

# MicroGuide™ Standard & Wide Stainless Steel Linear Guides

## TECHNICAL BULLETIN

### Features & Benefits:

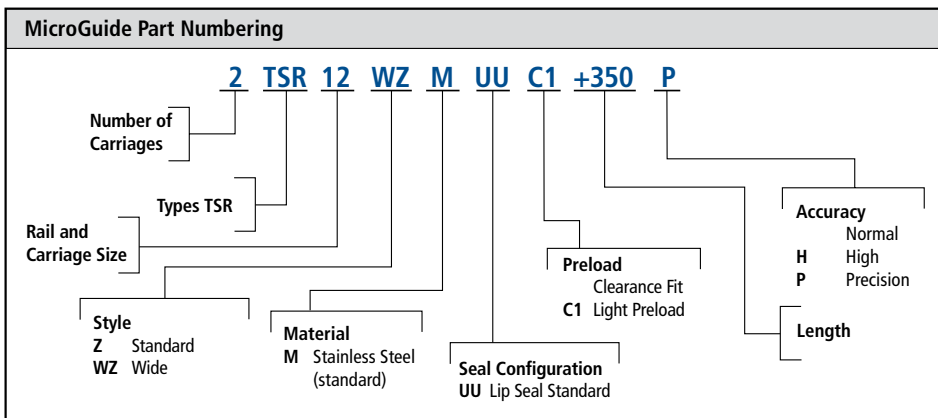
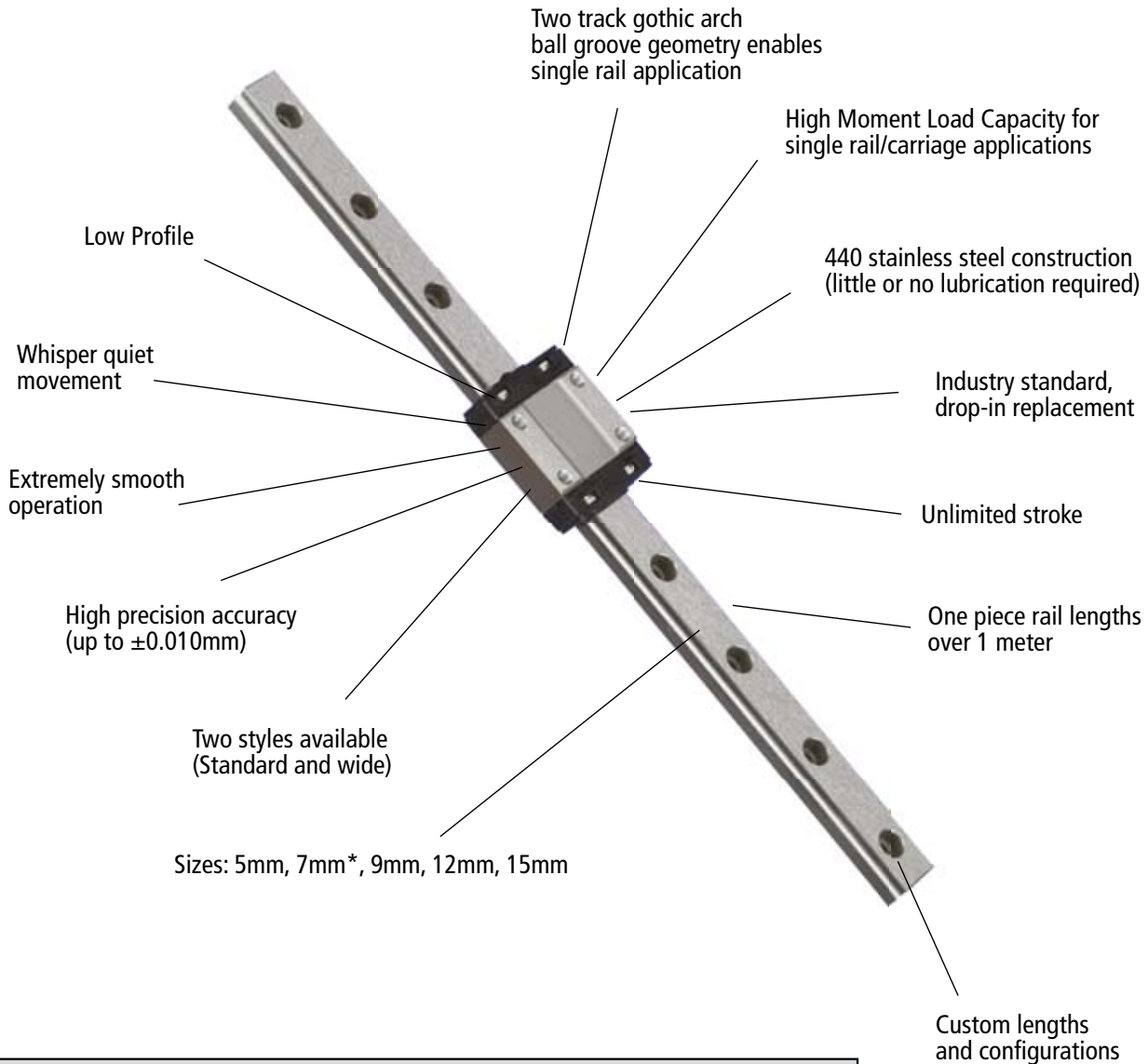
- Industry standard drop-in replacement
- 440 stainless steel construction (corrosion resistance, little or no lubrication)
- High precision accuracy (up to  $\pm 0.010\text{mm}$ )
- Extremely smooth, quiet operation
- Unlimited stroke
- Low Profile
- High Moment Load Capacity for single rail / carriage applications
- Whisper quiet movement
- Gothic arch ball groove geometry provides enables single rail application
- Sizes: 5mm, 7mm, 9mm, 12mm, 15mm (MicroGuide standard)
- Sizes: 7mm, 9mm, 12mm, 15mm (MicroGuide wide)
- Technical engineering support from Danaher Motion
- One-piece length up to 1 meter (in sizes 7mm - 15mm)
- Contact Danaher Motion for custom lengths and configurations

### Typical Applications Include:

- Front end semiconductor processing equipment
- Backend semiconductor packaging and handling equipment
- Medical diagnostic and imaging equipment
- Laboratory automation equipment
- Testing and inspection equipment



## Profile Rail

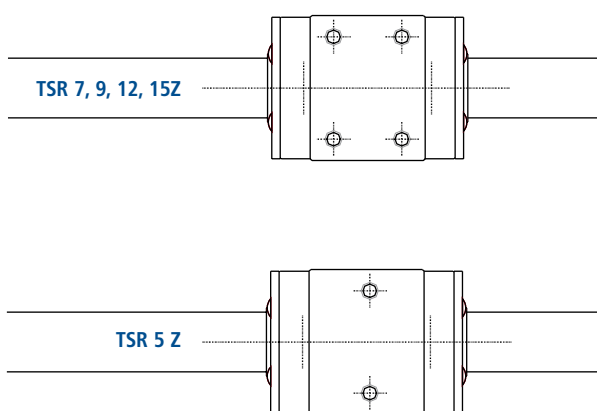
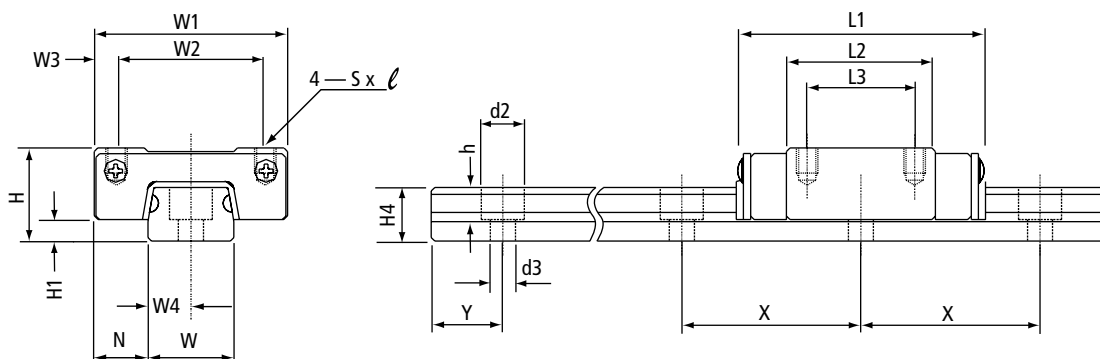


\*For 7mm size, there are only 2 mounting holes per carriage.

For more information, or to place an order, please contact your local authorized Thomson™ distributor or Danaher Motion at 1-540-633-3400, Fax: 1-540-633-4162, or E-mail at [profilerail@DanaherMotion.com](mailto:profilerail@DanaherMotion.com).

## Profile Rail

### TSR-Z Standard



### Standard Lengths of Rail

Sizes	5	7	9	12	15
Standard Lengths	40	40	55	70	150
	55	55	75	95	230
	70	70	95	120	310
	100	85	115	145	430
	130	100	135	170	550
	160	130	155	195	670
			175	220	1030
			195	245	
			275	270	
			1015	320	
			370		
			470		
			1020		
X	15	15	20	25	40
Y	5	5	7.5	10	15

Longer lengths may be supplied with butt-joints on sizes 7 through 15.

### MicroGuide™ TSR-Z (Standard)

Size	Assembly Dimensions			Carriage Dimensions							Rail Dimensions							
	H	H1	N	W1	W2	W3	L1	L2	L3	Sxℓ	W	W4	H4	d2	d3	h	Y	X
5	6	1.5	3.5	12	8	2	17	12.8	-	M2X1.5 <sup>1</sup>	5	2.5	4	3.5	2.4	1	5	15
7	8	1.5	5	17	12	2.5	23.5	13.5	8	M2X2.5	7	3.5	4.7	4.2	2.4	2.3	5	15
9	10	2.2	5.5	20	15	2.5	31	20.0	10	M3X3	9	4.5	5.5	6	3.5	3.3	7.5	20
12	13	3	7.5	27	20	3.5	35	20.8	15	M3X3.5	12	6	7.5	6	3.5	4.5	10	25
15	16	4	8.5	32	25	3.5	43	25.7	20	M4X6	15	7.5	9.5	6	3.5	4.5	15	40

(1) For 5mm size, there are only 2 mounting holes per carriage.

Note All: Dimensions in mm except where noted otherwise. Longer lengths are available with butt joints on sizes 7-15. Sizes in between standards are available, Y dimensions will be the same unless specified at time of ordering.

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# Profile Rail

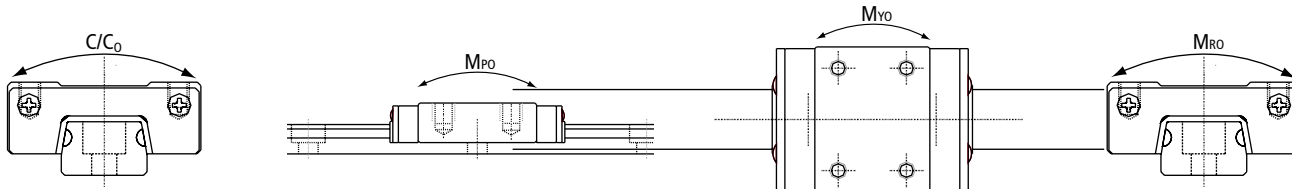
## TSR-Z Standard

### Dynamic Load and Moment Ratings

C = Dynamic load rating

### Static Load and Moment Capacities

C = Static load rating  
 M<sub>PO</sub> = Static pitch moment capacity  
 M<sub>YO</sub> = Static yaw moment capacity  
 M<sub>RO</sub> = Static roll moment capacity



Size	Load Capacity (N)		Moments (Nm)			Mass	
	Dynamic C <sup>1</sup>	Limit Co <sup>2</sup>	M <sub>PO</sub>	M <sub>YO</sub>	M <sub>RO</sub>	Carriage [kg]	Rail [kg/m]
5	336	620	0.8	0.8	1.47	0.01	0.14
7	924	1440	2.55	2.55	5.10	0.02	0.23
9	1544	2360	5.10	5.10	10.4	0.02	0.32
12	2780	4220	8.04	8.72	14.7	0.04	0.58
15	4410	6570	16.5	17.9	30.2	0.07	0.93

**Notes:**

1. The dynamic load and moment ratings are based upon 50km travel life.
2. The static load and moment capacities are the maximum radial load and moment load that should be applied to the bearing while there is no relative motion between the carriage and rail.
3. The load limit is the maximum load that may be applied to a system. It is important to analyze the application so that peak and/or shock loads do not exceed the load limit.

### Load/Life Calculations

<p>To determine proper carriage size:</p> $C = \frac{100}{L}$	<p>To determine travel life:</p> $L = \frac{C}{F}$ <p>L = normal travel life (km)                  C = rated dynamic load capacity of carriage (N)                  F = equivalent load on carriage (N)</p>
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### Operating Parameters

Maximum Velocity: 3 m/s  
 Maximum Acceleration: 50 m/s

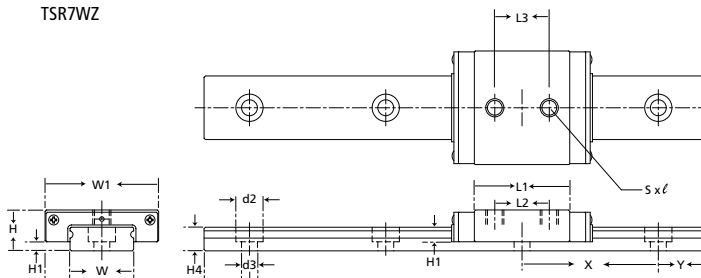
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## Profile Rail

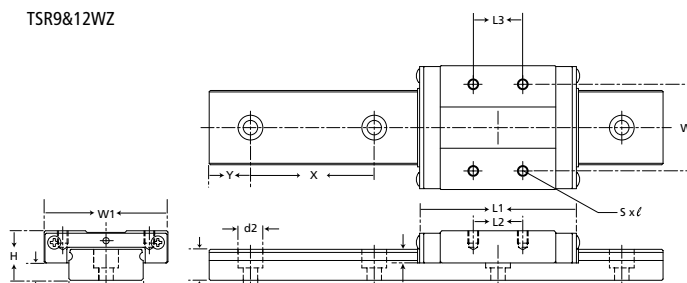
### TSR-WZ Wide



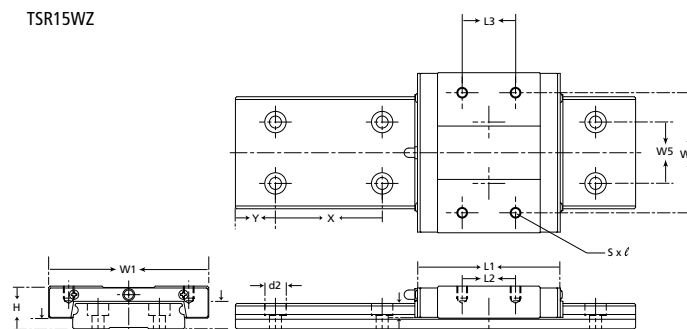
TSR7WZ



TSR9&12WZ



TSR15WZ



### Standard Lengths of Rail

Sizes	7	9	12	15
Standard Lengths	50	50	70	110
	85	110	150	190
	170	260	310	270
	100	350	390	430
	130	440	470	590
	260	530	630	750
	350	620	790	910
	440	800	950	1030
	530	1010	1030	
	620			
	800			
1010				
X	30	30	40	40
Y	10	10	15	15

### MicroGuide™ TSR-WZ Wide

Size	Assembly Dimensions			Carriage Dimensions						Rail Dimensions							
	H	H1	N	W1	W2	L1	L2	L3	S x l	W	W5	H4	d2	d3	h	Y	X
7	9	2	5.5	25	-	31	21.5	12	M4X3.5	14	-	5.2	6	3.5	3.2	10	30
9	12	4.2	6	30	21	39	28	12	M2.6X3	18	-	7.5	6	3.5	4.5	10	30
12	14	4	8	40	28	44.5	30.5	15	M3X3.5	24	-	8.5	8	4.5	4.5	15	40
15	16	4	9	60	45	55.5	38.5	20	M4X4.5	42	23	9.5	8	4.5	4.5	15	40

Note: All dimensions in mm except where noted otherwise. Longer lengths are available with butt joints.  
 Sizes in between standards are available, Y dimensions will be the same unless specified at time of ordering.

\*For 7mm size, there are only 2 mounting holes per carriage.

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# Profile Rail

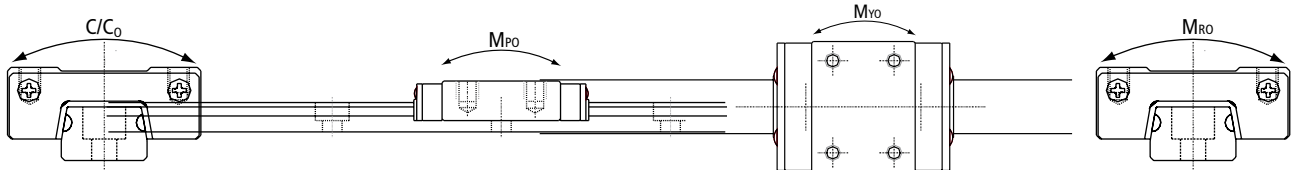
## TSR-WZ Wide

### Dynamic Load and Moment Ratings

C = Dynamic load rating

### Static Load and Moment Capacities

C = Static load rating  
 M<sub>PO</sub> = Static pitch moment capacity  
 M<sub>YO</sub> = Static yaw moment capacity  
 M<sub>RO</sub> = Static roll moment capacity



Size	Load Capacity (N)		Moments (Nm)			Mass	
	Dynamic C <sup>1</sup>	Limit Co <sup>2</sup>	M <sub>PO</sub>	M <sub>YO</sub>	M <sub>RO</sub>	Carriage [kg]	Rail [kg/m]
7	1370	2160	5.39	5.39	15.2	0.03	0.51
9	2450	3920	16.3	16.3	36.0	0.04	1.08
12	4020	6080	17.2	18.6	47.6	0.08	1.5
15	6660	9800	35.2	38.2	137	0.17	3.0

**Notes:**

1. The dynamic load and moment ratings are based upon 50 km travel life.
2. The static load and moment capacities are the maximum radial load and moment load that should be applied to the bearing while there is no relative motion between the carriage and rail.
3. The load limit is the maximum load that may be applied to a system. It is important to analyze the application so that peak and/or shock loads do not exceed the load limit.

### Load/Life Calculations

<p>To determine proper carriage size:</p> $C_{min} = F \cdot \left(\frac{100}{L}\right)^{1/3}$ <p>C<sub>min</sub> = minimum required dynamic load capacity of carriage (N)</p> <p>F = equivalent load on carriage (N)</p> <p>L = required travel life (km)</p>	<p>To determine travel life:</p> $L = \left(\frac{C}{F}\right)^3 \cdot 100$ <p>L = normal travel life (km)</p> <p>C = rated dynamic load capacity of carriage (N)</p> <p>F = equivalent load on carriage (N)</p>
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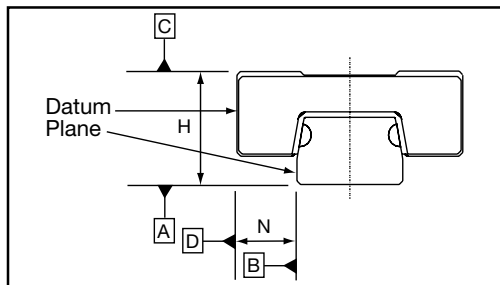
### Operating Parameters

Maximum Velocity: 3 m/s  
 Maximum Acceleration: 50 m/s<sup>2</sup>

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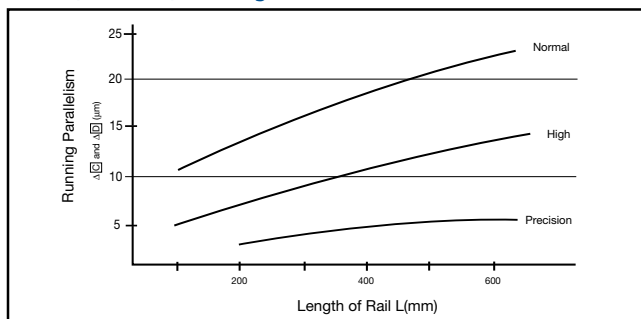
## Profile Rail

### TSR-Z (Standard) Accuracy Tolerance



Accuracy of each part		TSR5 Z		TSR7 Z, TSR9 Z, TSR12 Z & TSR15 Z		
		Normal (blank)	Precision P	Normal (blank)	High H	Precision P
Height H	Dimensional Tolerance	±0.030	±0.015	±0.040	±0.020	±0.010
	Pair Tolerance	0.015	0.005	0.030	0.015	0.007
Width N	Dimensional Tolerance	±0.030	±0.015	±0.040	±0.025	±0.015
	Pair Tolerance	0.015	0.005	0.030	0.020	0.010

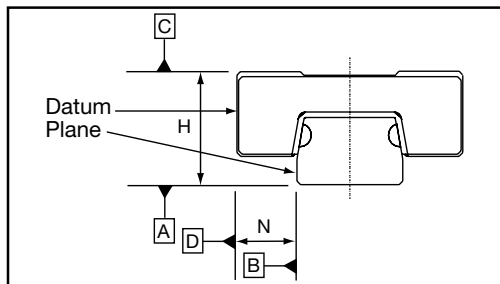
### TSR-Z (Standard) Running Parallelism



### TSR-Z (Standard) Fit Up

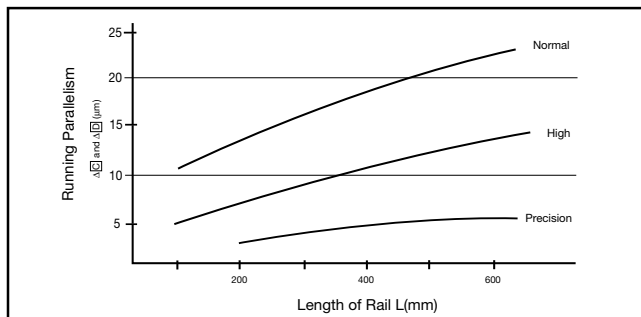
Series Type, Size, and Style	Radial Clearances (µm)	
	clearance fit (blank)	light preload C1
TSR5 Z	0~+1.5	-1.5~0
TSR7 Z	±2	-3~0
TSR9 Z	±2	-4~0
TSR12 Z	±3	-6~0
TSR15 Z	±5	-10~0

### Accuracy Tolerance Running Parallelism



Accuracy of each part		TSR WZ		
		Normal (blank)	High H	Precision P
Height H	Dimensional Tolerance	±0.040	±0.020	±0.010
	Pair Tolerance	0.030	0.015	0.007
Width N	Dimensional Tolerance	±0.040	±0.025	±0.015
	Pair Tolerance	0.030	0.020	0.010

### TSR-WZ (Wide) Running Parallelism



### TSR-WZ (Wide) Fit Up

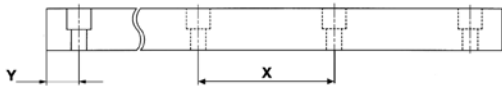
Series Type, Size, and Style	Radial Clearances (µm)	
	clearance fit (blank)	light preload C1
TSR7 WZ	±2	-3~0
TSR9 WZ	±2	-4~0
TSR12 WZ	±3	-6~0
TSR15 WZ	±5	-10~0

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## Profile Rail

### Standard Lengths of Rail

Sizes	7 WZ	9 WZ	12 WZ	15 WZ
Standard Lengths	50	50	70	110
	110	110	150	190
	170	170	230	270
	260	260	310	430
	350	350	390	590
	440	440	470	750
	530	530	630	910
	620	620	790	1030
	800	800	950	
	1010	1010	1030	
X	30	30	40	40
Y	10	10	15	15



### Load/Life Calculations

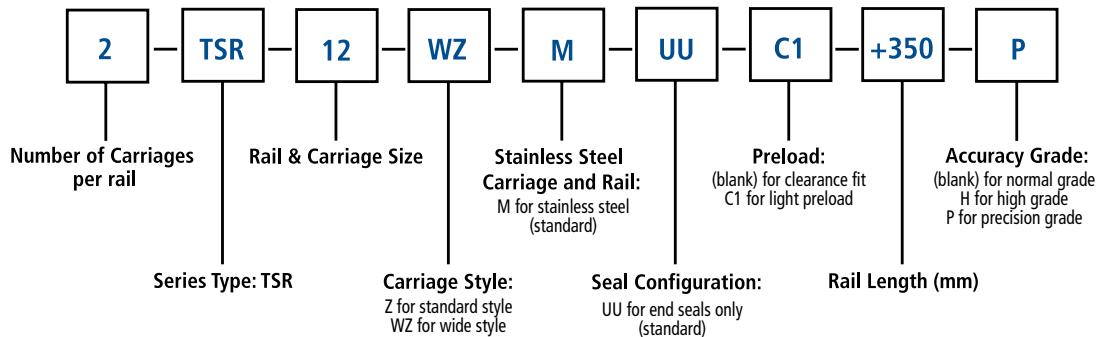
To determine proper carriage size: $C_{min} = F \cdot \left(\frac{50}{L}\right)^{1/3}$ $C_{min} = \text{minimum required dynamic load capacity of carriage (N)}$ $F = \text{equivalent load on carriage (N)}$ $L = \text{required travel life (km)}$	To determine travel life: $L = \left(\frac{C}{F}\right)^3 \cdot 50$ $L = \text{normal travel life (km)}$ $C = \text{rated dynamic load capacity of carriage (N)}$ $F = \text{equivalent load on carriage (N)}$
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### Conversions

1 lbf = 4.448 N	1 km = 39,370 inches
1 kgf = 9.8 N	1 Nm = 0.7376 lbf - ft

Maximum Travel Speed:  $V_{max} = 3 \text{ m/s}$   
 Maximum Acceleration:  $a_{max} = 50 \text{ m/s}^2$

### How To Order



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