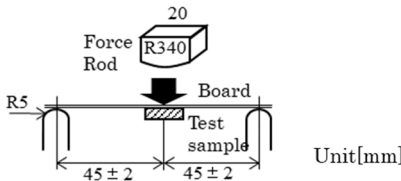


**Wire-wound Metal Power Inductors MCOIL™ LBEN series  
for Telecommunications Infrastructure and Industrial Equipment**  
**Wire-wound Metal Power Inductors MCOIL™ LMEN series  
for Medical Devices classified as GHTF Class C (Japan Class III)**

■ RELIABILITY DATA

1. Operating Temperature Range	
Specified Value	-40~+125°C
Test Methods and Remarks	Including self-generated heat
2. Storage Temperature Range	
Specified Value	-40~+85°C
Test Methods and Remarks	0 to 40°C for the product with taping.
3. Rated current	
Specified Value	Within the specified tolerance
4. Inductance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : LCR Meter (HP 4294A or equivalent) Measuring frequency : 1MHz, 0.5V
5. DC Resistance	
Specified Value	Within the specified tolerance
Test Methods and Remarks	Measuring equipment : DC ohmmeter (HIOKI 3227 or equivalent)
6. Temperature characteristic	
Specified Value	Inductance change : Within ±15%
Test Methods and Remarks	Measurement of inductance shall be taken at temperature range within -40°C~+125°C. With reference to inductance value at +20°C., change rate shall be calculated.
7. Resistance to flexure of substrate	
Specified Value	No damage
Test Methods and Remarks	<p>The test samples shall be soldered to the test board by the reflow. As illustrated below, apply force in the direction of the arrow indicating until deflection of the test board reaches to 2 mm.</p> <p>Test board size : 100×40×1.6 mm Test board material : Glass epoxy-resin Solder cream thickness : 0.1 mm</p> 
8. Adhesion of terminal electrode	
Specified Value	No abnormality.
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. Applied force : 17.7N Duration : 60s. Solder cream thickness : 0.10mm.

▶ This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification.  
For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (<http://www.ty-top.com/>).

### 9. Resistance to vibration

Specified Value	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.	
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. Then it shall be submitted to below test conditions.	
	Frequency Range	10~55Hz
	Total Amplitude	1.5mm (May not exceed acceleration $196\text{m/s}^2$ )
	Sweeping Method	10Hz to 55Hz to 10Hz for 1min.
Time	X	For 2 hours on ach X, Y, and Z axis.
	Y	
	Z	
Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.		

### 10. Solderability

Specified Value	At least 90% of surface of terminal electrode is covered by new solder.	
Test Methods and Remarks	The test samples shall be dipped in flux, and then immersed in molten solder as shown in below table. Flux : Ethanol solution containing rosin 25%.	
	Solder Temperature	$245 \pm 5^\circ\text{C}$
	Time	$5 \pm 0.5 \text{ sec.}$
	※Immersion depth : All sides of mounting terminal shall be immersed.	

### 11. Resistance to soldering heat

Specified Value	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.	
Test Methods and Remarks	The test sample shall be exposed to reflow oven at $230^\circ\text{C}$ for 40 seconds, with peak temperature at $260+0/-5^\circ\text{C}$ for 5 seconds, 2 times.	
	Test board material	: Glass epoxy-resin
	Test board thickness	: 1.6mm
	Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.	

### 12. Thermal shock

Specified Value	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.		
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. The test samples shall be placed at specified temperature for specified time by step 1 to step 2 as shown in below table in sequence. The temperature cycle shall be repeated 1000 cycles.		
	Conditions of 1 cycle		
	Step	Temperature ( $^\circ\text{C}$ )	Duration (min)
	1	$-40 \pm 5$	$30 \pm 3$
	2	$+125 \pm 5$	$30 \pm 3$
Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.			

### 13. Damp heat

Specified Value	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.	
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. The test samples shall be placed in thermostatic oven set at specified temperature and humidity as shown in below table.	
	Temperature	$85 \pm 2^\circ\text{C}$
	Humidity	$85 \pm 5\% \text{RH}$
	Time	1000 hour
Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.		

### 14. High temperature life test

Specified Value	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.	
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown in below table.	
	Temperature	$125 \pm 2^\circ\text{C}$
	Time	1000 hour
Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.		

▶ This catalog contains the typical specification only due to the limitation of space. When you consider the purchase of our products, please check our specification.  
For details of each product (characteristics graph, reliability information, precautions for use, and so on), see our Web site (<http://www.ty-top.com/>).

15. Loading at high temperature life test

Specified Value	Inductance change : Within $\pm 10\%$ No significant abnormality in appearance.								
Test Methods and Remarks	The test samples shall be soldered to the test board by the reflow. After that, the test samples shall be placed at test conditions as shown in below table.								
	<table border="1" style="width: 100%;"> <tr> <td style="width: 30%;">Temperature</td> <td>1). <math>85 \pm 2^\circ\text{C}</math> 2). <math>105 \pm 3^\circ\text{C}</math></td> </tr> <tr> <td>Applied current</td> <td>1). Rated current(+40°C) 2). Rated current(+20°C)</td> </tr> <tr> <td>Time</td> <td>1000hour</td> </tr> <tr> <td></td> <td></td> </tr> </table>	Temperature	1). $85 \pm 2^\circ\text{C}$ 2). $105 \pm 3^\circ\text{C}$	Applied current	1). Rated current(+40°C) 2). Rated current(+20°C)	Time	1000hour		
	Temperature	1). $85 \pm 2^\circ\text{C}$ 2). $105 \pm 3^\circ\text{C}$							
	Applied current	1). Rated current(+40°C) 2). Rated current(+20°C)							
Time	1000hour								
Recovery : At least 2hrs of recovery under the standard condition after the test, followed by the measurement within 48hrs.									

16. Standard condition

Specified Value	Standard test condition : Unless otherwise specified, temperature is $20 \pm 15^\circ\text{C}$ and $65 \pm 20\%$ of relative humidity. When there is any question concerning measurement result: In order to provide correlation data, the test shall be condition of $20 \pm 2^\circ\text{C}$ of temperature, $65 \pm 5\%$ relative humidity. Inductance is in accordance with our measured value.
-----------------	--

Derating of Rated Current

LBEN/LMEN series

Derating of current is necessary for LBEN/LMEN series depending on ambient temperature. Please refer to the chart shown below for appropriate derating of current.

