



Guideline on Waste Oil Blending

When waste oil is incinerated in a waste oil burner, any contaminants it contains are released into the air. If these contaminants are too highly concentrated, they can have serious effects on the local environment and human health. To prevent such effects, people operating waste oil burners are required to ensure that contaminant levels in the oil they intend to incinerate remain below acceptable limits as set out in the table below.

SUBSTANCE	ALLOWABLE CONTAMINANT LEVEL IN WASTE OIL (ppm)
Arsenic	5
Cadmium	2
Chromium	10
Lead	100
Total Organic Halogens	1000

Where the level of contaminants in a batch of waste oil exceeds the levels shown in this table, a person who holds a special waste permit allowing waste oil blending may blend the contaminated waste oil with uncontaminated waste oil, or virgin oil, in order to reduce the concentration of contaminants to below the allowable levels. Permittees intending to blend waste oil must use the procedure set out in this guideline to determine the volumes of contaminated and uncontaminated oil to be combined.

Permittees must obtain written authorization from an environmental protection officer prior to blending any oil, to ensure that the procedure has been followed correctly so that the blended waste oil will be suitable for use in a waste oil burner. Authorization will **not** be given to blend waste oil containing PCB contamination in excess of the level specified in a permit.

If your permit does not cover blending of waste oil, you may apply to have it amended. Contact the Environmental Programs Branch, as listed below, for more information.

Calculation of Blending Volumes

If a feedstock of waste oil contains contaminant levels in excess of the allowable levels for any of the substances listed above, use the following formula to determine the volume of uncontaminated waste oil to be added to the contaminated oil in order to bring the contaminant levels to within the standards:

$$V_2 = V_1 \frac{(C_3 - C_1)}{(C_2 - C_3)}$$

Where:

C_1 = Concentration of contaminant in the contaminated feedstock

V_1 = Volume of the contaminated feedstock

C_2 = Concentration of contaminant in the uncontaminated feedstock

V_2 = Volume of the uncontaminated feedstock to be added

C_3 = Final concentration of contaminant after blending the feedstocks. C_3 must not exceed the maximum contaminant levels specified in the table above.

If virgin oil is to be used as the uncontaminated feedstock, assume that the concentration of contaminants (C_2) is zero. If waste oil is to be used as the uncontaminated feedstock, it must be analyzed to determine the actual concentration of contaminants.

If more than one contaminant exceeds the standards in the contaminated feedstock, you must apply the formula separately for each contaminant of concern; this will produce a number of different values for V_2 . When blending, use the largest volume of uncontaminated oil calculated for all contaminants.

Example

Let's consider an example. You have 200 litres of waste oil contaminated with 200 ppm of lead and 7 ppm of arsenic. You have a large supply of uncontaminated waste oil, which you have found to contain 20 ppm of lead and 1 ppm of arsenic. You want to know how much uncontaminated oil to add to the 200 L of contaminated oil in order to meet the allowable contaminant levels in the table above.

The volume of uncontaminated oil to add is designated as V_2 in the formula. V_1 , the volume of contaminated oil, is 200 L. For lead, C_1 is 200 ppm (the concentration in the contaminated oil), C_2 is 20 ppm (the concentration in the uncontaminated oil), and C_3 is 100 ppm (the standard you're trying to reach). When we plug these numbers into the formula:

$$V_2 = V_1 \frac{(C_3 - C_1)}{(C_2 - C_3)}$$

We find that:

$$V_2 = \frac{(200 \text{ L}) (100 \text{ ppm} - 200 \text{ ppm})}{(20 \text{ ppm} - 100 \text{ ppm})}$$

$$= \frac{(200 \text{ L}) (-100 \text{ ppm})}{(-80 \text{ ppm})}$$

$$= 250 \text{ L}$$

So, to meet the standard for lead, you would need to add 250 L of your uncontaminated oil to the 200L of contaminated oil.

Next, we repeat the calculation, but use arsenic instead of lead. For arsenic, C_1 is 7 ppm, C_2 is 1 ppm, and the standard, C_3 , is 5 ppm.

$$\begin{aligned} V_2 &= \frac{(200 \text{ L}) (5 \text{ ppm} - 7 \text{ ppm})}{(1 \text{ ppm} - 5 \text{ ppm})} \\ &= \frac{(200 \text{ L}) (-2 \text{ ppm})}{(-4 \text{ ppm})} \\ &= 100 \text{ L} \end{aligned}$$

We find that to meet the standard for arsenic, you only need to add 100 L of uncontaminated oil to the 200L of contaminated oil. However, since both the lead and arsenic standards must be met, we choose the greater volume and add 250 L of uncontaminated waste oil to the 200 L contaminated batch.

Other Topics

Fact Sheets are also available on the following topics:

- Special Waste Regulations
- Used Oil
- Guide for Used Oil Burner Operators
- Transportation of Special Wastes
- Used Oil from Piston Aircraft

For more information on the Special Waste Regulations, please contact:

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 Department of Environment (V-8)
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 Y1A 2C6

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Copies of Yukon regulations may be viewed online at <http://environmentyukon.gov.yk.ca/monitoringenvironment/> under the "Standards & Approvals" section, or at any Yukon Public Library, territorial agent, territorial representative or regional services office. You may purchase copies at the Inquiry Centre, Yukon Government Administration Building, 2071-2nd Avenue in Whitehorse, or by mail from the Subscriptions Clerk, Yukon Government Queen's Printer, Box 2703, Whitehorse, Yukon, Y1A 2C6 (phone (867) 667-5783 or toll free 1-800-661-0408 extension 5783).

