

Styra Green

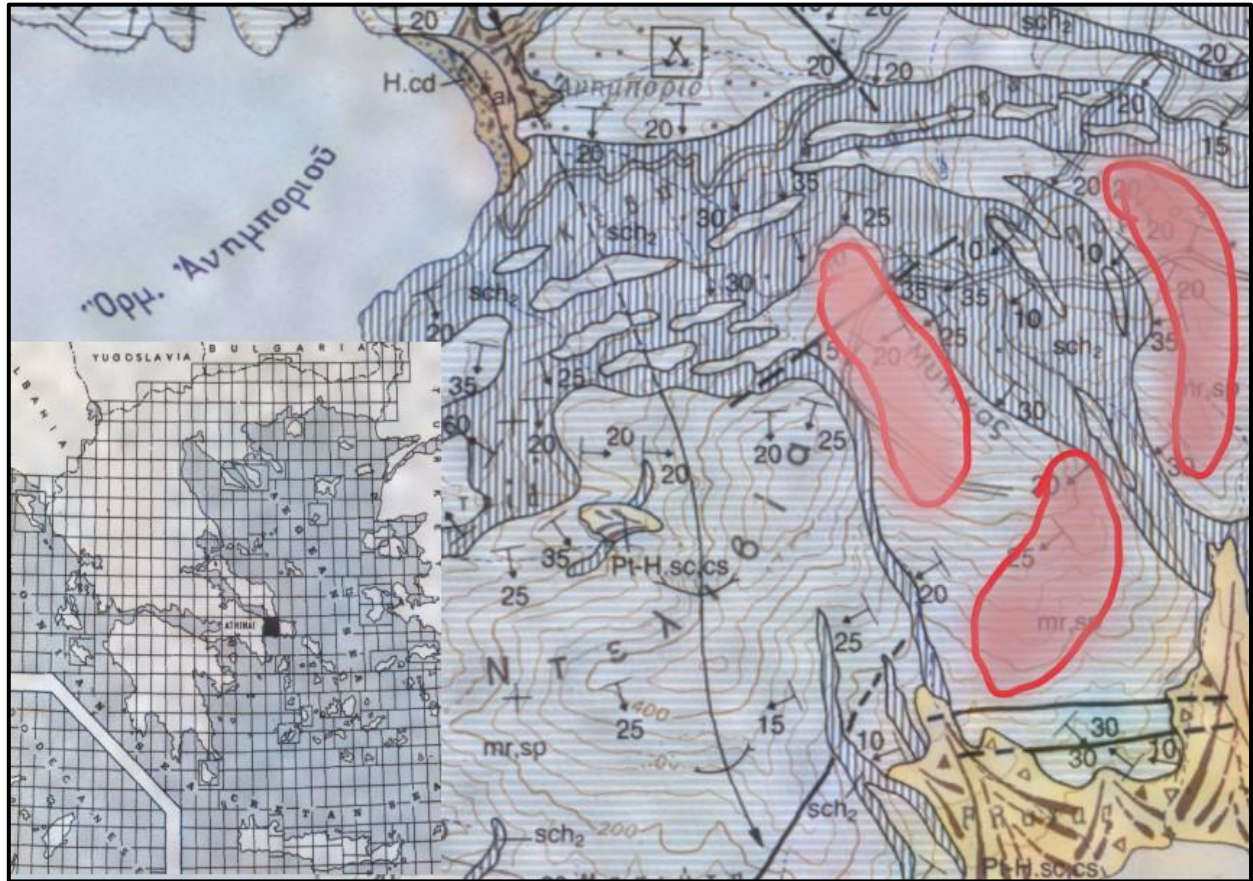


Scale 1:1

Short description: Medium grained marble with green veins crossing the light green crystalline mass.

Commodity (vocabulary)	Lithology (vocabulary)	Typical colour (code list)	Place of origin			
			Country	County / District / Province	Municipality / Community	Place/town / Village
Marble	Cipollino marble	Green	Greece	Central Greece	Styra	Kapsala

Geological setting



Geology: Styra Green marbles (red markings) are very thick series of marbles and cipolins with schist and sometimes quartzite intercalations, which form the upwards regular evolution of the Tsakeoi Schists occupying a significant part of Southern Euboea. The marbles of the Styra series are usually grey, thin to medium bedded and locally thick-bedded, fine to medium crystalline, and often with great participation of muscovite, passing as a result to cipolin-marbles or / and cipolins. Besides that, chlorite participates locally in a significant proportion and they pass to green cipolins which have been intensely exploited, occasionally from the ancient times to the present day.

(Source: Geological Map of Greece 1:50000, Rafina Sheet)

Production: The most important quarry area is near Styra and Kapsala villages, in South Evia.

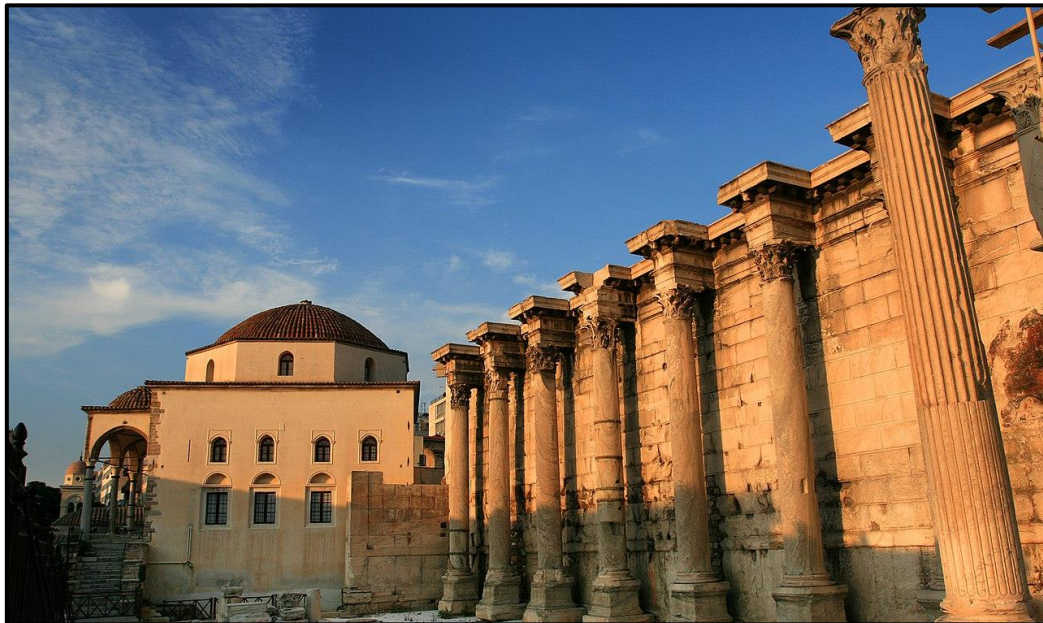
Geological age: Neogene – Middle – Upper Miocene

Geological unit: Neohellenic Tectonic Nappe Unit – Marbles and cipolins of Styra

Application, use and heritage

Description: Cipollino marble was a variety of marble used by the ancient Greeks and Romans, whose Latin term for it was *marmor carystium* (meaning "marble from Karystos"). It was quarried in several locations on the south-west coast of the Greek island of Euboea, between the modern-day cities of Styra and Karystos. Some of these ancient quarries survive with a mine-face of over 100 metres.

(Source: https://en.wikipedia.org/wiki/Cipollino_marble)



Hadrian's Library was created by Roman Emperor Hadrian in AD 132 on the north side of the Acropolis of Athens. The library was seriously damaged by the Herulian invasion of 267 and repaired by the prefect Herculus in AD 407-412. The Columns were made of Styra Green (cipollino marble).

(Source: https://en.wikipedia.org/wiki/Hadrian%27s_Library)



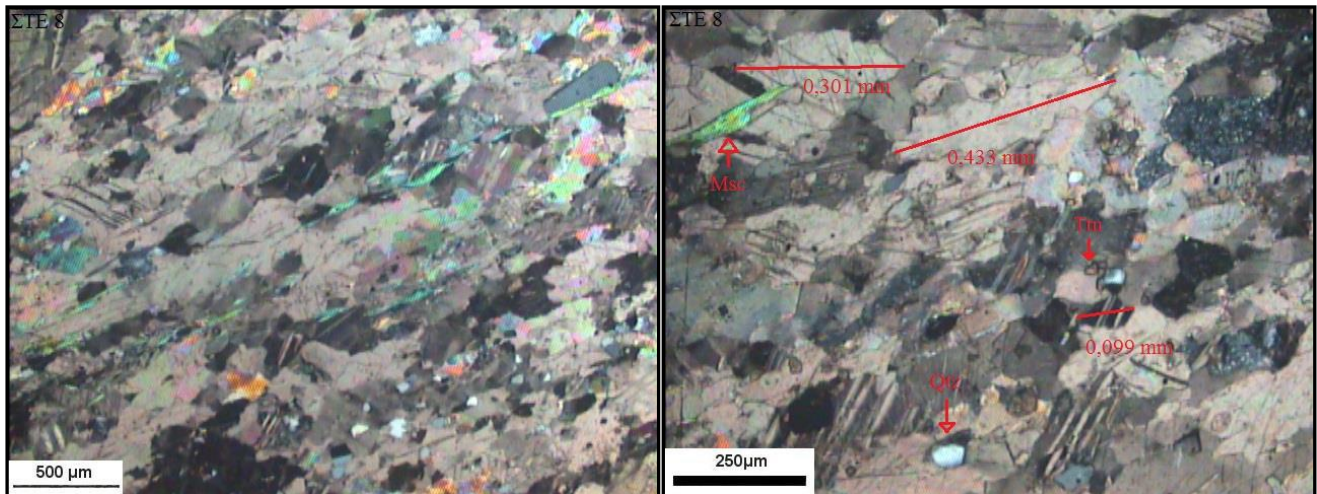
Ancient Columns with Styra Green in the Ancient Quarries on the southern flanks of Mountain Ochi.



“Karystia Lithos” – Cipollino marble

(Source: «ΚΑΡΥΣΤΙΑ ΛΙΘΟΣ» ΕΝΑ ΔΙΑΧΡΟΝΙΚΟ ΔΟΜΙΚΟ ΥΛΙΚΟ, Ελληνική Γεώσφαιρα, Περιοδική Έκδοση Ι.Γ.Μ.Ε., Απρίλιος 2009, Τεύχος 6)

Petrography



Description: Photomicrograph of thin section, showing calcite crystals, presence of muscovite, quartz, titanite and chlorite.

Source of information: Hellenic Survey of Geology and Mineral Exploration

Mineral composition

If no accurate number, use MM=main minerals, SM = Subordinate minerals, AM=accessory minerals

Calcite (%)	Muscovite (%)	Albite (%)	Chlorite (%)	Dolomite (%)	Quartz (%)	
70	14	8	5	2	1	

Source of information: Hellenic Survey of Geology and Mineral Exploration

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
2720	0,3	0,1	86	22,6

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
-	-		

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	
22,5	48			

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, cm ³ / 50cm ²	Method C - Amsler Abrasion Test, mm	Change in mass (increase: +; decrease: -), %	Breaking load, N	Thickness of the test specimens, mm
-	26	-	-	2000	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		
			6	-

Source of information: Hellenic Survey of Geology and Mineral Exploration

Chemical properties

Main elements

SiO ₂ (%)	Al ₂ O ₃ (%)	Fe ₂ O ₃ (%)	TiO ₂ (%)	MgO (%)	CaO (%)	Na ₂ O (%)	K ₂ O (%)	MnO (%)	P ₂ O ₅ (%)	SO ₃ (%)	LOI (%)
3,00	0,73	0,45	-	0,80	52,20	1,50	0,40	0,15	-	-	41,65

Trace elements

V (ppm)	Cr (ppm)	Mn (ppm)	Co (ppm)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)
10	26	950	4,0	25	104	22	2,0
Sr (ppm)	Cd (ppm)	Ba (ppm)	Pb (ppm)	Be (ppm)	Rb (ppm)	Bi (ppm)	U (ppm)
570	0,6	56	12,5	0,3	5,5	<0,1	1,4
Sc (ppm)	Y (ppm)	Th (ppm)	Sb (ppm)	Ta (ppm)	Nb (ppm)	Zr (ppm)	Sn (ppm)
31	3,3	1,4	1,7	0,4	0,6		
Ag (ppm)	B (ppm)	Mo (ppm)	W (ppm)	Ga (ppm)	Ge (ppm)	Se (ppm)	Cs (ppm)
Tl (ppm)							

REE

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

Methods applied and source of information: Hellenic Survey of Geology and Mineral Exploration

Sources of more information

Type of information	Name of provider	URL
This data sheet	Hellenic Survey of Geology and Mineral Exploration	https://www.eagme.gr/
Non-commercial directory	Wikipedia	https://en.wikipedia.org/wiki/Cipollino_marble https://en.wikipedia.org/wiki/Hadrian%27s_Library
Commercial directory		
Scientific publication	Ελληνική Γεώσφαιρα, Περιοδική Έκδοση Ι.Γ.Μ.Ε., Απρίλιος 2009, Τεύχος 6	https://www.igme.gr/images/igme/magazine/Elliniki_Geosphaera_No6.pdf
Other publication		

Compiled by:	Hellenic Survey of Geology and Mineral Exploration (H.S.G.M.E.) https://www.eagme.gr/	
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