
Acreage Living

IOWA STATE UNIVERSITY
Cooperative Extension

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Lightning Protection for Buildings

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I know you've all been there..thunder rumbling, rain beating down on the roof, and a curtain of water pouring like a waterfall over the edge of the plugged gutters. As I watched from my front window and pondered the prospect of water leaking into my basement, I threw common sense aside and ventured out in the pouring rain to unplug my downspouts. As I reached over the chain-link fence and shook the offending downspout, the sky flashed with the eerie green light of a nearby lightning strike and immediately I got the sensation that someone had just thrust a potent electric cattle prod into my armpit. A second later, a deafening clap of thunder revived my sense of self-preservation and I left the downspout to fend for itself and ran back indoors. Dumb.

Each year, lightning strikes cause around one hundred deaths, several hundred injuries, and hundreds of millions of dollars of property damage in the U.S. Protecting yourself and your property from lightning damage requires a basic understanding of lightning and some specialized protective equipment.

Lightning can be described as a visible discharge of static electric charges occurring within a cloud, between clouds, or between a cloud and earth.

Such charges always develop in pairs, one negative and one positive. The potential power depends upon the size of the charge that builds up between these opposite charges which are separated by an insulating air gap. When the electrical potential between the positive and negative charges becomes great enough to jump the air gap insulator, the charges rush to meet. This action produces a sudden release of energy, heating the air to incandescence to form the intense white spark we call lightning.

Generally speaking, the negative charges accumulate near the base of thunderclouds with opposite charges developing in the upper portion of the cloud and/or on the earth's surface with its projecting objects like trees, building steeples, chimneys, poles, or wires. Because the potential buildup is greatest on these projecting objects, lightning is more apt to strike there than on larger, flatter surfaces.

You should consider several factors before purchasing a lightning protection system. Consider the frequency and severity of thunderstorms in your area, the value and nature of each building and its contents, the relative building exposure (whether located on a hill or in a valley), and

the hazards to people and/or livestock. By evaluating your needs, the insurability factors and gathering accurate cost estimates, you can decide the relative importance of such an investment.

The fundamental principle of lightning protection is to provide a safe conductor pathway for lightning to follow without destroying a structure or other object. Adequate protection systems for buildings must include: 1) properly sized, placed, and installed air terminals (lightning rods) to receive the lightning strike; 2) conductors designed to carry the discharge from the air terminal to the ground; and 3) ground rods properly sized and installed to carry the charge to the earth.

Conductor materials used in a protection system must be resistant to corrosion. Copper, copper alloys, copper-clad steel, and aluminum are all approved materials, with copper and aluminum the most common. Because aluminum conductors corrode when in contact with earth, aluminum should terminate at least one foot above ground level and connect with corrosion-resistant copper conductors and ground rods. Always use a special bi-metal connector to avoid corrosion when bonding aluminum and copper conductors.

The installation of a lightning protection system is as important as the materials used. A sufficient number of air terminals or points must be spaced properly. The spacing of air terminals depends on the roof shape and slope, but generally is 20-25 feet along the ridge and on any tall projections such as chimneys or vent pipes.

Conductors must be properly sized and installed to avoid sharp turns. The momentum of the huge surge of electrons in a lightning strike can straighten sharp conductor turns and jump off the conductor onto other building parts.

Metal conduits, gutters, drain pipes, pipe vents, metal water pipe, radio and television antennas, metal roofing, fences and other metal objects should be bonded to main down conductors and ground rods to prevent side flashes.

Lightning system ground rods (electrodes) must be driven to a minimum depth of ten feet. Use no less than two rods at opposite corners of major buildings.

Details on lightning protection systems can be found in a number of sources. On the web, try University of Missouri bulletin "Lightning Protection for Missouri Farms and Homes" at <http://mnextension.missouri.edu/xplor/agguides/agengin/g01020.htm>. Protection system specifications are spelled out in the National Fire Protection Association Lightning Protection Code (NFPA 78). More information on this code is available from NFPA at (617) 770-3000, or on the web at <http://www.nfpa.org/>

A properly installed lightning protection system can save life and property. If you decide to install a lightning protection system, make sure you get the best. Do your homework, ask questions before you buy, and get competitive bids.

Thinking back to my brainless experience at the beginning of this article, I must include a note on personal lightning safety. The lightning hazard to people is greatest for those who are outdoors at work or play. For the best protection, follow these simple safety rules:

- ✎ Do not go or stay outdoors in thunderstorms. Seek shelter in buildings with lightning protection systems or enclosed automobiles.
- ✎ Avoid tents, open-top autos, and unprotected buildings.
- ✎ Avoid open fields, athletic fields, golf courses, wire fences, isolated trees, swimming pools, and open bodies of water such as lakes.
- ✎ If possible, seek dense woods, depressed areas, and/or buildings in low areas.
- ✎ If you are caught in a high-risk situation, assume the lightning safety position: crouch on the balls of your feet with arms wrapped around your knees. This position keeps your body low and minimizes your ground connection.

What is a Clandestine Laboratory?

by Division of Narcotics Enforcement, Iowa Department of Public Safety

Clandestine laboratories are illegal operations consisting of chemicals and equipment necessary to manufacture controlled substances. The types and numbers of laboratories seized, to a large degree, reflect regional and national trends in the types and amounts of illicit substances being manufactured, trafficked, and abused. Clandestine laboratories have been found in abandoned and rural farms. Laboratories are also being operated in single and multifamily residences in urban and suburban neighborhoods where their toxic and explosive fumes can pose a significant threat to the health and safety of local residents.

Signs

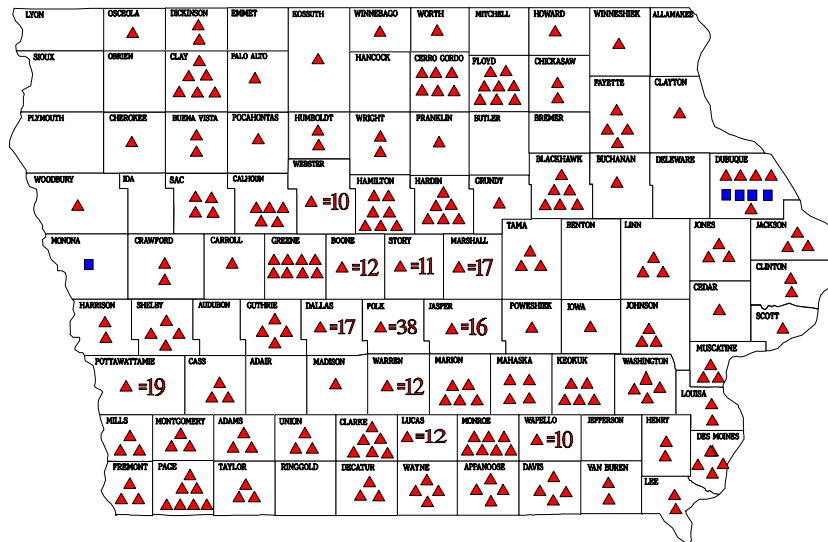
In Iowa the majority of clandestine laboratories produce methamphetamine utilizing the "nazi" method. The "nazi" method is a process that needs lithium or sodium metal, ephedrine or

pseudoephedrine, and anhydrous ammonia. No heat is necessary but may be used. Other items needed are coffee filters, solvents, Tupperware, and other common items easily obtained from local merchants.

What to look for if you suspect a methamphetamine laboratory:

- Strong smell that might resemble urine, or unusual chemical smell like ether, ammonia, or acetone.
- Little or no traffic during the day, but lots of traffic at extremely late hours. Extra efforts made to cover windows and reinforce doors.
- Residents never putting out their trash.
- Lab materials surrounding the property (lantern fuel cans, red chemically stained coffee filters, clear glass jugs, and duct tape).
- Vehicles loaded with trunks, chemical

Iowa Department of Public Safety 2000 Clandestine Methamphetamine Laboratory Seizures By County



1999 Total	<i>Iowa Department of Public Safety Clandestine Emergency Response Team Methamphetamine Laboratory Seizures</i>	2000 Totals to Dec 31, 2000
502	▲ = Seized "Nazi Method" Meth Lab ■ = Seized "Red Phosphorous" Meth Lab	393

containers, or basic chemical paraphernalia – glassware, rubber tubing, etc.

- Laboratory glassware being carried into the residence.
- Inhabitants smoking outside due to the fumes.

Who do I call if I suspect a methamphetamine lab in my area?

Contact your local police or sheriff's department. You can also contact us at 1-800-532-0052 or e-mail dneinfo@dps.state.ia.us

Never try to take matters into your own hands, contact the proper authorities.

The table to the right is for labs that the Department of Public Safety have been involved with. As of December 31, 2000, an additional 267 labs have been investigated by local and county

agencies. The combined total of clandestine laboratories seized by state, local, and county departments for 2000 is 658.

For more information, contact your local law enforcement agency or visit the Division of Narcotics Enforcement web site at <http://www.state.ia.us/government/dps/dne/index.htm>

Clandestine Laboratory Seizures

<u>Year</u>	<u>Labs seized</u>
1995	8
1996	31
1997	63
1998	320
1999	500
2000	391
2001	116*

* As of April 1, 2001

Estimated Costs of Pasture & Hay Production

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The newly revised "Estimated Costs of Pasture & Hay Production" AG 96 (hardcopy: 50 cents) is now available. This eight-page publication reviews all the costs involved with pasture and hay establishment and yearly production costs in a spreadsheet format. Columns are included for the producer to include his/her costs. Contact your

county ISU Extension office for a copy. This publication can also be found on the Internet at this address: <http://www.extension.iastate.edu/Publications/AG96.pdf>

Other publications of interest can be found at: <http://www.extension.iastate.edu/Pages/pubs/>

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