



Technical Information

Decay damage is a major concern of everyone who owns property. And it's no wonder! Current estimates show that replacement materials, required to repair decay damage, consume up to 10% of the U.S. annual wood production.

For commercial property owners, destructive decay can mean expensive repairs and even the disruption of business. Newer home owners may also experience problems when decay is caused by improper construction. For owners of contemporary log homes, unchecked decay can have particularly expensive consequences because timbers are used for principle supports and exterior walls. And where decay exists in historic buildings, bridges, and other structures, the consequences can be devastating.

The key to decay prevention is controlling wood's exposure to moisture, and employing an effective preservative treatment where applicable. This IMPEL® Rod information will explain how decay-damaging conditions occur and how you can spot, prevent, and treat them.

Decay Thrives On Moisture

Although wood looks and feels solid, it's actually made of millions of porous, thick-walled cells that are bound together. And given the right conditions, decay fungi can thrive, break down this cellular structure, and ultimately destroy wood. Once decay has begun, it offers a natural environment for termites and other wood-destroying insects, which can cause additional, serious damage to the wood's integrity.

Decay needs certain conditions to thrive, including: (1) a moisture content of only about 20% or higher; (2) oxygen; (3) food; and (4) a temperature in a general range of 45° to 100°F. Among these conditions, controlling moisture

is the most practical means of preventing or inhibiting the growth of decay. However, many conditions exist where high moisture cannot be controlled. When moisture problems are discovered, decay is often present. And where there is decay, there is an increased chance of insects that attack decaying wood,

such as termites, carpenter ants, and beetles.

In these circumstances, **IMPEL Rods** are an effective preservative system for the prevention and control of fungal decay in wooden structures.

TABLE 1.
PROPERTY INSPECTION FOR STRUCTURAL DECAY

AREA	WHAT TO LOOK FOR	POSSIBLE CAUSE
Flooring	• Baseboard Separation From Wall Or Floor • Evidence Of Insects • Evidence Of Decay, Rot • Buckled Or Cracked Flooring	• Foundation Settling • Water Leak Inside Wall • Excess Moisture Under House • Poor Ventilation Under House • Inadequate Foundation Waterproofing • Improper Lot Grading • Plumbing Leakage
Baseboards	• Signs Of Decay Or Paint Blistering • Dampness Or Decay In Subflooring • Evidence Of Insects	• Moisture In Wall • Moisture In Subfloor • Plumbing Or Roof Leakage • Standing Water Under House • Poor Attic Ventilation • Inadequate Vapor Barrier In Wall
Walls (Interior/ Exterior)	• Blistered Plaster Or Paint • Mildew • Blistered Paint • Obvious Signs Of Mold, Decay	• Poor Ventilation Of Clothes Dryer • Paint Over Greasy Spots • Paint Over Termite Damage • Clogged Gutters • Rain Infiltration • Improper Roof Angle • Inadequate Roof Overhang • Inadequate Vapor Barrier In Wall
Siding Log Walls	• Softness Or Sponginess Of Log Courses Or Wood Siding	
Eaves		
All Plumbing Areas	• See All Of The Above • Check Surfaces Around All Sinks, Tubs, Showers, Clothes And Dishwashers	• See All Of The Above • Cracked Tiles Around Fixtures • Deteriorated Caulking
Attics	• Water Stains On Ceilings Or Walls • Obvious Signs Of Decay	• See All Of The Above • Poor Ventilation
Under House	• Damp Soil, Standing Water • Damp Foundation Walls, Mold Present • Ground To Floor Clearance Less Than 18" • Obvious Signs Of Decay, Fungus Growth	• Faulty Drainage Away From House • Poor Ventilation In Crawl Spaces • See All Of The Above

Frequent Inspection Means Greater Protection

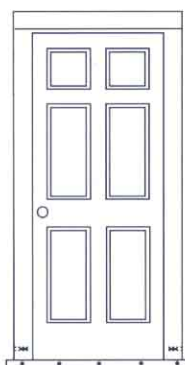
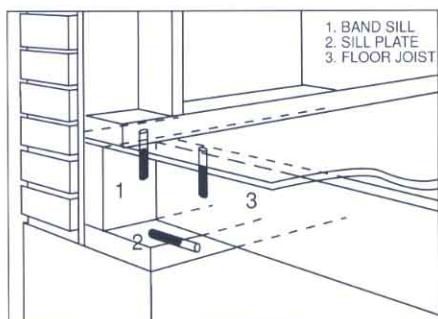
The best protection is a periodic inspection for signs of decay. Look for wood deterioration, discoloration, and fungal growth when examining a structure's interior, exterior, attic, and crawl space/foundation. Utility buildings, decks, fencing, and other wooden structures should also be inspected. See Table 1. for more examples.

Since moisture is a leading cause of decay, closely examine structural areas where there may be:

- (1) Soil Contact;
- (2) Frequent Rain;
- (3) Rain Seepage;
- (4) Water Flow From Roof;
- (5) Splashing Rain;
- (6) Water Collecting Against Wood;
- (7) Plumbing Leaks; and
- (8) Condensation.

All areas where wood is exposed to water are at high risk, such as in soil, concrete, and other places that retain moisture. These high exposure areas include:

(1) **Flooring and Foundation Systems.** The greatest risks for decay are at exposed wood ends and at wood joints where moisture is more readily absorbed than on side surfaces. These areas are especially at risk in wood construction under kitchens and bathrooms where leaky plumbing, deteriorated caulking, and inadequate moisture barriers may be common. Other areas of concern are where joists rest on block piers; at band sills around dirt-filled porches; at untreated deck headers; and at foundation sites near chimneys. To protect these areas, install IMPEL Rods as shown within 6 inches of wood ends and at recommended spacings thereafter.

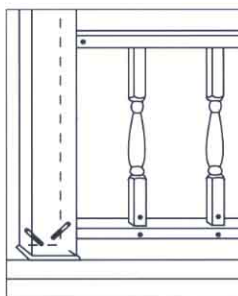


(2) **Window and Door Framing.** Anywhere weathering of paint and exposure has occurred, especially at the bottom of windows and doors, is at risk of decay. Other areas include the base of garage doors and crawl space access doors and their frames. For protection,

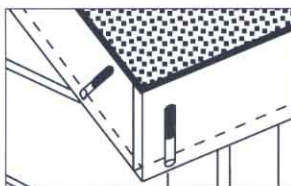
install IMPEL Rods as shown.

(3) **Exterior Steps, Porches and Decking.**

Install IMPEL Rods as shown in posts, rails, wood ends, joints, and trim. Hollow columns can be protected by installing rods through the thickness edges of side pieces.



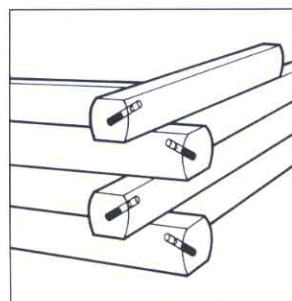
(4) **Roof Trim and Facia.** Facia boards supporting gutter systems and soffits are especially vulnerable to decay attack. Install IMPEL Rods within 6 inches of corners (as shown) and at recommended spacings thereafter. Also protect areas where trim is in contact with skylights, vents, chimneys and where excessive moisture is common.



(5) **Roof and Attic.** Install IMPEL Rods where leaks have caused water damage to sup-

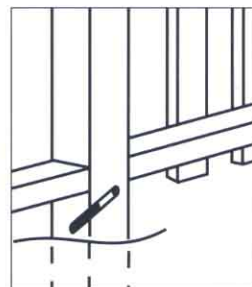
port members and rafters.

(6) **Log Construction.** IMPEL Rods should



be installed (as shown) in corner areas, lower courses of logs, joints, or wherever logs are not protected from the elements.

(7) **Poles and Posts.** Where moisture may cause decay; especially in building and foundation poles; and farm and residential fence posts.



If the wood's structural integrity has been damaged to the extent that repair or replacement is necessary, repairs and/or replacements should be made and the source of moisture should be reduced or eliminated. Inspection should also reveal areas where potential damage can occur. In either case, the application of IMPEL Rods is the appropriate step to preserve wood integrity.

The IMPEL Rod System

IMPEL Rods are easy, low-cost, and EPA-approved as a decay protection and prevention system for wood. They have an appearance similar to glass rods and are available in a variety of sizes for a wide range of applications (see Table 2.).

TABLE 2.
RECOMMENDED IMPEL ROD SIZES FOR VARIOUS APPLICATIONS

AREA	IMPEL Rod Size
Smaller Window And Door Frames And Smaller Millwork	¼" x ½"
Larger Window And Door Frames And Facial Applications In Dimensional Lumber	¼" x ½"
Facia Boards, Eaves And Other 1" Board Applications	½" x 1"
Joists, Rafters, Girders, Headers, Sleepers And Similar Applications	½" x 1"
Foundation Posts, Large Beams, Poles And Timber Applications	½" x 2"
Logs And Timbers	½" x 2"
Large Timbers And Poles	¾" x 3"

IMPEL Rods are molded from fused, water-diffusible borates which are internationally recognized as an effective and well established wood preservative. Borates also effectively control termites, carpenter ants, a variety of beetles, and many other wood-boring insects. They are "user friendly" and environmentally acceptable. Borates are highly toxic to fungal decay and many insects at concentrations that are not poisonous to humans or other mammals.

IMPEL Rods are placed into holes drilled in

wood at key locations as previously discussed. As the Rods dissolve, the borate preservative migrates to areas of highest moisture and concentrates where wood is most susceptible to decay. If the wood dries, the Rods stop diffusing. The residual preservative remains in place. When the moisture content rises, the Rods resume diffusion. Depending upon conditions of moisture,

IMPEL Rods need not be replaced for years. At recommended spacings (See Table 3.), IMPEL Rods will control existing decay and prevent future growth.

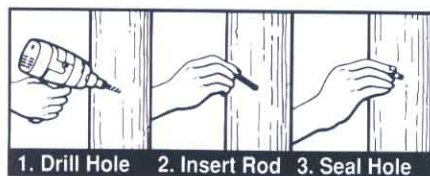
Three Simple Steps

There are three easy steps to install IMPEL Rods:

(1) Drill appropriate sized holes to accommodate the predetermined number and size of IMPEL Rods required;

(2) Insert the suitable size and number of IMPEL Rods into the holes; and

(3) Seal the holes with a treated wooden dowel, wood filler, or caulk. The covering may be painted, if desired.



1. Drill Hole 2. Insert Rod 3. Seal Hole

TABLE 3.
RECOMMENDED IMPEL ROD SIZES AND SPACING
FOR VARIOUS WOOD DIMENSIONS

Nominal Size	Rod Size (Dia. x Length)	Hole Size (Dia. x Length)	Space Between Holes	No. Of Rods Per Hole
Dimensional Lumber				
1" x 1"	1/4" x 1/2"	3/16" x 3/4"	12"	1
1" x 2"	1/4" x 1/2"	3/16" x 1"	8"	1
1" x 4"	1/4" x 1/2"	3/16" x 2 1/4"	6"	2
1" x 6"	1/4" x 1/2"	3/16" x 3 1/4"	4"	2
2" x 2"	1/4" x 1/2"	3/16" x 1 1/2"	7"	2
2" x 2"	1/3" x 1"	3/8" x 1 1/2"	12"	1
2" x 4"	1/3" x 1"	3/8" x 2 3/4"	8"	1
2" x 6"	1/3" x 1"	3/8" x 3 3/4"	10"	2
2" x 8"	1/3" x 1"	3/8" x 4 1/2"	7"	2
2" x 10"	1/3" x 1"	3/8" x 6"	8"	2
2" x 10"	1/2" x 2"	3/8" x 5 1/2"	12"	1
2" x 12"	1/3" x 1"	3/8" x 7"	7"	3
2" x 12"	1/2" x 2"	3/8" x 6 1/2"	10"	1
Sawn Timbers				
4" x 4"	1/2" x 2"	3/8" x 2 3/4"	14"	1
4" x 6"	1/2" x 2"	3/8" x 3 3/4"	9"	1
4" x 8"	1/2" x 2"	3/8" x 4 3/4"	6"	1
6" x 6"	1/2" x 2"	3/8" x 4 3/4"	11"	2
6" x 6"	3/4" x 3"	13/16" x 4 3/4"	15"	1
6" x 8"	1/2" x 2"	3/8" x 5 3/4"	8"	2
6" x 8"	3/4" x 3"	13/16" x 5 3/4"	14"	1
6" x 12"	3/4" x 3"	13/16" x 7 1/4"	9"	1
8" x 8"	3/4" x 3"	13/16" x 5 3/4"	10"	1
10" x 10"	3/4" x 3"	13/16" x 6 3/4"	13"	2
12" x 12"	3/4" x 3"	13/16" x 7 1/4"	9"	2
Round Logs, Posts And Poles				
4" Diameter	1/2" x 2"	3/8" x 2 3/4"	14"	1
6" Diameter	1/2" x 2"	3/8" x 4"	12"	2
6" Diameter	3/4" x 3"	13/16" x 4 1/2"	15"	1
8" Diameter	3/4" x 3"	13/16" x 5"	12"	1
10" Diameter	3/4" x 3"	13/16" x 6"	7"	1
12" Diameter	3/4" x 3"	13/16" x 9"	10"	2
14" Diameter	3/4" x 3"	13/16" x 10"	7"	2
16" Diameter	3/4" x 3"	13/16" x 12"	9"	3

Note: Recommended application rates are based upon rods being installed in a linear pattern. If necessary, holes can be drilled on an angle in order to have room for plug and expansion.

Caution: When drilling into structural support members, such as a joist, consult your local building code authority for restrictions. Extensive drilling could result in structural weakening.

The Installation Of IMPEL Rods

A few examples of where to place IMPEL Rods and the sizes to use are found in Table 2.

IMPEL Rods can be inserted through any wood surface, depending on access, in almost any pattern. It is important to understand that spacing depends upon the size of the IMPEL Rod, the dimensions of the wood, and the volume of wood to be treated.

For facial applications, IMPEL Rods should be inserted in a staggered pattern covering the entire affected length. Otherwise, IMPEL Rods may be installed through the thickness edge in a linear pattern beginning at 6 inches from a joint or the end of the wood.

For best results, linear spacings (i.e., along the grain) should not exceed 18 inches on center. And since diffusion across the grain is more limited, spacings should not exceed 6 inches on center. Also, positioning IMPEL Rods in certain applications may require drilling at various angles to the wood's surface.

Selecting The Correct IMPEL Rod

The recommended size of IMPEL Rods and their spacings for various sawn wood dimensions and logs are provided in Table 3.

The Durability Of IMPEL Rods

The IMPEL Rod system offers a long-lasting, highly concentrated, solid form of boron that slowly dissolves over time. The less consistently moist the environment, the longer IMPEL Rods will last.

For example, IMPEL Rods provide long-lasting protection in crawl spaces where the structure is protected from continuously wet conditions. However, where there are consistently moist to wet conditions, research suggests that exposed IMPEL Rods can retain their effectiveness for 3 to 10 years. They should, however, be inspected at regular service intervals in these conditions. In any event, IMPEL Rods' effectiveness can be enhanced if wood surfaces are sealed with a water sealant or water repellent paint.

Safety And Handling Precautions

IMPEL Rods should be used only in accordance with manufacturer's instruction and only as a wood preservative. Suitable clothing should be worn and gloves should be used when handling. **DO NOT ALTER ROD SIZES BY CUTTING OR BREAKING; SHARP EDGES MAY BE EXPOSED.** Do not use where food or drink can become contaminated. Keep out of reach of children at all times. Dispose of used packaging materials safely in ordinary trash collection containers. For additional details, see the IMPEL Rods Material Safety Data Sheet.

Ordering IMPEL Rods And Obtaining Technical Assistance

IMPEL Rods are available through authorized dealers of Chemical Specialties, Inc. (CSI). For the dealer nearest you, contact CSI directly by writing or calling:

PoleCare, a division of CSI • P.O. Box 610
5910 Pharr Mill Rd. • Harrisburg, NC 28075
800-355-6615 • 800-801-0078

IMPEL Rods: TECHNICAL INFORMATION

Chemical And Physical Data

Active:	100% Anhydrous Disodium Octaborate ($\text{Na}_2\text{B}_8\text{O}_{13}$)
Equivalents:	18% Sodium Oxide (Na_2O); 82% Boric Oxide (B_2O_3)
Specific Gravity:	2.2g/cc @ 20°C
Appearance:	Cylindrical, glass-like rods; colorless to opaque
Odor:	None
Melting Point:	> 1000°C
Solubility in H_2O:	100% by weight

Fire And Explosion Data

None:	IMPEL Rods do not alter combustibility or ignition point of wood
Flashpoint:	None

Health Hazard Data

Skin Contact:	May be slightly irritating; reversible
Eye Contact:	May be slightly irritating; reversible
Ingestion:	Nausea, vomiting
LD50:	Oral-1760mg/kg(rat) Dermal->2000mg/kg (rabbit)

Corrosion/Compatibility Data

Corrosion:	None
Compatibility:	Does not affect glass, textiles, plastics, rubber, putty, paint, most metals, or sealants
Surface Treatment:	No effect on existing surface treatments
Storage:	Store in dry conditions at all times. IMPEL Rods are highly water soluble. Always store pesticides safely and out of the reach of children.

Distributed By:

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