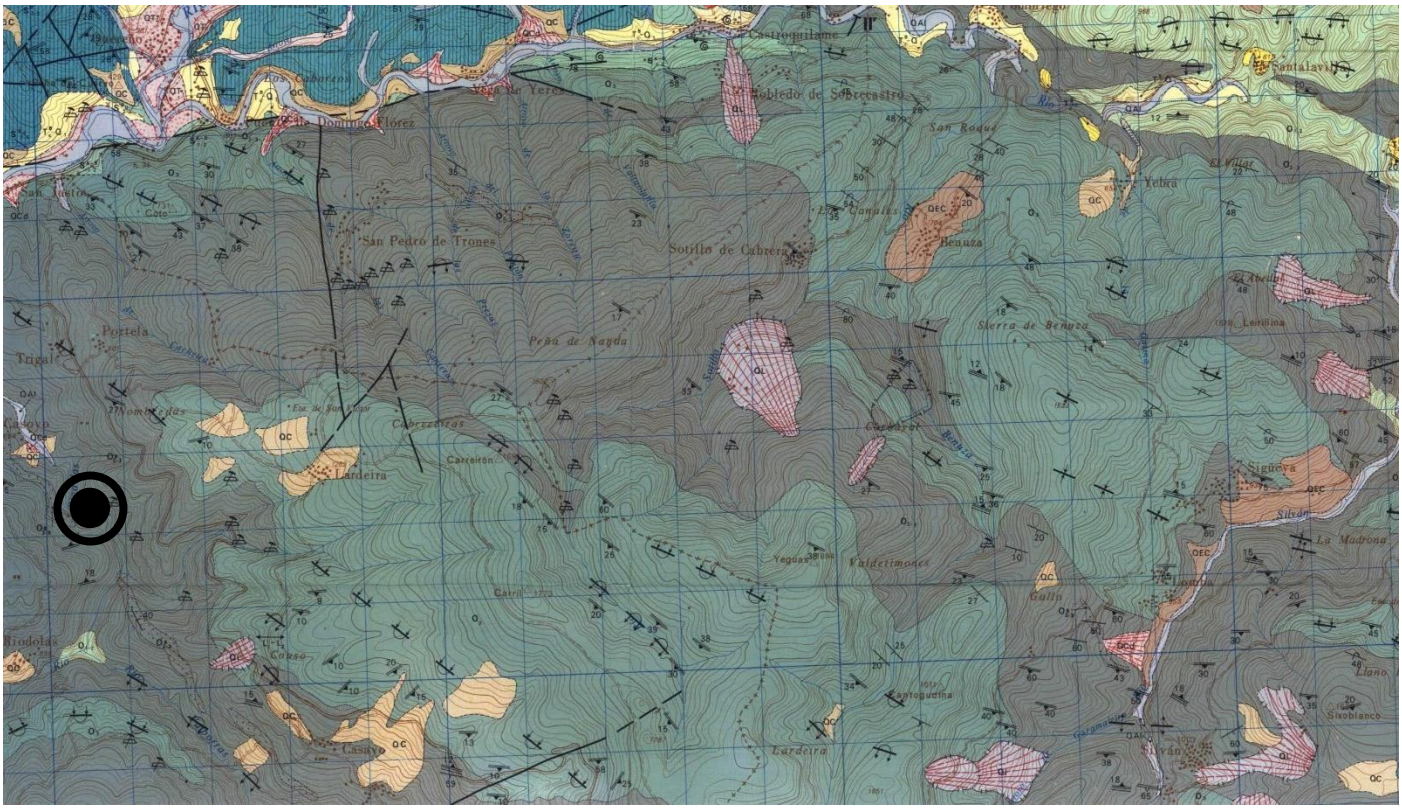
Valdeorras Castañeiro

Short description: Homogeneous black and gray slates, with fine or medium grain size, and frequent presence of metallic sulphides (pyrite and pyrrhotite). Metallic sulphides, which appear more frequently dispersed in the rock, but concentrated at certain levels, have varied shapes from cubic to nodular, with also variable sizes, the most frequent being between 2 and 3 mm.

Commodity (vocabulary)	Lithology (vocabulary)	Typical colour (code list)	Place of origin			
			Country	County / District / Province	Municipality / Community	Place/town / Village
slate of tectonic compres	slate	grey	Spain	Orense	Carballeda de Valdeorras (OR-OU)	Carballeda de Valdeorras

Geological setting



Geology: The slates of the Luarca slates formation are a monotonous series of homogeneous black and gray shales, with fine or medium grain size, and frequent presence of metallic sulphides (pyrite and pyrrhotite). Metallic sulphides, which appear more frequently dispersed in the rock, but concentrated at certain levels, have varied shapes from cubic to nodular with variable sizes, the most frequent being between 2 and 3 mm. These slates show occasionally sandy laminations of centimeter or decametric scale thicknesses, especially in their middle and lower part and in some sectors include towards the roof intercalations of decametric scale sandstones and ferruginous layers (30-40 cm thick), as well as volcanic and volcanoclastic layers of less than 5m in thickness. The thickness of this formation in this area can be around 200 m. Given their homogeneity, they have a more frequently high degree of fissility, ranging up to medium.

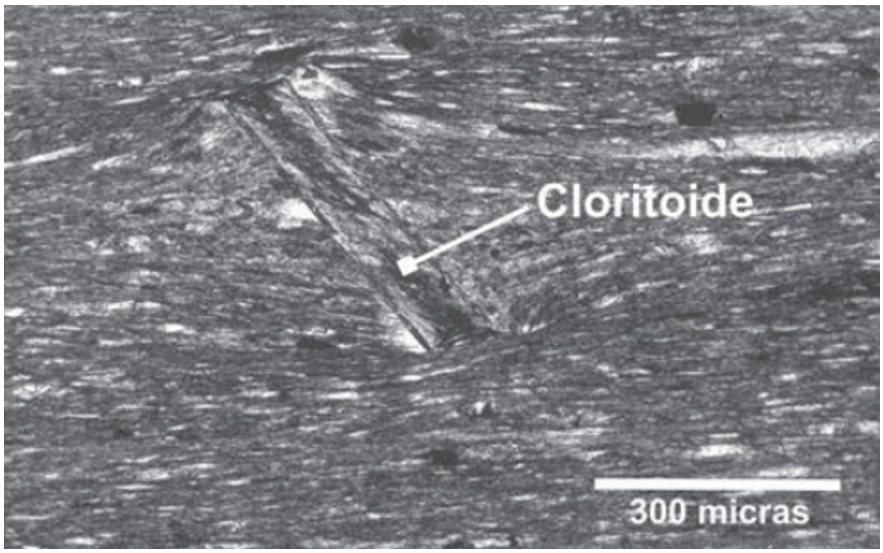
Production: This group is made up of the Lombeiro, San Cosme, Chao de Golada, Ardigonte, Castañeiro, Castañeiro I, El Río, Carmiña, Ardemouro, and Ardigonte quarries and other exploitations without recent activity. They are located between the Riodolas river and the OUR-122 road, in the area called Castañeiro, between the Majada de Trapela to the N and Rabo da Porca to the S, being close to the town of Casoio.

Geological age: Middle Ordovician.
Geological unit: Luarca Slates.

Application, use and heritage

Description: Slate roof on a building.

Petrography



Description: Postkinematic idiomorphic chloritoid blast with foliation. Valdeorras District, Pizarras de Luarca Formation.

Source of information: V. Cárdenes, A. Rubio Ordóñez, A. López Munguira y C. Monterroso. 2010. Petrografía y mineralogía de las pizarras para cubiertas de la Península Ibérica en relación con su calidad. Trabajos de Geología, Universidad de Oviedo, 30 : 412-420.

Mineral composition

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

Mineral 1 (%)	Mineral 2 (%)	Mineral 3 (%)	Mineral 4 (%)	Mineral 5 (%)	Mineral 6 (%)	Mineral 7 (%)
Chlorite (15-40%)	**Feldspars (0-15%)**	**Mica (30-50%)**	**Quartz (20-35%)**			
Mineral 8 (%)	Mineral n (%)					

Source of information: V. CÁRDENES, A. RUBIO ORDÓÑEZ, A. LÓPEZ MUNGUIRA Y C. MONTERROSO. 2010. Petrografía y mineralogía de las pizarras para cubiertas de la Península Ibérica en relación con su calidad. Trabajos de Geología, Universidad de Oviedo, 30: 412-420.

Physical properties

Apparent density (EN 1936) kg/m3	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
2810		1.07	113.86	41.69

Real density (EN 1936) kg/m3	Total porosity (EN 1936) % vol	Water absorption coefficient by capillary (EN 1925) (g/m2 x s0,5)	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

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		

Source of information: Quiroga, J.R., Casares, A., Míguez, V., Vidal, J.R. (1997): La Piedra de Galicia. Xunta de Galicia, 319 págs. ISBN: 84-453-2037-8.

Sources of more information

Type of information	Name of provider	URL
This data sheet	Instituto Geológico y Minero de España (IGME)	http://www.igme.es/
Non-commercial directory		
Commercial directory		
Scientific publication	V. CÁRDENES, A. RUBIO ORDÓÑEZ, A. LÓPEZ MUNGUIRA Y C. MONTERROSO. 2010. Petrografía y mineralogía de las pizarras para cubiertasde la Península Ibérica en relación con su calidad. Trabajos de Geología, Universidad de Oviedo, 30 : 412-420	
Other publication	Quiroga, J.R., Casares, A., Míguez, V., Vidal, J.R. (1997): La Piedra de Galicia. Xunta de Galicia, 319 págs. ISBN: 84-453-2037-8.	

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