

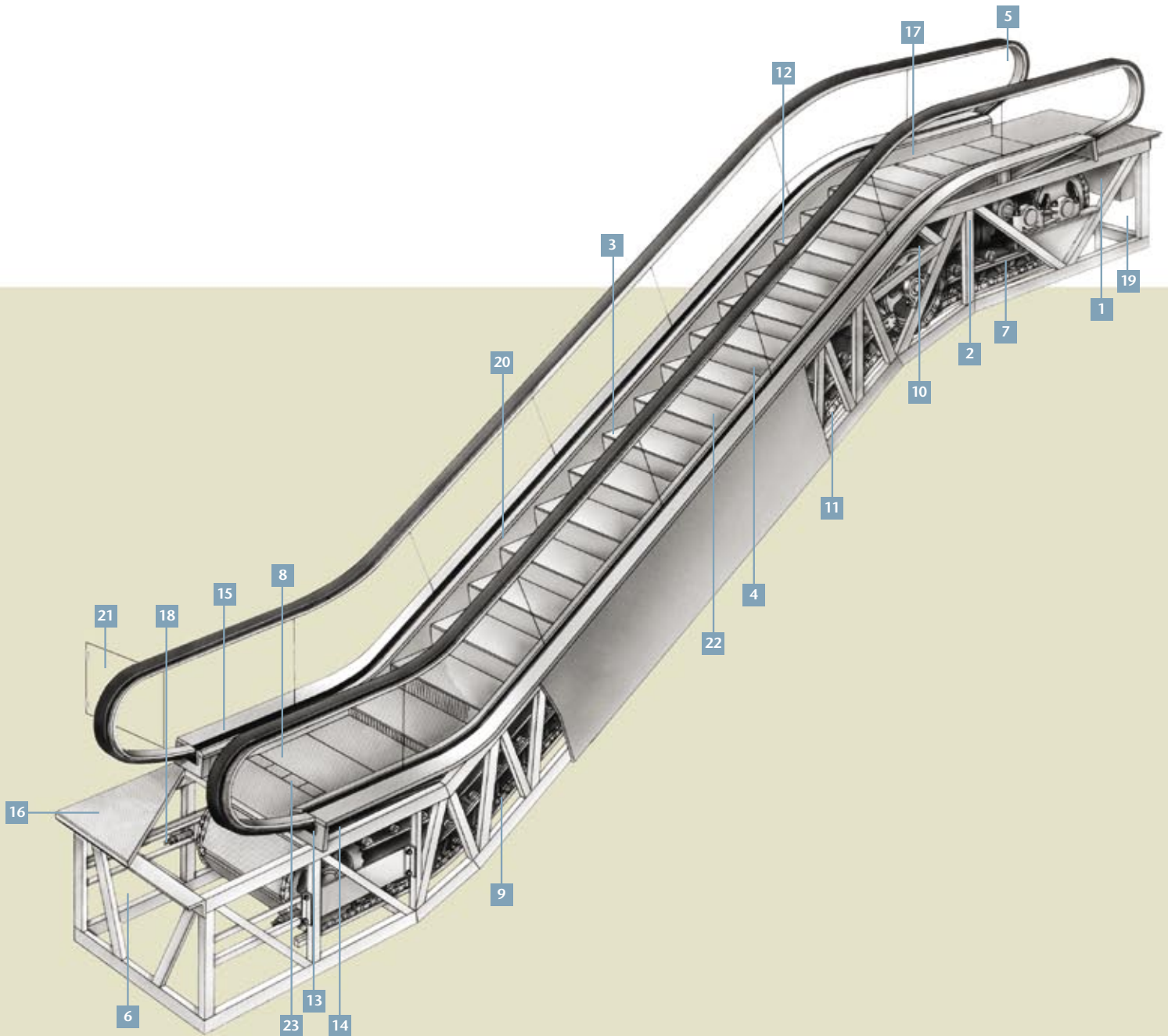
Dedicated to People Flow™



ESCALATORS

Safety and Performance Upgrades

Performance. Safety. Reliability.



1 CONTROL & ANNUNCIATOR:

New microprocessor controllers are designed to work in conjunction with other new safety devices to provide correct information processing and proper escalator control. Escalator faults are identified by the control and illuminated in a display on the control cabinet or the upper and lower annunciators for easy troubleshooting.

2 ESCALATOR BRAKE:

A new permanent magnet ceramic brake can be installed. When activated the brake is designed to gradually stop the escalator, and hold it stationary under full load. The closed-loop brake circuit is designed to meet current ASME Code deceleration rate requirements and operate in conjunction with a velocity feedback encoder and microprocessor controller.

3 SKIRT GAP AND STIFFNESS:

Installation of skirt stiffening channels is designed to provide uniform clearance between the step edge and skirt, reducing the possibility of entrapment between the step and skirt and enhancing safety. See the following pages for additional information.

4 STEP RISERS:

See next page for information.

5 EMERGENCY STOP BUTTONS AND ALARM:

See next page for information.

6 PIT STOP SWITCH:

All escalator machine spaces and other areas where access to the interior of an escalator is provided must be furnished with a stop switch. The stop switch is designed to enhance safe access by authorized personnel.

7 REVERSAL STOP DEVICE:

Protection against accidental or inadvertent reversing of an escalator operating in the UP direction is monitored by a directional feedback encoder designed to prevent a reversal in the escalator's direction. This device, when activated, turns off the motor and activates the brake, bringing the escalator to a smooth stop.

8 STEP DEMARCATION LIGHTS:

See next page for information.

9 STEP-UP THRUST DEVICE:

This device is designed to detect obstructions in the lower curve area, which could cause a step to be elevated, thus impacting the combplate. When this device detects a raised step, it will shut off the motor and activate the brake to stop the escalator.

10 HANDRAIL SPEED MONITORING DEVICE:

A handrail speed sensor is designed to measure the variation in speed between the step band and handrail. If speed variation becomes too great, the controller will sound an alarm buzzer, turn off power to the motor and activate the brake to stop the escalator.

11 MISSING STEP DEVICE:

This device is designed to detect a missing step. When a missing step is detected, power to the motor is turned off and the brake is activated to stop the escalator.

12 STEP LEVEL DEVICE:

This device is designed to detect a step that is about to enter the comb area at a "lower elevation" than the combplate. If a "low step" is detected, the escalator is turned off and the brake is applied to stop the escalator.

13 HANDRAIL ENTRY DEVICE:

See next page for information.

14 COMB IMPACT DEVICE:

See next page for information.

15 SAFETY SIGNS:

See next page for information.

16 ACCESS COVERS:

See next page for information.

17 SKIRT OBSTRUCTION DEVICE:

This device is designed to detect obstructions between the skirt and step at the point where the step approaches the upper and/or lower combplate area and shut down the escalator if there is an entrapment.

18 BROKEN STEP-CHAIN DEVICE:

Installed on the lower end carriage, this device is designed to detect step-chain breakage or excessive step-chain sag.

19 KONE EcoStart®:

This energy performance control is designed to save up to 40% in energy costs, extend motor life, and provide a smooth, safe start. See the following pages for additional information.

20 KONE Avert™:

These escalator skirt deflector brushes are designed to encourage safe escalator use by providing a subtle indicator to passengers riding near the step's edge. See the following pages for additional information.

21 DECK GUARDS:

See next page for information.

22 STEPS:

See next page for information.

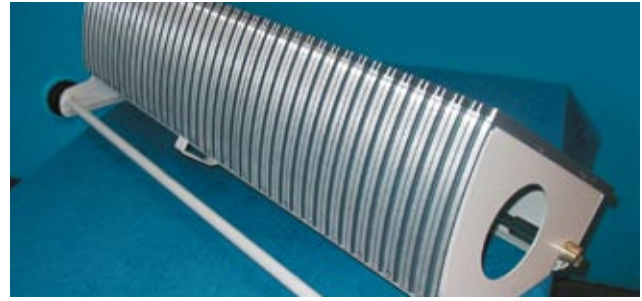
23 COMB TEETH:

See next page for information.

Also available:

PROFESSIONAL STEP CLEANING:

A three-step process which involves a machine that removes dirt, grease, oil, stains, etc. from the steps and is followed up by a manual touch up.



EMERGENCY STOP BUTTONS AND ALARM

Code requires the emergency stop button to be located at a 45 degree angle on the escalator newel end. This increases accessibility in the event of an emergency. An alarm bell designed to ring whenever the cover is lifted can be installed to discourage “nuisance pressing” of the stop button by unauthorized persons.

STEP RISERS

Some older escalators were equipped with smooth step risers. New steps can be installed (with cleated step treads and risers that intermesh) that are designed to reduce the possibility of objects becoming entrapped.



HANDRAIL ENTRY DEVICE

Code requires that this device detects an object prior to entering the handrail inlet area. When activated, this device is designed to turn the motor off and activate the brake to stop the escalator.

STEP DEMARCATION LIGHTS

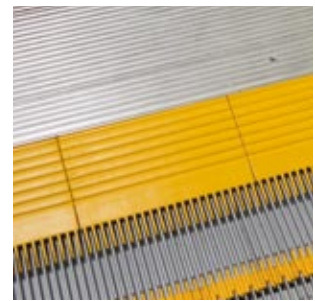
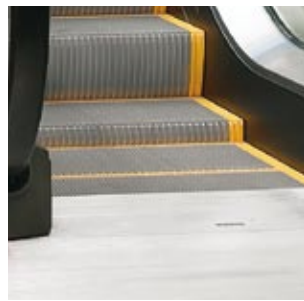
Installation of green fluorescent light fixtures beneath the steps at both the upper and lower ends differentiate the step from the combplates. This step demarcation is designed to signal the passenger that the end of the escalator is near.

STEPS

The step design provides a clean look, better ride and replaceable demarcation strips for improved safety. Demarcation inserts or paint are optional along the side or front of step to warn passengers of possible entrapment points.

COMB IMPACT DEVICE

Detection of combplate movement in either the horizontal or vertical direction is required by Code. The comb impact device is designed to shut the motor off and activate the brake in the event that combplate movement is detected.



SAFETY SIGNS

Code requires special caution and safety signs at both ends of the escalator.

ACCESS COVERS

Specially designed access covers that require no more than 70 pounds of force to open can be provided to replace older types that no longer meet Code requirements.

DECK GUARDS

These plastic barriers are designed to prevent an object and people from getting wedged between the escalator handrail and a wall or another escalator.

COMB TEETH

Defines the end of a moving escalator step and the stationary access cover to warn passengers to pick up their feet.

KONE EcoStart

Key Benefits

- Reduces escalator energy consumption by 20–40%*
- Extends escalator life and up-time
- Adds smooth starting capability to the escalator

Energy Savings

EcoStart's patented algorithms and circuitry are used to sense the energy used by an escalator and can reduce energy consumption by precisely calculating only the energy it requires.

EcoStart reduces energy when an escalator is operating with no load or is lightly loaded while maintaining a constant speed.

Life and Up-time

EcoStart has an extended life over a standard electro-mechanical escalator motor starter. During energy savings it will reduce the temperature to the motor which will increase motor life. EcoStart has enhanced electronic motor protection to protect escalator motor from damaging power fluctuations. EcoStart is specifically engineered for escalators and is CSA and CE certified.

**results may vary*



Soft Start

The soft-start functionality of EcoStart provides smooth acceleration of the escalator motor until it reaches its normal operating speed.

EcoStart has saved energy on escalators in the field for over a decade. Thousands of units are installed and benefiting end users at sites such as:

- Major U.S. department stores
- Shopping malls
- Airports/Public transportation stations
- Events centers/Museums
- Universities
- Medical centers
- Leading hotel chains



Denver International Airport (DIA) Case Study

Type of Project:
Retrofit

Applications:
Escalators and Moving Walks

Number of Units Retrofitted:
160

Estimated Average Savings:
35%

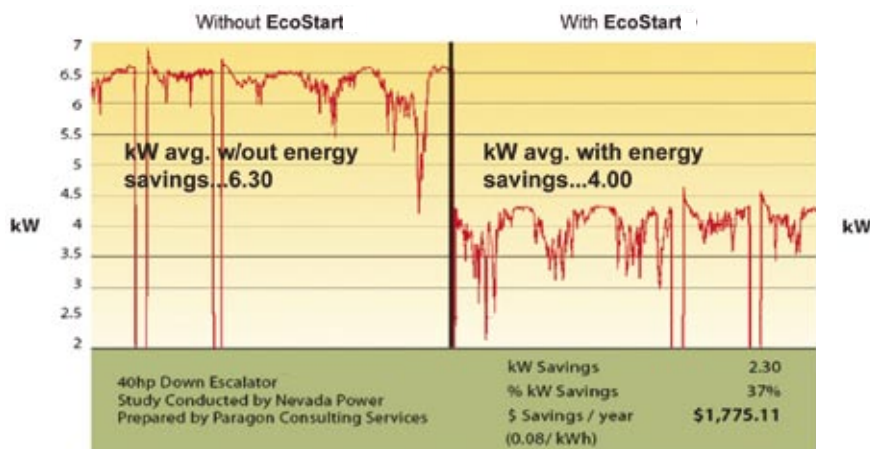
Estimated kWh Savings:
2 million kWh per year

Carbon Emission Reduction:
4 million lbs. per year

Estimated Cost Savings:
\$100,000 per year

Average Payback:
3 years

Tests and Savings Estimates verified by Xcel Energy



Graph above shows results from a test on a 40HP "down" escalator conducted by Nevada Power.

Code Standards

CODE REQUIREMENTS	UNIT INSTALLED UNDER THE SPECIFIED CODE	ACTION REQUIRED
Step/Skirt Performance Index		
≤ 0.15	Any	None
> 0.15 and ≤ 0.4	A 17.1-2000 and earlier Editions	Skirt deflectors required
> 0.4		Corrective action required to achieve at least 0.4 with skirt deflectors
> 0.15 and ≤ 0.25	A 17.1a-2002 and earlier Editions	Skirt deflectors required
> 0.25		Corrective action required to achieve at least 0.25 with skirt deflectors
Loaded Gap		
≤ 0.2 in.	A 17.1d-2000 and later Editions	None
> 0.2 in.		Corrective action required to achieve no more than 0.2 in.

Note: Step-to-Skirt Clearances shall be maintained in compliance with the applicable codes at the time of installation.

Get an accurate assessment

Some escalators may need only minor adjustments to meet these new Code requirements. Others may require more extensive solutions. That means it's important to get an honest assessment today.

Once you do, we'll be there to help you develop a plan to meet annual testing requirements or to make any changes that will reduce downtime, decrease energy need, increase reliability and provide an overall safer ride.



The Escalator Step/Skirt Performance Index is a measure of the attributes affecting the likelihood of entrapment between the escalator skirt and step.

KONE Avert and Solutions

(Escalator Step/Skirt Performance Index)



KONE Avert skirt deflector brushes encourage safe escalator use by providing a subtle indicator to passengers riding near the step's edge.



The testing device mounts directly on the escalator step to measure coefficient of friction and loaded gap. Loaded gap is the measurement of the gap between the step and skirt when 25 lbs. of force are applied to the face of the skirt.

KONE Avert

- KONE Avert skirt deflector brushes are designed to follow the profile of the skirt panel.
- Curved brush holder sections are formed during fabrication to fit the contours of your escalator.
- Standard anodized aluminum brush holders are available in black or silver.
- Black end caps provide a smooth, attractive contour.
- The non-metallic brush section is easy to remove for maintenance, cleaning or replacement.
- KONE Avert skirt deflector brushes are designed to accommodate annual performance index tests without brush removal in most cases. This means less downtime during testing.
- This is often the easiest and most cost-effective solution if the Performance Index value falls within a specified range.

Skirt replacement and track alignment

The Performance Index must be less than or equal to .40; this is the ideal long-term solution. Skirt brush deflectors may also be required by Code to supplement skirt replacement.

Skirt adjustment

There is a short-term solution if the Performance Index value reaches .40. If the Performance Index value exceeds .15 then skirt brushes are required. Skirt brush deflectors may also be required by Code to supplement skirt adjustment.

Skirt refinishing

This is the prescribed solution for older escalators with skirt designs that cannot be replaced and where the loaded gap is optimal, meaning that a slight reduction of the coefficient of friction will bring Code compliance. Skirt brush deflectors may also be required by Code to supplement skirt refinishing.

Test device

A testing device measures an escalator's loaded gap and the coefficient of friction of the skirt panel. The device uses this data to calculate a Performance Index value. The code specifies acceptable index values and loaded gap measurements.



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