Safety
Concept and Theory

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Characteristics of a Safe Work Environment

Whose Responsibility Is Safety?

Safety is a shared responsibility. Responsibility for a safe work environment is shared by:

- Graco, as a manufacturer
- You, as a representative of Graco
- Distributors
- Graco and distributors' customers
- Equipment users

As the manufacturer, Graco is responsible for providing safe products to its customers. The company is also responsible for providing them with safety information. This is a responsibility you share as a representative of Graco and its products. As a representative of Graco, you must always model and point out safety devices and procedures when you demonstrate products at the customer site.

Graco's customers are, in turn, responsible for training their employees on the safe use of Graco equipment. Finally, the employees are responsible for always following safe operating procedures in order to keep themselves and others safe.

The objective for all of those involved in using Graco's products is to create and maintain a safe work environment. This module explains how we can accomplish that objective.

What Is a Safe Work Environment?

A safe work environment is one that meets three primary criteria. In a safe work environment:

1. The company and its employees have identified any and all significant hazards in that setting.
2. Preventive measures are in place to address each significant hazard.
3. The company and its employees know how to respond if or when accidents or near-miss accidents occur.

Clearly, helping to create a safe work environment requires that you understand the meaning of the term *significant hazard.* A significant hazard is a situation in which there is a risk of serious injury or death if safe procedures are not followed or preventive measures are not in place.

Identifying Significant Hazards

As a representative of Graco products, an essential part of the service you provide Graco customers is to promote the safe use of Graco products. To perform this role, you need to understand the hazards associated with using Graco products. What are these significant hazards?

The significant hazards what may occur when using Graco products are:

- Fire and explosion
- Skin injection
- Pressure-related injuries
- Injury from moving parts
- Toxicity
- Electric shock

Figure 1 shows the typical symbols Graco uses in product literature to represent these potential hazards.

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Figure 1 Symbols representing potential significant hazards

Understanding Significant Hazards in Using Graco Products

Fire and Explosion

Fires and explosions can only occur if there is an *ignition source* combined with flammable vapors and oxygen in the work environment. Therefore, the presence of ignition sources is an important work environment factor leading to a risk of fire and explosion. Ignition sources that can potentially lead to a fire or explosion are:

- Electrical switches or motors
- Open flames
- Static electricity discharge

The last item on this list, static electricity discharge, requires further explanation. Electrical discharge from an ungrounded object can occur when static electricity builds up. Static electricity may build up when fluids flow through pumps, hoses, and sprayers. Electrostatic spray guns also provide a charging source. In these situations, ungrounded objects can accumulate a charge and subsequently discharge.

Graco uses the symbols shown in Figure 2 in its product literature to call your attention to potential fire and explosion risk factors. Look over several Instruction Manuals now and review the sections where these symbols appear.

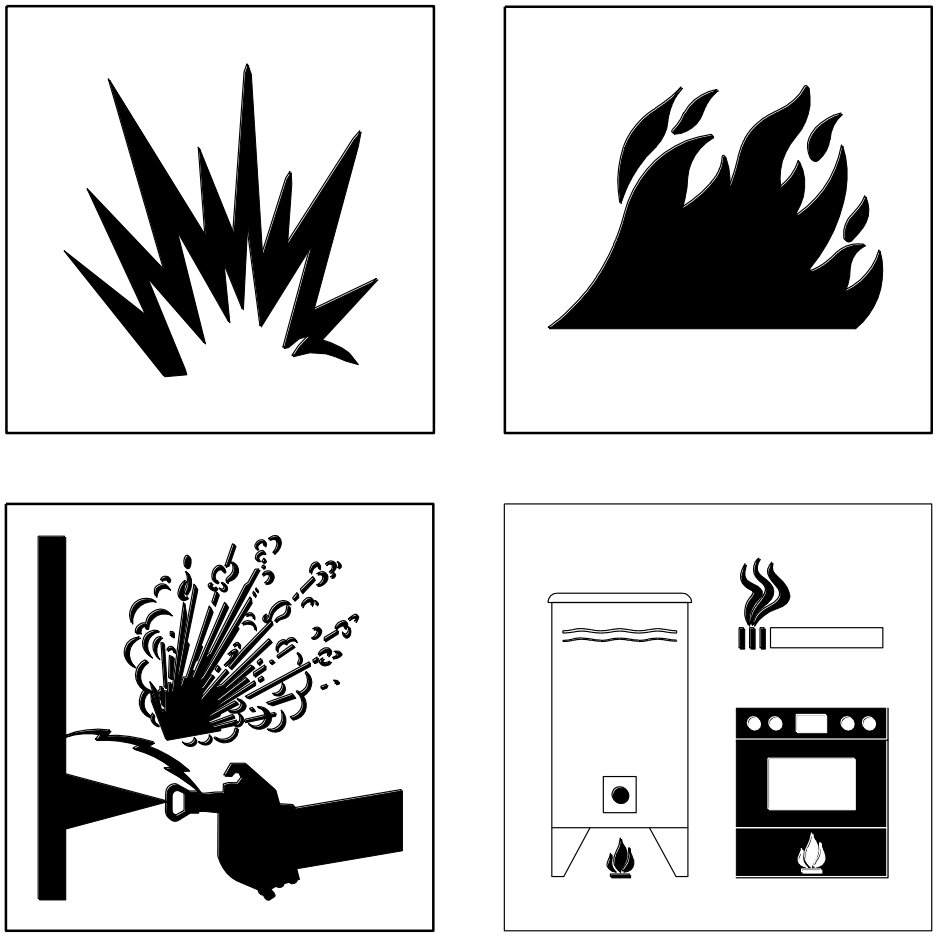

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Figure 2 Fire and explosion hazards

Skin Injection

Spray equipment users often underestimate the seriousness of skin injection injury. You can help your customers take skin injection risks more seriously by pointing them out and explaining carefully how to prevent such injuries. The factors in the work environment that contribute to the risk of accidental skin injection are:

- A high-pressure fluid stream directed toward skin or clothing
- Removal of protective devices from equipment
- Unexpected release of fluid pressure
- Failure to use a spray gun trigger safely

Graco uses the symbols shown in Figure 3 to call your attention to potential skin injection risk factors. Look over the Instruction Manuals now and review the sections where these symbols appear.

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Figure 3 Skin injection hazards

Over-pressurization and Unexpected Pressure Release

Pressure-related injuries happen when equipment is over-pressurized and a component ruptures.

Component ruptures are most often caused by:

- Exceeding the safe working pressure of a component
- Continued use of damaged equipment

Pressure-related injuries can also occur when:

- The operator does not follow pressure-relief procedures
- Equipment is worn or damaged
- Parts have been replaced with improper replacements
- Connections are not tight
- Connections are incompatible
- Connections are inappropriate for the pressure rating

When equipment components rupture or an unexpected pressure release occurs, injuries are most often caused by:

- Spray in the face or eyes
- A whipping hose
- Projectiles

Figure 4 shows Graco's symbols for pointing out unexpected pressure-release risk factors in the work environment. Look over the Instruction Manuals now and review the sections where the symbols appear.

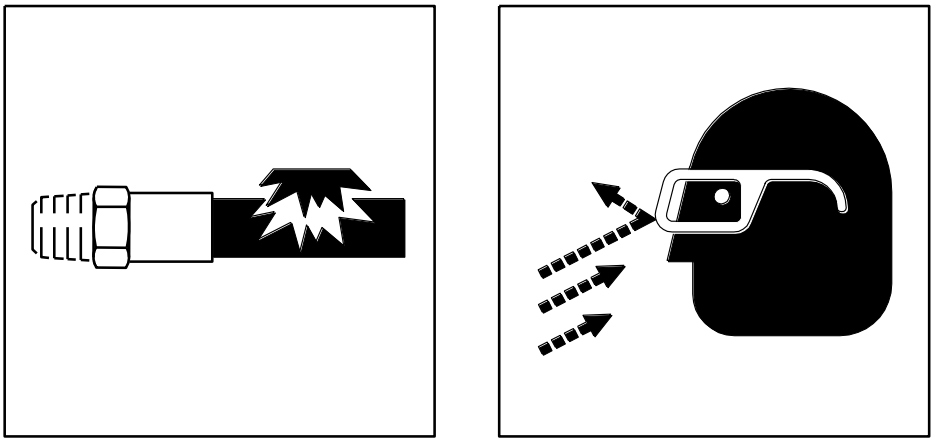

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Figure 4 Over-pressurization and unexpected pressure-release hazards

Moving Parts

Injury from moving parts most often occurs when there is:

- Unexpected movement of components (for example, air motor and pump displacement rods)
- Removal of equipment guards
- Failure to completely relieve fluid and air pressure when servicing equipment

Figure 5 shows Graco's symbols portraying moving part risk factors in the work environment. Look over the Instruction Manuals now and review the sections where these symbols appear.

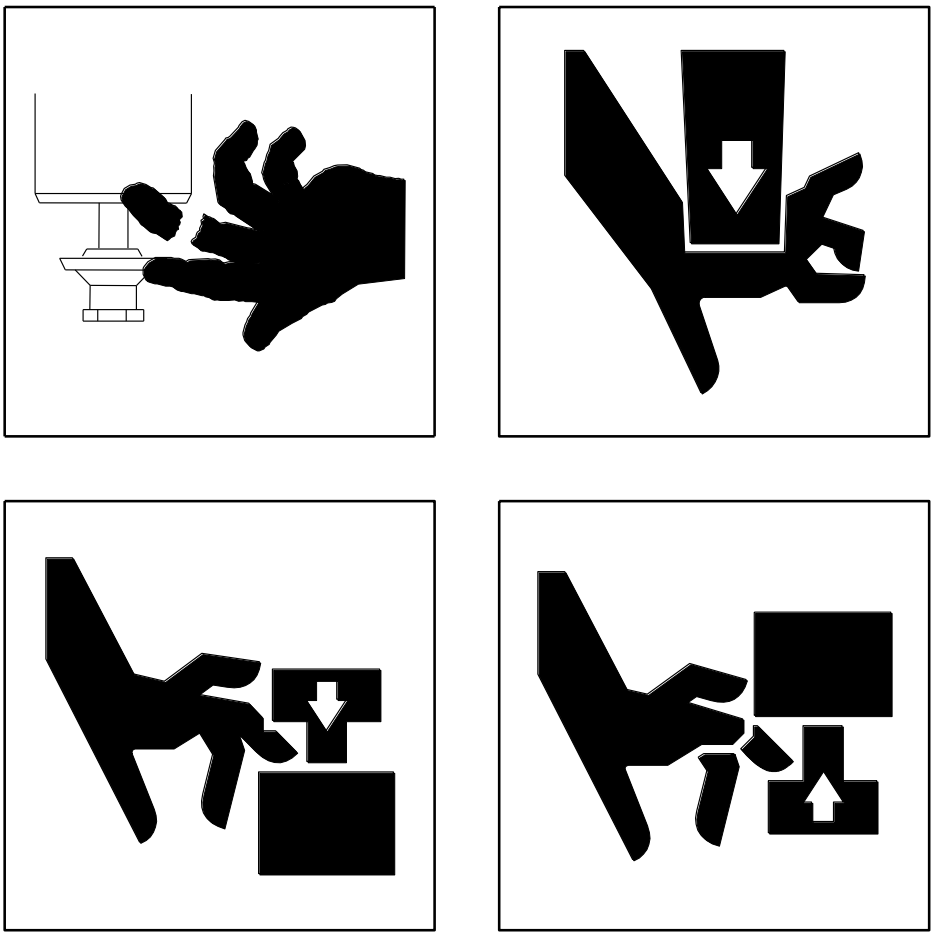

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Figure 5 Moving part hazards

Toxicity

Toxicity is a potential risk when the work environment exposes employees to:

- Fumes from coating materials or fluids
- Gas engine exhaust fumes
- Toxic fluid that contacts the skin, nose, mouth, or eyes

Figure 6 shows the symbols that indicate toxicity risk factors. Review the sections of Graco's Instruction Manuals where these symbols appear.

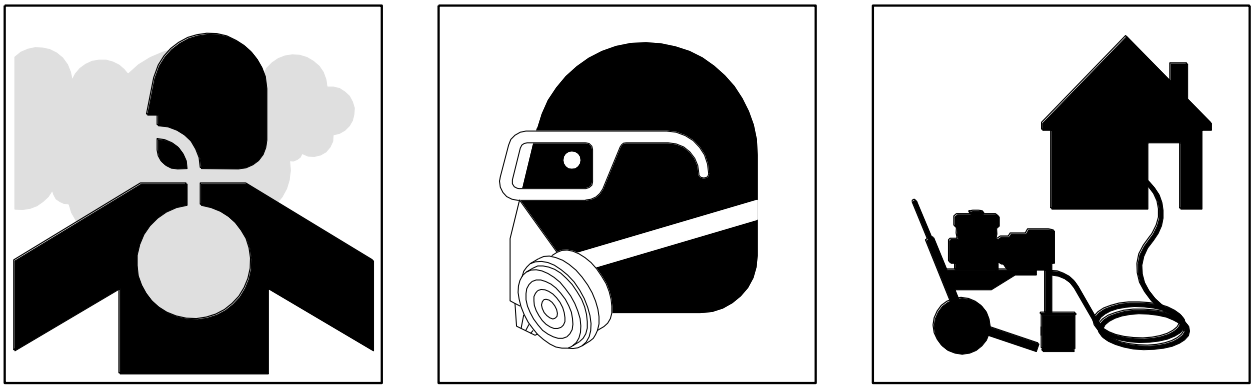

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Figure 6 Toxicity hazards

Electric Shock

The factors in the work environment that may potentially lead to electric shock are:

- Contact with electrically live or charged parts
- Improper grounding of equipment and other objects in the spray area

Figure 7 shows how Graco portrays electric shock risk factors to call them to your attention. Review the Instruction Manual sections where these symbols appear.

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Figure 7 Electric shock hazards

Reducing the Risks of Significant Hazards

Preventing Fire and Explosion

To prevent fire and explosion:

- Install and use proper ventilation
- Remove or extinguish all ignition sources, such as pilot lights, cigarettes, arcing motors, and others
- Ground all people, objects, and spraying equipment in the spray area to prevent electrostatic discharge
- Use safe flushing procedures
- Do not use flammable fluids with electrostatic equipment that is designed for use only with nonflammable fluids

The Instruction manual for each Graco product identifies the particular preventive actions that pertain to that equipment. You and your customers should always consult the product safety information to learn about the safe use of each Graco product. Figure 8 shows an example of product-specific fire and explosion hazard prevention actions from a Graco Instruction Manual.

FIRE AND EXPLOSION HAZARD

Improper grounding, poor ventilation, open flames or sparks can cause a hazardous condition and result in a fire or explosion and serious injury.

- Ground the equipment. Refer to **Grounding** on page 5.
- The acetal pump contains stainless steel fibers and is conductive. ***Never*** use a polypropylene pump with flammable fluids.
- If there is any static sparking or you feel an electric shock while using this equipment, **stop pumping immediately.** Do not use the equipment until you identify and correct the problem.
- Provide fresh air ventilation to avoid the buildup of flammable fumes from solvents or the fluid being pumped.
- Pipe and dispose of the exhaust air safely, away from all sources of ignition. If the diaphragm fails, the fluid is exhausted along with the air. See **Air Exhaust Ventilation** on page 10.
- Keep the work area free of debris, including solvent, rags, and gasoline.
- Electrically disconnect all equipment in the work area.
- Extinguish all open flames or pilot lights in the work area.
- Do not smoke in the work area.
- Do not turn on or off any light switch in the work area while operating or if fumes are present.
- Do not operate a gasoline engine in the work area.

Figure 8 Fire and explosion hazard prevention actions

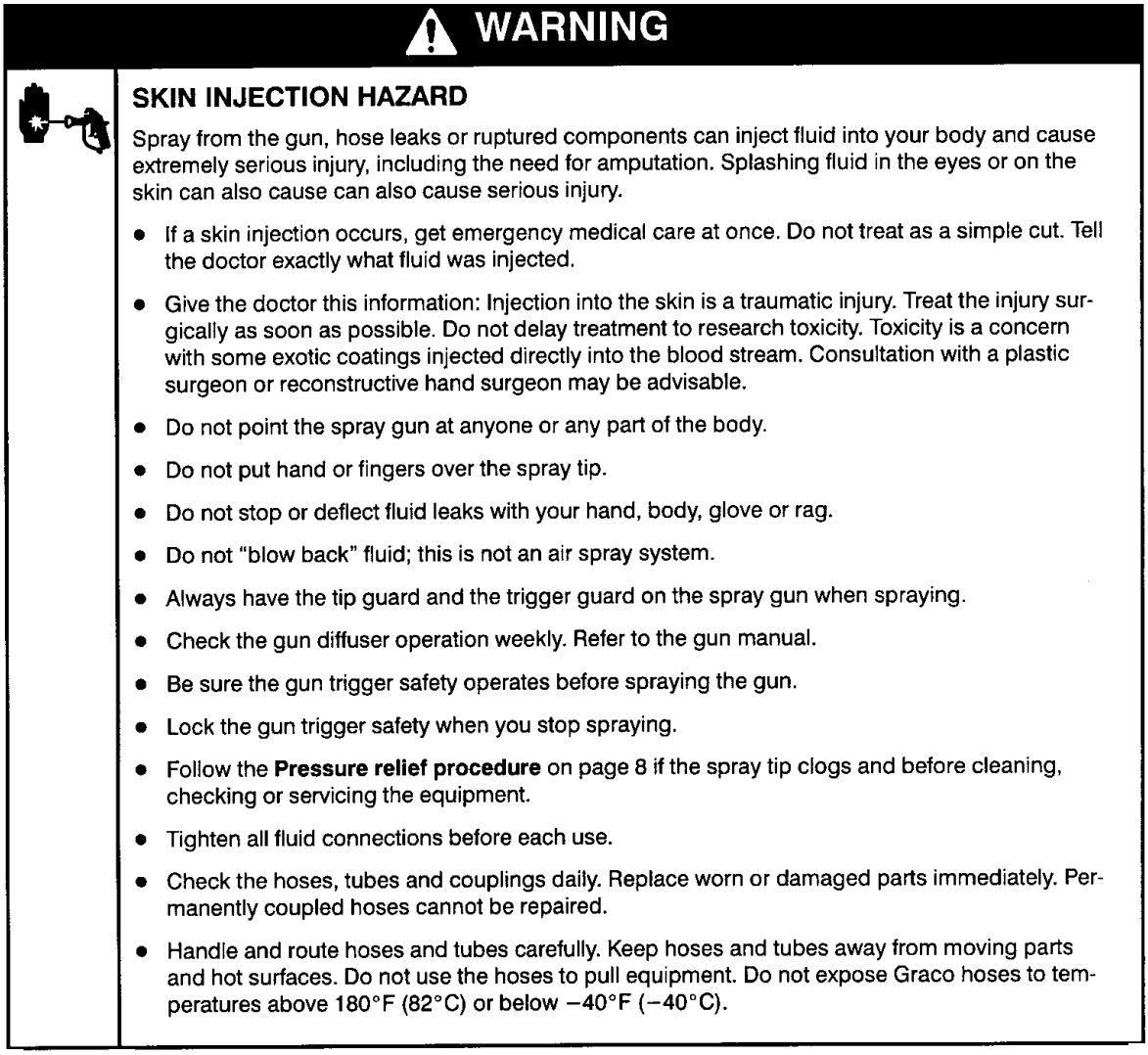
Preventing Skin Injection

To prevent skin injection injuries:

- Stay clear of high-pressure fluid streams and sprays
- Never remove protective devices, such as spray gun tip guards
- Use proper pressure-relief procedures
- Use safe flushing practices
- Never try to stop leaks with your hands or body
- Always use the spray gun trigger safety

Before an accident happens, becoe familiar with the important inforation provided on the Graco Skin Injection Response Wallet Card (Graco part number 222-385). Refer to this card again if a skin injection accident happens. If skin injection does occur, obtain medical attention immediately.

Figure 9 shows an example of product-specific skin injection hazard prevention actions from a Graco Instruction Manual.



⚠ WARNING

SKIN INJECTION HAZARD

Spray from the gun, hose leaks or ruptured components can inject fluid into your body and cause extremely serious injury, including the need for amputation. Splashing fluid in the eyes or on the skin can also cause can also cause serious injury.

- If a skin injection occurs, get emergency medical care at once. Do not treat as a simple cut. Tell the doctor exactly what fluid was injected.
- Give the doctor this information: Injection into the skin is a traumatic injury. Treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the blood stream. Consultation with a plastic surgeon or reconstructive hand surgeon may be advisable.
- Do not point the spray gun at anyone or any part of the body.
- Do not put hand or fingers over the spray tip.
- Do not stop or deflect fluid leaks with your hand, body, glove or rag.
- Do not "blow back" fluid; this is not an air spray system.
- Always have the tip guard and the trigger guard on the spray gun when spraying.
- Check the gun diffuser operation weekly. Refer to the gun manual.
- Be sure the gun trigger safety operates before spraying the gun.
- Lock the gun trigger safety when you stop spraying.
- Follow the **Pressure relief procedure** on page 8 if the spray tip clogs and before cleaning, checking or servicing the equipment.
- Tighten all fluid connections before each use.
- Check the hoses, tubes and couplings daily. Replace worn or damaged parts immediately. Permanently coupled hoses cannot be repaired.
- Handle and route hoses and tubes carefully. Keep hoses and tubes away from moving parts and hot surfaces. Do not use the hoses to pull equipment. Do not expose Graco hoses to temperatures above 180°F (82°C) or below −40°F (−40°C).

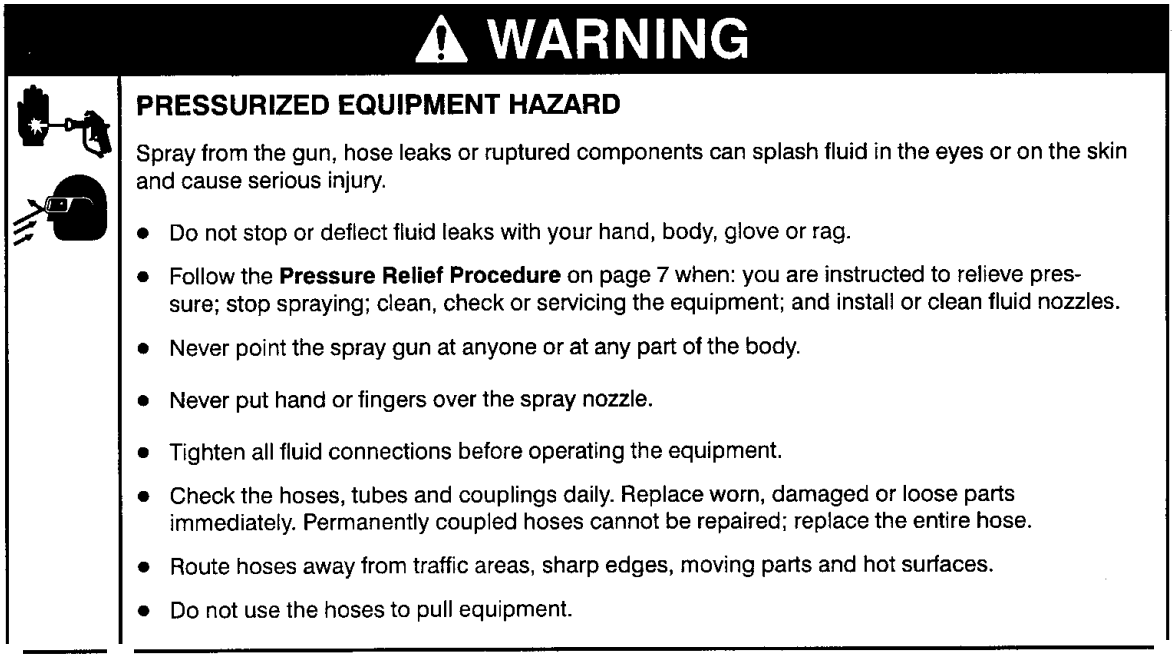
Figure 9 Skin injection hazard prevention actions

Preventing Pressure-Related Injuries

To prevent pressure-related injuries:

- Do not exceed the working pressure ratings (WPR) of components, paying special attention to high-pressure equipment
- Use of pressure-relief devices
- Limit the air or hydraulic pressure to the motor so that the fluid pressure produced by the pump is less than the working pressure of all system components
- Do not repair permanently coupled hoses
- Use only genuine Graco service parts
- Do not modify Graco (or any other) parts
- Properly align spray tips to prevent back-spray
- Do not use low-pressure fittings with high-pressure equipment
- Use proper pressure-relief procedures
- Do not use damaged or worn equipment
- Check for proper connections and make sure they are tight before pressurizing the system

See Figure 10 for an example of product-specific over-pressurization (and unexpected pressure release) hazard prevention actions from a Graco Instruction Manual.



⚠ WARNING

PRESSURIZED EQUIPMENT HAZARD

Spray from the gun, hose leaks or ruptured components can splash fluid in the eyes or on the skin and cause serious injury.

- Do not stop or deflect fluid leaks with your hand, body, glove or rag.
- Follow the **Pressure Relief Procedure** on page 7 when: you are instructed to relieve pressure; stop spraying; clean, check or servicing the equipment; and install or clean fluid nozzles.
- Never point the spray gun at anyone or at any part of the body.
- Never put hand or fingers over the spray nozzle.
- Tighten all fluid connections before operating the equipment.
- Check the hoses, tubes and couplings daily. Replace worn, damaged or loose parts immediately. Permanently coupled hoses cannot be repaired; replace the entire hose.
- Route hoses away from traffic areas, sharp edges, moving parts and hot surfaces.
- Do not use the hoses to pull equipment.

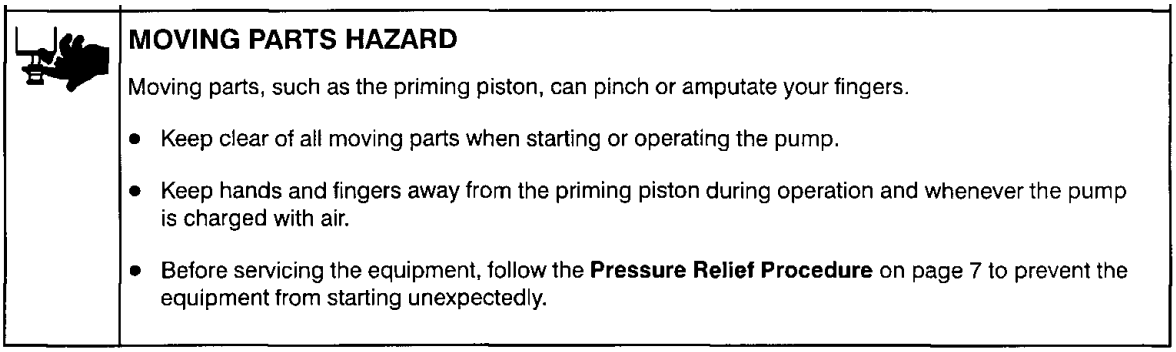
Figure 10 Pressure-release hazard prevention actions

Preventing Injury from Moving Parts

To prevent injury from moving parts:

- Follow procedures for relieving fluid and air pressure whenever you stop equipment for service or repair
- Never operate equipment with guards or other protective devices removed
- Check regularly to ensure that safety devices are operating properly
- Properly use bleed type shutoff valves

Figure 11 shows product-specific moving part hazard prevention actions from a Graco Instruction Manual.



MOVING PARTS HAZARD

Moving parts, such as the priming piston, can pinch or amputate your fingers.

- Keep clear of all moving parts when starting or operating the pump.
- Keep hands and fingers away from the priming piston during operation and whenever the pump is charged with air.
- Before servicing the equipment, follow the **Pressure Relief Procedure** on page 7 to prevent the equipment from starting unexpectedly.

Figure 11 Moving part hazard prevention actions

Preventing Toxicity

To prevent toxicity:

- Use personal protection equipment (PPE) to avoid contact with hazardous materials
- Read all fluid (material) labels and material safety data sheets (MSDS)
- Follow the recommendations of the fluid manufacturers
- Never operate gas engines indoors

Figure 12 is an example of product-specific toxicity hazard prevention actions from a Graco Instruction Manual.

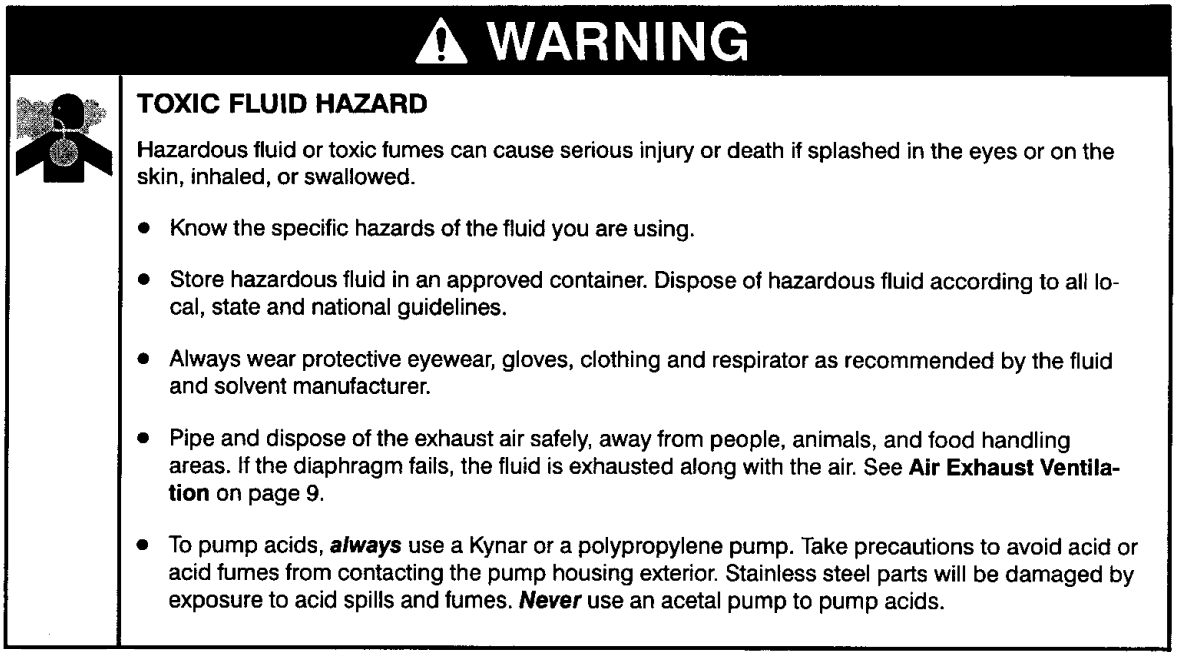


Figure 12 Toxicity hazard prevention actions

Preventing Electric Shock

To avoid electric shock injuries:

- Properly ground all objects in the system, including operators
- Follow the procedures in electrostatic equipment Instruction Manuals to avoid shocks from electrostatically charged components
- Never operate electric equipment when it is wet or when the surrounding area is wet
- Use only grounded outlets and extension cords with ground wires
- Use conductive grounded fluid hoses for high-pressure spraying

See Figure 13 for an example of product-specific electric shock hazard prevention actions. Note that the preventive actions related to electric shock hazards rarely appear in a separate list in the Instruction Manuals. Rather, as in the example on the next page, they are listed with preventive actions related to other types of hazards.

⚠ WARNING

FIRE, EXPLOSION AND ELECTROSTATIC SHOCK HAZARD

Improper grounding, poor air ventilation, open flames or sparks can cause a hazardous condition and result in a fire, explosion or electrostatic shock and other serious injury.

- Electrostatic equipment must be used only by trained, qualified personnel who shall be understand with the requirements stated in this instruction manual and the electrostatic gun manual.
- Ground the equipment, the object being sprayed and all other electrically conductive objects in the spray area. Proper grounding dissipates static electricity generated in the equipment. See **Ground the system** on 6.
- If there is any static sparking while using the equipment, **stop spraying immediately**. Identify and correct the problem.
- When flushing or purging electrostatic equipment, use solvents with a flash point equal to or greater than that of the fluid being sprayed.
- To clean the exterior of the electrostatic equipment, use solvents with a flash point higher than 100° F (38° C).
- Remove all solvent from the system before reactivating the electrostatic spray gun.
- Use only non-sparking tools to clean residue from the booth and hangers.
- Spray only in a ventilated spray booth. Electrically interlock the gun air supply with the ventilators to prevent operation of the electrostatic power supply unless ventilating fans are running.
- Do not smoke in the spray area.
- Extinguish all open flames or pilot lights in the spray area.
- Do not turn on or off any light switch in the spray area.
- Electrically disconnect all equipment in the spray area.
- Keep the spray area free of debris, including solvent, rags and gasoline.
- Do not operate a gasoline engine in the spray area.

Figure 13 Electric shock hazard prevention actions

General Preventive Actions for All Types of Hazards

Before using any equipment, carefully read and understand all safety information provided with the product. Provide users with training before they use the fluid or equipment.

Figure 14 shows an example of product-specific equipment misuse hazard prevention actions.\

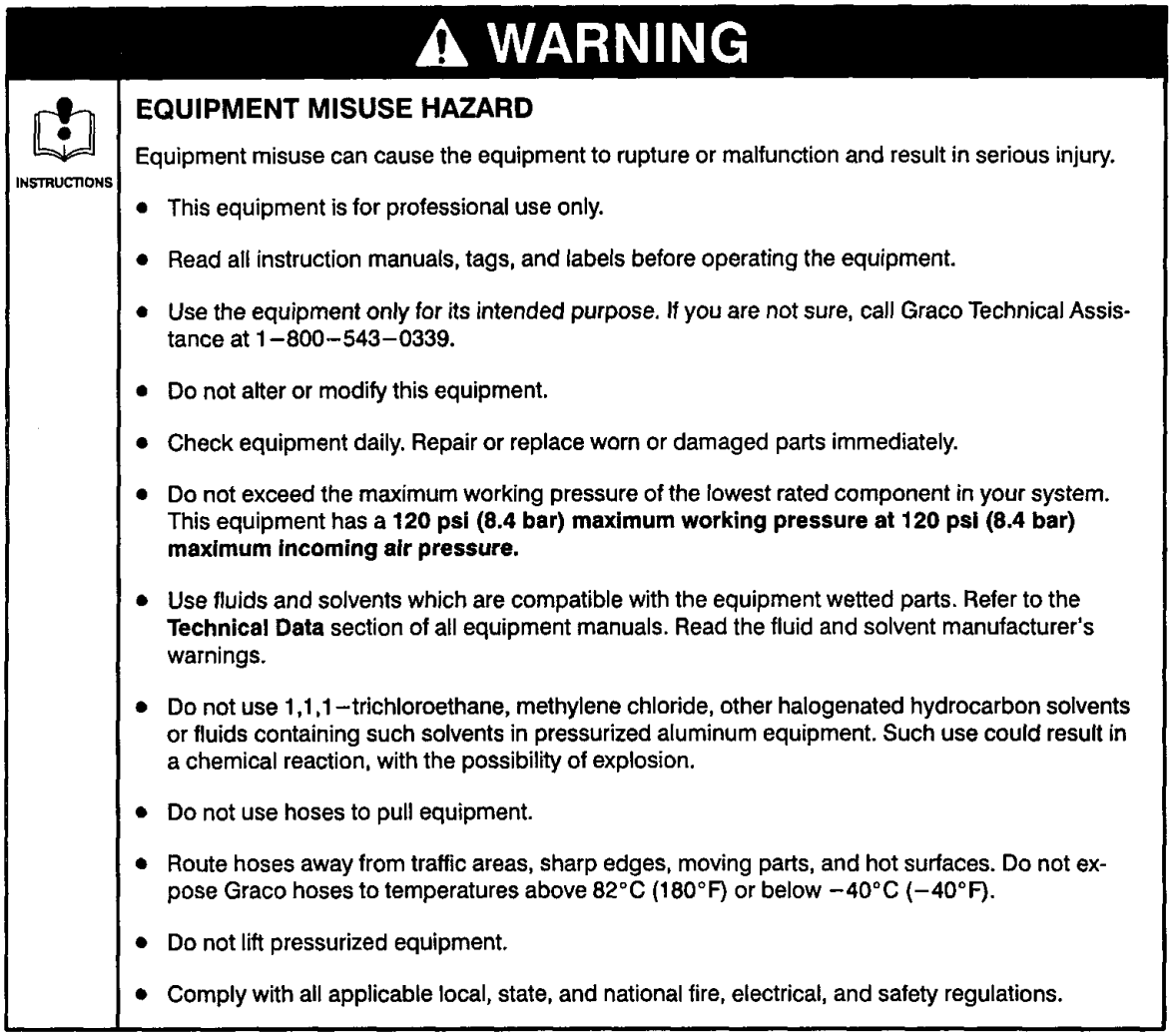


Figure 14 General equipment misuse hazard prevention actions

Accident and Near-Miss Accident Reporting

Preparing and Submitting Required Reports

All Graco employees and Distributors must report accidents and near-miss accidents to Graco at 1-800-543-0339. Be prepared for the possibility of an accident by having the Graco Accident Reporting Wallet Card on hand at all times. To order the Graco wallet card, order part number 301-283.

Figure 15 shows you what the Accident Reporting Wallet Card looks like.

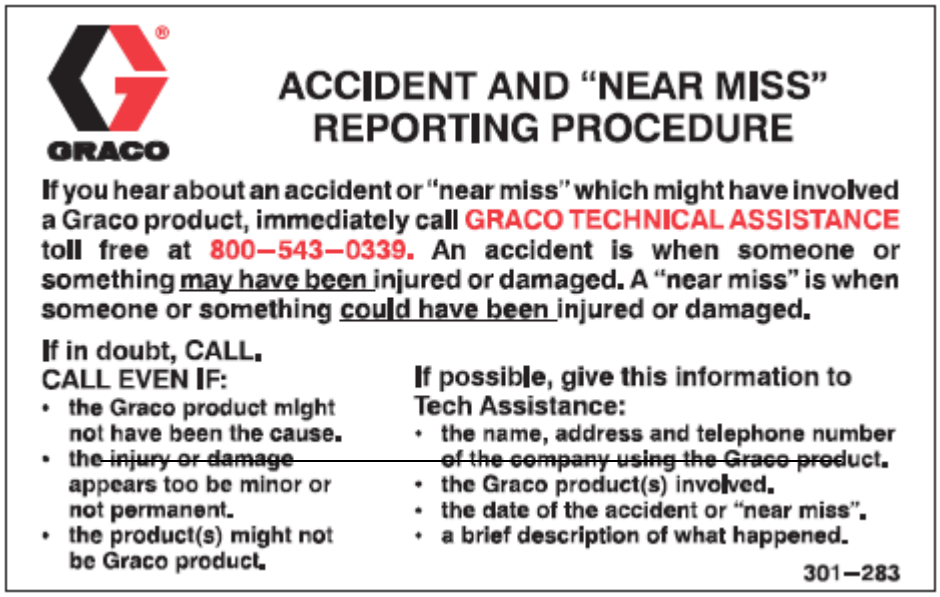


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Figure 15 Graco Accident Reporting Wallet Card