

Table F.1 — Recommended limiting values for composition and properties of concrete

|  | Exposure classes               |                               |        |        |        |                            |        |        |                                    |        |        |  |                  |                  |                  |                                  |                                       |        |
|--|--------------------------------|-------------------------------|--------|--------|--------|----------------------------|--------|--------|------------------------------------|--------|--------|--|------------------|------------------|------------------|----------------------------------|---------------------------------------|--------|
|  | No risk of corrosion or attack | Carbonation-induced corrosion |        |        |        | Chloride-induced corrosion |        |        |                                    |        |        | Freeze/thaw attack   |                  |                  |                  | Aggressive chemical environments |                                       |        |
|  |                                |                               |        |        |        | Sea water                  |        |        | Chloride other than from sea water |        |        |  |                  |                  |                  |                                  |                                       |        |
| X0   | XC 1                           | XC 2                          | XC 3   | XC 4   | XS 1   | XS 2                       | XS 3   | XD 1   | XD 2                               | XD 3   | XF 1   | XF 2   | XF 3             | XF 4             | XA 1             | XA 2                             | XA 3                                  |        |
| Maximum $w/c^c$  | –                              | 0,65                          | 0,60   | 0,55   | 0,50   | 0,50                       | 0,45   | 0,45   | 0,55                               | 0,55   | 0,45   | 0,55   | 0,55             | 0,50             | 0,45             | 0,55                             | 0,50                                  | 0,45   |
| Minimum strength class                                   | C12/15                         | C20/25                        | C25/30 | C30/37 | C30/37 | C30/37                     | C35/45 | C35/45 | C30/37                             | C30/37 | C35/45 | C30/37   | C25/30           | C30/37           | C30/37           | C30/37                           | C30/37                                | C35/45 |
| Minimum cement content <sup>c</sup> (kg/m <sup>3</sup> ) | –                              | 260                           | 280    | 280    | 300    | 300                        | 320    | 340    | 300                                | 300    | 320    | 300  | 300              | 320              | 340              | 300                              | 320                                   | 360    |
| Minimum air content (%)                                  | –                              | –                             | –      | –      | –      | –                          | –      | –      | –                                  | –      | –      | –  | 4,0 <sup>a</sup> | 4,0 <sup>a</sup> | 4,0 <sup>a</sup> | –                                | –                                     | –      |
| Other requirements                                       | –                              | –                             | –      | –      | –      | –                          | –      | –      | –                                  | –      | –      | Aggregate in accordance with EN 12620 with sufficient freeze/thaw resistance |                  |                  |                  | –                                | Sulfate-resisting cement <sup>b</sup> |        |

<sup>a</sup> Where the concrete is not air entrained, the performance of concrete should be tested according to an appropriate test method in comparison with a concrete for which freeze/thaw resistance for the relevant exposure class is proven.

<sup>b</sup> Where sulfate in the environment leads to exposure classes XA2 and XA3, it is essential to use sulfate-resisting cement conforming to EN 197-1 or complementary national standards.

<sup>c</sup> Where the  $k$ -value concept is applied the maximum  $w/c$  ratio and the minimum cement content are modified in accordance with 5.2.5.2.