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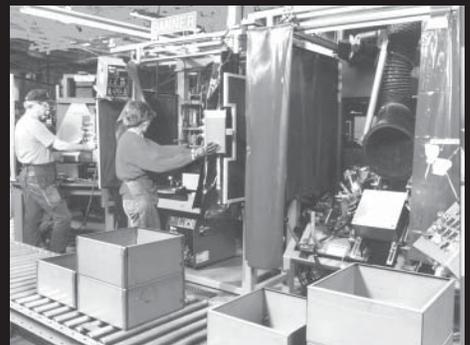
# Specifier Handbook

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**A Consultant's Guide for  
Choosing the Right  
Enclosure**



**SPEC-07**



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## Introduction

This guide is intended to assist in the preparation of specifications for electrical enclosures. We hope it is easy to follow and gives you the opportunity to upgrade sections that may have been dormant for some time.

With many processes, materials and designs changing we sometimes find the old mixed with the new, resulting in product descriptions that cannot be certified or go beyond the current standards in place.

For further assistance please feel free to contact our manufacturing facility in Guelph, Ontario. Our contact numbers are located on the back cover of this publication.

## Intended Use of Electrical Enclosures

Electrical enclosures are designed for commercial and industrial electrical applications and as such should be selected, transported, handled, installed, and re-fabricated by qualified professional electricians. These products are not intended for household applications or use by the general public. All applications of these products should be in accordance with proper inspections, test approvals, warnings, notices, and instructions as indicated by Consumer Product Safety Regulations and all other applicable local, state, provincial, and federal laws.

Hammond Manufacturing supplies enclosures built to the 3rd party specifications (i.e. UL, CSA). Hammond offers no guarantee or warranty as to the applicability of our products outside these specifications. If you have any concerns about the appropriate enclosure selection for your application, please contact Hammond for advice regarding the variables in your particular situation.

## What is a Standards Organization?

- Standards organizations create rating measurements for the performance of many different products.
- There are many standards organizations throughout the world, however those most commonly recognized are North American and European organizations.
- Electrical enclosures are rated by organizations like NEMA, CSA, UL and IEC which identify an enclosure's ability to provide protection from dust, dripping water, hose directed water and more.

While these standards are all intended to guide the user to make the right choice of product, there are some important differences between them.

## Standards Organizations



[www.nema.org](http://www.nema.org)

### **NEMA National Electrical Manufacturers' Association**

- 1300 North 17th Street Rosslyn, VA 22209
- NEMA Standards Publication No. 250 enclosures for Electrical Equipment (1000 Maximum)
- NEMA Standards Publication No. ICS6 enclosures for Industrial Controls and Systems



[www.ul.com](http://www.ul.com)

### **UL Underwriters' Laboratories Inc.**

- 333 Pfingsten Road, Northbrook, IL 60062
- UL 50 Cabinets and Boxes
- UL 508 Industrial Control Equipment
- UL 870 Wireways, Auxiliary Gutter, and Associated Fittings



[www.csa.ca](http://www.csa.ca)

### **CSA CSA International**

- 178 Rexdale Boulevard, Etobicoke (Toronto), Ontario, Canada M9W 1R3
- CSA Standard C22.2, No 0 General Requirements - Canadian Electrical Code, Part II
- CSA Standard C22.2, No 0.4 Bonding and Grounding of Electrical Equipment (Protective Equipment)
- CSA Standard C22.2, No. 14 Industrial Control Equipment for Use in Ordinary (Non-Hazardous) Locations
- CSA Standard C22.2, No. 40 Cutout, Junction, and Pull Boxes
- CSA Standard C22.2, No. 26 Construction and Test of Wireways, and Auxiliary Gutters, and Associated Fittings.
- CSA Standard C22.2, No. 94-M91 Special Purpose Enclosures



[www.amtonline.org](http://www.amtonline.org)

### **JIC Joint Industry Council c/o AMT - The Association for Manufacturing Engineering**

- 7901 Westpark Drive, McLean, VA 22101
- EMP-1 Electrical Standards for Mass Production Equipment
- EGP-1 Electrical Standards for General Purpose Machine Tools
- These standards have been replaced by NFPA-79



[www.eia.org](http://www.eia.org)

### **EIA Electronic Industries Association**

- 2500 Wilson Blvd, Arlington, VA 22201
- EIA RS-310-D Cabinets, Racks, Panels, and Associated Equipment



[www.iec.ch](http://www.iec.ch)

### **IEC International Electrotechnical Commission**

- 3 Rue de Varemb, Geneva, Switzerland
- IEC 60529 Classification of Degrees of Protection Provided by Enclosures



[www.cemarking.net](http://www.cemarking.net)

### **CE Conformite Europeene**

- European Commission



[www.ansi.org](http://www.ansi.org)

### **ANSI American National Standards Institute**

- 1819 L Street NW Washington, DC 20036

## North American Standards

In North America, NEMA, UL and CSA are the most commonly recognized standards organizations.

They are *almost* identical in their rating and testing of enclosures.

### UL and CSA

- Provide “certification labels” to be permanently attached inside the enclosures.
- Require that enclosures be tested in an approved lab in order to prove their performance.
- Inspect manufacturers to ensure they use approved materials and build to tested product designs.

### NEMA, EEMAC and JIC

- Do not provide “certification labels” for enclosures
- Do not provide testing services or require enclosures to be tested.
- Leave compliance and testing to the discretion of the manufacturer.

### JIC Ratings

- JIC or Joint Industrial Commission ratings are standards which (in brief) specify minimum allowable material thickness for various enclosure sizes.

## Hammond Enclosure Ratings

In general, Hammond Enclosures are...

- Listed by **UL**
- Certified by **CSA**
- Comply with **NEMA**
- Comply with **EEMAC**
- Comply with **JIC**
- Comply with **IEC**

## European Standards

### IEC

In Europe, IEC ratings are the most commonly recognized standards for enclosures.

- IEC ratings are similar to NEMA, but the pass or fail requirements are different. (see NEMA to IEC Cross Reference Chart on page 7).
- IEC does not include ratings for enclosures in conditions of corrosion, rust or oil.
- IEC does not provide testing, so testing and compliance is left up to the manufacturer. In Europe, TUV and VDE are two popular testing agencies that manufacturers use.

### CE

- CE is a European Union (EU) symbol, which indicates that the product complies with the EU directives or standards for that product.

CE *does not apply to empty enclosures* because enclosures are components of a final assembly. Testing and compliance to EU directives is the responsibility of the final equipment manufacturer.

## Dual Standards

UL and CSA have markings available that indicate approvals meet standards of their “non-home” country.

- The cUL mark indicates the product has been tested to meet Canadian Standards by the UL organization.
- The cCSAus mark indicates the product has been tested to meet USA standards by CSA.

# NEMA Type Designation

	1	3/3R	4	4X	12/13
<b>Application</b>	<b>Commercial</b> Junction Box Switch Box Pull Box Service & Utility Box	<b>Commercial</b> Weather Proof Meter Cabinet Utility Box	<b>Industrial/ Watertight</b> Electrical Hydraulic or Pneumatic Controls Junction/Terminal Wiring Enclosures Operator Interface/ Consoles	<b>Industrial/ Watertight</b> Corrosion Resistant Electrical Hydraulic or Pneumatic Controls Junction/Terminal Wiring Enclosures Operator Interface/ Consoles with Corrosion Resistant Properties	<b>Industrial Oil &amp; Dust Tight</b> Electrical Hydraulic or Pneumatic Controls Junction/Terminal Wiring Enclosures Operator Interface/ Consoles
<b>Hammond Product Series</b>	N1J N1A CSKO CS CHKO 1416 1439 1420 N1W	C3R EJ 1414N4 EN4SD	EJ 1414N4 EN4SD 1418N4 1422N4	EJ...SS 1414N4SS 304/316 EN4SD...SS 304/316 1418N4SS 304/316 1422N4SS 304 PJU P JW PHW PW PB PJFS 1554	EJ 1414 EN4SD 1418 1422 1436 1438 2UD 2UHD Series 2000 Consoles IME
<b>National Electrical Manufacturers Association (NEMA Standard 250)</b>	Enclosures constructed for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment to provide a degree of protection against falling dirt.	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with enclosed equipment to provide a degree of protection against falling dirt, rain, sleet, snow and windblown dust and that will be undamaged by the external formation of ice on the enclosure.	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment: to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, hose directed water, and hose-directed water; and that will be undamaged by the external formation of ice on the enclosure.	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, hose-directed water, and corrosion; and that will be undamaged by the external formation of ice on the enclosure.	Enclosures constructed (without knockouts) for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against circulating dust, lint and fiber flyings; and against dripping and light splashing of liquids.
<b>Underwriters Laboratories Inc. (UL 50 and UL 508)</b>	Indoor use primarily to provide a degree of protection against limited amount of falling dirt.	Outdoor use primarily to provide a degree of protection against rain, sleet, windblown dust, and damage from external ice formation.	Indoor or outdoor use primarily to provide a degree of protection against windblown dust, and rain, splashing water, hose-directed water; and damage from external ice formation.	Indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, hose-directed water; and damage from external ice formation.	Indoor use primarily to provide a degree of protection against circulating dust, falling dirt, and dripping non-corrosive liquids.
<b>Canadian Standards Association (Standard C22.2, Nos. 14, 40 and 94)</b>	General purpose enclosure in ordinary locations.	An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against rain, snow, and windblown dust; undamaged by the external formation of ice on the enclosure.	An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against rain, snow, windblown dust, splashing and hose-directed water; undamaged by the external formation of ice on the enclosure.	An enclosure for either indoor or outdoor use, constructed so as to provide a degree of protection against rain, snow, windblown dust, splashing and hose-directed water; undamaged by the external formation of ice on the enclosure; resists corrosion.	An enclosure for indoor use, constructed so as to provide a degree of protection against circulating and settling dust and lint, fibre flyings; dripping and light splashing of non-corrosive liquids; not provided with knockouts.

## Protection Rating - Quick Selection Guide

Provides a degree of protection against:	Type 1	Type 3R	Type 12	Type 13	Type 4	Type 4X
Contact w/ Enclosed Equipment	✓	✓	✓	✓	✓	✓
Falling Dirt	✓	✓	✓	✓	✓	✓
Falling & Lightly Splashing water	✗	✓	✓	✓	✓	✓
Dust	✗	✗	✓	✓	✓	✓
Oil & Coolant	✗	✗	✗	✓	✗	✗
Sleet & Ice	✗	✓	✗	✗	✗	✗
Splashing Water & Hose-Down	✗	✗	✗	✗	✓	✓
Corrosives	✗	✗	✗	✗	✗	✓
<b>NEMA to IEC Cross Reference*</b>	<b>IP20</b>	<b>IP22</b>	<b>IP54</b>	<b>IP54</b>	<b>IP66</b>	<b>IP66</b>

\* This cross reference is an approximation of NEMA and IEC classifications for reference only. Please consult the appropriate JIC agencies for requirements and test qualifications for complete information.

## Industry and the Products they use

The following is a list of those industries with the enclosures most commonly used by them.

Industry	Examples of Products Used
Utilities, Municipalities (water/waste water)	Industrial Enclosures, Non Metallic NEMA 12 & 4X
Saw Mills, Pulp & Paper, Mining	Industrial Disconnect Freestanding, Corrosion Resistant
Farm, Irrigation Systems	Corrosion Resistant, Non Metallic NEMA 4X
Transportation Industries	Industrial Enclosures, Aluminum NEMA 12 & 4
Marine, Naval, Canadian Forces	Industrial, Freestanding NEMA 4X & 4, Non Metallic & Stainless Steel
General Industries	Industrial Modular Operator Interface
Process Industries (oil, chemical, food processing)	Industrial Corrosion Resistant, 316 Stainless Steel



## Corrosion Protection - Mild Steel/Powder Coat

Users of older Hammond Manufacturing catalogs will have noticed a change to the ratings noted for Type 4 painted mild steel enclosures. Previously, Hammond catalogs have shown that these enclosures also carried the Type 4X designation, but this is no longer noted in the catalog. There has been NO CHANGE WHATSOEVER to the quality of the Hammond paint finish. Hammond has removed the 4X approval from the catalog only to avoid misapplication of painted steel enclosures. The testing criteria for Type 4X is not as rigorous as many users may assume.

It is important for users to understand the NEMA 4/4X rating. In response to concern about the costs of corrosion, the Underwriters' Laboratory (UL) and the National Electrical Manufacturers' Association (NEMA) have developed a rating system for electrical enclosures, stipulating that certain minimum conditions of corrosion resistance be met.

Material tested to UL1332 (type 4 protective coating) is prerequisite to a type 4X salt spray test. The NEMA 4X rating is applied to material that has met, under laboratory conditions, a six hundred hour salt spray with no worse pitting than that exhibited on a Type 304 Stainless sample run at the same time. This rating, however, does not test for corrosion resistance beyond this, or with chemicals other than salt.

### Corrosion Resistance of Various Enclosure Materials\*

		Suitability		
		Limited	Satisfactory	High
Material Type	Acids	Aluminium	Fiberglass Steel - Powder Paint	Stainless Steel Type 316 Stainless Steel Type 304
	Alkalies	Steel - Powder Paint Aluminium	Fiberglass	Stainless Steel Type 316 Stainless Steel Type 304
	Solvents			Stainless Steel Type 316 Stainless Steel Type 304 Fiberglass Aluminium Steel Powder Painted

**Acids:** Hydrochloric acid, nitric acid, sulphuric acid, acetic acid, magnesium, chloride, sea water

**Alkalies:** Sodium hydroxide, potassium hydroxide, calcium hydroxide, ammonia, pyridine, hydroxylamine, methylamine

**Solvents:** Acetone, ethyl alcohol, lacquer thinner, methylene chloride, mineral spirits, turpentine, toluene, unleaded gasoline, xylene

\* This chart provides a quick reference but does not address material concentration levels or other environmental impacts. For more detailed information,

### Suggested Applications for Corrosion Resistant Enclosures

Material Type	Hammond NEMA Rating	Suggested Application
<b>Stainless Steel Type 304</b>	4X	Indoor/outdoor applications. Ideal for hose-down and wet areas (eg. food processing, water treatment, dairies, breweries, etc.)
<b>Stainless Steel Type 316</b>	4X	Indoor/outdoor applications. Ideal for most environments, especially marine.
<b>Aluminum</b>	4	Indoor/outdoor applications. Ideal for environments containing solvents, petrochemicals, some acids and most sulfates and nitrates. Light weight provides for easier handling.
<b>Fiberglass Reinforced Polyester</b>	4X	Indoor/outdoor applications. Ideal for continually wet, cold or salty environments. Also useful in solvent or chemical laden areas. Strong resistance to heat, dilute acids and bases, impact, fire and outdoor exposure.

## Pre-Treatment and Paint Process

Hammond offers a number of standard colors including ASA 61 gray, RAL 7035 and panel white. The ultra durable powder paint is applied to a multi-staged washing, rinsing and phosphating undercoating. Hammond standard finishes can be re-painted and detailed recoating information is published in catalogs and also included with insert sheets shipped with the product.

Hammond has established, documented, implemented, and maintained a quality management system and has continually improved its effectiveness in accordance with the requirements of the ISO 9001:2000 International Standard.

Process	Function
Wash & Rinsing	Cleaning solution aids rinsing agents, prepares surface for conversion coatings
Phosphate Coating	Corrosion protection agent plus surface prep for superior paint adhesion
Powder Coating	Electrostatically applied for uniform coverage on all surfaces edges and recessed areas
Bake Cycle	Baked at 400°F



*Wash, Rinsing*



*Phosphate Coating Line*



*Powder Painting*



*Baking*

## Powder Coating Reference Chart

The majority of enclosure suppliers, including Hammond, utilize polyester powder paint in their manufacturing process.

Properties	Polyester TGIC*	Hybrid Polyester	Polyurethane	Epoxy
<b>Outdoor Weathering</b>	Excellent	Fair	Good	Fair
<b>Flexibility</b>	Excellent	Good	Good	Good
<b>Adhesion</b>	Excellent	Excellent	Excellent	Excellent
<b>Chemical Resistance</b>	Good	Good	Good	Good/Excellent
<b>Solvent Resistance</b>	Good	Good	Good	Excellent
<b>Hardness - Scratch Resistance</b>	Good	Good	Good	Excellent

\*Hammond Powder Coating

The performance of the various paints listed above can change and is dependent on the variety and effects of the different acids and solvents used.

## Two Design Styles

The application or use normally decides the style. For example, if frequent opening is required, the new 1/4 turn contemporary design is faster and easier than removing the compression clamps. If the application demands heavy equipment mounted to the doors or large cutouts that weaken the door structure, a heavy duty traditional style is recommended. Hammond offers a variety of both Traditional and Euro/Contemporary designs with various NEMA ratings, material types and features.

### Traditional Design

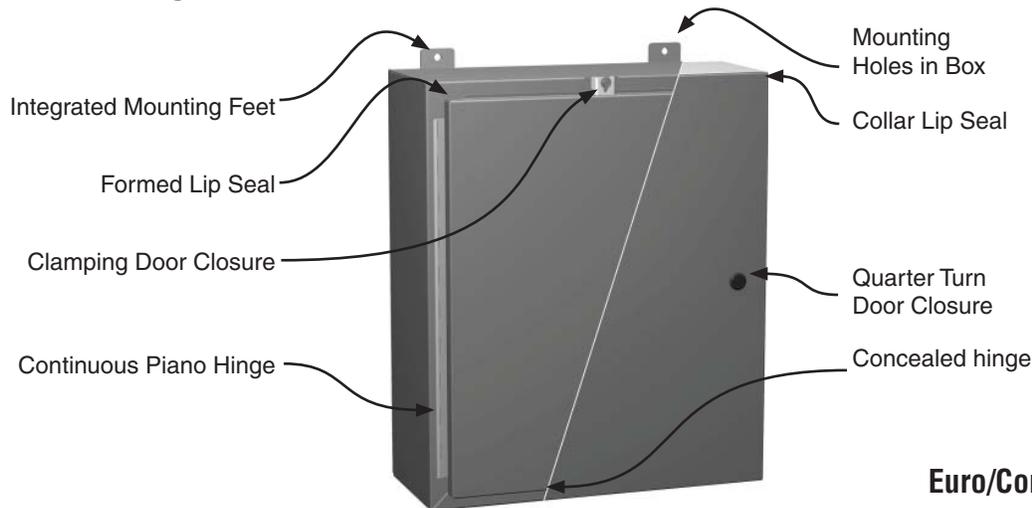
Traditional design is generally heavy duty or severe environment conditions.

### Euro or Contemporary Design

Euro/Contemporary design is generally used for appearance, ease of entry or for use with modular accessories.

#### 1418 Series

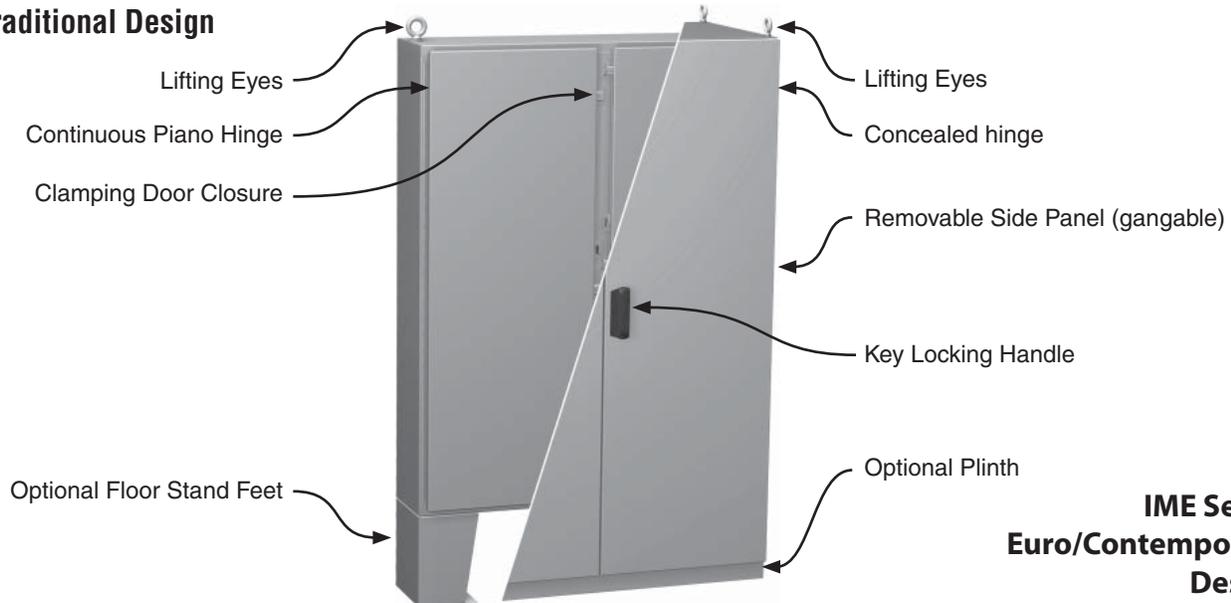
##### Traditional Design



#### Eclipse Series Euro/Contemporary Design

#### 1422 Series

##### Traditional Design



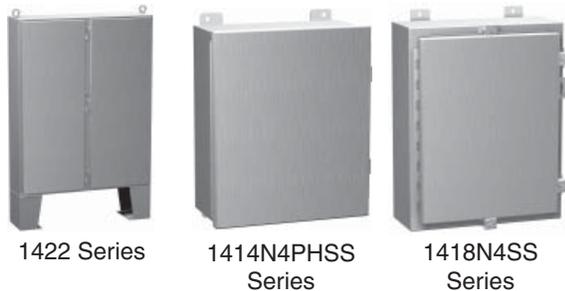
#### IME Series Euro/Contemporary Design

## Features and Benefits of Enclosure Types

Features	Traditional	Euro/Contemporary
<b>Enclosure Types</b>	Wallmounts, Floormounts, Freestanding	Wallmounts, Floormount, Modular
<b>NEMA Rating</b>	Type 12, 4 & 4X	Type 12, 4 & 4X
<b>Material Type</b>	Mild Steel, SS, Non-metallic	Mild Steel, SS, Non-metallic
<b>Finish</b>	Mild Steel ASA 61 Gray exterior White interior  Stainless Steel - brushed Non-Metallic - Gray	Mild Steel ASA 61 Gray exterior RAL 7035 interior/exterior  Stainless Steel - brushed Non-Metallic - Medium Gray
<b>Hinges</b>	Continuous piano hinge Advantage - greater strength	Concealed Hinge Advantage - easily removable
<b>Door Closure</b>	Clamps, screws or handle Advantage - maximum surface area	Quarter Turn - 2 or 3 Point handle Advantage - easily accessible entry
<b>Padlocking</b>	Comes standard on enclosure	Accessory Padlock Adaptor available
<b>Mounting Options</b>	Integrated Mounting Feet	Holes through box or optional feet
<b>Lip Construction</b>	Flat or formed lip seal	Collar lip seal
<b>Inner Panel</b>	White inner panel included	White or galvanized inner panel available as an accessory.*

\* Eclipse Junior Series includes a galvanized inner panel. IME Series includes white inner panel.

### Traditional Style



### Euro/Contemporary Style



## Writing the Enclosure Specification

This section is designed to provide specification writing guidelines.  
The following pages contain:

<b>Step #1 - Specifying the Manufacturer</b> .....	<b>page 12</b>
Describes why it is important to specify manufacturers.	
<b>Step #2 - Generic Description</b> .....	<b>page 13</b>
The generic description templates lay out the basic features generally noted on an enclosure specification.	
<b>Step #3 - Detailed Description</b> .....	<b>page 14</b>
The detailed description templates illustrate the specific product details the designer expects. Traditional and contemporary details are documented for reference.	
<b>Modification Information</b> .....	<b>page 20</b>
When customers require very specific designs, many manufacturers, including Hammond, offer modification services of their standard product.	

### Specifying Manufacturer

Specifying catalog numbers ensure certain features are maintained, or at least illustrated, for those quoting and supplying the product. This also establishes the quality grade from one of the manufacturers being named that could be transferred through to other pre-qualified manufacturers who you deem of equal stature.

Acceptable Manufacturers are:

1. Hammond Manufacturing
2. ...
3. ...

## Generic Description Templates

### 1. Commercial NEMA Type 1 Enclosures - Junction Boxes, Pull Boxes, Splitter Boxes and Troughs

Junction, pull and switch boxes for general purpose, indoor commercial use:

- Must carry CSA label and meet NEMA/EEMAC classification
- Formed and spot welded from 12, 14 or 16 gauge steel
- Screw cover or hinged cover
- Finished in ASA 61 gray powder coating

Splitter boxes and troughs for indoor distribution of up to 600 amp service:

- Must carry CSA, UL or cUL label and meet NEMA/EEMAC classification
- Accommodates either 3 or 4 wires
- Formed and spot welded from 14 or 16 gauge steel, including factory installed splitter blocks
- Finished in ASA 61 gray powder coating

## Generic Description Templates...cont'd

### 2. Commercial Outdoor NEMA Type 3R - Enclosures

General purpose outdoor enclosures are intended for surface mounting and will be of the following minimum standard:

- Must carry CSA, UL or cUL label and meet NEMA/EEMAC Type 4X classification (as required)
- Formed and welded from 12, 14 or 16 gauge steel (preferably galvanized steel)
- Finished in ASA 61 powder coating

### 3. Industrial NEMA Type 12, 4, 4X - Enclosures and Cabinets

#### Mild Steel Construction

Enclosures are intended for surface mounting and will be of the following minimum standard:

- Must carry CSA, UL or cUL label and meet NEMA/EEMAC Type 12 or 4 classification (as required)
- General construction shall be of sheet steel with all welds to be continuously finished smooth, free of all burrs, scale and imperfections
- Shall be stiffened to prevent any deformation or bowing during installation and after components are mounted
- All doors are to be formed flush fitting with all welds ground smooth
- Latching as specified with permanent gasket installed
- Supply print pocket for documentation
- Internal mounting panel

#### Stainless Steel Construction

Enclosures are intended for surface mounting and will be of the following minimum standard:

- Must carry CSA, UL or cUL label and meet NEMA/EEMAC Type 4X classification (as required)
- Unless otherwise specified material to be type 304 or 316 with a brushed finish, depending on application, with all hardware of the same or higher grade
- General construction shall be of sheet steel with all welds to be continuously finished smooth, free of all burrs, scale and imperfections
- Shall be stiffened to prevent any deformation or bowing during installation and after components are mounted
- All doors are to be formed flush fitting with all welds ground smooth, latching as specified with permanent gasket installed
- Supply print pocket for documentation
- Internal mounting panel

#### Fiberglass Re-inforced Polyester Construction

Enclosures are intended for surface mounting and will be of the following minimum standard:

- Must carry CSA, UL or cUL label and meet NEMA/EEMAC Type 4X classification (as required)
- Manufactured of fiberglass-reinforced polyester with all stainless steel hardware and padlocking provision
- Internal mounting panels will be supported by reinforced fittings

## Detailed Description Templates

### Small Wallmounts

Size Range - 4x4x3 inches (100x100x75mm) - 16x14x10 inches (400x355x250mm)

Manufacturer shall construct from 14 or 16 gauge sheet steel. All welds are to be continuous, finished smooth and free of all burrs, scales and imperfections. Body shall have integrated mounting feet with ground studs and rear mounting panel. Door shall be removable and have a permanently secured gasket with bonding studs.

	Traditional	Contemporary/Euro
<b>Material &amp; Finish</b>	Mild steel finish in ASA 61 grey inside and out Stainless steel 304 or 316 brushed finish	Mild steel finish in ASA 61 grey inside and out Stainless steel 304 or 316 brushed finish
<b>Ratings</b>	NEMA 12 NEMA 4 NEMA 4X	NEMA 12 NEMA 4 NEMA 4X
<b>Construction Details</b>	Compression clamps or screws Flat lip seal	1/4 turn latch Collar lip seal
Hammond	1414PH Series 1414SC Series 1414 Series	Eclipse Junior Series (EJ)

#### Spec Tips:

- Traditional series for most severe conditions.
- Euro/Contemporary dual rating NEMA 12/4 offer great application flexibility

#### Accessories common for both styles:

- Terminal kits, Breather kits, Thermostats, Heaters

#### Additional accessories for Euro Style:

- Key and pad lock kits, galvanized inner panels



1414N4PH Series



1414SC Series



Eclipse Junior

## Detailed Description Templates

### Medium/Large Wallmounts - Single Door and Safety Disconnect

Size Range - 12x12x6 inches (300x300x150mm) - 60x36x20 inches (1530x915x500mm)

Manufacturer shall construct from 14-16 gauge sheet steel. All welds are to be continuous, finished smooth and free of all burrs, scales and imperfections. A ground stud shall be provided in the enclosure with a rear mounting panel. Doors shall be removable and have permanently secured gaskets with bonding studs.

	Traditional	Contemporary/Euro
<b>Material &amp; Finish</b>	Mild steel finish in ANSI 61 grey outside, white inside Stainless steel 304 or 316 brushed finish	Mild steel - RAL 7035 or ANSI 61 grey inside and out Stainless steel 304 or 316 brushed finish
<b>Ratings</b>	NEMA 12 NEMA 4 NEMA 4X	NEMA 12 NEMA 4 NEMA 4X
<b>Construction Details</b>	Compression clamps or handles Piano hinge with removable pin Formed lip seal White inner panel Pad lock hasp Integrated mounting feet Gasket retainers	1/4 turn latch handles Concealed hinge and pin Collar lip seal White or galvanized inner panel Optional pad lock adaptor Optional mounting feet
<b>Hammond</b>	1418 Series 1418N4 Series 1418N4SS Series 1447S Disconnect Series 1447SN4 Disconnect Series 1447SN4SS Disconnect Series	Eclipse Series Eclipse Stainless Steel Series Eclipse Disconnect Series

#### Spec Tips:

- Traditional series offer greatest strength and weight capacity for the most severe conditions
- Euro/Contemporary offers more options like latching and handle combinations and dual NEMA 12/4 ratings.

#### Options:

- Material thickness upgrade on doors primarily
- Add stainless steel hinging to Type 12 enclosures
- 2 and 3 point latching systems
- Factory installed accessories

#### Accessories common for both styles:

- Door stop kits, Window kits, Air conditioners, Heaters, Filter fans, Thermostats, Literature pockets, Light kits, Drip shields

#### Additional accessories for Euro Style:

- Swing frames, Swing panels, Gland plates, DIN rail kits, Key, handle & pad lock accessories



1418J Series



Eclipse Series



1418N4 Series



1447S Disconnect Series

## Detailed Description Templates

### Two Door Enclosures (Wallmounts and Floor mounts)

Size Range - 24x42x8 inches (600x1060x200mm) - 72x72x24 inches (1820x1820x600mm)

Manufacturer shall construct from 12 - 14 gauge sheet steel. All welds to be continuous, finished smooth and free of all burrs, scales and imperfections. A ground stud shall be provided in the enclosure with rear mounting panel. Doors shall be removable and have permanently secured gaskets with bonding studs.

	Traditional	Contemporary/Euro
<b>Material &amp; Finish</b>	Mild steel - ASA 61 grey outside, white inside Stainless steel 304 or 316 brushed finish	Mild steel - RAL 7035 or ASA 61 grey inside and out
<b>Ratings</b>	NEMA 12 NEMA 4 NEMA 4X	NEMA 12 NEMA 4
<b>Construction Details</b>	On NEMA 12 - 3 point key handle Piano hinge with removable pin Formed lip seal White inner panel Integrated mounting feet Lifting eyes (large units only)	On NEMA 12/4 - 3 point key handle Stainless Steel concealed hinge and pin Collar lip seal White or galvanized inner panel Optional mounting feet
<b>Hammond</b>	1422 Series (Wall or floor mount) 1422N4 Series (Wall or floor mount) 2UD Disconnect Series (Wall or floor mount) 2UDCP Disconnect Series (Wall or floor mount)	Eclipse Two Door Series (Wall mount)

#### Spec Tips:

- Traditional units support greater panel and door loads, especially in freestanding applications.
- Euro offers more options like latching and handle combinations along with dual NEMA 12/4 ratings

#### Options:

- Material thickness upgrade on doors primarily
- Add stainless steel hinges to type 12
- Change in handle type, key and pad lock options
- Factory installed accessories

#### Accessories common for both styles:

- Door stop kits, Window kits, Air conditioners, Heaters, Filter fans, Thermostats, Literature pockets, Light kits, Drip shields

#### Additional accessories for Euro Style:

- Gland plates, DIN rail kits, Pad lock accessories



1422 Floormount Series



1422 Wallmount Series



Eclipse Two Door Series



2UDCP Disconnect Series

## Detailed Description Templates

### Large Heavy Duty Single and Multi Door Free Standing Enclosures

Size Range 60x24x18 inches (1520x600x450mm) - 90x72x36 inches (2280x1820x910mm)

Manufacturer shall construct frame from 10-14 gauge sheet steel. All welds to be continuous, finished smooth and free from all burrs, scales and imperfections. A ground stud shall be provided in the enclosure with rear mounting panel. Doors shall be removable and have permanently secured gaskets with bonding studs.

	Traditional	Contemporary/Euro
<b>Material &amp; Finish</b>	Mild steel - ASA 61 grey outside, white inside Stainless steel 304 or 316 brushed finish	Mild steel - RAL 7035 inside and out
<b>Ratings</b>	NEMA 12 NEMA 4 NEMA 4X	NEMA 12
<b>Construction Details</b>	On NEMA 12 - 3 point key handle Piano hinge with removable pin White inner panel Lifting eyes On NEMA 4 - Compression clamps Removable center post Pad lock hasp	3 point key handle Concealed hinge with removable pin White or galvanized inner panel Lifting eyes Not available
<b>Hammond</b>	1418 Series 1422MD UHD Disconnect Series UHDM Disconnect Series	IME Series IMET Series IPC Series IMFD Disconnect Series

#### Spec Tips:

- Traditional units support greatest weight and can be lifted into position without extra support.
- Euro provides 360 degree accessibility to internal construction plus easy modular sections for expansions.

#### Options:

- Material thickness upgrade on doors primarily
- Add stainless steel hinges
- Change in handle type, key and pad lock options
- Factory installed accessories

#### Accessories common for both styles:

- Door stop kits, Window kits, Air conditioners, Heaters, Filter fans, Thermostats, Literature pockets, Light kits, Drip shields, Disconnect adapter kits, Depth mounting panels

#### Additional accessories for Euro Style:

- Swing frames, Swing panels, Gland plates, DIN rail kits, Pad lock accessories



1418 Freestanding Series



UHD Disconnect Series



IME Series



IPC Series

## Industrial Type 4X Wallmounts - Non-Metallic

### Small Wallmounts

Size range 4x4x3 (100x100x75mm) - 16x14x10 (400x355x250mm)

	Traditional	Contemporary/Euro
<b>Construction Details</b>	Fiberglass Reinforced Polyester Exterior mounting feet Latch, twist or Screw Cover Continuous piano hinge, removable pin Unpainted aluminum, fiberglass or white inner panel available	Fiberglass Reinforced Polyester Exterior mounting feet Screw Cover Optional non-metallic hinge Unpainted aluminum, fiberglass or white inner panel available
<b>Finish</b>	Gray	RAL 7032 or RAL 7035
<b>Hammond</b>	PJ Series	PB Series PJU Series

### Medium/Large Wallmounts

Size range 12x12x6 (300x300x150mm) - 72x30x24 (1820x760x600mm)

	Traditional	Contemporary/Euro
<b>Construction Details</b>	Fiberglass Reinforced Polyester Exterior mounting feet Compression clamps (twist type) Padlock provision\ Continuous piano hinge, removable pin White inner panel available	Fiberglass Reinforced Polyester Exterior mounting feet 1/4 turn latch Padlock adaptor available Concealed hinge, removable pin White or aluminum inner panel available
<b>Finish</b>	Gray	RAL 7032
<b>Hammond</b>	PJ Series PHW Series	PB Series PW Series



PJU - Clear Cover



PJU Series



PJ Series



PB Series



PHW Series



PW Series

## Commercial Type 1

	Junction Box		Panel Enclosures	Splitter Box/Trough	Meter Cabinets
	Screw Cover	Hinge Cover			
<b>Construction</b>	Mild Steel 14, 16 ga.	Mild Steel 14,16 ga.	Mild Steel 14,16 ga.	Mild Steel 14,16 ga.	Mild Steel 14,16 ga.
<b>Covers</b>	Flat keyhole slots	Formed with 1/4 turn slot	Formed with 1/4 turn slot	Formed with screws provision for sealing wire	Padlocking Hasp
<b>Conduit Entry</b>	With/without K/Os	With K/Os	No K/Os	With K/Os	
<b>Finish</b>	ASA 61 Inside/out	ASA 61 Inside/out	ASA 61 Inside/out	ASA 61 Inside/out	ASA 61 Inside/out
<b>Hammond</b>	CSKO (with K/Os) CS (no K/Os)	CHKO	N1J 1420 N1A	CSB (box) CST (trough)	CMC



CSKO Series



CSB Series



CMC Series



N1J Series

## Commercial Type 3R

	Junction Box Screw Cover	Panel Enclosures	
		Latched Hinge Cover	Screw Hinged Cover
<b>Construction</b>	Mild Steel 14,16 ga. (Galvanized preferred), overhanging rain hood	Mild Steel 14,16 ga. (Galvanized preferred), overhanging rain hood	Mild Steel 14,16 ga. (Galvanized preferred), overhanging rain hood
<b>Covers</b>	Formed with screw cover and padlocking hasp	Hinged, formed with padlockable flip hatch	Hinged, formed with screw cover and padlocking hasp
<b>Conduit Entry</b>	With K/Os	With K/Os	No K/Os
<b>Finish</b>	ASA 61 Inside/out	ASA 61 Inside/out	ASA 61 Inside/out
<b>Hammond</b>	C3R...SC	C3R...HCR	C3R...HCR



SC Series



HCR Latch



HCR Screw

## Modification Services

When a standard enclosure isn't exactly what you need, Hammond can modify our designs for the ideal enclosure solution. Should you need some assistance specifying your enclosure, our experienced sales and design professionals will share their expertise to help determine which enclosure would best fit your needs. Why have Hammond modify your enclosure?



*Wallmount Enclosures*



*Modular Freestanding Enclosures*



*19" Rack Cabinets  
Standard and Type 12*



*Large Box Enclosures*



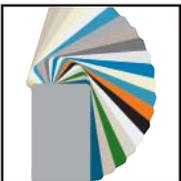
*Modular Consoles*

There are two good reasons - **quality** and **cost**.

Hammond is a name trusted for enclosure quality for many years. Our highly accurate laser work centers and CNC punches can guarantee the exact location and dimensions of your holes and cutouts. Our ultra-durable powder paint can be color matched to your specifications ensuring a factory quality paint finish every time.

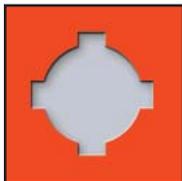
Consider the true costs of modifying enclosures at your factory. When you add up prep time, layout, drilling, tapping, cutting, paint touch up, assembly and the extra product handling, you'll see the value in getting an enclosure from Hammond that's ready to load up.

### Common Modifications



**Paints**

- Standard Colors
- Custom Colors



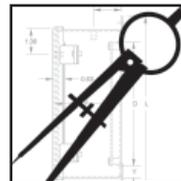
**Holes & Cutouts**

- Knockouts
- Punches



**Mounting**

- Studs
- Tapped Holes
- Mounting Struts



**Construction Changes**

- Dimension Changes
- Stiffeners



**Accessories**

- Windows
- Shelves
- Climate Control

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- Commercial Enclosures
- Climate Control
- General Accessories
- Technical Information
- Hoffman Cross Reference
- Part Number Index

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**Service Excellence**

Our difference is industry leading service you can trust. We know there are many enclosure supplier alternatives, but it's our service that makes Hammond different. We've committed our people and resources to ensuring you get exactly what you need, when you need it.

**Polyester Modular Enclosures - NEMA 4X**  
250 Series - T-rod Latch, Hinged Cover, Gasketed Hinged Door

**Application**

- Designed for use as an enclosure for electrical, electronic, hydraulic or pneumatic control equipment, electrical junction boxes or terminal using applications.
- Provides outstanding insulation and protection when equipment may be housed down to the zero level.
- Used in applications with high temperatures or highly corrosive environments.

**Standards**

- UL 508 Type 1, 2, 3, 4, 4X, 12 and 13
- CAN Type 1, 2, 3, 4, 4X, 12 and 13
- Canadian safe
- NEMA Type 1, 2, 3, 4, 4X, 12 and 13
- IEC 60529, IP66

**Construction**

- Molded thermoplastic polyester enclosure with matching cover is easily portable, safe, durable.
- Enclosure is chemically resistant against outdoor weathering.
- Standard DC cover latch (SP) is 30" x 30" outdoor weathering.
- Troughed cover inserts are provided for superior cover seal against air leakage. Mounting hardware is included.
- Cabinet steel latches Type T-rod latch are standard.
- Door features include a provision for padlocking.
- Enclosure available with clear polycarbonate cover to 30" x 14".
- Cabinet available with stainless steel.
- Capable of withstanding greater pressure a positive seal.
- Available with polyethylene flange or foot mount brackets for multi-directional mounting.
- Operating temperature range is from -40°C (40°F to +60°C).
- Paper stock of 4.75 (12 AWG).
- For complete installation information, please refer to table in the technical information section.

**Finish**

- Thermoplastic polyester material has a gray finish.
- Standard cover panels are available in thermoplastic control finished color or colorized stainless steel or Fiberglass.

**Accessories**

- Painted steel inner panels
- 430/316 ending panel
- Fiberglass inner panels
- Troughed lid accessories

**Technical Information**

Front View, Side View, Latch Location, Rear View, Back View

Part No.	Panel Size	Overall Dimensions	Panel Size	Color	Finish	Mounting Hardware
PS4000	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4001	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4002	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4003	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4004	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4005	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4006	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4007	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4008	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4009	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4010	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4011	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4012	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4013	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4014	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4015	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4016	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4017	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4018	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4019	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4020	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4021	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4022	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4023	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4024	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4025	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4026	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4027	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4028	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4029	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4030	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4031	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4032	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
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PS4035	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4036	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4037	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
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PS4047	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4048	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4049	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4050	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
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PS4057	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
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PS4060	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4061	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4062	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
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PS4064	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4065	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4066	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4067	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4068	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4069	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4070	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4071	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4072	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4073	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4074	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4075	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4076	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4077	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
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PS4079	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4080	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4081	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
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PS4091	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4092	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4093	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4094	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4095	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4096	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4097	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4098	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4099	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard
PS4100	14.00 x 14.00	14.00 x 14.00	14.00 x 14.00	Gray	Standard	Standard

## Information Available Online:

- Searchable Product Database
- Spec Sheet Downloads
- New Product Announcements
- Climate Control Sizing Downloads
- Engineer Drawing Downloads
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## Warranty Information

### Hammond Product Warranty

All goods sold by HAMMOND MANUFACTURING COMPANY INC, are warranted to be free from defects in material and workmanship for a period of one year from date of shipment. This express warranty is in lieu of and excludes all other warranties whether expired or implied by operation of law or otherwise, including any warranty on the merchantability or fitness for a particular purpose. Defective goods may be returned to HAMMOND MANUFACTURING COMPANY INC. After inspection by the Company and upon receipt of definite shipping instructions, goods so returned will be replaced or repaired without charge, provided however, that HAMMOND MANUFACTURING COMPANY INC, shall not be liable for loss, damage or expense directly or indirectly resulting from the use of the product or from any other cause, the exclusive remedy against HAMMOND MANUFACTURING COMPANY INC, being to require the replacement or repair of defective products.

**Note:** By this warranty, HAMMOND MANUFACTURING COMPANY INC, is not obligated where products have been subject to careless handling, improper application, or faulty installation, and any obligation, guarantee or liability whatsoever except as stated above is hereby expressly disclaimed.

