



What is IBC?

International Building Code

The International Building Code (IBC) is a comprehensive set of regulations addressing both the structural design and the installation requirements for building systems – including HVAC and Industrial Refrigeration equipment.

How Does IBC Apply to Cooling Towers, Closed Circuit Coolers and Evaporative Condensers?

All EVAPCO towers, coolers and condensers have an associated seismic (S_{DS}) and wind load (P) capability which is a function of construction; standard or upgraded. Most model lines also have an upgraded construction option if higher seismic or wind load ratings are needed. The purpose of this document is to explain the new terms and to help explain how these ratings should be considered when selecting units.

Importance factor (I_P), seismic requirement (S_{DS}) and wind load requirement (P) as defined in the paragraphs below are required from the project specific structural documents and should be used for all final selections.

Tables containing applicable structural capability information for EVAPCO product lines are located at the end of this document.

Importance Factor:

Importance factor is used to designate installations that have strategic importance in an emergency (i.e. hospital) or have a toxic substance (i.e. ammonia). Importance factor is identified by the symbol I_P . **The I_P value is not something that you will need to determine; it must be indicated on the structural drawings for the job being bid.** Installations that are not critical are designated with an importance factor of 1.0. Installations that are critical, such as hospitals and communication centers, or have a toxic substance are designated with an importance factor of 1.5.

Units assigned an importance factor of 1.5 (due to the facility being critical) require that they be verified via physical (shake table) test by a 3rd party. Tests are performed to verify the structural and functional integrity of the units and their attachments following exposure to a simulated seismic shake. In other words, units for critical jobs have to be put on a test table and shaken to confirm that the stated seismic ratings are accurate.

Individual units do not have to be tested, but a unit from the product line (i.e. AT) being offered has to be tested for the entire product line to be qualified.

Units assigned an importance factor of 1.5 for a toxic substance may have their seismic capability verified via either a shake table test or analysis. In fact, condensers generally do not need to be shake table tested.

All EVAPCO product lines qualify for I_P 1.0 jobs. Please refer to the tables at the end of this document for EVAPCO product lines that qualify for I_P 1.5 jobs.

Seismic Requirement:

Seismic requirement is used to designate installations that require upgraded structural design. Seismic requirement, as defined in the most recent IBC, is identified by the term S_{DS} . **The S_{DS} value is not something that you will need to determine; it must be indicated on the structural drawings for the job being bid.**

In the tables at the end of this document, you will find S_{DS} capabilities for EVAPCO product lines. Values are shown for the unit with standard construction as well as for the unit with upgraded structural design.

Wind Load Requirement:

Wind load requirement is used to designate installations that require upgraded structural design. Wind load requirement, as defined in the most recent IBC, is identified by the term P . **The P value is not something that you will need to determine; it must be indicated on the structural drawings for the job being bid.**

In the tables at the end of this document, you will find P capabilities for EVAPCO product lines. Values are shown for the unit with standard construction as well as for the unit with upgraded structural design.

Summary:

Importance Factor (I_P), Seismic Rating (S_{DS}) and Wind Load Rating (P) are all specified by the engineer.

When determining what product will be appropriate for your specific job, start with the Importance Factor as determined by the engineer. From there, determine the appropriate construction (standard or upgraded) as noted by the S_{DS} and P values specified by the engineer.

Units with an importance factor of 1.5 do not necessarily need to be provided with upgraded structural design. Likewise, a project with an importance factor of 1.0 may be located in a high seismic or wind load area and thus require upgraded structural design.

How Do I Select the Correct Unit Construction in evapSelect?

1. You must select the Importance Factor before selecting a Product Line.

See screenshot below:

The screenshot shows the 'evapSelect' software interface. The 'IBC Specification' section is highlighted with a red box, showing two radio buttons: '1.0 Importance Factor' (selected) and '1.5 Importance Factor'. Below these is a link that says 'How Do I Choose?'. Other sections include 'Operating Parameters' (Flow Rate: 0.00 GPM, Temp In: 95.00 F, Temp Out: 85.00 F, Wet Bulb: 78.00 F), 'Capacity' (Capacity Range: 99-125%, Number of Units: 1-2), 'Units of Measure' (English, US Dollar), 'Product Lines' (SUN-Cooling Tower*, AT/UT/USS Cooling Tower*, AXS Cooling Tower*, CAT Cooling Tower*, LPT-Cooling Tower*, LSTE-Cooling Tower*), and 'LSTB / LSTE / LPT Options' (None, AT / USS Options, Low Sound Fan, External Static Pressure).

2. After indicating the appropriate Importance Factor, the available Product Lines will be selectable.

See screenshot below:

This screenshot is similar to the previous one, but the '1.5 Importance Factor' radio button is now selected. The 'Search' button in the 'Product Lines' section is highlighted in blue, indicating it is now active. The 'How Do I Choose?' link is still present below the radio buttons.

- After selecting the best unit(s) you will then indicate the appropriate level of construction required for the installation. Standard Structural Design will be the default for all units.

See screenshot below:

AT 112-4N12

Accessories Water Systems

ACCESSORIES	Type	Quantity	Unit Price	Total Unit Price	Total Net Price	Remove
ASSEMBLY OPTIONS	Fan Motor: Inverter Capable, Premium Efficient	1	Included in price	Included in price	Included in price	
CONNECTIONS	EVAPAK Fill	1	Included in price	Included in price	Included in price	
CONSTRUCTION DETAILS	IBC Standard Structural Design	1	Included in price	Included in price	Included in price	
Seismic: S _{ds} <= 1.34 g Wind Load: P <= 119 psf						

IBC Standard Structural Design ✖
 IBC Upgraded Structural Design
 OSHPD Pre Approval
 304 Stainless Steel Upper
 304 Welded Stainless Steel Cold Water Basin
 316 Stainless Steel Upper
 316 Welded Stainless Steel Cold Water Basin
 Export Crating
 Factory Mutual Approved
 Galvanized Steel Fan Screen
 Stainless Steel Fan Shaft

- If Upgraded Structural Design is required, you can select it as an “accessory” in Construction Details.

See screenshot below:

AT 112-4N12

Accessories Water Systems

ACCESSORIES	Type	Quantity	Unit Price	Total Unit Price	Total Net Price	Remove
ASSEMBLY OPTIONS	Fan Motor: Inverter Capable, Premium Efficient	1	Included in price	Included in price	Included in price	
CONNECTIONS	EVAPAK Fill	1	Included in price	Included in price	Included in price	
CONSTRUCTION DETAILS	IBC Upgraded Structural Design	1				✖
Seismic: S _{ds} <= 3.09 g Wind Load: P <= 288.3 psf						

IBC Standard Structural Design
IBC Upgraded Structural Design ✖
 OSHPD Pre Approval
 304 Stainless Steel Upper
 304 Welded Stainless Steel Cold Water Basin
 316 Stainless Steel Upper
 316 Welded Stainless Steel Cold Water Basin
 Export Crating
 Factory Mutual Approved
 Galvanized Steel Fan Screen
 Stainless Steel Fan Shaft

EVAPCO Product Lines - Structural Capability
Cooling Towers and Closed Circuit Coolers

		Importance Factor: $I_p = 1.0$				Importance Factor: $I_p = 1.5$			
		Standard Construction		Upgraded Construction		Standard Construction		Upgraded Construction	
		Seismic S_{DS} (g)	Wind Load P (psf)	Seismic S_{DS} (g)	Wind Load P (psf)	Seismic S_{DS} (g)	Wind Load P (psf)	Seismic S_{DS} (g)	Wind Load P (psf)
Cooling Towers	AT	1.34	119	3.09	288	1.34	119	3.09	288
	AXS	2.40	59.5	3.20	119	2.40	59.5	3.20	119
	SUN	0.67	59.5	*	*	N/A		N/A	
	LSTE	0.67	288	3.20	288	N/A		N/A	
	LPT	0.67	288	3.20	288	N/A		N/A	
Closed Circuit Coolers	ATWB	1.60	288	3.09	288	1.60	288	3.09	288
	eco-ATWB	1.60	288	3.09	288	1.60	288	3.09	288
	eco-ATWB-E	1.60	288	3.09	288	1.60	288	3.09	288
	eco-ATWB-H	1.60	288	*	*	1.60	288	*	*
	ESWA	0.67	119	3.20	288	N/A		N/A	
	ESWB	1.60	119	*	*	1.60	119	*	*
	LSWE	0.67	288	3.20	288	N/A		N/A	
	LRWB	0.67	288	3.20	288	N/A		N/A	
	eco-LSWE	0.67	288	*	*	N/A		N/A	
	eco-LRWB	0.67	288	*	*	N/A		N/A	

* Pending Final Design

EVAPCO Product Lines - Structural Capability
Evaporative Condensers

		Importance Factor: $I_p = 1.0$				Importance Factor: $I_p = 1.5$			
		Standard Construction		Upgraded Construction		Standard Construction		Upgraded Construction	
		Seismic S_{DS} (g)	Wind Load P (psf)	Seismic S_{DS} (g)	Wind Load P (psf)	Seismic S_{DS} (g)	Wind Load P (psf)	Seismic S_{DS} (g)	Wind Load P (psf)
Evaporative Condensers	ATC-E	1.60	288	3.09	288	1.60	288	3.09	288
	eco-ATC-A	1.60	288	3.09	288	1.60	288	3.09	288
	ATC-DC	1.60	288	*	*	1.60	288	*	*
	PMCB	0.67	288	3.20	288	N/A		N/A	
	PMCE	0.67	288	3.20	288	0.67	288	3.20	288
	eco-PMC	0.67	288	*	*	N/A		N/A	
	PMCQ	0.67	288	3.20	288	N/A		N/A	
	PHC	0.67	288	3.20	288	N/A		N/A	
	LSCE	0.67	288	3.20	288	0.67	288	3.20	288
	LRC	0.67	288	3.20	288	0.67	288	3.20	288

* Pending Final Design