

Amarelo Vila Real

Amarelo Real

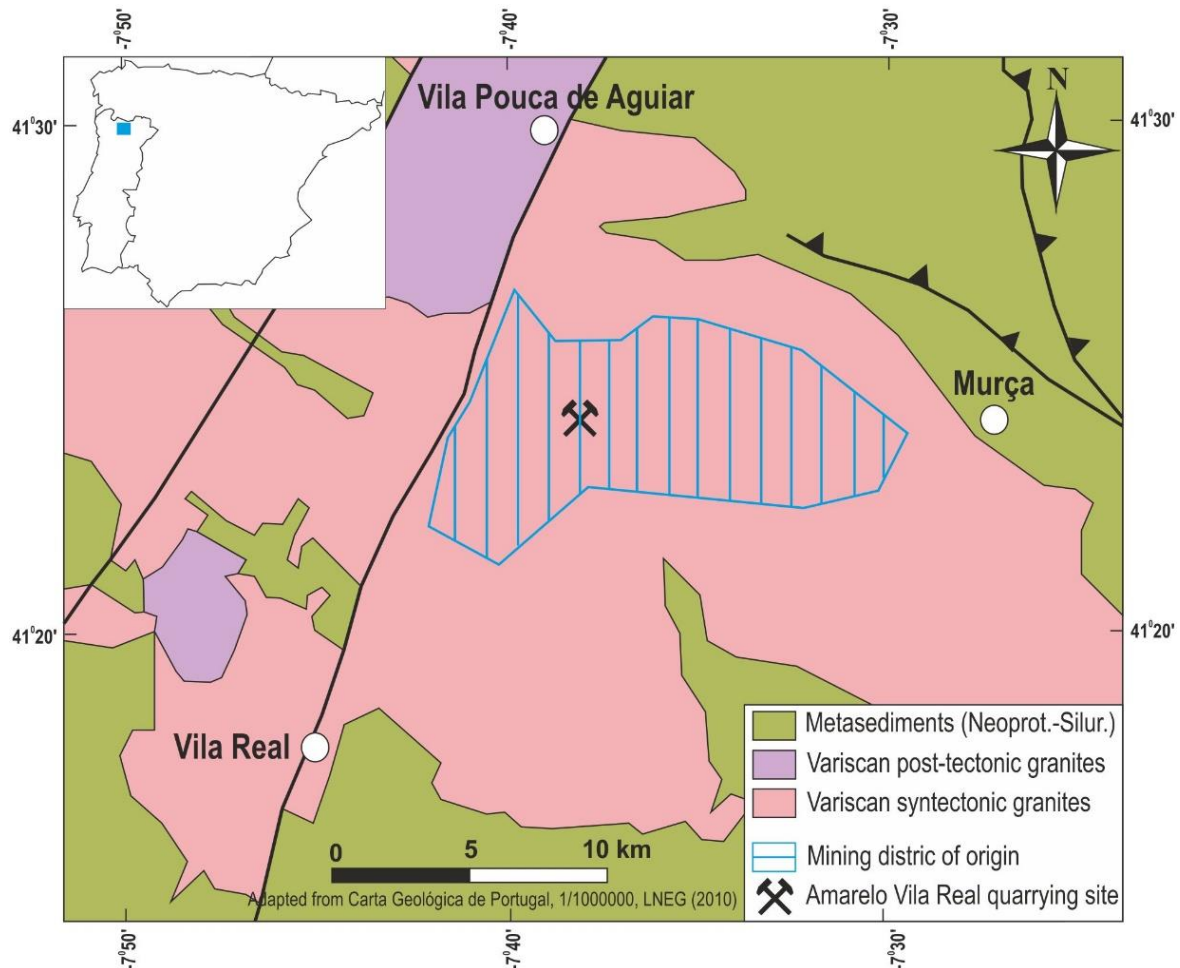


Light yellow to brownish yellow two-mica granite. Medium to coarse grain with porphyroid tendency and incipient foliation.

Commodity	Lithology	Typical colour	Place of origin			
			Country	District	Municipality	Village
Commercial granite	Monzogranite	Yellow	Portugal	Vila Real	Vila Real	S. Tomé do Castelo, Pinhão Cel



Geological setting



Geology:

The granitic massif of Vila Real is part of a larger granitic body striking WNW-ESE that was formed during the last stages of the Variscan Orogeny. The yellowish shades of the Amarelo de Vila Real ornamental variety is the result of a slight meteoric alteration of the most superficial levels of the Vila Real Granite.

Production:

Because only the superficial levels of the Vila Real Granite show a yellowish colour, the quarrying of the Amarelo de Vila Real occupies large areas. Large granite boulders are also exploited. Production is conditioned by the colour variations, which, in turn, depend on the proximity to fractures. Therefore, large blocks are difficult to obtain.

Geological age: Carboniferous

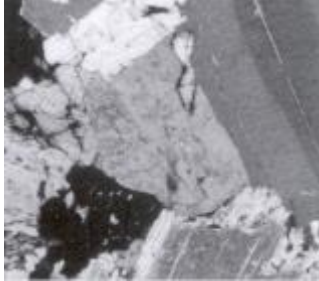
Geological unit: Maciço Granítico de Vila Real

Application, use and heritage

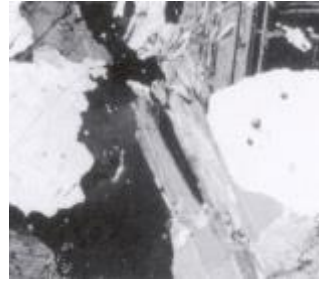
The Amarelo de Vila Real is suitable for application in interior or exterior sheltered areas, particularly for wall cladding. it is also used in the form of cubes for road paving



Petrography



Thin section parallel to the preferred orientation plane, when applied.



Thin section perpendicular to the preferred orientation plane, when applied.

Description:

Granite with inequigranular hypidiomorphic texture, showing slight porphyroid tendency and moderate or clear feldspar weathering.

Source of information:

Geological Survey of Portugal (LNEG - Laboratório Nacional de Energia e Geologia, IP).

Mineral composition

Microcline (%)	Quartz (%)	Plagioclase (%)	Muscovite (%)	Biotite (%)
~32	~27	~26	~11	~3
Chlorite, zircon, apatite, rutile, ilmenite and other opaque minerals (%)				
~1				

Source of information:

Geological survey of Portugal (Laboratório Nacional de Energia e Geologia, IP)

Physical properties

Apparent density (EN 1936) kg/m ³	Open porosity (EN 1936) % vol	Water absorption at atmospheric pressure (EN 13755) % wt	Uniaxial Compressive strength (EN 1926) MPa	Flexural strength under concentrated load (EN 12372) MPa
2590	2.0	0.8	81	8.9

Real density (EN 1936) kg/m ³	Total porosity (EN 1936) % vol	Water absorption coefficient by capillary (EN 1925) (g/m ² x s ^{0,5})	Flexural strength under constant moment (EN 13161) MPa
—	—	10.4 (C ₁)	—

Frost resistance (EN 12371)				
Technological Test (Test A)				Identification Test (Test B): Number of cycles completed prior to stone failure
Flexural strength (EN 12372) after freeze-thaw cycling, MPa	Number of cycles	Uniaxial compressive strength (EN 1926) after freeze-thaw cycling, MPa	Number of cycles	
—	—	78	25	—

Resistance to ageing by thermal shock (EN 14066)			
Change in dynamic modulus of elasticity (increase: +; decrease: -) %	Change in open porosity (increase: +; decrease: -) %	Change in ultrasound pulse velocity (increase: +; decrease: -) %	Change in flexural strength under conc. load (increase: +; decrease: -) %
—	—	—	—

Abrasion resistance (EN 14157)			Resistance to salt crystallisation (EN 12370)	Breaking load at dowel hole (EN 13364)	
Method A - Wide Wheel Abrasion Test, mm	Method B - Böhme Abrasion Test, mm ³	Method C - Amsler Abrasion Test, mm	Change in mass (increase: +; decrease: -), %	Breaking load, N	Thickness of the test specimens, mm
—	—	0.3	—	—	—

Slip resistance by means of the pendulum tester (EN 14231 / CEN/TS 16165)			Rupture energy (EN 14158), Joule	Thermal Conductivity (EN 1745), W/m·K
Tested surface finish	Slip Resistance Value — SRV			
	Dry test condition	Wet test condition		
honed	82	77	6	—

Source of information:

Geological survey of Portugal (Laboratório Nacional de Energia e Geologia, IP)

Chemical properties

Main elements (%)

SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	TiO ₂	SO ₃	LOI
73.59	14.67	1.11	0.02	< 0.20	0.46	3.32	4.91	0.36	0.15	—	1.18

Trace elements (ppm)

V	Cr	Mn	Co	Ni	Cu	Zn	As
< 5	6	—	<5	< 7	< 6	74	13
Sr	Cd	Ba	Pb	Be	Rb	Bi	U
32	—	111	26	—	425	—	10
Sc	Y	Th	Sb	Ta	Nb	Zr	Sn
< 7	8	< 5	< 8	< 6	15	57	22
Ag	B	Mo	W	Ga	Ge	Se	Cs
—	—	—	< 6	25	—	—	—
Tl	Hf						
—	< 5						

REE (ppm)

La	Ce	Pr	Nd	Sm	Eu	Gd	Tb
Dy	Ho	Er	Tm	Yb	Lu		

Methods applied:

Determination of the main elements and of the trace elements: X-Ray Fluorescence.

Source of information:

Geological survey of Portugal (Laboratório Nacional de Energia e Geologia, IP)

Sources of more information

Type of information	Name of provider	URL
This data sheet:	Geological survey of Portugal (Laboratório Nacional de Energia e Geologia, IP)	www.lneg.pt https://rop.lneg.pt/rop/index_en.php
Non-commercial directory:		
Commercial directory:		
Scientific publication:	Engineering Geology	http://dx.doi.org/10.1016/j.enggeo.2017.01.030
	Environmental Earth Sciences	https://doi.org/10.1007/s12665-018-7780-0
Other publication:		

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