

FIREHARD CANADA

WER-2 DESIGN GUIDE

STANDARD HARDENING

A comprehensive guide for homeowners, contractors, and builders

Moderate ember and radiant heat exposure — targeted upgrades to the most vulnerable components

New build: 3–7% cost premium (\$10,000–\$25,000) | Retrofit: \$5,000–\$30,000

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IMPORTANT — WER levels are cumulative. WER-2 includes ALL WER-1 measures plus the additional measures listed below. You must complete WER-1 hardening before starting WER-2. Do not skip WER-1.

For approved products and assemblies: FireHard Component & Assembly Reference at firehard.ca/components.

DISCLAIMER

This guide is published by FireHard Canada for general educational and informational purposes. It provides technical guidance on wildfire-resistant construction practices based on current Canadian building science, standards, and research. This guide is subject to the following conditions:

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. Users should engage qualified professionals for design, specification, and construction of wildfire-resistant assemblies.

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Site-specific conditions: The specifications and recommendations in this guide are general in nature. Actual wildfire resistance depends on site-specific conditions including but not limited to: topography, prevailing wind patterns, vegetation type and density, proximity to wildland fuels, local climate, neighbouring structures, and access to fire suppression services. A qualified professional familiar with local conditions should assess the applicability of any recommendation to a specific property.

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1. What WER-2 Means

Your home faces moderate wildfire exposure: significant ember attack plus radiant heat from vegetation or structures within 30–100m on flat ground. Embers will be more numerous and persistent than WER-1. Radiant heat from burning vegetation or a neighbouring structure can crack windows and ignite combustible surfaces at these distances.

WER-2 builds on all WER-1 measures (and FireSmart Canada vegetation management) by adding targeted upgrades to the most vulnerable components: vents, glazing on exposed faces, cladding where feasible, and gap sealing throughout the building envelope. Slope correction applies: if vegetation is uphill from your home at 5-10 degrees, increase the effective WER by one level on the exposed face; at 10-15 degrees, increase by one to two levels. See the formal slope correction table in the WER Technical Document Section 3.1. Estimated radiant heat at WER-2: 10-19 kW/m².

PREREQUISITE

WER-2 assumes all WER-1 measures are already in place. If you have not completed the WER-1 Design Guide, do that first. WER-2 upgrades are ineffective without WER-1 maintenance.

2. In Plain English

What You're Dealing With

At WER-2, your home faces not just embers but radiant heat — the intense heat that radiates from burning vegetation or a burning neighbouring structure. Radiant heat can crack windows, melt vinyl siding, and ignite combustible surfaces from 30 metres away without any direct flame contact. You're also getting more embers, arriving in larger numbers and for longer periods.

What You're Actually Doing

WER-2 is targeted upgrades to the most vulnerable parts of your home. The big moves are: replacing standard vent screens with ember-resistant ones (the single highest-impact upgrade), upgrading to tempered glass on windows facing the risk, replacing vinyl or wood cladding with non-combustible material on the most exposed wall, and enclosing your soffits so embers can't get into the roof space from underneath. You're hardening the weak points, not rebuilding the house.

Alternatives and Options

There are choices within each measure. For cladding, fibre cement board (like HardiePlank), metal panel, stucco, and masonry all qualify. For vent screening, several manufacturers make ember-resistant products tested to ASTM E2886 — the specific brand matters less than the test certification. For insulation behind cladding, mineral wool (like Rockwool) is preferred because it's non-combustible, but other options exist. Your contractor can help you choose based on your home's existing construction and your budget.

What It Costs

If you're building new, WER-2 adds roughly \$10,000–\$25,000 to the build — about the cost of a kitchen upgrade. As a retrofit, the same measures cost \$5,000–\$30,000 depending on how much needs replacing. The most cost-effective approach is to implement upgrades as components need replacement anyway: when the siding needs redoing, specify fibre cement instead of vinyl. When windows need replacing, specify tempered glass.

What Happens If You Don't

Standard windows crack and fall out in 5–10 minutes of radiant heat exposure, creating an opening for embers to enter your home. Vinyl siding melts and exposes the combustible sheathing behind it. Unscreened vents allow embers into the attic where they ignite insulation and framing. Each of these failures happens independently — any one of them can cost you the house.

Working With Contractors

WER-2 upgrades involve trades: siding, glazing, roofing. When engaging contractors, share this guide and the relevant Construction Detail Modules with them. Ask specifically whether they have experience with fibre cement installation, and whether they will follow the manufacturer's installation instructions for fasteners, flashing, and gap tolerances. A fibre cement siding job done to vinyl siding standards will not perform in a fire. The details matter — not just what material goes on the wall, but how it's attached, how joints are sealed, and how it connects to windows, doors, and the roof.

Getting the Details Right

Every building assembly is a system of components that must work together. A non-combustible cladding with combustible foam insulation behind it can still fail. A tempered glass window with gaps around the frame lets embers in. A rain screen cavity without fire stops at each storey creates a chimney that carries fire up the wall. The specifications in this guide address the full assembly, not just the visible surface. When your

contractor installs any measure, insist that flashing, sealing, and fire stopping are done per the manufacturer's instructions and per the relevant Construction Detail Module. Take photos during installation — you can't inspect what's behind the cladding after it's finished.

MANUFACTURER INSTRUCTIONS MATTER

Every fire-rated product is tested as a specific assembly — the product plus the way it's installed. Using the right product with the wrong fasteners, wrong spacing, or wrong substrate can void the fire rating entirely. Always follow the manufacturer's published installation instructions. If your contractor says 'we always do it this way,' ask whether 'this way' matches the manufacturer's spec sheet.

3. Specifications by Building Element

All WER-1 specifications remain in effect. The following are the additional or upgraded requirements at WER-2. For approved products and tested assemblies, see the FireHard Component & Assembly Reference.

3.1 Roof & Eaves

At WER-2, roof materials should be non-combustible where possible. Enclosed soffits become mandatory, and gutters require non-combustible guards.

Reference: *Construction Detail Guide 2 — Roof & Eaves*

Component	WER-2 Specification
Roof covering	Class A fire-rated (ASTM E108 / CAN/ULC-S107). Non-combustible preferred: metal standing seam or concrete tile. Asphalt shingles acceptable if Class A rated.
Underlayment	Code minimum. Sarking (self-adhering modified bitumen underlayment) recommended on exposed roof faces for additional ember protection. See Component Reference for approved products.
Soffits	Enclosed required. Non-combustible material: fibre cement (e.g., James Hardie HardieSoffit), aluminium, or steel. No vinyl. Perforated soffits: ensure perforations $\leq 3\text{mm}$.
Fascia	Non-combustible cladding preferred: aluminium-wrapped or fibre cement. At minimum, maintain in good repair and seal all gaps.
Gutters	Metal only (aluminium, steel, or copper). No vinyl. Non-combustible gutter guards required. Enclosed gutter profiles preferred (e.g., LeafGuard-type). Clean twice annually.
Roof penetrations	Seal all gaps $\leq 3\text{mm}$ with non-combustible caulk or metal flashing. Spark arrester on all chimneys (12mm mesh). Metal flashing collars on all vent pipes.
Valleys and junctions	Metal valley flashing. Seal wall-to-roof junctions with metal step flashing and non-combustible caulk. No exposed wood at junctions.

3.2 Exterior Walls

At WER-2, non-combustible cladding is preferred on exposed faces (the faces closest to wildland vegetation or neighbouring structures). Comprehensive gap sealing is required throughout.

Reference: *Construction Detail Guide 6 — Exterior Walls & Cladding*

Component	WER-2 Specification
Cladding	Non-combustible preferred on exposed faces: fibre cement (James Hardie, Allura), metal panel, stucco, masonry, or stone veneer. Vinyl and wood acceptable on protected faces only. See Component Reference for approved products.
Sheathing	Code minimum (OSB or plywood). Type X gypsum sheathing recommended on Close Neighbour faces. See Section 6 for Close Neighbour specifications.
Insulation	Code minimum. Mineral wool (Rockwool ComfortBatt or equivalent) recommended on Close Neighbour faces for fire resistance within cavity.

Component	WER-2 Specification
Gaps and joints	Seal ALL gaps $\leq 3\text{mm}$ with non-combustible exterior caulk. Back-flash butt joints in cladding with metal or NC substrate where gaps exceed 3mm. No visible gaps anywhere in the envelope.
Wall base (0–400mm)	Non-combustible cladding or equivalent protection within 400mm of grade. Seal wall-to-foundation junction. Weep holes: screen with $\leq 3\text{mm}$ non-combustible mesh.
Rain screen cavity	Screen bottom of rain screen cavity with $\leq 3\text{mm}$ non-combustible mesh to prevent ember entry. Cap top of cavity to prevent airflow into soffit space.
Corner trim	Non-combustible or aluminium-wrapped trim on exposed corners. Seal all joints.

3.3 Windows, Doors & Openings

At WER-2, tempered glass becomes the standard on exposed faces. This is the single most impactful glazing upgrade — tempered glass resists radiant heat cracking far better than annealed glass.

Reference: *Construction Detail Guide 1 — Openings*

Component	WER-2 Specification
Glazing — exposed faces	5mm tempered glass in both panes of all windows on exposed faces (faces toward wildland fuel or within 30m of neighbouring structure). This is the critical WER-2 glazing upgrade.
Glazing — protected faces	Code minimum acceptable. Tempered glass recommended but not required if face is well protected.
Window frames	Aluminium-clad wood, fibreglass, or aluminium preferred. Vinyl acceptable on protected faces. All frames: intact weatherstripping, no gaps between frame and wall $>3\text{mm}$.
Exterior doors	Solid core wood, fibreglass, or steel. No hollow core. Weatherstripping must seal fully. Threshold seal intact.
Garage doors	Maintain full seal at all edges and bottom. No gaps $>3\text{mm}$. Insulated steel preferred for new installation.
Skylights	Tempered glass preferred. Seal curb. Clear debris. If replacing, specify tempered glazing.

3.4 Vents & Penetrations

At WER-2, all vents must be screened with ember-resistant mesh tested to ASTM E2886. This is the standard that simulates ember intrusion under wind-driven conditions. This is the highest-priority WER-2 upgrade.

Reference: *Construction Detail Guide 3 — Vents & Penetrations***PRIORITY #1**

Ember-resistant vent screening (ASTM E2886) is the single highest-priority WER-2 upgrade. IBHS research shows that ember intrusion through vents is the #1 ignition pathway for WUI structure loss. Upgrading vent screens has more impact per dollar than any other single measure.

Component	WER-2 Specification
All vents	Screen with ASTM E2886 ember-resistant mesh, maximum 2mm (1/16") aperture. Non-combustible metal mesh (stainless steel, galvanised steel, or bronze). See Component Reference for tested products.
Gable vents	HIGHEST PRIORITY. ASTM E2886 mesh or replace with ember-resistant vent assembly. Consider eliminating gable vents if adequate alternative ventilation exists (ridge + soffit). See Guide 3 for elimination guidance.
Foundation/crawl space	ASTM E2886 mesh \leq 2mm. Ensure vents are clear of soil, mulch, and vegetation. Consider self-closing foundation vents that seal during fire.
Soffit vents	ASTM E2886 mesh \leq 2mm on all soffit vents. Continuous strip vents: replace with ember-resistant perforated soffit panels.
Ridge vents	Ensure baffles are intact. External fire-resistant ridge vent products preferred (see Component Reference).
Dryer/exhaust vents	No mesh on dryer vent (lint fire hazard). Ensure flap closes fully. All other exhaust vents: \leq 2mm mesh. Backdraft damper on kitchen exhaust.
All penetrations	Seal ALL gaps around pipes, cables, conduit with non-combustible caulk or fire-stop foam. No gap $>$ 2mm anywhere in envelope.

3.5 Decks & Attachments

At WER-2, deck surfaces should be non-combustible where feasible, and the under-deck zone must be either enclosed or cleared with non-combustible ground cover beneath.

Reference: *Construction Detail Guide 4 — Decks & Attachments*

Component	WER-2 Specification
Deck surface	Non-combustible preferred: concrete, stone, porcelain tile, aluminium, or fibre cement. Composite decking acceptable if Class B+ flame spread rating. See Component Reference for rated composite products.
Deck framing	Existing wood framing acceptable at WER-2 if deck surface and under-deck zone are addressed. For new construction, steel or aluminium framing preferred.
Under-deck zone	If deck $>$ 600mm above grade: enclose with non-combustible screening (metal mesh \leq 3mm) or install non-combustible skirting. Clear ALL combustible storage. Non-combustible ground cover underneath.
Deck-to-wall junction	Metal flashing at ledger board. Seal all gaps \leq 3mm with NC caulk. No exposed wood at junction.
Attached structures	Carports, pergolas within 3m: code minimum. Non-combustible roof preferred. NC posts preferred. Match building WER level roof if within 1.5m.
Stairs	Existing treated wood acceptable. Non-combustible preferred for

Component	WER-2 Specification
	replacement. Clear debris from treads and risers.

3.6 Fencing, Landscaping & Site

At WER-2, non-combustible materials become required within 1.5m of the building. Ground cover is non-combustible throughout Zone 1A.

Reference: *Construction Detail Guide 5 — Fencing, Landscaping & Site*

Component	WER-2 Specification
Fence within 1.5m	Non-combustible required within 1.5m: metal (steel, aluminium, chain link), masonry, stone, or concrete. The 8-foot rule becomes mandatory: metal section between combustible fence and building.
Fence attachment	Non-combustible connection required. Metal gate section (min 2.4m / 8 ft) between any combustible fence and the building wall.
Parallel fences	Avoid parallel combustible fences. If unavoidable, maintain min 1.8m (6 ft) separation with non-combustible ground cover between.
Ground cover 0–1.5m	Non-combustible required: gravel (min 75mm depth), stone, concrete, or pavers. No wood mulch, bark, pine straw, or rubber mulch within 1.5m. No pine straw within 3m.
Vegetation 0–1.5m	No vegetation within 1.5m of building per FireSmart Canada Zone 1A. Non-combustible ground cover only. Hardscape integration preferred.
Outbuildings within 10m	Class A roof. Non-combustible siding preferred. Clear 1.5m non-combustible zone around shed. Relocate combustible outbuildings >10m if feasible. Refer to FireSmart Canada HomeOwners Manual for vegetation management guidance beyond Zone 1A..
Combustible storage	No combustible materials within 1.5m of building walls. Firewood: minimum 10m. Propane: per fire code separation.

4. Close Neighbour Exposure Level (CNEL) at WER-2

If any neighbouring structure is within 10 metres of your home, the Close Neighbour Exposure Level (CNEL) system applies to that face. At WER-2, many CNEL measures overlap with your wildland exposure specifications. Apply whichever is more stringent on each element.

For faces requiring CNEL-2 (separation 3–6m, neighbour unrated — the most common suburban scenario):

Full non-combustible cladding on the facing elevation (fibre cement, metal panel, stucco, or masonry). Type X glass-mat faced exterior gypsum sheathing (15.9mm) behind cladding on the facing wall (Gold Bond eXP Fire-Shield, DensGlass, or equivalent). Mineral wool cavity insulation on the facing wall (Rockwool ComfortBatt or SafenSound). Tempered or fire-rated glazing on all facing windows. Enclosed non-combustible soffits with ASTM E2886 ember-resistant vents on the facing side. Non-combustible ground cover throughout the gap. No combustible fencing, vegetation, storage, or attachments in the separation zone.

Typical cost for CNEL-2 on a single elevation: \$5,000–\$15,000 retrofit; \$2,000–\$8,000 incremental in new construction.

For CNEL-1 and CNEL-3 specifications, and the decision tree to determine your CNEL level, see the standalone FireHard Close Neighbour Exposure Level (CNEL) Guide at firehard.ca.

5. Cost Summary

New Construction vs. Retrofit

Building to WER-2 from the start typically adds 3–7% to total build cost. On a \$350,000 build, that is approximately \$10,000–\$25,000. The same measures as a retrofit cost 2–4x more. The table below shows both new construction premiums and retrofit costs for each measure.

Measure	New Build Premium	Retrofit Cost
ASTM E2886 ember-resistant vents	\$200–\$600	\$400–\$1,200
Comprehensive gap sealing	\$100–\$300	\$200–\$600
5mm tempered glass (exposed faces)	\$500–\$2,000	\$2,000–\$6,000
NC soffits (fibre cement/aluminium)	\$300–\$800	\$1,500–\$4,000
NC cladding on exposed face(s)	\$1,000–\$4,000	\$3,000–\$10,000
Metal gutters + NC guards	\$300–\$800	\$500–\$1,500
NC ground cover + fence section	\$300–\$800	\$300–\$800
Type X + mineral wool (CN faces)	\$500–\$1,500	\$2,000–\$6,000
TOTAL	\$3,200–\$10,800	\$10,000–\$30,000

6. Priority Order (Retrofit)

If you cannot do everything at once, implement in this order. Each step builds on the previous and delivers the highest impact per dollar.

#	Measure	Why This Order	Cost
1	Complete all WER-1 measures	Foundation for everything else. Free.	\$0
2	ASTM E2886 vent screening	#1 ignition pathway. Highest impact per dollar.	\$400–\$1,200
3	Seal all gaps ≤3mm	Closes ember entry points throughout envelope.	\$200–\$600
4	5mm tempered glass, exposed faces	Prevents radiant heat glass failure.	\$2,000–\$6,000
5	NC soffits + metal gutters	Eliminates eave-line ignition pathway.	\$2,000–\$5,500
6	NC cladding on most exposed face	Addresses highest-risk wall.	\$3,000–\$10,000
7	Close Neighbour Exposure Level (CNEL) (if applicable)	Addresses structure-to-structure exposure.	\$2,000–\$6,000
8	NC ground cover + fence section	Breaks ground-to-structure fire pathway.	\$300–\$800

STAGED APPROACH

You don't have to do everything at once. The priority order above means that even partial completion provides meaningful protection. Steps 1–3 alone ($\leq \$1,800$) address the two highest-risk ignition pathways.

7. Verification Pathways

Deemed-to-Satisfy

Follow the specifications in this guide using materials and products listed in the FireHard Component & Assembly Reference. No testing or engineering required.

Tested Equivalent

Use alternative materials or products tested to equivalent or higher standard. Product must carry certification to the relevant test standard (e.g., ASTM E2886 for vents, ASTM E108 for roofing). Document the test certificate.

Engineered Alternative

Engage a P.Eng. to design an alternative approach achieving equivalent performance.

8. Documenting Your Work

For each WER-2 measure completed, document: dated photos (before/during/after), material receipts, contractor invoices referencing WER specification, and product spec sheets with fire test certifications. Organize into your FireHard Hardening File. Visit firehard.ca/partners for insurance programs.

9. About FireHard Canada

FireHard Canada (firehard.ca) is a trade name of Wildernest Systems Inc. The WER system was developed by professionals at Wildernest Systems Inc. and Bulkley Valley Engineering Services Ltd., with landscape architecture expertise from Lazzarin Svisdahl Landscape Architects.

Products: Fire Hard exterior manual roller shutters. Professional services: P.Eng. WER assessments through BVES (EGBC Permit No. 1001683). Landscape architecture: Lazzarin Svisdahl (BCSLA).

Get involved: firehard.ca/partners | Contact: info@firehard.ca

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