

- Independent exhaust study results:  
From Aerospace Welding Minneapolis, Inc.

We are frequently asked for valid, independent test results on the performance of exhaust systems for RV aircraft and with so many requests, it appears that it is of general interest to RV builders and owners.

We believe the best information is found in a 16-month study conducted by the CAFÉ Foundation. It can be found there as a .pdf - [http://cafefoundation.org/v2/research\\_reports.php](http://cafefoundation.org/v2/research_reports.php) the first study on the list should be the exhaust study.

Some portions in that study relate to Aerospace Welding Minneapolis, Inc., as manufacturers of 4 INTO 1 systems, appear on #9 and #10:

*“Aerospace Welders in Minneapolis, Minnesota can provide very high quality stainless steel collectors and merges for any desired system. All systems must include slip joints or ball joints for strain relief placed both at the mouth of the collector entry as well as about half way down the headers The joints must always be secured with redundant spanning bolts, compression springs and cotter pinned castle nuts.”*

The study conclusions state, in part:

- 1. Substantial negative pressure waves can be generated in tuned aircraft exhaust systems and the timing of their suction can be arranged so as to improve engine power. Such improvement should produce more power, better efficiency and a cleaner combustion chamber.*
- 2. The 4 into 1 collector exhaust systems appear to offer the best combination of low opening pressure, some pumping gain and good scavenging, though the crossover and Tri-Y systems can also obtain good scavenging during the overlap stroke.*
- 3. The addition of a suitable megaphone to the collector of a 4 into 1 exhaust system usually produces an increase in the negative pressure achieved at the exhaust valve, but at a substantial penalty in noise.*
- 4. The use of swiveling ball joints on the collector of a 4 into 1 exhaust system has a negligible effect on the EPG and provides an important vibration-isolation benefit to the system.*
- 5. The optimization of pipe geometry for the crossover, Tri-Y and 4 into 1 exhaust systems can be found by study of the EPG.*

We hope this information is helpful and invite you to call 800-597-4315 with any questions.