

**Shayan Marble Physical Characteristics**  
**EUROPEAN STANDARD: DIN EN 12371: 2010**

| Test items               | Test methods   | Test results                    |
|--------------------------|----------------|---------------------------------|
| Petrographic description | EN 12407: 2007 | Sedimentary (Marble) Fractured. |
| Apparent density         | EN 1936: 2006  | 2700 kg/m <sup>3</sup>          |
| Open porosity            | EN 1936: 2006  | 0.41 %                          |
| Water absorption         | EN 1925: 2008  | 0.15 %                          |

**Determination of Frost Resistance**  
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**Summary of test results**  
(Average value)

|   |                                  |           |       |
|---|----------------------------------|-----------|-------|
| Flexural strength in natural condition            | EN 12372: 2006                   | 7.67 MPa  |       |
| Flexural strength after 120 cycles freeze/thaw    | EN 12371: 2010<br>EN 12372: 2006 | 6.27 MPa  | 18.25 |
| Compressive strength in natural condition         | EN 1926: 2006                    | 63.92 MPa |       |
| Compressive strength after 120 cycles freeze/thaw | EN 12371: 2010<br>EN 1926: 2006  | 43.87 MPa | 31.37 |
| Static modulus before testing                     | EN 14146                         | 19.20 GPa |       |
| Static modulus after 120 cycles freeze/thaw       | EN 14146                         | 18 GPa    | 6.25  |
| Dynamic Modulus before testing                    | EN 14580                         | 45.44 GPa |       |
| Dynamic Modulus after 120 cycles freeze/thaw      | EN 14580                         | 41.87 GPa | 7.85  |

### Shayan Marble Chemical Characteristics

|                                |         |                 |         |
|--------------------------------|---------|-----------------|---------|
| SiO <sub>2</sub>               | 0.57 %  | LoI             | 43.46 % |
| Al <sub>2</sub> O <sub>3</sub> | 0.04 %  | SO <sub>3</sub> | 0.026 % |
| Fe <sub>2</sub> O <sub>3</sub> | 0.41 %  | Cl              | 67 ppm  |
| CaO                            | 54.49 % | Ba              | 173 ppm |
| Na <sub>2</sub> O              | 0.12 %  | Sr              | 221 ppm |
| K <sub>2</sub> O               | 0.11 %  | Cu              | 14 ppm  |
| MgO                            | 0.43 %  | Zn              | 15 ppm  |
| TiO <sub>2</sub>               | 0.006 % | Pb              | 40 ppm  |
| MnO                            | 0.001 % | Ni              | 28 ppm  |
| P <sub>2</sub> O <sub>5</sub>  | 0.085 % | Cr              | 2 ppm   |