

1. Modified bitumen roofing membranes represent the latest in the evolution of bituminous roofing systems. However, some systems require that applicators use a propane-fuelled open flame torch to adhere the membrane. When working with an open flame on the construction site, applicators must use extreme caution to prevent accidents. Carelessness could lead to loss of property or life.

This section contains precautions for applying modified bitumen roofing. The applicator will find proper procedures for working with equipment on the jobsite, and dealing with personnel.

NOTE: If a fire occurs for any reason, call the fire department immediately, even if you put out the flames. Some material may smoulder for hours before bursting into flames, and could be smouldering in places where the layman may not think to look. Let the fire fighters do their job. Safety is no accident.

A. EQUIPMENT

Applicators use an open flame to soften the bitumen on the underside of the membrane to make it adhere to the roofing substrate. At a temperature of 1100°C (2000°F), the flame produced by liquid propane gas does an excellent melting job. But used incorrectly or carelessly, the flame could damage the roof or the building and seriously injure the applicator.

Applicators should receive training in proper application, maintenance and safety procedures when handling torching equipment.

Operators should handle their equipment carefully. Protect the soft brass valve of the gas cylinder. It is easy to crack or break it. A broken valve could turn the cylinder into a projectile. Check all cylinders before refilling. Never overfill a cylinder. It could explode.

All applicators of modified bitumen should participate in the safety and training program.

A.1 General

- Use well-built durable products that feature safety devices and are listed by Underwriters Laboratories of Canada (ULC).
- Follow the manufacturer's safety and operating instructions provided with the torch system.
- Check all equipment for wear. Repair and / or replace as necessary.
- Use soap solution to test for gas leaks before lighting, then check for proper operation of the torch.
- Check all fittings and other equipment on the applications equipment for leakage.
- Be sure that torching equipment is in good working order and that the cylinder valves are clean.
- Stop work and shut off flame if propane odour is detected.
- Stop work and make repairs if a leak occurs.
- Keep non-applicators at least 3 m (10') from the flame.
- Protect your equipment: store it in a toolbox.
- Do not use matches or cigarette lighter to test for gas leaks.
- Containers which hold or may have held flammable material must be kept clear of the torch or other heat sources.
- Do not use equipment that has been damaged or that is in need of repair.

A.2 Tanks

- Protect cylinder valves; where possible use cylinders that have valve protection welded to the cylinder.
- Propane tanks are pressurized – do not puncture or subject to extreme heat.
- Secure propane tanks in an upright position and place them at least 3 m (10') from the open flame.
- Increase the size of the bottle or cylinder to keep frosting from occurring.
- Close the propane cylinder valve first and let the remaining gas burn out of the hose before closing the torch valve when shutting off the torch.
- Plug the valve with a plastic plug when cylinder is not in use.
- Do not turn a vapour cylinder on its side to increase pressure – liquid could escape.
- Do not heat a cylinder to increase pressure.
- Do not fill gas cylinder or bottle in need of repair.
- Do not tighten the brass fittings too tightly with a wrench.

A.3 Regulators

- Use an adjustable ULC listed regulator with the torch.
- Make sure flow of gas through the regulator is in the proper direction. Directional flow is stamped on regulator.
- Keep vent in pressure regulator clear at all times.
- Use a pressure gauge on every regulator.
- Do not use an adjustable regulator with a higher pressure range than the one that came with the torch.
- Do not operate any pressure gauge beyond the top of its scale or near excessive heat (above 65°C) or where there is excessive vibration.
- Do not use equipment without an operating pressure gauge.

A.4 Hoses

- Check hoses for wear and tear.
- Use only hoses listed for liquid propane gas.
- Use less than 15 m (50') of hose at one time.

A.5 Torches

- Use an adjustable pilot light with a complete shut-off.
- Only use a torch stand to direct flame upward when not in use. Do not use a trowel as a torch stand.
- Use only torch machines equipped with the same safety features as described for torches. They should also have individually adjustable torches. Use only torch trolleys and multiple head machines with approved safety valves.
- Ignite burner with a flint or electronic lighter. Matches or disposable lighters are unsafe substitutes.
- Do not play with a torch. Treat the torch as if it is always burning. A flame can be hard to see on a bright day and can ignite skin or clothing instantly and when working around mechanical equipment, it is impossible to hear the torch operating.
- Be very careful when working with torches in areas where you cannot see. Pull material away, heat it, and then apply it to the flashing.
- Do not leave lighted torch unattended.
- Do not lay an operating torch over the edge of a roof.
- Do not lay an operating torch to rest on a gas cylinder. If there is a gas leak in the cylinder area, there could be a fire.

A.6 Extinguishers

- Have at least one Class ABC fire extinguisher within 6 m (20') of each worker using the torch.
- Train each worker in the proper use of fire extinguishers.
- Direct the stream from a dry chemical-type fire extinguisher at the base of the fire from a distance of at least 3 m (10'). Sweep the fire away from you, starting at its nearest point and moving the chemical stream toward the farthest point.
- Do not try to put out a cylinder fire if it cannot be done without tipping the cylinder. Let it burn and call the fire department.
- Do not place fire extinguisher too close to liquid propane gas equipment. If fire results, you may not be able to get at fire extinguisher to put out the fire.

**WHEN IN DOUBT - CHECK IT OUT.
IF STILL IN DOUBT - DON'T USE IT.**

B. BUILDINGS

Each building is different from every other building, and each roof design presents a new set of challenges to the roofing contractor. The applicator of modified bitumen systems must adapt his standard safety procedures to meet the special requirements of the current job. However, roofers should follow the basic rules presented in these pages.

The job supervisor should take extra care when working on the modified bitumen roofing job. The supervisor should walk the job one hour after all torches have been extinguished. The delay will help guard against a smoldering fire going undetected at the end of the work day. Check for potential "hot spots" - especially cants, wall flashings, and around penetrations such as vent pipes, intake vents and skylights.

Applicators must take special care when torching at flashings, corners, or voids in the roof deck. Never torch directly at these locations. Always torch the membrane and then adhere it to the corner or joint.

B.1 General

- Install metal flashing on penetrations or flashings with tight fitting felt collar before torching.
- Shut down air conditioning units, exhaust fans and air intake fans in the work area at the roof control.
- Do not work in an enclosed area where gas can accumulate.

B.2 Substrates

- Use perlite, fibreglass, or concrete cant strips if cant strips are required.
- Use glass or organic base sheet on all wood decks and over flammable insulation, cant strips or other flammable surfaces.
- Look for any void, hole or gap in substrate and fill with non-combustible or perlite cant strip.
- Use a base ply over all flammable insulation surfaces and edges and over all joints between rigid insulation boards. The base ply provides a protective covering for underlying combustibles.
- Install a base ply or a layer of roof insulation, acceptable to the membrane manufacturer, to separate polyurethane or polyisocyanurate roof insulation from the modified sheet and the torch.

- Install a base ply over all flammable surfaces and rigid board insulations. Be sure base ply fits tightly around all roof deck openings and turns up the wall, so the flame cannot flash down and start a fire underneath the deck.
- Do not torch to wood fibre insulation, cant strip, wood or any flammable material.

B.3 Torching Methods

- Follow manufacturer's recommendations on torching to insulation and recover board surface.
- Use a small torch when flashing near details.
- Shield air conditioning units and other protrusions with perlite panels or similar material when using the torch around them.
- Heat the membrane away from air conditioning units, fans, soil pipes and all other protrusions. Care must be taken to avoid flame being pulled into the building interior.
- Feather seams around details with hot trowel, not open flame.
- Heat membrane and then attach to flashings, corners, or voids in the roof deck. Never torch directly.
- Use caution when torching near pipes in the event there is suction present.
- Do not torch anything you cannot see such as under air conditioning units or behind counter flashing.
- Do not torch near gas lines or near electric wires (such as around roof top equipment, etc.).
- Do not torch around flammable vents or plastic projections.
- Do not point the torch under rooftop equipment.
- Do not point the torch down open roof penetrations.
- Do not point the torch into corners or roof edges where dried wood or fibre may ignite (such as wood blocking or cant strip).
- Do not point the torch at low flashings where there is an overhang and flame could get up under the counter flashing, such as around skylights or prefabricated curbs with fibreboard sidewall insulation.
- Do not apply modified bitumen products directly over exposed conduits or pipes lying on the roof deck.
- Avoid prolonged contact with heat sensitive metals such as lead, as overheating of these metals could ignite underlying flammable services.
- Do not lay an operating torch directly onto the membranes – there is a danger both of fire and of damaging the membrane.
- Do not lay an operating torch on an open penetration on the roof. If the penetration is part of an air intake system, the flames could be sucked into the building.

C. PERSONNEL

Many construction-industry tradesman use open flames or flame tools in their jobs. Heating and air conditioning contractors, welders and plumbers all use open flame at the job site. These professionals are responsible for the safe use of their tools, just as the roofing contractor is responsible for the safe application of modified bitumen roofing systems.

Contractors must not only train their own men in using open flame application, but must also make sure the general contractor and his superintendents are familiar with the necessary safety precautions for using torch application of roofing membrane.

Some of the safety precautions will be considered unpleasant, such as wearing long-sleeve shirts and long pants in the summer, but the results – a safe, injury-free job site – are worth the effort.

C.1 General

- Wear proper clothing: non-synthetic fabrics, long-sleeve shirt, long pants, boots, gloves and proper eye protection.
- Keep non-applicators at least 3 m (10') from open flame.
- Train, instruct, and warn employees on the use of torching equipment.
- Use extra caution around edges of insulation board. Cover exposed edges with an incombustible base ply to prevent flame from coming in contact with any combustible material. Contact for any length of time with lead or other materials affected by heat should be avoided.
- Do not take anything for granted. Be on guard against lapses in on-the-job safety.

D. FIRE DEPARTMENT

For years fire departments have been learning the proper safety precautions necessary to prevent fires. Their expertise and assistance should be utilized whenever possible to supplement a company's safety training program. By making the local fire department a part of your team, you are giving notice that in all cases Safety Comes First.

D.1 Fire Department Recommendations

- Strict compliance with local fire codes must be maintained.
- Give written notice to the local fire department where required, and obtain any necessary permits.
- The required number of fire extinguishers shall be on the roof at all times. They shall be Class ABC extinguishers of the size specified by the local fire code. One per each torch operator.
- Install portable smoke detectors in attics as required by the local fire department.
- Foremen on the job shall have fire safety training and shall remain at job site at least one hour after the application has ended for the day.
- No flammable liquids shall be stored or used on the roof excluding liquid propane gas in approved containers. All liquid propane gas not in use shall be stored on the ground.

**Report ALL fires to the fire department
- even those that are extinguished quickly -
there may still be fire and / or smouldering in areas
where a layman may not think to look.**