

FireHard Canada

Why Wildfire Is Different

Understanding why fire services cannot protect every home, how wildfire threatens structures and communities, and why building hardening is the only reliable defence

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This guide is free. It always will be.

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Not professional advice: This guide does not constitute professional engineering, architectural, or construction advice. It is not a substitute for the services of a licensed engineer, architect, or other qualified professional.

Building code responsibility: Building codes vary by jurisdiction. Compliance is the responsibility of the property owner, their professionals, and local building authorities.

Site-specific conditions: Actual wildfire resistance depends on site-specific conditions including topography, wind, vegetation, climate, neighbouring structures, and access to fire suppression services.

No guarantee of wildfire survival: Compliance with recommendations does not guarantee survival. Wildfire outcomes depend on fire intensity, duration, wind, ember density, suppression response, terrain, vegetation, and other factors beyond building construction.

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The Wildfire Exposure Rating system is a voluntary framework based on current best practices from wildfire research in Canada, the United States, and Australia. It is not a building code, regulation, or mandatory standard. It is a set of specifications that homeowners, builders, and communities can adopt by choice to improve their wildfire resilience. The system matches hardening measures to actual exposure:

Hardening Is Not Sheltering in Place

No Home Is Fireproof

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Why Wildfire Is Different

The Problem No One Talks About

When people think about wildfire risk, they picture flames racing through forest toward their home, and fire trucks arriving to save it. That picture is wrong in almost every way that matters.

In a major wildfire event, your local fire department is overwhelmed within the first hour. Mutual aid from neighbouring departments takes hours to arrive — and they are often overwhelmed too. During the 2023 Kelowna wildfire, some neighbourhoods burned with no suppression response at all. Not because firefighters didn't care, but because there were 200 structures threatened and a handful of trucks. The math doesn't work.

This is the fundamental reality of wildfire: **your home must be able to protect itself**. Fire services are critical for mop-up, for protecting high-value structures, and for community-scale suppression. But the expectation that a fire truck will park in your driveway and defend your house during a major wildfire event is, for most properties, unrealistic.

Why the Firefighting System Cannot Protect Individual Homes

This is not a criticism of firefighters. It is a description of physics, infrastructure, and math that no amount of courage can overcome.

Structural Fire Departments

Your local fire department is designed for one structure fire at a time. A typical rural or small-town department has 1–3 engines and a roster of volunteer or part-time firefighters. They can mount an effective defence of one or two homes simultaneously.

In a wildfire event threatening a community, there may be 50, 100, or 200 structures at risk in the same hour. The department must triage. They protect what they can reach with the resources they have, which means most homes receive no direct defence.

Mutual aid — calling neighbouring departments — takes hours to mobilise and those departments may be dealing with their own fires. During the 2023 wildfire season in BC, mutual aid requests exceeded available resources across the entire province simultaneously.

Wildland Firefighters

Provincial wildland firefighters (BC Wildfire Service, Alberta Wildfire, etc.) are trained and equipped for landscape-scale fire suppression — containing fire spread across terrain, not defending individual homes. Their tools are bulldozers, helicopters, air tankers, and hand crews building fire guards. Wildland crews are not equipped with structural firefighting gear. They do not carry the hose, nozzles, SCBA (breathing apparatus), or training to enter or defend a burning building. When a wildfire reaches a subdivision, wildland crews typically pull back to defensible positions and focus on preventing fire spread at the landscape scale — not protecting individual homes.

There is a critical gap between the wildland fire agency (which fights the fire in the landscape) and the structural fire department (which defends buildings). In many jurisdictions, coordination between these agencies during a fast-moving fire is limited.

Water Infrastructure

Municipal water systems are designed for domestic use plus one or two fire hydrants flowing simultaneously. When a wildfire threatens a community and multiple hydrants are opened — for

engine supply, sprinkler systems, and residents wetting their properties — water pressure drops, sometimes to zero.

Many wildfire-interface communities are on well water, gravity-fed systems, or small-capacity reservoirs that cannot sustain firefighting flows for more than minutes. Some rural properties have no hydrants within reach at all.

During the 2021 Lytton fire, the community's water infrastructure was destroyed in the first minutes of the fire entering town. During the 2023 Kelowna fires, some neighbourhoods experienced significant water pressure loss as demand exceeded system capacity.

Access and Evacuation

Many wildfire-interface communities have one or two roads in and out. When evacuation orders are issued, those roads fill with outbound traffic. Fire trucks trying to reach threatened homes are driving into the evacuation flow — often on smoke-obscured, narrow roads with vehicles on both shoulders. In some events, fire departments cannot physically reach threatened neighbourhoods because the access route is cut by the fire itself. Fallen trees, downed power lines, and abandoned vehicles block roads. The homes at the end of a single-access road are, for practical purposes, on their own.

Speed and Scale

A wind-driven wildfire in dry conditions can advance at 5–10 km/h through forest and 15–20 km/h through grassland. Spot fires from ember transport can ignite structures kilometres ahead of the main fire front. The time between “fire visible on the horizon” and “fire in your neighbourhood” can be minutes, not hours.

Even if a fire department has time to deploy, they face a fire that is simultaneously threatening structures across a front that may be several kilometres wide. There is no scenario in which a small-town fire department can defend every home across a multi-kilometre fire front arriving at 10 km/h.

This is not a failure of the system. Firefighters are doing extraordinary work with limited resources. But the system was designed for individual structure fires in communities with hydrants, roads, and time. Wildfire breaks every one of those assumptions simultaneously. The only reliable defence is a building that doesn't need a fire truck to survive.

How Homes Actually Catch Fire

Wildfire threatens your home through three distinct mechanisms, each requiring different defences:

Ember Attack

Burning fragments — some as small as a fingernail, some the size of a fist — are carried by wind kilometres ahead of the fire front. They land on your roof, in your gutters, against your walls, and in any opening they can find: vents, gaps around pipes, spaces under doors, cracks in soffits. A single ember in an unscreened attic vent can ignite your home from the inside while the fire is still a kilometre away.

Ember attack is the number one cause of home ignition during wildfire. It is also the most preventable. Every gap sealed, every vent screened, every gutter cleaned removes an ignition pathway.

Radiant Heat

A large fire — whether burning vegetation or a burning structure — radiates intense heat. This radiant energy travels in straight lines and can crack windows, ignite combustible surfaces, and soften or melt materials at significant distances. At 30 metres from a fully involved structure fire,

radiant heat can exceed 12.5 kW/m² — enough to crack standard window glass within minutes. At 10 metres, it exceeds 40 kW/m² — enough to ignite untreated wood. Radiant heat defence means upgrading vulnerable surfaces: tempered glass that resists cracking, non-combustible cladding that won't ignite, and sufficient separation distance from fuel sources.

Direct Flame Contact

When fire reaches your property — whether from burning vegetation, a burning fence, a burning deck, or a burning neighbouring structure — flames directly contact building surfaces. This is the most intense exposure and requires the most robust construction response: fully non-combustible exterior assemblies with demonstrated fire resistance.

Your Neighbour's House May Be the Biggest Threat

Here is the fact that changes everything: **a burning house is a worse fire exposure than a burning forest.**

A structure fire burns at 800–1100°C for 1–4 hours. A vegetation fire front passes in 5–15 minutes. A burning house produces sustained, concentrated radiant heat and a continuous shower of burning debris that can ignite everything within 6–10 metres.

In most Canadian subdivisions, houses are 1.2 to 3 metres apart. Even in rural-residential areas, lot sizes often put homes within 10 metres of each other. The vast majority of Canadian homes in wildfire-interface areas are close enough to their neighbours that structure-to-structure ignition is not a theoretical risk — it is the default condition.

In subdivisions and rural-residential communities, this is how wildfire becomes catastrophic. The fire front ignites one or two homes. Those homes become sustained heat sources that ignite their neighbours. Those neighbours ignite their neighbours. Hours after the wildfire front has passed, houses are still catching fire from the house next door.

This is why FireHard includes the CNEL system as a core component. If your home is within 10 metres of another structure, your neighbour's home — if it catches fire — may be a greater threat than the wildfire itself. Hardening the face of your home that faces a close neighbour is one of the highest-impact investments you can make.

And the effect is multiplicative. When one side of the gap is hardened, both homes benefit. When both sides are hardened, the probability of structure-to-structure ignition drops dramatically. When an entire street hardens, the probability of a neighbourhood-scale loss event drops by an order of magnitude.

The Community Effect

Wildfire resilience is not an individual property problem. It is a community problem with a community solution.

Every home that burns during a wildfire becomes an ignition source for neighbouring homes. Every home that survives becomes a fire break that protects neighbouring homes. The research is unambiguous: community-level hardening is exponentially more effective than individual hardening.

This is why every FireHard guide is free. The system only works if the whole community can access it. A single hardened home in an unhardened neighbourhood has improved odds, but a hardened neighbourhood has transformed odds.

The NIST investigations of the 2018 Camp Fire (Paradise, California) and the 2021 Marshall Fire (Louisville, Colorado) both documented this effect: survival was strongly correlated with neighbourhood-level hardening, not just individual home hardening. Homes with non-combustible roofs and siding survived at dramatically higher rates — but homes in clusters of hardened homes survived at even higher rates.

Hardening vs. Fire Rating: A Critical Distinction

If your home meets building code, isn't it already fire-resistant? The short answer is: **your home is designed to not kill you. It is not designed to survive.**

This distinction is critical, and widely misunderstood.

What Building Code Requires

Building codes set minimum standards for fire safety. These standards are designed to:

- Give occupants enough time to evacuate (typically 30–60 minutes)

- Prevent fire from spreading between units in multi-family buildings

- Provide structural stability long enough for safe egress

- Ensure fire department access for suppression

Building code fire requirements are about **life safety during evacuation**. They assume fire department response. They assume the fire starts inside the building. They do not address external wildfire exposure.

What Fire-Rated Assemblies Do

When you see a “1-hour fire rating” on a wall assembly, it means that assembly was tested in a furnace and maintained its structural integrity and prevented fire passage for 60 minutes under standardised conditions. This is valuable — it slows fire spread between compartments and between buildings.

But a fire-rated assembly is tested from one side, under controlled conditions, at a standard temperature curve. It is not tested against the combination of ember attack, radiant heat, and wind-driven flame contact that occurs during a wildfire. A 1-hour fire-rated wall assembly can still fail during a wildfire if:

- Embers enter through unsealed gaps around penetrations

- The exterior cladding ignites and burns through to the rated layer

- Wind-driven rain of embers finds the unrated side of the assembly

- Combustible trim, soffits, or fascia ignite and carry fire past the rated barrier

What Wildfire Hardening Does

Wildfire hardening addresses a fundamentally different threat: **external attack by embers, radiant heat, and flame, arriving simultaneously from multiple directions, during a wind event, with no suppression response.**

Hardening works from the outside in:

- Eliminate ignition pathways (screen vents, seal gaps, remove combustible debris)

- Resist radiant heat (tempered glass, non-combustible cladding, separation distance)

- Withstand flame contact (non-combustible assemblies throughout, fire-resistant structural systems)

- Prevent structure-to-structure spread (CNEL system)

Hardening and fire rating are complementary. A home can (and should) have both. But they are not the same thing, and meeting building code fire requirements does not mean your home is hardened against wildfire.

The Practical Difference

A code-compliant home in a wildfire zone has fire-rated wall assemblies between units (in multi-family) and meets minimum non-combustible requirements for some components. But it may have:

- Unscreened vents that allow ember entry
- Standard (non-tempered) glass that cracks under radiant heat
- Combustible vinyl or wood cladding that ignites
- Combustible decking attached directly to the structure
- Gaps around every pipe, wire, and duct that penetrates the envelope

A hardened home addresses all of these, systematically, based on the specific wildfire exposure level the property faces. That is what the WER system provides: a structured, level-specific approach to closing every vulnerability, proportional to the threat.

The WER Approach

WER-1 (Basic Exposure): Ember attack only. Seal, screen, maintain. Mostly free.

WER-2 (Moderate Exposure): Embers plus radiant heat. Targeted upgrades to vulnerable components.

WER-3 (High Exposure): Embers, radiant heat, potential flame contact. Full non-combustible envelope.

WER-4 (Extreme Exposure): Direct flame zone. Engineered, P.Eng.-designed fire resistance. Each level builds on the one below it. Each level has specific, measurable specifications — not vague advice, but construction details you can hand to a contractor. And each level addresses the close neighbour exposure that turns individual home fires into neighbourhood losses.

Hardening Is Not Sheltering in Place

This is critical and must be stated clearly: hardening your home does not mean you should stay in it during a wildfire. Hardening and evacuation are not alternatives. They are complementary.

When an evacuation order is issued by your local authority — whether that is the RCMP, your regional district, your municipality, or the BC Wildfire Service — you must leave. Evacuation orders exist because conditions have been assessed by professionals with real-time information about fire behaviour, wind, and suppression capacity. They know things you do not.

What hardening does is allow you to evacuate with confidence that you have done everything within your control to give your home the best chance of surviving while you are safely away. A hardened home does not need you in it to function. The screened vents, the sealed gaps, the non-combustible cladding, the tempered glass — all of these work whether you are there or not. That is the entire point.

Staying behind to “defend” your home with a garden hose is not a strategy. Garden hoses deliver a fraction of the water volume a fire engine provides. Residential water pressure drops under community-wide demand. Smoke reduces visibility to metres. Radiant heat can cause burns at distance. Embers arrive from every direction. People who stay behind during major wildfire events die — not because they were careless, but because the conditions exceeded what any individual can manage.

The sequence is: harden your home before fire season. Prepare an evacuation kit. When conditions deteriorate, follow evacuation alerts and orders from the appropriate authorities. Leave early. Trust the hardening you have invested in. Come back when authorities say it is safe.

If your community issues an Evacuation Alert (be ready to leave) or an Evacuation Order (leave now), comply. Your home's hardening gives it the best possible chance. Your presence does not improve those odds — but it does put you and the emergency responders who may need to rescue you at risk.

No Home Is Fireproof

We will never tell you your home is safe from wildfire. No building is fireproof. Wildfire is an unpredictable natural hazard influenced by weather, wind, fuel, terrain, suppression response, and factors beyond anyone's control.

What we will tell you is that hardening works. It works probabilistically — it shifts the odds, sometimes dramatically. A hardened home has a significantly higher probability of surviving a wildfire event than an identical unhardened home. A hardened neighbourhood has a dramatically higher probability than a hardened individual home.

The goal is not certainty. The goal is the best achievable outcome given the physics of fire, the reality of suppression limitations, and the economics of residential construction.

That's what FireHard Canada provides: the specifications, the guidance, and the tools to give your home — and your community — the best possible chance.

About FireHard Canada

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