Petroleum-based oils and greases guideline

Measuring and reporting consumption

2016–17 reporting period

Version 2.0 August 2017
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## Abbreviations

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<th>Term</th>
<th>Meaning</th>
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<tr>
<td>GJ</td>
<td>gigajoules</td>
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<tr>
<td>NGER</td>
<td>National Greenhouse and Energy Reporting</td>
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<tr>
<td>NGER Act</td>
<td>National Greenhouse and Energy Reporting Act 2007</td>
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<tr>
<td>NGER Determination</td>
<td>National Greenhouse and Energy Reporting (Measurement) Determination 2008</td>
</tr>
<tr>
<td>NGER Regulations</td>
<td>National Greenhouse and Energy Reporting Regulations 2008</td>
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<td>Scope 1 emissions</td>
<td>Means the release of greenhouse gas into the atmosphere as a direct result of an activity or series of activities (including ancillary activities) that constitute the facility.</td>
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<tr>
<td>Scope 2 emissions</td>
<td>Means the release of greenhouse gas into the atmosphere as a direct result of one or more activities that generate electricity, heating, cooling or steam that is consumed by the facility but that do not form part of the facility.</td>
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<tr>
<td>t CO2-e</td>
<td>Tonnes carbon dioxide equivalence</td>
</tr>
<tr>
<td>L</td>
<td>Litres</td>
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Disclaimer

This guideline should be read in conjunction with the National Greenhouse and Energy Reporting Act 2007, the National Greenhouse and Energy Reporting Regulations 2008 and the National Greenhouse and Energy Reporting (Measurement) Determination 2008 (current versions can be found on the Federal Register of Legislation website). Changes to the legislation may affect the information in this guideline. This guideline is not intended to comprehensively deal with its subject area or to provide legal advice. Entities are responsible for determining their obligations under the law and for applying the law to their individual circumstances. If you have any concerns, you should seek independent professional advice.

Introduction

This document assists in measuring and reporting consumption of petroleum-based oils and greases used as lubricants under the National Greenhouse and Energy Reporting Act 2007 (NGER Act).

Petroleum-based oils (PBOs) and petroleum-based greases (PBGs) used for all purposes, including transport, should be reported under the National Greenhouse and Energy Reporting (NGER) legislation.

This document covers the use of PBOs and PBGs as lubricants, but does not cover the use of PBOs as fuel.

PBOs and PBGs used as lubricants are considered to have undergone a degree of oxidation and are therefore reported under the fuel combustion source. The consumption of PBOs and PBGs as lubricants needs to be reported at a facility if one or more separate instances of the source combusts more than 5 kilolitres of PBO or PBG. If the PBO or PBG is used as a fuel, or if the amount is less than 5 kilolitres for a separate instance of a source, then emissions arising from that source are not reportable using the methods listed under section 2.40A of the National Greenhouse and Energy Reporting (Measurement) Determination 2008 (NGER Determination). Where a PBO or PBG is used as a fuel, reporters should consider reporting consumption of item 41—fuel oil, or another appropriate item listed in Schedule 1 of the National Greenhouse and Energy Reporting Regulations 2008 (NGER Regulations).
What are petroleum-based oils and petroleum-based greases?

PBOs and PBGs are identified as an energy type under Schedule 1 of the NGER Regulations and NGER Determination. The quantity of PBOs and PBGs consumed at a facility must be measured and, providing thresholds are met, included in reports submitted under the NGER Act. Measuring the quantity of PBOs and PBGs allows the emissions released from the consumption of the fuel to be determined.

**Petroleum-based oils are:**

a) oils (including lubricants or fluids but not greases) derived from petroleum and their synthetic equivalents; or

b) oils (including lubricants, fluids and greases) derived from petroleum and their synthetic equivalents, if recycled for use as oils.

**Petroleum-based greases are:**

a) petroleum-based greases and their synthetic equivalents; or

b) oils (including lubricants, fluids and greases) derived from petroleum and their synthetic equivalents, if recycled for use as greases.

(r 1.03 NGER Regulations)

When are they consumed?

PBOs and PBGs are generally considered consumed when the oil or grease is applied or used in the operation of a facility in a manner consistent with their intended use (for example, in the transmission of a heavy vehicle). Under regulation 2.26, ‘use’ of an energy commodity has occurred, and PBOs and PBGs applied to equipment must therefore be reported as energy consumed.

**Consumption of energy, in relation to a facility, means the use or disposal of energy from the operation of the facility including own-use and losses in extraction, production and transmission.**

(r 2.26 NGER Regulations)

Consumption of PBOs and PBGs can occur through complete or partial combustion, or without combustion.
When do they need to be reported?

Reports under:

- sections 22G and 22X of the NGER Act, and
- section 19 of the NGER Act, where the reporting corporation’s group meets a threshold in paragraphs 13(1)(a), (b) or (c) of the NGER Act for the reporting year or a threshold only in paragraph 13(1)(d) of the NGER Act (see paragraph 4.05(1)(b) of the NGER Regulations),

are required to include any PBO or PBG consumption during the reporting year from the operation of the facility(s) covered by the reports. Such reports must include the amount and energy content of the PBOs and PBGs consumed by both:

- combustion
- any other means, and
- if the amount exceeds the relevant thresholds set out in the NGER Determination.¹

Estimating emissions from the use of PBOs and PBGs as lubricants

Division 2.4.5A of the NGER Determination provides three methods for estimating emissions of carbon dioxide⁵ released from the combustion, through use as lubricants, of PBOs and PBGs in the operation of a facility⁶.

However, Section 2.40A (2) provides that for incidental emissions, another method may be used that is consistent with the principles in section 1.13 of the NGER Determination.

Method 1

The following methodology must be followed for all uses of PBOs and PBGs irrespective of whether they are combusted, except where it may be more appropriate to use a site specific emissions factor.

General methodology for estimating emissions from the consumption of PGOs and PBGs

Described in section 2.48A (1) of the NGER Determination.

\[
E_{pogco2} = Q_{pog} \times EC_{pogco2} \times \frac{EF_{pogco2oxec}}{1000}
\]

Where:

\[ E_{pogco2} \] is the amount of carbon dioxide released from the consumption of PBOs or PBGs from the operation of the facility during the year measured in CO2-e tonnes.

¹ See Regulations 4.05 and 4.22(1) of the NGER Regulations.
² There is no measurement methodology for emissions of methane and nitrous oxide from the consumption of PBOs and PBGs as lubricants.
³ Section 2.40A of the NGER Determination.
Q_{pog} is the quantity of PBOs or PBGs consumed from the operation of the facility, estimated in accordance with Division 2.4.6 of the NGER Determination.

EC_{pogco2} is the energy content factor of PBOs or PBGs measured in gigajoules per kilolitre as mentioned in the Part 3 of Schedule 1 of the NGER Determination.

EF_{pogco2oxec} (a) the emission factor for carbon dioxide released from the operation of the facility during the year (which includes the effect of an oxidation factor) measured in kilograms CO₂-e per gigajoule of PBO or PBG consumed as mentioned in Part 3 of Schedule 1 of the NGER Determination or (b) as calculated through equation 1 below 2.48A (2).

The above methodology assumes a default oxidation factor approximately equal to 0.20 for petroleum based oils and 0.05 for petroleum based greases. This means that approximately 20% of the PBOs and 5% of the PBGs used in the facility (for example, in the transmission of a heavy vehicle) is assumed to be combusted. Reporters should consider if this is the most appropriate oxidation factor in their circumstances.

Site specific oxidation and emissions factor calculations

Where the default oxidation factor is not appropriate, a site specific emissions factor can be developed based on equation 1.

Equation 1: Site specific emissions factor. Described in section 2.48A (2) (b) of the NGER Determination.

\[ EF_{pogco2oxec} = OF_{pog} \times EF_{pogco2ec} \]

Where:

\( OF_{pog} \) is the estimated oxidation factor for PBOs or PBGs (to be determined according to equation 2 below).

\( EF_{pogco2ec} \) is 69.9.

Equation 2: Site specific oxidation factor. Described in section 2.48A (3) of the NGER Determination.

\[ OF_{pog} = \frac{Q_{pog} - Oil \ transferred \ Offsite_{pog}}{Q_{pog}} \]

Where:

\( Q_{pog} \) is the quantity of PBOs or PBGs consumed from the operation of the facility, estimated in accordance with Division 2.4.6 of the NGER Determination.

\( Oil \ transferred \ Offsite_{pog} \) is the quantity of oils, derived from PBOs or PBGs, transferred outside the facility, and estimated in accordance with Division 2.4.6 of the NGER Determination.

Criteria for measuring quantity

Reporters must measure quantities consumed or transferred offsite, as noted in the above equations, in accordance with Division 2.4.6 of the NGER Determination. This Division describes four criteria for measurement of liquid fuels. The NGER Determination categorises PBOs and PBGs as liquid fuels. Accordingly, the measurement methodologies provided in Division 2.4.6, adapted to measurement of PBOs and PBGs, would work as follows:

a) **Criterion A**: the amount of PBOs or PBGs delivered for the facility during the year as evidenced by invoices issued by the vendor of the PBO or PBGs.
b) **Criterion AA:** the amount of PBOs or PBGs combusted from the operation of the facility during the year based on amounts delivered during the year (evidenced by invoices) as adjusted for the estimated change in the quantity of the stockpile of PBOs or PBGs for the facility during the year.

c) **Criterion AAA:** the measurement during the year of the PBOs or PBGs combusted from the operation of the facility. The measurement must be carried out:

1) at the point of combustion at ambient temperatures and converted to standard temperatures, using measuring equipment calibrated to a measurement requirement, or

2) if:

   a) the change in the stockpile of the PBOs or PBGs for the facility for the year is less than 1 per cent of total combustion on average for the facility during the year, and

   b) the stockpile of the PBOs or PBGs for the facility at the beginning of the year is less than 5 per cent of the total combustion from the operation of the facility for the year,

   then at ambient temperatures and converted to standard temperatures, at the point of sale of the PBOs or PBGs, using measurement equipment calibrated to a measurement requirement.

d) **Criterion BBB:** is the estimation of the combustion of a PBO or PBG for the year using accepted industry measuring devices or, in the absence of such measuring devices, in accordance with industry practice if the equipment used to measure consumption of the fuel is not calibrated to a measurement requirement.

Criteria A, AA and AAA can be used if the acquisition of the PBOs or PBGs involves a commercial transaction. Criteria AAA and BBB can be used if the acquisition of the PBOs or PBGs does not involve a commercial transaction.

If, during a year, criterion AA, or criterion AAA using paragraph 2.52(2) (a) of the Determination (i.e. measuring at the point of consumption or transfer), is used to estimate the quantity of PBOs or PBGs combusted then, in each year following that year, only criterion AA or, as the case may be, criterion AAA using paragraph 2.52(2) (a), (respectively) may be used.

In accordance with the general principles of emissions reporting outlined in section 1.13 of the NGER Determination, reporters must demonstrate that they have followed one of these criteria when estimating the amount of PBOs and PBGs consumed in or transferred from the facility.

**Method 2**

Method 2 is the same as Method 1, but the emission factor $E_{PBG_{CO2EC}}$ must be determined in accordance with Division 2.4.3 of the NGER Determination.

**Method 3**

Method 3 is the same as Method 1, but the emission factor $E_{PBG_{CO2EC}}$ must be determined in accordance with Division 2.4.4 of the NGER Determination.
Further information

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