

A Cooperative Project
between the
U.S. Environmental
Protection Agency
and the
Printing Trade
Associations
Nationwide

design FOR THE ENVIRONMENT

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LITHOGRAPHY PROJECT BULLETIN 3



BULLETIN HIGHLIGHTS

- How well do they perform?
- How much do they cost?
- What are the reduced health, fire, and environmental risks?

ALSO IN THIS BULLETIN

- Tips to get started in finding the best substitute blanket wash for you
- Questions to ask your blanket wash supplier
- How to recognize vegetable ester washes by their common names on MSDS forms



Vegetable Ester Blanket Washes

Through a series of product trials, EPA's Design for the Environment (DfE) Lithography Project evaluated 22 different commercially available blanket washes. All of the washes were scrutinized for their performance, cost, and environmental and health characteristics. Then each wash was categorized based on its chemical make-up. This bulletin highlights one category of these blanket washes: vegetable esters. Vegetable esters are fatty acid derivatives produced from agricultural sources, mainly soybean oil.

Use this bulletin to compare the performance, cost, and health and environmental benefits of vegetable ester blanket washes with your current wash. This information can help you get started in finding the best substitute blanket wash for you.

Lower VOCs: An Important Benefit

One of the biggest advantages of vegetable ester blanket washes is that they are lower in volatile organic compounds (VOCs) than many standard blanket washes. VOCs are chemicals that evaporate very quickly. The faster a chemical evaporates, the faster it will get into the air during use. While standard, solvent-based washes can contain up to 100% VOCs, the VOC content of the vegetable ester washes typically ranges from 12 to 30%. This range drops to 2% or less for vegetable ester and water mixtures.

Worker health concerns

The higher the VOC content of a product, the greater the chances that your workers are inhaling harmful chemicals. Vegetable ester washes, with their low VOC content, evaporate more slowly. Worker exposure is less, so potential health risks are decreased.

What are my options for a substitute blanket wash?

A substitute blanket wash can be classified by its primary chemical component. The Design for the Environment Lithography Project product trials evaluated 22 substitute blanket washes that were classified into four different categories of chemicals. These washes were tested and compared to a baseline wash by printers in their print shops. Some of the characteristics of the four categories and the baseline are listed below:

THE BASELINE

VM&P Naphtha:

- + quick-drying
- 100% volatile organic compounds (VOCs)
- health and environmental concerns

THE SUBSTITUTES

Petroleum-based:

- + quick-drying
- greater than 60% VOCs
- health and environmental concerns

Vegetable ester:

- + VOC content as low as 5%
- + unprocessed towels may be treated as non-hazardous waste
- + lack of odor

Petroleum/vegetable ester mixtures:

- +/- VOC content less than most petroleum-based washes, but not all are less than 30% VOC
- +/- Depending on proportion of petroleum, may have health and environmental concerns

Terpene:

- + low VOC, derived from wood and citrus products
- + does not deplete ozone
- odor can be irritating to press operators

Environmental Benefits

The quick evaporation of VOCs can also harm the environment. VOCs are a major contributor to smog, and are among the most persistent emissions problems in the printing industry. High-VOC washes will increase your shop's contribution to environmental problems.

Just as they can improve worker safety, low-VOC vegetable esters can reduce the environmental impact of your shop on your community.

A Less Flammable Substitute

Compared to most of the other blanket washes, vegetable esters are much less flammable. This is because they have a much higher flash point (the temperature at which the wash can be ignited). A less flammable blanket wash means a safer work environment.

Performance

During the product trials, overall press operator opinion of the performance of vegetable ester washes varied but was generally favorable. The printers found that the vegetable ester blanket washes handled quite differently from their traditional wash. Press operators discovered that a little extra effort was required, but with changes in the way the wash was used, the substitute performed as well as the standard wash. Some problems associated with using vegetable ester washes, and their solutions, include:

There is an oily film left on the blanket

➤ **Use a wipe firmly wrung in water instead of a dry wipe to remove the oily film from the blanket surface**

It takes longer to dry

➤ **Dry the blanket with a clean dry wipe**

The wash is thicker

➤ **Give the wash enough time to soak into the wipe by keeping a supply of wipes and wash together in a covered container. When ready to use the wash-soaked wipe, squeeze or wring the excess wash back into the container.**



How to Identify A Vegetable Ester

These are some names for vegetable esters that you might find on an MSDS or product label:

- Fatty acid methyl esters
- Diethanolamine tallate
- Sorbitan compounds
- Soybean oils
- Tall oils
- Methyl stearates
- Methyl oleate
- Crillet 4

Ask your supplier if you have questions.

Cost

In general, vegetable ester washes cost more per gallon than many of the other blanket washes tested. However, it is important to remember that purchase price alone may not be the best indicator of the true overall cost of using a blanket wash. Take into account the following factors which may affect the actual cost of a blanket wash:

COMPLIANCE COSTS. Washes high in VOC content may yield waste—excess wash or used wipes—that has to be handled as regulated hazardous waste.

Low-VOC washes such as vegetable esters may eliminate this potentially costly handling procedure. Also, with lower VOCs, a facility's air emissions may drop to levels below the threshold amounts that require costly permitting and reporting.

QUANTITY OF BLANKET WASH NEEDED. Some printers found that once experienced in using a vegetable ester wash, they often needed much less wash for a given job. This can mean cost savings.

INSURANCE COSTS. Switching to a low-flammability vegetable ester wash may reduce your insurance costs. Check with your underwriter to see if such benefits apply to your facility.

Questions You Can Ask Your Chemical Supplier

Ask these questions to learn more about the blanket wash you are currently using or a substitute blanket wash you may consider testing:

- What chemicals or generic chemical families are in the blanket wash?
- What percent of the blanket wash is volatile organic compounds (VOCs)?
- Will the daily use and disposal of the blanket wash trigger federal air regulations?
- What short-term and long-term health risks are associated with the chemicals in the blanket wash?
- Are workers exposed to the chemicals through the skin and/or through inhaling the chemicals?
- What gloves or protective equipment should be used with the wash?
- How can blanket washes be applied so that I can minimize both the health risk and waste generated?
- How do I properly dispose of the used blanket wash and towels?
- What state, municipal, or local regulations may apply to the use and disposal of this blanket wash?

Partners in the Design for the Environment Lithography Project: Printing Industries of America, Graphic Arts Technical Foundation, the Environmental Conservation Board of the Graphic Communications Industry, The University of Tennessee, and individual printers and suppliers.

 Design for the Environment

Where Do I Go From Here?

1 Get to know your current wash. Look at product labels and material safety data sheets (MSDS) and ask your supplier the questions listed to the left, so that you can learn:

- ◆ The chemicals or chemical families
- ◆ The VOC content
- ◆ The health and environmental impacts
- ◆ The regulatory issues

2 Work with your supplier to evaluate substitute washes

- ◆ Question your supplier about substitute washes (see left)
- ◆ Work with your supplier to optimize the wash performance
- ◆ Use the summary booklet, *Evaluating Blanket Washes: A Guide For Printers*, for additional information (see below for ordering information)

3 Try out substitute blanket washes

- ◆ Follow supplier suggestions on how to use substitutes properly
- ◆ Try the substitute blanket wash with different ink types, ink coverages, conditions of the blanket, and lengths of runs prior to blanket cleaning
- ◆ Expect cost and performance to improve as you optimize the washing technique
- ◆ Use the "Substitute Blanket Washes: Making Them Work" bulletin for information on different washing techniques (see below for ordering information)

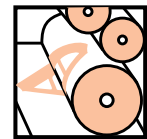
4 Compare your traditional wash with your favorite substitute wash

- ◆ Compare cost, performance, and health and environmental impacts of your traditional wash with the substitute wash
- ◆ Use the "A Worksheet To Help You Choose A Better Wash" bulletin for additional information (see below for ordering information)

About the Design for the Environment Lithography Project

The goal of the Design for the Environment (DfE) Lithography Project is to provide lithographers with information that can help them design an operation which is more environmentally sound, safer for workers, and more cost effective.

Concentrating on the process of blanket washes, the partners of the DfE Lithography Project, in a voluntary cooperative effort, evaluated 37 different blanket wash products. Information was gathered on the performance, cost, and health and environmental risk trade-offs of the different types of substitute blanket wash. For more details on the evaluations, please refer to the booklet, *Evaluating Blanket Washes: A Guide For Printers*.



In addition to the Lithography Project, similar DfE projects are currently underway with both the screen printing and flexography industries.

To obtain additional copies of this or other bulletins and case studies, or for more information about EPA's Design for the Environment Program, contact:

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