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MSWI fly ash particle size chemical and mineralogical characterization, before and after leaching tests, aimed to reuse.

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Municipal solid waste incinerator (MSWI) fly ash can represent a sustainable source of construction materials, but it needs to be treated in order to remove dangerous substances as chlorides, sulfates, and heavy metals. The concentration of salts and heavy metals in fly ash usually exceeds the law threshold and so they are considered a hazardous waste, unsuitable for reuse in concrete and civil engineering applications.In this work, a complete characterization of fly ash coming from a northern Italy thermovalorization plant was investigated, both on the solid and leachates composition, focused on the particle size, by X-Ray fluorescence and X-Ray diffraction on the solid matrices and ICP-MS analysis on the leachates.Using mechanical sieving on several subsamples of fly ash, six different particle size were separated and analyzed, and compared to the bulk fly ash composition.The most abundant elements are represented by Ca, Cl, S, and Si; trace elements and heavy metals are mainly represented by Zn, Fe, Al, Pb. The XRF and ICP-MS analysis show a general increasing trend, as the particle size decrease, of Na, K, Cl, S, as well as Cr, Cd, Cu, Pb, Sb, Zn, Ba, both on solid and leachates composition; on the contrary Ca and Si decrease.After leaching Cl and K decrease consistently, while it can be observed an increase of all the other elements, due to the weight loss attributable mainly to the leaching of Na-K chlorides, that is confirmed also by the X-Ray diffraction analysis.