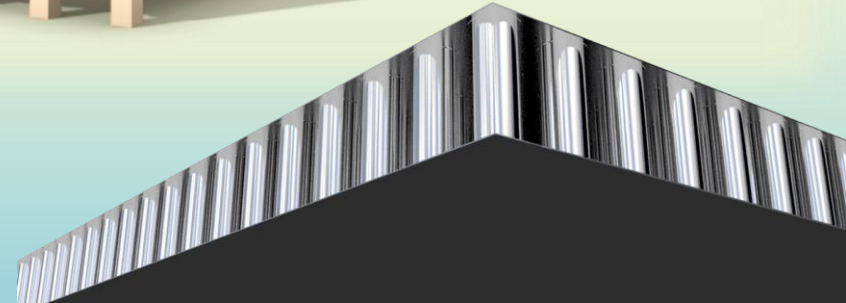
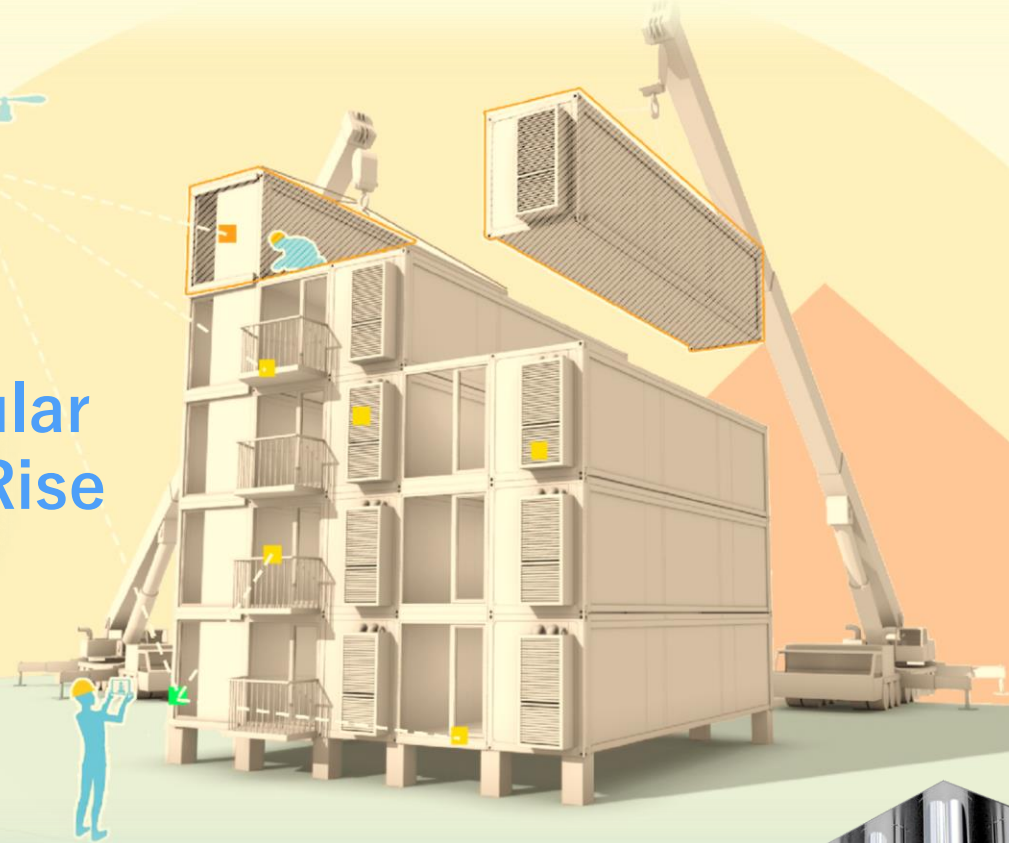




# BROAD Holon Sustainable Modular Multifamily High-Rise



# The BROAD Group

- Established in 1988, currently 3,000 employees
- Privately owned company
- BROAD Town: area of 1km<sup>2</sup> (~250 acres)
- BROAD holds over 460 patents
- Global Market presence: Installed base of more than 35,000 climate control systems in over 82 countries
- **BROAD U.S.A. Inc:** Established in 1997 to serve the north America market
- Product lines: HVAC, Indoor Air Quality (Ventilation/Filtration/Purification), Holon Building (Stainless Steel based mid/high rise modular buildings)



## BROAD GROUP

### BROAD Air Conditioning

Absorption Chiller

Maglev Chiller

Heat Pump



### BROAD Energy

EMC

District Energy



### BROAD Clean Air

Filtering Energy Recovery Ventilation (FERV)

Air Purifier

Air Monitor

AirPro Mask

### BROAD Sustainable Building (BSB)

Holon Building

B-CORE Slab



# Why Offsite construction?



QUALITY



WORKFORCE



SUSTAINABILITY



SPEED TO  
MARKET



AFFORDABILITY



JOBSITE  
SAFETY

## MODULAR CONSTRUCTION SCHEDULE



## SITE BUILT CONSTRUCTION SCHEDULE



# Stainless Steel Lifecycle Assessment - Durability

- Stainless steel is non-corrosive, more than **30 x more resistant to corrosion** than carbon steel
- Impact and abrasion resistant
- Durability = Sustainability: Premature replacement increases a building's carbon footprint
- Stainless steel has been used in buildings for almost a century, exhibiting excellent performance in durability and low maintenance



**ICONIC STAINLESS STEEL  
SPIRE OF THE CHRYSLER  
BUILDING - 1930**

# Stainless Steel Lifecycle Assessment - Performance

- Ductility: The capability of steel to be stretched without fracturing or losing its inherent strength, measured in elongation ***Ductility > Hardness***
- High resistance to oxidation (scaling) at consistently high temperatures
- Superior performance at high temperatures: Austenitic stainless steels retain a higher proportion of their strength above approximately 1,020 °F (550 °C) than carbon steel<sup>1</sup>
- Resistant to spalling



# Stainless Steel Lifecycle Assessment - Recyclability

- Stainless steel is 100% recyclable without loss of strength regardless how many times the process is repeated
- The average recycled content of the 300 series stainless steel grades that are used in the architecture, building and construction market is approximately 75 to 85%<sup>1</sup>
- Upon demolition, 92% of the stainless steel used in construction is recycled back into new metal.



Team Stainless: The Global Life Cycle of Stainless Steels

*“Taking into account its entire lifecycle, stainless steel has one of the lightest impacts on the Earth of all known engineering materials. And at the end of its long life, all stainless steel can be recycled to create new stainless that is as strong and long-lasting as the original.”*

~International Stainless Steel Forum

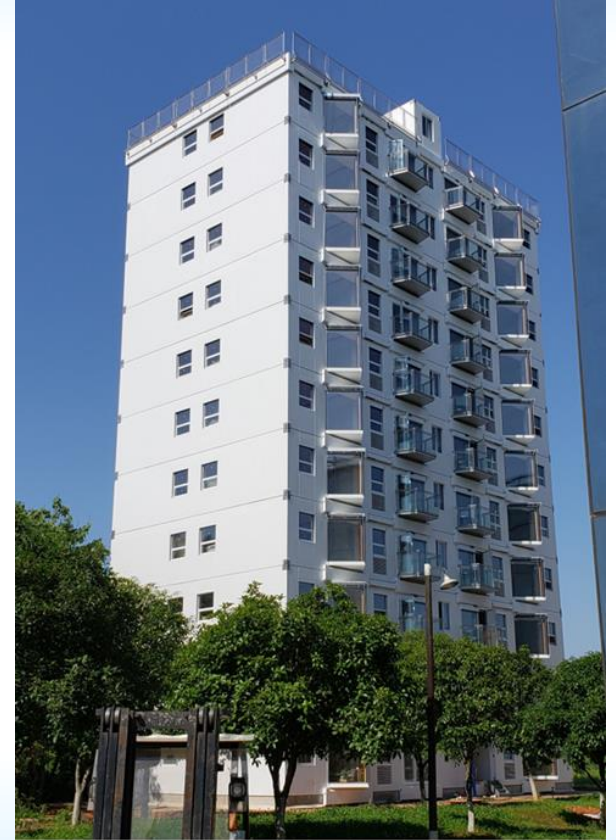
*Stainless Steel is an infinitely recyclable resource with one of the highest recycling rates of any material*

1. SSINA – Specialty Steel Industry of North America

# The BROAD all Stainless Steel Volumetric modular building



***BROAD is the first to use Stainless Steel not only for the façade of a building, but for all the building's load bearing structural members***



Garden Home  
Turnkey Building erected in 28 hours

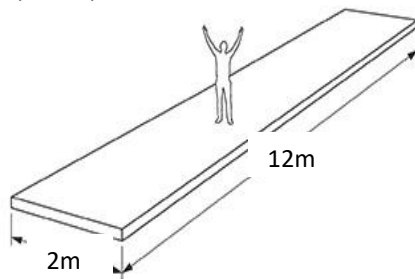
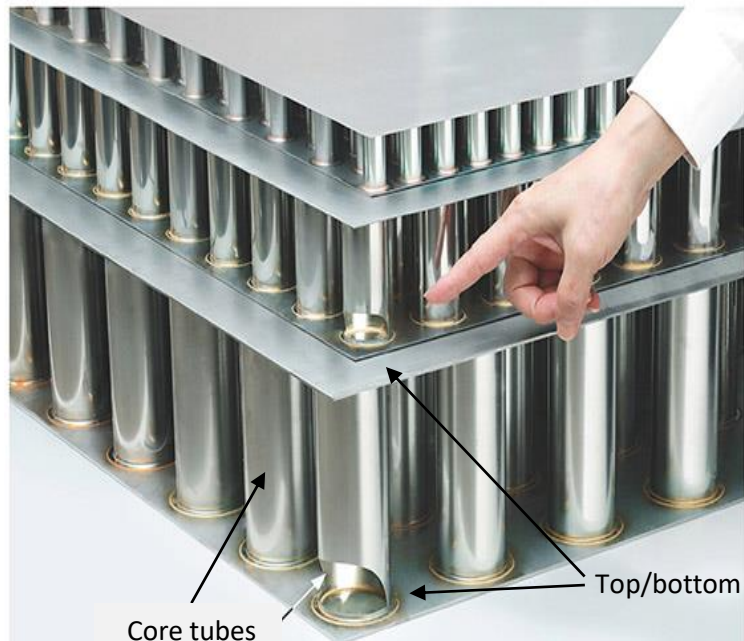


Plate Thickness: 1.5mm,2.5mm,4mm,6mm (0.6" – 0.25")  
Slab Thickness: 100mm, 150mm (3.9" - 5.9")

- Two plates with array of core tubes
- Ductility: Elongation>40%
- Everlasting: Corrosion rate is 0.005 g/m<sup>2</sup>/hr
- Eco-friendly: Recycle & Reuse
- 10 x lighter than reinforced concrete of the same design strength

# BROAD's architectural milestones

BROAD founded BROAD Sustainable Buildings in 2009, and has built over 60 steel modular buildings.

Six stories/day



Launched in 2009

Three stories/day



More than 60 buildings  
have been built by BSB

Built within one day



Since 2017

16 story "F" Tower  
(our corporate HQ)



81,000 sq. ft. total floor area on  
a mere 1615 sq. ft. footprint  
(50:1 FAR), with a cantilever area  
of 12,375 sq. ft.

Holon Home Garden



11 stories, 32,000 sf, installed in  
28 hours

# A demonstration of BROAD's capabilities



**Negative Pressure Isolation Hospital Built in 48 Hours**

<https://youtu.be/jLYp7YUE9DE>



**Prefabrication of Korea NPI Hospital**

<https://youtu.be/l3onLxBCpNg>



**J57: 57-Story Building Start to Finish in 19 Days**

<https://youtu.be/veNf-bz99cl>



**Newark Hotel: 15 Stories in 48 Hours**

<https://youtu.be/Ps0DSihggio>



**"F" Tower: All stainless-steel building**

<https://youtu.be/7GHAKdHupgg>

# The first All Stainless Steel modular building



BROAD is the first to use stainless steel for all structural members of a building

## “F” Building:

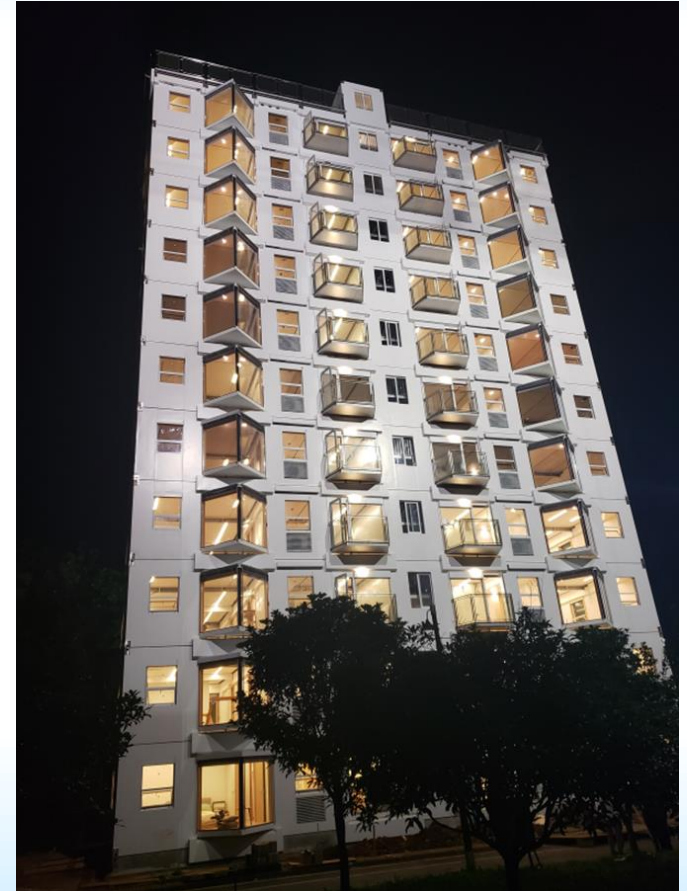
- 16 stories
- 43 days to erect
- 6 month cycle: Design, expert review, government approval, prefab, installation, occupancy

Notice the small footprint! The entire structure is supported by just four B-CORE pillars, 1 m wide each.

## Case Study: Garden A-1, erected on June 5, 2021



- 11 story  
32,000 sf
- 56 modules  
manufactured in 15  
days
- Stacked onsite in under  
29 hours
- Includes all MEP and  
interior fixtures, ready  
to move in
- LCA: 20 x lifespan of a  
conventional reinforced  
concrete building



# BROAD Holon Home Garden wins First Prize at MBI “Awards of Distinction”

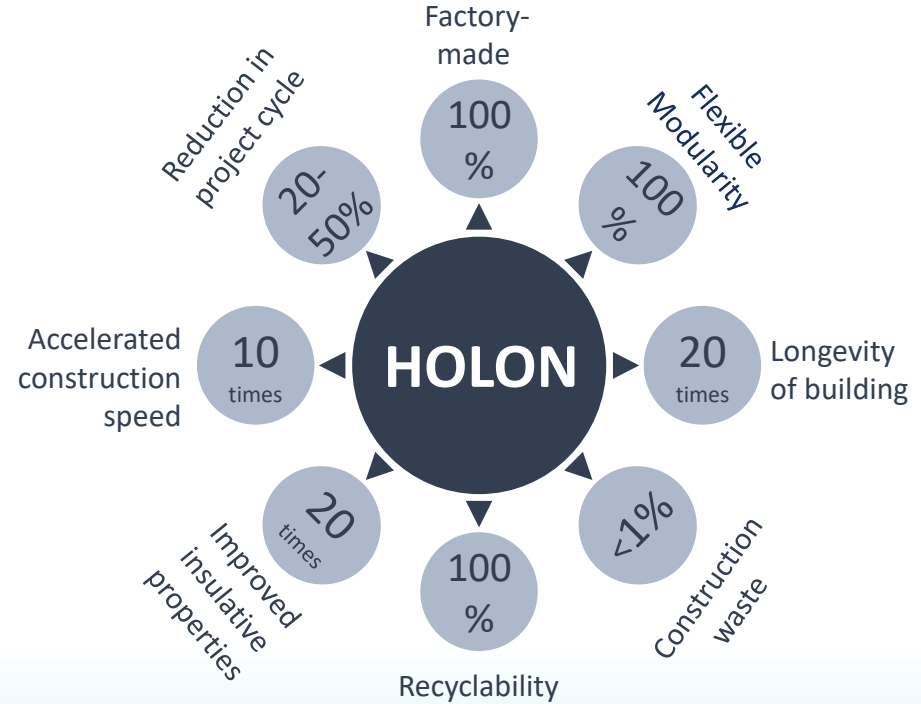
- Awards of Distinction are awarded by Modular Building Institute at the World of Modular convention each year
- BROAD Holon Building won First Place in the category of Multifamily 25,000+ sf
- The award criteria are
  - ❖ *Architectural Excellence*
  - ❖ *Technological Innovation*
  - ❖ *Sustainability*
  - ❖ *Time to completion*



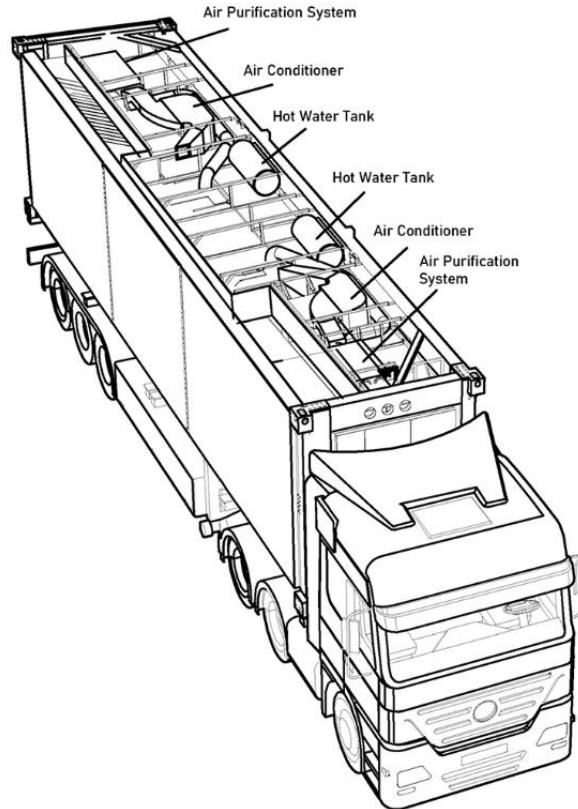
## Why do we call the HOLON Building a “Living Building?”

- B-CORE is one of the most environmentally friendly construction materials.
- B-CORE is the ultimate sustainable construction material - extremely durable with unprecedented longevity.
- Incorporating the BROAD’s unique Fresh Air Machine, an ERV with HEPA filtration, provides 100% fresh air, eliminates cross infection and filters PM2.5 by 99.9% to protect life.
- The floor layout, room type and number of floors can be changed after construction is completed:

*Flexible modularity*



## Living Buildings Illustrations



## Room/Elevator Module Transport Dimensions

LxWxH: 12,190 x 2,438 x 3,000 mm

40' x 8' x 9'-10"

40'HQ container size

No additional container needed for shipping

### During transportation

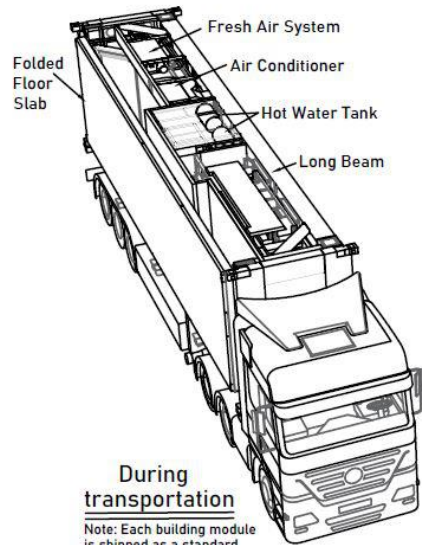
Note: Transported at the size  
of international standard 40 ft.  
high-cube container (no  
container needed for shipping)

# HOLON Building: Unfold, bolt and stack

Building module is 100% prefabricated in the factory before delivery. For clarity, this drawing does not showcase the wall, door & window, fire-protection, MEP and finishes

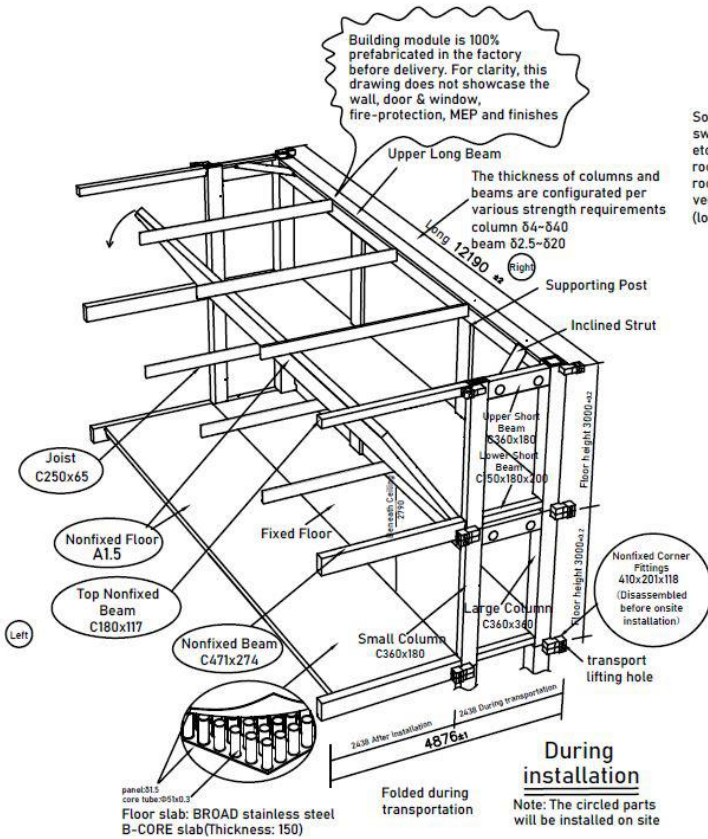
The thickness of columns and beams are configured per various strength requirements  
 column  $\phi 4-\phi 40$   
 beam  $\phi 2.5-\phi 20$

Solar energy facilities, swimming pool, water tank etc. can be set up on the roof. There is also plenty of room for planting vegetables, recreation etc (load:  $0.7t/m^2$ )



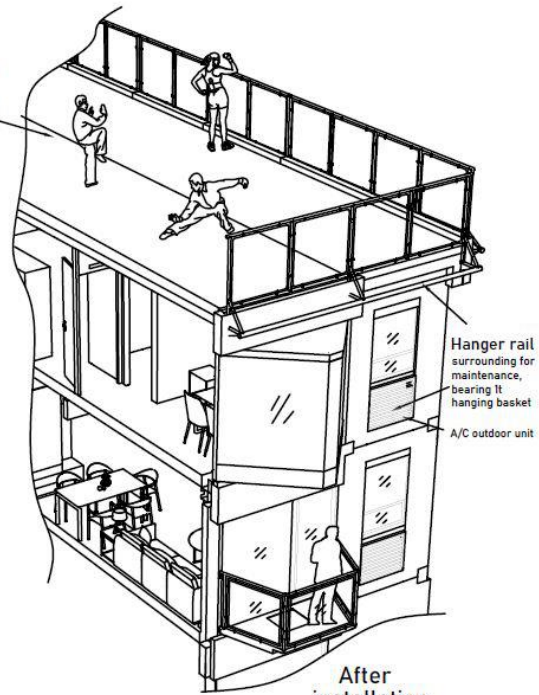
## During transportation

Note: Each building module is shipped as a standard 40ft container (actually no container is needed),



## During installation

Note: The circled parts will be installed on site



## After installation

Note: construction, finishes and MEP all done, turnkey project

# The steps of erecting a Holon Building



## Step 1: Bolting & Riveting

Once the modules are delivered on site, they are connected by bolts.

## Step 2: Unfolding

Unfold the flexible floor and balcony.

## Step 3: Install Nonfixed Beam, Joist.

Joists will be installed every 4 to 6m for load bearing.  
*Walls are non-load bearing.*

## Step 4: Sealing

Sealing with structural adhesive.

# Garden A1 turnkey Multifamily building

Efficient erecting of a turnkey building



## Optimize Energy Performance: High Insulation & AI Control



Energy & Atmosphere

HOLON building is highly insulated with a superior energy efficiency system which consumes 80%-90% less energy than conventional buildings.

	HOLON Insulation Material	R Value	ASHRAE 90.1 Zone 5A Min. R-Value
Roof	rock wool	32	R-30
Exterior Wall	8.6" rock wool	28	R-19
Windows	Triple/quadruple pane, argon-filled	3/4	2.2-2.6



BBA AI Control: Virtualized control for sunshade, lighting, IAQ, energy consumption

## ➤ BROAD Fresh Air ERV

- 100% fresh air with no recycled air
- Unique 3 stage filtration: filters 99.9% PM2.5
- Electrostatic Cleaner: kills pathogens, neutralizes allergens
- Air-to-air energy exchanger: 80% energy recovery efficiency

## ➤ Great Acoustic Performance:

Location	Sound Insulation	Location	Sound Insulation
Exterior Wall	50dB(A)	Between Units	45dB(A)
Between Floors	55dB(A)	Between Rooms	35dB(A)
Window & Door	40dB(A)		



Indoor Environment Quality



BROAD Fresh Air ERV

# Holon: The Sustainable Stainless Steel modular building built on B-CORE

The Holon Building incorporates sustainable B-CORE construction material into a highly energy efficient, everlasting modular building with ultra low carbon footprint





# HOLON: The new era in modular construction

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THANK YOU