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Natural stone — Terminology

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ICS 91.100.15; 01.040.91

National foreword

This British Standard is the official English language version of EN 12670:2001.

The UK participation in its preparation was entrusted to Technical Committee B/545, Natural stone, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Management Centre: rue de Stassart, 36 B-1050 Brussels

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Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 246 "Natural Stone", the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2002, and conflicting national standards shall be withdrawn at the latest by June 2002.

This draft standard is one of a series of standards for natural stone products including denomination, test methods and product standards.

Annexes A and B are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The term Natural Stone groups several rock types with marked geological differences. The extraction elaboration and commerce of Natural Stone have set a very particular vocabulary. Many of these terms have been taken from the popular or quarrymen language, which sometimes is far from scientific definitions; this often results in a great deal of confusion.

This standard establishes the terminological bases for geological and petrologic definitions of Natural Stone and its classification. References to definitions of natural stone products, defined in other European Standards, are provided when necessary. It also incorporates most of the popular or commercial terminology.

The terminology covers the fields of geology, mining, processing, marketing and products of Natural Stone. The included scientific classifications allows to set the scientific name of the stone varieties.

1 Scope

This European Standard defines the recommended terminology covering scientific, and technical terms, test methods, products, and the classification of Natural Stones.

2 Terminology of Natural Stone

NOTE For the purposes of this European Standard the following abbreviations apply:

e.g. for example (Latin *exempli gratia*);

i.e. that is (Latin *id est*).

2.1 Geological terms

2.1.1 **accessory minerals:** Rock-forming minerals that occur in such small amounts that they are not included in the classification of the rock.

NOTE Accessory minerals can be used to state precisely the name of the rock, e.g. biotite granite. (See also EN 12440).

2.1.2 **acid rock:** Igneous rock that contains more than 65 % of silica.

2.1.3 **actinolite:** Ca-Mg-Fe-amphibole. See amphibole formula.

2.1.4 **agate:** Cryptocrystalline variety of silica, showing a variegated banded structure and waxy luster.

2.1.5 **agglomerate:** Extrusive pyroclastic rock of consolidated or unconsolidated coarse volcanic fragments (with diameters greater than 64 mm), in which rounded pyroclasts predominate.

2.1.6 **alabaster:** Fine grained, compact variety of gypsum, usually white or pale coloured and translucent.

2.1.7 **albite:** Sodium plagioclase, formula $Na\,[Al\,Si_3\,O_8]$ See plagioclase.

2.1.8 **alkali feldspar:** The alkali-rich feldspars microcline, orthoclase, sanidine, albite, with less than 5% anorthite. See feldspar and plagioclase.

2.1.9 **allochems:** One of the several varieties of discrete and organized carbonate aggregates that serve as the coarser framework grains in most mechanically deposited limestones. Important allochems include: silt, sand, gravelsize intraclasts ooids; pellets; lumps and fossils or fossil fragments.

2.1.10 **allotriomorphic; anhedral; xenomorphic:** Term applied to minerals which show in thin sections no characteristic or rational faces, suggested by its crystalline structure.

2.1.11 **alteration:** Changes of the mineralogical composition of a rock brought about by physical, chemical or biological means, including actions of hydrothermal solutions and weathering processes. Differs from metamorphism in being milder, more localized and not restricted to high temperatures.

2.1.12 **alumina; corundum:** A mineral, formula Al_2O_3. Used in fine polishing.

2.1.13 **amorphous:** Mineral that does not have a crystalline structure.

2.1.14 **amphibole:** Family of dark ferromagnesian silicate minerals, general formula $A_{2\text{-}3}B_5(Si,Al)_8O_{22}(OH)_2$, where A= Mg, Fe^{2+}, Ca, Na; B=Mg, Fe^{2+}, Fe^{3+}, Al.

2.1.15 **amphibolite:** Metamorphic rock consisting mainly of amphibole and plagioclase. See 3.2.3.1

2.1.16 **amygdaloidal:** Fabric of volcanic rocks where vesicles are present, which are full or partially filled with secondary minerals.

2.1.17 **analcime:** A mineral $Na\,[AlSi_2O_6]\,H_2O$ of the zeolite group, which can occur in basalts. See

also zeolite, secondary minerals.

2.1.18 **anhedral:** See allotriomorphic.

2.1.19 **anisotropy:** Property of some minerals and rocks of having different behaviour in different directions. i.e. hardness in kyanite, thermal expansion in calcite, flexural resistance in slate.

2.1.20 **andalusite:** Mineral Al_2SiO_5 polymorphous with sillimanite and kyanite.

2.1.21 **andesite:** Volcanic rock composed mainly of plagioclase (oligoclase-andesine) and one or more of the dark minerals amphibole, pyroxene, and biotite.

2.1.22 **anhydrite:** Sedimentary evaporitic mineral, formula $CaSO_4$.

2.1.23 **ankerite:** Mineral of dolomite group with calcium and iron.

2.1.24 **anorthite:** Calcic plagioclase, Ca $[Al_2Si_2O_8]$. See plagioclase.

2.1.25 **anorthoclase:** Sodium-rich mineral of the alkali feldspar group, formula $(Na,K)AlSi_3O_8$. Its composition, in term of the mole fraction of the orthoclase component (or) and the albite component (ab) is $or_{40}ab_{60}$ to $or_{10}ab_{90}$. See feldspar, microcline, plagioclase, orthoclase.

2.1.26 **anorthosite:** Plutonic rock mainly composed of plagioclase and little or no dark minerals. See 3.2.1.1.

2.1.27 **antiperthite:** Feldspar containing intergrowth lamellae of orthoclase in albite. See also feldspar and perthite.

2.1.28 **apatite:** Group of minerals, formula $Ca_5(PO_4,CO_3)_3(F,OH,Cl)$.

2.1.29 **aplite:** Fine grained dyke rock of granitic composition.

2.1.30 **aragonite:** Mineral, polymorphous with calcite, formula $CaCO_3$.

2.1.31 **arenite:** Consolidated sedimentary rock mainly composed of sand-size detrital fragments or mineral grains, usually the term is used with a prefix that refers to its composition or genesis, e.g. quartzarenite. See also 3.2.2.4

2.1.32 **argillite:** Consolidated sedimentary rock mainly composed wholly of detrital clay-size particles or clay minerals.

2.1.33 **arkose:** Sedimentary detrital rock with less than 75 % quartz and a high content of feldspar grains. See 3.2.2.4.

2.1.34 **augen fabric; ocellar fabric:** Fabric in some rocks, usually metamorphic, consisting of ellipsoidal or lens-shaped porphyroblasts, crystals, or fragments, rounded and enveloped by the foliation, resembling eyes (augen) in a cross section.

2.1.35 **augite (clinopyroxenes):** Mineral of the pyroxene group (clinopiroxenes), general formula $(Ca,Na)\ (Mg,Fe^{2+},Al)\ (Si,Al)_2O_6$

2.1.36 **banded:** Rock having alternating nearly parallel layers that differ in colour, fabric or mineral composition, and because of that it shows alternating bands in a cross section.

2.1.37 **basalt (basanite):**

a) Scientifically: volcanic rock consisting essentially of plagioclase (labradorite-anorthite) and pyroxene and includes a fine grained to dense fabric (See 3.2.1.3).

b) Commercially: basalt is a natural stone as per the scientific definition of basalt and other rocks such as basalt, picrites, diabases, dolerites and microgabbros.

2.1.38 **basic:** Igneous rock with more than 45 % and less than 52 % of silice.

2.1.39 **bedding plane:**

a) A planar or nearly planar surface that visibly separates the individual beds, layers or strata, especially in sedimentary rocks.

b) Any surface, even when conspicuously bent or deformed by folding.

2.1.40 **bioclastic rock:** Sedimentary rock consisting of fragments and broken remains of organisms; e.g. limestone composed of shell fragments.

2.1.41 **biotite:** Black rock-forming mineral of the mica group, formula $K(Mg,Fe^{2+})_3(Al,Fe^{3+})\ Si_3O_{10}(OH)_2$.

2.1.42 **blasto:** Prefix used to describe the metamorphic rock fabrics denoting the presence of residual crystals or pre-existing fabric modified by metamorphism, but still recognized; e.g. blastogranular, blastomylonitic.

2.1.43 **breccia:**

a) A coarse-grained clastic sedimentary rock composed by angular rock fragments held together by a mineral cement or in a fine grained matrix.

b) Rock consisting of highly angular coarse fragments, of whatever origin, for example, volcanic breccia (explosive origin), fault breccia (tectonic crushing origin), intraclastic breccia (sedimentary origin).

2.1.44 **Buntsandstein:** The lower part of Triassic Period. See 3.1.

2.1.45 **calcarenite:** Limestone consisting predominantly of recycled detrital calcite grains of sand size.

2.1.46 **calcareous:** Containing calcium carbonate.

2.1.47 **calcilutite:** Limestone consisting predominantly of detrital calcite grains or fragments of silt or clay size.

2.1.48 **calcirudite:** Limestone consisting predominantly of detrital calcite grains or fragments larger than sand size. See rudite.

2.1.49 **calcisiltite:** Limestone consisting predominantly of detrital calcite grains or fragments of silt size.

2.1.50 **calcite:** Mineral, very common in some sedimentary and metamorphic rocks, formula $CaCO_3$; trimorphous with aragonite and vaterite.

2.1.51 **calcitic dolomite:** Carbonate rock which 50 % to 89 % of the mineral dolomite. (See also 3.2.2.2).

2.1.52 **calcitic marble:** a marble containing more than 90 % of calcite.

2.1.53 **calc-silicate marble:** Marble with calcium and partially magnesium silicate minerals. See marble, ophicalcite, 3.2.3.2

2.1.54 **calc-schist; carbonate mica-schist:** Schist with carbonate minerals, in a lesser amount than a marble. See schist, 3.2.3.

2.1.55 **Cambrian:** The oldest system and period into which the Palaeozoic is divided. See 3.1.

2.1.56 **carbonate :** Mineral containing CO_3^{2-}; calcite, dolomite, magnesite, and siderite are frequent rock-forming carbonate minerals.

2.1.57 **carbonate rock:** Rock consisting chiefly of carbonate minerals, especially a sedimentary rock; limestone, dolomite, and carbonatite are examples of carbonate rocks. See 3.2.2.2.

2.1.58 **Carboniferous:** Period and system of the Palaeozoic. See 3.1.

2.1.59 **cataclastic:** Pertaining to the structure and texture produced in a rock by severe mechanical stress during dynamic metamorphism; bending, breaking, and fragmentation of the mineral grains are characteristic features; also said of the rocks exhibiting such structure. (See also breccia).

2.1.60 **cement:** Mineral materia, usually chemically precipitated, that occurs in the spaces among the individual grains of a consolidated sedimentary rock, thereby binding the grains together as a rigid mass; silica, carbonates and iron oxides are common cements.

2.1.61 **Cenozoic:** Era of geologic time. See 3.1.

2.1.62 **chalcedony:** Cryptocrystalline commonly fibrous variety of silica.

2.1.63 **chalcopyrite:** Mineral formula $CuFeS_2$.

2.1.64 **chalk:** Soft fine-grained limestone, consisting almost wholly of calcitic remains from microorganisms, usually white.

2.1.65 **charnockite:** Orthopyroxene-bearing. Member of granite family.

2.1.66 **chert:** Hard, compact and dense sedimentary rock, consisting dominantly of cryptocrystalline and/or amorphous silica; flint is a variety of chert.

2.1.67 **chlorite:** Group of clay minerals, some of them of green colour, general formula $(Mg, Fe^{2+}, Fe^{3+})_6 AlSi_3O_{10}(OH)_8$.

2.1.68 **chloritoid:** Micaceous mineral, formula $Fe_2Al_4Si_2O_{10}(OH)_4$.

2.1.69 **chromite:** Mineral formula $(Fe,Mg)(Cr,Al)_2O_4$.

2.1.70 **cipollino marble:** Calc silicate marble with band coloured structure, consisting in layers of calcite or dolomite grains mixed with variable quantities of silicate minerals.

2.1.71 **clast:** mineral or rock fragment composing clastic sedimentary rocks.

2.1.72 **clastic:** Pertaining to a rock or sediment composed principally of broken fragments that are derived from preexisting minerals, rocks or organic structures and that have been transported some distance from its original place.

2.1.73 **clay:** Loose, extremely fine grained sediment or soft rock composed of particles with diameters less than 0,002 mm, mainly of clay minerals and other minerals, especially quartz, feldspars, and carbonates (see 3.2.2.1).

2.1.74 **clay minerals:** Group of minerals, essentially hydrous silicates of aluminium with a layered crystalline structure; iron, magnesium, potassium, and other cations are also present in their formula; the most common clay minerals belong to illite, montmorillonite, and kaolinite mineral subgroups.

2.1.75 **clay slate; shale:** A weakly metamorphosed claystone with intermediate character between a claystone and a true slate.

2.1.76 **claystone:** A rock with more than 67 % claysized minerals.

2.1.77 **cleavage:**

a) Tendency of a rock to split along closely spaced planar surfaces, originated by recrystallization and strain during metamorphism and tectonic deformation; the type of rock, strain intensity, and metamorphic grade, control the type of cleavage developed; see slaty cleavage, crenulation cleavage, schistosity, and rough cleavage;

b) The splitting of a mineral along its crystallographic planes, thus reflecting crystal structure.

2.1.78 **columnar:** A structure of some volcanic rocks, such as basalt, consisting of parallel, prismatic columns, polygonal in cross section, nearly perpendicular to the top and the bottom of the flow.

2.1.79 **comb layering; Willow-Lake layering:** A fabric of igneous rocks consisting of bands of elongated crystals with nearly vertical mineral-elongation relative to the border of the bands.

2.1.80 **concretion:** A collective term applied loosely to various primary and secondary segregations of diverse origin, including irregular nodules, spherulites, crystalline aggregates, geodes, septarias and related bodies.

2.1.81 **conglomerate:** Coarse-grained sedimentary rock composed of rounded to subangular fragments (pebbles, cobbles, boulders), set in a fine-grained matrix of sand or clay, and commonly cemented.

2.1.82 **consertal:** Fabric of rocks showing toothed border lines between two minerals.

2.1.83 **contact (between grains):** Mode of relation between grains of rock-forming minerals; i.e. by points, by lines, within the matrix.

2.1.84 **coral rock:** Coral reef limestone.

2.1.85 **corona:** A fabric of igneous rocks where minerals are surrounded by a seam of one or more other minerals; particular examples are the rapakivi fabric and kelyphitic rims.

2.1.86 **cordierite:** A silicate mineral, common in some metamorphic and magmatic rocks, formula $(Mg,Fe)_2Al_4Si_5O_{18}$.

2.1.87 **Cretaceous:** The youngest of the periods and systems included in the mesozoic. (See 3.1).

2.1.88 **cross-bedding:** Cross-stratification with thick individual beds

2.1.89 **crossed twinning:** Lamellae of mineral twins after two laws making in thin sections a grid as seen in microcline.

2.1.90 **cryptocrystalline:** Composed of crystal so fine that they cannot be recognized even under polarizing microscope.

2.1.91 **crystal zoning:** A fabric of igneous rocks with concentric layers in the minerals made by inclusions or variations in chemical composition e.g. in plagioclases.

2.1.92 **dacite:** Volcanic rock with quartz, plagioclase, alkali feldspar, and often dark components. (See 3.2.1.3).

2.1.93 **dark mineral; mafic mineral:** In thin section dark-coloured rock-forming minerals, e.g. olivine, pyroxenes, amphiboles and biotite.

2.1.94 **decussate:** Fabric of granoblastic metamorphic rocks in which the crystals tend to be elongated or prismatic and randomly oriented.

2.1.95 **dedolomitization:** The change of dolomite into calcite and periclase (brucite).

2.1.96 **deformation fabric; tectonic fabric:** A rock fabric resulting from deformation, as lineations, cleavages, schistosities, folds, preferred orientations of crystals etc**.** (See fabric).

2.1.97 **devitrification:**The process by which glassy parts of rocks change into crystalline minerals.

2.1.98 **Devonian:** A system of the Paleozoic Erathem above the Silurian and below the Carboniferous. See also 3.1.

2.1.99 **diabase:** Altered basaltic rocks like dolerites.

2.1.100 **diagenesis:** Process of mineralogical changes in sediments after deposition which result in a consolidated rock.

2.1.101 **diorite:** Plutonic rock mainly composed of plagioclase (oligoclase-andesine), hornblende, and/or biotite.

2.1.102 **dip:** Inclination of a bed to the horizontal; the dip is at a right angle to the strike.

2.1.103 **dolerite:** Igneous rock with basaltic composition, commonly with ophitic fabric, ocurring in dykes. See also diabase.

2.1.104 **dolomite:**

1) The mineral $CaMg(CO_3)_2$, commonly with some Fe replacing Mg (ankerite).

2) Carbonate rock with high percentage (90 % to 100 %) of the mineral dolomite. (See 3.2.2.2).

2.1.105 **dolomitic limestone:** Carbonate rock with a certain percentage (10 % to 49 %) of the mineral dolomite. (See 3.2.2.2)

2.1.106 **dolomitic marble; magnesian marble:** a marble containing dolomite more than 90 % dolomite.

2.1.107 **dyke (or dike):** A tabular or nearly tabular body of igneous rock that cuts across the geological structure of other rocks.

2.1.108 **eclogite:** Metamorphic rock consisting essentially of garnet and sodic pyroxene (omphacite)..

2.1.109 **elongate fabric:** Fabric of granoblastic metamorphic rocks in which the crystals tend to be elongated with preferred orientation.

2.1.110 **epidote:** A mineral $Ca_2(Fe,Al)Al_2[O(OH)(SiO_4)(Si_2O_7)]$ common in some metamorphic rocks or as alteration product.

2.1.111 **equigranular fabric:** Rock containing crystals of a similar size.

2.1.112 **erathem:** Chronostratigraphic unit. An erathem consists of several adjacent systems.

2.1.113 **essential minerals; main minerals:** Those minerals existing in a rock that are used for its classification in main petrographic families or classes; see quartz, alkali feldspar, plagioclase, feldspathoids. (See also EN 12407).

2.1.114 **essexite:** Plutonic rock composed essentially of plagioclase, alkali feldspar, feldspathoids e.g. nepheline, and dark minerals.

2.1.115 **eucrystalline; eucrystallized:** Well crystallized igneous rocks.

2.1.116 **euhedral; idiomorphic:** A mineral grain in an igneous rock which is bounded entirely by its crystal faces.

2.1.117 **exfoliation:** The process by which concentric or parallel scales of rock are spalled from the surface of a large rock mass.

2.1.118 **extrusive rocks; volcanic rocks:** Igneous rocks that come to the surface of the earth in a molten condition.

2.1.119 **fabric:** Spatial arrangement and geometrical relationships of the rock elements, as observed in hand specimen or by optical microscope.

2.1.120 **fabric, depositional:** A fabric resulting from deposition of sediments or gravity differentiation of igneous rocks.

2.1.121 **fabric element:** Rock component that acts as a unit in deformation.

2.1.122 **fabric, growth:** Fabric grown without stress and movement.

2.1.123 **facies:** General appearance or nature of a rock mass, differentiating such unit from adjacent or associated units.

2.1.124 **fault:** A fracture with displacement of the sides.

2.1.125 **feldspar:** Group of silicate minerals with the chemical composition $KAlSi_3O_8$ (orthoclase, microcline), $NaAlSi_3O_8$ (albite), $CaAl_2Si_2O_8$ (anorthite) with certain miscibility of these components; see anorthite, microcline, orthoclase, sanidine, plagioclase.

2.1.126 **feldspathic:** Containing feldspar in a considerable amount.

2.1.127 **feldspathic sandstone; subarkose:** A sandstone with less feldspar than an arkose (less than 15 % matrix, between 75 % and 95 % quartz, more feldspar, and less fragments of rocks). (See 3.3.2.2).

2.1.128 **fels:** A suffix added to the name of a a mineral, indicating a metamorphic rock with more than 80 % of that mineral, e.g. albite-fels, quartz-fels=quartzite. (See 3.2.3.1).

2.1.129 **felsic:** Containing feldspar, feldspathoids and other light silicates like quartz.

2.1.130 **ferruginous:** Containing iron.

2.1.131 **fissile bedding:** Bedding with laminae less than 2 mm in thickness.

2.1.132 **fissility:** The property of splitting easily along closely spaced parallel planes.

2.1.133 **fissure:** A visible crack or fracture in the rocks.

2.1.134 **flint:** Variety of chert.

2.1.135 **flow fabric:** Fluidal fabric in the groundmass of rocks shown by a wavy or swirling pattern of the constituent minerals.

2.1.136 **fluorite:** A mineral, formula CaF_2.

2.1.137 **foidite (feldspathoidite):** A volcanic rock with high percentage (more than 60 %) of foids. (See 3.2.1.3).

2.1.138 **foidolite (feldspathoidolite):** A plutonic rock with high percentage (more than 60 %) of foids. (See 3.2.1.1).

2.1.139 **foids (feldspathoids):** Minerals similar to the feldspars but with less silica content e.g. leucite, nepheline, sodalite.

2.1.140 **fold:** A bend in formerly planar or tabular rock bodies.

2.1.141 **foliation:** Planar arrangement of components like minerals in any type of rock, especially the planar structure that results from flattening, segregation and other processes undergone by the grains in a metamorphic rock. (See also cleavage).

2.1.142 **formation:** The basic stratigraphic unit identified by lithic characteristics and fossils.

2.1.143 **fossil:** The remains or marks of animals or plants in sedimentary rocks.

2.1.144 **gabbro:** A coarsed grained plutonic rock consisting of plagioclase (labradorite-anorthite), clinopyroxene, and other minerals like orthopyroxene, and olivine. (See 3.2.1.1).

2.1.145 **garnet:** A group of minerals of formula $x_3y_2(SiO_4)_3$ where x=Ca,Mg,Fe^{2+},Mn^{2+} and y=Al,Fe^{3+},Mn^{3+},V^{3+},Cr.

2.1.146 **geode:** Globular bodies in sediments often containing fossils and crystals.

2.1.147 **geological structure:**

a) A macroscopic feature of a rock mass or rock unit, generally seen best in the outcrop rather than in hand specimen, e.g. columnar structure, blocky fracture, platy parting, bedding.

b) The general disposition, attitude, arrangement or relative positions of the rock units of a region or area, resulting from such geological processes as sedimentation, faulting, folding, igneous intrusion, etc.

2.1.148 **glass:** Non-crystallized product of the rapid cooling of a magma.

2.1.149 **glauconite:** A green mineral closely related to biotite and essentially an hydrous potassium iron aluminium silicate in sedimentary rocks, formula $(K,Na)(Al,Fe^{3+},Mg)_2(Al,Si)_4O_{10}(OH)_2$.

2.1.150 **gneiss:** A metamorphic rock mainly consisting of quartz, feldspar and mica, in which bands rich in granular minerals such as feldspar and quartz, alternate with bands of planar minerals like mica. Might derive from an igneous rock (orthogneiss) or from a sedimentary rock (paragneiss). (See leptite and 3.2.3).

2.1.151 **gneissose, gneissic fabric:** Fabric in metamorphic rocks in which bands rich in granular minerals alternate with bands of planar minerals.

2.1.152 **goethite:** A mineral (α-FeOlOH).

2.1.153 **graded bedding:** Stratification in which each stratum shows a gradation in grain size from coarse to fine.

2.1.154 **grain:** Particles of a rock e.g. the crystals in a granite.

2.1.155 **grain size:** The predominant diameter of particles in a rock as observed.

2.1.156 **granite:**

a) Scientifically: Plutonic rock with alkali feldspar, quartz, little quantities of plagioclase, mica, and other minerals. (See 3.2.1.1).

b) Commercially: Compact and polishable natural stone, used in decoration and building, mainly consisting of minerals with a hardness between 5 and 7 on the Mohs scale, such as quartz and feldspar, e.g. granite as per the scientific definition, other plutonic rocks, volcanic rocks with porphyritic structure, metamorphic rocks with mineralogical composition similar to granitoids such as gneiss, and limestone in some regions of Europe. (See hardness scale).

2.1.157 **granite, black:** A commercial term for black or dark coloured igneous rocks. (See gabbro).

2.1.158 **granoblastic:** Fabric of metamorphic rocks in which the grains are of nearly equal size.

2.1.159 **granodiorite:** A plutonic rock resembling granite but with less alkali feldspar and with more plagioclase. (See 3.2.1.1).

2.1.160 **granofelsose:** Fabric of granoblastic metamorphic rocks with little or no foliation or lineation.

2.1.161 **granophyric:** A variety of graphic fabric with more or less intergrowth of alkali feldspar and quartz e.g. around plagioclases.

2.1.162 **granular:** Term applied to rocks with nearly equal grains.

2.1.163 **granulite:** A metamorphic rock with K-feldspar, quartz and garnet and/or different other minerals and no primary muscovite.

2.1.164 **graphic:** A fabric of igneous rocks resulting from a regular intergrowth of two minerals and showing graphic patterns in sections, e.g. in graphic granite.

2.1.165 **graphite:** Mineral, one of the two natural occuring forms of crystalline carbon, the other being diamond.

2.1.166 **greywacke:** A sandstone with abundant (more than 15 %) matrix. (See 3.2.2.5).

2.1.167 **greenschist:** A schistose metamorphic rock with albite whose green colour is due to the presence of chlorite, epidote, or actinolite. (See 3.2.3.1).

2.1.168 **greenstone:** An altered igneous rock with chlorite, hornblende, epidote, and with comparatively low silica content.

2.1.169 **grit:** Sedimentary rock with coarse and angular grains.

2.1.170 **groundmass; matrix:** The material between the grains or inclusions in a rock.

2.1.171 **growth fabric:** Crystal arrangement determined by more or less free growth from a plane or a centre.

2.1.172 **gypsum:** A mineral $CaSO_4.2H_2O$ also called selenite; the dense varieties are called alabaster.

2.1.173 **habit:** The characteristic crystal form or combination of forms of a mineral, including characteristic irregularities; i.e. idiomorphic.

2.1.174 **heavy minerals:** Accessory minerals with a density greater than 2,9 g/cm^3.

2.1.175 **hematite:** A mineral, alpha-Fe_2O_3.

2.1.176 **heteroblastic fabric:** Term referring to metamorphic rocks composed of crystals with a range of sizes.

2.1.177 **holoblast:** Newly grown mineral.

2.1.178 **holocrystalline fabric:** A term generally applied to rocks consisting almost entirely of cristallized minerals.

2.1.179 **holohyaline:** A term generally applied to rocks consisting almost entirely of glass.

2.1.180 **homeoblastic:** Term referring to metamorphic rocks composed of crystals of approximately equal size.

2.1.181 **hornblende:** Monoclinic amphibole with Al_2O_3 and Fe_2O_3 (See amphibolite).

2.1.182 **hornfels:** A nonfoliated often banded, fine-grained, metamorphic rock with quartz, feldspar, and other minerals; typically formed by thermal metamorphism.

2.1.183 **host:**

a) A mineral containing an inclusion.

b) A rock body containing other, small bodies which are not indigenous but allochthonous.

2.1.184 **hydrothermal:** An adjective applied to processes, formations, and products, usually of magmatic origin, made by hot water or steam.

2.1.185 **hypidioblastic fabric:** A mineral constituent of a metamorphic rock which is bounded only in part by its own crystal faces. Analogous to the term subhedral in igneous rocks.

2.1.186 **hypidiomorphic; subhedral:** A mineral grain in a rock which is bounded by only some of its crystal faces.

2.1.187 **idioblastic:** A mineral constituent of a metamorphic rock which is bounded in part by its own crystal faces. Analogous to the term euhedral in igneous rocks.

2.1.188 **igneous rock, eruptive rock:** A rock formed by solidification from molten material (magma).

2.1.189 **ignimbrite:** A pyroclastic volcanic rock either welded on deposition or subsequently lithified.

2.1.190 **illite:** Micaceous clay mineral of the phyllosilicate group.

2.1.191 **impactite:** Finely crystalline or glassy material or breccia produced by a meteorite impact like suevite.

2.1.192 **inclusion:** A small crystal, fragment, gas, or liquid filled void within a larger crystal.

2.1.193 **intergranular fabric:** A fabric where there is a grain or an aggregation of grains e.g. mostly pyroxene filling the spaces between laths of plagioclases.

2.1.194 **intergrowth:** A term applied to the interlocking of different crystals due to simultaneous crystallisation e.g. perthite.

2.1.195 **intermediate rock:** Said of an igneous rock that is transitorial between acid and basic.

2.1.196 **intersertal fabric:** A fabric in igneous rocks where glass and small crystals infill the spaces between laths or plates of plagioclases.

2.1.197 **intraclast:** A general term for a component of a limestone, representing a redeposited fragment of a previous sediment.

2.1.198 **intrusive rock:** Igneous rocks which have invaded a pre-existing rock.

2.1.199 **ironstone:** A clayey or compact rock consisting largelly of iron minerals.

2.1.200 **Jurassic:** System of Mesozoic (See 3.1).

2.1.201 **kaolinite:** A common clay mineral with the general formula $Al_4(Si_4O_0)(OH)_8$.

2.1.202 **karst:** Applied to the characteristic landscape and structures developed in limestone, gypsum, and other soluble rocks by the effects of solution weathering.

2.1.203 **kelyphytic rims:** Corona structure composed of microcrystalline aggregates of fibrous pyroxene or amphibole developed around olivine or garnet.

2.1.204 **K-feldspar:** Potassium feldspar; see microcline, orthoclase, sanidine.

2.1.205 **kerf:** Continuous groove cut into the side of a stone unit for the inserting of anchoring devices. (See also anchor).

2.1.206 **kyanite; disthene:** A mineral, polymorphous with andalusite and sillimanite, formula Al_2SiO_5.

2.1.207 **labradorescence; schiller:** An optical phenomenon consisting of flashes or iridescence

visible when the mineral or rock is moved in the light, as seen in some plagioclases; see feldspar, plagioclase.

2.1.208 **laccolith:** A concordant dome-like intrusion which arches the overlying rocks and has a floor which is generally horizontal.

2.1.209 **lamprophyre:** Dark igneous dyke rocks characterised by abundant mafic phenocrysts, most commonly biotite, hornblende or augite.

2.1.210 **lapilli:** Small pyroclastic fragments of lava. (See 3.2.1.4).

2.1.211 **larvikite:** A syenite or monzonite characterised by the distinctive blue labradorescence of its feldspars.

2.1.212 **latite:** A volcanic rock with roughly equal proportions of plagioclase and alkali feldspar. (See 3.2.1.3).

2.1.213 **lava:** Igneous magma which is extruded from a volcano or fissure in the earth's surface.

2.1.214 **layer:** Bed or stratum of rock.

2.1.215 **lepidoblastic fabric:** A textural term applied to the flaky cleavage resulting from the parallel alignment of sheet silicate minerals, such as micas and chlorites in metamorphic rocks.

2.1.216 **leptite:** Fine-grained, often banded gneiss, often resulting from metamorphism of a volcanic rock or by thermal metamorphism of other rocks; e.g. hälleflinta.

2.1.217 **leucite:** A feldspathoid mineral, $KAlSi_2O_6$, found in potassium rich volcanic rocks.

2.1.218 **leuco:** Prefix meaning white, weakly coloured, or colourless.

2.1.219 **leucocratic:** A term applied to light coloured rocks, generally of igneous type.

2.1.220 **light minerals:** Rock-forming minerals with a density less than 2,9 g/cm^3, e.g. quartz, feldspar.

2.1.221 **limestone:** A sedimentary rock consisting chiefly of calcite, $CaCO_3$. (See 3.2.2.2).

2.1.222 **limonite:** Hydrated iron oxide FeOOH.

2.1.223 **linear cleavage:** The property of splitting into large rod-like fragments, seen in some foliated metamorphic rocks, due to the intersection of two cleavage sets.

2.1.224 **lineation:** A general descriptive term for any kind of linear (one-dimensional) feature in the fabric of a rock.

2.1.225 **lithic:** A term applied to rock fragments occurring in a later formed rock, e.g. in a tuff or ash.

2.1.226 **lithic tuff:** A pyroclastic tuff composed predominantly of rock fragments. (See 3.2.1.4).

2.1.227 **lithification:** The conversion of a newly formed sediment into a rock.

2.1.228 **lithographic limestone:** An extremely fine-grained micritic limestone.

2.1.229 **lithographic structure:** A term used to describe grain size in calcareous sedimentary rocks, where it is homogeneous and very fine (clay size).

2.1.230 **lithology:** The general character of a rock, particularly as seen in field-exposures and hand specimens; i.e., its mineral composition, fabric, primary structures, and the smaller-scale secondary structures.

2.1.231 **lithostratigraphy:** Stratigraphy based on the petrological characteristics of the rocks.

2.1.232 **lithotype:** Rock defined on the basis of certain selected petrological characteristics.

2.1.233 **longrain:** preferred direction of cut in slates and other rocks.

2.1.234 **lumachelle:** A limestone consisting of fossil mollusc shells like bivalves.

2.1.235 **macroclastic:** Composed of fragments visible without magnification.

2.1.236 **macrostructure:** Structural feature of a rock which can be seen without magnification.

2.1.237 **mafic:** A term referring to ferromagnesian minerals and rocks composed largely of these minerals.

2.1.238 **magma:** Molten rock material within the earth.

2.1.239 **magnesian limestone; dolomitic limestone:** Carbonate rock with 10 to 49% of the mineral dolomite. (See 3.2.2.2).

2.1.240 **magnesite:** A mineral, formula $MgCO_3$.

2.1.241 **magnetite:** A strongly magnetic mineral, formula $(Fe,Mg)Fe_2O_4$.

2.1.242 **main minerals:** Those rock-forming minerals that occur in sufficient amount to be used in the classification of the rock.

2.1.243 **marble:**

a) Scientifically: Metamorphic rock containing more than 50 % of carbonates (calcite or dolomite) formed by metamorphic recrystallization of a carbonate rock. (See 3.2.3.2)

b) Commercially: Compact and polishable natural stone, used in decoration and building, mainly consisting of minerals with hardness between 3 and 4 on the Mohs scale (such as calcite, dolomite or serpentine), e.g. marbles as per the scientific definition and cipolino marbles, as well as the following natural stones, provided that they are capable of taking a mirror polish: limestone marbles, limestones, dolomites, calcareous breccias, travertines and serpentinites. (See Mohs scale).

2.1.244 **marl:** A mixture of calcite and clay (See 3.2.2.1).

2.1.245 **massive:** Of homogenous structure, without stratification, foliation,flow-banding, schistosity, and the like, said of some rocks e.g. granites and limestones from reefs.

2.1.246 **matrix:** In a rock in which certain grains are much larger than the others, the grains of smaller size or even the glass are called the matrix, e.g. the groundmass of porphyritic igneous rocks; may be used also in sedimentary rocks.

2.1.247 **meta:** Prefix indicating the parent rock has undergone a low grade metamorphic process (e.g. metasediments, metavolcanics).

2.1.248 **metamorphic grade:** Estimated intensity or rank of metamorphism, measured by the difference in minerals between the assumed parent rock and the resulting metamorphic rock.

2.1.249 **metamorphic rock:** Includes all those rocks which have formed from a preexisting or parental rock by metamorphism (See 3.2.3).

2.1.250 **metamorphism:** Process by which consolidated rocks are altered in their nature adjusting the mineralogical composition, structure, and texture to the different physico-chemical conditions existing in the earth; diagenesis is usually not considered as metamorphism.

2.1.251 **metasomatism:** Metamorphic process by which the chemical composition of a rock or rock portion is altered in a pervasive manner and which involves the introduction or removal of substances, others than H_2O and CO_2.

2.1.252 **miarolitic:** The fabric applied to small cavities in igneous rocks, especially common in granites, into which small crystals project.

2.1.253 **mica:** A mineral group consisting of silicates characterized by very perfect basal cleavage, the formula of the group is $(K,Na,Ca)(Mg,Fe,Li,Al)_{2-3}\ (Al,Si)_4O_{10}(OH,F)_2$ See biotite, muscovite.

2.1.254 **micacite:** A metamorphic rock whose essential constituents are mica and quartz and whose schistosity is mainly due to parallel arrangement of mica flakes. Syn: mica schist.

2.1.255 **micrite:** Fine crystalline matrix of limestones (See 3.2.2.1).

2.1.256 **microcline:** A member of the feldspar group, composition $KAlSi_3O_8$. See also feldspar.

2.1.257 **microcrack:** crack observable only in microscope.

2.1.258 **microcrystalline; microgranular:** Applied to a rock in which the individual crystals can only be seen under the microscope.

2.1.259 **microfabric:** Refers to the microscopical structure and texture of a rock.

2.1.260 **migmatite:** A metamorphic mixed rock in which two components are intimately mingled, a host material representing pre-existing rocks and a granitic componenet which is at least in part derived from an outside source.

2.1.261 **mineral:** A homogeneous naturally occurring solid phase.

NOTE The solid parts of living plants and animals are not regarded as minerals.

2.1.262 **mineral replacement:** The process of practically simultaneous disintegration and deposition by which a new mineral of partly or wholly differing chemical composition may grow in the body of an old mineral or mineral aggregate.

2.1.263 **minor elements:** Components with concentrations less than 0,5 %.

2.1.264 **modal composition; mode:** Mineral content of a rock determined by polarizing microscope in volume percentage.

2.1.265 **Mohs scale; hardness scale:** The empirical scale developed by Mohs in which the relative hardness of a mineral is assessed: 1. Talc; 2. Gypsum; 3. Calcite; 4. Fluorite; 5. Apatite; 6. Orthoclase; 7. Quartz; 8. Topaz; 9. Corundum; 10. Diamond.

2.1.266 **monzonite:** A group of plutonic rocks standing compositionally between syenite and diorite (See 3.2.1.1).

2.1.267 **mosaic fabric:** Applied to the fabric sometimes seen in rocks whose crystal fragments are angular and granular and appear, in polarized light, like the pieces of a mosaic.

2.1.268 **mudstone; pelite:** Fine sediments like clay, silt, siltstone, claystone, shale, and argillite.

2.1.269 **muscovite:** A member of the mica group, usually white, general formula $KAl_2(AlSi_3)O_{10}(OH,F)_2$

2.1.270 **mylonite:** Fine-grained, laminated rock with deformation fabric and grains showing a reduction in size, formed by brecciation and milling of rocks during deformation. Mylonites that show recrystallization are called blastomylonites.

2.1.271 **myrmekitic fabric:** Fabric of igneous rocks showing an intergrowth of plagioclase with worm-like quartz often penetrating into alkali feldpar.

2.1.272 **natural stone:** A piece of naturally occurring rock.

2.1.273 **nematoblastic fabric:** Fabric of a recrystallized rock in which the shape of the grains is threadlike.

2.1.274 **nepheline:** Silicate mineral of the feldspathoids group, formula $(NaK)AlSiO_4$.

2.1.275 **nepheline syenite:** Plutonic rock consisting of alkali feldspar, nepheline, and an alkali amphibole or pyroxene. (See 3.2.1.1).

2.1.276 **nephelinite:** A foidite composed primarily of nepheline and mafic minerals. (See foidite and 3.2.1.1).

2.1.277 **nodule:** Small more or less rounded body generally somewhat harder than the enclosing sediment or rock matrix.

2.1.278 **norite:** A plutonic rock like gabbro but with more orthopyroxene than clinopyroxene. (See 3.2.1.1).

2.1.279 **nummulite limestone:** A formation made up chiefly of fossil shells of certain foraminifers (nummulites).

2.1.280 **obsidian:** Dark rhyolitic volcanic glass. (See rhyolite).

2.1.281 **ocellar:** See augen fabric.

2.1.282 **olivine:** Silicate mineral series of solid solutions from forsterite, Mg_2SiO_4, with fayalite, Fe_2SiO_4.

2.1.283 **onyx:** A variety of chalcedony consisting of alternating layers. (See also chalcedony).

2.1.284 **ooid; oolith:** Spherical to ellipsoidal body which may or may not have a nucleus and has concentric or radial structure or both, it is usually calcareous, but may be siliceous, hematitic, or of other composition.

2.1.285 **opal:** Non-crystalline mineral made by tiny balls of $SiO_2 \cdot nH_2O$.

2.1.286 **opaque minerals:** Minerals that are impervious to visible light, observed in thin section. See thin section.

2.1.287 **ophicarbonate rocks:** (ophicalcite, ophidolomite, ophimagnesite) fragment of serpentinite cemented by carbonate.

2.1.288 **ophiolite:** Group of igneous rocks ranging from spilite and basalt to gabbro and peridotite and also the metamorphic rocks derived from them.

2.1.289 **ophitic fabric:** Term referring to laths of plagioclase embedded in augite crystals, also in other rocks and by other minerals, e.g. in dolerites.

2.1.290 **orbicular fabric; spheroidal fabric:** Fabric in certain holocrystalline rocks (e.g. in granites and diorites) due to the occurrence of concentric shells of different mineral composition.

2.1.291 **Ordovician:** The second of the periods comprised in the palaeozoic era. (See 3.1).

2.1.292 **dimensional oriantation:** Preferred orientation showing a pattern dependent on shapes of fabric elements.

2.1.293 **orthoclase:** Member of the feldspar group, composition $KAlSi_3O_8$ (or). See also alkali feldspar and feldspar.

2.1.294 **orthogneiss:** A gneiss derived from an igneous rock.

2.1.295 **orthopyroxene:** Pyroxenes crystallizing in the orthorhombic system, and usually containing no calcium or little or no aluminium.

2.1.296 **orthoschist:** Schist derived from an igneous rock. (See also schist).

2.1.297 **overgrowth:** Secondary material deposited in continuity with a crystal grain, common in some sedimentary rocks.

2.1.298 **Palaeozoic:** The first era in the earth's history with abundant fossil remains following the precambrian time with very rare traces of fossils. (See 3.1).

2.1.299 **paragneiss:** A gneiss derived from a sedimentary rock. See gneiss.

2.1.300 **paraschist:** A schist derived from a sedimentary rock. See also schist.

2.1.301 **parting:** The tendency of crystals to separate along certain planes that are no true cleavage planes.

2.1.302 **pebbles:** Smooth rounded stones ranging in diameter from 4 mm to 63 mm.

2.1.303 **pegmatite:** Very coarse grained igneous rock in dykes associated with a plutonic rock.

2.1.304 **pelite; mudstone:** Group of rocks containing fine sediments like clay, silt, claystone, siltstone, shale, and argillite.

2.1.305 **pellet:** Small aggregation of sedimentary material.

2.1.306 **peridotite:** Plutonic rock consisting of 40 % to 90 % olivine with pyroxene, hornblende, and other minerals. (See 3.2.1.2).

2.1.307 **Permian:** Last period of the palaeozoic era (See 3.1).

2.1.308 **perthite:** Feldspar containing intergrown lamellae of albite in microcline.

2.1.309 **petrography:** Description and classification of rocks by analysis of origin, fabric and mineral content, e.g. with polarizing microscope, X-ray diffraction, chemical analysis or other means.

2.1.310 **phaneritic:** Texture of igneous rocks in which all the crystals of the essential minerals can be distinguished with the unaided eye, contrasted with aphanitic, microcrystalline, and cryptocrystalline.

2.1.311 **phenocryst:** One of the relatively large crystals in a porphyritic igneous rock.

2.1.312 **phlogopite:** Mineral of the mica group, formula $K(Mg,Fe)_3AlSi_3O_{10}(OH)_2$.

2.1.313 **phonolite:** Volcanic rock with sanidine or albite, nepheline, aegirine, and other components. See 3.2.1.3.

2.1.314 **phyllite:** Schist with glittering layers of micas, consisting of these, chlorite, quartz, and other minerals.

2.1.315 **picrite:** Olivine-rich basalt.

2.1.316 **plagioclase:** A solid solution series of minerals from $NaAlSi_3O_8$ (Albite=Ab) and $CaAl_2Si_2O_8$ (Anorthite=An); commonly the series is designated in terms of the mole fraction of the anorthite component (An) as follows: albite (An 0 % to 10 %), oligoclase (An 10 % to 30 %), andesine (An 30 % to 50 %), labradorite (An 50 % to 70 %), bytownite (An 70 % to 90 %), anorthite (An 90 % to 100 %). See also feldspar.

2.1.317 **Pleistocene:** The older of the two epochs comprising the quaternary period. See also 3.1.

2.1.318 **pleochroism:** The anisotropy of absorption of light in crystals, e.g. shown by biotite in polarizing microscope (brown: cleavage parallel -colourless: cleavage vertical to vibration direction of light).

2.1.319 **plutonic rock:** Igneous rock that has formed beneath the surface by consolidation from magma.

2.1.320 **pneumatolysis:** The alteration of rocks by gases and vapours from igneous rocks in a late stage of intrusion.

2.1.321 **poikilitic:** A fabric with relatively large crystals of one mineral containing other small minerals without orientation.

2.1.322 **poikiloblastic:** Fabric of heteroblastic metamorphic rocks in which large crystals contain numerous inclusions of small ones. Analogous to poikilitic in igneous rocks.

2.1.323 **polymorphic minerals; polymorphous minerals:** Serie of minerals with same chemical composition but different crystalline form, e.g. andalusite-kyanite-sillimanite serie.

2.1.324 **polycrystalline:** Assemblage of crystal grains that together form a solid body.

2.1.325 **polygonal fabric; mosaic:** Fabric of granoblastic metamorphic rocks in which the general shape of crystals are interlocking with moderately straight boundaries tending to meet in triple point.

2.1.326 **porphyric; porphyritic fabric:** Fabric or texture of those igneous rocks in which larger crystals are set in a finer groundmass.

2.1.327 **porphyroblastic fabric:** Said of a metamorphic rock which contains large crystals in a matrix of smaller ones.

2.1.328 **porphyroclast:** Relict crystals surrounded by finer grains in a dynamic metamorphosed rock.

2.1.329 **Precambrian:** A term for the time before the Cambrian. See 3.1.

2.1.330 **preferred orientation:** A fabric term used for a rock in which the grains are more or less systematically oriented, produced by growth, deposition, or deformation.

2.1.331 **primary minerals:** Those minerals that crystallized or were deposited in the original

rock-forming process.

2.1.332 **psammite:** A sand or sandstone with grain diameters mainly between 0,02 mm and 4 mm. See also arenite.

2.1.333 **psephite:** Coarse- grained fragmental rock composed of rounded pebbles with diameters mainly greater than 4 mm. See also rudite.

2.1.334 **pseudomorph:** A crystal having the outward form proper to another species of mineral, which it has replaced.

2.1.335 **pumice:** A volcanic pyroclastic rock with great porosity. See 3.2.1.4.

2.1.336 **pyrite:** Mineral of FeS_2 formula, dimorphous with marcasite.

Note If finely distributed in a rock instable against weathering.

2.1.337 **pyroclastic rocks:** A term for the rocks which are made of >75 % fragmental volcanic materials that have been explosively ejected. (See 3.2.1.4).

2.1.338 **pyrophyllite:** Silicate mineral, formula $AlSi_2O_5(OH)$.

2.1.339 **pyroxene:** Mineral family of silicates of the general formula $R_2Si_2O_6$ with R=Mg,Fe,Ca,Na,Al, and other elements.

2.1.340 **pyroxenite:** Plutonic rock consisting mainly of pyroxene, less than 40 % olivine, and other minerals. See 3.2.1.2.

2.1.341 **pyrrhotite:** A mineral with formula $Fe_{1-x}S$, instable to the weathering like many other fine grained sulfides.

2.1.342 **quartz; silica:** Very common mineral of the formula SiO_2.

2.1.343 **quartzarenite:** Sandstone cemented by silica which has grown around each fragment. See 3.2.2.4

2.1.344 **quartz diorite:** Plutonic rock with plagioclase, quartz, and other minerals. See 3.2.1.1.

2.1.345 **quartzite:**Metamorphic rock consisting essentially of quartz. See 3.2.3.1

2.1.346 **quartz latite:** A volcanic rock with alkali feldspar, plagioclase, 5 % to 20 % quartz, and other components. See 3.2.1.3.

2.1.347 **quartz monzonite; adamellite:** A plutonic rock with alkali feldspar, plagioclase, 5 % to 20 % quartz, and other minerals. See 3.2.1.1.

2.1.348 **quartz porphyry:** A paleovolcanic rhyolite.

2.1.349 **Quaternary:** The younger of the two geological systems in the Cenozoic era. (See 3.1).

2.1.350 **radiate intergrowth fabric:** A variety of skeletal fabric of igneous rocks with a skeletal intergrowth of two minerals where one of these is filling the gaps of the other in radiate manner.

2.1.351 **rapakivi granite:** A granite with large rounded potassic feldspars mantled with plagioclase.

2.1.352 **recrystallization:** The formation of new mineral grains in a rock or in its constituents.

2.1.353 **relict fabric:** Preservation of any original fabric when one or more minerals are replaced or recrystallized.

2.1.354 **relief:**The plastic appearance of a mineral in a thin section, depending upon its refractive index relative to that of the embedding medium.

2.1.355 **rhyolite:** Volcanic rock with quartz, alkali feldspar, plagioclase, and other components. See 3.2.1.3.

2.1.356 **rift:** A plane of splitting in granitic rocks other than the sheeting (parallel or inclined to the surface of the earth).

2.1.357 **rock-forming minerals:** The 50 to 100 principal oxidic minerals occurring in rocks, e.g. feldspar, quartz, pyroxene, amphibole, mica, calcite, dolomite, and clay-minerals.

2.1.358 **rudite:** Fragmental sedimentary rocks composed of fragments coarser than sand grains (4 mm); see psephite.

2.1.359 **rutile:** A mineral, formula TiO_2.

2.1.360 **saccharoidal fabric:** Granular or crystalline fabric resembling that of loaf sugar.

2.1.361 **sand:** A sediment of size range 0,06 mm to 4 mm.

2.1.362 **sandstone:**

a) Scientifically, a sedimentary rock composed of grains from quartz, feldspar, mica, and little fragments from older rocks.(See 3.2.2.1 and 3.2.2.4).

b) Commercially a sandstone is a natural stone as per the scientific definition of sandstone and with silicates, calcite, clay minerals or iron oxides as cement.

2.1.363 **sanidine:** A potassium feldspar in volcanic rocks.

2.1.364 **saussurite:** Mineral aggregate, produced in part by the alteration of feldspar, consisting chiefly of epidote and zoisite.

2.1.365 **scapolite:** Group of minerals, closely related to the plagioclase group, general formula $(Na,Ca,K)_4[Al_3(Al,Si)_3Si_6O_{24}](Cl,F,OH,CO_3,SO_4)$.

2.1.366 **schist:**

a) Scientifically, a foliated metamorphic rock composed of nearly parallel arranged mica chlorite, quartz, and other typical minerals. See also foliation, schistosity, calc-schist and 3.2.3.1.

b) Commercially a schist is a natural stone possessing a well developed fissility that allows an easy split, i.e. slate, some gneiss and phyllites, some limestones, quartzites, and fine grained pyroclastic rocks.

2.1.367 **schistose fabric:** Fabric of metamorphic rocks displaying schistosity.

2.1.368 **schistosity:** A variety of foliation usually developed in metamorphic rocks with a plane fabric consisting in a preferred orientation.

2.1.369 **schlieren:** Bodies in plutonic or metamorphic rocks that have the same general mineralogy as the plutonic or metamorphic rock, but because of differences in the ratios of the minerals they are darker or lighter.

2.1.370 **secondary minerals:** Term applied to minerals formed as a consequence of the alteration of pre-existing minerals.

2.1.371 **sector fabric:** A fabric of igneous rocks showing minerals with v-shaped sectors at the ends e.g. in pyroxenes.

2.1.372 **sedimentary rocks:** Rocks formed by the accumulation of sediment in water or in the air. (See 3.2.2).

2.1.373 **seriate fabric:** Fabric in which crystals size shows a gradual variation.

2.1.374 **sericite:** Fine-grained variety of muscovite. (See also muscovite).

2.1.375 **serpentine:** Mineral of the chemical formula $Mg_6Si_4O_{10}(OH)_8$, including the two varieties antigorite and chrysotile.

2.1.376 **serpentinite:** A metamorphic rock consisting almost wholly of serpentine and relics of primary minerals. See green marble.

2.1.377 **shale:** Sedimentary rocks including the indurated, laminated, or fissile claystones and siltstones with cleavage parallel to bedding, consisting of phyllosilicate and quartz (See 3.2.2.1).

2.1.378 **shonkinite:** A nepheline syenite with more than 60% dark minerals.

2.1.379 **siderite:** A carbonate mineral, $FeCO_3$.

2.1.380 **silicate:** A compound whose crystal lattice contains SiO_4-tetrahedra, either isolated or joined through one or more of the oxygen atoms to form groups, chains, sheets, or three-dimensional structures.

2.1.381 **silicification:** The introduction of, or replacement by, silica, covering all varieties of such processes, whether late magmatic, hydrothermal or diagenetic.

2.1.382 **sill:** Relatively thin intrusive body of igneous rock which has been emplaced parallel to the bedding or schistosity of the intruded rocks.

2.1.383 **sillimanite:** Mineral, $Al_2 SiO_5$ polymorphous with kyanite and andalusite.

2.1.384 **silt:** Sediment of size range 0,002 mm to 0,06 mm.

2.1.385 **siltstone:** Fine-grained consolidated sedimentary rock composed predominantly of particles of silt size.

2.1.386 **Silurian:** Geologic system between Ordovician and Devonian. (See 3.1).

2.1.387 **sinter:** A chemical sediment deposited from water, e.g. siliceous sinter, consisting of silica, calcareous sinter, consisting of calcium carbonate, is also called tufa, travertine, and onyx marble.

2.1.388 **skeletal fabric:** A fabric of igneous rocks showing skeletal or dendritic crystallized minerals as e.g. in olivines.

2.1.389 **slate:**

a) Scientifically, fine-grained very low- to low-grade metamorphic rock possessing a well-developed fissility parallel to the planes of slaty cleavage (See 3.2.3.1).

b) Commercially, rocks which are easily split into thin sheets along a plane of cleavage resulting from a schistosity flux, caused by very low or or low grade metamorphism due to tectonic compression. They are distinguised from sedimentary (stone) slates which invariably split along a bedding or sedimentation plane. See prEN 12326-1.

2.1.390 **slaty cleavage:** A variety of foliation, typical for fine-grained metamorphic rocks such the slates, consisting in a continuous and homogeneous preferred orientation of the mineral grains, especially the platy crystals of mica show a plane texture visible in polarizing microscope.

2.1.391 **soapstone:** The term includes rocks consisting largely of talc, they have a soapy feel and are soft enough to be carved with a knife.

2.1.392 **sodalite:** A feldspathoid mineral, $Na_8(AlSiO_4)_6Cl_2$.

2.1.393 **sparite:** Limestones with more coarse calcite cement than micritic groundmass. (See 3.2.2.1).

2.1.394 **sphene; titanite:** A silicate mineral, $CaTiSiO_5$.

2.1.395 **spheroidal structure; orbicular structure:** Onion-like structure of rock mass.

2.1.396 **spherulite:** A radiating, and usually concentrically arranged aggregation of one or more minerals generally of spherical or spheroidal shape, formed by the radial growth of acicular crystals from a common centre or inclusion.

2.1.397 **spherulitic:** A radial fabric of minerals in rocks showing spherulites.

2.1.398 **spilite:** A green basaltic rock altered by water on the ocean floor containing albitic feldspar and other minerals.

2.1.399 **spotted slate:** Slate in which metamorphism has caused the growth of larger crystals in the fine-grained matrix.

2.1.400 **staurolite:** Silicate mineral, formula $(Fe,Mg)_2\ Al_9Si_4\ O_{23}(OH)$

2.1.401 **stratification:** A texture produced by deposition of sediments in beds or layers (strata), laminae, lenses, wedges, and other units.

2.1.402 **structure:** A part of fabric that is related to arrangement of the parts of a rock, including geometric relationships between those parts, their shapes and sizes. The example of structure is shape preferred orientation of rock-forming minerals. The prefixes micro- (in the thin section scale), meso- (hand specimen scale), and macro- (outcrop scale) can be used.

2.1.403 **stylolite:** Lobate sharp-edged separation line of the layers in some limestones.

2.1.404 **syenite:** Plutonic rock consisting of alkali feldspar, some plagioclase, and other minerals. See 3.2.1.1.

2.1.405 **symplectite:** A fabric of igneous rocks with an intergrowth of two minerals with one of these showing a worm-like shape.

2.1.406 **talc:** Silicate mineral, formula $Mg_3Si_4O_{10}(OH)_2$.

2.1.407 **tectonic:** Resulting from forces during the deformation of the earth's crust the rocks show features like cracks, faults, folds, flexures, striations, and brecciation.

2.1.408 **tectonic breccia:** Aggregation of angular coarse rocks formed as the result of tectonic movement. See breccia.

2.1.409 **tectonite:** Rock whose minute structure has been produced by tectonic movement of its parts.

2.1.410 **Tertiary:** The oldest geologic system comprised in the Cenozoic era. (See 3.1).

2.1.411 **texture:** A part of rock fabric that is related to the crystallographic properties of rock-forming minerals like crystallographic preferred orientation.

2.1.412 **thin section:** An embedded fragment of rock or mineral ground to a thickness of approximately 25 µm, polished, and mounted on a glass as a microscopical slide and often covered with a thin glass. See EN 12407.

2.1.413 **tholeiite:** A basalt containing plagioclase, augite, and orthopyroxene.

2.1.414 **tonalite:** A plutonic rock consisting of quartz, plagioclase, and other minerals. See 3.2.1.1.

2.1.415 **topaz:** A mineral, $Al_2SiO_4F_2$.

2.1.416 **tourmaline:** Group of silicate minerals, general formula $(Na,Ca)(Hg,Fe^{2+},Fe^{3+},Al,Li)_3Al_6(BO_3)_3Si_6O_{18}\ OH_4$.

2.1.417 **trachyte:**

a) Scientifically, a volcanic rock consisting essentially of alkali feldspar and minor mafic minerals, and, possibly small amounts of sodic plagioclase. See 3.2.1.3.

b) Commercially a trachyte is a natural stone as per the scientific definition of trachyte and other rocks such as latites, quartz-trachytes, quartz-latites and trachyte tuffs.

2.1.418 **travertine; onyx marble:**

Travertine: a fine-grained freshwater limestone formed by rapid precipitation of $CaCO_3$ from water.

onyx marble: Compact, banded variety of travertine, consisting of coloured and transparent layers of calcite and/or aragonite, and capable of taking a polish.

2.1.419 **tremolite:** Mineral of the calcic amphibole group, formula $Ca_2Mg_5Si_8O_{22}(OH)_2$.

2.1.420 **Triassic:** The oldest of the three geologic systems comprised in the Mesozoic era. (See 3.1).

2.1.421 **trondhjemite; leuco-tonalite:** tonalite with high quartz content (See 3.2.1.1).

2.1.422 **tufa:** A porous chemical sedimentary rock composed of calcium carbonate or of silica, deposited from water; see sinter and travertine.

2.1.423 **tuff:** A pyroclastic rock formed of consolidated volcanic fragments with diameters less than 64 mm. See 3.2.1.4.

2.1.424 **tuffite:** A pyroclastic rock composed by tuff mixed with sediments.

2.1.425 **twin; twinned crystal; twin crystal:** A nonparallel intergrowth of two or more individuals of the same crystalline phase having additional symmetry elements.

2.1.426 **ultrabasic:** Igneous rock containing less than 45 % by masse of SiO_2.

2.1.427 **ultramafic:** Describes rock containing less than 10 % by volume pale minerals.

2.1.428 **unequigranular:** Rocks containing crystals of variable grain size.

2.1.429 **uralitization:** The conversion of pyroxene (augite) into fibrous hornblende.

2.1.430 **urtite:** Foidolite with more than 70 % nepheline. (See 3.2.1.1).

2.1.431 **variolitic fabric:** Fabric of igneous rocks with bundles of diverging fibrous minerals in most cases plagioclases.

2.1.432 **vein:** Mineral body, thin in relation to its other dimensions, which cuts across the older country rock.

2.1.433 **vesicle:** Small cavity in a volcanic rock, formed by the expansion of a bubble of gas or steam during the solidification.

2.1.434 **vesicular fabric:** Fabric of volcanic rocks where vesicles are present.

2.1.435 **vitreous (syn. glassy):** Mineral material that does not have crystalline structure.

2.1.436 **volcanic agglomerate:** A pyroclastic rock composed of bombs or rounded fragments with diameters greater than 64 mm. See 3.2.1.4.

2.1.437 **volcanic glass:** Natural glass produced by the rapid cooling of molten lava and forming such material as obsidian and the glassy groundmass of many extrusive rocks.

2.1.438 **volcanic rocks**
(see extrusive rocks)

2.1.439 **vug:** A cavity in a rock, sometimes lined or filled with either crystalline or amorphous minerals.

2.1.440 **wallrock:** The country rock immediately adjacent to a vein, dyke or larger intrusive body.

2.1.441 **wollastonite:** A silicate mineral, formula $CaSiO_3$.

2.1.442 **xenoblastic mineral:** A mineral constituent of a metamorphic rock which has grown without the development of its characteristic crystal faces. Analogous to allotriomorphicin igneous rocks.

2.1.443 **xenocryst:** A term applied to allothigenous crystals in igneous rocks that are foreign to the body of rock in which they occur.

2.1.444 **xenolith:** A term applied to allothigenous rock fragments that are foreign to the body of igneous rock in which they occur.

2.1.445 **xenomorphic:** See allotriomorphic.

2.1.446 **zeolite:** Group of minerals, aluminium silicate hydrates, with one or more of Na, K, Ca, Sr, Ba, and other elements.

2.1.447 **zircon:** A mineral, $ZrSiO_4$.

2.1.448 **zoisite:** A mineral $Ca_2Al_3(SiO_4)_3(OH)$.

2.1.449 **zonation:** The formation of bands or zones in minerals in the process of crystallization.

2.2 Quarrying terms

2.2.1 air bag: Quarrying device, consisting of a thin-walled metal or rubber bag, which can be inserted in the vertical cut made in the bench and pumped up with air or water, causing the block to turn over.

2.2.2 bedding plane: Quarrymen's term for nearly horizontal rock-mass discontinuities along which a rock tends to split or break readily.

2.2.3 bit: Drill tipped with diamond or carborundum, used as tool in a drilling machine.

2.2.4 block squaring: Operation by which raw blocks are brought to a regular shape and average dimensions.

2.2.5 boulder:

a) Fragment of rock, usually large (more than 256 mm) and rounded in shape.

b) Massive body in granitoid rocks, which has remained unweathered in the disintegrated outcropping portion of a deposit.

2.2.6 bulk stone: Big pieces or blocks removed (separated) from the rock mass in natural stone quarries, before any other work such as regular shape cut, or sawn can be done.

2.2.7 channeling flame jet; jet burner: Cutting device used for flame channeling. It consists of a kerosene-fuelled torch, capable of developing a 2 500 °C temperature whereby rock is broken out.

2.2.8 clay hole: Hole, from 5 mm to 25 mm of diameter, filled with clay, occasionally found in marble, limestone and sandstone blocks, resulting from karstic processes.

2.2.9 clot: A group of dark minerals in igneous rocks, ranging in size from a few centimetres to one meter or more, that may be a segregation or a xenolith.

2.2.10 core: Cylinder of stone obtained by drilling with drilling devices.

2.2.11 crack: A fissure in stone, visible to the naked eye.

2.2.12 deposit: Earth material of any type, either consolidated or unconsolidated, that has accumulated by some natural process or agent.

2.2.13 derrick; guy derrick: Crane consisting of a boom fastened to a pivoting mast, capable of operating in a 360º radius.

2.2.14 diamond bead: Electroplated or sintered diamond-coated cylinder, which is the cutting agent of a diamond wire.

2.2.15 diamond wire: Cutting tool consisting of a 5 mm twisted multistrand steel cable, onto which diamond beads and spring spacers are threaded.

2.2.16 diamond wire saw: Cutting device consisting of an engine section travelling on tracks and driving the diamond wire.

2.2.17 down hole hammer drill: Stationary air drilling machine generally capable of making vertical, horizontal and inclined holes.

2.2.18 drill rod: Piece of steel of varying length with a cutting edge at one end and used for track drills and drilling machines.

2.2.19 fault: A fracture with displacement of the sides.

2.2.20 flagstone: Hard thin bedded sandstone splitting into thin slabs.

2.2.21 freestone: A stone that can be shaped and dressed with equal ease in any direction without splitting.

2.2.22 frost splitting: Destruction of bodies by water freezing in its capillary pores and cracks. (See also prEN 12371).

2.2.23 grain; easy way: A splitting direction of igneous rock, less pronounced than the rift and often at right angles to it.

2.2.24 hairline fracture; cutter; leptoclase: Minute barely visible crack.

2.2.25 joint; lithoclase: A surface of actual or potential parting within a rock along which there has been practically no displacement.

2.2.26 open cast quarry: Any kind of quarry where operations are performed from the surface.

2.2.27 overburden: Loose soil, sand, gravel or similar material above a deposit that is stripped off when opening a quarry.

2.2.28 piston jack: Device used to turn over parts of the bench and consisting of a hydraulic pump unit and one or more jacks.

2.2.29 plug and feathers: Device for cleaving blocks of stone. A line of shallow holes is drilled, a pair of feathers (half rounded steel strips) inserted in each hole and a plug (steel wedge) driven in between.

2.2.30 quarry: Open excavation in the surface of a planet, used for extraction of rocks or minerals.

2.2.31 quarry bench: Step-like portion of rock in a quarry.

2.2.32 quarry face; quarry front: Part of the quarry where excavation takes place.

2.2.33 quarry floor: The part of the quarry onto which the cut bench is turned over and where operations such as block squaring and hauling are carried out.

2.2.34 rough block: Basis of the utilizable stone consisting of rocks from quarries or erratics.
a) Rough block of specific size: Squared rough block with certain given dimensions
b) Shapeless rough block: Rough block without regular shape and size
c) Squared rough block: Rough block which corresponds approximately to a regular parallelepiped.

2.2.35 rough-hewn: Surface condition as quarried.

2.2.36 sheeting: Gently dipping joints that are essentially parallel to the ground surface. See exfoliation.

2.2.37 slickenside: The striations, grooves and polish on joints and fault surfaces.

2.2.38 strike of a rock: The intersection line of an inclined layer or plane with the horizontal plane; it is perpendicular to the direction of the dip.

2.2.39 toe: Lower edge of the quarry face.

2.2.40 tracks drills; chanelling drills: Drilling machine travelling on tracks and used in quarrying to

make a line of closely spaced holes into which bars are driven to break out the stone.
2.2.41 undercut toecut: Horizontal cut in the face of a stone quarry.

2.3 Processing terms

2.3.1 abrasive slurry: slurry consisting of water and abrasive, used for wire sawing.

2.3.2 arm polisher; hand polisher: Power driven machine for rubbing or polishing, consisting of a polisher mounted on a swivel arm. Generally it is hand operated.

2.3.3 axed finish: Rough and rugged surface achieved by using a punch or axe.

2.3.4 belt polisher: Automatic machine consisting of a feed belt and a series of polishing heads with varying grit sizes.

2.3.5 block cutter: Sawing machine consisting of a horizontal diamond disk and a series of vertical diamond disks, used for the production of standard-sized dimensional stone.

2.3.6 block saw: Bridge saw fitted with a large diamond disk used for primary sawing.

2.3.7 bridge saw: Saw consisting of a beam carrying the cutting head, placed at right angle to the bench.

2.3.8 bush hammered finish: Finish obtained by using a bush hammer (percussion tool for roughening a surface, with a square head and with few pyramidal percussion teeth or points) or a bush hammering machine (machine consisting of feed rolls and a overhanging beam supporting a pneumatic bush hammer).

2.3.9 chain saw; diamond belt saw: Mechanically powered cutting device, consisting of an engine section travelling on tracks and a 3 m to 4 m long cutting arm around which a diamond-tipped endless chain is driven.

2.3.10 chiselling: Dressing of a stone surface with a chisel.

2.3.11 claw chisel; tooth chisel.: Percussion tool with a toothed edge.

2.3.12 corrugated; reeded: Surface finish formed by parallel semi-cylindrical grooves carved in the rock.

2.3.13 diamond gang saw: Sawing device consisting of one or generally more metallic blades with diamond coated edges, used for cutting stone rough blocks by the abrasion produced by the backwards and forwards movement of the blades.

2.3.14 diamond saw finish: Smooth finish resulting from sawing a block with diamond blades.

2.3.15 dolly pointed finish; point finish: Semi-rough finish achieved using a four pointed dolly point (bush hammer with four pyramidal percussion teeth or points).

2.3.16 dressing: The shaping and squaring of stone units prior to fabrication.

2.3.17 edge: The side which runs counter to the panel face and borders the surface area of the panel. In particular, the side of a stone unit whose dimensions are determined by thickness and height of the panel.

2.3.18 edge treatment: Grinding or other treatment made to give a continuous and regular-shaped profile to the edges of the stone unit.

2.3.19 edge polisher: Machine fitted with grinding and polishing heads for edge-polishing, and sometimes also for edge-chamfering, and cutting drips.

2.3.20 filled finish: Having natural voids in the surface of the stone filled with putty, shellac, and resins or other materials.

2.3.21 finish: Final surface applied to the face of piece of rock during fabrication.

2.3.22 flamed finish: Surface texture obtained by thermal treatment the stone using a high temperature flame.

2.3.23 flaming machine: Machine consisting of feed rolls and a overhanging beam supporting a torch moving along the beam.

2.3.24 gang saw; frame saw: Cutting device consisting of one or generally more metallic blades mounted on a frame, used for cutting stone rough blocks by the abrasion produced by the backwards and forwards movement of the blades adding a slurry of water and abrasive into the cut.

2.3.25 grinding machine: Automatic machine generally consisting of a feed belt and a series of head with varying grit sizes.

2.3.26 ground finish; abrasive finish: Surface treatment (e.g. by means of a grinding disk bonded with silicium carbide) to produce a flat, uniform finish.

a) Rough ground finish is obtained by a coarse grinding agent (e.g. silicium carbide of grain size F.60, see FEPA 42-GB-1984)

b) Medium ground finish is obtained by a medium grinding agent (e.g. silicium carbide of grain size F.120)

c) Fine ground finish is obtained by a fine grinding agent (e.g. silicium carbide of grain size F.220).

2.3.27 groove: A channel of rectangular or circular cross section cut into a slab.

2.3.28 ground finish: Surface treatment with coarse abrasive aimed to eliminate the main surface irregularities.

2.3.29 guillotine; splitting machine: Machine used for the fabrication of split faced pieces of stones.

2.3.30 hard way; head; tough way: Plane at right angle to the rift and the grain along which splitting is most difficult.

2.3.31 honed finish: Surface finish having a dull polish or matt surface. (See also ground finish and matt finish).

2.3.32 hydraulic splitter: Splitting device consisting of a hydraulic pump unit operated by an electrical or combustion engine and one or more rock-splitting cylinders.

2.3.33 key-way: Opening in the bench made at a right angle to the bench to enable further cutting operations.

2.3.34 matt finish: Surface treatment (e.g. by means of a silicium carbide bonded polishing disk with grain size F.400 - (See also FEPA 42-GB-1984) to produce a very flat, uniform, but not polished finish (See 2.3.40).

2.3.35 monoblade gang saw; cross cut saw; crosscutter: Frame saw fitted with just one blade

and used for block squaring and primary sawing.

2.3.36 multi-disc circular saw: Machine for the elaboration of stone, consisting of a bridge saw fitted with a series of circular saw blades used for dimension sawing.

2.3.37 natural stone product: A worked piece of naturally occurring rock used in building and for monuments.

2.3.38 natural cleft finish; rock faced finish: Finish for metamorphic rocks such as slate and quartzite, resulting from splitting or separating stone along the cleavage plane and showing the natural rock face.

2.3.39 pointed finish: Semi-rough finish achieved by using a point chisel.

2.3.40 polished finish: Surface treatment (e.g. by means of a polish disk or felt) to produce a high gloss finish.

2.3.41 polishing line: Automatic machine generally consisting of a feed belt and a series of heads with varying grit sizes.

2.3.42 profile cutter: Machine fitted with router bits or profile wheels for obtaining moulded edges.

2.3.43 riven cut finish: Rugged surface produced by splitting a stone.

2.3.44 rough slab: Flat surface semi-finished product with unfinished edges obtained by sawing or splitting from a rough block.

2.3.45 rumbling: A percussion process to produce manufactured stone masonry units with randomly irregular arises, corners and surfaces.

2.3.46 sand blasted finish; shot blasted finish: A matt finishing resulting of impact of the sand or other abrasive grains expelled by a sand jet.

2.3.47 sawn finish: Finish resulting from the gang, block-cutter or diamond-wire sawing of the rock, without further treatment.

2.3.48 shape cutter: Machine for the fabrication of specially designed stone units.

2.3.49 split: To cut the rock along one preferential splitting plane with a chisel or guillotine, usually by hand.

2.3.50 splitting machine: Air driven machine used for the fabrication of split faced curbing and cubic stone.

2.3.51 steel shot: Abrasive used in sawing granite blocks.

2.3.52 template: Pattern, usually of thin board or wood, used as a guide for cutting a stone unit.

2.3.53 texture finish; dressed finish: Texture finish, the modified appearance of a piece of rock resulting from one or several mechanical or thermal surface treatments.

2.3.54 tooled finish; machine tooled finish:

a) Finish resulting from the mechanical surface treatment with tools.

b) Dressed finish clearly showing tool marks

2.3.55 water jet: Cutting device consisting of a nozzle projecting a pressurized thin jet of water mixed

with an abrasive.

2.3.56 waxed finish:

a) Having natural voids in the surface of the stone filled with cements, shellac, and resins or other materials.
b) To polish with wash the surface of a stone unit.

2.3.57 wire saw: Sawing device consisting of a twisted three-strand wire cable, running over pulleys. It cuts stone by abrasion, by means of a slurry of water and abrasive fed into the cut.

2.4 Products and installation terms

2.4.1 anchor: Retention device or element to fix a slab or a dimensioned stone, usually to a wall for cladding or lining.

2.4.2 bearing length: Length of the end of a lintel which bears on its support.

2.4.3 bed joint: Horizontal joint in masonry.

2.4.4 bracket; corbel: Support that projects horizontally from a masonry surface.

2.4.5 cladding: Slabs cut to size which form a wall covering for outside and inside use, fixed to a structure either by anchors or by means of mortar or adhesives. (See prEN 1469).

2.4.6 cramp: U-shaped piece of metal used to tie stone units together or to their backing.

2.4.7 cut sheet: Fabrication drawing detailing piece mark, location and dimensions of each single stone unit.

2.4.8 dimension stone work: Stone element prepared to specific dimensions for inside or outside application $\geq$ 80 mm thickness. (See also prEN 12059).

2.4.9 dowel: Anchor consisting in a cylindrical metal bar which is introduced into the edge of a slab or a dimensioned stone to fix it to a wall, usually for cladding or lining. (See prEN 13364).

2.4.10 efflorescence: Whitish powder sometimes found on the surface of stones and masonry, caused by the deposition of soluble salts carried through or into the surface by moisture.

2.4.11 face: The surface of a piece of stone intended to be see in use.

2.4.12 green marble: Commercial name for serpentinite; this commercial term is restricted to the trade names and may not be used as a petrographic name of a rock. (See marble).

2.4.13 iridescence: The exhibition of coloured reflections from a mineral; a play of colours.

2.4.14 limestone marble; marble limestone: Commercial term for compact limestone that will take a mirror polish is often classified as marble the commercial sense. (See also marble).

2.4.15 masonry: Construction of stone, bricks or blocks.

2.4.16 modular tile; cut to size tile: A modular tile is a piece of natural stone in standard sizes, obtained by cutting or splitting at a thickness less than 12 mm, to be fixed to a structure by means of mortar or adhesives. (See also prEN 12057).

2.4.17 notch: V-shaped indentation made along the edges of a stone panel for the insertion of anchoring devices. (See also anchor and 2.3.27).

2.4.18 putty: Stiff paste used to fill cracks or holes in natural stone.

2.4.19 reinforcement; liner: The strengthening of fragile or unsound stone by laminating fibreglass or similar material to the back of the slabs.

2.4.20 riser: The upright member between two stair treads.

2.4.21 rubble stone: Natural stone masonry unit, of any shape, with variable dimensions, whose face is rough or worked.

2.4.22 sealant: An elastic adhesive compound used to seal stone veneer joints.

2.4.23 seasoning: Process of storing stone after quarrying to reduce its moisture content and bring it to proper condition for used.

2.4.24 shop drawing; shop ticket: Detailed drawing showing dimensions, location, finishing and anchoring system, which may be used by the fabricator to draw up a cut sheet.

2.4.25 slab:

a) Flat structural element where the relationship of length to width is between 1 and 8, and that of width to thickness is greater than 10.

b) Any unit of natural stone, in which the plan dimensions exceed 150 mm and the larger plan dimensions exceed four times the thickness.

2.4.26 slab for floors: A slab for floors is a piece of natural stone obtained by cutting or splitting at a thickness > 12 mm (See also prEN 12059). They are put on to a structure by means of mortar, adhesives or other supporting elements.

2.4.27 slab for stairs: A slab for stairs is a piece of natural stone obtained by cutting or splitting at a thickness > 20 mm (except risers) to form the horizontal part of a stair step (tread) or the vertical part of a stair step (riser) (See also prEN 12058).

2.4.28 slot: Short groove cut in the back or the edge of a stone panel for insertion of an anchor.

2.4.29 surface treatment: The application of certain materials (i.e chemicals) to the exposed face of a slab.

2.4.30 work size: The size of a masonry unit specified for its manufacture, to which the actual size should conform within specified permissible deviations.

3 Scientific Classifications

3.1 Geological Time Scale (Informative)

Table 1

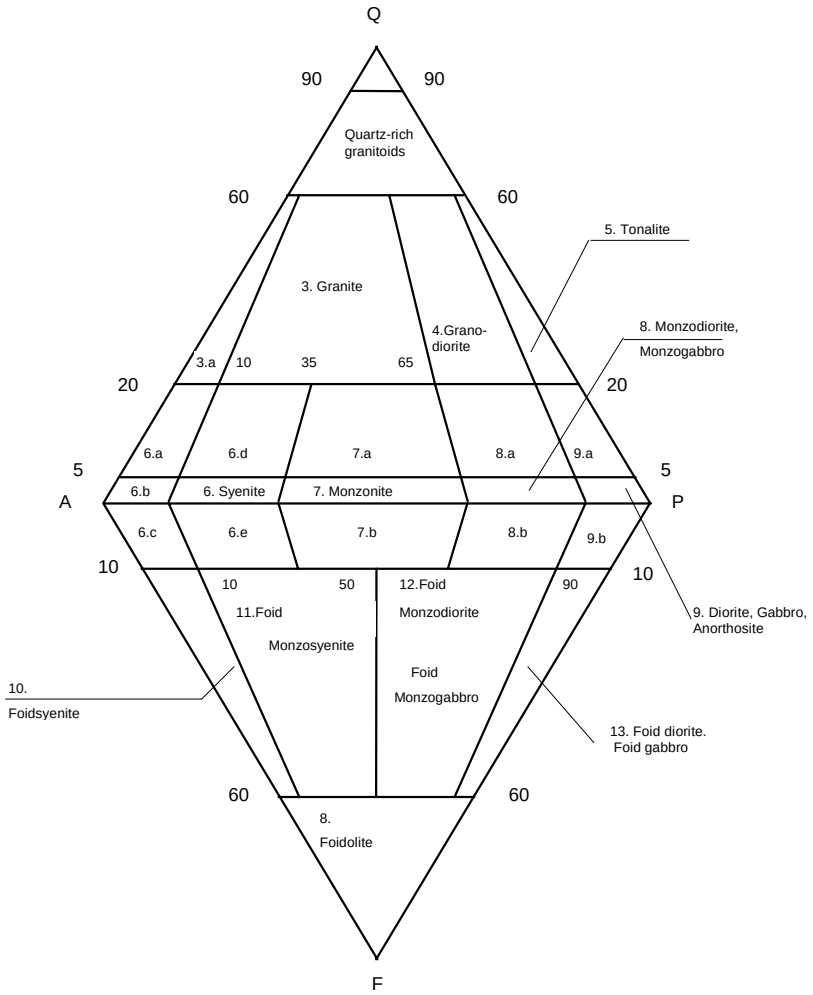
Million years	Erathem	System	Series	
	Cenozoic	Quaternary	Holocene	
			Pleistocene	
- 1,6 -		Tertiary	Neogene	Pliocene
				Miocene
			Paleogene	Oligocene
				Eocene
				Paleocene
- 65 -	Mesozoic	Cretaceous	upper	
			lower	
- 135 -		Jurassic	Malm	
			Dogger	
- 205 -			Lias	
		Triassic	upper	
			middle	
- 250 -			lower	
	Paleozoic	Permian	upper	
			lower	
- 290 -		Carboniferous	uppper	Stephalian
				Westphalian
				Namurian
			lower	Visean
				Tournaisian
- 355 -		Devonian	upper	
			middle	
- 410 -			lower	
		Silurian	Pridoli	
			Ludlow	
			Wenlock	
- 436 -			Llandovery	
		Ordovician	Ashgill	
			Caradoc	
			Llandeilo-Llanvirn	
			Arenig	
- 510 -			Tremadoc	
		Cambrian	upper	
			middle	
- 570 -			lower	
- 2500 -	Proterozoic - - - - - - - Archean			

3.2 Scientific Classification Charts

3.2.1 Igneous Rocks Classification Charts

Based on Le Maitre, R.W. (Editor), 1989, with authorization of Blackwell Scientific Publications. Oxford, United Kingdom.

3.2.1.1 Plutonic Rocks (Mafic minerals < 90 %)



Key

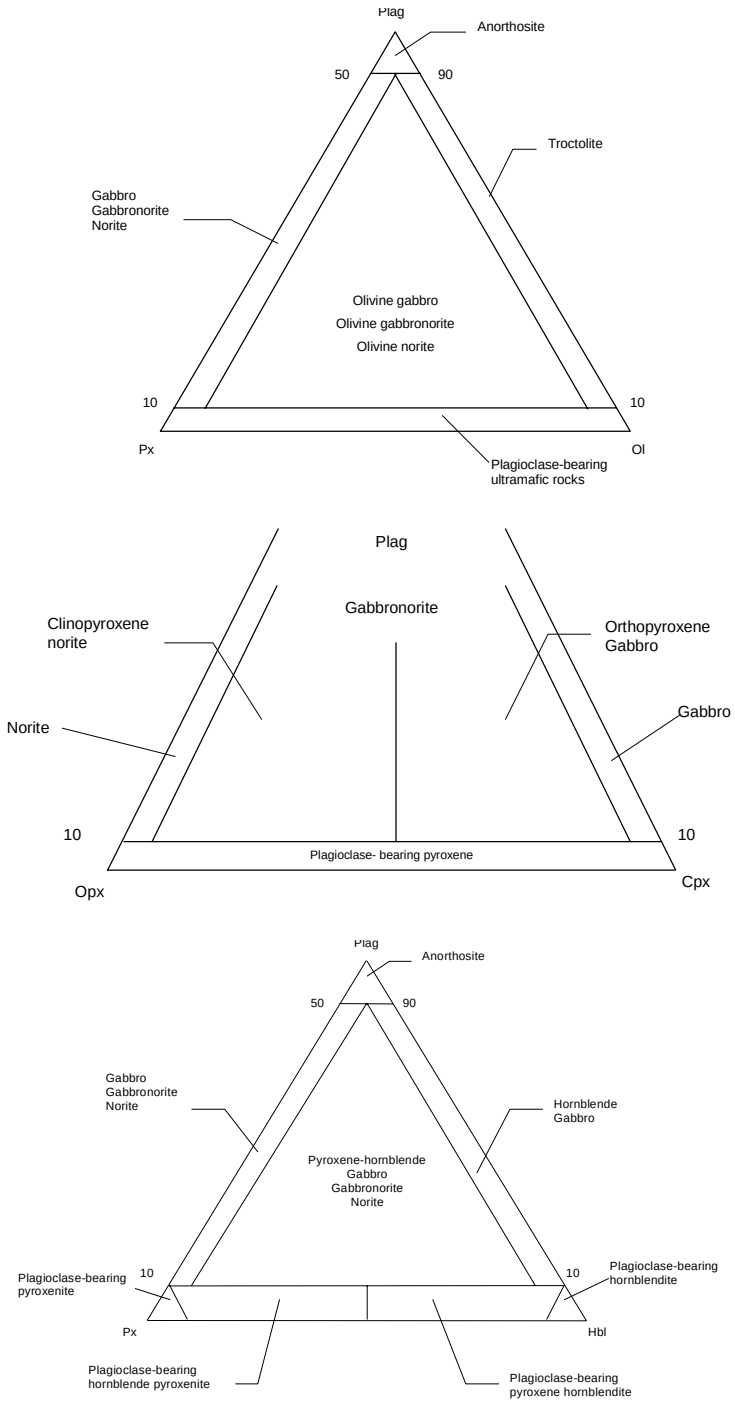
3.a Alkali feldspar granite
6.a Quartz-alkali feldspar syenite
6.b Alkali feldspar syenite
6.c Foid-bearing alkali feldspar syenite
6.d Quartz syenite
6.e Foid-bearing syenite
7.a Quartz monzonite
7.b Foid-bearing monzonite
8.a Quartz monzodiorite; Quartz monzogabbro
8.b Foid -bearing monzodiorite; Foid -bearing monzogabbro
9.a Quartz diorite; Quartz gabbro; Quartz anorthosite
9.b Foid-bearing diorite; Foid-bearing gabbro; Foid-bearing anorthosite

Q Quartz
A Alkali feldspar

P Plagioclase
F Foid

Figure 1

Detail of field 9 (DIORITE, GABBRO & ANORTHOSITE):



Key

Cpx Clinopyroxene
Hbl Hornblende
Ol Olivine
Opx Orthopyroxene
Plag Plagioclase (An_5 to An_{100} and scapolite)
Px Pyroxene

Figure 2

3.2.1.2 Ultrabasic rocks (Mafic minerals > 90 %):

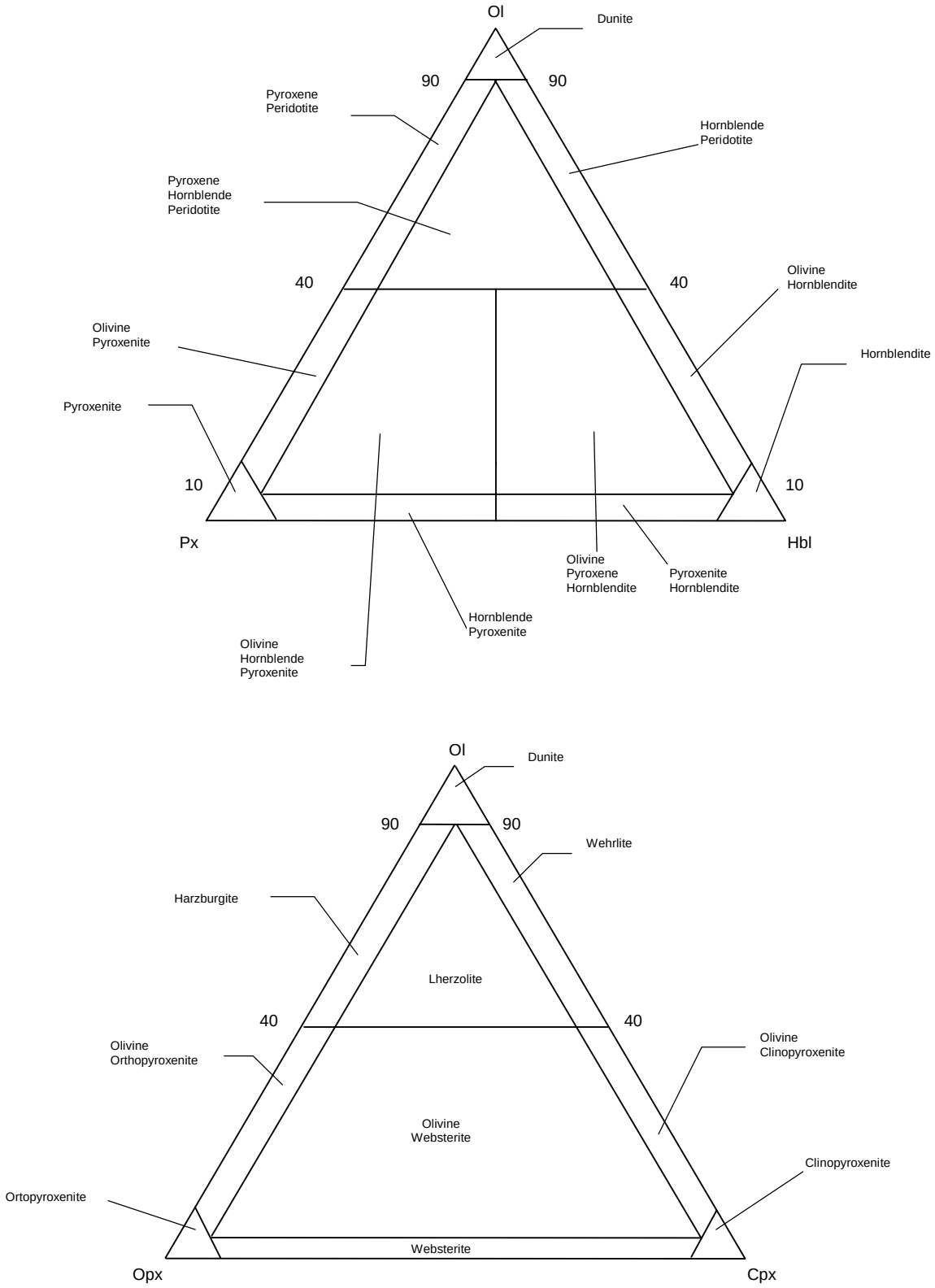
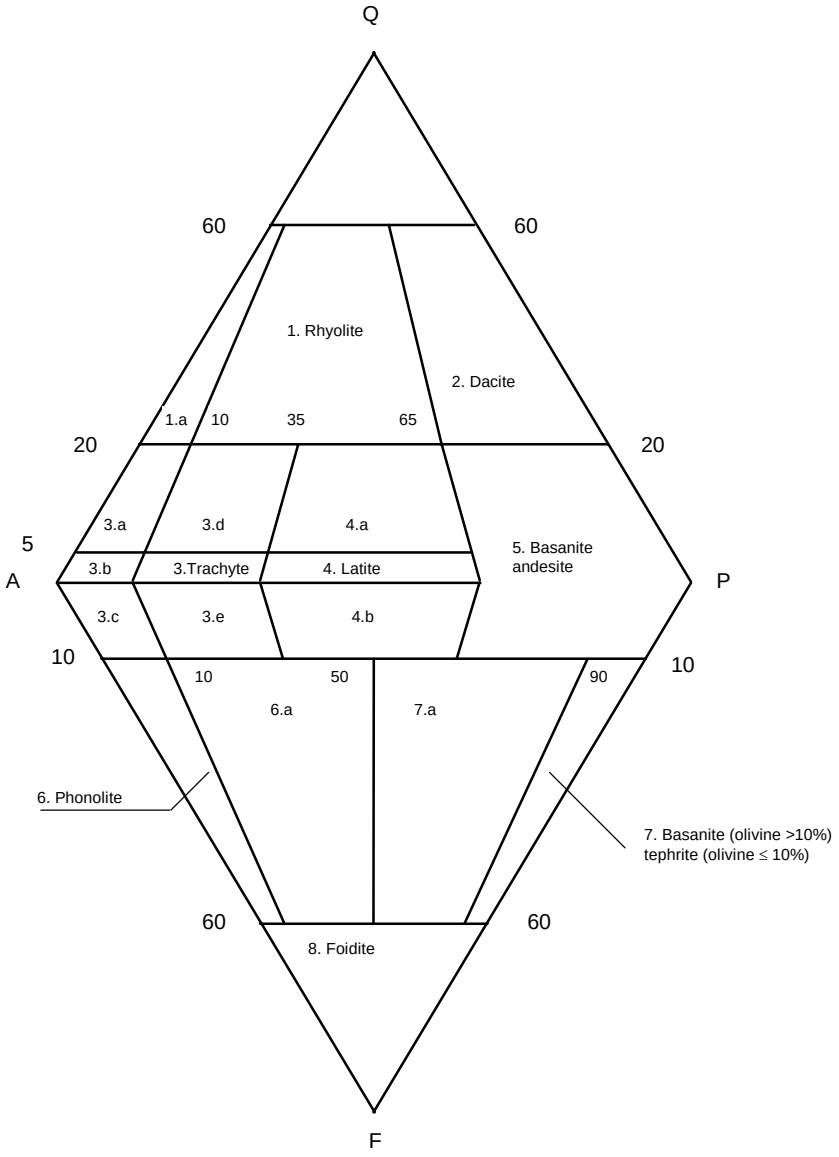


Figure 3

3.2.1.3 Volcanic Rocks (Use if mode is available)



Key

1.a Alakli feldspar rhyolite
3.a Quartz alkali feldspar trachyte
3.b Alkali feldspar trachyte
3.c Foid-bearing alkali feldspar trachyte
3.d Quartz trachyte
3.e Foid-bearing trachyte
4.a Quartz latite
4.b Foid-bearing latite
6.a Tephritic phonolite
7.a Phonolitic basanite phonolitic tephrite

Q Quartz
A Alkali feldspar

P Plagioclase
F Foid

Figure 4

3.2.1.4 Volcanic Rocks (Pyroclastic Rocks)

Table 2

Average clast size in mm.	Pyroclastic	Tuffites (mixed pyroclastic -epiclastic)	Epiclastic (volcanic and/or nonvolcanic)
64	Agglomerate, agglutinate, pyroclastic breccia	Tuffaceous conglomerate, tuffaceous breccia	Conglomerate, breccia
2	Lapilli tuff		
1/16	coarse (Ash) tuff	Tuffaceous sandstone	Sandstone
1/256	fine	Tuffaceous siltstone	Siltstone
		Tuffaceous mudstone, shale	Mudstone, shale
Amount pyroclastic material	100 % to 75 %	75 % to 25 %	25 % to 0 %

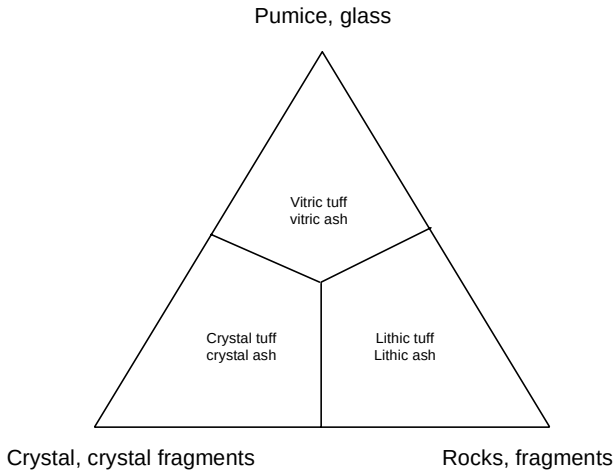


Figure 5

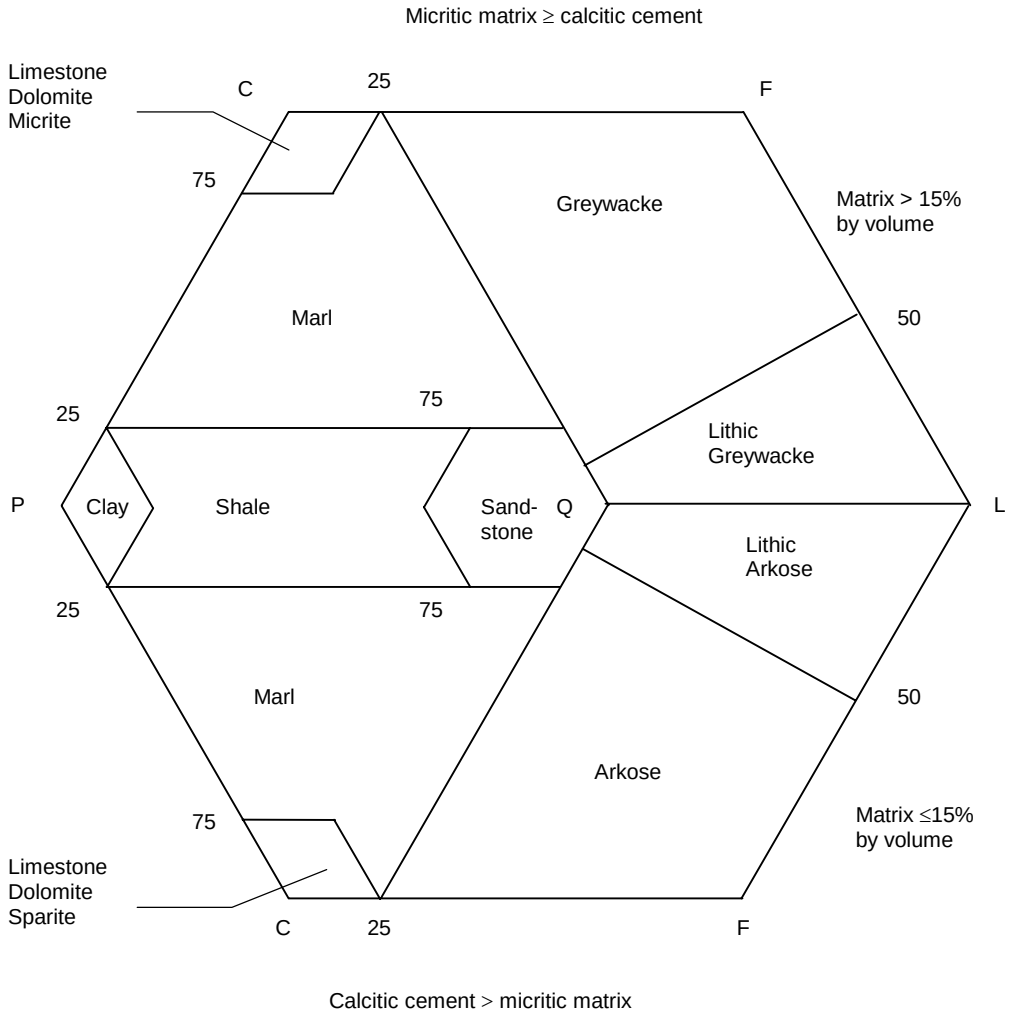
Table 3

Clast size in mm.	Pyroclast	**Pyroclastic deposit**	
		Mainly unconsolidated: tephra	Mainly consolidated: pyroclastic rock
64	bomb, block	agglomerate bed of blocks or bomb, block tephra	agglomerate pyroclastic breccia
2	Lapillus	layer, bed of lapilli or lapilli tephra	lapilli tuff
1/16	coarse ash grain	coarse ash	coarse (ash) tuff
	fine ash grain (dust grain)	fine ash (dust)	fine (ash) tuff (dust tuff)

3.2.2 Sedimentary Rocks Classification Charts

3.2.2.1 General Classification

(After Kraeft, 1994)



Key

Q= Quartz
P= Phyllosilicates
C= Carbonates
F= Feldspar & feldspar/quartz fragments
L= Lithic fragments

Figure 6

3.2.2.2 Classification of carbonates according to dolomite content

Table 4

Limestone	0 % to 9 % Dolomite
Dolomitic Limestone	10 % to 49 % Dolomite
Calcitic Dolomite	50 % to 89 % Dolomite
Dolomite	90 % to 100 % Dolomite

3.2.2.3 Classification of limestones. Based in Folk 1959.1962

Table 5

<table>
<tr><td colspan="3" rowspan="2">Allochems
per volume</td><td colspan="2">More than 10 % Allochems</td><td colspan="2">Less than 10 % Allochems</td><td rowspan="2">Undisturbed bioherm limestone</td></tr>
<tr><td>Sparry calcite predominant</td><td>Micritic matrix predominant</td><td>1 % to 10 % Allochems</td><td>Less than 1 % Allochems</td></tr>
<tr><td colspan="3">more than 25 % Intraclasts</td><td>Intrasparite</td><td>Intramicrite</td><td>Intraclast bearing micrite</td><td rowspan="5">Micrite</td><td rowspan="4"></td></tr>
<tr><td rowspan="4">less than 25 % Intraclasts</td><td colspan="2">more than 25 % Ooids</td><td>Oosparite</td><td>Oomicrite</td><td>Ooidbearing Micrite</td></tr>
<tr><td rowspan="3">less than 25 % Ooids</td><td>> 3:1</td><td>Biosparite</td><td>Biomicrite</td><td rowspan="2">Fossiliferous Micrite</td></tr>
<tr><td>3:1 to 1:3</td><td>Biopelsparite</td><td>Biopelmicrite</td><td rowspan="2">Biolithite</td></tr>
<tr><td>< 1:3</td><td>Pelsparite</td><td>Pelmicrite</td><td>Pelletiferous micrite</td><td>Dismicrite</td></tr>
</table>

3.2.2.4 Sandstone Classification. After Folk

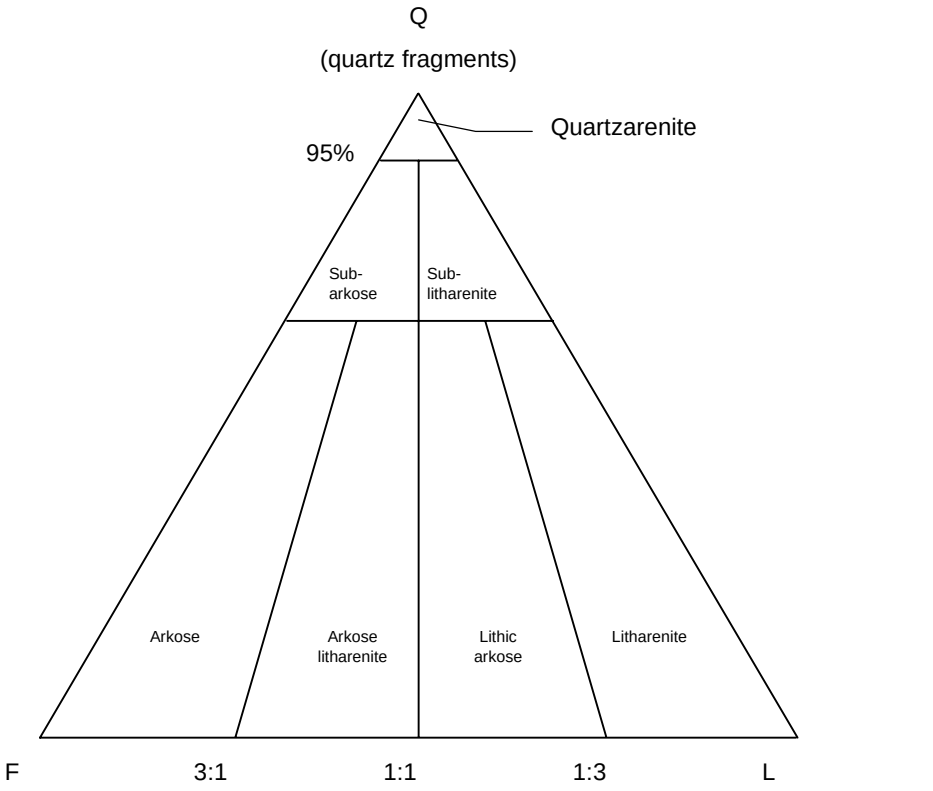


Figure 7

3.2.2.5 Classification of Greywackes. After Folk

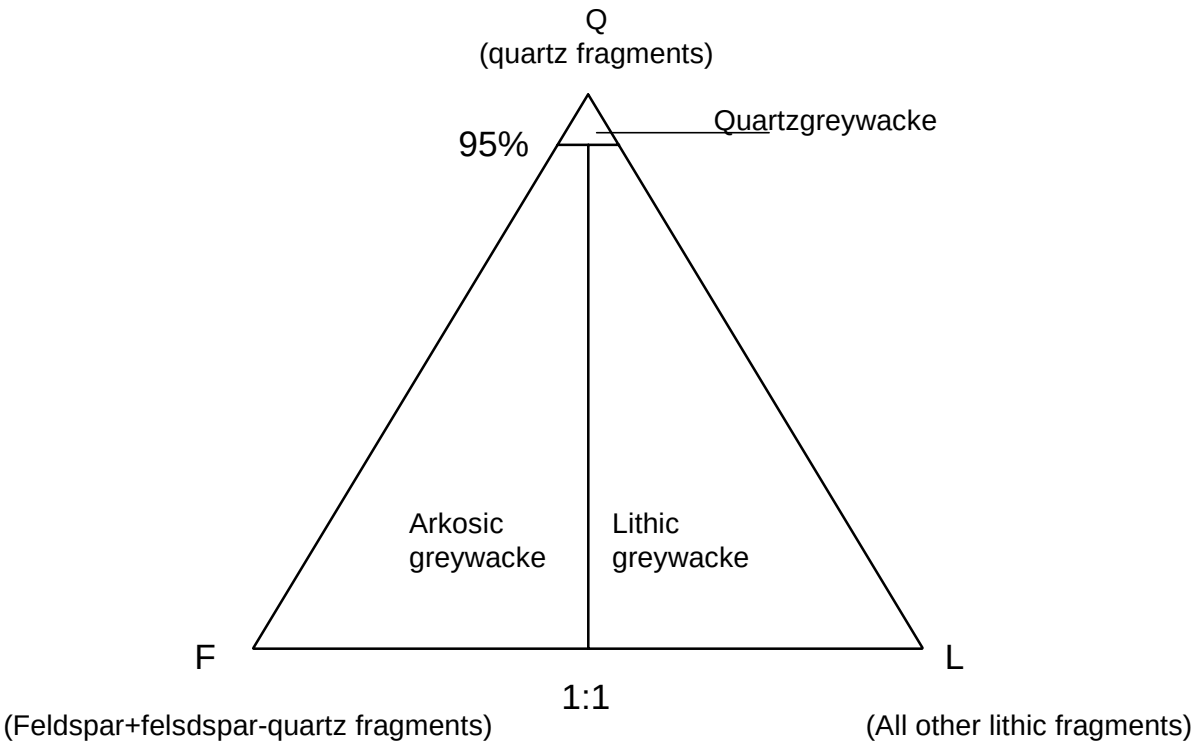
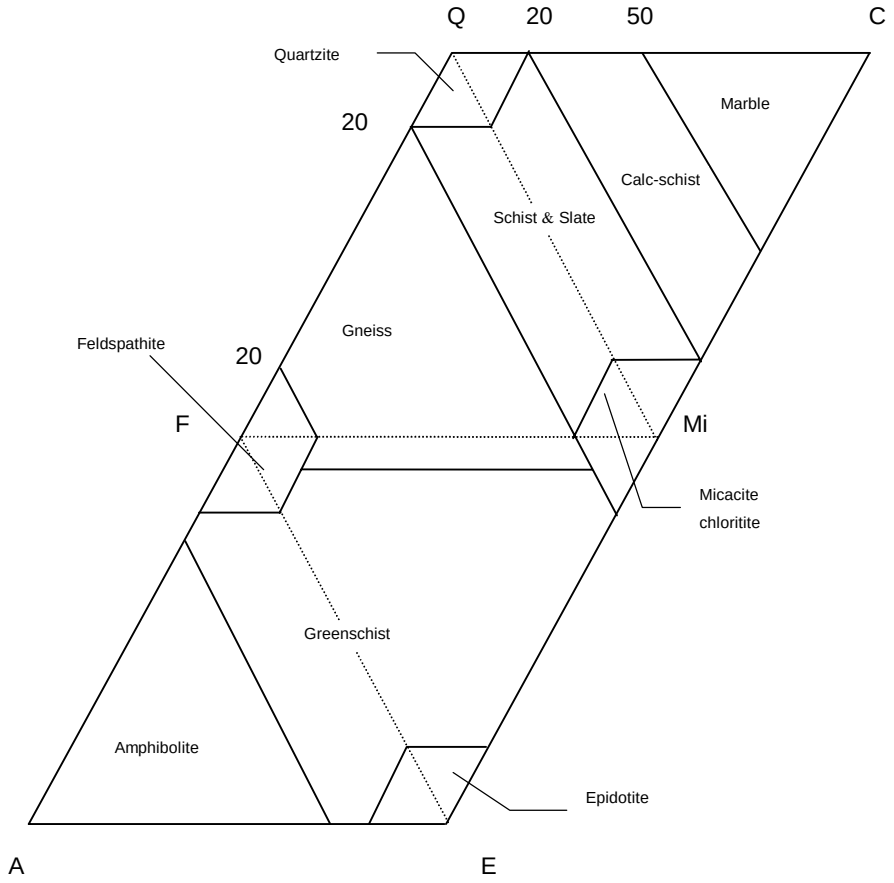


Figure 8

3.2.3 Metamorphic Rocks Classification Chart

3.2.3.1 General

(For the following not included terms: eclogite, granulite, leptite, migmatite, ophicalcite, phyllite, serpentinite, see 3.1.)



Key
F Feldspar
C Carbonates
E Epidote
A Amphiboles
Mi Mica, Chlorite
Q Quartz

Figure 9

3.2.3.2 Classification of marble according to dolomite content

Table 6

Calcitic marble	0 % to 10 %
Calcitic-dolomitic marble	10 % to 50 %
Dolomitic-calcitic marble	50 % to 90 %
Dolomitic marble	90 % to 100 %

Annex A
(informative)

Alphabetic Index

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EN 1925	*Natural stone test methods - Determination of water absorption coefficient by capillary*
EN 1926	*Natural stone test methods - Determination of compression strength*
EN 1936	*Natural stone test methods - Determination of real density and apparent density, and of total and open porosity*
EN 12370	*Natural stone test methods - Determination of resistance to salt crystallisation*
EN 12372	*Natural stone test methods - Determination of flexural strength under concentrate load*
EN 12407	*Natural stone test methods - Petrographic examination*
EN 12440	*Natural stone - Denomination criteria*
prEN 1467	*Natural stone products - Rough blocks - Specifications*
prEN 1468	*Natural stone products - Rough slabs - Specifications*
prEN 1469	*Natural stone products – Finished products, slabs for cladding - Specifications*
prEN 12057	*Natural stone products - Finished products, modular tiles - Specifications*
prEN 12058	*Natural stone products - Finished products, slabs for floors and stairs - Specifications*
prEN 12059	*Natural stone products - Dimensional stone work - Specifications*
prEN 12326-1	*Slate and stone products for discontinuous roofing and cladding- Part 1: Product specification*
prEN 12371	*Natural stone test methods - Determination of frost resistance*
prEN 13161	*Natural stone test methods - Determination of flexural resistance under constant moment*
prEN 13364	*Natural stone test methods - Determination of the breaking load at dowel hole*
prEN 13373	*Natural stone test methods - Determination of geometric characteristics on units*
prEN 13755	*Natural stone test methods - Determination of water absorption at atmospheric pressure*
prEN 13919	*Natural stone test methods. Determination of resistance to ageing by SO_2 action in the presence of humidity*
prEN 14066	*Natural stone test methods - Determination of resistance to ageing by thermal shock*
prEN 14146	*Natural stone test methods - Determination of dynamic elastic modulus (by measuring the resonance frequency)*
prEN 14147	*Natural stone test methods - Determination of resistance to ageing by salt mist*
prEN 14157	*Natural stone test methods - Determination of abrasion resistance*
prEN 14158	*Natural stone test methods - Determination of rupture energy*
prEN 14205	*Natural stone test methods - Determination of Knoop hardness*
prEN 14231	*Natural stone test methods - Determination of the slip resistance by means of the pendulum tester*

FEPA - Standard 42-GB-1984 FEPA Standard for bonded abrasive products of fused alumina and silicium carbide

(WI 00246 011) *Natural stone test methods - Determination of thermal dilatation coefficient*
(WI 00246 018) *Natural stone test methods. Determination of static elastic modulus*

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