

APPENDIX 12 – CUMMINS PPE DETERMINATION GUIDE

Each of the basic hazards should be reviewed and a determination made as to the type, level of risk, and seriousness of potential injury. Consideration should be given to the possibility of exposure to several hazards at once. The general procedure for determining appropriate protective equipment is to:

- identify the potential hazards and the type of protective equipment that is available, and what protection it provides (i.e., splash protection, impact protection, etc.);
- compare the capabilities of various types of PPE with the hazards associated with the environment (e.g., impact velocities, masses, projectile shape, and radiation intensities);
- select the PPE which provides a level of protection greater than the minimum required to protect workers from the hazards; and,
- select PPE that will fit each person properly and provides protection from the hazard.

PPE SELECTION

EYE AND FACE PROTECTION: Persons must use appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids, or caustic liquids, chemical gases or vapors, or potentially injurious light radiation. Requirements for side protection, prescription lenses, filter lenses, and identification of the manufacturer are outlined in the ANSI standard (*minimum requirements*) or should be as per local requirements, if they are specific. Protective eye and face devices must comply with ANSI Z87.1 or be demonstrated to be equally effective. It is mandatory to wear safety glasses with side-shields throughout the Cummins facility.

RESPIRATORY PROTECTION: Appropriate respirators are required to be worn in areas where persons are exposed to inhalation hazards in excess of the established exposure limits. Inhalation hazards may consist of exposure to gases, vapors, dusts, mists, fumes or fibers. All respirator usage shall be in accordance with the ANSI Z88.2 (Standard Practice for Respiratory Protection) or be equally effective. Occupations/activities that may be exposed to these types of hazards include abrasive blasting, spray painting, welding, demolition, chemical related activities, asbestos maintenance etc....

HEAD PROTECTION: Persons must wear protective helmets when working in areas where there is a potential for injury to the head from falling objects or with possibilities of head striking against objects. Protective helmets designed to reduce electrical shock hazards shall be worn by each such affected employee when near exposed electrical conductors which could contact the head. Protective helmets purchased shall comply with ANSI Z89.1 (NFPA 70E: current edition for electrical PPE) or be equally effective. Occupations/activities that may

be exposed to these types of hazards include crane operations, overhead work areas, all construction related work, low clearance work areas etc...

FOOT PROTECTION: Persons must wear protective footwear when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, or where employees' feet are exposed to electrical hazards. Protective footwear must comply with ANSI Z41 or be equally effective.

HAND AND SKIN PROTECTION: Appropriate hand protection are required when persons' hands are exposed to hazards such as those from skin absorption of harmful substances; cuts or lacerations; abrasions; punctures; chemical burns; thermal burns, harmful temperature extremes etc... The selection of the appropriate hand protection should be based on an evaluation of the performance characteristics of the hand protection relative to the tasks to be performed, conditions present, duration of use and the hazards and potential hazards identified. Occupations/activities that may be exposed to these types of hazards include sheet metal fabrication, painters, welders, electricians, parts cleaning, material handling etc...

ANSI/ISEA 105-2005, *American National Standard for Hand Protection Selection Criteria*, provides guidance for selecting the correct gloves. Also, refer to *Cummins Hand Safety Procedure*.

Refer **NFPA 70E, current edition**, *Standard for electrical safety in the workplace* for determining the right PPEs based on the Arc Flash analysis approach for any job required to be carried out on energized electrical installations or on equipment that can expose person(s) to live electrical parts. Also, refer to *Cummins Electrical Safety Work Policy and related Procedures*.

Employees should wear fully buttoned coats or body aprons, hairnets, and beard covers in designated areas (as specified by the sites). Certain areas where hazardous chemicals are stored/ handled may require a higher level of protection in the form of coveralls or air suits. Employees should not be allowed to enter these areas without appropriate clearance, training, and protection. Shirts with sleeves must be worn at all times.

HEARING PROTECTION: Persons exposed to excessive noise must use appropriate PPE including ear plugs, muffs, or both when engineering or administrative controls are not feasible to reduce exposure. Where the individual's noise exposure equals or exceeds an 8-hour time-weighted average of 85 decibels on the A scale (dBA), hearing protection should be exercised mandatorily.

Ear plugs are inserted to block the ear canal. They may be pre-molded (pre-formed) or moldable (foam ear plugs). Ear plugs are either available as disposable products or reusable plugs.

Semi-insert ear plugs which consist of two ear plugs held over the ends of the ear canal by a rigid headband.

Ear muffs consist of sound-attenuating material and soft ear cushions that fit around the ear and with hard outer cups. They are held together by a head band.

Use subject fit data based on ANSI S12.6-1997 [ANSI 1997] to estimate hearing protector noise attenuation.

Comparison of Hearing Protection	
Ear Plugs	Ear Muffs
Advantages: <ul style="list-style-type: none">• small and easily carried• convenient to use with other personal protection equipment (can be worn with ear muffs)• more comfortable for long-term wear in hot, humid work areas• convenient for use in confined work areas	Advantages: <ul style="list-style-type: none">• less attenuation variability among users• designed so that one size fits most head sizes• easily seen at a distance to assist in the monitoring of their use• not easily misplaced or lost• may be worn with minor ear infections
Disadvantages: <ul style="list-style-type: none">• requires more time to fit• more difficult to insert and remove• require good hygiene practices• may irritate the ear canal• easily misplaced• more difficult to see and monitor usage	Disadvantages: <ul style="list-style-type: none">• less portable and heavier• more inconvenient for use with other personal protective equipment.• more uncomfortable in hot, humid work area• more inconvenient for use in confined work areas• may interfere with the wearing of safety or prescription glasses: wearing glasses results in breaking the seal between the ear muff and the skin and results in decreased hearing protection.

FALL PROTECTION: Cummins mandates use of full body harness conforming to ANSI Z359.1, ANSI A10.14 requirements, or be equally effective, in all the

operations/ activities where fall protection is required. All fall protection equipment/ attachments are to be thoroughly inspected prior to every use.

Inspection and Maintenance tips -

To maintain service life and high performance, you should inspect harnesses frequently. Visual inspection before each use is required. Regular inspection by a competent person for wear, damage, or corrosion should be a part of the safety program. Inspect the equipment daily and replace it if any defective conditions exist.

1. Webbing - Grasp the webbing with both hands 6 to 8 inches apart. Bend the webbing in an inverted "U" as shown. The resulting surface tension makes damaged fibers or cuts easier to see. Follow this procedure the entire length of the webbing, inspecting both sides of each strap. Watch for frayed edges, broken fibers, pulled stitches, cuts, burns, and chemical damage.

2. D-Rings/BackPads - Check D-rings for distortion, cracks, breaks, and rough or sharp edges. The D-ring should pivot freely. D-ring back pads should also be inspected for damage.

3. Attaching Buckles - Attachments of buckles and D-rings should be given special attention. Note any unusual wear, frayed or cut fibers, or distortion of the buckles or D-rings.

4. TheTongue/Grommets - The tongue receives heavy wear from repeated buckling and unbuckling. Inspect for loose, distorted, or broken grommets. Webbing should not have additional punched holes.

5. TongueBuckle - Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. Roller should turn freely on frame. Check for distortion or sharp edges.

6. Friction and Mating Buckles - Inspect the buckle for distortion. The outer bars and center bars must be straight. Pay special attention to corners and attachment points of the center bar.

7. Visual Indications of Damage to Webbing and Rope –

a) Heat - In excessive heat, becomes brittle and has a shriveled brownish appearance. The fibers will break when flexed. Should not be used above 180 degrees Fahrenheit.

b) Chemical - Change in color usually appearing as a brownish smear or smudge. Transverse cracks when bent over a mandrel. Loss of elasticity.

c) Molten metal or flame. Webbing strands fuse together. Hard shiny spots. Hard and brittle feel.

d) Paint and solvents - Paint that penetrates and dries restrict movement of the fibers. Drying agents and solvents in some paints cause chemical damage.

Fall arrestors: A fall arrest system is an assembly of components and subsystems, including the necessary connectors, used to arrest the user in a fall from a working height and suspend the user until rescue can be effected. A fall arrest system must always include a full body harness and connecting means

between the harness and an anchorage or anchorage connector. Such connecting means may consist of a lanyard, energy (shock) absorber, fall arrester (rope grab), lifeline, self-retracting lanyard or qualified combinations of these.

Suspension systems: The suspension configuration permits workers to sit and work safely while elevated. Unlike the fall arrest configuration, the suspension configuration distributes the worker's weight on areas of the body capable of bearing that weight for extended periods. A suspension system is designed to raise or lower and support a worker at an elevated work station. The connecting points of the system, such as shoulder or seat-strap D-rings, are NOT designed to properly distribute the impact forces that result in arresting a free fall. A suspension system alone cannot be relied upon to provide proper fall arrest protection; the worker must be properly attached to an independent fall arrest system if a free fall is a possibility.

Restraint systems: A restraint system is an assembly of components and subsystems, including the necessary connectors, used to: (a) stabilize and partially support the user at an elevated work location and allow free use of both hands. Certain restraint systems are referred to as a work positioning system or, simply, a positioning system that restrict the user's motion so as to prevent reaching a location where a fall hazard exists. A positioning system includes the user's harness and connecting means between the harness and an anchorage or anchorage connector. Such connecting means usually consists of a positioning lanyard which is connected to both hip D-rings of the harness and wraps around or connects to an anchorage or anchorage connector. A positioning system must always be backed up by a fall arrest system.

WELDING, CUTTING and BURNING: Welders must wear a welding helmet with welding hood (combination hard hat) when welding. Soft caps are prohibited. Face shields or goggles that fit on hard hats must be worn along with approved safety glasses during grinding operations. For overhead work, employees should wear fire-resistant hard hats and fire-retardant shoulder covers.

Keep clothing free of oil, grease, and flammable material. Button collars and cuffs, and turn pant cuffs inside pants. Pockets must be covered with flaps and buttoned, or removed from the front of vests, shirts, and aprons.

Welders and their helpers must wear gloves and proper infrared/ultraviolet eye protection in addition to safety glasses. Workers engaged in oxy-acetylene welding or cutting must wear a welding helmet or safety goggles that are equipped with suitable filter lenses. Workers who are engaged in electric arc welding must use shields or helmets that are equipped with suitable filter lenses that fit on a hard hat. Wear approved safety glasses or goggles under a combination hard hat or welding hood. Employees should not be allowed to perform welding, burning, or open flame work on staging suspended by fiber or synthetic rope.

ADDITIONAL PPEs: The Supplier should be directed to furnish any additional equipment required by unusual circumstances (such as high temperature work or handling corrosive liquids) and not specifically covered in this section. Use of such PPEs must be reviewed with the site safety department.