

Product/Process Change Notification

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Initiation Date	3 Feb 2022	Notification No.	20220203
Implementation Date	3 May 2022	Initiator's Name	Sharon Tomo-Bustamante
Beginning Date Code of Implemented Change			TBD

CHANGE DESCRIPTION:

Knowles is making a change to the RAB receiver family. This change is to go from a “wet wound” coil to a thermo-bond coil.

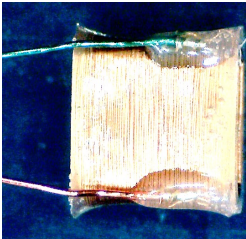
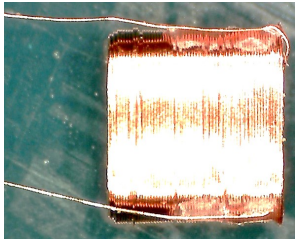
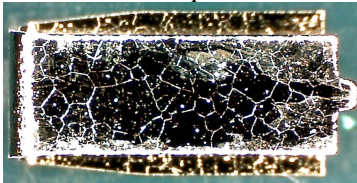
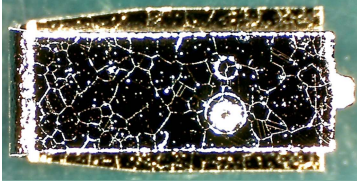
This will be an alternate component to the current RAB coil design to increase capacity and assure adequate parts supply. These changes apply to the models shown on the next page.

This change also requires a modification of the RAB reed to be compatible within this design.

Note: There are no significant changes in the product fit, acoustic performance & reliability. There is no change to the visual appearance of the receiver.

Please continue to work with your local Knowles Sales Manager if you have any questions, concerns or require samples for evaluations related to this product change notification.

Changes are shown below.

CURRENT	NEW
Wet Wound Coil 	Thermo-bond Coil 
No-Bump Reed 	Bump Reed 

MODELS AFFECTED: Below part numbers are covered within this PCN

PART NUMBERS
RAB-31761-000
RAB-32167-000
RAB-33726-000

SUPPORT INFORMATION:

The following qualification testing was conducted and shows no significant change in the performance. The test model is RAB-33726-000 receiver.

Group Identification:

Current: Wet Wound Coil and Normal Reed
New: Thermo-Bond Coil and Bump Reed.

Knowles Qualification Plan Number: R-P-21150

Acoustic Performance:

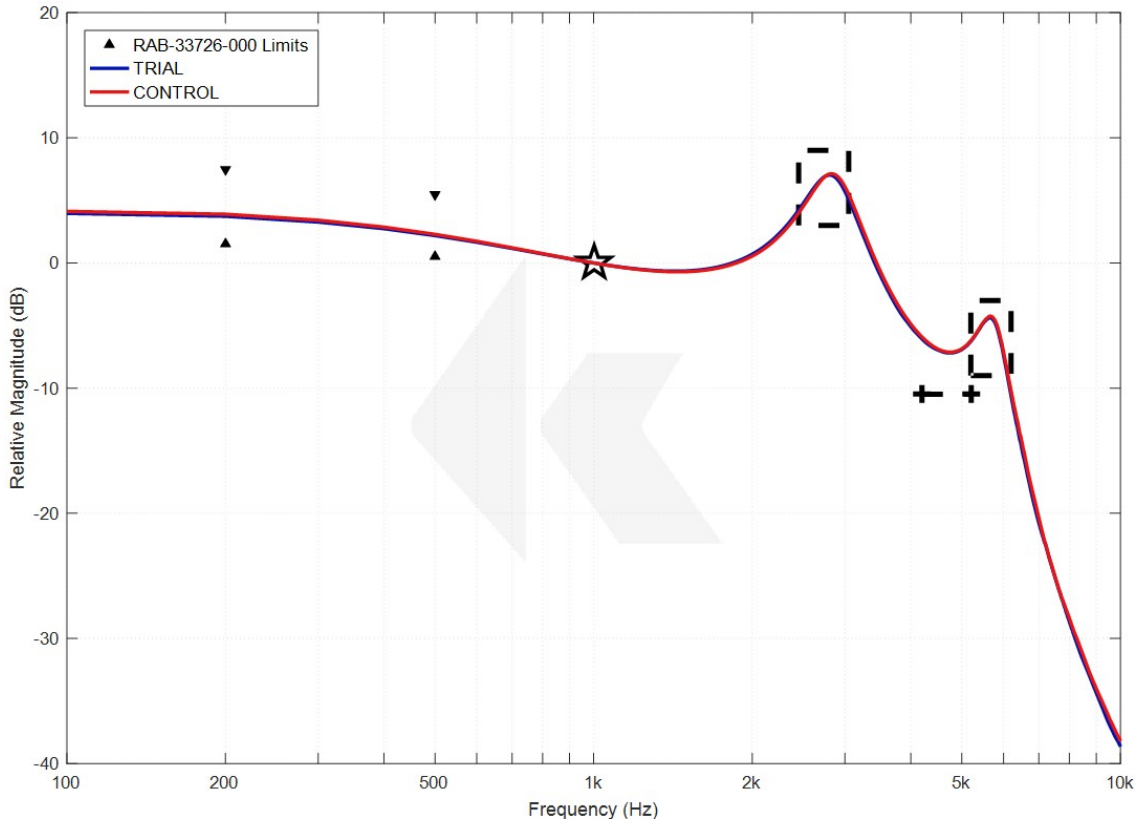
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Test	Acceptance Criteria	Model Tested	Sample Size	Result
Acoustical Characteristics	Performance to be comparable to current product	RAB-33726-000	Preliminary Quantity: N (Trial)=150pcs N (Control)= 150pcs	All parameters met the 1.33 CpK requirements

Note: Sensitivity is measured as dB relative to 20 μ Pa.		Average	Std. Dev	Cpk
RELSSENS @200 Hz	Trial	3.98	0.19	4.27
	Control	3.63	0.18	5.23
RELSSENS @500 Hz	Trial	2.26	0.1	9.074
	Control	2.07	0.09	10.25
SENSITIVITY @1000 Hz	Trial	101.28	0.12	8.17
	Control	101.27	0.1	8.22
PKREL1 Amp	Trial	3.75	0.48	4.35
	Control	3.5	0.37	3.45
PK1 Freq	Trial	2625	25.0	2.75
	Control	2613	27.6	2.26
VLREL1 Amp	Trial	-9.62	0.2	1.41
	Control	-9.52	0.25	1.34
PKREL2 Amp	Trial	-7.75	0.44	2.59
	Control	-7.76	0.42	2.41
PK2 Freq	Trial	5831	58.3	1.74
	Control	5780	53.6	2.32
THD 1/3rd PK @ Nom Drive	Trial	0.97	0.35	3.42
	Control	0.9	0.35	4.02
THD ½ PK @ Nom Drive	Trial	1.25	0.66	1.69
	Control	1.14	0.59	2.22
THD 1/3rd PK @ +9dB Drive	New	1.68	0.75	3.81
	Current	1.43	0.74	4.27
THD ½ PK @ +9dB Drive	Trial	2.26	1.29	1.95
	Control	1.77	1.13	2.66
THD 500Hz @ 0.4 Vrms	Trial	1.33	0.58	1.99
	Control	1.14	0.59	2.23
THD 800Hz @ 0.4 Vrms	Trial	1.38	0.54	2.08
	Control	1.19	0.55	2.35
THD 1.6KHz @ 0.25 Vrms	Trial	0.7	0.38	3.43
	Control	0.64	0.34	4.27
IMPEDANCE @ 500Hz	Trial	129.48	2.48	2.55
	Control	139.32	1.89	2.26
IMPEDANCE @ 1KHz	Trial	205.06	7.82	1.80
	Control	212.35	4.57	2.09
DC Resistance	Trial	94.23	0.62	2.28
	Control	105.81	0.64	2.05

Response Comparison:

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Reliability Tests

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Test	Acceptance Criteria	Model Tested	Sample Size	Result
HALT Condition A: 63°C / 95% RH, 1008 hours total exposure, biased.	Units shall compare favourably to historical data from similar model and shall change ≤ 3.0 dB change in sensitivity at the adjust frequency; $\leq 5\%$ distortion changes at the nominal drive ; $\leq 10\%$ distortion changes at the high drive.	RAB-33726-000	Trial = 30 Control = 30	PASSED
	<u>Average Change of Sensitivity (dB) @ 1 kHz</u> Trial = -0.03 dB Control = -0.04 dB			
Stress Test 1Hr at High Drive @ Motor Resonance. Drive Train Integrity Test.	Sensitivity change ≤ 3 dB at the adjust frequency.	RAB-33726-000	Trial = 20 Control= 20	PASSED
	<u>Average Change of Sensitivity (dB) @ 1 kHz</u> Trial = 101.14 dB Control= 101.12 dB			
Composite Temperature Humidity Cyclic Test Test 2b (10 cycles of 24 hrs each) 25°C / 80-100% RH for 3 h 65°C / 90-100% RH for 5 h -10°C / 0% RH for 5 h	Sensitivity changes at the adjustment frequency < 1.5 dB(FF model 3dB)	RAB-33726-000	Trial = 20 Control = 20	PASSED
	<u>Average Change of Sensitivity (dB) @ 1 kHz</u> Trial = 101.18 dB Control = 101.04 dB			

Test	Acceptance Criteria	Model Tested	Sample Size	Result
Aggressive Sweat Cond 4 -10 Day exposure to sweat vapor in 38°C oven (1.8PH \pm .2.)	No visual signs of corrosion, Sensitivity to change < 4 dB	RAB-33726-000	Trial = 20 Control = 20	PASSED
	<u>Average Change of Sensitivity (dB) @ 1 kHz</u> Trial= 101.15 dB Control = 101.01 dB			
Powered Salt Fog Test	Comparable to similar coils.	RAB-33726-000	Trial = 20 Control = 20	PASSED

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<p>4 Weeks exposure to 35°C salt fog chamber with salt deposition 20~50g/sq.m/24 hours. Units powered with 0.289Vrms@1kHz</p>	<p style="text-align: center;"><u>Average Change of Sensitivity (dB) @ 1 kHz</u> Trial = 101.15 dB Control = 101.01 dB</p>			
<p>Mechanical Shock Shock at progressively higher heights until failure. "Failure" means that a unit changes >3dB from initial, THD at nominal drive at 1/3 resonance > 10% or THD at nominal drive at 1/2 resonance > 20%.</p>	<p>90% Survivability @14.1kG</p>	<p>RAB-33726-000</p>	<p>Trial = 20 Control = 20</p>	<p>PASSED</p>
<p style="text-align: center;"><u>Average Change of Sensitivity (dB) @ 1 kHz</u> Trial = above 90% survivability @14.1kG Control = above 90% survivability @14.1kG</p>				

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