



## Rail Car Bearings Case Study: Thermax



## Company Profile

**Industry:** Railroad

**Application:** Rail Car Bearings

**Challenge:** Monitoring the working temperatures of rail car bearings.



For rail cars, operating temperatures matter. By monitoring the temperature of cars' wheel bearings, a regional railway network in Asia is gaining insights it uses to schedule predictive maintenance, thereby enhancing safety, reliability, and service throughout its 262-kilometer passenger and cargo network.

## Bearing Temperatures Predict Failures

Monitoring the working temperatures of the bearings is one of the most effective methods in the prediction and prognosis of failures because it is an excellent indicator of bearing status.

Excessive temperatures inside bearing casings directly affect the performance of the bearing lubricant. When that lubricant becomes too hot, it suffers the effects of catalytic decomposition and oxidation, which accelerate the degradation of the bearing until it locks or breaks.



## The Solution: Thermax Temperature Indicator Strips

Thermax® temperature indicator labels are a simple, inexpensive, irreversible, fast, safe, and reliable option for monitoring the maximum temperature of bearings during operation.

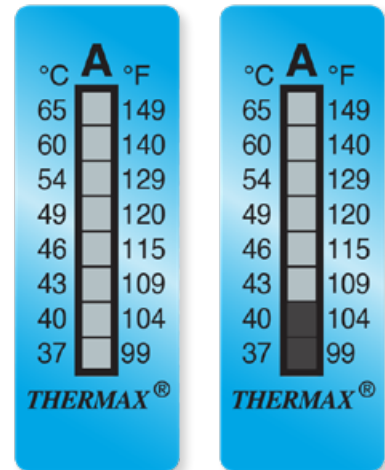
There's no setup, and no activation. Simply stick these irreversible, self-adhesive temperature measuring strips to the axle box. Then maintenance technicians can perform regular temperature checks at a glance, just by noting whether their color has changed to black. When above-normal temperatures are recorded, the color change serves as a warning that the bearings inside are suffering excessive wear.

Thermax temperature measurement strips record the highest temperature reached by an object. Maintenance technicians, therefore, can know whether normal operating temperatures and safety limits have been exceeded and, if so, by how much.

Thermax temperature measurement strips are available in multiple shapes, sizes, and temperature ranges to accommodate various applications. Temperature thresholds range from 29°C/84°F to 290°C/554°F. Accuracy is ±1° at temperatures below 100°C, ±1.5°C between 100°C and 154°C, and ±1C + 1% at 160°C to 280°C.

Because Thermax temperature measurement strips do not tear when removed, they can be attached to an inspection report as a permanent record for quality control and audits.

This railroad considers Thermax temperature indicators an effective way to identify the conditions that lead to bearing failures and, therefore, an essential tool for the company's maintenance engineering activities.



To learn how Thermax temperature indicators can support your predictive maintenance program, contact SpotSee.

[spotsee.io/contact](https://spotsee.io/contact)



- Immediate and Permanent Record of Highest Temperature
- Oil and Water Resistant
- Self Adhesive Label
- Accuracy - Less than 100°C: +/- 1°C  
100°C to 154°C: +/- 1.5°C  
Greater than 160°C to 280°C: +/- 1°C + 1%
- Temperature Range 29-290°C
- Silver to Black (Below 204°C/399°F)
- Orange to Black (Above 210°C/410°F)
- Last Black Event is the Highest Temperature Achieved

1	°F	105	110	115	120	130
	°C	40	43	46	49	54
2	°F	140	150	160	170	180
	°C	60	65	71	77	82
3	°F	190	200	210	220	230
	°C	88	93	99	104	110
4	°F	240	250	260	270	280
	°C	116	121	127	132	138
5	°F	290	300	310	320	330
	°C	143	149	154	160	166
6	°F	340	350	360	370	380
	°C	171	177	182	188	193
7	°F	390	400	410	420	435
	°C	199	204	210	216	224
8	°F	450	465	480	490	500
	°C	232	241	249	254	260

### 5 LEVEL

#### CLOCK SPECIFICATIONS

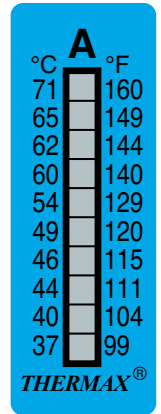
Size: 0.55" Dia. (14mm)  
Type: Circular, Self Adhesive  
Scale: °F and °C  
Range: (Sold in units of 10)



A	°F	99	104	111	115	120	129	140	144	149	160
	°C	37	40	44	46	49	54	60	62	65	71
B	°F	171	180	190	199	210	219	230	241	250	261
	°C	77	82	88	93	99	104	110	116	121	127
C	°F	270	280	289	300	309	320	331	340	351	360
	°C	132	138	143	149	154	160	166	171	177	182
D	°F	370	379	390	399	410	421	435	450	466	480
	°C	188	193	199	204	210	216	224	232	241	249

### 10 LEVEL SPECIFICATIONS

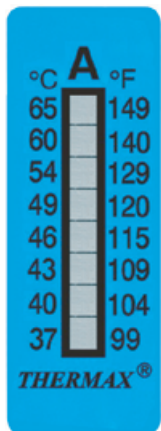
Size: 2.00" x 0.7" (51x18mm) Type: Vertical, Self Adhesive  
Scale: °F and °C Range: (Sold in units of 10)



A	°F	99	104	109	115	120	129	140	149	
	°C	37	40	43	46	49	54	60	65	
B	°F	160	171	180	190	199	210	219	230	
	°C	71	77	82	88	93	99	104	110	
C	°F	241	250	261	270	280	289	300	309	
	°C	116	121	127	132	138	143	149	154	
D	°F	320	331	340	351	360	370	379	390	
	°C	160	166	171	177	182	188	193	199	
E	°F	399	410	421	435	450	466	480	489	500
	°C	204	210	216	224	232	241	249	254	260

### 8 LEVEL SPECIFICATIONS

Size: 2.00" x 0.7" (51x18mm) Type: Vertical, Self Adhesive  
Scale: °F and °C Range: (Sold in units of 10)



1	°F	84	93	99	104	108	111
	°C	29	34	37	40	42	44
2	°F	111	115	120	129	140	144
	°C	44	46	49	54	60	62
3	°F	149	160	171	180	190	199
	°C	65	71	77	82	88	93
4	°F	210	219	230	241	250	261
	°C	99	104	110	116	121	127
5	°F	270	280	289	300	309	320
	°C	132	138	143	149	154	160
6	°F	331	340	351	360	370	379
	°C	166	171	177	182	188	193
7	°F	390	399	410	421	435	450
	°C	199	204	210	216	224	232
8	°F	466	480	489	500	536	554
	°C	241	249	254	260	280	290



### 6 LEVEL SPECIFICATIONS

Size: .47" x 1.26" (12x32mm)  
Scale: °F and °C  
Type: Horizontal, Self Adhesive  
Range: (Sold in units of 10)

# Thermax Irreversible Temperature Sensitive Labels

°F	93	99	104	109	115	120	129	140
°C	34	37	40	43	46	49	54	60
°F	149	160	171	180	199	219	241	261
°C	65	71	77	82	93	104	116	127
°F	280	300	320	340	360	380	399	421
°C	138	149	160	171	182	193	204	216
°F	450	480	500	536	554			
°C	232	249	260	280	290			



## ENCAPSULATED SPECIFICATIONS

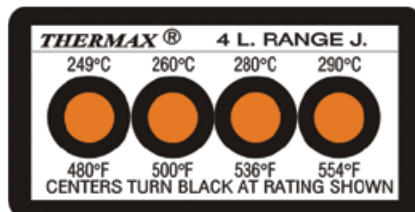
Size: 0.47" x 0.51" (12x13mm)

Scale: °F and °C

Range: (Sold in units of 50)

Type: Single temperature indicator shows when maximum temperature has been achieved. Self adhesive.

<b>A</b>	°F	99	111	120	129
	°C	37	44	49	54
<b>D</b>	°F	219	230	241	250
	°C	104	110	116	121
<b>E</b>	°F	261	270	280	289
	°C	127	132	138	143
<b>F</b>	°F	300	309	320	331
	°C	149	154	160	166



## 4 LEVEL SPECIFICATIONS

Size: 0.91" x 1.77" (23x45mm)

Type: Horizontal, Self Adhesive

Scale: °F and °C

Range: (Sold in units of 10)

<b>2</b>	°F	120	130	140	150
	°C	49	54	60	65
<b>4</b>	°F	200	210	220	230
	°C	93	99	104	110
<b>5</b>	°F	240	250	260	270
	°C	116	121	127	132
<b>7</b>	°F	320	330	340	350
	°C	160	166	171	177
<b>8</b>	°F	360	370	380	390
	°C	182	188	193	199
<b>9</b>	°F	400	410	420	435
	°C	204	210	216	224



## 4 LEVEL MICRO SPECIFICATIONS

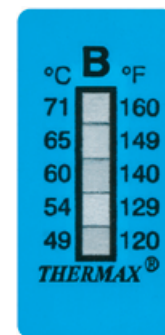
Size: 0.15" x 0.43" (4x11mm)

Type: Horizontal, Self Adhesive

Scale: °F or °C

Range: (Sold in units of 10)

<b>A</b>	°F	99	104	109	115	120
	°C	37	40	43	46	49
<b>B</b>	°F	120	129	140	149	160
	°C	49	54	60	65	71
<b>C</b>	°F	171	180	190	199	210
	°C	77	82	88	93	99
<b>D</b>	°F	219	230	241	250	261
	°C	104	110	116	121	127
<b>E</b>	°F	270	280	289	300	309
	°C	132	138	143	149	154
<b>F</b>	°F	320	331	340	351	360
	°C	160	166	171	177	182
<b>G</b>	°F	370	379	390	399	410
	°C	188	193	199	204	210
<b>H</b>	°F	421	435	450	466	480
	°C	216	224	232	241	249
<b>I</b>	°F	480	489	500	536	554
	°C	249	254	260	280	290



## 5 LEVEL SPECIFICATIONS

Size: 2.00" x 0.7" (51x18mm)

Scale: °F and °C

Type: Vertical, Self Adhesive

Range: (Sold in units of 10)