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Evaluation of some Italian tuffs as compatible replacement stone for Römer tuff in the Netherlands

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Rhenish tuffs from the volcanic Eifel region, Germany, are amongst the most prominent and voluminous natural stones in Dutch monuments. In particular, tuffs from the 11,900 bp Laacher See eruption have been used since Roman times, - hence the name Römer tuff-, and were widely used again in romanesque (and to lesser extent romano-gothic and early gothic) architecture. The limited (or non) availability of Römer tuff for restoration purposes is posing an increasing problem. Last decennia, the availability of Römer tuff was practically limited to blocks from the lower parts of the pyroclastic flows, with abundant basalt (and other) xenoliths, giving the rock a different appearance from the traditional one; both kinds of Römer tuff also show different physical and hygric properties.

Given the wide use of tuff stone in Italian architecture, several Italian tuffs have been evaluated in search of replacement stone of Römer tuff. The replacement stones should approach the original as much as possible, both in terms of authentic appearance and durability. The Italian tuffs evaluated include tuffs commercially denominated as Tufo Etrusco and Tufo Romano, from the central part of Italy, and a variety of Neapolitan Yellow Tuff from the Naples reagion. Hygric behaviour, resistance to frost-thaw cycles, resistance to salt crystallization, petrographic characteristics and mineralogy of Italian tuffs have been determined and evaluated in comparison to original Römer tuff. In all three cases, resistance to frost-thaw cycles is unfortunately shown to be considerably less than that of original Römer tuff. In addition, hygric expansion of the Neapolitan Yellow Tuff appeared to be considerably larger than that of original Römer tuff. Of the tuffs evaluated, the variety of Neapolitan Yellow Tuff is showing a good match with the original Römer tuff in terms of visual appearance. It has already

sparsely been used in the Netherlands in minor amounts. However, the durability characteristics warrant for additional evaluation.