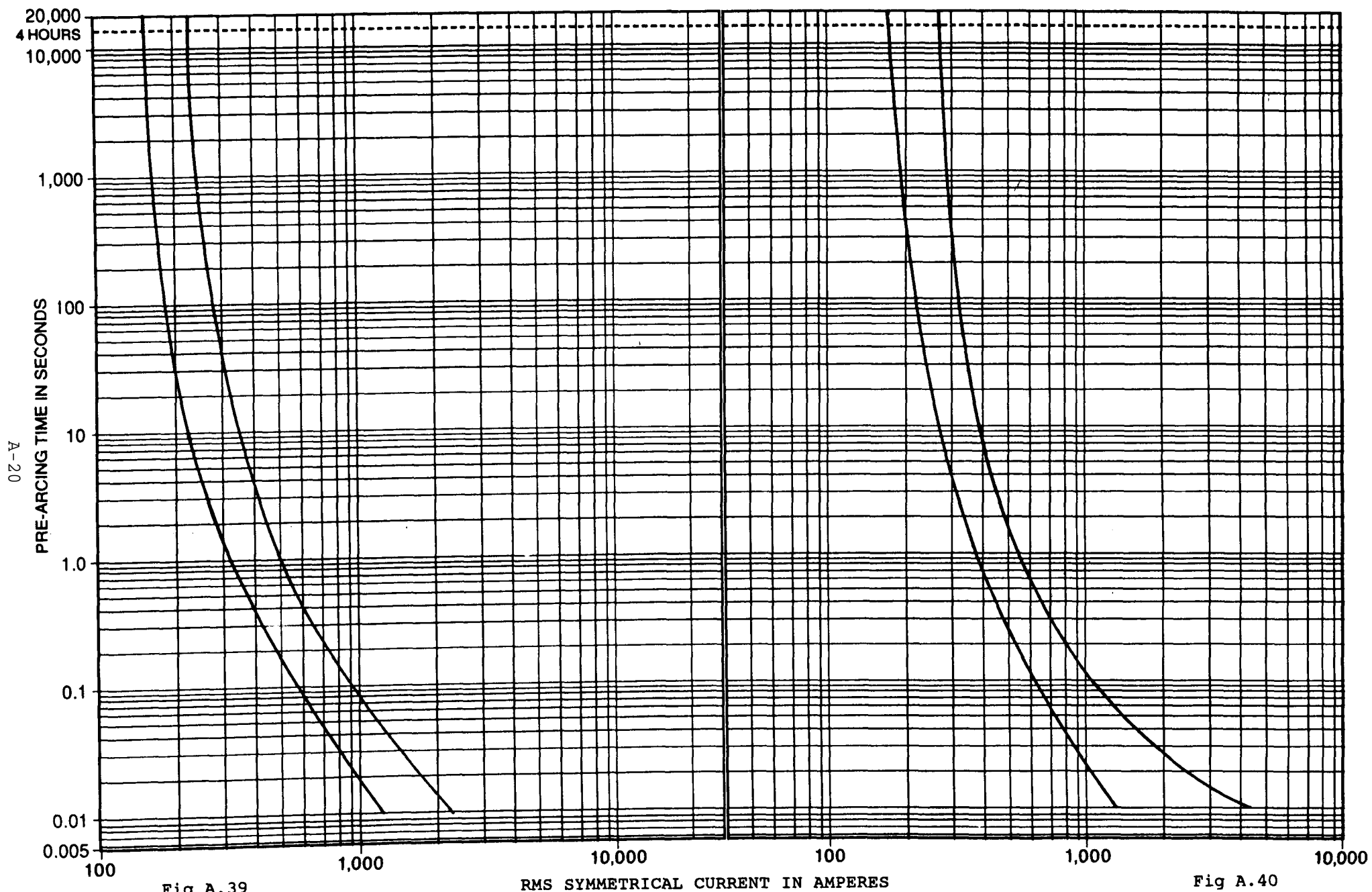


Fig A.35
40 AMP SIZE 3

Fig A.36
60 AMP SIZE 3

CHARACTERISTIC ENVELOPE FUSELINK (NORMAL INSTANTANEOUS)





CHARACTERISTIC ENVELOPE FUSELINK (NORMAL INSTANTANEOUS)

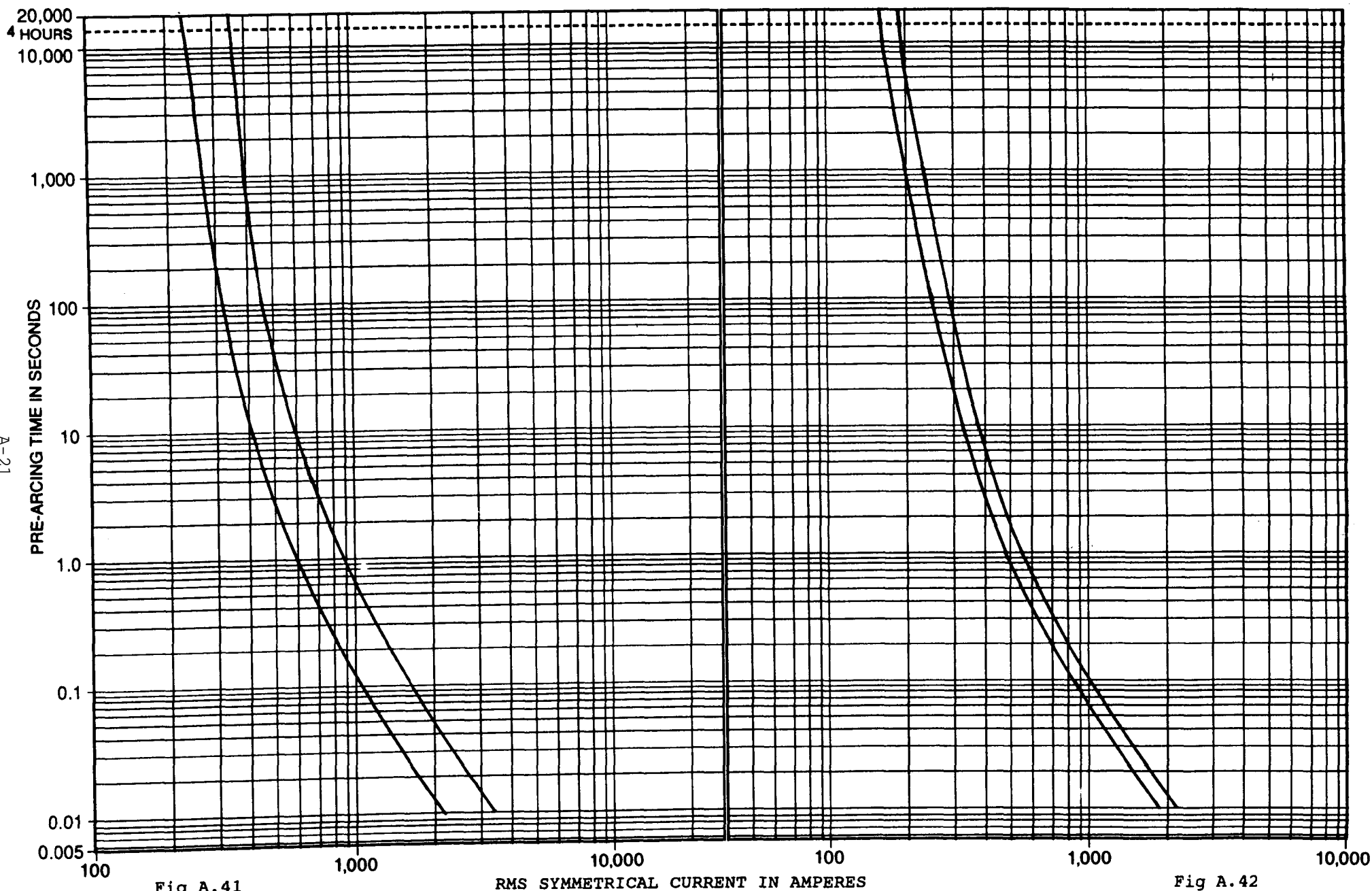
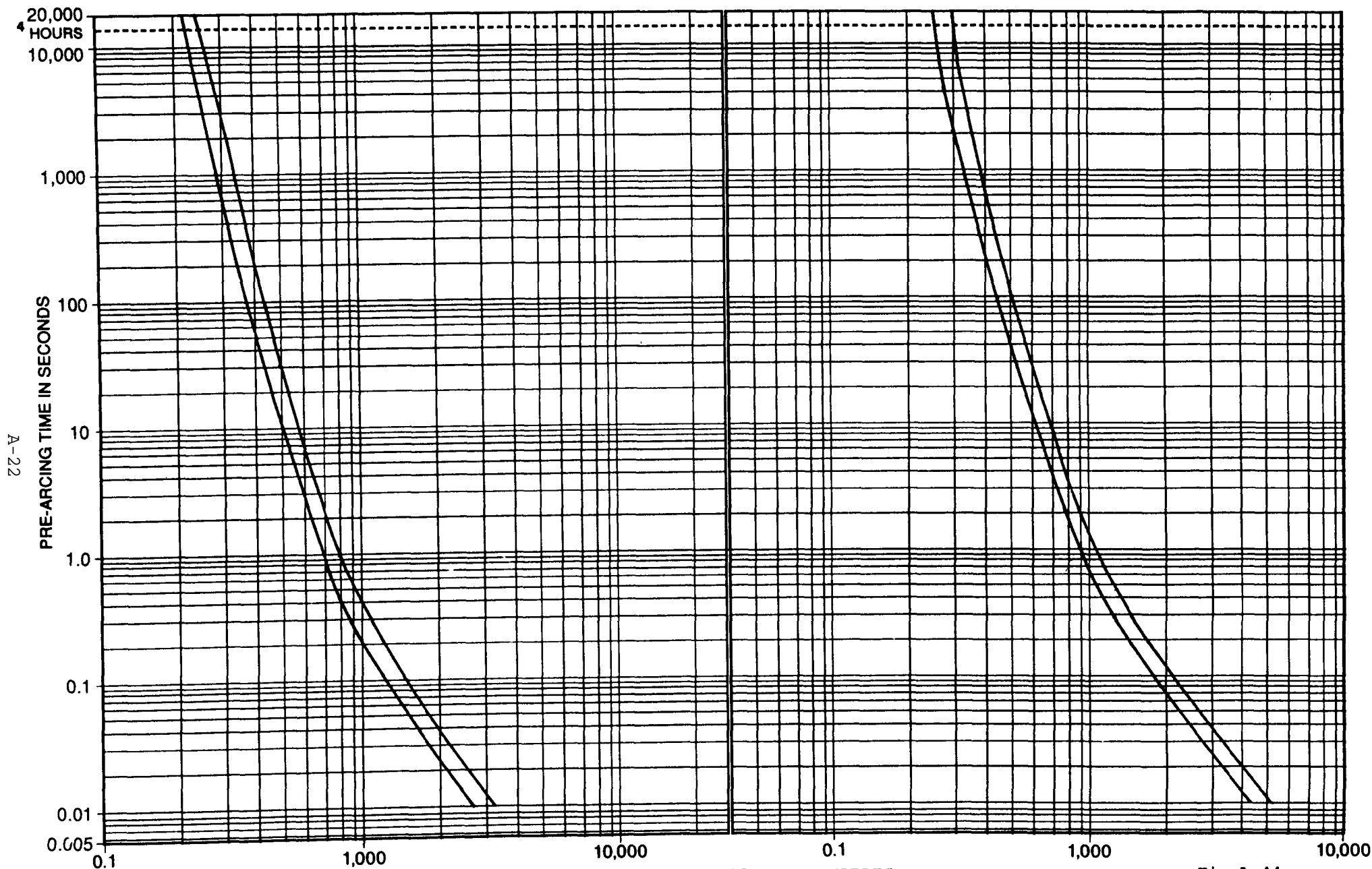


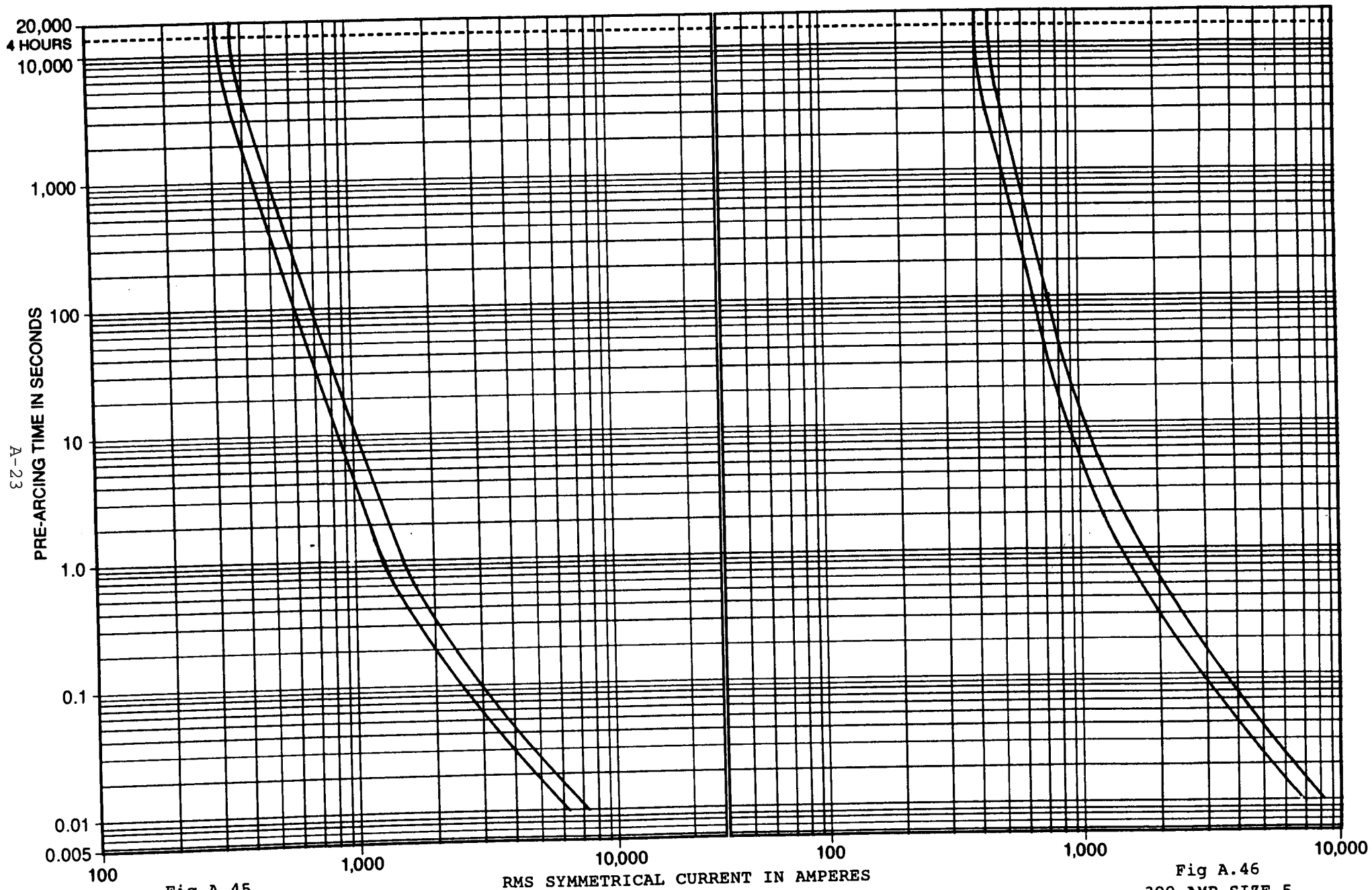
Fig A.41
200 AMP SIZE 3

CHARACTERISTIC ENVELOPE FUSELINK (NORMAL INSTANTANEOUS)

Fig A.42
125 AMP SIZE 4



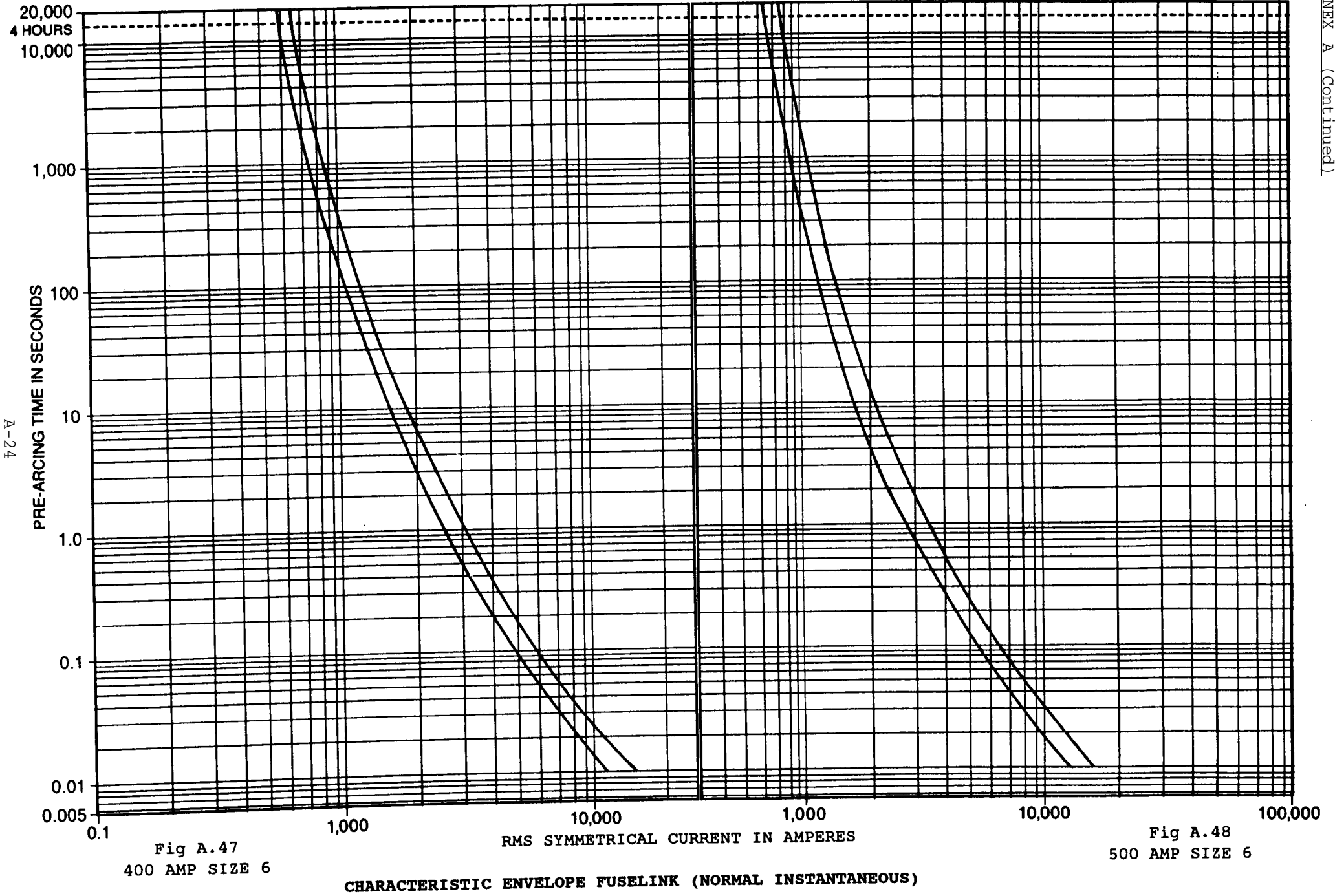
CHARACTERISTIC ENVELOPE FUSELINK (NORMAL INSTANTANEOUS)

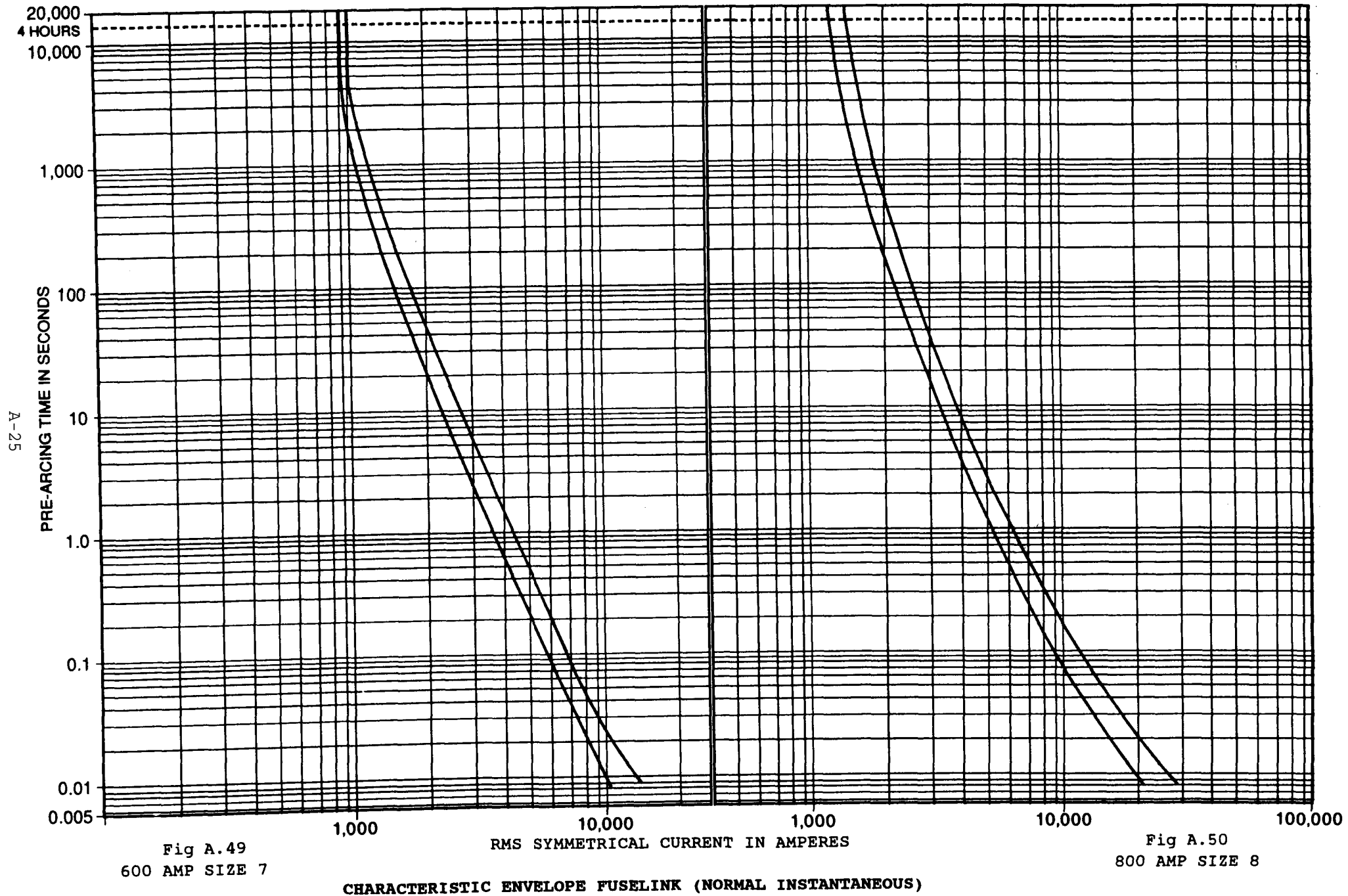


PRE-ARCING TIME IN SECONDS

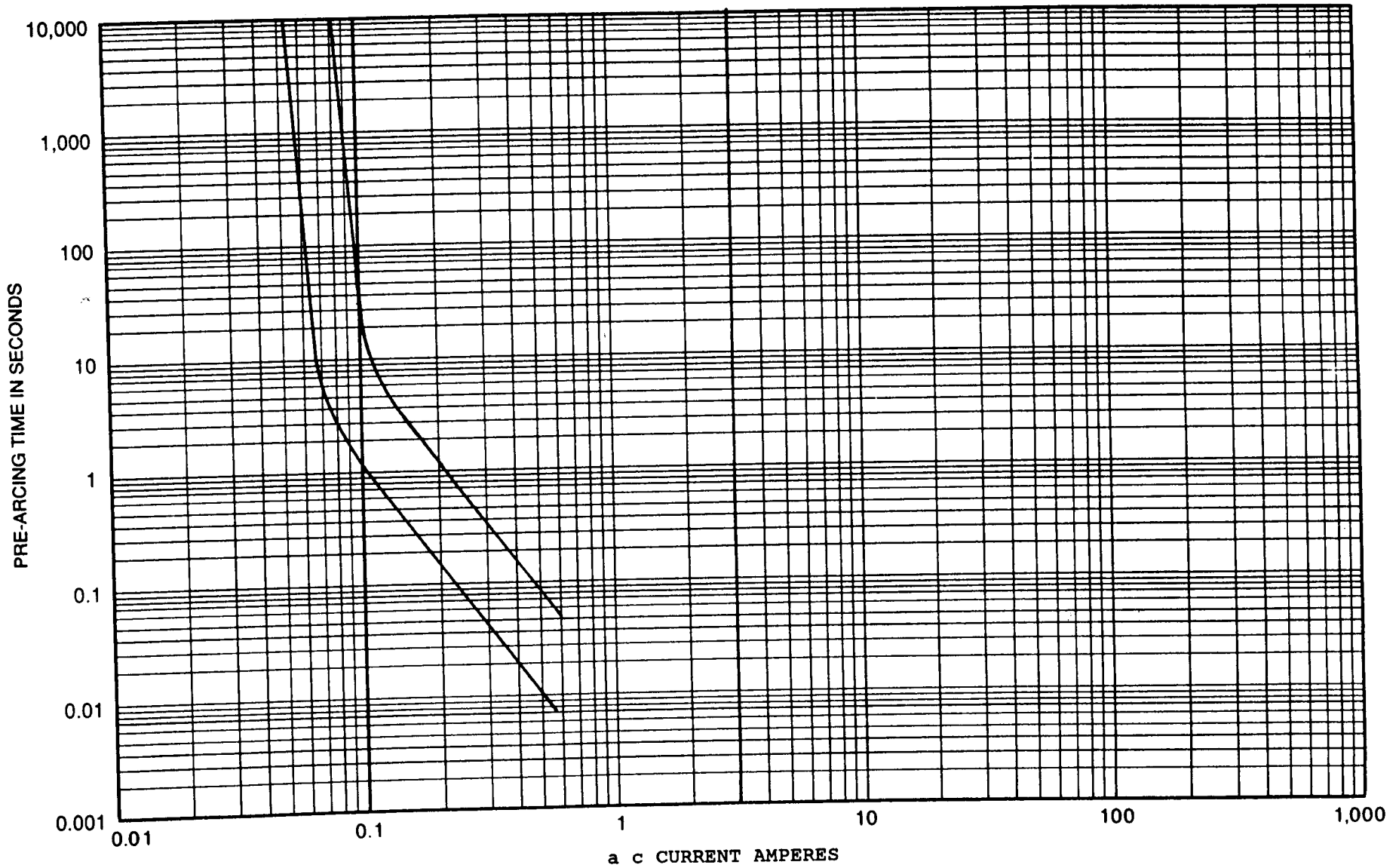
A-23

RMS SYMMETRICAL CURRENT IN AMPERES





FUSE LINK TIME DELAY TYPE



ENVELOPE CHARACTERISTIC CURVE

50mA Fig B.1

FUSE LINK TIME DELAY TYPE

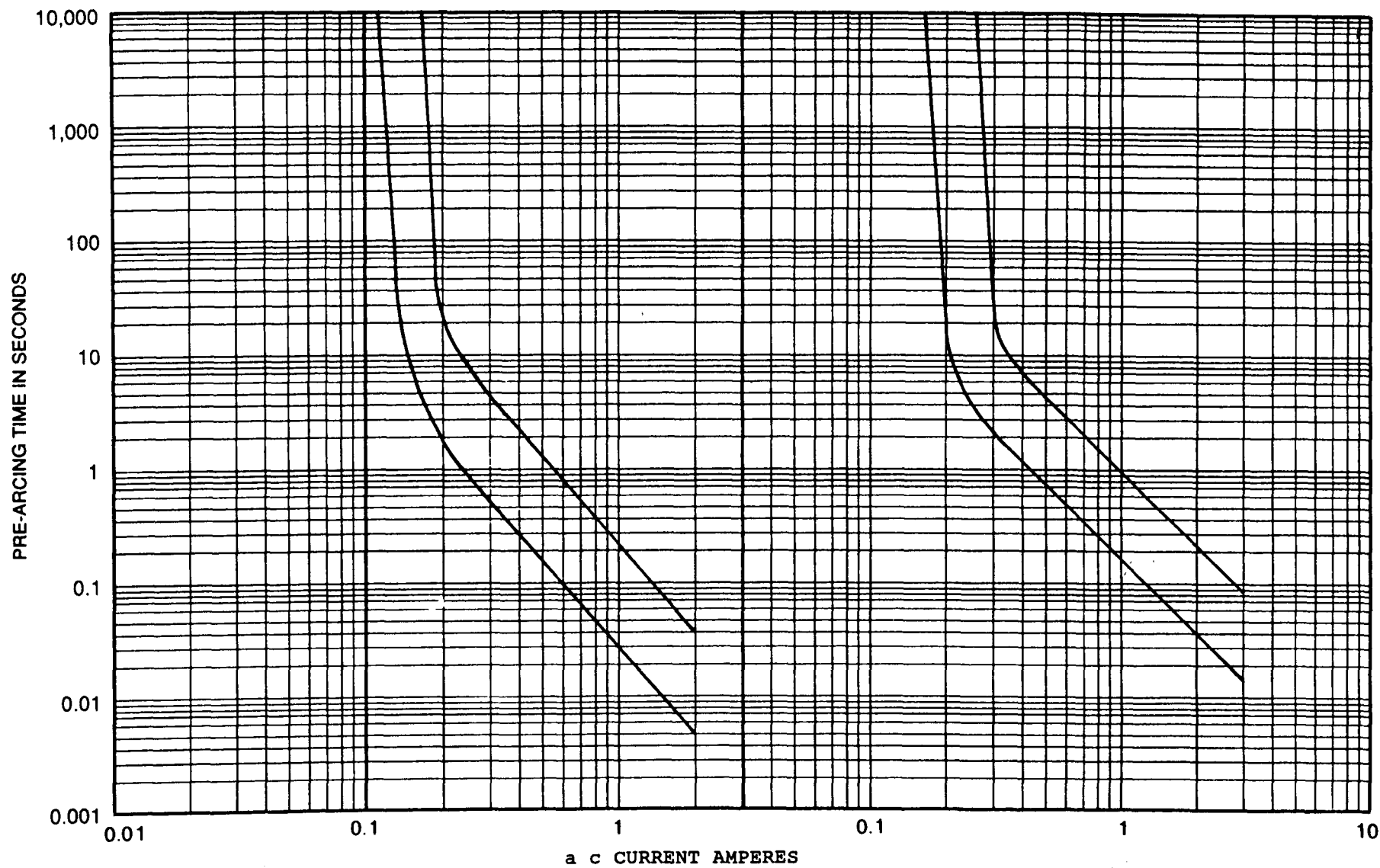


Fig B.2
100mA

Fig B.3
15mA

ENVELOPE CHARACTERISTIC CURVE

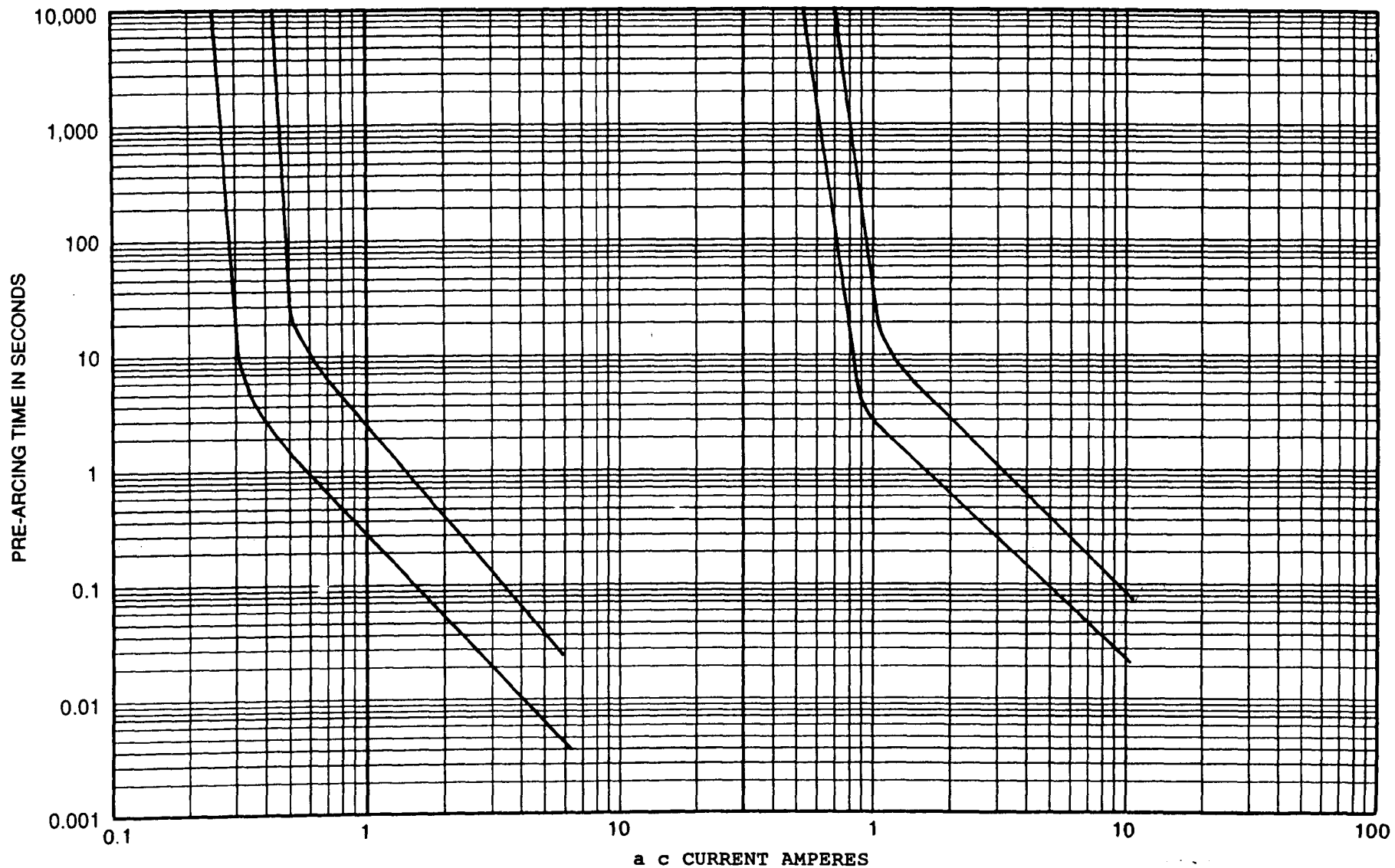


Fig B.4
250mA

Fig B.5
500mA

ENVELOPE CHARACTERISTIC CURVE

FUSE LINK TIME DELAY TYPE

FUSE LINK TIME DELAY TYPE

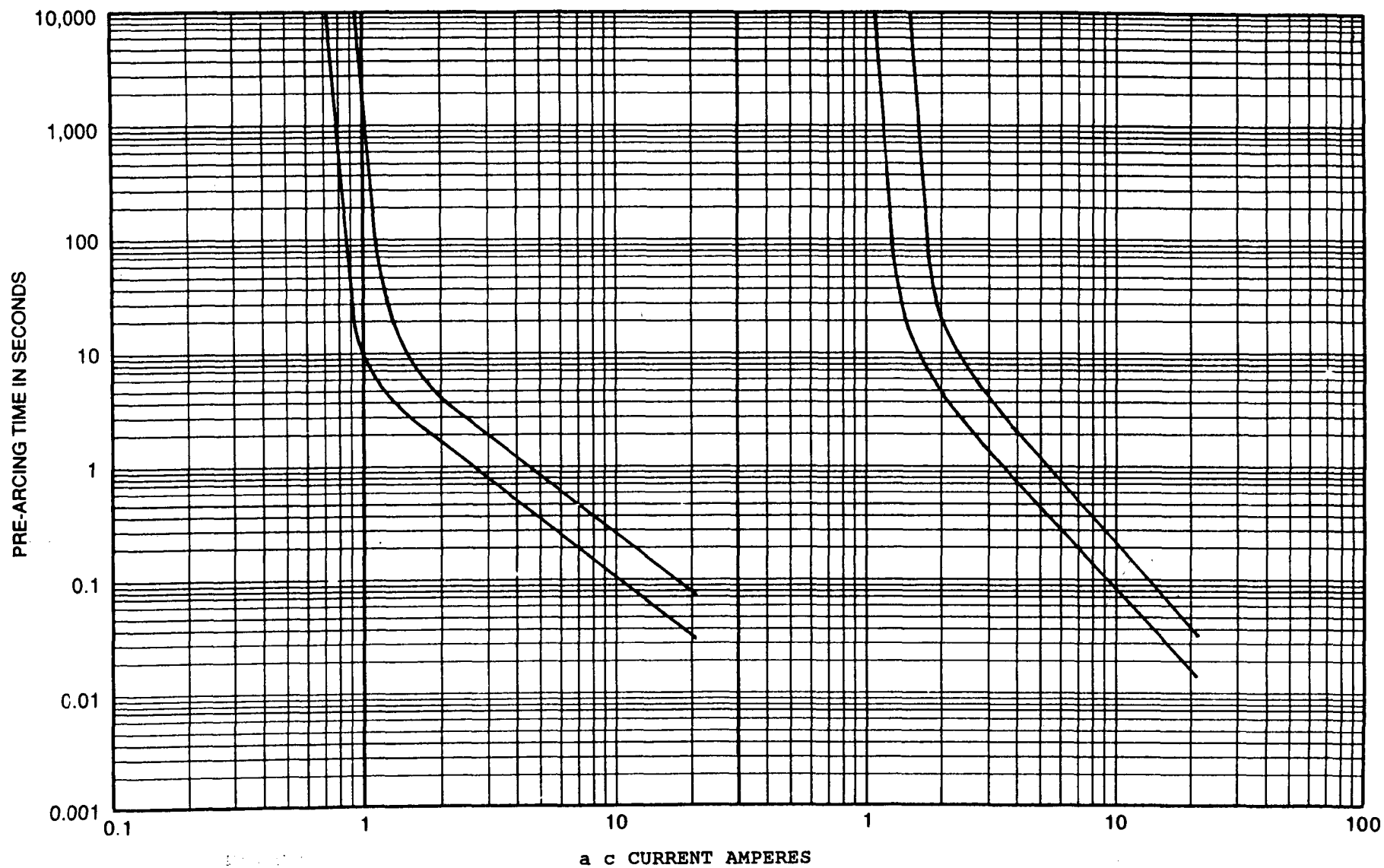


Fig B.6
750mA

Fig B.7
1A

ENVELOPE CHARACTERISTIC CURVE

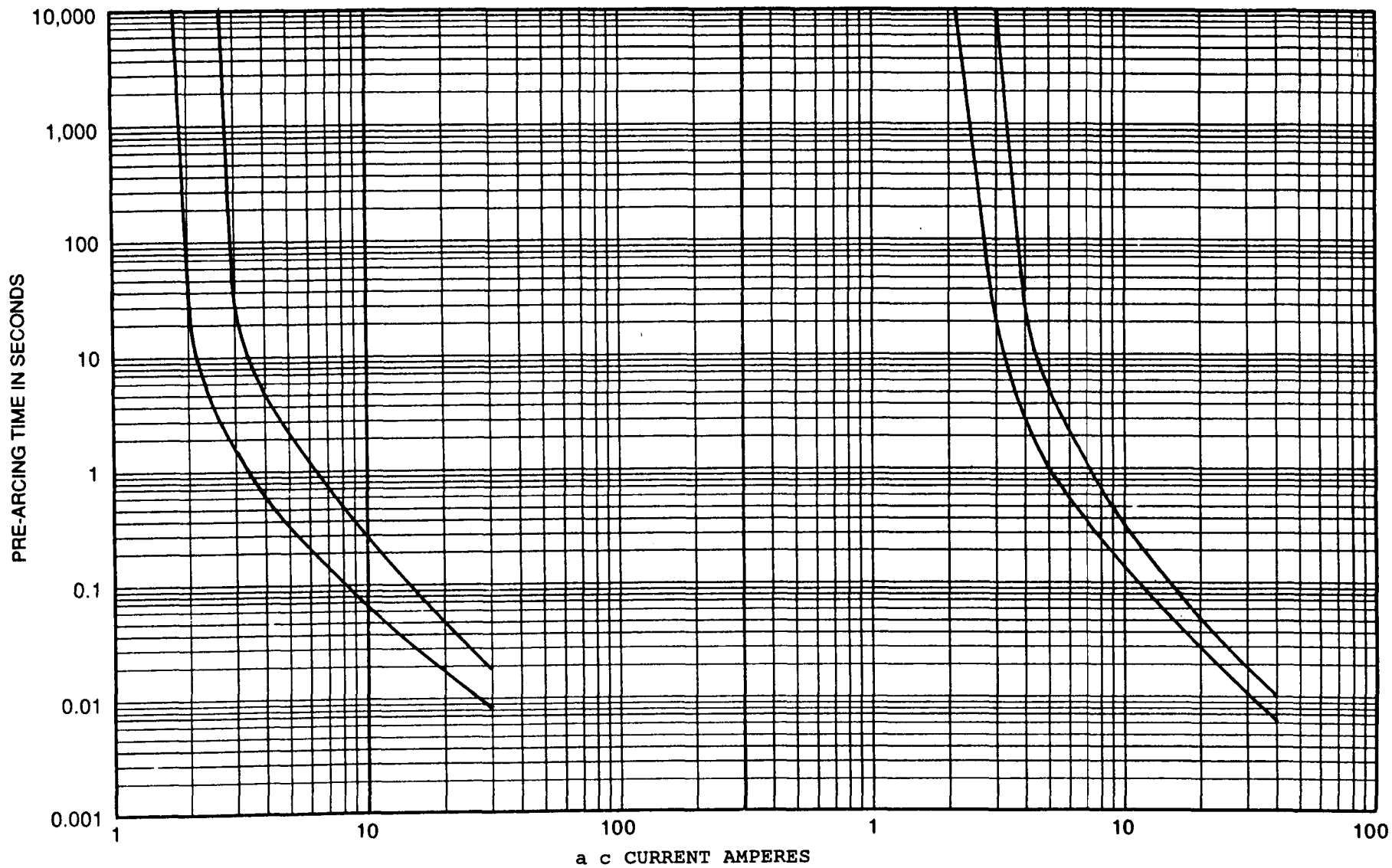


Fig B.8
1.5A

Fig B.9
2A

ENVELOPE CHARACTERISTIC CURVE

FUSE LINK TIME DELAY TYPE

FUSE LINK TIME DELAY TYPE

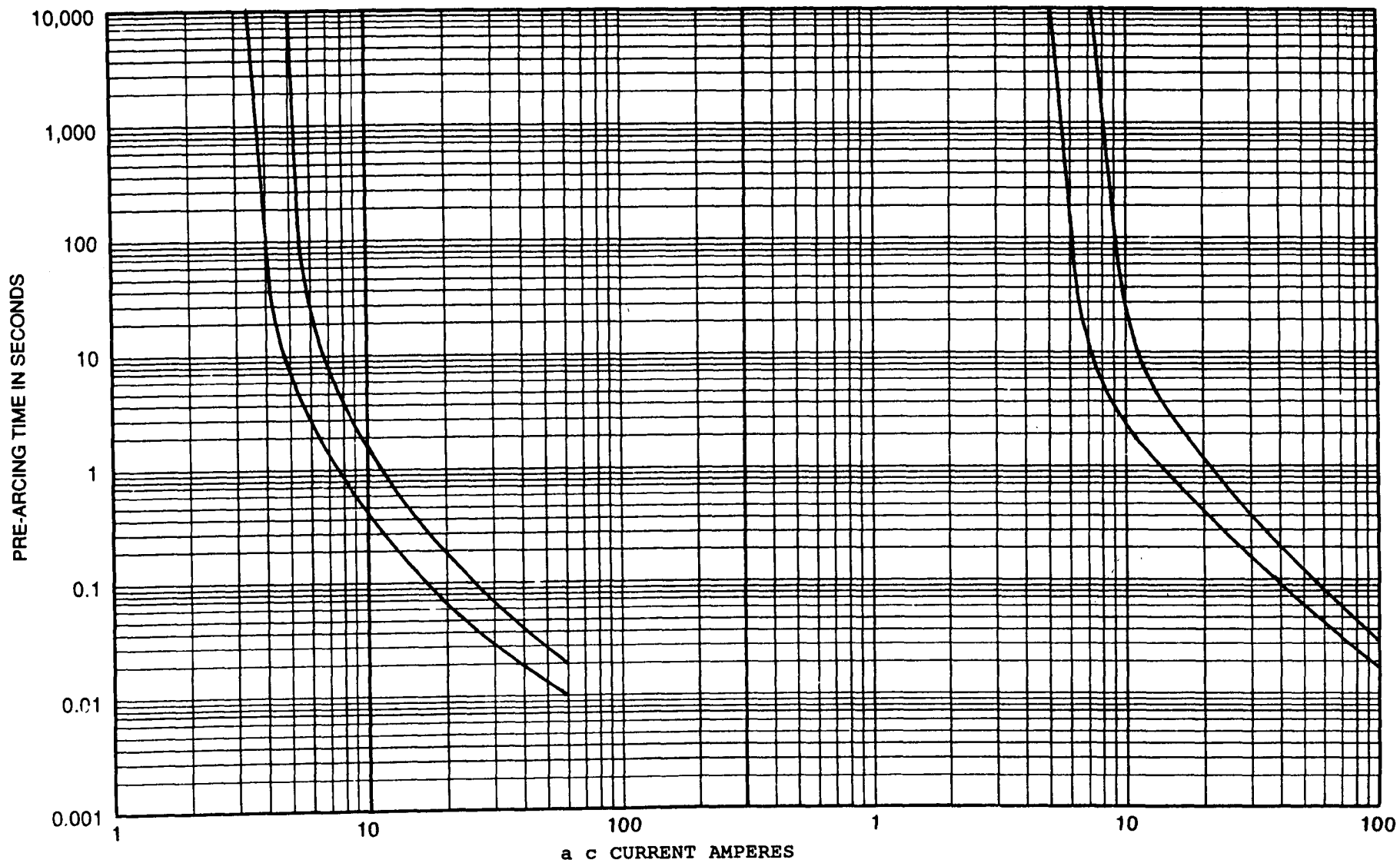


Fig B.10
3A

Fig B.11
5A

ENVELOPE CHARACTERISTIC CURVE

FUSE LINK TIME DELAY TYPE

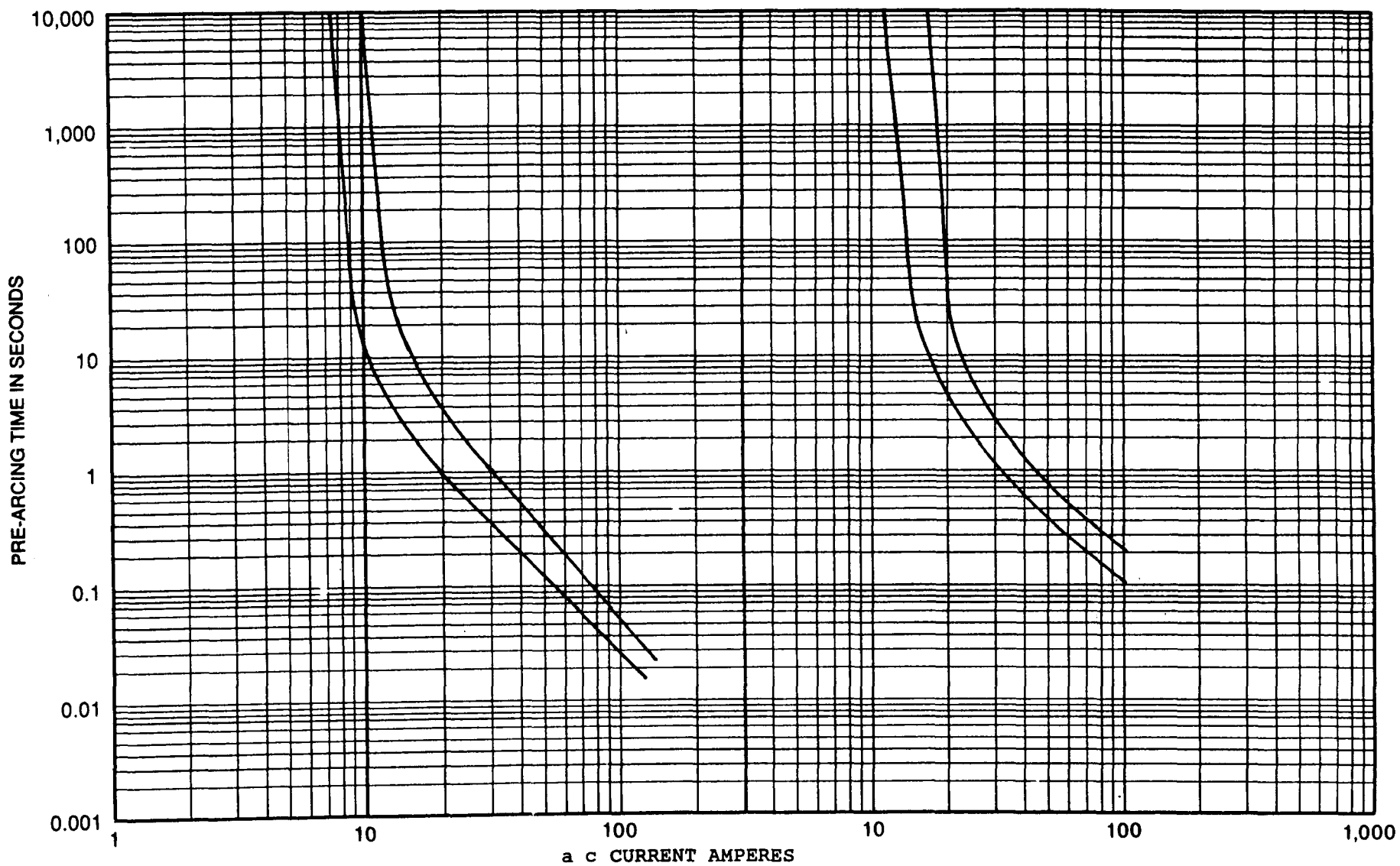


Fig B.12
7A

ENVELOPE CHARACTERISTIC CURVE

Fig B.13
10A

Collation Page

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Date : 9 November 1998

Removal of Product Qualification Approval

IMPORTANT ANNOUNCEMENT

1. This Standard contains a Product Qualification Approval (PQA) scheme. ⁱMOD policy requires that all PQA schemes are removed from Defence Standards called up in contracts placed after 1st January 1998.
2. Users of this Standard are to contact the Project Manager (PM), Equipment Support Manager (ESM) or Technical Service Authority (TSA) named in the contract or order, to identify whether there is a continuing need for an approvals scheme.
3. ⁱⁱProduct Conformity Certification (PCC) is a risk based process that replaces PQA. Once a risk has been identified PCC can be included as a contract clause. In exceptional circumstances agreement can be sought from AD/Stan for PCC to be included in a Defence Standard.
4. At the next revision of this Standard the PQA scheme will be removed.

T R Leaver
Head of Standards Programme Management
Tel: 0141 224 2595 FAX: 0141 224 2503

ⁱ Defence Council Instruction (General) 197/97; Quality Temporary Memorandum 5/98; Chief of Defence Procurement Instruction CDPI/TECH/250 (draft)

ⁱⁱ PCC is certification that a product meets its specification. When PC is required by the contract, the contractor is responsible for obtaining the necessary PCC. Certification shall be provided from a NAMAS accredited laboratory when appropriate. PCC shall apply where a Risk Assessment has been identified by the PM; ESM or TSA.