

# इंटरनेट

# मानक

## Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 1898 (1990): Timber for aircraft construction in converted form (finished form) - [CED 9: Timber and Timber Stores]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



BLANK PAGE



*Indian Standard*

**TIMBER FOR AIRCRAFT CONSTRUCTION  
IN CONVERTED FORM (FINISHED FORM) —  
SPECIFICATION**

*( Second Revision )*

**भारतीय मानक**

**विमान निर्माण के लिए लकड़ी के परिवर्तन रूप ( तैयार रूप ) — विशिष्टि  
( दूसरा पुनरीक्षण )**

UDC 674 - 412 : 674 - 419.32

© BIS 1990

**BUREAU OF INDIAN STANDARDS  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002**

**AMENDMENT NO. 1 AUGUST 1993**  
**TO**  
**IS 1898 : 1990 TIMBER FOR**  
**AIRCRAFT CONSTRUCTION IN CONVERTED**  
**FORM ( FINISHED FORM ) — SPECIFICATION**  
*( Second Revision )*

( Page 1, clause 7.1 ) — Substitute the following for the existing clause:

‘7.1 The density of timber when determined by the method described in Annex A shall be not less than  $440 \text{ kg/m}^3$  or more than  $580 \text{ kg/m}^3$  at a moisture content of 15 percent. The value of density shall be increased or decreased with the moisture content at the rate of  $4 \text{ kg/m}^3$  for each one percent increase or decrease in moisture content from 15 percent.’

[ Page 2, Table 1, *Sl No. (ii) and col 7* ] — Substitute ‘Fig. 1’ for ‘Fig. 19C’.

( Page 2, Note 1 under Table 1 ) — Substitute

‘20 mm × 20 mm × 80 mm’ for ‘25 mm × 25 mm × 100 mm’.

( Page 2, clause A-1.2, last line ) — Substitute ‘Cubic centimeter’ for ‘cubic metre’.

( Page 2, clause A-1.3 ) — Substitute the following for the existing formula:

$$\text{Density} = \frac{W}{V} \times 10^3 \frac{\text{kg}}{\text{m}^3}$$

( CED 9 )

Reprography Unit, BIS, New Delhi, India

## FOREWORD

This Indian Standard ( Second Revision ) was adopted by the Bureau of Indian Standards on 18 January 1990, after the draft finalized by the Timber Sectional Committee had been approved by the Civil Engineering Division Council.

The provision relating to aircraft timber first converted in the form of baulks and scantlings from logs is covered in IS 1329 : 1975 'Specification for aircraft timber ( baulks and scantlings ) ( *first revision* )'. This timber is further converted into finished sizes for various uses and provisions relating to this timber is covered in this standard.

This standard was first published in 1961 and subsequently revised in 1975. In this revision, the clause on density and Table for strength requirements for Grade I and Grade II timbers have been modified.

In the formulation of this standard due weightage has been given to international coordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values ( *revised* )'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## Indian Standard

# TIMBER FOR AIRCRAFT CONSTRUCTION IN CONVERTED FORM (FINISHED FORM) — SPECIFICATION ( Second Revision )

### 1 SCOPE

1.1 This standard covers the requirements of timber in converted form (finished form) for use in aircraft construction.

### 2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	Title
707 : 1976	Glossary of terms applicable to timber technology and utilization (second revision)
1141 : 1973	Code of practice for seasoning of timber (first revision)
1329 : 1975	Specification for aircraft timber (baulks and scantlings)
1708 : 1986	Methods of testing small clear specimens of timber (second revision)

### 3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in IS 707 : 1976 shall apply.

### 4 SPECIES OF TIMBER

4.1 Unless otherwise specified, the following species of timber shall be used for the construction of aircraft and gliders:

- a) *Picea smithiana* (Spruce)
- b) *Abies* spp. (other than *Abies densa*) (fir)

### 5 PROHIBITED DEFECTS

5.1 The timber shall be clear and free from rot, dote, brashness and all forms of incipient decay, discoloration, shakes, knots, resin pockets, compression failures and compression wood.

5.2 The rate of growth of any piece shall not be less than 6 annual rings in any 25 mm measured in the radial direction on either end section.

### 6 MOISTURE CONTENT

6.1 The timber shall be properly seasoned by any of the approved methods described in IS 1141 :

1973 to a moisture content of not less than 10 percent nor more than 17 percent of the weight of dry wood, when determined by the method described in IS 1708 : 1986 (see Note).

NOTE — Immediately after the mechanical tests specified at (i) and (iii) of Table 1, one disc per test piece approximately 25 mm in length and of full section as the test piece, shall be taken normally at the place of failure, failing which at the central portion of the test specimen, the average moisture content of all the discs shall be taken as representing the moisture content of the scantling.

### 7 DENSITY

7.1 The density of timber when determined by the method described in Annex A shall be not less than 4 400 N/m<sup>3</sup> or more than 5 800 N/m<sup>3</sup> at a moisture content of 15 percent. The value of density shall be increased or decreased with the moisture content at the rate of 40 N/m<sup>3</sup> for each one percent increase or decrease in moisture content from 15 percent.

### 8 GRADING

8.1 The converted timber for use in aircraft construction shall be of two grades, namely, Grade I and Grade II based on the mechanical properties as given in Table 1.

### 9 SLOPE OF GRAIN

9.1 The maximum resultant slope of grain shall be determined in accordance with Appendix B of IS 1329 : 1975 and shall not exceed 1 in 15 for Grade I and 1 in 12 for Grade II.

### 10 SIZES

10.1 The sizes of finished timber shall be as agreed to between the supplier and the purchaser.

### 11 MARKING

11.1 The timber shall be legibly and indelibly marked with the following information:

- a) Grade (see 8.1), and
- b) Species of timber (see 4.1).

Table 1 Strength Requirements of Timber for Use in Aircraft Construction

( Clauses 6.1 and 8.1 )

Sl No.	Test	Characteristics	Strength Value at 15 Percent Moisture Content		Increase or Decrease for One Percent Below or Above 15 Percent Moisture Content	Method of Test, Ref to
			Grade I	Grade II		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Compression parallel to grain	Maximum compressive stress, <i>Mln</i>	42.5 N/mm <sup>2</sup>	34 N/mm <sup>2</sup>	1.4 N/mm <sup>2</sup>	Part 8 of IS 1708 : 1986 ( see Note 1 )
ii)	Izod impact	Work absorbed, <i>Mln</i>	8 200 N-mm	6 500 N-mm	—	Part 16 ( Fig. 19C ) of IS 1708 : 1986
iii)	Static bending ( two point loading )	a) Modulus of elasticity, <i>Mln</i>	0.105 × 10 <sup>6</sup> N/mm <sup>2</sup>	0.085 × 10 <sup>6</sup> N/mm <sup>2</sup>	1.75 × 10 <sup>2</sup> N/mm <sup>2</sup>	Part 6 of IS 1708 : 1986 ( see Note 2 )
		b) Modulus of Rupture	66.5 N/mm <sup>2</sup>	53.5 N/mm <sup>2</sup>	2.6 N/mm <sup>2</sup>	

## NOTES

1 Compression parallel to grain test shall be made on three specimens 25 mm × 25 mm × 100 mm in size cut out from the piece to be tested.

2 One test specimen 50 mm × 50 mm × 1 000 mm in size shall be taken from the piece to be tested, for static bending test under two point loading.

## ANNEX A

( Clause 7.1 )

## METHOD OF DETERMINATION OF DENSITY OF WOOD

## A-1 SAMPLE PREPARATION

A-1.1 Cut a sample approximately 25 mm long and full cross section of the board or plank from both ends, at a position clear of weathering, where the moisture content is known or is to be determined.

A-1.2 Make a number of measurements of length, width and thickness of each sample, obtain the

arithmetic mean of each dimension and calculate volume (*V*) of the sample in cubic metre.

A-1.3 Weigh each sample in grams (*W*) to an accuracy of 0.001 g.

Calculate the density as follows:

$$\text{Density} = \frac{W}{V} \times 10^3 \frac{\text{N}}{\text{m}^3}$$



**Standard Mark**

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

## **Bureau of Indian Standards**

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

### **Copyright**

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

### **Revision of Indian Standards**

Indian Standards are reviewed periodically and revised, when necessary and amendments, if any, are issued from time to time. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc : No. CED 9 (4596)

### **Amendments Issued Since Publication**

Amend No.	Date of Issue	Text Affected

## **BUREAU OF INDIAN STANDARDS**

### **Headquarters :**

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002  
Telephones : 331 01 31, 331 13 75

\* Telegrams : Manaksanstha  
( Common to all Offices )

### **Regional Offices :**

Telephone

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg  
NEW DELHI 110002

{ 331 01 31  
{ 331 13 75

Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola  
CALCUTTA 700054

37 86 62

Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036

2 18 43

Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113

41 29 16

Western : Manakalaya, E9 MIDC, Marol, Andheri ( East )  
BOMBAY 400093

6 32 92 95

**Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE.  
FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR.  
PATNA. TRIVANDRUM.**