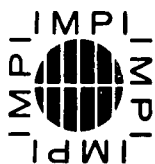


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**Performance  
Standard  
on Leakage from  
Industrial  
Microwave  
Systems "**

**INTERNATIONAL MICROWAVE POWER INSTITUTE**

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**IMPI PERFORMANCE STANDARD  
ON LEAKAGE FROM  
INDUSTRIAL MICROWAVE SYSTEMS**

This standard has been developed by IMPI as a *voluntary* microwave leakage standard for industrial microwave systems. It is intended that products designed under this standard should provide more than adequate safeguards for the limiting of microwave leakage to an acceptable emission level, based on our present knowledge. However, it is not to be inferred that products previously built and not conforming in every detail with this standard are necessarily hazardous.

August 1973

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# INDUSTRIAL MICROWAVE SYSTEMS

## IMPI PERFORMANCE STANDARD ON LEAKAGE FROM

### Applicability

The provisions of this standard are applicable to microwave systems and instrumentation devices employed where microwave energy is utilized as at least one of the major steps in heating and other processing. In order to comply with this standard, manufacturers shall design and test such equipment to meet the requirements specified in the standard.

### Definitions

(a) "Microwave System" means a device designed to apply microwave energy to the materials being processed. This will be through the application of electromagnetic energy at frequencies normally in the ISM heating bands ranging from 500 to 10,000 MHz (megahertz). As defined in this standard, "Microwave Systems" are limited to those manufactured for use in applications other than those defined in #78.212, sub-paragraph (b) of HEW Regulations, BRH/OBD 71-1.

(b) "Applicator" means that portion of the microwave system by or in which the product may be processed.

(c) "Access Means" describes a structural feature that may be moved or unhinged or otherwise opened to provide access to the applicator when it is not operative. During operation it will be in its closed position.

(d) "Entrance or Exit Port" means the aperture whereby a product may enter or leave the microwave system. It differs from the access means in that it is normally open during operation of the microwave system with suppression of microwave leakage accomplished by specified means.

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(e) "Safety Interlock" means a device or system of devices which is intended to prevent generation of microwave energy when access is possible to that part of the equipment which contains microwave energy of power density exceeding  $10\text{mW}/\text{cm}^2$ .

(f) "Service Adjustments or Service Procedures" means those servicing methods prescribed by the manufacturer for a specific product model.

(g) "External Surface" means the outside surface of the cabinet or enclosure provided by the manufacturer as part of the microwave system including doors, door handles, latches, control knobs, and other structural members in any way associated with the microwave system as permanent fixtures. External surface shall be deemed to terminate at the plane(s) of the entrance port(s).

(h) "Product" The product may also be referred to as the load. It is the material being processed.

### **Requirements**

(a). "Power Density Limit" The power density of the microwave energy emitted by a microwave system shall not exceed  $10\text{mW}$  (ten milliwatts) per square centimeter at any point 5 centimeters or more from the external surface of the system measured prior to acquisition by a purchaser.

#### **(b). Measurements and Test Conditions**

(1) Compliance with the power density limit in this paragraph shall be determined by measurements of microwave power density made with an instrument system which (a) reaches 90 percent of its steady-state reading within 3 seconds when the system is subjected to a stepped input signal and which, (b) has a detector with an effective aperture of 25 square centimeters or less, as measured in a plane

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wave, said aperture having no dimension exceeding 10 centimeters. This aperture shall be determined at the fundamental frequency of the system being tested for compliance. The instrument system shall be capable of measuring the power density limits of this section with an accuracy of plus 25 percent and minus 20 percent (plus or minus 1 decibel).

(2) Microwave systems shall be in compliance with the power density limit if the maximum reading obtained in any plane of rotation at the location of greatest microwave leakage does not exceed the limit specified in sub-paragraph (a) of this paragraph.

(3) Measurements shall be made with the microwave system operating under conditions of maximum rated power and with the minimum specified load.

(4) Measurements shall be made with the access means fully closed as well as with the access means fixed in any other position which allows the system to operate.

**(c) Safety Interlocks**

(1) Microwave systems shall have a minimum of two operative safety interlocks which are electrically and mechanically independent for each access means provided.

(2) Service adjustments or service procedures on the microwave system shall not cause the safety interlocks to become inoperative

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or the microwave leakage to exceed the power density limits of this section as a result of such service adjustments or procedures.

(d) Instructions Manufacturers of microwave systems to which this section is applicable shall provide or cause to be provided:

(1) To service dealers and distributors and to others upon request, for each system model, adequate instructions for service adjustments and service procedures including clear warnings or precautions to be taken to avoid possible exposure to microwave leakage.

(2) With each system, adequate instructions for its safe use including clear warnings of precautions to be taken to avoid possible exposure to microwave leakage. Specific attention will be directed to entrance and exit ports which by their nature will be open during operation and may be hazardous to operators who could insert objects into such ports. That hazard will be recognized and will be dealt with by:

- a. Reasonable training procedures and schedules for operating personnel
- b. Strict enforcement of correct practice by competent supervision
- c. A label cautioning against insertion of objects into ports or other misuse