UNIVERSIDAD DE PUERTO RICO EN PONCE
JUNTA DE SUBASTAS

SUBSATA UPRP-22-04
ADQUISICIÓN E INSTALACIÓN DE GENERADOR ELÉCTRICO EN BIBLIOTECA UPR PONCE

Para participar en esta subasta la asistencia a la reunión presubasta es *compulsoria*. Ésta se celebrará a las 1:30pm del viernes, 4 de febrero de 2022 en el Salón 247 del Edificio Ruth Fortuño de la Universidad de Puerto Rico en Ponce.

Todos los participantes deberán presentar evidencia de vacunación contra el COVID19, asistir con mascarilla, mantener el distanciamiento social requerido y cumplir con los protocolos de seguridad establecidos por la institución (ver pliegos de subasta).

Los asistentes **deberán confirmar su asistencia** indicando el nombre y la compañía que representan escribiendo a: militza.dejesus@upr.edu entre el 20 de enero y el 3 de febrero.

Subasta UPRP-22-04
Adquisición e Instalación de Generador Eléctrico en Biblioteca UPR-Ponce

CONDICIONES E INSTRUCCIONES ESPECIALES APLICABLES A LA SOLICITUD DE PROPUESTAS SELLADAS DE CONFORMIDAD CON EL REGLAMENTO SOBRE ADQUISICIÓN DE EQUIPO, MATERIALES Y SERVICIOS NO PERSONALES DE LA UNIVERSIDAD DE PUERTO RICO. CERTIFICACIÓN NÚMERO 30 (2008-2009) DE LA JUNTA DE SÍNDICOS DE LA UNIVERSIDAD DE PUERTO RICO

Descripción de los bienes o servicios: Se recibirán propuestas para la instalación de un generador eléctrico en la biblioteca de la Universidad de Puerto Rico en Ponce.

Las especificaciones técnicas del proyecto de instalación se detallan en los siguientes anejos:

1) Electrical plans (4 pp).
2) SPECS: Adelina Coppin Library Emergency Generator (55 pp).

Los términos y condiciones para la adquisición e instalación del generador eléctrico para la Biblioteca Adelina Coppin Alvarado de la Universidad de Puerto Rico en Ponce son los siguientes:

1. Los trabajos deberán realizarse en un término de tiempo razonable el cual será propuesto por el contratista. La viabilidad del plan de trabajo propuesto, incluyendo el tiempo de culminación, será considerado por la Junta de Subastas como uno de los criterios de selección. El contratista tendrá hasta 30 días adicionales al plan de trabajo propuesto para completar los trabajos en caso de que presenten dificultades adquiriendo los materiales necesarios para finalizar la obra. Los trabajos se conducirán en los turnos que se establezca entre las partes, trabajándose un mínimo de cinco días a la semana, a partir de la fecha de la orden para comenzar. De no completarse la obra en ese término, incluyendo la extensión de treinta días, el proponente pagará la suma de $100 a la UPR Ponce como daños líquidos convenidos por cada día que tome en terminar la obra en exceso del tiempo estipulado. El importe por dichos daños líquidos será descontado del pago global por la UPR Ponce, disponiéndose que el proponente tendrá derecho a una extensión de tiempo que compense las demoras debido a lluvias o mal tiempo, interrupciones de utilidades u otras causas fortuitas, pero excluyendo la falta de materiales. El contratista deberá reclamar semanalmente las extensiones de tiempo que reclame por las causas antes especificadas indicando el desglose del tiempo perdido y sus causas. Dichas extensiones de tiempo se aprobarán únicamente mediante un Aviso de Cambio debidamente autorizado por el representante de UPR Ponce.

2. La suma estipulada como precio del proyecto será satisfecha por la UPR Ponce en pagos parciales, por áreas, previa certificación del proponente y aprobada por el Decano de Administración, siguiendo las recomendaciones del Director de Recursos Físicos de la Universidad de Puerto Rico en Ponce. El proponente presentará facturas certificadas para pago según se estipula en esta sección. El representante de la UPR Ponce, dentro de los veinte días luego de recibida la factura, emitirá una certificación para pago. La UPR Ponce realizará el pago de esta factura en un término no mayor de quince días a partir de la certificación, conforme a las retenciones establecidas. La UPR Ponce retendrá el 10 (diez) porciento de cada factura certificada. Este importe será pagado una vez el proyecto sea aceptado satisfactoriamente.

3. El desempeño negligente de sus funciones o el abandono de éstos por el proponente se considerará una violación del contrato otorgado y será causa suficiente para que la UPR Ponce lo declare terminado y quede relevado de toda obligación y responsabilidad bajo el mismo.

4. El proponente asegura que está legalmente autorizado y registrado en su profesión en el Estado Libre Asociado de Puerto Rico y certifica que se encuentra cualificado y con las licencias requeridas para ejecutar el proyecto. Así también, certifica que cuenta con el equipo, mano de obra, organización y financiamiento requerido para llevar a cabo el proyecto.

5. El término “proyecto” incluirá todo lo que el proponente venga obligado a realizar para llevar a cabo o completar satisfactoriamente todos sus deberes requeridos en los documentos de este proyecto. El proponente será responsable de tramitar todos los documentos de fianzas, seguros y otros requeridos, suministrar toda labor de supervisión y ejecución, materiales, licencias, suministros, equipos, instalaciones, herramientas y otras utilidades, según requeridos en esta subasta.

6. La UPR Ponce no será responsable por daños que sufra el proponente causados por interrupciones de luz, agua, actos de fuerza mayor, ni por cierres de la Institución que sean decretados por cualquier causa. La Institución no será responsable del hurto, apropiación ilegal o cualquier acto delictivo que se cometa contra los empleados, agentes y contra la propiedad del proponente. Tampoco será responsable por daños o pérdidas a la propiedad por motivo de incendio, huracán, terremoto, inundaciones y cualquier acto de fuerza mayor.

7. La UPR Ponce y el proponente se comprometen a no discriminar por razones de edad, sexo, raza, color, nacimiento, origen o condición social, impedimento físico, creencias políticas o religiosas o status de veteranos en las prácticas de empleo, contratación y sub-contratación, a tenor con la legislación estatal y federal vigente.

8. El proponente deberá entregar un Memorando Explicativo que describa su historial empresarial, su capacidad y peritaje técnico, la experiencia y preparación de sus agentes principales y un listado de proyectos realizados en los pasados tres años que incluya: descripción de las obras, costo total de cada proyecto, nombre de la entidad que recibió los servicios con su dirección y teléfonos de contacto. Debe incluir además tres (3) cartas de referencia, con información de contacto, que acrediten la culminación exitosa de proyectos similares realizados durante este periodo de tiempo.

9. El proponente entregará estados financieros de la compañía (último año fiscal o natural) al momento de presentar su licitación.

10. El proponente no podrá traspasar ni negociar el contrato otorgado a personas o entidad alguna sin el consentimiento expreso de la UPR Ponce. UPR Ponce se reserva el derecho de rescindir el mismo en el momento en que el proponente falle en la ejecución de cualquier servicio especificado en el contrato otorgado o en caso de actos de negligencia, abandono de deberes o incumplimiento. El proponente presentará una lista con la información de las empresas a ser subcontratadas para la realización de la obra.

11. Según estipulado en la Orden Ejecutiva OE-2018-033 emitida por el gobernador de Puerto Rico se dispone que todo proyecto de construcción financiado parcial o totalmente con fondos del gobierno de Puerto Rico, sus agencias, instrumentalidades y corporaciones públicas tendrá como condición de su otorgamiento que el contratista pague a los trabajadores que allí laboren un salario mínimo de quince dólares ($15.00) por hora, así como certificar que el cemento a utilizarse sea producido en Puerto Rico. La Carta Circular número 2018-01 del Departamento del Trabajo y Recursos Humanos establece una guía interpretativa y normas vinculantes en cuanto a la implementación de la OE-2018-033.

12. Se advierte al proponente que el Proyecto se financia con fondos federales por lo que aplica el *Buy American Act*. Aplicarán además, los *Procurement Standard*s establecidos en el *Uniform Guidance* 2 CFR 200 del gobierno federal.

13. Conforme a la Orden Ejecutiva del Gobernador 2021-062 todo contratista o sus empleados que realicen labores presenciales en la UPR Ponce deberá, excepto las excepciones permitidas, presentar evidencia de vacunación contra el COVID19.

14. El proponente deberá proveer su número de registro en DUNS y del "System for Award Management" (SAM). Referencia: https://sam.gov/content/entity-registration

15. Cualquier cambio o modificación que las partes acuerden con respecto a los términos y condiciones del contrato otorgado, incluidos los servicios y cuantía, deberá incorporarse al contrato mediante enmienda formal, por escrito, de acuerdo a las normas que rigen la contratación en la UPR Ponce.

16. El proponente presentará su propuesta utilizando el formato provisto por la Junta de Subastas de la Universidad de Puerto Rico en Ponce para este propósito (presentación de oferta), la hoja de cotejo, así como todos los documentos requeridos en los pliegos de subasta.

17. El licitador debe especificar la marca del generador propuesto e incluir un documento con las especificaciones y los términos de garantía del manufacturero.

No se aceptarán precios estimados o fórmulas para calcular precios o descripciones de los equipos, materiales o servicios ofrecidos que puedan prestarse a diversas interpretaciones.

La Junta de Subasta no considerará ofertas de licitadores que no hayan cumplido a cabalidad sus compromisos anteriores con la Universidad.

Mientras las ofertas estén bajo consideración, los licitadores, sus representantes u otras partes interesadas se abstendrán de comunicarse por cualquier medio con personal de la Universidad en cuestiones relacionadas con la subasta.

Ningún funcionario o empleado de la Universidad ni los miembros de su familia, se comunicará con los licitadores o con personas ajenas a la Universidad para ofrecer información relacionada con subastas bajo consideración.

Descripción del proceso de subasta: La asistencia a la reunión presubasta y recorrido de facilidades es **compulsoria** y se efectuará a la **1:30pm del viernes, 4 de febrero** de 2021 en el Salón 247 del Edificio Ruth Fortuño de la Universidad de Puerto Rico en Ponce. Todos los participantes deberán presentar evidencia de estar vacunados contra el COVID19 o presentar una prueba negativa tomada dentro de 72 horas de la reunión, asistir con mascarilla, mantener el distanciamiento social requerido y cumplir con los protocolos de seguridad establecidos por la institución. A toda persona que NO cumpla estos requisitos NO le será permitido acceso a la institución.

Las propuestas se recibirán entre los días **20 de enero de 2022 de 8:30am a 11:45am y de 1:00pm a 4:15pm hasta las 10:45am del viernes, 4 de marzo de 2022** en la Oficina de Compras ubicada en el Decanato de Administración en UPR Ponce. No se aceptarán propuestas después de la fecha y hora señalada. La Apertura de Ofertas de Subastas se realizará a las **11:00am del viernes, 4 de marzo de 2022** en el Salón 247 del Edificio Ruth Fortuño de la Universidad de Puerto Rico en Ponce.

Los licitadores podrán estar presentes durante la Apertura de Ofertas de Subastas (aplicarán los protocolos de prevención contra el COVID19 antes mencionados). Al abrirse las ofertas, los miembros de la Junta presentes y el Secretario verificarán que: (a) todas las ofertas estén firmadas en tinta por el licitador, (b) el nombre de la persona que firma aparezca en letra de molde, (c) se indique en qué calidad firma y el puesto que ocupa en la empresa, (d) aparezcan anotados el nombre, la dirección comercial física y postal, número identificación patronal, el teléfono y el correo electrónico, de conformidad con lo dispuesto en este Reglamento. Se dará lectura en público de cada oferta y se les dará suficiente tiempo a los licitadores para que, en el salón de apertura o en un sitio designado y en presencia del Secretario de la Junta de Subastas, inspeccionen cada oferta o parte de ella, excepto aquellos documentos que sean considerados confidenciales.

La Junta de Subastas, a su discreción, podrá referir las propuestas a un Comité Evaluador designado por esta. Este comité tendrá la encomienda de evaluar las propuestas siguiendo el procedimiento establecido en la Certificación Número 30, 2008-2009 de la Junta de Síndicos de la Universidad de Puerto Rico y los parámetros de los pliegos de subasta.

En dicho caso, el Comité Evaluador presentará a la Junta de Subastas sus recomendaciones en torno a la propuesta que mejor sirva los intereses de la Institución. La Junta de Subastas procederá a adjudicar de conformidad a lo establecido en el Artículo 23.H de la referida Certificación Núm. 30. Se notificará mediante correo certificado tanto al licitador seleccionado como a los demás licitadores.

Instrucciones: Las ofertas deberán ser entregadas en un sobre sellado. El mismo debe estar identificado de la siguiente forma:

- Nombre del Licitador
- Dirección
- Teléfono
- Correo electrónico
- Nombre de la Subasta (Identificación del Proyecto)
- Fecha y hora de entrega de la propuesta

Toda oferta deberá estar firmada por el proponente o la persona autorizada mediante la Resolución Corporativa emitida por la compañía. Asimismo, el documento deberá tener las iniciales del proponente en todas sus páginas. Los precios cotizados deberán estar garantizados por ciento veinte (120) días a partir del día de la apertura de pliegos.

a. Si el licitador es una sociedad, su oferta estará firmada en tinta a nombre de dicha sociedad, por un socio o representante autorizado para obligarla.
b. Si el licitador es una corporación, su oferta estará firmada en tinta con el nombre corporativo seguido de la firma y designación de su Presidente, Secretario u otro oficial autorizado para obligarla.
c. Los nombres de los firmantes deberán ser mecanografiados o impresos bajo las firmas en tinta. La oferta de una persona que añade a su firma “Presidente”, “Secretario”, “Agente” u otra designación sin revelar su principal, estará descalificada.

No se aceptarán ofertas por teléfono ni por medios electrónicos.

Si aplica, la oferta debe incluir reclamación de que se aplique al licitador lo dispuesto en la Ley Núm. 14, sustentada con los documentos que evidencien el por ciento de preferencia otorgado por la Junta de Inversión en la Industria Puertorriqueña.

Una oferta abierta prematuramente, por haber sido incorrectamente dirigida será descalificada.

A menos que en el pliego de subasta se solicite o se autorice más de una alternativa, ningún licitador podrá someter más de una oferta, y de así hacerlo, todas las ofertas sometidas por ese licitador serán descalificadas.

En caso de que el licitador invitado no esté en condiciones de cotizar, debe devolver la invitación a la Secretaria de la Junta de Subastas indicando la(s) razón(es) e informando si desea recibir futuras invitaciones.

Las correcciones o tachaduras en la oferta deberán estar debidamente firmadas con las iniciales por el licitador, en manuscrito, con tinta indeleble. De lo contrario, quedará invalidada la oferta para la(s) partidas(s) correspondiente(s).

Criterios de Evaluación: Los licitadores tendrán que cumplir con los criterios establecidos en los pliegos de subastas, sus anejos y especificaciones técnicas según provistas. Además del precio, se dará especial consideración a la capacidad operacional del licitador para realizar los servicios

y trabajos de la subasta bajo consideración; la calidad, garantía, adaptabilidad y compatibilidad de los materiales, efectos, equipos o servicios para los fines deseados; la capacidad económica del licitador; su pericia, experiencia, reputación e integridad comercial y capacidad para prestar los servicios complementarios que apliquen tales como adiestramiento, mantenimiento, garantía, piezas de repuesto, así como el plan de trabajo y culminación del proyecto propuesto.

El licitador seleccionado deberá presentar evidencia de las cubiertas de seguro desde su contratación hasta el momento en que finalice el contrato. Esta evidencia se requerirá al momento de la firma del contrato.

DOCUMENTOS REQUERIDOS AL SOMETER LA OFERTA

1. Presentación de Oferta (documento adjunto)

2. Hoja de Cotejo (documento adjunto)

3. Garantía de oferta: La oferta debe venir acompañada por una garantía o fianza de licitación (BID BOND) por la cantidad igual al 5% del valor total de la oferta, pagadero a la Universidad de Puerto Rico. La garantía de oferta tendrá vigencia de noventa (90) días calendario o más, y tendrá que provenir de una compañía de seguros debidamente certificada por el Comisionado de Seguros de Puerto Rico. La proposición que no venga acompañada por esta garantía no será considerada y se devolverá al remitente.
4. Certificación vigente del Registro Único de Licitadores de la Administración de Servicios Generales.

5. Estados financieros

6. Memorando explicativo

7. Tres cartas de referencia

8. Plan de trabajo

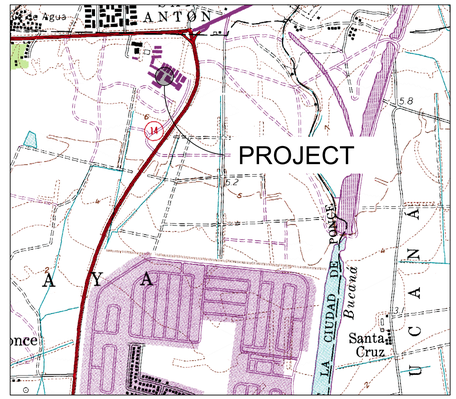
9. Especificaciones y términos de garantía del manufacturero

TODA LICITACIÓN QUE NO CONTENGA EN EL SOBRE SELLADO TODOS LOS DOCUMENTOS REQUERIDOS SERÁ DESCUALIFICADA

Conforme al Reglamento sobre Adquisición de Equipos, Materiales y Servicios No Personales de la Universidad de Puerto Rico, CERTIFICACIÓN NÚMERO 30 (2008-2009), la Junta de Subastas no considerará ofertas de licitadores que no hayan cumplido a cabalidad sus compromisos anteriores con la Universidad o con agencias gubernamentales o clientes privados. En caso de incumplimiento, la Junta notificará a la Oficina de Compras para que los participantes sean eliminados del Registro de Licitadores. La Junta de Subastas velará porque los licitadores que reciban la buena pro de la subasta sean personas naturales o jurídicas: (1) de sólida solvencia moral y económica, según se refleje en la presentación de los documentos requeridos y estados financieros; (2) que posean la experiencia y capacidad necesaria demostrada por transacciones similares a la de la subasta; (3) que tengan vigentes las licencias, permisos o franquicias necesarias y requeridas por las leyes y reglamentos aplicables; y (4) que cuando hubieren participado en otras transacciones con la Universidad hayan cumplido a cabalidad con sus obligaciones. Todo solicitante que tenga deuda con cualquier agencia gubernamental, deberá someter copia del plan de pago acordado o entregar documento oficial que certifique el pago total de la deuda.

LA JUNTA DE SUBASTAS SE RESERVA EL DERECHO DE RECHAZAR UNA O TODAS LAS PROPUESTAS Y DE ADJUDICAR LA BUENA-PRO A UN POSTOR QUE NO SEA EL MÁS BAJO EN PRECIO, CUANDO A JUICIO DE ESTA RESPONDA A LOS MEJORES INTERESES DE LA UPR-PONCE.

ELECTRICAL PLANS FOR:
ADELINA COPIN LIBRARY
ELECTRICAL GENERATOR SET
LOCATED AT PUERTO RICO UNIVERSITY
OF PONCE, PUERTO RICO



LOCATION PLAN

SCALE: 1: 20,000

COORDENADAS LAMBERT: X=195,541.1276 Y=220,697.0903

REVISIONES

NUM.	FECHA	DESCRIPCION

NOMBRE DEL PROYECTO:
ADELINA COPIN LIBRARY ELECTRICAL GENERATOR

NOMBRE DE LA HOJA:
TITLE SHEET

DIBUJADO POR:
E. TARAFA

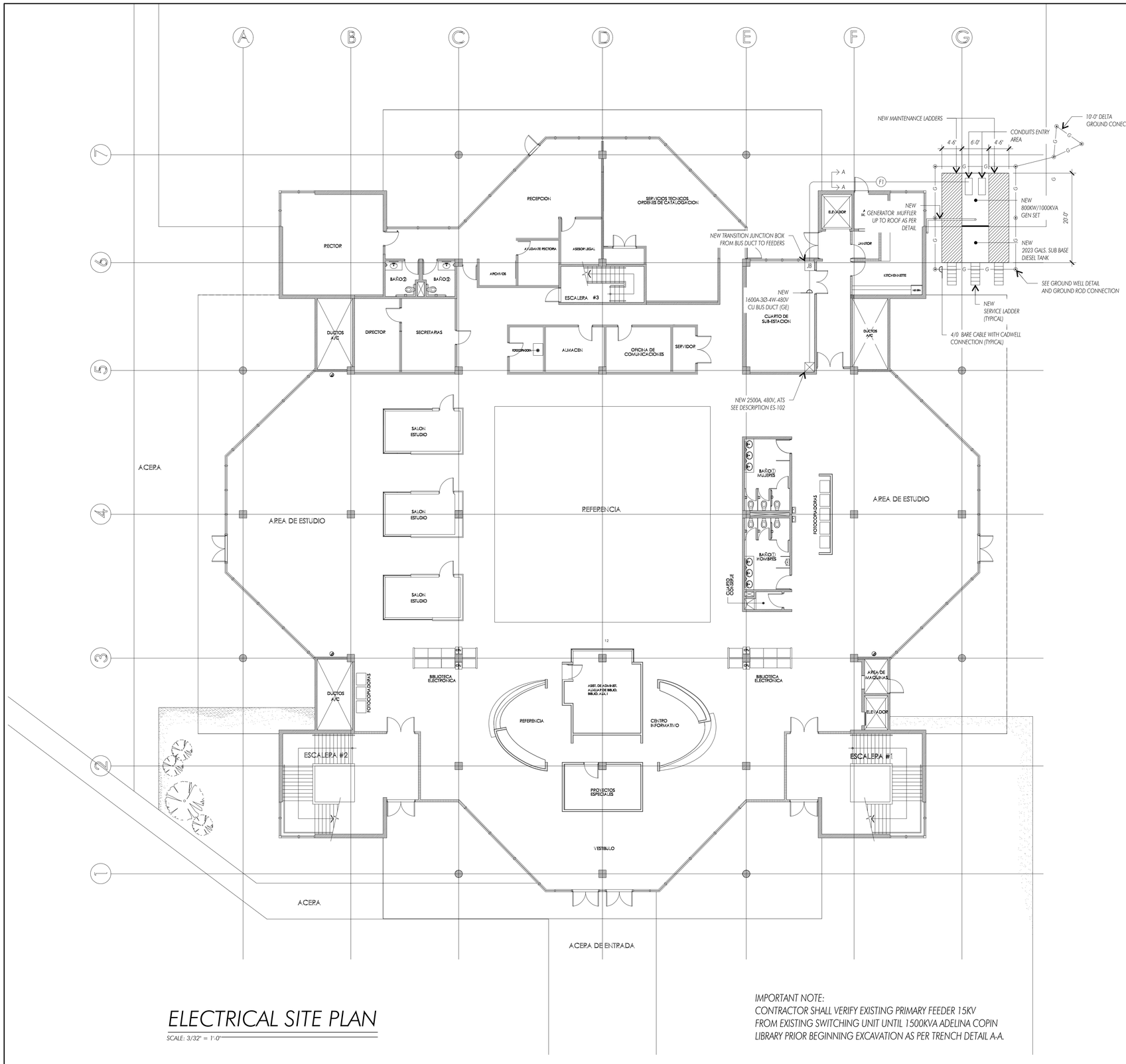
APROBADO POR:
E. TARAFA

ESCALA
N.T.S.

FECHA
ENERO 2021

HOJA
TES101

NUM.
1 DE 4



ELECTRICAL SITE PLAN

SCALE: 3/32" = 1'-0"

IMPORTANT NOTE:
CONTRACTOR SHALL VERIFY EXISTING PRIMARY FEEDER 15KV FROM EXISTING SWITCHING UNIT UNTIL 1500KVA ADELINA COPIN LIBRARY PRIOR BEGINNING EXCAVATION AS PER TRENCH DETAIL A-A.

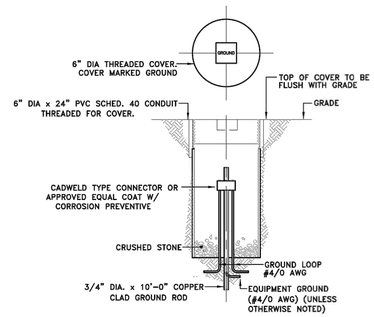
IMPORTANT NOTES:

1-CONTRACTOR SHALL PREPARE AND DELIVER TO OWNER & DESIGNER, FOR THEIR APPROVAL, A DETAILED SUBMITTAL OF ALL ELECTRICAL EQUIPMENT AND/OR MATERIALS RELATED TO THE WORKS SHOWN ON THE ONE LINE DIAGRAMS, PRIOR TO RELEASING FOR FABRICATION. THESE SUBMITTALS SHALL INCLUDE SHOP DRAWINGS, AC AND DC WIRING DIAGRAMS, INSTALLATION PLANS, OPERATIONS/MAINTENANCE MANUALS AND ANY OTHER ITEM LISTED IN THE "SUBMITTALS" SECTION OF THE CONTRACTOR SPECIFICATIONS OR AS REQUIRED BY OWNER.

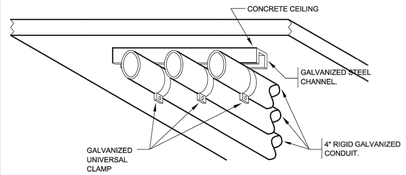
SYSTEM PROTECTION NOTES:

1-THE CONTRACTOR MUST ENGAGE AN ELECTRICAL CONSULTING FIRM TO PERFORM A SHORT CIRCUIT AND PROTECTION COORDINATION STUDY TO ESTABLISH THE REQUIRED PROTECTION SETTINGS FOR THE FEEDER BREAKERS.

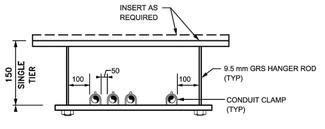
2-THE CONTRACTOR MUST SUBMIT THE PROTECTION COORDINATION STUDY TO DESIGNER TO OBTAIN THE REQUIRED APPROVAL. THE SUBMITTAL MUST BE PERFORMED NOT LATE THAN 60 DAYS BEFORE THE PROJECT ENERGIZATION DATE.



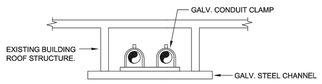
GROUND WELL DETAIL AND
GROUND ROD CONNECTION
N.T.S.



MOUNTING DETAIL
N.T.S.



CONDUIT HANGER (TYP.)
N.T.S.



CONDUIT SUPPORT
N.T.S.

REVISIONES			
NUM.	FECHA	DESCRIPCION	

NOMBRE DEL PROYECTO:
ADELINA COPIN LIBRARY ELECTRICAL GENERATOR

NOMBRE DE LA HOJA:
ELECTRICAL SITE PLAN

DIBUJADO POR:
E. TARAFA

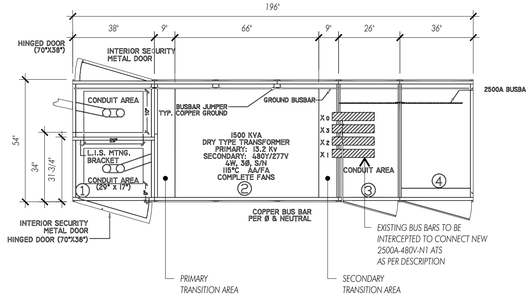
APROBADO POR:
E. TARAFA

ESCALA
3/32=1'-0"

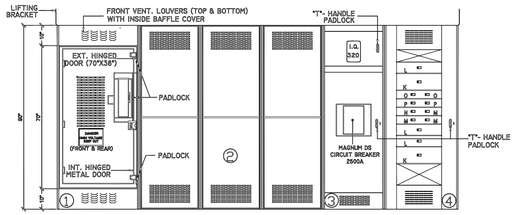
FECHA
ENERO 2021

HOJA
ES101

NUM.
2 DE 4



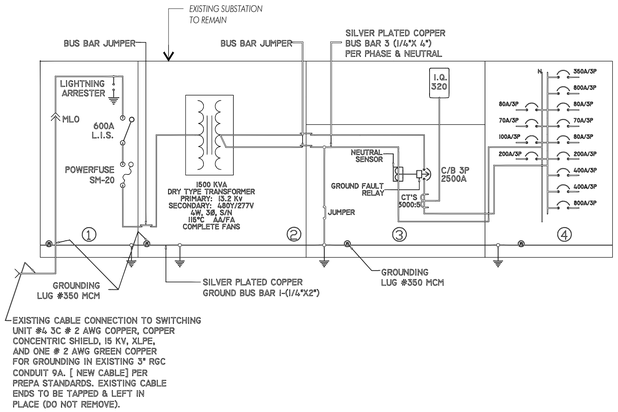
TOP VIEW



FRONT VIEW

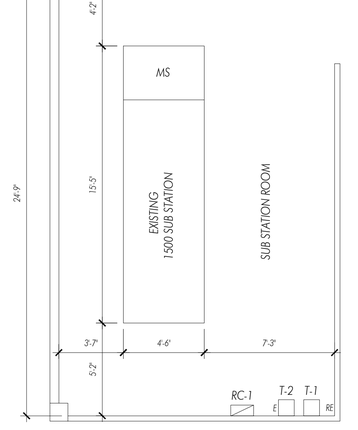
EXISTING 1500KVA SUBSTATION

NOT TO SCALE



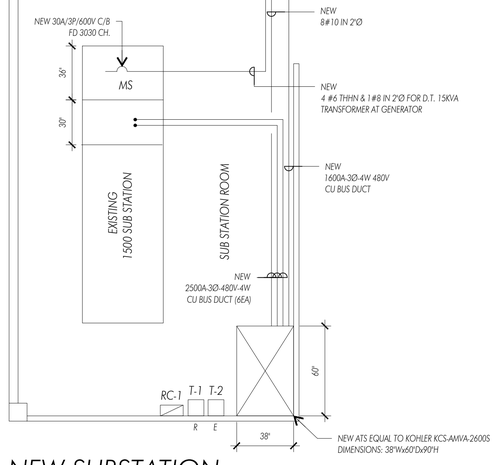
EXISTING ONE LINE DIAGRAM

NOT TO SCALE



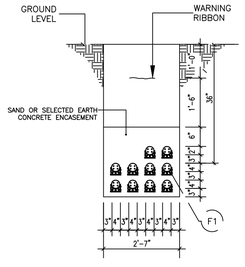
EXISTING SUBSTATION ROOM BLOW UP

SCALE: 1/4 = 1'-0"



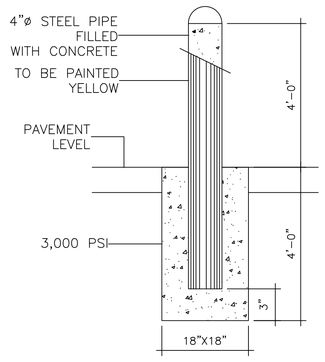
NEW SUBSTATION ROOM BLOW UP

SCALE: 1/4 = 1'-0"



TRENCH DETAIL A-A

NTS



PROTECTION PIPE DETAIL

NOT TO SCALE

RC-1 — EXISTING PANELBOARD TO REMAIN

T-# — EXISTING DRY TYPE TRANSFORMER 45KVA 480V-120/208V
E= TO REMAIN, RE=TO BE RELOCATED, R=RELOCATED

REVISIONES

NUM.	FECHA	DESCRIPCION

NOMBRE DEL PROYECTO: ADELINA COPIN LIBRARY ELECTRICAL GENERATOR

NOMBRE DE LA HOJA: ELECTRICAL DETAILS

DIBUJADO POR: E. TARAFA

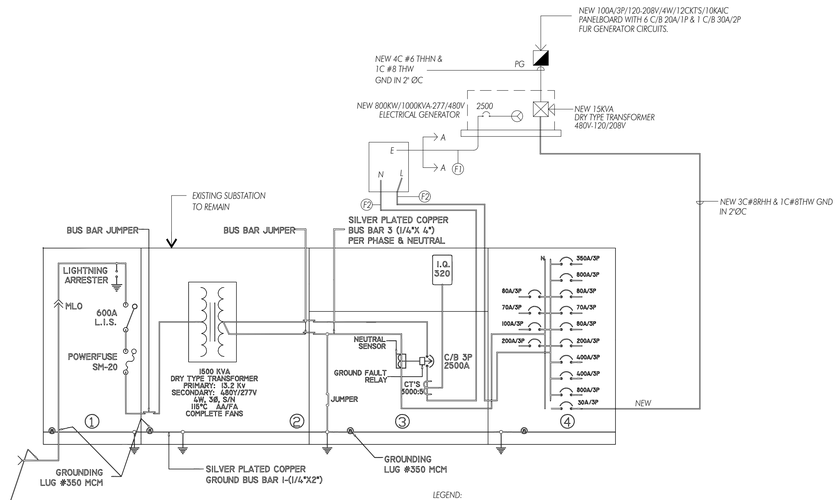
APROBADO POR: E. TARAFA

ESCALA AS SHOWN

FECHA ENERO 2021

HOJA ES102

NUM. 3 DE 4



LEGEND:

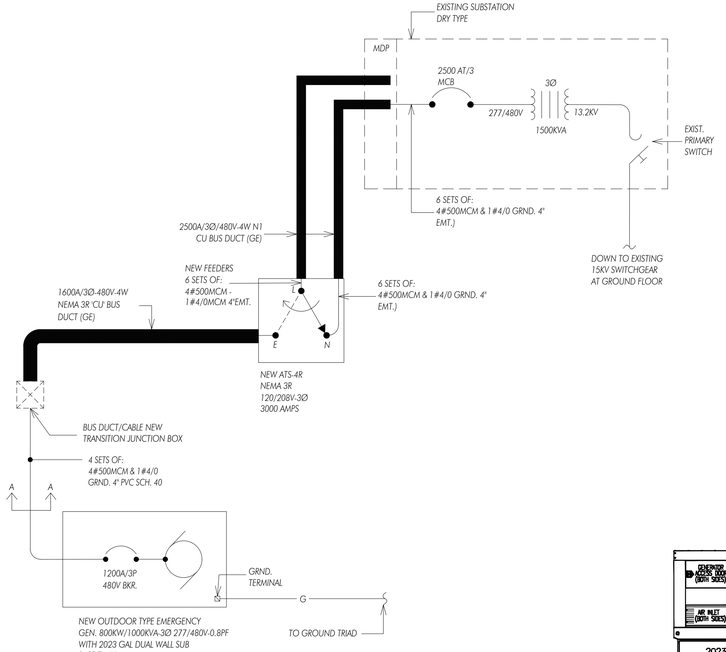
(F1) *4 SETS OF (3½0 MCM RHH2 - 1#4/0 GND-4"Ø) ALSO PROVIDE 1-4"Ø SPARE CONDUIT AND 1-2"Ø WITH 8C#10 THHN FOR CONTROL WIRING*

PVC-UNDERGROUND
EMT-INSIDE HUNG CEILING
RGS-EXPOSED

(F2) *NEW 2500A-3Ø, 480V, 4W W BUS DUCT*

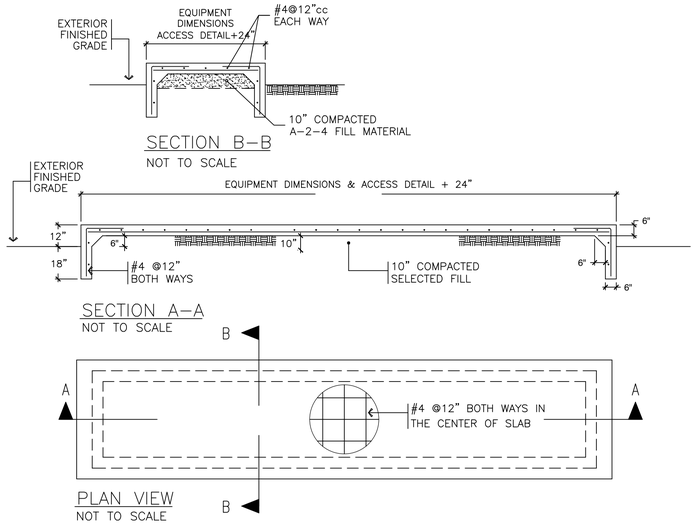
NEW ONE LINE DIAGRAM

NOT TO SCALE



ONE LINE DIAGRAM

NOT TO SCALE



NEW GENERATOR CONCRETE PAD DETAILS

EMERGENCY GENERATOR AND TRANSFER SWITCH SPECIFICATIONS

1- THE EMERGENCY GENERATOR SHALL BE FURNISHED COMPLETE WITH A FUEL (DIESEL) TANK, AUTOMATIC TRANSFER SWITCH (ES), BATTERY, AUTOMATIC BATTERY CHARGER, AND ALL THE REQUIRED ACCESSORIES FOR NORMAL OPERATION.

2- THE EMERGENCY GENERATOR SHALL BE RATED AS FOLLOWS:

KW = 800
KVA = 1000 AT 0.8 POWER FACTOR.
PHASES = 3
WIRES = 4
VOLTS = 277/480V
HERTZ = 60
R. P. M. = 1800

THE EMERGENCY GENERATOR SHALL BE EQUAL OR SIMILARTO : KOHLER 800 REOZVB THE UNIT SHALL BE SKID MOUNTED.

3- THE UNIT IS TO INCLUDE THE FOLLOWING EQUIPMENT AND ACCESSORIES:

A) WATER COOLED RADIATOR.
B) ONE (1) SUB-BASE GROUND FUEL VERTICAL (DIESEL) TANK OF 2023 GALLONS CAPACITY WITH ALL FUEL SUPPLY, RETURN AND VENTILATION LINES AND EQUIPMENT. ONE (1) DIESEL FUEL RESERVOIR DAY TANK.
C) TWO (2) 24 VOLTS, HEAVY DUTY BATTERY WITH RACK AND

D) EXHAUST CRITICAL TYPE MUFFLER WITH STEEL CONNECTIONS AND FITTINGS, INCLUDING FLEXIBLE SECTION AND RAIN CAP FOR EXHAUST.
E) VIBRATION ISOLATORS OF THE SIZE, NUMBER AND TYPE REQUIRED BY THE PLANT MANUFACTURER.
F) SCREEN, BAFFLED, LOUVERED AIR INTAKE.
G) DUCTED, BAFFLED, LOUVERED AND SCREENED HOT AIR DISCHARGE.
H) PUMPS AND FILTERS AS REQUIRED.
I) RELAYS AND CONTACTORS AS REQUIRED FOR REMOTE CONTROL FROM TRANSFER SWITCH.
J) INSTRUMENTS AND CONTROL PANEL INCLUDING THE FOLLOWING:
a. VOLTMETER AND SELECTOR SWITCH.
b. AMMETER AND SELECTOR SWITCH.
c. WATTMETER AND SELECTOR SWITCH.
d. FREQUENCY METER AND SELECTOR SWITCH.
e. RUNNING TIME METER.
f. FIELD CIRCUIT BREAKER (S).
g. VOLTAGE REGULATOR WITH TWO (2) POSITION (OFF AND AUTOMATIC) SWITCH.
h. WATER TEMPERATURE GAUGE.
i. OIL PRESSURE GAUGE.
j. AUTOMATIC SHUTDOWN DEVICE WITH INDICATOR LIGHTS FOR:
(1) OVER CRANKING PROTECTION.
(2) HIGH WATER TEMPERATURE.
(3) LOW OIL PRESSURE.
k. START/STOP SWITCH.
l. REMOTE START/STOP TERMINALS.

K) AUTOMATIC TRANSFER SWITCH (EQUAL OR SIMILAR TO ONAN OTPC WITH CONTROL LEVEL 2).

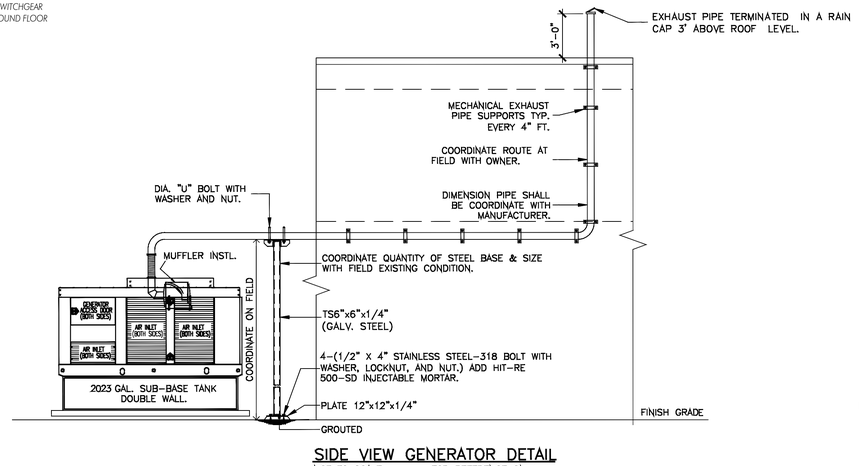
DESIGNATION:	ATS KOHLER KCS-AMVA-2600S		
AMPS:	2500		TO BE INSTALLED IN MSB (MAIN SWITCH BOARD) ENCLOSURE
VOLTS:	277/480V		
PHASES:	3		
WIRES:	4		
NEMA TYPE:	NSR		

THE TRANSFER SWITCH (ES) SHALL BE FOR OPERATION AT 60 HERTZ AND SHALL BE PROVIDED WITH THE REQUIRED PILOT LIGHTS ON THE DOOR AND WITH THE FOLLOWING ACCESSORIES:
a. SELECTOR SWITCH WITH OFF-AUTOMATIC CHECK POSITIONS.
b. TIME DELAY IN TRANSFER TO EMERGENCY ENGINE START, ADJUSTABLE FROM ½ TO 180 SECONDS.
c. TIME DELAY ON RESTORATION TO NORMAL POWER, ADJUSTABLE FROM 30 SECONDS TO 10 MINUTES.
d. CLOCK EXERCISER TO START GENERATOR SET AUTOMATICALLY. IT SHALL OPERATE EVERY WEEK AND RUN THE GENERATOR SET FOR ONE (1) HOUR AND THEN, STOP THE GENERATOR SET AUTOMATICALLY.
e. ALL OTHER ACCESSORIES REQUIRED FOR NORMAL OPERATION.
f. TIME DELAY RELAYS AND CONTACTORS (IF SO REQUIRED) TO ACHIEVE THE FOLLOWING STARTING SEQUENCE TO OPERATE

4. REMARKS:
A) ALL ELBOWS SHALL BE OF THE LONG RADIUS TYPE.
B) THE DIAMETER OF THE EXHAUST PIPE MUST BE INCREASED 1" FOR EACH 10 FEET OF VERTICAL RUN AFTER THE FIRST 10 FEET.
C) THE CONTRACTOR SHALL LEAVE BOTH TANKS FULL OF DIESEL FUEL OF THE TYPE REQUIRED FOR THE OPERATION OF THE EMERGENCY GENERATOR.
D) THE CONTRACTOR SHALL MAKE SURE THAT THE CONNECTIONS AT THE DIESEL FUEL TANKS ARE TIGHT BEFORE PROCEEDING WITH THE FINAL INSTALLATION OF THE TANKS.
E) THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE COMPLETE INSTALLATION OF THE EMERGENCY GENERATOR WITH ALL ITS NECESSARY FITTINGS AND APPURTENANCES. THIS SHALL BE DONE ACCORDING TO THE MANUFACTURERS SPACIFICATIONS AND INSTRUCTIONS. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR LEAVING THE EMERGENCY POWER GENERATING SYSTEM IN PERFECT OPERATING CONDITIONS.
F) THE STRUCTURAL DETAILS SHOWN IN THE ELECTRICAL DRAWINGS FOR THE SUPPORT OF THE DIESEL FUEL TANK ARE OF A GENERAL NATURE. IT CORRESPONDS TO THE CONTRACTOR TO PROVIDE THE CORRECT TYPE AND SIZE OF STRUCTURAL SUPPORTS ACCORDING TO THE ACTUAL DIMENSIONS AND CHARACTERISITICS OF THE TANK PURCHASED.

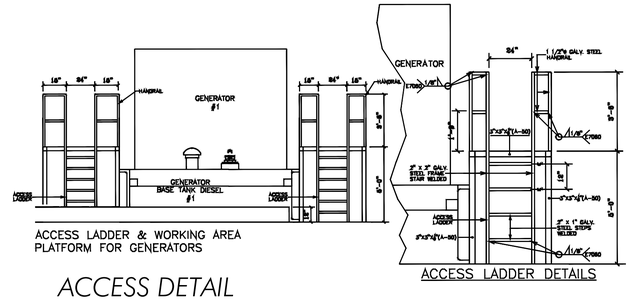
G) VOID

IMPORTANT NOTE:
1-PROVIDE WEATHER HOUSING ENCLOSURE NSR
SUPER SOUND ATTENUATED (25dB BELOW NORMAL TYPE OPERATION)



SIDE VIEW GENERATOR DETAIL

NOT TO SCALE FOR REFERENCE ONLY



ACCESS LADDER & WORKING AREA PLATFORM FOR GENERATORS

ACCESS DETAIL

NOT TO SCALE

ACCESS LADDER DETAILS

REVISIONES

NUM.	FECHA	DESCRIPCION

NOMBRE DEL PROYECTO: ADELINA COPIN LIBRARY ELECTRICAL GENERATOR

NOMBRE DE LA HOJA: ELECTRICAL DETAILS 2

DIBUJADO POR: E. TARAFA

APROBADO POR: E. TARAFA

ESCALA AS SHOWN

FECHA ENERO 2021

HOJA ES103

NUM. 4 DE 4

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EMERGENCY GENERATOR

TABLE OF CONTENTS

SPECS

Section

SECTION 16231 - PACKAGED ENGINE GENERATOR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes packaged engine-generator sets for [**emergency**] [**standby**] power supply with the following features:

1. [**Gas**] [**Diesel**] engine.
2. [**Unit-mounted**] [**Remote-mounting**] cooling system.
3. [**Unit-mounted**] [**Remote-mounting**] control and monitoring.
4. Performance requirements for sensitive loads.
5. Load banks.
6. Outdoor enclosure.

B. Related Sections include the following:

1. Division 16 Section "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

1.3 DEFINITIONS

A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

B. LP: Liquid petroleum.

1.4 SUBMITTALS

A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:

1. Thermal damage curve for generator.
2. Time-current characteristic curves for generator protective device.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
2. Design Calculations: Signed and sealed by a qualified professional engineer. Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
3. Vibration Isolation Base Details: Signed and sealed by a qualified professional engineer. Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include base weights.
4. Wiring Diagrams: Power, signal, and control wiring.

C. Manufacturer Seismic Qualification Certification: Submit certification that [**day tank,**]engine-generator set, batteries, battery racks, accessories, and components will withstand seismic forces defined in Division 16 Section "Electrical Supports and Seismic Restraints." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

    a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
    b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Qualification Data: For [**installer**] [**manufacturer**] [**and**] [**testing agency**].

E. Source quality-control test reports.

1. Certified summary of prototype-unit test report.
2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
3. Certified Summary of Performance Tests: Certify compliance with specified requirement to meet performance criteria for sensitive loads.
4. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
5. Report of sound generation.
6. Report of exhaust emissions showing compliance with applicable regulations.
7. Certified Torsional Vibration Compatibility: Comply with NFPA 110.

F. Field quality-control test reports.

G. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:

1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.

H. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1. Maintenance Proximity: Not more than [**four**] <**Insert number**> hours' normal travel time from Installer's place of business to Project site.
2. Engineering Responsibility: Preparation of data for vibration isolators and seismic restraints of engine skid mounts, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within [**200 miles (321 km)**] <**Insert number of miles (kilometers)**> of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL), and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

D. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

F. Comply with ASME B15.1.

G. Comply with NFPA 37.

H. Comply with NFPA 70.

I. Comply with NFPA 99.

J. Comply with NFPA 110 requirements for Level [**1**] [**2**] emergency power supply system.

K. Comply with UL 2200.

L. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

M. Noise Emission: Comply with [**applicable state and local government requirements**] <**Insert Project criteria**> for maximum noise level at [**adjacent property boundaries**] <**Insert critical locations**> due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Notify [**Architect**] [**Construction Manager**] [**Owner**] no fewer than [**two**] <**Insert number**> days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without [**Architect's**] [**Construction Manager's**] [**Owner's**] written permission.

B. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: [**5 to 40 deg C**] [**Minus 15 to plus 40 deg C**].
2. Relative Humidity: 0 to 95 percent.
3. Altitude: Sea level to [**1000 feet (300 m)**] <**Insert altitude**>.

C. Unusual Service Conditions: Engine-generator equipment and installation are required to operate under the following conditions:

1. [**High salt-dust content in the air due to sea-spray evaporation**] <**Insert unusual condition**>.

1.7 COORDINATION

A. Coordinate size and location of concrete bases for package engine generators[**and remote radiators mounted on grade**]. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

B. Coordinate size and location of roof curbs, equipment supports, and roof penetrations for remote radiators. These items are specified in Division 7 Section "Roof Accessories."

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: <**Insert number**> years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, provide [**12**] <**Insert number**> months' full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

1.10 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Product: Subject to compliance with requirements, provide [**the product indicated on Drawings**] <**Insert manufacturer's name; product name or designation**> or a comparable product by one of the following:

1. Caterpillar; Engine Div.
2. Generac Power Systems, Inc.
3. Kohler Co.; Generator Division.
4. Magnetek, Inc.
5. Onan/Cummins Power Generation; Industrial Business Group.

6. Spectrum Detroit Diesel.
7. <**Insert manufacturer's name.**>

2.2 ENGINE-GENERATOR SET

A. Factory-assembled and -tested, engine-generator set.

B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.

1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.

C. Capacities and Characteristics:

1. Power Output Ratings: Nominal ratings as indicated[**, with capacity as required to operate as a unit as evidenced by records of prototype testing**].
2. Output Connections: Three-phase, [**three**] [**four**] wire.
3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

D. Generator-Set Performance:

1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.
6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
8. Start Time: Comply with NFPA 110, Type 10, system requirements.

E. Generator-Set Performance for Sensitive Loads:

1. Oversizing generator compared with the rated power output of the engine is permissible to meet specified performance.

    a. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.

2. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.
3. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 second.
4. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.
5. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
6. Transient Frequency Performance: Less than 2-Hz variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.
7. Output Waveform: At no load, harmonic content measured line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
8. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to winding insulation or other generator system components.
9. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear load.

    a. Provide permanent magnet excitation for power source to voltage regulator.

10. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.3 ENGINE

A. Fuel: [**Fuel oil, Grade DF-2**] [**Natural gas with automatic LP-gas standby**] [**Natural gas**].

1. <**Insert specific fuel grade requirements.**>

B. Rated Engine Speed: 1800 rpm.

C. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm (11.4 m/s).

D. Lubrication System: The following items are mounted on engine or skid:

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.

2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

E. Engine Fuel System:

1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
2. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.
3. Dual Natural Gas with LP-Gas Backup (Vapor-Withdrawal) System:

    a. Carburetor.
    b. Secondary Gas Regulators: One for each fuel type.
    c. Fuel-Shutoff Solenoid Valves: One for each fuel source.
    d. Flexible Fuel Connectors: One for each fuel source.

F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.

G. Governor: [**Mechanical**] [**Adjustable isochronous, with speed sensing**].

H. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.

    a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
    b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

I. Cooling System: Closed loop, liquid cooled, with remote radiator and integral engine-driven coolant pump.

1. Configuration: [**Vertical**] [**Horizontal**] air discharge.

2. Radiator Core Tubes: [**Aluminum**] [**Nonferrous-metal construction other than aluminum**].
3. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
4. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
5. Fan: Driven by [**multiple belts from engine shaft**] [**totally enclosed electric motor with sealed bearings**].
6. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
7. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.

J. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 25 dB at 500 Hz.
2. Sound level measured at a distance of 10 feet (3 m) from exhaust discharge after installation is complete shall be [**85**] <**Insert number**> dBA or less.

K. Muffler/Silencer: Residential type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 18 dB at 500 Hz.
2. Sound level measured at a distance of 10 feet (3 m) from exhaust discharge after installation is complete shall be [**95**] <**Insert number**> dBA or less.

L. Muffler/Silencer: Industrial type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 12 dB at 500 Hz.
2. Sound level measured at a distance of 25 feet (8 m) from exhaust discharge after installation is complete shall be [**87**] <**Insert number**> dBA or less.

M. Air-Intake Filter: [**Standard**] [**Heavy**]-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

N. Starting System: [**12**] [**24**]-V electric, with negative ground.

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: [**As required by NFPA 110 for system level specified**] [**60 seconds**].

4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least [**twice**] [**three times**] without recharging.
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 10 deg C regardless of external ambient temperature within range specified in Part 1 "Project Conditions" Article. Include accessories required to support and fasten batteries in place.
7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
8. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:

    a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
    b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
    c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
    d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
    e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
    f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.4 FUEL OIL STORAGE

A. Comply with NFPA 30.

B. Day Tank: Comply with UL 142, freestanding, factory-fabricated fuel tank assembly, with integral, float-controlled transfer pump and the following features:

1. Containment: Integral rupture basin with a capacity of 150 percent of nominal capacity of day tank.

    a. Leak Detector: Locate in rupture basin and connect to provide audible and visual alarm in the event of day-tank leak.

2. Tank Capacity: [**As recommended by engine manufacturer for an uninterrupted period of 4 hours' operation at 100 percent of rated power output of engine-generator system without being refilled**] <**Insert gallons (liters)**>.
3. Pump Capacity: Exceeds maximum flow of fuel drawn by engine-mounted fuel supply pump at 110 percent of rated capacity, including fuel returned from engine.
4. Low-Level Alarm Sensor: Liquid-level device operates alarm contacts at 25 percent of normal fuel level.
5. High-Level Alarm Sensor: Liquid-level device operates alarm and redundant fuel shutoff contacts at midpoint between overflow level and 100 percent of normal fuel level.
6. Piping Connections: Factory-installed fuel supply and return lines from tank to engine; local fuel fill, vent line, overflow line; and tank drain line with shutoff valve.
7. Redundant High-Level Fuel Shutoff: Actuated by high-level alarm sensor in day tank to operate a separate motor device that disconnects day-tank pump motor. Sensor shall signal solenoid valve, located in fuel suction line between fuel storage tank and day tank, to close. Both actions shall remain in shutoff state until manually reset. Shutoff action shall initiate an alarm signal to control panel but shall not shut down engine-generator set.

C. Base-Mounted Fuel Oil Tank: Factory installed and piped, complying with UL 142 fuel oil tank. Features include the following:

1. Tank level indicator.
2. Capacity: Fuel for [**eight**] <**Insert number**> hours' continuous operation at 100 percent rated power output.
3. Vandal-resistant fill cap.
4. Containment Provisions: Comply with requirements of authorities having jurisdiction.

2.5 CONTROL AND MONITORING

A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.

B. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.

C. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.

D. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common wall-mounted control and monitoring panel.

E. Configuration: Operating and safety indications, protective devices, basic system controls, engine gages, instrument transformers, generator disconnect switch or circuit breaker, and other indicated components shall be grouped in a combination control and power panel. Control and monitoring section of panel shall be isolated from power sections by steel barriers. Panel features shall include the following:

1. Wall-Mounting Cabinet Construction: Rigid, self-supporting steel unit complying with NEMA ICS 6. Power bus shall be copper. Bus, bus supports, control wiring, and temperature rise shall comply with UL 891.
2. Switchboard Construction: Freestanding unit complying with Division 16 Section "Switchboards."
3. Switchgear Construction: Freestanding unit complying with Division 16 Section "Switchgear."
4. Current and Potential Transformers: Instrument accuracy class.

F. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level [**1**] [**2**] system, and the following:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
10. Fuel tank derangement alarm.
11. Fuel tank high-level shutdown of fuel supply alarm.
12. Generator overload.

G. Indicating and Protective Devices and Controls:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
10. Start-stop switch.
11. Overspeed shutdown device.
12. Coolant high-temperature shutdown device.
13. Coolant low-level shutdown device.

14. Oil low-pressure shutdown device.
15. Fuel tank derangement alarm.
16. Fuel tank high-level shutdown of fuel supply alarm.
17. Generator overload.

H. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

I. Connection to Data Link: A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication is reserved for connections for data-link transmission of indications to remote data terminals. Data system connections to terminals are covered in Division 16 Section "Electrical Power Monitoring and Control."

J. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.

1. Overcrank shutdown.
2. Coolant low-temperature alarm.
3. Control switch not in auto position.
4. Battery-charger malfunction alarm.
5. Battery low-voltage alarm.

K. Common Remote Audible Alarm: Signal the occurrence of any events listed below without differentiating between event types. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset.

1. Engine high-temperature shutdown.
2. Lube-oil, low-pressure shutdown.
3. Overspeed shutdown.
4. Remote emergency-stop shutdown.
5. Engine high-temperature prealarm.
6. Lube-oil, low-pressure prealarm.
7. Fuel tank, low-fuel level.
8. Low coolant level.

L. Remote Alarm Annunciator: Comply with NFPA 99. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

M. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.
2. Trip Rating: Matched to generator rating.
3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

B. Generator Circuit Breaker: Molded-case, electronic-trip type; 100 percent rated; complying with UL 489.

1. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
2. Trip Settings: Selected to coordinate with generator thermal damage curve.
3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

C. Generator Circuit Breaker: Insulated-case, electronic-trip type; 100 percent rated; complying with UL 489.

1. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
2. Trip Settings: Selected to coordinate with generator thermal damage curve.
3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

D. Generator Disconnect Switch: Molded-case type, 100 percent rated.

1. Rating: Matched to generator output rating.
2. Shunt Trip: Connected to trip switch when signaled by generator protector or by other protective devices.

E. Generator Protector: Microprocessor-based unit shall continuously monitor current level in each phase of generator output, integrate generator heating effect over time, and predict when thermal damage of alternator will occur. When signaled by generator protector or other generator-set protective devices, a shunt-trip device in the generator disconnect switch shall open the switch to disconnect the generator from load circuits. Protector shall perform the following functions:

1. Initiates a generator overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
2. Under single or three-phase fault conditions, regulates generator to 300 percent of rated full-load current for up to 10 seconds.

3. As overcurrent heating effect on the generator approaches the thermal damage point of the unit, protector switches the excitation system off, opens the generator disconnect device, and shuts down the generator set.
4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot.

F. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground-fault. Integrate ground-fault alarm indication with other generator-set alarm indications.

2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H or Class F.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Enclosure: Dripproof.

G. Instrument Transformers: Mounted within generator enclosure.

H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.

1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.

I. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

J. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

K. Subtransient Reactance: [**12**] <**Insert number**> percent, maximum.

2.8 LOAD BANK

A. Description: Permanent, outdoor, weatherproof, remote-controlled, forced-air-cooled, [**resistive**] [**resistive and reactive**] unit capable of providing a balanced 3-phase, delta-connected load to generator set at [**100**] <**Insert number**> percent rated-system capacity, at [**80**] <**Insert number**> percent power factor, lagging. Unit may be composed of separate

resistive and reactive load banks controlled by a common control panel. Unit shall be capable of selective control of load in 25 percent steps and with minimum step changes of approximately 5 and 10 percent available.

B. Resistive Load Elements: Corrosion-resistant chromium alloy with ceramic and steel supports. Elements shall be double insulated and designed for repetitive on-off cycling. Elements shall be mounted in removable aluminized-steel heater cases.

C. Reactive Load Elements: Epoxy-encapsulated reactor coils.

D. Load-Bank Heat Dissipation: Integral fan with totally enclosed motor shall provide uniform cooling airflow through load elements. Airflow and coil operating current shall be such that, at maximum load, with ambient temperature at the upper end of specified range, load-bank elements operate at not more than 50 percent of maximum continuous temperature rating of resistance elements.

E. Load Element Switching: Remote-controlled contactors switch groups of load elements. Contactor coils are rated 120 V. Contactors shall be located in a separate NEMA 250, Type 3R enclosure within load-bank enclosure, accessible from exterior through hinged doors with tumbler locks.

F. Contactor Enclosures: Heated by thermostatically controlled strip heaters to prevent condensation.

G. Load-Bank Enclosures: NEMA 250, Type 3R, complying with NEMA ICS 6. Louvers at cooling-air intake and discharge openings shall prevent entry of rain and snow. Openings for airflow shall be screened with 1/2-inch- (13-mm-) square, galvanized-steel mesh. Reactive load bank shall include automatic shutters at air intake and discharge.

H. Protective Devices: Power input circuits to load banks shall be fused, and fuses shall be selected to coordinate with generator circuit breaker. Fuse blocks shall be located in contactor enclosure. Cooling airflow and overtemperature sensors shall automatically shut down and lock out load bank until manually reset. Safety interlocks on access panels and doors shall disconnect load power, control, and heater circuits. Fan motor shall be separately protected by overload and short-circuit devices. Short-circuit devices shall be noninterchangeable fuses with 200,000-A interrupting capacity.

I. Remote-Control Panel: Separate from load bank in NEMA 250, Type 1 enclosure with a control power switch and pilot light, and switches controlling groups of load elements.

J. Control Sequence: Control panel may be preset for adjustable single-step loading of generator during automatic exercising.

2.9 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Vandal-resistant, weatherproof steel housing, wind resistant up to 100 mph (160 km/h). Multiple panels shall be lockable and provide adequate access to components requiring

maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.

B. Description: Prefabricated or preengineered walk-in enclosure with the following features:

1. Construction: Galvanized-steel, metal-clad, integral structural-steel-framed building erected on concrete foundation.
2. Structural Design and Anchorage: Comply with ASCE 7 for wind loads.
3. Space Heater: Thermostatically controlled and sized to prevent condensation.
4. Louvers: Equipped with bird screen and filter arranged to permit air circulation when engine is not running while excluding exterior dust, birds, and rodents.
5. Hinged Doors: With padlocking provisions.
6. Ventilation: Louvers equipped with bird screen and filter arranged to permit air circulation while excluding exterior dust, birds, and rodents.
7. Thermal Insulation: Manufacturer's standard materials and thickness selected in coordination with space heater to maintain winter interior temperature within operating limits required by engine-generator-set components.
8. Muffler Location: [**Within**] [**External to**] enclosure.

C. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.

1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.
2. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.

D. Interior Lights with Switch: Factory-wired, vaporproof-type fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external electrical connection.

1. AC lighting system and connection point for operation when remote source is available.
2. DC lighting system for operation when remote source and generator are both unavailable.

E. Convenience Outlets: Factory wired[**, GFCI**]. Arrange for external electrical connection.

2.10 MOTORS

A. General requirements for motors are specified in Division 15 Section "Motors."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
2. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 16 Sections.

2.11 VIBRATION ISOLATION DEVICES

A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.

1. Material: [**Standard neoprene**] [**Natural rubber**] [**Bridge-bearing neoprene, complying with AASHTO M 251**].
2. Durometer Rating: [**30**] [**40**] [**45**] [**50**] [**60**] [**65**] [**70**] <**Insert number**>.
3. Number of Layers: [**One**] [**Two**] [**Three**] [**Four**] <**Insert number**>.

B. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.

1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
2. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.12 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.13 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.

B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
2. Full load run.
3. Maximum power.
4. Voltage regulation.
5. Transient and steady-state governing.

6. Single-step load pickup.
7. Safety shutdown.
8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.
9. Report factory test results within 10 days of completion of test.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.

B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.

B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

C. Install packaged engine generator with [**elastomeric isolator pads**] [**restrained spring isolators**] having a minimum deflection of [**1 inch (25 mm)**] <**Insert static deflection**> on 4-inch- (100-mm-) high concrete base. Secure sets to anchor bolts installed in concrete bases. Concrete base construction is specified in Division 16 Section "Electrical Supports and Seismic Restraints."

D. Install remote radiator with [**elastomeric isolator pads**] [**restrained spring isolators**] having a minimum deflection of [**1 inch (25 mm)**] <**Insert static deflection**> on [**concrete base on grade**] [**roof equipment supports on roof**].

E. Install Schedule 40, black steel piping with welded joints for cooling water piping between engine-generator set and [**heat exchanger**] [**remote radiator**]. Piping materials and installation requirements are specified in Division 15 Section "Hydronic Piping."

F. Install Schedule 40, black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet. Flexible connectors and steel piping materials and installation requirements are specified in Division 15 Section "Hydronic Piping."

1. Install condensate drain piping to muffler drain outlet full size of drain connection with a shutoff valve, stainless-steel flexible connector, and Schedule 40, black steel pipe with welded joints. Flexible connectors and piping materials and installation requirements are specified in Division 15 Section "Hydronic Piping."

G. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.3 CONNECTIONS

A. Piping installation requirements are specified in Division 15 Sections. Drawings indicate general arrangement of piping and specialties.

B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.

C. Connect cooling-system water piping to engine-generator set and [**remote radiator**] [**heat exchanger**] with flexible connectors.

D. Connect engine exhaust pipe to engine with flexible connector.

E. Connect fuel piping to engines with a gate valve and union and flexible connector.

1. Diesel storage tanks, tank accessories, piping, valves, and specialties for fuel systems outside the building are specified in Division 2 Section "Fuel Oil Distribution."
2. Diesel fuel piping, valves, and specialties inside the building are specified in Division 15 Section "Fuel Oil Piping."
3. Natural- and LP-gas piping, valves, and specialties for gas distribution outside the building are specified in Division 2 Section "Natural Gas Distribution."
4. Natural- and LP-gas piping, valves, and specialties for gas piping inside the building are specified in Division 15 Section "Fuel Gas Piping."

F. Ground equipment according to Division 16 Section "Grounding and Bonding."

G. Connect wiring according to Division 16 Section "Conductors and Cables."

3.4 IDENTIFICATION

A. Identify system components according to Division 15 Section "Mechanical Identification" and Division 16 Section "Electrical Identification."

3.5 FIELD QUALITY CONTROL

A. Testing Agency: [**Owner will engage**] [**Engage**] a qualified testing agency to perform tests and inspections and prepare test reports.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

C. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Tests and Inspections:

1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection[**(except those indicated to be optional)**] for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.
    a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
    c. Verify acceptance of charge for each element of the battery after discharge.
    d. Verify that measurements are within manufacturer's specifications.
4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
6. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg (120 kPa). Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
7. Exhaust Emissions Test: Comply with applicable government test criteria.
8. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
9. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.
10. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at [**four**] <**Insert number**> locations [**on the property line**] <**Insert location for measurement**>, and compare measured levels with required values.

E. Coordinate tests with tests for transfer switches and run them concurrently.

F. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.

G. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

H. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

I. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

J. Remove and replace malfunctioning units and [**retest**] [**reinspect**] as specified above.

K. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

L. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

M. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each power wiring termination and each bus connection. Remove all access panels so terminations and connections are accessible to portable scanner.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 months after date of Substantial Completion.
2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
3. Record of Infrared Scanning: Prepare a certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION 16231

SECTION 16231 - PACKAGED ENGINE GENERATORS

1.1 SUMMARY

A. Packaged [**gas**] [**diesel**]-engine generator sets.

1.2 QUALITY ASSURANCE

A. Quality Standard: NEMA MG 1 and NFPA 37[**and NFPA 99**].

B. Emergency Power Supply System: NFPA 110, Level [**1**] [**2**].

C. Safety Standard: ASME B15.1.

1.3 PROJECT CONDITIONS

A. Environmental Conditions: [**5**] [**Minus 15**] to 40 deg C and [**1000 feet (300 m)**] <**Insert altitude**> altitude[**, and high salt-dust air due to sea-spray evaporation**] <**Insert other conditions**>.

1.4 WARRANTY

A. Materials and Workmanship: Five years.

1.5 MAINTENANCE SERVICE

A. Full-Maintenance Service: [**12**] <**Insert number**> months.

1.6 ENGINE-GENERATOR SET

A. Output Connections: Three-phase, [**three**] [**four**] wire.

B. Performance: Suitable for loads[**not**] involving sensitive electronic equipment, adjustable frequency drives, or uninterruptible power supply systems.

C. Fuel: [**Fuel oil, Grade DF-2**] [**Natural gas with automatic LP-gas standby**] <**Insert specific fuel grade requirements**>.

D. Governor: [**Mechanical**] [**Adjustable isochronous, with speed sensing**].

E. Engine Cooling System: [**Integral**] [**Remote, horizontal-discharge**] [**Remote, vertical-discharge**] radiator[**with expansion tank**].

F. Fuel Oil Storage:

1. Day Tank: Freestanding, with capacity [**for 4 hours' operation**] [**of <Insert gallons (liters)>**].
2. Base-Mounted Fuel Oil Tank: Capacity [**for 8 hours' operation**] [**of <Insert gallons (liters)>**].
3. Fuel oil storage tank outside the building, as specified in Division 2 Section "Fuel Oil Distribution."

G. Engine Exhaust System: [**Critical**] [**Residential**] [**Industrial**]-type muffler.

H. Combustion-Air Intake: [**Standard**] [**Heavy**]-duty, engine-mounted air cleaner with replaceable dry-filter element.

I. Starting System: Electric motor, [**12**] [**24**] V, with battery and battery charger.

J. Control and Monitoring: [**Automatic**] [**Manual**] starting; with control devices grouped on [**panel mounted on generator set**] [**wall-mounted panel**] [**combination control and power panel**].

1. Connection to data link for building automation system or building monitoring and control system.
2. Common remote audible alarm.
3. Remote alarm annunciator.
4. Remote emergency-stop switch.

K. Generator Overcurrent and Fault Protection:

1. Generator Circuit Breaker: [**Molded-case, thermal-magnetic**] [**Molded-case, electronic-trip**] [**Insulated-case, electronic-trip**] type.
2. Generator disconnect switch.
3. Microprocessor-based generator protector.
4. Ground-fault indication.

L. Generator: Directly connected to engine shaft, with dripproof enclosure and solid-state voltage regulator.

M. Load Bank: Permanent, outdoor, weatherproof, remote-controlled, forced-air-cooled, [**resistive**] [**resistive and reactive**], with remote-control panel.

N. Outdoor Generator-Set Enclosure: [**Vandal-resistant, weatherproof steel housing**] [**Prefabricated walk-in steel building on concrete foundation**].

1.7 SOURCE QUALITY CONTROL

A. Testing: [**Prototype**] [**Project specific**] at factory.

1.8 INSTALLATION

A. Mounting: On [**concrete base with rubber-pad vibration isolation**] [**concrete base with restrained-spring vibration isolators**] [**vibration isolation equipment base**].

1.9 FIELD QUALITY CONTROL

A. Testing: By [**Owner-engaged agency**] [**Contractor-engaged agency**] [**Contractor**].

END OF SECTION 16231

SECTION 16231 - PACKAGED ENGINE GENERATORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes packaged engine-generator sets for [**emergency**] [**standby**] power supply with the following features:

1. [**Gas**] [**Diesel**] engine.
2. [**Unit-mounted**] [**Remote-mounting**] cooling system.
3. [**Unit-mounted**] [**Remote-mounting**] control and monitoring.
4. Outdoor enclosure.

B. See Division 16 Section "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

1.2 SUBMITTALS

A. Product Data: For each type of packaged engine generator and accessory indicated.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

C. Manufacturer Seismic Qualification Certification: Submit certification that engine-generator set, batteries, battery racks, accessories, and components will withstand seismic forces defined in Division 16 Section "Electrical Supports and Seismic Restraints." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

    a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
    b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Source quality-control test reports.

E. Field quality-control test reports.

F. Operation and maintenance data.

G. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within [**200 miles (321 km)**] <**Insert number of miles (kilometers)**> of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with ASME B15.1.

E. Comply with NFPA 37.

F. Comply with NFPA 70.

G. Comply with NFPA 99.

H. Comply with NFPA 110 requirements for Level [**1**] [**2**] emergency power supply system.

I. Comply with UL 2200.

J. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

K. Noise Emission: Comply with [**applicable state and local government requirements**] <**Insert Project criteria**> for maximum noise level at [**adjacent property boundaries**] <**Insert critical locations**> due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.4 PROJECT CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: [**5 to 40 deg C**] [**Minus 15 to plus 40 deg C**].
2. Relative Humidity: 0 to 95 percent.
3. Altitude: Sea level to [**1000 feet (300 m)**] <**Insert altitude**>.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: <**Insert number**> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

C. Basis-of-Design Product: Subject to compliance with requirements, provide [**the product indicated on Drawings**] <**Insert manufacturer's name; product name or designation**> or a comparable product by one of the following:

1. Caterpillar; Engine Div.
2. Generac Power Systems, Inc.
3. Kohler Co.; Generator Division.
4. Magnetek, Inc.
5. Onan/Cummins Power Generation; Industrial Business Group.
6. Spectrum Detroit Diesel.
7. <**Insert manufacturer's name.**>

2.2 ENGINE-GENERATOR SET

A. Factory-assembled and -tested, engine-generator set.

B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.

C. Capacities and Characteristics:

1. Power Output Ratings: Nominal ratings as indicated[**, with capacity as required to operate as a unit as evidenced by records of prototype testing**].
2. Output Connections: Three-phase, [**three**] [**four**] wire.
3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.

D. Generator-Set Performance:

1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.
6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
8. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.3 ENGINE

A. Fuel: [**Fuel oil, Grade DF-2**] [**Natural gas with automatic LP-gas standby**] [**Natural gas**].

1. <**Insert specific fuel grade requirements.**>

B. Rated Engine Speed: 1800 rpm.

C. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm (11.4 m/s).

D. Lubrication System: The following items are mounted on engine or skid:

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

E. Engine Fuel System:

1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
2. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.
3. Dual Natural Gas with LP-Gas Backup (Vapor-Withdrawal) System:

a. Carburetor.
b. Secondary Gas Regulators: One for each fuel type.
c. Fuel-Shutoff Solenoid Valves: One for each fuel source.
d. Flexible Fuel Connectors: One for each fuel source.

F. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.

G. Governor: Adjustable isochronous, with speed sensing.

H. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
2. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.

I. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 25 dB at 500 Hz.
2. Sound level measured at a distance of 10 feet (3 m) from exhaust discharge after installation is complete shall be [**85**] <**Insert number**> dBA or less.

J. Muffler/Silencer: Residential type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 18 dB at 500 Hz.
2. Sound level measured at a distance of 10 feet (3 m) from exhaust discharge after installation is complete shall be [**95**] <**Insert number**> dBA or less.

K. Muffler/Silencer: Industrial type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 12 dB at 500 Hz.
2. Sound level measured at a distance of 25 feet (8 m) from exhaust discharge after installation is complete shall be [**87**] <**Insert number**> dBA or less.

L. Air-Intake Filter: [**Standard**] [**Heavy**]-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

M. Starting System: [**12**] [**24**]-V electric, with negative ground.

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.

2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: [**As required by NFPA 110 for system level specified**] [**60 seconds**].
4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least twice without recharging.
5. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.

    a. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236.

2.4 FUEL OIL STORAGE

A. Comply with NFPA 30.

B. Base-Mounted Fuel Oil Tank: Factory installed and piped, complying with UL 142 fuel oil tank. Features include the following:

1. Tank level indicator.
2. Capacity: Fuel for [**eight**] <**Insert number**> hours' continuous operation at 100 percent rated power output.
3. Vandal-resistant fill cap.
4. Containment Provisions: Comply with requirements of authorities having jurisdiction.

2.5 CONTROL AND MONITORING

A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms.

B. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms.

C. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.

D. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level [**1**] [**2**] system, and the following:

1. AC voltmeter.
2. AC ammeter.
3. AC frequency meter.
4. DC voltmeter (alternator battery charging).

5. Engine-coolant temperature gage.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
10. Fuel tank derangement alarm.
11. Fuel tank high-level shutdown of fuel supply alarm.
12. Generator overload.

E. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

F. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.

1. Overcrank shutdown.
2. Coolant low-temperature alarm.
3. Control switch not in auto position.
4. Battery-charger malfunction alarm.
5. Battery low-voltage alarm.

G. Remote Alarm Annunciator: Comply with NFPA 99. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.

1. Tripping Characteristic: Designed specifically for generator protection.
2. Trip Rating: Matched to generator rating.
3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

B. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground-fault. Integrate ground-fault alarm indication with other generator-set alarm indications.

2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H or Class F.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Enclosure: Dripproof.

G. Instrument Transformers: Mounted within generator enclosure.

H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.

1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.

I. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

J. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

K. Subtransient Reactance: [**12**] <**Insert number**> percent, maximum.

2.8 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Vandal-resistant, weatherproof steel housing, wind resistant up to 100 mph (160 km/h). Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.

B. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.

1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.
2. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.

C. Interior Lights with Switch: Factory-wired, vaporproof-type fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external electrical connection.

1. AC lighting system and connection point for operation when remote source is available.
2. DC lighting system for operation when remote source and generator are both unavailable.

D. Convenience Outlets: Factory wired[**, GFCI**]. Arrange for external electrical connection.

2.9 VIBRATION ISOLATION DEVICES

A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.

1. Material: [**Standard neoprene**] [**Natural rubber**] [**Bridge-bearing neoprene, complying with AASHTO M 251**].
2. Durometer Rating: [**30**] [**40**] [**45**] [**50**] [**60**] [**65**] [**70**] <**Insert number**>.
3. Number of Layers: [**One**] [**Two**] [**Three**] [**Four**] <**Insert number**>.

B. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.

1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to 1/4-inch- (6-mm-) thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.
2. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.10 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.11 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.
2. Report factory test results within 10 days of completion of test.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.

B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

C. Install packaged engine generator with [**elastomeric isolator pads**] [**restrained spring isolators**] having a minimum deflection of [**1 inch (25 mm)**] <**Insert static deflection**> on 4-inch- (100-mm-) high concrete base. Secure sets to anchor bolts installed in concrete bases. Concrete base construction is specified in Division 16 Section "Electrical Supports and Seismic Restraints."

D. Install Schedule 40, black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet. Flexible connectors and steel piping materials and installation requirements are specified in Division 15 Section "Hydronic Piping."

1. Install condensate drain piping to muffler drain outlet full size of drain connection with a shutoff valve, stainless-steel flexible connector, and Schedule 40, black steel pipe with welded joints. Flexible connectors and piping materials and installation requirements are specified in Division 15 Section "Hydronic Piping."

E. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

F. Piping installation requirements are specified in Division 15 Sections. Drawings indicate general arrangement of piping and specialties.

G. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.

H. Connect engine exhaust pipe to engine with flexible connector.

I. Connect fuel piping to engines with a gate valve and union and flexible connector.

1. Natural- and LP-gas piping, valves, and specialties for gas distribution outside the building are specified in Division 2 Section "Natural Gas Distribution."
2. Natural- and LP-gas piping, valves, and specialties for gas piping inside the building are specified in Division 15 Section "Fuel Gas Piping."

J. Ground equipment according to Division 16 Section "Grounding and Bonding."

K. Connect wiring according to Division 16 Section "Conductors and Cables."

L. Identify system components according to Division 15 Section "Mechanical Identification" and Division 16 Section "Electrical Identification."

3.2 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection[**(except those indicated to be optional)**] for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

    a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
    c. Verify acceptance of charge for each element of the battery after discharge.
    d. Verify that measurements are within manufacturer's specifications.

4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
6. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg (120 kPa). Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
7. Exhaust Emissions Test: Comply with applicable government test criteria.
8. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
9. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.
10. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at [**four**] <**Insert number**> locations [**on the property line**] <**Insert location for measurement**>, and compare measured levels with required values.

C. Coordinate tests with tests for transfer switches and run them concurrently.

D. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

E. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

F. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

G. Remove and replace malfunctioning units and [**retest**] [**reinspect**] as specified above.

H. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

I. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

3.3 DEMONSTRATION

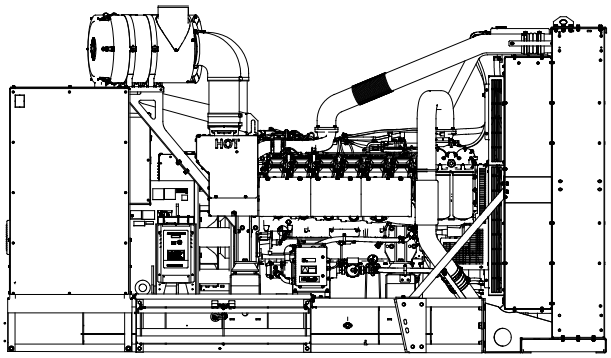
A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION 16231

KOHLER Power Systems

Industrial Diesel Generator Set - KD800

Tier 2 EPA-Certified for Stationary Emergency Applications



KDxxxx designates a generator set with a Tier 2 EPA-Certified engine.
KDxxxx-F designates a 60 Hz generator set with a fuel optimized engine.

Ratings Range

		60 Hz
Standby:	**kW**	720–800
	kVA	900–1000
Prime:	**kW**	640–720
	kVA	800–900

Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- A standard three-year or 1000-hour limited warranty for standby applications. Five-year basic, five-year comprehensive, and ten-year extended limited warranties are also available.
- A standard two-year or 8700-hour limited warranty for prime power applications.
- Other features:
  - Kohler designed controllers for one-source system integration and remote communication. See Controller on page 4.
  - The low coolant level shutdown prevents overheating (standard on radiator models only).

General Specifications

Orderable Generator Model Number	GMKD800
Manufacturer	Kohler
Engine: model	KD27V12
Alternator Choices	KH02970TO4D KH03450TO4D KH04070TO4D
Performance Class	Per ISO 8528-5
One Step Load Acceptance	100%
Voltage	Wye or 600 V
Controller	APM802
Fuel Tank Capacity, L (gal.)	3475–15740 (918–4158)
Fuel Consumption, L/hr (gal./hr) 100% at Standby	218 (57.5)
Fuel Consumption, L/hr (gal./hr) 100% at Prime Power	200 (52.8)
Emission Level Compliance (KDxxxx)	Tier 2
Open Unit Noise Level @ 7 m dB(A) at Rated Load	96
Data Center Continuous (DCC) Rating (Refer to TIB-101 for definitions)	Same as the Prime Rating below

Generator Set Ratings

				150°C Rise Standby Rating		130°C Rise Standby Rating		125°C Rise Prime Rating		105°C Rise Prime Rating	
Alternator	**Voltage**	**Ph**	**Hz**	**kW/kVA**	**Amps**	**kW/kVA**	**Amps**	**kW/kVA**	**Amps**	**kW/kVA**	**Amps**
KH02970TO4D	120/208	3	60	800/1000	2776	720/900	2499	720/900	2499	—	—
	127/220	3	60	800/1000	2625	800/1000	2625	720/900	2362	—	—
	139/240	3	60	800/1000	2406	800/1000	2406	720/900	2166	695/869	2091
	220/380	3	60	800/1000	1520	800/1000	1520	720/900	1368	695/869	1321
	240/416	3	60	740/925	1284	720/900	1250	705/881	1223	640/800	1111
	254/440	3	60	800/1000	1313	790/988	1297	720/900	1181	695/869	1141
	277/480	3	60	800/1000	1203	800/1000	1203	720/900	1083	695/869	1046
	347/600	3	60	800/1000	963	800/1000	963	720/900	867	695/869	837
KH03450TO4D	120/208	3	60	800/1000	2776	800/1000	2776	720/900	2499	—	—
	127/220	3	60	800/1000	2625	800/1000	2625	720/900	2362	—	—
	139/240	3	60	800/1000	2406	800/1000	2406	720/900	2166	720/900	2166
	220/380	3	60	800/1000	1520	800/1000	1520	720/900	1368	720/900	1368
	240/416	3	60	800/1000	1388	800/1000	1388	720/900	1250	720/900	1250
	254/440	3	60	800/1000	1313	800/1000	1313	720/900	1181	720/900	1181
	277/480	3	60	800/1000	1203	800/1000	1203	720/900	1083	720/900	1083
	347/600	3	60	800/1000	963	800/1000	963	720/900	867	720/900	867

RATINGS: All three-phase units are rated at 0.8 power factor. *Standby Ratings:* The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. *Prime Power Ratings:* At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528-1 and ISO-3046-1. For limited running time and continuous ratings, consult the factory. Obtain technical information bulletin (TIB-101) for ratings guidelines, complete ratings definitions, and site condition derates. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever.

KOHLER Power Systems

Industrial Diesel Generator Set - KD800

Tier 2 EPA-Certified for Stationary Emergency Applications

Alternator	Voltage	Ph	Hz	150°C Rise Standby Rating kW/kVA	150°C Rise Standby Rating Amps	130°C Rise Standby Rating kW/kVA	130°C Rise Standby Rating Amps	125°C Rise Prime Rating kW/kVA	125°C Rise Prime Rating Amps	105°C Rise Prime Rating kW/kVA	105°C Rise Prime Rating Amps
KH04070TO4D	120/208	3	60	800/1000	2776	800/1000	2776	720/900	2499	720/900	2499
	127/220	3	60	800/1000	2625	800/1000	2625	720/900	2362	720/900	2362
	139/240	3	60	795/994	2392	795/994	2392	720/900	2166	—	—
	220/380	3	60	800/1000	1520	800/1000	1520	720/900	1368	720/900	1368
	240/416	3	60	800/1000	1388	800/1000	1388	720/900	1250	720/900	1250
	254/440	3	60	800/1000	1313	800/1000	1313	720/900	1181	720/900	1181
	277/480	3	60	800/1000	1203	800/1000	1203	720/900	1083	720/900	1083
	347/600	3	60	800/1000	963	800/1000	963	720/900	867	720/900	867

Engine Specifications	60 Hz
Manufacturer	Kohler
Engine: model	KD27V12
Engine: type	4-Cycle, Turbocharged, Charge Air Cooled
Cylinder arrangement	12-V
Displacement, L (cu. in.)	27 (1648)
Bore and stroke, mm (in.)	135 x 157 (5.31 x 6.18)
Compression ratio	15.0:1
Piston speed, m/min. (ft./min.)	565 (1854)
Main bearings: quantity, type	7, Precision Half Shells
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	891 (1195)
Cylinder head material	Cast Iron
Crankshaft material	Steel
Valve (exhaust) material	Steel
Governor: type, make/model	KODEC Electronic Control
Frequency regulation, no-load to-full load	Isochronous
Frequency regulation, steady state	±0.25%
Frequency	Fixed
Air cleaner type, all models	Dry

Lubricating System	60 Hz
Type	Full Pressure
Oil pan capacity dipstick mark max., L (qt.)	79 (83.5)
Oil pan capacity, initial filling, L (qt.)	101 (106.7)
Oil filter: quantity, type	2, Cartridge
Oil cooler	Water-Cooled

Fuel System	60 Hz
Fuel supply line, min. ID, mm (in.)	14 (0.55)
Fuel return line, min. ID, mm (in.)	14 (0.55)
Max. fuel flow, Lph (gph)	233 (62)
Min./max. fuel pressure at engine supply connection, kPa (in. Hg)	–30/30 (–8.8/8.8)
Max. return line restriction, kPa (in. Hg)	20 (5.9)
Fuel filter: quantity, type	1, Primary Engine Filter 1, Fuel/Water Separator
Recommended fuel	#2 Diesel ULSD

Fuel Consumption	60 Hz
Diesel, Lph (gph) at % load	**Standby Rating**
100%	218 (57.5)
75%	169 (44.6)
50%	118 (31.2)
25%	66 (17.3)
Diesel, Lph (gph) at % load	**Prime Rating**
100%	200 (52.8)
75%	154 (40.7)
50%	108 (28.5)
25%	62 (16.3)

Radiator System	60 Hz
Ambient temperature, °C (°F)*	50 (122)
Engine jacket water capacity, L (gal.)	55 (14.4)
Radiator system capacity, including engine, L (gal.)	113.5 (30)
Engine jacket water flow, Lpm (gpm)	1015 (268)
Charge cooler air flow, Lps (cfm)	568 (1203)
Charge cooler air inlet temperature at 25°C (77°F) ambient, °C (°F)	207 (405)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	325 (18499)
Heat rejected to charge air cooler at rated kW, dry exhaust, kW (Btu/min.)	232 (13205)
Turbocharger boost (abs) bar (psi)	3.2 (46)
Water pump type	Vane Wheel
Fan diameter, including blades, mm (in.)	1350 (53.1)
Fan, kWm (HP)	48 (64.3)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H_2O)	0.125 (0.5)

* Enclosure with enclosed silencer reduces ambient temperature capability by 5°C (9°F).

Remote Radiator System†	60 Hz
Exhaust manifold type	Dry
Connection sizes:	
Water inlet/outlet, mm (in.)	85 (3.35)
Charge air cooler inlet/outlet (pipe dia. of flange), mm (in.)	127 (5)
Static head allowable above engine, kPa (ft. H_2O)	70 (23.5)

† Contact your local distributor for cooling system options and specifications based on your specific requirements.

Exhaust System	60 Hz
Exhaust flow at rated kW, m^3/min. (cfm)	174.3 (6155)
Exhaust temperature at rated kW at 25°C (77°F) ambient, dry exhaust, °C (°F)	470 (878)
Maximum allowable back pressure, kPa (in. Hg)	8.5 (2.5)
Exh. outlet size at eng. hookup, mm (in.)	See ADV drawing

Electrical System	60 Hz
Battery charging alternator:	
Ground (negative/positive)	Negative
Volts (DC)	24
Ampere rating	140
Starter motor qty. at starter motor power rating, rated voltage (DC)	Standard: 1 @ 7.8 kW, 24; Redundant (optional): 2 @ 7.8 kW, 24
Battery, recommended cold cranking amps (CCA):	
Quantity, CCA rating each, type (with standard starter)	2, 1110, AGM
Quantity, CCA rating each, type (with optional redundant starters)	4, 1110, AGM
Battery voltage (DC)	12

Air Requirements	60 Hz
Radiator-cooled cooling air, m^3/min. (scfm)‡	1212 (42801)
Cooling air required for generator set when equipped with city water cooling or remote radiator, based on 14°C (25°F) rise, m^3/min. (scfm)‡	565 (19953)
Combustion air, m^3/min. (cfm)	63.5 (2241)
Heat rejected to ambient air:	
Engine, kW (Btu/min.)	111 (6318)
Alternator, kW (Btu/min.)	47 (2675)

‡ Air density = 1.20 kg/m^3 (0.075 lbm/ft^3)

Alternator Specifications		60 Hz
Type		4-Pole, Rotating-Field
Exciter type		Brushless, Permanent-Magnet Pilot Exciter
Voltage regulator		Solid-State, Volts/Hz
Insulation:		NEMA MG1, UL 1446, Vacuum Pressure Impregnated (VPI)
Material		Class H, Synthetic, Nonhygroscopic
Temperature rise		130°C, 150°C Standby
Bearing: quantity, type		1, Sealed
Coupling		Flexible Disc
Amortisseur windings		Full
Alternator winding type		Random Wound
Rotor balancing		125%
Voltage regulation, no-load to full-load		±0.25%
Unbalanced load capability		100% of Rated Standby Current
Peak motor starting kVA:		(35% dip for voltages below)
480 V	KH02970TO4D	2717
480 V	KH03450TO4D	3136
480 V	KH04070TO4D	3774

Alternator Standard Features

- The pilot-excited, permanent magnet (PM) alternator provides superior short-circuit capability.
- All models are brushless, rotating-field alternators.
- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Superior voltage waveform from two-thirds pitch windings and skewed stator.
- Brushless alternator with brushless pilot exciter for excellent load response.

NOTE: See TIB-102 Alternator Data Sheets for alternator application data and ratings, efficiency curves, voltage dip with motor starting curves, and short circuit decrement curves.

Controller

APM802 Controller
Provides advanced control, system monitoring, and system diagnostics for optimum performance and compatibility.

- Graphic display with touch screen and menu control provide easy local data access
- Measurements are selectable in metric or English units
- User language is selectable
- Two USB ports allow connection of a flash drive, mouse, or keypad
- Electrical data, mechanical data, and system settings can be saved to a flash drive
- Ethernet port allows connection to a PC type computer or Ethernet switch
- The controller supports Modbus® RTU and TCP protocols
- NFPA 110 Level 1 capability

Refer to G6-152 for additional controller features and accessories.

Modbus® is a registered trademark of Schneider Electric.

Codes and Standards

- Engine–generator set is designed and manufactured in facilities certified to standards ISO2008:9001 and ISO2004:14001.
- Generator set meets NEMA MG1, BS5000, ISO, DIN EN, and IEC standards, NFPA 110
- Engine generator set is tested to ISO 8528-5 for transient response.
- The generator set and its components are prototype-tested, factory-built, and production-tested.

Third-Party Compliance

- Tier 2 EPA-Certified for Stationary Emergency Applications

Available Approvals and Listings

- ❑ California OSHPD Approval
- ❑ CSA Certified
- ❑ IBC Seismic Certification
- ❑ UL 2200 Listing
- ❑ cUL Listing (fuel tanks only)
- ❑ Florida Dept. of Environmental Protection (FDEP) Compliance (fuel tanks only)

Warranty Information

- A standard three-year or 1000-hour limited warranty for standby applications. Five-year basic, five-year comprehensive, and ten-year extended limited warranties are also available.
- A standard two-year or 8700-hour limited warranty for prime power applications.

Available Warranties for Standby Applications

- ❑ 5-Year Basic Limited
- ❑ 5-Year Comprehensive Limited
- ❑ 10-Year Major Components Limited

KOHLER Power Systems

Industrial Diesel Generator Set - KD800

Tier 2 EPA-Certified for Stationary Emergency Applications

Standard Features

- Battery Rack and Cables
- Closed Crankcase Ventilation (CCV) Filters
- Customer Connection
- Integral Vibration Isolation
- Local Emergency Stop Switch
- Oil Drain and Coolant Drain Extension
- Operation and Installation Literature

Available Options

Engine Type

- ❑ KDxxxx Tier 2 EPA-Certified Engine
- ❑ KDxxxx-F Fuel Optimized Engine

Approvals and Listings

- ❑ California OSHPD Approval
- ❑ CSA Certified
- ❑ IBC Seismic Certification
- ❑ UL 2200 Listing
- ❑ cUL Listing (fuel tanks only)
- ❑ Florida Dept. of Environmental Protection (FDEP) Compliance (fuel tanks only)

Enclosed Unit

- ❑ Sound Level 1 Enclosure/Fuel Tank Package
- ❑ Sound Level 2 Enclosure/Fuel Tank Package

Open Unit

- ❑ Exhaust Silencer, Critical (kits: PA-354880 qty. 2 or PA-354898 qty. 1)
- ❑ Exhaust Silencer, Hospital (kits: PA-354905 qty. 2 or PA-354912 qty. 1)
- ❑ Flexible Exhaust Connector, Stainless Steel

Controller

- ❑ Input/Output, Analog
- ❑ Input/Output, Digital
- ❑ Input/Output, Harness
- ❑ Load Shed
- ❑ Manual Key Switch
- ❑ Remote Emergency Stop
- ❑ Remote Serial Annunciator Panel

Cooling System

- ❑ Block Heater; 6000 W, 208 V, (select 1 Ph or 3 Ph) *
- ❑ Block Heater; 6000 W, 240 V, (select 1 Ph or 3 Ph) *
- ❑ Block Heater; 6000 W, 480 V, (select 1 Ph or 3 Ph) *

* Required for Ambient Temperatures Below 10°C (50°F)

- ❑ Radiator Guard and Duct Flange

Electrical System

- ❑ Battery, AGM (kit with qty. 2)
- ❑ Battery, AGM (kit with qty. 4)
- ❑ Battery Charger
- ❑ Battery Heater; 80 W, 120 V, 1Ph
- ❑ Bus Bar
- ❑ Generator Heater
- ❑ Line Circuit Breaker (select right or left side mounting)
- ❑ Line Circuit Breaker with Shunt Trip (select right or left side mtg)
- ❑ Redundant Starters

Fuel System

- ❑ Flexible Fuel Lines
- ❑ Restriction Gauge (for fuel/water separator)

Literature

- ❑ General Maintenance
- ❑ NFPA 110
- ❑ Overhaul
- ❑ Production

Miscellaneous

- ❑ Air Cleaner, Heavy Duty
- ❑ Air Cleaner Restriction Indicator
- ❑ Alternator Air Filter (will reduce generator set rating by 7%)
- ❑ Automatic Oil Replenishment System
- ❑ Engine Fluids (oil and coolant) Added
- ❑ Rated Power Factor Testing

Electrical Package

- ❑ Basic Electrical Package (select 1 Ph or 3 Ph)
- ❑ Wire Battery Charger (1 Ph)
- ❑ Wire Block Heater (select 1 Ph or 3 Ph)
- ❑ Wire Controller Heater (1 Ph)
- ❑ Wire Generator Heater (1 Ph)

Warranty (Standby Applications only)

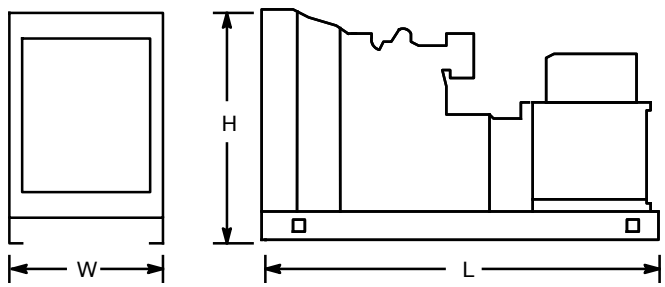
- ❑ 5-Year Basic Limited
- ❑ 5-Year Comprehensive Limited
- ❑ 10-Year Major Components Limited

Other

- ❑
- ❑

Dimensions and Weights

Overall Size, max., L x W x H, mm (in.):	4181 x 1924 x 2125 (165.0 x 75.7 x 83.7)
Weight, radiator model, max. wet, kg (lb.):	7457 (16440)



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

KOHLER Power Systems

Industrial Diesel Generator Set - KD800
Tier 2 EPA-Certified for Stationary Emergency Applications

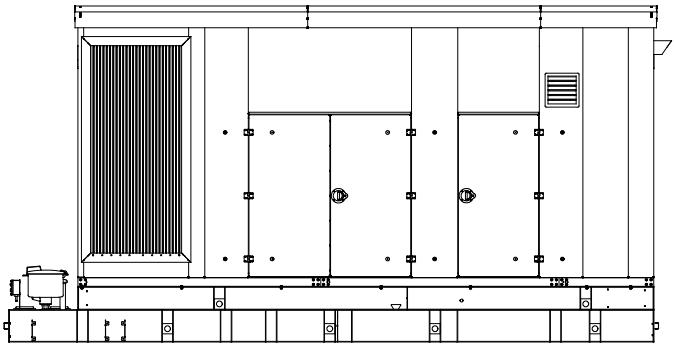
KOHLER CO., Kohler, Wisconsin 53044 USA
Phone 920-457-4441, Fax 920-459-1646
For the nearest sales and service outlet in the US and Canada, phone 1-800-544-2444
KOHLERPower.com

SDMO Industries
12 bis rue de la villeneuve, CS 92 848
29 228 Brest Cedex 2, France
Phone +33 (0)2 98 41 41 41, Fax +33 (0)2 09 41 63 07
www.sdmo.com

Sound Enclosures and Subbase Fuel Tank

Sound Level 1 Enclosure Standard Features

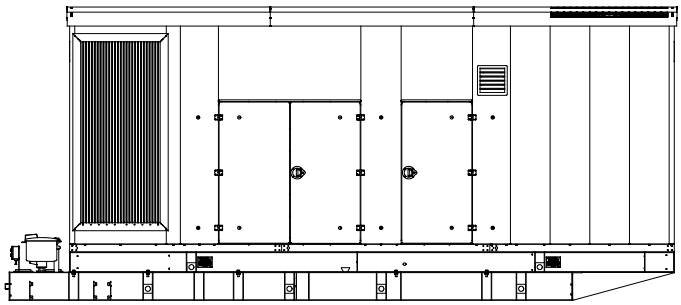
- Lift base or tank-mounted, aluminum construction enclosure with internal-mounted, exhaust silencers.
- Every enclosure has a sloped roof to reduce the buildup of moisture and debris.
- Sound attenuated enclosure that offers noise reduction using acoustic insulation, acoustic-lined air inlets and an acoustic-lined air discharge.
- Fade-, scratch-, and corrosion-resistant Kohler® Power Armor™ automotive-grade textured finish.
- Acoustic insulation that meets UL 94 HF1 flammability classification.
- Enclosure has large access doors that are hinged and removable which allow for easy maintenance.
- Lockable, flush-mounted door latches.
- Air inlet louvers reduce rain and snow entry.
- High wind bracing, 241 kph (150 mph).



Sound Level 1 Enclosure
(Shown with available spill containment)

Sound Level 2 Enclosure Standard Features

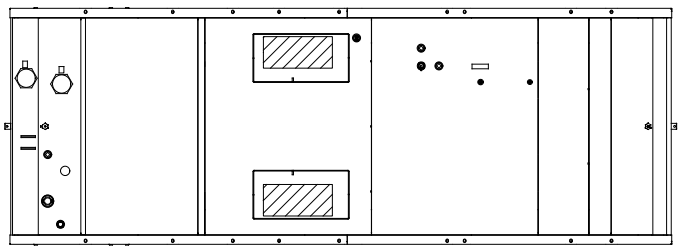
- Includes all of the sound level 1 enclosure features with the addition of up to 51 mm (2 in.) acoustic insulation material, intake sound baffles, vertical air discharge, and secondary silencers.
- Louvered air inlet and vertical outlet hood with 90 degree angles to redirect air and reduce noise.



Sound Level 2 Enclosure
(Shown with available spill containment)

Subbase Fuel Tank Features

- The fuel tank has a Power Armor Plus™ textured epoxy-based rubberized coating.
- The above-ground rectangular secondary containment tank mounts directly to the generator set, below the generator set skid (subbase).
- Both the inner and outer tanks have UL-listed emergency relief vents.
- Flexible fuel lines are provided with subbase fuel tank selection.
- The containment tank's construction protects against fuel leaks or ruptures. The inner (primary) tank is sealed inside the outer (secondary) tank. The outer tank contains the fuel if the inner tank leaks or ruptures.
- The above ground secondary containment subbase fuel tank meets UL 142 requirements.
- Features include:
  - Additional fittings for optional accessories (qty. 3)
  - Electrical stub-up area open to bottom
  - Emergency inner and outer tank relief vents
  - Fuel fill with lockable cap and 51 mm (2 in.) riser
  - Fuel leak detection switch
  - Fuel level mechanical gauge
  - Fuel level sender
  - Normal vent
  - Removable engine supply and return diptubes



Subbase Fuel Tank (Top View)

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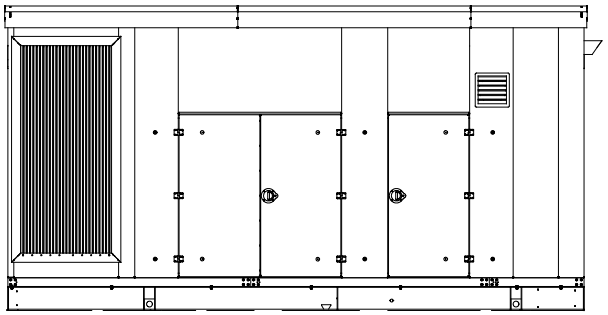
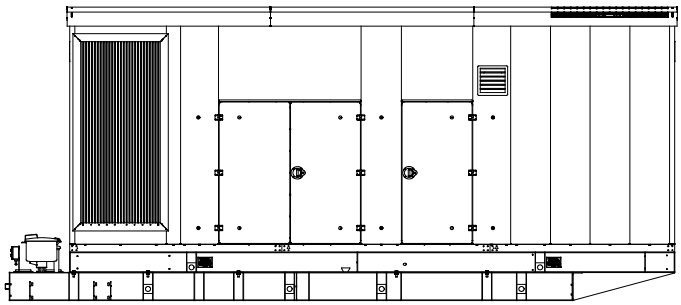
KOHLER®

Industrial Generator Set Accessories

Sound Enclosure and Subbase Fuel Tank Package



Level 1 Sound Enclosure with Lift Base



Level 2 Sound Enclosure with Subbase Fuel Tank
(shown with optional spill containment)

Enclosure and Subbase Fuel Tank Combinations

Four enclosure configurations are available with the subbase fuel tanks:

- ○ Sound Enclosure Level 1
- ○ Sound Enclosure Level 1, AQMD Ready
- ○ Sound Enclosure Level 2
- ○ Sound Enclosure Level 2, AQMD Ready

Available Approvals and Listings

- ❑ UL 2200 Listing
- ❑ UL142 Listing (fuel tanks)
- ❑ CSA Approval
- ❑ IBC Seismic Certification
- ❑ California OSHPD Approval (KD800- KD1750 models)
- ❑ cUL Listing (fuel tanks only)
- ❑ Hurricane Rated Enclosure - Available on aluminum Sound Level 2 enclosures, KD800- KD1750 models (Impact rated for Large Missile Level E and Wind load rated per Florida Building Code, tested to TAS201- 94, TAS202- 94 and TAS203- 94 standards)

NOTE: Some models may have limited third-party approvals; see your local distributor for details.

Applicable to the following models: KD800 - KD2500 (includes KD1250-A)

Sound Level 1 Enclosure Standard Features

- Internal silencers with flexible exhaust connectors and exhaust elbows.
- Mounts to lift base and optional subbase fuel tank.
- Aluminum construction with six large, hinged, removable doors for easy maintenance.
- Fade-, scratch-, and corrosion-resistant Kohler® Power Armor™ automotive-grade textured finish.
- Lockable, flush-mounted door latches.
- Air inlet louvers to reduce rain and snow entry.
- Sloped roof to reduce the buildup of moisture and debris.
- Acoustic insulation that meets UL 94 HF1 flammability classification.
- Sound level 1 enclosure is designed to 150 mph (241 kph) wind load rating.
- Sound level 1 enclosure uses internal silencers, acoustic insulation and acoustic-lined air inlet hoods.

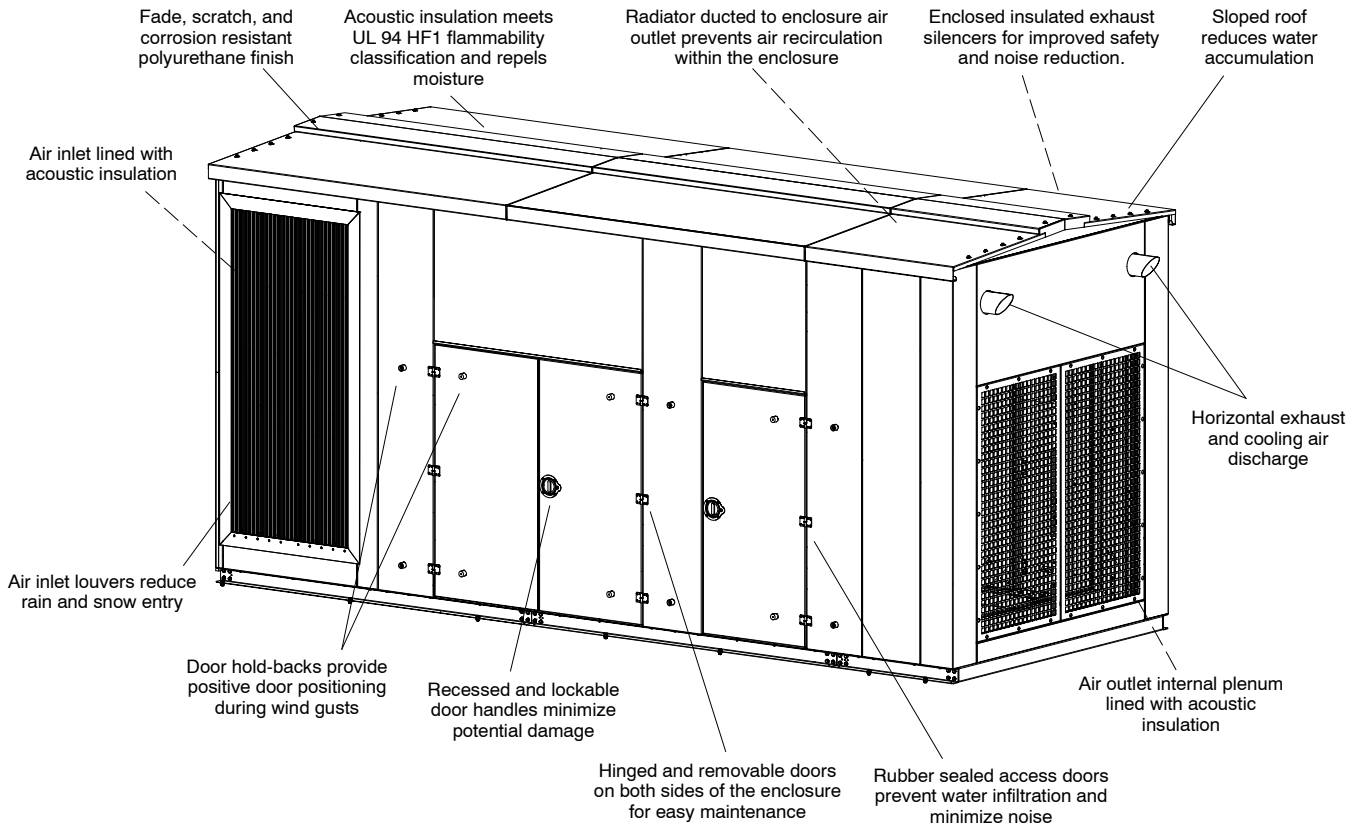
Sound Level 2 Enclosure Standard Features

- Includes all of the sound level 1 enclosure features with the addition of up to 51 mm (2 in.) acoustic insulation material, intake sound baffles, secondary silencers, and vertical air discharge with rain caps.
- Vertical outlet hood with 90 degree angles to redirect air and reduce noise.
- Sound level 2 enclosure is certified to 186 mph (299 kph) wind load rating for KD800- 2500 models.

Subbase Fuel Tank Features

- The fuel tank has a Power Armor Plus™ textured epoxy-based rubberized coating.
- The above-ground rectangular secondary containment tank mounts directly to the generator set, below the generator set skid (subbase).
- Both the inner and outer tanks have UL-listed emergency relief vents.
- Flexible fuel lines are provided with subbase fuel tank selection.
- The containment tank's construction protects against fuel leaks or ruptures. The inner (primary) tank is sealed inside the outer (secondary) tank. The outer tank contains the fuel if the inner tank leaks or ruptures.
- The above ground secondary containment subbase fuel tank meets UL 142 requirements.
- State tanks with varying capacities are available. Florida Dept. of Environmental Protection (FDEP) File No. EQ-634 approved.

Aluminum Sound Enclosures



Note: Sample sound level 1 (SL1) enclosure shown; other models are similar.
Enclosure ships assembled on lifting base.

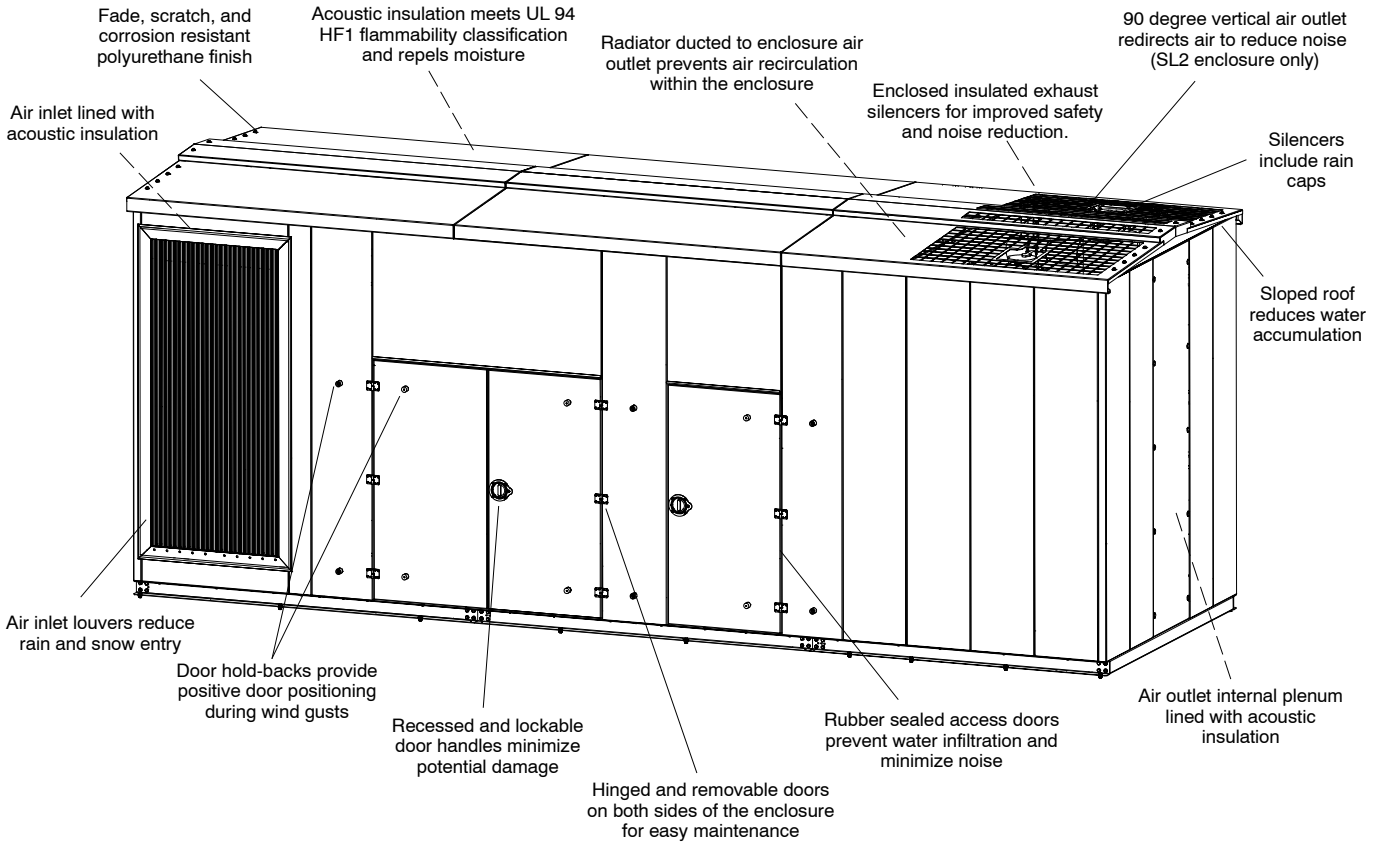
ADV- 8927

Level 1 Sound Enclosure Features

- Heavy-duty formed panels, solid construction. Preassembled package offering corrosion resistant, dent resilient structure mounting directly to lift base or fuel tank.
- Polyurethane enamel paint. Superior finish, durability, and appearance.
- The enclosure has a sloped roof to reduce the buildup of moisture and debris.
- Internal exhaust silencers offering maximum component life and operator safety.

  NOTE: Installing an additional length of exhaust tail pipe may increase backpressure levels. Please refer to the generator set spec sheet for the maximum backpressure value.
- Service access. Multiple personnel doors for easy access to generator set control and servicing of the fuel fill, fuel gauge, oil fill, and battery.
- Interchangeable modular panel construction. Allows complete serviceability or replacement without compromising enclosure design.
- Bolted panels facilitate service, future modification upgrades, or field replacement.
- Cooling/combustion air intake. Fixed air intake louvers.
- Sound-attenuating design using critical silencers. Acoustic insulation UL 94 HF1 listed for flame resistance.
- Horizontal air discharge. Sound level 1 (SL1) enclosures use a horizontal design that directs exhaust and cooling air out the end of the enclosure.

Aluminum Sound Enclosures



Note: Sample sound level 2 (SL2) enclosure shown; other models are similar.

Enclosure ships assembled on lifting base.

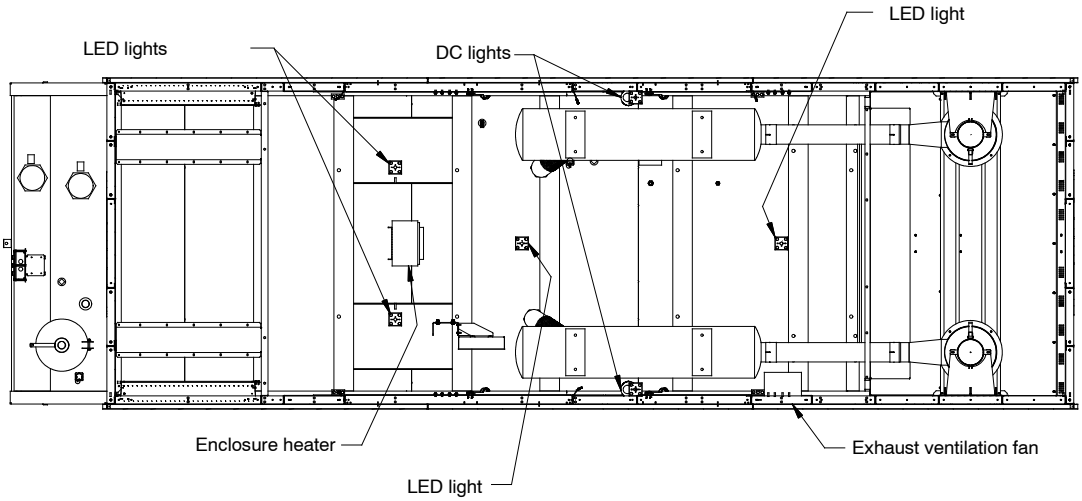
ADV- 8927

Level 2 Sound Enclosure Features

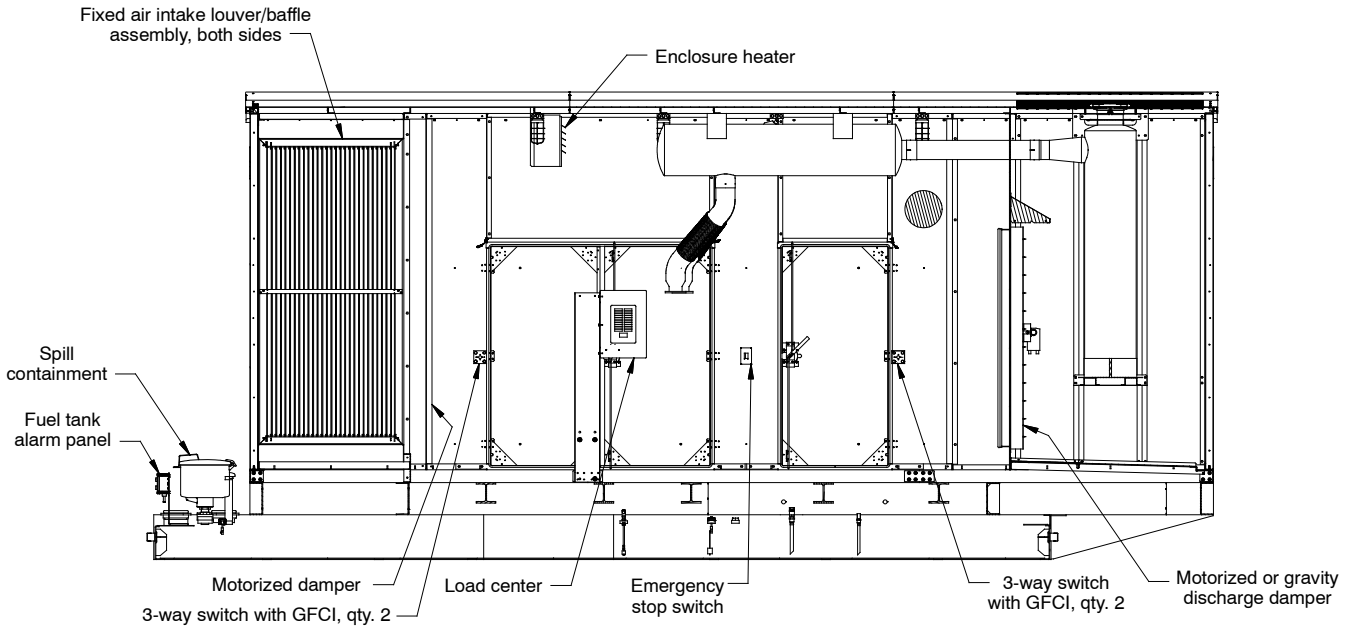
- Heavy-duty formed panels, solid construction. Preassembled package offering corrosion resistant, dent resilient structure mounting directly to lift base or fuel tank.
- Polyurethane enamel paint. Superior finish, durability, and appearance.
- The enclosure has a sloped roof to reduce the buildup of moisture and debris.
- Internal exhaust silencers offering maximum component life and operator safety.
- Service access. Multiple personnel doors on both sides for easy access to generator set control and servicing of the fuel fill, fuel gauge, oil fill, and battery.
- Interchangeable modular panel construction. Allows complete serviceability or replacement without compromising enclosure design.
- Bolted panels facilitate service, future modification upgrades, or field replacement.
- Cooling/combustion air intake. Fixed air intake louvers.
- Sound-attenuating design using additional secondary silencers and up to 51 mm (2 inches) of added acoustic insulation, UL 94 HF1 listed for flame resistance.
- Vertical air discharge. Sound level 2 (SL2) models use a vertical air discharge design that redirects exhaust and cooling air up and above the enclosure to reduce noise.

Aluminum Sound Enclosure Options

Top view of SL2 enclosure, shown with roof removed for illustration only:



Side view of SL2 enclosure, shown with side panels removed for illustration only:



Note: Sample sound level 2 (SL2) enclosure shown; other models are similar.

ADV-8919-5

Aluminum Sound Enclosure Options

Basic Electrical Package (BEP)

Distribution Panel/Load Center. Prewired AC power distribution of all factory-installed features including block heater, two GFCI-protected internal 120-volt service receptacles, internal lighting, and commercial grade wall switches. Single-phase or three-phase load center powered by building source power and protected by a main circuit breaker, rated for 100, 125, or 200 amps as noted, with capacity and circuit positions for future expansion. AC power distribution installed in accordance with NEC and all wiring within EMT thin wall conduit. LED AC lights located within UL-listed fixtures designed for wet locations.

- ❑ BEP, single-phase, 120/208, 60 Hz or 120/240 VAC, 60 Hz. Includes 100 amp electrical panel, two 3-way switches, four LED lights, and two GFCI receptacles.
- ❑ BEP, three-phase, 120/208, 60 Hz or 120/240VAC, 60 Hz. Includes 125 amp electrical panel, two 3-way switches, four LED lights, and two GFCI receptacles.
- ❑ BEP, 200 amp, single-phase, 120/208, 60 Hz or 120/240 VAC, 60 Hz. Includes 200 amp electrical panel, two 3-way switches, four LED lights, and two GFCI receptacles.
- ❑ BEP, 200 amp, three-phase, 120/208, 60 Hz or 120/240VAC, 60 Hz. Includes 200 amp electrical panel, two 3-way switches, four LED lights, and two GFCI receptacles.

DC Light Package

DC Light Package (DLP). Prewired, internal DC light package offering an economical alternative light source within the enclosure, as a complement to the BEP or a source of light when AC power is not available. Battery drain limited with fuse protection and controlled through a 0- 60 minute, spring-wound, no-hold timer.
Available in LED.

Electrical Accessories

Wiring Kits. Electrical wiring for accessories. BEP required.

- ❑ Alternator heater wiring (KD1250- 2500 only)
- ❑ Block heater wiring, single-phase
- ❑ Block heater wiring, three-phase
- ❑ Battery charger wiring

Emergency Stop Switch

- ❑ Generator set emergency stop switch, qty. 1.

Stepdown Transformers. 100 amp BEP required, 60 Hz only. KD1250- 2500 only.

- ❑ Single-phase, 120/240 V
- ❑ Three-phase, 120/208 V

Disconnect Switches. Disconnect switch for stepdown transformer. 60 Hz only.

- ❑ Single-phase
- ❑ Three-phase

Enclosure Heater

Heater, 3.7/5 kW Ceiling Mounted. Electrical utility heater prewired to load center internal to enclosure. Rated at 17100 Btu. Includes adjustable louvers offering down flow and horizontal air tuning, built-in thermostat with automatic fan delay controls.

- ❑ Heater kit with 1 heater, single/three phase, 208/240 VAC, 60 Hz. BEP required.
- ❑ Heater kit with 2 heaters, for KD1250- 2500 only, single/three phase, 208/240 VAC, 60 Hz. 200 amp BEP required.

Exhaust Fan

- ❑ Exhaust Ventilation Fan. Mounted inside the enclosure. BEP required.

Motorized Inlet Louvers. 60 Hz only; BEP required.

- ❑ Aluminum construction
- ❑ Insulated aluminum construction
- ❑ Galvanized construction

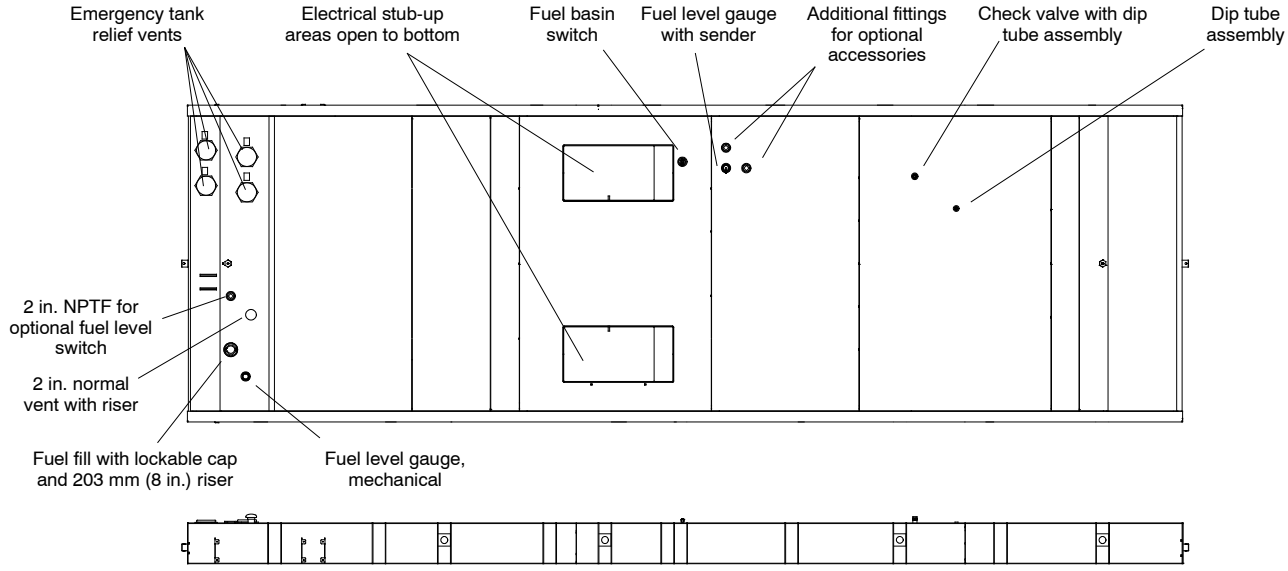
Motorized Outlet Louvers. 60 Hz only; BEP required.

- ❑ Aluminum construction
- ❑ Insulated aluminum construction
- ❑ Galvanized construction

Gravity Air Outlet

- ❑ Aluminum construction

Subbase Fuel Tank



Note: Sample model shown, other models are similar.

ADV-8927

Subbase Fuel Tank Standard Features

- Extended operation. State tanks with various capacities for multiple hour requirements.
- UL listed. Secondary containment generator set base tank meeting UL 142 requirements.
- NFPA compliant. Designed to comply with the installation standards of NFPA 30 and NFPA 37.
- Integral external lift lugs. Enables crane with spreader-bar lifting of the complete package (empty tank, mounted generator set, and enclosure) to ensure safety.
- Emergency pressure relief vents. Vents ensure adequate venting of inner and outer tank under extreme pressure and/or emergency conditions.
- Normal vent with cap. Vent is raised above lockable fuel fill.
- Fuel level gauge with sender.
- Mechanical fuel level gauge.
- Leak detection switch. Annunciates a contained primary tank fuel leak condition at generator set control.
- Electrical stub-up area open to bottom.
- Additional 2 in. NPT fittings for optional accessories.

Subbase Fuel Tank Options

Bottom Clearance

❑ I-beams, provide 102 mm (4 in.) of ground clearance (not available with OSHPD or IBC seismic certification)

Emergency Vent Options

❑ 127 mm (5 in.), IBC
❑ 152.4 mm (6 in.), IBC KD800- 1000 12 hr. tank only

Fuel in Basin Options

❑ Fuel in basin switch, Florida Dept. of Environmental Protection (FDEP) File No. EQ-682 approved
❑ 100% engine fluid containment

Fuel Supply Options

❑ Fire safety valve (installed on fuel supply line)
❑ Ball valve (installed on fuel supply line)

Fuel Fill Options

❑ Fill pipe extension to within 152 mm (6 in.) of bottom of fuel tank
❑ 18.9 L (5 gallon) spill containment
❑ 18.9 L (5 gallon) spill containment with 95% shutoff
❑ 18.9 L (5 gallon) spill containment fill to within 152 mm (6 in.) of bottom of fuel tank
❑ 18.9 L (5 gallon) spill containment, OSHPD/IBC
❑ 18.9 L (5 gallon) spill containment with 95% shutoff, OSHPD/IBC
❑ 28.4 L (7.5 gallon) spill containment, Florida Dept. of Environmental Protection (FDEP) File No. EQ-345 approved
❑ 28.4 L (7.5 gallon) spill containment with 95% shutoff, Florida Dept. of Environmental Protection (FDEP) File No. EQ-345/EQ-257 approved

High Fuel Level Switch

❑ High fuel level switch, 24V
❑ High fuel level switch, 24V, Florida Dept. of Environmental Protection (FDEP) File No. EQ-682 approved
❑ Fuel tank panel, 3 alarm, 24 V
❑ Fuel tank panel, 3 alarm, 24 V, Florida Dept. of Environmental Protection (FDEP) File No. EQ-682 approved

Normal Vent Options

❑ 3.7 m (12 ft.) above grade (without spill containment)
❑ 3.7 m (12 ft.) above grade (with spill containment)

Freestanding Stairs

❑ Stairs only, single door access
❑ Stairs with platform, single door access
❑ Stairs with catwalk, 2 door access, door length only
❑ Stairs with catwalk, 2 door access, full length of enclosure

Tank Marking Options

❑ Decal, Combustible Liquids - Keep Fire Away (qty. 2)
❑ Decal, NFPA 704 identification (qty. 2)
❑ Decal, tank number and safe fuel fill height (qty. 2)

Enclosure and Subbase Fuel Tank Specifications

Fuel Tank Capacity, L (gal.)	Est. Fuel Supply Hours at 60 Hz with Full Load (nominal)	Max. Dimensions, mm (in.)			Max. Weight, † kg (lb.)	Fuel Tank Height, mm (in.)	Sound Pressure Level at 60 Hz with Full Load, dB(A) ‡
		Length	Width §	Height			
KD800 SL1 Sound Enclosure with Internal Silencer and State Code Subbase Fuel Tank *							
Lifting Base	0	6582 (259)	2616 (103)	3350 (132)	10184 (22452)	—	90
3475 (918)	12	7309 (288)		3706 (146)	13772 (30362)	356 (14.0)	
6621 (1749)	24			3934 (155)	14252 (31421)	584 (23.0)	
10573 (2793)	48			4264 (168)	14831 (32698)	914 (36.0)	
15740 (4158)	72	9144 (360)		4366 (172)	16242 (35808)	1016 (40.0)	
KD800 SL2 Sound Enclosure with Internal Silencer and State Code Subbase Fuel Tank *							
Lifting Base	0	7707 (303)	2616 (103)	3350 (132)	10587 (23340)	—	75
3475 (918)	12	8434 (332)		3706 (146)	14175 (31250)	356 (14.0)	
6621 (1749)	24			3934 (155)	14655 (32309)	584 (23.0)	
10573 (2793)	48			4290 (169)	15234 (33586)	915 (36.0)	
15740 (4158)	72	9144 (360)		4366 (172)	16645 (36696)	1016 (40.0)	
KD900 SL1 Sound Enclosure with Internal Silencer and State Code Subbase Fuel Tank *							
Lifting Base	0	6582 (259)	2616 (103)	3350 (132)	10497 (23343)	—	91
3475 (918)	12	7309 (288)		3706 (146)	14085 (31253)	356 (14.0)	
6621 (1749)	24			3934 (155)	14565 (32312)	584 (23.0)	
12969 (3426)	48	8400 (331)		4293 (169)	16348 (36243)	940 (37.0)	
19381 (5120)	72	11050 (435)		4369 (172)	17527 (38840)	1016 (40.0)	
KD900 SL2 Sound Enclosure with Internal Silencer and State Code Subbase Fuel Tank *							
Lifting Base	0	7707 (303)	2616 (103)	3350 (132)	10900 (24231)	—	75
3475 (918)	12	8434 (332)		3706 (146)	14488 (32141)	356 (14.0)	
6621 (1749)	24			3934 (155)	14968 (33200)	584 (23.0)	
12969 (3426)	48			4290 (169)	16751 (37131)	940 (37.0)	
19381 (5120)	72	11050 (435)		4366 (172)	17930 (39728)	1016 (40.0)	
KD1000 SL1 Sound Enclosure with Internal Silencer and State Code Subbase Fuel Tank *							
Lifting Base	0	6582 (259)	2616 (103)	3350 (132)	10810 (23833)	—	92
3475 (918)	12	7309 (288)		3706 (146)	14398 (31743)	356 (14.0)	
6621 (1749)	24			3934 (155)	14878 (32802)	584 (23.0)	
12969 (3426)	48	8400 (331)		4290 (169)	16661 (36733)	940 (37.0)	
19381 (5120)	72	11050 (435)		4366 (172)	17840 (39330)	1016 (40.0)	
KD1000 SL2 Sound Enclosure with Internal Silencer and State Code Subbase Fuel Tank *							
Lifting Base	0	7707 (303)	2616 (103)	3353 (132)	11213 (24721)	—	76
3475 (918)	12	8434 (332)		3706 (146)	14801 (32631)	356 (14.0)	
6621 (1749)	24			3934 (155)	15281 (33690)	584 (23.0)	
12969 (3426)	48			4290 (169)	17064 (37621)	940 (37.0)	
19381 (5120)	72	11050 (435)		4366 (172)	18243 (40218)	1016 (40.0)	
KD1250/1500 SL1 Sound Enclosure with Internal Silencers and State Code Subbase Fuel Tank *							
Lifting Base	0	8831 (348)	3033 (119)	3579 (141)	17116 (37748)	—	93
5863 (1549)	18/15	9594 (378)		3960 (156)	22326 (49234)	381 (15.0)	
9860 (2605)	30/25			4138 (163)	22808 (50296)	559 (22.0)	
11204 (2960)	34/28			4214 (166)	22973 (50661)	635 (25.0)	
19214 (5076)	58/48	11113 (438)		4468 (176)	25277 (55741)	889 (35.0)	
21985 (5808)	66/55			4570 (180)	25684 (56637)	991 (39.0)	
KD1250/1500 SL2 Sound Enclosure with Internal Silencer and State Code Subbase Fuel Tank *							
Lifting Base	0	10420 (410)	3033 (119)	3579 (141)	18031 (39764)	—	79
5863 (1549)	18/15	11147 (439)		3960 (156)	23241 (51250)	381 (15.0)	
9860 (2605)	30/25			4138 (163)	23723 (52312)	559 (22.0)	
11204 (2960)	34/28			4214 (166)	23888 (52677)	635 (25.0)	
19214 (5076)	58/48			4468 (176)	26192 (57757)	889 (35.0)	
21985 (5808)	66/55			4570 (180)	26599 (58653)	991 (39.0)	

***** Data in table is for reference only. Height includes enclosure, lift base, and tank (if equipped). Refer to your authorized Kohler distributor for enclosure and subbase fuel tank specification details.

† Max. weight includes the generator set (wet) with the largest alternator option, enclosure, silencers, lift base, and tank (no fuel).

‡ Log average sound pressure level of 8 measured positions around the perimeter of the unit at a distance of 7 m (23 ft.). Refer to TIB-114 for details. Enclosed generator set sound data for some models was not available at time of print.

§ An additional 940 mm (37 inches) of clearance on each side for opening and closing the access doors is recommended.

NOTE: If the Est. Fuel Supply Hours column shows more than one number, the numbers represent each model in that range.

Enclosure and Subbase Fuel Tank Specifications, continued

Fuel Tank Capacity, L (gal.)	Est. Fuel Supply Hours at 60 Hz with Full Load (nominal)	Max. Dimensions, mm (in.)			Max. Weight, † kg (lb.)	Fuel Tank Height, mm (in.)	Sound Pressure Level at 60 Hz with Full Load, dB(A) ‡
		Length	Width §	Height			
KD1250-A/1350 SL1 Sound Enclosure with Internal Silencers and State Code Subbase Fuel Tank *							
Lifting Base	0	8831 (348)	3033 (119)	3579 (141)	17116 (37748)	—	93
5863 (1549)	18/17	9594 (378)		3960 (156)	22326 (49234)	381 (15.0)	
9860 (2605)	30/29			4138 (163)	22808 (50296)	559 (22.0)	
11204 (2960)	34/32			4214 (166)	22973 (50661)	635 (25.0)	
19214 (5076)	58/56	11113 (438)		4468 (176)	25277 (55741)	889 (35.0)	
21985 (5808)	67/64			4570 (180)	25684 (56637)	991 (39.0)	
KD1250-A/1350 SL2 Sound Enclosure with Internal Silencer and State Code Subbase Fuel Tank *							
Lifting Base	0	10420 (410)	3033 (119)	3579 (141)	18031 (39764)	—	76
5863 (1549)	18/17	11147 (439)		3960 (156)	23241 (51250)	381 (15.0)	
9860 (2605)	30/29			4138 (163)	23723 (52312)	559 (22.0)	
11204 (2960)	34/32			4214 (166)	23888 (52677)	635 (25.0)	
19214 (5076)	58/56			4468 (176)	26192 (57757)	889 (35.0)	
21985 (5808)	67/64			4570 (180)	26599 (58653)	991 (39.0)	
KD1600 SL1 Sound Enclosure with Internal Silencers and State Code Subbase Fuel Tank *							
Lifting Base	0	8831 (348)	3033 (119)	3579 (141)	17343 (38248)	—	94
5863 (1549)	14	9594 (378)		3960 (156)	22553 (49734)	381 (15.0)	
9860 (2605)	23			4138 (163)	23035 (50796)	559 (22.0)	
11204 (2960)	26			4214 (166)	23200 (51161)	635 (25.0)	
19214 (5076)	45	11113 (438)		4468 (176)	25504 (56241)	889 (35.0)	
21985 (5808)	52			4570 (180)	25911 (57137)	991 (39.0)	
KD1600 SL2 Sound Enclosure with Internal Silencer and State Code Subbase Fuel Tank *							
Lifting Base	0	10420 (410)	3033 (119)	3579 (141)	18258 (40264)	—	79
5863 (1549)	14	11147 (439)		3960 (156)	23468 (51750)	381 (15.0)	
9860 (2605)	23			4138 (163)	23950 (52812)	559 (22.0)	
11204 (2960)	26			4214 (166)	24115 (53177)	635 (25.0)	
19214 (5076)	45			4468 (176)	26419 (58257)	889 (35.0)	
21985 (5808)	52			4570 (180)	26826 (59153)	991 (39.0)	
KD1750 SL1 Sound Enclosure with Internal Silencers and State Code Subbase Fuel Tank *							
Lifting Base	0	8831 (348)	3033 (119)	3579 (141)	17343 (38248)	—	95
5863 (1549)	13	9594 (378)		3960 (156)	22553 (49734)	381 (15.0)	
9860 (2605)	21			4138 (163)	23035 (50796)	559 (22.0)	
11204 (2960)	24			4214 (166)	23200 (51161)	635 (25.0)	
19214 (5076)	42	11113 (438)		4468 (176)	25504 (56241)	889 (35.0)	
21985 (5808)	48			4570 (180)	25911 (57137)	991 (39.0)	
KD1750 SL2 Sound Enclosure with Internal Silencer and State Code Subbase Fuel Tank *							
Lifting Base	0	10420 (410)	3033 (119)	3579 (141)	18258 (40264)	—	79
5863 (1549)	13	11147 (439)		3960 (156)	23468 (51750)	381 (15.0)	
9860 (2605)	21			4138 (163)	23950 (52812)	559 (22.0)	
11204 (2960)	24			4214 (166)	24115 (53177)	635 (25.0)	
19214 (5076)	42			4468 (176)	26419 (58257)	889 (35.0)	
21985 (5808)	48			4570 (180)	26826 (59153)	991 (39.0)	

***** Data in table is for reference only. Height includes enclosure, lift base, and tank (if equipped). Refer to your authorized Kohler distributor for enclosure and subbase fuel tank specification details.

† Max. weight includes the generator set (wet) with the largest alternator option, enclosure, silencers, lift base, and tank (no fuel).

‡ Log average sound pressure level of 8 measured positions around the perimeter of the unit at a distance of 7 m (23 ft.). Refer to TIB-114 for details. Enclosed generator set sound data for some models was not available at time of print.

§ An additional 940 mm (37 inches) of clearance on each side for opening and closing the access doors is recommended.

NOTE: If the Est. Fuel Supply Hours column shows more than one number, the numbers represent each model in that range.

Enclosure and Subbase Fuel Tank Specifications, continued

Fuel Tank Capacity, L (gal.)	Est. Fuel Supply Hours at 60 Hz with Full Load (nominal)	Max. Dimensions, mm (in.)			Max. Weight, † kg (lb.)	Fuel Tank Height, mm (in.)	Sound Pressure Level at 60 Hz with Full Load, dB(A) ‡
		Length	Width §	Height			
KD2000/2250/2500 SL1 Sound Enclosure with Internal Silencers and State Code Subbase Fuel Tank *							
Lifting Base	0	10774 (424)	3488 (137)	4141 (163)	33073 (72909)	—	90
8577 (2266)	15/14/13	11465 (451)		4522 (178)	40485 (89252)	381 (15)	
14130 (3733)	25/22/22			4700 (185)	41216 (90861)	559 (22)	
16451 (4346)	29/26/25			4776 (188)	41497 (91483)	635 (25)	
KD2000/2250/2500 SL2 Sound Enclosure with Internal Silencer and State Code Subbase Fuel Tank *							
Lifting Base	0	12766 (503)	3488 (137)	4141 (163)	35121 (77426)	—	78
8577 (2266)	15/14/13	13491 (531)		4522 (178)	42533 (93766)	381 (15)	
14130 (3733)	25/22/22			4700 (185)	43264 (95378)	559 (22)	
16451 (4346)	29/26/25			4776 (188)	43545 (95997)	635 (25)	

***** Data in table is for reference only. Height includes enclosure, lift base, and tank (if equipped). Refer to your authorized Kohler distributor for enclosure and subbase fuel tank specification details.

† Max. weight includes the generator set (wet) with the largest alternator option, enclosure, silencers, lift base, and tank (no fuel).

‡ Log average sound pressure level of 8 measured positions around the perimeter of the unit at a distance of 7 m (23 ft.). Refer to TIB-114 for details. Enclosed generator set sound data for some models was not available at time of print.

§ An additional 940 mm (37 inches) of clearance on each side for opening and closing the access doors is recommended.

NOTE: If the Est. Fuel Supply Hours column shows more than one number, the numbers represent each model in that range.

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Phone 920-457-4441, Fax 920-459-1646
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KOHLERPower.com

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UNIVERSIDAD DE PUERTO RICO EN PONCE

Junta de Subastas UPR-Ponce
PO BOX 7186
Ponce, Puerto Rico 00732
Tel. (787) 844-8181 Ext. 2403

PRESENTACIÓN DE OFERTA

Número: **SUBASTA-UPRP-22-04**	Fecha entrega de propuesta:	Lugar: Oficina de Compras UPR-Ponce

Este documento es un requisito de subasta. **Este debe ser el primer documento visible** de su licitación (puede incluir los anejos que estime pertinentes). Añada la hoja de cotejo con todos los documentos y certificaciones requeridas. Los precios cotizados deberán estar garantizados por ciento veinte (120) días a partir de la apertura de pliegos.

Renglón	Descripción General	Precio Subastado	Garantía
Renglón 1 Adquisición e instalación de generador eléctrico en la Biblioteca Adelina Coppin Alvarado de la Universidad de Puerto Rico en Ponce			Términos y condiciones

FAVOR DE INCLUIR ADEMÁS:

1. Correo electrónico _____
2. Número de teléfono _____
3. Seguro Social Patronal _____
4. Tiempo de entrega _____
5. DUNS number: _____
6. Numero registro SAM: _____

_____
Nombre del Licitador
(Compañía)

_____
Nombre y puesto de quien
presenta la oferta

_____
Fecha

_____
Firma autorizada

UPRP
Universidad de Puerto Rico en Ponce

Apartado 7186
Ponce, PR 00732
Teléfono 844-8181

Junta de Subastas

Exts. 2400, 2403

Hoja de Cotejo
Subasta UPRP-22-04
Adquisición e Instalación de Generador Eléctrico en
Biblioteca UPR Ponce

Nombre de Licitador (compañía): _____

Documento	***Cumplimiento (Completado por el proponente)***	***Revisión Oficina de Compras***	***Comentarios***
1. Presentación de Oferta (según formato provisto)	__Sometido __N/A	__Cumple __No Cumple	
2. BID BOND (5%)	__Sometido __N/A	__Cumple __No Cumple	
3. Certificación vigente del Registro Único de licitadores de la ASG	__Sometido __N/A	__Cumple __No Cumple	
4. Estados Financieros	__Sometido __N/A	__Cumple __No Cumple	
5. Memorando explicativo (según requerido en pliego de subasta)	__Sometido __N/A	__Cumple __No Cumple	
6. Cartas de referencia (tres)	__Sometido __N/A	__Cumple __No Cumple	
7. Plan de trabajo (según requerido en pliego de subasta)	__Sometido __N/A	__Cumple __No Cumple	
8. Especificaciones y términos de garantía del manufacturero	__Sometido __N/A	__Cumple __No Cumple	
9. Otros:	__Sometido __N/A	__Cumple __No Cumple	
Otros:	__Sometido __N/A	__Cumple __No Cumple	
Otros:	__Sometido __N/A	__Cumple __No Cumple	

Sometido por: _____ Fecha: _____
Nombre

Firma: _____

Iniciales: _____