IS 2372 (2004): Timber for cooling towers - [CED 9: Timber and Timber Stores]

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भारतीय मानक

# प्रशीतन टावरों के लिए इमारती लकड़ी — विशिष्टि

( दूसरा पुनरीक्षण )

*Indian Standard*

# TIMBER FOR COOLING TOWERS — SPECIFICATION

*( Second Revision )*

ICS 79.040



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

*September* 2004

**Price Group 1**

FOREWORD

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

This standard was first published in 1963. Based on the experience gained in this field, it was revised in 1991. Permissible defects in different grades of timber for cooling towers were also rationalized and the standard was brought in uniformity with the style of other standards on grading of timber. In this revision a rational approach has been made with respect to permitted defects.

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 COOLING TOWERS — SPECIFICATION

*( Second Revision )*

## 1 SCOPE

This standerd covers the species, grades, requirements and treatments for timber used in the construction of cooling towers.

## 2 REFERENCES

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

| *IS No.* | *Title* |
|---|---|
| 401 : 2001 | Preservation of timber — Code of practice (*fourth revision*) |
| 707 : 1976 | Glossary of terms applicable to timber technology and utilization (*second revision*) |

## 3 TERMINOLOGY

**3.1** For the purpose of this standard, the definition given in IS 707, and the following shall apply.

**3.1.1** *Columns*

The main vertical supporting members in the tower framework.

**3.1.2** *Fill* — These are either splash bars or splash slats. Splashing of water takes place on these bars or slats.

**3.1.3** *Joists and Beams* — Horizontal supports for live and dead loads, such as supports for fan deck flooring, filling drift eliminator, cold and hot water collecting and redistributing basins, water troughs, piping and mechanical equipment.

## 4 SPECIES OF TIMBER

The species of timber suitable for cooling towers shall be as given in Table 1.

## 5 GRADING OF TIMBER

**5.1** Cooling tower timbers shall be of three grades, namely, select grade, Grade I and Grade II depending on the defects permitted (*see* **5.3**).

**Table 1 Timbers for Cooling Towers**

(*Clause* 4)

| Sl No. | Botanical Name | Trade Name |
|---|---|---|
| (1) | (2) | (3) |
| i) | *Abies pindrow* | fir |
| ii) | *Cedrus deodara* | deodar |
| iii) | *Picea smithiana* | spruce |
| iv) | *Pinus kesiya* | khasi pine |
| v) | *Pinus roxburghii* | chir |
| vi) | *Pinus wallichiana* | kail |
| vii) | *Pseudotsuga taxifolia* | douglas fir |
| viii) | *Pinus radiata* | radiata pine |
| ix) | *Tectona grandis* | teak |

### 5.2 Prohibited Defects (for All Grades)

Timber with loose grain, reaction wood, heartwood rot, warp, worm holes which are likely to affect strength, pitch pockets, centre heart (pith), shakes twisted grain and wane shall not be selected for cooling towers.

### 5.3 Permissible Defects

The defects to the extent specified in Table 2 for different grades of timber shall be permissible.

## 6 DIMENSIONS AND TOLERANCES

**6.1** The suggested nominal sizes, rough and finished dimensions for various thicknesses are given in Table 3.

### 6.2 Tolerances

A 5-mm tolerance in length shall normally be permissible. In other dimensions, no minus tolerances shall be permitted but a maximum plus tolerance of 2 mm shall be permitted.

## 7 TREATMENT

The following treatments are recommended:

a) The structural members and the shell members are to be treated to a net retention of 12 kg/m$^3$ of timber with copper-chrome-arsenic (CCA) or acid-copper-chrome (ACC) or 16 kg/m$^3$ of copper-chrome-boron (CCB) or 128 kg/m$^3$ of creosote/fuel oil mixture in accordance with IS 401.

**Table 2 Permitted Defects for Different Grades of Timber for Cooling Towers**

(*Clause* 5.3)

| Sl No. | Defects | Select Grade | Grade I | Grade II |
|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) |
| i) | Slope of grain | Slope of grain shall not exceed 1 in 18 | Slope of grain shall not exceed 1 in 12 | Slope of grain shall not exceed 1 in 8 |
| ii) | Knot/Knot hole | Both on narrow and wide face up to 15 mm, the diameter of knots shall not be more than one fifth of the face. Beyond 50 mm face the diameter of knots shall not be more than one sixth of the face. Such knots shall not be more than one per any given 1.5 m length | Both on narrow and wide face up to 50 mm, the diameter of knots shall not be more than one fifth of the face. Beyond 50 mm face the diameter of knots shall not be more than one sixth of the face. Such knots shall not be more than one per any given 1 m length | Both on narrow and wide face up to 50 mm, the diameter of knots shall not be more than one fifth of the face. Beyond 50 mm face the diameter of knots shall not be more than one fifth of the face. Such knots shall not be more than two per any given 1 m length |
| iii) | Check | Check up to 3 mm in depth shall be allowed | Check up to 5 mm in depth shall be allowed | Checks up to 5 mm in depth shall be allowed |
| iv) | End split | End split shall be permitted up to 150 mm on either end subject to maximum 25 percent of overall length | End split shall be permitted up to 150 mm on either end subject to maximum 33 percent of overall length | End split shall be permitted up to 150 mm on either end subject to maximum 33 percent of overall length |

**Table 3 Nominal and Dressed Dimensions**

(*Clause* 6.1)

All dimensions in millimetres.

| | | | | | | |
|---|---|---|---|---|---|---|
| **Nominal Rough Thickness or Width** | 25 | 32 | 38 | 50 | 75 | over 100 |
| **Minimum Rough Sawn Thickness or Width** | 23 | 30 | 35 | 47.5 | 72.5 | off 5 |
| **Dressed Thickness or Width** | 21 | 27 | 32 | 45 | 70 | off 10 |

b) Fill is to be treated under pressure with a minimum average retention of 16 kg/m$^3$ of timber with copper-chrome-arsenic (CCA) or acid-copper-chrome (ACC) or 20 kg/m$^3$ of copper-chrome-boron (CCB) or 160 kg/m$^3$ of creosote/fuel oil mixture in accordance with IS 401.

### 7.1 Penetration of Preservatives

The depth of penetration of the preservative shall be as given in Table 4.

**Table 4 Depth of Penetration of Preservative in Different Species of Timber**

(*Clause* 7.1)

| Sl No. | Botanical Name | Depth, *Min.* | |
|---|---|---|---|
| | | Sapwood (Percent) | Heartwood |
| (1) | (2) | (3) | (4) |
| i) | *Abies pindrow* | 100 | 5 mm[1)] |
| ii) | *Cedrus deodara* | 100 | 10 mm |
| iii) | *Pseudotsuga taxifolia* | 100 | 5 mm[1)] |
| iv) | *Picea smithiana* | 100 | 5 mm[1)] |
| v) | *Pinus kesiya* | 100 | 20 mm |
| vi) | *Pinus radiata* | 100 | 20 mm |
| vii) | *Pinus roxburghii* | 100 | 20 mm |
| viii) | *Pinus wallichiana* | 100 | 10 mm |
| ix) | *Tectona grandis* | 100 | Needs no treatment |

[1)] For structural member incision about 15 mm should be made on all surfaces (except end ) to achieve the required absorption.

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**Amendments Issued Since Publication**

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