
Foster STRD

EVT2.1 800Hz Rocking Investigation

15/Mar/2021 update

FOSTER

Root Cause Analysis

Rocking Motion	Mass Unbalance	— Coil Position(concentricity)	to be updated
		— Glue Overwrapping	refer to slide 4-6
	Stiffness Unbalance	— Diaphragm Surround Design	refer to slide 7
		— Wire forming shape	refer to slide 8
	BI Unbalance	— Magnetic Circuit concentricity	refer to slide 9
		— Coil Position(concentricity)	to be updated
	Others	— Screen Mesh on Frame	refer to slide 10-14
		— Frame Hole unbalance	to be updated
		— Frame Groove leakage	refer to slide 16-18

Coil Position

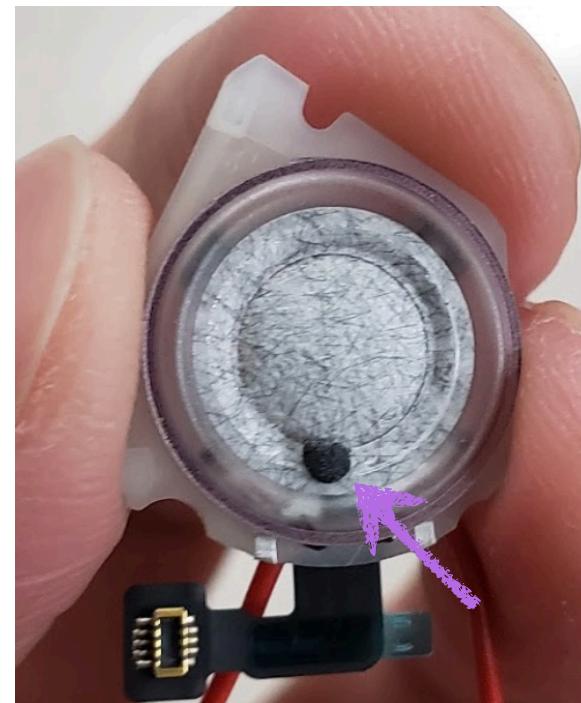
to be updated

Glue Overwrapping

To simulate Mass Unbalance,
Compare Soundcheck result
before / after adding glue ball

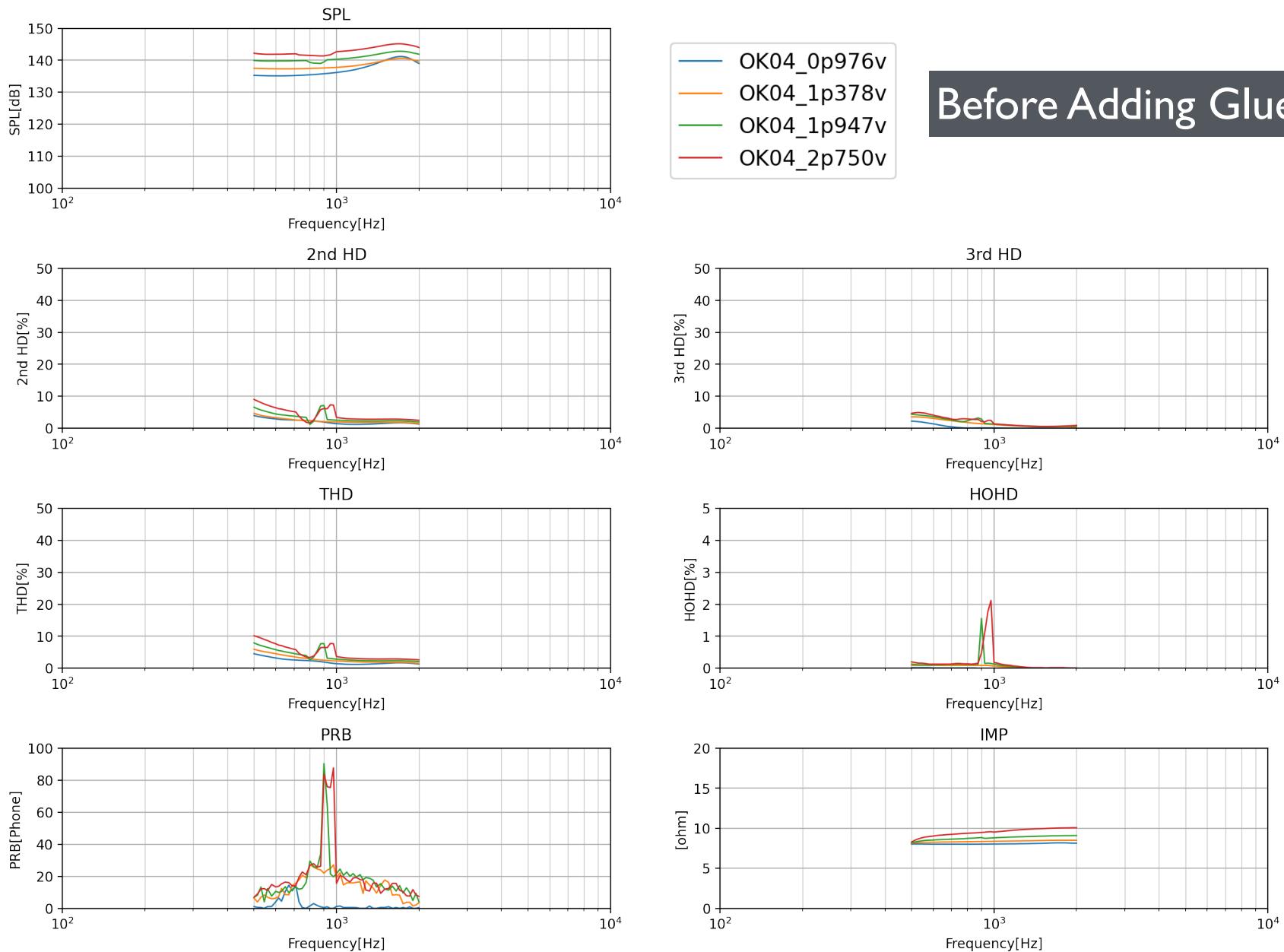
input voltage

- 2.750 Vrms (0dBFS@FATP)
- 1.947 Vrms (-3dB)
- 1.378 Vrms (-6dB)
- 0.976 Vrms (-9dB)



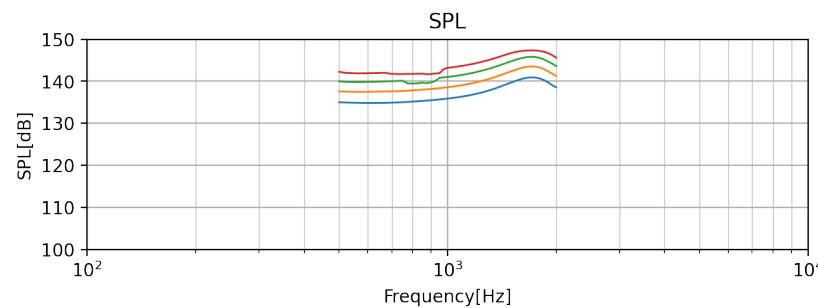
Add Glue Ball about 1mg

Glue Overwrapping



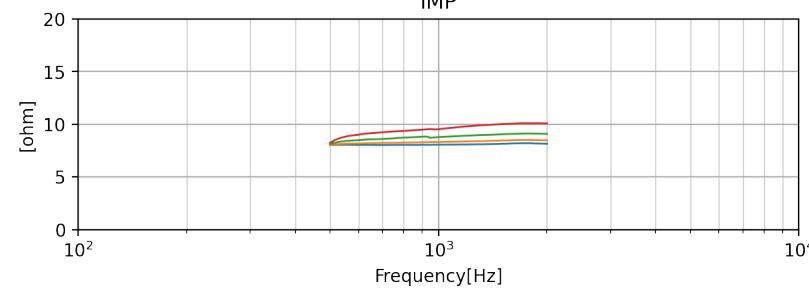
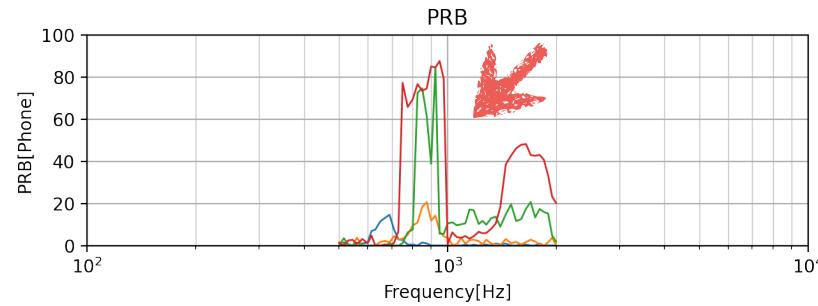
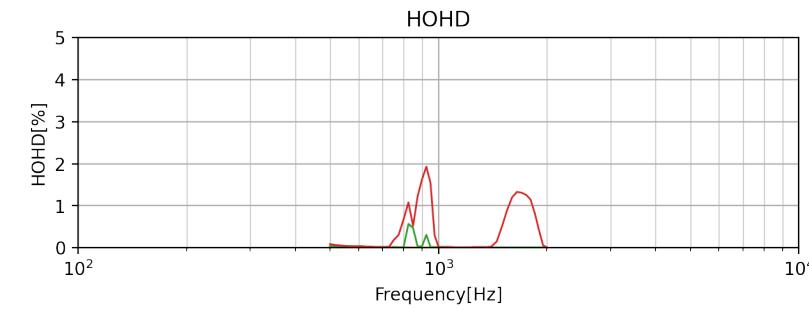
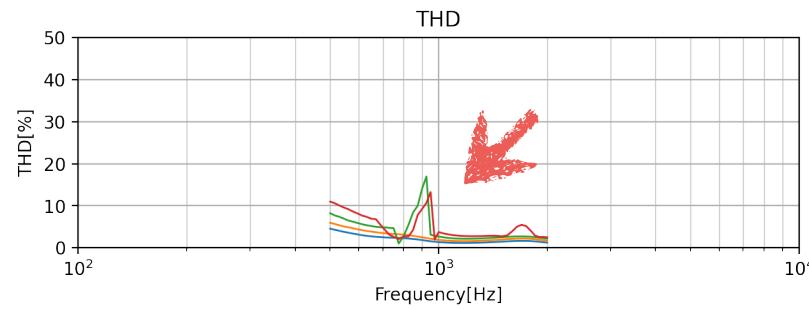
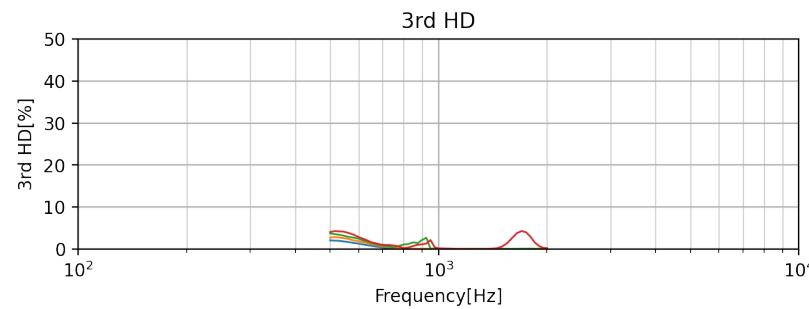
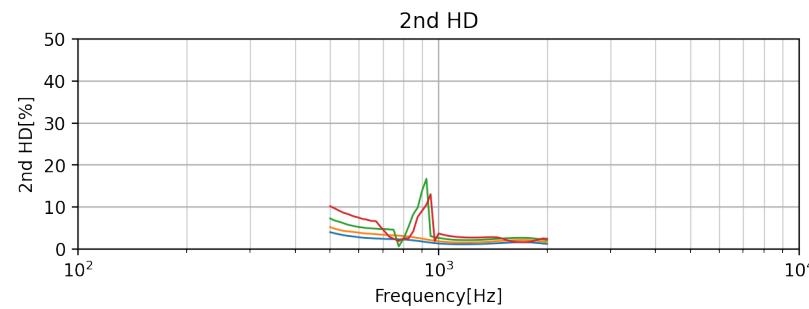
Glue Overwrapping

Add Glue Ball about Img



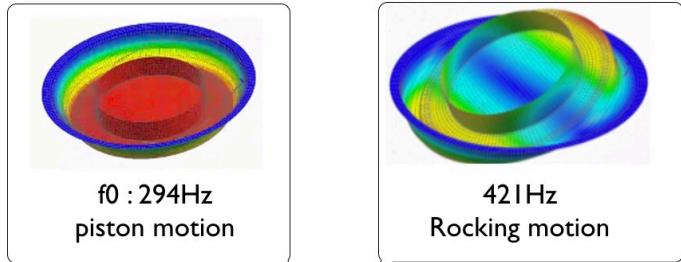
- OK04_0p976v_mass
- OK04_1p378v_mass
- OK04_1p947v_mass
- OK04_2.750v_mass

THD/PRB peak become larger
→ Mass Unbalance makes rocking worse

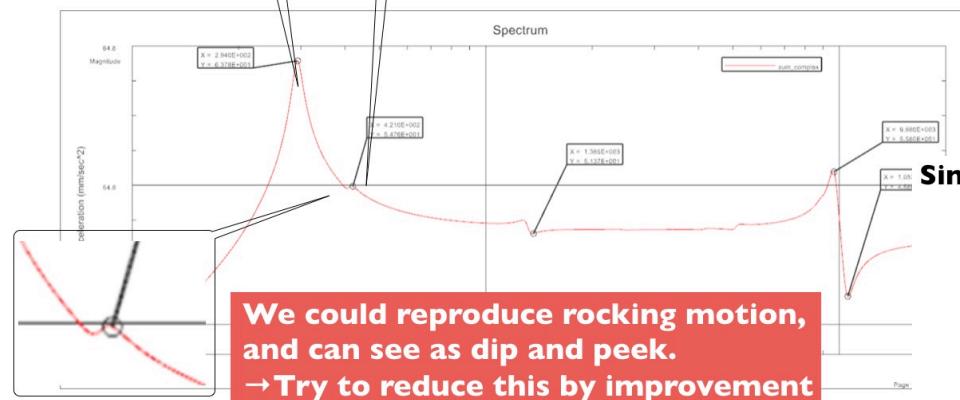


Diaphragm Surround shape

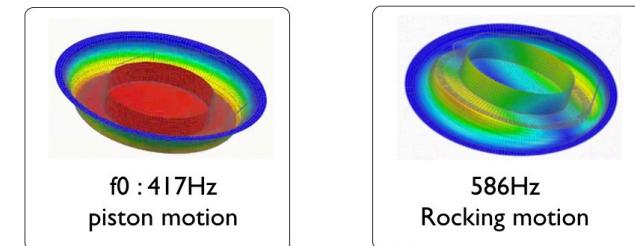
Simulation for Rocking Motion



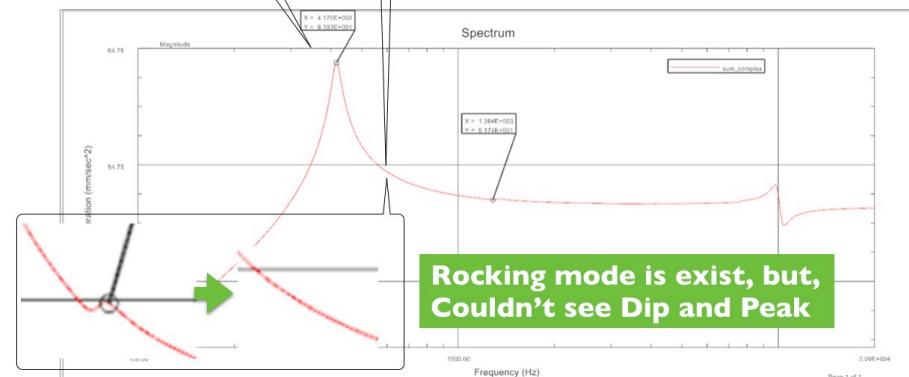
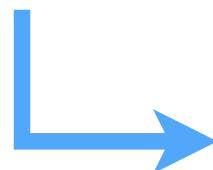
Diaphragm Thickness may affects
Rocking Motion magnitude



Simulation for Rocking Motion

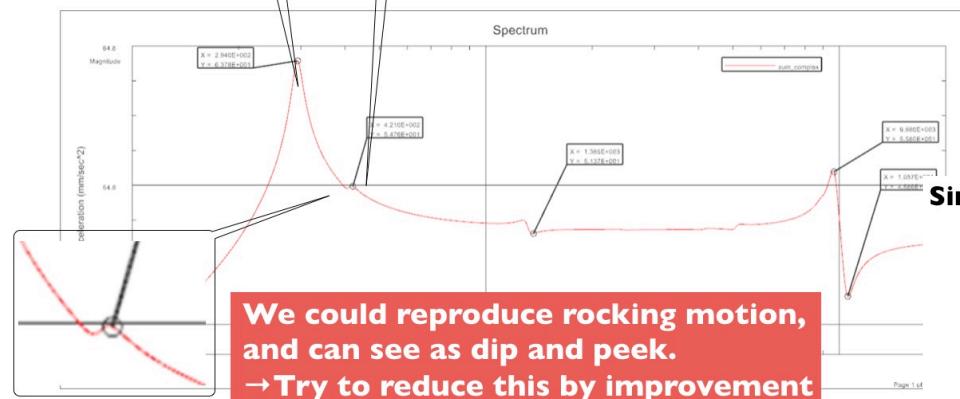
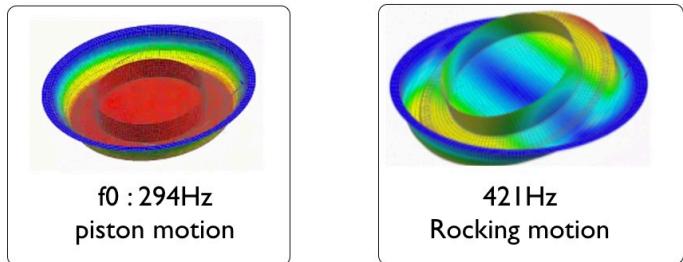


Thicker Surround
75um



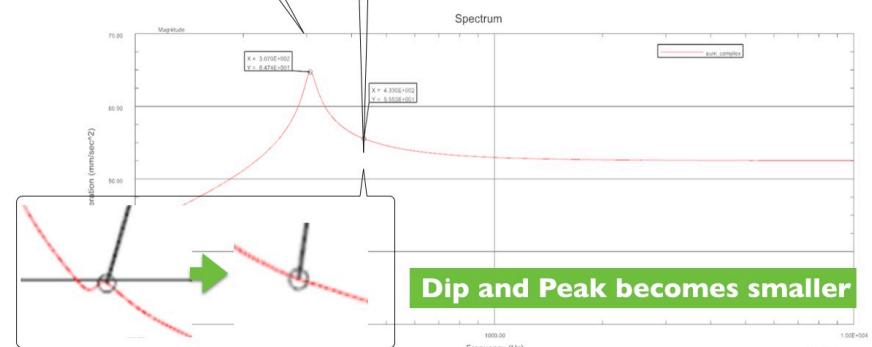
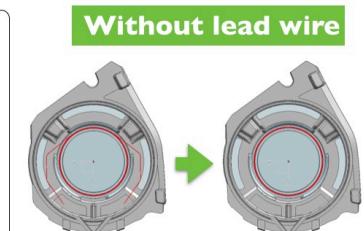
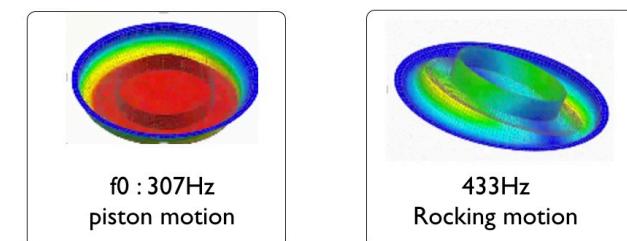
Wire forming shape

Simulation for Rocking Motion

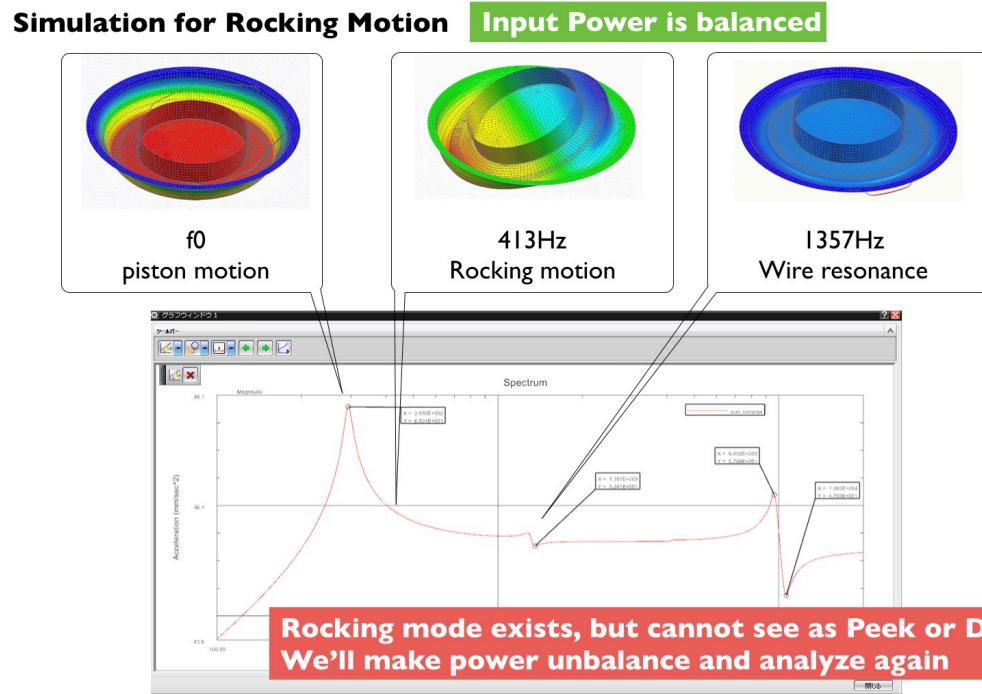


Lead wire affects Rocking Motion

Simulation for Rocking Motion

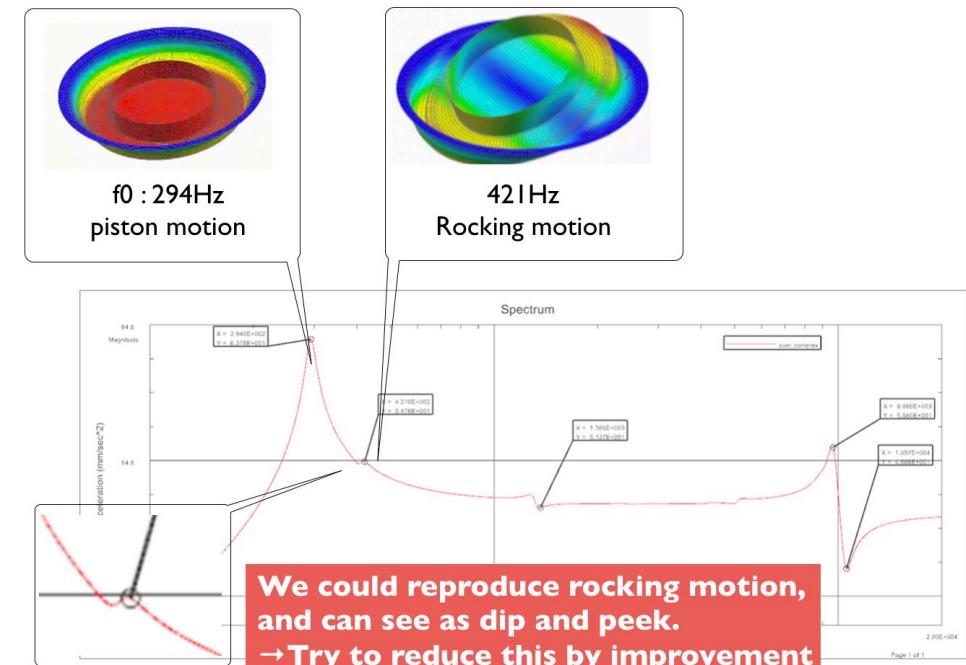


Magnetic Circuit concentricity



If Magnetic Circuit concentricity is not good, BI unbalance occurred. and it makes Power Unbalance. Power Unbalance affects Rocking Motion.

Simulation for Rocking Motion Input Power is unbalanced



Screen Mesh on Frame

To confirm larger Rms effect,
change mesh material on Frame

input voltage

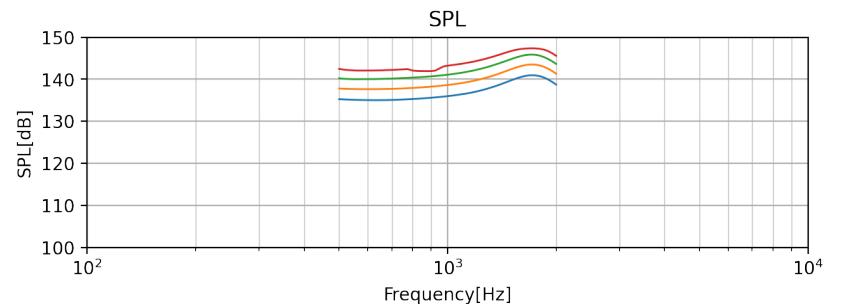
- 2.750 Vrms (0dBFS@FATP)
- 1.947 Vrms (-3dB)
- 1.378 Vrms (-6dB)
- 0.976 Vrms (-9dB)



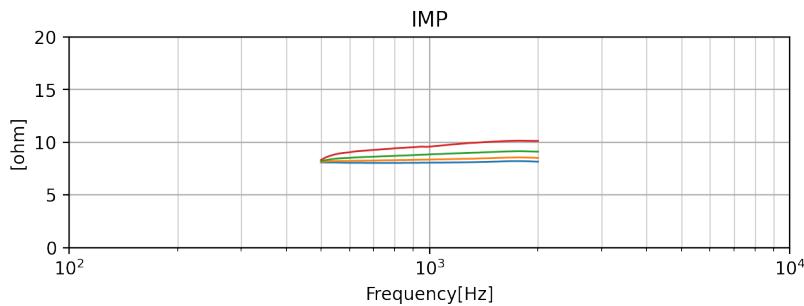
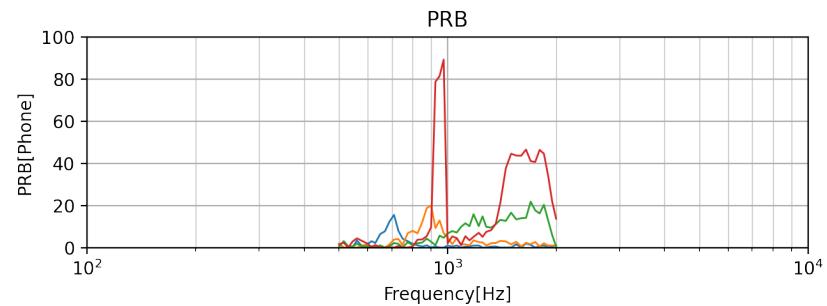
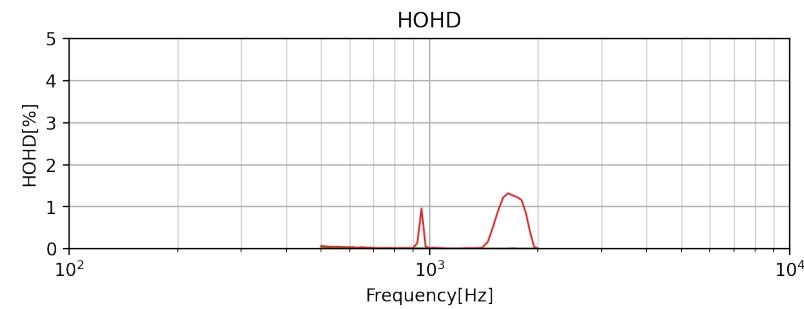
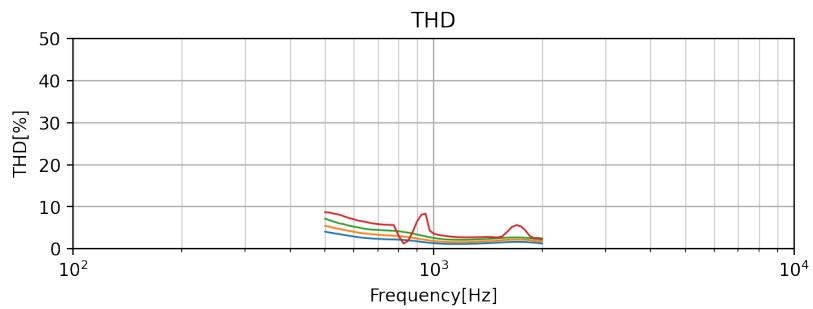
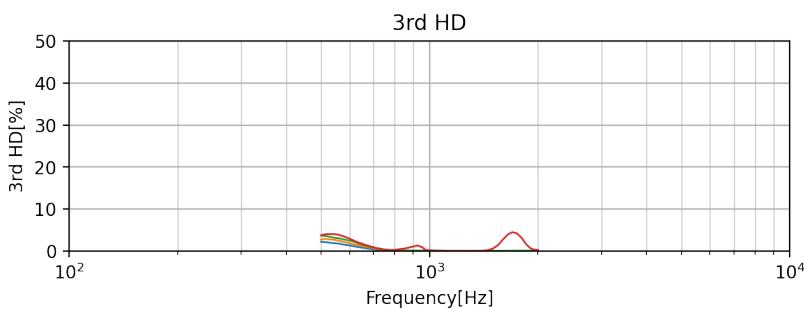
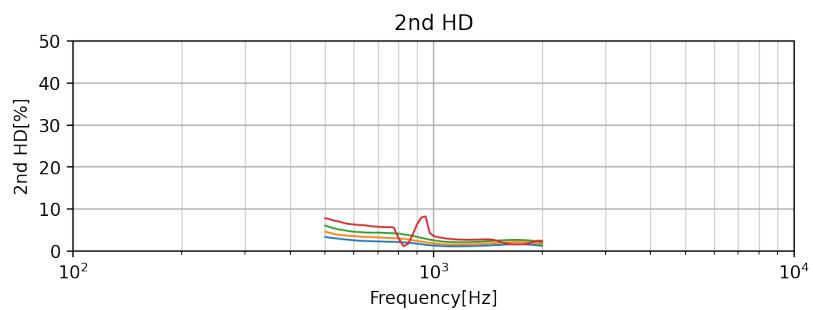
Change Mesh material
Specific Airflow Resistance : 260 MKS rayls

Screen Mesh on Frame

#2



- OK02_0p976v
- OK02_1p378v
- OK02_1p947v
- OK02_2p750v

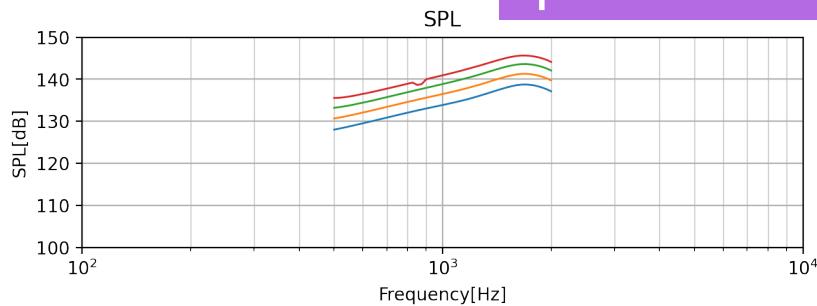
Original Mesh : 20MKS rayls

Screen Mesh on Frame

Change Mesh material

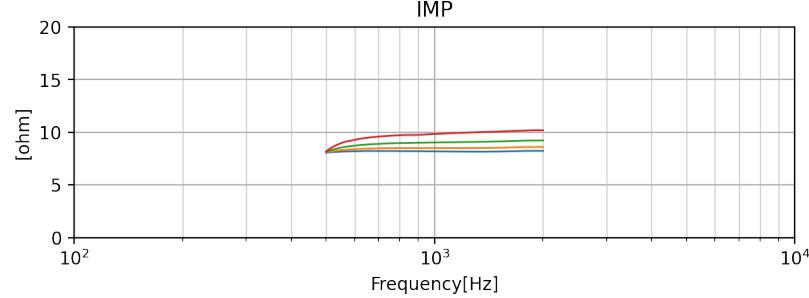
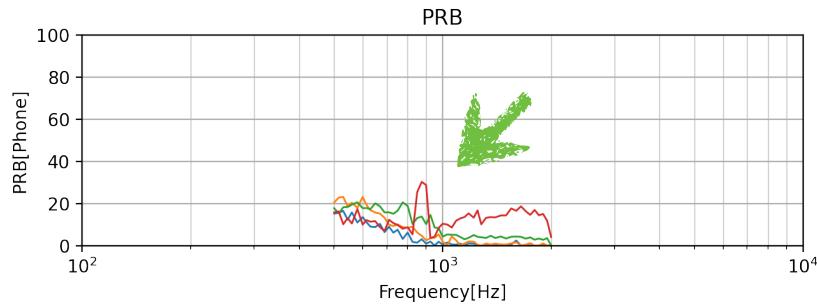
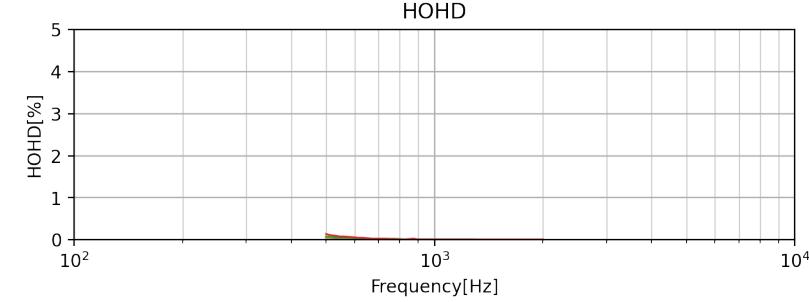
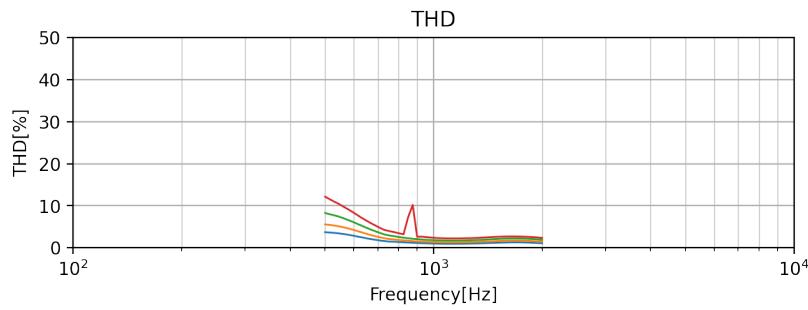
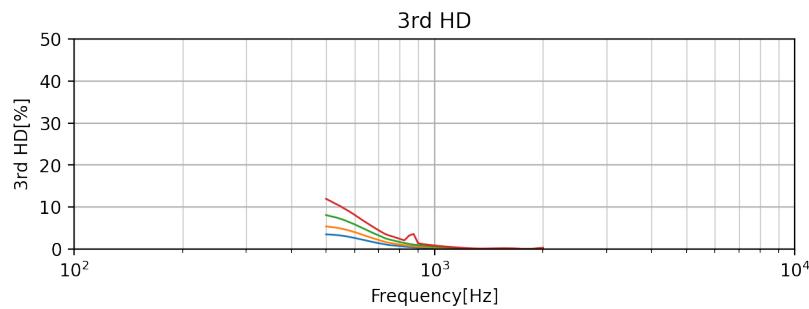
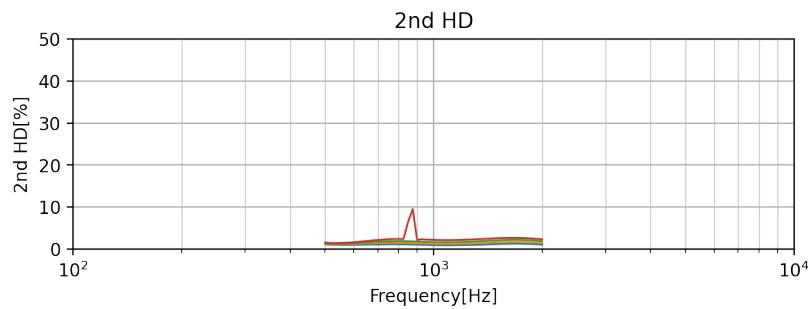
Specific Airflow Resistance : 260 MKS rayls

#2



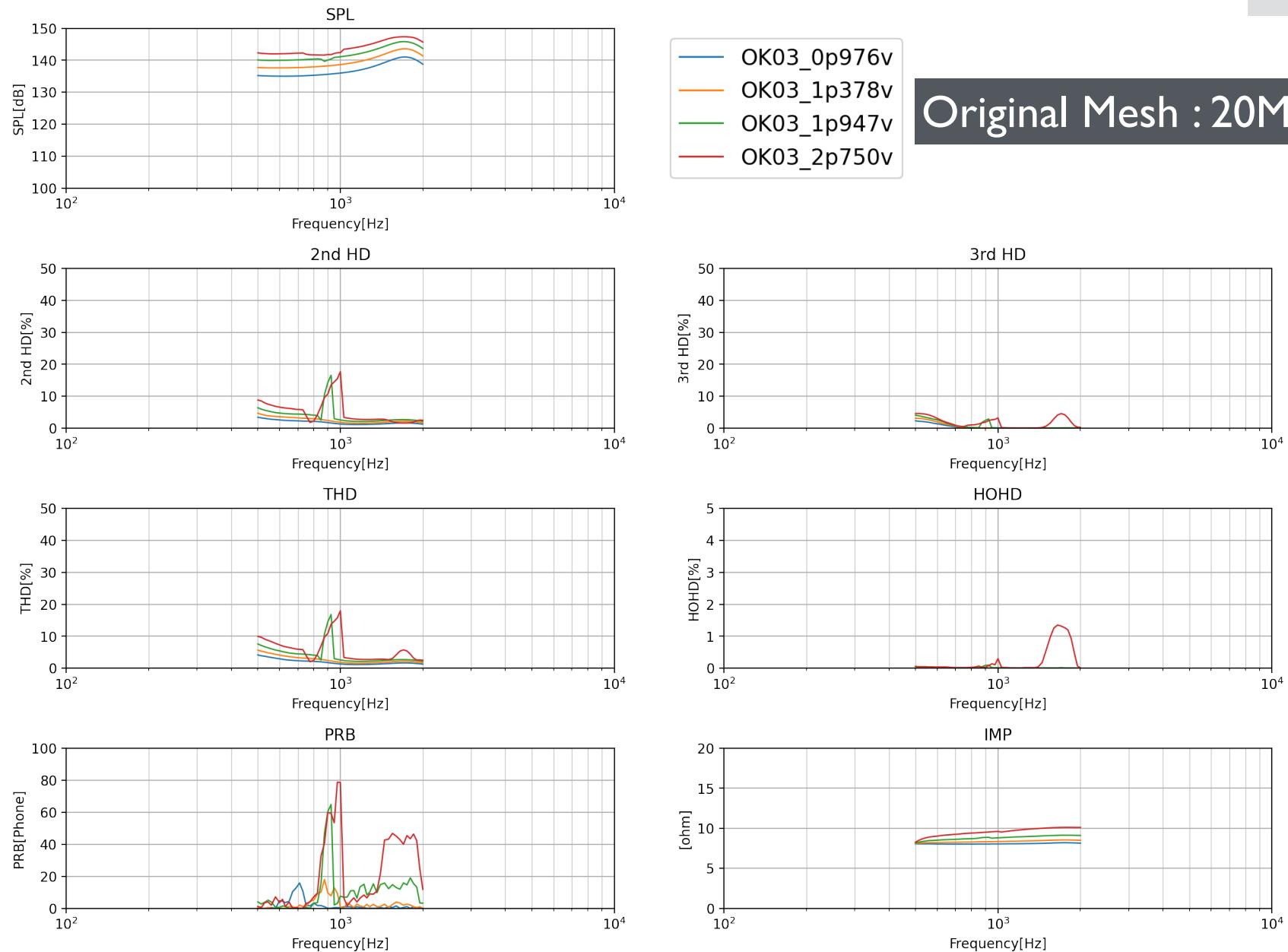
- OK02_0p976v_260
- OK02_1p378v_260
- OK02_1p947v_260
- OK02_2p750v_260

with 2.75V, still Buzzing,
but PRB peak become
very small



Screen Mesh on Frame

#3



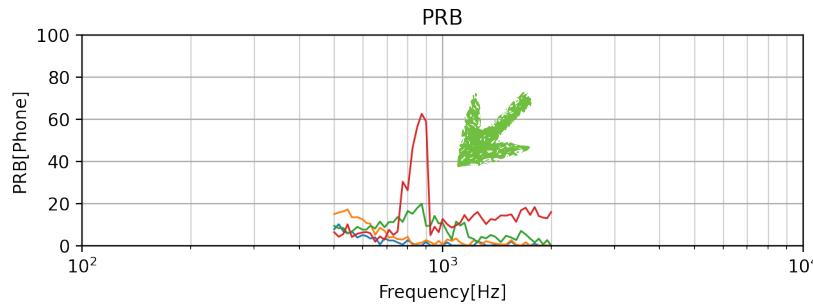
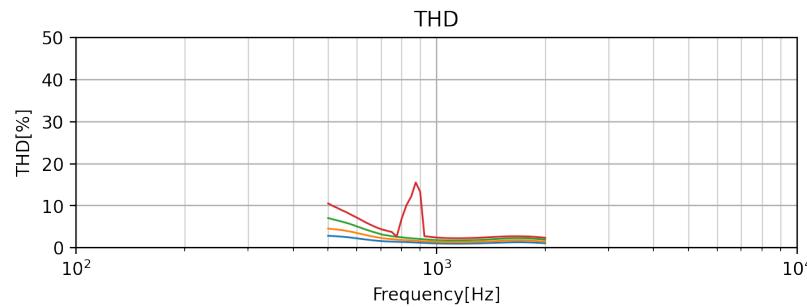
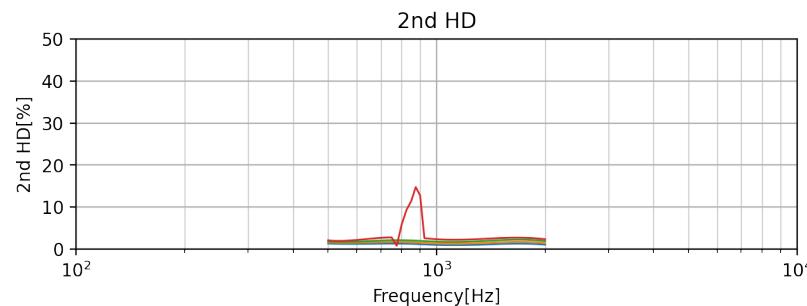
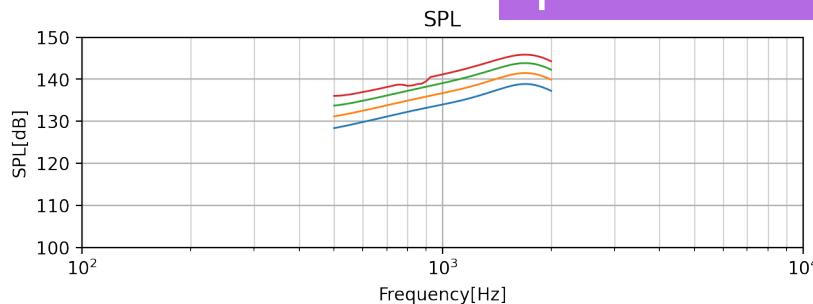
Original Mesh : 20MKS rayls

Screen Mesh on Frame

Change Mesh material

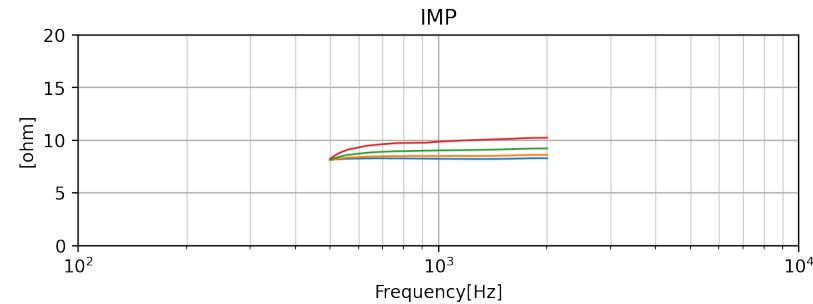
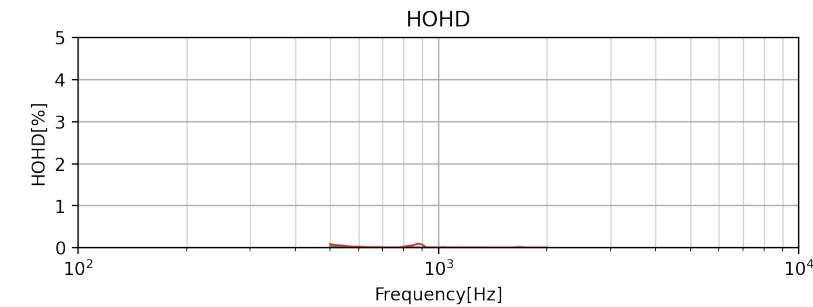
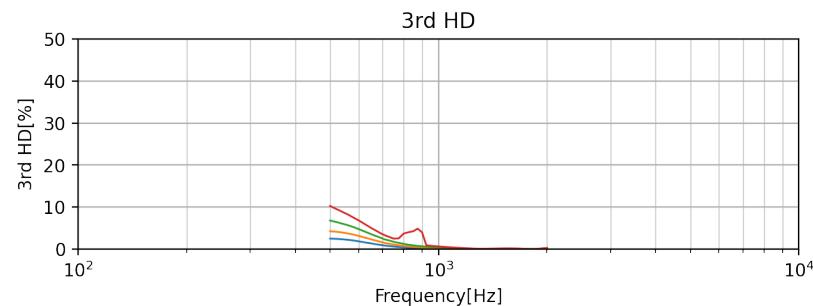
Specific Airflow Resistance : 260 MKS rayls

#3



- OK03_0p976v_260
- OK03_1p378v_260
- OK03_1p947v_260
- OK03_2p750v_260

with 1.947V, buzz disappears

with 2.75V, still Buzzing,
but PRB peak become small

Frame Hole unbalance

to be updated

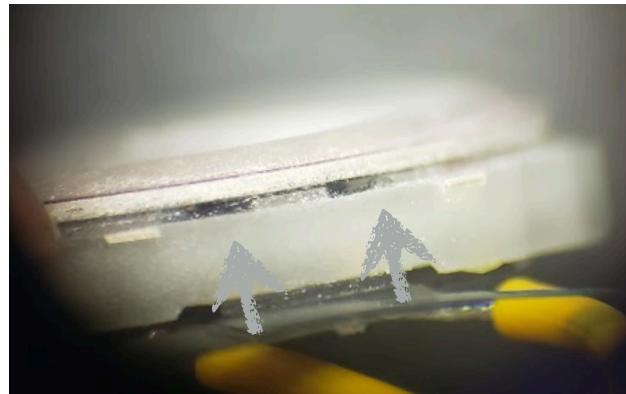
Frame Groove leakage

To confirm Frame groove leakage effect,
Seal the groove by glue

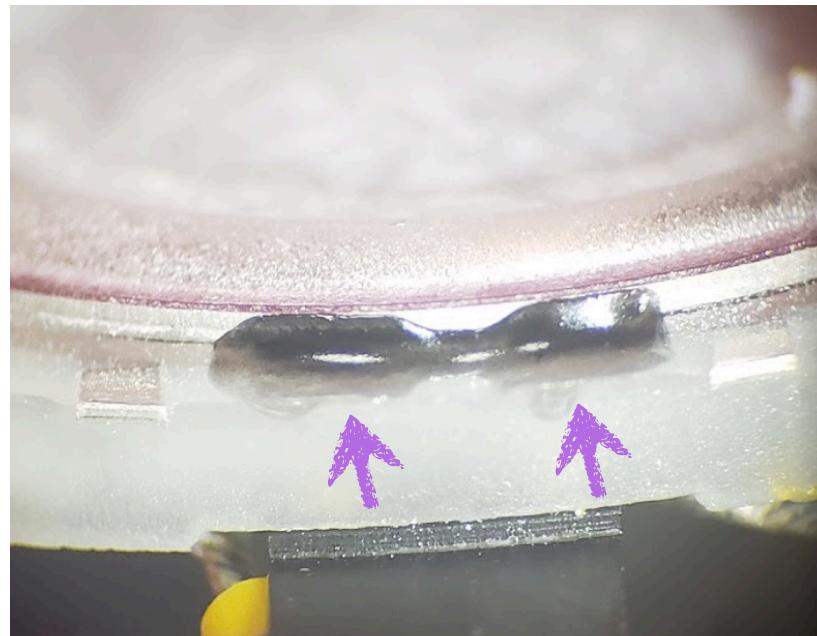
Using 260 mesh sample

input voltage

- 2.750 Vrms (0dBFS@FATP)
- 1.947 Vrms (-3dB)
- 1.378 Vrms (-6dB)
- 0.976 Vrms (-9dB)



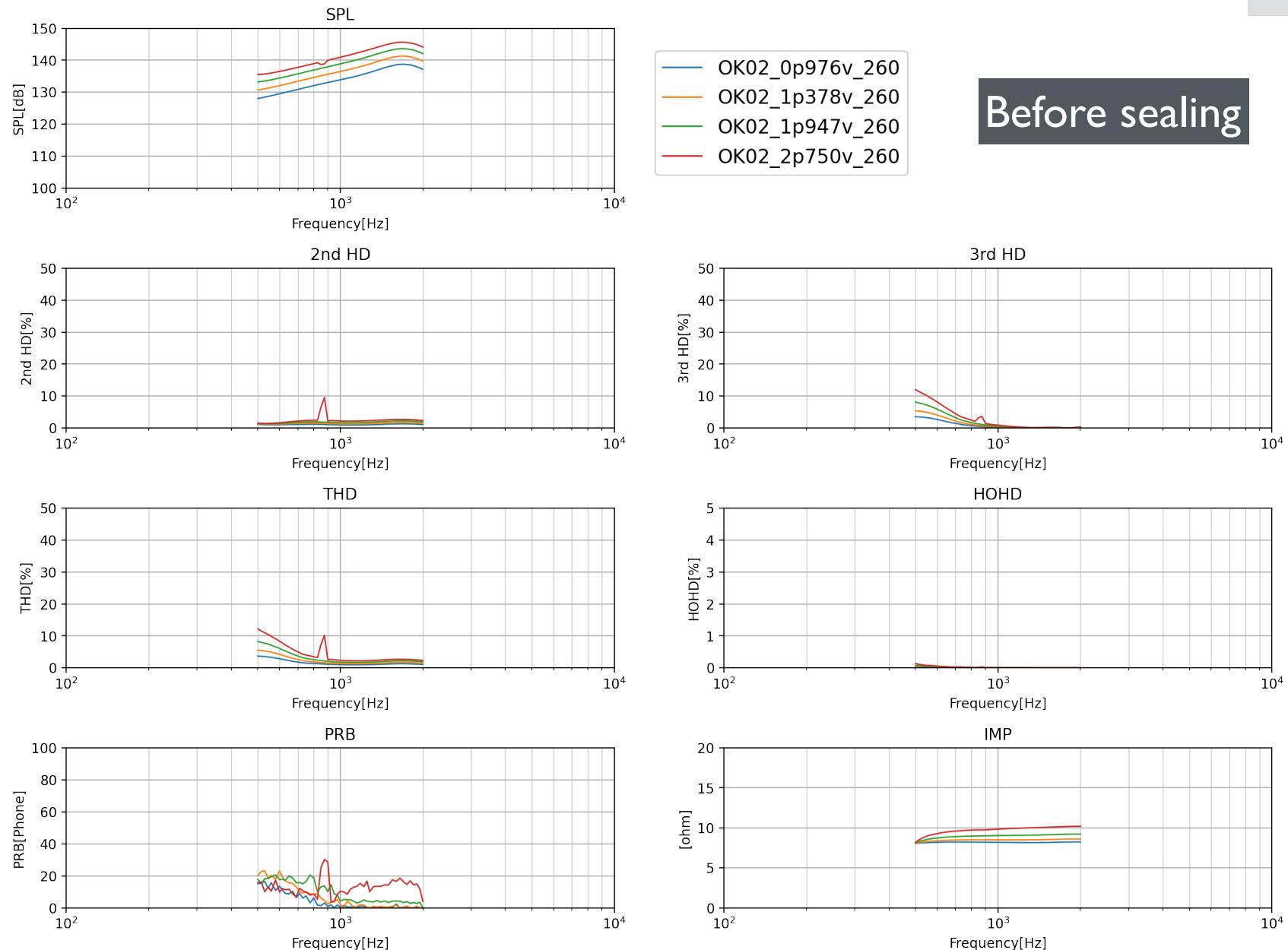
before seal



Seal Groove by Glue

Frame Groove leakage

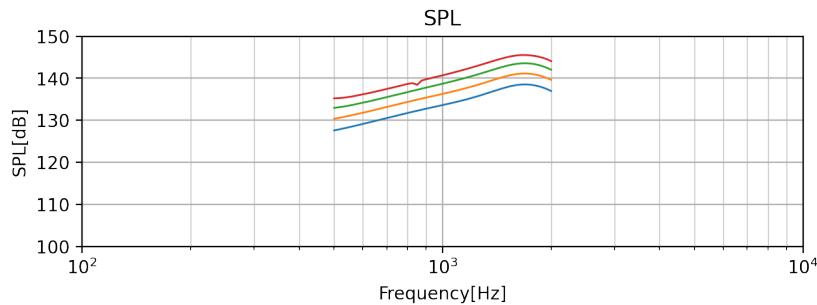
#2



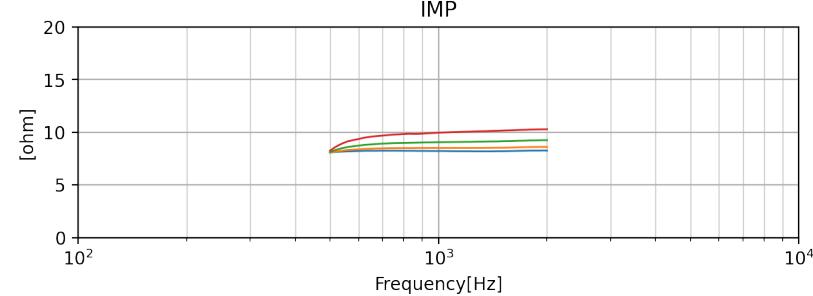
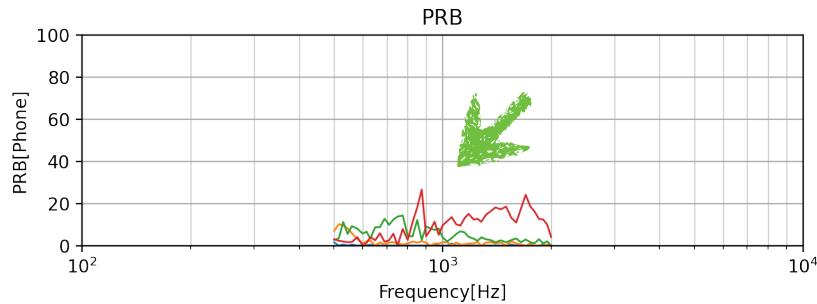
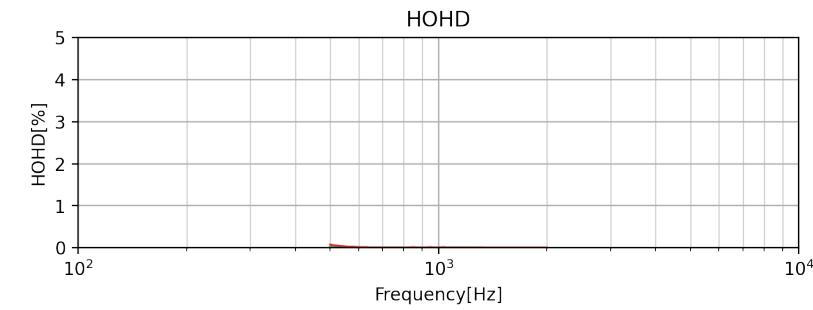
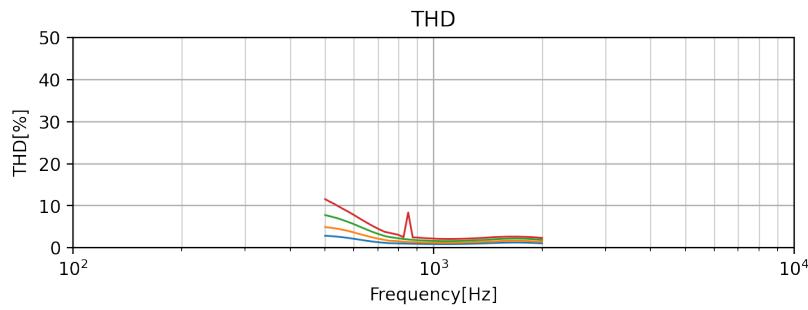
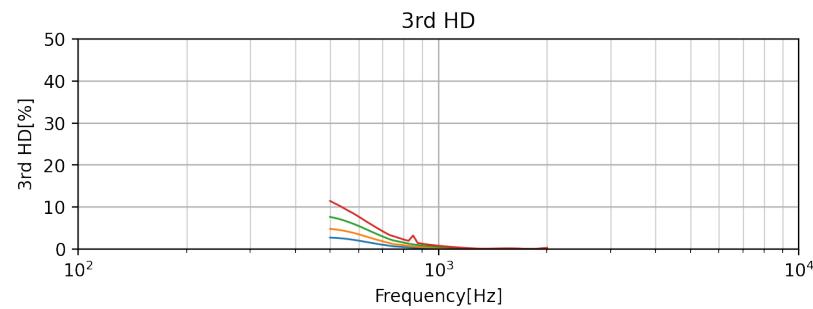
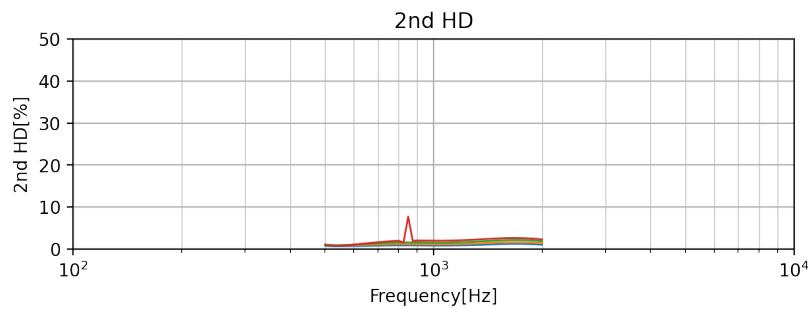
Frame Groove leakage

Seal Groove by Glue

#2



- OK02_0p976v_260
- OK02_1p378v_260
- OK02_1p947v_260
- OK02_2p750v_260



PRB peak become little small