# WORKING AT HEIGHT

# ROOF WORKS SAFETY REQUIREMENTS

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## 1. Objective and scope

The below safety requirements apply to all parties and contractors involved in roof works, including roof repair works and cleaning works. These Barry Callebaut (BC) requirements address key safety concerns to protect both the workers and the property.

These requirements are mandatory and are applicable in all BC locations and apply to all third parties involved in roof works.

In case BC contracted parties (contractors) work with subcontractors, the contracted party has to ensure that all requirements are signed off by the parties they subcontract activities to.

## 2. Legal Notice

The requirements and expectations set out herein are in addition to, and not in lieu of any other requirements, standards, regulations, manual and expectations applicable. This document is not exhaustive and is subject to periodic review, revision and extension by BC. Terms and conditions set out herein are in no way intended to replace, limit or supersede any contractual arrangements between the supplier and the BC Group, but are by their nature intended to supplement any such contractual arrangements.

## 3. General Requirements

3.1. Compliance with Regulations and Standards

- Contractors must comply with all applicable local, federal, state and national safety regulations for all relevant activities (e.g. construction, working at height, electrical work, hot work). If there are local industry specific standards, all work must comply with these as well.
- Every worker performing specialized tasks must hold the appropriate certifications. A list of all persons indicating the tasks they will perform, the company they work for, as well as a copy of their certifications will be made available to BC prior to them working on our location. This list will be kept up to date by the contractor and new additions will be communicated to the project manager before the start of their work on the BC site.
- All personnel must be trained in fall protection, ladder safety and any other relevant safety practices. Training must be up to date and documented.

3.2. Safety Plan

- The contractor will carry out a comprehensive risk assessment to identify potential hazards (e.g., falls from ladders, weather conditions, fragile roofing materials, unstable surfaces, electrical lines). This shall be shared and signed off by the contractor, the BC project manager or his delegate on site and the local BC SHE manager.
- Contractors must submit a site-specific safety plan prior to commencing work. The plan should detail all safety measures, emergency procedures, the above mentioned risk assessment and the control measures of any potential hazards.
- Contractors will ensure that anyone working at height is fit to do so safely and does not have a medical condition or is taking substances which could result in injury to themselves or others.
- Control measures for identified hazards must be implemented before the work begins.
- The plan shall contain emergency response procedures, including fall rescues, first aid, and evacuation routes. It shall detail how workers will never work alone on the roof. The emergency plan shall be communicated to all workers.

3.3. Daily Safety Briefings

- It is mandatory to conduct and document daily safety briefings to review hazards, tasks, and ensure that safety protocols are understood by all workers. The BC project manager or his delegate shall participate at each Daily Safety Briefing.
- Work permits (Working at height, BC Global Hot Work Procedure and Permit, Electrical Work) are mandatory for construction work, working at height, hot work, electrical work etc.. Permits are authorized by the BC Plant Manager or his/her delegate.

## 4. Additional Expectations

4.1. Roof Access and Egress

- Provide safe access to and from the roof, such as ladders, scaffolding, or aerial lifts that comply with local and BC standards.
- Ensure that all access points are secure and stable to prevent accidents during ascent or descent.
- Ladders are approved to reach an area or for inspection purposes but require an approval when used to work from, scaffolds or scissor lifts shall be used to work from. PPE shall we worn as set out in paragraph 4.4.

4.2. Weather Conditions

- No roof work in hazardous weather conditions (e.g., high winds, rain, snow, ice or when the risk of being struck by lightning exists) that could increase the risk of slips, falls or equipment malfunction.
- Monitor weather forecasts and have contingency plans for sudden weather changes.
- Include hazardous weather conditions in the risk assessment and determine and communicate clearly how these will be controlled.

4.3. Fragile Roofs

- Identify fragile roof areas (e.g., asbestos sheeting, glass, old roofing materials) and take precautions, such as installing crawling boards or roof ladders, to avoid falls.
- Mark fragile areas clearly to prevent accidental access.

4.4. Personal Protective Equipment (PPE)

- PPE Usage: All workers are required to wear appropriate PPE, including but not limited to hard hats, gloves, safety glasses, high-visibility vests and non-slip safety footwear.
- Fall Protection: Use of fall protection gear such as harnesses, guardrails, and safety nets is mandatory whenever working at heights above 180 cm / 6 feet.
- All fall protection devices shall be used, inspected and maintained in accordance with the manufacturer’s specifications, legal requirements and all recognized standards at least once a year. Records of inspections shall be retained by the (sub) contractors and made available to Barry Callebaut upon request.
- Defective fall protection equipment, or equipment that has been subjected to impact, shall not be used, it shall be locked out and removed immediately from the BC site.
- Safety harnesses, lanyards and associated equipment shall be visually inspected each day prior to use by the user. This inspection shall be documented.
- Where personnel lifting devices are being used (aerial lifts, man-baskets) the occupants must be demonstrably trained, must wear full body harnesses and must be hooked up to a secure point within the equipment.

4.5. Fall Protection Measures

- Roof Edge Protection: Guardrails or barriers must be installed around the perimeter of the roof if no parapet walls are present.
- Install edge protection like toe boards and guardrails to prevent falls from the roof's perimeter.
- Where guardrails are not feasible, ensure the use of temporary edge protection systems.
- Anchor Points: Secure anchor points for fall arrest systems must be installed and inspected prior to starting work.
- Ladders and Scaffolding: All ladders, scaffolding, and access points must be inspected for safety and properly secured before use.

4.6. Emergency Preparedness

- First Aid Kits: Ensure that first aid kits are readily accessible at the work site. At least one person trained in first aid and CPR must be on-site at all times.

4.7. Tool and Equipment Safety

- Tool Inspection: All tools and equipment must be regularly inspected and maintained to ensure safe operation. Defective tools must be removed from service immediately.
- Proper Usage: Contractors are responsible for ensuring that tools and equipment are used correctly and in accordance with manufacturer guidelines.
- Secure all materials and tools on the roof to prevent them from falling and causing injury.
- Use proper lifting techniques and equipment to handle heavy materials safely.

4.8 Communication and Signage

- Communication: Maintain open lines of communication between the contractor, site supervisor, and workers to address safety concerns in real time.
- Signage: Post appropriate warning signs around the work area to alert non-workers to potential hazards, such as falling debris or restricted access areas.

4.9 Waste Management and Housekeeping

- Debris Removal: All debris, materials, and tools must be properly secured and removed from the roof at the end of each workday to prevent accidents.
- The work area should be kept clean and organized to minimize tripping hazards and ensure safe movement around the site.

**5. Inspection and Compliance Monitoring**

- Site Inspections: Regular safety inspections must be conducted by a competent person designated by the contractor to ensure compliance with all safety protocols.
- Reporting: Contractors must immediately report any safety incidents, near-misses, or violations to the BC project leader.

**6. Penalties and Enforcement**

- Non-Compliance: Failure to adhere to these safety requirements may result in the suspension of work, penalties, or termination of the contract.
- Corrective Actions: Contractors must take immediate corrective actions to address any safety violations or hazards identified during inspections.

**Annex: NFPA Standard for Safeguarding Construction, Alteration and Demolition Operations (2022 Edition)**

***Note: where BC Hot Work Permit procedure requires stricter standard (e.g. fire watch), the BC Standard applies***

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# NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations (2022 edition)

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## Chapter 10 - Safeguarding Roofing Operations

### 10.1 General.

All roofing operations involving heat sources and hot processes shall be conducted by a qualified agency.

### 10.2 Asphalt and Tar Kettles.

**10.2.1***

Asphalt and tar kettles and associated LP-Gas cylinders shall be located in a safe place outside of the building at a point that avoids the danger of ignition of combustible material.

*A.10.2.1 Roofing kettles and all integral working parts should be in good working condition and should be maintained free of excessive residue.*

**10.2.2**

Asphalt and tar kettles shall not be located on roofs.

**10.2.3**

A lid that can be closed by means of gravity shall be provided on all roofing kettles.

**10.2.4**

The tops and covers of all kettles shall be close-fitting and constructed of steel having a thickness of not less than 2 mm (0.075 in.).

**10.2.5***

Used roofing mops and rags shall be cleaned of excessive asphalt and stored away from the building and combustible materials.

*A.10.2.5 Many flammable and combustible liquids, including roofing asphalts, combine readily with the oxygen in air and produce heat. Where these liquids are present on rags and mops used in roofing operations, the heat can concentrate inside the mass faster than it can be dissipated and can result in spontaneous combustion.*

*Fires in mops can be prevented by "spinning" or cleaning excessive asphalt out of the mop or rag* after its work period is finished.

**10.2.6**

Discarded roofing mops and rags shall not be in contact with combustibles.

**10.2.7**

Kettles shall be constantly attended when in operation by a minimum of one employee knowledgeable of the operations and hazards. The employee shall be within 7.6 m (25 ft) of the kettle and have the kettle within sight.

**10.2.8**

Roofing kettles shall not block exits, means of egress, gates, roadways, or entrances. In no case shall kettles be closer than 3 m (10 ft) from exits or means of egress.

## 10.3* Single-Ply and Torch-Applied Roofing Systems.

*A.10.3 For additional information, see FM Data Sheet 1-33, Safeguarding Torch-Applied Roof Installations.*

**10.3.1* General.**

*A.10.3.1 Torch-applied roofing can be a potentially hazardous construction process, and extreme caution should be exercised during installation. The exposed outer surface of the membrane coil should be heated until a slight sheen develops. The compound should not be overheated. A slight smoke vapor can be seen when the compound is overheated. The flame from a hand-held torch should be moved from side to side constantly. If a mobile heating apparatus is used, it should be kept in constant motion while in operation.*

*Some roof membranes, such as polyvinyl chloride (PVC) or chloro-sulfonated polyethylene (CSPE or Hypalon), might necessitate heating or the use of solvents in order to form lap joints or to secure the membrane.*

**10.3.1.1**

Single-ply and torch-applied roofing systems shall be installed using extreme caution.

**10.3.1.2**

Torches or hot-air guns used to secure roofing membranes shall be used in accordance with the manufacturer's recommendations.

**10.3.1.3**

In order to prevent smoking or ignition of roofing membranes, they shall not be overheated.

**10.3.1.4***

Personnel applying torch-applied roofing shall be qualified.

*A.10.3.1.4 One example of demonstrating qualifications could be through the Certified Roofing Torch Applicator program (CERTA) administered through the National Roofing Contractors' Association (NRCA)*

**10.3.2* Openings, Penetrations, and Flashings.**

*A.10.3.2 Roof openings/vents and crevices should be covered with a stable, noncombustible cover to prevent the ignition of building contents.*

*Extreme caution should be used near penetrations such as exhaust vents. Flames could ignite grease accumulations from kitchen vents and lint accumulations from laundry vents. Such accumulations should be cleaned before roofing work is begun.*

*Areas equipped with air conditioning units and ventilating fans should be shut down before torch work is performed.*

*A torch stand should be used to direct the flame upward while momentarily suspending the use of the flame. The cylinder valve should be closed to burn off propane in the line before shutting off the torch head. The gas supply should be shut off whenever a propane odor is detected.*

*Torches should not be used near gas lines or electrical wires.*

**10.3.2.1**

Caution shall be used where working near roof openings, penetrations, or flashings.

**10.3.2.2**

The flame of the torch shall not come in direct contact with wood nailers, cant strips, or metal flashing.

**10.3.2.3**

Small torches shall be used to heat the underside of the membrane at a safe distance from openings, penetrations, and flashing before securement.

**10.3.2.4**

Hot trowels shall be used to feather seams at laps and flashings.

**10.3.2.5**

The torch shall not be used in areas where the flame impingement cannot be fully viewed.

**10.3.2.6**

Open flames shall not be left unattended.

**10.3.3 Flame Contact Protection.**

**10.3.3.1**

The torch flame shall not be applied to a combustible substrate for the membrane.

**10.3.3.2**

Base ply shall be used to cover wooden decks, combustible insulation (such as foam plastic, kraft-faced glass fiber, or wood fiber), small crevices, cant strips, plastic fastener plates, or any other combustible surface.

**10.3.3.3**

Base ply shall be permitted to consist of either glass fiber felts or minimum 18 kg (40 lb) organic felts.

**10.3.3.4**

Torch flames shall not come in contact with exposed plastic roofing cement.

**10.3.4 Installation.**

**10.3.4.1**

The installation of torch-applied roofing and, in some cases, single-ply roofing systems is hot work and shall comply with Section 7.1 (hot work operations), except where otherwise noted.

**10.3.4.2***

Torch-applied roofing shall be exempt from the requirements of 7.1.3, commonly referred to as the "35-foot rule," of NFPA 51B.

*A.10.3.4.2 While there are a number of important safety requirements in NFPA 51B, it is impractical to apply the "35-foot rule" to torch-applied roofing because the roof cover itself is combustible and such a requirement would prohibit the use of such systems. Requirements in this standard for torch-applied roofing provide safe alternatives to the "35-foot rule."*

**10.3.5* Personal Protection.**

Protective clothing and personal protective equipment shall be worn by installers.

*A.10.3.5 Protective clothing should include acceptable fabrics, a long-sleeve shirt, long pants, gloves, and eye protection. The safe handling of hand torches and hot trowels necessitates the use of proper protective clothing and personal protective equipment.*

**10.3.6 Equipment.**

**10.3.6.1**

Proper equipment shall be used to heat roofing membranes.

**10.3.6.2**

Torches shall be equipped with a pilot adjustment, a flame height adjustment, a minimum of 7.6 m (25 ft) to a maximum of 15 m (50 ft) of listed hose, a pressure gauge, and a regulator.

**10.3.6.3**

A spark igniter shall be used.

**10.3.6.4**

Torch trolleys and multiple torch head machines shall be equipped with listed safety valves.

**10.3.7* Equipment Inspection.**

*A.10.3.7 Liquid fuel gas cylinders can be of either the vapor withdrawal or liquid withdrawal type. The vapor withdrawal type draws vapor off the torch head. Vapor withdrawal cylinders are equipped with female cylinder valves. Liquid withdrawal cylinders transfer the liquid, via a dipstick, from the cylinder to the torch head, where it is vaporized. Liquid withdrawal cylinders have male cylinder valves, which can come equipped with adapters.*

*Frost buildup occurs only with vapor withdrawal cylinders. This can be the result of a cylinder that is undersized for the torch or air temperatures that are low. When vapor is drawn off more quickly than it is replaced, heat is absorbed and frost buildup occurs on the outside of the cylinder. Vapor pressure then further declines. Consequently, liquid withdrawal cylinders are recommended. However, where vapor withdrawal cylinders are used, 18 kg (40 lb) or 45 kg (100 lb) cylinders should be used with larger torches (such as those used on the field of the roof) or where temperatures are low [below −7°C (20°F)].*

*Equipment shall be inspected thoroughly and repaired or replaced as needed prior to use.*

**10.3.8* Fuel Gas Cylinders.**

*A.10.3.8 Fuel gas cylinders should be inspected for dents. If dents larger than 25 mm (1 in.) in diameter are found, the cylinder should be replaced. Torch and cylinder connectors should be inspected visually and checked for leaks with a soap and water solution. An open flame should not be used to test for leaks.*

*Leaky equipment should not be used. Regulator adjustments and pressure gauges should be checked to ensure that they are operable. The vent on the regulator should be checked to ensure that it is not blocked. If an unstable flame occurs (e.g., roars loudly and tends to blow itself out), the equipment should be repaired or replaced immediately.*

**10.3.8.1 Valves.**

Fuel gas cylinders shall not be hoisted by their valves.

**10.3.8.2 Straps.**

Straps placed around the cylinders shall be utilized.

**10.3.8.3 Carts.**

Carts used to transport fuel gas cylinders shall be stable.

**10.3.8.4 Caps.**

Safety caps shall be attached to all fuel gas cylinders and installed on the valves whenever cylinders are not in use.

**10.3.8.5 Size.**

The fuel gas cylinder shall be sized for the torch used.

**10.3.8.6 Frost Buildup.**

**10.3.8.6.1**

If frost buildup occurs on fuel gas cylinders and the rate of vapor withdrawal is no longer adequate for operating conditions, the cylinder shall not be placed on its side or heated with the torch flame.

**10.3.8.6.2**

If frost buildup occurs on fuel gas cylinders and the rate of vapor withdrawal is no longer adequate for operating conditions, the hose shall be disconnected and a cylinder with greater propane volume shall be used.

**10.3.9* Fire Watch.**

A fire watch shall be conducted for at least 2 hours after torches have been extinguished.

*A.10.3.9 All roof areas under repair should be checked for hot spots and signs of smoldering. The inside of the building also should be inspected for signs of fire or smoke. Particular attention should be paid to cants, flashings, and areas around penetrations such as vent pipes, air vents, and skylights. Where available, infrared scanners should be used to detect hot spots. All fires should be reported to the fire department, even when extinguished. Smoldering can continue after extinguishment, can occur for hours before flaming begins, and can occur in areas unsuspected by laypersons.*

## 10.4 Fire Extinguishers for Roofing Operations.

**10.4.1***

*A.10.4.1 Additional information regarding the safe use and operation of roofing kettles can be found in NFPA 1 Section 16.8.*

There shall be at least one portable fire extinguisher having a rating of not less than 20-B no closer than 1.5 m (5 ft) and no more than 7.6 m (25 ft) of horizontal travel distance from every kettle at all times while such kettle is in operation.

**10.4.2**

Fire extinguishers shall be located in an accessible, visible, or identified location.

**10.4.3***

There shall be at least one multipurpose 2-A:20-B:C portable fire extinguisher on the roof being covered or repaired, or other fire protection shall be provided as determined by the AHJ.

*A.10.4.3 For large roof areas, additional protection, such as charged hose lines or additional extinguishers, is recommended.*

**10.4.4**

There shall be at least one multipurpose 2-A:20-B:C portable fire extinguisher within 6.1 m (20 ft) of horizontal travel distance from torch-applied roofing equipment.

**10.4.5**

All kettle operators and torch-applied roof installers shall be trained in the use of fire extinguishers.

## 10.5 Fuel for Roofing Operations.

**10.5.1**

Fuel containers, burners, and related appurtenances of roofing equipment in which LP-Gas is used for heating shall comply with all the applicable requirements of NFPA 58.

**10.5.2**

Fuel containers having capacities greater than 0.45 kg (1 lb) shall be located at least 3 m (10 ft) from the burner flame or at least 0.6 m (2 ft) therefrom where properly insulated from heat or flame.

**10.5.3**

Solid fuel or Class I liquids *(flash points below 100 °F (37.8 °C))* shall not be used as fuel for roofing kettles.

**10.5.4**

LP-Gas cylinders shall be secured to prevent accidental tip over.

**10.5.5**

Fuel containers shall be protected against physical damage as approved.