

**TITLE: Standard Application Procedure for Diesel Electric Evaluation and Extension of Diesel Electric Evaluation****MSHA Mine Safety and Health Administration, Approval & Certification Center**

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**1.0 PURPOSE**

- 1.1. The purpose of this Standard Application Procedure (SAP) is to explain the basic investigative process, and specify the minimum documents and requirements necessary to initiate an investigation leading to the issuance of a Diesel Electric evaluation or Extension of Diesel Electric evaluation.
- 1.2. Title 30 Code of Federal Regulations (30 CFR) Section 36.32 requires electrical equipment on mobile diesel-powered transportation equipment to be certified or approved to 30 CFR parts 18, 20 or 27. The Diesel Electric (DE) Evaluation program provides the applicant with a means of having their product evaluated by MSHA prior to its initial usage on a permissible diesel machine. This will allow the machine applicant to specify an MSHA evaluation number (DE) and, therefore, not require a complete electrical investigation in conjunction with a diesel approval application.

**2.0 SCOPE**

This SAP encompasses all applications submitted for diesel electric evaluation or extension of diesel electric evaluation under 30 CFR, Part 36.

**3.0 REFERENCES**

- 3.1. 30 CFR Part 18 "Electric Motor-Driven Mine Equipment and Accessories"
- 3.2. 30 CFR Part 20 "Electric Mine Lamps other than Standard Cap Lamps"
- 3.3. 30 CFR Part 27 "Methane Monitoring Systems"
- 3.4. 30 CFR Part 36.32 "Electrical Components and Systems"
- 3.5. APOL1009 "Application Cancellation Policy"
- 3.6. ACRI2001 "Criteria for the Evaluation and Test of Intrinsically Safe Apparatus and Associated Apparatus"

**4.0 Definitions:**

None

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**5.0 APPLICATION PROCEDURE**

- 5.1. All applications for a Diesel Electric evaluation or Extension of Diesel Electric evaluation must include the documentation listed in Sections 4.1.1 through 4.1.6.
  - 5.1.1. An evaluation or extension of evaluation application letter. (Refer to Enclosures A and B.) The application letter should include the applicant's name and address; application date; model and voltage rating of the Diesel Electric; a six digit Company Application Code Number assigned by the applicant (this number is used to identify the application and should not have been assigned to an application previously submitted by the applicant); the name, address, telephone number, FAX number and e-mail address of the person MSHA is to contact regarding the application and billing. The letter should be signed by the person responsible for answering questions regarding the subject application.
  - 5.1.2. An optional completed checklist. (Refer to Enclosure C.) Additional information may be required due to the great variety of diesel electric systems.
  - 5.1.3. All drawings, bill of materials, specifications, etc., which show the details of the design and construction of the Diesel Electric as related to the applicable requirements of 30 CFR. Documents previously accepted by MSHA need not be submitted, unless modified.
  - 5.1.4. A complete list of the drawings, bill of materials, specifications, certified components, intrinsically safe components, etc. that are submitted, referenced, or used to construct the Diesel Electric system. (Refer to Enclosure D.)
  - 5.1.5. A Factory Inspection Form or a certified statement in lieu of the Factory Inspection Form (Refer to Enclosures E or F). The certified statement can be written in the application letter under the Diesel Electric description.
  - 5.1.6. An Electrical Permissibility Checklist (Refer to Enclosure G).

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- 5.1.7. Upon receipt of the application package by the Approval and Certification Center (A&CC), a letter estimating the maximum anticipated fee to complete the investigation and a tentative starting date will be mailed to the applicant.
- 5.1.8. The applicant can pre-authorize the application by authorizing up to a certain dollar amount of investigation time in the application letter. This will permit MSHA to initiate the investigation while the fee estimation process is taking place.
- 5.1.9. Applicants who submit applications to MSHA on a regular basis may choose to submit a blanket authorization indicating their agreement to pay incurred fees.
- 5.1.10. An authorization response form will also be included which indicates agreement, by the applicant, to pay expenses up to the maximum estimated fee for the investigation or requests cancellation of the application. This form must be returned to the A&CC, by the applicant, before any further action can be taken on the application. If the form letter is not returned by the date specified in the fee estimate letter, the application will be canceled.
- 5.1.11. When unforeseen circumstances encountered during the investigation result in exceeding the estimated fee, the applicant will be contacted and given the option of either canceling the action or accepting a revised fee estimate.
- 5.2. During the investigation, the A&CC Investigator assigned to evaluate the application will review the application and contact the person designated in the application letter to discuss any discrepancies. The applicant will receive a discrepancy letter listing additional documentation and components for evaluation and/or test necessary to continue the investigation. If the Applicant does not resolve all of the discrepancies listed in the letter within the time specified in the discrepancy letter, the investigation of the application will be cancelled per A&CC APOL1009 "Application Cancellation Policy".
- 5.3. The final Evaluation or Extension of Evaluation letter and drawing list will be mailed to the applicant when the investigation is completed.

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- 5.4. The applicant will receive an invoice for the cost of the investigation after the investigation is either completed or cancelled.

**ABC Company, 950 Mining Road, Pittsburgh, PA 15293**

July 1, 2008

Chief, Approval and Certification Center  
RR #1, Box 251, Industrial Park Road  
Triadelphia, West Virginia 26059

Gentlemen:

This is a request for a new 12 volt, Model Electro, diesel electric system, Company Code No. 010100.

We are requesting approval of the subject diesel electric assembled according to Layout Drawing 100. The subject diesel electric consists of one 12 volt alternator, one switch enclosure, and four lights.

Since this is a prototype diesel electric, it will be completely assembled and available for inspection on November 1, 2007, at the ABC Company, 950 Mining Road, Pittsburgh, Pennsylvania 15293.

Enclosed are all the new or revised drawings and specifications pertinent to this application. If there are any questions, please contact Mr. John Doe at (555) 555-0001.

Sincerely,

John Doe  
Design Engineer

Enclosure

(Enclosure A)

**DEF Company, 440 Mining Road, Pittsburgh, PA 15293**



July 1, 2008

Chief, Approval and Certification Center  
RR #1, Box 251, Industrial Park Road  
Triadelphia, West Virginia 26059

Gentlemen:

This is a request for an extension of Diesel Electric Evaluation No. DE-8990, Investigation No. DE-8990, to include the subject Model Electro, 12 volt, direct current, Diesel Electric, Company Code No. 040200.

We are requesting an extension of diesel electric evaluation of the subject diesel electric assembled according to Assembly Drawing A-550.

This Diesel Electric is similar to the Model Electro, Diesel Electric built according to Assembly Drawing A-440, Evaluation No. DE-8990-0, Investigation No. DE-8990, letter dated July 1, 1995, except as follows:

1. The alternator manufacturer was changed.
2. All the cables were changed.

Enclosed are all the new or revised drawings and specifications pertinent to this application. If there are any questions, please contact Mr. John Doe at (555) 555-9191.

Sincerely,

John Doe  
Design Engineer

Enclosure

(Enclosure B)

## EVALUATION/EXTENSION OF EVALUATION CHECKLIST

Complete all of the following by adding a check mark or N/A on the lines provided. The check mark signifies the item has been positively addressed. N/A signifies the item is not applicable to the design of the diesel electric.

### Administrative

- \_\_\_\_\_ 1. The appropriate Evaluation or Extension of Evaluation application letter is enclosed.
- \_\_\_\_\_ 2. A drawing list, electrical permissibility checklist, and Factory Inspection Form is enclosed.
- \_\_\_\_\_ 3. All correspondence, specifications and lettering on documents are in English or translated into English and legible.
- \_\_\_\_\_ 4. All documents are titled, numbered, dated, and show the latest revision or date. If multiple pages are submitted, this information is on each page.
- \_\_\_\_\_ 5. There are no pencil or ink notations, or correction fluid (white-out) on the documents.
- \_\_\_\_\_ 6. All documents include a note "Do not change without approval of MSHA" on each page or sheet.
- \_\_\_\_\_ 7. All submitted drawings, including sheet numbers, are traceable (referenced) back to the one or more drawings to which the equipment is built.
- \_\_\_\_\_ 8. All wiring diagrams showing intrinsically safe circuits include a warning statement "Any change(s) in the intrinsically safe circuitry or components may result in an unsafe condition"?

### Technical

- 9. The drawing(s) includes the following:
  - \_\_\_\_\_ a. The location of all electrical enclosures and intrinsically safe components.
  - \_\_\_\_\_ b. Location of the evaluation plate and method of attachment.
- \_\_\_\_\_ 10. The location of all cables entering/exiting electrical enclosures is shown.
- 12. All inter component cables are identified by:

(Enclosure C)

- \_\_\_\_\_ a. Conductor size, (e.g., 1/0 A.W.G.).
- \_\_\_\_\_ b. Type of cable, (e.g., G-GC).
- \_\_\_\_\_ c. Number of conductors, (e.g., 3).
- \_\_\_\_\_ d. Electrical rating, (e.g., 2KV).
- \_\_\_\_\_ e. Outer diameter, (e.g., 1.65",  $\pm 0.04$ ").

13. All explosion-proof electrical enclosures are identified by:

- \_\_\_\_\_ a. Manufacturer.
- \_\_\_\_\_ b. Model/Type Number
- \_\_\_\_\_ c. Electrical Rating (if applicable).
- \_\_\_\_\_ d. Function, (e.g., light, switch).
- \_\_\_\_\_ e. Certification/approval number, including extension number. If the original issuance is used, indicate (-0).

Note: If no certification/approval number was issued, indicate the approval number and extension number under which it was accepted.

- \_\_\_\_\_ f. Quantity.

14. All intrinsically safe circuits/components are identified by:

- \_\_\_\_\_ a. Manufacturer.
- \_\_\_\_\_ b. Model/Type Number.
- \_\_\_\_\_ c. Quantity.
- \_\_\_\_\_ d. MSHA Evaluation Number, including extension number. If the original issuance is used, indicate (-0).

- \_\_\_\_\_ 15. All plugs and receptacles are explosion-proof or mechanically or electrically interlocked unless used in an intrinsically safe circuit.

(Enclosure C)



- \_\_\_\_\_ 16. The ampacity rating for each inter component cable is adequate for the full load current of its load or a justification for the use of the cable is enclosed with the application.
- \_\_\_\_\_ 17. If the diesel electric is equipped with a methane monitor, the methane monitor shuts down the diesel engine which deenergizes the alternator and all non-battery powered machine electrics. The methane monitor shut-off relay is connected into the control circuitry so that it is not possible to defeat the methane monitor by holding down or blocking any reset (start) switch in the start position. Note: Intrinsically safe circuits and the methane monitor may remain energized.
- \_\_\_\_\_ 18. All energy storage devices (not including batteries) housed in explosion-proof enclosures have a means of being discharged before they are accessible to personnel. The maximum discharge time of the device is specified on the drawing.
- \_\_\_\_\_ 19. The cross-sectional area(s) of the grounding conductor(s) is at least 50 percent of one of the power conductors on No. 6 (AWG) or larger cables, and at least the same size on cables smaller than No. 6 (AWG).
- \_\_\_\_\_ 20. There are no insulating materials in the enclosures that give off flammable or explosive gases when decomposed electrically. Additionally, all parts coated or impregnated with insulating materials were heat treated to remove any combustible solvents before assembly.
- Note: Air drying insulating materials are excepted.
- \_\_\_\_\_ 21. The temperature of the external surfaces of the mechanical or electrical components does not exceed 150<sup>0</sup>C (302<sup>0</sup>F) under normal operating conditions.
- \_\_\_\_\_ 22. If the diesel electric is equipped with fiber optic cable(s), which do not contain current-carrying electrical conductors must meet the following criteria.
- \_\_\_\_\_ a. The cable is MSHA accepted flame-resistant unless totally enclosed within an MSHA flame-resistant hose conduit or other MSHA flame-resistant material, or totally contained within an explosion-proof enclosure.
- \_\_\_\_\_ b. A strain relief device is provided at both ends of the cable where it enters an explosion-proof enclosure not on a common frame.
- \_\_\_\_\_ c. All the conductive members are grounded on cables which contain noncurrent-carrying conductive members, such as metallic strength members and metallic vapor barriers.

(Enclosure C)

\_\_\_\_\_ d. Any cable exiting an explosion-proof enclosure was explosion tested in a gland arrangement similar to that being used and in an MSHA tested enclosure at a pressure of approximately 150 psi or the tests were waived based on a previously accepted similar design.

\_\_\_\_\_ e. The cable manufacturer, type and outside diameter (including tolerance) is specified.

Note: Cables which contain both optical fibers and current-carrying electrical conductors will be classified as electrical cables and must meet the requirements of 30 CFR Part 18.

\_\_\_\_\_ 23. All circuit-interrupting devices can be reset without opening the compartment in which they are enclosed and no explosion-proof enclosure is required to be opened to operate a switch, rheostat or other device. A circuit-interrupting device does not need a method for external operation if the following criteria are met:

1. the circuit-interrupting device is not required by 30 CFR 18.51(a);

2. the circuit-interrupting device protects only control circuit wire(s) or device(s);

3. the circuit-interrupting device provides protection only for cables or components internal to the explosion-proof enclosure; and

4. the circuit-interrupting device can be re-closed without exposing personnel to any energized power circuit.

\_\_\_\_\_ 24. All components and quantities (lights, ISC components, etc.) listed on the bill of materials, etc., are also shown on the drawing(s).

\_\_\_\_\_ 25. The schematic/wiring drawing(s) includes/specifies the following, where applicable.

\_\_\_\_\_ a. Short-circuit protective devices for all cables exiting explosion-proof enclosures, including their electrical ratings and trip settings, in amperes.

Note: If one protective device is used to protect several cables, the protective device must protect the smallest cable.

\_\_\_\_\_ b. Primary and secondary transformer voltages and any voltage change from AC to DC.

\_\_\_\_\_ c. Labels for all major switches (as to functions), example, emergency stop switch, pump start, light switch, etc.

(Enclosure C)

\_\_\_\_\_ d. Separate grounding conductors to indicate all headlight and luminaire assemblies are grounded by a separate conductor.

\_\_\_\_\_ e. A separate two-pole switch to deenergize all power conductors to headlights and luminaires.

Note I. Relay actuated contactors are not acceptable as the sole means of providing this function.

Note II: More than one separate two-pole switch may be used; however, each switch must only control a lighting circuit.

Note III: On three phase lighting circuits, a three-pole switch must be used.

\_\_\_\_\_ f. Identification of all intrinsically safe circuits by the MSHA evaluation number, including extension number. If the original issuance is used, indicate (-0).

\_\_\_\_\_ g. The note "Any change(s) in the intrinsically safe circuitry or components may result in an unsafe condition."

Note: For each schematic/wiring diagram(s) that contains intrinsically safe circuits.

\_\_\_\_\_ h. Cover interlocks on covers providing access to power fuses (other than headlight and control circuit fuses). The interlock must interrupt the electrical circuit in the explosion-proof enclosure and prevents automatic reenergization of the circuit until the explosion-proof integrity of the enclosure is reestablished. The power fuses are located on the load side of the circuit interrupting device.

\_\_\_\_\_ i. The location of the basic electrical parts such as the circuit breakers, overloads, fuses, switches and contactors in relationship to the enclosures.

26. Where applicable the following information shall be provided (notes/statements are acceptable).

\_\_\_\_\_ a. All electrical cables are isolated from hydraulic lines.

\_\_\_\_\_ b. All headlights and luminaires are protected by guarding or location.

(Enclosure C)

- \_\_\_\_\_ c. All moving parts are guarded (rotating belts/chains, fan blades, etc.).
- \_\_\_\_\_ d. Wiring for non-intrinsically safe circuit conductors and intrinsically safe circuit conductors is not intermingled with wiring for other intrinsically safe circuit conductors.  
  
Note: Unless the circuit was evaluated in that mode.
- \_\_\_\_\_ e. The magnesium content of any external aluminum alloy fans, pulleys, or other rotating devices does not exceed 0.6%.
- \_\_\_\_\_ f. The voltage ratings of all conductors and cables within the enclosures is compatible with the impressed voltage.
- \_\_\_\_\_ g. All components on a common frame are solidly frame grounded when the inter component cable(s) to those components do not have separate grounding conductors.
- \_\_\_\_\_ h. All electrical cables/cords are MSHA accepted flame-resistant or enclosed in MSHA accepted flame-resistant hose conduit. The conduit must completely enclose the cable. Clamping the hose conduit to the cable is not acceptable. Note: This includes intrinsically safe cables.
- \_\_\_\_\_ i. All cables are protected from mechanical damage and clamped in place to prevent undue movement.
- \_\_\_\_\_ j. Electrical clearances within enclosures are in accordance with 30 CFR 18.24.

(Enclosure C)

INVESTIGATION NO. DE-(leave blank)

DRAWING LIST

GHI Company  
Model 100, 12 volt, Direct Current,  
Diesel Electric  
Built According to Assembly Drawing A-500  
Evaluation No. DE-(leave blank)-0

<u>TITLE</u>	<u>DRAWING</u>	<u>PART NO.</u>	<u>REVISION</u>
Layout Drawing	A-500	-	A
Electric Diagram	C-500	-	A
(Alt.) Electric Diagram	D-500	-	A
Electrical Permissibility Checklist	A-321, 3 shts	-	A
Factory Inspection Form	G-500	-	E

(Enclosure D)

GHI Company  
Drawing G-500/ Revision E (dated 7-23-08)

**FACTORY INSPECTION FORM**

Approval # \_\_\_\_\_ Serial # \_\_\_\_\_ Model No. \_\_\_\_\_ Customer \_\_\_\_\_  
Date Inspected \_\_\_\_\_ Inspector \_\_\_\_\_ Signature \_\_\_\_\_

Conformance to Approval Drawings:

- The electrical system conforms to Layout drawing A-500 \_\_\_\_\_
- The electrical system conforms to Electrical Diagram drawing C-500 or D-500 \_\_\_\_\_

Permissibility and Workmanship:

- All explosion-proof enclosures have an MSHA plate attached \_\_\_\_\_
- Lockwashers (or equivalent) are provided for all bolts securing flame-path fits \_\_\_\_\_.
- None of the fastenings used for joints on the explosion-proof enclosures are used for attaching non-essential parts or for making electrical connections \_\_\_\_\_
- All joints forming flame-arresting paths are smooth and free from rust corrosion and pitting \_\_\_\_\_.
- Clearances on all joints forming flame-arresting paths meet the applicable regulations \_\_\_\_\_.
- Lenses are intact and not cracked or broken.
- All lead entrances are assembled so that the cable jacket penetrates into the enclosure and when tightened, an 1/8" minimum clearance remains between the packing nut and stuffing box. \_\_\_\_\_
- All threaded covers are secured \_\_\_\_\_.
- All packing nuts and stuffing boxes are secured from loosening \_\_\_\_\_.
- All unused lead entrances are closed with plugs and secured by spot welding or equivalent \_\_\_\_\_.
- Electrical cables are secured in place to prevent undo movement \_\_\_\_\_.
- Electrical cables are either flame resistant or enclosed in flame resistant hose conduit \_\_\_\_\_.

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*Note: This is very generic example of a Factory Inspection Form. It would be expected that more detail would be included in the form submitted to MSHA.*  
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**Do Not Change Without Approval of MSHA**

(Enclosure E)

**GHI Company, 550 Mining Road, Pittsburgh, PA 15201**

July 4, 2008

GHI Company  
550 Mining Road  
Pittsburgh, Pennsylvania 15201

SUBJECT: Model RB1 - Diesel electric  
Company Application Code No. 141989

I, John Bolter, Design Engineer, certify that the GHI Company will conduct regular inspections of the subject diesel electric manufactured by GHI Company to insure that this product is made and assembled in strict accordance with the drawings and specifications approved by MSHA.

Sincerely,

John Bolter  
Design Engineer

(Enclosure F)

## Electrical Permissibility Checklist

GHI Company

Drawing A-321, Sheet 1, Revision A, dated 7/31/08

**Do Not Change Without Approval of MSHA**

The component and function checks in this document that are identified as “weekly” must be performed during each weekly maintenance examination in accordance with 30 CFR, Section 75.1914. All checks must be performed in fresh air, in an area where permissible equipment is not required.

Machine Approval # \_\_\_\_\_ Serial # \_\_\_\_\_

Examination Date \_\_\_\_\_ Conducted by \_\_\_\_\_

(Weekly) All electrical enclosures have an MSHA plate attached that is clearly stamped with an MSHA certification number. The certification number must match the number listed in the table below.

Enclosure	Quantity of Item per machine	Certification Number
Alternator	1	07-JA010001-0
Headlight Switch	1	XP-1234-1
Headlight	4	XP-4321-0
Dash Light	1	XP-4321-0 or -1
Hourmeter	1	XP-4321-0 or -1

(Weekly) All electrical enclosures are securely mounted and all vulnerable electrical components are protected from physical damage.

(Weekly) Lock washers or equivalent devices are provided for all bolts, screws, or studs that secure parts of the explosion-proof enclosures. All bolts, screws, and studs are in place and tightened.

(Weekly) None of the fastenings used for joints on the explosion-proof enclosures are used for attaching non-essential parts or for making electrical connections.

(Weekly) Use feeler gauges of the appropriate size to ensure that clearances in all accessible flame path joints, between the enclosures and corresponding covers, are not exceeded. **(See Table Below)**

(Enclosure G)



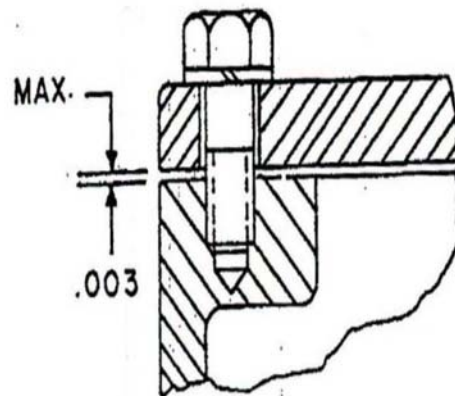
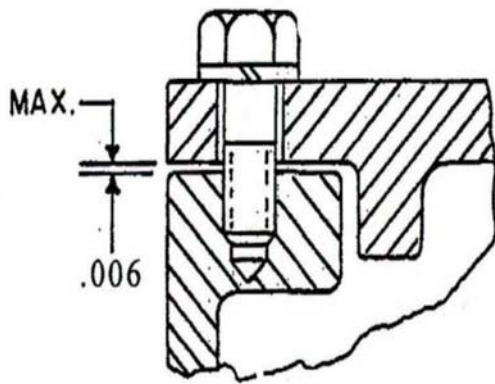
## Electrical Permissibility Checklist

GHI Company

Drawing A-321, Sheet 2, Revision A, dated 7/31/08

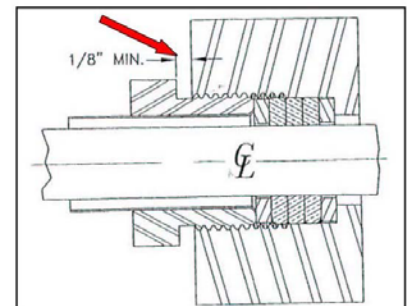
**Do Not Change Without Approval of MSHA**

Component	Clearance (Inches)
Alternator (See Fig. below)	.006
Headlight Switch (See Fig. below)	.003
Headlight	NA
Dash Light	NA
Hourmeter	NA



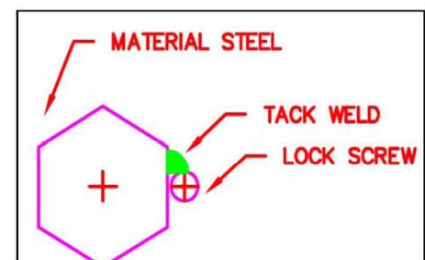
[ ] (Weekly) Headlight, dash light, and hourmeter enclosures are intact, not cracked or broken, and the lenses are not loose.

[ ] (Weekly) All lead entrances (packing glands) are assembled so that the cable jacket penetrates into the enclosure and when tightened, a 1/8" minimum clearance remains between the packing nut and stuffing box. (See figure)



[ ] (Weekly) All packing nuts and stuffing boxes are secured from loosening by a locking screw, wire, or other means.

[ ] (Weekly) All unused lead entrances are closed with metal plugs which are secured in place by spot welding, brazing, or equivalent. (See Figure)



(Enclosure G)

## **Electrical Permissibility Checklist**

GHI Company

Drawing A-321, Sheet 3, Revision A, dated 7/31/08

Do Not Change Without Approval of MSHA

- (Weekly) Headlights are installed at each end of the machine.
- (Weekly) Headlights and strobe lights are operable.
- (Weekly) Headlight switches do not control or operate any electrical circuits other than the headlights.
- All joints forming the flame arresting paths (flanges or covers) are smooth and free from rust, corrosion and pitting.
- Where required, electric cables outside of explosion proof enclosures are protected by flame resistant hose conduit. If hose conduit is used, it must be securely clamped at both ends and MSHA markings appear as "Flame-Resistant", US MSHA.
- Cables are clamped in place to prevent undue movement.
- Cables are not subject to abrasion from sharp corners or edges.
- Cables are protected from mechanical damage by position, flame resistant hose conduit, metal tubing, or troughs. NOTE: Flexible or threaded rigid metal conduit is not acceptable.
- Cables are isolated from hydraulic lines, hydraulic components and fuel lines.
- Cables are flame resistant if not enclosed in hose conduit. This is indicated by "MSHA" markings on the cable.
- Fuses are installed inside the alternator housing for overload protection of each power conductor in the electrical system. The fuses are of the proper dimensions for the fuse holders and do not exceed a current rating of 10A.
- Electrical Connections inside the electrical enclosures are secure and are insulated where space is limited. The ground conductors are not broken and are securely attached.

(Enclosure G)