St. Margarethen

St. Margarethener Kalksandstein

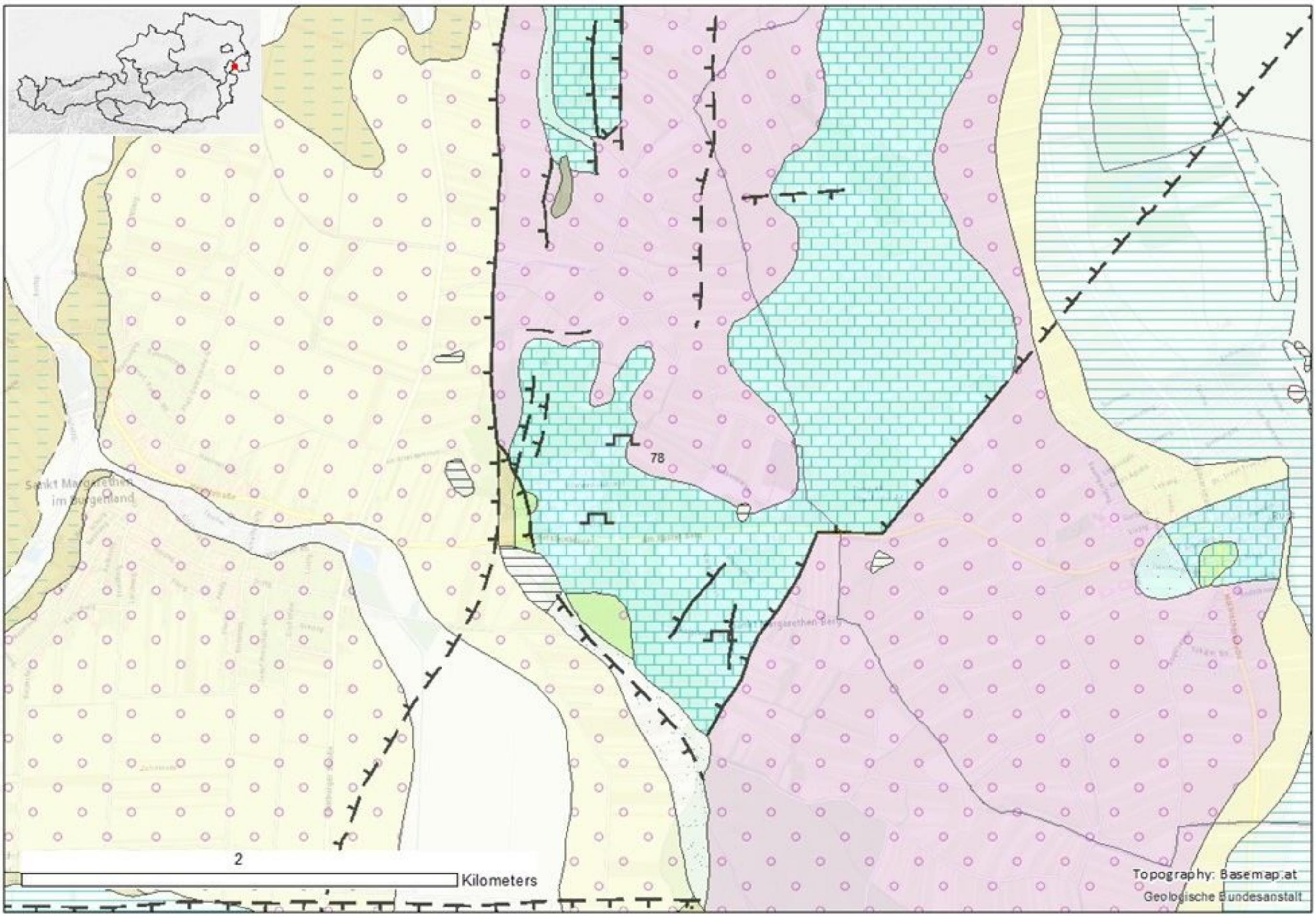
Römerstein

3 cm

Short description: mostly only poorly consolidated, porous algal foraminiferous calcarenite with rich fossil content (foraminifera, echinids, bryozoans, calcareous red algae, molluscs); characteristic are large nodules of calcareous red algae enriched in layers; partly also well-banked, laminated limestones to marls in various facies

Commodity (vocabulary)	Lithology (vocabulary)	Typical colour (code list)	Place of origin			
			Country	County / District / Province	Municipality / Community	Place/town / Village
Commercial Sandstone	Calcarenite	Beige	Austria	Eisenstadt-Umgebung / Burgenland	St. Margarethen im Burgenland	St. Margarethen

Geological setting



Geology: The St. Margarethen calcareous sandstone (light blue signature on the map) is located near the village of St. Margarethen in Burgenland. The quarried type is a massive thick or medium bedded light brown fossil-rich of fine particles of calcareous red algae and other shallow marine fossils (foraminifera, echinoderms, molluscs, bryozoans and others). Often nodules of these algae – rhodolithes – occur as layers. It was deposited on a shallow, tide influenced marine platform and redeposited on its slope. The components are weakly cemented with fine-grained calcite, yet better cemented deformation bands are partly characteristic.

Production: The huge quarrying area is limited to the crest of the Ruster Hills east of the village of St. Margarethen in Burgenland. Mining began in the 14th century at the latest, and the rock gained supraregional importance at the end of the 17th century. When fresh and moist, the rock is very soft and can be extracted by means of shearing chain saws and wedge techniques. The blocks and slabs harden after drying out in the air. Unlike its name “Römersteinbruch” no traces are left and prove Roman quarrying, which stands in contrast to the underground quarry at 9 km distant Fertörákos/Kroisbach (Hungary).

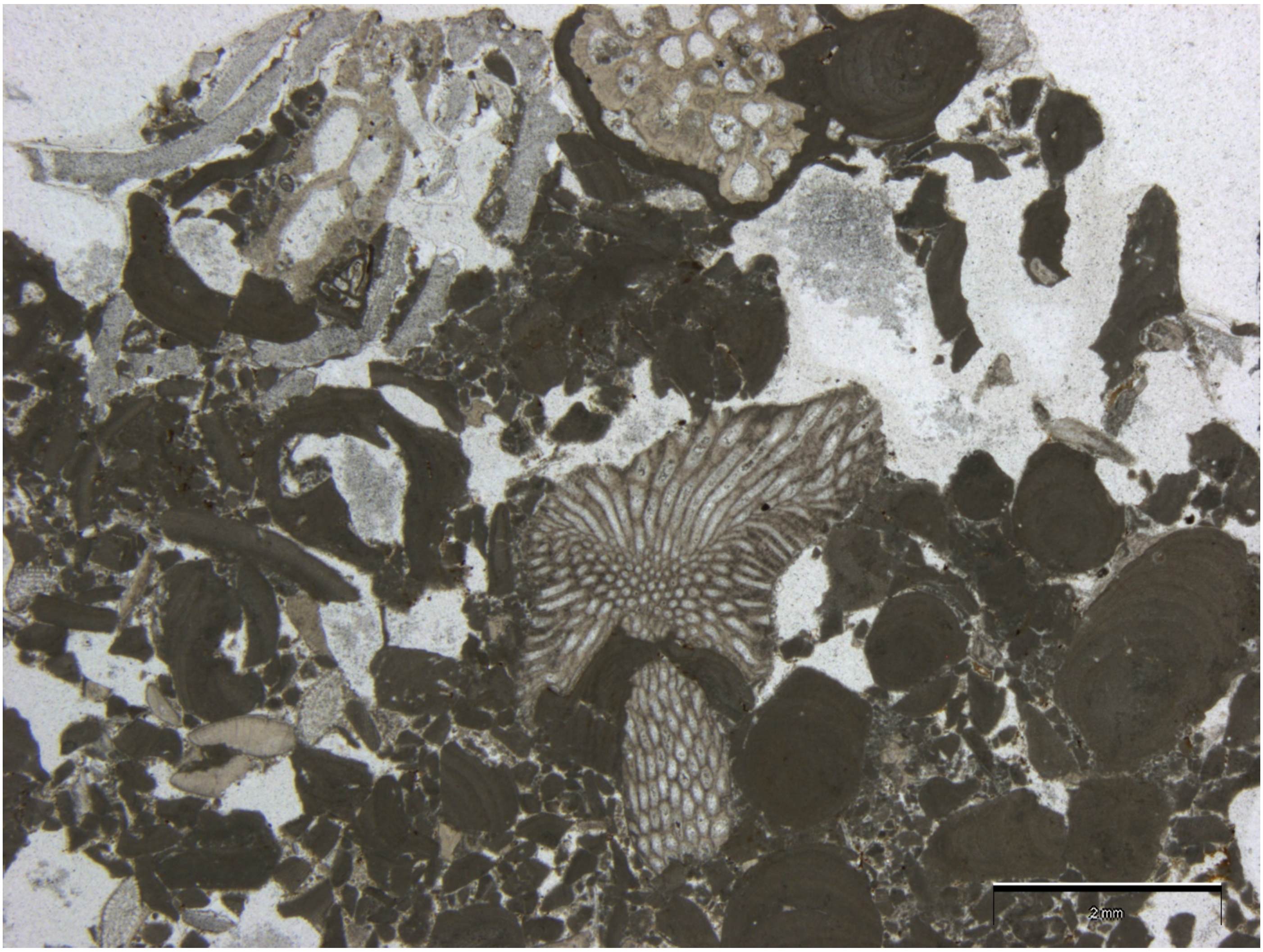
Geological age: Badenian	
Geological unit: Leithakalk / Leitha Limestone (URI: http://resource.geolba.ac.at/GeologicUnit/677)	

Application, use and heritage

Description: The stone is used for portal and window jambs, floor coverings, stair treads, columns, façade cladding, wall stones and decorative art objects. In the 19th century, St. Margarethen calcareous sandstone, calcarenite respectively, was used for numerous magnificent buildings in Vienna's inner city. Today, renovation work on these historic buildings, among them St. Stephen's Cathedral, Schönbrunn Palace and Vienna Musikverein, is one of its main uses.

Description: Pictures from 2013 show Vienna: Main Hall (1872-1883) part of frontal façade (left), newer facing of the base of the builing of Ministry of the Interior (middle) and façade of Palais Ferstl (1855-60; former Österreichisch-Ungarische Bank; right), both Herrengasse.

Petrography



Description: Lithothamnium-bryozoan grain-rudstone with echinoderms, foraminifers, decapods. Further features are collapsed structure, very thin cement crusts from, if at all – bad primary and nearly no secondary stabilized cement; biodestruction; very pure limestone. Environmental conditions shallow clear qiet without mechanical abrasion, process of automicrite generation and phreatic diageneses. Photomicrograph under unpolarized light, 18x enlargement.

Source of information: Geological Survey of Austria (GBA)

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 (%)
Mineral 8 (%)	Mineral n (%)					

Source of information:

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**

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:

Chemical properties

Main elements

SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	TiO_2 (%)	MgO (%)	CaO (%)	Na_2O (%)	K_2O (%)	MnO (%)	P_2O_5 (%)	SO_3 (%)	LOI (%)
1,51	0,4	0,45	0,01	0,81	52,5	0,06	0,06	0,07	0,18	0,11	43,1

Trace elements

V (ppm)	Cr (ppm)	Mn (ppm)	Co (ppm)	Ni (ppm)	Cu (ppm)	Zn (ppm)	As (ppm)
	22,2			4,1	< 1,9	5,4	< 0,8
Sr (ppm)	Cd (ppm)	Ba (ppm)	Pb (ppm)	Be (ppm)	Rb (ppm)	Bi (ppm)	U (ppm)
430	< 0,5	29,9	4,8		3,3	< 1,7	< 2
Sc (ppm)	Y (ppm)	Th (ppm)	Sb (ppm)	Ta (ppm)	Nb (ppm)	Zr (ppm)	Sn (ppm)
	4,5	< 1,5	2	< 8	< 0,9	4,5	< 0,5
Ag (ppm)	B (ppm)	Mo (ppm)	W (ppm)	Ga (ppm)	Ge (ppm)	Se (ppm)	Cs (ppm)
< 0,4		< 1,9	< 5	< 0,7	< 0,7	< 0,5	< 2,6
Tl (ppm)							
< 1,5							

REE

La (ppm)	Ce (ppm)	Pr (ppm)	Nd (ppm)	Sm (ppm)	Eu (ppm)	Gd (ppm)	Tb (ppm)
10,1	12,8	< 5	<9,3				
Dy (ppm)	Ho (ppm)	Er (ppm)	Tm (ppm)	Yb (ppm)	Lu (ppm)		

Methods applied and source of information: average value from 3 samples; analysis of major, minor and selected trace elements: energy-dispersive X-ray fluorescence analysis; gravimetric determination of the loss on ignition; Geological Survey of Austria (GBA)

Sources of more information

Type of information	Name of provider	URL
This data sheet	Geological Survey of Austria (GBA)	https://www.geologie.ac.at
Non-commercial directory		
Commercial directory		
Scientific publication		
Other publication		

Bednarik, M., Moshammer, B., Heinrich, M., Holzer, R., Laho, M., Rabeder, J., Unterwurzacher, M. & Uhlir, C. (2014): Engineering geological properties of Leitha Limestone from historical quarries in Burgenland and Styria, Austria.- Engineering Geology 176, pp. 66-78, Elsevier, Amsterdam.

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Häusler, H. mit Beiträgen von Figdor, H., Hammerl, Ch., Kohlbeck, F., Lenhardt, W. & Schuster, R. (2010): Erläuterungen zur Geologischen Karte der Republik Österreich 1:50.000 Blatt 78 Rust.- 192 S., 65 Abb., 5 Tab., 2 Taf., Geologische Bundesanstalt, Wien.

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Picture of stone surfaces: Source: Kieslinger-Archive, Geological Survey of Austria, Wien

Geological map: Häusler, H. & Pascher, G. (1993): Geologische Karte der Republik Österreich 1:50.000 Blatt 78 Rust.- 1 Bl., Geologische Bundesanstalt, Wien.

Topographic map: Basemap.at (https://basemap.at)

Compiled by:	Geological Survey of Austria (GBA) https://www.geologie.ac.at	Geologische Bundesanstalt