



## CERTIFICATE OF APPROVAL

### No CF 5359

This is to certify that, in accordance with  
TS00 General Requirements for Certification of Fire Protection Products  
The undermentioned products of

## Arabian Vermiculite Industries

**P.O. Box 7137, Dammam 31462**  
**Tel. +966 3847 1450 Fax: +966 3847 1575**

Have been assessed against the requirements of the Technical Schedule(s)  
denoted below and are approved for use subject to the conditions  
appended hereto:

#### CERTIFIED PRODUCT

**AVIKOTE WB1200G**

#### TECHNICAL SCHEDULE

**TS15 Intumescent  
Coatings for Steelwork**

**Signed and sealed for and on behalf of CERTIFIRE**



Sir Ken Knight  
Chairman  
WCL Impartiality Committee



Paul Duggan  
Certification Manager  
Warrington Certification Ltd



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020

Page 1 of 34





## CERTIFICATE No CF 5359

### Arabian Vermiculite Industries

#### AVIKOTE WB1200G

1. This approval relates to the use of AVIKOTE WB1200G for the fire protection of steel I-shaped beams and columns, circular and rectangular hollow column sections. The precise scope is given in Tables 1 to 24 which show the total dry film thickness of AVIKOTE WB1200G (excluding primer and topcoat) required to provide fire resistance periods in accordance with BS476: Part 21: 1987 of 15 minutes up to 120 minutes for differing sections, section factors and design temperatures.
2. This certification is designed to demonstrate compliance of the product or system specifically with Approved Document B (England and Wales), Section 2 of the Technical Standards (Scotland), Technical Booklet E (N. Ireland). If compliance is required to other regulatory or guidance documents there may be additional considerations or conflict to be taken into account.'
3. The products are approved on the basis of:
  - i) Initial type testing.
  - ii) A design appraisal against TS15.
  - iii) Certification of quality management system to ISO 9001: 2008.
  - iv) Inspection and surveillance of factory production control.
  - v) Audit testing.
4. The data referring to three-sided fire exposure of beams relate to beams supporting concrete floor slabs. Separate consideration is required where this is not the case.
5. The data shown is applicable to steel sections blast cleaned to ISO 8501-1 SA 2<sup>1/2</sup> or equivalent and primed with a suitable and compatible primer. Specifications of surface preparations, primers and topcoats are available from the manufacturer whose responsibility is to ensure that AVIKOTE WB1200G is compatible for use in respect of both ambient and fire conditions. The total dry film thickness of primer and topcoat together should not exceed that tested.
6. Specific data given in the tables applies to horizontal, vertical, flexural and compression members supporting loads up to the maximum design loads specified in BS449: Part 2.
7. The approval relates to on going production. Product and/or its immediate packaging is identified with the manufacturers' name, the product name or number, the CERTIFIRE name or name and mark, together with the CERTIFIRE certificate number and application where appropriate.
8. The data shown in the tables is based on assessments which comply with the criteria for acceptability now incorporated within the CERTIFIRE scheme.



# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 1: I-Section Beams 15 minutes  |   |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|                                      | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 620°C | 650°C | 700°C | 750°C |
| 85                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 90                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 95                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 100                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 105                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 110                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 115                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 120                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 125                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 130                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 135                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 140                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 145                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 150                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 155                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 160                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 165                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 170                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 175                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 180                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 185                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 190                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 195                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 200                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 205                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 210                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 215                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 220                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 225                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 230                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 235                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 240                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 245                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 250                                  | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 255                                  | 0.457   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 260                                  | 0.468   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 265                                  | 0.479   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 270                                  | 0.490   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 275                                  | 0.501   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 280                                  | 0.513   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 285                                  | 0.524   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 290                                  | 0.535   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 295                                  | 0.546   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 300                                  | 0.557   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 305                                  | 0.568   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 310                                  | 0.580   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 315                                  | 0.591   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 320                                  | 0.602   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 325                                  | 0.613   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 330                                  | 0.624   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 335                                  | 0.636   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 340                                  | 0.647   | 0.458 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 345                                  | 0.658   | 0.467 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 350                                  | 0.669   | 0.477 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 355                                  | 0.680   | 0.486 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 360                                  | 0.692   | 0.496 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |

Table applies to I-section beams with 3 sides fire exposure and a concrete slab on top. Thickness is intumescent only.

Page 3 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 2: I-Section Beams 30 minutes  |   |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|                                      | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 620°C | 650°C | 700°C | 750°C |
| 85                                   | 0.455   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 90                                   | 0.475   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 95                                   | 0.495   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 100                                  | 0.515   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 105                                  | 0.536   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 110                                  | 0.556   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 115                                  | 0.576   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 120                                  | 0.596   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 125                                  | 0.617   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 130                                  | 0.637   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 135                                  | 0.657   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 140                                  | 0.678   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 145                                  | 0.698   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 150                                  | 0.718   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 155                                  | 0.738   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 160                                  | 0.759   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 165                                  | 0.779   | 0.472 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 170                                  | 0.799   | 0.492 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 175                                  | 0.819   | 0.512 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 180                                  | 0.840   | 0.532 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 185                                  | 0.860   | 0.552 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 190                                  | 0.880   | 0.572 | 0.461 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 195                                  | 0.901   | 0.592 | 0.478 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 200                                  | 0.921   | 0.612 | 0.496 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 205                                  | 0.941   | 0.632 | 0.513 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 210                                  | 0.961   | 0.652 | 0.530 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 215                                  | 0.982   | 0.672 | 0.547 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 220                                  | 1.002   | 0.692 | 0.564 | 0.457 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 225                                  | 1.022   | 0.712 | 0.581 | 0.472 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 230                                  | 1.042   | 0.732 | 0.598 | 0.487 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 235                                  | 1.063   | 0.752 | 0.615 | 0.502 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 240                                  | 1.083   | 0.772 | 0.632 | 0.517 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 245                                  | 1.103   | 0.792 | 0.650 | 0.531 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 250                                  | 1.124   | 0.812 | 0.667 | 0.546 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 255                                  | 1.144   | 0.832 | 0.684 | 0.561 | 0.459 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 260                                  | 1.164   | 0.852 | 0.701 | 0.576 | 0.472 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 265                                  | 1.184   | 0.872 | 0.718 | 0.591 | 0.485 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 270                                  | 1.205   | 0.892 | 0.735 | 0.606 | 0.498 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 275                                  | 1.225   | 0.912 | 0.752 | 0.620 | 0.510 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 280                                  | 1.245   | 0.932 | 0.769 | 0.635 | 0.523 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 285                                  | 1.265   | 0.952 | 0.786 | 0.650 | 0.536 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 290                                  | 1.286   | 0.972 | 0.804 | 0.665 | 0.549 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 295                                  | 1.306   | 0.992 | 0.821 | 0.680 | 0.561 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 300                                  | 1.326   | 1.012 | 0.838 | 0.695 | 0.574 | 0.465 | 0.454 | 0.454 | 0.454 | 0.454 |
| 305                                  | 1.346   | 1.032 | 0.855 | 0.709 | 0.587 | 0.476 | 0.454 | 0.454 | 0.454 | 0.454 |
| 310                                  | 1.367   | 1.052 | 0.872 | 0.724 | 0.600 | 0.486 | 0.454 | 0.454 | 0.454 | 0.454 |
| 315                                  | 1.387   | 1.072 | 0.889 | 0.739 | 0.612 | 0.497 | 0.454 | 0.454 | 0.454 | 0.454 |
| 320                                  | 1.407   | 1.092 | 0.906 | 0.754 | 0.625 | 0.508 | 0.464 | 0.454 | 0.454 | 0.454 |
| 325                                  | 1.428   | 1.112 | 0.923 | 0.769 | 0.638 | 0.519 | 0.474 | 0.454 | 0.454 | 0.454 |
| 330                                  | 1.448   | 1.131 | 0.940 | 0.784 | 0.651 | 0.530 | 0.484 | 0.454 | 0.454 | 0.454 |
| 335                                  | 1.468   | 1.151 | 0.958 | 0.798 | 0.663 | 0.540 | 0.494 | 0.454 | 0.454 | 0.454 |
| 340                                  | 1.488   | 1.171 | 0.975 | 0.813 | 0.676 | 0.551 | 0.504 | 0.454 | 0.454 | 0.454 |
| 345                                  | 1.509   | 1.191 | 0.992 | 0.828 | 0.689 | 0.562 | 0.514 | 0.454 | 0.454 | 0.454 |
| 350                                  | 1.529   | 1.211 | 1.009 | 0.843 | 0.702 | 0.573 | 0.524 | 0.456 | 0.454 | 0.454 |
| 355                                  | 1.549   | 1.231 | 1.026 | 0.858 | 0.714 | 0.583 | 0.534 | 0.465 | 0.454 | 0.454 |
| 360                                  | 1.569   | 1.251 | 1.043 | 0.873 | 0.727 | 0.594 | 0.544 | 0.474 | 0.454 | 0.454 |

Table applies to I-section beams with 3 sides fire exposure and a concrete slab on top. Thickness is intumescent only.

Page 4 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 3: I-Section Beams 45 minutes  |   |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|                                      | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 620°C | 650°C | 700°C | 750°C |
| 85                                   | 1.055   | 0.707 | 0.484 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 90                                   | 1.077   | 0.721 | 0.507 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 95                                   | 1.100   | 0.744 | 0.529 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 100                                  | 1.123   | 0.767 | 0.551 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 105                                  | 1.145   | 0.790 | 0.573 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 110                                  | 1.168   | 0.813 | 0.595 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 115                                  | 1.190   | 0.836 | 0.617 | 0.473 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 120                                  | 1.213   | 0.859 | 0.639 | 0.494 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 125                                  | 1.236   | 0.882 | 0.661 | 0.514 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 130                                  | 1.258   | 0.905 | 0.683 | 0.535 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 135                                  | 1.281   | 0.928 | 0.706 | 0.556 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 140                                  | 1.303   | 0.951 | 0.728 | 0.576 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 145                                  | 1.326   | 0.974 | 0.750 | 0.597 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 150                                  | 1.349   | 0.997 | 0.772 | 0.618 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 155                                  | 1.371   | 1.020 | 0.794 | 0.639 | 0.462 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 160                                  | 1.394   | 1.043 | 0.816 | 0.659 | 0.482 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 165                                  | 1.416   | 1.066 | 0.838 | 0.680 | 0.501 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 170                                  | 1.439   | 1.089 | 0.860 | 0.701 | 0.521 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 175                                  | 1.462   | 1.112 | 0.882 | 0.721 | 0.540 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 180                                  | 1.484   | 1.135 | 0.905 | 0.742 | 0.560 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 185                                  | 1.507   | 1.158 | 0.927 | 0.763 | 0.580 | 0.463 | 0.454 | 0.454 | 0.454 | 0.454 |
| 190                                  | 1.529   | 1.181 | 0.949 | 0.784 | 0.599 | 0.480 | 0.454 | 0.454 | 0.454 | 0.454 |
| 195                                  | 1.552   | 1.204 | 0.971 | 0.804 | 0.619 | 0.498 | 0.465 | 0.454 | 0.454 | 0.454 |
| 200                                  | 1.575   | 1.227 | 0.993 | 0.825 | 0.639 | 0.515 | 0.481 | 0.454 | 0.454 | 0.454 |
| 205                                  | 1.597   | 1.250 | 1.015 | 0.846 | 0.658 | 0.533 | 0.498 | 0.454 | 0.454 | 0.454 |
| 210                                  | 1.620   | 1.273 | 1.037 | 0.867 | 0.678 | 0.550 | 0.514 | 0.466 | 0.454 | 0.454 |
| 215                                  | 1.642   | 1.296 | 1.059 | 0.887 | 0.697 | 0.567 | 0.531 | 0.480 | 0.454 | 0.454 |
| 220                                  | 1.665   | 1.319 | 1.081 | 0.908 | 0.717 | 0.585 | 0.547 | 0.495 | 0.454 | 0.454 |
| 225                                  | 1.691   | 1.342 | 1.104 | 0.929 | 0.737 | 0.602 | 0.564 | 0.510 | 0.454 | 0.454 |
| 230                                  | 1.729   | 1.365 | 1.126 | 0.949 | 0.756 | 0.620 | 0.581 | 0.525 | 0.454 | 0.454 |
| 235                                  | 1.767   | 1.388 | 1.148 | 0.970 | 0.776 | 0.637 | 0.597 | 0.540 | 0.456 | 0.454 |
| 240                                  | 1.805   | 1.411 | 1.170 | 0.991 | 0.796 | 0.655 | 0.614 | 0.555 | 0.469 | 0.454 |
| 245                                  | 1.844   | 1.434 | 1.192 | 1.012 | 0.815 | 0.672 | 0.630 | 0.570 | 0.482 | 0.454 |
| 250                                  | 1.882   | 1.457 | 1.214 | 1.032 | 0.835 | 0.690 | 0.647 | 0.585 | 0.495 | 0.454 |
| 255                                  | 1.920   | 1.480 | 1.236 | 1.053 | 0.855 | 0.707 | 0.663 | 0.600 | 0.507 | 0.454 |
| 260                                  | 1.958   | 1.503 | 1.258 | 1.074 | 0.874 | 0.725 | 0.680 | 0.615 | 0.520 | 0.454 |
| 265                                  | 1.996   | 1.527 | 1.281 | 1.094 | 0.894 | 0.742 | 0.696 | 0.630 | 0.533 | 0.454 |
| 270                                  | 2.035   | 1.550 | 1.303 | 1.115 | 0.913 | 0.760 | 0.713 | 0.645 | 0.546 | 0.454 |
| 275                                  | 2.073   | 1.573 | 1.325 | 1.136 | 0.933 | 0.777 | 0.729 | 0.659 | 0.559 | 0.454 |
| 280                                  | 2.111   | 1.596 | 1.347 | 1.157 | 0.953 | 0.795 | 0.746 | 0.674 | 0.572 | 0.454 |
| 285                                  | 2.149   | 1.619 | 1.369 | 1.177 | 0.972 | 0.812 | 0.762 | 0.689 | 0.585 | 0.455 |
| 290                                  | 2.188   | 1.642 | 1.391 | 1.198 | 0.992 | 0.830 | 0.779 | 0.704 | 0.597 | 0.466 |
| 295                                  | 2.226   | 1.665 | 1.413 | 1.219 | 1.012 | 0.847 | 0.795 | 0.719 | 0.610 | 0.476 |
| 300                                  | 2.264   | 1.691 | 1.435 | 1.240 | 1.031 | 0.865 | 0.812 | 0.734 | 0.623 | 0.486 |
| 305                                  | 2.302   | 1.731 | 1.457 | 1.260 | 1.051 | 0.882 | 0.828 | 0.749 | 0.636 | 0.496 |
| 310                                  | 2.341   | 1.771 | 1.480 | 1.281 | 1.070 | 0.900 | 0.845 | 0.764 | 0.649 | 0.507 |
| 315                                  | 2.379   | 1.811 | 1.502 | 1.302 | 1.090 | 0.917 | 0.861 | 0.779 | 0.662 | 0.517 |
| 320                                  | 2.417   | 1.851 | 1.524 | 1.322 | 1.110 | 0.935 | 0.878 | 0.794 | 0.675 | 0.527 |
| 325                                  | 2.455   | 1.890 | 1.546 | 1.343 | 1.129 | 0.952 | 0.894 | 0.809 | 0.687 | 0.537 |
| 330                                  | 2.493   | 1.930 | 1.568 | 1.364 | 1.149 | 0.970 | 0.911 | 0.824 | 0.700 | 0.548 |
| 335                                  | 2.532   | 1.970 | 1.590 | 1.385 | 1.169 | 0.987 | 0.927 | 0.839 | 0.713 | 0.558 |
| 340                                  | 2.570   | 2.010 | 1.612 | 1.405 | 1.188 | 1.005 | 0.944 | 0.853 | 0.726 | 0.568 |
| 345                                  | 2.608   | 2.050 | 1.634 | 1.426 | 1.208 | 1.022 | 0.960 | 0.868 | 0.739 | 0.578 |
| 350                                  | 2.646   | 2.090 | 1.656 | 1.447 | 1.228 | 1.040 | 0.977 | 0.883 | 0.752 | 0.589 |
| 355                                  | 2.685   | 2.130 | 1.679 | 1.467 | 1.247 | 1.057 | 0.993 | 0.898 | 0.765 | 0.599 |
| 360                                  | 2.723   | 2.170 | 1.714 | 1.488 | 1.267 | 1.075 | 1.010 | 0.913 | 0.778 | 0.609 |

Table applies to I-section beams with 3 sides fire exposure and a concrete slab on top. Thickness is intumescent only.

Page 5 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 4: I-Section Beams 60 minutes  |   |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|                                      | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 620°C | 650°C | 700°C | 750°C |
| 85                                   | 1.683   | 1.270 | 0.955 | 0.702 | 0.494 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 90                                   | 1.716   | 1.293 | 0.979 | 0.715 | 0.518 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 95                                   | 1.749   | 1.316 | 1.002 | 0.739 | 0.541 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 100                                  | 1.782   | 1.339 | 1.025 | 0.763 | 0.564 | 0.466 | 0.454 | 0.454 | 0.454 | 0.454 |
| 105                                  | 1.815   | 1.362 | 1.049 | 0.787 | 0.587 | 0.487 | 0.454 | 0.454 | 0.454 | 0.454 |
| 110                                  | 1.848   | 1.386 | 1.072 | 0.811 | 0.610 | 0.509 | 0.465 | 0.454 | 0.454 | 0.454 |
| 115                                  | 1.881   | 1.409 | 1.095 | 0.835 | 0.634 | 0.530 | 0.486 | 0.454 | 0.454 | 0.454 |
| 120                                  | 1.914   | 1.432 | 1.119 | 0.859 | 0.657 | 0.551 | 0.506 | 0.454 | 0.454 | 0.454 |
| 125                                  | 1.947   | 1.455 | 1.142 | 0.883 | 0.680 | 0.573 | 0.527 | 0.454 | 0.454 | 0.454 |
| 130                                  | 1.980   | 1.479 | 1.165 | 0.908 | 0.703 | 0.594 | 0.548 | 0.470 | 0.454 | 0.454 |
| 135                                  | 2.013   | 1.502 | 1.189 | 0.932 | 0.727 | 0.615 | 0.568 | 0.489 | 0.454 | 0.454 |
| 140                                  | 2.046   | 1.525 | 1.212 | 0.956 | 0.750 | 0.636 | 0.589 | 0.509 | 0.454 | 0.454 |
| 145                                  | 2.079   | 1.548 | 1.235 | 0.980 | 0.773 | 0.658 | 0.609 | 0.529 | 0.454 | 0.454 |
| 150                                  | 2.112   | 1.572 | 1.259 | 1.004 | 0.796 | 0.679 | 0.630 | 0.548 | 0.454 | 0.454 |
| 155                                  | 2.144   | 1.595 | 1.282 | 1.028 | 0.819 | 0.700 | 0.650 | 0.568 | 0.454 | 0.454 |
| 160                                  | 2.177   | 1.618 | 1.305 | 1.052 | 0.843 | 0.721 | 0.671 | 0.588 | 0.454 | 0.454 |
| 165                                  | 2.210   | 1.641 | 1.329 | 1.076 | 0.866 | 0.743 | 0.692 | 0.607 | 0.471 | 0.454 |
| 170                                  | 2.243   | 1.664 | 1.352 | 1.100 | 0.889 | 0.764 | 0.712 | 0.627 | 0.490 | 0.454 |
| 175                                  | 2.276   | 1.690 | 1.375 | 1.124 | 0.912 | 0.785 | 0.733 | 0.646 | 0.508 | 0.454 |
| 180                                  | 2.309   | 1.727 | 1.398 | 1.148 | 0.935 | 0.807 | 0.753 | 0.666 | 0.527 | 0.454 |
| 185                                  | 2.342   | 1.764 | 1.422 | 1.172 | 0.959 | 0.828 | 0.774 | 0.686 | 0.545 | 0.454 |
| 190                                  | 2.375   | 1.800 | 1.445 | 1.197 | 0.982 | 0.849 | 0.794 | 0.705 | 0.564 | 0.461 |
| 195                                  | 2.408   | 1.837 | 1.468 | 1.221 | 1.005 | 0.870 | 0.815 | 0.725 | 0.583 | 0.477 |
| 200                                  | 2.441   | 1.874 | 1.492 | 1.245 | 1.028 | 0.892 | 0.836 | 0.745 | 0.601 | 0.492 |
| 205                                  | 2.474   | 1.911 | 1.515 | 1.269 | 1.052 | 0.913 | 0.856 | 0.764 | 0.620 | 0.508 |
| 210                                  | 2.507   | 1.947 | 1.538 | 1.293 | 1.075 | 0.934 | 0.877 | 0.784 | 0.638 | 0.523 |
| 215                                  | 2.540   | 1.984 | 1.562 | 1.317 | 1.098 | 0.955 | 0.897 | 0.804 | 0.657 | 0.539 |
| 220                                  | 2.573   | 2.021 | 1.585 | 1.341 | 1.121 | 0.977 | 0.918 | 0.823 | 0.675 | 0.555 |
| 225                                  | 2.606   | 2.057 | 1.608 | 1.365 | 1.144 | 0.998 | 0.938 | 0.843 | 0.694 | 0.570 |
| 230                                  | 2.639   | 2.094 | 1.632 | 1.389 | 1.168 | 1.019 | 0.959 | 0.862 | 0.712 | 0.586 |
| 235                                  | 2.672   | 2.131 | 1.655 | 1.413 | 1.191 | 1.041 | 0.980 | 0.882 | 0.731 | 0.601 |
| 240                                  | 2.705   | 2.167 | 1.678 | 1.437 | 1.214 | 1.062 | 1.000 | 0.902 | 0.749 | 0.617 |
| 245                                  | 2.738   | 2.204 | 1.717 | 1.461 | 1.237 | 1.083 | 1.021 | 0.921 | 0.768 | 0.633 |
| 250                                  | 2.771   | 2.241 | 1.759 | 1.486 | 1.260 | 1.104 | 1.041 | 0.941 | 0.786 | 0.648 |
| 255                                  | 2.808   | 2.278 | 1.802 | 1.510 | 1.284 | 1.126 | 1.062 | 0.961 | 0.805 | 0.664 |
| 260                                  | 2.848   | 2.314 | 1.844 | 1.534 | 1.307 | 1.147 | 1.082 | 0.980 | 0.823 | 0.679 |
| 265                                  | 2.888   | 2.351 | 1.886 | 1.558 | 1.330 | 1.168 | 1.103 | 1.000 | 0.842 | 0.695 |
| 270                                  | 2.927   | 2.388 | 1.929 | 1.582 | 1.353 | 1.189 | 1.124 | 1.019 | 0.860 | 0.710 |
| 275                                  | 2.967   | 2.424 | 1.971 | 1.606 | 1.377 | 1.211 | 1.144 | 1.039 | 0.879 | 0.726 |
| 280                                  | 3.007   | 2.461 | 2.013 | 1.630 | 1.400 | 1.232 | 1.165 | 1.059 | 0.897 | 0.742 |
| 285                                  | 3.047   | 2.498 | 2.056 | 1.654 | 1.423 | 1.253 | 1.185 | 1.078 | 0.916 | 0.757 |
| 290                                  | 3.087   | 2.534 | 2.098 | 1.678 | 1.446 | 1.275 | 1.206 | 1.098 | 0.935 | 0.773 |
| 295                                  | 3.127   | 2.571 | 2.140 | 1.718 | 1.469 | 1.296 | 1.226 | 1.118 | 0.953 | 0.788 |
| 300                                  | 3.167   | 2.608 | 2.183 | 1.761 | 1.493 | 1.317 | 1.247 | 1.137 | 0.972 | 0.804 |
| 305                                  | 3.206   | 2.645 | 2.225 | 1.804 | 1.516 | 1.338 | 1.267 | 1.157 | 0.990 | 0.820 |
| 310                                  | 3.246   | 2.681 | 2.267 | 1.848 | 1.539 | 1.360 | 1.288 | 1.177 | 1.009 | 0.835 |
| 315                                  | 3.286   | 2.718 | 2.310 | 1.891 | 1.562 | 1.381 | 1.309 | 1.196 | 1.027 | 0.851 |
| 320                                  | 3.326   | 2.755 | 2.352 | 1.934 | 1.585 | 1.402 | 1.329 | 1.216 | 1.046 | 0.866 |
| 325                                  | 3.366   | 2.795 | 2.394 | 1.978 | 1.609 | 1.423 | 1.350 | 1.235 | 1.064 | 0.882 |
| 330                                  | 3.406   | 2.852 | 2.437 | 2.021 | 1.632 | 1.445 | 1.370 | 1.255 | 1.083 | 0.898 |
| 335                                  | 3.446   | 2.908 | 2.479 | 2.064 | 1.655 | 1.466 | 1.391 | 1.275 | 1.101 | 0.913 |
| 340                                  | 3.485   | 2.965 | 2.521 | 2.108 | 1.678 | 1.487 | 1.411 | 1.294 | 1.120 | 0.929 |
| 345                                  | 3.525   | 3.021 | 2.564 | 2.151 | 1.718 | 1.509 | 1.432 | 1.314 | 1.138 | 0.944 |
| 350                                  | 3.565   | 3.078 | 2.606 | 2.194 | 1.762 | 1.530 | 1.453 | 1.334 | 1.157 | 0.960 |
| 355                                  | 3.605   | 3.134 | 2.648 | 2.238 | 1.805 | 1.551 | 1.473 | 1.353 | 1.175 | 0.975 |
| 360                                  | 3.645   | 3.191 | 2.691 | 2.281 | 1.849 | 1.572 | 1.494 | 1.373 | 1.194 | 0.991 |

Table applies to I-section beams with 3 sides fire exposure and a concrete slab on top. Thickness is intumescent only.

Page 6 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 5: I-Section Beams 75 minutes  |   |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|                                      | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 620°C | 650°C | 700°C | 750°C |
| 85                                   | 2.423   | 1.879 | 1.446 | 1.156 | 0.895 | 0.676 | 0.549 | 0.504 | 0.454 | 0.454 |
| 90                                   | 2.474   | 1.910 | 1.477 | 1.178 | 0.918 | 0.700 | 0.574 | 0.527 | 0.454 | 0.454 |
| 95                                   | 2.526   | 1.941 | 1.507 | 1.199 | 0.942 | 0.724 | 0.599 | 0.550 | 0.474 | 0.454 |
| 100                                  | 2.578   | 1.972 | 1.537 | 1.220 | 0.966 | 0.748 | 0.623 | 0.573 | 0.495 | 0.454 |
| 105                                  | 2.629   | 2.003 | 1.568 | 1.242 | 0.990 | 0.772 | 0.648 | 0.596 | 0.517 | 0.454 |
| 110                                  | 2.681   | 2.035 | 1.598 | 1.263 | 1.013 | 0.796 | 0.673 | 0.619 | 0.538 | 0.454 |
| 115                                  | 2.732   | 2.066 | 1.628 | 1.285 | 1.037 | 0.820 | 0.698 | 0.642 | 0.560 | 0.454 |
| 120                                  | 2.784   | 2.097 | 1.659 | 1.306 | 1.061 | 0.844 | 0.722 | 0.665 | 0.581 | 0.471 |
| 125                                  | 2.824   | 2.128 | 1.690 | 1.327 | 1.085 | 0.868 | 0.747 | 0.688 | 0.603 | 0.491 |
| 130                                  | 2.865   | 2.160 | 1.725 | 1.349 | 1.108 | 0.892 | 0.772 | 0.711 | 0.624 | 0.510 |
| 135                                  | 2.905   | 2.191 | 1.759 | 1.370 | 1.132 | 0.916 | 0.797 | 0.734 | 0.646 | 0.529 |
| 140                                  | 2.946   | 2.222 | 1.794 | 1.392 | 1.156 | 0.940 | 0.821 | 0.757 | 0.667 | 0.549 |
| 145                                  | 2.986   | 2.253 | 1.828 | 1.413 | 1.180 | 0.964 | 0.846 | 0.780 | 0.689 | 0.568 |
| 150                                  | 3.027   | 2.284 | 1.863 | 1.435 | 1.203 | 0.988 | 0.871 | 0.803 | 0.710 | 0.587 |
| 155                                  | 3.067   | 2.316 | 1.898 | 1.456 | 1.227 | 1.012 | 0.896 | 0.826 | 0.732 | 0.606 |
| 160                                  | 3.108   | 2.347 | 1.932 | 1.477 | 1.251 | 1.036 | 0.920 | 0.850 | 0.753 | 0.626 |
| 165                                  | 3.148   | 2.378 | 1.967 | 1.499 | 1.275 | 1.060 | 0.945 | 0.873 | 0.775 | 0.645 |
| 170                                  | 3.188   | 2.409 | 2.002 | 1.520 | 1.298 | 1.084 | 0.970 | 0.896 | 0.796 | 0.664 |
| 175                                  | 3.229   | 2.441 | 2.036 | 1.542 | 1.322 | 1.108 | 0.995 | 0.919 | 0.818 | 0.684 |
| 180                                  | 3.269   | 2.472 | 2.071 | 1.563 | 1.346 | 1.132 | 1.020 | 0.942 | 0.839 | 0.703 |
| 185                                  | 3.310   | 2.503 | 2.105 | 1.584 | 1.370 | 1.156 | 1.044 | 0.965 | 0.861 | 0.722 |
| 190                                  | 3.350   | 2.534 | 2.140 | 1.606 | 1.393 | 1.180 | 1.069 | 0.988 | 0.882 | 0.741 |
| 195                                  | 3.391   | 2.565 | 2.175 | 1.627 | 1.417 | 1.204 | 1.094 | 1.011 | 0.904 | 0.761 |
| 200                                  | 3.431   | 2.597 | 2.209 | 1.649 | 1.441 | 1.227 | 1.119 | 1.034 | 0.926 | 0.780 |
| 205                                  | 3.471   | 2.628 | 2.244 | 1.670 | 1.465 | 1.251 | 1.143 | 1.057 | 0.947 | 0.799 |
| 210                                  | 3.512   | 2.659 | 2.279 | 1.701 | 1.488 | 1.275 | 1.168 | 1.080 | 0.969 | 0.819 |
| 215                                  | 3.552   | 2.690 | 2.313 | 1.746 | 1.512 | 1.299 | 1.193 | 1.103 | 0.990 | 0.838 |
| 220                                  | 3.593   | 2.722 | 2.348 | 1.790 | 1.536 | 1.323 | 1.218 | 1.126 | 1.012 | 0.857 |
| 225                                  | 3.633   | 2.753 | 2.382 | 1.835 | 1.560 | 1.347 | 1.242 | 1.149 | 1.033 | 0.877 |
| 230                                  | 3.674   | 2.784 | 2.417 | 1.880 | 1.583 | 1.371 | 1.267 | 1.172 | 1.055 | 0.896 |
| 235                                  | 3.714   | 2.836 | 2.452 | 1.925 | 1.607 | 1.395 | 1.292 | 1.195 | 1.076 | 0.915 |
| 240                                  | 3.755   | 2.889 | 2.486 | 1.969 | 1.631 | 1.419 | 1.317 | 1.218 | 1.098 | 0.934 |
| 245                                  | 3.795   | 2.941 | 2.521 | 2.014 | 1.655 | 1.443 | 1.341 | 1.241 | 1.119 | 0.954 |
| 250                                  | 3.835   | 2.993 | 2.555 | 2.059 | 1.678 | 1.467 | 1.366 | 1.264 | 1.141 | 0.973 |
| 255                                  | 3.876   | 3.045 | 2.590 | 2.104 | 1.721 | 1.491 | 1.391 | 1.287 | 1.162 | 0.992 |
| 260                                  | 3.916   | 3.098 | 2.625 | 2.148 | 1.768 | 1.515 | 1.416 | 1.310 | 1.184 | 1.012 |
| 265                                  | 3.957   | 3.150 | 2.659 | 2.193 | 1.815 | 1.539 | 1.440 | 1.333 | 1.205 | 1.031 |
| 270                                  | -   | 3.202 | 2.694 | 2.238 | 1.862 | 1.563 | 1.465 | 1.356 | 1.227 | 1.050 |
| 275                                  | -   | 3.254 | 2.729 | 2.283 | 1.909 | 1.587 | 1.490 | 1.379 | 1.248 | 1.069 |
| 280                                  | -   | 3.307 | 2.763 | 2.327 | 1.956 | 1.611 | 1.515 | 1.402 | 1.270 | 1.089 |
| 285                                  | -   | 3.359 | 2.812 | 2.372 | 2.003 | 1.635 | 1.539 | 1.425 | 1.291 | 1.108 |
| 290                                  | -   | 3.411 | 2.883 | 2.417 | 2.050 | 1.659 | 1.564 | 1.448 | 1.313 | 1.127 |
| 295                                  | -   | 3.463 | 2.954 | 2.462 | 2.097 | 1.683 | 1.589 | 1.471 | 1.334 | 1.147 |
| 300                                  | -   | 3.516 | 3.025 | 2.507 | 2.144 | 1.731 | 1.614 | 1.494 | 1.356 | 1.166 |
| 305                                  | -   | 3.568 | 3.097 | 2.551 | 2.191 | 1.779 | 1.638 | 1.517 | 1.377 | 1.185 |
| 310                                  | -   | 3.620 | 3.168 | 2.596 | 2.238 | 1.827 | 1.663 | 1.540 | 1.399 | 1.205 |
| 315                                  | -   | 3.672 | 3.239 | 2.641 | 2.285 | 1.874 | 1.693 | 1.563 | 1.420 | 1.224 |
| 320                                  | -   | 3.725 | 3.310 | 2.686 | 2.332 | 1.922 | 1.741 | 1.586 | 1.442 | 1.243 |
| 325                                  | -   | 3.777 | 3.381 | 2.730 | 2.379 | 1.970 | 1.789 | 1.609 | 1.464 | 1.262 |
| 330                                  | -   | 3.829 | 3.452 | 2.775 | 2.426 | 2.018 | 1.838 | 1.632 | 1.485 | 1.282 |
| 335                                  | -   | 3.882 | 3.523 | 2.860 | 2.473 | 2.066 | 1.886 | 1.655 | 1.507 | 1.301 |
| 340                                  | -   | 3.934 | 3.594 | 2.956 | 2.521 | 2.114 | 1.934 | 1.678 | 1.528 | 1.320 |
| 345                                  | -   | 3.986 | 3.665 | 3.051 | 2.568 | 2.162 | 1.982 | 1.722 | 1.550 | 1.340 |
| 350                                  | -   | -     | 3.736 | 3.147 | 2.615 | 2.210 | 2.031 | 1.770 | 1.571 | 1.359 |
| 355                                  | -   | -     | 3.807 | 3.242 | 2.662 | 2.257 | 2.079 | 1.818 | 1.593 | 1.378 |
| 360                                  | -   | -     | 3.878 | 3.338 | 2.709 | 2.305 | 2.127 | 1.867 | 1.614 | 1.397 |

Table applies to I-section beams with 3 sides fire exposure and a concrete slab on top. Thickness is intumescent only.

Page 7 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020



# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 6: I-Section Beams 90 minutes  |   |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|                                      | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 620°C | 650°C | 700°C | 750°C |
| 85                                   | 3.102   | 2.658 | 2.044 | 1.585 | 1.321 | 1.069 | 0.977 | 0.853 | 0.668 | 0.501 |
| 90                                   | 3.180   | 2.658 | 2.086 | 1.620 | 1.342 | 1.091 | 1.000 | 0.876 | 0.692 | 0.523 |
| 95                                   | 3.257   | 2.693 | 2.128 | 1.655 | 1.363 | 1.113 | 1.023 | 0.899 | 0.716 | 0.546 |
| 100                                  | 3.334   | 2.751 | 2.170 | 1.690 | 1.384 | 1.135 | 1.046 | 0.922 | 0.740 | 0.569 |
| 105                                  | 3.412   | 2.810 | 2.212 | 1.725 | 1.405 | 1.157 | 1.069 | 0.945 | 0.764 | 0.591 |
| 110                                  | 3.489   | 2.868 | 2.254 | 1.760 | 1.425 | 1.179 | 1.091 | 0.968 | 0.787 | 0.614 |
| 115                                  | 3.567   | 2.926 | 2.296 | 1.794 | 1.446 | 1.201 | 1.114 | 0.991 | 0.811 | 0.636 |
| 120                                  | 3.644   | 2.984 | 2.338 | 1.829 | 1.467 | 1.223 | 1.137 | 1.014 | 0.835 | 0.659 |
| 125                                  | 3.722   | 3.042 | 2.380 | 1.864 | 1.488 | 1.246 | 1.160 | 1.037 | 0.859 | 0.682 |
| 130                                  | 3.799   | 3.101 | 2.422 | 1.899 | 1.508 | 1.268 | 1.182 | 1.060 | 0.883 | 0.704 |
| 135                                  | 3.877   | 3.159 | 2.464 | 1.934 | 1.529 | 1.290 | 1.205 | 1.083 | 0.907 | 0.727 |
| 140                                  | 3.954   | 3.217 | 2.506 | 1.969 | 1.550 | 1.312 | 1.228 | 1.107 | 0.930 | 0.750 |
| 145                                  | -   | 3.275 | 2.549 | 2.004 | 1.571 | 1.334 | 1.251 | 1.130 | 0.954 | 0.772 |
| 150                                  | -   | 3.333 | 2.591 | 2.038 | 1.592 | 1.356 | 1.273 | 1.153 | 0.978 | 0.795 |
| 155                                  | -   | 3.392 | 2.633 | 2.073 | 1.612 | 1.378 | 1.296 | 1.176 | 1.002 | 0.818 |
| 160                                  | -   | 3.450 | 2.675 | 2.108 | 1.633 | 1.400 | 1.319 | 1.199 | 1.026 | 0.840 |
| 165                                  | -   | 3.508 | 2.717 | 2.143 | 1.654 | 1.422 | 1.342 | 1.222 | 1.049 | 0.863 |
| 170                                  | -   | 3.566 | 2.759 | 2.178 | 1.675 | 1.444 | 1.364 | 1.245 | 1.073 | 0.886 |
| 175                                  | -   | 3.624 | 2.804 | 2.213 | 1.711 | 1.466 | 1.387 | 1.268 | 1.097 | 0.908 |
| 180                                  | -   | 3.683 | 2.853 | 2.247 | 1.758 | 1.489 | 1.410 | 1.291 | 1.121 | 0.931 |
| 185                                  | -   | 3.741 | 2.903 | 2.282 | 1.804 | 1.511 | 1.433 | 1.314 | 1.145 | 0.954 |
| 190                                  | -   | 3.799 | 2.952 | 2.317 | 1.851 | 1.533 | 1.455 | 1.337 | 1.169 | 0.976 |
| 195                                  | -   | 3.857 | 3.002 | 2.352 | 1.898 | 1.555 | 1.478 | 1.360 | 1.192 | 0.999 |
| 200                                  | -   | 3.915 | 3.051 | 2.387 | 1.944 | 1.577 | 1.501 | 1.383 | 1.216 | 1.022 |
| 205                                  | -   | 3.973 | 3.101 | 2.422 | 1.991 | 1.599 | 1.524 | 1.406 | 1.240 | 1.044 |
| 210                                  | -   | -     | 3.150 | 2.456 | 2.038 | 1.621 | 1.546 | 1.429 | 1.264 | 1.067 |
| 215                                  | -   | -     | 3.200 | 2.491 | 2.084 | 1.643 | 1.569 | 1.452 | 1.288 | 1.090 |
| 220                                  | -   | -     | 3.249 | 2.526 | 2.131 | 1.665 | 1.592 | 1.475 | 1.311 | 1.112 |
| 225                                  | -   | -     | 3.298 | 2.561 | 2.178 | 1.693 | 1.615 | 1.499 | 1.335 | 1.135 |
| 230                                  | -   | -     | 3.348 | 2.596 | 2.224 | 1.741 | 1.637 | 1.522 | 1.359 | 1.157 |
| 235                                  | -   | -     | 3.397 | 2.631 | 2.271 | 1.790 | 1.660 | 1.545 | 1.383 | 1.180 |
| 240                                  | -   | -     | 3.447 | 2.666 | 2.317 | 1.839 | 1.683 | 1.568 | 1.407 | 1.203 |
| 245                                  | -   | -     | 3.496 | 2.700 | 2.364 | 1.888 | 1.733 | 1.591 | 1.431 | 1.225 |
| 250                                  | -   | -     | 3.546 | 2.735 | 2.411 | 1.936 | 1.782 | 1.614 | 1.454 | 1.248 |
| 255                                  | -   | -     | 3.595 | 2.770 | 2.457 | 1.985 | 1.832 | 1.637 | 1.478 | 1.271 |
| 260                                  | -   | -     | 3.645 | 2.838 | 2.504 | 2.034 | 1.881 | 1.660 | 1.502 | 1.293 |
| 265                                  | -   | -     | 3.694 | 2.927 | 2.551 | 2.082 | 1.931 | 1.683 | 1.526 | 1.316 |
| 270                                  | -   | -     | 3.744 | 3.016 | 2.597 | 2.131 | 1.981 | 1.735 | 1.550 | 1.339 |
| 275                                  | -   | -     | 3.793 | 3.106 | 2.644 | 2.180 | 2.030 | 1.787 | 1.573 | 1.361 |
| 280                                  | -   | -     | 3.843 | 3.195 | 2.691 | 2.229 | 2.080 | 1.839 | 1.597 | 1.384 |
| 285                                  | -   | -     | 3.892 | 3.284 | 2.737 | 2.277 | 2.129 | 1.891 | 1.621 | 1.407 |
| 290                                  | -   | -     | 3.941 | 3.374 | 2.784 | 2.326 | 2.179 | 1.943 | 1.645 | 1.429 |
| 295                                  | -   | -     | 3.991 | 3.463 | 2.878 | 2.375 | 2.229 | 1.995 | 1.669 | 1.452 |
| 300                                  | -   | -     | -     | 3.552 | 2.972 | 2.423 | 2.278 | 2.047 | 1.703 | 1.475 |
| 305                                  | -   | -     | -     | 3.642 | 3.066 | 2.472 | 2.328 | 2.098 | 1.754 | 1.497 |
| 310                                  | -   | -     | -     | 3.731 | 3.160 | 2.521 | 2.377 | 2.150 | 1.805 | 1.520 |
| 315                                  | -   | -     | -     | 3.821 | 3.253 | 2.570 | 2.427 | 2.202 | 1.856 | 1.543 |
| 320                                  | -   | -     | -     | 3.910 | 3.347 | 2.618 | 2.477 | 2.254 | 1.907 | 1.565 |
| 325                                  | -   | -     | -     | -     | 3.441 | 2.667 | 2.526 | 2.306 | 1.958 | 1.588 |
| 330                                  | -   | -     | -     | -     | 3.535 | 2.716 | 2.576 | 2.358 | 2.009 | 1.611 |
| 335                                  | -   | -     | -     | -     | 3.629 | 2.765 | 2.625 | 2.410 | 2.060 | 1.633 |
| 340                                  | -   | -     | -     | -     | 3.723 | 2.865 | 2.675 | 2.462 | 2.111 | 1.656 |
| 345                                  | -   | -     | -     | -     | 3.817 | 3.000 | 2.724 | 2.514 | 2.162 | 1.678 |
| 350                                  | -   | -     | -     | -     | 3.911 | 3.135 | 2.774 | 2.566 | 2.213 | 1.722 |
| 355                                  | -   | -     | -     | -     | -     | 3.270 | 2.890 | 2.618 | 2.264 | 1.771 |
| 360                                  | -   | -     | -     | -     | -     | 3.406 | 3.021 | 2.670 | 2.315 | 1.821 |

Table applies to I-section beams with 3 sides fire exposure and a concrete slab on top. Thickness is intumescent only.

Page 8 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020



# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 7: I-Section Beams 105 minutes |   |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|                                      | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 620°C | 650°C | 700°C | 750°C |
| 85                                   | 3.892   | 3.128 | 2.670 | 2.210 | 1.700 | 1.452 | 1.361 | 1.222 | 1.017 | 0.806 |
| 90                                   | 3.892   | 3.224 | 2.741 | 2.258 | 1.741 | 1.477 | 1.381 | 1.241 | 1.039 | 0.829 |
| 95                                   | -   | 3.319 | 2.812 | 2.307 | 1.782 | 1.502 | 1.400 | 1.260 | 1.061 | 0.852 |
| 100                                  | -   | 3.415 | 2.883 | 2.356 | 1.824 | 1.527 | 1.419 | 1.279 | 1.083 | 0.875 |
| 105                                  | -   | 3.510 | 2.954 | 2.404 | 1.865 | 1.552 | 1.439 | 1.298 | 1.105 | 0.898 |
| 110                                  | -   | 3.606 | 3.025 | 2.453 | 1.907 | 1.577 | 1.458 | 1.318 | 1.128 | 0.920 |
| 115                                  | -   | 3.701 | 3.097 | 2.502 | 1.948 | 1.603 | 1.478 | 1.337 | 1.150 | 0.943 |
| 120                                  | -   | 3.797 | 3.168 | 2.550 | 1.989 | 1.628 | 1.497 | 1.356 | 1.172 | 0.966 |
| 125                                  | -   | 3.892 | 3.239 | 2.599 | 2.031 | 1.653 | 1.516 | 1.375 | 1.194 | 0.989 |
| 130                                  | -   | 3.988 | 3.310 | 2.648 | 2.072 | 1.678 | 1.536 | 1.395 | 1.217 | 1.012 |
| 135                                  | -   | -     | 3.381 | 2.696 | 2.113 | 1.717 | 1.555 | 1.414 | 1.239 | 1.035 |
| 140                                  | -   | -     | 3.452 | 2.745 | 2.155 | 1.759 | 1.574 | 1.433 | 1.261 | 1.057 |
| 145                                  | -   | -     | 3.523 | 2.794 | 2.196 | 1.802 | 1.594 | 1.452 | 1.283 | 1.080 |
| 150                                  | -   | -     | 3.594 | 2.842 | 2.238 | 1.844 | 1.613 | 1.472 | 1.305 | 1.103 |
| 155                                  | -   | -     | 3.665 | 2.891 | 2.279 | 1.886 | 1.633 | 1.491 | 1.328 | 1.126 |
| 160                                  | -   | -     | 3.736 | 2.940 | 2.320 | 1.929 | 1.652 | 1.510 | 1.350 | 1.149 |
| 165                                  | -   | -     | 3.807 | 2.988 | 2.362 | 1.971 | 1.671 | 1.529 | 1.372 | 1.172 |
| 170                                  | -   | -     | 3.878 | 3.037 | 2.403 | 2.013 | 1.703 | 1.548 | 1.394 | 1.194 |
| 175                                  | -   | -     | 3.949 | 3.085 | 2.445 | 2.056 | 1.754 | 1.568 | 1.416 | 1.217 |
| 180                                  | -   | -     | -     | 3.134 | 2.486 | 2.098 | 1.804 | 1.587 | 1.439 | 1.240 |
| 185                                  | -   | -     | -     | 3.182 | 2.527 | 2.140 | 1.855 | 1.606 | 1.461 | 1.263 |
| 190                                  | -   | -     | -     | 3.231 | 2.569 | 2.183 | 1.905 | 1.625 | 1.483 | 1.286 |
| 195                                  | -   | -     | -     | 3.280 | 2.610 | 2.225 | 1.956 | 1.645 | 1.505 | 1.309 |
| 200                                  | -   | -     | -     | 3.328 | 2.652 | 2.267 | 2.006 | 1.664 | 1.528 | 1.331 |
| 205                                  | -   | -     | -     | 3.377 | 2.693 | 2.310 | 2.057 | 1.683 | 1.550 | 1.354 |
| 210                                  | -   | -     | -     | 3.425 | 2.734 | 2.352 | 2.107 | 1.739 | 1.572 | 1.377 |
| 215                                  | -   | -     | -     | 3.474 | 2.776 | 2.394 | 2.158 | 1.795 | 1.594 | 1.400 |
| 220                                  | -   | -     | -     | 3.523 | 2.845 | 2.437 | 2.208 | 1.852 | 1.616 | 1.423 |
| 225                                  | -   | -     | -     | 3.571 | 2.921 | 2.479 | 2.259 | 1.908 | 1.639 | 1.446 |
| 230                                  | -   | -     | -     | 3.620 | 2.996 | 2.521 | 2.309 | 1.964 | 1.661 | 1.468 |
| 235                                  | -   | -     | -     | 3.668 | 3.072 | 2.564 | 2.360 | 2.020 | 1.683 | 1.491 |
| 240                                  | -   | -     | -     | 3.717 | 3.148 | 2.606 | 2.410 | 2.076 | 1.735 | 1.514 |
| 245                                  | -   | -     | -     | 3.766 | 3.224 | 2.648 | 2.461 | 2.132 | 1.787 | 1.537 |
| 250                                  | -   | -     | -     | 3.814 | 3.300 | 2.691 | 2.511 | 2.189 | 1.839 | 1.560 |
| 255                                  | -   | -     | -     | 3.863 | 3.376 | 2.733 | 2.562 | 2.245 | 1.891 | 1.583 |
| 260                                  | -   | -     | -     | 3.911 | 3.452 | 2.776 | 2.612 | 2.301 | 1.943 | 1.605 |
| 265                                  | -   | -     | -     | 3.960 | 3.528 | 2.859 | 2.663 | 2.357 | 1.995 | 1.628 |
| 270                                  | -   | -     | -     | -     | 3.604 | 2.953 | 2.713 | 2.413 | 2.047 | 1.651 |
| 275                                  | -   | -     | -     | -     | 3.680 | 3.047 | 2.764 | 2.469 | 2.098 | 1.674 |
| 280                                  | -   | -     | -     | -     | 3.755 | 3.141 | 2.843 | 2.526 | 2.150 | 1.715 |
| 285                                  | -   | -     | -     | -     | 3.831 | 3.235 | 2.942 | 2.582 | 2.202 | 1.768 |
| 290                                  | -   | -     | -     | -     | 3.907 | 3.329 | 3.041 | 2.638 | 2.254 | 1.821 |
| 295                                  | -   | -     | -     | -     | 3.983 | 3.423 | 3.140 | 2.694 | 2.306 | 1.874 |
| 300                                  | -   | -     | -     | -     | -     | 3.516 | 3.239 | 2.750 | 2.358 | 1.926 |
| 305                                  | -   | -     | -     | -     | -     | 3.610 | 3.338 | 2.833 | 2.410 | 1.979 |
| 310                                  | -   | -     | -     | -     | -     | 3.704 | 3.437 | 2.956 | 2.462 | 2.032 |
| 315                                  | -   | -     | -     | -     | -     | 3.798 | 3.536 | 3.079 | 2.514 | 2.085 |
| 320                                  | -   | -     | -     | -     | -     | 3.892 | 3.635 | 3.203 | 2.566 | 2.138 |
| 325                                  | -   | -     | -     | -     | -     | 3.986 | 3.734 | 3.326 | 2.618 | 2.191 |
| 330                                  | -   | -     | -     | -     | -     | -     | 3.833 | 3.449 | 2.670 | 2.244 |
| 335                                  | -   | -     | -     | -     | -     | -     | 3.932 | 3.572 | 2.722 | 2.297 |
| 340                                  | -   | -     | -     | -     | -     | -     | -     | 3.695 | 2.774 | 2.350 |
| 345                                  | -   | -     | -     | -     | -     | -     | -     | 3.818 | 2.927 | 2.403 |
| 350                                  | -   | -     | -     | -     | -     | -     | -     | 3.941 | 3.106 | 2.456 |
| 355                                  | -   | -     | -     | -     | -     | -     | -     | -     | 3.284 | 2.509 |
| 360                                  | -   | -     | -     | -     | -     | -     | -     | -     | 3.463 | 2.562 |

Table applies to I-section beams with 3 sides fire exposure and a concrete slab on top. Thickness is intumescent only.

Page 9 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 8: I-Section Beams 120 minutes |   |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|                                      | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 620°C | 650°C | 700°C | 750°C |
| 85                                   | -   | 3.892 | 3.212 | 2.800 | 2.362 | 1.934 | 1.700 | 1.516 | 1.371 | 1.139 |
| 90                                   | -   | 3.892 | 3.312 | 2.879 | 2.419 | 1.971 | 1.742 | 1.558 | 1.388 | 1.158 |
| 95                                   | -   | -     | 3.412 | 2.958 | 2.476 | 2.008 | 1.784 | 1.600 | 1.405 | 1.178 |
| 100                                  | -   | -     | 3.512 | 3.037 | 2.533 | 2.045 | 1.826 | 1.641 | 1.422 | 1.198 |
| 105                                  | -   | -     | 3.612 | 3.116 | 2.590 | 2.082 | 1.868 | 1.683 | 1.439 | 1.217 |
| 110                                  | -   | -     | 3.712 | 3.196 | 2.647 | 2.119 | 1.910 | 1.725 | 1.456 | 1.237 |
| 115                                  | -   | -     | 3.812 | 3.275 | 2.704 | 2.156 | 1.952 | 1.766 | 1.473 | 1.256 |
| 120                                  | -   | -     | 3.912 | 3.354 | 2.761 | 2.193 | 1.994 | 1.808 | 1.490 | 1.276 |
| 125                                  | -   | -     | -     | 3.433 | 2.818 | 2.230 | 2.036 | 1.850 | 1.507 | 1.295 |
| 130                                  | -   | -     | -     | 3.512 | 2.874 | 2.267 | 2.078 | 1.892 | 1.524 | 1.315 |
| 135                                  | -   | -     | -     | 3.591 | 2.931 | 2.304 | 2.120 | 1.933 | 1.541 | 1.335 |
| 140                                  | -   | -     | -     | 3.670 | 2.988 | 2.341 | 2.162 | 1.975 | 1.558 | 1.354 |
| 145                                  | -   | -     | -     | 3.750 | 3.044 | 2.378 | 2.204 | 2.017 | 1.575 | 1.374 |
| 150                                  | -   | -     | -     | 3.829 | 3.101 | 2.414 | 2.246 | 2.058 | 1.591 | 1.393 |
| 155                                  | -   | -     | -     | 3.908 | 3.157 | 2.451 | 2.288 | 2.100 | 1.608 | 1.413 |
| 160                                  | -   | -     | -     | 3.987 | 3.214 | 2.488 | 2.330 | 2.142 | 1.625 | 1.432 |
| 165                                  | -   | -     | -     | -     | 3.270 | 2.525 | 2.372 | 2.183 | 1.642 | 1.452 |
| 170                                  | -   | -     | -     | -     | 3.327 | 2.562 | 2.414 | 2.225 | 1.659 | 1.472 |
| 175                                  | -   | -     | -     | -     | 3.383 | 2.599 | 2.456 | 2.267 | 1.676 | 1.491 |
| 180                                  | -   | -     | -     | -     | 3.440 | 2.636 | 2.498 | 2.309 | 1.721 | 1.511 |
| 185                                  | -   | -     | -     | -     | 3.496 | 2.673 | 2.540 | 2.350 | 1.784 | 1.530 |
| 190                                  | -   | -     | -     | -     | 3.553 | 2.710 | 2.582 | 2.392 | 1.848 | 1.550 |
| 195                                  | -   | -     | -     | -     | 3.609 | 2.747 | 2.624 | 2.434 | 1.911 | 1.569 |
| 200                                  | -   | -     | -     | -     | 3.666 | 2.784 | 2.666 | 2.475 | 1.974 | 1.589 |
| 205                                  | -   | -     | -     | -     | 3.722 | 2.863 | 2.708 | 2.517 | 2.037 | 1.609 |
| 210                                  | -   | -     | -     | -     | 3.779 | 2.942 | 2.750 | 2.559 | 2.101 | 1.628 |
| 215                                  | -   | -     | -     | -     | 3.835 | 3.021 | 2.800 | 2.601 | 2.164 | 1.648 |
| 220                                  | -   | -     | -     | -     | 3.892 | 3.101 | 2.882 | 2.642 | 2.227 | 1.667 |
| 225                                  | -   | -     | -     | -     | 3.949 | 3.180 | 2.963 | 2.684 | 2.290 | 1.694 |
| 230                                  | -   | -     | -     | -     | -     | 3.259 | 3.045 | 2.726 | 2.354 | 1.750 |
| 235                                  | -   | -     | -     | -     | -     | 3.338 | 3.126 | 2.767 | 2.417 | 1.807 |
| 240                                  | -   | -     | -     | -     | -     | 3.417 | 3.208 | 2.838 | 2.480 | 1.863 |
| 245                                  | -   | -     | -     | -     | -     | 3.496 | 3.289 | 2.929 | 2.544 | 1.919 |
| 250                                  | -   | -     | -     | -     | -     | 3.575 | 3.371 | 3.020 | 2.607 | 1.975 |
| 255                                  | -   | -     | -     | -     | -     | 3.655 | 3.452 | 3.111 | 2.670 | 2.031 |
| 260                                  | -   | -     | -     | -     | -     | 3.734 | 3.534 | 3.202 | 2.733 | 2.087 |
| 265                                  | -   | -     | -     | -     | -     | 3.813 | 3.615 | 3.293 | 2.804 | 2.144 |
| 270                                  | -   | -     | -     | -     | -     | 3.892 | 3.696 | 3.383 | 2.903 | 2.200 |
| 275                                  | -   | -     | -     | -     | -     | 3.971 | 3.778 | 3.474 | 3.002 | 2.256 |
| 280                                  | -   | -     | -     | -     | -     | -     | 3.859 | 3.565 | 3.101 | 2.312 |
| 285                                  | -   | -     | -     | -     | -     | -     | 3.941 | 3.656 | 3.200 | 2.368 |
| 290                                  | -   | -     | -     | -     | -     | -     | -     | 3.747 | 3.298 | 2.424 |
| 295                                  | -   | -     | -     | -     | -     | -     | -     | 3.838 | 3.397 | 2.481 |
| 300                                  | -   | -     | -     | -     | -     | -     | -     | 3.928 | 3.496 | 2.537 |
| 305                                  | -   | -     | -     | -     | -     | -     | -     | -     | 3.595 | 2.593 |
| 310                                  | -   | -     | -     | -     | -     | -     | -     | -     | 3.694 | 2.649 |
| 315                                  | -   | -     | -     | -     | -     | -     | -     | -     | 3.793 | 2.705 |
| 320                                  | -   | -     | -     | -     | -     | -     | -     | -     | 3.892 | 2.762 |
| 325                                  | -   | -     | -     | -     | -     | -     | -     | -     | 3.991 | 2.929 |
| 330                                  | -   | -     | -     | -     | -     | -     | -     | -     | -     | 3.169 |
| 335                                  | -   | -     | -     | -     | -     | -     | -     | -     | -     | 3.410 |
| 340                                  | -   | -     | -     | -     | -     | -     | -     | -     | -     | 3.651 |
| 345                                  | -   | -     | -     | -     | -     | -     | -     | -     | -     | 3.892 |

Table applies to I-section beams with 3 sides fire exposure and a concrete slab on top. Thickness is intumescent only.

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 9: I-Section Columns 15 minutes |   |       |       |       |       |       |       |       |       |
|---------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>  | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |
|                                       | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 85                                    | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 90                                    | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 95                                    | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 100                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 105                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 110                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 115                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 120                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 125                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 130                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 135                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 140                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 145                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 150                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 155                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 160                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 165                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 170                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 175                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 180                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 185                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 190                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 195                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 200                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 205                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 210                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 215                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 220                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 225                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 230                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 235                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 240                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 245                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 250                                   | 0.454   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 255                                   | 0.457   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 260                                   | 0.468   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 265                                   | 0.479   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 270                                   | 0.490   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 275                                   | 0.501   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 280                                   | 0.513   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 285                                   | 0.524   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 290                                   | 0.535   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 295                                   | 0.546   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 300                                   | 0.557   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 305                                   | 0.568   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 310                                   | 0.580   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 315                                   | 0.591   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 320                                   | 0.602   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 325                                   | 0.613   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 330                                   | 0.624   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 335                                   | 0.636   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 340                                   | 0.647   | 0.458 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 345                                   | 0.658   | 0.467 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 350                                   | 0.669   | 0.477 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 355                                   | 0.680   | 0.486 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 360                                   | 0.692   | 0.496 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |

Table applies to I-section columns with protection to four sides. Thickness is intumescent only.  
Table also applies to I-section beams protected on four sides.

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 10: I-Section Columns 30 minutes |   |       |       |       |       |       |       |       |       |
|--|---|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>   | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |
|  | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 85                                     | 0.455   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 90                                     | 0.475   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 95                                     | 0.495   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 100                                    | 0.515   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 105                                    | 0.536   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 110                                    | 0.556   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 115                                    | 0.576   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 120                                    | 0.596   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 125                                    | 0.617   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 130                                    | 0.637   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 135                                    | 0.657   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 140                                    | 0.678   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 145                                    | 0.698   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 150                                    | 0.718   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 155                                    | 0.738   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 160                                    | 0.759   | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 165                                    | 0.779   | 0.472 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 170                                    | 0.799   | 0.492 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 175                                    | 0.819   | 0.512 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 180                                    | 0.840   | 0.532 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 185                                    | 0.860   | 0.552 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 190                                    | 0.880   | 0.572 | 0.461 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 195                                    | 0.901   | 0.592 | 0.478 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 200                                    | 0.921   | 0.612 | 0.496 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 205                                    | 0.941   | 0.632 | 0.513 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 210                                    | 0.961   | 0.652 | 0.530 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 215                                    | 0.982   | 0.672 | 0.547 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 220                                    | 1.002   | 0.692 | 0.564 | 0.457 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 225                                    | 1.022   | 0.712 | 0.581 | 0.472 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 230                                    | 1.042   | 0.732 | 0.598 | 0.487 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 235                                    | 1.063   | 0.752 | 0.615 | 0.502 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 240                                    | 1.083   | 0.772 | 0.632 | 0.517 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 245                                    | 1.103   | 0.792 | 0.650 | 0.531 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 250                                    | 1.124   | 0.812 | 0.667 | 0.546 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 255                                    | 1.144   | 0.832 | 0.684 | 0.561 | 0.459 | 0.454 | 0.454 | 0.454 | 0.454 |
| 260                                    | 1.164   | 0.852 | 0.701 | 0.576 | 0.472 | 0.454 | 0.454 | 0.454 | 0.454 |
| 265                                    | 1.184   | 0.872 | 0.718 | 0.591 | 0.485 | 0.454 | 0.454 | 0.454 | 0.454 |
| 270                                    | 1.205   | 0.892 | 0.735 | 0.606 | 0.498 | 0.454 | 0.454 | 0.454 | 0.454 |
| 275                                    | 1.225   | 0.912 | 0.752 | 0.620 | 0.510 | 0.454 | 0.454 | 0.454 | 0.454 |
| 280                                    | 1.245   | 0.932 | 0.769 | 0.635 | 0.523 | 0.454 | 0.454 | 0.454 | 0.454 |
| 285                                    | 1.265   | 0.952 | 0.786 | 0.650 | 0.536 | 0.454 | 0.454 | 0.454 | 0.454 |
| 290                                    | 1.286   | 0.972 | 0.804 | 0.665 | 0.549 | 0.454 | 0.454 | 0.454 | 0.454 |
| 295                                    | 1.306   | 0.992 | 0.821 | 0.680 | 0.561 | 0.454 | 0.454 | 0.454 | 0.454 |
| 300                                    | 1.326   | 1.012 | 0.838 | 0.695 | 0.574 | 0.465 | 0.454 | 0.454 | 0.454 |
| 305                                    | 1.346   | 1.032 | 0.855 | 0.709 | 0.587 | 0.476 | 0.454 | 0.454 | 0.454 |
| 310                                    | 1.367   | 1.052 | 0.872 | 0.724 | 0.600 | 0.486 | 0.454 | 0.454 | 0.454 |
| 315                                    | 1.387   | 1.072 | 0.889 | 0.739 | 0.612 | 0.497 | 0.454 | 0.454 | 0.454 |
| 320                                    | 1.407   | 1.092 | 0.906 | 0.754 | 0.625 | 0.508 | 0.454 | 0.454 | 0.454 |
| 325                                    | 1.428   | 1.112 | 0.923 | 0.769 | 0.638 | 0.519 | 0.454 | 0.454 | 0.454 |
| 330                                    | 1.448   | 1.131 | 0.940 | 0.784 | 0.651 | 0.530 | 0.454 | 0.454 | 0.454 |
| 335                                    | 1.468   | 1.151 | 0.958 | 0.798 | 0.663 | 0.540 | 0.454 | 0.454 | 0.454 |
| 340                                    | 1.488   | 1.171 | 0.975 | 0.813 | 0.676 | 0.551 | 0.454 | 0.454 | 0.454 |
| 345                                    | 1.509   | 1.191 | 0.992 | 0.828 | 0.689 | 0.562 | 0.454 | 0.454 | 0.454 |
| 350                                    | 1.529   | 1.211 | 1.009 | 0.843 | 0.702 | 0.573 | 0.456 | 0.454 | 0.454 |
| 355                                    | 1.549   | 1.231 | 1.026 | 0.858 | 0.714 | 0.583 | 0.465 | 0.454 | 0.454 |
| 360                                    | 1.569   | 1.251 | 1.043 | 0.873 | 0.727 | 0.594 | 0.474 | 0.454 | 0.454 |

Table applies to I-section columns with protection to four sides. Thickness is intumescent only.

Table also applies to I-section beams protected on four sides.

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 11: I-Section Columns 45 minutes |   |       |       |       |       |       |       |       |       |
|--|---|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>   | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |
|  | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 85                                     | 1.055   | 0.707 | 0.484 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 90                                     | 1.077   | 0.721 | 0.507 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 95                                     | 1.100   | 0.744 | 0.529 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 100                                    | 1.123   | 0.767 | 0.551 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 105                                    | 1.145   | 0.790 | 0.573 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 110                                    | 1.168   | 0.813 | 0.595 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 115                                    | 1.190   | 0.836 | 0.617 | 0.473 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 120                                    | 1.213   | 0.859 | 0.639 | 0.494 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 125                                    | 1.236   | 0.882 | 0.661 | 0.514 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 130                                    | 1.258   | 0.905 | 0.683 | 0.535 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 135                                    | 1.281   | 0.928 | 0.706 | 0.556 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 140                                    | 1.303   | 0.951 | 0.728 | 0.576 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 145                                    | 1.326   | 0.974 | 0.750 | 0.597 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 150                                    | 1.349   | 0.997 | 0.772 | 0.618 | 0.454 | 0.454 | 0.454 | 0.454 | 0.454 |
| 155                                    | 1.371   | 1.020 | 0.794 | 0.639 | 0.462 | 0.454 | 0.454 | 0.454 | 0.454 |
| 160                                    | 1.394   | 1.043 | 0.816 | 0.659 | 0.482 | 0.454 | 0.454 | 0.454 | 0.454 |
| 165                                    | 1.416   | 1.066 | 0.838 | 0.680 | 0.501 | 0.454 | 0.454 | 0.454 | 0.454 |
| 170                                    | 1.439   | 1.089 | 0.860 | 0.701 | 0.521 | 0.454 | 0.454 | 0.454 | 0.454 |
| 175                                    | 1.462   | 1.112 | 0.882 | 0.721 | 0.540 | 0.454 | 0.454 | 0.454 | 0.454 |
| 180                                    | 1.484   | 1.135 | 0.905 | 0.742 | 0.560 | 0.454 | 0.454 | 0.454 | 0.454 |
| 185                                    | 1.507   | 1.158 | 0.927 | 0.763 | 0.580 | 0.463 | 0.454 | 0.454 | 0.454 |
| 190                                    | 1.529   | 1.181 | 0.949 | 0.784 | 0.599 | 0.480 | 0.454 | 0.454 | 0.454 |
| 195                                    | 1.552   | 1.204 | 0.971 | 0.804 | 0.619 | 0.498 | 0.454 | 0.454 | 0.454 |
| 200                                    | 1.575   | 1.227 | 0.993 | 0.825 | 0.639 | 0.515 | 0.454 | 0.454 | 0.454 |
| 205                                    | 1.597   | 1.250 | 1.015 | 0.846 | 0.658 | 0.533 | 0.454 | 0.454 | 0.454 |
| 210                                    | 1.620   | 1.273 | 1.037 | 0.867 | 0.678 | 0.550 | 0.466 | 0.454 | 0.454 |
| 215                                    | 1.642   | 1.296 | 1.059 | 0.887 | 0.697 | 0.567 | 0.480 | 0.454 | 0.454 |
| 220                                    | 1.665   | 1.319 | 1.081 | 0.908 | 0.717 | 0.585 | 0.495 | 0.454 | 0.454 |
| 225                                    | 1.691   | 1.342 | 1.104 | 0.929 | 0.737 | 0.602 | 0.510 | 0.454 | 0.454 |
| 230                                    | 1.729   | 1.365 | 1.126 | 0.949 | 0.756 | 0.620 | 0.525 | 0.454 | 0.454 |
| 235                                    | 1.767   | 1.388 | 1.148 | 0.970 | 0.776 | 0.637 | 0.540 | 0.456 | 0.454 |
| 240                                    | 1.805   | 1.411 | 1.170 | 0.991 | 0.796 | 0.655 | 0.555 | 0.469 | 0.454 |
| 245                                    | 1.844   | 1.434 | 1.192 | 1.012 | 0.815 | 0.672 | 0.570 | 0.482 | 0.454 |
| 250                                    | 1.882   | 1.457 | 1.214 | 1.032 | 0.835 | 0.690 | 0.585 | 0.495 | 0.454 |
| 255                                    | 1.920   | 1.480 | 1.236 | 1.053 | 0.855 | 0.707 | 0.600 | 0.507 | 0.454 |
| 260                                    | 1.958   | 1.503 | 1.258 | 1.074 | 0.874 | 0.725 | 0.615 | 0.520 | 0.454 |
| 265                                    | 1.996   | 1.527 | 1.281 | 1.094 | 0.894 | 0.742 | 0.630 | 0.533 | 0.454 |
| 270                                    | 2.035   | 1.550 | 1.303 | 1.115 | 0.913 | 0.760 | 0.645 | 0.546 | 0.454 |
| 275                                    | 2.073   | 1.573 | 1.325 | 1.136 | 0.933 | 0.777 | 0.659 | 0.559 | 0.454 |
| 280                                    | 2.111   | 1.596 | 1.347 | 1.157 | 0.953 | 0.795 | 0.674 | 0.572 | 0.454 |
| 285                                    | 2.149   | 1.619 | 1.369 | 1.177 | 0.972 | 0.812 | 0.689 | 0.585 | 0.455 |
| 290                                    | 2.188   | 1.642 | 1.391 | 1.198 | 0.992 | 0.830 | 0.704 | 0.597 | 0.466 |
| 295                                    | 2.226   | 1.665 | 1.413 | 1.219 | 1.012 | 0.847 | 0.719 | 0.610 | 0.476 |
| 300                                    | 2.264   | 1.691 | 1.435 | 1.240 | 1.031 | 0.865 | 0.734 | 0.623 | 0.486 |
| 305                                    | 2.302   | 1.731 | 1.457 | 1.260 | 1.051 | 0.882 | 0.749 | 0.636 | 0.496 |
| 310                                    | 2.341   | 1.771 | 1.480 | 1.281 | 1.070 | 0.900 | 0.764 | 0.649 | 0.507 |
| 315                                    | 2.379   | 1.811 | 1.502 | 1.302 | 1.090 | 0.917 | 0.779 | 0.662 | 0.517 |
| 320                                    | 2.417   | 1.851 | 1.524 | 1.322 | 1.110 | 0.935 | 0.794 | 0.675 | 0.527 |
| 325                                    | 2.455   | 1.890 | 1.546 | 1.343 | 1.129 | 0.952 | 0.809 | 0.687 | 0.537 |
| 330                                    | 2.493   | 1.930 | 1.568 | 1.364 | 1.149 | 0.970 | 0.824 | 0.700 | 0.548 |
| 335                                    | 2.532   | 1.970 | 1.590 | 1.385 | 1.169 | 0.987 | 0.839 | 0.713 | 0.558 |
| 340                                    | 2.570   | 2.010 | 1.612 | 1.405 | 1.188 | 1.005 | 0.853 | 0.726 | 0.568 |
| 345                                    | 2.608   | 2.050 | 1.634 | 1.426 | 1.208 | 1.022 | 0.868 | 0.739 | 0.578 |
| 350                                    | 2.646   | 2.090 | 1.656 | 1.447 | 1.228 | 1.040 | 0.883 | 0.752 | 0.589 |
| 355                                    | 2.685   | 2.130 | 1.679 | 1.467 | 1.247 | 1.057 | 0.898 | 0.765 | 0.599 |
| 360                                    | 2.723   | 2.170 | 1.714 | 1.488 | 1.267 | 1.075 | 0.913 | 0.778 | 0.609 |

Table applies to I-section columns with protection to four sides. Thickness is intumescent only.  
Table also applies to I-section beams protected on four sides.

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 12: I-Section Columns 60 minutes |   |       |       |       |       |       |       |       |       |
|--|---|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>   | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |
|  | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 85                                     | 1.683   | 1.270 | 0.955 | 0.702 | 0.494 | 0.454 | 0.454 | 0.454 | 0.454 |
| 90                                     | 1.716   | 1.293 | 0.979 | 0.715 | 0.518 | 0.454 | 0.454 | 0.454 | 0.454 |
| 95                                     | 1.749   | 1.316 | 1.002 | 0.739 | 0.541 | 0.454 | 0.454 | 0.454 | 0.454 |
| 100                                    | 1.782   | 1.339 | 1.025 | 0.763 | 0.564 | 0.466 | 0.454 | 0.454 | 0.454 |
| 105                                    | 1.815   | 1.362 | 1.049 | 0.787 | 0.587 | 0.487 | 0.454 | 0.454 | 0.454 |
| 110                                    | 1.848   | 1.386 | 1.072 | 0.811 | 0.610 | 0.509 | 0.454 | 0.454 | 0.454 |
| 115                                    | 1.881   | 1.409 | 1.095 | 0.835 | 0.634 | 0.530 | 0.454 | 0.454 | 0.454 |
| 120                                    | 1.914   | 1.432 | 1.119 | 0.859 | 0.657 | 0.551 | 0.454 | 0.454 | 0.454 |
| 125                                    | 1.947   | 1.455 | 1.142 | 0.883 | 0.680 | 0.573 | 0.454 | 0.454 | 0.454 |
| 130                                    | 1.980   | 1.479 | 1.165 | 0.908 | 0.703 | 0.594 | 0.470 | 0.454 | 0.454 |
| 135                                    | 2.013   | 1.502 | 1.189 | 0.932 | 0.727 | 0.615 | 0.489 | 0.454 | 0.454 |
| 140                                    | 2.046   | 1.525 | 1.212 | 0.956 | 0.750 | 0.636 | 0.509 | 0.454 | 0.454 |
| 145                                    | 2.079   | 1.548 | 1.235 | 0.980 | 0.773 | 0.658 | 0.529 | 0.454 | 0.454 |
| 150                                    | 2.112   | 1.572 | 1.259 | 1.004 | 0.796 | 0.679 | 0.548 | 0.454 | 0.454 |
| 155                                    | 2.144   | 1.595 | 1.282 | 1.028 | 0.819 | 0.700 | 0.568 | 0.454 | 0.454 |
| 160                                    | 2.177   | 1.618 | 1.305 | 1.052 | 0.843 | 0.721 | 0.588 | 0.454 | 0.454 |
| 165                                    | 2.210   | 1.641 | 1.329 | 1.076 | 0.866 | 0.743 | 0.607 | 0.471 | 0.454 |
| 170                                    | 2.243   | 1.664 | 1.352 | 1.100 | 0.889 | 0.764 | 0.627 | 0.490 | 0.454 |
| 175                                    | 2.276   | 1.690 | 1.375 | 1.124 | 0.912 | 0.785 | 0.646 | 0.508 | 0.454 |
| 180                                    | 2.309   | 1.727 | 1.398 | 1.148 | 0.935 | 0.807 | 0.666 | 0.527 | 0.454 |
| 185                                    | 2.342   | 1.764 | 1.422 | 1.172 | 0.959 | 0.828 | 0.686 | 0.545 | 0.454 |
| 190                                    | 2.375   | 1.800 | 1.445 | 1.197 | 0.982 | 0.849 | 0.705 | 0.564 | 0.461 |
| 195                                    | 2.408   | 1.837 | 1.468 | 1.221 | 1.005 | 0.870 | 0.725 | 0.583 | 0.477 |
| 200                                    | 2.441   | 1.874 | 1.492 | 1.245 | 1.028 | 0.892 | 0.745 | 0.601 | 0.492 |
| 205                                    | 2.474   | 1.911 | 1.515 | 1.269 | 1.052 | 0.913 | 0.764 | 0.620 | 0.508 |
| 210                                    | 2.507   | 1.947 | 1.538 | 1.293 | 1.075 | 0.934 | 0.784 | 0.638 | 0.523 |
| 215                                    | 2.540   | 1.984 | 1.562 | 1.317 | 1.098 | 0.955 | 0.804 | 0.657 | 0.539 |
| 220                                    | 2.573   | 2.021 | 1.585 | 1.341 | 1.121 | 0.977 | 0.823 | 0.675 | 0.555 |
| 225                                    | 2.606   | 2.057 | 1.608 | 1.365 | 1.144 | 0.998 | 0.843 | 0.694 | 0.570 |
| 230                                    | 2.639   | 2.094 | 1.632 | 1.389 | 1.168 | 1.019 | 0.862 | 0.712 | 0.586 |
| 235                                    | 2.672   | 2.131 | 1.655 | 1.413 | 1.191 | 1.041 | 0.882 | 0.731 | 0.601 |
| 240                                    | 2.705   | 2.167 | 1.678 | 1.437 | 1.214 | 1.062 | 0.902 | 0.749 | 0.617 |
| 245                                    | 2.738   | 2.204 | 1.717 | 1.461 | 1.237 | 1.083 | 0.921 | 0.768 | 0.633 |
| 250                                    | 2.771   | 2.241 | 1.759 | 1.486 | 1.260 | 1.104 | 0.941 | 0.786 | 0.648 |
| 255                                    | 2.808   | 2.278 | 1.802 | 1.510 | 1.284 | 1.126 | 0.961 | 0.805 | 0.664 |
| 260                                    | 2.848   | 2.314 | 1.844 | 1.534 | 1.307 | 1.147 | 0.980 | 0.823 | 0.679 |
| 265                                    | 2.888   | 2.351 | 1.886 | 1.558 | 1.330 | 1.168 | 1.000 | 0.842 | 0.695 |
| 270                                    | 2.927   | 2.388 | 1.929 | 1.582 | 1.353 | 1.189 | 1.019 | 0.860 | 0.710 |
| 275                                    | 2.967   | 2.424 | 1.971 | 1.606 | 1.377 | 1.211 | 1.039 | 0.879 | 0.726 |
| 280                                    | 3.007   | 2.461 | 2.013 | 1.630 | 1.400 | 1.232 | 1.059 | 0.897 | 0.742 |
| 285                                    | 3.047   | 2.498 | 2.056 | 1.654 | 1.423 | 1.253 | 1.078 | 0.916 | 0.757 |
| 290                                    | 3.087   | 2.534 | 2.098 | 1.678 | 1.446 | 1.275 | 1.098 | 0.935 | 0.773 |
| 295                                    | 3.127   | 2.571 | 2.140 | 1.718 | 1.469 | 1.296 | 1.118 | 0.953 | 0.788 |
| 300                                    | 3.167   | 2.608 | 2.183 | 1.761 | 1.493 | 1.317 | 1.137 | 0.972 | 0.804 |
| 305                                    | 3.206   | 2.645 | 2.225 | 1.804 | 1.516 | 1.338 | 1.157 | 0.990 | 0.820 |
| 310                                    | 3.246   | 2.681 | 2.267 | 1.848 | 1.539 | 1.360 | 1.177 | 1.009 | 0.835 |
| 315                                    | 3.286   | 2.718 | 2.310 | 1.891 | 1.562 | 1.381 | 1.196 | 1.027 | 0.851 |
| 320                                    | 3.326   | 2.755 | 2.352 | 1.934 | 1.585 | 1.402 | 1.216 | 1.046 | 0.866 |
| 325                                    | 3.366   | 2.795 | 2.394 | 1.978 | 1.609 | 1.423 | 1.235 | 1.064 | 0.882 |
| 330                                    | 3.406   | 2.852 | 2.437 | 2.021 | 1.632 | 1.445 | 1.255 | 1.083 | 0.898 |
| 335                                    | 3.446   | 2.908 | 2.479 | 2.064 | 1.655 | 1.466 | 1.275 | 1.101 | 0.913 |
| 340                                    | 3.485   | 2.965 | 2.521 | 2.108 | 1.678 | 1.487 | 1.294 | 1.120 | 0.929 |
| 345                                    | 3.525   | 3.021 | 2.564 | 2.151 | 1.718 | 1.509 | 1.314 | 1.138 | 0.944 |
| 350                                    | 3.565   | 3.078 | 2.606 | 2.194 | 1.762 | 1.530 | 1.334 | 1.157 | 0.960 |
| 355                                    | 3.605   | 3.134 | 2.648 | 2.238 | 1.805 | 1.551 | 1.353 | 1.175 | 0.975 |
| 360                                    | 3.645   | 3.191 | 2.691 | 2.281 | 1.849 | 1.572 | 1.373 | 1.194 | 0.991 |

Table applies to I-section columns with protection to four sides. Thickness is intumescent only.  
Table also applies to I-section beams protected on four sides.

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 13: I-Section Columns 75 minutes |   |       |       |       |       |       |       |       |       |
|--|---|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>   | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |
|  | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 85                                     | 2.423   | 1.879 | 1.446 | 1.156 | 0.895 | 0.676 | 0.504 | 0.454 | 0.454 |
| 90                                     | 2.474   | 1.910 | 1.477 | 1.178 | 0.918 | 0.700 | 0.527 | 0.454 | 0.454 |
| 95                                     | 2.526   | 1.941 | 1.507 | 1.199 | 0.942 | 0.724 | 0.550 | 0.474 | 0.454 |
| 100                                    | 2.578   | 1.972 | 1.537 | 1.220 | 0.966 | 0.748 | 0.573 | 0.495 | 0.454 |
| 105                                    | 2.629   | 2.003 | 1.568 | 1.242 | 0.990 | 0.772 | 0.596 | 0.517 | 0.454 |
| 110                                    | 2.681   | 2.035 | 1.598 | 1.263 | 1.013 | 0.796 | 0.619 | 0.538 | 0.454 |
| 115                                    | 2.732   | 2.066 | 1.628 | 1.285 | 1.037 | 0.820 | 0.642 | 0.560 | 0.454 |
| 120                                    | 2.784   | 2.097 | 1.659 | 1.306 | 1.061 | 0.844 | 0.665 | 0.581 | 0.471 |
| 125                                    | 2.824   | 2.128 | 1.690 | 1.327 | 1.085 | 0.868 | 0.688 | 0.603 | 0.491 |
| 130                                    | 2.865   | 2.160 | 1.725 | 1.349 | 1.108 | 0.892 | 0.711 | 0.624 | 0.510 |
| 135                                    | 2.905   | 2.191 | 1.759 | 1.370 | 1.132 | 0.916 | 0.734 | 0.646 | 0.529 |
| 140                                    | 2.946   | 2.222 | 1.794 | 1.392 | 1.156 | 0.940 | 0.757 | 0.667 | 0.549 |
| 145                                    | 2.986   | 2.253 | 1.828 | 1.413 | 1.180 | 0.964 | 0.780 | 0.689 | 0.568 |
| 150                                    | 3.027   | 2.284 | 1.863 | 1.435 | 1.203 | 0.988 | 0.803 | 0.710 | 0.587 |
| 155                                    | 3.067   | 2.316 | 1.898 | 1.456 | 1.227 | 1.012 | 0.826 | 0.732 | 0.606 |
| 160                                    | 3.108   | 2.347 | 1.932 | 1.477 | 1.251 | 1.036 | 0.850 | 0.753 | 0.626 |
| 165                                    | 3.148   | 2.378 | 1.967 | 1.499 | 1.275 | 1.060 | 0.873 | 0.775 | 0.645 |
| 170                                    | 3.188   | 2.409 | 2.002 | 1.520 | 1.298 | 1.084 | 0.896 | 0.796 | 0.664 |
| 175                                    | 3.229   | 2.441 | 2.036 | 1.542 | 1.322 | 1.108 | 0.919 | 0.818 | 0.684 |
| 180                                    | 3.269   | 2.472 | 2.071 | 1.563 | 1.346 | 1.132 | 0.942 | 0.839 | 0.703 |
| 185                                    | 3.310   | 2.503 | 2.105 | 1.584 | 1.370 | 1.156 | 0.965 | 0.861 | 0.722 |
| 190                                    | 3.350   | 2.534 | 2.140 | 1.606 | 1.393 | 1.180 | 0.988 | 0.882 | 0.741 |
| 195                                    | 3.391   | 2.565 | 2.175 | 1.627 | 1.417 | 1.204 | 1.011 | 0.904 | 0.761 |
| 200                                    | 3.431   | 2.597 | 2.209 | 1.649 | 1.441 | 1.227 | 1.034 | 0.926 | 0.780 |
| 205                                    | 3.471   | 2.628 | 2.244 | 1.670 | 1.465 | 1.251 | 1.057 | 0.947 | 0.799 |
| 210                                    | 3.512   | 2.659 | 2.279 | 1.701 | 1.488 | 1.275 | 1.080 | 0.969 | 0.819 |
| 215                                    | 3.552   | 2.690 | 2.313 | 1.746 | 1.512 | 1.299 | 1.103 | 0.990 | 0.838 |
| 220                                    | 3.593   | 2.722 | 2.348 | 1.790 | 1.536 | 1.323 | 1.126 | 1.012 | 0.857 |
| 225                                    | 3.633   | 2.753 | 2.382 | 1.835 | 1.560 | 1.347 | 1.149 | 1.033 | 0.877 |
| 230                                    | 3.674   | 2.784 | 2.417 | 1.880 | 1.583 | 1.371 | 1.172 | 1.055 | 0.896 |
| 235                                    | 3.714   | 2.836 | 2.452 | 1.925 | 1.607 | 1.395 | 1.195 | 1.076 | 0.915 |
| 240                                    | 3.755   | 2.889 | 2.486 | 1.969 | 1.631 | 1.419 | 1.218 | 1.098 | 0.934 |
| 245                                    | 3.795   | 2.941 | 2.521 | 2.014 | 1.655 | 1.443 | 1.241 | 1.119 | 0.954 |
| 250                                    | 3.835   | 2.993 | 2.555 | 2.059 | 1.678 | 1.467 | 1.264 | 1.141 | 0.973 |
| 255                                    | 3.876   | 3.045 | 2.590 | 2.104 | 1.721 | 1.491 | 1.287 | 1.162 | 0.992 |
| 260                                    | 3.962   | 3.098 | 2.625 | 2.148 | 1.768 | 1.515 | 1.310 | 1.184 | 1.012 |
| 265                                    | 4.078   | 3.150 | 2.659 | 2.193 | 1.815 | 1.539 | 1.333 | 1.205 | 1.031 |
| 270                                    | 4.194   | 3.202 | 2.694 | 2.238 | 1.862 | 1.563 | 1.356 | 1.227 | 1.050 |
| 275                                    | 4.311   | 3.254 | 2.729 | 2.283 | 1.909 | 1.587 | 1.379 | 1.248 | 1.069 |
| 280                                    | 4.427   | 3.307 | 2.763 | 2.327 | 1.956 | 1.611 | 1.402 | 1.270 | 1.089 |
| 285                                    | 4.543   | 3.359 | 2.812 | 2.372 | 2.003 | 1.635 | 1.425 | 1.291 | 1.108 |
| 290                                    | 4.659   | 3.411 | 2.883 | 2.417 | 2.050 | 1.659 | 1.448 | 1.313 | 1.127 |
| 295                                    | 4.776   | 3.463 | 2.954 | 2.462 | 2.097 | 1.683 | 1.471 | 1.334 | 1.147 |
| 300                                    | 4.892   | 3.516 | 3.025 | 2.507 | 2.144 | 1.731 | 1.494 | 1.356 | 1.166 |
| 305                                    | 5.008   | 3.568 | 3.097 | 2.551 | 2.191 | 1.779 | 1.517 | 1.377 | 1.185 |
| 310                                    | 5.125   | 3.620 | 3.168 | 2.596 | 2.238 | 1.827 | 1.540 | 1.399 | 1.205 |
| 315                                    | 5.241   | 3.672 | 3.239 | 2.641 | 2.285 | 1.874 | 1.563 | 1.420 | 1.224 |
| 320                                    | 5.357   | 3.725 | 3.310 | 2.686 | 2.332 | 1.922 | 1.586 | 1.442 | 1.243 |
| 325                                    | 5.473   | 3.777 | 3.381 | 2.730 | 2.379 | 1.970 | 1.609 | 1.464 | 1.262 |
| 330                                    | -   | 3.829 | 3.452 | 2.775 | 2.426 | 2.018 | 1.632 | 1.485 | 1.282 |
| 335                                    | -   | 3.882 | 3.523 | 2.860 | 2.473 | 2.066 | 1.655 | 1.507 | 1.301 |
| 340                                    | -   | 4.028 | 3.594 | 2.956 | 2.521 | 2.114 | 1.678 | 1.528 | 1.320 |
| 345                                    | -   | 4.197 | 3.665 | 3.051 | 2.568 | 2.162 | 1.722 | 1.550 | 1.340 |
| 350                                    | -   | 4.366 | 3.736 | 3.147 | 2.615 | 2.210 | 1.770 | 1.571 | 1.359 |
| 355                                    | -   | 4.536 | 3.807 | 3.242 | 2.662 | 2.257 | 1.818 | 1.593 | 1.378 |
| 360                                    | -   | 4.705 | 3.878 | 3.338 | 2.709 | 2.305 | 1.867 | 1.614 | 1.397 |

Table applies to I-section columns with protection to four sides. Thickness is intumescent only. Table also applies to I-section beams protected on four sides up to a limiting nominal protection thickness of 3.992mm.



# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 14: I-Section Columns 90 minutes |   |       |       |       |       |       |       |       |       |
|--|---|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>   | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |
|  | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 85                                     | 3.102   | 2.658 | 2.044 | 1.585 | 1.321 | 1.069 | 0.853 | 0.668 | 0.501 |
| 90                                     | 3.180   | 2.658 | 2.086 | 1.620 | 1.342 | 1.091 | 0.876 | 0.692 | 0.523 |
| 95                                     | 3.257   | 2.693 | 2.128 | 1.655 | 1.363 | 1.113 | 0.899 | 0.716 | 0.546 |
| 100                                    | 3.334   | 2.751 | 2.170 | 1.690 | 1.384 | 1.135 | 0.922 | 0.740 | 0.569 |
| 105                                    | 3.412   | 2.810 | 2.212 | 1.725 | 1.405 | 1.157 | 0.945 | 0.764 | 0.591 |
| 110                                    | 3.489   | 2.868 | 2.254 | 1.760 | 1.425 | 1.179 | 0.968 | 0.787 | 0.614 |
| 115                                    | 3.567   | 2.926 | 2.296 | 1.794 | 1.446 | 1.201 | 0.991 | 0.811 | 0.636 |
| 120                                    | 3.644   | 2.984 | 2.338 | 1.829 | 1.467 | 1.223 | 1.014 | 0.835 | 0.659 |
| 125                                    | 3.722   | 3.042 | 2.380 | 1.864 | 1.488 | 1.246 | 1.037 | 0.859 | 0.682 |
| 130                                    | 3.799   | 3.101 | 2.422 | 1.899 | 1.508 | 1.268 | 1.060 | 0.883 | 0.704 |
| 135                                    | 3.877   | 3.159 | 2.464 | 1.934 | 1.529 | 1.290 | 1.083 | 0.907 | 0.727 |
| 140                                    | 4.074   | 3.217 | 2.506 | 1.969 | 1.550 | 1.312 | 1.107 | 0.930 | 0.750 |
| 145                                    | 4.303   | 3.275 | 2.549 | 2.004 | 1.571 | 1.334 | 1.130 | 0.954 | 0.772 |
| 150                                    | 4.531   | 3.333 | 2.591 | 2.038 | 1.592 | 1.356 | 1.153 | 0.978 | 0.795 |
| 155                                    | 4.759   | 3.392 | 2.633 | 2.073 | 1.612 | 1.378 | 1.176 | 1.002 | 0.818 |
| 160                                    | 4.987   | 3.450 | 2.675 | 2.108 | 1.633 | 1.400 | 1.199 | 1.026 | 0.840 |
| 165                                    | 5.215   | 3.508 | 2.717 | 2.143 | 1.654 | 1.422 | 1.222 | 1.049 | 0.863 |
| 170                                    | 5.443   | 3.566 | 2.759 | 2.178 | 1.675 | 1.444 | 1.245 | 1.073 | 0.886 |
| 175                                    | -   | 3.624 | 2.804 | 2.213 | 1.711 | 1.466 | 1.268 | 1.097 | 0.908 |
| 180                                    | -   | 3.683 | 2.853 | 2.247 | 1.758 | 1.489 | 1.291 | 1.121 | 0.931 |
| 185                                    | -   | 3.741 | 2.903 | 2.282 | 1.804 | 1.511 | 1.314 | 1.145 | 0.954 |
| 190                                    | -   | 3.799 | 2.952 | 2.317 | 1.851 | 1.533 | 1.337 | 1.169 | 0.976 |
| 195                                    | -   | 3.857 | 3.002 | 2.352 | 1.898 | 1.555 | 1.360 | 1.192 | 0.999 |
| 200                                    | -   | 3.919 | 3.051 | 2.387 | 1.944 | 1.577 | 1.383 | 1.216 | 1.022 |
| 205                                    | -   | 3.985 | 3.101 | 2.422 | 1.991 | 1.599 | 1.406 | 1.240 | 1.044 |
| 210                                    | -   | 4.052 | 3.150 | 2.456 | 2.038 | 1.621 | 1.429 | 1.264 | 1.067 |
| 215                                    | -   | 4.119 | 3.200 | 2.491 | 2.084 | 1.643 | 1.452 | 1.288 | 1.090 |
| 220                                    | -   | 4.185 | 3.249 | 2.526 | 2.131 | 1.665 | 1.475 | 1.311 | 1.112 |
| 225                                    | -   | 4.252 | 3.298 | 2.561 | 2.178 | 1.693 | 1.499 | 1.335 | 1.135 |
| 230                                    | -   | 4.318 | 3.348 | 2.596 | 2.224 | 1.741 | 1.522 | 1.359 | 1.157 |
| 235                                    | -   | 4.385 | 3.397 | 2.631 | 2.271 | 1.790 | 1.545 | 1.383 | 1.180 |
| 240                                    | -   | 4.452 | 3.447 | 2.666 | 2.317 | 1.839 | 1.568 | 1.407 | 1.203 |
| 245                                    | -   | 4.518 | 3.496 | 2.700 | 2.364 | 1.888 | 1.591 | 1.431 | 1.225 |
| 250                                    | -   | 4.585 | 3.546 | 2.735 | 2.411 | 1.936 | 1.614 | 1.454 | 1.248 |
| 255                                    | -   | 4.652 | 3.595 | 2.770 | 2.457 | 1.985 | 1.637 | 1.478 | 1.271 |
| 260                                    | -   | 4.718 | 3.645 | 2.838 | 2.504 | 2.034 | 1.660 | 1.502 | 1.293 |
| 265                                    | -   | 4.785 | 3.694 | 2.927 | 2.551 | 2.082 | 1.683 | 1.526 | 1.316 |
| 270                                    | -   | 4.851 | 3.744 | 3.016 | 2.597 | 2.131 | 1.735 | 1.550 | 1.339 |
| 275                                    | -   | 4.918 | 3.793 | 3.106 | 2.644 | 2.180 | 1.787 | 1.573 | 1.361 |
| 280                                    | -   | 4.985 | 3.843 | 3.195 | 2.691 | 2.229 | 1.839 | 1.597 | 1.384 |
| 285                                    | -   | 5.051 | 3.892 | 3.284 | 2.737 | 2.277 | 1.891 | 1.621 | 1.407 |
| 290                                    | -   | 5.118 | 3.988 | 3.374 | 2.784 | 2.326 | 1.943 | 1.645 | 1.429 |
| 295                                    | -   | 5.185 | 4.083 | 3.463 | 2.878 | 2.375 | 1.995 | 1.669 | 1.452 |
| 300                                    | -   | 5.251 | 4.179 | 3.552 | 2.972 | 2.423 | 2.047 | 1.703 | 1.475 |
| 305                                    | -   | 5.318 | 4.275 | 3.642 | 3.066 | 2.472 | 2.098 | 1.754 | 1.497 |
| 310                                    | -   | 5.384 | 4.370 | 3.731 | 3.160 | 2.521 | 2.150 | 1.805 | 1.520 |
| 315                                    | -   | 5.451 | 4.466 | 3.821 | 3.253 | 2.570 | 2.202 | 1.856 | 1.543 |
| 320                                    | -   | 5.518 | 4.562 | 3.911 | 3.347 | 2.618 | 2.254 | 1.907 | 1.565 |
| 325                                    | -   | -     | 4.657 | 4.007 | 3.441 | 2.667 | 2.306 | 1.958 | 1.588 |
| 330                                    | -   | -     | 4.753 | 4.102 | 3.535 | 2.716 | 2.358 | 2.009 | 1.611 |
| 335                                    | -   | -     | 4.848 | 4.198 | 3.629 | 2.765 | 2.410 | 2.060 | 1.633 |
| 340                                    | -   | -     | 4.944 | 4.294 | 3.723 | 2.865 | 2.462 | 2.111 | 1.656 |
| 345                                    | -   | -     | 5.040 | 4.389 | 3.817 | 3.000 | 2.514 | 2.162 | 1.678 |
| 350                                    | -   | -     | 5.135 | 4.485 | 3.910 | 3.135 | 2.566 | 2.213 | 1.722 |
| 355                                    | -   | -     | 5.231 | 4.581 | 4.001 | 3.270 | 2.618 | 2.264 | 1.771 |
| 360                                    | -   | -     | 5.327 | 4.676 | 4.093 | 3.406 | 2.670 | 2.315 | 1.821 |

Table applies to I-section columns with protection to four sides. Thickness is intumescent only. Table also applies to I-section beams protected on four sides up to a limiting nominal protection thickness of 3.992mm.

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 15: I-Section Columns 105 minutes |   |       |       |       |       |       |       |       |       |
|---|---|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>    | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |
|   | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 85                                      | 3.892   | 3.128 | 2.670 | 2.210 | 1.700 | 1.452 | 1.222 | 1.017 | 0.806 |
| 90                                      | 3.892   | 3.224 | 2.741 | 2.258 | 1.741 | 1.477 | 1.241 | 1.039 | 0.829 |
| 95                                      | -   | 3.319 | 2.812 | 2.307 | 1.782 | 1.502 | 1.260 | 1.061 | 0.852 |
| 100                                     | -   | 3.415 | 2.883 | 2.356 | 1.824 | 1.527 | 1.279 | 1.083 | 0.875 |
| 105                                     | -   | 3.510 | 2.954 | 2.404 | 1.865 | 1.552 | 1.298 | 1.105 | 0.898 |
| 110                                     | -   | 3.606 | 3.025 | 2.453 | 1.907 | 1.577 | 1.318 | 1.128 | 0.920 |
| 115                                     | -   | 3.701 | 3.097 | 2.502 | 1.948 | 1.603 | 1.337 | 1.150 | 0.943 |
| 120                                     | -   | 3.797 | 3.168 | 2.550 | 1.989 | 1.628 | 1.356 | 1.172 | 0.966 |
| 125                                     | -   | 3.892 | 3.239 | 2.599 | 2.031 | 1.653 | 1.375 | 1.194 | 0.989 |
| 130                                     | -   | 4.129 | 3.310 | 2.648 | 2.072 | 1.678 | 1.395 | 1.217 | 1.012 |
| 135                                     | -   | 4.366 | 3.381 | 2.696 | 2.113 | 1.717 | 1.414 | 1.239 | 1.035 |
| 140                                     | -   | 4.604 | 3.452 | 2.745 | 2.155 | 1.759 | 1.433 | 1.261 | 1.057 |
| 145                                     | -   | 4.841 | 3.523 | 2.794 | 2.196 | 1.802 | 1.452 | 1.283 | 1.080 |
| 150                                     | -   | 5.078 | 3.594 | 2.842 | 2.238 | 1.844 | 1.472 | 1.305 | 1.103 |
| 155                                     | -   | 5.315 | 3.665 | 2.891 | 2.279 | 1.886 | 1.491 | 1.328 | 1.126 |
| 160                                     | -   | 5.552 | 3.736 | 2.940 | 2.320 | 1.929 | 1.510 | 1.350 | 1.149 |
| 165                                     | -   | -     | 3.807 | 2.988 | 2.362 | 1.971 | 1.529 | 1.372 | 1.172 |
| 170                                     | -   | -     | 3.878 | 3.037 | 2.403 | 2.013 | 1.548 | 1.394 | 1.194 |
| 175                                     | -   | -     | 3.945 | 3.085 | 2.445 | 2.056 | 1.568 | 1.416 | 1.217 |
| 180                                     | -   | -     | 4.012 | 3.134 | 2.486 | 2.098 | 1.587 | 1.439 | 1.240 |
| 185                                     | -   | -     | 4.079 | 3.182 | 2.527 | 2.140 | 1.606 | 1.461 | 1.263 |
| 190                                     | -   | -     | 4.145 | 3.231 | 2.569 | 2.183 | 1.625 | 1.483 | 1.286 |
| 195                                     | -   | -     | 4.212 | 3.280 | 2.610 | 2.225 | 1.645 | 1.505 | 1.309 |
| 200                                     | -   | -     | 4.278 | 3.328 | 2.652 | 2.267 | 1.664 | 1.528 | 1.331 |
| 205                                     | -   | -     | 4.345 | 3.377 | 2.693 | 2.310 | 1.683 | 1.550 | 1.354 |
| 210                                     | -   | -     | 4.412 | 3.425 | 2.734 | 2.352 | 1.739 | 1.572 | 1.377 |
| 215                                     | -   | -     | 4.478 | 3.474 | 2.776 | 2.394 | 1.795 | 1.594 | 1.400 |
| 220                                     | -   | -     | 4.545 | 3.523 | 2.845 | 2.437 | 1.852 | 1.616 | 1.423 |
| 225                                     | -   | -     | 4.612 | 3.571 | 2.921 | 2.479 | 1.908 | 1.639 | 1.446 |
| 230                                     | -   | -     | 4.678 | 3.620 | 2.996 | 2.521 | 1.964 | 1.661 | 1.468 |
| 235                                     | -   | -     | 4.745 | 3.668 | 3.072 | 2.564 | 2.020 | 1.683 | 1.491 |
| 240                                     | -   | -     | 4.811 | 3.717 | 3.148 | 2.606 | 2.076 | 1.735 | 1.514 |
| 245                                     | -   | -     | 4.878 | 3.766 | 3.224 | 2.648 | 2.132 | 1.787 | 1.537 |
| 250                                     | -   | -     | 4.945 | 3.814 | 3.300 | 2.691 | 2.189 | 1.839 | 1.560 |
| 255                                     | -   | -     | 5.011 | 3.863 | 3.376 | 2.733 | 2.245 | 1.891 | 1.583 |
| 260                                     | -   | -     | 5.078 | 3.930 | 3.452 | 2.776 | 2.301 | 1.943 | 1.605 |
| 265                                     | -   | -     | 5.145 | 4.026 | 3.528 | 2.859 | 2.357 | 1.995 | 1.628 |
| 270                                     | -   | -     | 5.211 | 4.122 | 3.604 | 2.953 | 2.413 | 2.047 | 1.651 |
| 275                                     | -   | -     | 5.278 | 4.217 | 3.680 | 3.047 | 2.469 | 2.098 | 1.674 |
| 280                                     | -   | -     | 5.345 | 4.313 | 3.755 | 3.141 | 2.526 | 2.150 | 1.715 |
| 285                                     | -   | -     | 5.411 | 4.408 | 3.831 | 3.235 | 2.582 | 2.202 | 1.768 |
| 290                                     | -   | -     | 5.478 | 4.504 | 3.911 | 3.329 | 2.638 | 2.254 | 1.821 |
| 295                                     | -   | -     | 5.544 | 4.600 | 4.003 | 3.423 | 2.694 | 2.306 | 1.874 |
| 300                                     | -   | -     | -     | 4.695 | 4.096 | 3.516 | 2.750 | 2.358 | 1.926 |
| 305                                     | -   | -     | -     | 4.791 | 4.189 | 3.610 | 2.833 | 2.410 | 1.979 |
| 310                                     | -   | -     | -     | 4.887 | 4.281 | 3.704 | 2.956 | 2.462 | 2.032 |
| 315                                     | -   | -     | -     | 4.982 | 4.374 | 3.798 | 3.079 | 2.514 | 2.085 |
| 320                                     | -   | -     | -     | 5.078 | 4.466 | 3.892 | 3.203 | 2.566 | 2.138 |
| 325                                     | -   | -     | -     | 5.174 | 4.559 | 3.993 | 3.326 | 2.618 | 2.191 |
| 330                                     | -   | -     | -     | 5.269 | 4.652 | 4.093 | 3.449 | 2.670 | 2.244 |
| 335                                     | -   | -     | -     | 5.365 | 4.744 | 4.194 | 3.572 | 2.722 | 2.297 |
| 340                                     | -   | -     | -     | 5.461 | 4.837 | 4.294 | 3.695 | 2.774 | 2.350 |
| 345                                     | -   | -     | -     | 5.556 | 4.930 | 4.395 | 3.818 | 2.927 | 2.403 |
| 350                                     | -   | -     | -     | -     | 5.022 | 4.495 | 3.928 | 3.106 | 2.456 |
| 355                                     | -   | -     | -     | -     | 5.115 | 4.596 | 4.020 | 3.284 | 2.509 |
| 360                                     | -   | -     | -     | -     | 5.208 | 4.696 | 4.111 | 3.463 | 2.562 |

Table applies to I-section columns with protection to four sides. Thickness is intumescent only. Table also applies to I-section beams protected on four sides up to a limiting nominal protection thickness of 3.992mm.

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 16: I-Section Columns 120 minutes |   |       |       |       |       |       |       |       |       |
|---|---|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>    | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |
|   | 350°C   | 400°C | 450°C | 500°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 85                                      | -   | 3.892 | 3.212 | 2.800 | 2.362 | 1.795 | 1.516 | 1.371 | 1.139 |
| 90                                      | -   | 3.892 | 3.312 | 2.879 | 2.419 | 1.838 | 1.558 | 1.388 | 1.158 |
| 95                                      | -   | -     | 3.412 | 2.958 | 2.476 | 1.881 | 1.600 | 1.405 | 1.178 |
| 100                                     | -   | -     | 3.512 | 3.037 | 2.533 | 1.924 | 1.641 | 1.422 | 1.198 |
| 105                                     | -   | -     | 3.612 | 3.116 | 2.590 | 1.967 | 1.683 | 1.439 | 1.217 |
| 110                                     | -   | -     | 3.712 | 3.196 | 2.647 | 2.010 | 1.725 | 1.456 | 1.237 |
| 115                                     | -   | -     | 3.812 | 3.275 | 2.704 | 2.053 | 1.766 | 1.473 | 1.256 |
| 120                                     | -   | -     | 3.912 | 3.354 | 2.761 | 2.096 | 1.808 | 1.490 | 1.276 |
| 125                                     | -   | -     | 4.012 | 3.433 | 2.818 | 2.139 | 1.850 | 1.507 | 1.295 |
| 130                                     | -   | -     | 4.112 | 3.512 | 2.874 | 2.182 | 1.892 | 1.524 | 1.315 |
| 135                                     | -   | -     | 4.212 | 3.591 | 2.931 | 2.225 | 1.933 | 1.541 | 1.335 |
| 140                                     | -   | -     | -     | 3.670 | 2.988 | 2.268 | 1.975 | 1.558 | 1.354 |
| 145                                     | -   | -     | -     | 3.750 | 3.044 | 2.311 | 2.017 | 1.575 | 1.374 |
| 150                                     | -   | -     | -     | 3.829 | 3.101 | 2.354 | 2.058 | 1.591 | 1.393 |
| 155                                     | -   | -     | -     | 3.916 | 3.157 | 2.397 | 2.100 | 1.608 | 1.413 |
| 160                                     | -   | -     | -     | 4.037 | 3.214 | 2.440 | 2.142 | 1.625 | 1.432 |
| 165                                     | -   | -     | -     | 4.158 | 3.270 | 2.483 | 2.183 | 1.642 | 1.452 |
| 170                                     | -   | -     | -     | 4.279 | 3.327 | 2.526 | 2.225 | 1.659 | 1.472 |
| 175                                     | -   | -     | -     | 4.400 | 3.383 | 2.569 | 2.267 | 1.676 | 1.491 |
| 180                                     | -   | -     | -     | 4.521 | 3.440 | 2.612 | 2.309 | 1.721 | 1.511 |
| 185                                     | -   | -     | -     | 4.642 | 3.496 | 2.655 | 2.350 | 1.784 | 1.530 |
| 190                                     | -   | -     | -     | 4.763 | 3.553 | 2.698 | 2.392 | 1.848 | 1.550 |
| 195                                     | -   | -     | -     | 4.884 | 3.609 | 2.741 | 2.434 | 1.911 | 1.569 |
| 200                                     | -   | -     | -     | 5.005 | 3.666 | 2.784 | 2.475 | 1.974 | 1.589 |
| 205                                     | -   | -     | -     | 5.126 | 3.722 | 2.863 | 2.517 | 2.037 | 1.609 |
| 210                                     | -   | -     | -     | 5.247 | 3.779 | 2.942 | 2.559 | 2.101 | 1.628 |
| 215                                     | -   | -     | -     | 5.368 | 3.835 | 3.021 | 2.601 | 2.164 | 1.648 |
| 220                                     | -   | -     | -     | 5.489 | 3.892 | 3.101 | 2.642 | 2.227 | 1.667 |
| 225                                     | -   | -     | -     | -     | 3.994 | 3.180 | 2.684 | 2.290 | 1.694 |
| 230                                     | -   | -     | -     | -     | 4.096 | 3.259 | 2.726 | 2.354 | 1.750 |
| 235                                     | -   | -     | -     | -     | 4.199 | 3.338 | 2.767 | 2.417 | 1.807 |
| 240                                     | -   | -     | -     | -     | 4.301 | 3.417 | 2.838 | 2.480 | 1.863 |
| 245                                     | -   | -     | -     | -     | 4.403 | 3.496 | 2.929 | 2.544 | 1.919 |
| 250                                     | -   | -     | -     | -     | 4.505 | 3.575 | 3.020 | 2.607 | 1.975 |
| 255                                     | -   | -     | -     | -     | 4.608 | 3.655 | 3.111 | 2.670 | 2.031 |
| 260                                     | -   | -     | -     | -     | 4.710 | 3.734 | 3.202 | 2.733 | 2.087 |
| 265                                     | -   | -     | -     | -     | 4.812 | 3.813 | 3.293 | 2.804 | 2.144 |
| 270                                     | -   | -     | -     | -     | 4.914 | 3.892 | 3.383 | 2.903 | 2.200 |
| 275                                     | -   | -     | -     | -     | 5.017 | 3.989 | 3.474 | 3.002 | 2.256 |
| 280                                     | -   | -     | -     | -     | 5.119 | 4.086 | 3.565 | 3.101 | 2.312 |
| 285                                     | -   | -     | -     | -     | 5.221 | 4.184 | 3.656 | 3.200 | 2.368 |
| 290                                     | -   | -     | -     | -     | 5.323 | 4.281 | 3.747 | 3.298 | 2.424 |
| 295                                     | -   | -     | -     | -     | 5.426 | 4.378 | 3.838 | 3.397 | 2.481 |
| 300                                     | -   | -     | -     | -     | 5.528 | 4.475 | 3.932 | 3.496 | 2.537 |
| 305                                     | -   | -     | -     | -     | -     | 4.572 | 4.033 | 3.595 | 2.593 |
| 310                                     | -   | -     | -     | -     | -     | 4.670 | 4.133 | 3.694 | 2.649 |
| 315                                     | -   | -     | -     | -     | -     | 4.767 | 4.234 | 3.793 | 2.705 |
| 320                                     | -   | -     | -     | -     | -     | 4.864 | 4.334 | 3.892 | 2.762 |
| 325                                     | -   | -     | -     | -     | -     | 4.961 | 4.435 | 3.988 | 2.929 |
| 330                                     | -   | -     | -     | -     | -     | 5.059 | 4.535 | 4.083 | 3.169 |
| 335                                     | -   | -     | -     | -     | -     | 5.156 | 4.636 | 4.179 | 3.410 |
| 340                                     | -   | -     | -     | -     | -     | 5.253 | 4.736 | 4.275 | 3.651 |
| 345                                     | -   | -     | -     | -     | -     | 5.350 | 4.837 | 4.370 | 3.892 |
| 350                                     | -   | -     | -     | -     | -     | 5.447 | 4.937 | 4.466 | 3.977 |
| 355                                     | -   | -     | -     | -     | -     | 5.545 | 5.038 | 4.562 | 4.061 |
| 360                                     | -   | -     | -     | -     | -     | -     | 5.138 | 4.657 | 4.146 |

Table applies to I-section columns with protection to four sides. Thickness is intumescent only. Table also applies to I-section beams protected on four sides up to a limiting nominal protection thickness of 3.992mm.

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

Table 17: Circular and Rectangular Hollow Section Columns 15 minutes

| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                      | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 40                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 45                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 50                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 55                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 60                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 65                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 70                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 75                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 80                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 85                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 90                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 95                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 100                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 105                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 110                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 115                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 120                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 125                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 130                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 135                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 140                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 145                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 150                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 155                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 160                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 165                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 170                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 175                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 180                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 185                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 190                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 195                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 200                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 205                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 210                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 215                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 220                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 225                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 230                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 235                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 240                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 245                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 250                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 255                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 260                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 265                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 270                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 275                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 280                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 285                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 290                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 295                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 300                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 305                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 310                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 315                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |

Tabulated values continued overleaf

Page 19 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020



# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 17: Circular and Rectangular Hollow Section Columns 15 minutes (continued) |   |       |       |       |       |       |       |       |       |       |
|--|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>   | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|  | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 320  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 325  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 330  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 335  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 340  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 345  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 350  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 355  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 360  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 365  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 370  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 375  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 380  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 385  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 390  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 395  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 400  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 405  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 410  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 415  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 420  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 425  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 430  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 435  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |

Table applies to fully exposed circular and rectangular hollow columns with all round protection. Thickness is intumescent only.



# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

Table 18: Circular and Rectangular Hollow Section Columns 30 minutes

| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                      | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 40                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 45                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 50                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 55                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 60                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 65                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 70                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 75                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 80                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 85                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 90                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 95                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 100                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 105                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 110                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 115                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 120                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 125                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 130                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 135                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 140                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 145                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 150                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 155                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 160                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 165                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 170                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 175                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 180                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 185                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 190                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 195                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 200                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 205                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 210                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 215                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 220                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 225                                  | 1.806   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 230                                  | 1.843   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 235                                  | 1.880   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 240                                  | 1.917   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 245                                  | 1.954   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 250                                  | 1.991   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 255                                  | 2.028   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 260                                  | 2.064   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 265                                  | 2.101   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 270                                  | 2.138   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 275                                  | 2.175   | 1.811 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 280                                  | 2.212   | 1.852 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 285                                  | 2.249   | 1.892 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 290                                  | 2.286   | 1.933 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 295                                  | 2.323   | 1.974 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 300                                  | 2.359   | 2.014 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 305                                  | 2.396   | 2.055 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 310                                  | 2.433   | 2.095 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 315                                  | 2.470   | 2.136 | 1.790 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |

Tabulated values continued overleaf

Page 21 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020



# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

| Table 18: Circular and Rectangular Hollow Section Columns 30 minutes (continued) |   |       |       |       |       |       |       |       |       |       |
|--|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>   | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|  | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 320  | 2.507   | 2.177 | 1.834 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 325  | 2.544   | 2.217 | 1.877 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 330  | 2.581   | 2.258 | 1.920 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 335  | 2.618   | 2.298 | 1.963 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 340  | 2.654   | 2.339 | 2.007 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 345  | 2.691   | 2.380 | 2.050 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 350  | 2.728   | 2.420 | 2.093 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 355  | 2.765   | 2.461 | 2.136 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 360  | 2.802   | 2.501 | 2.180 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 365  | 2.839   | 2.542 | 2.223 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 370  | 2.876   | 2.582 | 2.266 | 1.801 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 375  | 2.913   | 2.623 | 2.309 | 1.846 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 380  | 2.949   | 2.664 | 2.353 | 1.890 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 385  | 2.986   | 2.704 | 2.396 | 1.935 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 390  | 3.023   | 2.745 | 2.439 | 1.980 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 395  | 3.060   | 2.785 | 2.482 | 2.025 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 400  | 3.097   | 2.826 | 2.526 | 2.070 | 1.806 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 405  | 3.134   | 2.867 | 2.569 | 2.115 | 1.854 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 410  | 3.171   | 2.907 | 2.612 | 2.159 | 1.902 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 415  | 3.208   | 2.948 | 2.655 | 2.204 | 1.950 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 420  | 3.244   | 2.988 | 2.699 | 2.249 | 1.998 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 425  | 3.281   | 3.029 | 2.742 | 2.294 | 2.046 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 430  | 3.318   | 3.069 | 2.785 | 2.339 | 2.094 | 1.802 | 1.781 | 1.781 | 1.781 | 1.781 |
| 435  | 3.355   | 3.110 | 2.828 | 2.384 | 2.142 | 1.849 | 1.781 | 1.781 | 1.781 | 1.781 |

Table applies to fully exposed circular and rectangular hollow columns with all round protection. Thickness is intumescent only.





# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

Table 19: Circular and Rectangular Hollow Section Columns 45 minutes

| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                      | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 40                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 45                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 50                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 55                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 60                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 65                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 70                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 75                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 80                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 85                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 90                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 95                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 100                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 105                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 110                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 115                                  | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 120                                  | 1.868   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 125                                  | 1.961   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 130                                  | 2.054   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 135                                  | 2.147   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 140                                  | 2.240   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 145                                  | 2.333   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 150                                  | 2.426   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 155                                  | 2.520   | 1.820 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 160                                  | 2.613   | 1.947 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 165                                  | 2.706   | 2.074 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 170                                  | 2.799   | 2.202 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 175                                  | 2.892   | 2.329 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 180                                  | 2.985   | 2.457 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 185                                  | 3.078   | 2.584 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 190                                  | 3.172   | 2.712 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 195                                  | 3.265   | 2.839 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 200                                  | 3.358   | 2.967 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 205                                  | 3.451   | 3.094 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 210                                  | 3.488   | 3.222 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 215                                  | 3.525   | 3.349 | 1.808 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 220                                  | 3.562   | 3.458 | 1.966 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 225                                  | 3.599   | 3.491 | 2.124 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 230                                  | 3.636   | 3.524 | 2.282 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 235                                  | 3.673   | 3.557 | 2.440 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 240                                  | 3.710   | 3.591 | 2.598 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 245                                  | 3.747   | 3.624 | 2.756 | 1.832 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 250                                  | 3.784   | 3.657 | 2.914 | 1.936 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 255                                  | 3.821   | 3.691 | 3.072 | 2.040 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 260                                  | 3.858   | 3.724 | 3.230 | 2.143 | 1.816 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 265                                  | 3.895   | 3.757 | 3.388 | 2.247 | 1.917 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 270                                  | 3.932   | 3.790 | 3.472 | 2.351 | 2.018 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 275                                  | 3.969   | 3.824 | 3.507 | 2.455 | 2.119 | 1.818 | 1.781 | 1.781 | 1.781 | 1.781 |
| 280                                  | 4.006   | 3.857 | 3.542 | 2.558 | 2.220 | 1.900 | 1.781 | 1.781 | 1.781 | 1.781 |
| 285                                  | 4.043   | 3.890 | 3.577 | 2.662 | 2.321 | 1.982 | 1.781 | 1.781 | 1.781 | 1.781 |
| 290                                  | 4.080   | 3.923 | 3.612 | 2.766 | 2.422 | 2.063 | 1.781 | 1.781 | 1.781 | 1.781 |
| 295                                  | 4.117   | 3.957 | 3.647 | 2.870 | 2.523 | 2.145 | 1.781 | 1.781 | 1.781 | 1.781 |
| 300                                  | 4.154   | 3.990 | 3.682 | 2.974 | 2.624 | 2.227 | 1.781 | 1.781 | 1.781 | 1.781 |
| 305                                  | 4.192   | 4.023 | 3.717 | 3.077 | 2.725 | 2.308 | 1.781 | 1.781 | 1.781 | 1.781 |
| 310                                  | 4.229   | 4.057 | 3.752 | 3.181 | 2.825 | 2.390 | 1.781 | 1.781 | 1.781 | 1.781 |
| 315                                  | 4.266   | 4.090 | 3.787 | 3.285 | 2.926 | 2.471 | 1.801 | 1.781 | 1.781 | 1.781 |

Tabulated values continued overleaf

Page 23 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020

## CERTIFICATE No CF 5359

### Arabian Vermiculite Industries

#### AVIKOTE WB1200G

| Table 19: Circular and Rectangular Hollow Section Columns 45 minutes (continued) |   |       |       |       |       |       |       |       |       |       |
|--|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>   | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|  | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 320  | 4.303   | 4.123 | 3.823 | 3.389 | 3.027 | 2.553 | 1.877 | 1.781 | 1.781 | 1.781 |
| 325  | 4.340   | 4.156 | 3.858 | 3.466 | 3.128 | 2.635 | 1.953 | 1.781 | 1.781 | 1.781 |
| 330  | 4.377   | 4.190 | 3.893 | 3.502 | 3.229 | 2.716 | 2.028 | 1.781 | 1.781 | 1.781 |
| 335  | 4.414   | 4.223 | 3.928 | 3.539 | 3.330 | 2.798 | 2.104 | 1.781 | 1.781 | 1.781 |
| 340  | 4.451   | 4.256 | 3.963 | 3.575 | 3.431 | 2.880 | 2.180 | 1.781 | 1.781 | 1.781 |
| 345  | 4.488   | 4.289 | 3.998 | 3.611 | 3.480 | 2.961 | 2.255 | 1.781 | 1.781 | 1.781 |
| 350  | 4.525   | 4.323 | 4.033 | 3.648 | 3.516 | 3.043 | 2.331 | 1.781 | 1.781 | 1.781 |
| 355  | 4.562   | 4.356 | 4.068 | 3.684 | 3.552 | 3.124 | 2.407 | 1.781 | 1.781 | 1.781 |
| 360  | 4.599   | 4.389 | 4.103 | 3.721 | 3.588 | 3.206 | 2.482 | 1.781 | 1.781 | 1.781 |
| 365  | 4.636   | 4.423 | 4.138 | 3.757 | 3.624 | 3.288 | 2.558 | 1.781 | 1.781 | 1.781 |
| 370  | 4.673   | 4.456 | 4.173 | 3.794 | 3.660 | 3.369 | 2.634 | 1.781 | 1.781 | 1.781 |
| 375  | 4.710   | 4.489 | 4.208 | 3.830 | 3.696 | 3.451 | 2.709 | 1.781 | 1.781 | 1.781 |
| 380  | 4.747   | 4.522 | 4.243 | 3.867 | 3.733 | 3.490 | 2.785 | 1.853 | 1.781 | 1.781 |
| 385  | 4.784   | 4.556 | 4.278 | 3.903 | 3.769 | 3.528 | 2.861 | 1.933 | 1.781 | 1.781 |
| 390  | 4.821   | 4.589 | 4.313 | 3.940 | 3.805 | 3.567 | 2.936 | 2.014 | 1.781 | 1.781 |
| 395  | 4.858   | 4.622 | 4.348 | 3.976 | 3.841 | 3.605 | 3.012 | 2.095 | 1.781 | 1.781 |
| 400  | 4.895   | 4.655 | 4.383 | 4.013 | 3.877 | 3.644 | 3.088 | 2.176 | 1.781 | 1.781 |
| 405  | 4.930   | 4.689 | 4.418 | 4.049 | 3.913 | 3.683 | 3.163 | 2.256 | 1.781 | 1.781 |
| 410  | 5.005   | 4.722 | 4.453 | 4.085 | 3.949 | 3.721 | 3.239 | 2.337 | 1.781 | 1.781 |
| 415  | 5.060   | 4.755 | 4.488 | 4.122 | 3.985 | 3.760 | 3.315 | 2.418 | 1.781 | 1.781 |
| 420  | 5.115   | 4.789 | 4.523 | 4.158 | 4.021 | 3.798 | 3.390 | 2.498 | 1.781 | 1.781 |
| 425  | 5.169   | 4.822 | 4.559 | 4.195 | 4.057 | 3.837 | 3.458 | 2.579 | 1.781 | 1.781 |
| 430  | 5.224   | 4.855 | 4.594 | 4.231 | 4.094 | 3.876 | 3.495 | 2.660 | 1.781 | 1.781 |
| 435  | 5.279   | 4.888 | 4.629 | 4.268 | 4.130 | 3.914 | 3.532 | 2.741 | 1.781 | 1.781 |

Table applies to fully exposed circular and rectangular hollow columns with all round protection. Thickness is intumescent only.

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

Table 20: Circular and Rectangular Hollow Section Columns 60 minutes

| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                      | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 40                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 45                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 50                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 55                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 60                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 65                                   | 1.781   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 70                                   | 1.832   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 75                                   | 1.924   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 80                                   | 2.016   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 85                                   | 2.108   | 1.783 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 90                                   | 2.200   | 1.866 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 95                                   | 2.292   | 1.948 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 100                                  | 2.384   | 2.031 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 105                                  | 2.476   | 2.114 | 1.823 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 110                                  | 2.568   | 2.196 | 1.910 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 115                                  | 2.660   | 2.279 | 1.998 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 120                                  | 2.752   | 2.361 | 2.086 | 1.798 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 125                                  | 2.844   | 2.444 | 2.173 | 1.889 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 130                                  | 2.936   | 2.526 | 2.261 | 1.980 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 135                                  | 3.028   | 2.609 | 2.348 | 2.071 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 140                                  | 3.120   | 2.691 | 2.436 | 2.161 | 1.827 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 145                                  | 3.212   | 2.774 | 2.523 | 2.252 | 1.934 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 150                                  | 3.304   | 2.857 | 2.611 | 2.343 | 2.041 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 155                                  | 3.396   | 2.939 | 2.698 | 2.434 | 2.148 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 160                                  | 3.512   | 3.022 | 2.786 | 2.525 | 2.254 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 165                                  | 3.666   | 3.104 | 2.873 | 2.616 | 2.361 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 170                                  | 3.820   | 3.187 | 2.961 | 2.706 | 2.468 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 175                                  | 3.973   | 3.269 | 3.048 | 2.797 | 2.575 | 1.872 | 1.781 | 1.781 | 1.781 | 1.781 |
| 180                                  | 4.127   | 3.352 | 3.136 | 2.888 | 2.682 | 2.030 | 1.781 | 1.781 | 1.781 | 1.781 |
| 185                                  | 4.281   | 3.434 | 3.223 | 2.979 | 2.789 | 2.188 | 1.781 | 1.781 | 1.781 | 1.781 |
| 190                                  | 4.434   | 3.650 | 3.311 | 3.070 | 2.895 | 2.345 | 1.781 | 1.781 | 1.781 | 1.781 |
| 195                                  | 4.588   | 3.899 | 3.398 | 3.160 | 3.002 | 2.503 | 1.781 | 1.781 | 1.781 | 1.781 |
| 200                                  | 4.741   | 4.148 | 3.503 | 3.251 | 3.109 | 2.661 | 1.781 | 1.781 | 1.781 | 1.781 |
| 205                                  | 4.895   | 4.397 | 3.632 | 3.342 | 3.216 | 2.819 | 1.781 | 1.781 | 1.781 | 1.781 |
| 210                                  | 4.933   | 4.646 | 3.760 | 3.433 | 3.323 | 2.977 | 1.781 | 1.781 | 1.781 | 1.781 |
| 215                                  | 4.970   | 4.895 | 3.889 | 3.493 | 3.430 | 3.135 | 1.781 | 1.781 | 1.781 | 1.781 |
| 220                                  | 5.008   | 4.928 | 4.018 | 3.544 | 3.483 | 3.293 | 1.781 | 1.781 | 1.781 | 1.781 |
| 225                                  | 5.046   | 4.962 | 4.147 | 3.596 | 3.522 | 3.451 | 1.781 | 1.781 | 1.781 | 1.781 |
| 230                                  | 5.083   | 4.995 | 4.276 | 3.648 | 3.562 | 3.490 | 1.781 | 1.781 | 1.781 | 1.781 |
| 235                                  | 5.121   | 5.028 | 4.405 | 3.700 | 3.602 | 3.528 | 1.901 | 1.781 | 1.781 | 1.781 |
| 240                                  | 5.159   | 5.061 | 4.534 | 3.752 | 3.641 | 3.567 | 2.143 | 1.781 | 1.781 | 1.781 |
| 245                                  | 5.196   | 5.095 | 4.663 | 3.804 | 3.681 | 3.605 | 2.385 | 1.781 | 1.781 | 1.781 |
| 250                                  | 5.234   | 5.128 | 4.792 | 3.856 | 3.721 | 3.644 | 2.628 | 1.781 | 1.781 | 1.781 |
| 255                                  | 5.271   | 5.161 | 4.902 | 3.908 | 3.760 | 3.683 | 2.870 | 1.781 | 1.781 | 1.781 |
| 260                                  | 5.309   | 5.195 | 4.936 | 3.960 | 3.800 | 3.721 | 3.112 | 1.781 | 1.781 | 1.781 |
| 265                                  | 5.347   | 5.228 | 4.970 | 4.012 | 3.840 | 3.760 | 3.354 | 1.781 | 1.781 | 1.781 |
| 270                                  | 5.384   | 5.261 | 5.004 | 4.064 | 3.879 | 3.798 | 3.475 | 1.781 | 1.781 | 1.781 |
| 275                                  | 5.422   | 5.294 | 5.037 | 4.116 | 3.919 | 3.837 | 3.515 | 1.919 | 1.781 | 1.781 |
| 280                                  | 5.460   | 5.328 | 5.071 | 4.168 | 3.959 | 3.876 | 3.555 | 2.116 | 1.781 | 1.781 |
| 285                                  | 5.497   | 5.361 | 5.105 | 4.220 | 3.998 | 3.914 | 3.595 | 2.312 | 1.781 | 1.781 |
| 290                                  | 5.535   | 5.394 | 5.139 | 4.272 | 4.038 | 3.953 | 3.634 | 2.509 | 1.781 | 1.781 |
| 295                                  | 5.573   | 5.428 | 5.173 | 4.324 | 4.078 | 3.992 | 3.674 | 2.705 | 1.781 | 1.781 |
| 300                                  | 5.610   | 5.461 | 5.207 | 4.376 | 4.117 | 4.030 | 3.714 | 2.901 | 1.781 | 1.781 |
| 305                                  | 5.648   | 5.494 | 5.241 | 4.428 | 4.157 | 4.069 | 3.754 | 3.098 | 1.781 | 1.781 |
| 310                                  | 5.686   | 5.527 | 5.275 | 4.479 | 4.197 | 4.107 | 3.794 | 3.294 | 1.781 | 1.781 |
| 315                                  | 5.723   | 5.561 | 5.309 | 4.531 | 4.236 | 4.146 | 3.834 | 3.459 | 1.781 | 1.781 |

Tabulated values continued overleaf

Page 25 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020

## CERTIFICATE No CF 5359

### Arabian Vermiculite Industries

#### AVIKOTE WB1200G

| Table 20: Circular and Rectangular Hollow Section Columns 60 minutes (continued) |   |       |       |       |       |       |       |       |       |       |
|--|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>   | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|  | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 320  | 5.761   | 5.594 | 5.343 | 4.583 | 4.276 | 4.185 | 3.874 | 3.499 | 1.781 | 1.781 |
| 325  | 5.798   | 5.627 | 5.377 | 4.635 | 4.316 | 4.223 | 3.914 | 3.538 | 1.855 | 1.781 |
| 330  | 5.836   | 5.661 | 5.411 | 4.687 | 4.355 | 4.262 | 3.954 | 3.578 | 1.974 | 1.781 |
| 335  | 5.874   | 5.694 | 5.444 | 4.739 | 4.395 | 4.300 | 3.993 | 3.618 | 2.093 | 1.781 |
| 340  | 5.911   | 5.727 | 5.478 | 4.791 | 4.435 | 4.339 | 4.033 | 3.657 | 2.212 | 1.781 |
| 345  | 5.949   | 5.760 | 5.512 | 4.843 | 4.474 | 4.378 | 4.073 | 3.697 | 2.331 | 1.781 |
| 350  | 5.987   | 5.794 | 5.546 | 4.895 | 4.514 | 4.416 | 4.113 | 3.737 | 2.451 | 1.781 |
| 355  | 6.024   | 5.827 | 5.580 | 4.945 | 4.554 | 4.455 | 4.153 | 3.776 | 2.570 | 1.781 |
| 360  | 6.062   | 5.860 | 5.614 | 4.994 | 4.594 | 4.493 | 4.193 | 3.816 | 2.689 | 1.781 |
| 365  | 6.100   | 5.894 | 5.648 | 5.044 | 4.633 | 4.532 | 4.233 | 3.856 | 2.808 | 1.800 |
| 370  | 6.137   | 5.927 | 5.682 | 5.093 | 4.673 | 4.571 | 4.273 | 3.895 | 2.927 | 1.882 |
| 375  | 6.175   | 5.960 | 5.716 | 5.143 | 4.713 | 4.609 | 4.313 | 3.935 | 3.046 | 1.965 |
| 380  | 6.213   | 5.993 | 5.750 | 5.193 | 4.752 | 4.648 | 4.353 | 3.975 | 3.165 | 2.048 |
| 385  | 6.250   | 6.027 | 5.784 | 5.242 | 4.792 | 4.687 | 4.392 | 4.014 | 3.284 | 2.130 |
| 390  | 6.288   | 6.060 | 5.817 | 5.292 | 4.832 | 4.725 | 4.432 | 4.054 | 3.403 | 2.213 |
| 395  | 6.325   | 6.093 | 5.851 | 5.341 | 4.871 | 4.764 | 4.472 | 4.094 | 3.478 | 2.295 |
| 400  | 6.480   | 6.127 | 5.885 | 5.391 | 4.919 | 4.802 | 4.512 | 4.133 | 3.524 | 2.378 |
| 405  | 6.663   | 6.160 | 5.919 | 5.440 | 4.980 | 4.841 | 4.552 | 4.173 | 3.569 | 2.460 |
| 410  | 6.847   | 6.193 | 5.953 | 5.490 | 5.040 | 4.880 | 4.592 | 4.213 | 3.614 | 2.543 |
| 415  | 7.030   | 6.226 | 5.987 | 5.540 | 5.100 | 4.929 | 4.632 | 4.252 | 3.660 | 2.625 |
| 420  | 7.214   | 6.260 | 6.021 | 5.589 | 5.161 | 4.985 | 4.672 | 4.292 | 3.705 | 2.708 |
| 425  | 7.397   | 6.293 | 6.055 | 5.639 | 5.221 | 5.041 | 4.712 | 4.332 | 3.751 | 2.791 |
| 430  | 7.581   | 6.326 | 6.089 | 5.688 | 5.282 | 5.097 | 4.751 | 4.371 | 3.796 | 2.873 |
| 435  | 7.764   | 6.483 | 6.123 | 5.738 | 5.342 | 5.153 | 4.791 | 4.411 | 3.842 | 2.956 |

Table applies to fully exposed circular and rectangular hollow columns with all round protection. Thickness is intumescent only.

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

Table 21: Circular and Rectangular Hollow Section Columns 75 minutes

| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                      | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 40                                   | 1.894   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 45                                   | 2.024   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 50                                   | 2.154   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 55                                   | 2.283   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 60                                   | 2.413   | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 65                                   | 2.543   | 1.845 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 70                                   | 2.673   | 1.973 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 75                                   | 2.802   | 2.100 | 1.821 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 80                                   | 2.932   | 2.227 | 1.919 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 85                                   | 3.062   | 2.355 | 2.018 | 1.800 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 90                                   | 3.192   | 2.482 | 2.116 | 1.882 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 95                                   | 3.321   | 2.610 | 2.214 | 1.965 | 1.863 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 100                                  | 3.451   | 2.737 | 2.312 | 2.048 | 1.947 | 1.827 | 1.781 | 1.781 | 1.781 | 1.781 |
| 105                                  | 3.540   | 2.865 | 2.410 | 2.130 | 2.032 | 1.913 | 1.781 | 1.781 | 1.781 | 1.781 |
| 110                                  | 3.629   | 2.992 | 2.509 | 2.213 | 2.116 | 1.998 | 1.781 | 1.781 | 1.781 | 1.781 |
| 115                                  | 3.718   | 3.120 | 2.607 | 2.295 | 2.201 | 2.083 | 1.821 | 1.781 | 1.781 | 1.781 |
| 120                                  | 3.808   | 3.247 | 2.705 | 2.378 | 2.285 | 2.169 | 1.909 | 1.781 | 1.781 | 1.781 |
| 125                                  | 3.897   | 3.375 | 2.803 | 2.460 | 2.370 | 2.254 | 1.998 | 1.781 | 1.781 | 1.781 |
| 130                                  | 3.986   | 3.497 | 2.901 | 2.543 | 2.454 | 2.340 | 2.087 | 1.781 | 1.781 | 1.781 |
| 135                                  | 4.075   | 3.611 | 2.999 | 2.625 | 2.539 | 2.425 | 2.175 | 1.781 | 1.781 | 1.781 |
| 140                                  | 4.164   | 3.726 | 3.098 | 2.708 | 2.623 | 2.511 | 2.264 | 1.781 | 1.781 | 1.781 |
| 145                                  | 4.253   | 3.841 | 3.196 | 2.791 | 2.708 | 2.596 | 2.352 | 1.781 | 1.781 | 1.781 |
| 150                                  | 4.342   | 3.955 | 3.294 | 2.873 | 2.792 | 2.682 | 2.441 | 1.781 | 1.781 | 1.781 |
| 155                                  | 4.431   | 4.070 | 3.392 | 2.956 | 2.877 | 2.767 | 2.530 | 1.781 | 1.781 | 1.781 |
| 160                                  | 4.521   | 4.184 | 3.518 | 3.038 | 2.961 | 2.853 | 2.618 | 1.781 | 1.781 | 1.781 |
| 165                                  | 4.610   | 4.299 | 3.686 | 3.121 | 3.046 | 2.938 | 2.707 | 1.914 | 1.781 | 1.781 |
| 170                                  | 4.699   | 4.414 | 3.854 | 3.203 | 3.130 | 3.024 | 2.795 | 2.054 | 1.781 | 1.781 |
| 175                                  | 4.788   | 4.528 | 4.022 | 3.286 | 3.214 | 3.109 | 2.884 | 2.194 | 1.781 | 1.781 |
| 180                                  | 4.877   | 4.643 | 4.190 | 3.368 | 3.299 | 3.195 | 2.973 | 2.333 | 1.781 | 1.781 |
| 185                                  | 5.145   | 4.757 | 4.358 | 3.451 | 3.383 | 3.280 | 3.061 | 2.473 | 1.781 | 1.781 |
| 190                                  | 5.458   | 4.872 | 4.526 | 3.729 | 3.509 | 3.366 | 3.150 | 2.613 | 1.781 | 1.781 |
| 195                                  | 5.770   | 5.116 | 4.694 | 4.006 | 3.798 | 3.451 | 3.238 | 2.752 | 1.781 | 1.781 |
| 200                                  | 6.083   | 5.393 | 4.861 | 4.284 | 4.086 | 3.740 | 3.327 | 2.892 | 1.781 | 1.781 |
| 205                                  | 6.351   | 5.669 | 4.970 | 4.562 | 4.375 | 4.029 | 3.416 | 3.032 | 1.781 | 1.781 |
| 210                                  | 6.438   | 5.946 | 5.063 | 4.839 | 4.664 | 4.317 | 3.512 | 3.172 | 1.781 | 1.781 |
| 215                                  | 6.526   | 6.222 | 5.156 | 4.930 | 4.902 | 4.606 | 3.614 | 3.311 | 1.781 | 1.781 |
| 220                                  | 6.614   | 6.369 | 5.250 | 4.974 | 4.939 | 4.895 | 3.715 | 3.451 | 1.781 | 1.781 |
| 225                                  | 6.701   | 6.429 | 5.343 | 5.018 | 4.976 | 4.930 | 3.817 | 3.502 | 1.781 | 1.781 |
| 230                                  | 6.789   | 6.488 | 5.437 | 5.062 | 5.013 | 4.965 | 3.919 | 3.553 | 1.781 | 1.781 |
| 235                                  | 6.877   | 6.548 | 5.530 | 5.105 | 5.050 | 5.000 | 4.020 | 3.604 | 1.781 | 1.781 |
| 240                                  | 6.964   | 6.608 | 5.623 | 5.149 | 5.087 | 5.035 | 4.122 | 3.654 | 1.781 | 1.781 |
| 245                                  | 7.052   | 6.668 | 5.717 | 5.193 | 5.124 | 5.070 | 4.224 | 3.705 | 1.781 | 1.781 |
| 250                                  | 7.140   | 6.728 | 5.810 | 5.237 | 5.160 | 5.104 | 4.326 | 3.756 | 1.781 | 1.781 |
| 255                                  | 7.227   | 6.787 | 5.903 | 5.281 | 5.197 | 5.139 | 4.427 | 3.807 | 2.361 | 1.781 |
| 260                                  | 7.315   | 6.847 | 5.997 | 5.325 | 5.234 | 5.174 | 4.529 | 3.858 | 2.967 | 1.781 |
| 265                                  | 7.403   | 6.907 | 6.090 | 5.368 | 5.271 | 5.209 | 4.631 | 3.909 | 3.460 | 1.781 |
| 270                                  | 7.490   | 6.967 | 6.184 | 5.412 | 5.308 | 5.244 | 4.732 | 3.959 | 3.506 | 1.781 |
| 275                                  | 7.578   | 7.026 | 6.277 | 5.456 | 5.345 | 5.279 | 4.834 | 4.010 | 3.552 | 1.808 |
| 280                                  | 7.666   | 7.086 | 6.359 | 5.500 | 5.382 | 5.314 | 4.911 | 4.061 | 3.598 | 1.966 |
| 285                                  | 7.753   | 7.146 | 6.425 | 5.544 | 5.419 | 5.349 | 4.952 | 4.112 | 3.644 | 2.124 |
| 290                                  | 7.841   | 7.206 | 6.491 | 5.588 | 5.455 | 5.384 | 4.992 | 4.163 | 3.690 | 2.282 |
| 295                                  | 7.929   | 7.265 | 6.557 | 5.632 | 5.492 | 5.419 | 5.032 | 4.214 | 3.736 | 2.440 |
| 300                                  | 8.016   | 7.325 | 6.622 | 5.675 | 5.529 | 5.453 | 5.073 | 4.265 | 3.782 | 2.598 |
| 305                                  | 8.104   | 7.385 | 6.688 | 5.719 | 5.566 | 5.488 | 5.113 | 4.315 | 3.828 | 2.756 |
| 310                                  | 8.192   | 7.445 | 6.754 | 5.763 | 5.603 | 5.523 | 5.154 | 4.366 | 3.874 | 2.914 |
| 315                                  | 8.279   | 7.505 | 6.820 | 5.807 | 5.640 | 5.558 | 5.194 | 4.417 | 3.920 | 3.072 |

Tabulated values continued overleaf

Page 27 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020

## CERTIFICATE No CF 5359

### Arabian Vermiculite Industries

#### AVIKOTE WB1200G

| Table 21: Circular and Rectangular Hollow Section Columns 75 minutes (continued) |   |       |       |       |       |       |       |       |       |       |
|--|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>   | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|  | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 320  | 8.367   | 7.564 | 6.885 | 5.851 | 5.677 | 5.593 | 5.234 | 4.468 | 3.966 | 3.230 |
| 325  | 8.455   | 7.624 | 6.951 | 5.895 | 5.714 | 5.628 | 5.275 | 4.519 | 4.012 | 3.388 |
| 330  | 8.542   | 7.684 | 7.017 | 5.938 | 5.750 | 5.663 | 5.315 | 4.570 | 4.058 | 3.480 |
| 335  | 8.630   | 7.744 | 7.083 | 5.982 | 5.787 | 5.698 | 5.355 | 4.620 | 4.104 | 3.529 |
| 340  | -   | 7.803 | 7.148 | 6.026 | 5.824 | 5.733 | 5.396 | 4.671 | 4.150 | 3.577 |
| 345  | -   | 7.863 | 7.214 | 6.070 | 5.861 | 5.768 | 5.436 | 4.722 | 4.196 | 3.625 |
| 350  | -   | 7.923 | 7.280 | 6.114 | 5.898 | 5.802 | 5.477 | 4.773 | 4.242 | 3.674 |
| 355  | -   | 7.983 | 7.346 | 6.158 | 5.935 | 5.837 | 5.517 | 4.824 | 4.288 | 3.722 |
| 360  | -   | 8.043 | 7.411 | 6.201 | 5.972 | 5.872 | 5.557 | 4.875 | 4.334 | 3.771 |
| 365  | -   | 8.102 | 7.477 | 6.245 | 6.009 | 5.907 | 5.598 | 4.928 | 4.380 | 3.819 |
| 370  | -   | 8.162 | 7.543 | 6.289 | 6.045 | 5.942 | 5.638 | 4.982 | 4.426 | 3.868 |
| 375  | -   | 8.222 | 7.609 | 6.333 | 6.082 | 5.977 | 5.679 | 5.037 | 4.472 | 3.916 |
| 380  | -   | 8.282 | 7.674 | 6.508 | 6.119 | 6.012 | 5.719 | 5.091 | 4.518 | 3.965 |
| 385  | -   | 8.341 | 7.740 | 6.684 | 6.156 | 6.047 | 5.759 | 5.146 | 4.564 | 4.013 |
| 390  | -   | 8.401 | 7.806 | 6.859 | 6.193 | 6.082 | 5.800 | 5.200 | 4.610 | 4.062 |
| 395  | -   | 8.461 | 7.872 | 7.034 | 6.230 | 6.117 | 5.840 | 5.255 | 4.656 | 4.110 |
| 400  | -   | 8.521 | 7.937 | 7.210 | 6.267 | 6.152 | 5.881 | 5.309 | 4.702 | 4.158 |
| 405  | -   | 8.580 | 8.003 | 7.385 | 6.304 | 6.186 | 5.921 | 5.363 | 4.748 | 4.207 |
| 410  | -   | 8.640 | 8.069 | 7.560 | 6.405 | 6.221 | 5.961 | 5.418 | 4.794 | 4.255 |
| 415  | -   | 8.700 | 8.135 | 7.736 | 6.763 | 6.256 | 6.002 | 5.472 | 4.840 | 4.304 |
| 420  | -   | -     | 8.200 | 7.911 | 7.122 | 6.291 | 6.042 | 5.527 | 4.886 | 4.352 |
| 425  | -   | -     | 8.266 | 8.086 | 7.481 | 6.326 | 6.083 | 5.581 | 4.942 | 4.401 |
| 430  | -   | -     | 8.332 | 8.262 | 7.839 | 6.620 | 6.123 | 5.636 | 5.000 | 4.449 |
| 435  | -   | -     | 8.398 | 8.398 | 8.198 | 6.979 | 6.163 | 5.690 | 5.059 | 4.498 |

Table applies to fully exposed circular and rectangular hollow columns with all round protection. Thickness is intumescent only.

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries


### AVIKOTE WB1200G

Table 22: Circular and Rectangular Hollow Section Columns 90 minutes

| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                      | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 40                                   | 1.790   | 1.790 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 45                                   | 2.050   | 2.050 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 50                                   | 2.309   | 2.305 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 55                                   | 2.569   | 2.445 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 60                                   | 2.828   | 2.585 | 1.804 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 65                                   | 3.088   | 2.725 | 1.966 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 70                                   | 3.347   | 2.864 | 2.127 | 1.820 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 75                                   | 3.565   | 3.004 | 2.289 | 1.947 | 1.860 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 80                                   | 3.755   | 3.144 | 2.450 | 2.074 | 1.975 | 1.861 | 1.781 | 1.781 | 1.781 | 1.781 |
| 85                                   | 3.945   | 3.283 | 2.611 | 2.202 | 2.090 | 1.959 | 1.781 | 1.781 | 1.781 | 1.781 |
| 90                                   | 4.135   | 3.423 | 2.773 | 2.329 | 2.206 | 2.057 | 1.863 | 1.781 | 1.781 | 1.781 |
| 95                                   | 4.325   | 3.560 | 2.934 | 2.457 | 2.321 | 2.155 | 1.947 | 1.781 | 1.781 | 1.781 |
| 100                                  | 4.515   | 3.696 | 3.096 | 2.584 | 2.436 | 2.253 | 2.032 | 1.827 | 1.781 | 1.781 |
| 105                                  | 4.705   | 3.832 | 3.257 | 2.712 | 2.552 | 2.351 | 2.116 | 1.913 | 1.781 | 1.781 |
| 110                                  | 4.895   | 3.969 | 3.419 | 2.839 | 2.667 | 2.450 | 2.201 | 1.998 | 1.781 | 1.781 |
| 115                                  | 4.996   | 4.105 | 3.532 | 2.967 | 2.782 | 2.548 | 2.285 | 2.083 | 1.825 | 1.781 |
| 120                                  | 5.098   | 4.241 | 3.634 | 3.094 | 2.897 | 2.646 | 2.370 | 2.169 | 1.912 | 1.781 |
| 125                                  | 5.199   | 4.377 | 3.736 | 3.222 | 3.013 | 2.744 | 2.454 | 2.254 | 1.998 | 1.781 |
| 130                                  | 5.300   | 4.514 | 3.837 | 3.349 | 3.128 | 2.842 | 2.539 | 2.340 | 2.084 | 1.781 |
| 135                                  | 5.401   | 4.650 | 3.939 | 3.476 | 3.243 | 2.940 | 2.623 | 2.425 | 2.171 | 1.781 |
| 140                                  | 5.503   | 4.786 | 4.041 | 3.603 | 3.359 | 3.039 | 2.708 | 2.511 | 2.257 | 1.781 |
| 145                                  | 5.604   | 4.925 | 4.142 | 3.730 | 3.479 | 3.137 | 2.792 | 2.596 | 2.344 | 1.781 |
| 150                                  | 5.705   | 5.075 | 4.244 | 3.856 | 3.621 | 3.235 | 2.877 | 2.682 | 2.430 | 1.781 |
| 155                                  | 5.806   | 5.225 | 4.346 | 3.983 | 3.762 | 3.333 | 2.961 | 2.767 | 2.517 | 1.781 |
| 160                                  | 5.908   | 5.374 | 4.448 | 4.110 | 3.904 | 3.431 | 3.046 | 2.853 | 2.603 | 1.781 |
| 165                                  | 6.009   | 5.524 | 4.549 | 4.236 | 4.046 | 3.599 | 3.130 | 2.938 | 2.690 | 1.781 |
| 170                                  | 6.110   | 5.674 | 4.651 | 4.363 | 4.187 | 3.784 | 3.214 | 3.024 | 2.776 | 1.781 |
| 175                                  | 6.211   | 5.824 | 4.753 | 4.490 | 4.329 | 3.969 | 3.299 | 3.109 | 2.863 | 1.781 |
| 180                                  | 6.313   | 5.974 | 4.854 | 4.616 | 4.470 | 4.154 | 3.383 | 3.195 | 2.949 | 1.781 |
| 185                                  | 6.420   | 6.123 | 5.100 | 4.743 | 4.612 | 4.340 | 3.507 | 3.280 | 3.036 | 1.781 |
| 190                                  | 6.527   | 6.273 | 5.443 | 4.870 | 4.753 | 4.525 | 3.784 | 3.366 | 3.122 | 1.781 |
| 195                                  | 6.634   | 6.423 | 5.785 | 5.156 | 4.895 | 4.710 | 4.062 | 3.451 | 3.209 | 1.781 |
| 200                                  | 6.741   | 6.572 | 6.128 | 5.483 | 5.222 | 4.895 | 4.340 | 3.740 | 3.295 | 1.781 |
| 205                                  | 6.848   | 6.723 | 6.470 | 5.810 | 5.549 | 5.070 | 4.617 | 4.029 | 3.382 | 1.781 |
| 210                                  | 6.955   | 6.874 | 6.808 | 6.137 | 5.875 | 5.246 | 4.895 | 4.317 | 3.520 | 1.781 |
| 215                                  | -   | 7.025 | 7.157 | 6.464 | 6.202 | 5.421 | 4.965 | 4.606 | 3.864 | 1.781 |
| 220                                  | -   | 7.132 | 7.264 | 6.591 | 6.375 | 5.596 | 5.035 | 4.895 | 4.207 | 1.781 |
| 225                                  | -   | 7.239 | 7.371 | 6.718 | 6.445 | 5.772 | 5.104 | 4.934 | 4.551 | 2.089 |
| 230                                  | -   | 7.346 | 7.478 | 6.845 | 6.593 | 5.947 | 5.174 | 4.973 | 4.895 | 2.543 |
| 235                                  | -   | 7.453 | 7.585 | 6.972 | 6.720 | 6.123 | 5.244 | 5.012 | 4.929 | 2.997 |
| 240                                  | -   | 7.560 | 7.692 | 7.100 | 6.847 | 6.298 | 5.314 | 5.051 | 4.963 | 3.451 |
| 245                                  | -   | 7.667 | 7.799 | 7.227 | 6.974 | 6.471 | 5.384 | 5.090 | 4.998 | 3.511 |
| 250                                  | -   | 7.774 | 7.906 | 7.354 | 7.101 | 6.645 | 5.453 | 5.129 | 5.032 | 3.571 |
| 255                                  | -   | 7.881 | 8.013 | 7.481 | 7.228 | 6.819 | 5.523 | 5.169 | 5.066 | 3.632 |
| 260                                  | -   | 7.988 | 8.120 | 7.608 | 7.355 | 6.946 | 5.593 | 5.208 | 5.100 | 3.692 |
| 265                                  | -   | 8.095 | 8.227 | 7.735 | 7.482 | 7.073 | 5.663 | 5.247 | 5.135 | 3.752 |
| 270                                  | -   | 8.202 | 8.334 | 7.862 | 7.609 | 7.200 | 5.733 | 5.286 | 5.169 | 3.812 |
| 275                                  | -   | 8.309 | 8.441 | 7.989 | 7.736 | 7.327 | 5.802 | 5.325 | 5.203 | 3.872 |
| 280                                  | -   | 8.416 | 8.548 | 8.116 | 7.863 | 7.454 | 5.872 | 5.364 | 5.237 | 3.932 |
| 285                                  | -   | 8.523 | 8.655 | 8.243 | 7.990 | 7.581 | 5.942 | 5.403 | 5.272 | 3.993 |
| 290                                  | -   | 8.630 | 8.762 | 8.370 | 8.117 | 7.708 | 6.012 | 5.442 | 5.306 | 4.053 |
| 295                                  | -   | 8.737 | 8.869 | 8.497 | 8.244 | 7.835 | 6.082 | 5.481 | 5.340 | 4.113 |
| 300                                  | -   | 8.844 | 8.976 | 8.624 | 8.371 | 7.962 | 6.152 | 5.520 | 5.374 | 4.173 |
| 305                                  | -   | 8.951 | 9.083 | 8.751 | 8.498 | 8.089 | 6.221 | 5.559 | 5.409 | 4.233 |
| 310                                  | -   | 9.058 | 9.190 | 8.878 | 8.625 | 8.216 | 6.291 | 5.598 | 5.443 | 4.293 |
| 315                                  | -   | 9.165 | 9.297 | 9.005 | 8.752 | 8.343 | 6.375 | 5.637 | 5.477 | 4.354 |

Tabulated values continued overleaf

Page 29 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020



## CERTIFICATE No CF 5359

### Arabian Vermiculite Industries

#### AVIKOTE WB1200G

| Table 22: Circular and Rectangular Hollow Section Columns 90 minutes (continued) |   |       |       |       |       |       |       |       |       |       |
|--|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>   | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|  | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 320  | -   | -     | -     | 7.972 | 7.771 | 7.466 | 6.478 | 5.677 | 5.511 | 4.414 |
| 325  | -   | -     | -     | 8.049 | 7.841 | 7.538 | 6.582 | 5.716 | 5.546 | 4.474 |
| 330  | -   | -     | -     | 8.125 | 7.911 | 7.610 | 6.686 | 5.755 | 5.580 | 4.534 |
| 335  | -   | -     | -     | 8.202 | 7.981 | 7.681 | 6.790 | 5.794 | 5.614 | 4.594 |
| 340  | -   | -     | -     | 8.279 | 8.051 | 7.753 | 6.894 | 5.833 | 5.648 | 4.654 |
| 345  | -   | -     | -     | 8.355 | 8.120 | 7.825 | 6.997 | 5.872 | 5.682 | 4.715 |
| 350  | -   | -     | -     | 8.432 | 8.190 | 7.897 | 7.101 | 5.911 | 5.717 | 4.775 |
| 355  | -   | -     | -     | 8.508 | 8.260 | 7.968 | 7.205 | 5.950 | 5.751 | 4.835 |
| 360  | -   | -     | -     | 8.585 | 8.330 | 8.040 | 7.309 | 5.989 | 5.785 | 4.895 |
| 365  | -   | -     | -     | 8.662 | 8.400 | 8.112 | 7.413 | 6.028 | 5.819 | 4.952 |
| 370  | -   | -     | -     | -     | 8.470 | 8.184 | 7.517 | 6.067 | 5.854 | 5.009 |
| 375  | -   | -     | -     | -     | 8.539 | 8.255 | 7.620 | 6.106 | 5.888 | 5.066 |
| 380  | -   | -     | -     | -     | 8.609 | 8.327 | 7.724 | 6.145 | 5.922 | 5.123 |
| 385  | -   | -     | -     | -     | 8.679 | 8.399 | 7.828 | 6.185 | 5.956 | 5.180 |
| 390  | -   | -     | -     | -     | -     | 8.470 | 7.932 | 6.224 | 5.991 | 5.237 |
| 395  | -   | -     | -     | -     | -     | 8.542 | 8.036 | 6.263 | 6.025 | 5.294 |
| 400  | -   | -     | -     | -     | -     | 8.614 | 8.139 | 6.302 | 6.059 | 5.352 |
| 405  | -   | -     | -     | -     | -     | 8.686 | 8.243 | 6.405 | 6.093 | 5.409 |
| 410  | -   | -     | -     | -     | -     | -     | 8.347 | 6.763 | 6.128 | 5.466 |
| 415  | -   | -     | -     | -     | -     | -     | 8.451 | 7.122 | 6.162 | 5.523 |
| 420  | -   | -     | -     | -     | -     | -     | 8.555 | 7.481 | 6.196 | 5.580 |
| 425  | -   | -     | -     | -     | -     | -     | 8.658 | 7.839 | 6.230 | 5.637 |
| 430  | -   | -     | -     | -     | -     | -     | -     | 8.198 | 6.265 | 5.694 |
| 435  | -   | -     | -     | -     | -     | -     | -     | 8.557 | 6.299 | 5.751 |

Table applies to fully exposed circular and rectangular hollow columns with all round protection. Thickness is intumescent only.

# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

Table 23: Circular and Rectangular Hollow Section Columns 105 minutes

| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                      | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 40                                   | 4.406   | 2.966 | 2.169 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 45                                   | 4.406   | 3.047 | 2.311 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 50                                   | 4.469   | 3.128 | 2.454 | 1.907 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 55                                   | 4.602   | 3.209 | 2.596 | 2.059 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 60                                   | 4.735   | 3.289 | 2.739 | 2.210 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 65                                   | 4.868   | 3.370 | 2.881 | 2.361 | 1.925 | 1.781 | 1.781 | 1.781 | 1.781 | 1.781 |
| 70                                   | 5.002   | 3.451 | 3.024 | 2.513 | 2.107 | 1.935 | 1.781 | 1.781 | 1.781 | 1.781 |
| 75                                   | 5.135   | 3.795 | 3.166 | 2.664 | 2.289 | 2.093 | 1.848 | 1.781 | 1.781 | 1.781 |
| 80                                   | 5.268   | 4.139 | 3.309 | 2.815 | 2.470 | 2.251 | 1.973 | 1.804 | 1.781 | 1.781 |
| 85                                   | 5.401   | 4.482 | 3.451 | 2.967 | 2.652 | 2.409 | 2.098 | 1.901 | 1.781 | 1.781 |
| 90                                   | 5.534   | 4.826 | 3.657 | 3.118 | 2.833 | 2.567 | 2.223 | 1.998 | 1.790 | 1.781 |
| 95                                   | 5.667   | 4.989 | 3.864 | 3.269 | 3.015 | 2.725 | 2.349 | 2.095 | 1.877 | 1.781 |
| 100                                  | 5.800   | 5.107 | 4.070 | 3.421 | 3.197 | 2.882 | 2.474 | 2.192 | 1.963 | 1.781 |
| 105                                  | 5.934   | 5.225 | 4.276 | 3.562 | 3.378 | 3.040 | 2.599 | 2.289 | 2.050 | 1.781 |
| 110                                  | 6.067   | 5.343 | 4.482 | 3.701 | 3.517 | 3.198 | 2.725 | 2.385 | 2.136 | 1.823 |
| 115                                  | 6.200   | 5.461 | 4.689 | 3.840 | 3.626 | 3.356 | 2.850 | 2.482 | 2.223 | 1.910 |
| 120                                  | 6.333   | 5.579 | 4.895 | 3.979 | 3.735 | 3.495 | 2.975 | 2.579 | 2.309 | 1.998 |
| 125                                  | 6.558   | 5.697 | 5.009 | 4.117 | 3.845 | 3.604 | 3.100 | 2.676 | 2.396 | 2.086 |
| 130                                  | 6.784   | 5.814 | 5.123 | 4.256 | 3.954 | 3.714 | 3.226 | 2.773 | 2.482 | 2.173 |
| 135                                  | 7.009   | 5.932 | 5.237 | 4.395 | 4.064 | 3.823 | 3.351 | 2.870 | 2.569 | 2.261 |
| 140                                  | 7.235   | 6.050 | 5.352 | 4.534 | 4.173 | 3.932 | 3.478 | 2.967 | 2.655 | 2.348 |
| 145                                  | 7.460   | 6.168 | 5.466 | 4.673 | 4.282 | 4.042 | 3.611 | 3.064 | 2.742 | 2.436 |
| 150                                  | 7.686   | 6.286 | 5.580 | 4.812 | 4.392 | 4.151 | 3.745 | 3.160 | 2.828 | 2.523 |
| 155                                  | 7.911   | 6.522 | 5.694 | 4.969 | 4.501 | 4.261 | 3.879 | 3.257 | 2.915 | 2.611 |
| 160                                  | 8.136   | 6.838 | 5.808 | 5.153 | 4.611 | 4.370 | 4.013 | 3.354 | 3.001 | 2.698 |
| 165                                  | 8.362   | 7.154 | 5.922 | 5.337 | 4.720 | 4.479 | 4.146 | 3.451 | 3.088 | 2.786 |
| 170                                  | 8.587   | 7.469 | 6.036 | 5.522 | 4.829 | 4.589 | 4.280 | 3.636 | 3.174 | 2.873 |
| 175                                  | -   | 7.785 | 6.150 | 5.706 | 5.020 | 4.698 | 4.414 | 3.821 | 3.261 | 2.961 |
| 180                                  | -   | 8.100 | 6.265 | 5.891 | 5.333 | 4.807 | 4.547 | 4.006 | 3.347 | 3.048 |
| 185                                  | -   | 8.416 | 6.530 | 6.075 | 5.645 | 4.975 | 4.681 | 4.192 | 3.434 | 3.136 |
| 190                                  | -   | -     | 7.023 | 6.259 | 5.958 | 5.374 | 4.815 | 4.377 | 3.657 | 3.223 |
| 195                                  | -   | -     | 7.517 | 6.419 | 6.270 | 5.774 | 5.046 | 4.562 | 3.915 | 3.311 |
| 200                                  | -   | -     | 8.010 | 6.563 | 6.438 | 6.173 | 5.425 | 4.747 | 4.173 | 3.398 |
| 205                                  | -   | -     | 8.503 | 6.706 | 6.570 | 6.402 | 5.803 | 4.940 | 4.431 | 3.511 |
| 210                                  | -   | -     | -     | 6.849 | 6.701 | 6.516 | 6.182 | 5.165 | 4.689 | 3.662 |
| 215                                  | -   | -     | -     | 6.993 | 6.833 | 6.630 | 6.388 | 5.389 | 4.910 | 3.812 |
| 220                                  | -   | -     | -     | 7.136 | 6.964 | 6.745 | 6.480 | 5.614 | 4.983 | 3.962 |
| 225                                  | -   | -     | -     | 7.280 | 7.096 | 6.859 | 6.572 | 5.839 | 5.056 | 4.113 |
| 230                                  | -   | -     | -     | 7.423 | 7.227 | 6.973 | 6.663 | 6.063 | 5.130 | 4.263 |
| 235                                  | -   | -     | -     | 7.567 | 7.359 | 7.088 | 6.755 | 6.288 | 5.203 | 4.414 |
| 240                                  | -   | -     | -     | 7.710 | 7.490 | 7.202 | 6.847 | 6.397 | 5.277 | 4.564 |
| 245                                  | -   | -     | -     | 7.854 | 7.622 | 7.316 | 6.939 | 6.476 | 5.350 | 4.715 |
| 250                                  | -   | -     | -     | 7.997 | 7.753 | 7.431 | 7.030 | 6.556 | 5.423 | 4.865 |
| 255                                  | -   | -     | -     | 8.141 | 7.885 | 7.545 | 7.122 | 6.636 | 5.497 | 4.933 |
| 260                                  | -   | -     | -     | 8.284 | 8.016 | 7.659 | 7.214 | 6.716 | 5.570 | 4.980 |
| 265                                  | -   | -     | -     | 8.427 | 8.148 | 7.774 | 7.305 | 6.795 | 5.643 | 5.027 |
| 270                                  | -   | -     | -     | 8.571 | 8.279 | 7.888 | 7.397 | 6.875 | 5.717 | 5.074 |
| 275                                  | -   | -     | -     | -     | 8.411 | 8.002 | 7.489 | 6.955 | 5.790 | 5.121 |
| 280                                  | -   | -     | -     | -     | 8.542 | 8.117 | 7.581 | 7.034 | 5.863 | 5.168 |
| 285                                  | -   | -     | -     | -     | 8.674 | 8.231 | 7.672 | 7.114 | 5.937 | 5.215 |
| 290                                  | -   | -     | -     | -     | -     | 8.346 | 7.764 | 7.194 | 6.010 | 5.262 |
| 295                                  | -   | -     | -     | -     | -     | 8.460 | 7.856 | 7.273 | 6.084 | 5.309 |
| 300                                  | -   | -     | -     | -     | -     | 8.574 | 7.948 | 7.353 | 6.157 | 5.356 |
| 305                                  | -   | -     | -     | -     | -     | 8.689 | 8.039 | 7.433 | 6.230 | 5.403 |
| 310                                  | -   | -     | -     | -     | -     | -     | 8.131 | 7.513 | 6.304 | 5.450 |
| 315                                  | -   | -     | -     | -     | -     | -     | 8.223 | 7.592 | 6.401 | 5.497 |

Tabulated values continued overleaf

Page 31 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020



## CERTIFICATE No CF 5359

### Arabian Vermiculite Industries

#### AVIKOTE WB1200G

| Table 23: Circular and Rectangular Hollow Section Columns 105 minutes (continued) |   |       |       |       |       |       |       |       |       |       |
|---|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to m <sup>-1</sup>  | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|   | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 320   | -   | -     | -     | -     | -     | -     | 8.315 | 7.672 | 6.513 | 5.544 |
| 325   | -   | -     | -     | -     | -     | -     | 8.406 | 7.752 | 6.626 | 5.591 |
| 330   | -   | -     | -     | -     | -     | -     | 8.498 | 7.831 | 6.739 | 5.637 |
| 335   | -   | -     | -     | -     | -     | -     | 8.590 | 7.911 | 6.851 | 5.684 |
| 340   | -   | -     | -     | -     | -     | -     | 8.682 | 7.991 | 6.964 | 5.731 |
| 345   | -   | -     | -     | -     | -     | -     | -     | 8.070 | 7.077 | 5.778 |
| 350   | -   | -     | -     | -     | -     | -     | -     | 8.150 | 7.190 | 5.825 |
| 355   | -   | -     | -     | -     | -     | -     | -     | 8.230 | 7.302 | 5.872 |
| 360   | -   | -     | -     | -     | -     | -     | -     | 8.309 | 7.415 | 5.919 |
| 365   | -   | -     | -     | -     | -     | -     | -     | 8.389 | 7.528 | 5.966 |
| 370   | -   | -     | -     | -     | -     | -     | -     | 8.469 | 7.640 | 6.013 |
| 375   | -   | -     | -     | -     | -     | -     | -     | 8.549 | 7.753 | 6.060 |
| 380   | -   | -     | -     | -     | -     | -     | -     | 8.628 | 7.866 | 6.107 |
| 385   | -   | -     | -     | -     | -     | -     | -     | 8.708 | 7.979 | 6.154 |
| 390   | -   | -     | -     | -     | -     | -     | -     | -     | 8.091 | 6.201 |
| 395   | -   | -     | -     | -     | -     | -     | -     | -     | 8.204 | 6.248 |
| 400   | -   | -     | -     | -     | -     | -     | -     | -     | 8.317 | 6.295 |
| 405   | -   | -     | -     | -     | -     | -     | -     | -     | 8.429 | 6.446 |
| 410   | -   | -     | -     | -     | -     | -     | -     | -     | 8.542 | 7.009 |
| 415   | -   | -     | -     | -     | -     | -     | -     | -     | 8.655 | 7.573 |
| 420   | -   | -     | -     | -     | -     | -     | -     | -     | -     | 8.136 |
| 425   | -   | -     | -     | -     | -     | -     | -     | -     | -     | 8.700 |

Table applies to fully exposed circular and rectangular hollow columns with all round protection. Thickness is intumescent only.



# CERTIFICATE No CF 5359

## Arabian Vermiculite Industries

### AVIKOTE WB1200G

Table 24: Circular and Rectangular Hollow Section Columns 120 minutes

| Section Factor up to m <sup>-1</sup> | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|--------------------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                      | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 40                                   | 5.700   | 3.961 | 3.030 | 2.393 | 2.153 | 1.813 | 1.781 | 1.781 | 1.781 | 1.781 |
| 45                                   | 5.700   | 4.173 | 3.103 | 2.525 | 2.297 | 1.967 | 1.781 | 1.781 | 1.781 | 1.781 |
| 50                                   | 5.819   | 4.385 | 3.175 | 2.658 | 2.441 | 2.122 | 1.781 | 1.781 | 1.781 | 1.781 |
| 55                                   | 6.003   | 4.598 | 3.248 | 2.790 | 2.585 | 2.276 | 1.781 | 1.781 | 1.781 | 1.781 |
| 60                                   | 6.186   | 4.810 | 3.320 | 2.922 | 2.730 | 2.431 | 1.781 | 1.781 | 1.781 | 1.781 |
| 65                                   | 6.370   | 4.993 | 3.393 | 3.054 | 2.874 | 2.585 | 1.849 | 1.781 | 1.781 | 1.781 |
| 70                                   | 6.553   | 5.156 | 3.582 | 3.187 | 3.018 | 2.740 | 2.035 | 1.790 | 1.781 | 1.781 |
| 75                                   | 6.737   | 5.320 | 4.239 | 3.319 | 3.162 | 2.895 | 2.222 | 1.939 | 1.781 | 1.781 |
| 80                                   | 6.920   | 5.483 | 4.895 | 3.451 | 3.307 | 3.049 | 2.408 | 2.087 | 1.837 | 1.781 |
| 85                                   | 7.104   | 5.647 | 5.031 | 3.779 | 3.451 | 3.204 | 2.594 | 2.235 | 1.952 | 1.781 |
| 90                                   | 7.287   | 5.810 | 5.166 | 4.107 | 3.718 | 3.358 | 2.780 | 2.383 | 2.067 | 1.821 |
| 95                                   | 7.471   | 5.974 | 5.302 | 4.436 | 3.986 | 3.531 | 2.967 | 2.532 | 2.183 | 1.909 |
| 100                                  | 7.654   | 6.137 | 5.438 | 4.764 | 4.253 | 3.732 | 3.153 | 2.680 | 2.298 | 1.998 |
| 105                                  | 7.838   | 6.300 | 5.573 | 4.967 | 4.521 | 3.932 | 3.339 | 2.828 | 2.413 | 2.087 |
| 110                                  | 8.021   | 6.567 | 5.709 | 5.087 | 4.788 | 4.133 | 3.493 | 2.977 | 2.528 | 2.175 |
| 115                                  | 8.205   | 6.859 | 5.845 | 5.207 | 4.965 | 4.333 | 3.600 | 3.125 | 2.644 | 2.264 |
| 120                                  | 8.388   | 7.151 | 5.980 | 5.326 | 5.081 | 4.534 | 3.706 | 3.273 | 2.759 | 2.352 |
| 125                                  | 8.572   | 7.443 | 6.116 | 5.446 | 5.197 | 4.735 | 3.812 | 3.421 | 2.874 | 2.441 |
| 130                                  | -   | 7.736 | 6.252 | 5.566 | 5.312 | 4.921 | 3.918 | 3.541 | 2.990 | 2.530 |
| 135                                  | -   | 8.028 | 6.454 | 5.686 | 5.428 | 5.052 | 4.024 | 3.654 | 3.105 | 2.618 |
| 140                                  | -   | 8.320 | 6.758 | 5.806 | 5.544 | 5.183 | 4.131 | 3.767 | 3.220 | 2.707 |
| 145                                  | -   | 8.612 | 7.061 | 5.926 | 5.660 | 5.313 | 4.237 | 3.880 | 3.336 | 2.795 |
| 150                                  | -   | -     | 7.365 | 6.045 | 5.776 | 5.444 | 4.343 | 3.993 | 3.451 | 2.884 |
| 155                                  | -   | -     | 7.668 | 6.165 | 5.892 | 5.575 | 4.449 | 4.105 | 3.595 | 2.973 |
| 160                                  | -   | -     | 7.972 | 6.285 | 6.008 | 5.706 | 4.555 | 4.218 | 3.740 | 3.061 |
| 165                                  | -   | -     | 8.275 | 6.448 | 6.124 | 5.836 | 4.661 | 4.331 | 3.884 | 3.150 |
| 170                                  | -   | -     | 8.579 | 6.641 | 6.240 | 5.967 | 4.768 | 4.444 | 4.029 | 3.238 |
| 175                                  | -   | -     | -     | 6.833 | 6.378 | 6.098 | 4.874 | 4.557 | 4.173 | 3.327 |
| 180                                  | -   | -     | -     | 7.026 | 6.604 | 6.228 | 5.233 | 4.669 | 4.317 | 3.416 |
| 185                                  | -   | -     | -     | 7.218 | 6.829 | 6.376 | 5.656 | 4.782 | 4.462 | 3.600 |
| 190                                  | -   | -     | -     | 7.411 | 7.054 | 6.589 | 6.079 | 4.895 | 4.606 | 3.849 |
| 195                                  | -   | -     | -     | 7.603 | 7.280 | 6.802 | 6.399 | 5.409 | 4.751 | 4.098 |
| 200                                  | -   | -     | -     | 7.796 | 7.505 | 7.015 | 6.563 | 5.922 | 4.895 | 4.347 |
| 205                                  | -   | -     | -     | 7.988 | 7.731 | 7.229 | 6.728 | 6.358 | 5.318 | 4.596 |
| 210                                  | -   | -     | -     | 8.180 | 7.956 | 7.442 | 6.892 | 6.483 | 5.741 | 4.845 |
| 215                                  | -   | -     | -     | 8.373 | 8.182 | 7.655 | 7.056 | 6.609 | 6.164 | 4.986 |
| 220                                  | -   | -     | -     | 8.565 | 8.407 | 7.868 | 7.221 | 6.734 | 6.391 | 5.100 |
| 225                                  | -   | -     | -     | -     | 8.632 | 8.082 | 7.385 | 6.859 | 6.489 | 5.215 |
| 230                                  | -   | -     | -     | -     | -     | 8.295 | 7.549 | 6.984 | 6.586 | 5.329 |
| 235                                  | -   | -     | -     | -     | -     | 8.508 | 7.714 | 7.109 | 6.684 | 5.443 |
| 240                                  | -   | -     | -     | -     | -     | -     | 7.878 | 7.235 | 6.781 | 5.557 |
| 245                                  | -   | -     | -     | -     | -     | -     | 8.043 | 7.360 | 6.878 | 5.671 |
| 250                                  | -   | -     | -     | -     | -     | -     | 8.207 | 7.485 | 6.976 | 5.785 |
| 255                                  | -   | -     | -     | -     | -     | -     | 8.371 | 7.610 | 7.073 | 5.899 |
| 260                                  | -   | -     | -     | -     | -     | -     | 8.536 | 7.736 | 7.171 | 6.013 |
| 265                                  | -   | -     | -     | -     | -     | -     | 8.700 | 7.861 | 7.268 | 6.128 |
| 270                                  | -   | -     | -     | -     | -     | -     | -     | 7.986 | 7.366 | 6.242 |
| 275                                  | -   | -     | -     | -     | -     | -     | -     | 8.111 | 7.463 | 6.360 |
| 280                                  | -   | -     | -     | -     | -     | -     | -     | 8.237 | 7.560 | 6.493 |
| 285                                  | -   | -     | -     | -     | -     | -     | -     | 8.362 | 7.658 | 6.627 |
| 290                                  | -   | -     | -     | -     | -     | -     | -     | 8.487 | 7.755 | 6.761 |
| 295                                  | -   | -     | -     | -     | -     | -     | -     | 8.612 | 7.853 | 6.895 |
| 300                                  | -   | -     | -     | -     | -     | -     | -     | -     | 7.950 | 7.028 |
| 305                                  | -   | -     | -     | -     | -     | -     | -     | -     | 8.047 | 7.162 |
| 310                                  | -   | -     | -     | -     | -     | -     | -     | -     | 8.145 | 7.296 |
| 315                                  | -   | -     | -     | -     | -     | -     | -     | -     | 8.242 | 7.430 |

Tabulated values continued overleaf

Page 33 of 34 Signed  
E/057



Issued: 22<sup>nd</sup> September 2015  
Valid to: 6<sup>th</sup> September 2020



## CERTIFICATE No CF 5359

### Arabian Vermiculite Industries

#### AVIKOTE WB1200G

| Table 24: Circular and Rectangular Hollow Section Columns 120 minutes (continued) |   |       |       |       |       |       |       |       |       |       |
|---|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Section Factor up to $m^{-1}$   | Thickness (mm) Required for a Design Temperature of |       |       |       |       |       |       |       |       |       |
|   | 350°C   | 400°C | 450°C | 500°C | 520°C | 550°C | 600°C | 650°C | 700°C | 750°C |
| 320   | -   | -     | -     | -     | -     | -     | -     | -     | 8.340 | 7.563 |
| 325   | -   | -     | -     | -     | -     | -     | -     | -     | 8.437 | 7.697 |
| 330   | -   | -     | -     | -     | -     | -     | -     | -     | 8.534 | 7.831 |
| 335   | -   | -     | -     | -     | -     | -     | -     | -     | 8.632 | 7.964 |
| 340   | -   | -     | -     | -     | -     | -     | -     | -     | -     | 8.098 |
| 345   | -   | -     | -     | -     | -     | -     | -     | -     | -     | 8.232 |
| 350   | -   | -     | -     | -     | -     | -     | -     | -     | -     | 8.366 |
| 355   | -   | -     | -     | -     | -     | -     | -     | -     | -     | 8.499 |
| 360   | -   | -     | -     | -     | -     | -     | -     | -     | -     | 8.633 |

Table applies to fully exposed circular and rectangular hollow columns with all round protection. Thickness is intumescent only.

