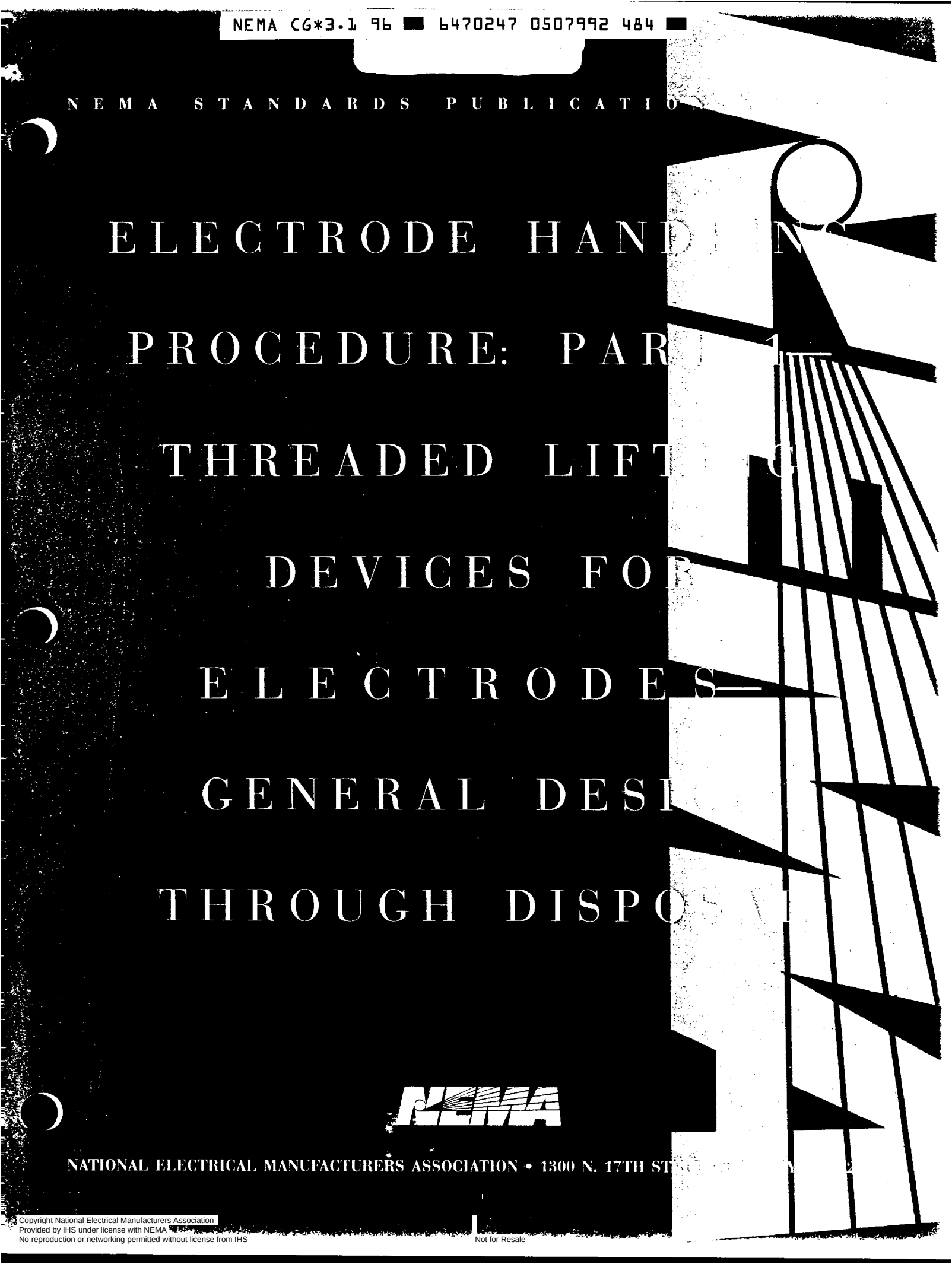
NEMA CG*3.1 96 ■ 6470247 0507992 484 ■

NEMA STANDARDS PUBLICATION

ELECTRODE HANDLING PROCEDURE: PART 1 — THREADED LIFTING DEVICES FOR ELECTRODES — GENERAL DESIGN THROUGH DISPOSAL



NEMA

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION • 1300 N. 17TH ST[illegible]

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale

NEMA Standards Publication CG 3.1-1996

Electrode Handling Procedure: Part 1—
Threaded Lifting Devices for Electrodes—General Design Through Disposal

Published by

National Electrical Manufacturers Association
1300 North 17th Street
Rosslyn, Virginia 22209

© 1996 by National Electrical Manufacturers Association

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS

Not for Resale

CONTENTS

Page

Foreword ii

Clause

Section 1 GENERAL
1.1 Scope 1
1.2 References 1

Section 2 REQUIREMENTS FOR MANUFACTURING THREADED LIFTING DEVICES
2.1 Critical Design Components 3
2.2 Deviations from Engineering Design 3
2.3 General Construction 3
2.4 Rated Load Testing and Marking 3
2.5 Quality System 3

Section 3 INSTRUCTIONS FOR THE USE OF THREADED LIFTING DEVICES
3.1 Storage 5
3.2 Care and Handling of Devices while in Use 5
3.3 Inspection 5
3.4 Repair and Modification 6
3.5 Removal and Disposal 6

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS

Not for Resale

Foreword

The purpose of this NEMA Standards Publication is to foster the safe and reliable use of threaded electrode lifting devices by assisting suppliers of these devices in communicating with:

- Device manufacturers about those aspects of lifting device design, construction, and testing
- End users about those aspects of lifting device inspection, handling, maintenance, and disposal.

This Standards Publication was developed by the Manufactured Graphite Technical Committee of the NEMA Carbon and Manufactured Graphite Section and approved as a NEMA Standard. During the development of this publication, the input of users and other interested parties was sought and evaluated. This publication will be reviewed periodically; inquiries, comments, and proposed or recommended revisions should be submitted to:

Vice President, Engineering
National Electrical Manufacturers Association
1300 North 17th Street
Rosslyn, Virginia 22209

This Standards Publication was developed by the Electrode Group in the Carbon/Manufactured Graphite Section of the National Electrical Manufacturers Association. At the time it was approved, the Electrode Group in the Carbon/Manufactured Graphite Section had the following members:

Carbone-Lorraine North America Corp.—Parsippany, NJ

The Carbide-Graphite Group, Inc.—Pittsburgh, PA

Graphite Sales, Inc.—Chagrin Falls, OH

National Electrical Carbon Corp.—Greenville, SC

SGL Carbon Corporation—Charlotte, NC

Showa Denko Carbon, Inc.—Ridgeville, SC

Superior Graphite Company, Ark Graphite Division—Chicago, IL

UCAR International, Inc.—Danbury, CT

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale

Section 1
GENERAL

1.1 SCOPE

This Standards Publication provides direction to suppliers of threaded electrode lifting devices regarding the general design, construction, testing, inspection, handling, maintenance, and disposal of these devices. For the purposes of this publication, threaded electrode lifting devices are those specifically designed for the addition or removal of manufactured graphite and carbon electrodes or columns to and from electric arc furnaces. Where the term "lifting device" or "plug" is used, it is meant to mean a threaded electrode lifting device. NEMA CG 1-1993 specifies dimensions and tolerances of the manufactured graphite and carbon electrodes with which these lifting devices are used.

1.2 NORMATIVE REFERENCES

The following documents contain definitions and provisions, which through reference in this text, constitute definitions and provisions of this Standards Publication. By reference herein, these documents are adopted in whole or in part, as indicated.

American Society of Mechanical Engineers
345 East 47th Street
New York, NY 10017

ASME B30.20-1993 *Below-the-Hook Lifting Devices*

National Electrical Manufacturers Association
1300 North 17th Street
Rosslyn, VA 22209

NEMA CG 1-1993 *Manufactured Graphite/Carbon Electrodes*

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS

Not for Resale

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS

Not for Resale

Section 2
REQUIREMENTS FOR MANUFACTURING THREADED LIFTING DEVICES

2.1 CRITICAL DESIGN COMPONENTS

All threaded lifting device designs shall be based on engineering drawings containing the following information:

a. Title indicating usage as an electrode lifting plug, component, or assembly
b. All relevant dimensions, tolerances, thread pitches, and surface finishes
c. Materials used and any treatments needed
d. Names, dates, and changes made to revisions of drawing
e. Bill of material for the assembly, including part numbers for the plug and all other relevant components of the assembly
f. Load capacity for the anchor shackle, when applicable
g. Pull test load value for each plug size, and testing requirements

2.2 DEVIATIONS FROM ENGINEERING DESIGN

Threaded devices supplied to end users for the specific purpose of lifting graphite electrodes shall not deviate from the design specified in the manufacturer's engineering drawings. Graphite nipples, hooks, or other components that have been modified to function as a threaded lifting device shall not be used unless the criteria specified in 2.3 are met.

2.3 GENERAL CONSTRUCTION

A threaded lifting plug shall be designed to withstand the stresses imposed by its rated load, with a minimum design factor of 3, based on yield strength, for load bearing structural components.

Materials used for the threaded lifting plug and other load bearing components of the device shall be selected for yield strength and the ability to withstand loads at the necessary operating temperatures.

2.4 RATED LOAD TESTING AND MARKING

The load rating and pull test loads for threaded lifting plugs shall be in accordance with ASME B30.20.

The rated load of a threaded lifting plug shall be indicated on a nameplate or permanent marking affixed to a surface visible to an operator. The nameplate or permanent marking shall also include the manufacturer's name and serial number.

The manufacturer shall maintain records of test results and be able to furnish test reports to suppliers upon demand.

2.5 QUALITY SYSTEM

Manufacturers producing threaded lifting plugs shall have a formal quality system in place to provide conformance to this standard. This system shall cover device design, purchasing, production, final inspection, testing, packaging, and delivery of the threaded lifting device.

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS

Not for Resale

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS

Not for Resale

Section 3
INSTRUCTIONS FOR THE USE OF THREADED LIFTING DEVICES

3.1 STORAGE

Personnel shall be trained on, and follow, accepted documented procedures for the proper storage of threaded lifting devices. Such procedures shall stress the following:

a. Storing the threaded lifting device in a dry, temperate area
b. Assigning a stock number identifier, linked to inspection reports, for each threaded lifting device
c. Using cushioning materials to protect lifting plug threads

3.2 CARE AND HANDLING OF DEVICES WHILE IN USE

Operators shall be trained on, and follow, accepted documented procedures for the proper care and handling of lifting devices while in service. Such procedures shall stress the following:

a. Avoid dropping or throwing the lifting device
b. Avoid sudden jerking of the lifting device by carefully taking up slack in the hoisting cable
c. Carefully guide and screw the plug into the electrode socket, and unscrew and guide the plug away from the socket
d. Perform periodic visual inspections of plug (see 3.4)
e. Wear approved protective clothing and equipment
f. Never lift electrode sections that exceed the rated load capacity of the plug (see 2.4)
g. Never walk under a suspended load while an electrode or electrode column is being moved to or from the furnace.

3.3 INSPECTION

3.3.1 Types of Inspection

The following types of inspection shall be done on threaded lifting devices to determine fitness for use:

a. Initial inspection
b. Periodic inspection
c. Inspection of the device prior to each use

3.3.2 Initial Inspection

All components of a threaded lifting device, whether new or repaired, shall be inspected by qualified personnel prior to use. A written record of component condition shall be maintained.

3.3.3 Periodic Inspection

All components of a lifting device shall be periodically inspected by qualified personnel for damage and cracks using appropriate techniques such as x-ray or magnaflux. A written record of component condition shall be maintained.

3.3.4 Inspection Prior To Each Use

The operator shall perform a visual inspection of the lifting device prior to each use. Should any deficiencies be found, the operator shall notify designated personnel for corrective action.

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS

Not for Resale

3.3.5 Areas Of Inspection

The following conditions shall be checked at each inspection:

a. Corrosion
b. Cracks
c. Damaged, chipped, or missing threads
d. Damage or deformation of the lifting bail
e. Proper position of lifting bail and bail nuts
f. Bail nuts secured with fastening pins

Any degradation shall be documented. This documentation shall be used to determine when the lifting device is removed from service for repair or disposal.

3.4 REPAIR AND MODIFICATION

No modifications shall be made to the originally supplied equipment, such as using slings or chains to replace the bail. After replacement of any component, the lifting device shall be tested and inspected by qualified personnel in accordance with ASME B30.20 (see 3.3).

3.5 REMOVAL AND DISPOSAL

The device shall be removed from service when more than 20% of the plug threads are damaged, or if any crack in the metal components has been detected.

A lifting device shall be disposed of in such a manner as to prevent reuse when it is determined that the device is no longer fit for service.

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale

NEMA STANDARDIZATION BACKGROUND

The purpose of NEMA standards, their classification, and status are set forth in certain clauses of the NEMA *Standardization Policies and Procedures* manual and are referenced below:

Purpose of Standards

National Electrical Manufacturers Association Standards are adopted in the public interest and are designed to eliminate misunderstandings between the manufacturer and the purchaser and to assist the purchaser in selecting and obtaining the proper product for their particular needs. Existence of a National Electrical Manufacturers Association Standard does not in any respect preclude any member or nonmember from manufacturing or selling products not conforming to the standard.

Definition of a Standard

A standard of the National Electrical Manufacturers Association defines a product, process, or procedure with reference to one or more of the following; nomenclature, composition, construction, dimensions, tolerances, safety, operating characteristics, performance, rating, testing, and the service for which they are designed.

(Standardization Policies and Procedures, p. 1)

Dimensions

Where dimensions are given for interchangeability purposes, alternate dimensions satisfying the other provisions of the Standards Publication may be capable of otherwise equivalent performance.

(Standardization Policies and Procedures, p. 6)

Categories of Standards

National Electrical Manufacturers Association Standards are of three classes, which have received the affirmative vote of at least two-thirds of the Subdivision votes cast in the affirmative or negative:

NEMA Standard, which relates to a product, process, or procedure commercially standardized and subject to repetitive manufacture.

Suggested Standard for Future Design, which may not have been regularly applied to a commercial product, but which suggests a sound engineering approach to future development.

Adoptive Standard, which is adopted in whole or in part from the standards of another organization, either domestic, regional, or international.

(Standardization Policies and Procedures, p. 5)

Authorized Engineering Information

Authorized Engineering Information consists of explanatory data or other engineering information of an informative character not falling within the classification of NEMA Standard or Suggested Standard for Future Design, which standard has received the affirmative vote of at least two-thirds of the Subdivision votes cast in the affirmative or negative.

(Standardization Policies and Procedures, p. 5)

Identification of Status

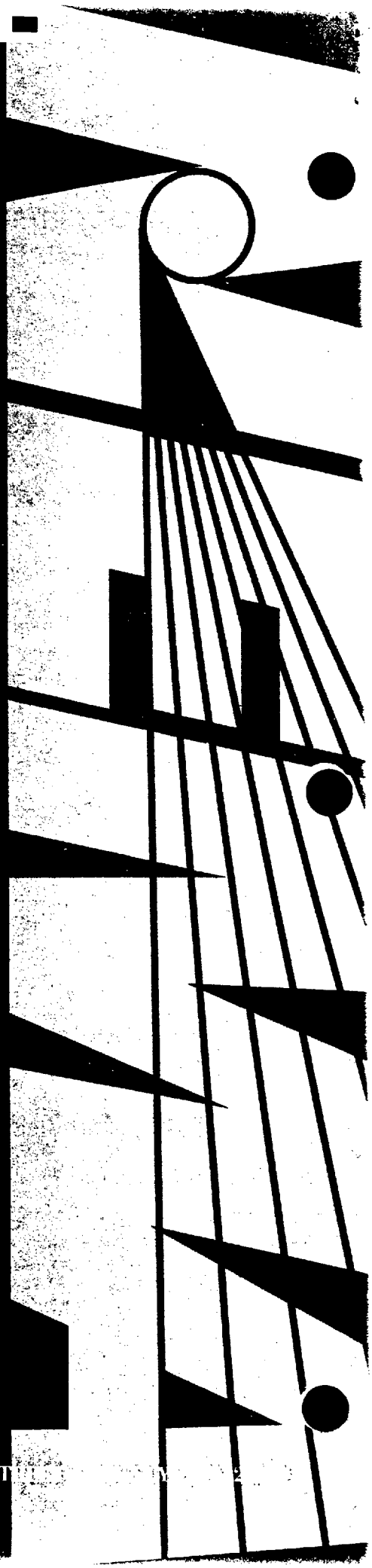
Standards in NEMA Standards Publications are identified as "NEMA Standard," "Suggested Standard for Future Design," or "Adoptive Standard." These indicate the status of the standard. A statement incorporating the auxiliary verb "shall" indicates that compliance with a requirement is mandatory for compliance with the standard. These classes of standards are identified in the foreword or throughout the text.

The material identified as "Authorized Engineering Information" is designated similarly. Statements incorporating other auxiliary verbs such as "should," "may," etc. refer to the authorized engineering information and not to procedures required for compliance with the standard.

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS

Not for Resale

NEMA CG*3.1 96 ■ 6470247 0508003 968 ■



NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION • 1300 N. 17TH ST[illegible]

Copyright National Electrical Manufacturers Association
Provided by IHS under license with NEMA
No reproduction or networking permitted without license from IHS
Not for Resale