

Introduction into the Transylvanian Sand Deposits

In Transylvania, in the ring of the Carpathians, there are many, more or less rich sand deposits. Most of the sand deposits can only be used for local constructions, therefore we only studied the raw material of sand mines with larger masses and more uniform grains.

Table #3 presents the chemical compositions of sands, table #4 the grain sizes

#	Composition (%)	Aghires	Popesti	Docleni	Valenii de Munte	Szeltersz	Hidveg
1.	SiO ₂	97.19%	82.50%	70.14%	95.85%	89.24%	96.86%
2.	Fe ₂ O ₃	0.57%	0.85%	1.20%	0.85%	1.48%	1.75%
3.	Al ₂ O ₃	1.05%	7.80%	8.10%	3.70%	5.02%	1.51%
4.	CaO	0.28%	2.50%	6.73%	0.85%	2.66%	1.10%
5.	MgO	0.29%	1.80%	0.54%	0.10%	0.18%	0.38%
6.	Na ₂ O+K ₂ O	0.31%	0.61%	0.43%	0.20%	0.65%	0.18%
7.	Heating loss	0.30%	3.68%	5.30%	1.12%	0.91%	0.65%
8.	Susp. matter	0.50%	15.60%	19.80%	1.20%	11.30%	1.50%

3. table – Chemical composition of sands

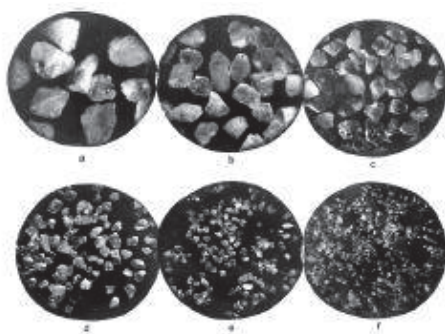
#	Characteristic	Aghires	Popesti	Docleni	Valenii de Munte	Szeltersz	Hidveg
1.	Granulation sieve characteristic in mm (%)						
	1.000	3.00%	-	0.50%	-	0.20%	-
	0.630	5.00%	-	13.80%	0.50%	0.40%	-
	0.400	17.00%	1.58%	62.20%	8.80%	0.40%	10.00%
	0.315	15.00%	2.43%	13.00%	7.20%	3.40%	32.00%
	0.200	38.00%	14.23%	3.00%	20.00%	22.60%	53.50%
	0.160	9.00%	30.20%	5.10%	17.40%	20.00%	1.00%
	0.100	7.00%	31.00%	2.00%	32.55%	18.60%	3.00%
	0.063	4.00%	13.00%	0.25%	13.00%	18.60%	0.50%
	dust	2.00%	8.75%	0.25%	2.50%	13.40%	0.01%
2.	Average grain size characteristic in mm						
		0.275	0.130	0.440	0.162	0.132	0.170
3.	Grain uniformity characteristic in (%)						
		52%	56%	34%	53%	36%	56%

4. table – Grain sizes of sands

There are numerous sand quarries in Transylvania, however, only a few of them are of real importance from the point of view of the amount of sediment. We will briefly describe these in the followings.

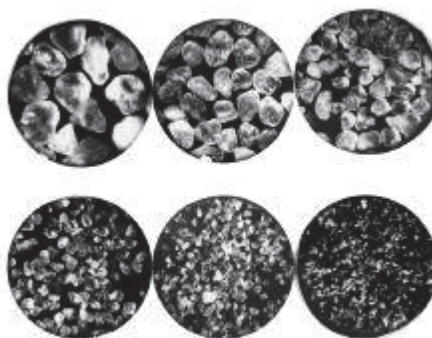
Aghires is the largest sand deposit not only in Transylvania, but also in Romania. At the Aghires deposit, the quartz sand is relatively clean, containing only 2-5% suspended matter before washing. Its grains are rather angular, the edges are slightly rounded (Figure 5). Judging by the shape of the grains, it belongs to the sands rolled by water, but the small content of suspended matter suggests sea water. The only screening and washing equipment in Romania that produces pure quartz sand in four grain fractions for the ceramics, glass and metal industries is located here. Half of the washed floating

material is silicon dioxide and half is aluminum oxide. The low calcium oxide content indicates the presence of very few shell fragments.



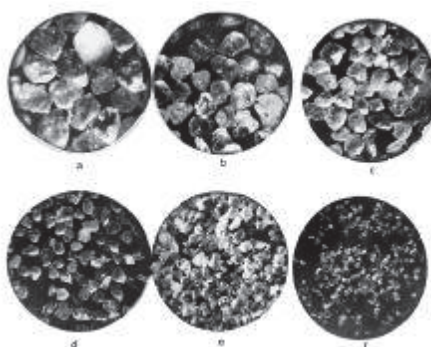
5. fig. – Aghires sand grains (x40)

There is also a deposit of quartz sand on the southern slope of the Southern Carpathians near **Văleni de Munte**. Smaller, rounder-grained and more expensive sand than the Aghires sand. The fluidity of the mixture made from them also differs. The fluidity of the mixture containing 10% bentonite and 2.6% moisture with Aghires sand is 45-50%, while with Văleni sand it is 55-60%. The shape of the grains of Văleni sand can be seen in *Figure 6*. In washed form, it is also used by the glass industry for the production of green glass.



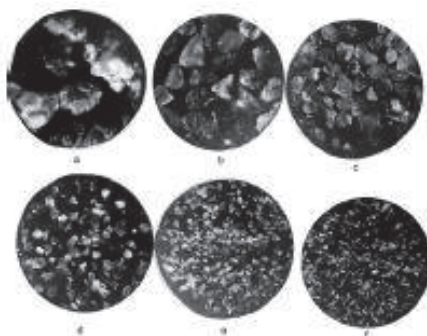
6. fig. - Valeni de Munte sand grains (x40)

The sand with a higher suspended content was collected by the flow of river waters. On the border of **Popesti** there is clayey sand that is very popular for the construction and metal industry. The content of suspended solids is between 12-18%. Its average grain size is smaller than that of other clay mining sands and its degree of uniformity is also higher. It is one of the oldest mined sands in Transylvania. *Figure 7* illustrates the shape of the grains. In the recording, we can see the grains with worn corners. Due to its high content of clay minerals, it has a significant ion exchange capacity.



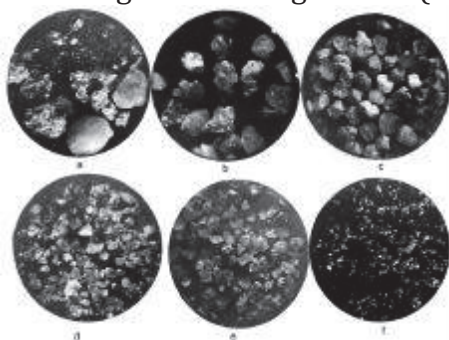
7. fig. - Popesti sand grains (x40)

The other very useful sand with a high clay content is the **Docleni** sand found in Caras-Severin county in Transylvania. Docleni clayey sand has the lowest silicon dioxide content and the highest aluminum dioxide content. *Figure 8* illustrates the shape of its particles. The sand with the largest clay content and grain size that has been excavated and mined so far in Romania.

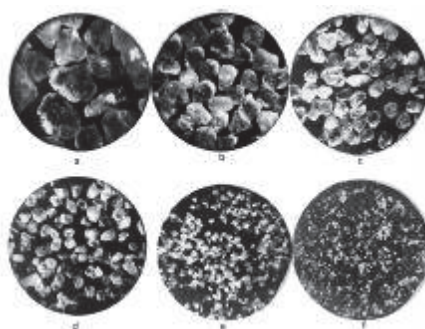


8. fig. - Docleni sand grains (x40)

Sand deposits are often found on the slopes of the Carpathians in larger or smaller quantities. Their content of suspended matter is medium, not the best for making concrete, but the local population still uses it. Due to their natural clay content, some of them are used as foundry sand, like **Seltersz** sand (*Figure 9*). The quartz content of the sand at the **Hidveg** is quite high, but due to a smaller deposit, no industrial washing took place. Its grains are angular and fragmented (*Figure 10*)



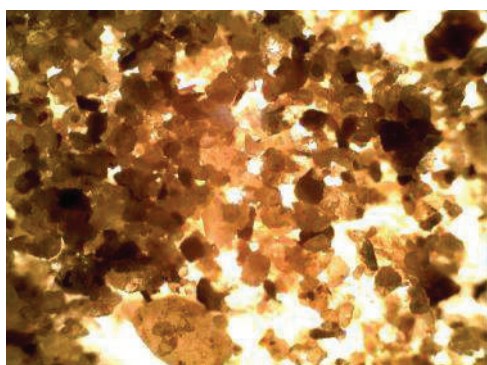
9. fig. - Szeltersz sand grains



10. fig. - Hidvég sand grains

Cuci Sand Deposit (Thesaur ownership)

Although the sand belonging to **Thesaur** – located in **Cuci** - Mures county is of river origin, it stands out for its quality. Due to the very small content of suspended solids, its low grain size and very good degree of uniformity, this sand is an excellent raw material for various companies producing dry plaster and tile adhesive products (*Henkel, Hasit, Weber-Batec*). *Figure 11* illustrates the shape of its grains.



11. fig. - Cuci sand grains (x40)

The material composition of the examined 9 hectares area is illustrated in *Figure 12A*, and its location in *Figure 12B*.



TEST REPORT:
RAPORT DE INCERCARE :

No. -
Nr. -
DATE: 12.07.2021
DATA: 12.07.2021

Test sieve grading / Granulozitate

Client/ Beneficiar :
Type of material / Materialul testat
Location/Locul prelevării
Sample no/ Indicativ proba
Data/ Data prelevării
Data/ Data încercării
Prelevator/Mod de prelevare

SC VALPET SA
Foraj 5
Cuci
-
06.07.2021
-
laborator cf PV

Test according with / Metoda de determinare conf.SR EN 933/1

Sieves/ Site (mm)	Rest on sieve/ Rest pe site (g)				Rest on sieve/ Rest pe site (%)	Passing through / Treceri (%)
	1	2	3	Media		
100	0			0.00	0.00	100.00
63	0			0.0	0.00	100.00
50	0.0			0.0	0.00	100.00
31.5	0.0			0.0	0.00	100.00
22.4	81.2			81.2	1.19	98.81
16	564.3			564.3	8.28	90.53
12.5	376.4			376.4	5.52	85.01
8	461.1			461.1	6.76	78.25
5	358.2			358.2	5.25	73.00
4	161.5			161.5	2.37	70.63
2	405.0			405.0	5.94	64.69
1	413.5			413.5	6.06	58.63
0.125	2643.1			2643.1	38.76	19.86
0.063	485.0			485.0	7.11	12.75
Tr	869.5			869.5	12.75	
Total	6818.8			6818.8		

Notes / Observatii

Lab. Assistant/ Laborant Florea Mircea
Chief profiles/Sef profile Suteu Georgiana
Chief laboratory/Sef laborator Sing. Grosu Mircea Dorel

12A. fig. – Cuci sand composition