EUROLITHOS European Ornamental Stone Resources

European Ornamental Stone Resources

Deliverable D3.2

Country-level and European-level Atlas templates for input of harmonized data

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1 INTRODUCTION

The Work package 3 of the EUROLITHOS project aims to establish the framework and develop a first edition of an Atlas of European Ornamental Stones, integrating it in the GeoEra Information Platform, which will act as an extension to the European Geological Data Infrastructure (EGDI).

The Atlas of European Ornamental Stones is intended to be a science-based information system which will identify, collect and harmonize existing available data on the provenance of European Ornamental Stones, particularly on what respects the geology, resources, quarrying sites, and competing land uses with emphasis on those that may threaten or sterilize the resource.

1.1 Scope and purpose

This document is the deliverable D3.2 - “Country-level and European-level Atlas templates for input of harmonized data”. Its content is based on a close collaboration with the WP6 team.

Besides presenting preliminary design options on how to make data available to end users, the main objective of this report is to provide recommendations for delivering spatial data needed to make the Atlas. These recommendations aim to ensure the harmonization of data to be provided by the project partners, and that they follow the interoperability rules established for the GeoEra Information Platform.

It also presents a proposal for changes to be made to the definitions, code lists and ornamental stone vocabularies currently in use by the GeoSciML and EarthResourceML data transfer standards, and consequently by Minerals4EU and INSPIRE.

Lastly, draft templates for outputting printable factsheets and a Eurolithos’ flagship printable atlas are presented.

2 EUROLITHOS SPATIAL DATA – AN OVERVIEW

Previous work developed at WP3 highlights that ornamental stones are mineral resources that deserve a different approach when comparing with other mineral commodities, due to the way they are used as a final product (without changes in their internal structure) and their commercial transaction practices. These differences are reflected in how should be the ornamental stones databases organized, especially in the importance given to trading name and colour.

The trade names of ornamental stones are like quality seals used by prescribers (usually architects) and final consumers, for whom they are considered more reliable than the geological classification, while being linked to a geographical origin.

In ornamental stones marketing, colour plays a crucial role, which is why many of the trading name of stones is a composite name where the colour is usually mentioned. For this reason, it should also be considered in databases through a direct relationship with the unique name of each stone, so that users may build queries about the colour of the stones.

Taking into account the importance of the commercial names and colour of the stones, it was achieved that the database supporting the Atlas of European Ornamental Stones, as well as other databases, should pay attention to two major requirements and guidelines:

- **Requirement 1**- Use the trading name of each ornamental stone as *unique object identifier*.
  - **Guideline 1**- Alternative trading names for the ornamental stones should be included.
  - **Guideline 2**- Priority should be given to ornamental stone names included in EN-12440.
- **Requirement 2**- The colour of each stone is a main attributes to be considered.
  - **Guideline 3**- Simple colour names should be used instead of the fancy names that sometimes are used for the compound name of the stones.

Since these requirements are fundamental inputs to a database of ornamental stones, they must be matched with the spatial data common to an atlas. The Atlas of European Ornamental Stones respects to the place or places of origin of each stone, and respective description with regard to the extraction place and geology. For this purpose, the provenance of each stone should be addressed in terms of the type of place of origin, the type of spatial data that represents it and the geological unit (Figure 1).

In addition, the Atlas is intended to provide information about the location of remarkable uses of each stone, even if it does not correspond to spatial information directly available from the partners, and information regarding the availability of resources and land use constraints that are or may threaten that availability.

Regarding the type of place of origin, data depends on the available information in each country. It may correspond to an extraction site (a quarry or a cluster of quarries), or to places where the stone is known to exist (known deposits, prospects).

In what respects the type of spatial data, it may correspond to points (quarries or centroids representing quarrying areas, quarry provinces, known deposits and prospects) or to polygons (quarrying areas, quarry provinces, known deposits and prospects).

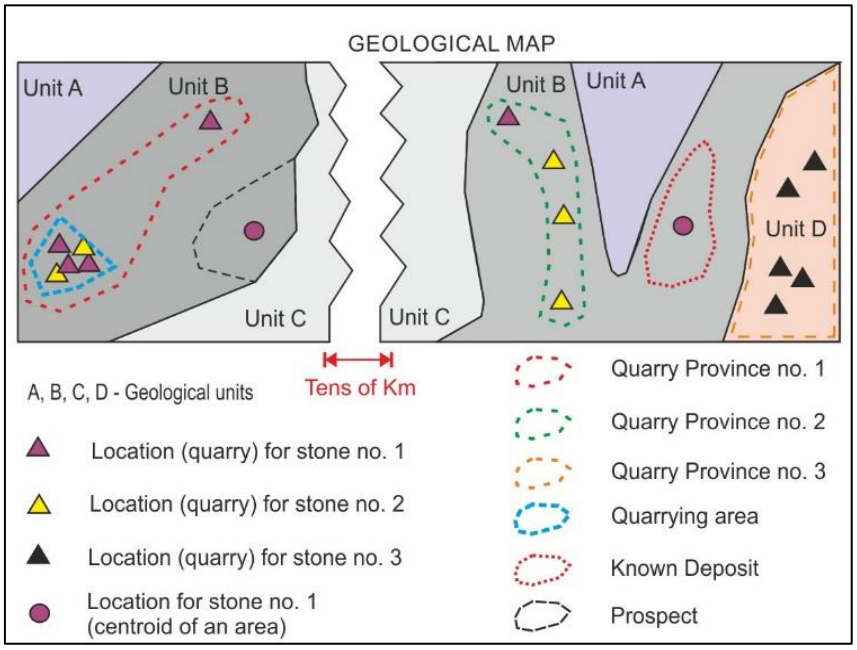


Figure 1- Possibilities for the geographical representation of provenance of ornamental stones, with combination of point and polygon registration.

The Atlas should relate the geographical place of origin of each stone (i.e. a point if it corresponds to a quarry or a polygon if it corresponds to a quarrying area) with the geology. For this purpose the place of origin of each stone should be displayed over a geological base map (*cf*. Figure 1), where geological units correspond to polygons with appropriate database attributes.

3 BASIC RECOMMENDATIONS FOR DELIVERING SPATIAL DATA

The purpose of the Atlas is to display the provenance of each stone as regards to its extraction site and respective geology. In addition, it may display the origin of stones even if it does not correspond to an extraction site, but to an occurrence in a known deposit or prospect. Preferentially, depending on available geological map scales in each country, the Atlas will allow to represent the productive geological unit.

A survey has shown that there is a large discrepancy among the country partners in what regards the geologic mapping coverage of the extraction sites at scales bigger than 1:1000.000 (*cf*. Deliverable 3.1). Therefore, even if the geological detail to be provided by the Atlas will vary from country to country, it was found that the Atlas must at least display the quarrying province and provide the respective geological information. As a matter of fact, the quarrying province has a two-fold meaning: it respects to areas where extraction was or is taking place, but also may relate directly to the geological unit from where the stones come.

Thus, given these constraints, the spatial data to be provided for the atlas must at least correspond to the types presented in Table 1.

Table 1- Basic spatial data to be delivered for the Atlas.

Points	Polygons	
• Operating or historical/closed **quarries**, or **occurrences**, of one or several unique stone types. • Centroids of polygons	• **Quarry Cluster**: area encompassing a group of quarries close to each other. • **Mineral Deposit**: A mass of naturally occurring mineral material, usually of economic value. • **Prospect**: An area that is a potential site of mineral deposits	• The mineral occurrence type "**Province**": a geological unit containing stone resources and one or several quarries.

In addition to the nomenclature directly associated with these spatial data, such as the name of each stone, the name of the extraction site or the name of the geological unit, it is important to provide more comprehensive information to end users. For that purpose, the existing Minerals4EU infrastructure and vocabularies for mineral resources may be used to a large extent, namely for describing the ornamental stone resources. This is INSPIRE compliant, which, in turn, takes its terminology mostly from EarthResourceML vocabularies which are under the control of CGI, Geoscience Terminology Working Group from IUGS[1].

[1] http://resource.geosciml.org/def/voc/

As recommended in D3.2.2[2] from GIP-P, for describing geology (geological units, lithology, etc.), the GeoSciML terminology must be used, which is also under the control of CGI, Geoscience Terminology Working Group from IUGS.

3.1 Registration of spatial data

For the registration of spatial data there is a need to consider two possible sets of data: points and polygons.

As shown in Table 1, **point data** respect to quarries or ornamental stone occurrences or to centroids of polygons that correspond to quarry clusters, deposits or prospects. It is expected that most of data will correspond to quarries or to centroids of quarry clusters. Therefore, acknowledging the EUROLITHOS submitted application, the atlas should also provide information about the properties of the mining activity, existing ornamental stone resources and the sterilization risk due to land use planning issues. For this purpose, Table 2 depicts the type of information that should be provided to characterize each of them. It corresponds to a selection of the properties considered in the Minerals4EU/INSPIRE structure, but includes two new ones: the unique stone name (as well as alternative names) and colour. Each stone should have its own ID.

Table 2- Properties for the registration of the geographical place of origin of ornamental stones (Green colour minimum requirement, white optional.)

Name of place	Quarry name or other geographic
Mining activity type	INSPIRE
Mine status	INSPIRE
Enduse potential value	Building and dimension stone
Stone name	ID - Unique traditional names (EN12440)
Alternative stone names	Other commercial or trade names (EN12440)
Commodity code value	INSPIRE
Colour	New code list – colour of the stone
Lithology value	INSPIRE
Deposit Group value	Bulk rock material
Deposit type value	Dimension stone
Mineral Occurrence type	INSPIRE
UNFC Value	CGI UNFC Value code list
Resource Category	INSPIRE
Reserve Category	INSPIRE
Endowment	INSPIRE
Sterilization risk	Free text
Historical status	Free text (historic stone vs currently produced)
Notable uses	Free text/links
Documents	INSPIRE
Remarks	INSPIRE

[2] https://geoera.eu/wp-content/uploads/2020/01/D3.2.2-Technical-requirements-and-guidance-to-expose-the-data.pdf.

On the other hand, for **polygons**, it is necessary to consider two possible sets of data: those that respect the polygons delimiting quarry clusters, mineral deposits or prospects, and those corresponding to geological units.

A quarry cluster is a quarrying area where several quarries close to each other operate or have operated. These clusters are usual in some countries (e.g. Portugal) and are characterized by the fact that, within them, the physical limits between different quarries are hardly distinguishable. Figure 2 depicts a paradigmatic example where each red polygon corresponds to a licensed area for quarrying.

In these clusters, one or more types of stones are extracted. The properties of each type are independent of the quarry from which they come. Sometimes, the standard characteristics of a unique stone type correspond to the mean of values obtained from several samples taken in different quarries. **Delimiting a cluster of quarries from which one or more stones come is a good alternative to recording all quarry points**.

Figure 2- A quarrying area for ornamental limestones in central Portugal. Each red polygon corresponds to an area legally granted for extraction (i.e. a quarry).

Thus, taking these consideration into account, the properties to be registered for these quarry clusters should be similar to the registry of single quarries, with the exception that the name of place will not correspond to the name of a quarry, but to the name of the cluster. For polygons matching the limits of ornamental stone deposits or prospects, the properties of Table 2 also apply, as well as if they are registered by the respective centroid-point.

As for the registration of the geological units of provenance of each stone, the spatial data properties to be recorded should allow their characterization without the need to provide mining activity-related information (Table 3).

Table 3- Properties for the registration of polygons respecting geological units (Green colour minimum requirement, white optional).

Geological unit	Name of geological unit
Geological unit type value	INSPIRE (e.g. lithostratigraphic, lithologic)
Stone name	Unique traditional name (EN12440)
Alternative stone names	Other commercial or trade names (EN12440)
Colour	New code list – colour of the stone
Geochronological era value	INSPIRE (CGI geological time vocabulary[3])
Description of unit	Free text
Enduse potential value	Bulilding and dimension stone
Commodity code value	INSPIRE
Lithology value	INSPIRE
Mineral occurrence type value	INSPIRE (e.g. province)
Documents	INSPIRE

[3] http://resource.geosciml.org/

4 THE USE OF INSPIRE CODELISTS

A main challenge for the Atlas of European Ornamental Stones is the harmonization of data from different countries in order it becomes INSPIRE compliant. For that purpose, the existing Minerals4EU infrastructure and vocabularies may be used to a large extent.

For the registry of the geographical place of origin of each stone, be it a quarry (a point), or a quarrying area (a polygon), Table 2 presents the type of data to be considered for their characterization, while Table 3 respects the characterization of the geological unit.

The existing, definitions and vocabularies for ornamental stones in Minerals4Eu and INSPIRE mostly follow those registered by the IUGS/CGI Geoscience Terminology Working Group[4], specifically the Earth Resource information model (EarthResourceML), which, in turn, are rooted in the old American concepts (Barton, 1968; Bowles and Coons, 1933; Currier, 1960) that led to the ASTM C119 Standard.

The Eurolithos team has come to the conclusion that some of these concepts and terminologies are out of date and that there is a need to make changes. In addition, there is a need to include new vocabularies that are specific to ornamental stones.

The following chapter is a proposal for changes in vocabularies and code lists of Minerals4EU / INSPIRE. Yet, the Eurolithos guide for recording spatial data presented in the final chapter adopts the current terminology, as this proposal still needs to be implemented.

4.1 New Vocabularies

4.1.1 Stone Name

It was mentioned before that a major requirement for the database supporting the Atlas of European Ornamental Stones will be the use of the unique traditional names of the stones. This implies that a new code list must be implemented, which will follow the names already included in the European Standard EN12440.

For this, all partners were asked to provide a list of the unique stone names that they consider relevant to be part of this new code list – the Eurolithos Code List of Unique Stone Names. Thus, the basis of Eurolithos Code List of names is the EN12440 standard, but partners were also asked to update or modify it according to their best understanding.

A list of 917 unique traditional names is presented in Annex 1. It is not yet completed.

Bearing in mind that the stones to be included in the Atlas and the Directory will have to be the same and that the process of compiling and harmonizing all the data can be quite time-consuming, particularly with regard to the data for the Directory, it was also asked whether the partners intend to include in the Atlas all the stones of their country or just a

[4] http://www.cgi-iugs.org/tech_collaboration/geoscience_terminology_working_group.html

selection during the duration of the project. According to the answers already presented in Delivery D3.1, most partners have chosen to inform that they will start by providing data for a selection of the most important stone types in their respective countries. They also pointed out that the inclusion of the remaining stones is a matter of gathering and organizing all stone data and inserting them later. Only Greece has shown interest in providing data for all Greek stones during the project time frame.

Thus, the next step is the choice of stones that each partner considers most relevant to go into the Atlas during Eurolithos time frame. This choice will be simultaneous with the country-Atlas making process by each partner.

4.1.2 Colour

Also mentioned before, the main colour of the stones is an important distinctive feature to be considered. Therefore, there is the need for a specific code list where the most common colours are included. For this, all the partners were also asked to provide a list of stone colours that they consider relevant to be part of this new code list – the Eurolithos Code List of Stone Colours.

The following (Table 4) are the currently suggested values to integrate such list. It may be subject to minor changes during the development of the project.

Table 4- Code list to be used for describing the colour of ornamental stones.

Ornamental Stone colour values
BEIGE
BLACK
BLACK-GREEN
BLUE
BLUE-GREY
BROWN
DARK GREY
GREEN
GREY
GREY-BROWN
GREY-GREEN
LIGHT-GREY
LIGHT-PINK
MULTICOLOURED
PINK
RED
REDISH BROWN
WHITE
WHITE-BLACK
YELLOW

4.2 Changes to existing vocabularies and code lists

4.2.1 Concerning the labels "Dimension Stone", "Natural Stone" and "Ornamental Stone"

According to INSPIRE, the label Dimension Stone refers to a **Mineral Deposit Type**, a **Commodity** and an **Enduse Potential,** which cleary causes confusion. The main concept is associated with the type of commodity where, following the ASTM Standard, dimension stone is defined as natural stone or rock that has been selected and fabricated (i.e., trimmed, cut, drilled, ground, or other) to specific sizes or shapes. This is an old definition that takes the stones only by their structural role in building, not covering the main purpose for which they are currently used – beauty.

Natural Stone is the designation used in European standards. It began to be used by producers as a marketing strategy in response to the synthetic stone agglomerates that appeared in the market as possible substitution solutions.

Nowadays, the most current designation used by end-users is Natural Stone or Ornamental Stone. Bearing in mind that this raw material has lost much of its structural role in buildings, being mainly used for its decorative / ornamental capabilities, the name "Ornamental Stone" seems currently more appropriate and was used as a compromise term in the Eurolithos application. Thus, it is proposed that the **Minerals4EU vocabularies should adopt the label "Ornamental Stone" instead of "Dimension Stone"**.

4.2.2 Mineral Deposit Type

Regarding the mineral deposit type values, which indicate the style of mineral occurrence or deposit, Minerals4EU refers to "Dimension Stone" as integrating the "Bulk rock material" group.

The Eurolithos proposal is that **Mineral Deposit Type should be "Ornamental Stone".** In addition, the definition to be adopted should be: **Ornamental stone deposits are igneous, sedimentary or metamorphic rocks which are sufficiently consolidated to enable them to be cut or shaped into blocks or slabs.**

4.2.3 Commodity Code

Regarding Commodity Types, Minerals4EU refers to "Dimension Stone" as one Commodity code value included in the "Direct Use Commodity/Industrial Material" family.

The Eurolithos proposal: **The Commodity Type should be "Ornamental Stone", and use the following definition: Ornamental stones are rocks of igneous, sedimentary or metamorphic origin which are sufficiently consolidated to enable them to be cut or shaped into blocks or slabs for use in the construction of buildings and other structures**.

Table 5 refers to the commodity code values that should be used for distinguish the main kinds of ornamental stones. It introduces some changes and repairs some of the existing mistakes in the Minerals4EU list.

Table 5- Ornamental stone commodity code values.

Commodity Code Value	Definition
Basalt	Commercial basalt includes extrusive igneous rocks such as andesite, basalt, or dacite, and other igneous rocks that are too fine grained to be termed “granite”
Granite	Commercial granites include all feldspathic crystalline rocks of mainly interlocking texture and with individual mineral grains that are visible to the naked eye. This category includes igneous and metamorphic rocks such as anorthosite, gabbro, gneiss, granite, granodiorite, monzonite, syenite, and all other intermediate igneous and coarse-grained metamorphic rock types, independently of their colour.
Limestone	No changes from Minerals4EU Commercial limestones are rocks of sedimentary origin that primarily are composed of calcium carbonate with or without magnesium. Included in this category are limestone, dolomite, dolomitic limestone, and travertine, which is a calcitic rock that is precipitated from hot springs.
Marble	Marble is a metamorphic rock containing more than 50% of carbonate minerals, resulting from metamorphic recrystallization of limestones or dolostones.
Miscellaneous ornamental stones	This category includes commercial stone types that do not easily fall into the other categories, such as amphibolite, chert, serpentinite and steatite (= soapstone), or any other rocks used for the construction of buildings and other structures.
Sandstone	Commercial sandstone is a lithified sand that chiefly comprises quartz or quartz and feldspar with a fragmental (clastic) texture. Sandstone contains interstitial cementing materials, such as calcite, clay, iron oxides, or silica. Quartzite, arkose, graywacke, breccia and conglomerate are included in this category.
Slate	Commercial slate is a microgranular metamorphic rock formed by the recrystallization of clay sediments, such as claystone, shale, or siltstone. Characterized by excellent parallel cleavage, slates may be easily split into relatively thin slabs. This category also includes schists which are strongly foliated medium-grade metamorphic rocks characterized by an abundance of platy or elongated minerals (micas, chlorite, talc, graphite, amphiboles) in a preferred orientation.

Bearing in mind the Lithology field of Table 2 and Table 3, the values to be registered there should pay attention to the definitions presented in Table 5- Ornamental stone commodity code values. For that purpose, Table 6 should be taken as a guidance for the most common lithologies used for ornamental stone production.

Table 6- Common lithologies used as ornamental stone

Basalt	Granite	Limestone	Marble	Miscellaneous	Sandstone	Slate
Andesite	Anorthosite	Dolostone	Calcitic marble	Amphibolite	Arkose	Schist
Basalt	Diorite	Dolomitic limestone	Dolomitic marble	Chert	Breccia	Shale
Dacite	Foidite	Limestone		Eclogite	Conglomerate	Slate
Phonolite	Gabbro	Marlstone		Serpentinite.	Greywacke	
Rhyolite	Gneiss	Travertine		Steatite (soap stone)	Quartzite	
Trachyte	Granite			Etc	Sandstone	
Etc.	Granodiorite				Etc.	
	Granulite					
	Mylonite					
	Peridotite					
	Syenite					
	Tonalite					
	Etc.					

4.2.4 End Use Potential

Minerals4EU defines the Construction code label as “Material used in the construction industry. Includes aggregate, dimension & ornamental stones (granite, gabbro, travertine, etc.), gypsum, anhydrite, cement limestone, limestone for lime, marble, sand and gravel”. This group integrates, among others, “building and dimension stones” and “construction aggregates”.

Regarding this, Eurolithos makes several interdependent proposals:

- **In Enduse Potential, the value Construction should have its definition changed to: Material used in the construction industry. Includes building stones, gypsum, anhydrite, limestone and marble for cement or lime, sand and gravel.**
  - **Under Construction, “Building Stones” should be considered with the following definition: Consolidated or unconsolidated rocks directly used in building without modification of their mineralogical structure.**
    - **Under “Building Stones” two types should be considered:**
      - **“Construction Aggregates” (definition as in Minerals4EU)**
      - **“Ornamental Stones” with the following definition: Stones used for structural and decorative purposes as walling, paving or roofing materials in the construction of buildings, other structures and artifacts, e.g. millstones, statues.**

5 STEP-BY-STEP FOR DELIVERING SPATIAL DATA

The Atlas of European Ornamental Stones will consist of two main outputs:

- An on line functionality – Map Viewer - through the EGDI web service and respective technological capacities;
- Printable country atlases and, eventually, a printable atlas of a selection of the most relevant European ornamental stones.

The purpose of this chapter is to provide a guidance on delivering the Atlas spatial data for the on line functionality.

5.1 Selection of stones

The first step is a selection of the stones that each country-partner wants to be included in the Atlas. The stones most be chosen from the list provided by each partner.

The stones must be chosen from the list provided by each partner. Eventually, each partner can include all the stones. The main selection criterion is the knowledge of the geographical coordinates of the place of origin.

5.2 Filling in the tables of properties.

The on line functionality will be supported by a database of the stone properties that were previously presented in Table 2 and Table 3. For this purpose it should be noted again that **the suggested changes to INSPIRE and Minerals4EU definitions and vocabularies have not yet been adopted. Therefore, filling in the tables should respect the vocabularies currently in use within the aforementioned infrastructures for spatial information.**

Agreed changes from Minerals4EU project to the INSPIRE Technical Documentation for "D2.8.III.21 INSPIRE Data Specification on Mineral Resources –Technical Guidelines" are available on https://inspire.ec.europa.eu/id/document/tg/mr and Eurolithos intranet (Microsoft Teams/ Files/WP3/ inspire_mig_mineral4eu_codelist.xlsx). The Minerals4EU project official proposal to INSPIRE MIG to accept proposed changes to INSPIRE register code lists is available on https://inspire.ec.europa.eu/forum/file/view/61408/minerals4eu-project-official-proposal-to-inspire-mig-to-accept-proposed-changes-to-inspire-register-code-lists.

Additional information is available on the deliverables from the GeoEra GIP project.

5.2.1 Point data

As mentioned earlier, the data to be provided by each partner regarding the registration of points refers to quarries, occurrences or centroids of polygons representing quarry clusters, deposits or even prospects.

The template for the registration of the mandatory properties of data points is given in Table 7 and the optional properties in Table 8.

The table entries already filled in with a specific value (e.g.: bulk rock material) are fixed because they are common to all possible registrations. The others are discussed below.

Table 7- Mandatory properties for the registration of the geographical origin of ornamental stones (data points)

Ref.	Lat.	Long.	Name of place	Country	Mining activity type value	Mine status value	Enduse potential value	Stone name	Alternative stone names	Commodity code value	Colour	Lithology value	Mineral Deposit Group value	Deposit type value	Mineral Occurrence type value	UNFC Value
1							building and Dimension Stone						bulk rock material	dimension stone		
2							building and Dimension Stone	name 1	alt. name 1		colour 1	Lithology 1	bulk rock material	dimension stone		
								name 2	alt. name 2		colour 2	Lithology 2				
								name n	alt. name n		colour n	Lithology n				
3							building and Dimension Stone						bulk rock material	dimension stone		
n																

Table 8- Optional properties for the registration of data points

Ref	Resource Category	Reserve Category	Endowment	Sterilization risk	Historical status	Documents	Notable Uses	Remarks
1								
2								
n								

5.2.2 *Point data – Mandatory properties*

Ref. - Each row corresponds to a single location – a data point, and will be referenced sequentially by a number, starting at 1.

Lat./ Long. – Location coordinates. According to Deliverable 2.2.2 of the GeoERA Information Platform Project (GIP-P)[5], the reference system to be adopted is EPSG:3034. This means that data delivered to the EGDI platform as georeferenced images, tabular data, shapefiles, GeoPackages, etc. can be delivered in any other projection as long as its conversion to EPSG:3034 is straightforward.

Name of place - To each point a name should be given, usually the quarry name or other geographic name when the point does not correspond to a quarry. E.g.: *Chainça* quarry, *Codaçal* cluster (when represented by a centroid).

Country – To input the name of the country.

Mining activity type value – Taking into account the INSPIRE code list of Mining Activity Type values (http://inspire.ec.europa.eu/codelist/MiningActivityTypeValue), the ones to input here would be “quarry”, “underground” or “open pit and underground”. However, from the Minerals4EU agreed changes, “quarry” is superseded by “quarrying” and there is no a code value to those exploitations taking place both as a quarry and underground. So, for these cases it is suggested to use the most prominent type of excavation: “quarrying” or “underground mining”.

Mine status value – According to the Agreed changes from Minerals4EU project to the INSPIRE Technical Documentation, there are no modifications to the current INSPIRE codes. Therefore, for each point, one of the following options must be chosen:

Table 9- Mine status code list values

Value	Description
operating	A mine is operating.
operating continuously	A mine is operating continuously.
operating intermittently	A mine is operating intermittently.
not operating	A mine is not operating.
closed	A mine can be closed for technical, economical or technical-economic reasons.

[5] https://geoera.eu/wp-content/uploads/2020/01/D2.2.2-Refinements-of-requirements.pdf.

abandoned	A mine is abandoned.
care and maintenance	A mine is under care and maintenance.
retention	A mine can be kept unexploited until the price of contained commodity(ies) makes it economical.
historic	An 'old' mine which has been exploited before 1900.
under development	Under development.
under construction	Under construction.
pending approval	A mine waiting for the exploitation authorization, generally given by a State Mining Engineering Department.
feasibility	Technical economic study aimed at assessing the possibility to launching a mine venture.

If the record does not correspond to a mining operation (e.g. a prospect), it should be left blank.

Stone name – To each stone name an ID should be given. The unique stone names should be picked from the new Eurolithos Code List available on Microsoft Teams intranet (Files/WP3/Eurolithos Unique stone names code list.docx) and at the end of this Deliverable. It should be pointed out that this is not yet a complete list at the current date. Anyway, the names can be also selected in the EN 12440 standard.

To each registration point, more than one stone may be associated. It is the common situation where, from a single quarry, two or more stone types are exploited. For this reason, the field “Stone name” allows the registry of several stone names.

Alternative stone names - The same applies here as for the name of the stone.

Commodity code value – Dimension stone is the code value used by INSPIRE and MineralsS4EU to cover all types of ornamental stones. Narrowing, both schemes consider the following main groups of ornamental stones:

Table 10- INSPIRE commodity code values for ornamental stones and new definitions

Dimension stone commodity code value	Definitions proposed in Eurolithos
Basalt	Commercial basalt includes extrusive igneous rocks such as andesite, basalt, or dacite, and other igneous rocks that are too fine grained to be termed “granite”
Granite	Commercial granites include all feldspathic crystalline rocks of mainly interlocking texture and with individual mineral grains that are visible to the naked eye. This category includes igneous and metamorphic rocks such as anorthosite, gabbro, gneiss, granite, granodiorite, monzonite, syenite, and all other intermediate igneous and coarse-grained metamorphic rock types, independently of their colour.
Greenstone	-------
Limestone	No changes from Minerals4EU Commercial limestones are rocks of sedimentary origin that primarily are composed of calcium carbonate with or without magnesium. Included in this category are limestone, dolomite, dolomitic limestone, and travertine, which is a calcitic rock that is precipitated from hot springs.

Dimension stone commodity code value	Definitions proposed in Eurolithos
Marble	Marble is a metamorphic rock containing more than 50% of carbonate minerals, resulting from metamorphic recrystallization of limestones or dolostones.
Miscellaneous ornamental stones	This category includes commercial stone types that do not easily fall into the other categories, such as amphibolite, chert, serpentinite and steatite (= soapstone), or any other rocks used for the construction of buildings and other structures.
Sandstone	Commercial sandstone is a lithified sand that chiefly comprises quartz or quartz and feldspar with a fragmental (clastic) texture. Sandstone contains interstitial cementing materials, such as calcite, clay, iron oxides, or silica. Quartzite, arkose, greywacke, breccia and conglomerate are included in this category.
Slate	Commercial slate is a microgranular metamorphic rock formed by the recrystallization of clay sediments, such as claystone, shale, or siltstone. Characterized by excellent parallel cleavage, slates may be easily split into relatively thin slabs. This category also includes schists which are strongly foliated medium-grade metamorphic rocks characterized by an abundance of platy or elongated minerals (micas, chlorite, talc, graphite, amphiboles) in a preferred orientation.

The main difference with the now proposed values presented in Table 5 lies in the fact that this table does not consider the value “greenstone”, as well as the concepts behind each designation are different.

Therefore, the values to be used should be the current INSPIRE values, but considering the new definitions proposed for each one in Table 10. The value “greenstone” should not be used.

Colour - The colour of the stone should be picked from the new Eurolithos Code List presented in Table 4 and also available on Microsoft Teams intranet (Files/WP3/ Eurolithos Colour code list.docx). It is reproduced below again for ease of use. Because from one quarry more than one type of stone can be obtained, eventually with a different colour, then it applies here the same as for the stone name: the table entry allows the registry of more than one colour.

Ornamental Stone colour values
Beige
Black
Black-green
Blue
Blue-grey
Brown
Dark grey
Green
Grey
Grey-brown
Grey-green
Light-grey
Light-pink
Multicoloured
Pink
Red
Redish brown

Ornamental Stone colour values
WHITE
WHITE-BLACK
YELLOW

Lithology value – The values must be chosen from the Simple Lithology Categories code list of GeoSciML standard for the exchange of digital geoscientific information IUGS (http://www.cgi-iugs.org/tech_collaboration/geosciml.html). The code list is available on: http://resource.geosciml.org/static/vocabulary/cgi/201012/Vocab2011html/SimpleLithology201012.html.

However, as this is a very extensive and exquisite code list, it is proposed that the list of names presented in Table 6 be used instead, but not implying that only these names can be registered. It is reproduced below again for ease of use. Its purpose is to give guidance on using simple lithology names instead complex ones (e.g. Trachyte instead of alkali feldspar trachyte, granite instead of alkali feldspar granite, etc.).

Common ornamental stone lithologies						
Basalt	**Granite**	**Limestone**	**Marble**	**Miscellaneous**	**Sandstone**	**Slate**
Andesite	Anorthosite	Dolostone	Calcitic marble	Amphibolite	Arkose	Schist
Basalt	Diorite	Dolomitic limestone	Dolomitic marble	Chert	Breccia	Shale
Dacite	Foidite	Limestone		Eclogite	Conglomerate	Slate
Phonolite	Gabbro	Marlstone		Serpentinite.	Greywacke	
Rhyolite	Gneiss	Travertine		Steatite (soap stone)	Quartzite	
Trachyte	Granite			Etc.	Sandstone	
Etc.	Granodiorite				Etc.	
	Granulite					
	Mylonite					
	Peridotite					
	Syenite					
	Tonalite					
	Etc.					

Mineral Occurrence type value – The proposed changes to INSPIRE from Minerals4EU consider the values and definitions depicted in Table 11. For each registration point it should be choose one value bearing in mind the following:

- For the registry of quarries, the “deposit” value should be chosen.
- For the registry of centroids representing clusters of quarries or ornamental stone deposits, the “deposit” value should be chosen.
- For the registry of centroids representing any other kind of mineral occurrence, such as provinces, districts and prospects, the respective value should be chosen from Table 11. The same applies for the registry of point data representing mineral occurrences.

Table 11- Values and definitions for mineral occurrence types in Minerals4EU proposal of changes to INSPIRE.

Code value	Definition
deposit	A mass of naturally occurring mineral material, e.g. metal ores or non-metallic minerals, usually of economic value, without regard to mode of origin. Accumulations of coal and petroleum may or may not be included.
occurrence	Any ore or economic mineral in any concentration found in bedrock or as float.
prospect	An area that is a potential site of mineral deposits, based on preliminary exploration, previous exploration. A geologic or geophysical anomaly, especially one recommended for additional exploration.
province	Geologic provinces classified by mineral resources.
district	Geologic districts classified by mineral resources.
field	A region or area that possesses or is characterized by a particular mineral resource.

UNFC Value – It should be used the CGI UNFC Code vocabulary, as defined by the IUGS Geoscience Information Terminology Working Group. It defines concepts for the categorisation of mineral reserves and resources according to the UN Framework Classification (2009)[6]. The code values to be used are also in the Minerals4EU proposal to INPIRE.

Taking into account the specificities of the ornamental stones mining sector, which only began to seriously integrate geological knowledge a decade or two ago, it is advisable for each partner to only use one of the following main code values presented in Table 12: commercial projects, potentially commercial projects, non-commercial projects or exploration projects.

Table 12- CGI UNFC Value code list

Values		Definition
commercial projects		Commercial Projects have been confirmed to be technically, economically and socially feasible
	approved for development	Approved for Development requires that all approvals/contracts are in place, and capital funds have been committed. Construction and installation of project facilities should be underway or due to start imminently
	justified for development	Justified for Development requires that the project has been demonstrated to be technically feasible and commercially viable, and there must be a reasonable expectation that all necessary approvals/contracts for the project to proceed to development will be forthcoming.
	on production	On Production is used where the project is actually producing/extracting and selling one or more commodities to market as at the Effective Date of the evaluation
potentially commercial projects		Potentially Commercial Projects are expected to be developed in the foreseeable future, in that the quantities are assessed to have reasonable prospects for eventual economic extraction, but technical and/or commercial feasibility has not yet been confirmed
	development on hold	Development On Hold is used where a project is considered to have at least a reasonable chance of achieving commerciality (i.e. there are reasonable prospects for eventual economic extraction), but where there are currently major non-technical contingencies (e.g. environmental or social issues) that need to be resolved before the project can move towards development

[6] https://www.unece.org/energy/se/unfc_2009.html.

Values		Definition
	development pending	Development Pending is limited to those projects that are actively subject to project specific technical activities, such as acquisition of additional data (e.g. appraisal drilling) or the completion of project feasibility studies and associated economic analyses designed to confirm project commerciality and/or to determine the optimum development scenario or mine plan
non-commercial projects		Non-Commercial Projects include those that are at an early stage of evaluation in addition to those that are considered unlikely to become commercially feasible developments within the foreseeable future
	development not viable	Development not Viable is used where a technically feasible project can be identified, but it has been assessed as being of insufficient potential to warrant any further data acquisition activities or any direct efforts to remove commercial contingencies.
	development unclarified	Development Unclarified is appropriate for projects that are still in the early stages of technical and commercial evaluation (e.g. a recent new discovery), and/or where significant further data acquisition will be required, in order to make a meaningful assessment of the potential for a commercial development, i.e. there is currently insufficient basis for concluding that there are reasonable prospects for eventual economic extraction.
additional quantities in place		Quantities should only be classified as Additional Quantities in Place where no technically feasible projects have been identified that could lead to the extraction of any of these quantities.
exploration projects		Project identified that has not advanced enough to categorize further

5.2.3 Point data – Optional properties

The optional properties to be provided for the registration of data points are in Table 8 and discussed below. They relate primarily to the assessment of the mineral deposit and it is advisable to fill at least the Endowment field as it yields a general idea about the available resources, whether they refer to resources, reserves or both.

Resource category – This entry is for indication whether the resource is measured, indicated or inferred according to the international classification schemes for reporting mineral resources estimates. Table 13 presents the available code value choices taken from the Minerals4EU proposal, and links to the respective definitions.

If there are no estimates on the amount of mineral resources, then the entry should be left blank. Otherwise, one of the values of Table 13 should be picked-up.

Table 13- Resource category values

measured mineral resource http://resource.geosciml.org/classifier/cgi/resource-assessment-category/measured-mineral-resource
indicated mineral resource http://resource.geosciml.org/classifier/cgi/resource-assessment-category/indicated-mineral-resource
inferred mineral resource http://resource.geosciml.org/classifier/cgi/resource-assessment-category/inferred-mineral-resource
measured and indicated mineral resource http://resource.geosciml.org/classifier/cgi/resource-assessment-category/measured-and-indicated-mineral-resource

measured, indicated and inferred mineral resource http://resource.geosciml.org/classifier/cgi/resource-assessment-category/measured-indicated-inferred-mineral-resource
indicated and inferred mineral resource http://resource.geosciml.org/classifier/cgi/resource-assessment-category/indicated-and-inferred-mineral-resource
poorly estimated mineral resource, poorly documented http://resource.geosciml.org/classifier/cgi/resource-assessment-category/poorly-estimated-mineral-resource

Reserve category – It refers to the level of confidence of the estimate of the reserve according to the international classification schemes for reporting mineral resources. Table 14 presents the available code value choices taken from the Minerals4EU proposal, and links to the respective definitions.

If there are no estimates on the amount of mineral reserves, then the entry should be left blank. Otherwise, one of the values of Table 14 should be picked-up.

Table 14- Reserve category values

proved ore reserves http://resource.geosciml.org/classifier/cgi/reserve-assessment-category/proved-ore-reserves
probable ore reserves http://resource.geosciml.org/classifier/cgi/reserve-assessment-category/probable-ore-reserves
proved and probable ore reserves http://resource.geosciml.org/classifier/cgi/reserve-assessment-category/proved-and-probable-ore-reserves

Endowment - This field is for the entry of concrete data on the commodity amount, whether they refer to mineral resources, mineral reserves or both. According to Geoscience Terminology Working Group, it can even include past production amounts[7].

The quantity must be expressed in cubic meters (using the “long scale”, if needed.)

Sterilization risk – This is a free text entry. It is advisable to provide simple and concise information. Use the adjectives "high", "medium" or "low" and justify the terms "high" and "medium". E.g.: High risk due to urban sprawling.

[7] http://www.earthresourceml.org/earthresourceml/2.0/doc/ERML_HTML_Documentation/

Historical status – This is a free text entry to point out historical/heritage stones, i.e. those that are no longer produced. If this is the case for a specific stone, the free text should be "historic stone" or similar.

Documents – This field is reserved for input of links to documents. These can be documents to be included in the EGDI repository or in other web services.

Notable uses – This entry is intended to indicate the name and location of notable uses of each ornamental stone (e.g. a notable building or monument, a statue, etc.). It is still to be decided how this would be achieved: a direct input of the geographic coordinates of the location or a link to other services like OpenStretMap.

Remarks - This entry is intended to free-text remarks.

5.2.4 Polygon data

As mentioned earlier (cf. Chapter 3), polygon data may refer to the geographical location of the stones' provenance (a quarry cluster, a mineral deposit or a prospect) or to the geological unit containing the stone resources. When referring to the geographical location, the polygon properties to be provided are the same as for the registration of data points presented in the last chapter. Table 15 presents the respective template for data input, the only difference being the need to enter coordinates for the several points that define the polygon. These will be automatically created in a GIS environment.

For the registration of polygon data referring to the geological unit, the template shown in Table 16 should be used.

As for the registry of data points, the entries already filled in with a specific value are fixed because they are common to all possible registrations. The properties that are not common to both tables are discussed below.

Geological unit – The name of the geological unit according to the rules defined by IUGS.

Geological unit type value – The values to be used are the ones in GeoSciML standard: http://resource.geosciml.org/vocabulary/cgi/201012/Vocab2011html/GeologicUnitType201107.html. Example: "Lithostratigraphic unit".

Geochronological era value - The values to be used are the ones available on the CGI geological time vocabulary service: http://resource.geosciml.org/. It is advisable not to use values of an order lower than Series / Epoch. Example: use Lower Ordovician instead of Tremadocian (a stage of the Lower Ordovician).

Description of unit – Free text entry for a simple description of the geological unit.

Mineral occurrence type value - This value is common to data for points and polygons. However, as in this section we are dealing with polygons referring to the geologic unit, from the values in Table 11, only is possible to choose the “province”, “district” or “field”. It is advised that only provinces be chosen.

Table 15- properties for the registration of the geographical origin of ornamental stones (polygons)

Ref.	Lat.	Long.	Name of place	Mining activity type value	Mine status value	Enduse potential value	Stone name	Alternative stone names	Commodity code value	Colour	Lithology value	Mineral Deposit Group value	Deposit type value	Mineral Occurrence type value	UNFC Value
1	Point 1	Point 1				building and Dimension Stone	Name 1 … n	alt. name 1 … n	code 1	colour 1	Lithology 1	bulk rock material	dimension stone		
	Point 2	Point 2							code 2	colour 2	Lithology 2				
	Point n	Point n							code n	colour n	Lithology n				
2															
n															

Table 16- Properties for the registration of the geologic unit of provenance of ornamental stones (polygons)

Ref.	Lat.	Long.	Geological unit	Geological unit type value	Enduse potential value	Commodity Code Value	Lithology value	Stone name	Alternative stone names	Colour	Geochronological era value	Descript. of unit	Mineral occurrence type value	Docs.
1	Point 1	Point 1			building and Dimension Stone		Lithology 1	name 1	alt. name 1	colour 1				
	Point 2	Point 2					Lithology 2	name 2	alt. name 2	colour 2				
	Point n	Point n					Lithology n	name n	alt. name n	colour n				
2	Point 1	Point 1			building and Dimension Stone		Lithology 1	name 1	alt. name 1	colour 1				
	Point 2	Point 2					Lithology 2	name 2	alt. name 2	colour 2				
	Point n	Point n					Lithology n	name n	alt. name n	colour n				
n														

6 DISPLAYNG AND OUTPUTTING PRINTABLE INFORMATION

Currently, from the EGDI Web service / map viewer, querying a point results in information displayed in the form of a simple list, as exemplified in the snapshot of Figure 3.

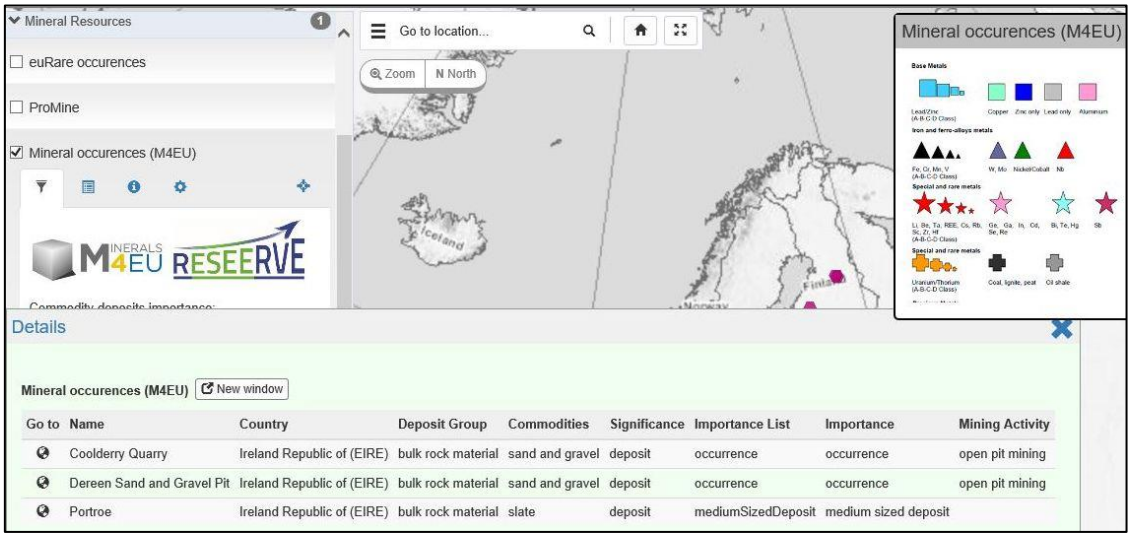


Figure 3- Type of information displayed by EGDI platform.

The option “new window” takes the user to a new webpages that simply reproduces the same list of properties, with the possibility of printing it, which is inherently provided by the web browser. The option “Go To” makes a zoom to each specific point on the map.

This type of information can be considered the most basic information to be achievable by the Eurolithos Atlas of European Ornamental Stones. Mostly, it will be an update of the existing layers of information in Minerals4EU and Promine.

The Eurolithos Atlas has bigger goals, as it also intends to display and inform about the geological unit of origin of each stone and, in addition, it intends to establish itself as a connection point with the information gathered in WP4 –Directory of Ornamental Stone Properties, and WP5- Ornamental Stone Heritage.

Therefore, the information to be displayed by the EGDI web service should allow direct links to each stone’s respective information in WP4 and WP5.

In addition, to become user-friendly to the end user, this linkage should allow the visualization and pdf-downloadable factsheets for each unique stone. As it was presented in Deliverable D3.1, one of the best appealing option is provided by the web map viewer interface of the Slovenian Mining Registry Book (https://ms.geo-zs.si/en-GB). Adapting from that interface, Figure 4 shows an outline of what information could

be retrieved in the form of a downloadable factsheet when selecting a unique stone type from a point or polygon of provenance picked from the map viewer window.

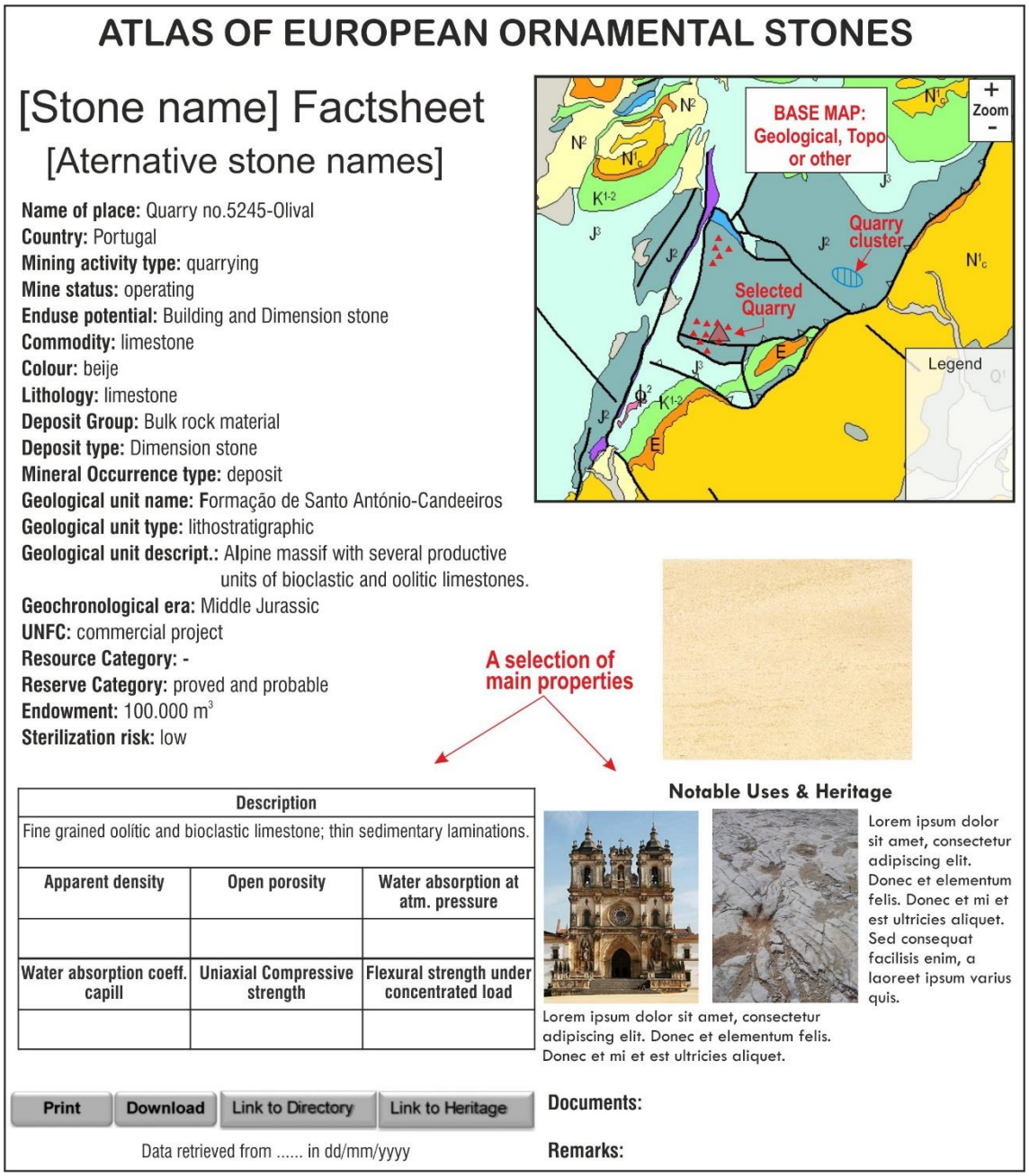
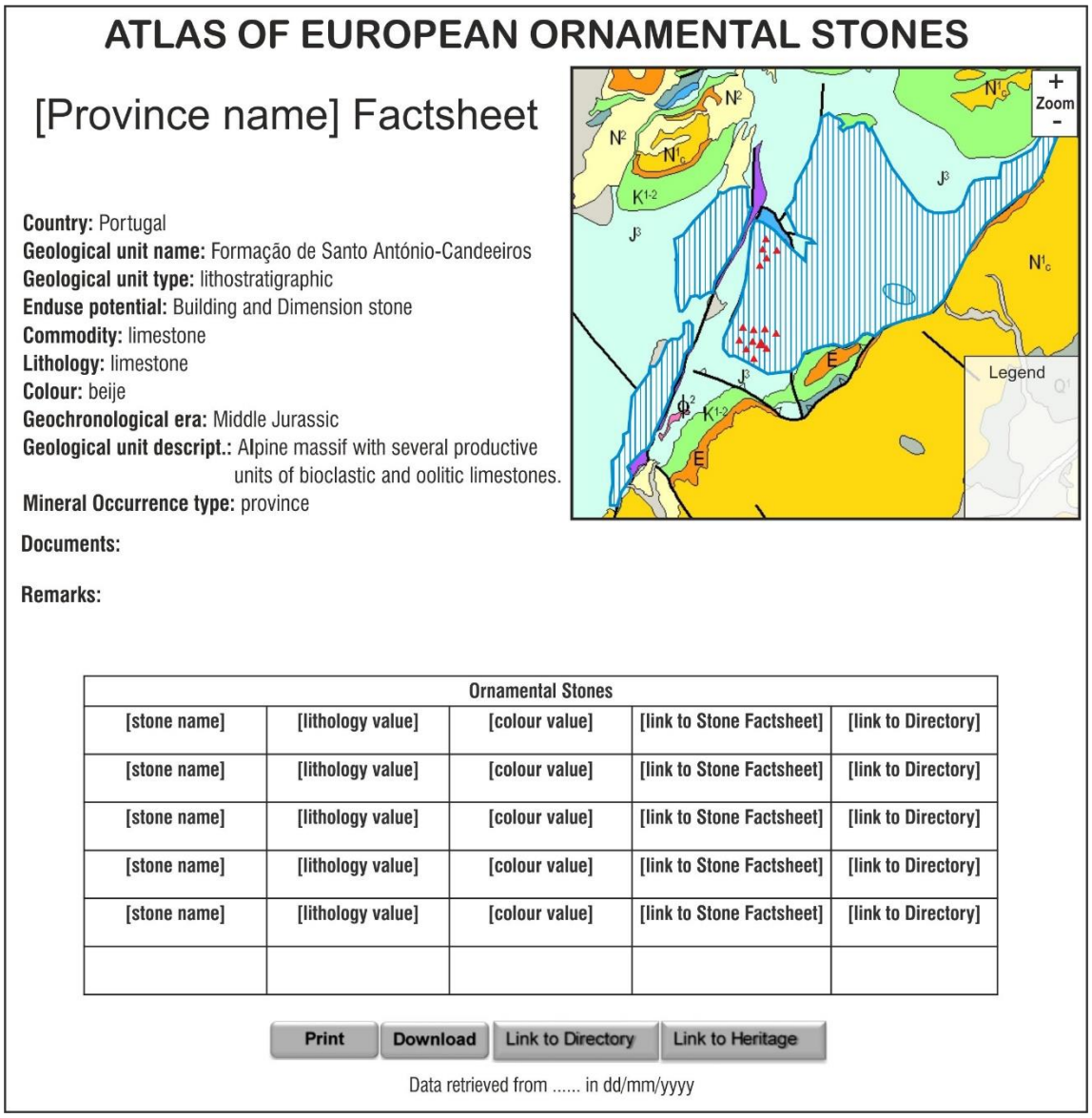


Figure 4- Draft Factsheet of a unique stone queried from an origin point or polygon selected in the map viewer.

If a geological unit is picked from the map viewer (a geological province as basic requirement), Figure 5 shows a draft of what could be the retrieved Factsheet when a stone from that geological unit is selected. The main difference between the two types

of factsheets is that the one reporting the geological unit does not provide information regarding the mining activity.



ATLAS OF EUROPEAN ORNAMENTAL STONES

[Province name] Factsheet

Country: Portugal
Geological unit name: Formação de Santo António-Candeeiros
Geological unit type: lithostratigraphic
Enduse potential: Building and Dimension stone
Commodity: limestone
Lithology: limestone
Colour: beije
Geochronological era: Middle Jurassic
Geological unit descript.: Alpine massif with several productive units of bioclastic and oolitic limestones.
Mineral Occurrence type: province

Documents:

Remarks:

Ornamental Stones				
[stone name]	[lithology value]	[colour value]	[link to Stone Factsheet]	[link to Directory]
[stone name]	[lithology value]	[colour value]	[link to Stone Factsheet]	[link to Directory]
[stone name]	[lithology value]	[colour value]	[link to Stone Factsheet]	[link to Directory]
[stone name]	[lithology value]	[colour value]	[link to Stone Factsheet]	[link to Directory]
[stone name]	[lithology value]	[colour value]	[link to Stone Factsheet]	[link to Directory]

Print | Download | Link to Directory | Link to Heritage

Data retrieved from ..... in dd/mm/yyyy

Figure 5- Draft Factsheet of a unique stone queried from a selected polygon (geological unit) in the map viewer.

6.1 Printable Atlas of European Ornamental Stones

Both templates for outputting information are not final versions because they need further discussion. Nevertheless, the collection of their printed versions can be understood as a first printed edition of an Atlas of European Ornamental Stones.

In addition, the outputting of such kind of factsheets – their design and contents - is dependent of the technological capacities of the information platform that will support EGDI.

Thus, in order to overcome any difficulties in the production of these factsheets, it is also planned to carry out a printable edition that will be complete with regard to the information about each stone. That is, that includes not only the spatial data information – the maps identifying the places of provenance of each stone, but also all the information collected in WP4 and WP5 regarding the properties of stones and their heritage features.

Due to the large number of stones that are expected to integrate the atlas, this printable edition will consist only of a selection of the most relevant stones of each country taking into account the current volume of production and the worldwide distribution of its use, but also its heritage value, and eventually, its regional importance. This wil be a Flagship of the Eurolithos project.

A very first draft for this printable edition is presented in Figure 6 (the front of the sheet) and Figure 7 (the back of the sheet).

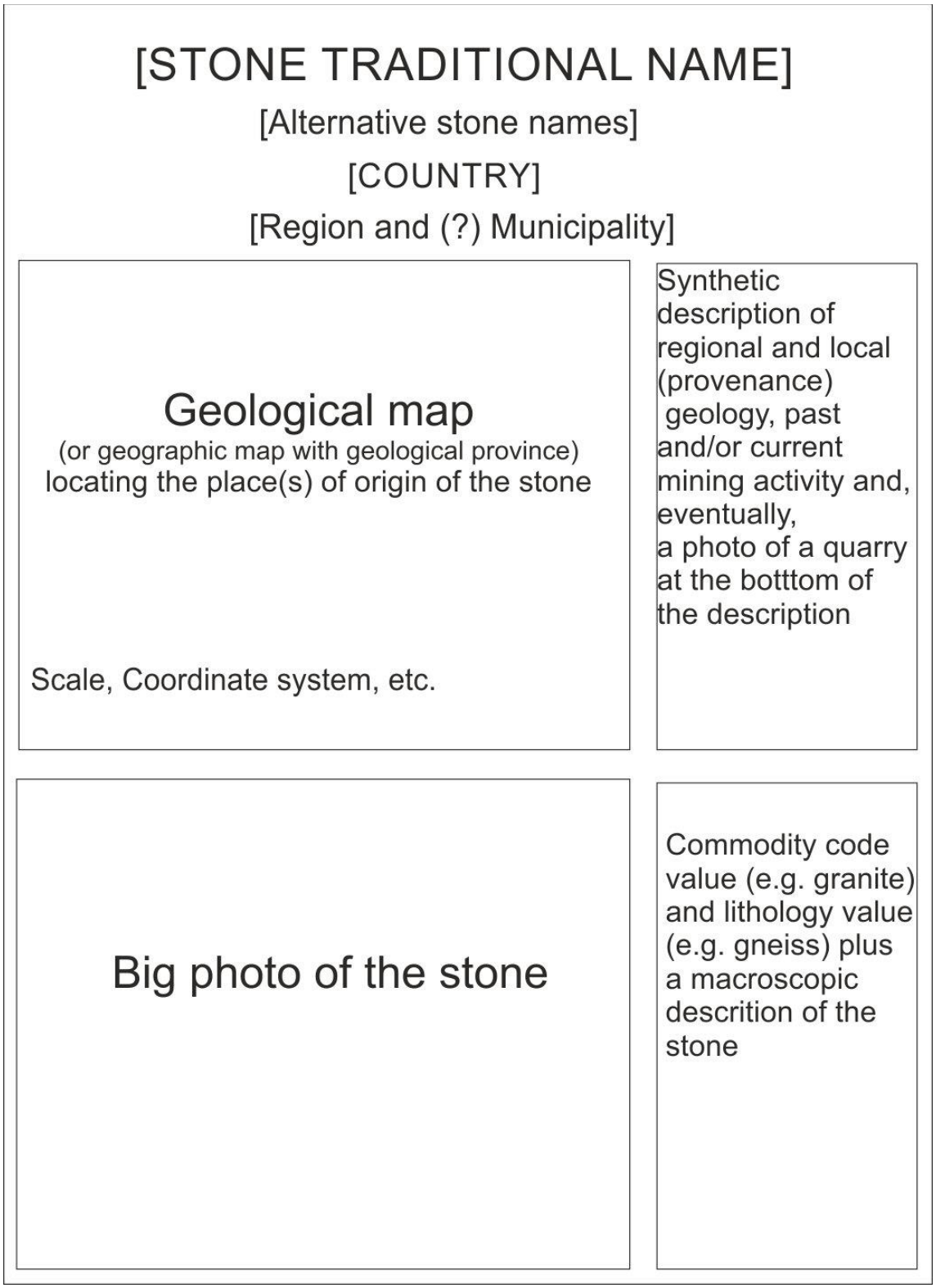


Figure 6- Draft design and contents for a printable Atlas of European Ornamental Stones. One unique stone per sheet (front sheet).

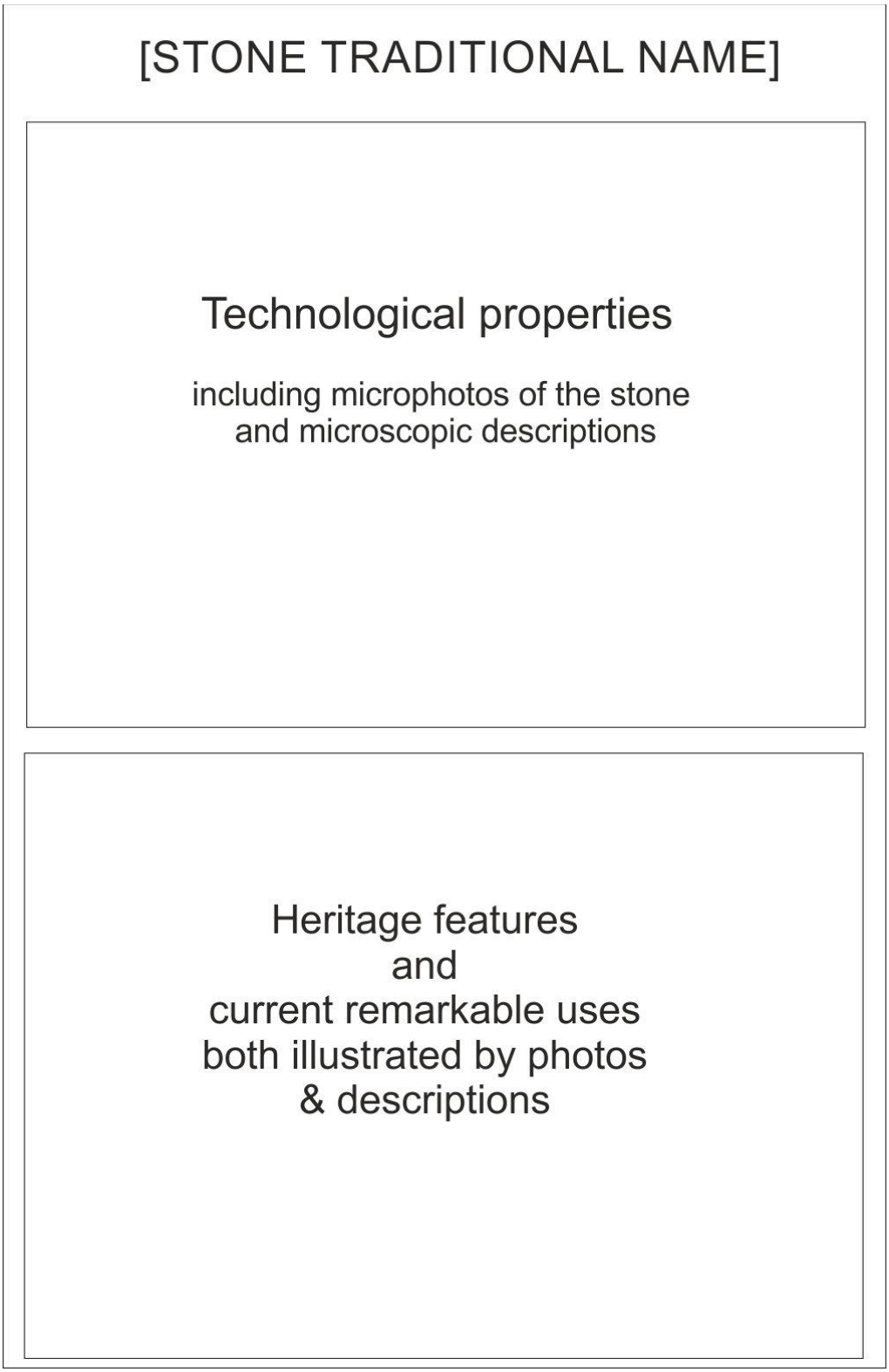


Figure 7- Draft design and contents for a printable Atlas of European Ornamental Stones. One unique stone per sheet (back sheet)

7 ANNEX 1 - EUROLITHOS UNIQUE STONE NAMES CODE LIST

Version 21Feb2020

AUSTRIA		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Aalfang	Aalfanger Granit	
Adneter	Adneter Marmor	Adneter Kalkstein
Adneter Rotgrau Lienbacher	Adneter Lienbacher	Adnet Rot
Adneter Rotgrau Scheck	Adneter Scheck	Rotscheck
Adneter Rotgrau Schnöll	Adneter Schnöll	Langmoos
Adneter Rotgrau Tropf	Adneter Rot Tropf	Rotgrautropf
Adneter Rotgrau Wimberger	Adneter Wimberger	
Aflenz	Aflenzer Sandstein	Aflenzer Muschelkalk
Alberschwende	Schwarzachtobel	
Böhmerwald Granit Fein		
Böhmerwald Hell	Heidlbrunn	
Carat	Alpen Diabas	Blaugrüner Carat
Gaissulz		
Gams	Gamser (Hart)gneis	Gamser Platten
Gebharts Fein	Gebhartser Syenit	Gebharts Feinkörnig
Gebharts Grob	Gebhartser Granit	
Golling	Gollinger Konglomerat/Nagelfluh	Torrener Nagelfluh
Gusen		
Hartberger	Hartberg	Hartberger Granit
Herschenberg	Herrschenberger Granit	Gmünder Granit
Höttinger	Höttinger Brekzie	
Kaunertal		
Kramsach	Kramsacher/Hagenauer Marmor	Tiroler Rot
Krastal	Krastaler Marmor	Rauchkristall
Lasberg	Lasberger Granit	
Lindabrunn	Lindabrunner Konglomerat	Lindabrunner Stein
Maltatal	Tauerngranit	Tauerngneis
Mauthausen	Mauthausener Granit	Mauthausner Granit
Neuhauser	Neuhaus	Mühlviertel-Granit
Ötztal		

AUSTRIA		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Pannonia Grün		
Perg	Perger Granit	
Plochwald	Plochwalder Granit	
Rauris Marmor	Rauriser Kristallmarmor	Rauriser Dunkelblau/Weiß
Rauris Quarzit	Rauriser Quarzit	Rauriser Grün
Salla		
Schärding	Schärdinger Granit	
Schlossberg	Schlossberg Kristall-Marmor	Schlossberg Kristall
Schrems Feinstkorn	Schremser Granit	Schremser Feinkorn
Schwarzensee	Schwarzenseer Marmor	Schwarzensee Rot
Sölk	Sölker Marmor	Gumpeneckmarmor
Spitz	Spitz Grün	Wachauer Marmor
St. Margarethen	St. Margarethener Kalksandstein	Römerstein
Stainzer Hartgneis	Stainz	Stainzer Platten
Steinwald	Steinwalder Granodiorit	Steinwalder
Tauerngrün	Dorfergrün	Tiroler Serpentin
Ternitz	Ternitzer Konglomerat	Rohrbacher Konglomerat
Untersberg	Untersberger Marmor	Salzburger Untersberger
Untersberg Hell		
Untersberg Rötlich		
Wachau	Wachauer Marmor	Waldviertler Marmor
Windhaag	Windhaager Granit	Spörbichl Granit

CYPRUS	
Stone Name	**Alternative Name 1**
Gypsomarmaro	
Gypsomarmaro	
Klimara Agias Annas	Petra Agias Annas
Klimara Psevda	Petra Psevda
Petra Lympion	
Petra Pachnas	
Petra Pachnas	
Petra Pachnas	Petra Kividon
Petra Pachnas	

CYPRUS	
Stone Name	**Alternative Name 1**
Petra Pachnas	
Petra Troodous	
Petra Yerolakkou	
Plakes Avdimou	

GREECE	GREECE	GREECE
Stone Name	**Stone Name**	**Stone Name**
"Granitis Dramas" Semi White	Ioannina Beige – Special	Podochorion White
"Granitis Dramas" White	Ioannina Beige – Vrachos	Podochorion Yellowish White
"Karystos Schists"	Ioannina Beige Kormos	Pteleos Pink
Achaia Sandstone	Ioannina Beige Trani	Ritsona Red
Aghia Marina Semi White Cloudy	Ioannina Bizani Beige	Roditis Semi White
Aghios Kyrillos Grey	Kastoria Red	Rodochori Red
Aliveri Grey	Kato Nevrokopi	Servia White
Aloides Semi White	Krestis Semi White-Multicolor	Skra Travertine
Argolida Black	Lafkos Pink	Skyros Breccia
Aridea Travertine	Lafkos White	Skyros Semi White
Arta Pink	Levadia Black	Stenopos Semi White
Candia Red	Ligourio Beige	Styra Green
Carnazeika Beige	Livadero Semi White	Thassos Crystallina Semi White
Chalkero Crystalina Semi White	Mani Crystallina Semi White	Thassos Limenas White
Chios Brown	Menoikio Semi White	Thassos Limenas White With Veins
Cresta Black	Metsovo Beige	Thassos Saliara White
Creta "Alabaster"	Moundros Semi White	Thassos Saliara White With Veins
Damasta Silver Grey	Mycenae Beige Red	Thassos Tris Gremi Snow White
Demati Green	Mystegna Ignimbrite	Tinos Green
Didymon Beige	Naxos Crystallina Semi White	Tranovaltos Grey
Dionyssos Semi White	Naxos Crystallina White	Tranovaltos Semi White
Dionyssos White	Nestos Semi White	Tranovaltos White
Disvato Semi White	Nestos White	Trikala-Keramidi White
Domvrena Beige	Nikissiani Crystallina Semi White	Trikas Drama Grey-Black
Doxato Semi White	Nikissiani Crystallina White	Tsakalina Nevrokopi White
Edessa Black	Ochiro White	Vamvakofito Travertine
Elafochori Semi White	Palia Kavala Semi White	Vathilakos Semi White

GREECE	GREECE	GREECE
Stone Name	**Stone Name**	**Stone Name**
Eleftheroupolis – Akrovouni Schists	Panorama Drama Grey Black	Veneto White
Epidavros Beige	Parnonas Semi White	Veria -Naousa Green
Eretria Red	Paros Semi White	Veria Semi White
Ermioni Red Brown	Pentelikon Semi White	Veria Semi White Banded
Evia “Alabaster”	Pentelikon White	Veria White
Fanari Trizinia Red	Pighes Semi White	Volakas Drama Semi White
Filadelfion Pink Red	Pighes White	Volakas Drama White
Helikonas Beige	Pilion Schists	Vytina Black
Helikonas Pink	Pirgi Drama White	Xiropotamos Green
Helikonas White	Pitsa Travertine	Zoodochos Pighi Semi White
Igoumenitsa Pink	Platanotopos Yellowish White	Zoodochos Pighi White

IRELAND		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Altito Sandstone		
Ardbraccan Limestone		
Ardfert Limestone		
Aughrim Granite		
Ballinsaloe Limestone		
Ballybeggan Limestone		
Ballybrew Granite		
Ballyknockan Granite		
Ballysimon Limestone		
Barna Granite		
Beaumont Dove Limestone		
Bushypark Limestone		
Calp		
Carlow Slate		
Carrigacrump Limestone		
Castleisland Marble	Lisheenbawn Marble	Kerry Red Marble
Clonmacnoise Marble		
Clonony Marble		
Connemara Marble		
Connemara Sepia Marble		
Connemara White Marble		
Cork Red Marble	Midleton Red	Sunset Red
Cork Red Marble	Victoria Red	
Dalkey Granite		
Dingle Red Sandstone		
Dingle Yellow Sandstone		
Donegal Golden Quartzite		
Donegal White Marble		
Galway Black Marble		
Glanmire Sandstone		

IRELAND		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Glenveagh Granite		
Golden Hill Granite		
Kilcloney Granite		
Kilkenny Marble		
Killaloe Slate		
Kilmurry Sandstone		
Lecarrow Limestone		
Limerick Black Marble		
Limerick Red Marble		
Meelin Limestone		
Mitchelstown Marble		
Mountcharles Sandstone		
Rosslevan Limestone		
Shantallow Granite		
Threecastles Limestone		
Tonevane Sandstone		
Tullamore Limestone		
Valentia Slate		

ITALY		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Alabastro di Volterra		
Ambrato di Puglia		
Arabaescato Gioia		
Arabescato		
Arabescato Cervaiole		
Arabescato Corchia		
Arabescato Faniello		
Arabescato Orobico		
Arabescato Orobico		
Arabescato Orobico		
Arabescato Orobico		
Arabescato Vagli		
Ardesia Fontana Buona		
Ardesia Valle Argentina		
Arenaria di Casso		
Arenaria di Val Gardena		
Arenaria Grigia dei Nebrodi		
Aurisina	Aurisina Chiara	Aurisina Fiorita
Avorio Casachella		
Avorio di Puglia		
Avorio di Siena		
Avorio Venato di Custonaci		
Bardiglio		
Bardiglio Imperiale		
Bardiglio Nuvolato		
Bargiolina		
Basaltina		
Basaltite		
Basalto	Bauladu	
Beola Argentata	Favalle	

ITALY		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Beola Bianca		
Beola Ghiandonata		
Beola Grigia		
Beola Grigia Valchiavenna		
Bianc Zandobbio	Rosato	
Bianco Arni		
Bianco Asiago	Biancone	
Bianco Carrara		
Bianco di Ostuni	Pietra Gentile	
Bianco Gioia		
Bianco Madielle	Arabescato	Venatino
Bianco P		
Bianco Sardo	Ovodda	
Bianco Vogogna	Quarzite Bianca	
Biancone di Apricena		
Biancone di Trani		
Biancone Tirreno		
Botticino	Fiorito	Semiclassico
Botticino Classico		
Breccia Aurora		
Breccia Caprara	Breccia Capraia	
Breccia Carsica		
Breccia di Mondragone		
Breccia Irpina		
Breccia Oniciata		
Breccia Pernice		
Breccia Primavera		
Breccia Stazzema	Medicea	
Breccia Variegata		
Broccatello di Siena		
Broccato		
Bronzetto di Apricena		
Bronzetto di Trani		
Bronzetto di Verona		
Calacatta	Carrara	Sponda
Calacatta di Siena		
Calacatta Luccicoso		
Calacatta Vagli	Macchia Oro	
Calcare Selcioso del Medolo		
Carparo		
Ceppo di Grè		
Ceppo di Poltragno		
Ceppo Norico		
Chiampo		
Cipollino Apuano		
Cocciolato		
Collemandina		
Corniola		
Cremamore		
Cremo Delicato		
Cremo Tirreno		
Daino - Marmo di Orosei		

ITALY		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Diorite di Traversella		
Diorite di Vico		
Dorato Valmalenco		
Fantastico Arni		
Filettato (America)		
Filettato Righina		
Filetto Rosso	Classico Jonico	
Fior di Mare		
Fior di Pesco Carnico		
Fior di Pesco Classico		
Fiorito Adriatico		
Fiorito Apricena		
Fiorito Canali		
Fiorito Trani		
Ghiandone	Gallura	Rosa Limbara
Ghiandone Valmasino		
Giallo Antico		
Giallo di Siena		
Giallo Reale		
Giallo Sardo - San Giacomo		
Gneiss di San Basilio		
Gneiss Verde Oropa		
Granito Bianco Baveno		
Granito Bianco Montorfano		
Granito dell'Adamello		
Granito Grigio Elba		
Granito Rosa Baveno		
Granito S. Fedelino		
Granito Verde Mergozzo		
Grigio Billiemi		
Grigio Carnico		
Grigio Mondragone		
Grigio Nuraghe		
Grigio Perla		
Grigio San Marco di Mirto		
Grigio Sardo	Champagne	Malaga
Grigio Viallsimius		
Ignimbrite Campana		
Ioriano		
Lasa Bianco		
Lastrato di Gadoni		
Lastrato di Lula		
Lastrato di Sindia		
Lastrato di Siniscola		
Lastrato Marmilla		
Lava grigia		
Libeccio		
Luana		
Marmo Colorato di Vitulano		
Marmo della Madonna		
Marmo di Cusano		
Marmo di Pietraroia		

ITALY		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Mazzaro		
Melange		
Moganato		
Moncervetto		
Morato		
Nembro		
Nerello di Custonaci		
Nero di Ormea		
Nero Nuxis		
Noisette Fleury		
Nuvolera		
Ondagata (Scura)		
Onice di Gesualdo		
Onice Sardo		
Oniciato		
Palissandro di Crevola		
Paonazzo Apuano		
Peperino		
Perlato Coreno	Perlatino	
Perlato di Bisceglie		
Perlato di Sicilia	Perlatino	
Perlato Lucano		
Perlato Svevo		
Pietra del Cardoso		
Pietra del Cilento		
Pietra della Lessina-Pietra di Prun		
Pietra di Bedonia		
Pietra di Bellona		
Pietra di Berbenno		
Pietra di Castellavazzo		
Pietra di Centola		
Pietra di Cogne		
Pietra di Comiso		
Pietra di Courtil		
Pietra di Credaro		
Pietra di Cugnan		
Pietra di Finale		
Pietra di Lecce		
Pietra di Luserna		
Pietra di Morgex		
Pietra di Padula		
Pietra di Perosa		
Pietra di Ragusa	Timpa	
Pietra di Sabucina		
Pietra di Sarnico		
Pietra di Vicenza		
Pietra di Vico		
Pietra Dorata		
Pietra Etrusca		
Pietra Lavica dell'Etna		
Pietra Lavica Vesuviana		
Pietra Maremma		

ITALY		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Pietra Matraia		
Pietra Ollare Piuro		
Pietra Ollare Val Malenco		
Pietra Pece di Ragusa		
Pietra Piasentina		
Pietra Serena del Trasimeno		
Pietra Serena di Ascoli		
Pietra Serena di Firenzuola		
Pietra Simona		
Pietra Sponga		
Pietraforte di Riscaggio		
Piperno		
Porfido Monumentale		
Porfido del Trentino		
Porfido Rosso di Cuasso al Monte		
Porfido Sardo		
Porfido Val d'Adige		
Porfirico Noce Radica		
Porfiroide Grigio - Ardesia di Branzi		
Porfiroide Grigio Scuro	Ardesia di Valleve	
Portoro		
Prali		
Quarzite Argentea		
Quarzite Cristallina		
Quarzite Verde Spluga		
Repen Classico		
Roman Stone		
Rosa Asiago		
Rosa Candoglia		
Rosa Ferula		
Rosa Predazzo		
Rosa Sardo		
Rosa Terlago		
Rosa Valtoce		
Rosatino		
Rosso Alamandino		
Rosso Antico di Sicilia - San Marco		
Rosso Asiago		
Rosso Cautano		
Rosso di Bolognetta		
Rosso di Sicilia- Rosso Montecitorio		
Rosso Levanto		
Rosso Rubino		
Rosso Santangelo		
Rosso Secca		
Rosso Trento	Ziresol	
Rosso Verona		
Rosso Verzegnis		
Rosvedo		
Santafiora		
Scaglia Bianca e Rossa		
Scaglia Rossa Umbra	Pietra di Assisi	

ITALY		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Serizzo Antigorio		
Serizzo Dubino		
Serizzo Formazza		
Serizzo Monte Rosa		
Serizzo Sempione	Simplon White	
Serizzo Valmasino		
Serpeggiante		
Serpeggiante di Trani		
Serpentino Classico		
Serpentino di Fundres		
Serpentinoscisto Valmalenco		
Sienite della Balma		
Sientie di Villagrande		
Silvabella		
Statuario (Venato)		
Stellato San Giacomo		
Trachite Euganea	Gialla Venata	Grigia
Trachite Sarda		
Travertino Ascolano		
Travertino di Gesualdo		
Travertino di Siena		
Travertino Etrusco		
Travertino Giallo Oro		
Travertino Montemerano		
Travertino Oniciato Bianco		
Travertino Romano	Chiaro Classico	Chiaro Venato
Tufo Giallo Napoletano		
Uliano Venato		
Venatino		
Venato Carrara	C-D	
Verde Acceglio		
Verde Alpi		
Verde Argento		
Verde Aver		
Verde Fleuran	Issogne	
Verde Gressoney		
Verde Imperiale		
Verde Issorie		
Verde Mare		
Verde S. Denis		
Verde Selene		
Verde Torre S. Maria		
Verde Vittoria		
Verde Vogogna	Quarzite Verde	
Verdello		
Verzino Frabosa		
Visone		
Zebrino Apuano		

ITALY - Em. Romag.	
Stone Name	**Alternative Name 1**
Arenaria di Cassio	Pietra di Cassio
Arenarie di Varana	
Grigio Ducale	Grigio Ducale Rosato
Macigno	
Marmo Verde Stella	
Molassa di Varignana	
Pietra Alberese	Colombino
Pietra da conci	
Pietra di Bedonia	Pietra di Carniglia
Pietra di Canossa	
Pietra di Montovolo	Arenarie ofiolitifere
Pietra di Scurano	
Pietra di Vergato	
Pietra Paesina	Pietra ruiniforme
Pietra Serena	
Rosso Napoleone	
Selenite	
Sponga	Tufo
Tufo di Renno	

LUXEMBOURG		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Gilsdorf Sandstone	Grès de Gilsdorf	
Luxembourg Sandstone	Grès du Luxembourg	Grès d'ERNZEN
Martelange slate	Ardoise de Martelange	
Rumelange limestone	Calcaires de Rumelange	

NORWAY		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Alta schist		
Altaskifer		
Antique	Blue Antique	Lundhs Antique
Antique Foncé	Hermelin	
Antique Foncé	Hermelin	
Arctic Black	Lødingen	
Arctic green	Antique Vérdatre	
Barents Blue		
Barents Red		
Bassebu Larvikitt		

NORWAY		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Bergan Larvikitt	Bergan	
Bindalmarmor	Sandra	Tundra
Bognesgranitt		
Budal Trondhjemitt		
Dovreskifer		
Drammengranitt	Røyken	
Evjengranitt		
Fåvangskifer		
Friarfjordskifer		
Furuli		
Gjellebekkmarmor		
Gneiss Royal		
Grorudsyenitt		
Høgsether	Otta Schist	
Iddefjordgranitt	Østfold Granite	
Innerdalen Trondhjemitt	Crystal White	
Koloritt		
Krukåsen Larvikitt	Lundhs Ocean	
Lilleberg		
Lindegneis		
Liskifer		
Lys Larvikitt	Lundhs Blue	Blue Pearl
Malerød	Lundhs Royal	
Malerød Larvikitt	Lundhs Royal	
Masikvartsitt		
Misværmarmor		
Mørk Larvikitt	Lundhs Emerald	Emerald Pearl
Mostermarmor		
Norwegian rose	Fauske marble	
Norwegian Rose	Fauske marble	
Nøtterøy Larvikitt		
Oppdalskifer		
Ottakleber		
Pillarguri	Otta Schist	
Porsgrunnmarmor		
Sel Royal	Otta Schist	
Snåsamarmor	Blue Olav	
Snåsaskifer		
Solørgabbro	Norwegian black	Hyperitt
Solvåg		
Stålaker Larvikitt	Lundhs Marina	Silver Pearl
Steigengranitt	Arctic Pink	
Stjørdalskifer	Sorte	
Støren		
Størengranitt		
Tolgagranitt		
Tønsberg Larvikitt		
Valdresskifer		
Verkengneis		
Vossaskifer		

PORTUGAL		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Abancado	Lioz Abancado	
Alabastrino	Alabastro de Vimioso	
Alpinina Clara	Alpinina Rosada	Alpinina Topázio
Alpinina Rosa Atlântida	Rosa Atlântida	
Amarelo Alpendorada		
Amarelo Cardielos		
Amarelo Cristal Transmontano	Amarelo Transmontano	
Amarelo Crucho		
Amarelo da Torre		
Amarelo de Figueira		
Amarelo de Fonte Arcada		
Amarelo de Luzelos	Amarelo Pardo	
Amarelo de Negrais		
Amarelo do Vimieiro		
Amarelo Gondomar	Ouro Velho	
Amarelo Macieira	Amarelo Beirão	
Amarelo Mondim		
Amarelo Penafiel		
Amarelo Pínzio		
Amarelo Ponte de Lima	Amarelo Limiano	
Amarelo Taias	Amarelo Fino	
Amarelo Trigo	Amarelo Estrela	
Amarelo Vila Real	Amarelo Real	
Amarelo Vitória		
Amarelo-Cela	Amarelo Castro Daire	
Ançã	Pedra de Ançã	Calcário de Ançã
Ardósia de Canelas		
Ardósia de Valongo	Lousa de Valongo	
Ardósia do Marão		
Azul Airão		
Azul Atlantis		
Azul Cascais	Cinzento Azulado	Cinzento Azulado de Cascais
Azul de Alpalhão	SPI	MFI
Azul Ferreiras		
Azul Fino		
Azul Gondomar	Azul Fino	
Azul Guerra	Azul Lagoa	
Azul Moleanos	Moleanos Azul	
Azul Palmeira		
Azul Ponte de Lima	Cinza Limiano	Cinzento Ponte de Lima
Azul Tragal	Cinzento Tragal	
Azul Transmontano	Azul Cristal Transmontano	
Azul Valverde	Azul Mónica	
Azulália	Azul de Évora	Cinzento Escuro
Azul-Cela	Cinza Castro Daire	
Azulino de Maceira	Lioz Azulino	
Banco do Fundo		
Basalto Malhadinha		
Beige Sonato	Beige Pacífico	Beige Pérola
Branco Aguiar	Cinzento Fino	Branco Micaela
Branco Almeida		
Branco Anilado		

PORTUGAL		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Branco Borba		
Branco Candoso		
Branco Caravela		
Branco com Vergadas		
Branco Coral	Coral White	Branco Miguel
Branco Corrente		
Branco da Neve		
Branco de Alcains		
Branco de Cabanas		
Branco de Ficalho		
Branco de Vila Real		
Branco de Vimioso		
Branco do Mar	Semi-Rijo do Arrimal	Salgueira / Abílio / Líbia
Branco do Olival Grande		
Branco do Porto	Branco	
Branco El-Rei		
Branco Estatuária		
Branco Estremoz		
Branco Lagoa		
Branco Levemente Venado		
Branco Luzelos		
Branco Maroteira		
Branco Pardais		
Branco Pérola		
Branco Rosado		
Branco Venado da Cruz dos Meninos		
Branco Venado da Fonte da Moura		
Branco Venado da Lagoa		
Branco Venado do Poço Bravo		
Branco Vigária		
Branco Vimieiro	Silver White	Kristal White
Brecha da Arrábida	Brecha Portugal	
Brecha de Santo António	Brecha Marítima	
Brecha de Tavira Amarela	Brecha Dourada	
Brecha Pérola	Brecha Lioz	
Brecha Portuguesa	Brecha da Ota	
Brecha Vermelha	Brecha de Tavira Vermelha	Brecha da Mesquita
Casas da Serra		
Chainette	Encarnadão Chainette	
Cinzala	Cizento de Sta. Eulália	
Cinzento Alpendorada	Azul Alpendorada	Cinzento Claro
Cinzento Antas	Antas Grise	Grigio Aveiro
Cinzento Ariz	Cinza Ariz	Zira Grey
Cinzento Claro		
Cinzento Claro	Pinheiro	Fino Pinheiro
Cinzento Claro com Bandas Escuras de Trigaches		
Cinzento de Carrazeda		
Cinzento de Castro Vicente		
Cinzento de Cinfães		
Cinzento de Montemuro		
Cinzento de Paços de Ferreira	Cinzento Escuro de Paços de Ferreira	Azul Cinzento/Negro Roriz/Cinzento Escuro Roriz

PORTUGAL		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Cinzento de Pinhel		
Cinzento de S. Torcato	Azul de Braga	
Cinzento de Satão	Silvã Fine Grey	
Cinzento Esmolfe	Cinzento de Penalva	
Cinzento Évora	Branco Preto do Barrocal	
Cinzento Fornos		
Cinzento Monchique	St. Louis	Sienito de Monchique
Cinzento Penafiel	Cinzento de Rio de Moinhos	Azul Penafiel
Cinzento Telões	Cinza Telões	
Cizento Arronches	Cinza Arronches	
Claro MR		
Creme Borba		
Creme do Mouro		
Creme Estremoz		
Creme Fátima	Creme Casal	Holly Stone
Creme Ficalho		
Creme Lagoa		
Creme Maroteira		
Creme MR		
Creme Pardais		
Creme Rosado		
Creme Rosado da Fonte Moura		
Creme Rosado El-Rei		
Creme Rosal		
Creme Rosal Unido		
Creme Venado		
Creme Venado		
Creme Venado da Lagoa		
Cristal amarelo	Amarelo Cristal	
Cristal Azul	Cristal Cinza	Cristal Branco
Encarnadão		
Encarnadão de Lameiras		
Encarnado da Pedra Furada		
Encarnado de Morelena		
Encarnado Negrais	Chitas	Roxo Negrais
Faticreme	Creme Valinho	Fátima B
Favaco	Cinzento Favaco	Preto Favaco
Grande Cristal		
Grande Cristal da Beira		
Isidora	Rosado Claro	
Jané	Gnaisse da Chainça	
Lagoa Fantasia		
Lioz	Lioz de Pero Pinheiro	
Lioz de Montemor		
Macheado de Castro Daire		
Marinela		
Moca Creme		
Moca Creme de grão médio		
Moleanos Macio		
Moleanos Rijo		
Negro de Mem Martins	Preto Mem Martins	
Pedra de Outil		

PORTUGAL		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Pedras Salgadas	Cinzento Claro de Pedras Salgadas	
Pele de Tigre		
Pernigem Claro		
Pernigem Escuro		
Preto de Arronches	Gabrodiorito de Arronches	
Preto de Odivelas	Gabro de Odivelas	
Preto do Alentejo	Negro Nacional	
Preto do Redondo	Verde do Redondo	
Preto Santa Comba		
Quartzito de Murça		
Relvinha	Moca Creme de grão fino	Moca Relvinha
Robrato	Pórfiro Ácido	
Rosa		
Rosa Arronches		
Rosa Aurora	Rosa Portugal	
Rosa Borba	Rosa Salmão	
Rosa Claro		
Rosa com Venado Esverdeado		
Rosa Covide		
Rosa Creme do Mouro		
Rosa D. João		
Rosa de Rosal	Rosal	
Rosa do Monte		
Rosa El-Rei		
Rosa Estremoz		
Rosa Lagoa		
Rosa Monção	Cristal Rosa	Rosa do Minho
Rosa Monforte	Forte Rosa	
Rosa MR		
Rosa Pardais		
Rosa Puro		
Rosa Salmão Venado		
Rosa Santa Eulália		
Rosa Venado da Lagoa		
Rosa Venado da Maroteira		
Rosa Venado de Cinzento		
Rosa Venado de S. Marcos	Rosa com Venado Encarniçado	
Rosa Venado do Olival da Encostinha		
Rosa Venado do Poço Bravo		
Rosa Vigária		
Ruivina	Ruivina Escuro	
Ruivina Claro		
Ruivina da Fonte da Moura		
Ruivina de Fonte da Moura		
Semi-rijo		
Semi-rijo do Codaçal		
Silver Grey Torre Monte		
St. Florient Rose	Abancado St. Florient Rose	
Topázio	Alpinina Blé	Alpinina Monsanto
Travertino		
Trigaches Claro	Cinzento Claro de Trigaches	

PORTUGAL		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Trigaches Escuro	Cinzento Anegrado de Trigaches	
Trigaches Vergado		
Verde Aragão	Verde Vera Cruz	
Verde de Serpa	Verde Atlântico	
Verde Donai	Serpente Verde	
Verde Escoural		
Verde Escuro da Herdade das Perdizes		
Verde Ficalho		
Verde Sampaio		
Verde Viana Cristal	Verde Cristal	Viana Cristal
Vermelho Barbacena	Rosa de Barbacena	
Vidraço de Ataíja Azul		
Vidraço de Ataíja Creme		
Vidraço de Moleanos	Creme Moleanos	
Xisto de Barrancos		
Xisto de Mourão		
Xisto Negro de Foz Côa	Ardósia de Foz Côa	Xisto do Poio Azulado
Xisto Oxidado de Foz Côa	Xisto do Poio Amarelado	

ROMANIA	
Stone Name	**Alternative Name 1**
Aghireș	
Albesti-Muscel	
Alun	
Anieș	
Băița	
Başchioi	
Bocșa	
Bologa	
Borsec	
Bratcu Meri	
Bucova	
Budeşti	
Bunila	
Buteasa	
Călugări	
Căprărie	
Căprioara	
Cărpiniș	
Cărpiniș	
Ceamurlia	

ROMANIA	
Stone Name	**Alternative Name 1**
Ciolanu	
Ciucurova	
Codru Babadag	
Cormaia	
Cresuia	
Cufoaia	
Deleni	
Forotic	
Găvăjdia	
Geoagiu	
Greci	
Guşeţel I	Gutetel
Iardaștița	
Izvorul Crișului	
Lespezi	
Letca	
Luncani	
Măcin	
Măgura - Buzău	
Mala	
Mateiaș	
Moigrad	
Moneasa	
Năieni	
Nicolae Bălcescu	
Novaci	
Ocna de Fier	
Orko	
Pietroasa Deva	
Pietroasa Sud-Est	
Podeni	
Pojoga	
Porumbacu	
Rapoltu Mare	

ROMANIA	
Stone Name	**Alternative Name 1**
Răstoci	
Remeţi	
Ruşchiţa	
Săvădisla	
Sohodol	
Stana	
Ticera	
Tișoviţa	
Topleţ	
Trei Fântâni	
Valea Șesului	
Vărănic	
Vaşcău	
Vaşcău	
Velniţa	
Vintere	
Viştea	Transilvanya Gold

SLOVENIA		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Apnenec Gradnik	Gradnik limestone	
Breča Želebej	Želebej breccia	Želebejska breča
Čizlakit	Cezlakite	
Drenov grič	Drenov grič limestone	Apnenec Drenovega griča
Gliniški apnenec	Glinice limestone	
Hotavlje rdeči	Red Hotavlje limestone	Rdeči hotaveljski marmor
Hotavlje roza	Rose Hotavlje limestone	Rožnati hotaveljski marmor
Hotavlje sivi	Grey Hotavlje limestone	Sivi hotaveljski marmor
Kazlje	Kazlje limestone	Tomajski apnenec
Kopriva	Kopriva limestone	
Lehnjak Jezersko	Jezersko travertine	
Lesno Brdo črni	Black Lesno Brdo limestone	
Lesno Brdo rdeči	Red Lesno Brdo limestone	
Lesno Brdo sivi	Grey Lesno Brdo limestone	
Lipica fiorito	Rožasti lipiški apnenec	
Lipica unito	Enotni lipiški apnenec	
Peračiški tuf	Peračica tuff	
Peščenjak	Jelarji sandstone	Peščenjak Jelarji
Peščenjak	Poljane-Puče sandstone	Peščenjak Poljane-Puče
Podpeški apnenec	Podpeč limestone	

SLOVENIA		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Pohorski marmor	Pohorje Marble	
Repen	Repen limestone	Repenski apnenec
Repen	Repen limestone	Repenski apnenec
Škofjeloški konglomerat	Škofja Loka conglomerate	
Tonalit	Tonalite	
Tonalit	Pohorje tonalite	Pohorski granit

SPAIN		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Alabastro		
Alabastro Matamala		
Alabastro Romano		
Albamiel		
Albero		
Aliste		
Alto Bierzo		
Amarillo Alicante	Amarillo Marés	Spanish Gold
Amarillo Macael Río	Amarillo Río	
Amarillo Macael Triana	Amarillo Triana	
Ambarino		
Anasol Macael	Anasol	
Arenisca Ariane	Arenisca de Valdeporres	
Arenisca Ronda		
Arenisca de Aguilar	Piedra de Aguilar	
Arenisca Dorada Urbión		
Arenisca de Quintanar		
Arenisca de Villamayor	Piedra de Villamayor	Piedra Franca de Villamayor
Arenisca Ojo de Perdiz		
Arenisca de Quintanar	Arenisca de Quintanar Beige	
Arenisca Quarcitica Argent		
Arenisca Valdeporres		
Arenisca Vermella	Arenisca Roja	
Azul Aran	Azul Arán	
Azul Claro		
Azul Platino		
Basalt de Castellfollit	Basalto de Castellfollit	
Bateig Azul	Piedra de Novelda	
Bateig Beig	Bateig Blanco	Piedra de Novelda
Bateig Llano	Bateig Fantasía	Piedra de Novelda
Bateig Fantasía	Piedra de Novelda	
Bateig Galaxy	Piedra de Novelda	
Beige Serpiente	Piel Serpentina	Beiserpiente
Blanco Alconera		
Blanco Aurora		
Blanco Castilla		
Blanco Chercos	Blanco Chercos Macael	
Blanco Cristal	Blanco Ártico	
Blanco Cóbdar Macael	Blanco Cóbdar	
Blanco Macael	Blanco Macael Río	
Blanco Macael Río Veteado		
Blanco Perla		

SPAIN		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Blanco Tranco	Blanco Tranco Macael	
Bronceado Sierra Elvira		
Caliza Alba		
Caliza Alcor		
Caliza Blanca Escalada		
Caliza Blanco Paloma		
Caliza Capri	Crema Levante	
Caliza del Páramo		
Caliza Marbella	Caliza Lorca	
Caliza Zarci	Caliza Lorca	
Caliza Sevilla	Crema Sevilla	Crema Gilena
Caramiel		
Crema Capri		
Crema Altea		
Crema Cenia	Cenia	
Crema Gilena	Moralejo Beige	
Crema Huéscar		
Crema Loja		
Crema Lorca	Caliza Zarce	
Crema Marfil Coto		
Crema Sierra Puerta		
Crema Marfil Zafra		
Crema Moralejo	Crema Sevilla	Moralejo Beige
Crema Nácar		
Crema Perla		
Crema Levante	Caliza Capri	Crema Pinta
Crema Senia		
Crema Valencia		
Emperador Oscuro	Emperador de Castril	
Crema Sevilla	Caliza Sevilla	
Crema Villamonte		
Dorado Conquistador	Gran Beige	
Dorado Perla		
El Caurel - Quiroga		
Emperador Buñol	Marrón Brisa	
Filita de Bernardos	Pizarra de Bernardos	Pizarra Gris Bernardos
Floresta	Piedra de Vinaixa	
Granito de Villavieja	Gris Yecla	
Silvestre	Gris Alba	Moreno Alba
Gris Campanario		
Gris Cardeñosa		
Gris Cehegín		
Gris Conquistador	Gran Gris	
Gris Los Santos		
Gris Macael		
Gris Mondariz	Mondariz	
Gris Morrazo		
Gris Nevada		
Gris Parga		
Gris Atiber	Albero Peral	
Gris Cadalso	Blanco Cristal	
Gris Perla		

SPAIN		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Gris Perla Crema		
Gris Pulpis		
Gris Quintana		
Gris San Vicente	Caliza San Vicente	
Gris de Sorihuela	Granito Gris Sorihuela	
Gris Villa		
Gris Zarza	Verde Estrella	
Grissal		
Iber Tuff	Crema Villamonte	
La Cabrera - Benuza		
La Cabrera - La Baña	Pizarra de la Cabrera Alta	
La Cabrera - Odollo	Odollo	
Lumaquela Rosella		
Lumaquela Rosada	Lumaquela Rosa	
Marrón Estrella		
Marrón Emperador		
Marrón Imperial	Emperador Oscuro, Marrón Imperial	
Rosa Mondariz		
Monte Rande		
Negro Esmeralda	Negro Galicia	
Negro Extremadura	Negro Ochavo	Negro Badajoz
Negro Marquina		
Negro Santa Olalla		
Tezal	Negro Tezal	
Negro Villar	Negro Encina	
Niwala crema	Niwala yellow	
Pacios-Quiroga Alta		
Pacios-Quiroga Baja		
Pedra de Banyoles		
Pedra de Folgueroles	Arenita Verde Musgo	Arenisca Verd Folgueroles
Pedra de Monistrol de Calders	Arenisca Beig Montjüic	Piedra de Rocafort
Perla Kaxigal		
Piedra Almorquí		
Piedra de Bernuy		
Piedra de Blanca	Piedra de Abaran	
Piedra de Boñar		
Piedra de Brañosera Amarilla		
Piedra de Caleruega		
Piedra de Campaspero		
Piedra de Carcedo		
Piedra de Colmenar		
Piedra de Hontoria		
Piedra de Silos		
Piedra de Ungo Nava		
Piedra del Cabezo	Piedra del Cabezo Gordo	
Piedra Maragata		
Pizarra Bernardos	Filita de Bernardos	Filita Gris de Bernardos
Pizarra de Villar del Rey		
Rojo Alicante		
Rojo Bilbao	Rojo Norte	Rojo Bidasoa
Rojo Carcabuey		

SPAIN		
Stone Name	**Alternative Name 1**	**Alternative Name 2**
Rojo Cehegin		
Rojo Coralito		
Rosa Buixcarro		
Rosa Dante		
Rosa Delta		
Rojo Espejón		
Rosa Porriño		
Rosa Sepúlveda	Piedra Rosa Sepuúlveda	Crema Sepúlveda
Rosa Valencia		
Rosa Villar		
Rosa Zarzi		
Rosabel	Rosavel	
Rubio Cardeñosa	Granito Rubio de Cardeñosa	
San Pedro de Trones Alto		
San Pedro de Trones Bajo		
San Pedro de Trones Medio		
San Román		
Silvestre Claro		
Silvestre Dorado		
Silvestre Moreno		
Tezal		
Rosa Fantasía		
Rosa Gala		
Rosa Levante		
Rosa Levante		
Rosa Lugo		
Travertino Macael Amarillo		
Travertino Macael Oro		
Travertino Rojo		
Valdeorras Los Molinos	Los Molinos	
Valdeorras Mormeau	Mormeau	
Valdeorras Rozadais	Rozadais	
Valdeorras San Vicente	San Vicente	
Valdeorras Casaio	Casayo	
Valdeorras Castañeiro	Castañeiro	
Valdeorras Domiz	Domiz	
Verde Lugo		
Verde Macael		
Vilarchao	Fonsagrada	Los Oscos