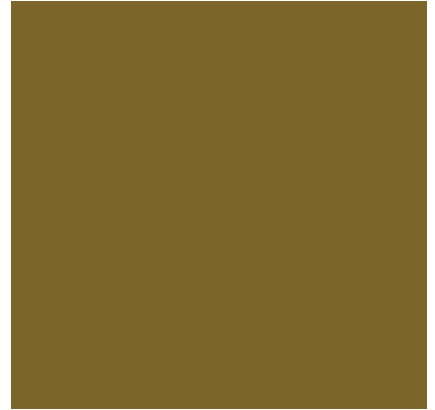




UNIVERSITY OF
SASKATCHEWAN



Smart Purchases Big Impact

Sustainable Purchasing Guide
Caulking Compounds

Sustainability... your university, your world



Introduction

This section provides information on currently available options for **caulking compounds** that can help to move the University of Saskatchewan toward its sustainability goals. Living within the boundaries of our sustainability goals requires us to apply two main strategies:

Dematerialization requires that we reduce the amount of materials as much as possible; and that we continually move toward the use of 100% recycled content.

Substitution requires that we find less harmful materials to replace those that currently damage and are not recyclable.

Sustainable purchasing is about including social, environmental, financial and performance factors in a systematic way. It involves thinking about the reasons for using the product (the service) and assessing how these services could be best met. If a product is needed, sustainable purchasing involves considering how products are made, what they are made of, where they come from and how they will be used and disposed.

Finally, remember that this is an evolving document – it will change with new information as our understanding of sustainability impacts and potential solutions improves.

Purchasing Services

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**Smart Purchases
Big Impact**

Wherever possible **CHOOSE** products that employ a combination of characteristics listed in the left hand column, and **AVOID** products that demonstrate characteristic in the right-hand column.

CHOOSE

- EcoLogo certified products
- Appropriate amounts of sealant
- Durable and long-lasting
- Water-based clean-up

AVOID

- High VOC compounds (>5% by weight)
- Heavy metals

Option: Use EcoLogo Certified Products

Strategy: Substitution (SO 1, 2, 3)

Environmental Choice certified caulking and sealants are assessed based on their production methods and product contents, and are generally more sustainable than other alternatives. Selecting these products does not eliminate all sustainability impacts, but they are among the best options available on the market at present.

To carry the EcoLogo, sealant and caulking compounds must not be formulated or manufactured with:

- aromatic solvents
- fibrous talc or asbestos
- formaldehyde
- halogenated solvents
- mercury, lead, cadmium, hexavalent chromium, barium or its compounds, except barium sulphate
- VOC content in excess of 5% by weight.

Option: Use Low or No-VOC Sealants

Strategy: Substitution (SO 2, 4)

Some manufacturers sell low VOC sealant and caulking products. Sealants should contain VOCs at less than 5% of the product by weight. The primary benefit of low or no VOC sealants is that they reduce the negative impacts on indoor air quality and human health. They also reduce contributions to photochemical smog.

Option: Use the Appropriate Amount of Sealant Required

Strategy: Dematerialization (SO 1, 2, 3, 4)

It is important to evaluate the need for sealant and to ensure that, if the sealant is required, waste is reduced by purchasing and applying the appropriate amount of sealant. Over-applying caulk or sealant will not necessarily improve its performance but will increase its adverse sustainability impacts.



Option: Use Durable Sealants with Extended Longevity

Strategy: Dematerialization (S0 1, 2, 3, 4)

Another way to reduce the amount of sealant required is to ensure that the sealant which is applied is durable and lasts as long as possible. This will result in less frequent reapplications. Some sealants (e.g. silicones) last longer than others and are preferred.

Option: Water-Based Cleanup

Strategy: Dematerialization (S0 1, 2, 3, 4)

Most acrylic-based products can be cleaned up with water. Using these products rather than those which require chemical solvents reduces the amount of chemicals released into nature. In turn, this mitigates the impacts on the natural environment and to human health.

Arriving at the currently preferred options

1. Identify the service

Sealants and caulking compounds are used to fill and seal joints in buildings and other structures. They are applied to accommodate the movement of building materials and to reduce unintentional air or water exchange.

2. Assess the need

The University of Saskatchewan requires energy efficient, healthy and functional structures that last over time. The services of sealant and caulking compounds help to achieve this.

3. Identify the contents

The composition of sealants and caulking compounds vary significantly, depending on the properties desired for particular applications. However, most caulking compounds have a petrochemical base such as oil, resin, butyl rubber, vinyl acrylic, acrylic, polyethylene, polyurethane or polyvinyl acetate. Additives such as stabilizers, preservatives and plasticizers give the caulks their final properties.

The most common sealants are used for weatherproofing around windows and doors, and for sealing joints between wood and masonry. The main components of these compounds are:

- The **vehicle** is the substance that provides the cohesion and sealing properties, usually drying oils such as soya or linseed oil, which absorb oxygen from the atmosphere to produce a dry film. Non-drying oils are frequently included in the vehicle to plasticize and aid the sealant in retaining its flexibility with age.
- **Solvents** adjust the workability of a caulking by reducing the viscosity of the vehicle which aids in the ease of application.
- **Driers** are substances added to accelerate the rate of skin formation by oxidation of the drying oils.
- **Mineral stabilizers** are added to hold caulking in position,

particularly in vertical joints, immediately after application and prior to setting.

Non-oxidizing caulking compounds, such as polybutenes and asphalt, often have fillers and stabilizers added. Other types of caulking, such as polysulphide polymers, butyl, neoprene, hypalon, and silicone rubbers, generally consist of two parts: a base compound and an accelerator. Silicone is a high performance single-component sealant that cures upon application and exposure to the air.

4. Identify sustainability impacts

i.systematically increasing concentrations of substances from the earth's crust?

- **Heavy metals** are used in many pigments as additives. For example, cadmium (Cd) may be used to give colour and mercury (Hg) may be added as an element in a pigment. Other heavy metals found in some caulking compounds include lead, hexavalent chromium, and barium.
- Many sealants and caulking compounds contain material derived from **petroleum** in the vehicle.
- At the same time, sealants and caulking compounds can reduce the use of materials from the earth's crust by increasing energy efficiency in buildings where electricity is generated from fossil fuels.

ii.systematically increasing concentrations of substances produced by society?

- Many caulking compounds contain **volatile organic compounds** (VOCs), which release fumes after application as the sealant sets. VOCs can contribute to problems such as the development of ground-level ozone and photochemical smog by reacting with nitrogen oxides in the presence of sunlight.
- Other materials used as solvents, driers or mineral stabilizers may be chemical compounds that do not break down easily in nature.

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4. Identify sustainability impacts (con't)

- Some sealants and caulking compounds require **chemicals** for clean up. These chemical cleaning substances are synthetic and their use for cleaning caulking compounds contributes to them systematically increasing in concentration in nature.

iii. ...systematically degrading nature by physical means?

- Many sealants and caulking compounds contain materials derived from **petrochemicals**. The **mining and development** of petrochemicals can contribute to the systematic degradation of nature by physical means if proper environmental practices during production, reclamation and restoration are not applied.

iv. ...systematically undermining people's ability to meet their basic human needs?

- VOCs in many caulking compounds negatively impact indoor air quality. Many caulking compounds dry very slowly to retain pliability. This results in a long period of off-gassing that causes indoor air quality problems. A number of VOCs are harmful to humans under conditions of long exposure. For example, toluene (methyl benzene) can affect the nervous system, kidneys, liver and heart. Formaldehyde, a suspected carcinogen (substance that causes or promotes the development of cancer), can irritate the eyes, nose and throat.
- Heavy metals such as mercury and cadmium are found in some pigments are neurotoxins and can damage the liver and kidneys.

5. Envision sustainable sealants

Sustainable sealants would not contribute to systematic increases of substances from the earth's crust or of human-made substances. This means that they would either not contain any substances that could systematically increase in nature, or that these substances would be 100% captured in a tight technical cycles and re-used. Since their application involves a chemical reaction that alters their material properties, it is difficult to imagine realistic potential for recycling. Therefore, a sustainable sealant would ultimately have to be derived from natural substances that could be broken down by nature after its functional life cycle.

6. Identify and prioritize alternatives

Identify the product or service that offers the best pathway toward meeting all four of our Sustainability Objectives by using the following three criteria:

- Does the product or service move us in the right direction with regards to our four Sustainability Objectives?
- Does the product or service create a flexible platform for the next step toward sustainability?
- Is the decision financially viable?

Resources and Additional Information

1. EcoLogo – Caulking Compounds and Sealants
http://www.ecologo.org/en/seeourcriteria/details.asp?ccd_id=270



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