

Ottaskifer (Otta Schist)

Pillarguri

Høgseter

Sel Royal

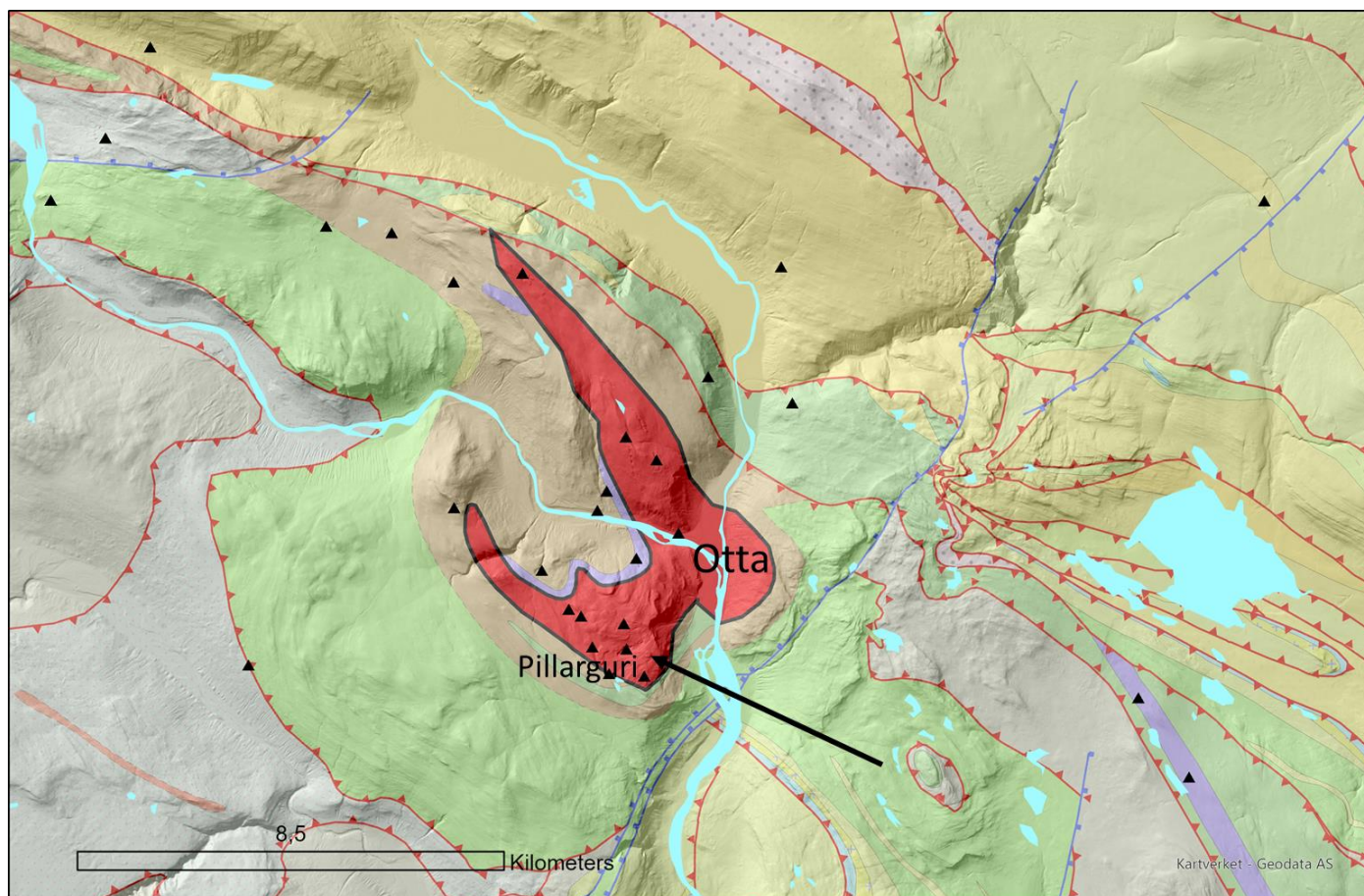


5 centimeters

Short description: The image displays a honed surface of the main variety of the Otta Schist containing needle-like crystals of hornblende. Although dark grey is the predominant colour, brown varieties (secondary colouration by iron hydroxides) are also common and sold as commercial products. Sometimes the stone is classified as phyllite, other times as mica schist. This is due to that the rock is a borderline case between the two definitions.

Commodity (vocabulary)	Lithology (vocabulary)	Typical colour (code list)	Place of origin			
			Country	County / District / Province	Municipality / Community	Place/town / Village
Commercial Slate	Mica Schist	Dark grey	Norway	Innlandet	Sel	Pillarguri

Geological setting



Geology: The Otta Schist is a term covering several varieties of dark grey, schistose rocks. They frequently contain hornblende or garnet porphyroblasts. The most important quarry area is the Pillarguri mountain, but there are several other historical quarry sites. The outcropping area is shown with red colour, arrow points at the Pillarguri site. The main commercial type is the Pillarguri subtype, containing needle-shaped hornblende porphyroblasts. A secondary type is the Sel Royal subtype, containing small garnet porphyroblasts.

Production: Production in an industrial scale most likely started in the 18th century, primarily for roofing slate. During the 19th century, a more diversified production delivered schist also for façade and floors. At present time, The Otta Schist is produced for a wide range of applications.

Geological age: Cambrian-Ordovician

Geological unit:

Application, use and heritage

Description: The Otta Schist (in particular the Pillarguri variety) is a traditional roofing slate material in a large part of eastern Norway, in particular the Gudbrandsdalen Valley. In the 20th century, the use was more diverse, such as flooring, facades and even honed floor tiles. The stone has been exported to many countries during the 20th century.



The 19th Century Otta Church, displaying roof and walls of Otta Schist.



Honed Pillarguri type at Geological Survey of Norway, 1995.

Petrography

Description: Fine-grained schist, containing mica and quartz as main minerals. Porphyroblasts of hornblende or garnet may occur. The stone contains some pyrrhotite, which may cause a slight brownish patina when exposed outdoor over long time periods.

Source of information: Geological Survey of Norway

Mineral composition

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

Quartz (%)	Muscovite (%)	Biotite (%)	Chlorite (%)	Amphibole (%)	Garnet (%)	Carbonate (%)
21	31	38	1,3	3	0,8	0,6
Phyrrotite (%)	Feldspar (%)	Titanite (%)	Epidote (%)			
1,9	1,3	1,3	0,6			

Source of information: [Minera Skifer](#)

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
2820		0,2		39,9

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

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	

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
25					

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	55	18		
Brushed	61	22		

Source of information: [Minera Skifer](#)

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 (%)

Trace elements

V (ppm)	Cr (ppm)	Mn (ppm)	Co (ppm)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)
Sr (ppm)	Cd (ppm)	Ba (ppm)	Pb (ppm)	Be (ppm)	Rb (ppm)	Bi (ppm)	U (ppm)
Sc (ppm)	Y (ppm)	Th (ppm)	Sb (ppm)	Ta (ppm)	Nb (ppm)	Zr (ppm)	Sn (ppm)
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:

Sources of more information

Type of information	Name of provider	URL
Data sheet	Geological Survey of Norway	https://geo.ngu.no/api/faktaark/mineralressurser/vi/sNaturstein.php?objid=9717&lang=engv
Maplink	Geological Survey of Norway	https://geo.ngu.no/kart/common_mobil/?_ /kart/mineralressurser_mobil/_ lang=eng::extent=193565.43810450536,6855511.443893401,226061.43810450536,6869728.443893401::map=9
Non-commercial directory	Natural stone online	Detail view (naturalstone-online.com)
Commercial directory		
Scientific publication		
Other publication		

Compiled by:	Geological Survey of Norway (NGU) https://www.ngu.no/	 GEOLOGICAL SURVEY OF NORWAY - NGU -
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