

## Product/Process Change Notification

<b>Initiation Date</b>	24-APR-2024	<b>Notification No.</b>	20240425
<b>Implementation Date</b>	Customer Approval	<b>Initiator's Name</b>	Joseph Omar saulo
<b>Beginning Date Code of Implemented Change</b>			Customer Approval

### **CHANGE DESCRIPTION:**

[This is a pre-PCN and will be tentatively updated by May 10, 2024]

Knowles is making a change to the TEC receiver family. The changes are the following:


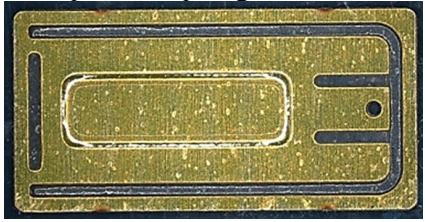
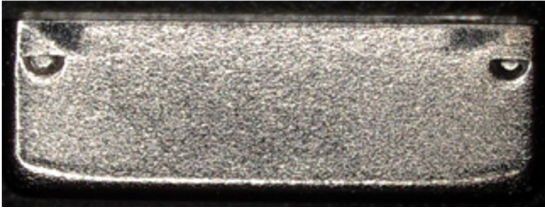
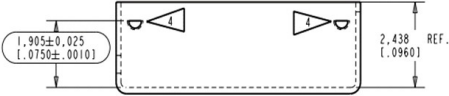

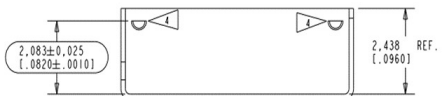
- A) Change from two-piece diaphragm to one-piece diaphragm.
- B) Change in perf height from 1.905mm to 2.083mm.  
(This mechanical change is to accommodate the OPD and maintain electroacoustic characteristics)
- C) Change from In-house heat cured cement mixing formula to UV-cured cement at the indicated locations. (Refer to page 2 for further details of the locations)

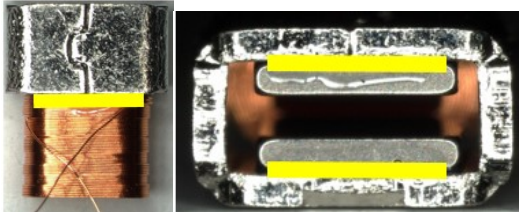
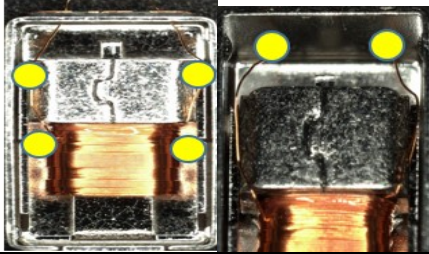

These changes will be considered an alternate component and are being made to increase capacity and ensure adequate parts supply. This change applies to the models shown on page 3.

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

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

Changes are shown below.

Change	CURRENT	NEW
Diaphragm Assembly	2-piece Diaphragm 	One-piece Diaphragm 
Cup perf height  (this mechanical change is to accommodate the One-piece diaphragm and maintain electroacoustic performance)	Perf height $1.905 \pm 0.025$ mm  	Perf height $2.083 \pm 0.025$ mm  

Change	PROCESSES AFFECTED	DETAILS								
UV Cement	CSMA – Coil to Stack and Stack to Magnets 	<table><tr><th colspan="2">Process</th><th>Cement Type</th></tr><tr><td rowspan="2">CSMA</td><td>Current</td><td>Heat-Cured</td></tr><tr><td>Proposal</td><td>UV-cured</td></tr></table>	Process		Cement Type	CSMA	Current	Heat-Cured	Proposal	UV-cured
	Process		Cement Type							
	CSMA	Current	Heat-Cured							
Proposal		UV-cured								
	Weld Case Apply Cement 	<table><tr><th colspan="2">Process</th><th>Cement Type</th></tr><tr><td rowspan="2">Weld Case Apply Cement</td><td>Current</td><td>Heat-Cured</td></tr><tr><td>Proposal</td><td>UV-cured</td></tr></table>	Process		Cement Type	Weld Case Apply Cement	Current	Heat-Cured	Proposal	UV-cured
Process		Cement Type								
Weld Case Apply Cement	Current	Heat-Cured								
	Proposal	UV-cured								
	Diaphragm Sealing 	<table><tr><th colspan="2">Process</th><th>Cement Type</th></tr><tr><td rowspan="2">Diaphragm Sealing</td><td>Current</td><td>Heat-Cured</td></tr><tr><td>Proposal</td><td>UV-cured</td></tr></table>	Process		Cement Type	Diaphragm Sealing	Current	Heat-Cured	Proposal	UV-cured
Process		Cement Type								
Diaphragm Sealing	Current	Heat-Cured								
	Proposal	UV-cured								

**MODELS AFFECTED:**

Part numbers below are covered within this PCN.

<b>Knowles Part Number</b>	<b>Customer Part Number</b>
HODTEC-31230-000	0A17RHO31230R
	1170HLTHO31230R
	HODTEC-31230-000
	HODTEC3123000-ND
HODTEC-31323-000	HODTEC-31323-000
	HODTEC3132300-ND

**SUPPORTING INFORMATION: RECEIVER LEVEL**

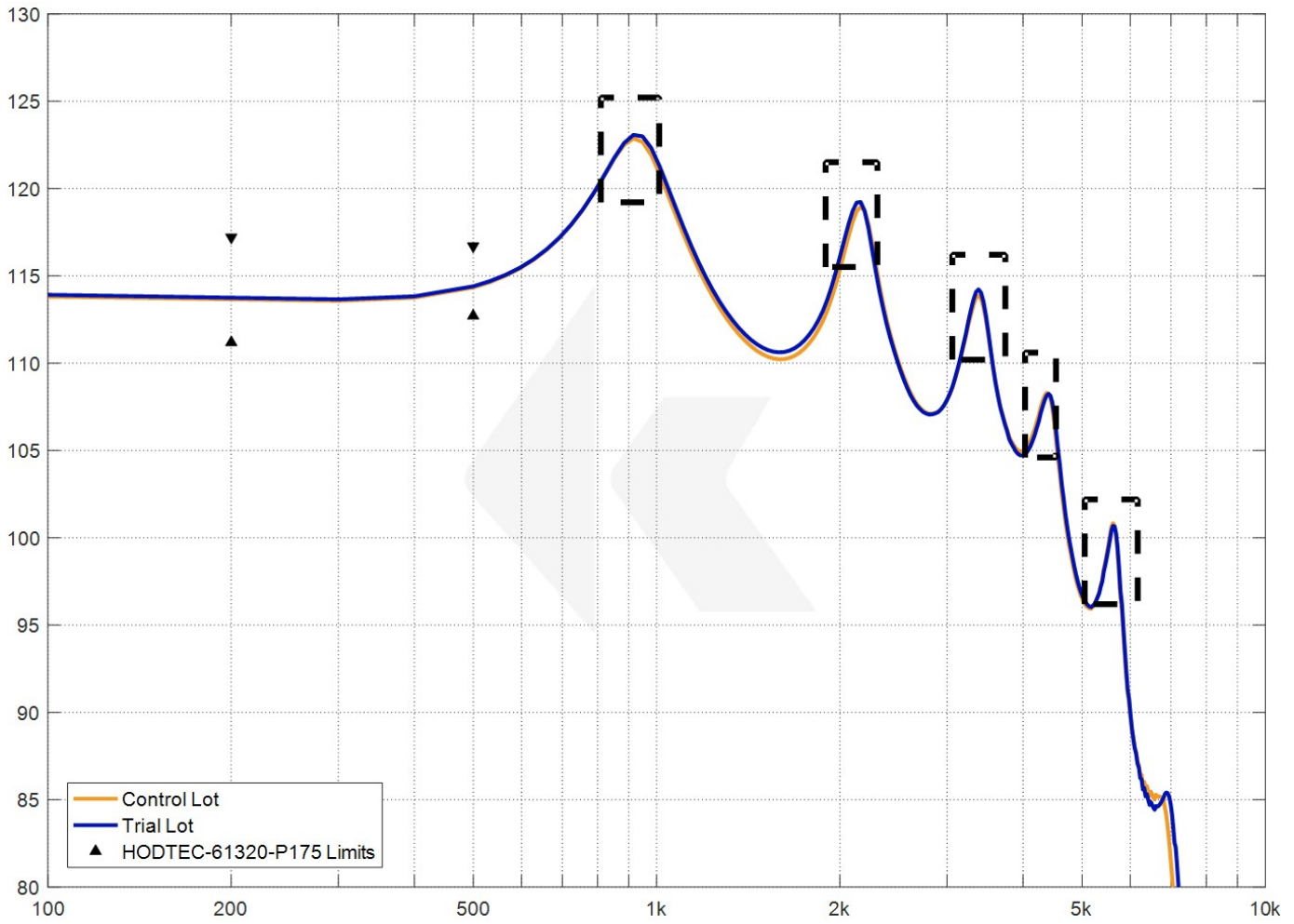
Knowles Qualification Plan Number: R-P-24051

### Acoustic Performance:

Test	Acceptance Criteria	Model Tested	Sample Size	Result
Acoustical Characteristics	Performance to be comparable to the current product	HODTEC-61320-P175	Control = 400pcs Trial = 400pcs	All parameters met the 1.33 Cpk requirements

Item	Parameter	Condition	Average	Stdev	Cpk
1	RELSSENS @200 Hz (-3.5 ~ +2.5)	Control	-0.7	0.096	9.86
		Trial	-0.6	0.111	1.93
2	SENSITIVITY @500 Hz (112.7 ~ 116.7)	Control	114.3	0.106	1.52
		Trial	114.4	0.069	8.18
3	PKREL1 Amp (+4.5 ~ +10.5)	Control	8.5	0.076	1.94
		Trial	8.7	0.255	1.39
4	PKREL1 Freq (810 Hz ~ 1010 Hz)	Control	917.3	6.333	1.34
		Trial	919.7	10.340	2.22
5	PKREL2 Amp (+0.8 ~ +6.8)	Control	4.6	0.078	9.35
		Trial	4.8	0.155	1.33
6	PKREL2 Freq (1895 Hz ~ 2305 Hz)	Control	2164	3.216	14.58
		Trial	2154	14.940	1.34
7	PKREL3 Amp (-4.5 ~ +1.5)	Control	-0.5	0.158	4.12
		Trial	-0.2	0.585	1.39
8	PKREL3 Freq (3060 Hz ~ 3740 Hz)	Control	3380	12.930	2.23
		Trial	3381	13.910	2.04
9	PKREL4 Amp (-10.1 ~ -4.1)	Control	-6.0	0.188	3.37
		Trial	-6.2	0.221	1.42
10	PKREL4 Freq (4030 Hz ~ 4530 Hz)	Control	4384	19.170	1.88
		Trial	4410	19.390	1.95
11	PKREL5 Amp (-18.5 ~ -12.5)	Control	-13.5	0.239	1.39
		Trial	-13.7	0.264	1.40
12	PKREL5 Freq (5050 Hz ~ 6170 Hz)	Control	5623	10.890	16.75
		Trial	5633	15.840	11.30
13	THD at 1/3 Peak, 0.296 Vrms AC (5% max)	Control	1.4	0.290	3.89
		Trial	1.3	0.277	1.34
14	THD at 1/2 Peak, 0.296 Vrms AC (5% max)	Control	2.6	0.603	1.35
		Trial	1.6	0.632	1.69
15	THD at 1/3 Peak, 0.590 Vrms AC (8% max)	Control	3.6	0.721	1.95
		Trial	3.8	0.578	2.30
16	THD at 1/2 Peak, 0.590 Vrms AC (8% max)	Control	5.1	1.141	1.72
		Trial	3.5	1.160	1.37
17	DCR (92.7 $\Omega$ ~ 113.3 $\Omega$ )	Control	107.2	1.485	1.40
		Trial	107.2	1.757	1.36
18	IMPEDANCE at 500 Hz (145.35 $\Omega$ ~ 196.65 $\Omega$ )	Control	170.9	1.947	4.44
		Trial	169.8	2.095	1.62
19	IMPEDANCE at 1000 Hz (162.35 $\Omega$ ~ 219.65 $\Omega$ )	Control	186.5	2.402	3.41
		Trial	183.5	2.961	1.41

### Frequency Curve:



## Reliability Tests

Test	Acceptance Criteria	Model Tested	Sample Size	Result
<b>High Drive Stress Test</b> 1Hr at High Drive @ Motor Resonance. Drive Train Integrity Test.	Sensitivity change $\leq 3$ dB at the Adjust Frequency.	HODTEC-31733-000	control = 20pcs trial = 20pcs	10-May-2024
	<u>Average Change of Sensitivity (dB) @ 500 Hz</u>			
<b>Mechanical Shock</b> Shock at progressively higher heights until failure. "Failure" means that a unit changes $>3$ dB from initial, THD at nominal drive at 1/3 resonance $> 10\%$ or THD at nominal drive at 1/2 resonance $> 20\%$ .	90% Survivability @7.1kG	HODTEC-31733-000	control = 60pcs trial = 60pcs	10-May-2024
<b>Composite Temperature Humidity Cyclic Test</b> 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 $< 3$ dB	HODTEC-31733-000	control = 20pcs trial = 20pcs	10-May-2024
	<u>Average Change of Sensitivity (dB) @ 500 Hz</u>			
<b>Thermal shock test</b> 5 cycles: -40°C to +63°C, 15 minute soaks, $<30$ sec. transition	$\leq 3$ dB change from initial adjust frequency value	HODTEC-31733-000	control = 20pcs trial = 20pcs	10-May-2024
	<u>Average Change of Sensitivity (dB) @ 500 Hz</u>			
<b>Solder / Desolder Cycling</b> Temp for Pb-Free: 750°F (400°C) 5 Cycles of 2 sec. / pad	$\leq 1$ dB in sensitivity at the adjust frequency and distortion shall meet specification for all units tested	HODTEC-31733-000	control = 20pcs trial = 20pcs	10-May-2024
	<u>Average Change of Sensitivity (dB) @ 500 Hz</u>			

Test	Acceptance Criteria	Model Tested	Sample Size	Result
<b>HALT</b> Condition A: 63°C / 95% RH, 1008 hours total exposure, biased	Sensitivity change $\leq$ 3dB at the Adjust Frequency.	HODTEC- 31733-000	control = 30pcs trial = 30pcs	10-May- 2024
	<u>Average Change of Sensitivity (dB) @ 500 Hz</u>			
<b>E3</b> Static damp heat, 63°C / 95% RH, 6 weeks total exposure	Sensitivity change $\leq$ 3dB at the Adjust Frequency.	HODTEC- 31733-000	control = 30pcs trial = 30pcs	10-May- 2024
	<u>Average Change of Sensitivity (dB) @ 500 Hz</u>			
<b>Dry Heat Storage</b> 63°C for 72 hours, unpowered	Sensitivity to change < 3 dB	HODTEC- 31733-000	control = 20pcs trial = 20pcs	10-May- 2024
	<u>Average Change of Sensitivity (dB) @ 500 Hz</u>			
<b>Low-Temperature Storage</b> -40°C for 72 hours, unpowered	Sensitivity to change < 3 dB	HODTEC- 31733-000	control = 20pcs trial = 20pcs	10-May- 2024
	<u>Average Change of Sensitivity (dB) @ 500 Hz</u>			

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