

**BUREAU OF INDIAN STANDARDS****MINUTES**

**Panel for Glass and Glazing, CED 46:P20 : Third Meeting**

**Friday, 05 April 2024 : 1030 h – 1400 h**

**Mimaansa (White Room), Bureau of Indian Standards, Manak Bhavan,  
9 Bahadur Shah Zafar Marg, New Delhi 110 002**

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**Convener:** Shri Pradeep Garg

**Member Secretary:** Shri Arunkumar S., Head(NBC Cell)

**NBC Officer :** Shri Shubham Chaudhary

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**Members Present Physically:**

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|----|------------------|---|
| 1) | Shri Arun Sharma | International Fenestration Forum, New Delhi |
|----|------------------|---|

**Members Present Virtually:**

|     |                              |  |
|-----|------------------------------|--|
| 2)  | Shri S. K. Negi              | CSIR-Central Building Research Institute, Roorkee                |
| 3)  | Shri Saju Siddharthan        | Central Public Works Department, New Delhi                       |
| 4)  | Shri Barjinder Singh<br>Ghai | Creative Design Consultants & Engineers Pvt. Ltd.,<br>Ghaziabad  |
| 5)  | Shri G N Gohul Deepak        | Glazing Society of India, Chennai                                |
| 6)  | Ms Dilna Subramanian         | Glazing Society of India, Chennai                                |
| 7)  | Dr Mahesh Tandon             | Indian Association of Structural Engineers, New<br>Delhi         |
| 8)  | Dr E. Rajasekar              | Indian Institute of Technology Roorkee, Roorkee                  |
| 9)  | Shri Bino                    | Rep. Larsen & Toubro Ltd, Chennai                                |
| 10) | Shri K. Surya Prakash        | Rep. Larsen & Toubro Ltd, Chennai                                |
| 11) | Shri Mahesh Arumugam         | Meinhardt Facade Technology India Pvt Ltd,<br>Chennai            |
| 12) | Shri Anuj Kumar Goyal        | NBCC (India) Limited, New Delhi                                  |
| 13) | Shri Avinash Gowra           | Rep. Saint-Gobain Glass India, Chennai                           |
| 14) | Ms Kaarnika                  | Rep. Saint-Gobain Glass India, Chennai                           |
| 15) | Shri Antony John             | Schueco India Pvt Ltd, Bangalore                                 |
| 16) | Shri Kushagra Awasthi        | Schueco India Pvt Ltd, Bangalore                                 |
| 17) | Shri Nagendra Kumar          | Rep. The All India Glass Manufacturers' Federation,<br>New Delhi |
| 18) | Shri Shailesh Ranjan         | Rep. The All India Glass Manufacturers' Federation,<br>New Delhi |
| 19) | Shri Tushar Zope             | Rep. The All India Glass Manufacturers' Federation,<br>New Delhi |

|     |                             |  |
|-----|-----------------------------|--|
| 20) | Shri Satish Kumar           | Rep. UWDMA, New Delhi                          |
| 21) | Shri P. Jothi<br>Ramalingam | Winwall Technology India Pvt Ltd, Chennai      |
| 22) | Shri Narayanasamy           | Rep. Winwall Technology India Pvt Ltd, Chennai |
| 23) | Shri Sharanraj A.           | Rep. Winwall Technology India Pvt Ltd, Chennai |

**From BIS :**

Shri Abhishek Pal, Scientist 'D' (Civil Engg)

Shri Abhishek Sharma, Scientist 'B' (Civil Engg)

**Item 0 OPENING REMARKS**

The Convener, Shri Pradeep Garg, cordially welcomed the members to the third meeting of the Panel for Glass and Glazing, CED 46:P20. Shri Garg expressed his gratitude to the National Building Code Sectional Committee, CED 46 of BIS for entrusting him with the responsibility to convene the expert Panel. Highlighting the advantages of the use of glass and the ever-increasing use to use this material including in partitions and even fire doors, Shri Garg mentioned that a holistic treatment of the provisions right from the usage in buildings through the disposal/dismantling needs to be covered in the Code to guide every related professional. He also mentioned that the chapter needs to be aptly read with the provisions relating to the seismic design of non-structural elements in building construction as in the seismic design standards. Shri Garg also suggested for providing a sufficient design guide when glass is being used as a load-bearing member when used in horizontal applications like slabs, stairs and floors. He also suggested to cover in the new NBC guidelines for blast resistant, bullet resistant and burglar resistant glass as its usage is increasing in new constructions in India now. Also, guidelines be included for frameless glazing in partitions, dry walls, doors & windows, railings, parapets etc. Noting the spectrum of domain knowledge available with the member organizations, he solicited wide views of the expert members present all through this revision of the National Building Code of India.

Earlier, Shri Arunkumar S, Head (NBC Cell) thanked Shri R N Dandekar (former ADG, CPWD) the immediate past Convener of the Panel for his leadership in the introduction of the new section under Part 6 in NBC 2016. Shri Arunkumar introduced Shri Garg to the Panel and also welcomed him to this first meeting and to convene the same.

Thereafter, it was decided to take up the Agenda item-wise.

**Item 1 CONFIRMATION OF MINUTES OF THE LAST MEETING**

**1.1** There being no comments, the Panel confirmed the Minutes of the last (second) meeting of the Panel held on 21 October 2015 in New Delhi, as circulated vide BIS DG letter No. CED 46:P20/A-2.2 dated 18 January 2016; based on which the National Building Code Sectional Committee, CED 46 had finalized the provisions and published the Code as NBC 2016 which was released on 15 March 2017.

## Item 2 COMPOSITION

2.1 The Panel noted its existing composition as given at Annex 1 to the Agenda. The Panel thereafter reviewed the same and decided/noted as below:

- a) The All India Glass Manufacturers' Federation, New Delhi would henceforth be represented by Shri Shailesh Ranjan and Shri Rupinder Shelly as their Principal and Alternate member respectively as informed by them during the meeting.
- b) M/s Saint-Gobain Glass India, Chennai would henceforth be represented by Shri Anand Santhanam and Shri Avinash Gowra as their Principal and Alternate member respectively as informed by them during the meeting.
- c) IIT Madras shall be represented also by their Dr P. Alagappan as informed by Dr S. Arul Jayachandran. They were requested to also send a formal request in this regard.
- d) UWDMA, New Delhi shall be represented by Shri Satish Kumar.
- e) To withdraw the nominations of M/s AECOM India Pvt Ltd, Noida in view of their continued non-participation and no response.
- f) To retain the membership of Delhi Development Authority, New Delhi by their designation.
- g) As requested by Shri S. K. Dheri to be relieved from the Panel.
- h) To co-opt another Fire Services (say Telangana/West Bengal) on the Panel, in consultation with Shri S. K. Dheri, Convener, CED 46 : P2.
- i) To obtain the revised nominations of M/s Façade India Testing Inc, Thane in view of their Shri Pravin Gaikwad having left the organization.
- j) To obtain the revised nominations of M/s International Fenestration Forum, Noida in view of their Shri Nikhil Kant having left the organization.
- k) To obtain the revised nominations of The Institution of Engineers (India), Kolkata as they have done so for various other Panels under CED 46.
- l) To co-opt M/s BES Consultants Pvt Ltd, Mumbai in view of their request.
- m) To seek the interest from the following and based on their response and inputs on the specific clauses, invite them to the next meeting and co-opt thereafter:
  - 1) Hilti India Private Limited, New Delhi
  - 2) Fischer India Private Limited, New Delhi
  - 3) Blick System India Private Limited, Thane

- 4) Teknal India Private Limited, New Delhi
- 5) Alufit India Private Limited, Bengaluru
- 6) The Energy and Resources Institute, New Delhi
- 7) Federation of Safety Glass, Haryana

Further, regarding the revised nominees/names as mentioned by the organizations during the meeting, it was decided that the respective organizations should send the same formally through email to [ced46@bis.gov.in](mailto:ced46@bis.gov.in) for BIS' records.

### **Item 3 PROJECT OF REVISION OF NBC**

**3.1** The Panel noted the information regarding the comprehensive exercise of revision of NBC 2016, being carried out through the 22 Panels to bring updates to the various Parts/Sections of NBC 2016 (as at Annex 2 of the Agenda) and to bring out most modern and state-of-the-art revision of the Code.

**3.2** The Panel noted the existing chapter titled 'Glass and Glazing' in Section 8 of Part 6 'Structural Design' of NBC 2016 and its contents as given in Annex 3 to the Agenda.

**3.2.1** The Panel noted that the ongoing revision of the National Building Code of India (NBC) is a comprehensive and interconnected effort involving thirty-three chapters. The revision exercise aims to refine the contents of the Code to ease its implementation and align the chapters with the current industry standards and practices. In this context, the Panel agreed that for harmonious revision of the Code, interconnection within the various Parts is essential including with that to Part 11 'Approach to Sustainability'.

**3.2.2** The Panel agreed that a methodical and consensus-driven approach, by leveraging the collective expertise of Panel members is essential and that the written suggestions and structured inputs/reviews from all the member organizations will be essential.

Based on the discussions during the meeting, the following were noted/decided to be suitably included in the revision:

- a) Special loading/security related, such as blast resistance, bullet resistance, burglar/security glazing.
- b) Update the provisions relating to energy and thermal performance.
- c) Update the provisions relating to fire safety aspects including testing.
- d) Review and update the provisions on structural design to cover all options of framing members and frameless glazing.
- e) Review and update the provisions relating to performance and testing of glass used as a system.
- f) Inclusion of a suitable informatory annex serving as a ready checklist for the municipal corporation/municipalities to verify the conformity to the relevant clauses of this chapter of NBC.
- g) Provisions for disposing and recycling of dismantled glass may be introduced here or in Part 9/Sec 4 of NBC.

- h) Review of the provisions relating to structural design of glass in tall/super tall buildings.
- i) Review w.r.t the provisions for use for glass in design of railings and parapet walls, horizontal slabs and caution thereof.

**3.3** It was decided that all the members of the Panel shall send their written inputs/comments/suggestions on the Working Draft of Part 6/Section 8 of NBC including the suggestive draft clauses before **19 April 2024**. Furthermore, the following Working Groups, comprising the members as below, were constituted to review the forthcoming inputs and formulate the requisite modifications or amendments to the existing chapter of the Code:

**a) Working Group for Energy, Thermal Performance (particularly Clause 5)**

| Organization                                      | Name                                       | Email Id   | Mobile No.  |
|---|--|--|-------------|
| IIT Roorkee,<br>Roorkee                           | Dr E. Rajasekar -<br><b>Group Convener</b> | <a href="mailto:raj@ar.iitr.ac.in">raj@ar.iitr.ac.in</a>                             | 9790828093  |
| Bureau of Energy<br>Efficiency, New<br>Delhi      | Shri Saurabh Diddi                         | <a href="mailto:sdiddi@beeindia.gov.in">sdiddi@beeindia.gov.in</a>                   | 9911105020  |
| Larsen and<br>Toubro Limited,<br>Chennai          | Shri Surya Prakash<br>Karri                | <a href="mailto:ksp@Intecc.com">ksp@Intecc.com</a>                                   | 94445046043 |
| Schueco India<br>Private Limited,<br>Bengaluru    | Shri Kushagra<br>Awasthi                   | <a href="mailto:kawasthi@schueco.in">kawasthi@schueco.in</a>                         | 9694579878  |
| Glazing Society of<br>India, Chennai              | Shri G. N. Gohul<br>Deepak                 | <a href="mailto:gohul.deepak@glazingsociety.com">gohul.deepak@glazingsociety.com</a> | 9994498795  |
| International<br>Fenestration<br>Forum, New Delhi | Shri Arun Sharma                           | <a href="mailto:arunindia4@gmail.com">arunindia4@gmail.com</a>                       | 9811038807  |

**b) Working Group for Special Glass ( Blast / Bullet resistant, Burglary safe ) –  
New Clause(s)**

| Organization  | Name  | Email Id   | Mobile No.  |
|---|---|--|-------------|
| Meinhardt Facade<br>Technology India<br>Private Limited,<br>Chennai | Shri Mahesh<br>Arumugam<br><b>-Group Convener</b> | <a href="mailto:mahesh.a@mfacade.com">mahesh.a@mfacade.com</a>             | 9952041111  |
| Schueco India<br>Private Limited,<br>Bengaluru                      | Shri Antony John V.<br>S.                         | <a href="mailto:ajohn@schueco.in">ajohn@schueco.in</a>                     | 9663501004  |
| Larsen and Toubro<br>Limited, Chennai                               | Shri Surya Prakash<br>Karri                       | <a href="mailto:ksp@Intecc.com">ksp@Intecc.com</a>                         | 94445046043 |
| Saint-Gobain Glass<br>India Private Limited,<br>Chennai             | Shri Avinash Gowra                                | <a href="mailto:avinash.g@saint-gobain.com">avinash.g@saint-gobain.com</a> | 9176516138  |
| International   | Shri Arun Sharma                                  | <a href="mailto:arunindia4@gmail.com">arunindia4@gmail.com</a>             | 9811038807  |

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|--|--|--|------------|
| Fenestration Forum,<br>New Delhi                 |  |  |            |
| Central Public Works<br>Department, New<br>Delhi | Shri Pradeep Garg                            | <a href="mailto:pradeepsecpwd@gmail.com">pradeepsecpwd@gmail.com</a> | 9420685651 |
| DRDO Laboratory                                  | Details to be<br>provided by the<br>Convener |  |            |

**c) Working Group for Fire Safety Aspects (particularly Clause 6)**

| Organization   | Name   | Email Id   | Mobile No. |
|--|--|--|------------|
| IIT Gandhinagar  | Prof Gaurav<br>Srivastava –<br><b>Group<br/>Convener</b> | gauravs@iitgn.ac.in  | 8141694724 |
| CSIR - Central<br>Building Research<br>Institute, Roorkee    | Dr. Shorab Jain  | shorab122@cbri.res.in  | 9897062284 |
| All India Glass<br>Manufacturers<br>Federation, New<br>Delhi | Shri Nagendra<br>Kumar                                   | nagendra.kumar@aisglass.com                                  | 8657436526 |
| BES Consultants Pvt<br>Ltd, Mumbai                           | Shri Rajan<br>Govind                                     | rajan@besconsultants.net                                     | 9930080118 |
| Indian Institute of<br>Technology Tirupati                   | Dr Jashnav<br>Pancheti                                   | <a href="mailto:jashnav@iittp.ac.in">jashnav@iittp.ac.in</a> | 7349211594 |
| Afiti Global Fire<br>Testing Pvt Ltd,<br>Chennai             | Shri Akhil<br>Chacko                                     | akhilvargees@gmail.com                                       | 7510886977 |

**d) Working Group for Structural Design Aspects (particularly Clauses 6 and 8)**

| Organization  | Name   | Email Id   | Mobile No.  |
|---|--|--|-------------|
| BES Consultants Pvt<br>Ltd, Mumbai                          | Shri Rajan<br>Govind – <b>Group<br/>Convener</b> | rajan@besconsultants.net                                       | 9930080118  |
| Larsen and Toubro<br>Limited, Chennai                       | Shri Surya<br>Prakash Karri                      | ksp@Intecc.com   | 94445046043 |
| Schueco India<br>Private Limited,<br>Bengaluru              | Shri Antony<br>John V S                          | <a href="mailto:ajohn@schueco.in">ajohn@schueco.in</a>         | 9663501004  |
| Indian Institute of<br>Technology Madras,<br>Chennai        | Dr Alagappan<br>Ponnalagu                        | <a href="mailto:alagappan@iitm.ac.in">alagappan@iitm.ac.in</a> | 04422574320 |
| Indian Association of<br>Structural Engineers,<br>New Delhi | Representative                                   |  |             |

**e) Working Group for Performance and Testing (particularly Annexes E & F)**

| Organization  | Name        | Email Id   | Mobile No. |
|---------------|-------------|--|------------|
| Schueco India | Shri Antony | <a href="mailto:ajohn@schueco.in">ajohn@schueco.in</a> | 9663501004 |

|   |   |  |            |
|---|---|--|------------|
| Private Limited,<br>Bengaluru   | John V S –<br><b>Group<br/>Convener</b> |  |            |
| Winwall Technology<br>India Private<br>Limited, Chennai                     | Shri P. Jothi<br>Ramalingam             | jothi.r@winwallindia.com   | 9841020620 |
| Façade India<br>Testing Inc, Thane  | Shri V. S. Ravi                         | vsravi@facade1.com   | 9768135085 |
| Eminent<br>International<br>Testing Centre<br>Private Limited,<br>Hyderabad | Shri Reji Bhami                         | <a href="mailto:rejibhami@eminent-itc.com">rejibhami@eminent-itc.com</a> | 7025000043 |

All the Working Groups were requested to immediately initiate discussions within their Group and arrive at their recommendations on the respective clauses (and their Annexes) by **30 May 2024**.

Further, it was decided that the comments received from The All India Glass Manufacturers' Federation (from their Shri Nagendra Kumar) on the Working Draft would be scrutinized by the relevant Working Groups as above for suitable incorporation in the Code.

#### **Item 4 COMMENTS RECEIVED ON / INPUTS RELATED TO PART 6/SECTION 8 'GLASS AND GLAZING' OF SP7 : 2016**

**4.1** It was decided by the Panel that the relevant Working groups, as constituted at **3.3** above, shall examine the comments from National Safety Council as given under the item of the agenda for suitable incorporation in the revision.

#### **Item 5 PROJECT OF PROMOTION OF USE OF NBC 2016 IN ALL STATES AND UTs OF INDIA**

**5.1** The BIS' Secretariat explained about the above Project that involved an exercise of Promotion of use of National Building Code of India 2016 in all States and UTs of India. The major deliverable namely the draft Standardized Development and Building Regulations aligned with the provisions of NBC 2016 and the other deliverables such as the [State wise](#) regulations, [Pamphlets](#) for awareness of general public, [GUIDE TO USING THE NBC](#) were explained to the members who appreciated the entire BIS team.

**5.2** The Panel noted the information about the new special publication, **SP 73 : 2023 'Standardized Development and Building Regulations, 2023'** was also published and released, which is available for access (free download) from the BIS' website and from: <https://standardsbis.bsbedge.com/>

#### **Item 6 DATE & PLACE OF THE NEXT MEETING**

**6.1** It was decided to hold the next meeting of the Panel around June 2024 after the receipt of inputs (as per items **3.2.2** and **3.3** above) from the members of the Panel and after the scrutiny of the comments received on the chapter by the Working groups.

**Item 7 ANY OTHER BUSINESS**

**7.1** The BIS Secretariat and the members complimented the Convener, Shri Pradeep Garg for excellently conducting the meeting and providing leadership in the revision exercise taken up in the important field of Glass and Glazing. The BIS Secretariat also thanked all the members and experts for taking active interest in the meeting leading to useful deliberations.

**7.2** There being no other business to transact, the meeting, thereafter, ended with a hearty vote of thanks to the Chair.

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