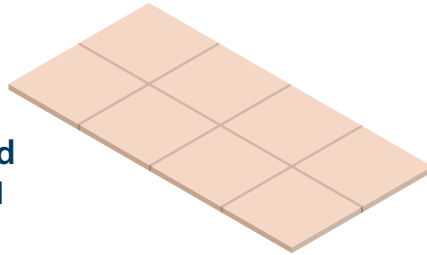


War disrupted CERAMIC CLAYS SUPPLIES from Ukraine

3.6%

share of Ukraine in the world production of kaolin in 2021 (according to USGS)



7.9%

share of Ukraine in global export of kaolin and other kaolinic clays in 2020 (according to UN Comtrade)

Ukraine is one of the world's leading suppliers of high-quality ceramic clays. In 2021, according to USGS, Ukraine produced 1.6 mln tons of kaolin (white clay). It is 3.6% of the world kaolin production. According to estimations of Industrial Mineral Forums & Research, total ball clay production in Ukraine is 4 mln tons.

Most deposits of ceramic clays are concentrated in Donetsk region, where active hostilities take place now. Ball clays from the Donetsk region are highly suitable for porcelain tile production as they exhibit high plasticity, high whiteness, and low water absorption after firing.

The leading Ukrainian producer of clays is VESCO Group, part of UMG Investments. This company sold

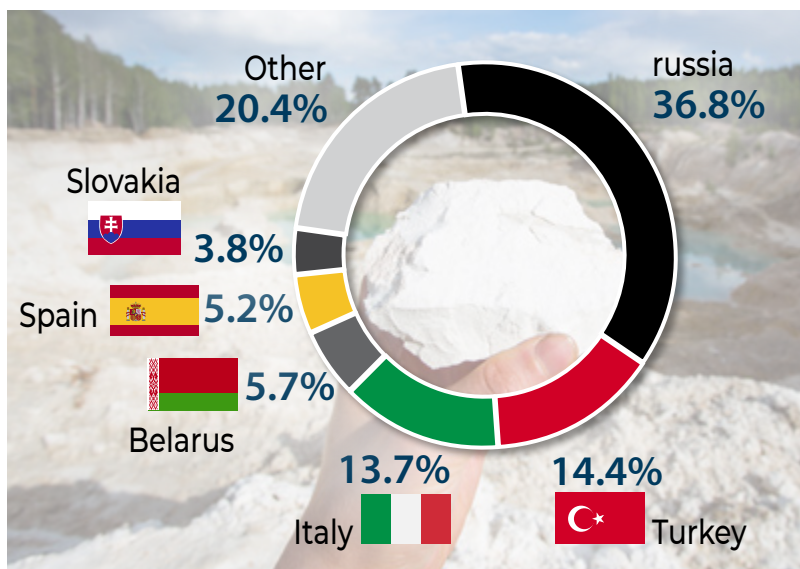
2.4 mln tons of clay in 2020. VESCO exported about 84% of its clay to 18 countries. The largest consumers were ceramic tile manufacturers in Spain, accounting for over 26% of all sales.

Some of European leading mineral groups have also established operating subsidiaries in Ukrainian clay sector, such as Sibelco, Imerys, AKW. For example, Sibelco subsidiary Donbas Clays PJSC produces 1.3 mln tons of high-quality plastic clays annually from three mines at Mertsalovo (Donetsk region).

In general, Ukraine exported 64.1% of kaolin produced domestically in 2021. Top-consumers include ceramic tile manufacturers from Italy and Spain. In recent years, Spanish ceramic manufacturers have switched from using red clays (locally produced) to white clays (mostly imported). According to Industrial Mineral Forums & Research, 70% of required white ball clays in Spain were imported from Ukraine.

According to Industrial Mineral Forums & Research, Spanish ceramic producers have three months' worth of Ukrainian clay in stock. After running out of stock Spanish ceramic producers will have to modify formulations to reduce dependency on Ukrainian clays, but it will be extremely challenging given high quality of Ukrainian clays. Ukraine will be able to resume supplies of ball clays after the end of the war if control over territories with clay deposits is maintained by Ukrainian authorities.

Kaolin export from Ukraine by country in 2021



STOP THE WAR