**Linear Guide - Structure and Features**

- Miniature Type
  - Rail
  - Ball
  - Under Seal
  - Bottom Rail: Upper Rail: Middle Rail
- Medium/Heavy Load Type
  - Rail
  - Ball
  - Return Cap: Side Seal
- Retainer: (Wire)

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**Dimensional Accuracy**

- Miniature Type
  - Accuracy Standards
    - Height H Tolerance ±10 ±20 ±30 ±40
    - Pair Variation of Height H 7 15 40 30
    - Width W2 Tolerance ±15 ±25 ±35 ±45
    - Pair Variation of Width W2 10 20 40 30

- Medium/Heavy Load Type
  - Accuracy Standards
    - Height H Tolerance ±40 ±20 ±100 ±120
    - Pair Variation of Height H 15 15 20 40
    - Width W2 Tolerance ±20 ±30 ±100 ±100
    - Pair Variation of Width W2 24 28 15 25 20 40

**Running Parallelism**

- Rail Length [mm]
  - Miniature Type
    - 50 2 3 13 17 4 6 7 10
    - 50 2 3 13 17 4 6 7 10
    - 125 3 7 15 15 7 8 5 3 10
  - Medium/Heavy Load Type
    - 250 3 7 15 15 7 8 5 3 10
    - 30 36 40 40 - 25 4 10

**Selection of Radial Clearance (Preload)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Preload</th>
<th>Co Value (N)</th>
<th>Radial Clearance (µ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miniature Type</td>
<td>Existing Products</td>
<td>Light Preload: 6–20</td>
<td>3–5</td>
</tr>
<tr>
<td>Medium/Heavy Load</td>
<td>Existing Products</td>
<td>Light Preload: 6–20</td>
<td>3–5</td>
</tr>
<tr>
<td>C-VALUE Products</td>
<td>Normal Clearance</td>
<td>6 ±3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interchangeable Light Preload</td>
<td>24, 28</td>
<td>8–10</td>
</tr>
<tr>
<td></td>
<td>Normal Clearance</td>
<td>24, 28</td>
<td>8–10</td>
</tr>
<tr>
<td></td>
<td>Normal Clearance</td>
<td>24, 28</td>
<td>8–10</td>
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</tr>
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<td></td>
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<td>24, 28</td>
<td>8–10</td>
</tr>
</tbody>
</table>

**Fricition Force (Required Thrust Force)**

Linear Guide friction force (required thrust) varies depending on load, speed and lubricant property. Especially when moment load is applied, Preload Type friction force increases. Although seal resistance varies according to seal lip press-fit allowance and lubrication conditions, it is not proportionate to load and keeps a constant value. Friction force is obtained by the following formula:

\[ F = \mu \cdot W + f \]

where:
- \( F \) = Friction Force
- \( \mu \) = Dynamic Friction Coefficient
- \( W \) = Applied Load
- \( f \) = Seal Resistance (CN – 5N)

**Allowable Load**

- **Basic Dynamic Load Rating (C)**
  - Basic dynamic load rating is defined as: a load applied in a constant direction and ran under equal condition on a group of linear guide specimen where 90% of specimen will reach 50x10^3m without experiencing any damages due to rolling fatigue.
  - Basic static load rating is defined as: a load applied on non-moving linear guides where a sum of rolling element plastic deformation amount and rolling surface plastic deformation amount becomes equal to 0.0001 times that of the diameter of the rolling element (balls).
  - Allowable static moment (Ma, Mb, Mc)
  - Allowable static moment is a critical static moment load defined by permanent deformation value similar to basic static load rating Co.

**Table 1. Dynamic Friction Coefficient**

<table>
<thead>
<tr>
<th>Type</th>
<th>Dynamic Friction Coefficient (µ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miniature Linear Guides</td>
<td>0.004–0.006</td>
</tr>
<tr>
<td>Linear Guide for Medium, Heavy Load</td>
<td>0.002–0.003</td>
</tr>
</tbody>
</table>

**Table 2. Static Safety Factor (fs Lower Limit)**

<table>
<thead>
<tr>
<th>Condition of Use</th>
<th>Lower Limit(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>For normal operating condition</td>
<td>1–2</td>
</tr>
<tr>
<td>When smooth running performance is required</td>
<td>2–4</td>
</tr>
<tr>
<td>When vibrations and impacts exist</td>
<td>3–5</td>
</tr>
</tbody>
</table>