MITSUBISHI ELECTRIC

Changes for the Better

Quality in Motion™

SPIRAL ESCALATOR®

Let your imagination run free

An Architectural Wonder

The Only One

A vision of future of modern architectural space design made feasible today. In order to provide the space that building owners could only once dream of, we developed the world's first curved escalators. Carefully intermixing vertical and rotational movements, an elegant arch is created utilizing one-and-only escalator technologies no other company has been able to achieve. The three-dimensional motion creates an expansive panoramic view for users, and the innovative design transforms the area into an unprecedented architectural masterpiece. An artisan skill called *Takumi* (in Japanese) is utilized, where the maker demands perfection and refuses to compromise down to the smallest detail. All of this to ensure satisfaction to the customer in the joy of ownership and welcome visitors with an experience that is exciting and unforgettable.

Shanghai New World Daimaru

Dynamic Beauty

p.3

New-generation luxurious department stores offering both traditional ambience and an entertaining atmosphere. Our SPIRAL ESCALATORs are installed in the central stairwell area of the facility, realizing an incomparable open-space design that gives the impression of floating on air. This landmark installation in Shanghai is enjoyed by visiting shoppers and tourists.

Inspirational Beauty

p.5

The majestic Venetian Macao Resort Hotel complex features various facilities for leisure and amusement, such as a hotel, casino, and shopping mall. Our SPIRAL ESCALATOR is installed at the center of the casino, creating a massive open-ceiling space at the heart of the facility. There is a stage for street performances and the arching presence of the escalator contributes as an inspirational piece of the architecture, producing a seemingly medieval atmosphere.

The Venetian Macao-Resort-Hotel

The Forum Shops at Caesars

Artistic Beauty

p.7

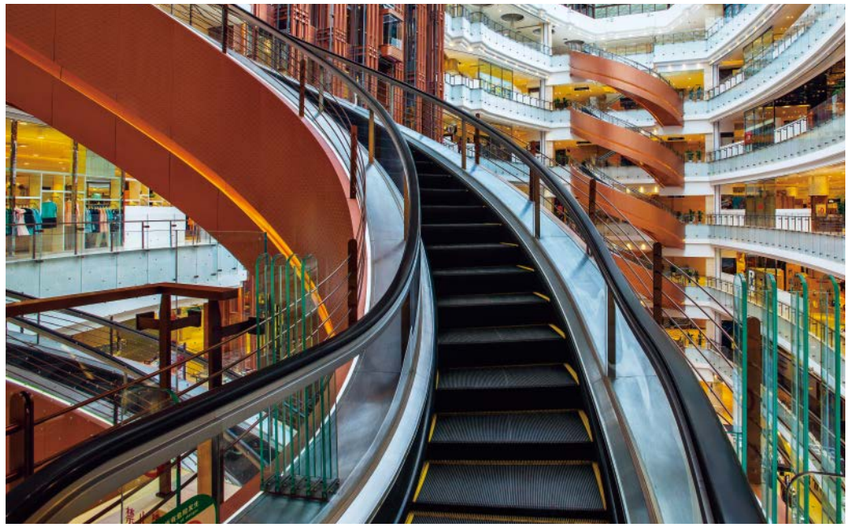
Our SPIRAL ESCALATOR takes center stage in the large shopping complex at Caesars Palace in Las Vegas. A series of escalators connect each floor, allowing people to enjoy a spacious panoramic view of the atrium, designed in the image of ancient Greco-Roman architecture.

Dynamic Beauty

Entertainment

An uplifting experience every time

Our SPIRAL ESCALATOR is not simply a means of transportation. Once onboard, passengers seemingly float on air as they travel through space. The sweeping three-dimensional motion produces an expansive panoramic view that excites and entertains. A continuous multi-layered atrium arrangement adds beautiful ambience to the architectural structure.

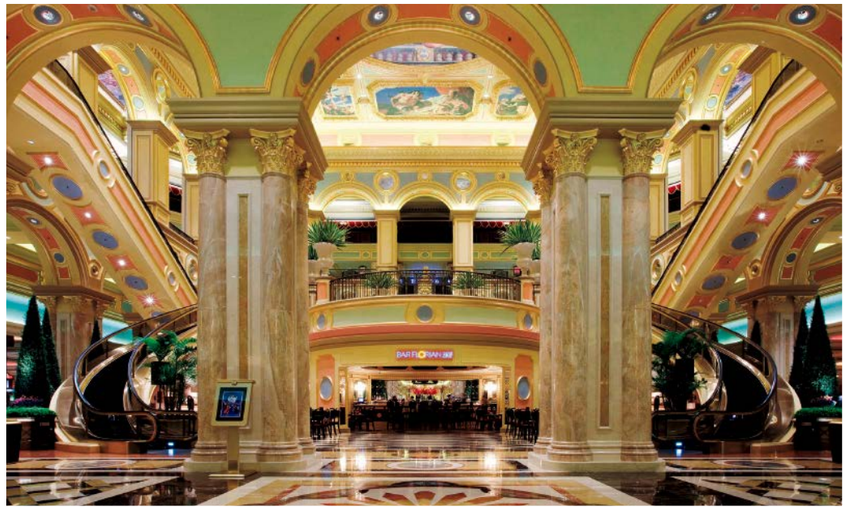


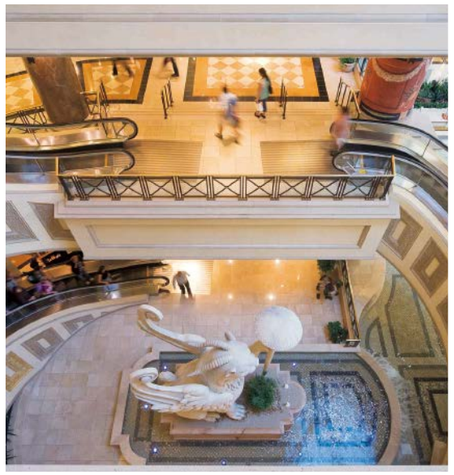
Inspirational Beauty

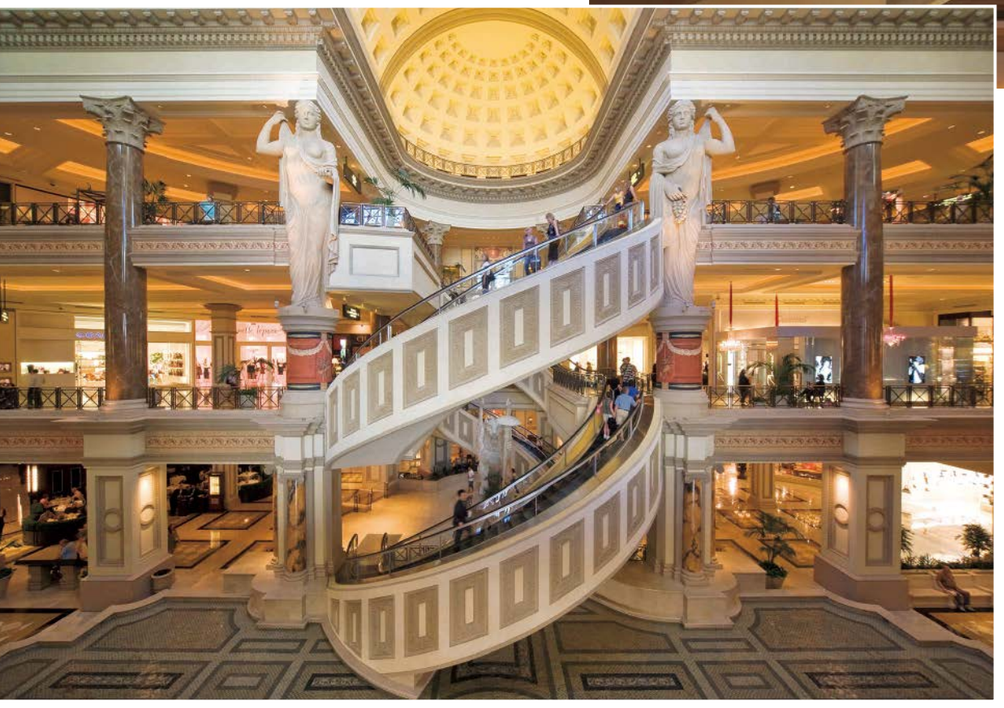
Premium

Fascinating premium appeal

Our SPIRAL ESCALATOR expresses a unique presence, creating a special space to welcome VIPs. When installed in an open-ceiling facility, the escalator symmetry enhances the feeling of spaciousness, sophistication and comfort, transforming the area into a cordial location where many people can gather.







Artistic Beauty

Craftsmanship

Breath-taking artistic design delivers added-value

Combined with highly advanced building design, our SPIRAL ESCALATOR enhances architectural structures by delivering added-value and artistic appeal. The unique "interior in motion" attraction produces a special space and time for tenants and visitors alike to enjoy. Installed in facilities such as museums or art museums, the escalators give a three-dimensional perspective to traditional buildings and exhibits, further confirming their high affinity in architectural design.

Escalators drawing an arc once said to be physically impossible. There is a reason that this could only be achieved only be achieved.

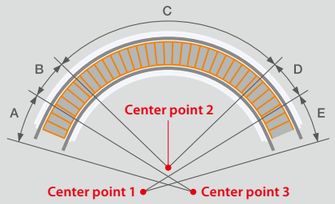
Escalators drawing arcs unique in appearance.
The rotational moment is complex in form, with the longitudinal movement closely intertwined.
To accomplish this, although the concept had long existed around the world,
it had not been successfully achieved. Then, in 1985,
we successfully developed what is now called the “SPIRAL ESCALATOR.”
Today, 31 years later, we remain the only company to manufacture the SPIRAL ESCALATOR.
At first glance, these escalators appear to have curvatures without any special features.
But the arcing structures achieved use elaborate,
sophisticated technologies only capable of being realized applying the design,
manufacturing, and installation skills of expert engineers.

Design

Discovery of the “Centralized motion method” principle

Most curving escalators once proposed around the world were based on methods for movement in a concentric circle. But none ever made it to market. Even though the speed of horizontal movement when creating a semi-circle is regular, making it possible to move concentrically, the structural problem is that movement in the horizontal direction slows to the extent that there is vertical movement in the inclined section. We overcame this issue by developing the "centralized motion method," in which the central point moves in stages based on the angle of incline.

■ Centralized motion method

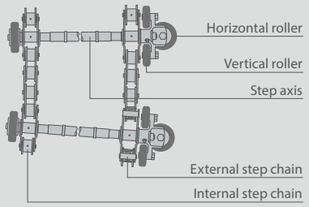


A. Upper horizontal interval B. Upper transition interval
C. Midpoint incline interval D. Lower transition interval
E. Upper horizontal interval

Innovation supporting 3D movement

Unique technologies were required to achieve the complex three-dimensional (3D) movement of the SPIRAL ESCALATOR. For example, a special chain capable of supporting a wide variety of angles required for the spiral orbit was introduced to move the steps. Horizontal rollers are installed on the outer-side of the chain, enabling the structure to manage the inward force generated by the arching configuration. This enables the escalator steps to move along the fixed orbital plane with high accuracy.

■ Step chain travels in 3D directions



Manufacturing

Elaborate processing only possible using manual labor

As the SPIRAL ESCALATOR requires complicated three-dimensional movement, various components must be processed into unique shapes such as curved trusses and steps with arch-like grooves. The complex shape of the track makes it one of the parts that requires a meticulous process utilizing intricate manufacturing technologies. Using special tools and original forming know-how, technicians finish the tracks manually by repeatedly performing a series of bending and twisting processes. Even when applying three-dimensional torsion, a final accuracy of 0.1mm or less is ensured, thus realizing smooth, precise motion.

Bending tracks three-dimensionally

Installation

Highly precise installation

Specialized installers assemble the truss by connecting up to 6,000 custom-shaped parts. After installation, multiple quality assurance checks are carried out to ensure that the finished product embodies our quality in the most detailed areas.

Truss installation work

Safety & comfort

In order for our customers to use these escalators anxiety-free and thus enjoy maximum comfort, various safety devices and functions are incorporated to guarantee smooth boarding and exit and advanced passenger safety during use.

For boarding

Yellow Demarcation Comb and Cleats

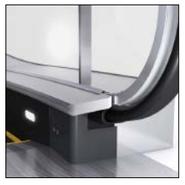
A yellow demarcation comb at the rear edge and yellow cleats at both sides make clear definition of each step very easy. These measures make boarding the escalator easier and safer.

Low-friction Material on Skirt Guard

The skirt guards have a special painting/coating on the surface, ensuring a low coefficient of friction and minimizing the risk of items getting caught.

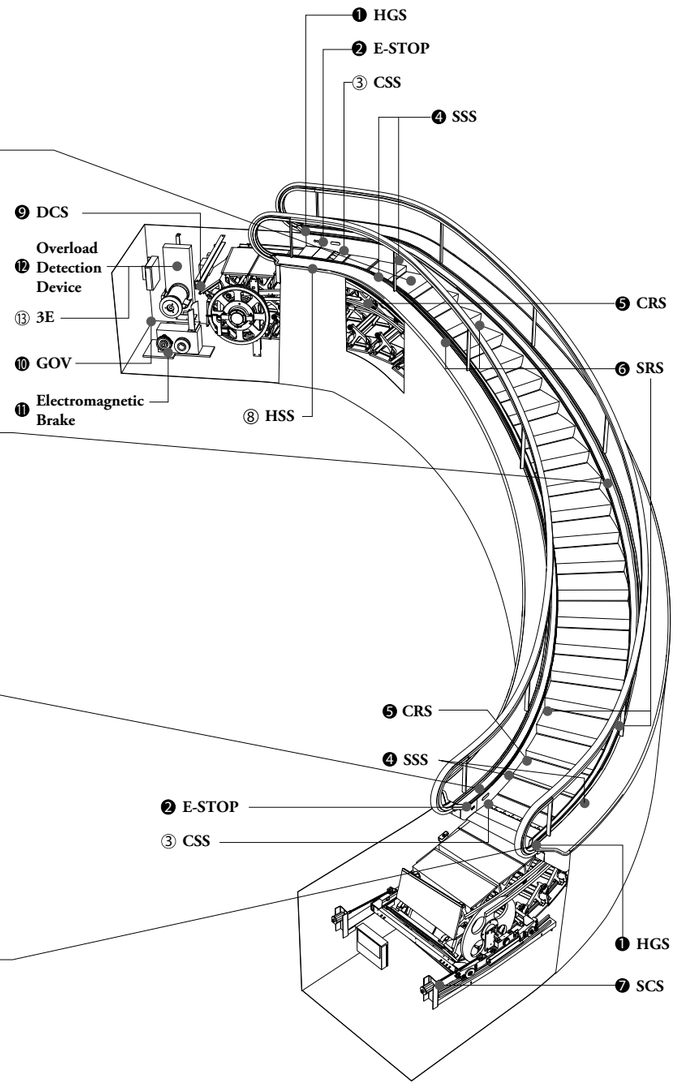
Comb Light (optional)

Lighting provided at comb level increases illumination, which further improves passenger safety around the step as well as visual effect.



Inlet Guards

These guards, formed of flexible rubber, inhibit fingers from being drawn inside by the movement of the handrail, making the escalator safer for children.



In an emergency

Safety devices

Various safety devices activate at the time of an emergency, protecting passenger safety.

●: Standard, ○: Optional

	Safety device	Description	Application
❶	**Handrail Guard Safety Device (HGS)**	1) Inlet Guard A guard made of soft rubber, which fits over the outside of the moving handrail where it enters the balustrade to keep fingers, hands or foreign objects away from the moving handrail opening 2) Inlet Guard Switch A safety device that stops the escalator when physical contact is made with the inlet	●
❷	**Emergency Stop Button (E-STOP)**	A button to immediately stop the escalator in emergency situations	●
③	**Comb-step Safety Switch (CSS)**	A safety device that stops the escalator if a foreign object becomes trapped in the gap between the step and comb	○
❹	**Skirt Guard Safety Device (SSS)**	A safety device to stop the escalator if a shoe or other item becomes trapped in the gap between the step and skirt guard	●
❺	**Step Motion Safety Device (CRS)**	A safety device to stop the escalator when a step has been dislocated on its riser side because of an object caught between the steps, or between the skirt guard and the step, or if an abnormality has been observed in the step motion	●
❻	**Step Level Device (SRS)**	A safety device that stops the escalator if the horizontal level of a step has dropped	●
❼	**Step Chain Safety Device (SCS)**	A safety device that stops the escalator if the step chain breaks or stretches beyond an allowable limit	●
⑧	**Handrail Speed Safety Device (HSS)**	A safety device that stops the escalator if the moving handrails fail to synchronize with the steps because of slippage, loosening or breakage of the moving handrails	○
❾	**Drive Chain Safety Device (DCS)**	A safety device that stops the escalator if the drive chain breaks or stretches beyond an allowable limit	●
❿	**Speed Governor (GOV)**	A safety device that stops the escalator before the operating speed exceeds 120% of the rated speed or if the operation speed becomes unusually slow	●
⓫	**Electromagnetic Brake**	A safety device that stops the escalator in the case of power failure, or if any safety device or the emergency stop button has been activated	●
⓬	**Overload Detection Device**	A safety device that stops the escalator if overload has been detected	●
⓭	**Three Elements (3E)**	A safety device that stops the escalator if any of the three abnormal conditions is detected: open phase (wire breakage), phase reversal or overload	○

*The options described in the table are incorporated as standard equipment based on applicable local codes or regulations.

Design planning precautions

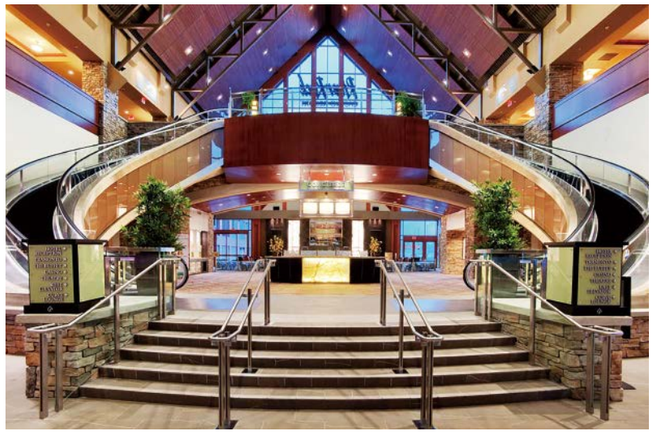
Please consult our local agents if any anti-earthquake measures are required based on regulations. Depending on the situation, collaborative construction work may be required regarding method of support of the escalator in the building.

Installation Examples

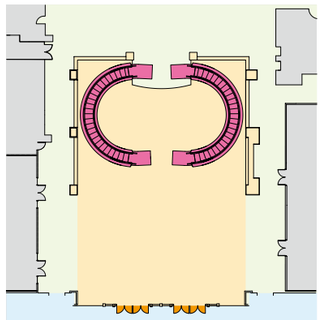
Why not add our SPIRAL ESCALATOR to your special building design. Discover how to use the arching curves to create a unique space not possible using normal escalators.

Entrance plan

Symbolizing and accenting spaciousness, the SPIRAL ESCALATOR dramatically portrays an increased field of vision. The public area.

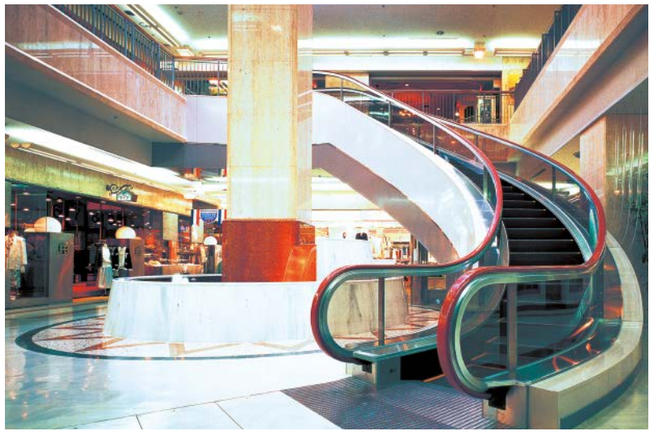


River Rock Casino

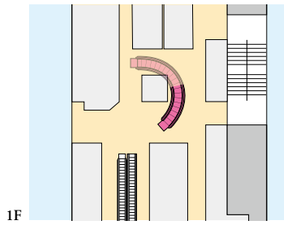


Plaza plan

An elegant entrance with open space is easily achievable by interweaving space and arching curves. Ideal for creating a comfortable place for people to meet or various other purposes, and improving building name value and adding value to the building structure itself.



AQ'A Hiroshima Center City



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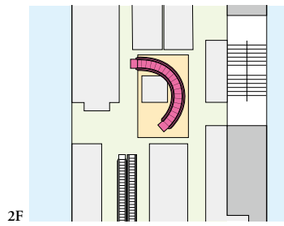

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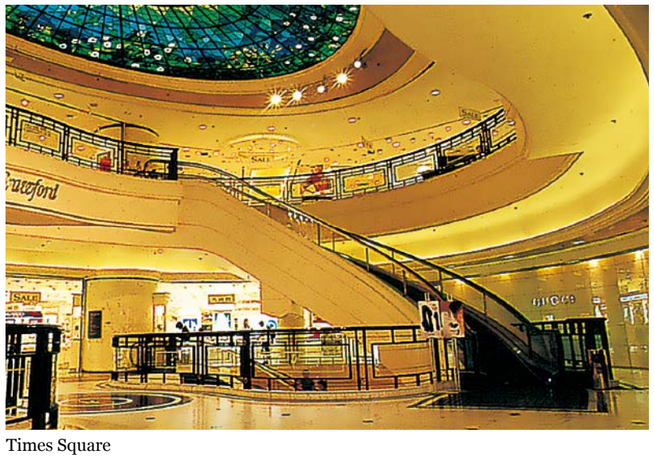
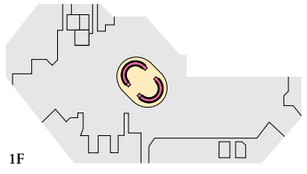
Open-air plan

Installation at the center of a structure creates an open-ceiling space that improves the atmosphere and impresses users with an expansive breadth of vision. It is also possible to use the area as an element for promoting window shopping and to announce special events.



Times Square



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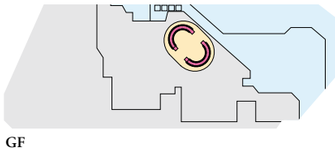

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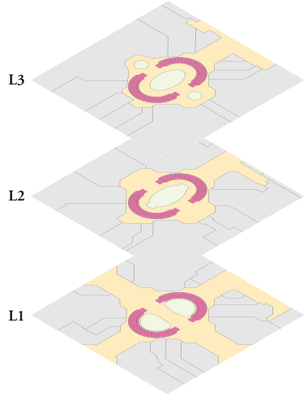
Multiple plan

A truly panoramic view can be achieved through consecutively linked layouts. This gives the appearance of a huge objet d'art, overflowing with a sense of opulence.

San Francisco Center



Installation List

Project name	Location	Completion	Unit	Rise (m)
INTERNATIONAL EXHIBITION CENTER OSAKA	OSAKA, JAPAN	1985	2	5
AQ'A HIROSHIMA CENTER CITY (See the plaza plan in page 14.)	HIROSHIMA, JAPAN	1986	1	5
SAN FRANCISCO CENTER (See the multiple plan in page 14.)	SAN FRANCISCO, USA	1988	2 4	6.6 4.8
LOTTE WORLD	SEOUL, KOREA	1988	2	5.5
BEST DENKI LTD. NAHA STORE	NAHA, JAPAN	1989	1	3.9
HIRAKATA BUILDING	HIRAKATA, JAPAN	1990	1	4.6
NAKAYAMA HORSE RACING FIELD	FUNABASHI, JAPAN	1990	1	5.1
MITSUBISHI ELECTRIC BUILDING SOLUTIONS CORPORATION INAZAWA BUILDING SYSTEMS WORKS	INAZAWA, JAPAN	1990	1	4.5
YONAGO SHOPPING CENTER	YONAGO, JAPAN	1990	2	4.9
TOKYU STORE SUSUKINO	YOKOHAMA, JAPAN	1991	1	4.5
TIMES SQUARE (See the open-air plan in page 13.)	HONGKONG, CHINA	1993	2 2	4.5 5.2
BIG STEP [SHINSAIBASHI BUILDING]	OSAKA, JAPAN	1993	2	5
WHEELOCK PLACE	SINGAPORE	1993	4	4.1
LANDMARK TOWER YOKOHAMA	YOKOHAMA, JAPAN	1993	2	4.5
LIVERPOOL SANTA FE	SANTA FE, MEXICO	1993	2	5.6
NEXT-21 PROJECT	NIIGATA, JAPAN	1993	1	5
SOGO DEPARTMENT STORE	KITAKYUSHU, JAPAN	1993	4	4.5
UTENA PROJECT	TOKYO, JAPAN	1993	2	4.2
DAYER TAKASHIMAYA DEPARTMENT STORE	TAIPEI, TAIWAN	1993	2	4.5
GOLD AND JEWELRY MARKET	ABU DHABI, U.A.E.	1993	2	6
SHANGHAI NEW WORLD MARKET	SHANGHAI, CHINA	1996	2	6.3
YAMAGATAYA MONZEN-NAKAMACHI BUILDING	TOKYO, JAPAN	1995	1	5.4
FUKUKO FUKUSHIMA STATION BUILDING	FUKUSHIMA, JAPAN	1996	1	4.6
YANG CHENG WORLD TRADE CENTER	GUANGZHOU, CHINA	1997	2	4
IZUTSUYA DEPARTMENT STORE	YAMAGUCHI, JAPAN	1998	1	4.4
TSUYAMA, TENMAYA	TSUYAMA, JAPAN	1998	2	5.5
JEDDAH HILTON HOTEL	JEDDAH, SAUDI ARABIA	1999	2	5
WTC MANGGA DUA	JAKARTA, INDONESIA	2003	2	6.6
BLOOMBERG BLDG.	NEW YORK, USA	2003	1	4.9
THE FORUM SHOPS AT CAESARS (See page 7.)	LAS VEGAS, USA	2003	4	6.6
WYNN LAS VEGAS	LAS VEGAS, USA	2004	2	5.5
BRILLIA TOWER TOKYO	TOKYO, JAPAN	2006	1	6.1
THE VENETIAN MACAO RESORT HOTEL (See page 5.)	MACAO, CHINA	2007	2	5.2
GULF CITY MALL	TOBAGO, TRINIDAD AND TOBAGO	2010	2	4.4
RIVER ROCK CASINO (See the entrance plan in page 13.)	VANCOUVER, CANADA	2010	2	6.6
AMIRI TERMINAL BUILDING	KUWAIT CITY, KUWAIT	2010	2	6.0
CONVENTION CENTRE EXTENSION & LINK BRIDGE TO QSTP AT WAJBA, DOHA, QATAR	DOHA, QATAR	2011	2	5.0
SHANGHAI NEW WORLD DAIMARU (See page 3.)	SHANGHAI, CHINA	2015	12	6.6
MITSUBISHI ELECTRIC BUILDING SOLUTIONS CORPORATION INAZAWA BUILDING SYSTEMS WORKS SOLAÉ PLACE	INAZAWA, JAPAN	2016	1	4.0
THE AVENUES	KUWAIT CITY, KUWAIT	2018	2	6.0
SEMINOLE HARD ROCK HOTEL & CASINO TAMPA	TAMPA, USA	2019	2	6.6
ENCORE BOSTON HARBOR	BOSTON, USA	2019	2	5
STARBUCKS RESERVE ROASTERY	CHICAGO, USA	2019	1	4.7

Important Information

Work not included in the escalator contract

The following items are not included in our escalator installation work, and the responsibility for carrying them out lies with the building owners or general contractors:

- Building construction and alterations associated with escalator installation
- Provision of intermediate support beams
- Provision of truss-supporting beams, including mounting plates
- Floor finishing after escalator installation
- Provision of fire-proofing and fire-prevention measures for escalator exterior materials and around escalator installation
- Provision of fire-prevention shutters (if required by local codes or regulations)
- Wiring for the escalator's main drive and lighting, from around the middle portion of the truss to the escalator's control unit in the upper truss
- Other wiring and electric conduits
- Provision of convenience outlets in the upper and lower truss
- Outer panel sheathing of truss
- Provision of inspection doors (lockable doors if installed in an environment where anyone could access and open the doors)
- All items for which procurement by building owners is instructed (with wording such as "by owner")

Notes on building work

- Tolerance in distance between supporting beams: +30mm to 0 or 13/8" to 0"
- Flooring around the escalator must not be finished until the escalator is installed.
- Flooring within 300mm or 12" of the escalator floor plate must not be finished until the floor plates are in place.
- Sprinkler pipes or wiring for soffit lights, or any other electric conduits for items other than escalator, must not be laid inside the truss.
- No walls or other parts of the building structure must be supported on the truss.
- Allowable maximum weight of outer sheathing: 20kg/m² or 0.028psi

Other Concepts

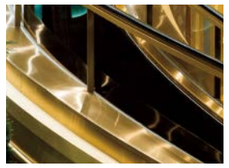
Other options available include items such as box beam support or a premium finish.

Box beam

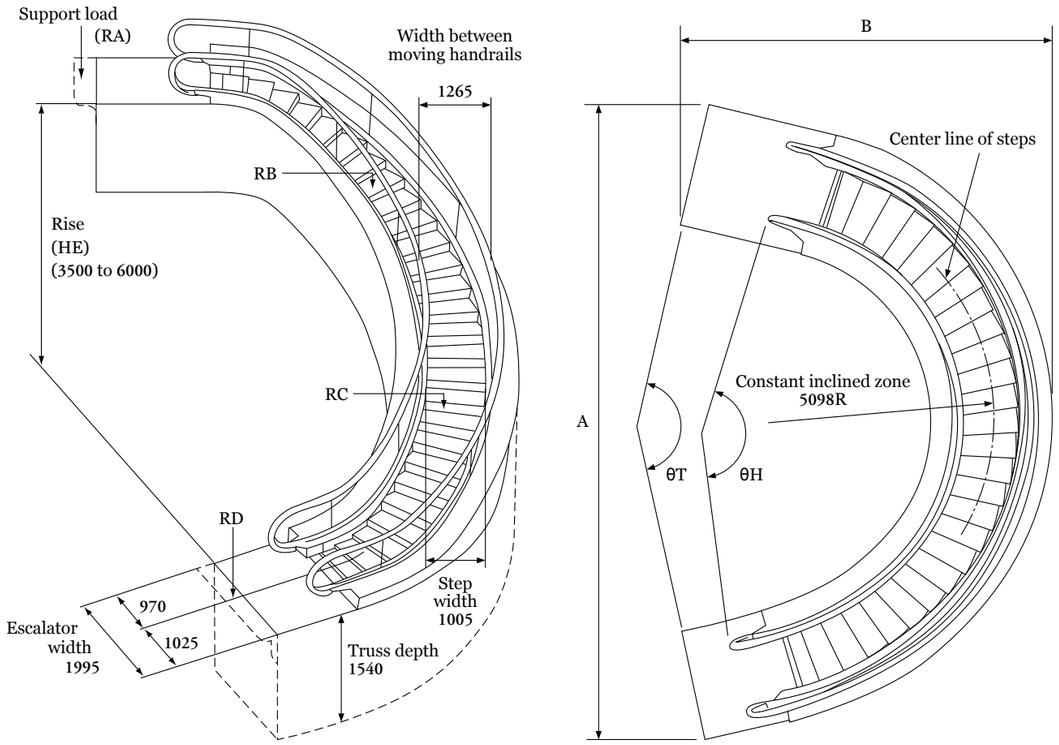
Utilizing a construction method known as "box beam" and collaborating with the building construction company, it is possible to eliminate the use of beams or columns for support, thereby creating a more attractive, alluring design. As the escalator is supported entirely by the box-shaped beam, the square production makes it appear that the escalator is floating in space.

"Premium Finish" proposal

The SPIRAL ESCALATOR expresses a premium presence of luxury. This value is accentuated by a consistently detailed finish overflowing with a sense of class. Various equipment and options are available upon request. For example, guardrail, deck boards and posts can be finished in the color of gold.



Layout & Specifications



Standard Dimensions and Overall Loads

Rise HE (mm)	Dimension A (mm)	Dimension B (mm)	Angle between truss ends θ_T	Angle between handrail ends θ_H	Total support load W=RA + RB + RC + RD (kN)
3500	12920	5810	118.7	102.9	270
3800	13060	6080	125.2	109.4	280
4000	13120	6260	129.5	113.7	284
4200	13170	6440	133.8	118.1	289
4400	13200	6620	138.1	122.4	299
4600	13210	6800	142.4	126.7	304
4800	13200	6980	146.8	131.0	309
5000	13170	7150	151.1	135.3	319
5200	13120	7330	155.4	139.6	324
5400	13050	7500	159.7	144.0	329
5600	12970	7670	164.0	148.3	333
5800	12870	7840	168.4	152.6	338
6000	12750	8010	172.7	156.9	348
6200	12610	8120	177.0	161.2	353
6400	12480	8330	181.3	165.6	358
6600	12430	8560	185.6	169.9	363

Notes:
1. The truss support angle is not included in dimensions A and B.
2. The loads between RA and RD will vary according to the positions of the supports; however, they will total W in the"Total support load"column.

Basic Specifications

Model		1200
Effective width between balustrades		1200mm
Step width		1005mm
Carrying capacity		6300 persons/hour
Rated speed *1		25m/min
Inclination angle *2		30°
Power source	for driving	3-phase, 200/400ACV 50Hz or 210/440ACV 60Hz
	for lighting inside machine room	Single-phase, AC, 50 or 60Hz
Direction of curve *3		Left or right
Applicable rise		3500 to 6600mm *4

Notes:
*1: Speed is measured at the outer side of step.
*2: Angle is measured at the inner side of step.
*3: "Left curve" is defined; when viewed from the floor plate on the lower floor, the escalator is curving to the left as it rises. "Right curve" is defined vice versa.
*4: Applicable rise is 3500 to 6000mm for areas following EN standard.

List of Finishes

Balustrade	Interior panel	Curved transparent tempered glass with hairline-finished stainless steel posts
	Guardrail	Extruded aluminum anodized hairline finish
	Corner deckboard	Hairline-finished stainless steel
	Outer deckboard	Hairline-finished stainless steel
	Inner deckboard	Hairline-finished stainless steel
	Skirt guard	Fluoride resin coating finished (black)
	Moving handrail	Synthetic rubber (standard color: deep red, blue or black)
Step	Tread board	Aluminum alloy (groove color: black)
	Cleated riser	Aluminum alloy (black)
	Demarcation line	Demarcation-comb: polycarbonate resin mold (yellow); Side lines: painted (yellow)
Floor plate	Comb	Resin mold (yellow)
	Comb plate	Stainless steel plate with anti-slip pattern (groove color: black)
	Landing plate	Stainless steel plate with anti-slip pattern (groove color: black)
	Manhole cover	Stainless steel plate with anti-slip pattern (groove color: black)

Trademark Rights

Quality in Motion is a trademark of Mitsubishi Electric Corporation.
SPIRAL ESCALATOR is a registered trademark of Mitsubishi Electric Corporation.

State-of-the-Art Factories…
For the Environment. For Product Quality.

Our elevators and escalators are currently operating in approximately 90 countries around the globe. Built placing priority on safety, our elevators, escalators and building system products are renowned for their excellent efficiency, energy savings and comfort.
The technologies and skills cultivated at the Inazawa Building Systems Works in Japan and 12 global manufacturing factories are utilized in a worldwide network that provides sales, installation and maintenance in support of maintaining and improving product quality.
As a means of contributing to the realization of a sustainable society, we consciously consider the environment in business operations, proactively work to realize a low-carbon, recycling-based society, and promote the preservation of biodiversity.

ISO9001/14001 certification

Mitsubishi Electric Building Solutions Corporation Inazawa Building Systems Works has acquired ISO 9001 certification from the International Organization for Standardization based on a review of quality management. The plant has also acquired environmental management system standard ISO 14001 certification.

ISO 9001
BUREAU VERITAS
Certification

ISO 14001
EC98J2017
UKAS MANAGEMENT SYSTEMS
0051

MITSUBISHI ELECTRIC BUILDING SOLUTIONS CORPORATION
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www.MitsubishiElectric.com/elevator

⚠ **Safety Tips:** Be sure to read the instruction manual fully before using this product.

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