

## Green Building Tile Adhesives- A primer

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### Green product

A product can be termed as green if it meets low VOC and no hazardous air pollutant qualifications ;reduces safety concern for end users; is functional and easy to use; and if the materials are reusable and/or recyclable in the industrial processes. A green product can have impact from point of manufacture all the way down the line to the end of the product's life. In case of adhesives it should contain no PBB (polybrominated biphenyl) (alloys that do not contain lead) or PBDE (polybrominated diphenyl ether) flame retardants, VOC-free materials and materials that meet the upcoming halogen-free (safer for disposal) specifications.

### Green adhesive

Key criteria for defining an adhesive as green include formulas that are green because of what is not in them (e.g., hazardous air pollutants and ozone depletors); products that are green because they reduce the environmental impact of building operation (e.g., the energy efficiency gained from the effective use of caulks and sealants); and products that contribute to a safe and healthy environment (e.g. low VOCs or formaldehyde free adhesives). The Table 1 given below can be taken as a benchmark for green adhesive for consumer products.

Table 1 : Green adhesives for Consumer products (less than 16 oz)

Product category	VOC% by weight	VOC g/l
Construction, panel & floor covering	15	200
Caulks and sealants	4	60
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Contact cements (general purpose)	55	600
Contact cements (special purpose)	80	735

### Recommendations of TERI-GRIHA, New Delhi

VOCs, especially formaldehyde, urea formaldehyde, urethanes, and other chemical substances contained within the building materials can be injurious to health and can also be odorous. The aim is to select materials with low to zero quantities of such chemicals so as to minimize the source of emission. In selecting low VOC materials, a practical thumb rule is to choose water-based products with low odour.

Most construction adhesives offer adequate bond strengths in water-based varieties. As adhesives usually have a high-VOC emission potential hence use adhesives with low-VOC or no-VOC emissions such as acrylics or phenolic resins such as phenol formaldehydes for indoors.

### Advantages of Green products

The VOC emissions level is greatly reduced from the levels that existed a decade ago.

These are non-flammable and safer in particular environment where other volatile products are being used.

These are less hazardous to human health and the environment than other traditional adhesives.

### Latest Green adhesive Technology

The three basic green technologies have come up in the last decade. The first was the family of low-solvent containing, low-VOC floor covering adhesives. Taylor developed a patented adhesive technology called Meta-tec technology in 2001. This technology was built on the inclusion of more bio-renewable resources, and also improved the performances of the product class by increasing strength and water resistance through its patented cross-linking system. Further Meta-tec technology has developed by offering alternative moisture cure technology with telechelic-modified silane polymer chemistry. This will open up many new avenues for product development for the next decade.

### Current options for end users

There are currently three options that can be used to address these environmental issues; incineration to maintain solvent chemistry; process conversion to aqueous chemistry; and substitution with low HAPs solvent chemistry.

Incineration is the leading option for customers who place a high priority on maintaining their current process and warranty risk, as well as have the scale to invest in incineration. While the price of solvent and its performance provides the most attractive option for end-users who have the scale to invest in incineration.

The second option for using aqueous adhesives does not have a clear cost-benefit profile in light of other options. The cost-in-use economics and performance of current aqueous adhesive offerings do not provide the incentive needed of environmental regulatory drivers. However, at this time aqueous products are the only commercially viable solution to address and/or eliminate VOC, HAP and CO<sub>2</sub> emissions resulting from adhesive application.

The third option for using low-HAP products.

Soya is being used as adhesives for wood and researches are being made to use it as tile adhesive in future.