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IMPERIAL VENICE 20mm




The international reference standards: ISO - EN

The values of the main technical characteristics measured on our products, compared with international standards, are clearly shown and reproduced on our contractual documents (catalogs, price lists, etc.).

The values given in this document are common to groups of articles or series of our tiles and therefore are to be used as a guide for a first orientation in choosing the product. If required, the specific values for a given product of a determined supply can be provided depending on its intended use, when formally brought to our attention by notice in writing.

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| Characteristics and Test methods   | Requirements EN 14411 ⁽¹⁾ – G / ISO 13006 ⁽²⁾ - G | Our general values |
|--|---|--|
| Determination of water absorption - (ISO 10545-3) | Average value $E_b \leq 0,5\%$ / Individual maximum $\leq 0,6\%$ | < 0,5% Average value and individual maximum |
| Classification | Definition § 3.2 and § 3.7 | BI_a – Porcelain tiles |
| 20 mm | | Physical properties |
| Modulus of rupture - (ISO 10545-4) | Average ≥ 35 N/mm ² | ≥ 35 N/mm ² |
| Breaking strength - (ISO 10545-4) | Average ≥ 1300 N for thickness $\geq 7,5$ mm Average ≥ 700 N for thickness < 7,5 mm | Complies |
| Flexion resistance and breaking load - (EN 1339-F) | Classes according to EN 1339 - § 5 | \geq U11 (3) (for square slabs) |
| Compressive strength (cubic sample 2 cm side) | NA | ≥ 200 MPa (2.000 kg/cm ² / 29.000 psi) |
| Mohs hardness scale (ex EN 101 / BS 6431-13) | NA | ≥ 8 |
| Resistance to surface abrasion - (ISO 10545-7) | Abrasion class and cycles passed | Class 0 – 5 |
| Resistance to deep abrasion - (ISO 10545 - 6) | Max volume abraded < 175 / mm ³ | < 130 / mm³ |
| Raccomanded use | Novabell criterion | Class 5 (see Annex N - ISO 13006 / EN 14411) |
| Color resistance to UV light (DIN 51094) | --- | Resistant |
| Coefficient of linear thermal expansion (ISO 10545-8) | Declared value ⁽¹⁾ / Test method available ⁽²⁾ | < $7,1 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$ |
| Thermal shock resistance (ISO 10545-9) | Pass according to EN ISO 10545-1 ⁽¹⁾ / Test method available ⁽²⁾ | Complies |
| Crazing resistance (ISO 10545-11) | Pass according to EN ISO 10545-1 ⁽¹⁾ / Required ⁽²⁾ | Complies |
| Frost resistance (ISO 10545-12) | Pass according to EN ISO 10545-1 ⁽¹⁾ / Required ⁽²⁾ | Complies |
| Moisture expansion (ISO 10545-10) | Declared value ⁽¹⁾ / Test method available ⁽²⁾ | $\leq 0,1$ mm/m |
| Small colour differences (ISO 10545-16) | $\Delta E_{cmc} da < 0,75$ a < 1,0 (1) | If agreed |
| Impact resistance - (ISO 10545-5) | Declared value ⁽¹⁾ / Test method available ⁽²⁾ | COR > 0,75 |
| Reaction to fire | Class A1 or A1 _{FL} ⁽¹⁾ | A1 _{FL} Classified Without Testing (CWT) – 96/603 EC |
| 20 mm | | Chemical properties |
| Chemical resistance (ISO 10545-13) | | |
| Resistance to low and high concentrations of acids and alkalis | Declared value ⁽¹⁾ / Manufacturer is to state classification ⁽²⁾ | Resistant (see "Maintenance and care" section) |
| Resistance to household chemicals and swimming pool salts | Minimum class B | A |
| Resistance to staining (ISO 10545-14) | Minimum class 3 | 5 (see "Maintenance and care" section) |
| Release of dangerous substances (ISO 10545-15) | Declared value ⁽¹⁾ / Test method available ⁽²⁾ | Pb < 0,1 / Cd < 0,01 mg/dm ² |
| 20 mm | | Dimensions and surface quality |
| Dimensions - (ISO 10545-2) | See ANNEX G | Complies |
| Surface quality - (ISO 10545-2 § 7) | A minimum of 95% of the tiles shall be free from visible defects that would impair the appearance of a major area of tiles | Complies |

(1) Requirements according to EN 14411 (2) Requirements according to ISO 13006 (3) This classification is not an indication of the intended use of NF 187 for concrete slabs

| Test methods | Requirements and references | Our general values |
|---|----------------------------------|------------------------------------|
| Determination of anti-slip properties – Workrooms and fields of activities with raised slip danger, walking method- Ramp test (DIN 51130) – Germany | BGR / ASR From R9 to R13 | R 11 |
| Determination of anti – slip properties. Wet-loaded barefoot areas – Walking method – Ramp test (DIN 51097) - Germany | GUV-I 8527 A – B – C | A + B + C |
| Dynamic Coefficient Friction wet and dry condition (BCR – ex BCRA) Italy | DM n. 236 / 1989 $\mu > 0,40$ | $\mu > 0,40$ |
| DCOF Resistance (ANSI A 137.1 Section 9.6) | $\geq 0,42$ ⁽¹⁾ | DCOF $\geq 0,42$ |
| | | - |



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IMPERIAL VENICE
20mm



PRODUCT INFORMATION - IMPORTANT NOTES FOR THE CONSUMER - CLEANING AND CARE

Our porcelain stoneware tiles are made from raw materials of great technical potential. This potential is enhanced by means of an integrated production process between mass and surface in which form and aesthetics are rendered permanent by firing at temperatures which may exceed 1200°C. This ensures that the surface and body of the tile become one, adding style and beauty to its intrinsic strength. Consequently, tiles' natural surfaces are stable against and unaffected by the chemicals and staining substances specified by the toughest international standards (ISO, EN, ASTM/ANSI), as documented by our product technical data sheets, including the statements of applicability which precede them. Maintenance performed at frequencies and by methods which effectively remove dirt will not only ensure hygiene but also conserve the material's beauty and, above all, its functional and safety characteristics: remember that the antislip properties declared refer to clean, new surfaces, as required by the standards. Inadequately removed dirt can, in itself, cause slipping unrelated to the properties of our coverings. Similarly, failure to remove or prevent abrasive dirt (e.g. by means of devices for cleaning the soles of shoes before coming indoors) may modify the structure of surfaces, reducing antislip properties below the values originally declared. Reference should be made to the ISO 13006/EN 14411 Annex N and ANSI A 137.1 § 6.2.2.1 standards.

Annex N (technical information)

Classification of glazed ceramic floor tiles according to their surface abrasion resistance

When necessary, the following guideline classification can be used for glazed ceramic tiles intended for use on floors with regard to their surface abrasion resistance.

This classification does not provide precise product specifications for specific requirements; it is intended as guidance only (see EN ISO 10545-7).

Class 5 Floor tiles for areas subject to intense pedestrian traffic for lengthy periods of time with scratching dirt, such that the conditions are the most severe for which glazed floor tiles may be suitable (for example, public premises such as shopping centres, airport terminals, hotel lobbies, public pedestrian walkways and industrial applications).

This classification is valid for the applications referred to in normal conditions. Consideration should be given to the type of footwear and traffic and the planned cleaning methods, and **floors should be suitably protected against scratching dirt at the entrances to buildings, with the installation of footwear cleaning devices**. In extreme cases of very heavy pedestrian traffic and a large amount of scratching dirt, Group I unglazed ceramic tiles can be considered.

2 CM Installation system information

DRY INSTALLATION on GRASS-GRAVEL-SAND (NOT SUITABLE FOR DRIVEWAYS)

The tile is not rigidly bonded to the substrate and is load-bearing. Depending on the type of substrate, its preparation and the layers present, some mechanical stresses may be transmitted to the substrate, but as a precautionary measure it is best to consider the tile as bearing the entire load. Information concerning

compressive strength:

- For 2 CM porcelain stoneware this is around 200 N/mm² (2,039 Kg/cm² – 29,008 lbf/in²)

bending strength:

- For 2CM porcelain stoneware this is around 50 N/mm² (509 Kg/cm² – 7,252 lbf/in²).

The products traditionally used for outdoor pavings without glue or fasteners are in natural stone of various types, in concrete conglomerates or in wood, with technical performances inferior to those of 2 CM.

INSTALLATION WITH ADHESIVE (SUITABLE FOR DRIVEWAYS)

The tile is rigidly bonded to the substrate.

The substrate is the load-bearing layer and all mechanical stresses are transmitted to it.

The substrate must be designed to withstand the static and/or dynamic loads.

It has been proven that the bending and/or compressive strength of a porcelain stoneware tile is always much greater than that of any substrate.

Remember that with regard to **compressive strength**:

- * The best concrete is around 45 N/mm² (458 Kg/cm² – 6,527 lbf/in²) *
- 2 CM porcelain stoneware is around 200 N/mm² (2,039 Kg/cm² – 29,008 lbf/in²)

In addition, for **bending strength**:

- * The best concrete is around 6 N/mm² (61 Kg/cm²) – 870 lbf/in²) **
- For 2 CM porcelain stoneware this is around 50 N/mm² (509 Kg/cm² – 7,252 lbf/in²).

To prevent breakages due to abnormal bending (e.g. local subsidence of the substrate, voids due to incorrect installation, etc.), square tiles are recommended.

The reference standards for porcelain stoneware installations installed in this way are:

EN 14411/ISO 13006 and ANSI A 137.1

Tiles must be installed and glued in accordance with good practice, depending on the local standards.

INSTALLATION AS AN OUTDOOR RAISED PAVING (NOT SUITABLE FOR DRIVEWAYS)

The entire system, consisting of the supporting structures and the tile, must be designed by a qualified engineer in accordance with the local regulations in force in the place of installation.

*<https://theconstructor.org/concrete/compressive-strength-concrete-cube-test/1561/>



<http://ongreening.com/en/Manufacturers/Details/9483>

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PORCELAIN
TILE



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IMPERIAL VENICE RT Naturale



The international reference standards: ISO - EN

The values of the main technical characteristics measured on our products, compared with international standards, are clearly shown and reproduced on our contractual documents (catalogs, price lists, etc.).
The values given in this document are common to groups of articles or series of our tiles and therefore are to be used as a guide for a first orientation in choosing the product. If required, the specific values for a given product of a determined supply can be provided depending on its intended use, when formally brought to our attention by notice in writing.

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| Characteristics and Test methods | Requirements EN 14411 ⁽¹⁾ – G / ISO 13006 ⁽²⁾ - G | Our general values |
|--|---|--|
| Determination of water absorption - (ISO 10545-3) | Average value $E_b \leq 0,5\%$ / Individual maximum 0,6% | Average value and individual maximum < 0,5% |
| Classification | Definition § 3.2 and § 3.7 | BI_a – Porcelain tiles |
| | | Physical properties |
| Modulus of rupture - (ISO 10545-4) | Average ≥ 35 N/mm ² | ≥ 35 N/mm ² |
| Breaking strength - (ISO 10545-4) | Average ≥ 1300 N for thickness $\geq 7,5$ mm Average ≥ 700 N for thickness < 7,5 mm | Complies |
| Abrasion resistance - (ISO 10545-7) | Abrasion class and cycles passed | Class 0 - 5 |
| NovaBell classification of abrasion resistance | Annex N | Class 4 |
| Coefficient of linear thermal expansion (ISO 10545-8) | Declared value ⁽¹⁾ / Test method available ⁽²⁾ | $< 7,1 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$ |
| Thermal shock resistance (ISO 10545-9) | Pass according to EN ISO 10545-1 ⁽¹⁾ / Test method available ⁽²⁾ | Complies |
| Crazing resistance (ISO 10545-11) | Pass according to EN ISO 10545-1 ⁽¹⁾ / Required ⁽²⁾ | Complies |
| Frost resistance (ISO 10545-12) | Pass according to EN ISO 10545-1 ⁽¹⁾ / Required ⁽²⁾ | Complies |
| Moisture expansion (ISO 10545-10) | Declared value ⁽¹⁾ / Test method available ⁽²⁾ | $\leq 0,2$ mm/m |
| Small colour differences (ISO 10545-16) | $\Delta E_{cmc} < 0,75^{(1)}$ | If agreed |
| Impact resistance - (ISO 10545-5) | Declared value ⁽¹⁾ / Test method available ⁽²⁾ | COR > 0,75 |
| Reaction to fire | Class A1 or A1 _{FL} ⁽¹⁾ | A1_{FL} Classified Without Testing (CWT) – 96/603 |
| | | Chemical properties |
| Chemical resistance -(GL) (ISO 10545-13) | | |
| Resistance to low and high concentrations of acids and alkalis | Declared value ⁽¹⁾ / Manufacturer is to state classification ⁽²⁾ | Resistant (see "Maintenance and care" section) |
| Resistance to household chemicals and swimming pool salts | Minimum class B | G A |
| Resistance to staining (ISO 10545-14) | Minimum class 3 | ≥ 4 |
| Release of dangerous substances (ISO 10545-15) | Declared value ⁽¹⁾ / Test method available ⁽²⁾ | Pb < 0,1 / Cd < 0,01 mg/dm ² |
| | | Dimensions and surface quality |
| Dimensions - (ISO 10545-2) | See ANNEX G | Complies |
| Surface quality - (ISO 10545-2 § 7) | A minimum of 95% of the tiles shall be free from visible defects that would impair the appearance of a major area of tiles | Complies |

(1) Requirements according to EN 14411

(2) Requirements according to ISO 13006

| Test methods | Requirements and references | Our general values |
|---|-------------------------------|--------------------|
| Determination of anti-slip properties – Workrooms and fields of activities with raised slip danger, walking method- Ramp test (DIN 51130) – Germany | BGR / ASR From R9 to R13 | R 9 |
| Determination of anti – slip properties. Wet-loaded barefoot areas – Walking method – Ramp test (DIN 51097) - Germany | GUV-I 8527 A – B – C | - |
| Dynamic Coefficient Friction wet and dry condition (BCR – ex BCRA) Italy | DM n. 236 / 1989 $\mu > 0,40$ | $\mu > 0,40$ |
| Scratch hardens of surface according to Mohs' | ex BS 6431-13 / ex EN 101 | ≥ 5 |

PRODUCT INFORMATION - IMPORTANT NOTES FOR THE CONSUMER - CLEANING AND CARE - PROPERTY RIGHTS :

www.novabell.com



Our porcelain stoneware tiles are made from raw materials of great technical potential. This potential is enhanced by means of a production process where the body and surface of the material are treated in exactly the same way, where the tile's shape and appearance are rendered permanent by firing at temperatures which may even exceed 1200°C. This ensures that the surface and body of the tile become one, adding style and beauty to its intrinsic strength. Consequently, tiles' natural surfaces are stable against and unaffected by the chemicals and staining substances specified by the toughest international standards (ISO, EN, ASTM/ANSI), as documented by our product technical data sheets, including the statements of applicability which precede them. Maintenance performed at frequencies and by methods which effectively remove dirt will not only ensure hygiene but also conserve the material's beauty and, above all, its functional and safety characteristics: remember that the antislip properties declared refer to clean, new surfaces, as required by the standards. Inadequately removed dirt can, in itself, cause slipping unrelated to the properties of our coverings. Similarly, failure to remove or prevent abrasive dirt (e.g. by means of devices for cleaning the soles of shoes before coming indoors) may modify the structure of surfaces, reducing antislip properties below the values originally declared. Reference should be made to the ISO 13006/EN 14411 Annex N and ANSI A 137.1 § 6.2.2.1 standards.



<http://ongreening.com/en/Manufacturers/Details/9483>

**IMPERIAL VENICE RT
Naturale**


NovaBell[®]
Ceramiche Gruppo Bellei

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Annex N (informative)

Classification of glazed ceramic tiles for floorings according to their resistance to surface abrasion

Where required, the following approximate classification may be used for glazed ceramic tiles intended for floorings with regard to their resistance to surface abrasion.

This classification should not be taken as providing accurate product specifications for specific requirements but rather used as guidance only (see EN ISO 10545-7).

- Class 0 Glazed tiles in this class are not recommended for use on floors.
- Class 1 Floor coverings in areas that are walked on essentially with soft soled footwear or bare feet without scratching dirt (e.g. residential bathrooms and bedrooms without direct access from the outside).
- Class 2 Floor coverings in areas that are walked on by soft soled or normal footwear with, at the most, occasional small amounts of scratching dirt (e.g. rooms in the living areas of homes but with the exception of kitchens, entrances, and other rooms which may have a lot of traffic). This does not apply to abnormal footwear (i.e. hobnailed boots).
- Class 3 Floor coverings in areas that, with normal footwear, are walked on more often with small amounts of scratching dirt (e.g. residential kitchens, halls, corridors, balconies, loggias and terraces). This does not apply to abnormal footwear (i.e. hobnailed boots).
- Class 4 Floor coverings that are walked on by regular traffic with some scratching dirt so that the conditions are more severe than Class 3 (e.g. entrances, commercial kitchens, hotel, exhibition and sale rooms).
- Class 5 Floor coverings that are subject to severe pedestrian traffic over sustained periods with some scratching dirt, so that the conditions are the most severe for which glazed floor tiles may be suitable (e.g. public areas such as shopping centres, airport concourses, hotel foyers, public walkways and industrial applications).

This classification is valid for the given applications under normal conditions. Consideration should be given to the footwear, type of traffic and cleaning methods expected, and the floors should be adequately protected against scratching dirt at the entrances to buildings by interposing footwear cleaning devices. In extreme cases of very heavy pedestrian traffic and quantities of scratching dirt, unglazed floor tiles from Group I can be considered.





<http://ongreening.com/en/Manufacturers/Details/9483>



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North America reference standards : ANSI – ASTM

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| Characteristics and Test methods | Requirements ANSI A 137.1 | Our general values |
|---|---|--------------------------------------|
| Determination of water absorption - (ASTM C 373) | Average value $E_b \leq 0,5 \%$ | Average value $\leq 0,5\%$ |
| Classification | Definition § 3.0 | Porcelain tiles |
| | | Physical properties |
| Breaking strength - (ASTM C 648) | Average ≥ 250 lbf (1.11 kN) Individual ≥ 225 lbf (1.00 kN) | Complies |
| Visible abrasion - (ASTM C 1027) | As reported | Class 0 - 5 |
| NovaBell classification of abrasion resistance | (see Annex N) | Class 4 |
| Thermal shock resistance (ASTM C 428) | Pass | Complies |
| Crazing resistance (ASTM C 424) | Pass | Complies |
| Resistance to freeze/thaw cycling (ASTM C 1026) | As reported | Resistant |
| DCOF Resistance (ANSI A 137.1 Section 9.6) | ≥ 0.42 ⁽¹⁾ | DCOF ≥ 0.42 |
| Bond strength (ASTM C 482) | ≥ 50 psi (0.34 MPa) | > 1 MPa |
| Color Uniformity (ASTM C 609 and ANSI A 137.1 Section 9.3) ⁽²⁾ | V0 – 3 Judds | See the specific section |
| | | Chemical properties |
| Chemical resistance (ASTM C 650) | As reported | Resistant |
| Stain resistance (ASTM C 1378) | As reported | Resistant |
| | | Dimensions - Calibrated tiles |
| Dimensions - (ASTM C 499) - (ASTM C 485) - (ASTM C 502) | See ANSI A 137.1 - Tab.10 | Complies |
| | | Dimensions - Rectified tiles |
| Dimensions - (ASTM C 499) - (ASTM C 485) - (ASTM C 502) | See ANSI A 137.1 - Tab.10 | Complies |

(1) For level interior spaces expected to be walked upon when wet - (2) For V0 tiles only

PRODUCT INFORMATION - IMPORTANT NOTES FOR THE CONSUMER - CLEANING AND CARE - PROPERTY RIGHTS :

www.novabell.com

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TILE

NovaBell®
Ceramiche Gruppo Bellei

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Annex N (informative)

Classification of glazed ceramic tiles for floorings according to their resistance to surface abrasion

Where required, the following approximate classification may be used for glazed ceramic tiles intended for floorings with regard to their resistance to surface abrasion.

This classification should not be taken as providing accurate product specifications for specific requirements but rather used as guidance only (see EN ISO 10545-7).

- Class 0 Glazed tiles in this class are not recommended for use on floors.
- Class 1 Floor coverings in areas that are walked on essentially with soft soled footwear or bare feet without scratching dirt (e.g. residential bathrooms and bedrooms without direct access from the outside).
- Class 2 Floor coverings in areas that are walked on by soft soled or normal footwear with, at the most, occasional small amounts of scratching dirt (e.g. rooms in the living areas of homes but with the exception of kitchens, entrances, and other rooms which may have a lot of traffic). This does not apply to abnormal footwear (i.e. hobnailed boots).
- Class 3 Floor coverings in areas that, with normal footwear, are walked on more often with small amounts of scratching dirt (e.g. residential kitchens, halls, corridors, balconies, loggias and terraces). This does not apply to abnormal footwear (i.e. hobnailed boots).
- Class 4 Floor coverings that are walked on by regular traffic with some scratching dirt so that the conditions are more severe than Class 3 (e.g. entrances, commercial kitchens, hotel, exhibition and sale rooms).
- Class 5 Floor coverings that are subject to severe pedestrian traffic over sustained periods with some scratching dirt, so that the conditions are the most severe for which glazed floor tiles may be suitable (e.g. public areas such as shopping centres, airport concourses, hotel foyers, public walkways and industrial applications).

This classification is valid for the given applications under normal conditions. Consideration should be given to the footwear, type of traffic and cleaning methods expected, and the floors should be adequately protected against scratching dirt at the entrances to buildings by interposing footwear cleaning devices. In extreme cases of very heavy pedestrian traffic and quantities of scratching dirt, unglazed floor tiles from Group I can be considered.

