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I. PURPOSE

The purpose of this Silica Safety Program is to provide the hazards associated with silica dust and outline the steps to take to ensure employees who work with, or around silica are not exposed to hazardous levels of silica dust; and to provide procedures for common silica related work duties to minimize exposure in accordance with the OSHA standards 29 CFR 1910.1000 and 29 CFR 1926.1153.

II. SCOPE

This program and procedures apply in its entirety to all Gallant Builders LLC (Gallant) projects unless a variance is granted by the Gallant Safety Director.

III. INTRODUCTION

Crystalline silica is a basic component of soil, sand, granite and many other minerals. Quartz is the most common form of crystalline silica. All materials containing silica can result in the presence of respirable silica particles when chipping, cutting, drilling or grinding takes place.

Silica exposure occurs through inhalation of silica containing particles and occurs through many construction and general industry methods. The most severe exposures generally occur during abrasive blasting with sand to remove paint and rust from bridges, tanks, concrete structures and other surfaces.

Other activities that may result in high silica exposure include jack hammering, rock/well drilling, concrete mixing, concrete drilling, brick and concrete cutting/sawing, tuck pointing and tunneling operations. Exposure to excessive silica dust over long periods of time can result in silicosis.

This Silica Safety Program applies to all Gallant projects and employees who are expected to be exposed to silica dust through the methods outlined above; or through other means, which are determined by their supervisor.

IV. KEY RESPONSIBILITIES

Due to the significant risk posed by respirable silica, it is critical that all personnel involved in operations that could potentially create silica dust take specific action to ensure that, as much as possible, a hazard is not created.

Gallant is responsible for:

- Substitution of less hazardous products for those that contain crystalline silica is required.
- Ensuring that the materials (e.g., tools, equipment, personal protective equipment) and other
- Ensuring that the materials (e.g., tools, equipment, personal protective equipment) and other resources (i.e., employee training materials) required to fully implement and maintain this exposure control plan (ECP) are readily available where and when they are required.
- Providing a job-specific ECP for each project as need warrants; which outlines in detail the work methods and practices that will be utilized.

Considerations for the plan should include:

- Availability and delivery of all required tools/equipment
- Scope and nature of grinding work to be conducted
- Control methods to be used and level of respiratory protection required

RESPONSIBILITIES
Safety, Health and Environmental (SH&E)

The Gallant Safety Director provides program oversight and consultation to Gallant Superintendent's regarding potential risks, exposure prevention and training relating to silica dust exposures.

Conduct building/material assessments for silica containing materials and perform employee silica hazard assessments/monitoring upon request.

Ensure the applicable components of the Silica Safety Program are available to all affected employees.

Provide applicable training to employees expected to work in, or with, building materials where there is a potential risk for silica exposure.

The safety director shall conduct a full assessment of the Silica Control Program effectiveness on an annual basis.

SUPERINTENDENTS AND SUBCONTRACTOR FOREMAN
Gallant Superintendents and Subcontractor Foreman who supervise personnel with responsibilities to work in areas where there is a risk of exposure to silica dust, must ensure employees are properly trained on the applicable contents of the Silica Safety Program and are provided appropriate personal protective equipment (PPE) when conducting such work.

AUTHORIZED PERSON
Employees working in areas where there is an identified risk of silica dust exposure must be properly trained on all applicable elements of the Silica Safety Program; and be provided and utilize the appropriate PPE for the task being performed.

V. DEFINITIONS

The following definitions are provided to allow for a better understanding of the Silica Safety Program.

Authorized Person - An employee who has received proper training and exposure monitoring to safely work with silica containing materials.

Crystalline Silica - Naturally occurring component in earth soils, sand, granite and many other minerals resulting in many building materials containing silica.

Exposure Assessment - The initial determination to find if any employee may be exposed to lead at or above the permissible exposure level. Until the assessment is completed, employees shall take all the precautions necessary to maintain exposures below the PEL.

HEPA - High Efficiency Particulate Air. A filtering system capable of trapping and retaining at least 99.97% of all particles of 0.3 micron in diameter and larger.

Permissible Exposure Limit (PEL) - the OSHA limit for silica dust exposure. It is set at 50µg/m3, averaged over an 8-hour workday, as a Time Weighted Average.

Silica Containing Material (SCM) - Any material, which has the potential to contain silica at levels, which may pose a hazard to employees when the material is manipulated to create airborne particles

Silicosis - A lung disease caused by inhalation of silica dust. Silica dust can cause fluid buildup and scar tissue in the lungs that cuts down the ability for the lungs to fully function. The disease is not curable, but can be prevented through the use of engineering controls, administrative controls and other protective systems.

VI. SILICA PROPERTIES

Silica is the second most common mineral on earth and makes up nearly all of what we call “sand” and “rock” and exists in many forms—one of these, “crystalline” silica (including quartz), is the most abundant and poses the greatest concern for human health.

Some common materials that contain silica include:

- Rock and sand
- Topsoil and fill
- Concrete, cement, and mortar
- Masonry, brick, and tile
- Granite, sandstone, and slate
- Asphalt (containing rock and stone)
- Fibrous-cement board containing silica

VII. MATERIAL ASSESSMENT

Any time there is a potential for silica containing materials to be involved in a project, sources of silica must be assessed prior to disturbing. The Gallant Safety Director or an authorized contractor can perform building material assessments to determine silica content in materials.

Crystalline silica occurs naturally in the earth’s crust and is a basic component of sand, concrete, brick, asphalt, granite, some blasting grit and wall spackling materials.

Silica is a primary component of many common construction materials, and silica-containing dust can be generated during many construction activities, including:

Employees can be exposed to silica when conducting the following tasks/activities such as:

- Abrasive blasting (e.g., of concrete structures)
- Jack hammering, chipping or drilling rock or concrete
- Concrete crushing

- Hoe ramming
- Mixing of concrete or grout
- Sawing concrete or bricks
- Chipping or scarifying concrete
- Tuck point grinding
- Road construction
- Rock crushing
- Moving/dumping piles of concrete, rock, sand and gravel
- Demolition of concrete or brick
- Sweeping concrete dust
- Using coatings containing silica
- Removing coatings containing silica

If airborne silica is expected to be generated during the project, Gallant Safety Director shall be contacted to conduct exposure monitoring and ensure all safety precautions are followed to minimize exposure to airborne silica dust.

VIII. HEALTH HAZARDS

Exposure to silica has been shown to cause silicosis, lung cancer, pulmonary tuberculosis and other airway diseases. Crystalline silica dust can cause a disabling, sometimes fatal disease called silicosis. The fine particles are deposited in the lungs, causing thickening and scarring of the lung tissue. The scar tissue restricts the lungs' ability to extract oxygen from the air. This damage is permanent, but symptoms of the disease may not appear for many years.
A worker may develop any of three types of silicosis, depending on the concentrations of silica dust and the duration of exposure:

Chronic silicosis – Develops after 10 or more years of exposure to crystalline silica at relatively low concentrations

Accelerated silicosis – Develops 5 to 10 years after initial exposure to crystalline silica at high concentrations

Acute silicosis – Develops within a few weeks, or 4 to 5 years, after exposure to very high concentrations of crystalline silica

Initially, workers with silicosis may have no symptoms; however, as the disease progresses, a worker may experience:

- Shortness of breath
- Severe cough
- Weakness

These symptoms can worsen over time and lead to death. Exposure to silica has also been linked to other diseases, including bronchitis, tuberculosis, and lung cancer.

IX. BEST PRACTICES

Gallant has developed a best practice governing the storage, handling, use and disposal of silica if there is potential for exposure. The best practice includes measures to be used to prevent the uncontrolled release of silica and the procedures to be followed if there is an uncontrolled release.

Engineering controls such as ventilation or wet methods will be used to control silica-containing dusts.

X. RISK IDENTIFICATION, ASSESSMENT AND CONTROL

The potential for employee exposure to silica should be identified during the hazard assessment. A worker's exposure to silica is kept as low as reasonably achievable. Employees must not be exposed to airborne concentrations of silica in excess of 0.025 mg/cubic meter over an 8-hour time period.

Atmospheric testing results should be assessed before an employee is exposed.

A key step in developing a silica exposure control plan is to identify the work activities that would put employees at risk of exposure.

- Work activities - that may generate airborne silica dust - for silica, the route of exposure is through the inhalation of airborne dust. The employer should have a qualified person review the planned work activities to identify those that may generate airborne silica.
- Identify workers at risk of exposure. For example, workers who finish concrete would be at greater risk of exposure than plumbers or electrical workers.
- Amount of exposure - some work activities generate more dust than others, and the amount of exposure should be estimated. Published resources are available that provide air sampling data and compare silica dust levels from various construction activities.
- Duration of exposure - employees who grind concrete for a full shift would be at greater risk than employees jackhammering for an hour.

CONTROL OPTIONS

Effective control options must be used to eliminate or reduce the risk to employees from the hazards of silica dust exposure.

The following hierarchy of control measures must be followed:

- Elimination/substitution (e.g., using products with less silica or using work methods that would eliminate the need for surface grinding)
- Engineering controls (e.g., water, local exhaust ventilation, enclosure)
- Administrative controls (e.g., coordination of tasks with subcontractors, signage)
- The use of proper PPE such as gloves, coveralls and eye protection when exposed to silica.

Personal protective equipment such as gloves, coveralls and eye protection will be used to control silica exposures.

Gallant commits to developing knowledge and expertise about these controls, and to establishing policies/procedures to protect workers from harmful exposure and to minimize reliance on respirators.

Effective engineering controls such as HEPA vacuum attachments and wetting methods, which control silica dust at its source, are readily available. These controls have been proven to reduce airborne dust levels significantly when selected and operated in accordance with best practices. We know that engineering controls alone do not reduce airborne silica to safe levels; so in most cases other control measures, including respiratory protection, will be necessary.

If we take on a job that could release an unusually high amount of dust, and we are unsure of the adequacy of our control measures, we will conduct air sampling in order to ensure that control methods are protective.

We will reduce or eliminate employee exposure to silica dust by selecting a combination of the following controls listed in order of preference:

- Elimination and substitution
- Engineering
- Administrative
- Personal protective equipment

ELIMINATION AND SUBSTITUTION

We recognize the importance of planning the work in order to minimize the amount of silica dust generated.

During the project planning phase, we will advocate for the use of methods that reduce the need for cutting, grinding, or drilling of concrete surfaces (e.g., formwork planning). Whenever possible, we will schedule work when concrete is still wet, because we know that much less dust is released at that time.

ENGINEERING CONTROL OF DUST

Engineering and work practice controls shall be used to reduce and maintain employee exposure to the lowest levels of respirable crystalline silica.

Selecting an appropriate control measure depends on the specifics of the operation. In some cases, local exhaust ventilation (LEV) is more effective at controlling exposure (e.g., during grinding operations) than wetting methods.

In a different application, wetting may be more effective (e.g., during cutting operations) than LEV. However, using LEV may reduce the amount of final cleaning required, as the silica dust is captured.

Our dust control systems may employ three well-established techniques:

- Local exhaust ventilation (LEV)
- Wet dust suppression (WDS)
- Restricting or isolating the work activity with barriers or full enclosures (this may be the only option where LEV or WDS is not practical or effective)

LOCAL EXHAUST VENTILATION (LEV)

When LEV is used in our work, we will employ the following systems and safe work practices:

- Vacuum attachment systems to capture and control the dust at its source whenever possible.
- Dust control systems (used regularly and well maintained).
- Grinding wheels operated at the manufacturers' recommended rpm (operating in excess of this can generate significantly higher airborne dust levels).
- Retrofit shrouds or exhaust cowlings for corner grinding; use manufacturer-specified rpm speeds and a well-maintained HEPA vacuum.
- Diamond stone grinders, which allow for the use of a more efficient suction casing on the grinder, whenever practicable.
- HEPA or good quality, multi-stage vacuum units approved for use with silica dust. [The vacuum units should be capable of creating a target airflow of at least 70 cfm. This should achieve a face velocity at the shroud of about 1.3 m/s (260 fpm)—the higher the face velocity, the more dust captured at source.]
- Work planning, so that concrete grinding can be completed when wet (dust release can be significantly reduced).
- Good housekeeping work practices (for example, use vacuums with high-efficiency particulate air (HEPA) filters, or use wet sweeping).
- Train employees and supervisors on how to properly use and maintain the equipment.

WET METHODS FOR DUST CONTROL

When water spray systems are used in our work, we will follow these safe work practices:

- Pneumatic grinders will be used instead of electric-powered grinders if water is the method of control.
- Pressure and flow rate of water will be controlled in accordance with tool manufacturers' specifications (for cutting saws, a minimum of 0.5 liters of water per minute should be used).
- When sawing concrete or masonry, we will use only saws that provide water to the blade.
- Wet slurry will be cleaned from work surfaces when the work is completed, using a wet vacuum or wet sweeping.

BARRIERS AND ENCLOSURE

- When barriers or enclosures are used in our work, we will follow these safe work practices:
- The site foreman will determine the type and design of barrier or enclosure (based on the work activity and the work area) and ensure it is constructed in accordance with the work plan. Barriers may be simple hazard-flagging ribbon or more restrictive hoarding.
- We will use commercially available negative air units when constructing a full enclosure.

ADMINISTRATIVE CONTROLS

We will follow these safe work practices:

- Exposure control plans and the site risk assessment/work plan will be submitted to the general contractor prior to the start of work.
- We will establish procedures for housekeeping, restricting work areas, personal hygiene, worker training, and supervision.
- As part of our project planning, we will assess when silica dust may be generated and plan ahead to eliminate or control the dust at the source. We recognize that awareness and planning are key factors in the prevention of silicosis.
- Warning signs will be posted to warn workers about the hazards of silica and to specify any protective equipment required (for example, respirators).
- Work schedules will be posted at the boundaries of work areas contaminated with silica dust.

- Work that generates silica dust will be conducted after hours, when access to other unprotected workers cannot be restricted.
- We will develop a site-specific exposure control plan to cover project-specific issues (e.g., scope of work, project location and site-specific hazards) and to be kept available at the worksite.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection:

- All employees who wear respirators will do so in adherence with our respirator program.
- Respirators must be selected based upon measured exposure levels and the assigned protection factor of respirators.
- Only approved respirators will be used.
- Workers who wear respirators will be clean-shaven. Filtering face piece respirators give little or no protection to workers with beards, and even a minor growth of stubble can severely reduce the effectiveness of respiratory protection.
- All employees who wear respirators will be fit-tested.
- Employees will be properly trained in the use of respirators, and a high standard of supervision, inspection, and maintenance will be followed.
- When required, employees shall be provided with the proper respiratory protection to protect them from respirable crystalline silica.

PROTECTIVE CLOTHING

Gallant will provide employees in a restricted area with protective clothing that protects other clothing worn by the employee from silica contamination, ensure that employees' street clothing is not contaminated by silica, and ensure that an employee does not leave a restricted area until the employee has been decontaminated.

HEALTH MONITORING

Exposures to airborne concentrations of Silica must be kept below the permissible exposure limits shown in 29 CFR 1910.1000 Table Z-3.

Full shift personal samples shall be representative of the employee’s regular, daily exposure to silica.

DOCUMENTATION

- Records must be kept of the following:
- All employees who are exposed to respirable silica dust while on the job
- Employee education and training sessions
- Respirator fit-testing
- Equipment maintenance and repair
- Worksite inspections

The exposure control plan must be reviewed at least annually and updated as necessary by the employer, in consultation with the workplace health and safety committee or the worker health and safety representative.

EXPOSURE MONITORING

INITIAL EXPOSURE MONITORING

Employees expected to come in contact/work with silica containing materials where there is a risk of exposure through inhalation of dust should develop an exposure monitoring program.

Initial exposure monitoring should be conducted by Gallant SH&E to quantitatively evaluate the exposure to airborne silica.

Exposure monitoring should be conducted on any employee exposed to airborne silica dust as levels may vary based on job duty within a project. For example, the employee performing concrete cutting vs an employee providing supervision during the work.

PERIODIC EXPOSURE MONITORING

Whenever silica exposure levels are greater than, or equal to the Permissible Exposure Level (50µg/m3), periodic exposure monitoring is required. It is the responsibility of the affected subcontractor to work with Gallant SH&E and develop a periodic exposure monitoring schedule.

The frequency of exposure monitoring should be as follows:

MEASURED CONCENTRATION AND MONITORING FREQUENCY

The Permissible Exposure Level (PEL) of 50 micrograms of respirable silica per cubic meter (µg/m3) averaged over an 8-hour work day.

Annual exposure monitoring is not required by every employee at risk of airborne silica exposure. Enough sampling must be done to enable the employee's exposure level to be reasonably represented.

TERMINATION OF EXPOSURE MONITORING

Periodic exposure monitoring may be discontinued if results from two consecutive sampling periods taken at least 7 days apart show that employee exposure is below the PEL.

SAMPLING METHODS

Personal exposure monitoring will be conducted using an approved NIOSH method. Monitoring records shall include the following.

The date, number, duration, location and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable.

- A description of the sampling and analytical methods used.
- The type of respiratory protective devices, if any.
- Name and job classification of the employee monitored.
- Any environmental variables that could affect the measurement of the employee exposure.

REPORTING OF EXPOSURE MONITORING RESULTS

Gallant SH&E will notify the superintendent/supervisor of exposure monitoring results within as soon as the final laboratory analysis is completed. The superintendent/supervisor must provide this information to the affected employee(s) within 5 working days.

If levels are measured during the exposure monitoring exceeding the PEL, the SH&E report will include steps and controls to reduce exposure to below the PEL.

Follow up exposure monitoring may be necessary if engineering or administrative controls are put in place to reduce hazardous exposures.

EXPOSURE CONTROL

The purpose of an exposure control plan (ECP) is to set out Gallant Builders (Gallant) approach to protecting workers from harmful exposure to airborne silica dust.

A copy of the Gallant exposure control plan is available to all employees.

A combination of control measures may be required to achieve this objective. We commit to being diligent in our efforts to select the most effective control technologies available, and to ensure that the best practices, as described in this ECP, are followed.

The work procedures we establish will protect not only our employees but other possible effected personal. These guidelines are designed to be used as per project when the need for a control plan may exist.

PROJECT PLANNING

Gallant and their subcontractors develop and implement a written exposure control plan when their employees are exposed to silica.

Prior to projects taking place Gallant SH&E reviews planning documents to account for potential exposures to hazardous materials, including silica.

Gallant SH&E can conduct material assessments to make determinations if there are any silica containing materials, which may be impacted by the project.

During the planning process, any silica containing materials are addressed and methods for exposure control are provided prior to work beginning.

If silica containing materials are to be disturbed during the project, the appropriate exposure control methods will be recommended by Gallant SH&E.

Employee access to high exposure areas shall be limited.

ADMINISTRATIVE / ENGINEERING CONTROLS

Gallant and their subcontractors shall use engineering controls to limit employee exposure to silica.

Where silica exposures at or above the Permissible Exposure Limit documented, or are expected, the appropriate engineering shall be implemented.

Follow-up exposure monitoring may be necessary when administrative or engineering exposure controls are utilized.

TYPICAL CONTROLS MAY INVOLVE:

- Substituting non-silica containing materials for use while abrasive blasting
- Alternative methods such as pre-ordering grout already mixed instead of on-site mixing in bulk
- Local exhaust ventilation
- General ventilation
- Vacuum methods with HEPA filters
- Distance
- Dust control products
- Containment
- Use of water to keep dust down
- General work practices such as good housekeeping, worker rotation, development of specific SOPs to minimize exposure

PERSONAL PROTECTIVE EQUIPMENT (PPE)

In addition to administrative/engineering controls, employees may be required to wear specific PPE during the disturbance of silica containing materials and/or when airborne silica is present. The level of protection will depend on the task being conducted and the tools being utilized to complete the task.

RECOMMENDED PPE WILL TYPICALLY INCLUDE:

- Respiratory Protection
- Disposable or reusable work clothing to keep from spreading the dust or bringing the dust home
- Leather gloves
- Safety glasses or goggles
- Face shield
- Boot covers or rubber boots

The following table provides recommended respiratory protection levels based on the measured or anticipated exposure levels:

Respirator	Protection Factor	Typical Silica Activity
N95	Less than 50 µg/m3	- Used on voluntary basis to control low exposures
Half-face with HEPA filters	50 – 500 µg/m3	- Housekeeping (wet method) - Saw cutting (wet method) - Drilling concrete (wet method) - Power tools with dust collection - Equipment operating with open cab
Full-face with HEPA filters	500 – 5,000 µg/m3	- Chipping concrete - Jack Hammering - Power tools without dust collection - Mixing grout in bulk - Vacuum abrasive blasting
SCBA	Above 5,000 µg/m3	- Abrasive blasting

XI. HOUSEKEEPING & HYGIENE FACILITIES

In areas where silica containing dust may be present, all surfaces must be maintained free from accumulations of dust to minimize potential silica exposure. Dust and other silica containing debris must be removed from the work area as soon as possible.

Acceptable method of silica dust removal includes the use of HEPA vacuum or wet methods such as wet mopping.

Unacceptable methods of silica dust removal include dry sweeping, vacuum cleaners, shop vacuums, and compressed air.

Follow all recommended procedures and utilize recommended PPE during silica containing debris cleanup activities.

Where silica containing materials are used, impacted, or being removed; the following requirements must be met:

- PPE should be removed upon work completion and disposed of after each use.
- Employees must wash hands and are recommended to shower prior to leaving work.
- Ensure contaminated PPE, including footwear is not worn outside the work areas.

XII. MEDICAL SURVEILLANCE

Gallant and their subcontractors shall offer their highly exposed employees medical exams and they shall also be included in the appropriate medical surveillance program.

Employees exposed to silica levels above the Permissible Exposure Limit (50 µg/m3), or any employee working with silica who develops signs/symptoms of excessive exposure, should be enrolled in the Medical Surveillance Program.

All medical surveillance will be performed by a licensed healthcare provider and results must be provided the affected employee and their supervisor within 15 days of the assessment.

All employees shall be placed into the medical surveillance when their silica exposure is equal to or exceeds the action level for 30 or more days per year.

The medical surveillance program consists of baseline examination and chest X-ray.

Employees enrolled in the medical surveillance program should be examined annually to track any changes as a result to exposure to silica dust.

XIII. TRAINING AND RECORDKEEPING

Hazard Communication training is required by all Gallant employees and should be conducted initially upon hiring. Additional information by contacting Gallant SH&E.

Silica Awareness Training is available from Gallant SH&E and must be offered to affected employees prior to working with Silica and annually thereafter.

Silica awareness training should include the following:

- Information about the dangers, potential health effects, symptoms of exposure to respirable silica and how to limit their exposure
- Safety data sheets for silica, quartz, and applicable products containing silica
- The purpose and set up of regulated areas to mark the boundaries of work areas containing silica dust
- The use of engineering controls, work practices, good housekeeping and PPE to control exposure to silica
- Signs and symptoms of silica disease
- Use and care of PPE
- How to seek first aid
- Use of control systems (e.g., LEV and wet methods)
- Expected exposures to silica dust
- Exposure monitoring process
- Medical surveillance process

- Respiratory protection training, medical clearance, and quantitative fit testing is required under the Respiratory Protection Program. Contact Gallant SH&E for additional information regarding enrollment in the program.
- The supervisor is required to maintain all training, medical surveillance, and exposure monitoring results.

XIV. SIGNAGE

In areas where exposure to silica dust may exceed the PEL the following type of signage must be in place to warn employee of hazards.