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Design and Testing of a Custom Air Horn JERROD WARD, WILLIAM V. SLATON, University of Central Arkansas — Construction and testing of an air horn can provide insight into how certain design decisions can influence resulting acoustic properties. The unique sound of the air horn is produced when compressed air enters the main chamber through an inlet and builds up pressure against the diaphragm. As pressure builds, this diaphragm flexes to allow the air to leave the chamber through the outlet which is flush against it. This relieves the pressure in the chamber and the diaphragm returns to its original position, slamming against the outlet, creating the signature sound. We have designed and manufactured an air horn where it is possible to vary many different experimental parameters such as nozzle length, outlet diameter, diaphragm material, diaphragm thickness, diaphragm tension, etc. In this study, we have focused on the properties of the diaphragm and their relationship with the air pressure. By trying different permutations of diaphragms and seals with a range of pressures, it is possible to produce a desired tone over a very large range of frequencies. The system is very delicate and things like a good gasket seal for the diaphragm and solid, flush connections between the outlet and the diaphragm are absolutely necessary to ensure that pressure builds and relieves itself appropriately.

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