



We are Subzero Engineering

Subzero Engineering is the industry leader in bespoke infrastructure solutions.

Subzero ensures a superior customer experience by applying unique product designs, quick turnaround engineering, and in-house installation teams.

Founded in 2005 by Larry Mainers and Vince Lake, Subzero started out as a data center airflow consulting company utilizing CFD studies to provide layout and design recommendations. The next decade would see them develop and release numerous industry changing products that would define how data center containment could and would be done. With the addition of server cabinets, PDUs, cages, and hyper scale specialty offerings, Subzero has cemented itself as a go to partner in a growing industry.

Our Sales Engineers will be working closely with your Data Center Solutions Manager to ensure a successful and enjoyable experience. All products have been built to scale inside of SolidWorks, which allows for quick turnaround on mechanical drawings. A typical proposal and drawing set can be provided in as little as 24 hours, and never more than 72.

From its inception, Subzero's offerings have always been about three things:

CUSTOMIZATION

Data centers are varied and dynamic, the solutions that go inside them should be too. Subzero's entire line of products are all completely customizable allowing the ability to quickly design, ship, and install.

QUALITY

A culture of best-in-class has been a part of Subzero from the beginning. From the raw materials used, to the components sourced, this self-imposed standard ensures that a great design becomes an even greater product.

FIT AND FINISH

Flexibility and quality are important, but it needs to look good too. High precision machining combined with thoughtfulness in design guarantees a great looking product. Highly trained and experienced site service teams ensure each project is deployed to meet the quality standards above.

Thanks for taking the time to consider us, and we look forward to working with you.

Vince Lake Vice President – Subzero Engineering

Data Center Containment

Data center cooling represents up to 50% of overall energy consumption.

An enormous amount of energy is used every day to maintain an acceptable intake temperature to the IT equipment. In recent years, there has been no greater positive impact on the cooling of data centers than the introduction of containment. The energy savings alone has saved hundreds of millions of dollars and has greatly decreased data centers' carbon footprint. Data center containment has virtually changed the way IT facilities are designed and operated by fully separating cold supply from hot equipment exhaust air.

What is Data Center Containment?

Data center containment fully separates the cold supply airflow from the hot equipment exhaust air. This simple separation creates a uniform and predictable supply temperature to the intake of IT equipment as well as a warmer, drier return air to the AC coil.

Hot aisle and cold aisle containment is a primary way leading businesses today help reduce the use of energy and optimize their equipment's performance within their data center. Adopting a cold and/or hot aisle containment solution increases air efficiency, translating to increased up-times, longer hardware life and valuable energy savings.





Key Benefits of Cotainment

- Reduced Energy Consumption
- Increased Cooling Capacity
- Increased Rack Population
- Consistent Acceptable Supply to IT Intake
- More Power Available for IT Equipment
- Increased Equipment Up-time
- Longer Hardware Life

Products AisleFrame Polar Cap 2 **Polar Roof Elite Series Aisle End Doors** Rack Hat & Strip Doors Wall Panels **Polar Booth Airflow Management Products**



SUBERO

Services

CFD Engineering DCEP Audits Energy Rebates Containment Installation Cabinet Installation

Containment

AisleFrame ST



AisleFrame ST (STEEL)

The Scalable Containment System to Support Data Center Infrastructure

AisleFrame by Subzero takes a simplistic approach to a typically complex design. The flexible Super Structure is designed to provide a complete solution for aisle containment. In addition, it provides a floor-supported structure that serves as a support platform for cable tray, busway, etc.

Elegance through Simplicity

Traditional methods for supporting data center infrastructure such as aisle containment, power distribution, and cable routing are costly and time consuming. These methods require a structural ceiling and a building that can support the entire weight of it. This typically involves multiple trades working on the project to accomplish just the supporting of the ceiling which costs time and money.

AisleFrame provides a 'floor-supported' method for providing infrastructure support and aisle containment. It can be erected quickly, and be placed in a building that does not have the expensive structural ceiling. This allows mission-critical facilities to build and scale data centers quickly and efficiently



KEY FEATURES

- Simplicity of Design
- Quick Installation
- Completely Custom
- High Loading Capacity
- Quality Containment Inc.

PRODUCT SPECIFICATIONS

Frame PHYSICAL PROPERTIES

Property: Material: Result: Structural Frame Mild Steel 3.00" x 3.00" Tube w/.25" Wall

ADDITIONAL COMPONENTS

Strut Arms Mild Steel Unistrut - P2580 - High Capacity

FEATURES Painted Stru

I Structural components are painter as per request.

Side Containment Panels -4mm Twin Wall Polycarbonate

FLAMMABILITY

 Property:
 Material:
 Result:

 Flame Spread
 ASTM E84
 5

 Smoke Developed
 ASTM E84
 40

PHYSICAL PROPERTIES

Thickness: 4mm (.15) R-Value: 1.45t Light Transmittance: 94%

Containment

AisleFrame EX

AisleFrame EX (ALUMINUM)

The Modular Containment System for Data Center Infrastructure

AisleFrame provides a 'floor-supported' method for providing infrastructure support and aisle containment. This allows mission-critical facilities to build and scale data centers quickly and efficiently.

Model EX400S AisleFrame by Subzero is designed to provide a complete solution for aisle containment and infrastructure support. EX400S uses a proprietary aluminum extrusion alongside pre-fabricated steel fittings to create a modular system that is extremely quick to procure, install, and expand.

KEY FEATURES

- Short Lead Times
- Quality Containment
- Modular & Configurable
- Quick Installation
- Pre-engineered
- Low Part Count
- High Loading

Physical Properties

Property	Material	Finish
Frame Members	Aluminum	Anodized
Fittings	Steel	Powder-coated
Doors & Panel Frames	Aluminum	Anodized
Panel Inserts	Polycarbonate	Clear
Strut & Hardware	Steel	Pre-galvanized & Electroplated Zinc





Containment Roof Systems

US Patent 8,701,737 B2



Polar Cap 2 §

The patented Subzero Engineering Polar Cap 2 is the first fully NFPA compliant containment roof system.

The Polar Cap 2 retractable roof system is a fully electric roof system that retracts into a metal housing when the fire suppression system is alarmed. Having a pre-action system that reacts to a smoke detector will ensure that the containment roof is fully retracted long before the fire suppression system is discharged.



The Polar Cap 2 can also be manually opened and closed when maintenance is required above the containment space.

KEY FEATURES







Modular Design ASTM E84 Class A Patented NFPA 75 Compliant

Material

Aluminum

Result:

22.000 psi

PRODUCT SPECIFICATIONS

Frame

Property:

FEATURES

Tensile Strength

PHYSICAL PROPERTIES

SIZES 60" Width 30' Max Length

Fire/Electrical System Interface

(The electrical line, power supply, and fire panel connections are not provided by Subzero.)

POWER SUPPLY CONNECTION

110/220VAC, 5A/2.5A, 50/60Hz Single Phase Supply* *Subzero recommends connecting to a dedicated branch emergency backed up power supply circuit to insure that the Polar Cap 2 will operate during a facility power outage.

FIRE SYSTEM INTERLOCK CONNECTION

(Subzero recommends the fire protection contractor makes this connection.)

Polar Cap 2 provides a two-wire 24VDC signal that should be wired to customer's fire alarm control panel (FACP) normally open (N.O.) contact rated at 24VDC, .25A. Upon closure of the FACP N.O. contact, the Polar Cap 2 will automatically open to expose the server aisle to the fire extinguishing agent. Connection to a FACP "pre-act" contact will insure that the roof is fully open prior to the extinguishing agent discharge.

30 Mil Polypropylene

LAMMADIETT		
Property:	Test:	Result:
Spread	ASTM E84	10
Smoke Dev.	ASTM E84	160

PHYSICAL PROPERTIES

2.5" Pleat High Light Transfer Matte Finish Light Transmittance - 85%

Containment

Roof Systems

Polar Roof §

The Subzero Engineering Polar Roof is uniquely designed to work under fire suppression systems by utilizing specially designed translucent panels.

In the event of a fire, the panels shrink and drop away to preserve the fire sprinkler pattern. The lightweight drop-in panels have a thickness of only 0.013" and are completely clear, allowing in the light from overhead lighting systems. The panels can be easily customized according to specific length and width.

As the Polar Roof containment system is modular in design, it can be easily attached to cabinets, doors, side wall systems, and even vinyl.



KEY FEATURES



Install Kit Fire Rated



OPTIONS





Finish

PRODUCT SPECIFICATIONS

Frame

PHYSICAL PROPERTIES

Property: Material Tensile Strength Aluminum Result:

22.000 psi

FEATURES

Typical size of 55.50" W x 79.50" L Frame attaches to top of server cabinets

Clear Panels

PHYSICAL PROPERTIES

Property:	Units:	Result:
Thickness	Mils	15 Mil
Material	-	Polyvinyl Chloride
Light Transmittance	-	87.67%

FLAMMABILITY

Property:	Test:	Result:
Smoke Dev.	ASTM E84	170
Flame Spread	ASTM E84	20

Shipping

PHYSICAL PROPERTIES		
Property:	Result:	
Weight	25-50 lbs. Approx.	
Components	5 Major Components	

Containment **Elite Aisle End Doors**

Elite Series LP Single Sliding Door §

Elite Series I P Doors are the most advanced and durable doors that Subzero has produced to date. They have the rigid design that is inherent of Elite Series Products, and advanced features that have taken years to develop. They feature smooth operation, adjustable closing and dampening speeds, and durability. Implement these doors when nothing but the best will do.



KEY FEATURES

			Le
Custom Sizes	Rigid Design	Clear Panels	No Threshol
	\square	+	
Smooth Actuation	Self Supporting	Auto Door Closer	Soft Closing

OPTIONS



PRODUCT SPECIFICATIONS

Doors & Frame

PHYSICAL PROPERTIES

Property:	Material:	
Tensile Strength	Aluminum	

Result: 22,000 psi

Panel Inserts - Optional

3MM - ACRYLIC

FLAWIWABILITT		
Property:	Test:	Result:
Smoke Dev.	ASTM E84	385
Flame Spread	ASTM E84	140
Horizontal Burn	ASTM D635	1.18 in/min
UL Horizontal	UL94	94 HB

4MM - POLYCARBONATE FLAMMABILITY

Property:	Test:	Result:
Smoke Dev.	ASTM E84	40
Flame Spread	ASTM E84	5

3MM - FM4910 FLAMMABILITY

Property:	Test:	Result:
_	UL94	V0
_	FM4910	Yes

Shipping

PHYSICAL PROPERTIES

Property:	Result:
Weight	200 lbs. Approx.
Components	6 Major Components

Containment **Elite Aisle End Doors**

Elite Series LP Dual Sliding Door

Elite Series I P Doors are the most advanced and durable doors that Subzero has produced to date. They have the rigid design that is inherent of Elite Series Products, and advanced features that have taken years to develop. They feature smooth operation, adjustable closing and dampening speeds, and durability. Implement these doors when nothing but the best will do.

PRODUCT SPECIFICATIONS

Doors & Frame

PHYSICAL PROPERTIES

Property:	Material:	Result:
Tensile Strength	Aluminum	22,000 psi

Panel Inserts - Optional 3MM - ACRYLIC

FLAMMABILITY

Test:	Result:
ASTM E84	385
ASTM E84	140
ASTM D635	1.18 in/min
UL94	94 HB
	ASTM E84 ASTM E84 ASTM D635

4MM - POLYCARBONATE

FLAMMABILITY		
Property:	Test:	Result
Smoke Dev.	ASTM E84	40
Flame Spread	ASTM E84	5

3MM - FM4910 FLAMMABILITY

Property:	Test:	Result:
_	UL94	V0
_	FM4910	Yes

Shipping

PHYSICAL PROPERTIES

Property:	Result:
Weight	275 lbs. Approx.
Components	7 Major Components



KEY FEATURES





Self Supporting Closer





Soft Closing



Containment **Elite Aisle End Doors**

Elite Series LP Hinged Door §

Elite Series I P Doors are the most advanced and durable doors that Subzero has produced to date. They have the rigid design that is inherent of Elite Series Products, and advanced features that have taken years to develop. They feature smooth operation, adjustable closing and dampening speeds, and durability. Implement these doors when nothing but the best will do.

PRODUCT SPECIFICATIONS

Door & Frame

PHYSICAL PROPERTIES

Property:	Material:	Result:
Tensile Strength	Aluminum	22,000 psi

Panel Inserts - Optional 3MM - ACRYLIC

FLAMMABILITY

Property:	Test:	Result:
Smoke Dev.	ASTM E84	385
Flame Spread	ASTM E84	140
Horizontal Burn	ASTM D635	1.18 in/min
UL Horizontal	UL94	94 HB

4MM - POLYCARBONATE

FLAWIWADILITT		
Property:	Test:	Result:
Smoke Dev.	ASTM E84	40
Flame Spread	ASTM E84	5

3MM - FM4910 FLAMMABILITY

Property:	Test:	Result:
	UL94	V0
	FM4910	Yes

Shipping

PHYSICAL PROPERTIES

Property:	Result:
Weight	250 lbs. Approx.
Components	4 Major Components



KEY FEATURES





Self Supporting

Actuation **OPTIONS**



Closer

Soft Closing

Containment

Curtain

Rack Hat §

The Subzero Engineering Rack Hat is the premium vinyl containment system that separates hot and cold airflow by using ceiling mounted vinyl panels. Aluminum tracks are mounted to the ceiling, and uniquely sized vinyl is hung from the track. The fire resistant vinyl comes in these standard drop down sizes: 26", 52", 94", 106", 118", 142", and 178". The aluminum track comes in these standard lengths: 1', 2', 3', 4', 5', and 6'. The Rack Hat corner system provides a seamless corner for optimum efficiency within the containment. The Rack Hat's modular and easy-to-assemble kit-based design makes it the industry's best, low-cost containment solution.



PRODUCT SPECIFICATIONS

Material:

Aluminum

Units:

Lbs.

Lbs.

Degrees F

Result: 22,000 psi

Result:

135°

45

3

Track

Property:

Property:

Heat Activation Maximum Load

Minimum Load

Tensile Strength

PHYSICAL PROPERTIES

Fire Suppression Link

PHYSICAL PROPERTIES

KEY FEATURES





Required

3609



Vinyl & Links

Install Kit

Design







Vinyl		
FLAMMABILITY		
Property:	Test:	Result:
NFPA	NFPA 701	Passed
Flammability	UL 94 V-0	Passed
Flammability	ASTM E84	Class A

Weights Per Linear Foot

Drop Down Length:	Weight:
29"	1.75 lbs
56"	2.25 lbs
98"	3.25 lbs
110"	3.5 lbs.

Shipping

PHYSICAL PROPERTIES	
Property:	Result:
Ships as a packaged kit	
Components	5 Major Components

Containment

Curtain

Strip Door 🗣

Our Strip Door system is the leading ceiling mounted strip door solution for both cold and hot aisle containment. It fully separates cold supply and hot exhaust airflow by closing the end of the aisle, ensuring a long lasting vertical partition solution. The Strip Door kit includes a high-grade aluminum track, UL/FM rated fire suppression links, and fire resistant vinyl. The door is custom fit to your aisle ends, and it can be installed on a drop-ceiling grid, or be hung onto any stationary ceiling system such as cable trays, U-Channel, or directly into a variety of ceiling materials. Our Strip Door system can be used in a variety of applications to create partitions while allowing access. The Strip Door can attach to the ceiling on the same aluminum track system as the Rack Hat partition system. Components slide together easily, securely, and can quickly be reconfigured. The fire resistant clear vinyl hangs down from ceiling to floor.



PRODUCT SPECIFICATIONS

Track

PHYSICAL PROPERTIES

Property: Material: Tensile Strength Aluminum Result: 22,000 psi

Fire Suppression Link

PHYSICAL PROPERTIES		
Property:	Units:	Result:
Heat Activation	Degrees F.	135°
Maximum Load	Lbs.	45
Minimum Load	Lbs.	3

Vinvl

FLAMMABILITY

Property:	Test:	Result:
NFPA	NFPA 701	Passed
Flammability	UL 94 V-0	Passed
Flammability	ASTM E84	Class A

Weights Per Linear Foot

Drop Down Length:	Weight:
29"	1.75 lbs.
56"	2.25 lbs.
98"	3.25 lbs.
110"	3.5 lbs.

Shipping

PHYSICAL PROPERTIES	
Property:	Result:
Ships as a packaged kit	
Components	5 Major Components







Fire Rated Vinyl & Links

OPTIONS



KEY FEATURES





Ceiling Grid

Attachment

Containment

Wall Panels





Wall Panels §

Missing cabinets, uneven aisle ends, and cityscape cabinet heights present a challenge to many containment designs. Subzero Engineering Wall Panels easily fill in any size of gap to create a continuous containment solution.

Elite Series Panel Frames are 1.5" x 1.5". SL Series Panel Frames are 1.5"x .75".



KEY FEATURES





OPTIONS



PRODUCT SPECIFICATIONS

Frame PHYSICAL PROPERTIES

Property:	Material:	Result:
Tensile Strength	Aluminum	22,000 ps

Panel Inserts - Optional 3MM – ACRYLIC

Property:	Test:	Result:
Smoke Dev.	ASTM E84	385
Flame Spread	ASTM E84	140
Horizontal Burn	ASTM D635	1.18 in/min
UL Horizontal	UL94	94 HB

4MM – POLYCARBONATE FLAMMABILITY

Property:	Test:	Result:
Smoke Dev.	ASTM E84	40
Flame Spread	ASTM E84	5

3MM – FM4910

Property:	Test:	Result:
_	UL94	V0
_	FM4910	Yes

Shipping

PHYSICAL PROPERTIES		
Property:	Result:	
Weight	10-17 lbs. Approx.	
Components	1 Major Component	

Containment

Polar Booth

Polar Booth

Many data centers have isolated cabinets that are not part of a hot or cold aisle. The Subzero Engineering Polar Booth fully completes the separation of supply and return airflow by addressing isolated equipment. This portable booth can be used for cold or hot aisle applications to ensure complete separation of exhaust and supply air on stand alone IT equipment.

A common problem many data center managers encounter is supplying cold air to equipment that is not in a rack row or aisle. Perforated tiles located in front of isolated equipment only cool the bottom half of the cabinet; the remainder of the cabinet is cooled by the ambient airflow. As a result, the supply air temperature is set considerably colder than necessary to cool the ambient air. The Polar Booth contains the supply air to the equipment intake and ensures both a uniform and predictable temperature to all isolated IT equipment.

The Polar Booth can be used to either contain cold supply air or direct hot exhaust air away, making it a perfect solution for equipment that is not in a dedicated hot or cold aisle configuration.





PRODUCT SPECIFICATIONS

Result:

22.000 psi

Frame

PHYSICAL PROPERTIES Property: Material: Tensile Strength Aluminum

FEATURES

Rolls easily on casters

Panel Inserts - Optional

3MM - ACRYLIC

FLAMMABILITY		
Property:	Test:	Result:
Smoke Dev.	ASTM E84	385
Flame Spread	ASTM E84	140
Horizontal Burn	ASTM D635	1.18 in/min
UL Horizontal	UL94	94 HB

4MM - POLYCARBONATE FLAMMABILITY

Property:	Test:	Result:
Smoke Dev.	ASTM E84	40
Flame Spread	ASTM E84	5

3MM - FM4910

Property:	Test:	Result:
_	UL94	V0
_	FM4910	Yes

KEY FEATURES



& Positions Fasily



Airflow Mgmt. Cable Cutout Cover



The Cube §

The Subzero Engineering Cube cable cutout cover is the most effective way to fill openings in your raised floor.

The Cube comes in a variety of sizes that will cover any opening required. It can be ordered in custom sizes or several standard sizes. The Cube is made of a fireproof material. Installation is easy – simply compress or squeeze the Cube, place it into the opening, and release! The Cube will instantly fill in around the raised floor opening (top, bottom, and side). The Cube is specifically engineered with a 5-1/2" depth so that it fully separates subfloor and ambient air.

Larger Cubes can also be used to create a subfloor wall or baffle. The Cube is an easy and efficient way to manage airflow during data center expansions.



Airflow Mgmt. **Velocity Adjustor**



Velocity Adjustor §

The Subzero Engineering Velocity Adjustor is the most efficient way to balance subfloor air pressure in data centers.

The Velocity Adjustor is designed to lower velocity at the AC discharge to eliminate sub floor vortices that are formed when two high velocity currents of air converge. Slowing the air increases pressure, and this in turn creates a consistent supply of air to any part of the data center. The supply airflow through the sub floor plenum is the foundation of any cooling program. Inconsistent supply, due to high velocity airflow from CRAC, units prevents cooling air from getting to the computer intake, especially at the top of the rack. A balanced supply volume is essential in order to match the kW load in each cabinet.





Airflow Mgmt. Egg Crate Ceiling Grille



Egg Crate Ceiling Grille §

Our Egg Crate Ceiling Grille airflow management solution is an important tool in helping design an energy efficient data center. It is designed to work with the natural properties of rising hot air.

The Subzero Engineering Egg Crate Ceiling Grille is used most effectively with hot aisle containment to allow hot IT equipment exhaust air to pass into the drop-ceiling void and be directed back to the AC unit. This allows for warmer, dryer air to return to the AC unit. As a result, the AC unit functions more efficiently and can provide increased cooling.







Professional Services §

Subzero Engineering provides several professional services to data center facilities worldwide to enhance their cooling and energy efficiencies.

We offer Computational Fluid Dynamics (CFD) modeling and studies, DCEP Energy Assessments, Engineering Design, Professional Installation, Custom Manufacturing, and Utility Incentive Rebate Assistance. We pride ourselves in offering the best services to assist our clients in reaching their IT and facility goals.

Computational Fluid Dynamics (CFD)

Subzero Engineering offers Computational Fluid Dynamics (CFD) services from accredited CDCDP, DCEP professionals, thus providing a comprehensive approach to modeling airflow, temperature, and an accurate energy profile of a data center.

Through state-of-the-art software, we construct a 3D layout of your data center. This layout models the hot and cold airflow within your facility as well as the impact of load distribution. There are two basic categories of data to collect; facility and rack. We fully inventory all equipment in the data center noting make, model, and heat load. This allows Subzero's engineering team to develop a baseline from which improvements can be measured and potential savings calculated. The engineers that perform the CFD services for Subzero have CDCDP (Certified Data Center Design Professional) and DCEP (Data Center Energy Practitioner) accreditation.



Services

Installation

Subzero Engineering has a trained team of professional, expert installers.

Our team has the experience to safely work with our products in your critical data center environment. We provide custom fabrication. All of our vinyl curtains are tailored to meet the exact height of each rack in your data center. Obstacles such as cable trays, conduit, and sprinkler lines are no problem for our installers. There's no substitute for experience. We will complete your job safely and quickly.



A SENNECA COMPANY

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