HYDE PIT EXPASION AIR QUALITY ANALYSIS

Palmer Coking Coal Company, LLP/ Enumclaw, WA

Prepared By:

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Project 214801.0064

Trinity Consultants

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1. INTRODUCTION AND SUMMARY

Palmer Coking Coal, LLP (Palmer) owns and plans to operate a sand and gravel mine in Enumclaw, Washington (the Hyde Pit). The mine is located at 36000 Enumclaw Franklin Rd SE, Enumclaw, WA 98022. The Hyde Pit is located in the Puget Sound Clean Air Agency (PSCAA) jurisdiction in an attainment or unclassified area for all pollutants. The Hyde Pit is used primarily to mine for sand and gravel, and Palmer is proposing to expand the Hyde Pit for further mining opportunities.

Palmer is proposing the installation of a diesel engine powered jaw crusher and diesel engine powered cone crusher in the expanded area of the mine. New mining operations will cause increases in emissions due to crushing, screening, material handling, and diesel engine operation. The project will cause emissions of the following pollutants: particulate matter (PM), particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}), $PM_{2.5}$, sulfur dioxide (SO_2), nitrogen oxides (NO_X), volatile organic compounds (VOCs), carbon monoxide (CO), greenhouse gas carbon dioxide (CO_2) and other GHG emissions (reported as total CO_2 equivalents (CO_2e), and toxic air pollutants (TAPs).

As described in Section 4.1 of this report, a Notice of Construction (NOC) application is not required for this project because all air emissions sources qualify for exemptions under the PSCAA regulations. This document serves as the Air Quality Report (AQ) and crushing operations notification for the Hyde Pit expansion project. This report contains the following elements:

- Section 2. Project Summary
- Section 3. Emission Calculations
- Section 4. Regulatory Applicability
- Section 5. Modeling Analysis
- Appendix A. Crushing Operation Registration Form
- Appendix B. Site Plan
- Appendix C. Equipment Specifications
- Appendix D. Emission Calculations
- Appendix E. Modeling Files

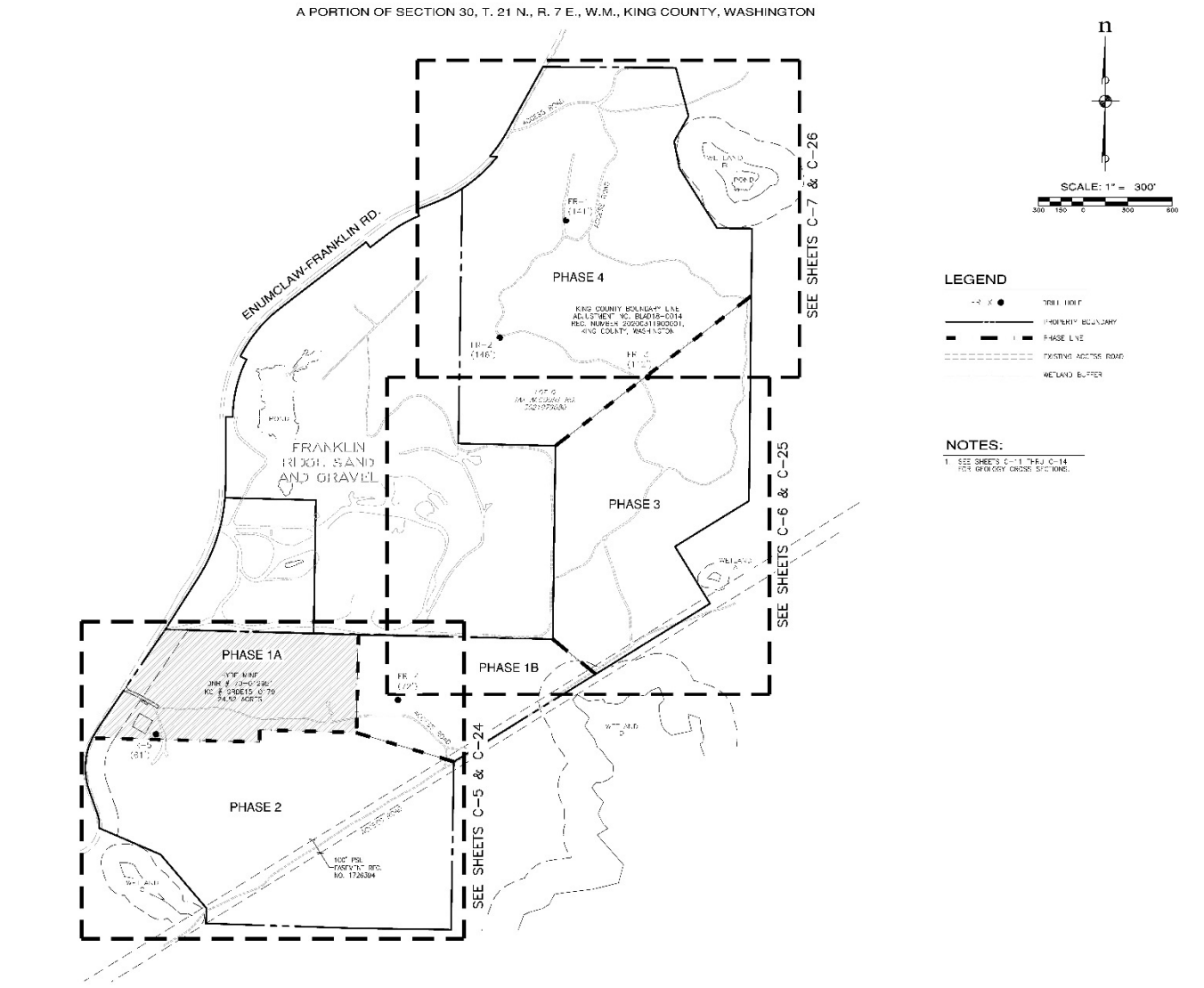
2. PROJECT SUMMARY

Palmer owns and plans to operate a sand and gravel mine in Enumclaw, the Hyde Pit. Palmer acquired the property in 1956 and used it to mine sand, gravel, and silica throughout its history. The Hyde Pit is currently used to mine for sand and gravel. Palmer is planning to begin mining in a new area of their property, labeled as "Phase 1A", in Figure 2-1 below. As a part of this expansion, Palmer is proposing the installation of a CAT 9.3B, 224-kilowatt (kW) diesel engine powering a jaw crusher and a CAT C13, 310 kW diesel engine powering a cone crusher. A detailed site plan with proposed equipment location can be found in Appendix B.

The proposed crushers will be place in the Phase 1A area to provide crushing operations in the area to be mined. The jaw crusher is the primary crushing unit with a maximum material throughput of 200 tons per hour (ton/hr) and the cone crusher is the secondary crushing unit with a maximum throughput of 130 ton/hr. Material is first transferred from a surge pile to the primary jaw crusher where it is broken down. From the jaw crusher, material is conveyed to the cone crusher. After it is crushed, the material goes through a series of screens to separate it based on size. Once separated, the material is transferred to one of three stockpiles via conveyor and truck.

The proposed crushing, screening, material handling, and diesel engine combustion operations for the expanded mining area will contribute to increases in emissions for this project.

Figure A-1. Site Location



3. EMISSION CALCULATIONS

Emissions of criteria pollutants from diesel engine combustion are calculated using emission rates from the engine manufacturer specification sheets,[1] projected operating hours of the equipment, and emission factors from Table 3.4-1 of AP-42 Section 3.4.[2] It is expected that the engines will operate 8 hours/day, 5 days/week, and 50 weeks/year; however, emissions are calculated based on 7,200 hours/year of operating time as a conservative maximum. Emissions of TAPs are calculated using projected operating hours of the equipment and emission factors from Table 3.3-1 and 3.3-2 of Section 3.3, Gasoline and Diesel Industrial Engines, of AP-42. Emissions of CO_{2e} are calculated using the projected operating hours of the equipment and the Global Warming Potentials in 40 CFR 98 Appendix A-1 and emission factors from Tables C-1 and C-2 of 40 CFR 98 for CO_2, nitrous oxide (N_2O), and methane (CH_4).

Emissions of PM, PM_{10}, and $PM_{2.5}$ from crushing and screening operations are calculated using projected maximum equipment throughput and emission factors from Table 11.19-2 of Section 11.19.2, Crushed Stone Processing and Pulverized Mineral Processing, of AP-42. The maximum primary crushing throughput is 200 tons/hour, and the maximum secondary crushing throughput is 130 tons/hour. Emissions are calculated based on 7,200 hours/year of operating time.

Emissions of PM, PM_{10}, and $PM_{2.5}$ from material handling operations are calculated using projected maximum primary crushing equipment throughput, total number of drop points, and equation 1 from Section 13.2.4, Aggregate Handling and Storage Piles, of AP-42 to determine the emission factor; mean wind speed, material moisture content, and a dimensionless size multiplier are variables used to determine the emission factor. The maximum primary crushing throughput is 200 tons/hour. Emissions are calculated based on 7,200 hours/year of operating time.

A summary of criteria pollutant and greenhouse gas emissions are in Table 3-1, and a summary of TAP emissions with respect to WAC 173-460-150 are in Table 3-2. While the emissions exemption levels are not directly used by PSCAA, the comparison is provided as a guide to demonstrate the project's criteria pollutant emission rates are relatively low and that permitting would not be required under Washington regulations for all criteria pollutants other than PM and PM_{10}. Detailed emission calculations are provided in Appendix D.

[1] Equipment specification sheets are provided in Appendix C.

[2] Section 3.4, Large Stationary Diesel and All Stationary Dual-Fuel Engines, of the United States Environmental Protection Agency (EPA) AP-42: Compilation of Air Emissions Factors (AP-42).

Table 3-1. Criteria Pollutant and Greenhouse Gas Emissions

Source	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_X (tpy)	VOC (tpy)	CO (tpy)	CO_2e (tpy)
Crushing	0.71	0.32	5.94E-02	--	--	--	--	--
Screening	0.51	0.17	1.17E-02	--	--	--	--	--
CAT C9.3B, 224 kW Diesel Engine	7.94E-03	7.94E-03	7.94E-03	1.38E-02	0.54	0.11	0.18	1,713
CAT C13, 310 KW Diesel Engine	5.56E-03	5.56E-03	5.56E-03	1.78E-02	0.65	3.60E-02	3.60E-02	1,959
Material Handling	2.36	1.12	0.17	--	--	--	--	--
Total	**3.60**	**1.62**	**0.25**	**3.16E-02**	**1.19**	**0.14**	**0.22**	**3,672**
NSR De Minimis	**1.25**	**0.75**	**0.50**	**2.00**	**2.00**	**2.00**	**5.00**	**--**

a. New Source Review (NSR) de minimis values obtained from WAC 173-400-110(5) for emission levels exempt from the NSR process.

Table 3-2. TAP Emissions

Pollutant	CAS Number	Averaging Period	SQER lb/averaging period	Emissions lb/averaging period	Modeling Required?
Benzene	71-43-2	year	21.00	38.93	**Yes**
Toluene	108-88-3	24-hr	370	0.06	No
Xylenes	1330-20-7	24-hr	16.00	0.04	No
Propylene	115-07-1	24-hr	220	0.36	No
1,3-Butadiene	106-99-0	year	5.40	1.63	No
Formaldehyde	50-00-0	year	27.00	49.24	**Yes**
Acetaldehyde	75-07-0	year	60.00	32.00	No
Acrolein	107-02-8	24-hr	0.03	1.29E-02	No
Naphthalene	91-20-3	year	4.80	3.54	No
Benzo(a)anthracene	56-55-3	year	0.89	0.07	No
Chrysene	218-01-9	year	8.90	1.47E-02	No
Benzo(b)fluoranthene	205-99-2	year	0.89	4.13E-03	No
Benzo(k)fluoranthene	207-08-9	year	0.89	6.47E-03	No
Benzo(a)pyrene	50-32-8	year	0.16	7.84E-03	No
Indeno(1,2,3-cd)pyrene	193-39-5	year	0.89	1.56E-02	No
Dibenz(a,h)anthracene	53-70-3	year	0.08	0.02	No
Diesel Engine Exhaust, PM	DPM	year	0.54	26.98	**Yes**
Carbon Monoxide	630-08-0	1-hr	43.00	0.06	No
Sulfur Dioxide	7446-09-5	1-hr	1.20	8.78E-03	No
Nitrogen Dioxide	10102-44-0	1-hr	0.87	0.33	No

4. REGULATORY APPLICABILITY

The following section outlines the applicability of various federal and state regulatory requirements.

4.1 NOC Permitting Applicability

Per PSCAA Regulation 1 Section 6.03(a), an NOC permit application must be filed, and a permit issued by PSCAA prior to the establishment of any new source or the modification of any existing stationary source unless exempt under Section 6.03(b) or (c). The proposed crushing and screening operation is classified as a nonmetallic mineral processing plant[3] and is categorically exempt under Section 6.03(c)(112). In addition, the engines powering the crushers are classified as nonroad engines and are categorically exempt under 6.03(c)(5). Therefore, an NOC application is not required. This report provides the detailed air quality analysis following the same procedures that would be required for an NOC application.

4.2 Best Available Control Technology (BACT)

Per WAC 173-400-113(2), adopted by reference in PSCAA Regulation I Section 6.01(a), each new or modified stationary source must employ BACT for all pollutants not previously emitted, or any pollutants for which there is an emissions increase. Because this project is exempt from NOC permitting, the project is exempt from a BACT analysis.

4.3 Prevention of Significant Deterioration (PSD)

Depending on the attainment status of the area, a project is subject to the PSD permitting program under WAC 173-400-700, or the Nonattainment New Source Review (NNSR) program under WAC 173-400-800, if the project is either a "major modification" to an existing "major source," or is a new major source itself. Because the Hyde Pit is in an attainment area for all criteria pollutants, NNSR does not apply. Therefore, the applicability of the PSD permitting program is evaluated for the project. The emissions of criteria pollutants from the proposed project are well below the PSD Significant Emission Rate (SER) for all criteria pollutants.[4] Therefore, the proposed project does not require PSD review.

4.4 New Source Performance Standards (NSPS)

WAC 173-400-115 adopts federal NSPS by reference in 40 CFR 60. NSPS apply to certain types of equipment that are newly constructed, modified, or reconstructed after a given applicability date. NSPS applicability for potentially applicable regulations is reviewed below.

4.4.1 NSPS Subpart OOO

NSPS Subpart OOO applies to portable nonmetallic mineral processing plants with the capacity to process more than 150 tons/hour. Therefore, the proposed operation at the Hyde Pit is subject to Subpart OOO. The requirements include (but are not limited to):

[3] A nonmetallic mineral processing plant is any combination of equipment that is used to crush or grind any nonmetallic mineral, including sand and gravel as defined in 40 CFR 60.671.

[4] PSD Significant emission inreases codified in 40 CFR 51.166(b)(23)(i).

- Within 60 days of achieving the maximum production rate, but no longer than 180 after startup, a fugitive emissions performance test must be conducted to demonstrate that:
  - 7 percent opacity is not being exceeded from general operations. This applies to fugitive emissions including conveyor transfer points, screening, and truck loading; and
  - 12 percent opacity is not being exceeded from crushers at which a capture system is not used.
- Notification of initial startup shall be submitted to the Administrator within 15 days after startup and shall include a description of each affected facility, equipment manufacturer, and serial number of the equipment, if available.

Palmer will operate in accordance with the requirements set forth under NSPS Subpart OOO.

4.4.2 NSPS Subpart IIII

NSPS Subpart IIII applies to non-fire pump compression ignition internal combustion engines manufactured after April 2006 and fire pump compression ignition internal combustion engines manufactured after July 1, 2006. The proposed crusher engines are classified as nonroad engines; this subpart applies only to stationary internal combustion engines per 40 CFR 60.4200. The definition *stationary internal combustion engines* (40 CFR 60.4219) specifically excludes nonroad engines as defined in 40 CFR 1068.30. Therefore, NSPS Subpart IIII does not apply.

4.5 National Emission Standards for Hazardous Air Pollutants (NESHAP)

National Emission Standards for Hazardous Air Pollutants (NESHAPs) have been established in 40 CFR Part 61 and Part 63 to control emissions of Hazardous Air Pollutants (HAP) from stationary sources. The applicability of NESHAP rules often depends on a facility's major source status with respect to HAP emissions. Under 40 CFR Part 63, a major source is defined as "any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any HAP or 25 tons per year or more of any combination of HAP." The Hyde Pit is not considered a major source of HAP. NESHAP applicability for potentially applicable regulations is reviewed below.

4.5.1 NESHAP Subpart ZZZZ

NESHAP Subpart ZZZZ applies to stationary reciprocating internal combustion engines. The proposed crusher engines are classified as nonroad engines; this subpart does not apply to nonroad engines per 40 CFR 63.6585(a). Therefore, NESHAP Subpart ZZZZ does not apply.

4.6 Federal, State, and Local Regulatory Applicability

4.6.1 40 CFR 1039

40 CFR 1039 applies to compression ignition nonroad engines[5]; the engines used to power the crushers are defined as nonroad engines. Therefore, the proposed operation at the Hyde Pit is subject to 40 CFR 1039. The requirements include purchasing certified engines and operating the proposed crusher engines in accordance with the manufacturer's specifications. Palmer will operate the engines in accordance with this part.

[5]A nonroad engine is an internal combustion engine that is used in or on a piece of equipment that is self-propelled or serves a dual purpose by both propelling itself and performing another function as defined in 40 CFR 1068.30.

4.6.2 Washington Toxic Air Pollutants Regulations

In Washington, all new sources emitting TAPs are required to show compliance with the Washington TAP program pursuant to WAC 173-460. PSCAA incorporates the Washington TAP program in PSCAA Regulation III Section 2.07(c). WAC 173-460 established a Small Quantity Emission Rate (SQER) and an Acceptable Source Impact Level (ASIL) for each listed TAP. An *acceptable source impact analysis* must be conducted for each TAP with an emission increase. The toxics rule, in WAC 173-460-080(2) allows for applicants to satisfy the acceptable source impact limit if emissions are below the SQER for each TAP. As shown in Table 3-2 all TAPs, except for diesel engine exhaust, particulate (DPM), benzene and formaldehyde, are below the respective SQERs. Air dispersion modeling is performed for DPM, and scaled for benzene and formaldehyde, to demonstrate that ambient impacts will be below the ASILs. Results in Section 6.8 show that the modeled concentrations of DPM, benzene, and formaldehyde are below the respective ASILs. Therefore, the acceptable source impact requirement is satisfied for all TAPs.

4.6.3 PSCAA Emission Standards

PSCAA Regulation 1 Section 9.18 details emission standards related to all equipment processing nonmetallic minerals. This regulation prohibits Palmer from exhibiting visible emissions from uncontrolled sources such as the crushers, screening operation, transfer points on a conveyor belt, or truck loading. It also includes specific opacity and grain loading standards. Several other PSCAA emission standards broadly apply to most sources:

- 9.03 Emission of Air Contaminant: Visual Standard Continuous Opacity Monitoring Systems
- 9.07 Sulfur Dioxide Emission Standard
- 9.08 Fuel Oil Standards
- 9.09 Particulate Matter Emission Standards
- 9.11 Emission of Air Contaminant: Detriment to Person or Property
- 9.13 Emission of Air Contaminant: Concealment and Masking Restricted
- 9.15 Fugitive Dust Control Measures
- 9.20 Maintenance of Equipment

4.6.4 PSCAA Nonroad Engine Requirements

PSCAA Regulation 1 Article 15 details requirements and emission standards for nonroad engines.

Palmer's engines are exempt from Section 15.03 (Notice of Intent to Operate) per PSCAA Regulation 1 Section 15.03(a)(1)(A), which exempts nonroad engines that are *in or on a piece of equipment that is self-propelled or serves a dual purpose by both propelling itself and performing another function*.

Section 15.05 requires all nonroad engines (including Palmer's) to use ultra-low sulfur diesel or ultra-low sulfur biodiesel (a sulfur content of 15 ppm or 0.0015% sulfur by weight or less), gasoline, natural gas, propane, liquefied petroleum gas (LPG), hydrogen, ethanol, methanol, or liquefied/compressed natural gas (LNG/CNG).

5. MODELING ANALYSIS

This section details the modeling analysis that was conducted for the project as part of the air quality analysis.

5.1 Model Selection

The latest version (21112) of the AERMOD model is used to estimate maximum ground-level concentrations in the air dispersion analysis. AERMOD is a refined, steady-state, multi-source, air dispersion model to be used for industrial sources.[6]

5.2 Meteorological Data

The modeling analysis is performed using five years of representative meteorological data (2008, 2010, 2011, 2016 and 2019) for the AERMOD dispersion model. Surface meteorological data meteorological data are taken from the Mud Mountain meteorological station southeast of Enumclaw, WA. This station is the nearest station to the proposed site with a complete meteorological dataset. Upper air data are from the nearest upper air station in Tacoma, Washington at McChord Airport (KTCM). The AERMOD-ready files included in Appendix E were processed using AERMET version 19191.

5.3 Terrain Data

Terrain elevations for receptors, buildings, and sources are determined using National Elevation Dataset (NED) supplied by the United States Geological Survey (USGS).[7] The NED is a seamless dataset with the best available raster elevation data of the contiguous United States. NED data retrieved for this model have a grid spacing of 1/3 arc-second or 10 m. The AERMOD preprocessor, AERMAP version 18081, is used to compute model object elevations from the NED grid spacing. AERMAP also calculates hill height data for all receptors.

5.4 Coordinate System

The location of emission source, structures and receptors are represented in the Universal Transverse Mercator (UTM) coordinate system using the North American 1983, Continental U.S. projection. The UTM grid divides the world into coordinates that are measured in north meters (measured from the equator) and east meters (measured from the central meridian of a particular zone, which is set at 500 km). UTM coordinates for this analysis are based on UTM Zone 10. The location of the Hyde Pit is approximately 5,236,558 Northing and 578,123 Easting in UTM zone 10.

5.5 Receptor Grid

A variable density Cartesian receptor grid is used in the analysis. The fenceline receptors have 25-meter spacing and follow the outline of the property boundary. The following receptor grid spacing is used:

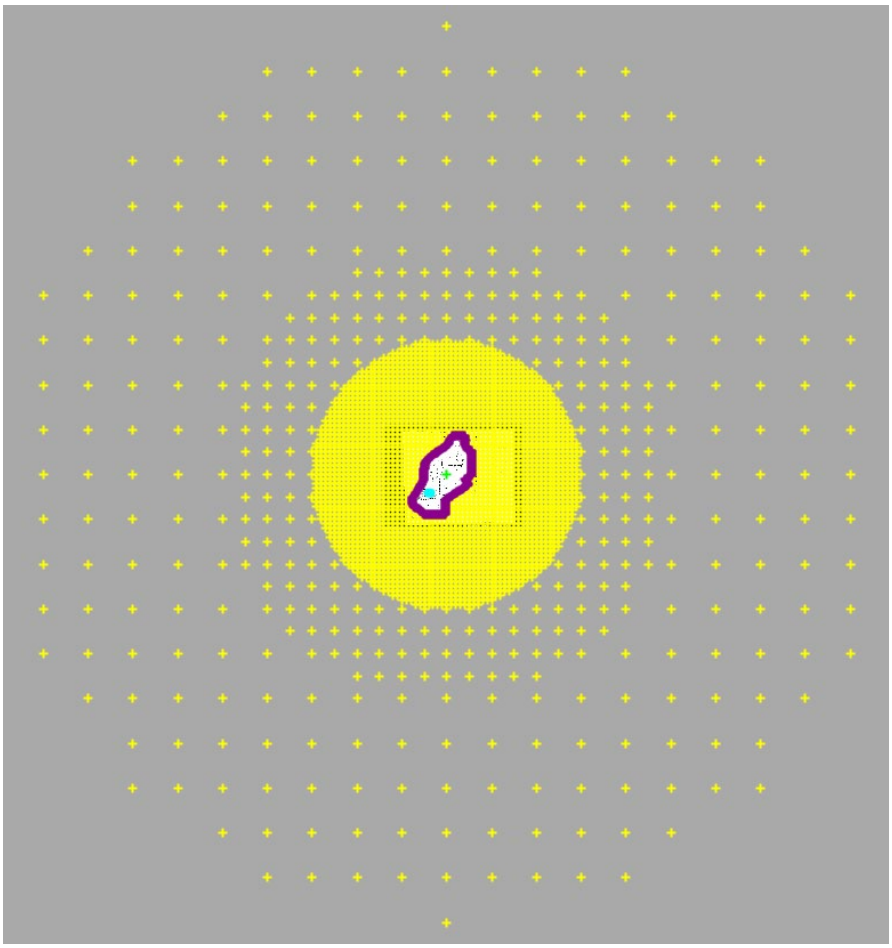
- A grid containing 100-meter spaced receptors and extending 3,000 meters from the facility center;

[6] 40 CFR 51, Appendix W–*Guideline on Air Quality Models*, Appendix A.1– AMS/EPA Regulatory Model (AERMOD).

[7] NED data retrieved from the National Map website at https://viewer.nationalmap.gov/basic/.

- A grid containing 500-meter spaced receptors extending from 3,000 to 5,000 meters from the facility center; and
- A grid containing 250-meter spaced receptors and extending 5,000 to 10,000 meters from the facility center.

Figure A-1. Receptor Grid



5.6 Building Downwash

Emissions from the engines are evaluated in terms of their proximity to nearby structures. The purpose of this evaluation is to determine if the discharges might become caught in the turbulent wakes of these structures. Wind blowing around a building creates zones of turbulence that are greater than if the buildings were absent.

Building parameters are provided in Table 5-1 below.

Table 5-1. Building Parameters

Building ID	UTM Easting (m)	UTM Northing (m)	Elevation (m)	Height (m)	X Length (m)	Y Length (m)
JAW	578122.4	5236265.7	228.73	3.91	2.79	14.63
CONE	578148.3	5236264.7	228.98	6.86	14.66	13.00
OFFICE1	577869.4	5236206.3	220.69	2.74	6.10	2.44

5.7 Modeled Source Parameters

Table5-2 below provides the parameters for both the jaw and cone crusher engines.

Table5-2. Source Parameters

Source ID	Release Height (m)	Temp (K)	Exit Velocity (m/s)	Diameter (m)	Modeled Emission Rate (g/s)
J_ENGINE	3.19	768.4	175.67	0.0731	0.000228
C_ENGINE	2.72	885	100.31	0.0976	0.000160

a. Modeled emission rates are the average annual emission rate based on 7,200 hours/year of operation time.

5.8 Model Results

Table 5-3 below provides the maximum modeled concentration and a comparison to the DPM, benzene, and formaldehyde ASILs.

Table 5-3. Maximum Modeled TAP Concentrations

Pollutant	Averaging Period	Concentration ($\mu g/m^3$) Modeled	ASIL	% of ASIL
Diesel engine exhaust, particulate	Annual	2.96E-03	3.30E-03	90%
Benzene	Annual	4.27E-03	0.13	3%
Formaldehyde	Annual	7.79E-03	0.17	5%

a. Benzene and formaldehyde model concentrations are scaled using the modeled concentration of DPM and the ratio of pollutant annual emissions to DPM annual emissions.

As shown in Table 5-3, the maximum modeled ambient concentration of DPM, benzene, and formaldehyde are in compliance with the corresponding ASILs.

APPENDIX A. CRUSHING OPERATION REGISTRATION FORM

pscleanair.org
Puget Sound Clean Air Agency

PUGET SOUND CLEAN AIR AGENCY
1904 3rd Ave Ste 105
Seattle WA 98101-3317
(206) 689-4077 Fax: (206) 343-7522 www.pscleanair.org

CRUSHING OPERATION REGISTRATION

Incomplete forms delay Agency review, so please fill out this form thoroughly. Your registration will not be processed unless you mail a $3,250 registration fee payment along with this form, as required by Regulation I, Section 5.12. To pay by credit card, check here ☐ and an accounting technician will contact you.

CRUSHING OPERATION REGISTRATION FORM FORM 50-112

AGENCY USE ONLY Date: Reg No.:

Company (or owner) name & mailing address (Include city & zip code) for invoicing:	Installation (physical) address: (Include city & zip code)
Palmer Coaking Coal Company, LLP 31407 WA-169 Black Diamond, WA 98010 Contact Person: Brett Morris Phone No.: (206) 383-7074 Fax No.: Email Address: brettgmorris@gmail.com	3600 Enumclaw Franklin Rd. Enumclaw, WA 98022

Section II – Primary Crusher/Grinder Information

Type of Crusher (pick one):	☒ Jaw	☐ Cone	☐ Roll	☐ Gyratory	☐ Hammermill	☐ Rod, Pebble, or Ball Mill	☐ Impactor
Use: ☒Primary							
Make & Model of Crusher (attached specification sheet if available): Lokotrack LT106							
Manufacture Date: 2021							

For additional crushers complete Section III. Attach additional copies of Section III as necessary.

pscleanair.org
Puget Sound Clean Air Agency

PUGET SOUND CLEAN AIR AGENCY
1904 3rd Ave Ste 105
Seattle WA 98101-3317
(206) 689-4077 Fax: (206) 343-7522 www.pscleanair.org

Section III – Additional Crusher/Grinder Information

Type of Crusher (pick one):	☐ Jaw	☒ Cone	☐ Roll	☐ Gyratory	☐ Hammermill	☐ Rod, Pebble, or Ball Mill	☐ Impactor
Use: ☐Primary ☒ Secondary or Tertiary							
Make & Model of Crusher (attached specification sheet if available): Lokotrack LT220D							
Manufacture Date: 2021							

Type of Crusher (pick one):	☐ Jaw	☐ Cone	☐ Roll	☐ Gyratory	☐ Hammermill	☐ Rod, Pebble, or Ball Mill	☐ Impactor
Use: ☐Primary ☐ Secondary or Tertiary							
Make & Model of Crusher (attached specification sheet if available):							
Manufacture Date:							

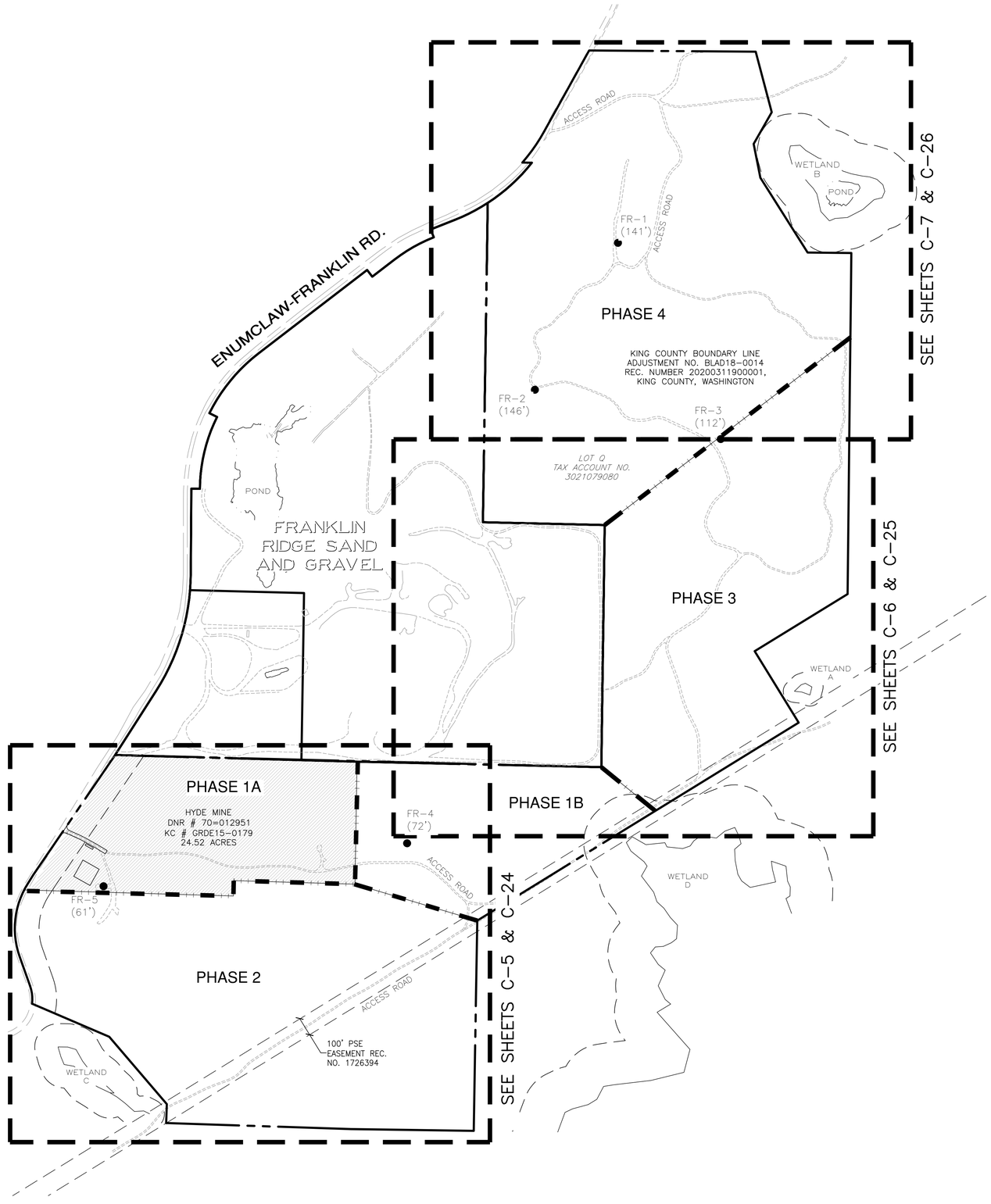
Type of Crusher (pick one):	☐ Jaw	☐ Cone	☐ Roll	☐ Gyratory	☐ Hammermill	☐ Rod, Pebble, or Ball Mill	☐ Impactor
Use: ☐Primary ☐ Secondary or Tertiary							
Make & Model of Crusher (attached specification sheet if available):							
Manufacture Date:							

Type of Crusher (pick one):	☐ Jaw	☐ Cone	☐ Roll	☐ Gyratory	☐ Hammermill	☐ Rod, Pebble, or Ball Mill	☐ Impactor
Use: ☐Primary ☐ Secondary or Tertiary							
Make & Model of Crusher (attached specification sheet if available):							
Manufacture Date:							

Type of Crusher (pick one):	☐ Jaw	☐ Cone	☐ Roll	☐ Gyratory	☐ Hammermill	☐ Rod, Pebble, or Ball Mill	☐ Impactor
Use: ☐Primary ☐ Secondary or Tertiary							
Make & Model of Crusher (attached specification sheet if available):							
Manufacture Date:							

APPENDIX B. SITE PLAN

A PORTION OF SECTION 30, T. 21 N., R. 7 E., W.M., KING COUNTY, WASHINGTON



n

SCALE: 1" = 300'

300 150 0 300 600

LEGEND

- FR-X ● DRILL HOLE
- PROPERTY BOUNDARY
- PHASE LINE
- EXISTING ACCESS ROAD
- WETLAND BUFFER

NOTES:

1. SEE SHEETS C-11 THRU C-14 FOR GEOLOGY CROSS SECTIONS.

REVISIONS

NO.	DESCRIPTION/DATE	BY

LAURA G. BARTENHAGEN — STATE OF WASHINGTON — 40111 — REGISTERED PROFESSIONAL ENGINEER

CONSULTING ENGINEERS LLC
33400 8th Ave S, Suite 205
Federal Way, WA 98003
FEDERAL WAY (253) 838-6113
EVERETT (425) 297-3900
www.esmcivil.com
Land Planning
Landscape Architecture
Land Surveying
Project Management
Civil Engineering
Public Works

PALMER COKING COAL

HYDE MINE

OVERALL SITE PLAN & KEY MAP

KING COUNTY WASHINGTON

JOB NO.:	1960-001-017
DWG. NAME:	C-2
DESIGNED BY:	LGB
DRAWN BY:	CJR
CHECKED BY:	
DATE:	07/19/2021
DATE OF PRINT:	

C-2

2 OF 25 SHEETS

File: \\esm8\engr\ESM-JOBS\1960\002\020\plots\C-02.dwg
Plotted: 7/20/2021 9:44 AM Plotted By: Carl Roberts

A PORTION OF SECTION 30, T. 21 N., R. 7 E., W.M., KING COUNTY, WASHINGTON

ENUMCLAW-FRANKLIN RD.

FRANKLIN RIDGE SAND AND GRAVEL

PROPERTY BOUNDARY

65' MINE SETBACK (TYP.)

ENTRY GATE

BERM (TYP)

PORTABLE OFFICE 20'X8'

PORTABLE RESTROOMS (TYP)

NEW GRAVEL ACCESS ROAD

SCALE HOUSE

TIRE WASH

SCALE

130' TREE BUFFER

PROCESSING EQUIPMENT AREA

FR-5 (61')

STOCK PILE

PRE-CRUSH PILE

CONVEYOR

JAW

CONE

STOCK PILE

PHASE 1A

MINE FLOOR ELEV.=720.00

SHOP

STOCK PILE

HYDE MINE
DNR # 70=012951
KC # GRDE15-0179
24.52 ACRES

PHASE 1B

MINE FLOOR ELEV.=720.00

FR-4 (72')

EX. POWER TRANSMISSION POLES

PHASE 2

MINE FLOOR ELEV.=720.00

100' PSE EASEMENT REC. NO. 1726394

EX. POWER TRANSMISSION POLES

860 L.F., FILTER FABRIC FENCE

WETLAND C

EX. POWER TRANSMISSION POLES

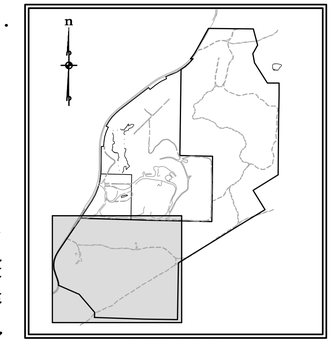
EX. POWER TRANSMISSION POLES

30' MINE SETBACK (TYP)

SCALE: 1" = 100'

100 5 0 100 200

CONTOUR INTERVAL = 5'



KEY MAP

KEY MAP

LEGEND

- FR-X ● DRILL HOLE
- PROPERTY BOUNDARY
- PHASE LINE
- 750 CONTOUR (MINOR)
- 700 CONTOUR (MAJOR)
- DAYLIGHT LINE
- CUTOFF SWALE
- INTERCEPTOR DITCH
- FILTER FABRIC FENCE
- CONSTRUCTION ENTRANCE
- P — P EX. OVERHEAD POWER LINE
- EXISTING ACCESS ROAD
- 700 EXISTING CONTOUR
- WETLAND BUFFER
- EDGE OF EX. VEGETATION

NOTES:

1. SEE SHEETS C-11 & C-12 FOR CROSS SECTIONS.

REVISIONS

NO.	DESCRIPTION/DATE	BY

LARA G. BARTENHAGEN — STATE OF WASHINGTON — 40111 — REGISTERED PROFESSIONAL ENGINEER

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KING COUNTY

WASHINGTON

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DESIGNED BY:	LGB
DRAWN BY:	CJR
CHECKED BY:	
DATE:	07/19/2021
DATE OF PRINT:	

C-5

5 OF 25 SHEETS

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Revised: 7/26/2021 4:15 PM Revised By: James Torr

APPENDIX C. EQUIPMENT SPECIFICATIONS

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Technical Specification

Lokotrack LT106 mobile crushing plant

Lokotrack LT106 is a track-mounted, self propelled, diesel engine powered primary crushing unit. Robust construction enables the application of Lokotrack LT106 in the toughest of rock sites. A powerful undercarriage system makes Lokotrack highly maneuverable. Wide range of options provides high versatility. Lokotrack LT106 is suitable for different applications from hard rock to recycling.

Performance when crushing

- feed size up to 24 in.
- product size up to 10 in.
- capacity up to 440 stph

Performance when moving

- travelling speed, normal 70 fpm
- travelling speed, fast 110 fpm
- tractive effort 56,000 lbf
- gradeability 28 degrees
- ground pressure 16 psi
- ground clearance 10 in.

Main dimensions of Lokotrack LT106 during crushing operations with default options:

- Length 48 ft.
- Width 9 ft. 2 in.
- Height 12 ft. 10 in.

Main dimensions of Lokotrack LT106 for transport with default options:

- Length 48 ft. 1 in.
- Width 9 ft. 2 in.
- Height 11 ft. 2 in.
- Weight 88,200+ lbs

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Basic module

Includes standard equipment of frame, tracks, hydraulics, electrification, control panels, fuel tank, service platform, rails and ladders.
Tracked undercarriage gives the Lokotrack LT high maneuverability under any ground conditions. Track control panel is a carrying harness with a 26 ft cable.

- track size D4
- track length c/c 11 ft. 3 in.
- track width 1 ft. 8 in.
- chain tensioning by grease cylinder
- No of links 52 off
- final drive
  - Lohmann+Stolterfoht GFT36T3+A10VEC80HZ
- track control panel
  - diesel engine rpm adjustment
  - tracks forward/reverse
  - emergency stop switch 1 off

Hydraulics of Lokotrack LT includes

- load sensing (LS) hydraulic circuit
  - controlled by solenoid valves for
    - track motors
    - feeder motors
    - belt conveyor motor(s)
    - options
  - main hydraulic pump:
    - axial piston pump 2 off
    - Hydromatik A4VG180
      - flow 92 gpm
    - Hydromatik A11VO130
      - flow 66 gpm
- hydraulic oil conditioning
  - cooler controlled by a thermal switch 1 off
  - pressure filter 10 µm ABS 1 off
  - return line filter 25 µm ABS 1 off
- hydraulic lines
  - No of reinforced plies in pressure line hose 2-4 off
  - No of reinforced plies in tank line hose 1 off
  - type of fittings JIC

Fuel tank

- volume 160 gal

Main control panel is mounted on the side of the Lokotrack LT frame including the following functions:

- process start/stop
- drive speed categories 1, 2 or 3
- lights on/off
- emergency stop switch 1 off
- gauges, motion alarm
- monitoring display
- switches for optional equipment

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Feeder & hopper

Feeder

TK11-42-2V horizontal vibrating feeder

Vibrating feeder to maximize the overall production through the efficient removal of fines from the feed material. The feeder is equipped with 2 grizzly sections and with hydraulic drive. The feeder control panel is mounted on the crusher service platform.

- width 3 ft. 10 in.
- length 14 ft. 3 in.
- grizzly length 2 ft. 6 in.
- feeder inclination horizontal
- feeder control panel
  - feeder start/stop
  - emergency stop switch 1 off

Feeder

Grizzly spacing 2 in

- fabricated steel bars

Grizzly mounting parts

Mesh size 1¾"

Feed hopper

Feed hopper capacity of 8 CY

Enables the loading of the Lokotrack LT with an excavator and is made of wear resistant steel. Side walls are folded down for transport.

- width 8 ft. 6 in.
- liner thickness 3/8 in

Feed hopper extensions 12 CY

Enables the loading of the Lokotrack LT either with an excavator or wheel loader and is made of wear resistant steel. Side walls are folded down for the transport.

- width 11 ft. 10 in.
- liner thickness 3/8 in.
-

By-pass arrangement

By-pass chute with a flop gate

For fine material transport from the feeder to the next conveyor including a flop gate.

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Side conveyor H5-5

Belt conveyor for transporting the fine material to the side of the Lokotrack LT. The side conveyor is equipped with hydraulic drive and stop buttons both sides of the conveyor. The folding of the side conveyor is hydraulic.

- discharge height 6 ft. 11 in.
- length 19 ft. 8 in.
- belt width 20 in.
- belt speed 350 fpm
- belt quality EP400/3 3+1.5D
- hydraulic motor
  - Danfoss OMTW 160

Crusher

Jaw crusher

Single toggle primary jaw crusher with non-welded construction. The crusher is mounted without a bolted connection. The discharge setting is easy to adjust mechanically or optionally by hydraulically operated wedges.

- intake width 42 in
- intake depth 28 in
- fixed jaw length 57 in
- setting c.s.s. (hard rock) 2¾ .. 8 in.
- setting c.s.s. (recycling) 1 .. 5 in.
- rotation speed 320 rpm
- inclination 6 degree
- V-belts 10 x SPB
-

Nordberg C106 jaw crusher

Single toggle primary jaw crusher with non-welded construction. The crusher is mounted without a bolted connection. The discharge setting is easy to adjust by hydraulically operated wedges.

Standard

The standard jaw die profile is suitable both for rock and gravel crushing.

Hydraulic setting adjustment

Enables remote crusher setting adjustment from the control panel.

- includes
  - hydraulic cylinders for adjustment wedges
  - hydraulic cylinder for return rod
  - hydraulic valves and piping
  - electrification

Material level control

An infra-red sensor to control the material level in the crusher cavity by overiding the start/stop control of the feeder.

- includes
  - infra-red transmitter and receiver
  - electrification
  -

Belt protection plate

On the fixed jaw side a plate is mounted to guide the crushed recycling material together with steel parts onto the main conveyor and to protect the belt conveyor. The inclination is adjusted with screws.

Main conveyor

Main conveyor

Belt conveyor for transporting the crushed material from the crusher to the discharge point. The conveyor is equipped with hydraulic drive and emergency stop wires on both sides of the conveyor.

Main conveyor H10-14 R

(Unavailable when configured as a "S" series machine.)

- discharge height 12 ft. 9 in.
- length 45 ft. 11 in.
- belt width 3 ft. 4 in.
- belt speed 350 fpm
- belt quality steel reinforced EP500/3 10+3RSD
- hydraulic motor
  - Danfoss TMTW470

Magnetic separator

Permanent magnet to remove the iron waste from the crushed material.
Eriez CP20/100 SC2 (hydr)

- includes
  - magnet separator
  - electrification
  - hydraulics
- hydraulic drive

Engine

Engine

Includes air cleaner,hydraulic tank and diesel engine.

- air cleaner — Donaldson FRG 13
  - two-stage heavy duty air cleaner
    - cycloid pre-cleaner
    - ejector with muffler
    - main cleaner with two filter elements
- hydraulic tank
  - volume — 105 gal
  -

Caterpillar C9 ATAAC diesel engine

- no of cylinders — 6 off
- turbo charged, air to air aftercooling, liquid cooled
- cylinder displacement — 537 in3
- power — 224 kW@2100 rpm
- hydraulic pumps SAE-connected to rear end of the diesel engine

Optional Screen unit to make a "S" series machine

Screen unit

Screen module TK11-30S

Horizontal single deck, single shaft screen. Steel wire and rubber screen clothes available.

- total width — 3 ft. 7 in.
- total length — 9 ft. 10in.
- screening area / deck — 35.2 ft^2
- max. cloth hole size — 2 in.
- screen deck side tensioned — 2 off
- type of vibrating unit — A2L
- hydraulic motor — A2FM16/61W-PAB030

Conveyor H6.5-4

Belt conveyor for transporting the oversize material of the screen deck on the right side of the LT106S. The conveyor is equipped with hydraulic drive and emergency stop buttons on both sides of the conveyor. The conveyor is hydraulically folded to the transport position to the side of the main conveyor.

- discharge height — 3 ft. 11 in.
- conveyor length c/c — 13 ft.
- belt width — 2ft. 2 in.
- belt speed — 400 fpm
- belt quality — EP400/3 3+1.5D
- hydraulic motor
  - Danfoss — OMTW 315

Conveyor H8-8

Belt conveyor for transporting the undersize material of the screen deck on the front side of the LT106S. The conveyor is equipped with hydraulic drive and emergency stop wires on both sides of the conveyor.

- discharge height 9 ft 4in
- conveyor length c/c 26 ft
- belt width 32 in
- belt speed 400 fpm
- belt quality EP400/3 3+1
- hydraulic motor
  - Danfoss OMTW315

Other additional equipment

Ancillary equipment

Interlocking cable with secondary LT

For following functions:

- the feeder unit stops as the lifting conveyor of the secondary unit stops
- material level control of the secondary unit stops/starts the feeder unit

Hydraulic power take off

For connecting the auxiliary hydraulic equipment to the hydraulic system of the Lokotrack LT. Includes hydraulic solenoid valve and electrification.

- max. flow 17 gpm @ 3600 psi

Water spraying system

For binding dust particles at the crusher cavity, under the crusher, at the discharge end of main conveyor.

- requires
  - water supply 2.2 gpm @ 40 – 90 psi
- includes
  - nozzles
    - crusher cavity 2 off
    - main conveyor 2+2 off
- piping and manual valves
- connection forwater supply 1 off

Picking station

Remote radio control

Enables the remote control of following functions:

- start/stop of feeder unit
- rpm adjustment of diesel engine
- moving forward/reverse (tracks)

NOTE! Remote radio control always requires a permit from local authorities

• frequency	433.100 - 434.750 MHz (other frequencies on reguest)
• band width	25 kHz
• power	5-25 mW
• range	300 - 1000 ft
• remote stop switch	1 off

including:

- transmitter and receiver units
- electrification

Paint colour

Standard beige and dark grey

Surface finishing N-5-BG includes

• one coat painting	
• oxiran ester paint	
• total film thickness	90 µm
• beige colour	BS 4800 / 10B17 (rev. 1998
• grey color	RAL 7024

Documentation

Manuals

English manuals

Display unit

English display unit

metso

Optional items for Lokotrack LT106 mobile crushing plant

Grizzly spacing 1½ in

- fabricated steel bars

Grizzly spacing 3 in

Finger grizzly 2 in

Rubber bottom

Discharge hood for H5-5

Dust encapsulation

Filter cartridge kit

Includes set of filter cartridges for first service of engine, hydraulics and transmission.

Pre-heater for diesel engine - Fuel

For warming the engine and lubrication unit in cold ambient conditions.

Heater options for diesel engine

- fuel heater
- type — Webasto Thermo 50
- fuel consumption — 0.3 gal/h

Preparation for hammer

Base for hydraulic boom (Rammer)

Enables the mounting of hydraulic boom and hammer.

Generator USA

- type — HG 10 kVA 400V
- hydraulics — 3600 psi@ 13 gpm
- voltage — 230 v. AC for hand tools

Water pump

Pump for the water spraying system.

- includes
  - hydraulic motor — John S. Barnes
  - water pump — Speck
  - piping

Fuel pump

- electric drive
- capacity — 16 gpm

Service kit

Includes a set of spare parts e.g. fuses, relays, bulbs, seals etc. for first service of the unit.

*Please note that options (and pricing) listed above take into consideration the items included in the initial configuration.If you consider taking more than one option, confirm that it is feasible to select these options at the same time.

Lokotrack LT 220D

Full Technical Specification

NOTE: This specification is a so called full technical specification, which illustrates wide range of available technical designs for the subject Metso equipment. Full technical specification does not necessarily specify the product design of an actual equipment offered by Metso or ordered by the customer. Full technical specification is not part of any legally binding offer or contract and no warranty is given on its basis. Metso disclaims and rejects any and all liability in relation to full technical specifications. Legally valid and binding contract can only base upon an express offer and/or order acceptance from Metso or a signed contract. Metso reserves all rights, at its sole discretion, to amend full specifications without prior notice and without any liability incurred thereby.

Lokotrack LT220D mobile crushing & screening plant

Lokotrack LT220D is a track-mounted, self-propelled diesel engine powered secondary crushing unit, including cone crusher and screening unit on the same chassis.

Main dimensions of LT during crushing operations

with default options and side conveyors

Length	14 650 mm	48 ft 1 in
Width	13 000 mm	42 ft 8 in
Height	6 850 mm	22 ft 6 in
Weight with GP220 crusher	47 900 kg	105 599 lbs
Weight with HP200 crusher	47 200 kg	104 060 lbs

Main dimensions of LT for transport

with default options and side conveyors

Length	16 850 mm	55 ft 3 in
Width	3 000 mm	9 ft 10 in
Height	3 500 mm	11 ft 6 in
Weight with GP220 crusher	47 900 kg	105 599 lbs
Weight with HP200 crusher	47 200 kg	104 060 lbs

Performance when moving

Travelling speed	crawl /1.3 / 1.8 km/h	crawl / 0.8 / 1.1 mi/h
Tractive effort	338 kN	
Gradeability	15 deg	
Ground pressure	115 kPa	
Ground clearance	270 mm	10 in

Basic module

Includes components which are standard in every Lokotrack LT220D like frame, tracks, hydraulics, electrification, control units, belt guards, service platforms, rails and ladders.

Tracks

Ground area (per track)	4 000 x 500 mm	13 ft x 19.7 in
Final drive max torque	61 kNm	

Hydraulics

Lokotrack LT220D hydraulics include seven (7) independent hydraulic circuits

- Load sensing pump to operate circulating conveyor, track drive, cylinder functions, lubrication device functions (hydraulic heating, lubrication, cooling and setting control) and options (high pressure water pump and power take-off for generator)
- Load sensing pump to operate screen
- Fixed displacement pump to operate lifting conveyor
- Fixed displacement pump to operate feeding conveyor
- Fixed displacement pump to operate discharge conveyor and side conveyors
- Hydraulic operated cooler
- Gearbox hydraulics

Electrification

Main control panel is mounted on the side of the Lokotrack LT frame including the following functions.

- Process start/stop
- Drive lights on/off
- Work lights on/off
- Emergency stop switch
- IC600/800 IC display
- Switches for optional equipment

Other electrics

- 5 pcs emergency stop switches off
- Trip wire switches on conveyors
- Detachable control and adjusting panel for crusher
- LED work and drive lights

Control units

- Metso IC control embedded automation control system
- Epec embedded control units and display

Lifting conveyors

Lifting conveyors are located on top of the Lokotrack LT220D. Material for the process is fed into lifting conveyor feed hopper that then moves the material into screen feeding conveyor that then feeds the material to screen.

Lifting conveyor H10-6		
Loading height	2 980mm	9 ft 9 in
Length	6 m	20 ft
Belt width	1 000 mm	39 in
Belt speed	2.0 - 2.3 m/s	6.6 - 7.5 ft/s
Hydraulic drive		
Feed hopper	For feeding material into Lokotrack LT220D.	
Conveyor positions	Discharge end can be hydraulically lowered for transport and raised for maintenance.	

Screen feeding conveyor H10-7		
Length	7 m	23 ft
Belt width	1 000 mm	39 in
Belt speed	2.0 - 2.3 m/s	6.6 - 7.5 ft/s
Hydraulic drive		
Metal detector	For stopping the process if the material on the belt conveyor contains metal pieces.	
Conveyor positions	Conveyor can be hydraulically lowered for transport and raised for maintenance.	

Screening unit

Screening unit includes a 3-deck screen, discharge conveyor and two side conveyors. Material on the screen top deck is always fed into the crusher. Material on the 2nd deck of the screen can be fed into the crusher or into the right side conveyor. Material on the 3rd deck of the screen is always fed into the left side conveyor. Undersize material on the screen is fed into the discharge conveyor.

3-deck screen		
Number of decks	3	
Screen area per deck	7.9 m²	85 ft 2 in
Screen width	1 524 mm	5 ft
Screen length	5 480 mm	18 ft
Mesh size width	1 490 mm	58.66 in
Mesh size length x 2	2 615 mm	102.95 in
Mesh overall dimensions	1.49 x 5.23 m	58.66 in x 205.91 in
Mesh area	7.8 m²	9.32 yd²
	All mesh panels are the same size and interchangeable.	
Screen angle in working position	21 deg	
Bearings	2	
Screen shaft speed	950 rpm	

Eccentric circle size	8 mm	0.315 in
Maximum G force	5	
Maximum Aperture, Top Deck	100 m	4 in
Maximum Aperture, 2nd and 3rd Deck	75 mm	3 in
Manual screen tension system		
Product conveyor H12-6		
Length	6 m	20 ft
Belt width	1 200 mm	47 in
Belt speed	2.0 m/s	6.6 ft/s
Discharge height	4 350 mm	14 ft 3 in
Hydraulic drive		
H6.5-6 side conveyor 2nd deck, left side (optional)		
Length	6 m	20 ft
Belt width	650 mm	26 in
Belt speed	1.5 - 1.8 m/s	4.9 - 5.9 ft/s
Hydraulic drive		
Foldable for transport with the main unit		
H6.5-6 side conveyor 3rd deck, right side (optional)		
Length	6 m	20 ft
Belt width	650 mm	26 in
Belt speed	1.5 - 1.8 m/s	4.9 - 5.9 ft/s
Hydraulic drive		
Foldable for transport with the main unit		

Crusher

For Lokotrack LT220D there is two optional crushers. It is possible to choose between GP220 and HP200 cone crushers to fit the exact demand of the application.

GP220 cone crusher		
Cavity options		
EC-cavity Feed opening	220 mm	8.66 in
C-cavity (default) Feed opening	180 mm	7.09 in
Stroke options		
	18 mm	0.71 in
	25 mm	0.98 in
	28 mm	1.10 in
	32 mm (default)	1.26 in
	36 mm	1.42 in
Bushing options		
	18/25 mm	0.71/0.98 in
	25/32 mm (default)	0.98/1.10 in
	28/36 mm	1.26/1.42 in

IC800 control system		
Material level control	An ultrasonic sensor to control the material level in the crusher cavity by stop/start control of primary unit's feeder.	
HP200 cone crusher		
Cavity options		
Standard coarse (default) Feed opening	185 mm	7.28 in
Standard medium Feed opening	125 mm	4.92 in
IC600 control system		
Material level control	An ultrasonic sensor to control the material level in the crusher cavity by stop/start control of primary unit's feeder.	

Lubrication unit

- Mineral oil for lubrication unit (default)
- Synthetic oil for lubrication unit

Electrification for heating

Includes electric preparation for heating resistors in lubrication unit (can be used with external electricity or optional hydraulic generator). Electric heating is recommended to use in temperatures below -10 °C.

Certified Toolkit

Main conveyor

Main conveyor in Lokotrack LT220D moves material from the crusher onto lifting conveyor via centrifugal loop.

Main conveyor H10-9CC		
Length	9 m	29½ ft
Belt width	1 000 mm	39 in
Belt speed	3.3 m/s	10.8 ft/s
Hydraulic drive	Hydraulic opening of the centrifugal loop for maintenance and emptying the conveyor	

Dust encapsulation as standard

Power unit

Power unit of Lokotrack LT220D includes diesel engine, cooler assembly with hydraulic fan, gearbox and five (5) main pumps, a pump for cooler fan and two batteries.

Engine type and emission class		
	TIER 3 (Stage III A)	Caterpillar C9.3B 310 kW
	TIER 4 (Stage V)	Caterpillar C9.3B 310 kW
Electrification		
	EU	24 V
	UK	24 V
	USA	24 V

Optional equipment

Side conveyor 2nd deck

Side conveyor 3rd deck

Dust encapsulation for conveyors

Includes aluminum sheet covers for lifting conveyors and discharge conveyor

Discharge hood for discharge conveyor

Includes aluminum/rubber discharge hood for discharge conveyor

Pre-heater for diesel engine

Type	Webasto Thermo 50	
Fuel consumption	1 l/h	0.3 gal/h

Block heater for diesel engine

Filter kit

Includes most often changed filters for the unit

Climater kit

Climate kits include set of oils best fitted to specified temperatures. Cold climate kit comes with block- and fuel operated engine heaters (additional price). There are three different climate kits for the Lokotrack LT220D.

Standard	-20...+35 °C	-5...+95 °F
Cold	-30...+30 °C	-20...+85 °F
Hot	-10...+50 °C	+15...+120 °F

Interlocking cable

For connecting Lokotrack LT220D with primary Lokotrack

Interlocking cable for secondary LT/ST

For connecting Lokotrack LT220D with secondary Lokotrack

Hydraulic power take off

For connecting the auxiliary hydraulic equipment to the hydraulic system of the Lokotrack LT220D. Used for hydraulic generator if installed.

High pressure water spraying system

For binding dust particles. Nozzles located on lifting conveyor, main conveyor and screen feeding conveyor. Requires water supply of 300 l/h at 2-3 bar.

Hydraulic generator 10 kVA

For connecting the auxiliary electric equipment. Can be used for lubrication unit electric heating.

Generator type	HG 10 kVA 400V/460V
Additional outlet	230 VAC for hand tools

Remote radio control

Enables the remote control of following functions

- Rpm adjustment of diesel engine
- Lokotrack movements (tracks)
- LT process controls
- Remote stop switch
- Frequency 434 / 458 MHz (other frequencies on request)

Remote radio control includes

- Transmitter and receiver units
- Integrated battery charger (2 pcs batteries)
- Electrification (key switch for radio control)
- Track control radio

NOTE! Remote radio control always requires a permit from local authorities

Remote IC system (ICr)

Metso Metrics

Finishing

Standard paint colors are Metso beige and Metso grey with Metso terracotta accents. Safety labels and stickers conform either to ISO or ANSI standards depending on destination.

Documentation

Following documents are included in the delivery.

Warranty documents

Printed Instruction manuals in selected language

Max two sets of printed instruction manuals are free of charge (one for the customer and one for local Metso / distributor service). Minor processing cost is added for the additional sets of printed instruction manuals.

- 1st set of printed instruction manual will be delivered with the unit.
- 2nd and following sets of printed instruction manual is delivered with the unit or sent to the address given by the customer.

Instruction manual in electronic format

Instruction manual on a memory stick will be delivered with the unit. Master language (English) manual is always included on the memory stick. The memory stick also includes all languages selected for printed manuals.

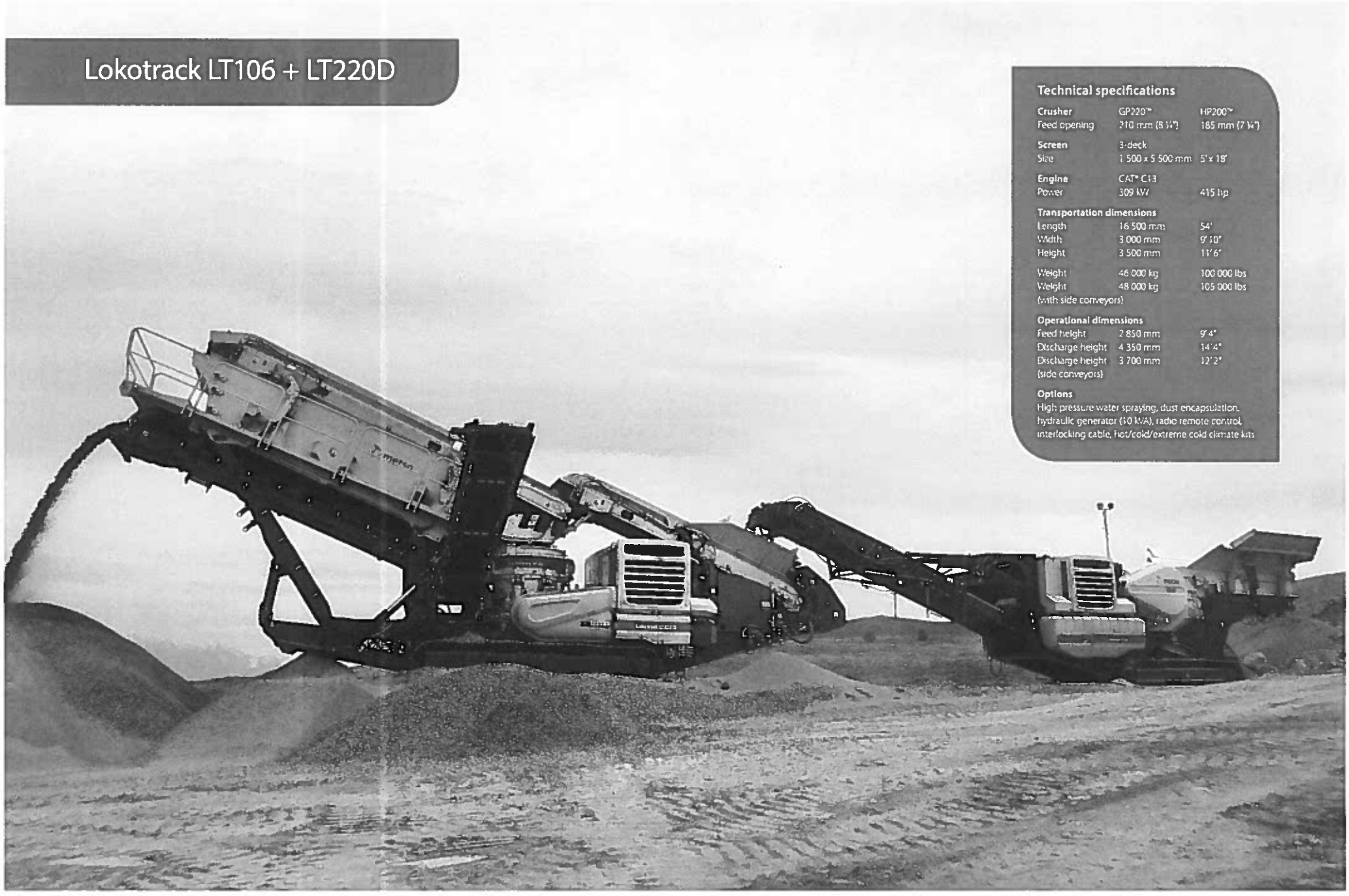
Spare part book

Max two sets of printed spare part books are free of charge (one for the customer and one for local Metso / distributor service). Minor processing cost is added for 3rd, 4th and 5th sets of printed spare part books.

Maintenance log as printed

eParts-application on memory stick

Lokotrack LT106 + LT220D



Technical specifications

Crusher	GP220™	HP200™
Feed opening	210 mm (8 ¼")	185 mm (7 ¼")
Screen	3-deck	
Size	1 500 x 5 500 mm	5' x 18'
Engine	CAT® C13	
Power	309 kW	415 hp
Transportation dimensions		
Length	16 500 mm	54'
Width	3 000 mm	9' 10"
Height	3 500 mm	11' 6"
Weight	46 000 kg	100 000 lbs
Weight (with side conveyors)	48 000 kg	105 000 lbs
Operational dimensions		
Feed height	2 850 mm	9' 4"
Discharge height	4 350 mm	14' 4"
Discharge height (side conveyors)	3 700 mm	12' 2"

Options

High pressure water spraying, dust encapsulation, hydraulic generator (10 kVA), radio remote control, interlocking cable, hot/cold/extreme cold climate kits

3406 C
Industrial Engine
Non-Certified
269 bkW/360 bhp @ 1800 rpm

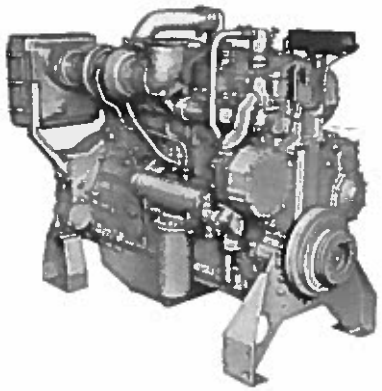


Image shown may not reflect actual engine

CAT® ENGINE SPECIFICATIONS

I-6, 4-Stroke-Cycle Diesel

Bore	137.2 mm (5.4 in)
Stroke	165.1 mm (6.5 in)
Displacement	14.64 L (893.39 in³)
Aspiration	Turbocharged / Aftercooled
Compression Ratio	15.9:1
Rotation (from flywheel end)	Counterclockwise
Capacity for Liquids	
Cooling System	20.8 L (5.5 gal)
Lube Oil System (refill)	38.0 L (10.0 gal)
Engine Weight, Net Dry (approximate)	1,512 kg (3,333 lb)

FEATURES

Emissions

Non-certified rating. Meets emission levels for Tier 1 / Stage I standards.

Single Source Supplier

Caterpillar
- Casts engine blocks, heads, cylinder liners, and flywheel housings
- Machines critical components
- Assembles complete engine

Ownership of these manufacturing processes enables Caterpillar to produce high quality, dependable product.

Factory-designed systems built at Caterpillar ISO certified facilities.

Testing

Prototype testing on every model:
- proves computer design
- verifies system torsional stability
- functionality tests every model

Every Caterpillar engine is dynamometer tested under full load to ensure proper engine performance.

Full Range of Attachments

Wide range of bolt-on system expansion attachments, factory designed and tested

Unmatched Product Support Offered Through Worldwide Caterpillar Dealer Network

More than 1,500 dealer outlets.
Caterpillar factory-trained dealer technicians service every aspect of your industrial engine.
99.7% of parts orders filled within 24 hours worldwide.
Caterpillar parts and labor warranty.
Preventive maintenance agreements available for repair before failure options.

Scheduled Oil Sampling program matches your oil sample against Caterpillar set standards to determine:
- internal engine component condition
- presence of unwanted fluids
- presence of combustion by-products

Web Site

For all your industrial power requirements, visit www.cat-industrial.com.

STANDARD ENGINE EQUIPMENT

Air Inlet System

Air cleaner, Regular duty, dry, panel type with service indicators, turbocharger, jacket water aftercooled

Control System

Governor, Hydra-mechanical

Cooling System

Thermostats and housing, Jacket water pump, gear driven, centrifugal, RH

Exhaust System

Exhaust manifold, dry, front exhaust
Exhaust elbow, dry, 152 mm (6 in), 4 bolt flange 127 mm (5 in) on 406DO12

Flywheels and Flywheel Housings

Flywheel, SAE No. 1
Flywheel housing, SAE No. 1, SAE standard rotation

Fuel Systems

Fuel Filter, LH
Fuel transfer pump
Fuel priming pump

Instrumentation

Instrument Panel, LH
Engine oil pressure gauge
Fuel pressure gauge
Water temperature gauge
Service meter

Lube System

Crankcase breather
Oil cooler, RH
Oil filter, RH
Oil filler in valve cover and dipstick, both RH
Rear sump oil pan

Mounting System

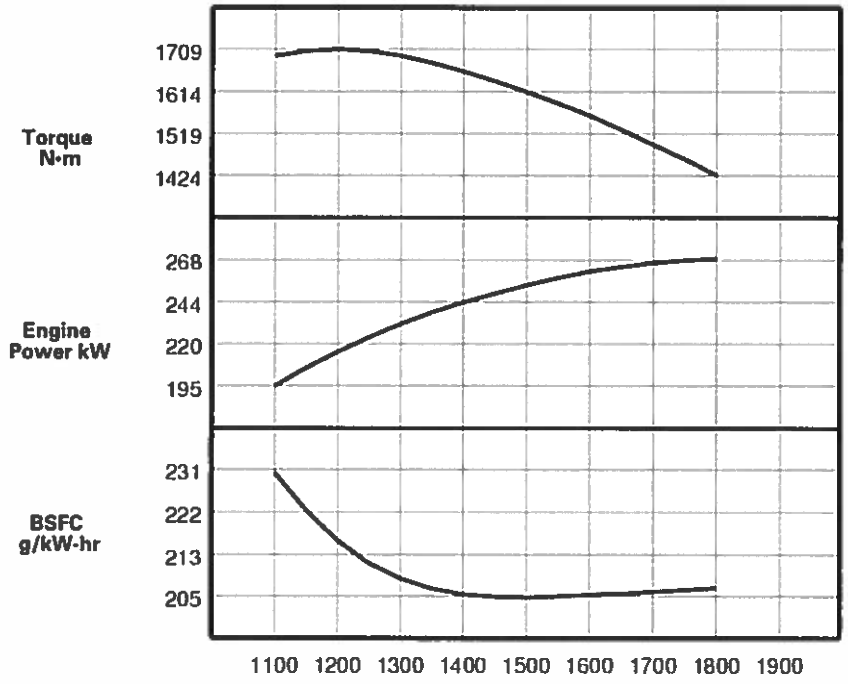
Supports

General

Paint, Caterpillar Yellow
Vibration damper and guard
Lifting eyes

PERFORMANCE CURVES

IND - C (Intermittent) - DM2169-01

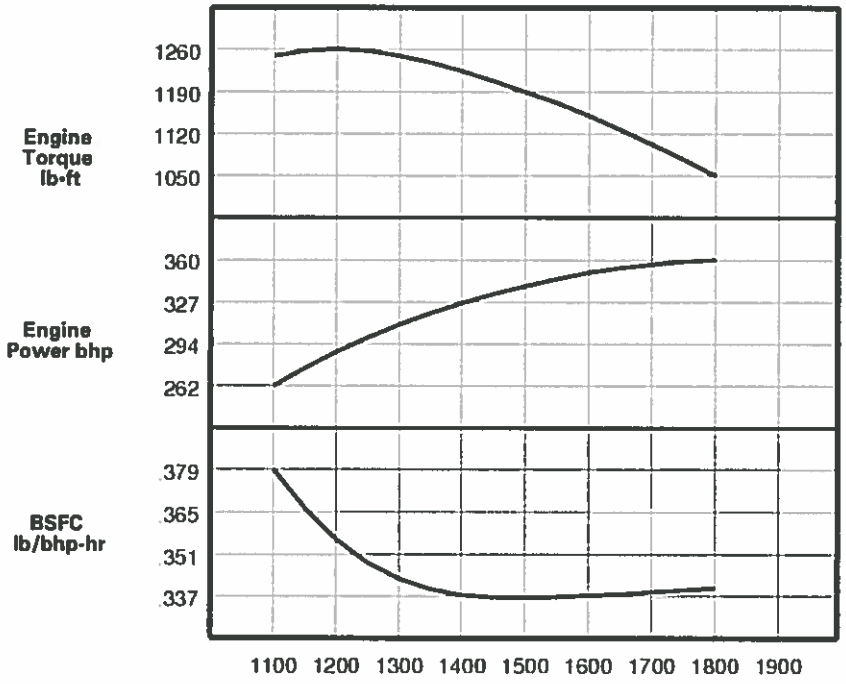


Metric

Engine Speed rpm	Engine Power kW	Torque N·m	BSFC g/kW-hr	Fuel Rate L/hr
1800	269	1424	206.6	66.1
1750	268	1460	206.2	65.7
1700	266	1494	205.8	65.1
1650	264	1527	205.4	64.4
1600	261	1559	205.1	63.6
1550	258	1587	204.8	62.6
1500	253	1612	204.6	61.6
1450	249	1637	204.7	60.5
1400	243	1659	205.2	59.4
1350	237	1678	206.4	58.3
1300	231	1694	208.5	57.2
1250	223	1705	211.8	56.1
1200	215	1709	216.5	55.1
1150	205	1705	222.8	54.3
1100	195	1694	230.7	53.7

PERFORMANCE CURVES

IND - C (Intermittent) - DM2169-01



English

Engine Speed rpm	Engine Power bhp	Engine Torque lb-ft	BSFC lb/bhp-hr	Fuel Rate gal/hr
1800	360	1050	.340	17.5
1750	359	1077	.339	17.4
1700	357	1102	.338	17.2
1650	354	1126	.338	17.0
1600	350	1150	.337	16.8
1550	345	1171	.337	16.5
1500	340	1189	.336	16.3
1450	333	1207	.337	16.0
1400	326	1224	.337	15.7
1350	318	1238	.339	15.4
1300	309	1249	.343	15.1
1250	299	1258	.348	14.8
1200	288	1260	.356	14.6
1150	275	1258	.366	14.3
1100	262	1249	.379	14.2

3406 C
Industrial Engine
Non-Certified
269 bkW/360 bhp @ 1800 rpm

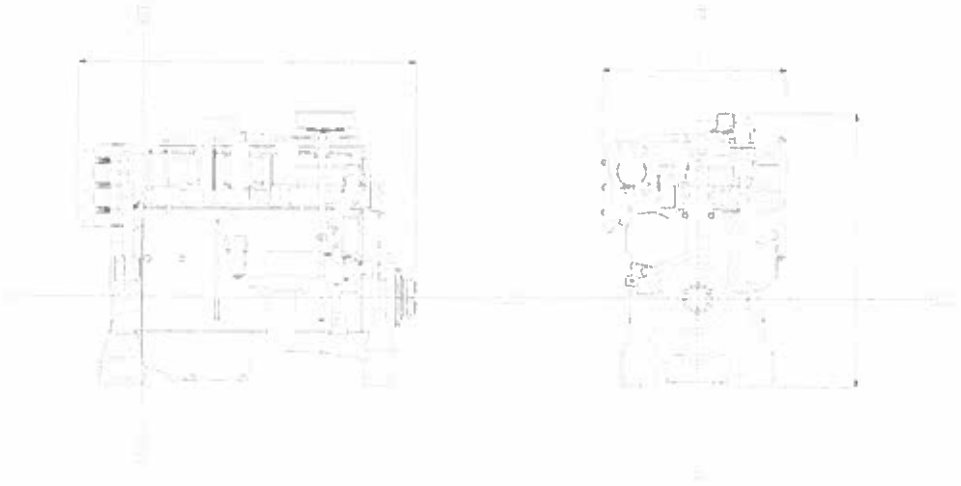
RATINGS AND CONDITIONS

IND - C (Intermittent) Intermittent service where maximum power and/or speed are cyclic. The power and speed capability of the engine can be utilized for one uninterrupted hour followed by one hour of operation at or below IND - A. Time at full load is not to exceed 50% of the duty cycle. Typical service examples are: agricultural tractors, harvesters and combines, off highway trucks, fire pump application power, blast hole drills, rock crushers and wood chippers with high torque rise, and oil field hosting.

Engine Performance Engine performance is corrected to inlet air standard conditions of 99 KPA (29.31 IN HG) dry barometer and 25 deg C (77 deg F) temperature. These values correspond to the standard atmospheric pressure and temperature as shown in SAE J1995.

Performance measured using a standard fuel with fuel gravity of 35 degrees API having a lower heating value of 42,780 KJ/KG (18,390 BTU/LB) when used at 29 DEG (84.2 DEG F) where the density is 838.9 G/L (7.001 LB/US GAL).

The corrected performance values shown for Caterpillar engines will approximate the values obtained when the observed performance data is corrected to SAE J1995, ISO 3046-2 and 8665 and 2288 and 9249 and 1585, EEC 80/1269 and DIN 70020 standard reference conditions.



Engine Dimensions	
(1) Length	1660.1 mm (65.36 in)
(2) Width	905.7 mm (35.66 in)
(3) Height	1335.0 mm (52.56 in)

Note: Do not use for installation design. See general dimension drawings for detail (Drawing # 1324895).

Performance Number: DM2169-01

Feature Code: 406DI04 Arr. Number: 1266205

Materials and specifications are subject to change without notice.

16282541

The International System of Units (SI) is used in this publication.

Cat® C13 ACERT™ Diesel Engine

Industrial

The Cat® C13 ACERT™ Industrial Diesel Engine is offered in ratings ranging from 287-388 bkW (385-520 bhp) @ 1800 -2100 rpm. Industries and applications powered by C13 ACERT engines include: Agriculture, Ag Tractors, Aircraft Ground Support, Bore/Drill Rigs, Chippers/Grinders, Combines/Harvesters, Compactors/Rollers, Compressors, Construction, Cranes, Crushers, Dredgers, Forestry, General Industrial, Hydraulic Power Units, Irrigation Equipment, Loaders/Forwarders, Material Handling, Mining, Mobile Earthmoving Equipment, Paving Equipment, Pumps, Shovels/Draglines, Specialty Ag Equipment, Surface Hauling Equipment, Trenchers and Underground Mining Equipment.

Specifications

Power Rating		
Minimum Power	287 bkW	385 bhp
Maximum Power	388 bkW	520 bhp
Rated Speed		1800-2100 rpm

Emission Standards	
Emissions	U.S. EPA Tier 4 Final Nonroad, EU Stage IV Nonroad, U.S. EPA Tier 4 Interim Nonroad Equivalent (Not Currently EPA Certified) and EU Stage IIIB Nonroad Equivalent (Non-Current for EU) Emission Standards. Designed to meet proposed EU Stage V Nonroad Emission Standards

General	
Engine Configuration	In-Line 6, 4-Stroke-Cycle Diesel
Bore	130 mm (5.1 in)
Stroke	157 mm (6.2 in)
Displacement	12.5 L (762.8 in³)
Aspiration	Turbocharged-Aftercooled (TA)
Compression Ratio	17.0:1
Combustion System	Direct Injection
Rotation (from flywheel end)	Counterclockwise
Cooling System Capacity	18.7 L (19.8 qt)
Lube System (refill)	34 L (35.9 qt)

Engine Dimensions (Approximate. Final dimensions dependent on selected options)	
Length	1203-1272 mm (47.2-50.1 in)
Width	933-996 mm (36.74-39.2 in)
Height	1132-1186 mm (44.6-46.7 in)

Weight - Net Dry (Basic Operating Engine Without Optional Attachments)	1143-1350 kg (2520-2976 lb)

Cat Regeneration System Aftertreatment Dimensions (Approximate. Final dimensions dependent on selected options)	
Length	1053-1077 mm (41.5-42.4 in)
Width	779.8-1069 mm (30.7-42.1 in)
Height	451.3-654 mm (17.8-25.7 in)
Weight	248-259 kg (547-571 lb)
Diameter	330.2 mm (13 in)

Passive Regeneration System Aftertreatment Dimensions (Approximate. Final dimensions dependent on selected options)	
Length	974.8 mm (38.4 in)
Width	958.3 mm (37.7 in)
Height	547.2 mm (21.5 in)
Weight	140 kg (308.6 lb)

PETU Dimensions (Tier 4 Final, Stage IV Only)	
Length	854 mm (33.6 in)
Width	287 mm (11.3 in)
Volume Capacity	48.4 L (51.1 qt)
Weight	19.42 kg (42.8 lb)
Height	551 mm (21.7 in)

Benefits and Features

Emissions

Meets U.S. EPA Tier 4 Final, EU Stage IV emission standards. Designed to meet proposed EU Stage V emission standards (As of publishing date, Stage V regulations have not been finalized). U.S. EPA Tier 4 Interim, EU Stage IIIB configurations are also available using EPA or EU Flex Provisions.

Reliable, Quiet and Durable Power

World-class manufacturing capability and processes coupled with proven core engine designs assure reliability, quiet operation, and many hours of productive life.

High Performance

Simple and efficient turbocharger with balance valve provides optimal air management and improved fuel efficiency.

Fuel Efficiency

Fuel consumption optimized to match operating cycles of a wide range of equipment and applications while maintaining low operating costs.

Fuel & Oil

Tier 4 Interim or Tier 4 Final, Stage IIIB or Stage IV engines require Ultra Low Sulfur Diesel (ULSD) fuel containing a maximum of 10 ppm sulfur (EU) and 15 ppm sulfur (U.S.), and new oil formulations to support the new technology. Cat® engines are designed to accommodate B20 biofuel. Your Cat dealer can provide more information regarding fuel and oil.

Broad Application Range

Industry leading range of factory configurable ratings and options for agricultural, material handling, construction, mining, aircraft ground support, and other industrial applications.

Package Size

Exceptional power density enables standardization across numerous applications. Multiple installation options minimize total package size. Ideal for equipment with narrow engine compartments.

Low Cost Maintenance

Worldwide service delivers ease of maintenance and simplifies the servicing routine. If applicable, minimum 5000 -hour diesel particulate filter (DPF) ash service interval enables low-cost maintenance. Capable of optimal oil change intervals of up to 500-hours, depending on rating, application, operating conditions, and maintenance practices. Engine B10 life up to 10000 hours for Tier 4 Final, Stage IV. The S·O·SSM program is available from your Cat dealer to determine oil change intervals and provide optimal performance.

Quality

Every Cat engine is manufactured to stringent quality standards in order to assure customer satisfaction.

World-class Product Support Offered Through Global Cat Dealer Network

- Scheduled maintenance, including SOSSM sample
- Customer Support Agreements (CSA)
- Caterpillar Extended Service Coverage (ESC)
- Superior dealer service network
- Extended dealer service network through the Cat Industrial Service Distributor (ISD) program

Tier 4 Interim, Stage IIIB Aftertreatment Features

Regeneration. Cat Regeneration System maximizes fuel efficiency during regeneration. Flexible regeneration options maximize uptime. **Mounting.** Remote installation options provide OEM flexibility for many applications, including horizontal and vertical mounting, with and without muffler.**Service.** Minimum 5000 hour DPF ash service interval.

Tier 4 Final, Stage IV Aftertreatment Features

Regeneration. Cat Regeneration System maximizes fuel efficiency during regeneration. Transparent regeneration maximizes uptime. Aftertreatment life is twice as long as engine rebuild. Option available utilizing Passive Regeneration not requiring Cat Regeneration System - please speak with your Dealer to determine which option is most suitable for your application.**Mounting.** Industrial power units have standard horizontal mounting.**Service.** Minimum 5000-hour diesel particulate filter ash service interval. PETU filter service is 5000 hours.

Standard Equipment

Air Inlet System

- Turbocharged
- Air-to-Air Aftercooled
- Mid-mount turbocharged system with front and rear exhaust configurations (Tier 4 Final, Stage IV)

Control System

- Electronic control system
- Over-foam wiring harness
- Automatic altitude compensation
- Power compensated for fuel temperature
- Configurable software features
- Engine monitoring system SAE J1939 broadcast and control
- Integrated Electronic Control Unit (ECU)
- Remote fan control

Cooling System

- Vertical or RH thermostat outlet
- Centrifugal water pump
- Guidance on cooling system design available through your dealer to ensure equipment reliability

Flywheels and Flywheel Housing

- SAE No. 1 flywheel housing
- Available SAE No. 1 power take off with optional SAE A, SAE B or SAE C power take off drives. Engine power can also be taken from the front of the engine with optional attachments. (Tier 4 Final, Stage IV).

Fuel System

- MEUI injection
- Primary fuel filter
- Secondary fuel filters
- Fuel transfer pump
- Electronic fuel priming

Lube System

- Open crankcase ventilation system
- Oil cooler
- Oil filler
- Lube oil filter
- Oil dipstick
- Gear driven oil pump
- Choice of front, rear or center sumps
- Open crankcase ventilation system with fumes disposal (optional OCV filter system) (Tier 4 Final, Stage IV)

Power Take Off (PTO)

- SAE A, SAE B or SAE C power take off (PTO) drives. Engine power can also be taken from the front of the engine on some applications.

General

- Paint: Caterpillar yellow, with optional colors available at request

U.S. EPA Tier 4 Interim, EU Stage IIIB Aftertreatment / Clean Emissions Control Equipment

- Cat Regeneration System
- Clean Emissions Module (CEM), consisting of Diesel Particulate Filter (DPF) and Diesel Oxidation Catalyst (DOC)
- NOx Reduction System (NRS)
- Flex pipe connection kit with 90° rotatable elbows to attach to Cat Regeneration System Inlet
- Available in 12 volt or 24 volt systems

U.S. EPA Tier 4 Final, EU Stage IV Aftertreatment

- Cat Regeneration System
- Clean Emissions Module (CEM), consisting of Diesel Particulate Filter (DPF) and Diesel Oxidation Catalyst (DOC)
- Aftertreatment Electronic Control Unit (ECU)
- NOx Reduction System (NRS)
- Pump Electronic Control Unit (PETU)
- Selective Catalytic Reduction (SCR)
- Available in 12V or 24V systems

Rating Type: IND-B RATING

Emissions: U.S. EPA Tier 4 Interim Nonroad Equivalent Emission Standards (Not Currently EPA Certified)

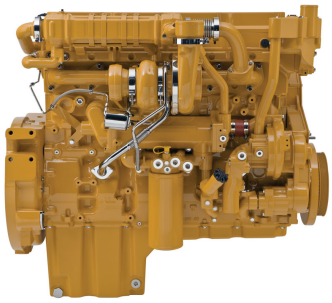


Image shown may not reflect actual configuration

C13 ACERT

DITA

310 bkW (415 bhp) @ 2100 rpm

	Metric	English
General Engine		
Power Rating	310 kW	415 hp
Number of Cylinders	6	
Bore	130 mm	5.1 in
Stroke	157 mm	6.2 in
Displacement	12.5 L	763.0 cu in.
Compression Ratio	17.0 : 1	

RATING DEFINITIONS AND CONDITIONS

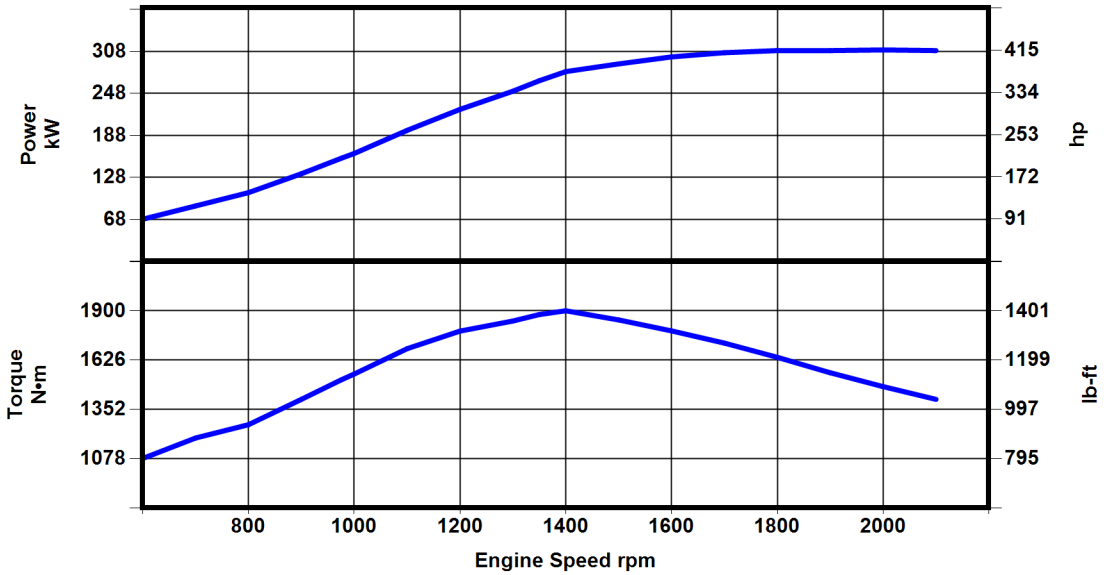
IND-B RATING: For service where power and/or speed are cyclic (time at full load not to exceed 80%).

Diesel Engines — up to 7.1 liter All rating conditions are based on ISO/TR14396, inlet air standard conditions with a total barometric pressure of 100 kPa (29.5 in Hg), with a vapor pressure of 1 kPa (.295 in Hg), and 25°C (77°F). Performance measured using fuel to EPA specifications in 40 CFR Part 1065 and EU specifications in Directive 97/68/EC with a density of 0.845-0.850 kg/L @ 15°C (59°F) and fuel inlet temperature 40°C (104°F).

Diesel Engines — greater than 7.1 liter All rating conditions are based on SAE J1995, inlet air standard conditions of 99 kPa (29.31 in Hg) dry barometer and 25°C (77°F) temperature. Performance measured using a standard fuel with fuel gravity of 35° API having a lower heating value of 42,780 kJ/kg (18,390 btu/lb) when used at 29°C (84.2°F) with a density of 838.9 g/L.

Rating Type: IND-B RATING

Emissions: U.S. EPA Tier 4 Interim Nonroad Equivalent Emission Standards (Not Currently EPA Certified)



Engine Speed rpm	Engine Power bkW	Engine Power bhp	Torque N*m	Torque lb-ft
2100	309	415	1407	1038
2000	310	415	1478	1090
1900	309	415	1555	1147
1800	309	415	1641	1210
1700	306	411	1720	1269
1600	300	402	1788	1319
1500	290	389	1849	1364
1400	279	374	1900	1401
1350	266	356	1879	1386
1300	251	336	1843	1359
1200	225	301	1787	1318
1100	195	261	1689	1246
1000	162	217	1548	1142
975	155	207	1515	1117
900	133	178	1407	1038
800	106	142	1266	934
700	87	117	1192	879
600	68	91	1078	795

The International System of Units (SI) is used in this publication. CAT, CATERPILLAR, their respective logos, ADEM, EUI, S•O•S, "Caterpillar Yellow" and the "Power Edge" trade dress, as well as corporate and product identity used herein, are trademarks of Caterpillar and may not be used without permission.

Cat® C9 ACERT™ Industrial Diesel Engine

Industrial

The Cat® C9 ACERT™ Industrial Diesel Engine is offered in ratings ranging from 205-280 bkW (275-375 bhp) @ 1800 -2200 rpm. These ratings meet China Stage II, EPA Tier 3 equivalent, and EU Stage IIIA equivalent emission standards. Industries and applications powered by C9 ACERT engines include Agriculture, Ag Tractors, Aircraft Ground Support, Bore/Drill Rigs, Chippers/Grinders, Combines/Harvesters, Compactors/Rollers, Compressors, Construction, Cranes, Crushers, Dredgers, Forestry, Forklifts, General Industrial, Hydraulic Power Units, Irrigation Equipment, Loaders/Forwarders, Material Handling, Mining, Mobile Earthmoving Equipment, Mobile Sweepers, Paving Equipment, Pumps, Shovels/Draglines, Specialty Ag Equipment, Sprayers, Surface Hauling Equipment, Trenchers and Underground Mining Equipment.

Specifications

Power Rating		
Minimum Power	205 bkW	275 bhp
Maximum Power	280 bkW	375 bhp
Rated Speed		1800-2200 rpm

Emission Standards	
Emissions	China Nonroad III, U.S. EPA Tier 3 Equivalent, EU Stage IIIA Equivalent

General	
Engine Configuration	Inline 6, 4-Stroke-Cycle Diesel
Bore	112 mm (4.41 in)
Stroke	149 mm (5.87 in)
Displacement	8.8 L (537.01 in³)
Aspiration	Turbocharged Aftercooled (TA)
Compression Ratio	16.1:1
Combustion System	Direct Injection
Rotation (from flywheel end)	Counterclockwise
Lube System (refill)	32 L (33.8 qt)

Engine Dimensions (Approximate. Final dimensions dependent on selected options)	
Length	1091 mm (43 in)
Width	827 mm (32.6 in)
Height	1023 mm (40.3 in)
Weight, Net Dry (Basic Operating Engine Without Optional Attachments)	864 kg (1905 lb)

Benefits and Features

Emissions

Designed to meet China Nonroad III emission standards. Meets U.S. EPA Tier 3 equivalent or U.S. EPA Tier 2 equivalent, EU Stage IIIA equivalent or EU Stage II equivalent emission standards. U.S. EPA Tier 3 equivalent EU Stage IIIA equivalent available using EPA (U.S.) Flexibility and EU Flexibility. Also available for other regulated and non-regulated areas.

Reliable, Quiet and Durable Power

World-class manufacturing capability and processes coupled with proven core engine designs assure reliability, quiet operation, and many hours of productive life.

Broad Application Range

Industry leading range of factory configurable ratings and options for agricultural, material handling, construction, mining, aircraft ground support, and other industrial applications.

Package Size

Exceptional power density enables standardization across numerous applications. Multiple installation options minimize total package size. Ideal for equipment with narrow engine compartments.

Quality

Every Cat engine is manufactured to stringent quality standards in order to assure customer satisfaction.

World-class Product Support Offered Through Global Cat Dealer Network

- Scheduled maintenance, including SOSSM sample
- Customer Support Agreements (CSA)
- Caterpillar Extended Service Coverage (ESC)
- Superior dealer service network
- Extended dealer service network through the Cat Industrial Service Distributor (ISD) program

Standard Equipment

Air Inlet System

- Turbocharged
- Air-to-Air Aftercooled

Control System

- Electronic governing, PTO speed control
- Programmable ratings
- Automatic altitude compensation
- Power compensation for fuel temperature
- Programmable low and high idle and total engine limit
- Electronic diagnostics and fault logging
- Engine monitoring system SAE J1939 broadcast and control
- ADEM™ A4 Electronic Control Unit (ECU)

Cooling System

- Thermostats and housing, vertical outlet

- Jacket water pump, centrifugal
- Water pump, inlet

Exhaust System

- Exhaust manifold, dry
- Optional exhaust outlet

Flywheels and Flywheel Housing

- SAE No. 1 flywheel housing

Fuel System

- HEUI™ injection
- Fuel filter, secondary (2 micron)
- ACERT™ Technology
- Fuel transfer pump
- Fuel priming pump

Lube System

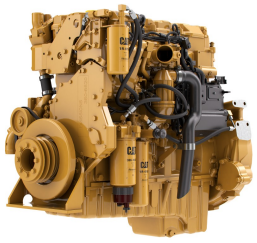
- Crankcase breather
- Oil cooler
- Oil filler
- Lube oil filter
- Front sump oil pan
- Oil dipstick
- Gear driven oil pump

General

- Vibration damper
- Lifting eyes
- Cold start capability to -20° C (-4° F)
- Paint: Caterpillar yellow, with optional colors available at request

Rating Type: IND-B RATING

Emissions: EU Stage IIIA Nonroad Equivalent Emission Standards (Non-Current for EU)



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C9 ACERT

DITA

224 bkW (300 bhp) @ 2200 rpm

	Metric	English
General Engine		
Power Rating	224 kW	300 hp
Number of Cylinders	6	
Bore	112 mm	4.4 in
Stroke	149 mm	5.9 in
Displacement	8.8 L	538.0 cu in.
Compression Ratio	16.1 : 1	

RATING DEFINITIONS AND CONDITIONS

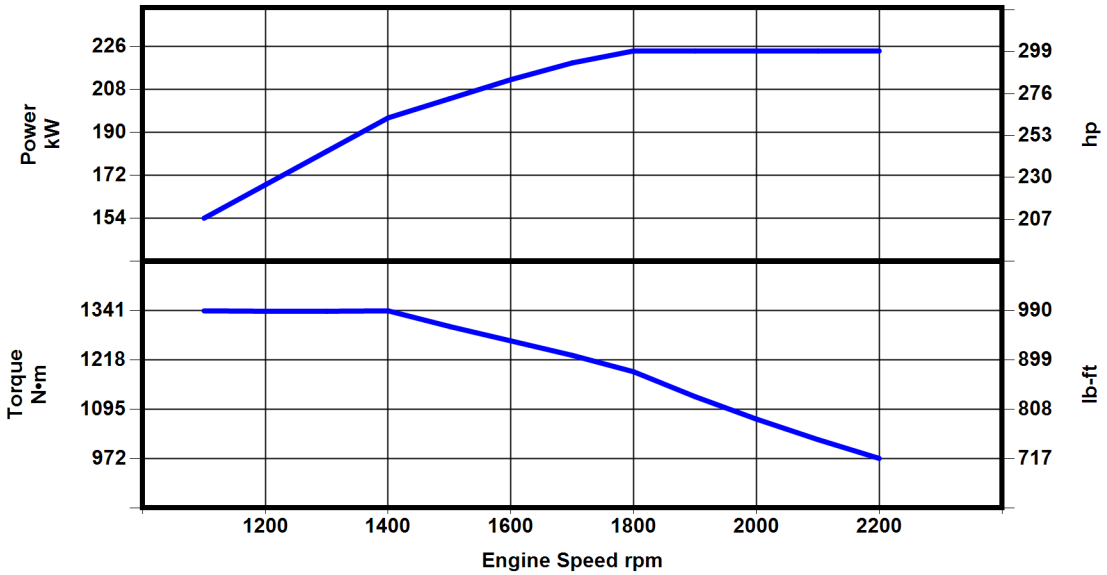
IND-B RATING: For service where power and/or speed are cyclic (time at full load not to exceed 80%).

Diesel Engines — up to 7.1 liter All rating conditions are based on ISO/TR14396, inlet air standard conditions with a total barometric pressure of 100 kPa (29.5 in Hg), with a vapor pressure of 1 kPa (.295 in Hg), and 25°C (77°F). Performance measured using fuel to EPA specifications in 40 CFR Part 1065 and EU specifications in Directive 97/68/EC with a density of 0.845-0.850 kg/L @ 15°C (59°F) and fuel inlet temperature 40°C (104°F).

Diesel Engines — greater than 7.1 liter All rating conditions are based on SAE J1995, inlet air standard conditions of 99 kPa (29.31 in Hg) dry barometer and 25°C (77°F) temperature. Performance measured using a standard fuel with fuel gravity of 35° API having a lower heating value of 42,780 kJ/kg (18,390 btu/lb) when used at 29°C (84.2°F) with a density of 838.9 g/L.

Rating Type: IND-B RATING

Emissions: EU Stage IIIA Nonroad Equivalent Emission Standards (Non-Current for EU)



Engine Speed rpm	Engine Power bkW	Engine Power bhp	Torque N*m	Torque lb-ft
2200	224	300	972	717
2100	224	300	1019	751
2000	224	300	1070	789
1900	224	300	1126	830
1800	224	300	1188	876
1700	219	293	1229	907
1600	212	284	1265	933
1500	204	274	1301	959
1400	197	264	1340	989
1300	182	244	1339	988
1200	168	226	1339	988
1100	154	207	1340	988

The International System of Units (SI) is used in this publication.

APPENDIX D. EMISSION CALCULATIONS

Table D-1a. Emissions Summary - Criteria Pollutants and GHG

Source	PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_X (tpy)	VOC (tpy)	CO (tpy)	CO_2e (tpy)
Crushing	0.71	0.32	5.94E-02	--	--	--	--	--
Screening	0.51	0.17	1.17E-02	--	--	--	--	--
CAT C9.3B, 224 kW Diesel Engine	7.94E-03	7.94E-03	7.94E-03	1.38E-02	0.54	0.11	0.18	1,713
CAT C13, 310 KW Diesel Engine	5.56E-03	5.56E-03	5.56E-03	1.78E-02	0.65	3.60E-02	3.60E-02	1,959
Material Handling	2.36	1.12	0.17	--	--	--	--	--
Total	**3.60**	**1.62**	**0.25**	**3.16E-02**	**1.19**	**0.14**	**0.22**	**3,672**
NSR De Minis	**1.25**	**0.75**	**0.50**	**2.00**	**2.00**	**2.00**	**5.00**	**--**

[1] NSR De Minis values obtained from WAC 176-400-110.

Table D-1b. Emission Summary - TAPs

Pollutant	CAS Number	SQER (lb/avg. period)	Averaging Period	Emissions (lb/avg. period)	Modeling Required?
Benzene	71-43-2	21.00	year	38.93	Yes
Toluene	108-88-3	370	24-hr	0.06	No
Xylenes	1330-20-7	16.00	24-hr	0.04	No
Propylene	115-07-1	220	24-hr	0.36	No
1,3-Butadiene	106-99-0	5.40	year	1.63	No
Formaldehyde	50-00-0	27.00	year	49.24	Yes
Acetaldehyde	75-07-0	60.00	year	32.00	No
Acrolein	107-02-8	0.03	24-hr	1.29E-02	No
Naphthalene	91-20-3	4.80	year	3.54	No
Benzo(a)anthracene	56-55-3	0.89	year	7.01E-02	No
Chrysene	218-01-9	8.90	year	1.47E-02	No
Benzo(b)fluoranthene	205-99-2	0.89	year	4.13E-03	No
Benzo(k)fluoranthene	207-08-9	0.89	year	6.47E-03	No
Benzo(a)pyrene	50-32-8	0.16	year	7.84E-03	No
Indeno(1,2,3-cd)pyrene	193-39-5	0.89	year	1.56E-02	No
Dibenz(a,h)anthracene	53-70-3	0.08	year	2.43E-02	No
Diesel Engine Exhaust, PM	DPM	0.54	year	26.98	Yes
Carbon Monoxide	630-08-0	43.00	1-hr	0.06	No
Sulfur Dioxide	7446-09-5	1.20	1-hr	8.78E-03	No
Nitrogen Dioxide	10102-44-0	0.87	1-hr	0.33	No

Table D-2a. Operating Parameters [1] - Crushing

Parameter	Value	Units
Jaw Crusher (Primary)		
Maximum throughput	200	tons/hr
Maximum throughput	1200	tons/day
Daily operation	6	hrs/day
Weekly operation	5	days/week
Annual operation	50	weeks/yr
Cone Crusher (Secondary)		
Maximum throughput	130	tons/hr
Maximum throughput	780	tons/day
Daily operation	6	hrs/day
Weekly operation	5	days/week
Annual operation	50	weeks/yr

[1] Operational data obtained from Brett Morris on June 10, 2021.

Table D-2b. Emission Calculations - Crushing

Pollutant	Emission Factor [1] (lb/ton) Uncontrolled	Controlled	Projected Emissions (lb/hr)	(lb/week)	(tpy)	Potential to Emit (tpy)
PM	0.0054	0.0006	0.20	5.94	0.15	0.71
PM_{10}	0.0024	0.00027	0.09	2.67	0.07	0.32
$PM_{2.5}$	ND	0.00005	1.65E-02	0.50	1.24E-02	0.06

[1] Emission factors obtained from Table 11.19.2-2, Section 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing, AP-42. As noted in footnote (n) of Table 11.19.2-2, given that no data is available for primary or secondary crushers, tertiary crushers can be used as an upper limit for calculations. The controlled emission factors are used to estimate site emissions. The moisture content of material on-site is approximately 3-5%. The moisture content in the study group for controlled emission factors ranged from 0.55-2.88%.

[2] Typical operation will be 6 hrs/day, 5 days/week, and 50 weeks/yr which is equal to 1500 hrs/yr.
Total annual emission calculations are based on 7200 hrs/year of operation.

Table D-3a. Operating Parameters [1] - Screening

Parameter	Value	Units
Maximum throughput	130	tons/hr
Maximum throughput	780	tons/day
Daily operation	6	hrs/day
Weekly operation	5	days/week
Annual operation	50	weeks/yr

[1] Operational data obtained from Brett Morris on June 10, 2021.

Table D-3b. Emission Calculations - Screening

Pollutant	Emission Factor [1] (lb/ton) Uncontrolled	Controlled	Projected Emissions (lb/hr)	(lb/week)	(tpy)	Potential to Emit (tpy)
PM	0.0125	0.0011	0.14	4.29	0.11	0.51
PM_{10}	0.0043	0.00037	0.05	1.44	3.61E-02	0.17
$PM_{2.5}$	ND	0.000025	3.25E-03	9.75E-02	2.44E-03	1.17E-02

[1] Emission factors obtained from Table 11.19.2-2, Section 11.19.2 Crushed Stone Processing and Pulverized Mineral Processing, AP-42. The controlled emission factors are used to estimate site emissions. The moisture content of material on-site is approximately 3-5%. The moisture content in the study group for controlled emission factors ranged from 0.55-2.88%.

[2] Typical operation will be 6 hrs/day, 5 days/week, and 50 weeks/yr which is equal to 1500 hrs/yr.
Total annual emission calculations are based on 7200 hrs/year of operation.

Table D-4a. Operating Parameters [1] - CAT C9.3B 224kW Diesel Engine

Parameter	Value	Units
Daily operation	8	hrs/day
Weekly operation	5	days/week
Annual operation	50	weeks/yr
Fuel throughput [2]	18.5	gal/hr
Fuel Input	2.53	MMBtu/hr

[1] Operational data obtained from Brett Morris on June 10, 2021.

[2] Fuel throughput data obtained from performance data for the CAT C9.3B 224kW diesel engine from the manufacturer. The fuel consumption at 100% load is used for conservatism.

[3] Heating value of diesel obtained from Appendix A: Miscellaneous Data and Conversion Factors, AP-42.

Diesel heating value: 137,000 Btu/gal

Table D-4b. Emission Calculations - CAT C9.3B 224kW Diesel Engine Criteria Pollutants and GHG

Pollutant	Emission Factor [1, 3] (lb/MMBtu)	Projected Emissions (lb/hr) [2]	(lb/week)	(tpy)	Potential to Emit (tpy)
PM	--	2.20E-03	0.09	2.20E-03	7.94E-03
PM_{10}	--	2.20E-03	0.09	2.20E-03	7.94E-03
$PM_{2.5}$	--	2.20E-03	0.09	2.20E-03	7.94E-03
SO_X	1.52E-03	3.84E-03	0.15	3.84E-03	0.01
NO_X	--	0.15	6.00	0.15	0.54
VOC	--	3.00E-02	1.20	3.00E-02	0.11
CO	--	0.05	2.00	0.05	0.18
CO_2e [4]	--	476	19,037	476	1,713
CO_2	--	475	19,000	475	1,710
N_2O [5]	6.61E-04	1.68E-03	0.07	1.68E-03	6.03E-03
CH_4 [5]	6.61E-03	1.68E-02	0.67	0.02	0.06

[1] Emission factors obtained from Table 3.3-1, Section 3.3 Gasoline and Diesel Industrial Engines, AP-42.

[2] Emission rates in lb/hr obtained from performance data for the CAT C9.3B 224 kW diesel engine from the manufacturer. The emission rates at 100% load are used for all pollutants except VOC, which is at 10% load for conservatism.

[3] Emission factor for SO_X obtained from Table 3.4-1, Section 3.4 Large Stationary Diesel and All Stationary Dual-Fuel Engines, AP-42. This emission factor is a function of sulfur content in diesel fuel. It is assumed that ULSD fuel is used with a sulfur content of:

15 ppm

[4] GHG emissions as CO_2 equivalents (CO_2e) are calculated based on the Global Warming Potentials (GWP) provided in Table A-1 of 40 CFR 98.

CO_2	1
N_2O	298
CH_4	25

[5] Distillate fuel no. 2 emission factors for GHG are obtained from 40 CFR 98 Subpart C, Tables C-1 and C-2, and converted to values in lb/MMBtu.

[6] Typical operation will be 8 hrs/day, 5 days/week, and 50 weeks/yr which is equal to 2000 hrs/yr.
Total annual emission calculations are based on 7200 hrs/year of operation.

Table D-4c. Emission Calculations - CAT C9.3B 224kW Diesel Engine TAP

Pollutant	CAS Number	TAP?	Emission Factor [1] (lb/MMBtu)	Projected Emissions (lb/hr)	(lb/week)	(tpy)	Potential to Emit (tpy)
Benzene	71-43-2	Yes	9.33E-04	2.36E-03	0.09	2.36E-03	8.51E-03
Toluene	108-88-3	Yes	4.09E-04	1.04E-03	0.04	1.04E-03	3.73E-03
Xylenes	1330-20-7	Yes	2.85E-04	7.22E-04	0.03	7.22E-04	2.60E-03
Propylene	115-07-1	Yes	2.58E-03	6.54E-03	0.26	6.54E-03	2.35E-02
1,3-Butadiene	106-99-0	Yes	3.91E-05	9.91E-05	3.96E-03	9.91E-05	3.57E-04
Formaldehyde	50-00-0	Yes	1.18E-03	2.99E-03	0.12	2.99E-03	1.08E-02
Acetaldehyde	75-07-0	Yes	7.67E-04	1.94E-03	0.08	1.94E-03	7.00E-03
Acrolein	107-02-8	Yes	9.25E-05	2.34E-04	9.38E-03	2.34E-04	8.44E-04
Naphthalene	91-20-3	Yes	8.48E-05	2.15E-04	8.60E-03	2.15E-04	7.74E-04
Acenaphthylene	208-96-8	No	5.06E-06	1.28E-05	5.13E-04	1.28E-05	4.62E-05
Acenaphthene	83-32-9	No	1.42E-06	3.60E-06	1.44E-04	3.60E-06	1.30E-05
Fluorene	486-25-9	No	2.92E-05	7.40E-05	2.96E-03	7.40E-05	2.66E-04
Phenanthrene	85-01-8	No	2.94E-05	7.45E-05	2.98E-03	7.45E-05	2.68E-04
Anthracene	120-12-7	No	1.87E-06	4.74E-06	1.90E-04	4.74E-06	1.71E-05
Fluoranthene	206-44-0	No	7.61E-06	1.93E-05	7.72E-04	1.93E-05	6.94E-05
Pyrene	129-00-0	No	4.78E-06	1.21E-05	4.85E-04	1.21E-05	4.36E-05
Benzo(a)anthracene	56-55-3	Yes	1.68E-06	4.26E-06	1.70E-04	4.26E-06	1.53E-05
Chrysene	218-01-9	Yes	3.53E-07	8.95E-07	3.58E-05	8.95E-07	3.22E-06
Benzo(b)fluoranthene	205-99-2	Yes	9.91E-08	2.51E-07	1.00E-05	2.51E-07	9.04E-07
Benzo(k)fluoranthene	207-08-9	Yes	1.55E-07	3.93E-07	1.57E-05	3.93E-07	1.41E-06
Benzo(a)pyrene	50-32-8	Yes	1.88E-07	4.76E-07	1.91E-05	4.76E-07	1.72E-06
Indeno(1,2,3-cd)pyrene	193-39-5	Yes	3.75E-07	9.50E-07	3.80E-05	9.50E-07	3.42E-06
Dibenz(a,h)anthracene	53-70-3	Yes	5.83E-07	1.48E-06	5.91E-05	1.48E-06	5.32E-06
Benzo(g,h,i)perylene	191-24-2	No	4.89E-07	1.24E-06	4.96E-05	1.24E-06	4.46E-06
Diesel Engine Exhaust, PM	DPM	Yes	--	2.20E-03	8.82E-02	2.20E-03	7.94E-03
Carbon Monoxide	630-08-0	Yes	--	0.05	2.00	0.05	0.18
Sulfur Dioxide [2]	7446-09-5	Yes	0.001515	0.00	0.15	3.84E-03	1.38E-02
Nitrogen Dioxide [3]	10102-44-0	Yes	--	0.15	6.00	0.15	0.54

[1] Emission factors obtained from Table 3.3-1 and 3.3-2 , Section 3.3 Gasoline and Diesel Industrial Engines, AP-42.

[2] It is conservatively assumed that all SO_X emissions are converted to SO_2.

[3] It is conservatively assumed that all NO_X emissions are converted to NO_2.

[4] Typical operation will be 8 hrs/day, 5 days/week, and 50 weeks/yr which is equal to 2000 hrs/yr.
Total annual emission calculations are based on 7200 hrs/year of operation.

Table D-5a. Operating Parameters [1] - CAT C13 310kW Diesel Engine

Parameter	Value	Units
Daily operation	8	hrs/day
Weekly operation	5	days/week
Annual operation	50	weeks/yr
Fuel throughput [2]	23.8	gal/hr
Fuel Input	3.26	MMBtu/hr

[1] Operational data obtained from Brett Morris on June 10, 2021.

[2] Fuel throughput data obtained from performance data for the CAT C13 310kW diesel engine from the manufacturer. The fuel consumption at 100% load is used for conservatism.

[3] Heating value of diesel obtained from Appendix A: Miscellaneous Data and Conversion Factors, AP-42.

Diesel heating value: 137,000 Btu/gal

Table D-5b. Emission Calculations - CAT C13 310kW Diesel Engine Criteria Pollutants and GHG

Pollutant	Emission Factor [1, 3] (lb/MMBtu)	Projected Emissions (lb/hr) [2]	(lb/week)	(tpy)	Potential to Emit (tpy)
PM	--	1.54E-03	0.06	1.54E-03	5.56E-03
PM_{10}	--	1.54E-03	0.06	1.54E-03	5.56E-03
$PM_{2.5}$	--	1.54E-03	0.06	1.54E-03	5.56E-03
SO_X	1.52E-03	0.00	0.20	4.94E-03	0.02
NO_X	--	0.18	7.20	0.18	0.65
VOC	--	0.01	0.40	1.00E-02	0.04
CO	--	0.01	0.40	1.00E-02	0.04
CO_2e [3]	--	544	21,767	544	1,959
CO_2	--	543	21,720	543	1,955
N_2O [4]	6.61E-04	2.16E-03	0.09	2.16E-03	7.76E-03
CH_4 [4]	6.61E-03	2.16E-02	0.86	0.02	0.08

[1] Emission factors obtained from Table 3.3-1, Section 3.3 Gasoline and Diesel Industrial Engines, AP-42.

[2] Emission rates in lb/hr obtained from performance data for the CAT C9.3B 224 kW diesel engine from the manufacturer. The emission rates at 100% load are used for all pollutants for conservatism.

[3] Emission factor for SO_X obtained from Table 3.4-1, Section 3.4 Large Stationary Diesel and All Stationare Dual-Fuel Engines, AP-42. This emission factor is a function of sulfur content in diesel fuel. It is assumed that ULSD fuel is used with a sulfur content of:

15 ppm

[4] GHG emissions as CO_2 equivalents (CO_2e) are calculated based on the Global Warming Potentials (GWP) provided in Table A-1 of 40 CFR 98.

CO_2	1
N_2O	298
CH_4	25

[5] Distillate fuel no. 2 emission factors for GHG are obtained from 40 CFR 98 Subpart C, Tables C-1 and C-2, and converted to values in lb/MMBtu.

[6] Typical operation will be 8 hrs/day, 5 days/week, and 50 weeks/yr which is equal to 2000 hrs/yr.
Total annual emission calculations are based on 7200 hrs/year of operation.

Table D-5c. Emission Calculations - CAT C13 310kW Diesel Engine TAP

Pollutant	CAS Number	TAP?	Emission Factor [1] (lb/MMBtu)	Emissions (lb/hr)	Emissions (lb/week)	Emissions (tpy)	Potential to Emit (tpy)
Benzene	71-43-2	Yes	9.33E-04	3.04E-03	0.12	3.04E-03	1.10E-02
Toluene	108-88-3	Yes	4.09E-04	1.33E-03	0.05	1.33E-03	4.80E-03
Xylenes	1330-20-7	Yes	2.85E-04	9.29E-04	0.04	9.29E-04	3.35E-03
Propylene	115-07-1	Yes	2.58E-03	8.41E-03	0.34	8.41E-03	3.03E-02
1,3-Butadiene	106-99-0	Yes	3.91E-05	1.27E-04	5.10E-03	1.27E-04	4.59E-04
Formaldehyde	50-00-0	Yes	1.18E-03	3.85E-03	0.15	3.85E-03	1.39E-02
Acetaldehyde	75-07-0	Yes	7.67E-04	2.50E-03	0.10	2.50E-03	9.00E-03
Acrolein	107-02-8	Yes	9.25E-05	3.02E-04	1.21E-02	3.02E-04	1.09E-03
Naphthalene	91-20-3	Yes	8.48E-05	2.76E-04	1.11E-02	2.76E-04	9.95E-04
Acenaphthylene	208-96-8	No	5.06E-06	1.65E-05	6.60E-04	1.65E-05	5.94E-05
Acenaphthene	83-32-9	No	1.42E-06	4.63E-06	1.85E-04	4.63E-06	1.67E-05
Fluorene	486-25-9	No	2.92E-05	9.52E-05	3.81E-03	9.52E-05	3.43E-04
Phenanthrene	85-01-8	No	2.94E-05	9.59E-05	3.83E-03	9.59E-05	3.45E-04
Anthracene	120-12-7	No	1.87E-06	6.10E-06	2.44E-04	6.10E-06	2.20E-05
Fluoranthene	206-44-0	No	7.61E-06	2.48E-05	9.93E-04	2.48E-05	8.93E-05
Pyrene	129-00-0	No	4.78E-06	1.56E-05	6.23E-04	1.56E-05	5.61E-05
Benzo(a)anthracene	56-55-3	Yes	1.68E-06	5.48E-06	2.19E-04	5.48E-06	1.97E-05
Chrysene	218-01-9	Yes	3.53E-07	1.15E-06	4.60E-05	1.15E-06	4.14E-06
Benzo(b)fluoranthene	205-99-2	Yes	9.91E-08	3.23E-07	1.29E-05	3.23E-07	1.16E-06
Benzo(k)fluoranthene	207-08-9	Yes	1.55E-07	5.05E-07	2.02E-05	5.05E-07	1.82E-06
Benzo(a)pyrene	50-32-8	Yes	1.88E-07	6.13E-07	2.45E-05	6.13E-07	2.21E-06
Indeno(1,2,3-cd)pyrene	193-39-5	Yes	3.75E-07	1.22E-06	4.89E-05	1.22E-06	4.40E-06
Dibenz(a,h)anthracene	53-70-3	Yes	5.83E-07	1.90E-06	7.60E-05	1.90E-06	6.84E-06
Benzo(g,h,i)perylene	191-24-2	No	4.89E-07	1.59E-06	6.38E-05	1.59E-06	5.74E-06
Diesel Engine Exhaust, PM	DPM	Yes	--	1.54E-03	6.17E-02	1.54E-03	5.56E-03
Carbon Monoxide	630-08-0	Yes	--	1.00E-02	0.40	1.00E-02	0.04
Sulfur Dioxide [2]	7446-09-5	Yes	0.001515	4.94E-03	0.20	0.00	1.78E-02
Nitrogen Dioxide [3]	10102-44-0	Yes	--	0.18	7.20	0.18	0.65

[1] Emission factors obtained from Table 3.3-1 and 3.3-2 , Section 3.3 Gasoline and Diesel Industrial Engines, AP-42.

[2] It is conservatively assumed that all SO_X emissions are converted to SO_2.

[3] It is conservatively assumed that all NO_X emissions are converted to NO_2.

[4] Typical operation will be 8 hrs/day, 5 days/week, and 50 weeks/yr which is equal to 2000 hrs/yr.
Total annual emission calculations are based on 7200 hrs/year of operation.

Table D-6. Emission Calculations - Material Handling

Pollutant	Moisture Content [1] (%)	Average Wind Speed [2] (m/s)	Particle Size Multiplier (k)	Emission Factor [3] (lb/ton)	Throughput [4] (tpy)	Number of Drops	Annual Emissions (tpy)
PM	3	2.88	0.74	6.55E-04	1,440,000	5	2.36
PM_{10}	3	2.88	0.35	3.10E-04	1,440,000	5	1.12
$PM_{2.5}$	3	2.88	0.053	4.69E-05	1,440,000	5	0.17

[1] Moisture content provided as a range between 3-5% by Brett Morris on June 10, 2021. 3% is used for conservatism.

[2] Average wind speed data obtained from the National Oceanic and Atmospheric Administration (NOAA) for the Pierce County Airport - Thun Field Station.

[3] Emission factor calculated using Eq. 1, Section 13.2.4 Aggregate Handling and Storage Piles, AP-42, listed below:

$E = k(0.0032)*[(U/5)^{1.3}/(M/2)^{1.4}]$ (lb/ton)

where E = emission factor
k = particle size multiplier (dimensionless)
U = mean wind speed (m/s)
M = material moisture content (%)

[4] Total annual throughput is estimated using the total primary crusher throughput.
Typical operation will be 6 hrs/day, 5 days/week, and 50 weeks/yr which is equal to 1500 hrs/yr.
Total annual emission calculations are based on 7200 hrs/year of operation.

[5] There are nine total drop points throughout the process and are listed below:

Number of Drops	Location
1	Surge pile to jaw crusher
1	Jaw crusher to cone crusher
1	Cone crusher to product A, B, or C
1	Product A, B, and C to stockpile A, B, or C
1	Stockpile to load on truck

APPENDIX E. MODELING FILES

Model files available upon request.

Appendix Table E-1. File Directory

File Name	File Type	File Description
TTA*yy*v0.3	AMI	AERMOD input file, model year 20*yy*.
TTA*yy*v0.3	AML	AERMOD output file, model year 20*yy*
ENUMCLAW_KTCM_yyyy	PFL	Upper air meteorological files as inputs to AERMOD. "yy*yy*" indicates the year among 2008, 2010, 2011, 2016, and 2019.
ENUMCLAW_KTCM_yyyy	SCF	Surface air meteorological files as inputs to AERMOD. "*yy*" indicates the year among 2008, 2010, 2011, 2016, and 2019.
Bpip input file	N/A	Files for BPIP inputs
Bpip output file	N/A	Files for BPIP outputs