

## IMD-1

### Escalator Step/Skirt Performance Index

#### Escalator Entrapment Potential Evaluation & Analysis

Physical Measurement Technologies' IMD-1 Step/Skirt Index Measurement Device is the standard for evaluating entrapment potential on escalator systems. The IMD-1, in combination with the EVA-625 (or MMC-1) system, and EVA Elevator & Escalator Analysis tools software, allows the complete evaluation of the newly defined step/skirt performance index (A17.1-2000). The index is meant to provide a quantitative measure of entrapment potential based on both the loaded gap and coefficient of friction.

- Step/Skirt Index
- Loaded Step/Skirt Gap
- Coefficient of Friction
- Real Time Evaluation
- Recording/Documentation

The Step/Skirt Performance Index was defined under a multi-year study with the purpose of establishing measurable parameters that affect the potential for entrapments on escalators. Entrapments in this case include finger/hand, calf, and shoes trapped between the escalator step and skirt. Based on empirical data, it was determined that the gap between the step and skirt, and the coefficient of friction (skirt panel and skin/shoes) were quantities that had a significant affect.

#### Step/Skirt Performance Index

The step/skirt performance index is calculated from the measurement of two quantities and is defined only for the inclined section of the escalator. The first quantity is the loaded gap (Lg). This is the distance between the edge of the step and skirt, while the step is 'pushed away' from the skirt using a force of approximately 110 N (25 lbs). The second quantity measured is the coefficient of sliding friction ( $\mu$ ) between the skirt panel and a standard polycarbonate test sample (PMT supplied). The Index is defined as:  $\text{Step/Skirt Performance Index} = \frac{ey}{(ey + 1)}$  Where:  $y = -3.77 + 2.37(\mu) + 0.37(Lg)e = 2.7183(Lg \text{ in mm})$

This is an example of an Index Measurement Time History (EVA Software). The values of loaded gap (upper graph) and coefficient of friction (middle graph) are used, at each point in time, to calculate the Step/Skirt Performance Index (lower graph) using the formula above. Measurements are made on each side of two representative steps (a total of 4 measurements).

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PMT's IMD-1 is the first instrument commercially available designed to accurately and reliably evaluate and analyze the Step/Skirt Performance Index. The IMD-1 is attached to the selected step and is connected to an existing EVA-625 system (v.6 firmware or later) or PMT's MMC-1 (Multi-Measurement Controller). The EVA functions as the data recorder/real time display for the IMD-1. When convenient, the data can be downloaded to your PC and analyzed using the EVA Elevator/Escalator Analysis Tools software.

Analysis Although the implementation of the Step/Skirt Performance Index is primarily designed to improve safety on escalators, the use and analysis of the Index measurements offers other significant advantages as well. The analysis of the recorded data offers the ability to vastly improve and document quality control procedures in the production and field service of escalators. The immediate feedback ensures that manufacturing and field personnel will adjust and maintain gaps properly.

For complete information on the IMD-1 and other PMT products, or to schedule a demonstration, contact your local PMT representative or, call/fax/e-mail/write Physical Measurement Technologies, Inc. directly.

#### Specifications

- Sensors: Linear Position/Cross Axis Force
- Range: Linear Position 7.6 mm (.300 in.)
- Cross Axis Force 111 N (25 lbs.)
- Resolution: Linear Position 0.04 mm (0.0015 in.)
- Cross Axis Force 0.04 N (0.008 lbs)
- Normal Force: 112 N (25 lbs.) +/- 9 N
- Friction Face: LEXAN® 100 Polycarbonate Equivalent
- Weight: 3.6 Kg
- Housing: Coated Steel

