Escalator Safety and Performance Upgrades
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.

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.

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.

STEP RISERS:
See next page for information.

EMERGENCY STOP BUTTONS AND ALARM:
See next page for information.

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.

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.

STEP DEMARCATION LIGHTS:
See next page for information.

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.

HANDBRAIL 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.

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.

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.

HANDRAIL ENTRY DEVICE:
See next page for information.

COMB IMPACT DEVICE:
See next page for information.

SAFETY SIGNS:
See next page for information.

ACCESS COVERS:
See next page for information.

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.

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.

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.

DECK GUARDS:
See next page for information.

STEPS:
See next page for information.

YELLOW COMB TEETH:
See next page for information.

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.
**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.

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

**HANDRAIL ENTRY DEVICE:**
Code requires this device to detect 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.

**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 these special caution and safety information signs at both ends of the escalator.

**ACCESS COVERS:**
Specially designed aluminum 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.

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

**YELLOW COMB TEETH:**
Defines the end of a moving escalator step and the stationary aluminum access cover to warn passengers to pick up their feet.
KONE EcoStart®

Key benefits
- Proven energy savings on escalators of 20-40%
- Replaces existing soft start
- Reduces motor temperature
- Maintains normal RPM
- Can be retrofitted onto any existing escalator
- May qualify for utility rebates and incentives

Proven energy saving technology
The EcoStart combines proven energy saving technology with a solid state soft start. Tests conducted by electric utilities show typical savings of 20-40% on escalators. The EcoStart saves energy while maintaining normal operating speed. It also reduces the operating temperature of the motor. The EcoStart is the only energy saving technology of its kind that is engineered specifically for escalators and is CSA B44.1 / ASME A17.5 certified.

Enhanced motor efficiency
Electronic circuits in the EcoStart constantly monitor the workload of the motor. Using patented technology, these circuits monitor the voltage and current waveforms. The EcoStart then reduces power when a motor is idling or is lightly loaded while still maintaining its original constant RPMs and then instantly increases current as loads increase. The EcoStart provides a solution for wasted energy and motor inefficiency on escalators.

Proven EcoStart savings

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>APPLICATION / HP</th>
<th>AVERAGE ANNUAL POWER SAVINGS %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartle Hall Convention Center, Kansas City, MO</td>
<td>Escalators / 20HP</td>
<td>39%</td>
</tr>
<tr>
<td>Luxor Hotel &amp; Casino, Las Vegas, NV</td>
<td>Escalators / 20HP</td>
<td>36%</td>
</tr>
<tr>
<td>Dallas Ft. Worth International Airport, Dallas, TX</td>
<td>Escalators / 15HP</td>
<td>33%</td>
</tr>
<tr>
<td>Hartsfield International Airport, Atlanta, GA</td>
<td>Escalators / 20HP</td>
<td>38%</td>
</tr>
</tbody>
</table>

Smooth starts
Full voltage hard starts increase the risk of damage to the motor as well as surrounding equipment. The soft start feature of the EcoStart reduces in-rush current by up to 75%. An adjustable timed ramp circuit gradually increases power until the motor reaches its operating RPM.

Maintenance
The EcoStart helps extend the life of motors and driven parts by eliminating undue strain caused by jarring starts. Also, the energy that the EcoStart saves results in lower motor operating temperatures.

KONE EcoStart energy performance control adjusts voltage and current to escalators 120 times per second, instantly delivering only the minimum power required to meet the necessary workload.
KONE Avert™ and ESSPI Solutions (Escalator Step Skirt Performance Index)

**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**
If the Performance Index value exceeds .40, this is the ideal long-term solution. Skirt brush deflectors may also be required by Code to supplement skirt replacement.

**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.

**Skirt adjustment**
This is a short-term solution if the Performance Index value exceeds .40 and skirt replacement is not affordable. Skirt brush deflectors may also be required by Code to supplement skirt adjustment.

**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.

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

The right-hand column of the chart lists index value ranges defined by ASME A17.1d-2000 Addendum & A17.1-2000 Code. The three columns to the right list actions required by various sections of the Code for each index value range.

**Get an assessment you can trust**

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.
U.S. Headquarters
KONE Inc.
One KONE Court
Moline, Illinois 61265
1-800-956-KONE (5663)
www.kone.com

Canadian Headquarters
KONE Inc.
80 Horner Avenue
Toronto, Ontario M8Z 4X8
1-416-252-6151
www.kone.com

Call your local KONE sales office and schedule your test ride today.

For the latest product information and interactive design tools, visit www.kone.com