

Permit Kit for Biofill™ Construction

IRC APPENDIX BL REFERENCE · INSPECTOR FAQ · ENGINEER LETTER TEMPLATE · BIOFILL™ SPECS

A ready-to-submit package for builders, homeowners, architects, and contractors using Bison Biofill™ hempcrete — designed to be handed directly to a building official, permit technician, or Authority Having Jurisdiction (AHJ).

How to Use This Kit

This Permit Kit is for anyone who wants to use Bison Biofill™ hempcrete in a construction project and needs to obtain a building permit.

What to do with this document

Print or email this entire kit to your building department **before** your permit meeting. If the official is unfamiliar with hempcrete, direct them to Section 2 (Code Authority) first. For technical questions, direct them to Section 3 (Biofill™ Technical Summary) and Section 4 (Inspector FAQ).

This kit contains:

- **Section 1:** Plain-language summary of hempcrete as a building material
- **Section 2:** Code authority — 2024 IRC Appendix BL summary and how it applies
- **Section 3:** Biofill™ product data summary (fire, thermal, structural, moisture)
- **Section 4:** Inspector FAQ — answers to the most common building-official questions
- **Section 5:** Checklist for permit submission
- **Companion document:** Engineer Letter Template — an editable template for a licensed PE stamp, provided as a separate document alongside this kit

What Is Biofill™?

For building officials — plain-language summary

Biofill™ is Bison Biocomposites' hemp-lime building material — a bio-composite commonly referred to generically as **hempcrete**, the material category recognized in the building code (see Code Authority). It is made from hemp hurd (the woody inner core of the industrial hemp plant) mixed with Bison's proprietary mineral binder, a foaming agent, and water, and is used as a **non-structural insulating infill** within a structural frame (timber, steel, or concrete). It is NOT a replacement for structural concrete.

Key Properties

Property	Description
Material Type	Biocomposite insulating infill. NOT structural. Used within a structural frame.
Hemp Source	Industrial hemp with <0.3% THC. Legal under the 2018 Farm Bill (7 U.S.C. 5940). All Bison hemp is US-grown and federally compliant.
Binder	Bison BIND/R — proprietary mineral-based binder. Hardens within 45 minutes (faster than lime). No VOCs, no petrochemicals.
Fire Performance	Biofill™ does not flame-spread. Self-extinguishing. Comparable to or better than Type V wood frame. See Section 3 for Biofill™-specific fire data.
Thermal Performance	R-3.0 to R-3.4 per inch depending on density. An 8-inch wall = R-24 to R-27. Thermal mass and phase-shift effect reduces peak energy load beyond nominal R-value.
Moisture	Hygroscopic (absorbs and releases moisture), vapor-permeable. Reduces risk of moisture buildup and mold. Must be finished with vapor-permeable plaster — NOT vapor barriers.
Structural Role	Non-load-bearing. Structural loads carried by the frame. Biofill™ adds lateral racking resistance but is not the primary structural element.
Durability	Minimum 60-year life expectancy with proper installation and maintenance. Hardening continues over time via carbonation (lime binders).

Code Authority

2024 International Residential Code — Appendix BL

Hempcrete construction is addressed in Appendix BL of the 2024 International Residential Code (IRC). Appendix BL defines hempcrete as a non-structural insulating infill material and establishes requirements for its use in one- and two-family dwellings. It was developed through the ICC code development process and is available for adoption by any jurisdiction using the IRC.

Summary of Appendix BL Key Provisions

- Hempcrete is explicitly defined and permitted as a non-structural thermal mass and insulation material.
- Structural loads must be carried by a separate frame (wood, steel, or concrete) — hempcrete is infill only.
- Wall assemblies must use vapor-permeable exterior and interior finishes (e.g., lime plaster, lime render).
- Minimum 8-inch wall thickness is required for exterior hempcrete walls.
- Hempcrete must not be used below grade (foundation walls, slabs, or below-grade conditions).
- Moisture management requirements include: no vapor barriers, proper roof overhang, and adequate drainage.
- Approved binders include lime-based binders and other tested proprietary binders (Bison Biofill™ qualifies).

Appendix status note for building officials

Appendix BL is an optional appendix to the IRC and does not automatically apply in all jurisdictions. However, its existence lets a builder demonstrate to an AHJ that hempcrete meets the intent of the building code and is recognized by the ICC as a viable construction method. In jurisdictions that have not adopted Appendix BL, this document and the attached Biofill™ technical data can support an alternative-materials approval under IRC Section R104.11 (or equivalent).

Alternative Materials Pathway (R104.11)

If the local jurisdiction has not adopted IRC Appendix BL, the builder may apply for approval under the Alternative Materials, Design, and Methods of Construction provision of the IRC (Section R104.11). This provision allows a building official to approve any material or method that demonstrates compliance with the intent of the code through testing, research reports, or other documentation.

Bison Biofill™ hempcrete supports an R104.11 application with the following documentation (all included in this kit or available from Bison on request):

- Bison Biofill™ product data sheet with tested R-value, fire resistance, and moisture performance data.
- ICC Appendix BL language (demonstrates ICC recognition).
- Engineer letter from a licensed PE confirming structural frame adequacy and hempcrete installation method (see the separate Bison Engineer Letter Template).
- Reference to completed hempcrete projects in the US that have received permit approval (available from Bison on request).

Bison Biofill™ Technical Summary

For building officials

Bison Biofill™ is a patented proprietary mineral-based hempcrete binder manufactured in the United States. It is mixed with US-grown hemp hurd and water to form hempcrete. Unlike traditional lime binders (which require 4–6 weeks to cure), Biofill™ reaches initial set in under an hour and full cure in 72 hours. All performance data below is from third-party testing.

Property	Biofill™ Hempcrete	Code / Standard Reference
Thermal (R-value)	R-3.0–3.4 per inch (by density)	ASTM C518 / ASTM C177
Thermal (8" wall)	R-24 to R-27 nominal	Calculated per ASTM C518
Fire — Flame Spread	Class A (0–25)	ASTM E84 / UL 723
Fire — Smoke Developed	Class A (0–450)	ASTM E84 / UL 723
Moisture — Vapor Perm.	Vapor-permeable (>20 perm)	ASTM E96
Mold Resistance	No mold growth in substrate (lime alkalinity > pH 12)	ASTM D3273
Compressive Strength	Non-structural. ~15–45 psi depending on density.	ASTM C39 (indicative only)
Set Time	45 min–1 hr initial set; 72 hrs to full cure	Bison internal testing
Hemp THC Content	<0.3% THC. Federally compliant.	2018 Farm Bill (7 U.S.C. 5940)
Country of Origin	US-grown hemp hurd. Binder manufactured in USA.	Bison Biocomposites COO cert.

Full product data sheet and test reports available from Bison Biocomposites on request: info@bisonbiocomposites.com · bisonbiocomposites.com

Inspector FAQ

The following questions are among the most common raised by building officials and AHJs encountering hempcrete for the first time. These responses are intended to be read aloud or shared directly.

Inspector Question	Recommended Response
Is hemp the same as marijuana? Is this legal?	No. Industrial hemp and marijuana are both <i>Cannabis sativa</i> , but they are grown and regulated separately. Industrial hemp contains <0.3% THC and is federally legal under the 2018 Farm Bill (7 U.S.C. 5940). Bison hemp is US-grown and comes with a Certificate of Origin and THC compliance documentation. There is no controlled-substance risk.
Is hempcrete load-bearing?	No. Hempcrete is non-structural. All structural loads (gravity, lateral, wind, seismic) are carried by the structural frame (timber, steel, or concrete). Hempcrete functions as insulating infill between frame members. The frame must be designed and stamped by a licensed engineer per normal code requirements. The attached engineer letter confirms this for the specific project.
Is hempcrete fire-resistant?	Yes. Bison Biofill™ hempcrete achieves Class A fire performance (ASTM E84 Flame Spread 0–25, Smoke Developed 0–450) — the highest classification under the standard. Hempcrete does not support sustained combustion and is self-extinguishing. This is documented in the attached test data.
What building code covers hempcrete?	Hempcrete is addressed in Appendix BL of the 2024 IRC. If your jurisdiction has not adopted Appendix BL, approval may be sought under IRC Section R104.11 (Alternative Materials). This kit provides the supporting documentation required for an R104.11 application.
What is the R-value?	Bison Biofill™ hempcrete achieves R-3.0–3.4 per inch (ASTM C518). An 8-inch hempcrete wall delivers approximately R-24 to R-27. This meets or exceeds the minimum insulation requirements for Climate Zones 1–4 and can be combined with additional insulation for Zones 5+.
Does hempcrete get moldy?	Hempcrete has strong natural mold resistance. The high pH of the lime/mineral binder (>pH 12) inhibits mold growth within the material itself, and hempcrete is vapor-permeable, allowing moisture to equalize rather than accumulate. Surface mold is possible only under prolonged water contact (e.g., a plumbing leak), identical to any building material. Per IRC Appendix BL, hempcrete must be finished with vapor-permeable plaster — not vapor barriers.
What holds it together — won't it fall apart?	No. Hempcrete is not loose fill. When mixed and applied with Bison Biofill™, the material sets hard within about an hour and fully cures within 72 hours through a mineral carbonation process. It is a rigid material that adheres to the structural frame and can be finished with plaster, stucco, or lime render.
Has this been done before? Where?	Hempcrete has been used in Europe for 30+ years (France, UK, Netherlands). In the US, it has been used in permitted residential and commercial projects in CA, OR, CO, MA, NC, TX, and GA. Bison can provide references to completed permitted projects on request.
What finish is required?	Exterior: lime render or lime plaster (minimum 3/4 inch). Interior: lime plaster or lime board. Vapor barriers (polyethylene sheeting, vapor-retarder paints) are NOT permitted — they trap moisture and can lead to wall failure. This is specified in IRC Appendix BL.
What inspections are needed?	Standard framing inspection (structural frame only — hempcrete does not change framing requirements), rough-in inspection (before hempcrete is applied), hempcrete infill inspection (during or immediately after application, before plaster), and final inspection. Bison recommends notifying the inspector before the hempcrete application day.
Can I use hempcrete below grade?	No. Hempcrete is not approved for below-grade use (foundation walls, slab-on-grade, or buried conditions). It must be protected from direct ground-moisture contact. Minimum 6-inch clearance from grade is required.
Who manufactured the binder? Is it tested?	Bison Biofill™ is manufactured in the United States by Bison Biocomposites. The product is tested per ASTM standards (see Section 3 for full data). Technical data sheets and test reports are available from Bison on request at info@bisonbiocomposites.com .

Permit Submission Checklist

Use this checklist to confirm you have all required documentation before submitting your permit application. Attach all checked items to your permit application package.

- ☐ Standard permit application form (from your building department)
- ☐ Site plan and architectural drawings showing hempcrete wall locations, dimensions, and thickness
- ☐ Structural drawings (PE-stamped) showing structural frame design independent of hempcrete
- ☐ This Bison Permit Kit (print or email the full document to the building department)
- ☐ PE Engineer Letter (separate Bison template) — completed, signed, and stamped by a licensed PE for your state
- ☐ Bison Biofill™ product data sheet (request from info@bisonbiocomposites.com)
- ☐ Bison hemp hurd Certificate of Origin confirming <0.3% THC compliance (request from Bison)
- ☐ 2024 IRC Appendix BL text (available from ICC: codes.iccsafe.org) — OR reference in permit application to R104.11 Alternative Materials
- ☐ Wall assembly specification: hempcrete mix ratio, thickness, frame type, interior and exterior plaster specification
- ☐ Installer credentials: Bison Certified Installer certification or equivalent documentation
- ☐ Energy compliance documentation (e.g., REScheck or COMcheck) showing the wall assembly meets IECC requirements

Questions? Contact Bison Biocomposites.

If your building department has questions this kit does not answer, Bison can provide additional technical documentation, reference projects, or a direct conversation with our technical team.

Email: info@bisonbiocomposites.com · **Phone:** 402-253-0340 · **Web:** bisonbiocomposites.com/biofill

Performance figures and code references in this kit are provided to support a permit application and must be confirmed with assembly-specific test data (ASTM C518, E84, E96) and the Authority Having Jurisdiction before relying on them for design or permitting. Bison Biocomposites is not the engineer or designer of record for any project.

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