

## Electronic Supplementary Material for:

### **RILEM TC 247-DTA Round Robin Test: Carbonation and chloride penetration testing of alkali-activated concretes**

(published in *Materials and Structures*)

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In the following Tables S1–S8, the data reported by the laboratories that participated in the carbonation and chloride penetration testing of RILEM TC 247-DTA are summarised. The data shown in the tables are the mean values and standard deviations (SD) of the experimental results of each laboratory. The means and standard deviations were either reported by the laboratories, or computed from the single-specimen data reported by the respective laboratories. When no standard deviation is given after a mean value, either only one specimen was tested, or no standard deviation and no single specimen values were reported.

In Tables S9–S13, the means ( $\bar{X}$ ), standard deviations ( $sd$ ) and coefficients of variation (COV), calculated from the mean results of the different laboratories for selected test methods and test durations, are shown.

**Table S1.** Results of the accelerated carbonation testing (EN 13295): depths of carbonation in mm – results reported by laboratories A, B, C, F

|     | Carbonation duration (d) | Lab A |      | Lab B |      | Lab C |      | Lab F |      |
|-----|--------------------------|-------|------|-------|------|-------|------|-------|------|
|     |                          | Mean  | SD   | Mean  | SD   | Mean  | SD   | Mean  | SD   |
| FA2 | 0                        | 2.88  | 0.23 |       |      |       |      |       |      |
|     | 7                        |       |      |       |      |       |      |       |      |
|     | 8                        | 7.50  | 0.27 |       |      |       |      |       |      |
|     | 14                       | 8.25  | 0.60 |       |      |       |      |       |      |
|     | 28                       | 9.88  | 0.52 |       |      | 14.00 | 3.55 |       |      |
|     | 42                       |       |      |       |      |       |      |       |      |
|     | 56                       | 12.31 | 0.53 | 7.56  | 0.60 | 19.35 | 3.86 |       |      |
|     | 84                       |       |      |       |      |       |      |       |      |
|     | 90                       |       |      |       |      | 20.16 | 4.29 |       |      |
|     | 91                       | 14.75 | 0.60 |       |      |       |      |       |      |
|     | 180                      |       |      |       |      | 23.44 | 5.64 |       |      |
|     | 182                      | 22.31 | 0.99 |       |      |       |      |       |      |
|     | 365                      |       |      |       |      | 34.27 | 4.91 |       |      |
| FA8 | 0                        | 3.25  | 0.27 |       |      |       |      |       |      |
|     | 7                        |       |      |       |      |       |      |       |      |
|     | 8                        | 9.44  | 0.62 |       |      |       |      |       |      |
|     | 14                       | 10.75 | 1.07 |       |      |       |      |       |      |
|     | 28                       | 12.81 | 1.31 |       |      | 19.09 | 4.89 |       |      |
|     | 42                       |       |      |       |      |       |      |       |      |
|     | 56                       | 16.81 | 1.94 | 11.69 | 0.91 | 26.29 | 6.97 |       |      |
|     | 84                       |       |      |       |      |       |      |       |      |
|     | 90                       |       |      |       |      | 30.98 | 5.69 |       |      |
|     | 91                       | 19.81 | 2.24 |       |      |       |      |       |      |
|     | 180                      |       |      |       |      |       |      |       |      |
|     | 182                      |       |      |       |      |       |      |       |      |
|     | 365                      |       |      |       |      |       |      |       |      |
| S1b | 0                        |       |      |       |      |       |      |       |      |
|     | 7                        |       |      |       |      |       |      |       |      |
|     | 8                        |       |      |       |      |       |      |       |      |
|     | 14                       |       |      |       |      |       |      | 8.50  |      |
|     | 28                       |       |      |       |      | 11.75 | 1.55 | 11.62 | 1.06 |

|     |     |  |       |      |       |      |       |      |  |
|-----|-----|--|-------|------|-------|------|-------|------|--|
|     | 42  |  |       |      |       |      |       |      |  |
|     | 56  |  | 16.13 | 0.36 | 12.17 | 1.34 | 16.26 | 0.92 |  |
|     | 84  |  |       |      |       |      | 18.72 | 1.56 |  |
|     | 90  |  |       |      | 14.13 | 1.09 |       |      |  |
|     | 91  |  |       |      |       |      |       |      |  |
|     | 180 |  |       |      |       |      |       |      |  |
|     | 182 |  |       |      |       |      |       |      |  |
|     | 365 |  |       |      |       |      |       |      |  |
| S3a | 0   |  |       |      |       |      |       |      |  |
|     | 7   |  |       |      |       |      |       |      |  |
|     | 8   |  |       |      |       |      |       |      |  |
|     | 14  |  |       |      |       |      | 6.30  | 0.47 |  |
|     | 28  |  |       |      | 7.49  | 1.28 | 8.91  | 1.22 |  |
|     | 42  |  |       |      |       |      |       |      |  |
|     | 56  |  | 12.13 | 0.23 | 6.06  | 2.56 | 11.29 | 0.91 |  |
|     | 84  |  |       |      |       |      | 13.61 | 0.98 |  |
|     | 90  |  |       |      | 7.21  | 1.44 |       |      |  |
|     | 91  |  |       |      |       |      |       |      |  |
|     | 180 |  |       |      |       |      |       |      |  |
|     | 182 |  |       |      |       |      |       |      |  |
|     | 365 |  |       |      |       |      |       |      |  |
| MK1 | 0   |  |       |      |       |      |       |      |  |
|     | 7   |  |       |      |       |      |       |      |  |
|     | 8   |  |       |      |       |      |       |      |  |
|     | 14  |  |       |      |       |      |       |      |  |
|     | 28  |  |       |      |       |      |       |      |  |
|     | 42  |  |       |      |       |      |       |      |  |
|     | 56  |  | 15.37 | 1.43 |       |      |       |      |  |
|     | 84  |  |       |      |       |      |       |      |  |
|     | 90  |  |       |      |       |      |       |      |  |
|     | 91  |  |       |      |       |      |       |      |  |
|     | 180 |  |       |      |       |      |       |      |  |
|     | 182 |  |       |      |       |      |       |      |  |
|     | 365 |  |       |      |       |      |       |      |  |

Table S1. continued

**Table S2.** Results of the accelerated carbonation testing (EN 13295): depths of carbonation in mm – results reported by laboratories H and J

|     | Carbonation duration (d) | Lab H <sup>a</sup> |      | Lab J |      |
|-----|--------------------------|--------------------|------|-------|------|
|     |                          | Mean               | SD   | Mean  | SD   |
| S1b | 0                        |                    |      |       |      |
|     | 7                        |                    |      | 5.70  | 0.34 |
|     | 8                        |                    |      |       |      |
|     | 14                       | 9.50               | 0.71 | 8.14  | 0.01 |
|     | 28                       | 11.50              | 0.71 | 11.54 | 0.20 |
|     | 42                       |                    |      | 13.64 | 0.78 |
|     | 56                       | 17.00              | 1.41 |       |      |
|     | 84                       | 24.50              | 0.71 |       |      |
|     | 90                       |                    |      |       |      |
|     | 91                       |                    |      |       |      |
|     | 180                      |                    |      |       |      |
|     | 182                      |                    |      |       |      |
|     | 365                      |                    |      |       |      |
|     | MK1                      | 0                  |      |       |      |
| 7   |                          |                    |      |       |      |
| 8   |                          |                    |      |       |      |
| 14  |                          | >25                | -    |       |      |
| 28  |                          | >25                | -    |       |      |
| 42  |                          |                    |      |       |      |
| 56  |                          | >25                | -    |       |      |
| 84  |                          | >25                | -    |       |      |
| 90  |                          |                    |      |       |      |
| 91  |                          |                    |      |       |      |
| 180 |                          |                    |      |       |      |
| 182 |                          |                    |      |       |      |
| 365 |                          |                    |      |       |      |

<sup>a</sup> Sample dimensions: 50 mm × 50 mm × 50 mm

**Table S3.** Results of the natural carbonation testing – carbonation under controlled exposure conditions using natural levels of carbon dioxide (‘indoor’): depths of carbonation in mm

|     | Carbonation duration (d) | Lab A <sup>a</sup> |      | Lab B <sup>b</sup> |      | Lab C <sup>c</sup> |      | Lab G <sup>d</sup> |      | Lab I <sup>e</sup> |    |
|-----|--------------------------|--------------------|------|--------------------|------|--------------------|------|--------------------|------|--------------------|----|
|     |                          | Mean               | SD   | Mean               | SD   | Mean               | SD   | Mean               | SD   | Mean               | SD |
| FA2 | 0                        | 3.00               | 0.00 |                    |      |                    |      |                    |      |                    |    |
|     | 28                       |                    |      |                    |      | 0.29               | 0.31 |                    |      |                    |    |
|     | 56                       |                    |      |                    |      |                    |      | 7.16               | 0.90 |                    |    |
|     | 90                       |                    |      |                    |      | 8.49               | 3.21 |                    |      |                    |    |
|     | 91                       |                    |      | 4.88               | 0.42 |                    |      |                    |      |                    |    |
|     | 125                      |                    |      |                    |      |                    |      |                    |      |                    |    |
|     | 139                      |                    |      |                    |      |                    |      |                    |      |                    |    |
|     | 180                      |                    |      |                    |      | 10.47              | 2.99 |                    |      |                    |    |
|     | 182                      | 12.95              | 0.53 |                    |      |                    |      | 14.06              | 1.30 |                    |    |
|     | 196                      |                    |      | 6.66               | 0.70 |                    |      |                    |      |                    |    |
|     | 273                      |                    |      | 8.27               | 0.35 |                    |      | 17.20              | 2.10 |                    |    |
|     | 274                      |                    |      |                    |      |                    |      |                    |      |                    |    |
|     | 365                      | 15.15              | 0.19 | 9.17               | 0.34 | 13.79              | 2.70 | 20.04              | 1.60 |                    |    |
|     | 368                      |                    |      |                    |      |                    |      |                    |      |                    |    |
| FA8 | 0                        | 3.38               | 0.25 |                    |      |                    |      |                    |      |                    |    |
|     | 28                       |                    |      |                    |      | 0.00               | 0.00 |                    |      |                    |    |
|     | 56                       |                    |      |                    |      |                    |      | 8.88               | 0.70 |                    |    |
|     | 90                       |                    |      |                    |      | 11.53              | 5.70 |                    |      |                    |    |
|     | 91                       |                    |      | 6.24               | 0.31 |                    |      |                    |      |                    |    |
|     | 125                      |                    |      |                    |      |                    |      |                    |      |                    |    |
|     | 139                      |                    |      |                    |      |                    |      |                    |      | 11                 | -  |
|     | 180                      |                    |      |                    |      | 18.84              | 3.13 |                    |      |                    |    |
|     | 182                      | 16.20              | 1.86 |                    |      |                    |      | 15.49              | 1.80 |                    |    |
|     | 196                      |                    |      | 9.49               | 0.60 |                    |      |                    |      |                    |    |
|     | 273                      |                    |      | 10.82              | 0.78 |                    |      | 18.10              | 2.90 |                    |    |
|     | 274                      |                    |      |                    |      |                    |      |                    |      |                    |    |
|     | 365                      | 18.25              | 0.64 | 12.81              | 0.94 | 24.36              | 4.58 | 23.23              | 4.10 |                    |    |
|     | 368                      |                    |      |                    |      |                    |      |                    |      |                    |    |
| S1b | 0                        |                    |      |                    |      |                    |      |                    |      |                    |    |
|     | 28                       |                    |      |                    |      | 2.41               | 1.28 |                    |      |                    |    |
|     | 56                       |                    |      |                    |      | 4.94               | 2.50 | 6.14               | 0.70 |                    |    |

|     |     |  |       |      |      |      |       |      |    |   |
|-----|-----|--|-------|------|------|------|-------|------|----|---|
|     | 90  |  |       |      | 8.58 | 1.41 |       |      |    |   |
|     | 91  |  | 5.77  | 0.48 |      |      |       |      |    |   |
|     | 125 |  |       |      |      |      |       |      |    |   |
|     | 139 |  |       |      |      |      |       |      |    |   |
|     | 180 |  |       |      |      |      |       |      |    |   |
|     | 182 |  | 6.58  | 0.14 |      |      | 10.33 | 0.90 |    |   |
|     | 196 |  |       |      |      |      |       |      |    |   |
|     | 273 |  |       |      |      |      | 9.92  | 2.20 |    |   |
|     | 274 |  | 8.51  | 0.30 |      |      |       |      |    |   |
|     | 365 |  |       |      |      |      | 12.84 | 1.20 |    |   |
|     | 368 |  | 9.00  | 0.80 |      |      |       |      |    |   |
| S3a | 0   |  |       |      |      |      |       |      |    |   |
|     | 28  |  |       |      | 1.60 | 0.80 |       |      |    |   |
|     | 56  |  |       |      | 4.66 | 2.10 | 4.41  | 0.50 |    |   |
|     | 90  |  |       |      | 4.83 | 0.99 |       |      |    |   |
|     | 91  |  | 3.57  | 0.43 |      |      |       |      |    |   |
|     | 125 |  |       |      |      |      |       |      |    |   |
|     | 139 |  |       |      |      |      |       |      |    |   |
|     | 180 |  |       |      |      |      |       |      |    |   |
|     | 182 |  | 4.92  | 0.34 |      |      | 8.25  | 1.10 |    |   |
|     | 196 |  |       |      |      |      |       |      |    |   |
|     | 273 |  |       |      |      |      | 9.85  | 1.60 |    |   |
|     | 274 |  | 6.28  | 0.34 |      |      |       |      |    |   |
|     | 365 |  |       |      |      |      | 9.04  | 0.90 |    |   |
|     | 368 |  | 6.14  | 0.20 |      |      |       |      |    |   |
| MK1 | 0   |  |       |      |      |      |       |      |    |   |
|     | 28  |  |       |      |      |      |       |      |    |   |
|     | 56  |  |       |      |      |      | 9.98  | 1.20 |    |   |
|     | 90  |  |       |      |      |      |       |      |    |   |
|     | 91  |  | 8.36  | 0.32 |      |      |       |      |    |   |
|     | 125 |  |       |      |      |      |       |      | 16 | - |
|     | 139 |  |       |      |      |      |       |      |    |   |
|     | 180 |  |       |      |      |      |       |      |    |   |
|     | 182 |  | 14.18 | 0.90 |      |      | 17.80 | 2.30 |    |   |
|     | 196 |  |       |      |      |      |       |      |    |   |
|     | 273 |  |       |      |      |      | 24.45 | 3.50 |    |   |

Table S3. continued

|  |     |  |  |       |      |  |  |     |   |  |
|--|-----|--|--|-------|------|--|--|-----|---|--|
|  | 274 |  |  | 18.92 | 0.45 |  |  |     |   |  |
|  | 365 |  |  |       |      |  |  | >25 | - |  |
|  | 368 |  |  | 22.27 | 0.26 |  |  |     |   |  |

<sup>a</sup> Exposure conditions: temperature: 19 °C, relative humidity: 50 %

<sup>b</sup> Exposure conditions: temperature: 20 °C, relative humidity: 65 %

<sup>c</sup> Exposure conditions not reported

<sup>d</sup> Exposure conditions: temperature: (20 ± 5) °C, relative humidity: ≥50 %; curing times (sealed) before exposure to CO<sub>2</sub>: S1b: 3 days, S3a: 2 days, FA2: 13 days, FA8: 13 days, MK1: 1 day

<sup>e</sup> Exposure conditions: temperature: 19–27 °C, relative humidity: 25–58 %

Table S3. continued

**Table S4.** Results of the natural carbonation testing – carbonation under natural outdoor conditions protected from rainfall (‘sheltered’): depths of carbonation in mm

|     | Carbonation duration (d) | Lab A |      | Lab G <sup>a</sup> |      |
|-----|--------------------------|-------|------|--------------------|------|
|     |                          | Mean  | SD   | Mean               | SD   |
| FA2 | 0                        | 2.88  | 0.25 |                    |      |
|     | 56                       |       |      | 5.33               | 0.80 |
|     | 182                      | 4.15  | 1.22 | 7.12               | 1.10 |
|     | 273                      |       |      | 7.49               | 1.50 |
|     | 365                      | 7.30  | 1.18 | 10.53              | 1.50 |
| FA8 | 0                        | 3.13  | 0.25 |                    |      |
|     | 56                       |       |      | 7.10               | 1.10 |
|     | 182                      | 6.10  | 0.89 | 10.77              | 1.20 |
|     | 273                      |       |      | 11.70              | 1.90 |
|     | 365                      | 7.50  | 0.66 | 11.61              | 2.70 |
| S1b | 0                        |       |      |                    |      |
|     | 56                       |       |      | 5.60               | 0.70 |
|     | 182                      |       |      | 8.96               | 1.20 |
|     | 273                      |       |      | 9.72               | 1.00 |
|     | 365                      |       |      | 11.19              | 1.10 |
| S3a | 0                        |       |      |                    |      |
|     | 56                       |       |      | 4.12               | 0.60 |
|     | 182                      |       |      | 6.39               | 0.80 |
|     | 273                      |       |      | 6.25               | 0.60 |
|     | 365                      |       |      | 7.86               | 1.00 |
| MK1 | 0                        |       |      |                    |      |
|     | 56                       |       |      | 6.79               | 1.00 |
|     | 182                      |       |      | 12.84              | 1.50 |
|     | 273                      |       |      | 17.88              | 1.60 |
|     | 365                      |       |      | >20                | -    |

<sup>a</sup> Curing times (sealed) before exposure to CO<sub>2</sub>: S1b: 3 days, S3a: 2 days, FA2: 13 days, FA8: 13 days, MK1: 1 day

**Table S5.** Results of the natural carbonation testing – carbonation under natural conditions exposed to rainfall (‘exposed’): depths of carbonation in mm

|     | Carbonation duration (d) | Lab A       |           | Lab I       |           |
|-----|--------------------------|-------------|-----------|-------------|-----------|
|     |                          | <i>Mean</i> | <i>SD</i> | <i>Mean</i> | <i>SD</i> |
| FA2 | 0                        | 2.75        | 0.29      |             |           |
|     | 126                      |             |           |             |           |
|     | 140                      |             |           |             |           |
|     | 182                      | 6.55        | 0.72      |             |           |
|     | 365                      | 11.70       | 1.18      |             |           |
| FA8 | 0                        | 3.13        | 0.25      |             |           |
|     | 126                      |             |           |             |           |
|     | 140                      |             |           | 11          | -         |
|     | 182                      | 6.90        | 1.01      |             |           |
|     | 365                      | 12.95       | 0.85      |             |           |
| MK1 | 0                        |             |           |             |           |
|     | 126                      |             |           | 11          | -         |
|     | 140                      |             |           |             |           |
|     | 182                      |             |           |             |           |
|     | 365                      |             |           |             |           |

**Table S6.** Results of the chloride penetration testing – results reported by laboratories B, C, D

|  |     | Lab B             |                          | Lab C       |           | Lab D       |           |
|--|-----|-------------------|--------------------------|-------------|-----------|-------------|-----------|
|  |     | <i>Mean</i>       | <i>SD</i>                | <i>Mean</i> | <i>SD</i> | <i>Mean</i> | <i>SD</i> |
| NT BUILD 443<br>$D_e$ in $10^{-12}$ m <sup>2</sup> /s      | FA2 |                   |                          |             |           |             |           |
|  | FA8 | 39.0 <sup>b</sup> | +25.0/−14.0 <sup>b</sup> |             |           |             |           |
|  | S1b | 0.6 <sup>b</sup>  | +1.0/−0.4 <sup>b</sup>   |             |           |             |           |
|  | S3a | 1.0 <sup>b</sup>  | +1.5/−0.7 <sup>b</sup>   |             |           |             |           |
|  | MK1 | >95 <sup>b</sup>  | -                        |             |           |             |           |
| NT BUILD 492<br>$D_{nssm}$ in $10^{-12}$ m <sup>2</sup> /s | FA2 | 41.4              | 4.0                      | 34.3        | 4.0       |             |           |
|  | FA8 | 62.0              | 2.2                      | 33.2        | 0.5       |             |           |
|  | S1b | 0.1               | 0.0                      | 2.1         | 0.1       |             |           |
|  | S3a | 0.3               | 0.1                      | 2.6         | 0.1       |             |           |
|  | MK1 | 154.4             | 9.1                      |             |           |             |           |
| ASTM C 1202 – 28 d <sup>a</sup><br>$Q$ in C                | S1b |                   |                          |             |           | 1261        | 87        |
|  | S3a |                   |                          |             |           | 3956        | 478       |
| ASTM C 1202 – 56 d <sup>a</sup><br>$Q$ in C                | S1b |                   |                          |             |           |             |           |
|  | S3a |                   |                          |             |           |             |           |
| ASTM C 1202 – 91 d <sup>a</sup><br>$Q$ in C                | S1b |                   |                          |             |           | 1292        | 326       |
|  | S3a |                   |                          |             |           | 2607        | 600       |

<sup>a</sup> Curing time of specimens

<sup>b</sup> Profile grinding was not done; instead, chloride penetration depths were determined with the AgNO<sub>3</sub> spray method as in NT BUILD 492. For the computation of the chloride transport coefficient, the Cl<sup>−</sup> concentration at the colour change boundary was assumed to be 0.10 M, and the surface Cl<sup>−</sup> concentration was assumed to be 2.8233 M (equivalent to a NaCl concentration of 165 g/dm<sup>3</sup>). Instead of standard deviations, estimated errors derived from the standard deviations of the measured chloride penetration depths and a possible range of the Cl<sup>−</sup> concentration at the colour change boundary of 0.05–0.20 M are given.

**Table S7.** Results of the chloride penetration testing – results reported by laboratories E, F, G

|  |     | <b>Lab E</b> |           | <b>Lab F</b> |           | <b>Lab G</b> |           |
|--|-----|--------------|-----------|--------------|-----------|--------------|-----------|
|  |     | <i>Mean</i>  | <i>SD</i> | <i>Mean</i>  | <i>SD</i> | <i>Mean</i>  | <i>SD</i> |
| NT BUILD 443<br>$D_e$ in $10^{-12}$ m <sup>2</sup> /s      | FA2 | 54.5         | 17.7      |              |           | 42.5         | -         |
|  | FA8 | 99.0         | 0.0       |              |           | 94.4         | -         |
|  | S1b | 0.7          | 0.0       |              |           | 2.8          | -         |
|  | S3a | 1.2          | 0.0       |              |           | 3.4          | -         |
|  | MK1 |              |           |              |           |              |           |
| NT BUILD 492<br>$D_{nssm}$ in $10^{-12}$ m <sup>2</sup> /s | FA2 | 26.8         | 2.1       |              |           |              |           |
|  | FA8 | 79.5         | 8.4       |              |           |              |           |
|  | S1b | 3.2          | 0.1       | 3.8          | 2.7       |              |           |
|  | S3a | 2.7          | 0.1       | 3.5          | 0.5       |              |           |
|  | MK1 |              |           |              |           |              |           |
| ASTM C 1202 – 28 d <sup>a</sup><br>$Q$ in C                | S1b |              |           | 610          | 184       |              |           |
|  | S3a |              |           | 1013         | 132       |              |           |
| ASTM C 1202 – 56 d <sup>a</sup><br>$Q$ in C                | S1b |              |           | 601          | 65        |              |           |
|  | S3a |              |           | 884          | 67        |              |           |
| ASTM C 1202 – 91 d <sup>a</sup><br>$Q$ in C                | S1b |              |           |              |           |              |           |
|  | S3a |              |           |              |           |              |           |

<sup>a</sup> Curing time of specimens

**Table S8.** Results of the chloride penetration testing – results reported by laboratory H

|  |     | <b>Lab H</b> |           |
|--|-----|--------------|-----------|
|  |     | <i>Mean</i>  | <i>SD</i> |
| NT BUILD 443<br>$D_e$ in $10^{-12}$ m <sup>2</sup> /s      | FA2 |              |           |
|  | FA8 |              |           |
|  | S1b | 13.2         | -         |
|  | S3a |              |           |
|  | MK1 | 59.1         | -         |
| NT BUILD 492<br>$D_{nssm}$ in $10^{-12}$ m <sup>2</sup> /s | FA2 |              |           |
|  | FA8 |              |           |
|  | S1b | 0.6          | 0.2       |
|  | S3a |              |           |
|  | MK1 | 79.7         | 0.7       |
| ASTM C 1202 – 28 d <sup>a</sup><br>$Q$ in C                | S1b | 217          | 4         |
|  | S3a |              |           |
| ASTM C 1202 – 56 d <sup>a</sup><br>$Q$ in C                | S1b |              |           |
|  | S3a |              |           |
| ASTM C 1202 – 91 d <sup>a</sup><br>$Q$ in C                | S1b |              |           |
|  | S3a |              |           |

**Table S9.** Mean ( $X$ ; in mm), standard deviation ( $sd$ ; in mm), and coefficient of variation (COV), calculated from the mean results of the accelerated carbonation testing (EN 13295) of the participating laboratories after an exposure time of 56 days, for the fly ash-based concretes and the BFS-based concretes

|     | No. of labs | $X$   | $sd$ | COV    |
|-----|-------------|-------|------|--------|
| FA2 | 3           | 13.08 | 5.93 | 45.4 % |
| FA8 | 3           | 18.26 | 7.41 | 40.6 % |
| S1b | 4           | 15.39 | 2.18 | 14.2 % |
| S3a | 3           | 9.83  | 3.29 | 33.5 % |

**Table S10.** Mean ( $X$ ; in mm), standard deviation ( $sd$ ; in mm), and coefficient of variation (COV), calculated from the mean results of the carbonation testing under conditions approximating natural exposure ('inside') of the participating laboratories after an exposure time of 365 or 368 days, for the fly ash-based concretes and the BFS-based concretes

|     | No. of labs | $X$   | $sd$ | COV    |
|-----|-------------|-------|------|--------|
| FA2 | 4           | 14.54 | 4.47 | 30.8 % |
| FA8 | 4           | 19.66 | 5.29 | 26.9 % |
| S1b | 2           | 10.92 | 2.72 | 24.9 % |
| S3a | 2           | 7.59  | 2.05 | 27.1 % |

**Table S11.** Mean ( $X$ ; in  $10^{-12}$  m<sup>2</sup>/s), standard deviation ( $sd$ ; in  $10^{-12}$  m<sup>2</sup>/s), and coefficient of variation (COV), calculated from the mean results of the accelerated chloride penetration testing (NT BUILD 443) of the participating laboratories, for the fly ash-based concretes and the BFS-based concretes

|                  | No. of labs | $X$  | $sd$ | COV    |
|------------------|-------------|------|------|--------|
| FA2              | 2           | 48.5 | 8.5  | 17.5 % |
| FA8              | 3           | 77.5 | 33.4 | 43.1 % |
| S1b <sup>a</sup> | 3           | 1.4  | 1.2  | 89.9 % |
| S3a              | 3           | 1.9  | 1.4  | 73.6 % |

<sup>a</sup> The result of laboratory H for concrete S1b was identified as an outlier (according to the  $Q$  test, Dean RB, Dixon WJ (1951) Anal Chem 23:636–638; confidence > 90 %) and, thus, was ignored for the computation of  $X$ ,  $sd$  and the COV.

**Table S12.** Mean ( $X$ ; in  $10^{-12}$  m<sup>2</sup>/s), standard deviation ( $sd$ ; in  $10^{-12}$  m<sup>2</sup>/s), and coefficient of variation (COV), calculated from the mean results of the rapid chloride migration testing (NT BUILD 492) of the participating laboratories, for the fly ash-based concretes and the BFS-based concretes

|     | No. of labs | $X$  | $sd$ | COV    |
|-----|-------------|------|------|--------|
| FA2 | 3           | 34.2 | 7.3  | 21.3 % |
| FA8 | 3           | 58.3 | 23.4 | 40.2 % |
| S1b | 5           | 1.9  | 1.6  | 81.3 % |
| S3a | 4           | 2.3  | 1.4  | 60.2 % |

**Table S13.** Mean ( $X$ ; in C), standard deviation ( $sd$ ; in C), and coefficient of variation (COV), calculated from the mean results of the rapid chloride permeability testing (ASTM C1202) of the participating laboratories, for the BFS-based concretes, cured for 28 days

|     | No. of labs | $X$  | $sd$ | COV    |
|-----|-------------|------|------|--------|
| S1b | 3           | 696  | 528  | 75.8 % |
| S3a | 2           | 2484 | 2080 | 83.7 % |