



O5.3.2008

**SOLID SAWN-WOOD CROSSARMS & BRACES –
SPECIFICATIONS & DIMENSIONS**

AMERICAN NATIONAL STANDARD



Founded in 1904, the American Wood Protection Association (AWPA) is a non-profit organization which is responsible for promulgating voluntary wood preservation standards. AWPA Standards are developed by its technical committees in an open, consensus-based process that involves individuals from all facets of wood preservation: Producers of preservatives and preservative components; producers of treated and untreated wood products; end users of treated wood; engineers, architects and building code officials; government entities, academia, and other groups with a general interest in wood preservation. AWPA's Standards are universally specified for wood preservation in the USA, and are recognized worldwide.

AWPA standards help ensure that treated wood products perform satisfactorily for their intended use. They are recognized and used by most, if not all, specifiers of treated wood including electrical utility, marine, road and building construction as well as by local, state and federal governments. For more information visit <www.awpa.com>.

AMERICAN NATIONAL STANDARD

Approval of an American National Standard requires review by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made towards their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Notice of Disclaimer & Limitation of Liability

The information provided in this document is directed solely to professionals who have the appropriate degree of experience to understand and interpret its contents in accordance with generally accepted engineering or other professional standards and applicable regulations. No recommendation as to products or vendors is made or should be implied.

NO REPRESENTATION OR WARRANTY IS MADE THAT THE INFORMATION IS TECHNICALLY ACCURATE OR SUFFICIENT OR CONFORMS TO ANY STATUTE, GOVERNMENTAL RULE OR REGULATION, AND FURTHER, NO REPRESENTATION OR WARRANTY IS MADE OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. ATIS SHALL NOT BE LIABLE, BEYOND THE AMOUNT OF ANY SUM RECEIVED IN PAYMENT BY ATIS FOR THIS DOCUMENT, WITH RESPECT TO ANY CLAIM, AND IN NO EVENT SHALL ATIS BE LIABLE FOR LOST PROFITS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES. ATIS EXPRESSLY ADVISES ANY AND ALL USE OF OR RELIANCE UPON THIS INFORMATION PROVIDED IN THIS DOCUMENT IS AT THE RISK OF THE USER.

NOTE - The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights. By publication of this standard, no position is taken with respect to whether use of an invention covered by patent rights will be required, and if any such use is required no position is taken regarding the validity of this claim or any patent rights in connection therewith.

O5.3.2008, *Solid Sawn-Wood Crossarms & Braces –Specifications & Dimensions*

Is an American National Standard developed by the **ASC O5 – Wood Poles and Wood Products**.

Published by

American Wood Protection Association
P.O. Box 36174
Birmingham, AL 35236

Copyright © 2011 by American Wood Protection Association

All rights reserved.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher. For information contact AWPA at 205.773.4077. AWPA is online at <<http://www.awpa.com>>.

Printed in the United States of America.

ANSI O5.3.2008

American National Standard for Wood Poles and Wood Products

**SOLID SAWN-WOOD CROSSARMS & BRACES –
SPECIFICATIONS & DIMENSIONS**

Secretariat

American Wood Protection Association

Approved July 15, 2008

American National Standards Institute, Inc.

Abstract

This standard consists of specifications covering solid sawn-wood crossarms and braces manufactured from coastal Douglas-fir grown in the West Coast region and from dense Southern pine.

ANSI O5.3.2008

FOREWORD

The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with the American National Standards Institute's (ANSI's) requirements for an ANS. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the standard.

This standard was developed by Accredited Standards Committee O5 on Specifications for Wood Poles (ASC O5) under the sponsorship of the American Wood Protection Association (AWPA). This Committee was organized in December 1924 and has produced revisions of this pole specification from time to time as required or deemed beneficial. This standard supersedes American National Standard O5.3-2002.

ANSI guidelines specify two categories of requirements: mandatory and recommendation. The mandatory requirements are designated by the word *shall* and recommendations by the word *should*. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages.

Suggestions for improvement of this standard will be welcome. They should be sent to ASC O5 Secretariat, c/o AWPA P.O. Box 361784, Birmingham, AL 35236 <www.awpa.com>.

This standard was processed and approved for submittal to ANSI by Accredited Standards Committee O5 on Specifications for Wood Poles. Committee approval of the standard does not necessarily imply that all Committee members voted for its approval.

At the time it processed and approved this standard, the ASC O5 membership was comprised of the following:

Nelson Bingel, Chairman
Colin McCown, Vice Chairman
Steve Barclay and Jean-Paul Emond, ATIS Secretariat and Editors
Chad Underkoffler, ATIS Chief Editor
S. Terrell, O5 Technical Editor

Name of Representative	Organization Represented
E.D. Williams	A.W. Williams Inspection Co., Inc.
Edward D. Williams Jr.	A.W. Williams Inspection Co., Inc.
Jeffrey D. Linville	American Institute of Timber Construction
R. Michael Caldwell, P.E.	American Institute of Timber Construction
Ron Goff, P.E.	American Institute of Timber Construction
Dean Matthews	American Wood Preservers Institute
Mike Dilbeck	American Wood Protection Association
Les Lonning	American Wood Protection Association
Colin McCown	American Wood Protection Association
Robert C. Patterson, P.E.	American Wood Protection Association
Craig McIntyre	American Wood Protection Association
James J. Healey	American Wood Protection Institution
Borjen Yeh	APA - The Engineered Wood Association
Shannon Terrell	Brooks Manufacturing Co.
Dwayne Carter	Brooks Manufacturing Co.
Gouri Bhuyan, Ph.D.	Canadian Electricity Association
Mary Joe Rodgers	Comcast
JR Gonzales	Comcast
Dave D'Hooge	Edison Electrical Institute
Randy Hopkins	Edison Electrical Institute
Reed Rosandich, P.E.	Edison Electrical Institute
Rob Nelson	EDM International
Lee R. Gjovik	Gjovik Consulting, Inc.

ANSI O5.3.2008

Name of Representative	Organization Represented
Nelson G. Bingel, III	IEEE
Robert O. Kluge	IEEE
Robert C. Peters	IEEE
Andrew Kudick	Intec Services
Robert A. Reisdorff	Laminated Wood Systems, Inc.
H. Michael Barnes	Mississippi Forest Production Lab
H. Martin Rollins	North American Wood Pole Council
James Carter	National Rural Electric Coop Association
Nick Klein	National Rural Electric Coop Association
Bill Latunen	North West Pole & Piling Shippers Association
Jeffrey J. Morrell	Oregon State University
Larry Slavin	Outside Plant Consulting Services
Todd Brown	Rocky Mountain Pole and Treating Association
H. Robert Lash	Rural Utilities Services
Vahid Zakeri	San Diego Gas & Electric
Arthur D. Peralta	Southern California Edison
Robby S. Brown	Southern Pine Inspection Bureau
Ron Cauley	Southern Pressure Treaters Association
Hollis Ervin	Southern Pressure Treaters Association
Joseph Wheat	Southern Pressure Treaters Association
Robert Meyer	State University of New York - Forestry - Syracuse
Trevor Bowmer	Telcordia Technologies
Donald A. Devisser	West Coast Lumber Inspection Bureau
Gerald Paulson	Western Area Power Administration
Karen Rowe	Western Area Power Administration
Tim Durbin	Western Red Cedar Pole Association
Steve Kracht	Western Red Cedar Pole Association
Randy Baileys	Western Wood Preservers Institute
Stephen F. Smith	Western Wood Preservers Institute
Craig Fohlich	Wood Preservation Canada
Henry Walthert	Wood Preservation Canada

ANSI O5.3.2008

TABLE OF CONTENTS

PART I -- GENERAL REQUIREMENTS	1
1 SCOPE & ORGANIZATION	1
1.1 SCOPE.....	1
1.2 GENERAL ORGANIZATION OF THE STANDARD.....	1
2 NORMATIVE REFERENCES	1
3 DEFINITIONS	2
4 MARKING	6
4.2.1 <i>Species Designation</i>	6
4.2.2 <i>Preservative Designation</i>	6
5 TREATMENT	7
6 STORAGE.....	7
7 QUALITY CONTROL.....	7
8 REJECTION	8
PART II -- DOUGLAS-FIR: SPECIFICATIONS FOR CROSSARMS & BRACES.....	9
9 SCOPE OF PART II.....	9
10 OPTIONS & LIMITATIONS (REQUIREMENTS)	9
11 MATERIAL REQUIREMENTS	9
11.1 PROHIBITED DEFECTS.....	10
11.2 SEASONING.....	10
11.3 COMMUNICATION CROSSARMS	10
11.4 POWER CROSSARMS & COMMUNICATION DEAD END CROSSARMS	10
11.5 HEAVY-DUTY TRANSMISSION CROSSARMS.....	13
11.6 HEAVY-DUTY BRACES.....	13
11.7 KNOT-SIZE LIMITATIONS	13
12 MANUFACTURING REQUIREMENTS.....	14
12.1 WORKMANSHIP.....	14
12.2 DIMENSIONS, DRILLING DETAILS, AND TOLERANCES	15
12.3 EDGES	15
12.4 INCISING.....	16
13 SEASONING	16
14 DESIGNATED FIBER STRENGTH	16
PART III -- DENSE SOUTHERN PINE: SPECIFICATIONS FOR CROSSARMS	19
15 SCOPE OF PART III	19
16 OPTIONS & LIMITATIONS (REQUIREMENTS)	19
17 MANUFACTURING REQUIREMENTS.....	19
17.1 WORKMANSHIP.....	19
17.2 DIMENSIONS, DRILLING DETAILS, AND TOLERANCES	19
17.3 EDGES	20

ANSI O5.3.2008

18	LIMITATIONS	20
18.1	CHECKS	20
18.2	COMPRESSION WOOD	20
18.3	CRACKS	20
18.4	CROSSGRAIN	21
18.5	ADVANCED DECAY (DOE OR ROT)	21
18.6	DENSITY	21
18.7	KNOTS	21
18.8	PITH CENTERS	21
18.9	RED HEART	21
18.10	SAPWOOD	21
18.11	SEASONING	21
18.12	SHAKES	22
18.13	SPLITS	22
18.14	TORN GRAIN	22
18.15	WANE	22
18.16	WARP	22
18.17	WORM HOLES	22
19	SEASONING	22
A	GRADING RULES FOR SOUTHERN PINE CROSSARM STOCK	24
B	TEST SETUP FOR EVALUATION OF CROSSARM BENDING MOR	25
C	ADJUSTING TEST RESULTS TO OBTAIN FIBER STRENGTH	28
D	BIBLIOGRAPHY	29
E	REQUIREMENTS FOR CONSIDERATION OF FOREIGN SPECIES INTO O5.3	30
E.1	SCOPE	30
E.2	REQUIREMENTS	30

TABLE OF FIGURES

FIGURE 1 - FEATURES OBSERVED DURING GRADING	3
FIGURE 2 - CROSSARM SECTIONS	5
FIGURE 3 - KNOT LIMITATIONS IN HEAVY-DUTY CROSSARMS (SIDE VIEW OF CENTRAL SECTION)	13
FIGURE 4 - RECOMMENDED DIMENSIONS FOR CROSSARMS WITH ARMS HAVING 2, 4, 6, AND 8 PIN HOLES	17
FIGURE 5 - SAMPLE OF SPECIFICATION PREPARED BY USER	18
FIGURE 6 - CROSSARM EDGES	18
FIGURE 7 - TEST SETUP FOR EVALUATION OF CROSSARM BENDING MOR	25

TABLE OF TABLES

TABLE 1 - DOUGLAS-FIR KNOT-SIZE LIMITATIONS FOR COMMUNICATION AND POWER CROSSARMS [NOT TO EXCEED 12 FEET (3.7M)] [NEITHER FACE TO EXCEED 5-3/4 INCHES (14.6CM) AND THE SUM OF THE ADJACENT FACES NOT TO EXCEED 9-1/2 INCHES (24.1CM)]	12
TABLE 2 - DOUGLAS-FIR KNOT AND WANE LIMITATIONS FOR HEAVY-DUTY CROSSARMS	14
TABLE 3 - DOUGLAS-FIR KNOT-SIZE LIMITATIONS FOR HEAVY-DUTY BRACES	15
TABLE 4 - KNOT-SIZE LIMITATIONS IN SOUTHERN PINE CROSSARMS	20
TABLE 5 - FACTORS FOR DETERMINING FIBER STRENGTH VALUES	28

American National Standard for Wood Poles and Wood Products --

Solid Sawn-Wood Crossarms & Braces – Specifications & Dimensions

PART I -- GENERAL REQUIREMENTS

1 SCOPE & ORGANIZATION

1.1 *Scope*

This standard consists of specifications covering solid sawn-wood crossarms and braces manufactured from coastal Douglas-fir (*Pseudotsuga menziesii* - variety *menziesii*) grown in the West Coast region (i.e., from the summit area of the Cascade Mountains of Washington, Oregon, California, and British Columbia, Canada); and from dense Southern pine of the following species: longleaf pine (*Pinus palustris*), shortleaf pine (*Pinus echinata*), loblolly pine (*Pinus taeda*), and slash pine (*Pinus elliottii*). The specifications are intended to cover communications crossarms, power crossarms, heavy-duty crossarms, and heavy-duty braces. Crossarms are intended primarily for use as beams. Heavy-duty crossarms may also be used as struts or columns in braced H-frames. Braces are used for tension, compression-bracing, or both.

1.2 *General organization of the standard*

This standard is divided into three parts:

- (1) *Part I*: General requirements and options that are applicable to all crossarms and braces covered in this standard are specified in Part I;
- (2) *Part II*: Specific requirements and options relating to crossarms and braces manufactured from Douglas-fir are specified in Part II; and
- (3) *Part III*: Specific requirements and options relating to crossarms and braces manufactured from dense Southern pine are specified in Part III.

2 NORMATIVE REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.