



adhoc Flow/2 Maker's Guide

Making Your Flow/2 Audiophile Loudspeaker

Appendix to the Flow/1
Maker's Guide

The Maker's Guide Map

Welcome to the Flow/2 Maker's Guide	4
What you will need to build a Flow/2	4
Before You Order Anything	5
The Journey: Making Your Flow/2	6
Drivers Used in Flow/2	6
Print the Parts	7
Flow/2 Bill of Materials	8
PIY (Print It Yourself)	9
Tube Section	9
Flow/2 DM	10
Bezel	10
Base	11
Build the Flow/2	12
Assemble the Enclosure	12
Attach the Egg/Arm Assembly and Complete the Build	25
Closing Note	26
Public Guide and Subscriber Resources	26
Disclaimer	26
Copyright and Design Rights Notice	26
Release Notes	27

Images and Illustrations

Figure 1. Flow/2, Vertical	4
Figure 2. Full Tube Section, Oblique View	9
Figure 3. Tube Section Vanes-Top and Bottom Oblique View	9
Figure 4. Flow/2 Driver Module (DM)	10
Figure 5. Bezel	10
Figure 6. Base	11
Figure 7. Preparing Epoxy	12
Figure 8. Bonding Top and Bottom Tube Sections	13
Figure 9. Join Top and Bottom Tube Halves	13
Figure 10. Bezel-to-Tube bonding areas.	14
Figure 11. Bezel-to-Tube adhesive areas (continued).	14
Figure 12. Bezel-to-Tube adhesive areas (continued).	14
Figure 13. Tube Section-to-Base epoxy/adhesive areas.	15
Figure 14. Applying adhesive to the Base	16
Figure 15. Clamp the Enclosure parts for curing	18
Figure 16. Assembled Enclosure	19
Figure 17. Flow/2 ND91 DM wire preparation	21

Figure 18. Routing the LF driver wires. _____	23
Figure 19. Sealing the ND91 driver wire holes. _____	24
Figure 20. Completed Flow/2 ND91 DM. _____	25

Tables and Lists

Table 1. Flow/2 Reference Drivers _____	6
Table 2. Flow/2 3D Files and Uses _____	7
Table 3. Parts List to Build One Pair of Flow/2 Speakers _____	8

Welcome to the Flow/2 Maker's Guide

Thank you for choosing to build a Flow/2 active loudspeaker. Flow/2 is a compact, modular, audiophile-grade loudspeaker designed to deliver coherent imaging, useful low-frequency extension, and the satisfaction of hearing a system you built yourself. Its design is based on the folded, coaxial, tapered quarter-wave tube architecture described in U.S. Patent 7,925,036 B2. Flow/2 extends Flow/1 with twisted gyroidic-like vanes that reduce higher-order line modes and seven tuned Helmholtz resonators that attenuate selected resonant frequencies.

This Guide is an appendix to the Flow/1 Maker's Guide. It covers the Flow/2-specific work required to build a complete Flow/2 loudspeaker. The Flow/1 Maker's Guide contains the shared information on maker resources, printer setup, tools, suppliers, software, ordering, and common construction procedures. Review the Flow/1 Maker's Guide before beginning a Flow/2 build.

Flow/2 is designed around the Wavector TW030WA26-8 Neo high-frequency (HF) driver and Dayton Audio ND91-8 low-frequency (LF) driver. The Flow/1 Maker's Guide contains instructions for making the Egg and Arms assembly and completing the final assembly.

What you will need to build a Flow/2

General preparation is covered in the Flow/1 Maker's Guide. Before beginning the Flow/2 build, consult these sections:

- "Maker Resources: Your 3D Printer Setup" covers printer types, capabilities, and setup.
- "Digital Blueprints" covers the STL and STEP files for the speaker and stand parts.
- "Tools" lists the tools and equipment used during construction.
- "Core Components" covers hardware, wires, jacks, connectors, adhesives, and related materials.
- "Print Partners" lists services that can print the parts for you.
- "Software" covers the software used for DSP setup, filter creation, and measurement.
- "Sources & Distributors" lists suppliers for components and materials.
- "Before You Order Anything" provides planning and purchasing guidance.

For system wiring, testing, DSP configurations, in-room measurements with response graphs, and use of REW, rePhase, and SigmaStudio, refer to the forthcoming Flow/2 User's Guide.

Read Flow/2 Theory of Operation before beginning the build. It explains the acoustic and structural principles behind the Flow/2 design.

To build stands for Flow/2, refer to the Flow Speaker Stand Maker's Guide.



Figure 1. Flow/2, Vertical

Before You Order Anything

Read “Before You Order Anything” in the Flow/1 Maker’s Guide before ordering. That section covers shared planning for printer setup, tools, hardware, electronics, cost, scheduling, and outside printing. This section lists the Flow/2-specific requirements.

Flow/2 is optimized for the Wavecor TW030WA26-8 Neo HF driver and Dayton Audio ND91-8 LF driver. Before ordering, confirm that you have selected:

- The specified Wavecor and Dayton Audio drivers
- The exact Flow/2 printed parts for this driver pair
- Your intended printing processes and materials

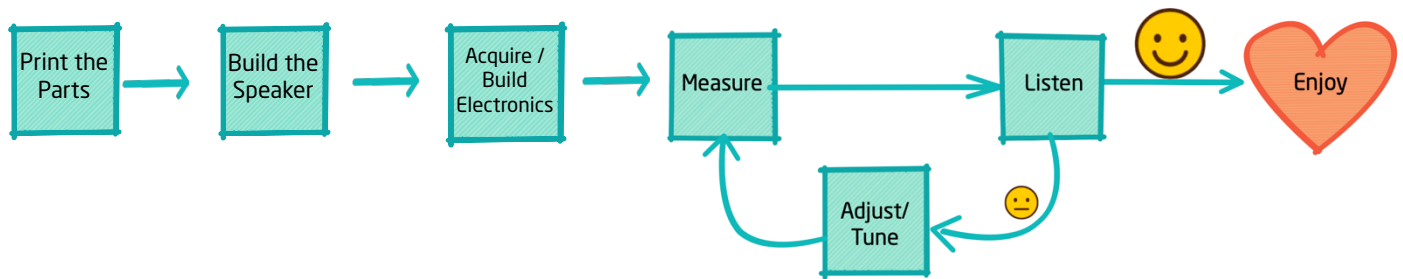
The one-piece Tube Section measures $357.76 \times 178.5 \times 178.5$ mm and requires 358 mm of Z clearance in its base-down print orientation. The two-piece version divides it into two parts, each with a 178.5 mm Z extent. The Tube Section’s internal vanes are designed for base-down printing without support material. The remaining rigid Flow/2 parts fit common desktop FDM printer capacities when the machine is well tuned and dimensionally accurate.

Print the DM covers in TPU. SLA resin is recommended for the Egg parts, Arms, and Bezel because their fit depends on fine detail and dimensional accuracy. The Tube Section and Base can be printed in FDM or SLA. ABS and PETG are suitable FDM materials for these larger parts.

Use the Flow/1 Maker’s Guide for general hardware, electronics, cost, and scheduling guidance. Verify all components, materials, and files before placing the order.

The Journey: Making Your Flow/2

The build proceeds through these stages:



Drivers Used in Flow/2

This Guide describes the specified Flow/2 driver pair: the Wavecor TW030WA26-8 Neo HF driver and the Dayton Audio ND91-8 LF driver. Table 1 lists these drivers and their source information.

Table 1. Flow/2 Reference Drivers

Driver	Image	Manufacturer	Manufacturer's Part No.	Link to Distributor	Estimated Price
Wavecor TW030WA26-8 Neo no faceplate		Wavecor	TW030WA26-8 Neo	Wavecor Distributors	\$32 USD
Dayton Audio ND91-8 8-ohm 3.5-inch Mini Subwoofer		Dayton Audio	ND91-8	Dayton Audio ND91-8 at Parts Express.com	\$27.98 USD

The HF driver mounts in the Egg. The Arms hold the Egg in front of the LF driver and allow 180-degree rotation. The LF driver mounts to the Driver Mount, called the DM. The Egg and DM connect to the main enclosure with banana plugs.

Print the Parts

Print the Parts

All parts for making the Flow/2 speaker and stands can be downloaded from the adhocspeakers.com [Subscriber Resources page](#). You must be a subscriber to gain access to these resources. The download package is a Zip file containing the 3D resources and ReadMe file. The ZIP file will be continuously updated with changes and additions, so the names may vary from what is listed below. Note: Filenames do not include a forward slash "/" for operating system compatibility.

Table 2 lists 3D STEP and STL files needed to make the Flow/2. The Wavecor files are copies from the Flow/1 directory; they are identical for Flow/1 and Flow/2.

Table 2. Flow/2 3D Files and Uses

3D Filename (.step or .stl)	Description
Flow 2 Base	Base, holds odd folds and five Helmholtz resonators; attaches to the bottom of the tube section
Flow 2 Bezel	Holds the even folds, a Helmholtz resonator, and is where the DM attaches
Flow 2 Full Tube	Complete tube section in one single body
Flow 2 ND91 DM Cover	Decorative DM cover; two required.
Flow 2 ND91 DM	DM for the Dayton Audio ND91-8; includes a Helmholtz resonator
Flow 2 Tube Top	Top half of the tube section; for smaller printers
Flow 2 Tube Bottom	Bottom half of tube section, for smaller printers
Wavecor Arm Minus	Arm carrying the negative wire to the Egg
Wavecor Arm Plus	Arm carrying the positive wire to the Egg
Wavecor Egg Front	Front body of the egg, including the grill
Wavecor Egg Rear	Rear body of the egg
Wavecor Holder	Secures the TW030WA26-8 Neo in the egg

Flow/2 Bill of Materials

Table 3 lists the parts needed to build two Flow/2 speakers (one stereo pair) and estimated cost of this reference system. Note that this table assumes a single-body full tube section, Flow 2 Full Tube.step. Generally, the half-bodies are approximately half the cost of a full body of the same material.

Table 3. Parts List to Build One Pair of Flow/2 Speakers

Description	Type	Filename or Part#	Qty	Ext. Cost (USD est.)
HF Driver	Driver	Wavecor TW030WA26-8 Neo	2	\$64
LF Driver	Driver	Dayton Audio ND91-8	2	\$56
Wavecor Egg front	Printed Part	Wavecor Egg Front.step	2	\$9
Wavecor Egg rear	Printed Part	Wavecor Egg Rear.step	2	\$9
Wavecor holder	Printed Part	Wavecor Holder.step	2	\$1
Wavecor minus Arm	Printed Part	Wavecor Arm Minus.step	2	\$6
Wavecor plus Arm	Printed Part	Wavecor Arm Plus.step	2	\$6
Flow/2 ND91 DM	Printed Part	Flow 2 ND91 DM.step	2	\$15
Flow/2 ND91 DM cover	Printed Part	Flow 2 ND91 DM Cover.step	4	\$8 - \$15
Flow/2 Bezel	Printed Part	Flow 2 Bezel.step	2	\$54
Flow/2 Tubes	Printed Part	Flow 2 Full Tube.step. See Not about cost of split bodies.	2	\$50 - \$500
Flow/2 Base	Printed Part	Flow 2 Base.step	2	\$24 - \$64
Wavecor Egg screw	Hardware	M2 x 10 mm, McMaster-Carr 90380A328	16	\$2
ND91 driver screw	Hardware	M4 x 20 mm, McMaster-Carr 90380A382	8	\$1
Arm screw	Hardware	M3 x 20 mm, McMaster-Carr 90380A356	8	\$1
DM screw	Hardware	M4 x 20 mm, McMaster-Carr 90380A382	16	\$2
Banana jacks	Electrical	Shenzen, Amass part #28.220	8	\$3
Banana plugs	Electrical	Mueller Electric BU-00246-0 Digi-Key 314-1058-ND	8	\$16
speakON connector	Electrical	Neutrik NL4FXX-W-S	2	\$11
Wire	Electrical	4-conductor 18-gauge twisted pair	4 m	\$12
Epoxy	Materials	Bonding enclosure parts	~20 g	\$10
Cotton	Materials	Stuffing for Bezel	~11 g	\$3
Fiberglass	Materials	Stuffing for Tube Section	~1.5 g	\$1
Gasket	Materials	Foam gasket for DM to enclosure	~30 cm	\$1

The estimated cost for one stereo pair is approximately \$375 to \$860, excluding electronics. The range depends on the printing method, material, and whether the parts are printed in-house or ordered from a service. Tube Section cost accounts for most of the variation. These values are planning estimates; confirm current prices before ordering.

For the split Tube Section, replace the quantity-two full-tube entry with two Tube Top parts and two Tube Bottom parts. Cost depends on material and print service.

PIY (Print It Yourself)

General printing methods, materials, and cost guidance are covered in the “PIY (Print It Yourself)” section of the Flow/1 Maker’s Guide. This appendix lists the Flow/2-specific recommendations for each build section.

Tube Section

The Tube Section contains a folded, tapered quarter-wave line approximately 1.83 m long. Because of the taper, its approximate quarter-wave frequencies are 47 Hz and 42 Hz. The Tube Section can be printed as one body or as two bonded halves using FDM or SLA. The one-piece Tube Section measures $357.76 \times 178.5 \times 178.5$ mm and requires 358 mm of Z clearance in the base-down orientation. The two-piece version is intended for smaller printers; each half has a 178.5 mm Z extent if that matches the current CAD files.

SLA can provide fine feature detail and clean mating surfaces. FDM is suitable when the printer produces accurate dimensions and the part is cleaned and finished carefully. The Tube Section’s internal vanes are designed for base-down printing without support material.

Here are images of the Tube Section and vanes. Figure 2 shows a single-piece full-tube body, and Figure 3 shows in blue where adhesive must be applied to bond the two sections together.

Figure 2. Full Tube Section, Oblique View

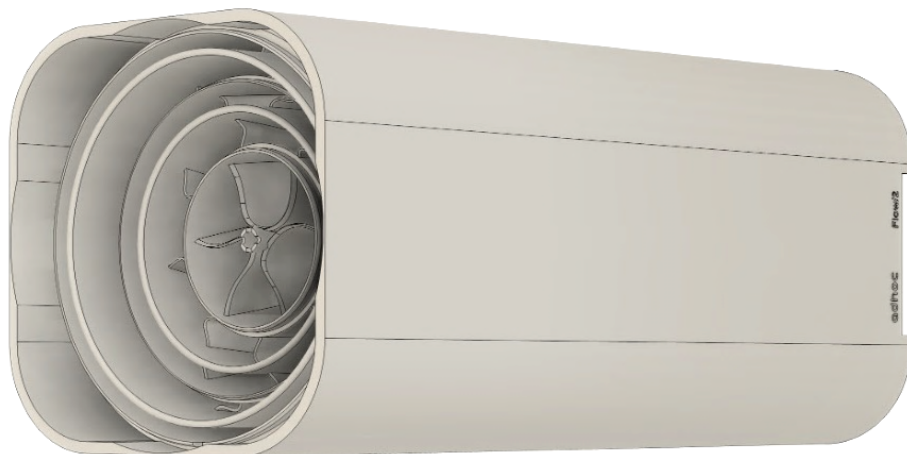
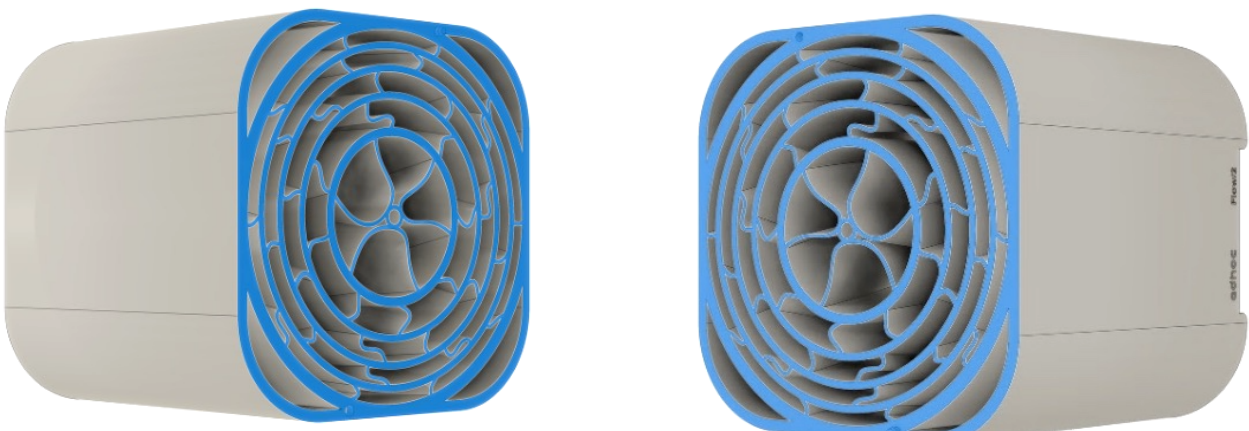


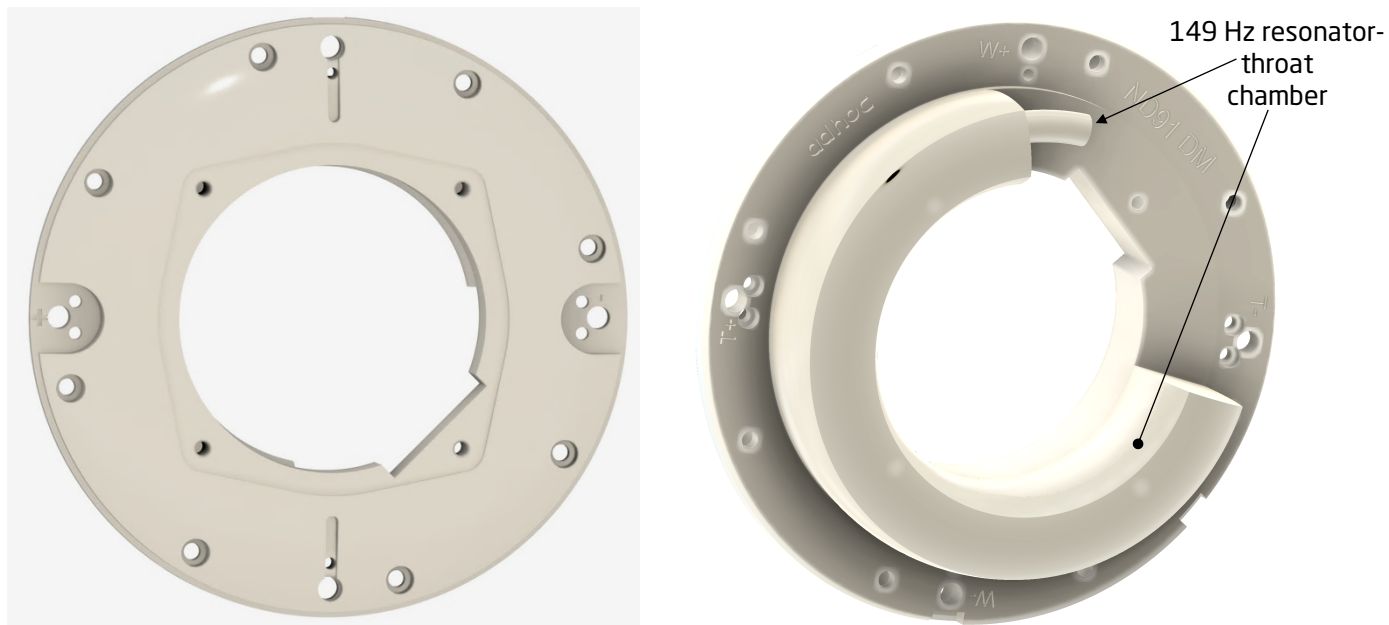
Figure 3. Tube Section Vanes-Top and Bottom Oblique View



Flow/2 DM

The DM, shown in Figure 4, contains the 149 Hz Helmholtz resonator. Because the DM contains fine features, print it at a layer height of 0.1 mm or finer.

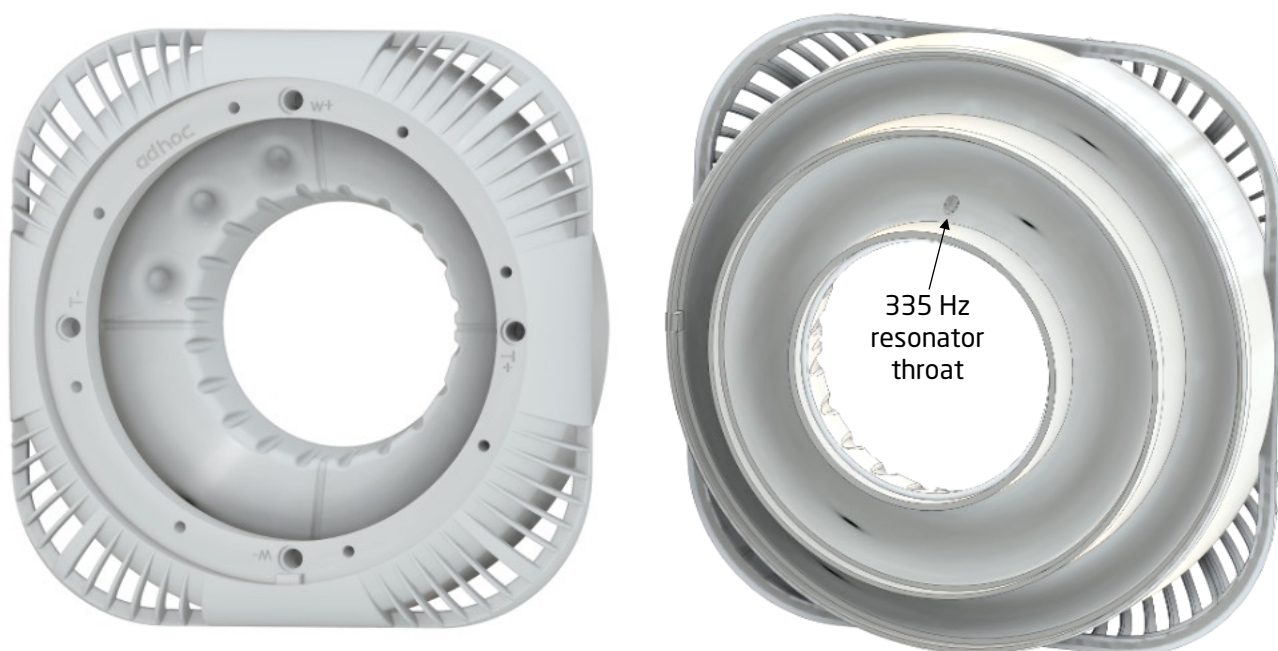
Figure 4. Flow/2 Driver Module (DM)



Bezel

The Bezel, shown in Figure 5, forms the LF driver rear chamber, contains the even-numbered line folds, houses the 335 Hz Helmholtz resonator, and receives the DM. SLA is recommended because of the fine vents and mating surfaces. FDM may be suitable with a well-calibrated printer; verify the vents and mating surfaces before assembly.

Figure 5. Bezel



Base

The base, shown in Figure 6, provides the odd-numbered line folds, contains the 432 Hz resonator and four 239 Hz resonators, routes air from S5 into the four S6 corner passages, and seals the bottom of the enclosure. The base can be printed by FDM or SLA. Keep all resonator chambers free of support material.

Figure 6. Base



The Bezel, Tube Section, and Base can all be FDM-printed. SLA is recommended for the Bezel because of its fine vents and mating surfaces. FDM-printed Tube Sections can perform well when printed accurately and will weigh less than resin-printed parts.

Review the "Printed Parts Acquired from a Printing Service" section of the Flow/1 Maker's Guide for suggested print services.

Build the Speaker

Build the Flow/2

This appendix covers the Flow/2-specific parts and procedures:

- Flow/2 DM with its 149 Hz Helmholtz resonator
- Bezel with its 335 Hz Helmholtz resonator
- Top and Bottom Tube Sections with twisted gyroidic-like vanes
- Base with its 432 Hz resonator and four 239 Hz resonators

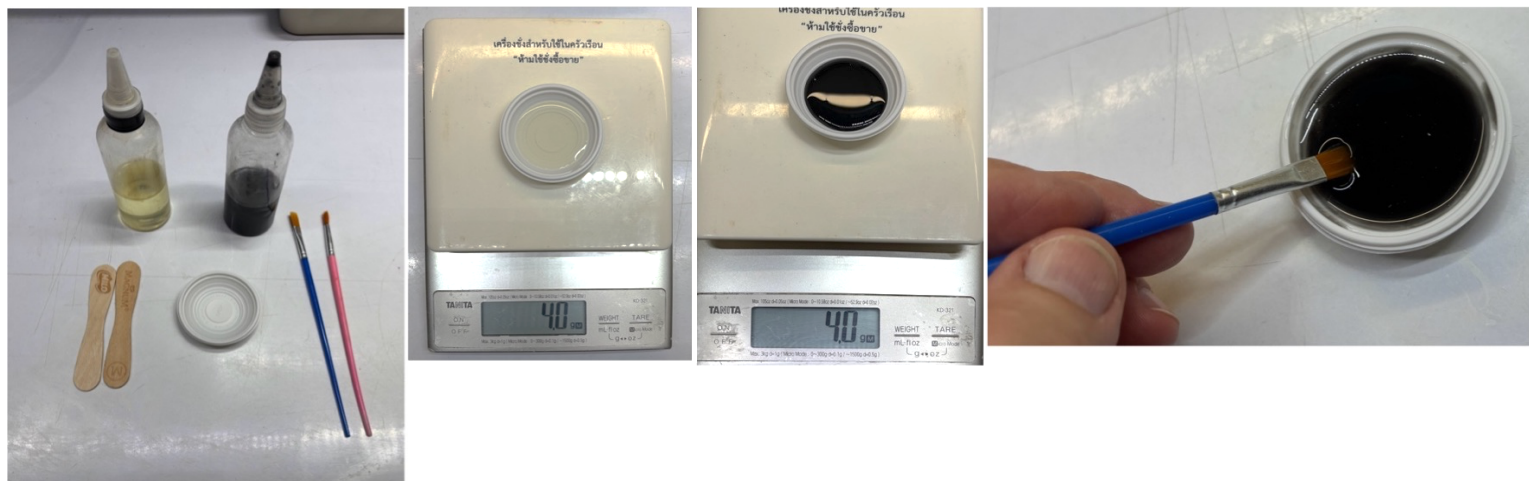
Follow “Build the Speaker” in the Flow/1 Maker’s Guide for the Egg, Arms, and shared assembly procedures.

Assemble the Enclosure

The enclosure assembly procedure is shared with Flow/1. Follow the “Assemble the Enclosure” section of the Flow/1 Maker’s Guide for cleaning, dry fitting, adhesive preparation, clamping, curing, and inspection. This appendix shows the Flow/2-specific adhesive areas and split Tube Section procedure in Figures 7 through 14.

Refer to Figure 7. Carefully measure, weigh, and mix epoxy or other slow-cure adhesive. If you are using epoxy, be sure to mix the epoxy according to instructions to ensure it will cure properly.

Figure 7. Preparing Epoxy



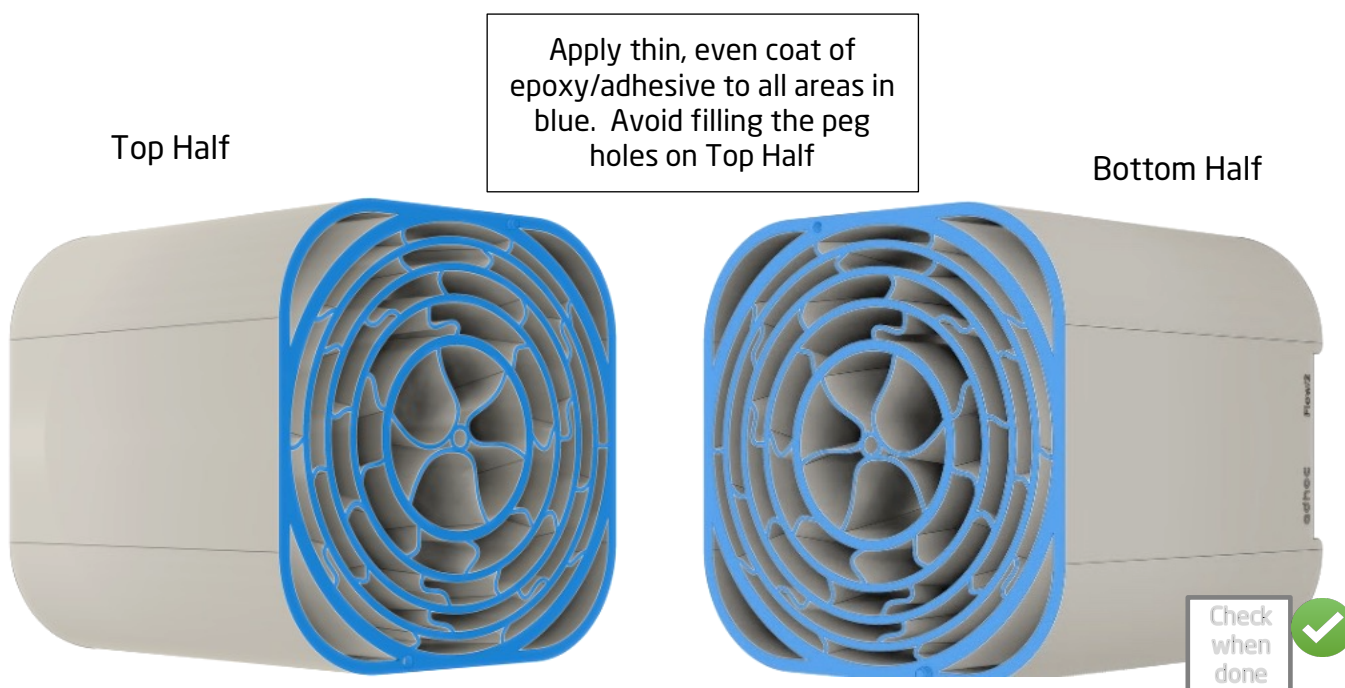
Let’s get started!

Step 1: Bond the Tube Top and Tube Bottom

(Skip this step if you have a single-body Tube Section.)

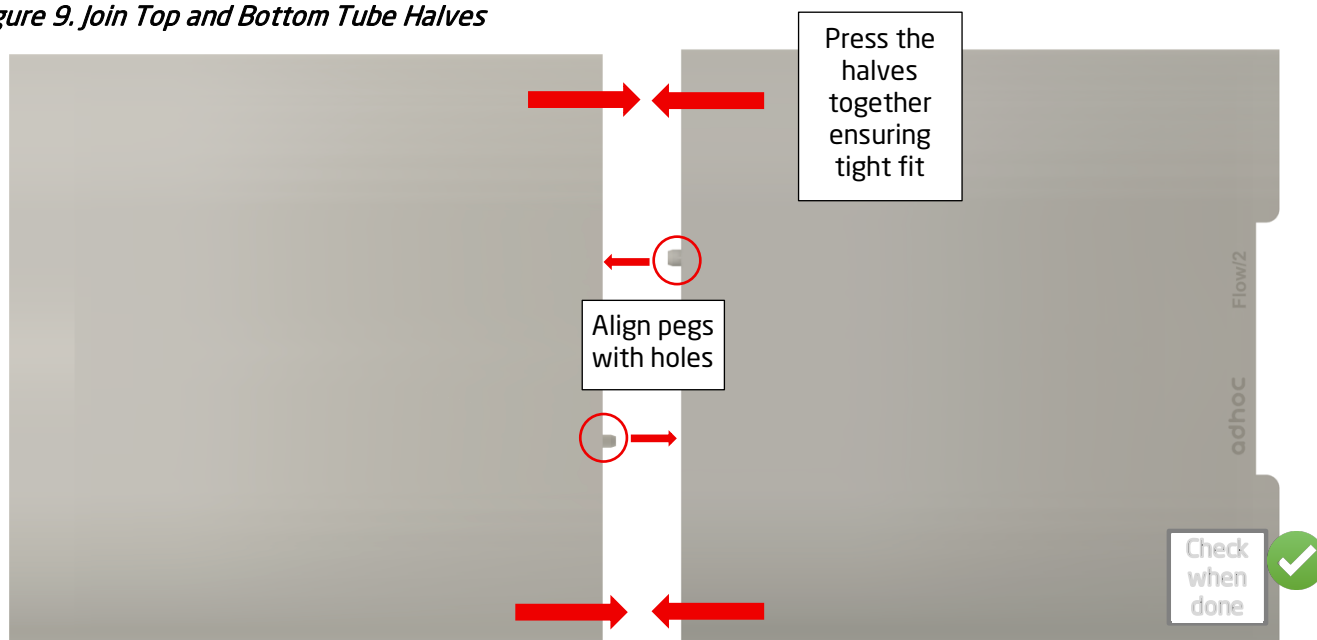
- Prepare at least 5 grams of epoxy/adhesive for bonding the two tube body parts together.
- Using a small brush, apply a thin, even coat onto all surfaces before fitting them together. Figure 8 shows the areas to apply the epoxy/adhesive in blue. It is important that there be a smooth coating of adhesive on every surface where the two bodies meet to ensure a solid, airtight seal.

Figure 8. Bonding Top and Bottom Tube Sections



- c. Refer to Figure 9. Align pegs in the bottom half with the holes in the top half. Press the top and bottom halves together, ensuring a tight fit. If excess adhesive oozes from the joint, separate the halves and remove the excess from the joint and the tube passages. Rejoin the halves after cleaning. This is important to prevent disruption of airflow in the tubes.

Figure 9. Join Top and Bottom Tube Halves



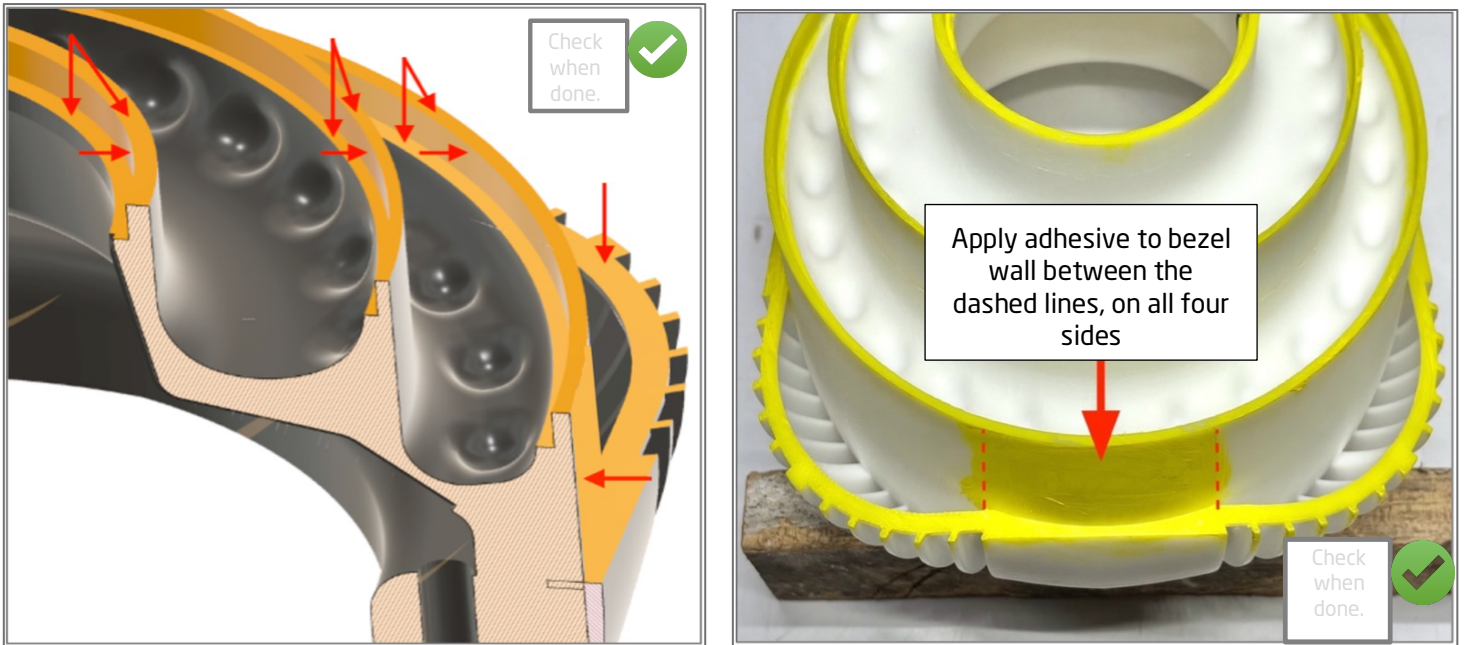
Clamp the assembly and allow it to cure for at least two hours before continuing.

Step 2: Bond the Bezel and Tube Section.

The images show Flow/1 parts. The adhesive areas and application procedure apply to Flow/2.

- Using a small brush or other applicator, apply the epoxy/adhesive to the areas where the Bezel and the Tube Section make contact.
- Apply a thin, even coat onto all surfaces before fitting them together. Figure 10 shows the areas to apply adhesive in yellow and orange; they are all the flat surfaces where the two bodies meet. It is important that there be a smooth coating of adhesive on every surface where the two bodies meet to ensure a solid, airtight seal.

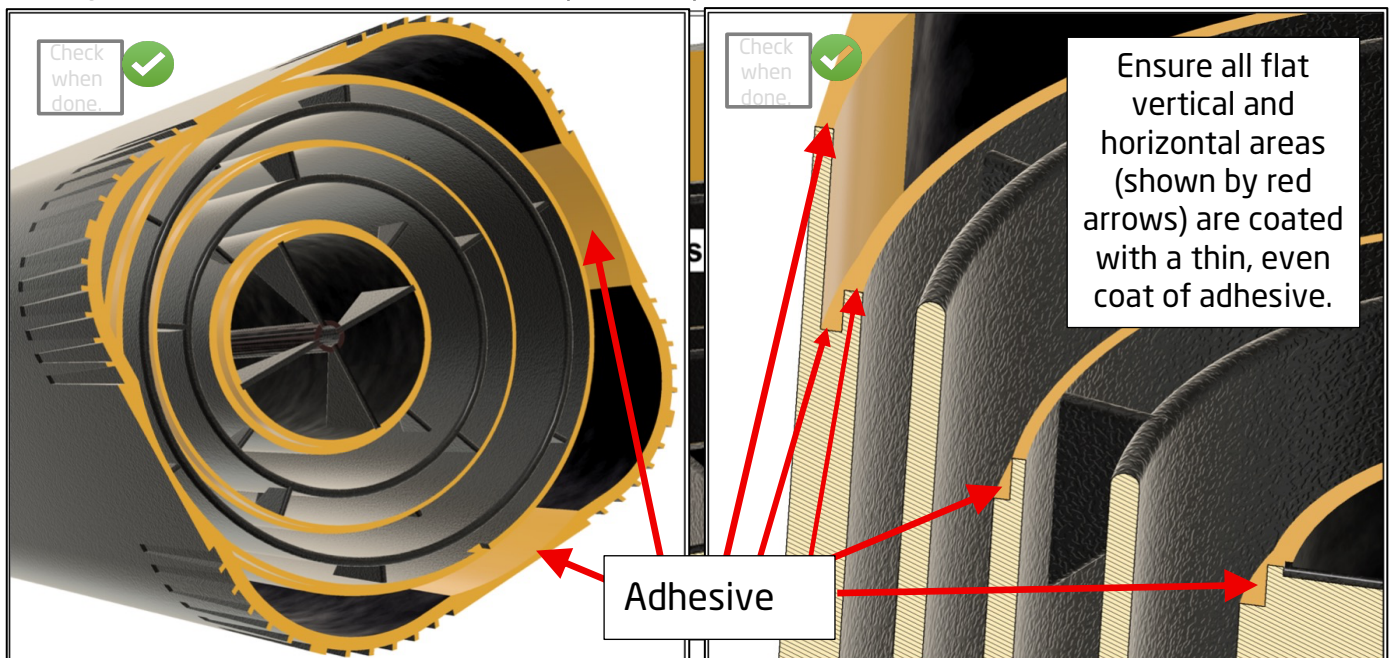
Figure 10. Bezel-to-Tube bonding areas.



- Apply adhesive to the inside surfaces of the four Tube Top walls where the Bezel fits and to the flat tops of the tube segments, as shown in Figure 11 and Figure 12.

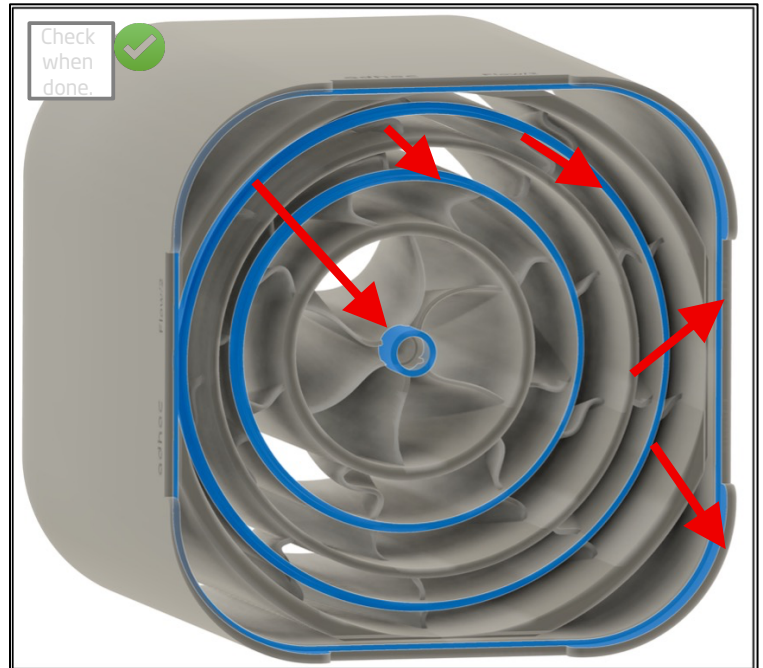
The Bezel and tube top adhesive areas are ready for the bodies to be attached. Set the Bezel aside. Quickly prepare the other end of the Tube Section and the base for joining.

Figure 11. Bezel-to-Tube adhesive areas (continued).



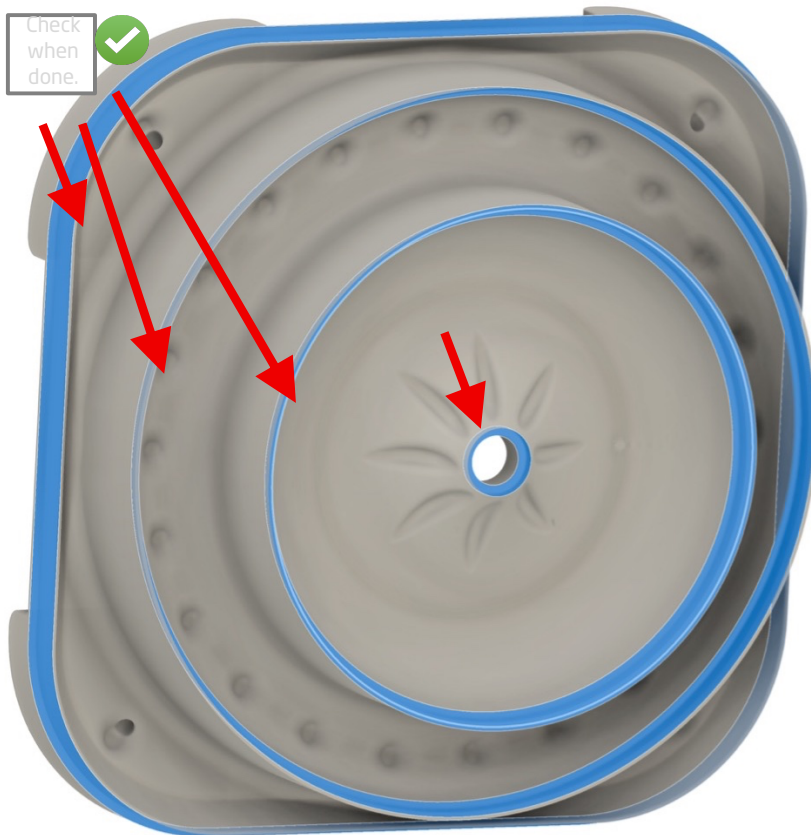
- d. Bond the base to the Tube Section. Apply epoxy/adhesive first to the bottom of the tube and then to the base. Position the tube base to have access to the surfaces to be bonded. Apply a thin, even coat of adhesive on the inside lip of the tube bottom, and the outside of the central wire tube as shown by the arrows in Figure 13.

Figure 13. Tube Section-to-Base epoxy/adhesive areas.



- e. Apply adhesive to the inside surfaces of the four rounded corners of the Base and to the center hole, as shown in Figure 14.

Figure 14. Applying adhesive to the Base



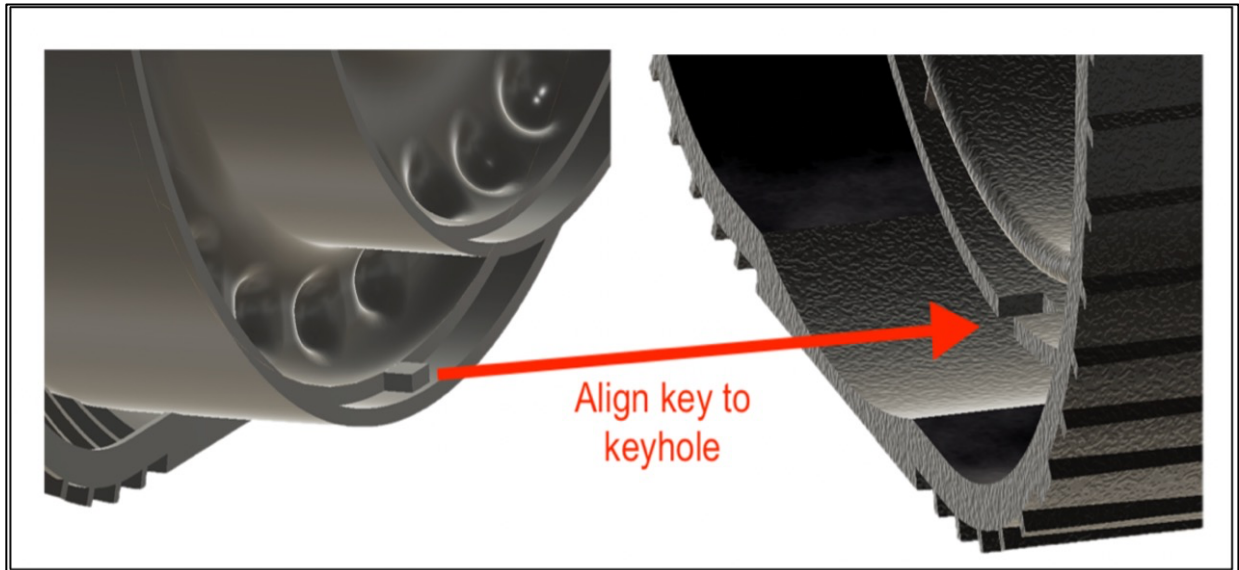
Application of epoxy/adhesive to all areas needing bonding is complete. Ensure that all adhesive is smooth, evenly spread, and uncured. In the next few steps we'll be aligning the Bezel, Tube Section and Base for assembly and clamping.



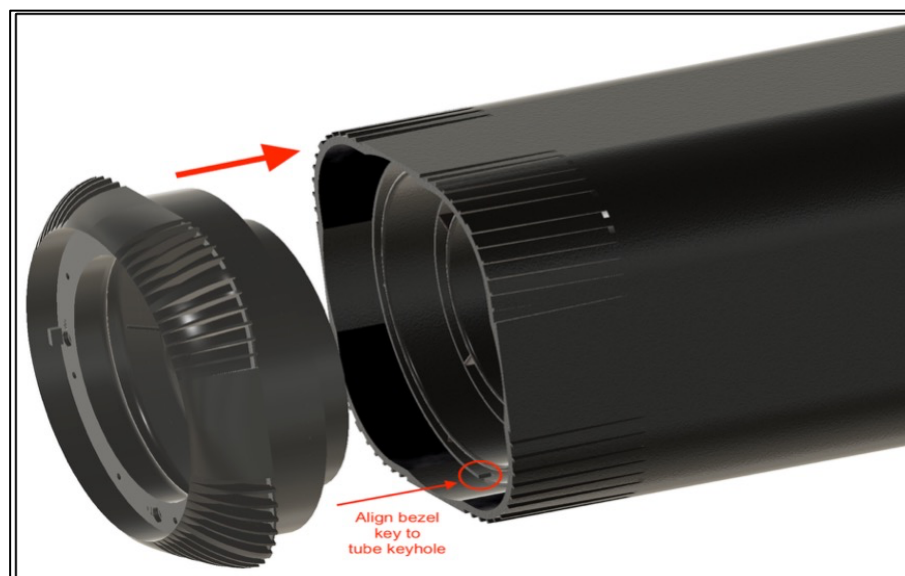
Step 3: Assemble the Enclosure Parts

This step should be done swiftly to ensure the parts are carefully positioned before the adhesive begins to cure. You have already ensured that the epoxy/adhesive is still uncured and the parts are ready to be assembled together. You have clamps ready and space on the workbench for the parts to rest and the epoxy/adhesive to cure. The images show Flow/1 parts. Follow the same alignment and clamping procedure for Flow/2.

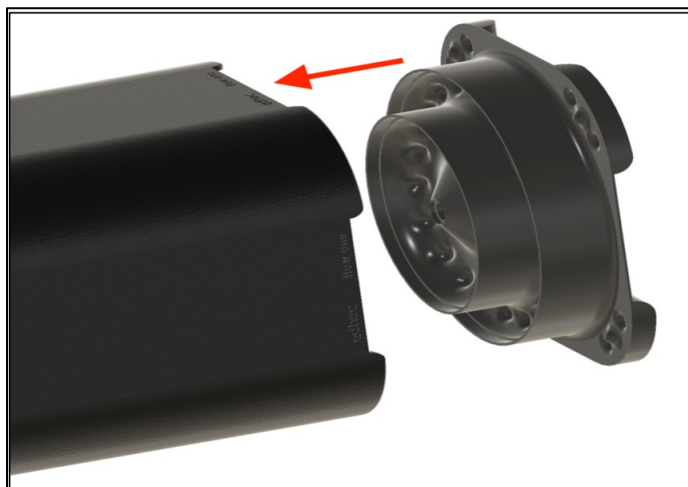
- a. Align the Bezel key with the Tube Section keyhole. The key aligns the bezel to the tube section.



- b. Join the Bezel to the Tube Section



- c. Join the base to the Tube Section



- d. Refer to Figure 15. Clamp the pieces together with rail clamps and set aside until the epoxy/adhesive is fully cured. Use blocks to prevent damage to the parts.

Figure 15. Clamp the Enclosure parts for curing



Check
when
done.



Step 4: Remove the clamps and inspect

After the adhesive has fully cured, remove the clamps and inspect the assembly for alignment, fit, bond integrity, air gaps, and excess adhesive.

Follow the Flow/1 Maker's Guide for the general enclosure inspection and finishing procedure. For a split Flow/2 Tube Section, fill the center seam before applying the finish. Keep paint and filler off mating edges and allow all fillers and finishes to cure for at least 24 hours.

Check
when
done.



Step 5: Apply a finish to the Enclosure

Follow the Flow/1 Maker's Guide for general finishing.

Choose the finish before attaching the wires and drivers.

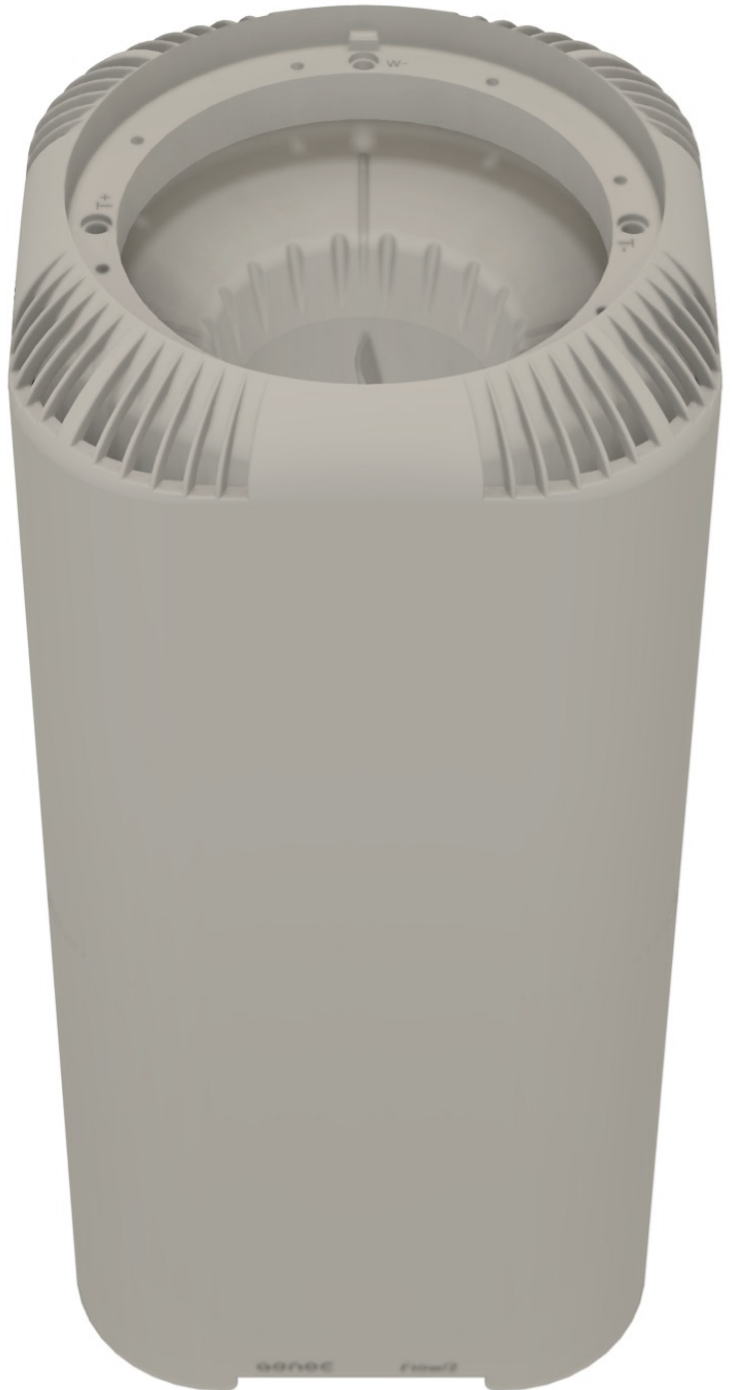
For a split Flow/2 Tube Section, fill and smooth the center seam before painting.

Keep paint and filler off mating edges.

Allow fillers and finishes to cure for at least 24 hours before assembly or handling.

Figure 16 a rendering of the finished Flow/2 enclosure.

Figure 16. Assembled Enclosure



Check
when
done.



Step 6: Prepare and Install the Wires

Wiring the Flow/2 follows the Flow/1 procedure, with one routing difference. Flow/1 has wire guides at the top of the S1 fins. Flow/2 has no S1 fins and therefore has no wire guides. Follow Step 6, "Prepare and Install the Wires," in the Flow/1 Maker's Guide.

Check
when
done.



Step 7: Attach the DM Gasket.

Follow "Attach the DM Gasket" in the Flow/1 Maker's Guide.

The enclosure is complete!

- ✓ The Bezel, Tube Section and Base are bonded together,
- ✓ the wiring is installed,
- ✓ the banana jacks are installed,
- ✓ the gasket is in place and prepared to receive jacks and screws,

Follow the Flow/1 Maker's Guide for connector selection and for building the second speaker. The Flow/2-specific DM wiring begins with Step 8.

Check
when
done.



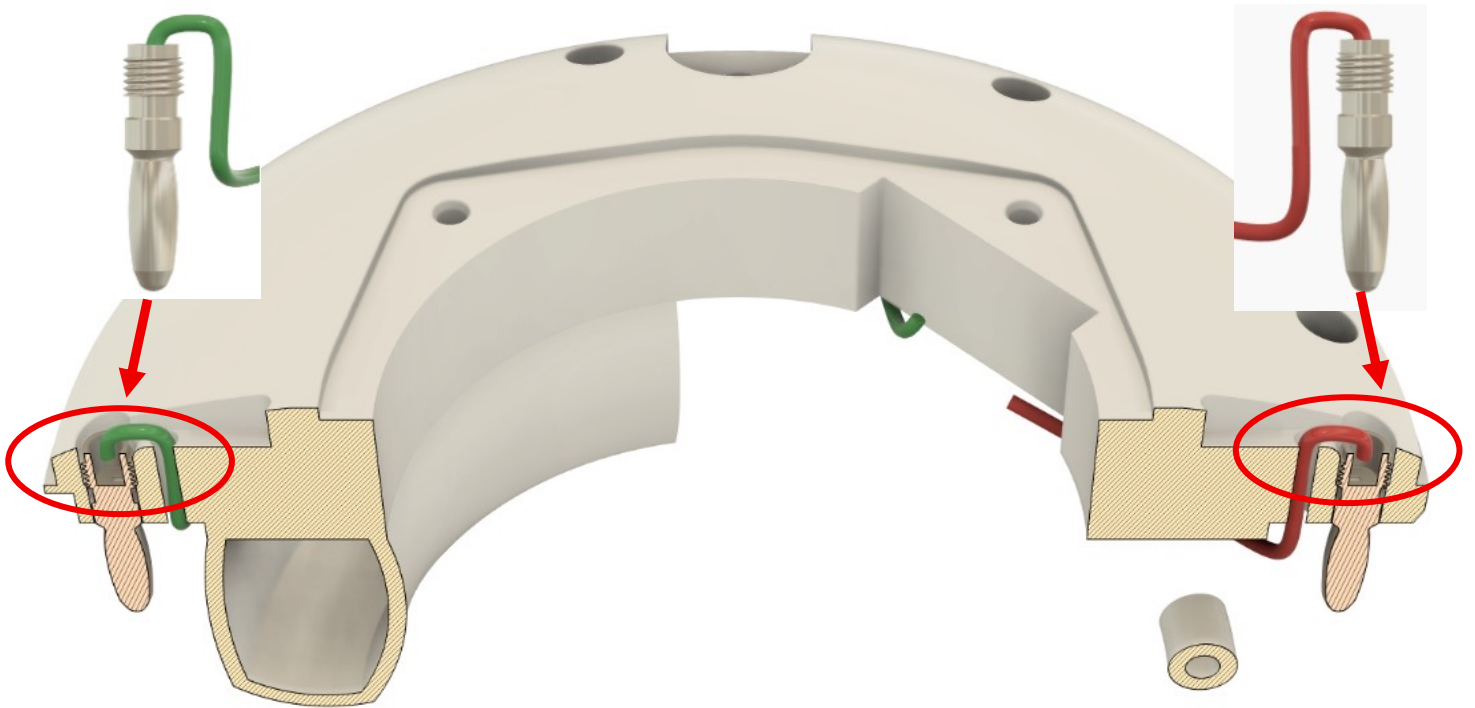
Step 8: Assemble the LF Driver to the Flow/2 DM

The Flow/1 Maker's Guide contains the general procedure for attaching the LF driver to the DM. The Flow/2-specific wire routing for the 149 Hz Helmholtz resonator is given below.

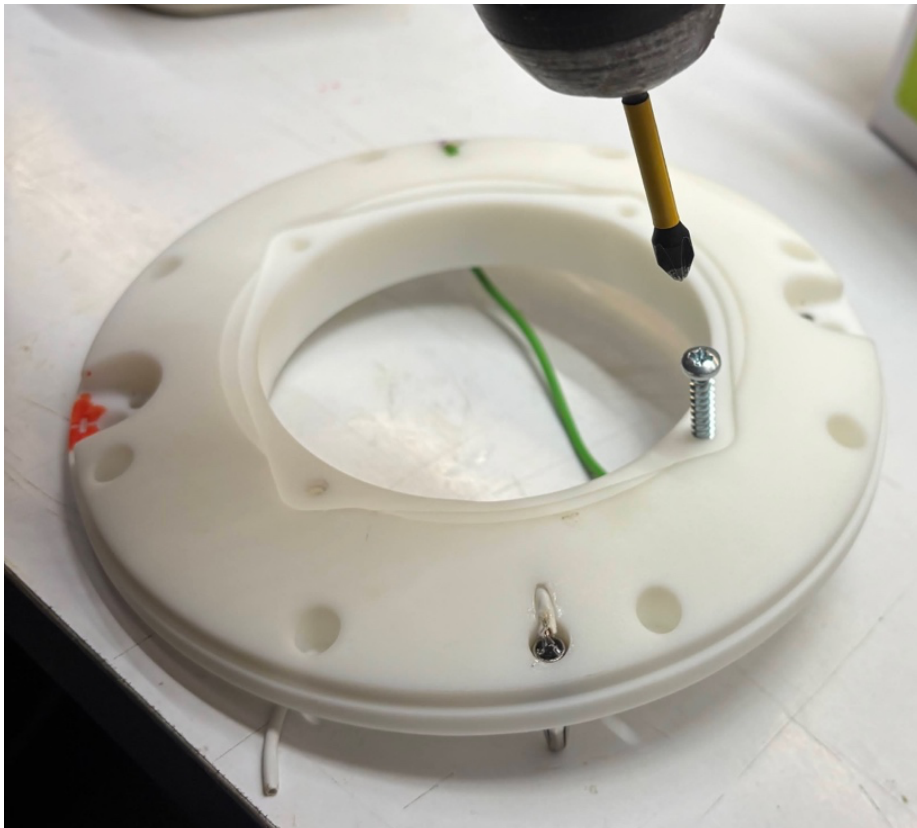
- a. Cut a 75 mm length of wire for the positive lead and a 135 mm length for the negative lead. Optionally now cut leads for a second Flow/2 speaker to make a stereo pair.
- b. Solder each lead to a banana plug (314-1058-ND) at a 180-degree angle.
- c. Position the Flow/2 ND91 DM with the Arm holes at the top and bottom and LF driver pin holes at the sides.
- d. Insert a banana pin into large outer hole and feed the wire through the smaller hole. Press the wire down until it seats below the top of the DM as shown in Figure 17.

Figure 17. Flow/2 ND91 DM wire preparation

Bend leads 180° for insertion into holes and press the banana plugs firmly into their holes until seated



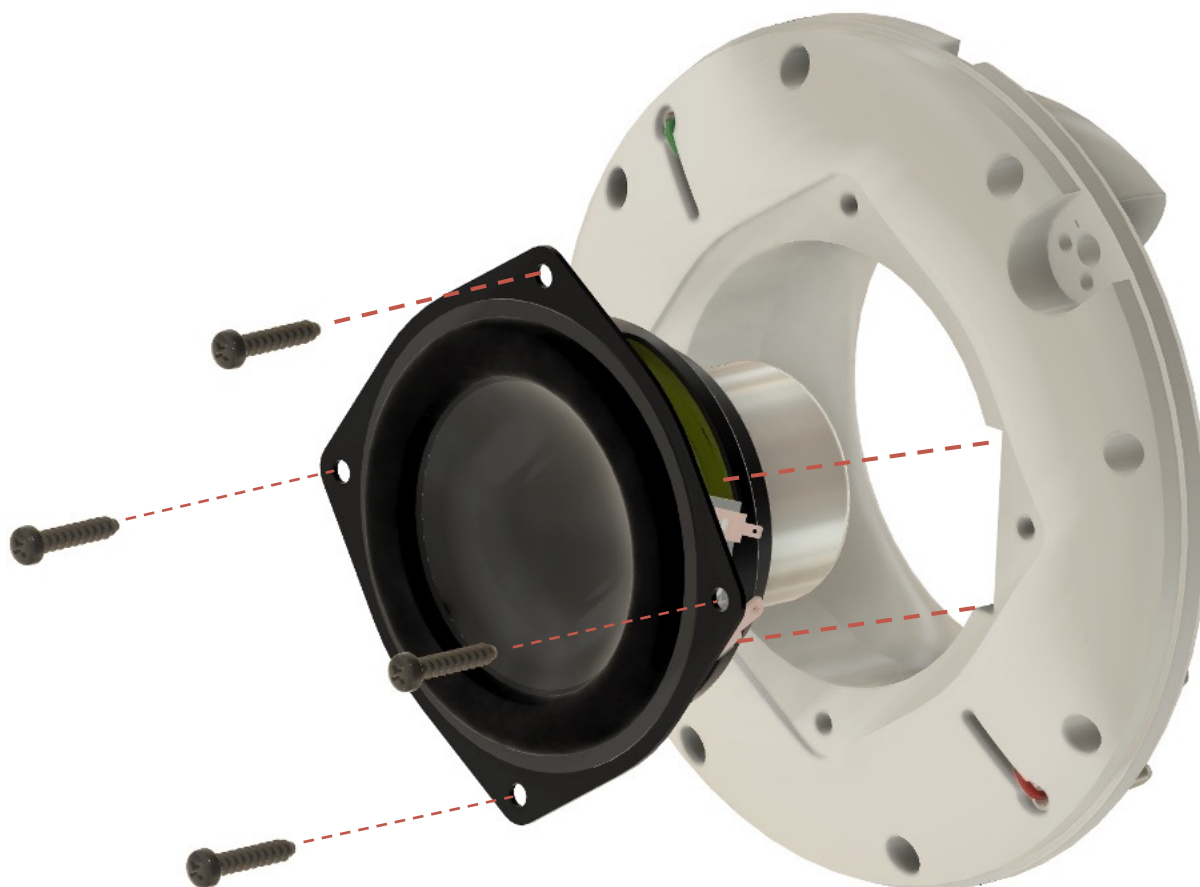
- e. Pre-tap the driver mount holes for easier assembly using one of the driver-to-DM screws



- f. The Dayton Audio ND91-8 is supplied with two gaskets. Use the gasket already attached to the driver and retain the spare.

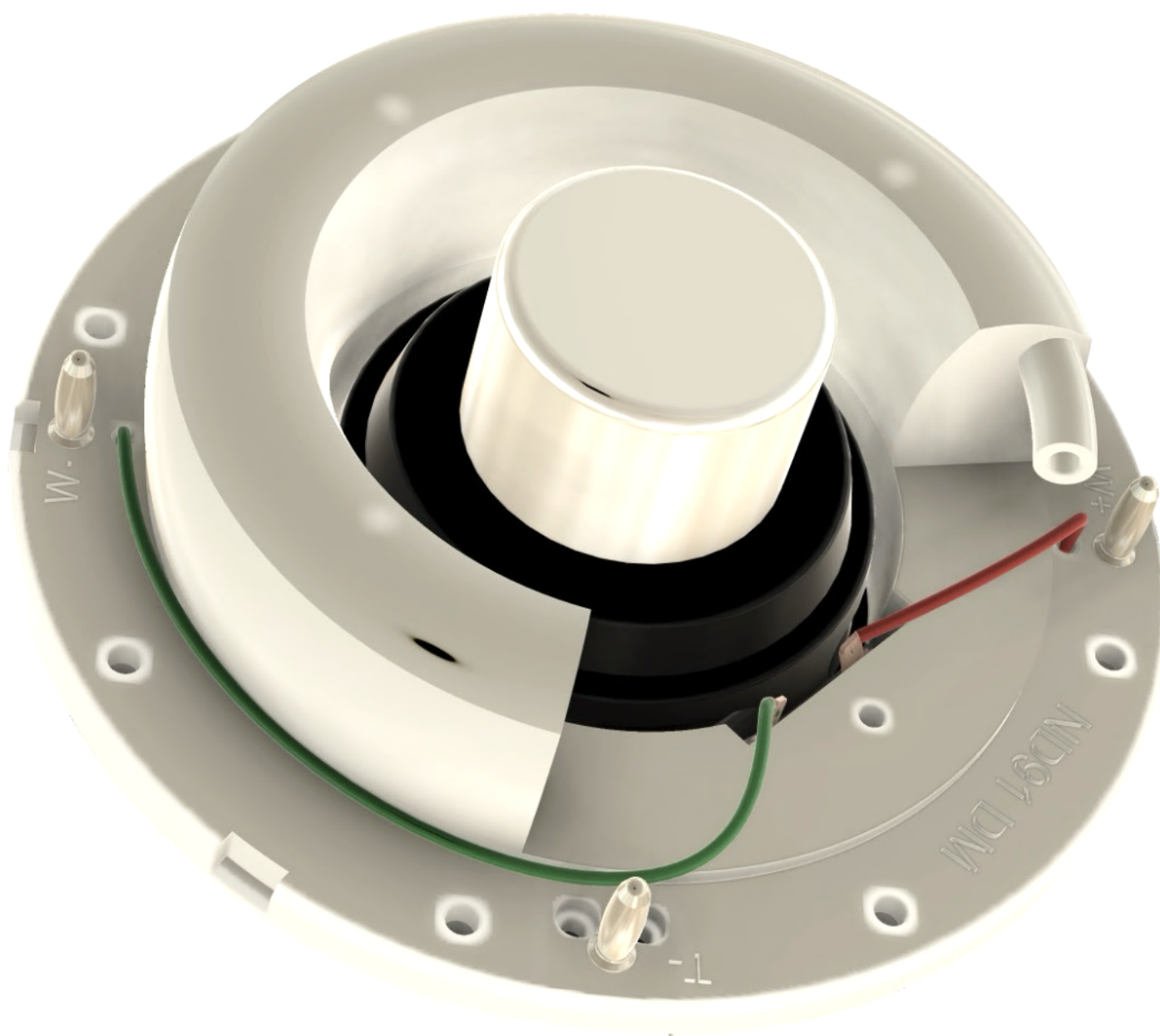


- g. Align the ND91 with its outline in the DM, with the terminals fitting into the terminal cutout, and seat well into the driver basket profile on the DM. Insert four ND91 Driver screws M4 x 20 mm (90380A382). Torque the screws to 0.9 N·m (8 in-lb). If you use a drill/driver, use the clutch setting that produces this torque.



- h. Route the wires through the holes to the corresponding positive and negative driver terminals. Tuck the negative wire into the groove where the resonator joins the DM so it will not interfere with the Bezel. Keep both leads short while leaving enough length to reach the terminals without strain. Cut and solder the wires to the driver terminals as shown in Figure 18.

Figure 18. Routing the LF driver wires.



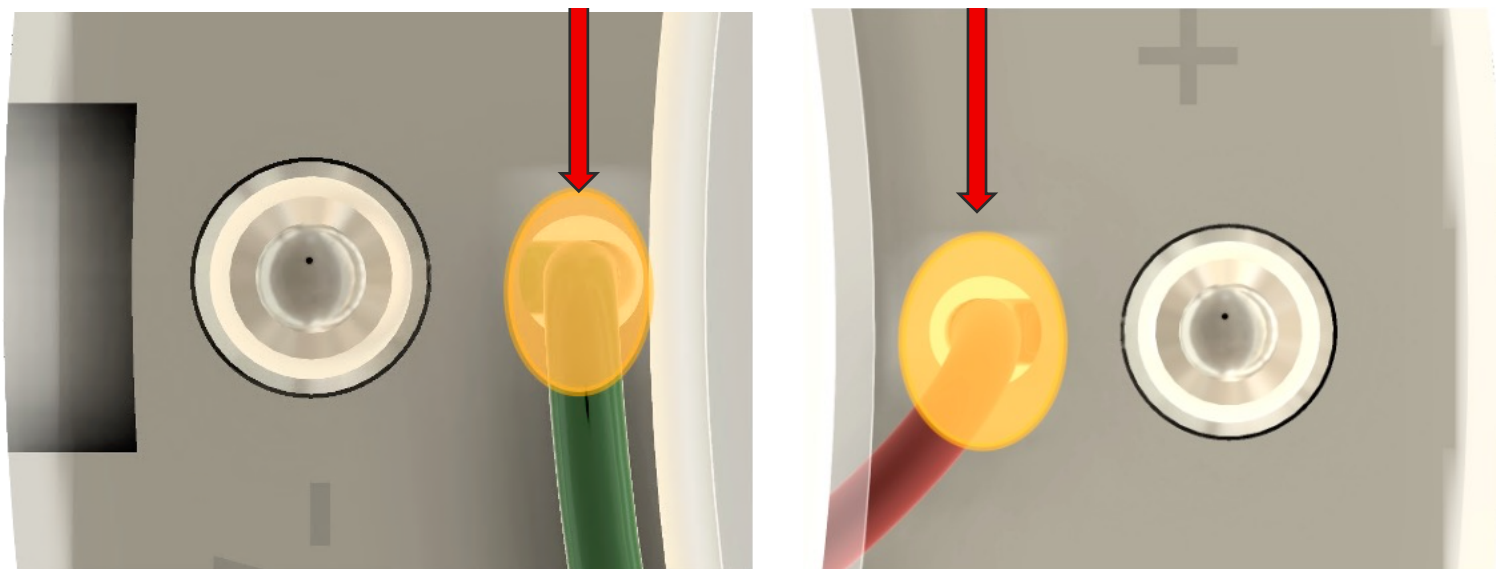
At this point:

- ✓ The gasketed driver is screwed securely in place and the wires are dressed.
- ✓ The banana plugs are seated properly and superglued in place.
- ✓ The lead wires are pressed into the slots on the top of the DM so that they fit beneath the DM cover.
- ✓ The leads on the underside of the DM are dressed neatly.

Apply rubber adhesive to each wire hole on both sides of the DM to seal the holes and prevent air leakage. Allow the adhesive to set before proceeding, as shown in Figure 19.

Figure 19. Sealing the ND91 driver wire holes.

Seal the wire holes well with rubber adhesive on top and bottom of DM



- i. Orient the Flow/2 ND91 DM with the Arm holes at the top and bottom and the LF driver pin holes at the sides. The completed assembly should look similar to the rendering in Figure 20; the orange ovals represent rubber adhesive sealing wire holes. The DM is ready to receive the Egg and Arm assembly.

Figure 20. Completed Flow/2 ND91 DM.



The Flow/2 ND91 DM assembly is complete.

Attach the Egg/Arm Assembly and Complete the Build

The Flow/2-specific enclosure and DM work is complete. Follow "Attach the Egg/Arm Assembly to the DM" in the Flow/1 Maker's Guide to complete the build.

Closing Note

Thank you for building a Flow/2. Follow the Flow/1 Maker's Guide for setup, DSP, measurement, and listening guidance.

Public Guide and Subscriber Resources

This Maker's Guide is provided publicly as an introduction to the Flow/2 project. Access to the Flow/2 3D design files, future design updates, and subscriber discussion resources is provided separately through adhocspeakers.com.

Disclaimer

This document is provided for informational and educational purposes only. The builder is solely responsible for safe use of tools, materials, adhesives, electrical equipment, amplifiers, DSP hardware, and loudspeaker components, and for verifying the suitability, fit, and performance of all parts, processes, and finished assemblies. adhocspeakers.com assumes no liability for injury, damage, loss, or unsatisfactory results arising from the use of this guide or from the construction or use of the finished loudspeaker system.

Copyright and Design Rights Notice

Copyright © 2025-2026 adhocspeakers.com. All rights reserved.

This document may be shared only in its complete, unmodified form for personal and non-commercial purposes, and only with full attribution to adhocspeakers.com. It may not be republished, excerpted for publication, modified, sold, translated, or redistributed as part of any commercial offering without prior written permission from adhocspeakers.com.

Release Notes

Version	Date	Description	Notes
1.0	22 September 2026	Flow/2 Maker's Guide	Initial Release.