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PAS 2060 Qualifying Explanatory Statement – Castrol Carbon Neutral Scope 1 and 2

2nd Application Period: January – December 2021

This is a PAS 2060 Qualifying Explanatory Statement to demonstrate that Castrol has achieved carbon neutrality with a commitment to maintain in accordance with PAS 2060:2014 reporting

Carbon Neutrality Declaration

"Carbon neutrality of Scope 1 and Scope 2 GHG Emissions achieved by Castrol in accordance with PAS 2060:2014 at 31st December 2021 with the commitment to maintain to 31st December 2022, for the period commencing 1st January 2022, DNV certified"

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This Qualifying Explanatory Statement (QES) contains all the required information on the carbon neutrality of the given subject. All information provided within this report has been reviewed by DNV Business Assurance Services UK Limited[1], a third-party assurer. If provided with any information affecting the validity of the following statements, this document will be updated accordingly. This report will be made publicly available on Castrol's carbon neutral webpage: www.castrol.com/cneutral. The publicly available version will be redacted to protect commercially sensitive information and any internal milestones that underpin external aims.

This is Castrol's first declaration of achievement of carbon neutrality for Scope 1 and 2 GHG emissions.

Castrol's carbon neutrality declaration has been reviewed and verified by an independent third- party assurer, DNV. Their Assurance Statement can be found in Annex B of this report.

[1] DNV is one of the world's leading certification and assurance bodies, helping businesses assure the performance of their organisations, products, people, facilities and supply chains through certification, verification, and assurance.

1. TERMS & DEFINITIONS

100-year Global Warming Potential	Factor describing the radiative forcing impact of one mass-based unit of a given greenhouse gas relative to an equivalent unit of carbon dioxide over a given period of time NOTE: Carbon dioxide is assigned a GWP of 1, while the GWP of other gases is expressed relative to the GWP of carbon dioxide from fossil carbon sources. Global warming potentials for a 100-year time period are produced by the Intergovernmental Panel on Climate Change[2].
Carbon	Carbon is used as shorthand for aggregated greenhouse gas (GHG) emissions, reported as carbon dioxide equivalents (CO2e). Throughout the report, the full term (CO2e) is employed. A full list of GHG emissions included in the inventory is provided in Annex C of this report
Carbon Credit	A generic term to assign a value to the carbon offset. One carbon credit is usually equivalent to one tonne of carbon dioxide.
Carbon Offsets	Discrete reduction in greenhouse gas emissions not arising from the defined subject, made available in the form of a carbon credit meeting the requirements of 9.1.2 of PAS 2060:2014 and used to counteract emissions from the defined subject. PAS 2060:2014 specifies that carbon offsets are acquired to compensate for greenhouse gas emissions arising from a defined subject. Offsets are calculated relative to a baseline that represents a hypothetical scenario for what emissions would have been in the absence of the mitigation project that generates the offsets.
GHG	Greenhouse Gas refers to carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF_6), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs). A full list of GHG emissions included in the inventory is provided in Annex C of this report
GHGP	Greenhouse Gas Protocol sets the standards to measure and report GHG emissions. Annex C of PAS 2060:2014 Table C.1 includes the GHG Protocol, Product lifecycle accounting and reporting standard as an example of a document providing methodologies appropriate for use in the quantification and reduction of GHG emissions. Greenhouse Gas Protocol | (ghgprotocol.org)
GHGP Corporate Standard	Greenhouse Gas Protocol Corporate Standard: (Scope 1 and 2 emissions) https://ghgprotocol.org/corporate-standard

[2] Taken from the Terms and definitions in PAS 2060:2014

GHGP Corporate Value Chain Standard	Greenhouse Gas Protocol Corporate Value Chain Standard: (Scope 3 emissions) https://ghgprotocol.org/corporate-standard
IPCC Fifth Assessment Report	The Intergovernmental Panel on Climate Change (IPCC) provides an international statement on the scientific understanding of climate change IPCC — Intergovernmental Panel on Climate Change
I3P-1 (for third party)	The conformity assessment type as outlined in PAS2060:2014, in this case: Independent 3P certification - commitment
I3P-3 (for independent third-party certification – unified)	The conformity assessment type as outlined in PAS2060:2014, in this case: Independent 3P certification - unified (achievement of and future commitment to, carbon neutrality)
PAS 2060	Publicly available Specification for the Demonstration of Carbon Neutrality. PAS 2060:2014 (referenced in this document) refers to the latest 2014 version of the document
QES	Collation of evidence in support of the declaration of a commitment to carbon neutrality and/or the declaration of achievement of carbon neutrality, in compliance with PAS 2060 (as per PAS 2060:2014).
Renewable Energy Certificates (RECs)	A REC (Renewable Energy Certificate) is a type of Energy Attribute Certificate (EAC) that represents the environmental attributes of the generation of a one-megawatt hour (MWh) of energy produced by renewable sources. I-REC Standard - The International REC Standard Foundation (irecstandard.org)

2. INTRODUCTION

2.1 Foreword

This Qualifying Explanatory Statement (QES) demonstrates Castrol's achievement of carbon neutrality of its Scope 1 and 2 GHG emissions at 31st December 2021 in accordance with PAS 2060:2014, with the commitment to maintain such achievement to 31st December 2022, for the period commencing 1st January 2022

This QES provides details on Castrol's Scope 1 and 2 carbon footprint, how it was calculated, and Castrol's carbon management plan inclusive of emission reduction initiatives and the offset process to compensate for residual emissions.

A checklist of requirements to demonstrate conformance to PAS 2060:2014 and their respective location within the QES can be found in Annex A.

Table 2.1 - General Information

PAS 2060:2014 Information Requirement	Information as it relates to Castrol Ltd
Entity making PAS 2060:2014 declaration	Castrol Limited (hereafter "Castrol")
Individual responsible for the evaluation and provision of data necessary for the substantiation of the declaration including that of preparing, substantiating, communicating, and maintaining the declaration	Carolyn Bongard, Sustainability Accounting Manager
Subject of the declaration	Scope 1 and 2 GHG emissions across Castrol's Global Operations (see Characteristics of the subject below for further details.)
Chosen consolidation approach (equity share, operational control, or financial control)	Operational Control
Characteristics of the subject	Castrol is a global lubricants manufacturing and marketing company offering a wide range of products and services across the automotive, industrial, marine and energy spaces. Castrol's Scope 1 and 2 GHG emissions include stationary emissions from 23 owned blend plants and 1 owned office and mobile emissions from leased vehicles for the sales fleet globally. Castrol's logistics fleet is 100% outsourced.

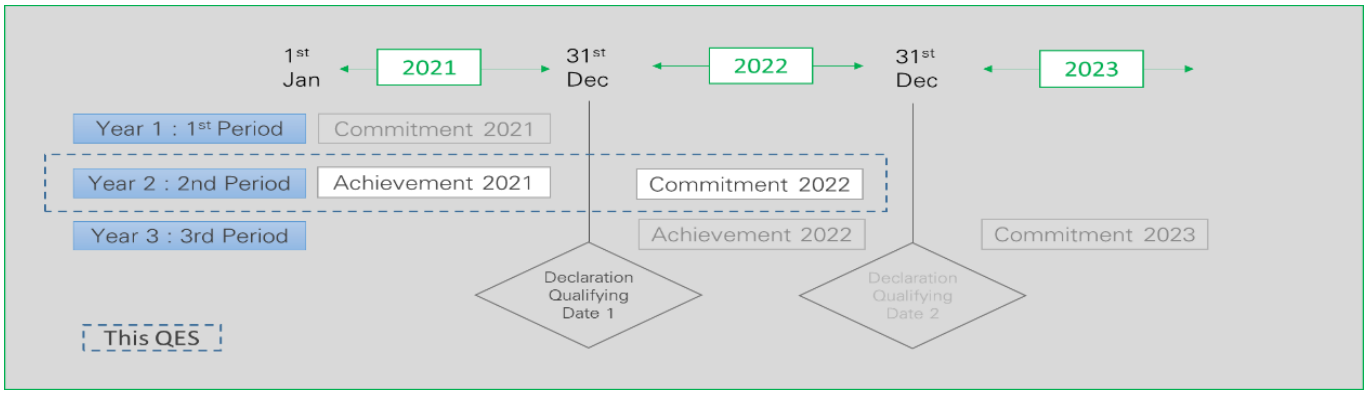
Rationale for the selection of the subject and boundary	Castrol is making its Scope 1 and 2 GHG emissions carbon neutral in support of its PATH360 Sustainability Strategy. Castrol first determined its baseline Scope 1, 2 and 3 GHG emissions in 2020, but is excluding Scope 3 from carbon neutrality due to its practicability. Within a separate QES, *PAS 2060 Qualifying Explanatory Statement – Castrol Carbon Neutral Products,* Castrol has demonstrated its achievement of and ongoing commitment to carbon neutrality over a significant portion of its Scope 3 emissions through its carbon neutral products programme which covers ~30% of its 2021 sales volume.
Conformity assessment type	I3P-3 Independent third-party certification – unified
Baseline date (Date of first determined footprint)	1st Jan – 31st Dec 2019
Achievement period for carbon neutrality	1st Jan – 31st Dec 2021
Commitment period for carbon neutrality	1st Jan – 31st Dec 2022

2.2 PAS 2060 Carbon Neutrality

Castrol will demonstrate carbon neutrality of the subject as set out in PAS 2060:2014 using an independent 3rd party certification in accordance with 10.3.2 of PAS 2060:2014. For the 1st application period following the baseline date, declaration I3P-1 from Annex A had been used. For this 2nd application period and all subsequent application periods with an unchanged subject, declaration I3P-3 modified as per A.2 of PAS 2060:2014 shall be used. In the event that material change to the subject occurs, the sequence shall be re-started on the basis of a newly defined subject.

Castrol is following the timeline for carbon neutrality in accordance to Figure 2.1 - Carbon Neutrality Declaration Periods. Castrol has completed its second application period. The first period represents the baseline period that corresponds with calendar year 2021. The subject has been defined and its carbon footprint quantified. A carbon management plan has been developed and implementation initiated to target carbon reductions within Castrol's defined boundaries, where the business is able to have direct influence over the carbon emissions. Section 5 of this QES provides details on this carbon management plan and the progress made in reducing carbon between 2019 (the baseline date / first assessment of Castrol's Scope 1 and 2 GHG emissions) and this 2021 achievement period. Section 6 provides details on the amount of offset credits used to compensate for the residual emissions and the projects associated with these credits.

Figure 2.1 – Carbon Neutral Declaration Periods



2.3 Boundaries of the Subject

The declaration of carbon neutrality covers GHG emissions relating to all of the activities across Castrol's owned / controlled manufacturing facilities (23), owned office locations (1- Castrol's headquarters in the UK) and the fleet of leased light vehicles used by the sales force to service Castrol customers globally.

Castrol conducted its first corporate footprint[3] (Scope 1, 2 and 3 GHG emissions) in 2020 using calendar year 2019 as the baseline date. This assessment of its full corporate value chain emissions helped inform Castrol's PATH360 Sustainability Strategy and its aim to halve the net carbon intensity of the products it sells by 2030 or sooner. In a separate QES and carbon neutrality declaration, Castrol has demonstrated its achievement of carbon neutrality over ~30% of its products sold in 2021 and the related Scope 3 GHG emissions for those products. Within this QES, Castrol is focusing on the GHG emissions within its operational control (Scope 1 and 2 emissions) and the associated carbon reduction activities which will help to underpin its 2030 aim. In 2021 and 2022, Castrol has limited the update of the GHG accounting to Scope 1 and 2 emissions, and for this QES and carbon neutrality declaration, Scope 3 has been excluded. The quantified carbon footprint covers at least 95% of the emissions from the subject.

[3] In accordance with the GHGP Corporate Standard and Corporate Value Chain Standard

3. QUANTIFICATION OF CARBON FOOTPRINT

3.1 Standard Chosen and Emissions Sources

Castrol has accounted its GHG emissions as per the GHG Protocol Corporate Standard; the most widely used accounting platform for corporate GHG reporting programs globally. The GHG Protocol Corporate Standard was applied in accordance with its provisions and the principles set out in PAS 2060:2014. The boundary for the subject has been defined as 'operational control.'

GHG emissions accounted for in the study are based on the 100-year Global Warming Potential figures published in Table 2.14 of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2014) and include those required by the GHGP Corporate Standard which specifies emissions to and removals from the atmosphere of: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), sulphur hexafluoride (SF6), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs). A full list of GHG emissions included in the inventory is provided in Annex C of this report.

100% of the Scope 1 and 2 GHG emissions within Castrol's operational control are included and summarised in Table 3.1. Where GHG emissions have been estimated, these have been determined based on a conservative approach that precludes underestimation. Sources of biogenic carbon in Castrol's Scope 2 emissions are limited to 1,034 tCO_2e and are not included in the boundary of Castrol's Scope 1 and Scope 2 GHG emissions.

Emissions for Scope 1 fuels and Scope 2 steam for were calculated using emission factors sourced from DEFRA 2021, DEFRA 2020 and DEFRA 2019 for each of the corresponding years' data. Scope 2 electricity emission factors were primarily sourced from IEA 2021 (2019 figures) - CO2, CH4 and N2O + Trade induced, IEA 2020 (2018 figures) - CO2, CH4 and N2O + Trade induced and IEA 2019 (2017 figures) - CO2, CH4 and N2O + Trade induced, for each of the corresponding years' data. Two manufacturing sites in Neudorf, Austria and Port Allen, Louisiana USA have used a market-based approach with the electricity energy mix provided by the supplier. The energy mix for both sites was collected in 2020 and used for 2019, 2020 and 2021 calculations. In 2020, 3 sites moved to Renewable Energy Certificates and 4 additional sites transitioned to RECs in 2021. In total, 10 of the 23 sites on scope are now using a market-based approach.

Table 3.1 – Carbon Footprint for Carbon Neutrality

PAS 2060:2014 Requirement	2nd Application Period		
	2019 Baseline	2020 Data (Used to estimate offsets in 2021 Commitment Period)	2021 Achievement Period
Standard used	The GHG Protocol Corporate Accounting and Reporting Standard		
Emissions covered	Scope 1 and 2		

Scope 1 (tCO_2e) [4]		[redacted]		
Scope 2 (tCO_2e) [5]				
Total (tCO_2e)				

Castrol has achieved a reduction in emissions of [redacted] tCO2e in the 2021 achievement period, 25% vs the baseline date and is committed to its continued carbon reduction efforts within its carbon management plan (refer to section 5 for details).

Table 3.2 Inclusions & Exclusions

Scope 1	Included: ○ Direct emissions from combustion of fuels occurring at Castrol-owned sites. ○ Emissions from combustion of fuels in vehicles leased by Castrol. Excluded: ○ Direct emission of refrigerants from Castrol-owned sites. Data is not currently available. Investigations ongoing into significance of these emissions but expected to be immaterial, (i.e., <1%). Results gathered thus far show that only 1 site in Europe required top-up of refrigerant in 2021 of 0.4kg during annual maintenance and that no other sites use refrigerant.
Scope 2	Included: ○ Indirect emissions associated with the purchase of energy for Castrol-owned sites (i.e., electricity and steam).
Scope 3	Excluded: ○ All Scope 3 emissions have been excluded from carbon neutrality due to its practicality. Within a separate QES, Castrol has demonstrated its achievement of carbon neutrality with a commitment to maintain over a significant portion of its Scope 3 emissions through its carbon neutral products programme.

[4] Direct stationary emissions from fuel used in boilers and furnaces, mobile emissions from leased light vehicles. Fugitive emissions from refrigerants being pursued but likely immaterial.

[5] Indirect emissions from the use of purchased electricity, steam, heating, or cooling

4. DATA METHODS

4.1 Description of Methodologies and Data Used

Scope 1: Fuel consumption data for all Castrol operated facilities are reported in kWh or L, along with distances driven in km for the operation of leased vehicles. Castrol consumption data (e.g., litres, kWh) are multiplied with secondary emission factors for direct emissions.

Scope 2: Site electricity and steam consumption data (kWh) are collected for all facilities operated by Castrol. Castrol consumption data (e.g., kWh) are multiplied with market-based emission factors where available and default to location-based emission factors for the remaining sites in order to calculate indirect emissions.

4.2 Data Quality

All data points were assessed for data quality to appraise representativeness in relation to – technology, geography, time-period, completeness, and reliability – and assigned a score on a scale of 1 to 4 (1 being poor; 4 being very good). ERM (Castrol's environmental consultancy partner for the development and calculation of the carbon footprint) were in constant communication with Castrol throughout the assessment, this included weekly data review meetings throughout the assessment process. All data provided by Castrol were subject to review and checked for completeness. Data clarifications were sought and promptly addressed by Castrol. All data gaps relating to Castrol operations were addressed. Castrol and ERM were prompt in responding to Critical Reviewer data queries and in implementing suggestions for improving data quality. A single data quality score was calculated as a weighted average of all four representativeness categories (applying equal weighting). The quality of the overall dataset was appraised as a percentage of the total carbon footprint result which relies on data that is appraised as 'poor' (weighted average score <2.5) as follows:

Table 4.1 Data Quality Scale

% Total Footprint results from 'poor' data	Data Quality Category
<10%	Very good
10% to <30%	Good
30% to <50%	Satisfactory
>50%	Poor

Separate data quality assessments were undertaken for activity data and secondary emission factor data.

Table 4.2 Data Quality Appraisal – Activity Data

Data Quality Appraisal – Activity Data	
Scope 1	Very good
Scope 2	Very good
Overall	Very good

Table 4.3 Data Quality Appraisal – Emission Factor Data

Data Quality Appraisal – Emission Factor Data	
Scope 1	Very good
Scope 2	Very good
Overall	Very good

4.3 Data Uncertainties

4.3.1 Scenario Uncertainty

Leased Vehicles - The data collected comprised the total distance driven by the vehicles Castrol leased by geography. However, the data was not further disaggregated by vehicle fuel type. This meant that assumptions were made regarding both the fuel consumption and the fuel type of the leased vehicles. As a conservative estimate, the fuel type for all leased vehicles was assumed to be petrol (i.e., no diesel or electric vehicles, which would be expected to emit less). For fuel consumption, an assumption of 23.5 miles per gallon was provided by Castrol.

The leased vehicles data could be improved by disaggregating the distances by vehicle fuel type and geography. Preferably, actual fuel consumption data would be collected instead of distance.

Fuels – In 2019, some sites had consumed small amounts of diesel, but this was not captured in the data reporting template. The associated emissions have been calculated to be immaterial but have since been added to the reporting template from 2020. There was also a separate reporting issue where fuel oil consumption at one site was reported as diesel. This has also been corrected from 2020.

4.3.2 Parameter Uncertainty

Uncertainty has not been appraised as parameter uncertainty is unknown for most of the measured activity and emission factor data.

The greatest uncertainty is associated with the GWP factors for CO_2, reported to be ±26% in the IPCC Fifth Assessment Report, 2014 (AR5) referenced above and in Annex A 6.

6 IPCC Fifth Assessment Report, 2014 (AR5) https://www.ipcc.ch/report/ar5/wg1/

5. CARBON MANAGEMENT PLAN

5.1 Commitment

Castrol is committed to achieve carbon neutrality of its Scope 1 and 2 GHG emissions for the 3rd application period of 1st January 2022 to 31st December 2022 in accordance with PAS 2060:2014.

As a sub-entity of bp, Castrol's Scope 1 and 2 GHG emissions target is aligned with bp's Aim 1 to be net zero across its entire operations on an absolute basis by 2050 or sooner. bp is also targeting a 20% reduction in its operational GHG emissions by 2025 and will aim for a 50% reduction by 2030 against the 2019 baseline.

Castrol is committed to continually exploring opportunities to reduce carbon and improve energy efficiency across its manufacturing sites. Section 5.2 provides details on the 3 main pillars of Castrol's management plan: operational efficiency, transitioning to renewable energy, and replacing carbon-intensive energy sources with cleaner, lower carbon alternatives.

5.2 Carbon Reduction Plan

The key components of Castrol's Scope 1 and 2 carbon reduction activities include:

- Operational Efficiency
    a) Raising awareness of energy consumption and energy waste
    b) Reviewing current energy intensive processes for potential optimisation
    c) Using capital expenditure to invest in energy saving solutions

- Transitioning to renewably sourced electricity where possible, using a combination of on-site installations of renewable energy (e.g., solar panels and wind turbines) and procurement of green energy through virtual purchase power agreements and green tariffs
- Replace carbon-intensive energy sources with cleaner, low carbon alternatives where commercially, technically, and practically feasible.

5.2.1 Carbon Reductions vs 2019

Castrol is in action on its carbon reduction plan and has delivered a 25% reduction at the end of 2021 vs its 2019 baseline. Some of the highlights underpinning this reduction are:

- 6 additional sites (7 in total) now on Renewable Electricity Certificates (RECs)
- 4 sites have installed solar panels during 2021
- 9% reduction in kWh of grid electricity consumed vs 2019
- 48% decrease in km driven by the sales fleet vs 2019

As part of its supply chain strategy and network optimization plans, Castrol did close one facility in 2021, the Neudorf plant in Austria. As this closure was not complete until March of 2021, 3 months of GHG emissions have been included in the 2021 GHG emissions inventory. As the total Scope 1 and 2 emissions for Neudorf only represent <2% of the 2019 baseline, a re-baseline is not deemed to be required. However, this will be reassessed in 2023 as 3 additional sites have been closed in 2022. For reference, if the Scope 1 and 2 GHG emissions were excluded from both the 2021 Actuals and the 2019 baseline, the reduction would be 24% instead of 25% as mentioned above.

5.2.2 Carbon Reduction Roadmap

Castrol's carbon management plan is updated and maintained regularly as part of its Sustainability Programme execution and progress against key activities are reviewed with leadership quarterly so that any corrective actions can be implemented to ensure targets are achieved. Performance against targets are measured on an absolute tonnes basis and progress against initiatives requiring capital investment are tracked using a stage gate process. Underlying energy consumption for Scope 1 + 2 GHG emissions are also tracked on a per litre basis to account for any significant variation in volume throughput.

Key Activities for the commitment period are listed below and are expected to deliver a further 8% reduction in GHG emissions vs 2021 and 6% vs the 2019 baseline.

- Further transition of 5 additional sites to RECs
- Further installation of solar panels and continued exploration of solar and/or wind
- Continued improvements in heating and blending efficiency through processes and investments on HVAC, pumps, LED lighting

6. CARBON OFFSET PROGRAM

Since the inception of its carbon neutral programme in 2014, Castrol has been ordering its carbon credits from bp Target Neutral. The purchase of these credits supports and contributes to a portfolio of carbon reduction, avoidance and removal projects around the world. Some of these projects have additional benefits that support the UN Sustainable Development Goals, improving the lives of millions of people through better health, decent work, training and gender equality.

6.1 Offset program for the 2nd Application Period

Credits for the period covering 1st Jan 2021 – 31st Dec 2021 were purchased and retired in advance through bp Target Neutral (www.bptargetneutral.com) based on 2020 Actual tCO_2e of [redacted]. This means that an excess of 3,421 credits have been purchased and retired compared to the 2021 Actual emissions of [redacted] tCO_2e and will be carried forward for the next application period.

These credits have been purchased from sources based on schemes with criteria for:

- The offsets purchased represent genuine, additional GHG emissions reductions; and
- The projects involved in delivering offsets meet the criteria of additionality, permanence, leakage, and double counting.

The purchase of offsets via these schemes also guarantees that the credits have been verified by an independent third party, only issued after the GHG emission reductions had taken place and were retired within 12 months from the date of the declaration of the achievement. These credits are supported by publicly available project documentation, with references provided and stored and retired in an independent and credible registry.

6.2 Offset program for the 3rd Application Period

For the 3rd application period and the commitment period within this QES, 1st January 2022 – 31st December 2022, Castrol will repeat the same process as followed for the 2nd application period but using 2021 Actual tCO_2e [redacted] less the existing buffer of offsets (3,421 tCO_2e) as the estimate for 2022 requirements [redacted] tCO_2e). Castrol has notified bp Target Neutral of the volume of credits required in advance of the retirements completing in 1Q 2023. Any difference between this estimation for 2022 and the Actuals will again be adjusted in the following 4th application period.

Table 6.1 Carbon Offsets to Account for 2021 Scope 1 and 2 emissions in the 1st Achievement Period

Project Name	Account Name	Standard and registry type	Date of retirement	Scope 1 & 2 carbon offset (credits/tCO2e)	HYPERLINKS	Vintage
Orb Energy Solar Program in India	BP Gas Marketing Limited	Gold Standard / Verified Emission Reductions (VERs)	8/5/2021	[redacted]	Orb Energy Solar Program in India	2019

ONIL Stoves Guatemala Uspantan - Guatemala	BP International Limited	VCS / Markit Env Registry	3/9/2022	[redacted]	ONIL Stoves - Guatemala	2017
El Arrayan Wind Farm - CHILE	BP Gas Marketing Limited	UN registry for CDM projects	3/9/2022	[redacted]	El Arrayan Wind Farm - CHILE	2020
TOTAL Full Year 2021				[redacted]		

Annex A: Qualifying Explanatory Statement (QES) Checklist

Table A.1 Checklist for QES supporting declaration of commitment to carbon neutrality

The following table has been extracted from PAS 2060:2014. It provides a checklist of information that should be included in the commitment to carbon neutrality, as well as identification of where this information is located.

#	Item Description	Status	Section in this QES
1	Identify the individual responsible for the evaluation and provision of data necessary for the substantiation of the declaration including that of preparing, substantiating, communicating, and maintaining the declaration.	✓	Section 2.1, Table 2.1
2	Identify the entity responsible for making the declaration.	✓	Section 2.1, Table 2.1
3	Identify the subject of the declaration.	✓	Section 2.1, Table 2.1
4	Explain the rationale for the selection of the subject. *(The selection of the subject should ideally be based on a broader understanding of the entire carbon footprint of the entity so that the carbon footprint of the selected subject can be seen in context; entities need to be able to demonstrate that they are not intentionally excluding their most significant GHG emissions (or alternatively can explain why they have done so).)*	✓	Section 2.1, Table 2.1, Section 2.3
5	Define the boundaries of the subject.	✓	Section 2.3, Table 2.1
6	Identify all characteristics *(purposes, objectives, or functionality)* inherent to that subject.	✓	Section 2.3, Table 2.1
7	Identify and take into consideration all activities material to the fulfilment, achievement or delivery of the purposes, objectives, or functionality of the subject.	✓	Section 2.3
8	Select which of the 3 options within PAS 2060 you intend to follow.	✓	Section 2.2, Table 2.1
9	Identify the date by which the entity plans to achieve the status of 'carbon neutrality' of the subject and specify the period for which the entity intends to maintain that status.	✓	Section 2.2, Figure 2.1, Section 5.1
10	Select an appropriate standard and methodology for defining the subject, the GHG emissions associated with that subject and the calculation of the carbon footprint for the defined subject.	✓	Section 3.1, Table 3.1
11	Provide justification for the selection of the methodology chosen. *(The methodology employed shall minimise uncertainty and yield accurate, consistent, and reproducible results.)*	✓	Section 3.1
12	Confirm that the selected methodology was applied in accordance with its provisions and the principles set out in PAS 2060.	✓	Section 3.1

13	Describe the actual types of GHG emissions, classification of emissions *(Scope 1, 2 or 3)* and size of carbon footprint of the subject exclusive of any purchases of carbon offsets:	✓	Section 3.1, Table 3.1, Table 3.2
	a) All greenhouse gases shall be included and converted to tCO_2e.	✓	Section 3.1, Table 3.1
	b) 100% Scope 1 (direct) emissions relevant to the subject shall be included when determining the carbon footprint.	✓	Section 3.1, Table 3.1, Table 3.2
	c) 100% Scope 2 (indirect) emissions relevant to the subject shall be included with determining the carbon footprint.	✓	Section 3.1, Table 3.1, Table 3.2
	d) Where estimates of GHG emissions are used in the quantification of the subject carbon footprint (particularly when associated with Scope 3 emissions) these shall be determined in a manner that precludes underestimation.	✓	Section 3.1
	e) Scope 1, 2 or 3 emission sources estimated to be more than 1% of the total carbon footprint shall be taken into consideration unless evidence can be provided to demonstrate that such quantification would not be technically feasible or cost effective. (Emissions sources estimated to constitute less than 1% may be excluded on that basis alone.)	✓	Table 3.2
	f) The quantified carbon footprint shall cover at least 95% of the emissions from the subject.	✓	Section 2.3
	g) Where a single source contributes more than 50% of the total emissions, the 95% threshold applies to the remaining sources of emissions.	N/A	
	h) Any exclusion and the reason for that exclusion shall be documented.	✓	Section 3.1, Table 3.2
14	Where the subject is an organisation/ company or part thereof, ensure that:		
	a) Boundaries are a true and fair representation of the organisation's GHG emissions (i.e., shall include GHG emissions relating to core operations including subsidiaries owned and operated by the organisation). It will be important to ensure claims are credible – so if an entity chooses a very narrow subject and excludes its carbon intensive activities or it if outsources its carbon intensive activities, then this needs to be documented.	✓	Section 2.3
	b) Either the equity share or control approach has been used to define which GHG emissions are included. Under the equity share approach, the entity accounts for GHG emissions from the subject according to its share of equity in the subject. Under the control approach, the entity shall account for 100% of the GHG emissions over which it has financial and/or operational control.	✓	Table 2.1, Section 2.3, Section 3.1
15	Identify if the subject is part of an organisation or a specific site or location and treat as a discrete operation with its own purpose, objectives, and functionality.	✓	Section 2.3
16	Where the subject is a product of service, include all Scope 3 emissions *(as the life cycle of the product/ service needs to be taken into consideration)*.	N/A	
17	Describe the actual methods used to quantify GHG emissions *(e.g., use of primary or secondary data)*, the measurement unit(s) applied, the period of application and the size of the resulting carbon footprint. *(The carbon footprint shall be based as far as possible on primary*	✓	Page 2, Section 2.1, Table 2.1, Figure 2.1, Section 3.1, Table 3.1, Table 3.2, Section 4.1, Section 4.2

	activity data.) Where quantification is based on calculations *(e.g., GHG activity data multiplied by greenhouse gas emission factors or the use of mass balance/ life cycle models)* then GHG emissions shall be calculated using emissions factors from national *(Government)* publications. Where such factors are not available, international or industry guidelines shall be used. In all cases the sources of such data shall be identified.		
18	Provide details of, and explanation for, the exclusion of any Scope 3 emissions.	✓	Section 2.3, Table 2.1, Table 3.2
19	Document all assumptions and calculations made in quantifying GHG emissions and in the selection or development of greenhouse gas emissions factors. *(Emission factors used shall be appropriate to the activity concerned and current at the time of quantification.)*	✓	Section 3.1, Section 4.1, Section 4.2, Section 4.3
20	Document your assessments of uncertainty and variability associated with defining boundaries and quantifying GHG emissions including the positive tolerances adopted in association with emissions estimates. *(The statement could take the form of a qualitative description regarding the uncertainty of the results, or a quantitative assessment of uncertainty if available (e.g., carbon footprint based on 95% of likely greenhouse gas emissions; primary sources are subject to variation over time; footprint is best estimate based on reasonable costs of evaluation)).*	✓	Section 4.2, Section 4.3
21	Document Carbon Footprint Management Plan:		
	a) Make a statement of commitment to carbon neutrality for the defined subject.	✓	Section 5.1
	b) Set timescales for achieving carbon neutrality for the defined subject.	✓	Section 5.1
	c) Specify targets for GHG reduction for the defined subject appropriate to the timescale for achieving carbon neutrality including the baseline date, the first qualification date and the first application period.	✓	Section 5.1
	d) Document the planned means of achieving and maintaining GHG emissions reductions including assumptions made and any justification of the techniques and measures to be employed to reduce GHG emissions.	✓	Section 5.2.2
	e) Specify the offset strategy including an estimate of the quantity of GHG emissions to be offset, the nature of the offsets and the likely number and type of credits.	✓	Section 6, Section 6.2
22	Implement a process for undertaking periodic assessments of performance against the Plan and for implementing corrective action to ensure targets are achieved. The frequency of assessing performance against the Plan should be commensurate with the timescale for achieving carbon neutrality.	✓	Section 5.2.2
23	Where the subject is a non-recurring event, such as weddings or a concert, identify ways of reducing GHG emissions to the maximum extent commensurate with enabling the event to meet its intended objectives before the event takes place and include 'post event review' to	N/A	

	determine whether the expected minimisation in emissions has been achieved.		
24	Any reductions in the GHG emissions from the defined subject delivered in the three years prior to the baseline date and not otherwise considered in any GHG emissions quantification have been made in accordance with this PAS.	N/A	
25	Record the number of times that the declaration of commitment has been renewed without declaration of achievement.	N/A	This is the first declaration of achievement with a commitment to maintain
26	Specify the type of conformity assessment:		
	a) independent third-party certification	✓	Section 2.1, Table 2.1
	b) other party validation	N/A	
	c) self-validation	N/A	
27	Include statements of validation where declarations of commitment to carbon neutrality are validated by a third-party certifier or second party organisations.	✓	Annex B
28	Date the QES and have signed by the senior representative of the entity concerned (e.g., CEO of a corporation; Divisional Director, where the subject is a division of a larger entity; the Chairman of a town council or the head of the household for a family group).	✓	Page 2
29	Make the QES publicly available and provide a reference to any freely accessible information upon which substantiation depends (e.g., via websites).	✓	A redacted version of the QES will be made publicly available
30	Update the QES to reflect changes and actions that could affect the validity of the declaration of commitment to carbon neutrality.	✓	A commitment has been made by the business to do this

Table A.2 Checklist for QES supporting declaration of achievement of carbon neutrality

The following table has been extracted from PAS 2060:2014. It provides a checklist of information that should be included in the achievement of carbon neutrality, as well as identification of where this information is located.

#	Item Description	Status	Section in this QES
1	Define standard and methodology to use to determine its GHG emissions reduction.	✓	Section 2.3, Section 3.1, Section 4.1
2	Confirm that the methodology used was applied in accordance with its provisions and the principles set out in PAS 2060 were met.	✓	Section 3.1
3	Provide justification for the selection of the methodologies chosen to quantify reductions in the carbon footprint, including all assumptions and calculations made and any assessments of uncertainty. *(The methodology employed to quantify reductions shall be the same as that used to quantify the original carbon footprint. Should an alternative methodology be available that would reduce uncertainty and yield more accurate, consistent, and reproducible results, then this may be used provided the original carbon footprint is re-qualified to the same methodology, for comparison purposes. Recalculated carbon footprints shall use the most recently available emission factors, ensuring that for purposes of comparison with the original calculation, any change in the factors used is considered.)*	✓	Section 3.1, Table 3.2, Section 4.1, Section 4.3.1, Section 5.2.1
4	Describe how reductions have been achieved and any applicable assumptions or justifications.	✓	Section 5.2.1
5	Ensure that there has been no change to the definition of the subject. *(The entity shall ensure that the definition of the subject remains unchanged through each stage of the methodology. If material change to the subject occurs, the sequence shall be re-started based on a newly defined subject.)*	✓	Section 2.2, Section 5.2.1
6	Describe the actual reductions achieved in absolute and intensity terms and as a percentage of the original carbon footprint. *(Quantified GHG emissions reductions shall be expressed in absolute terms and shall relate to the application period selected and/or shall be expressed in emission intensity terms (e.g., per specified unit of product or instance of service).)*	✓	Section 5.2.1, Section 3.1
7	State the baseline/ qualification date.	✓	Table 2,1, Section 2.2

8	Record the percentage economic growth rate for the given application period used as a threshold for recognising reductions in intensity terms.	N/A	
9	Provide an explanation for circumstances where a GHG reduction in intensity terms is accompanied by an increase in absolute terms for the determined subject.	N/A	
10	Select and document the standard and methodology used to achieve carbon offset.	✓	Section 6.1
11	Confirm that:		
	a) Offsets purchased or allowance credits surrendered represent genuine, additional GHG emission reductions elsewhere	✓	Section 6.1
	b) Projects involved in delivering offsets meet the criteria of *additionality*, *permanence*, *leakage,* and *double counting*. (See WRI Greenhouse Gas Protocol for definitions of *additionality*, *permanence*, *leakage,* and *double counting*.)	✓	Section 6.1
	c) Carbon offsets are verified by an independent third-party verifier	✓	Section 6.1
	d) Credits from carbon offset projects are only issued after the emission reduction has taken place	✓	Section 6.1
	e) Credits from carbon offset projects are retired within 12 months from the date of the declaration of achievement	✓	Section 6.1
	f) Credits from carbon offset projects are supported by publicly available project documentation on a registry which shall provide information about the offset project, quantification methodology and validation and verification procedures	✓	Section 6.; Table 6.1
	g) Credits from carbon offset projects are stored and retired in an independent and credible registry	✓	Section 6; Table 6.1
12	Document the quantity of GHG emissions offset and the type and nature of offsets purchased including the number and type of credits used and the time over which credits were generated including:	✓	Section 6; Table 6.1
	a) Which GHG emissions have been offset	✓	Section 6; Table 6.1
	b) The actual amount of carbon offset	✓	Section 6; Table 6.1
	c) The type of offset and projects involved	✓	Section 6; Table 6.1
	d) The number and type of carbon offset credits used and the time over which the credits have been generated	✓	Section 6; Table 6.1
	e) Information regarding the retirement/ cancellation of carbon offset credits to prevent their use by others including a link to the registry where the offset has been retired.	✓	Section 6.1
13	Specify the type of conformity assessment:		

	a) independent third-party certification	✓	Section 2, Table 2.1
	b) other party validation	N/A	
	c) self-validation	N/A	
14	Include statements of validation where declarations of achievement of carbon neutrality are validated by a third-party certifier or second party organisations.	✓	Annex B
15	Date the QES and have it signed by the senior representative of the entity concerned (e.g., CEO of a corporation; Divisional Director, where the subject is a division of a larger entity; the Chairman of a town council or the head of the household for a family group).	✓	Section 1
16	Make the QES publicly available and provide a reference to any freely accessible information upon which substantiation depends (e.g., via websites).	✓	Carbon Neutrality Declaration, page 2

Annex B: Carbon Neutrality Assurance Statement

DNV

WHEN TRUST MATTERS

Independent Limited Assurance Report

to the Management of Lubricants UK Ltd

Lubricants UK Ltd ("Castrol") commissioned DNV Business Assurance Services UK Limited ("DNV", "us" or "we") to conduct a limited assurance engagement over the declaration of carbon neutrality in the **PAS 2060 Qualifying Explanatory Statement** (the "Report") for its Organisational Scope 1 and 2 greenhouse gas (GHG) emissions for the achievement period commencing 1st January 2021 to 31st December 2021 and the commitment period commencing 1st January 2022 to 31st December 2022.

Our Conclusion: Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the Report is not fairly stated and has not been prepared, in all material respects, in accordance with the Criteria. This conclusion relates only to the Report, and is to be read in the context of this Independent Limited Assurance Report, in particular the inherent limitations explained below.

Scope of work

The scope and boundary of our work is restricted to assessing that Castrol's preparation of the declaration of carbon neutrality presented in the Report, is in accordance with the Publicly Available Specification (PAS) 2060:2014 Specification for the demonstration of carbon neutrality (the "Criteria").

The subject of the declaration of carbon neutrality is Castrol's Organisational Scope 1 and 2 GHG emissions.

We have not performed any work, and do not express any conclusion, on any other information that may be published outside of the Report and/or on Castrol's website for the current reporting period or for previous periods. Our work also excluded assessing the reliability of the inputs of the carbon footprint model.

Basis of our conclusion

We are required to plan and perform our work in order to consider the risk of material misstatement of the Report; our work included, but was not restricted to:

- Conducting interviews with Castrol's management to obtain an understanding of the key processes, systems and controls in place to generate and produce the content of the Report;
- Conducting interviews with Castrol's management and the third party in charge of maintaining and updating the carbon footprint model, used in the production of the Report;
- Assessing whether the standards and methodologies used in the carbon footprint model met the Criteria;
- Performing limited substantive testing of the carbon footprint model to check that its data and underlying assumptions had been appropriately measured, recorded and reported; and
- Reviewing that the evidence, calculations and the context provided in the Report is prepared in line with the Criteria.

Our competence, independence and quality control

DNV's policies and procedures are designed to ensure that DNV, its personnel and others where applicable, are subject to independence requirements (including personnel of other entities of DNV) and maintain independence where necessary by relevant ethical requirements. This engagement was carried out by an independent team of sustainability assurance professionals. DNV holds other contracts with Castrol, none of which conflict with the scope of this work. Our multi-disciplinary team consisted of professionals with a combination of environmental and sustainability assurance experience.

Inherent limitations

All assurance engagements are subject to inherent limitations as selective testing (sampling) may not detect errors, fraud or other irregularities. Non-financial data may be subject to greater inherent uncertainty than financial data, given the nature and methods used for calculating, estimating and determining such data. The selection of different, but acceptable, measurement techniques may result in different quantifications between different entities.
Our assurance relies on the premise that the data and information provided to us by Castrol have been provided in good faith. DNV expressly disclaims any liability or co-responsibility for any decision a person or an entity may make based on this Independent Limited Assurance Report.

DNV

WHEN TRUST MATTERS

Standard and level of assurance

We performed a limited assurance engagement in accordance with the International Standard on Assurance Engagements (ISAE) 3000 revised – 'Assurance Engagements other than Audits and Reviews of Historical Financial Information' (revised), issued by the International Auditing and Assurance Standards Board. This standard requires that we comply with ethical requirements and plan and perform the assurance engagement to obtain limited assurance.

DNV applies its own management standards and compliance policies for quality control, in accordance with ISO/IEC 17021:2015 - Conformity Assessment Requirements for bodies providing audit and certification of management systems, and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement; and the level of assurance obtained is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed. We planned and performed our work to obtain the evidence we considered sufficient to provide a basis for our opinion, so that the risk of this conclusion being in error is reduced but not reduced to very low.

Responsibilities of Castrol's Management and DNV

The Management of Castrol have sole responsibility for:

- Preparing and presenting the Report in accordance with the Criteria;
- Designing, implementing and maintaining effective internal controls over the information and data, resulting in the preparation of the Report that is free from material misstatements;
- Measuring and reporting the Report's data based on the established Criteria; and
- Contents and statements contained within the Report.

Our responsibility is to plan and perform our work to obtain limited assurance about whether the Report has been prepared in accordance with the Criteria and to report to Castrol in the form of an Independent Limited Assurance Report, based on the work performed and the evidence obtained. We have not been responsible for the preparation of the Report.

DNV Business Assurance Services UK Limited

London, UK
23 January 2023

DNV

DNV Business Assurance

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PDF

DNV - Assurance Report for Castrol's

Annex C: Included GHG Emissions

Table C.1 Global warming potential (GWP) values relative to CO_2

The following table includes the 100-year time horizon global warming potentials (GWP) relative to CO_2, which have been used for the carbon footprint assessment of the subject. This table is adapted from the IPCC Fifth Assessment Report, 2014 (AR5). For more information, please see the IPCC website (www.ipcc.ch).

Industrial designation or common name	Chemical formula	GWP values for 100-year time horizon Fifth Assessment Report (AR5)	
Carbon dioxide	CO_2	1	kg CO_2-eq per kg
Methane	CH_4	28	kg CO_2-eq per kg
Nitrous oxide	N_2O	165	kg CO_2-eq per kg
Substances controlled by the Montreal Protocol			
CFC-11	CCl_{3F}	4,660	kg CO_2-eq per kg
CFC-12	CCl_2F_2	10,200	kg CO_2-eq per kg
CFC-13	$CClF_3$	13,900	kg CO_2-eq per kg
CFC-113	CCl_2FCClF_2	5,820	kg CO_2-eq per kg
CFC-114	$CClF_2CClF_2$	8,590	kg CO_2-eq per kg
CFC-115	$CClF_2CF_3$	7,670	kg CO_2-eq per kg
Halon-1301	$CBrF_3$	6,290	kg CO_2-eq per kg
Halon-1211	$CBrClF_2$	1,750	kg CO_2-eq per kg
Halon-2402	$CBrF_2CBrF_2$	1,470	kg CO_2-eq per kg
Carbon tetrachloride	CCl_4	1,730	kg CO_2-eq per kg
Methyl bromide	CH_3Br	2	kg CO_2-eq per kg
Methyl chloroform	CH_3CCl_3	160	kg CO_2-eq per kg
HCFC-21	$CHCl_2F$	148	kg CO_2-eq per kg
HCFC-22	$CHClF_2$	1,760	kg CO_2-eq per kg
HCFC-123	$CHCl_2CF_3$	79	kg CO_2-eq per kg
HCFC-124	$CHClFCF_3$	527	kg CO_2-eq per kg
HCFC-141b	CH_3CCl_2F	782	kg CO_2-eq per kg
HCFC-142b	CH_3CClF_2	1,980	kg CO_2-eq per kg
HCFC-225ca	$CHCl_2CF_2CF_3$	127	kg CO_2-eq per kg
HCFC-225cb	$CHClFCF_2CClF_2$	525	kg CO_2-eq per kg
Hydrofluorocarbons (HFCs)			
HFC-23	CHF_3	12,400	kg CO_2-eq per kg
HFC-32	CH_2F_2	677	kg CO_2-eq per kg
HFC-41	CH_3F_2	116	kg CO_2-eq per kg
HFC-125	CHF_2CF_3	3,170	kg CO_2-eq per kg
HFC-134	CHF_2CHF_2	1,120	kg CO_2-eq per kg
HFC-134a	CH_2FCF_3	1,300	kg CO_2-eq per kg
HFC-143	CH_2FCHF_2	328	kg CO_2-eq per kg
HFC-143a	CH_3CF_3	4,800	kg CO_2-eq per kg
HFC-152	CH_2FCH_2F	16	kg CO_2-eq per kg
HFC-152a	CH_3CHF_2	138	kg CO_2-eq per kg
HFC-161	CH_3CH_2F	4	kg CO_2-eq per kg
HFC-227ea	CF_3CHFCF_3	3,350	kg CO_2-eq per kg
HFC-236cb	$CH_2FCF_2CF_3$	1,210	kg CO_2-eq per kg
HFC-236ea	CHF_2CHFCF_3	1,330	kg CO_2-eq per kg
HFC-236fa	$CF_3CH_2CF_3$	8,060	kg CO_2-eq per kg
HFC-245ca	$CH_2FCF_2CHF_2$	716	kg CO_2-eq per kg
HFC-245fa	$CHF_2CH_2CF_3$	858	kg CO_2-eq per kg
HFC-365mfc	$CH_3CF_2CH_2CF_3$	804	kg CO_2-eq per kg
HFC-43-10mee	$CF_3CHFCHFCF_2CF_3$	1,650	kg CO_2-eq per kg
Perfluorinated compounds			
Sulphur hexafluoride	SF_6	23,500	kg CO_2-eq per kg
Nitrogen trifluoride	NF_3	16,100	kg CO_2-eq per kg

PFC-14	CF_4	6,630	kg CO_2-eq per kg
PFC-116	C_2F_6	11,100	kg CO_2-eq per kg
PFC-218	C_3F_8	8,900	kg CO_2-eq per kg
PFC-318	c-C_4F_8	9,540	kg CO_2-eq per kg
PFC-31-10	C_4F_{10}	9,200	kg CO_2-eq per kg
PFC-41-12	C_5F_{12}	8,550	kg CO_2-eq per kg
PFC-51-14	C_6F_{14}	7,910	kg CO_2-eq per kg
PCF-91-18	$C_{10}F_{18}$	7,190	kg CO_2-eq per kg
Trifluoromethyl sulphur pentafluoride	SF_5CF_3	17,400	kg CO_2-eq per kg
Perfluorocyclopropane	c-C_3F_6	9,200	kg CO_2-eq per kg
Fluorinated ethers			
HFE-125	CHF_2OCF_3	12,400	kg CO_2-eq per kg
HFE-134	CHF_2OCHF_2	5,560	kg CO_2-eq per kg
HFE-143a	CH_3OCF_3	523	kg CO_2-eq per kg
HCFE-235da2	$CHF_2OCF_2CF_3$	491	kg CO_2-eq per kg
HFE-245cb2	$CH_3OCF_2CF_3$	645	kg CO_2-eq per kg
HFE-245fa2	$CHF_2OCH_2CF_3$	812	kg CO_2-eq per kg
HFE-347mcc3	$CH_3OCF_2CF_2CF_3$	530	kg CO_2-eq per kg
HFE-347pcf2	$CHF_2CF_2OCH_2CF_3$	889	kg CO_2-eq per kg
HFE-356pcc3	$CH_3OCF_2CF_2CHF_2$	413	kg CO_2-eq per kg
HFE-449sl (HFE-7100)	$C_4F_9OCH_3$	421	kg CO_2-eq per kg
HFE-569sf2 (HFE-7200)	$C_4F_9OC_2H_5$	57	kg CO_2-eq per kg
HFE-43-10pccc124 (H-Galden 1040x)	$CHF_2OCF_2OC_2F_4OCHF_2$	2,820	kg CO_2-eq per kg
HFE-234ca12 (HG-10)	$CHF_2OCF_2OCHF_2$	5,350	kg CO_2-eq per kg
HFE-338pcc13 (HG-01)	$CHF_2OCF_2CF_2OCHF_2$	2,910	kg CO_2-eq per kg
HFE-227ea	$CF_3CHFOCF_3$	6,450	kg CO_2-eq per kg
HFE-236ea2	$CHF_2OCHFCF_3$	1,790	kg CO_2-eq per kg
HFE-236fa	$CF_3CH_2OCF_3$	979	kg CO_2-eq per kg
HFE-245fa1	$CHF_2CH_2OCF_3$	828	kg CO_2-eq per kg
HFE-263fb2	$CF_3CH_2OCH_3$	1	kg CO_2-eq per kg
HFE-329mcc2	$CHF_2CF_2OCF_2CF_3$	3,070	kg CO_2-eq per kg
HFE-338mcf2	$CF_3CH_2OCF_2CF_3$	929	kg CO_2-eq per kg
HFE-347mcf2	$CHF_2CH_2OCF_2CF_3$	854	kg CO_2-eq per kg
HFE-356mec3	$CH_3OCF_2CHFCF_3$	387	kg CO_2-eq per kg
HFE-356pcf2	$CHF_2CH_2OCF_2CHF_2$	719	kg CO_2-eq per kg
HFE-356pcf3	$CHF_2OCH_2CF_2CHF_2$	446	kg CO_2-eq per kg
HFE-365mcf3	$CF_3CF_2CH_2OCH_3$	<1	kg CO_2-eq per kg
HFE-374pc2	$CHF_2CF_2OCH_2CH_3$	627	kg CO_2-eq per kg
Perfluoropolyethers			
PFPMIE	$CF_3OCF(CF_3)CF_2OCF_2OCF_3$	9,710	kg CO_2-eq per kg
Hydrocarbons and other compounds – direct effects			
Chloroform	$CHCl_3$	16	kg CO_2-eq per kg
Methylene chloride	CH_2Cl_2	9	kg CO_2-eq per kg
Methyl chloride	CH_3Cl	12	kg CO_2-eq per kg
Halon-1201	$CHBrF_2$	376	kg CO_2-eq per kg