

## Communication Antennas

The primary hazard associated with consumer citizens band (CB) radio and television antennas is electrocution from contact with overhead power lines. The U.S. Consumer Products Safety Commission (CPSC) has developed two product safety standards to address this hazard. This report describes the requirements of the two standards, identifies other safety standards relevant to antenna manufacture, and provides product safety recommendations.

### Introduction

The U.S. Consumer Product Safety Commission (CPSC) enforces two product safety standards for outdoor communication antennas. The standards address the electrocution hazard present during antenna installation and take down. The regulations apply to manufacturers and importers of outdoor television (TV) antennas, citizen's band (CB) radio antennas, and antenna supporting structures.

This report describes the requirements of the two standards, identifies other safety standards relevant to the manufacture of outdoor consumer antennas, and provides product safety recommendations. Large antennas used by commercial radio stations, TV stations, and other commercial entities are not addressed in this report. For information on these products, see ISO Services document, Construction Technology Report CT-50-00, Television- and Radio- Transmitting Towers.

### Loss Data

Electrocution is the primary hazard associated with outdoor antennas. The CPSC estimates that antennas coming into contact with

overhead power lines caused 10 electrocution deaths between January 1, 2000 and December 31, 2002. Thirty-two people died from antenna-related electrocutions between January 1, 1997 and December 31, 1998.

CPSC tracks consumer product-related injuries through the National Electronic Injury Surveillance System (NEISS). There are two NEISS product categories related to outdoor communication antennas: "Outdoor Antenna (separate)" and "Antennas, not specified." In 2003, there were 18 and 30 case reports provided to the CPSC for these categories. These amounts were too small a sample to develop national injury estimates. The reports indicated that electric shock was the primary cause of injury

### CPSC Standards

The two CPSC standards are codified in Title 16 of the Code of Federal Regulations (CFR). The first standard, codified at Part 1402, was promulgated in 1978. It establishes notification requirements for TV and CB radio antennas and antenna support structures. The second standard, codified at Part 1204,

was promulgated in 1982. This standard establishes safety performance requirements for omnidirectional CB base station antennas. Neither has been significantly amended since its adoption.

### **16 CFR 1402**

Part 1402 applies to manufacturers and importers of CB base station antennas and TV antennas, used as consumer products, and their supporting structures. It requires these manufacturers to provide notification of ways to avoid the hazard of electrocution present during installation and take-down.

Three types of notification are specified. These are:

- Instructional materials
- Warning labels on products
- Warning statements on packaging

The requirements vary depending upon the type of product. Copies of all notification materials must be provided to CPSC.

### **Instructional Materials**

Instructional materials must be provided with both the antenna and the antenna support structures. Both instructions must contain the following warning statement on the first page: "WARNING: INSTALLATION OF THIS PRODUCT NEAR POWERLINES IS DANGEROUS. FOR YOUR SAFETY, FOLLOW THE INSTALLATION DIRECTIONS." This statement must be legible and conspicuous.

Both instructions must explain the risk of electrocution caused by contact with power lines. The antenna instructions must provide information on types of available support structures and installation instructions for certain support structures. The support structure instructions must provide information on proper site selection

and installation methods. No wording is specified; however, the information must be understandable to a person with a sixth-grade reading ability. The required information should be provided in other languages, as appropriate.

### **Warning Labels**

Both antenna and support structures must bear a warning label that contains the following warnings: "DANGER. WATCH FOR WIRES. You can be KILLED if this antenna comes near electric power. READ INSTRUCTIONS." The regulation specifies the color, typeface, and format of the label. The label must be conspicuous to the installer and be legible for an expected life of at least 3 years. For support structures, the label must be 3 ft. (0.91 m) to 5 ft. (1.52 m) from the base of the structure.

### **Warning Statements**

The statement, "Warning: Installation of this product near powerlines is dangerous. For your safety, follow the enclosed installation directions," must appear on either the packaging or the parts container of any antenna or support structure. The statement must be legible and conspicuous.

### **16 CFR 1204**

Part 1204 applies to CB omnidirectional base station antennas, a subclass of CB radio antenna. These are antenna systems that are designed or intended primarily to exhibit approximately equal signal transmission or reception capabilities in all horizontal directions simultaneously.

The standard establishes performance requirements that each antenna must meet. Manufacturers must certify compliance with these requirements in order to manufacture or sell their products in the United States.

Also, an additional product warning must be provided to supplement the warning required in Part 1402.

### **Performance Requirements**

Antennas must pass two electrical shock protection tests: an Antenna-Mast System (AMS) test, and an Insulating Material Effectiveness (IME) Test. These tests are designed to demonstrate that an antenna will not transmit a harmful current if it contacts a 14.5 kilovolt (kV) power line. If a cable or other added materials are used to meet these requirements, they must be provided with the antenna.

The AMS test is intended to determine whether the antenna can withstand the stress imposed when the antenna falls on a power line. It consists of mounting the antenna to be tested on a specified mast and allowing the assembled antenna and mast to fall onto a power line of 14.5 kV rms phase-to-ground. Current flow measured by a current monitoring device connected to the mast must be no greater than 5.0 milliamperes (mA).

The IME test is intended to determine the durability of the material used to insulate the antenna. It consists of bringing a high voltage electrode or test rod in contact with the antenna. The insulating materials must not breakdown and transmit more than 5.0 mA of current when exposed to the 14.5 kV source for 5 minutes.

### **Certification**

Manufacturers or importers of antenna covered by the standard must issue a certificate stating that the product meets the requirements of the standard. The certificate must state that the product "complies with all applicable consumer product safety standards (16 CFR part 1204)," and provide

the name and address of the manufacturer or importer issuing the certificate; and the date and place of manufacture, if different from the address of the certifier. The certificate must be based on a test of each product or upon a reasonable testing program.

The regulation describes the minimum features of a reasonable testing program and includes requirements for record keeping. This program must include qualification, production, and other testing to show that the product meets the requirements of the standard. This testing may be performed by qualified third parties. In addition, the manufacturer or importer must also establish and maintain records to support the certificates of compliance that they issue.

### **Warning Statement**

The following additional warning statement is required: "Under some conditions, this antenna may not prevent electrocution. Users should keep antenna away from any overhead wires. If antenna contacts a power line, any initial protection could fail at any time. IF ANTENNA NEARS ANY OVERHEAD WIRES, IMMEDIATELY LET GO, STAY AWAY, AND CALL UTILITY COMPANY." This statement must appear on the first page of the instructions in a separate paragraph immediately following the Part 1402 warning statement.

### **Voluntary Standard**

The Telecommunications Industry Association (TIA) publishes a voluntary industry standard for base station antennas. The standard, TIA 329- C, Minimum Standards for Communication Antennas, Base Station Antennas, was last revised in 2003. It applies to linearly polarized antennas for use in

the 25 megahertz (MHz) to 1 gigahertz (GHz) frequency range. The standard gives minimum safety requirements for structural stability of antenna assemblies under various types of loading.

## Loss Control

The CPSC regulations and other appropriate standards should be incorporated into the product safety program of the antenna manufacturer. This program should include additional procedures for addressing product safety concerns throughout the design and manufacture of the product. Typical program elements include:

- Evaluating product designs for compliance with applicable regulations and standards
- Providing appropriate warnings against product hazards
- Establishing a supplier monitoring program to evaluate the quality of third-party component parts
- Establishing a testing program to evaluate the quality of finished products
- Providing instructions for proper care, handling, and use of the product, which includes identifying actions that would cause damage to the product.
- Implementing a product identification system to facilitate corrective actions, if necessary
- Investigating customer complaints for safety implications

## References

1. 16 C.F.R. 1204 (2004).
2. 16 C.F.R. 1402 (2004).
3. Telecommunications Industry Association (TIA). *Minimum Standards for Communication Antennas, Base Station Antennas*. TIA 329-C. Washington, DC: TIA, 2003.
4. U.S. Consumer Product Safety Commission (CPSC). *1997 Annual Estimates of Electrocutions Associated with Consumer Products*. Washington, DC: CPSC. 1999.
5. *1998 Annual Estimates of Electrocutions Associated with Consumer Products*. Washington, DC: CPSC. 2000.
6. *2000 Annual Estimates of Electrocutions Associated with Consumer Products*. Washington, DC: CPSC. 2003.
7. *2001 Annual Estimates of Electrocutions Associated with Consumer Products*. Washington, DC: CPSC. 2004.

▶ To learn more about Hanover Risk Solutions, visit [hanoverrisksolutions.com](http://hanoverrisksolutions.com)



The Hanover Insurance Company  
440 Lincoln Street, Worcester, MA 01653

[hanover.com](http://hanover.com)

Copyright ©2004, ISO Services, Inc.

The recommendation(s), advice and contents of this material are provided for informational purposes only and do not purport to address every possible legal obligation, hazard, code violation, loss potential or exception to good practice. The Hanover Insurance Company and its affiliates and subsidiaries ("The Hanover") specifically disclaim any warranty or representation that acceptance of any recommendations or advice contained herein will make any premises, property or operation safe or in compliance with any law or regulation. Under no circumstances should this material or your acceptance of any recommendations or advice contained herein be construed as establishing the existence or availability of any insurance coverage with The Hanover. By providing this information to you, The Hanover does not assume (and specifically disclaims) any duty, undertaking or responsibility to you. The decision to accept or implement any recommendation(s) or advice contained in this material must be made by you.