FIREHARD CANADA

WER-3 DESIGN GUIDE

COMPREHENSIVE HARDENING

Builder specification guide for high-risk properties — non-combustible envelope, tempered glazing, shutters, steel framing

New build: $15,000–$40,000 premium (8–15%) | Retrofit: $50,000–$120,000+

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IMPORTANT — WER levels are cumulative. WER-3 includes ALL WER-1 and WER-2 measures plus the additional measures listed below. You must complete WER-1 and WER-2 hardening before starting WER-3. Do not skip levels.

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.

Building code responsibility: Building codes, standards, and regulations vary by province, territory, and municipality and are subject to change. This guide references specific code provisions for context but does not warrant that any specification contained herein satisfies the requirements of any specific jurisdiction. Compliance with applicable building codes is the responsibility of the property owner, their design professionals, their contractors, and local building authorities.

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.

Product references: Where this guide references specific products, materials, standards, or testing protocols, such references are for informational purposes only and do not constitute an endorsement. Product availability, specifications, and certifications are subject to change. Users should verify current product specifications with manufacturers and confirm suitability for their specific application.

Accuracy and currency: FireHard Canada endeavours to provide accurate and current information but makes no warranty that all information is error-free or current at the time of reading. Standards, research findings, and best practices evolve. Users should verify critical information against current sources.

No guarantee of wildfire survival: Compliance with the recommendations in this guide does not guarantee that a property will survive a wildfire event. Wildfire outcomes depend on fire intensity, duration, wind conditions, ember density, suppression response, terrain, vegetation, neighbouring property conditions, and other factors beyond building construction. The WER system measures resistance to specific wildfire exposure mechanisms; it does not predict outcomes.

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1. What WER-3 Means

Dense conifers within 10–30m on flat ground, or closer on slopes. Severe ember attack, significant radiant heat, and potential direct flame contact from burning vegetation. WER-3 requires a fully non-combustible building envelope with structural fire resistance throughout. Slope correction applies per-face: at 5-10 degrees uphill from fuel, increase by one level (to WER-4); at 10+ degrees with dense conifers within 30 metres, default to WER-4 and seek professional P.Eng. assessment. See the formal slope correction table in the WER Technical Document Section 3.1. Estimated radiant heat at WER-3: 19-40 kW/m².

SERIOUS INVESTMENT

WER-3 is a serious investment — but for properties at this exposure level, it is the difference between a survivable home and a total loss. The economics strongly favour building to WER-3 from the start: new build premium is $15K–$40K vs $50K–$120K+ for retrofit.

2. In Plain English

What You're Dealing With

Your home is close to dense vegetation that will burn intensely. You face sustained ember attack, serious radiant heat, and the real possibility of direct flame contact from burning vegetation or debris. This is not a theoretical risk — at WER-3 exposure, an unprotected conventional home has a high probability of loss in a major wildfire event.

What You're Actually Doing

You're wrapping your entire home in a non-combustible shell. Every exterior surface — walls, roof, soffits, trim, decking — becomes non-combustible. Behind the cladding, you're adding a layer of fire-resistant gypsum board and non-combustible mineral wool insulation. Under the roof covering, you're adding a continuous membrane (called sarking) that prevents embers from getting through any gap in the roofing. On vulnerable windows, you're adding wildfire shutters that can be closed when a fire threatens. Your deck framing switches from wood to steel. This is a comprehensive upgrade.

Alternatives and Options

The non-combustible requirement is firm, but you have choices within it. For walls: fibre cement, metal panel, stucco, masonry, or stone — all qualify. For roofing: standing seam metal (preferred for shedding debris), concrete tile, or clay tile. For deck surfaces: concrete pavers, natural stone, aluminium planks, or fibre cement. For the structural framing system, you can use conventional light-frame wood (protected by the exterior shell), heavy timber (which provides its own fire resistance through charring), or steel framing. Each has cost and design implications your architect or engineer can help you evaluate.

What It Costs

Building new to WER-3 adds $15,000–$40,000 — roughly 8–15% of a typical build. That's significant, but it's a one-time cost built into the mortgage. As a retrofit, the same work costs $50,000–$120,000+ because you're stripping and replacing existing materials. The economics strongly favour building to WER-3 from the start if you're in a WER-3 zone. For existing homes, the most cost-effective approach is phased implementation over 5–10 years, upgrading each component to WER-3 spec as it naturally needs replacement.

What Happens If You Don't

At WER-3 exposure levels, the difference between a hardened home and a conventional home during a major wildfire event is often the difference between a home that survives and one that is a total loss. NIST post-fire investigations consistently show that homes with non-combustible exteriors survive at dramatically higher rates than those with combustible cladding, even when surrounding vegetation burns completely.

Working With Contractors

WER-3 is not a DIY project. You need experienced tradespeople, and ideally a general contractor who can coordinate the multiple trades involved: siding, roofing, glazing, framing, and potentially structural engineering. When selecting a contractor, ask whether they have experience with non-combustible cladding systems (fibre cement, metal panel), fire-resistant sheathing (Type X gypsum), and mineral wool insulation. Ask for references from similar projects. Share this guide and the relevant Construction Detail Modules before getting quotes — a contractor who prices the job without reading the specifications will either underquote (and cut corners) or overquote (because they don't understand what's needed).

For new construction, engage a designer (architect or building designer) who understands wildfire-resistant construction. For retrofit, consider getting a P.Eng. assessment first to identify the most effective sequence of upgrades for your specific home.

Getting the Details Right

At WER-3, assembly detailing is critical. The non-combustible shell only works if it's continuous — every gap, joint, junction, and penetration must be properly sealed and fire-stopped. A rain screen cavity without fire stops at each storey creates a path for fire to travel up the wall behind the cladding. A roof sarking membrane with gaps at the eaves lets embers into the roof space. A wall-to-deck junction without proper flashing creates a point of failure.

Every product has manufacturer-specific installation requirements that affect its fire performance. Fibre cement requires specific fastener types, spacing, and edge distances. Standing seam metal roofing requires specific clip spacing and seam profiles. Type X gypsum requires specific screw patterns and joint treatment. These are not suggestions — they are the conditions under which the product was tested and certified. Deviating from manufacturer instructions can void the fire rating and create a weak point in the assembly.

INSPECT WHAT GETS COVERED

The most important parts of a WER-3 assembly are the parts you can't see after construction: the gypsum sheathing behind the cladding, the mineral wool in the cavity, the sarking under the roof, the fire stops in the rain screen, the flashing at junctions. Photograph every layer during installation. If you're building new, consider hiring an independent inspector to verify critical assemblies before they're covered up. You cannot check these details after the cladding goes on.

3. Specifications by Building Element

All WER-1 and WER-2 specifications remain in effect. WER-3 adds non-combustible materials throughout, full sarking, wildfire shutters, and steel deck framing.

3.1 Roof & Eaves

Reference: Construction Detail Guide 2 — Roof & Eaves

Component	WER-3 Specification
Roof covering	Non-combustible only: metal standing seam, concrete tile, or clay tile. No asphalt shingles. Metal standing seam preferred for debris shedding and ember resistance.
Underlayment (sarking)	REQUIRED: Full sarking — self-adhering modified bitumen over entire roof deck (Grace Ice & Water Shield, Blueskin SA, or equivalent). Continuous ember barrier beneath roof covering.
Soffits	Enclosed non-combustible. Fibre cement or aluminium. Maximum 2mm perforations. No vinyl.
Fascia	Non-combustible: fibre cement or aluminium. No wood.
Gutters	Metal with NC guards. Enclosed gutter profile preferred. Spark arrester on all chimneys (12mm SS mesh).
Eave-to-wall	Sealed with metal flashing. Fire-stopped at junction. No exposed wood at eave line.

3.2 Exterior Walls

Reference: Construction Detail Guide 6 — Exterior Walls & Cladding

Component	WER-3 Specification
Cladding	NC required ALL faces: fibre cement, metal panel, stucco, masonry, or stone. No vinyl, wood, or EIFS.
Sheathing	Type X gypsum on exposed faces: 15.9mm (5/8") glass-mat faced (Gold Bond eXP, DensGlass). Provides 60+ min fire resistance behind cladding.
Insulation	Mineral wool preferred all faces: Rockwool ComfortBatt/SafenSound. No combustible foam on exposed faces.
Rain screen	Fire stops each storey + at eave. ≤2mm NC mesh at bottom. Metal hat channel furring (not wood). NC insulation behind cavity if combustible CI used.
Gaps and joints	Seal ALL gaps ≤3mm. Back-flash butt joints with NC substrate. NC caulk or metal flashing throughout.
Wall base	NC cladding to ground. Sealed foundation junction. ≤2mm mesh at weep holes. Metal flashing.

3.3 Windows, Doors & Openings

Reference: Construction Detail Guide 1 — Openings

Component	WER-3 Specification
Glazing	5mm tempered glass BOTH panes ALL faces. Non-negotiable at WER-3.
Frames	Aluminium or fibreglass preferred. No vinyl on exposed faces.
Wildfire shutters	Required on vulnerable openings: ground floor on exposed faces, large windows >2m², all Close Neighbour faces. Manual roller shutters (FireHard or AS 3959-compliant).
Exterior doors	Solid core or metal. Steel preferred on exposed faces. Full seal.
Garage doors	Insulated steel. Full seal. ≤3mm gaps. Fire-rated preferred if facing vegetation.

3.4 Vents & Penetrations

Reference: Construction Detail Guide 3 — Vents & Penetrations

Component	WER-3 Specification
All vents	ASTM E2886 ≤2mm mesh on ALL vents without exception.
Gable vents	Eliminate if possible. If retained, fire-rated ember-resistant assembly.
Foundation vents	ASTM E2886 ≤2mm. Self-closing fire-rated vents preferred.
All penetrations	Seal ALL gaps ≤2mm. Fire-stop caulk or intumescent sealant at every penetration.

3.5 Decks & Attachments

Reference: Construction Detail Guide 4 — Decks & Attachments

Component	WER-3 Specification
Deck surface	NC required within 3m of building: concrete, stone, aluminium, fibre cement. Composite beyond 3m only.
Deck framing	Steel or aluminium framing REQUIRED. Wood joists fail in 30–40 min when exposed to fire from below.
Under-deck	If >600mm above grade: fully enclosed NC. NC ground cover underneath.
Attached structures	Within 3m: must meet same WER level. NC roof, steel/NC posts, fire-rated connection to building.

3.6 Fencing, Landscaping & Site

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

Component	WER-3 Specification
Fencing within 3m	NC required: steel or masonry. No wood or composite. Vegetation management per FireSmart Canada Zones 1A, 1B, and 2.
Ground cover 0–1.5m	NC only: gravel, stone, or concrete. No organic material.

Component	WER-3 Specification
Mulch	None within 3m of building.
Outbuildings within 6m	Must meet building WER level or relocate >10m. Refer to FireSmart Canada HomeOwners Manual for comprehensive vegetation management.

4. Framing System Consideration

At WER-3, the building envelope (NC cladding, Type X gypsum, mineral wool) is your primary fire defence. The structural framing system provides a meaningful second line of defence if the envelope is breached.

Heavy Timber / Mass Timber

140mm+ members provide inherent fire resistance. A 140mm post retains a 100×100mm structural core after 30 minutes of direct fire exposure (0.65mm/min char rate per Eurocode 5). A 5-ply CLT panel sustained loads for over 3 hours in NRC testing. If budget and design allow, heavy timber framing at WER-3 provides structural reserve that light-frame construction does not.

Light-Frame Construction

Works at WER-3 when envelope is properly specified. Framing does not need to resist fire directly if exterior layers keep fire out for 30–60 minutes. But no reserve — if envelope breached, light framing fails in 25–45 minutes.

Deck Framing

Steel or aluminium required at WER-3. See Module 4 and Module 6 Section 2.5 for charring rates and member size comparisons.

5. Close Neighbour Exposure Level (CNEL) at WER-3

At WER-3, many close neighbour measures are already covered by the comprehensive wildland specifications. The Close Neighbour Exposure Level (CNEL) system may require additional measures on faces within 10 metres of a neighbouring structure. Apply whichever is more stringent between CNEL and WER-3 on each element.

Key additions for CNEL-2 or CNEL-3 faces beyond WER-3: wildfire shutters on ALL windows and doors on the neighbour-facing elevation (CNEL-3). Sealed soffit with no vents on the facing eave, with compensating ventilation on non-facing sides (CNEL-3). Radiant heat barrier between properties at separations under 3m (CNEL-3). Minimise glazing area on the neighbour-facing wall where possible.

For full CNEL specifications and decision tree, see the standalone FireHard Close Neighbour Exposure Level (CNEL) Guide at firehard.ca.

6. Cost Summary

Measure	New Build	Retrofit
NC cladding all faces	$3,000–$6,000	$12,000–$25,000
Type X gypsum + mineral wool	$1,000–$2,500	$5,000–$13,000
Full sarking	$800–$2,000	$2,000–$5,000
5mm tempered all faces	$1,500–$4,000	$4,000–$10,000
Steel deck + NC surface	$2,000–$4,000	$6,000–$16,000
Wildfire shutters (multiple)	$3,000–$8,000	$3,000–$8,000
NC fencing, ground cover, site	$1,000–$3,000	$2,000–$5,000
Other measures	$2,000–$5,000	$4,000–$10,000
TOTAL	**$15,000–$40,000**	**$50,000–$120,000+**

ECONOMICS

Building to WER-3 from the start costs $15K–$40K (8–15% of build). As a retrofit: $50K–$120K+. If you're building new in a WER-3 zone, it is dramatically cheaper to build it right once.

7. Priority Order (Retrofit)

Implement opportunistically as components need replacement over 5–10 years:

#	Measure	Notes
1	All WER-1 + WER-2 measures	Foundation. Do this first.
2	NC cladding on most exposed face + Type X	Addresses highest-risk wall. Do at next re-side.
3	Full sarking	Do at next re-roof. Most cost-effective time.
4	Shutters on remaining vulnerable openings	Can be phased by face.
5	Deck/attachment upgrades	As components age and need replacement.
6	Tempered glass all faces	As windows need replacement. Specify tempered.
7	Steel deck framing	Major project. Do when deck needs full rebuild.

PHASE IT

Most cost-effective: implement opportunistically as components need replacement over 5–10 years. Every component you upgrade to WER-3 spec during routine maintenance moves you closer to full compliance at fraction of one-time retrofit cost.

8. Verification Pathways

Deemed-to-Satisfy

Follow specifications using products from the Component & Assembly Reference.

Tested Equivalent

Alternative materials with equivalent or higher fire test certification.

Engineered Alternative

P.Eng. designed alternative achieving equivalent performance.

Fire-Rated Timber

Heavy timber (140mm+) or mass timber (CLT) may be used as structural system where charring rate calculations demonstrate adequate residual section. Per Eurocode 5 Part 1-2, standard char rate 0.65mm/min. Engineer to verify.

9. Documenting Your Work

For each WER-3 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 by building element. Visit firehard.ca/partners for insurance partner programs.

10. About FireHard Canada

FireHard Canada (firehard.ca) is a trade name of Wildernest Systems Inc. Developed by Wildernest Systems Inc. and Bulkley Valley Engineering Services Ltd., with Lazzarin Svisdahl Landscape Architects.

Products: Fire Hard exterior manual roller shutters. P.Eng. services: BVES (EGBC No. 1001683). Landscape: LSLA (BCSLA).

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