

Strings — An Important Exception to the General Rule

by R.J. Weisenberger

Gambas and other strings are similar to other flue pipes in their basic operating characteristics, but with one important exception. Their use of a harmonic bridge, also known as a "beard," allows these pipes to remain in their fundamental mode of operation at up to double normal operating pressures. This not only allows such pipes to speak with increased harmonic development and added crispness without overblowing, but also raises the dynamic capability by 6 db (a four to one increase in power) over pipes using ears, but no harmonic bridge.

It has been said that strings are the weakest ranks on most theatre organs, because enough care was never taken in their voicing. On instruments using pressures in excess of 10" it is a *physical impossibility* to design a small-scale string to speak with the power of a Tibia or Diapason. It is *not* caused by poor voicing. On instruments designed for pressures of 10" or less, it is possible to design all but the smallest scales of strings to stand out as a strong solo voice.

For example, using an 8' C pipe only 2½" in diameter and with the mouth cut up 2", it is possible to obtain an output of 108 db at three feet if properly voiced on 10" pressure. This output can be maintained to the upper octaves by halving the diameters of such a rank every 21st pipe, and by halving the cut-ups every 13th pipe (on bearded pipes). The cut-ups of non-bearded pipes (with ears) should be increased 40% over that predicted for the bearded pipes farther down in the rank, while the top octave pipes (without ears) should have their cut-ups increased 80% beyond that predicted by halving on the 13th. The point at which such changes should occur in the rank can pretty well follow tradition. A rank so designed will have all the tonal color of more conservatively-designed string ranks, plus the added

advantage of being able to be heard in all but the largest ensembles.

To prove my point, a 37-scale pipe of this rank can be approximated by following the sketch and using these dimensions:

Working length — 12.5"

Diameter — 1/2"

Cut-up — 1/4"

Toe hole — 1/2" minimum

Air slit (flue) — 1/32" minimum

To voice this pipe, first get it to clearly speak its octave without the harmonic bridge on 10" pressure. Once this is accomplished, place a 1/4" dowel or piece of tubing between the ears, as shown, until the pipe clearly speaks its fundamental.

Those who attempt this project will find this pipe to be quite loud and crisp, much more so than most existing string ranks of similar scale. Also, those who own test equipment will be able to verify that this pipe will speak at approximately 520 Hz (high C) and within a few dbs of that predicted, if properly voiced.

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