

Volcanic ash is:



<2mm (0.1 in) diameter, hard, abrasive and corrosive, and conductive if wet

VOLCANIC ASHFALL

ADVICE FOR: FACILITIES MANAGERS—BUILDINGS

ASH IMPACTS ON BUILDINGS & STRUCTURES

ROOF COLLAPSE	Very thick ash deposits (>100 mm/4 in) may collapse roofs. If ash is wet, loading may increase by up to 100%. Snow accumulation also increases loading. Long-span, low-pitched and/or poor condition roofs are the most vulnerable.
GUTTER COLLAPSE	Gutters may collapse with as little as 20 mm (0.5 in) ash accumulation on roofs, as will slide off and accumulate in gutters.
GUTTER BLOCKAGES	Blocked gutters may prevent water draining freely which may lead to water ingress into buildings.
DAMAGE TO METAL ROOFING MATERIALS	If not cleaned from roofs, ash can corrode metal roofing materials. Removal of ash may also cause abrasion damage.
IMPACTS ON HVAC SYSTEMS	Air intakes on building HVAC (heating, ventilation and air-conditioning) systems can become clogged rapidly by airborne ash. See companion HVAC poster.
ASH INGRESS INTO BUILDINGS	Ash entering buildings can be a health hazard to building occupants; can damage unprotected equipment such as computers and electronics; and can cause soiling damage to soft furnishings.

NOTE: ashfalls can cause road, water and power network outages which can also affect building systems, access and the supply of building resources.

Cleaning ash from roofs in Junín de los Andes, Argentina.



Approximately 3 cm (1.2 in) of fine andesitic ash fell across the town following the 2015 eruption of Calbuco volcano in Chile, 200 km (124 miles) to the southwest. Photo by Junín de los Andes Fire Department, Argentina.

Gutter damage in Vanuatu.



Ash loading can cause gutters to partially or completely detach from buildings. Basaltic ash from 2018 eruption of Ambae volcano, Vanuatu. Photo by Sally Dellow, GNS Science, New Zealand.

RECOMMENDED ACTIONS

WHERE TO FIND HAZARD & WARNING INFORMATION

Refer to the website of your local volcano observatory, national weather service and/or disaster management agency.

HOW TO PREPARE

At-risk facilities should develop operational plans for managing ashfall events, including:

- Pre-planning a safe work method for roof clean-up. A plan is required for all roofs, from single-level to multi-level. Typically a plan will include:
 - » Provision for safe access to the roof.
 - » Required qualifications and training of personnel.
 - » Safety and personal protective equipment required.
 - » Provision for collection/disposal of ash.
- Identification of a single entry and exit point for the building, and identification of any areas that require sealing off (e.g. computer rooms).
- Ensuring supplies of necessary equipment such as plastic sheeting and duct tape.
- Considering dependency on critical service utilities and taking steps to increase resilience, such as installing backup power generation.

If you anticipate using contractors, discuss the safe work method ahead of time to ensure that contractors are prepared.

If you are a critical facility, such as a hospital or police station, discuss priority access to services with your contractor.

Ash cleanup operations create substantial additional labour and resource demands.

Severe building damage from ashfall in Rabaul town.



In the 1994 eruption of Tavurvur and Vulcan volcanoes in Papua New Guinea, over 800 mm (2 ft, 8 in) of ash accumulated. Photo by Russell Blong.

HOW TO RESPOND

If Ash is Forecast For Your Location:

- Use a single entry/exit point for the building, preferably with a set of double doors which can act as an 'ash lock.' Ash-covered clothing and footwear can be left in this area.
- Disconnect inlet pipes from roof catchment rainwater tanks and seal open tanks.
- Cover sensitive equipment such as computers and electronics with plastic sheeting, or seal off rooms.
- If your building has rain gutters, remove them to prevent ash accumulating in and breaking gutters and to prevent ash from washing from roofs into rainwater tanks.

While Ash Is Falling:

Remain indoors where practical.

After Ash Has Stopped Falling:

Roof clean-up must be planned carefully. Many injuries and some fatalities have occurred while clearing ash from roofs. Property owners and contractors may have legal duties under local health and safety regulations. These may include:

- Providing workers with personal protective equipment (long-sleeved clothing, heavy footwear, safety goggles and a properly fitted P2, N95 or FFP2 dust mask). If industry-certified masks are not available, other face coverings may provide partial protection. For more information, see <https://www.ivhnn.org/index.php/ash-protection>
- Ensuring a safe working environment. For an example of best-practice guidelines for working on roofs, see: <http://www.worksafe.govt.nz/worksafe/information-guidance/all-guidance-items/best-practice-guidelines-for-working-on-roofs/roofs-best-practice.pdf>

General Advice for Ash Clean-up:

- Avoid using hoses to clean up as this can 1) deplete municipal water supplies and 2) wash ash into storm drains where it can cause blockages and be difficult to remove. It is preferable to sweep up the ash. Dampening the surface slightly can help stop the ash lifting into the air and becoming a breathing hazard.
- A broom is often the best method for clearing ash from a roof. Sweep the ash off the edge of the roof.
- After rainfall, shovels may be necessary to remove ash. Note that ash may cement as it dries.
- Follow any official instructions about ash collection and storage. If there is no specific advice, sweep or shovel ash into a pile in a sheltered location and cover with a tarpaulin.
- For cleaning up indoors, use a vacuum cleaner where possible. Avoid excessive rubbing as ash is highly abrasive and can scratch surfaces.
- Be aware that clean-up may be an ongoing challenge due to ash remobilization and any further ashfalls.

• FURTHER RESOURCES •

https://volcanoes.usgs.gov/volcanic_ash/buildings.html
www.ivhnn.org (volcanic health hazards information)

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