pH7™
NEUTRALISING HAZARDS

AS 4775:2007

COMPLIANCE CHECKLIST AND TECHNICAL GUIDELINES

NEW ZEALAND'S LEADER IN HAZCHEM SAFETY SOLUTIONS

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COMPLIANCE & TECHNICAL

Businesses use products with hazardous properties (hazardous substances) on a daily basis. Goods that are flammable, corrosive, explosive, toxic, oxidising or ecotoxic are useful because of their hazardous properties i.e. petrol that didn't ignite wouldn't be a very useful fuel for vehicles.

However, because of their properties, hazardous substances can cause serious harm to people and the environment and additional care must be taken when storing, handling and disposing of these substances.

pH7 is dedicated to preventing harm from hazardous substances to people and the environment. We do this every day by working towards our Vision of being New Zealand's leading provider of safety solutions for businesses working with hazardous substances.

INTRODUCTION

The selection of emergency eyewash and shower equipment is often a complicated process. In addition to addressing design and engineering issues, specifiers must be aware of regulatory requirements and compliance standards. In Australia and New Zealand the relevant standard is AS4775:2007 "Emergency Eyewash and Shower Equipment" which sets out requirements for the proper selection, installation, operation and maintenance of emergency equipment. AS4775:2007 is based on the American standard ANSI/ISEA Z358.1 and is essentially replicated with change to the units of measure and some other minor changes. E.g. the shower minimum flowrate requirement of 20 GPM (Gallons per minute) in the ANSI standard is changed to 75.7 LPM in the AS/NZS standard.

To assist specifiers and end users in understanding the provisions of the AS4775:2007 standard, Dalton International Ltd has prepared this Compliance Checklist. In this Checklist, we have summarised and graphically presented the provisions of the standard.

This Checklist can serve as a starting point for designing and planning emergency eyewash and shower systems and also highlights the maintenance requirements to ensure your chosen equipment continues to function properly.

LEGAL REQUIREMENTS

The Health and Safety at Work Act 2015 (HSWA) is New Zealand's workplace health and safety law. It introduced new responsibilities for managing the work-related risks that could cause serious injury, illness or even death.

In workplaces where there is a risk of chemical spills, splashes or accidents the PCBU (Person In Charge of Business or Undertaking) is required to take all practicable steps to ensure that risks are identified, and either eliminated, isolated or as a last resort mitigated. Providing emergency showers and eyewashes that comply with AS4775:2007 is part of the solution to mitigate the risk of chemical splashes.

AS4775:2007 & ANSI Z358.1

AS4775:2007 is based on the American standard ANSI Z358.1 but is not identical. Some minor changes have been made to address the specific needs of Australian applications, and integrate with other Australian Standards. The main differences are as follows:

- Inclusion of guidance on dimensional constraints for disabled access.
- Inclusion of guidance on local materials for plumbing components.
- Inclusion of guidance on good design and manufacture.

AS4775:2007 covers the following types of equipment:

- Emergency shower equipment.
- Eyewash equipment.
- Eye/face wash equipment.
- Combination shower and eyewash or eye/face wash equipment.
- Facilities for disabled persons.
- Supplemental equipment including drench hoses and self-contained equipment

The objective of this Standard is to provide uniform minimum requirements for equipment performance, installation, use, maintenance and training of users, along with relevant test procedures.

This Compliance Checklist summarises the key parts of the standards. It is not intended as a replacement for reading the standards and we strongly recommend that a copy of the standard be purchased and understood before purchasing any emergency shower or eyewash equipment.

01

FIRST AID DEVICES

Emergency eyewash and shower units are designed to deliver water to rinse contaminants from a user's eyes, face or body. As such, they are a form of first aid equipment to be used in the event of an accident. However, they are not a substitute for primary protective devices (including eye and face protection and protective clothing) or for safe procedures for handling hazardous materials.

02

LOCATION OF EMERGENCY EQUIPMENT

In general, the standard provides that emergency equipment be installed within 10 seconds walking time from the location of a hazard (approximately 16m). The equipment must be installed on the same level as the hazard (i.e. accessing the equipment should not require going up or down stairs or ramps). The path of travel from the hazard to the equipment should be free of obstructions and as straight as possible.

However, there are certain circumstances where these guidelines may not be adequate. Where workers are handling particularly strong acids, caustics or other materials where the consequences of a spill would be very serious, emergency equipment should be installed immediately adjacent to the hazard.

Laboratory environments may also require special consideration. It has been common in many laboratory buildings to install emergency equipment in a corridor or hallway outside of the lab room. Since a door is considered an obstruction, this violates the provisions of the standard. For laboratory environments, we recommend installing (i) recessed laboratory eyewash/shower cabinets inside the lab room and (ii) dual purpose eyewash/drench hose units at lab sinks. The recessed cabinet units are a space saving design that satisfy the standard's requirements for both a shower and an eye/face wash, and are wheelchair accessible, while the eyewash/drench hoses provide immediate protection for the eyes, face or body when a spill involves a relatively small amount of hazardous material.

03 WATER TEMPERATURE

The standard states that the water temperature delivered by emergency equipment should be 'tepid.' Tepid is defined to be between 16°C and 38°C. However, in circumstances where a chemical reaction is accelerated by flushing fluid temperature, a facilities safety/health advisor should be consulted to determine the optimum water temperature for each application.

The delivery of tepid water to emergency equipment may raise complicated engineering issues. At a minimum, it generally involves providing both hot and cold water to the unit, and then installing a mixing valve to blend the water to the desired temperature. Guardian offers a variety of mixing valves and turnkey, recirculating tempering systems to provide tempered water. Please contact Dalton International's office for further information.

04 SHUT OFF VALVES

Plumbed emergency equipment must be connected to a potable water supply line. It may be advisable to install a shut off valve on the water line, upstream of the unit, to facilitate maintenance of the equipment. If a shut off valve is installed, provision must be made to prevent unauthorized closure of the shut off valve. Such provision can include removing the handle of the shut off valve or locking the valve in the open position. Only maintenance personnel should be authorised to place a handle on or unlock the valve.

05 CORROSION RESISTANCE

Once connected to a water supply line, water will enter the emergency equipment and stand in the unit up to the valve(s). When activated, water will flow through the entire unit. Therefore, the unit must be constructed of materials that will not corrode when exposed to water for extended periods of time. In addition to this general provision, the standard specifically requires that valves be resistant to corrosion. Emergency equipment should therefore be constructed of materials that will resist rusting and corrosion. Materials that are considered acceptable for this purpose include brass, galvanized steel and many types of plastics (ABS, nylon, etc.). However, these materials may not provide durable service when exposed to harsh industrial conditions, may deteriorate in direct sunlight or be subject to other limitations.

Therefore, for maximum durability, the following materials should also be considered:

- Epoxy coated galvanized steel
- Epoxy coated brass
- Stainless steel
- PVC

06 FREEZING

There are many applications where emergency equipment must be installed in areas that are subject to freezing conditions. Such areas may include any type of outdoor area (bulk material handling facility, tank farm, etc.), as well as some interior areas (loading docks, low temperature facilities, etc.). In these cases, the emergency equipment must be protected against freezing.
Equipment that is designed and manufactured to be freeze-resistant should be installed. There are a number of different types of freeze-resistant equipment, including:

- Units that have a temperature actuated bleed valve that permits water to flow through the unit when the temperature drops below freezing. These units are generally used only where the possibility of freezing is very infrequent.
- Units on which the valve is mounted behind a wall or buried below the frost line and is remote-activated.
- Combination units that are electrically heated (heat-traced) and insulated.
- Units that have a heated enclosure to fully contain and protect both the equipment and the user.

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07 DISPOSAL OF WATER

The standard does not include any specific provisions regarding the disposal of waste water. However, designers must give consideration to where waste water will go. In particular, care must be taken that waste water not create a hazard (i.e. by creating a pool in which someone might slip) or freeze.

Generally, Guardian eyewash, eye/face wash and safety station units are designed with waste connections for connection to drain piping. **WE RECOMMEND THAT EMERGENCY EYEWASH AND SHOWER UNITS BE CONNECTED TO DRAIN PIPING. FOR EMERGENCY SHOWERS AND FOR OTHER UNITS WITHOUT WASTE CONNECTIONS, FLOOR DRAINS SHOULD BE PROVIDED.**

After an emergency eyewash or shower unit has been used, the waste water may contain hazardous materials that cannot or should not be introduced into a sanitary sewer. It may be necessary to connect the drain piping from the emergency equipment or floor drain to the building's acid waste disposal system or to a neutralising tank.

08 EMERGENCY RESPONSE

Simply installing emergency equipment is not sufficient to assure worker safety. Employees must be trained in the location of emergency equipment and in its proper use. Emergency equipment must be regularly maintained (including weekly activation of the equipment) to assure that it is in working order and inspected at least annually for compliance with the standard. Most importantly, employers should develop a response plan to be used in the event that an accident does occur. The focus of the response plan should be to provide assistance to the injured worker as quickly as possible.

Guardian offers a variety of alarm systems that may be installed in conjunction with our emergency equipment. They serve to alert personnel and summon assistance if an eyewash or shower is activated.
WE RECOMMEND INSTALLING AN ALARM UNIT WITH ANY EMERGENCY EYEWASH OR SHOWER UNIT.

09 O&M INFORMATION

Under the standard, the manufacturer of the emergency equipment must provide detailed instructions on the proper operation, inspection and maintenance of the emergency equipment. This information should be accessible to maintenance personnel. Guardian offers detailed installation, operation and maintenance guides for its equipment. These guides are available on the Dalton International's website (dilnz.co.nz) and from our sales representatives.

NOTE: THIS COMPLIANCE CHECKLIST IS INTENDED TO ASSIST DESIGN PERSONNEL, FACILITY OWNERS AND OTHERS IN SELECTING, SPECIFYING, INSTALLING AND MAINTAINING EMERGENCY EQUIPMENT. WE HAVE TRIED TO ASSURE THAT IT IS COMPREHENSIVE AND ACCURATE. HOWEVER, PLEASE REFER TO THE COMPLETE AS 4775:2007 STANDARD BEFORE PURCHASING OR INSTALLING EMERGENCY EQUIPMENT. GUARDIAN EQUIPMENT CANNOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS FROM THIS CHECKLIST, AND CANNOT ASSURE THAT ANY PARTICULAR PRODUCT WILL PERFORM SATISFACTORILY IN ANY PARTICULAR APPLICATION.

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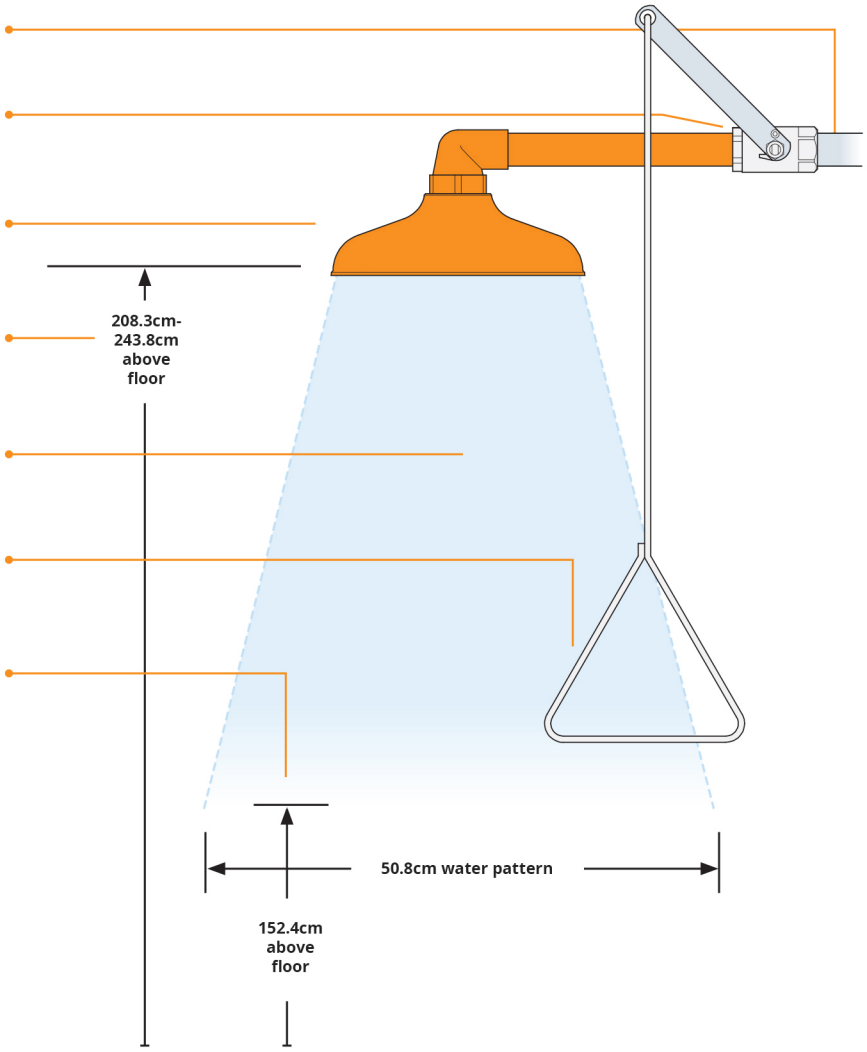
EMERGENCY SHOWERS

This checklist is a summary of the provisions of AS 4775:2007 relating to emergency showers. Please refer to the standard for a complete listing of these provisions.

All Guardian emergency showers are third-party certified to meet or exceed the provisions of ANSI Z358.1-2014.

- ☐ Water supply is sufficient to provide at least 75.7 LPM for 15 minutes.
- ☐ Hands-free valve activates in one second or less and remains open until manually closed.
- ☐ Shower delivers 75.7 liters of water per minute for 15 minutes in the required pattern.
- ☐ Height of water column is between 208.3 cm and 243.8 cm above the floor.
- ☐ Center of the water pattern is at least 40.6 cm from any obstruction.
- ☐ Easily located, accessible actuator is no more than 173.3 cm above floor.
- ☐ At 152.4 cm above the floor, the water pattern is at least 50.8 cm in diameter.
- ☐ If provided, shower enclosure has a minimum diameter of 86.4 cm.



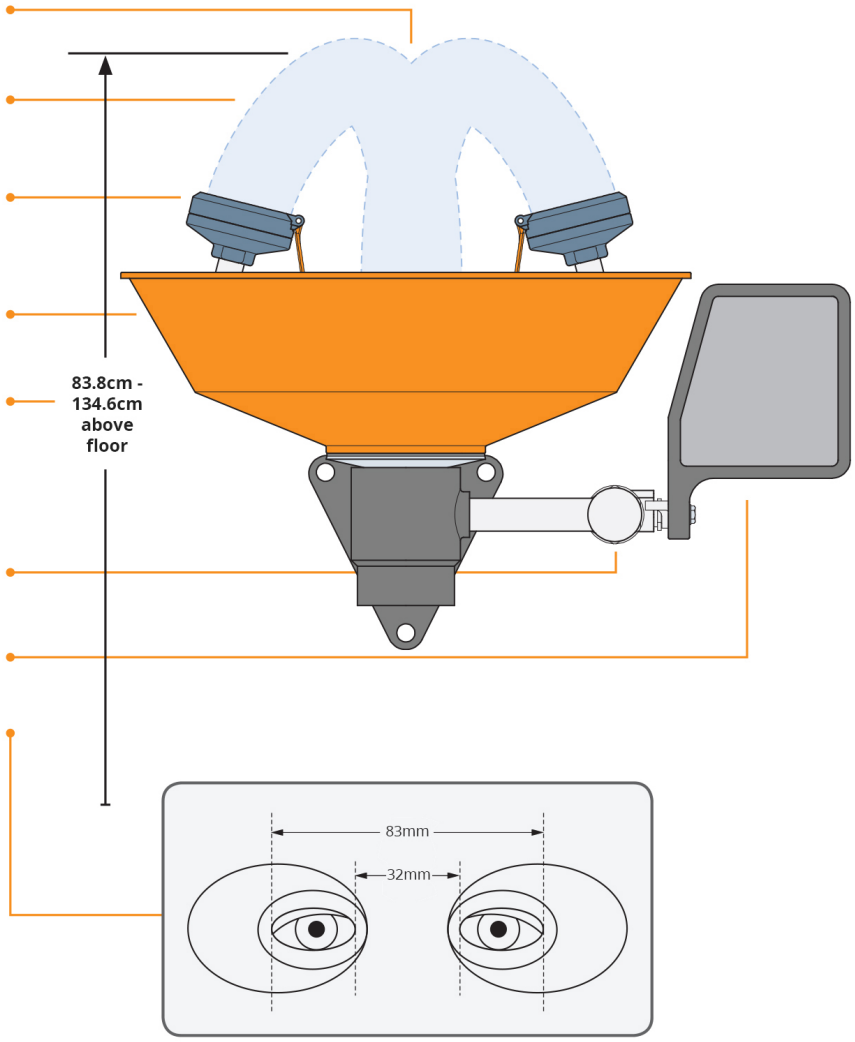
- ☐ **Location**: Install shower within 10 seconds (approximately 16 m) of hazard, on the same level as hazard and with unobstructed travel path. Where strong acids or caustics are being handled, emergency showers should be located adjacent to the hazard, and an appropriate professional should be consulted for advice on the proper distance.
- ☐ **Identification**: Identify shower location with highly visible sign. Area around shower shall be well-lit.
- ☐ **Water Temperature**: Water delivered by shower shall be tepid (16-38°C).
- ☐ **Training**: Instruct all employees in the location and proper use of emergency showers.
- ☐ **Maintenance/Inspection**: Activate plumbed shower at least weekly. Inspect all emergency showers annually for compliance with standard.

EYE/FACE WASHES

This checklist is a summary of the provisions of AS 4775:2007 relating to emergency eye/face washes. Please refer to the standard for a complete listing of these provisions.

All Guardian eye/face wash units are third-party certified to meet or exceed the provisions of ANSI Z358.1-2014.

- ☐ Controlled, low velocity flow completely rinses eyes and face and is not injurious to user.
- ☐ Water flow is sufficiently high to allow user to hold eyes open while rinsing.
- ☐ Spray heads are protected from airborne contaminants. Covers are removed by water flow.
- ☐ Unit delivers at least 11.4 liters of water per minute for 15 minutes.
- ☐ Water flow pattern is positioned between 83.8 cm and 134.6 cm from the floor and at least 15.3 cm from the wall or nearest obstruction.
- ☐ Hands-free stay-open valve activates in one second or less.
- ☐ Valve actuator is easy to locate and readily accessible to user.
- ☐ Unit washes both eyes simultaneously. Water flow covers area indicated on Guardian test gauge at no more than 20.3 cm above spray heads.



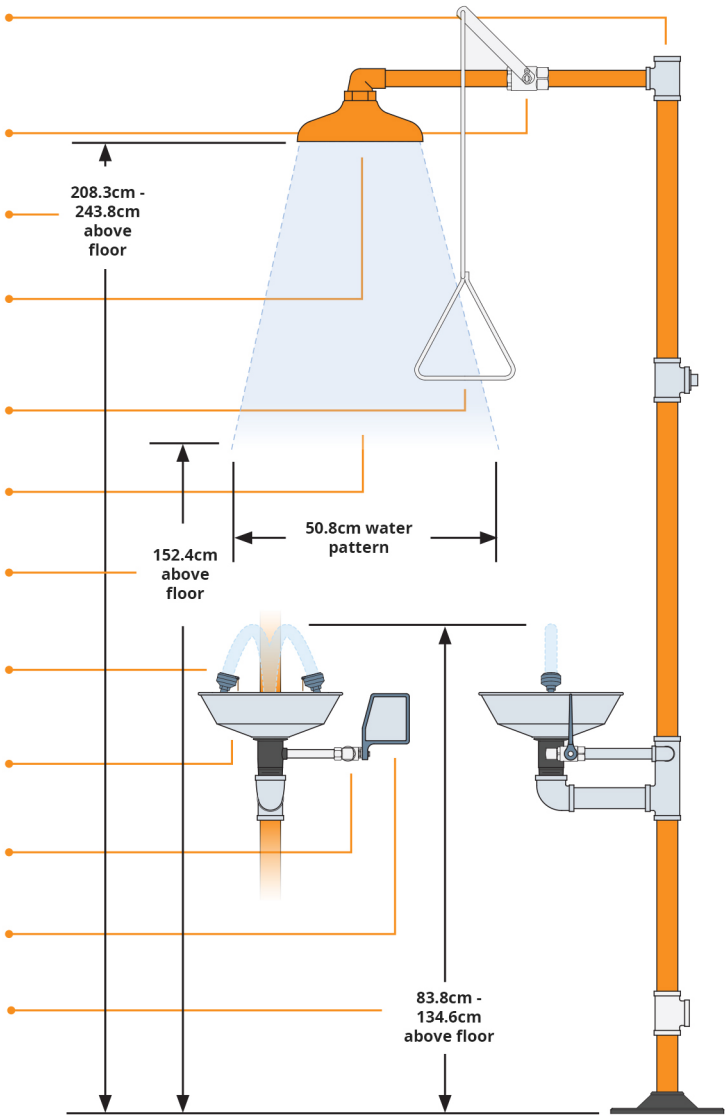
- ☐ **Location**: Install eye/face wash unit within 10 seconds (approximately 16 m) of hazard, on the same level as hazard and with unobstructed travel path. Where strong acids or caustics are being handled, emergency eye/face wash units should be located adjacent to the hazard, and an appropriate professional should be consulted for advice on the proper distance.
- ☐ **Identification**: Identify eye/face wash location with highly visible sign. Area around eye/face wash unit shall be well-lit.
- ☐ **Water Temperature**: Water delivered by eye/face wash shall be tepid (16-38°C).
- ☐ **Training**: Instruct all employees in the location and proper use of eye/face wash units.
- ☐ **Maintenance/Inspection**: Activate plumbed eye/face wash units at least weekly. Inspect all eye/face wash units annually for compliance with standard.

SAFETY STATIONS

This checklist is a summary of the provisions of AS 4775:2007 relating to eye or eye/face wash and shower combination stations. Please refer to the standard for a complete listing of these provisions.

All Guardian safety stations are third-party certified to meet or exceed the provisions of ANSI Z358.1-2014.

- ☐ Water supply delivers required flow when shower and eye or eye/face wash are operated simultaneously.
- ☐ Hands-free stay-open valve activates in one second or less.
- ☐ Height of water column is between 208.3 cm and 243.8 cm above the floor.
- ☐ Shower delivers 75.7 liters of water per minute for 15 minutes in the required pattern.
- ☐ Easily located, accessible actuator is no more than 173.3 cm above floor.
- ☐ Center of the water pattern is at least 40.6 cm from any obstruction.
- ☐ At 152.4 cm above the floor, the water pattern is at least 50.8 cm in diameter.
- ☐ Spray heads are protected from airborne contaminants. Covers are removed by water flow.
- ☐ Unit delivers at least 11.4 liters per minute (for eye/face wash or 1.5 liters per minute (for eyewash) for 15 minutes.
- ☐ Hands-free stay-open valve activates in one second or less.
- ☐ Valve actuator is easy to locate and readily accessible to user.
- ☐ Water flow pattern is positioned between 83.8 cm and 134.6 cm from the floor and at least 15.3 cm from the wall or nearest obstruction.



- ☐ **Location**: Install safety station within 10 seconds (approximately 16 m) of hazard, on the same level as hazard and with unobstructed travel path. Where strong acids or caustics are being handled, safety station should be located adjacent to the hazard, and an appropriate professional should be consulted for advice on the proper distance.
- ☐ **Identification**: Identify safety station location with highly visible sign. Area around safety station shall be well-lit.
- ☐ **Water Temperature**: Water delivered by safety station shall be tepid (16-38°C).
- ☐ **Training**: Instruct all employees in the location and proper use of safety station.
- ☐ **Maintenance/Inspection**: Activate safety station at least weekly. Inspect all safety stations annually for compliance with standard.

GUARDIAN EMERGENCY EYEWASH AND SHOWER TECHNOLOGY: ENGINEERED FOR TODAY'S INDUSTRIAL ENVIRONMENTS.

Safe workplaces demand advanced emergency eyewash and shower equipment. Guardian is proud to offer the most complete selection of emergency equipment designed for today's industrial applications. Characterised by enhanced performance and superior durability, all Guardian products feature the latest innovations in spray head technology. The unique GS-Plus™ and FS-Plus™ spray heads deliver water in a soft, wide spray rather than a solid, narrow stream. The user receives more water over a wider area than with any other type of outlet head. In an emergency, contaminants are flushed away quickly, gently, and completely. These heads incorporate a variety of unique and important features:

CONSISTENT, BALANCED FLOW

An engineered flow control located inside each spray head is calibrated to deliver 6.9 (GS-Plus™) or 12.1 (FS-Plus™) litres per minute, at pressures from 20 to 100 PSI. The flow is consistent, and evenly balanced between the spray heads regardless of line pressure.

"FLIP TOP" DUST COVER

Each spray head is protected against dust and dirt by a "flip top" cover which nests into the top of the outlet head when equipment is not in use. Upon unit activation, water flow swings the cover off the head. The cover is permanently attached to the spray head by a stainless steel pin to prevent removal or loss. Optional stainless steel covers are also available.

FILTERED WATER

Each spray head contains an internal filter to remove particles and debris from the water flow. During flushing, the user's eyes and face are protected against any potential foreign matter which may exist in the water or plumbing lines.

DURABILITY

The spray head bodies are molded from tough, impact-resistant and corrosion resistant polypropylene, while the "flip top" dust covers are molded nylon. Both the GS-Plus™ and FS-Plus™ spray heads stand up to the harshest laboratory environments.

EASY MAINTENANCE

Water often contains dissolved minerals and foreign matter which, over time can build up and clog any spray head. The GS-Plus™ and FS-Plus™ spray heads are designed such that all working components are contained within the head itself, making cleaning and maintenance easy. Guardian's emergency equipment should never need disassembly in the event of a clogged spray head.

>>SHOWERS
>>COMBINATION SHOWER-EYEWASH
>>COMBINATION SHOWER-EYE/FACE WASH

INSTALLATION

- Unit should be assembled in accordance with the manufacturer's drawing, installed in close proximity to hazard and should be in a location clearly identified and free of obstructions.
- Shut-off valve(s) (supplied by others) should be installed and located in accordance with the local plumbing code.
- Back flow prevention device(s) (supplied by others) should be installed and located in accordance with the local plumbing code.
- Drain location and waste discharge should be installed and located in accordance with the local plumbing code.
- Mixing valve(s) (supplied separately) should be installed and located in accordance with the Uniform Plumbing Code.
- Shower head should be located between 82 and 96 inches from the surface on which the user stands and center of spray pattern should be at least 16 inches from any obstruction.
- Eye or eye/face wash water flow pattern shall be positioned between 33 and 53 inches from the floor and at least 6 inches from the wall or nearest obstruction.
- Handicap accessible units intended to meet ADA requirements will have different eye/face wash clearance requirements. Please refer to enclosed drawings.
- Unit should be connected with a recommended minimum 1" IPS line to a tepid, clean water source capable of supplying 30-80 PSI flowing pressure for a minimum of 15 minutes. If shut-off valves are installed inline, provisions should be made to prevent unauthorized shut off.
- Where freezing conditions exist, unit must be protected from freezing.
- Performance should be verified after installation. Check for any leaks while all valves are in the closed position. Verify that all
- valves stay in the open position upon activation.
- With the shower valve in the fully opened position, spray pattern should be a minimum of 20 inches in diameter at 60 inches above the surface on which the user stands. Verify that the water is tepid and flow rate is at least 20 GPM.
- With the eyewash valve in the fully opened position and using a test gauge, the spray pattern should meet required pattern per ANSI Z358.1. Verify that the water is tepid, and flow rate is at least 0.4 GPM for eyewash and 3.0 GPM for eye/face wash.

MAINTENANCE

All units should be tested on a weekly basis to clear supply lines and verify proper activation. Units must also be inspected annually to verify the continued conformance of required performance standards stated above.

>>EYEWASH
>>EYE/FACE WASH
>>DRENCH HOSE

INSTALLATION

- Unit should be assembled in accordance with the manufacturer's drawing, installed in close proximity to hazard and should be in a location clearly identified and free of obstructions.
- Shut-off valve(s) (supplied by others) should be installed and located in accordance with the local plumbing code.
- Back flow prevention device(s) (supplied by others) should be installed and located in accordance with the local plumbing code.
- Drain location and waste discharge should be installed and located in accordance with the local plumbing code.
- Mixing valve(s) (supplied separately) should be installed and located in accordance with the Uniform Plumbing Code.
- Eye or eye/face wash water flow pattern shall be positioned between 33 and 53 inches from the floor and at least 6 inches from the wall or nearest obstruction.
- Handicap accessible units intended to meet ADA requirements will have different eye/face wash clearance requirements. Please refer to enclosed drawings.
- Unit should be connected with a recommended minimum 1/2" IPS line to a tepid, clean water source capable of supplying 30-80 PSI flowing pressure for a minimum of 15 minutes. If shut-off valves are installed inline, provisions should be made to prevent unauthorized shut off. Note: Do not use 3/8" nominal flex connector as flow may be insufficient.
- Where freezing conditions exist, unit must be protected from freezing.
- Performance should be verified after installation. Check for any leaks while all valves are in the closed position. All valves should stay in the open position upon activation.
- With the eyewash valve in the fully opened position and using a test gauge, the spray pattern should meet required pattern per ANSI Z358.1. Verify that the water is tepid, and flow rate is at least 0.4 GPM for eyewash and 3.0 GPM for eye/face wash.

MAINTENANCE

All units should be tested on a weekly basis to clear supply lines and verify proper activation. Units must also be inspected annually to verify the continued conformance of required performance standards stated above.

Drench Hose Note:
Do not exceed 90 PSI working pressure. Inspect at least monthly for wear, abrasion, loss of flexibility or loosening of end connections. For use with water in accessible locations only.

Standard emergency eye wash and shower equipment is constructed from a variety of materials, including stainless steel (shower pull rods and actuating arms), chrome plated brass (valves and eye wash components) and galvanized steel (pipe and fittings). In addition, standard units may include plastic components (shower heads, eye wash bowls, spray heads, etc.) that are molded from ABS, polypropylene and/or nylon.

When installed in industrial environments, emergency eye wash and shower equipment is exposed to all of the conditions present in the environment, including temperature, humidity, sunlight and chemicals that may be present. In particular, the equipment can be exposed to acids, caustics and other chemicals that will cause the materials in the equipment to corrode. Such corrosion is a serious matter, since it can cause the equipment to deteriorate to the point of becoming nonfunctional. In an emergency, the equipment may not be available to an injured person. While Guardian carefully selects the materials used in its products, the possibility of corrosion cannot be eliminated.

Guardian offers several alternatives for improving the corrosion resistance of emergency equipment:

- Powder Coated Finish. All of our units can be furnished with a powder coated finish applied over the galvanized steel and brass components. The surfaces to be coated are cleaned and etched with phosphoric acid solution. Epoxy/polyester hybrid powder is electrostatically applied to the metal surfaces and then baked to cure. The result is a smooth, hard surface that provides excellent resistance to corrosion. Guardian powder coating is available in a variety of colors, including high visibility orange, green, yellow and red. These colors provide the equipment with increased visibility in the industrial environment.
- Polyvinyl Chloride (PVC) Construction. Guardian offers a wide array of units that are constructed of PVC and PVC-coated materials. All pipe and fittings are PVC. Valves, actuators and other components are brass with a PVC coating. These units can provide better durability than standard emergency equipment in certain environments.
- Stainless Steel. Guardian also offers a wide selection of units that are constructed entirely of stainless steel. These units are highly resistant to corrosion, and are ideal for use in areas such as laboratories and clean rooms.

In order to assist in selecting the equipment that is best suited for a particular application, Guardian has compiled a "Corrosion Resistance Guide". This corrosion information is offered as a guideline only, to assist in selecting the equipment that will be best suited for the user's application.

Due to the infinite number of combinations of chemicals found in any environment, as well as the effects of chemical concentration, temperature, humidity, etc., Guardian cannot predict and cannot be held responsible for the effects of any particular environment on any specific installation of emergency eye wash and shower equipment.

A Good
B Fair
C Poor
D Not Recommended

CHEMICAL	CONCENTRATION	TEMPERATURE (F)	GALVANIZED STEEL	BRASS	EPOXY/POLYESTER POWDER COATED (SEE NOTE 2)	STAINLESS STEEL (TYPE 304)	POLYVINYL CHLORIDE (PVC)
Acetic Acid	85%	70		D	A	A	A
Acetic Acid, Glacial	99.50%			D	A	A	B
Acetone		70	A	A	A	A	D
Ammonium Hydroxide	10%	70	A	D	A	A	A
Amyl Acetate	Conc	70	A	B	A	A	D
Amyl Alcohol				A	A		C
Benzene		70	A	A	A	A	D
Butyl Alcohol			A		A	A	A
Calcium Hypochlorite	30%	70	A	D	A	A	A
Carbon Disulfide		70		B	A	A	D
Carbon Tetrachloride	CP (Dry)	70	A	A	A	A	D
Chloroform	Dry	70	A	A	A	A	D
Chromic Acid	50%			D	A		D
Cresol	90%				A		D
Crude Oil		70		D	A	A	A
Dioxane				A	A		D
Distilled Water		70	C	D	A	A	A
Ether		70			A	A	D
Ethyl Acetate					A		D
Ethyl Alcohol	10-100%	70	A		A	A	A
Ethyl Ether					A		D
Formaldehyde	37%	70	A		A	A	A
Formic Acid	90%	70			A	A	A
Gasoline		70		A	A	A	B
Glycerine		70		A	A	A	A
Hydrochloric Acid	38%	70	D	D	A	C	B
Hydrofluoric Acid	48%	70		D	A	D	B
Hydrogen Peroxide	90%	70		D	A	A	A
Isopropyl Alcohol				A	A	A	A
Kerosene		70		A	A	A	A
Lactic Acid	25%	70		D		A	B
Methanol		70		A	A	A	A
Methyl Ethyl Ketone				A	A	A	D
Methylene Chloride				B	A	A	D

Continued on next page.

A Good
B Fair
C Poor
D Not Recommended

CHEMICAL	CONCENTRATION	TEMPERATURE (F)	GALVANIZED STEEL	BRASS	EPOXY/POLYESTER POWDER COATED (SEE NOTE 2)	STAINLESS STEEL (TYPE 304)	POLYVINYL CHLORIDE (PVC)
Mineral Oil				A	A	A	B
Monochlorobenzene					A	B	B
Naphthalene					A	A	D
Nitric Acid	70%	70		D	A	A	B
Perchloric Acid	70%				A		C
Phenol	CP	70	A		A	A	D
Phosphoric Acid	75%	70		D	A	A	B
Sea Water		70	D	D	A	A	B
Silver Nitrate				D	A	B	A
Sodium Carbonate				B	A	A	A
Sodium Chloride	20%	70	D	B	A	A	A
Sodium Hydroxide	50%			D	A	A	A
Sodium Hypochlorite		70		D	A	A	B
Sodium Sulfide				D	A	A	A
Sulfuric Acid	87%	70		D	A	D	A
Toluene				A	A	A	D
Trichlorethylene		70		A	A	A	D
Turpentine		70		A	A	A	A
Urea (Saturated)					A		D
Xylene				A	A	A	D
Zinc Chloride	70%	70			A	B	B

Notes:

- The above table presents the relative corrosion resistant abilities of certain materials in the specific corrosive environments described. This information should be considered as a general guide only. The table does not provide information on possible combinations of concentrations of corrosive media or temperature levels that may be found in the field. Even small changes in the concentration of the corrosive media or in the temperature at which interaction takes place may generate different results from those described above. Results different from those shown above may also result from impurities in the metals or plastics, the actual condition of the environment in which the materials are used, or other factors.
- *NO GUARANTEE OF THE PERFORMANCE OF ANY METAL OR PLASTIC DESCRIBED IN THE TABLE IS EXPRESSED OR SHOULD BE INFERRED. GUARDIAN RECOMMENDS THAT MATERIAL SAMPLES BE SUBJECTED TO ACTUAL OPERATING CONDITIONS BEFORE FINAL SPECIFICATION.*
- The corrosion resistance data for powder coating is based upon laboratory testing consisting of subjecting coated samples to drops of the listed chemicals for ten minutes. Different results may be obtained when coated materials are subjected to chemicals for longer periods of time.

pH7™
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