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This is a brief assessment of the use of masonry sand - performed December 2009 *

There are two primary methods of delivery of masonry sand that is used to perform installation of masonry materials on construction projects. (*Similar issues apply to installation of stucco materials*)

Method a.
Dump truck loads of masonry sand delivered directly to jobsites- (Recommended for most applications-this is the Green method)
These are delivered directly from the masonry sand source to masonry projects-this is the most widely used method and **typically the least expensive method**.
Drying co2 emissions – **None.** There is no need to dry this sand as the contractor will be adding water to it anyway when they mix it with cement (2) at the jobsite.
Transportation co2 **emissions**- Co2 is emitted by the vehicle transporting the sand from the sand source directly to the masonry project. The amount emitted will vary depending on factors such as distance as well as efficiency of the vehicle.

Method b. (the method used for ready to use mortars for jobsite silo/supersack/bulk systems)
Masonry sand dried by a drying system- (Not recommended for most applications due to the negative environmental impact)
In this method sand is usually delivered by dump truck from the sand source to a suitable blending/ packaging plant. Then the sand is dried in an aggregate dryer typically powered by natural or propane gas. A large amount of energy is required to heat the sand sufficiently so that no moisture remains. The sand is then blended with cement (2), put into 80 lb bags or into 3000 lb bulk bags that are used with jobsite silo systems. (1) Once blended and packaged the material is delivered from the blending facility to the masonry project. (*The reason that the sand must be dried with this method is to prevent moisture from coming into contact with the cement in the bags. If moisture did come into contact with the cement in the bags it would develop rocks rendering it unusable.)*
Drying co2 emissions-* A comparison of gas fired sand drying systems was conducted. In the comparison on average the systems emitted 41 lbs of co2 per ton of sand dried.
Transportation co2 emissions- Co2 is emitted by the vehicle transporting the sand from the sand source to the plant where it is dried and blended. Additional co2 is emitted when the dried sand is hauled from the drying/blending plant to the construction jobsite. The amount emitted will vary depending on factors such as distance as well as efficiency of the vehicle. The models we accessed showed much higher transportation co2 emissions occurred with method b than with method a.

Our conclusion- We recommend method a due to the following:
- Method a has a much more positive impact on the environment than method b.
- The models assessed show Method a cost less than method b (3).
- How much sense does it make to completely dry the sand so it can be used with method b only to have to add water to it later so it can be used by the masonry contractor?

*Based off data collected from our own aggregate drying operations as well information provided by aggregate drying systems manufacturers.

(1) Other size bags may be available
(2) May be mixed with cement and or lime
(3) Some projects have **no alternative** but to use products that utilize method b. An example is home owners doing **very small jobs** that may require 1 or 2 each 80 lb bags.

Estimated co2 emitted to dry aggregate for the following applications: (using the 41 lb model) *these numbers can vary depending on real world performance of the drying systems as well as actual coverage experienced*.

a. Drying aggregate for enough mortar to lay 1000 brick-50 lbs of co2
(Masonry contractors tell us that it takes 1 yard of sand to lay 1000 brick -2419.2 lbs wet/2000=1.2096 tons X41=49.6 lbs co2)

b. Drying aggregate for enough mortar to lay 1000 each 8x8x16 block-198 lbs of co2
(*4 yards of sand required-4x2419.2 lbs wet/2000=4.8384 tons x41=198 lbs of co2*)

c. Drying aggregate for enough grout to fill 1000 8x8x16 block-372 lbs of co2 (all cells)
(About 1 yard of concrete is needed to fill both cells of 100 block. C479 shows fine grout made of 1 part Portland mixed with 3 parts fine damp aggregate. 92.6 lbs port with (3x89.6 damp agg. =268.8 lbs =361.4 total lbs per 4 cubic foot batch-aggregate = 74.4 % of total batch (268.8/361.4). 1000 block =10 yards. 10x27 cu ft per yard =270/4=67.5 batches, 67.5x268.8=18144 lbs /2000 x41=372 lbs co2

d. **Drying aggregate for enough mortar to lay 1000 8x8x16 block and enough grout to fill 1000 8x8x16 block (all cells) -570 lbs of co2. (**c& d added together)

The co2 numbers shown in a, b, c & d do not include additional co2 emissions related to transportation described below.

Transportation co2 emissions- *Co2 is emitted by the vehicle transporting the sand from the sand source to the plant where it is dried and blended. Additional co2 is emitted when the dried sand is hauled from the drying/blending plant to the construction jobsite. The amount emitted will vary depending on factors such as distance as well as efficiency of the vehicle. The models we accessed showed much higher transportation co2 emissions occurred with method b shown on page 1 than with method a on page 1.*