

VLBA ACQUISITION MEMO # 318

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To: VLBA Data Acquisition Group
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Subject: Tape loop clearance tolerance

The new tape loop geometry given in Memo #290 includes a sloping backplate and front door not analyzed in Memo #124. A new analysis has been performed which includes a slope and is shown in Figure 1. The tape clearance is a nominal 4.5 mils (also see Figure 1 of Memo #290) for a tape width of 0.998". If the tape width increases to 0.999" (to maximum width with manufacturer's tolerance) and we add to this a weave in the tape (lack of straightness) of 0.0015" between points 4" apart (approximate distance around loop) there still remains 2 mils of clearance before the tape can be "squashed" which seems adequate to accommodate mechanical tolerances. Increasing the clearance has been considered but leads to excessive loss of vacuum due to leaking and in addition a "honking" oscillation mode can be provoked. The oscillation is one in which the tape oscillates in the tape plane about an axis along the vacuum column through the front door contact point. While this oscillation doesn't appear to produce any damage it extends the contact arc around the loop and will affect tracking.

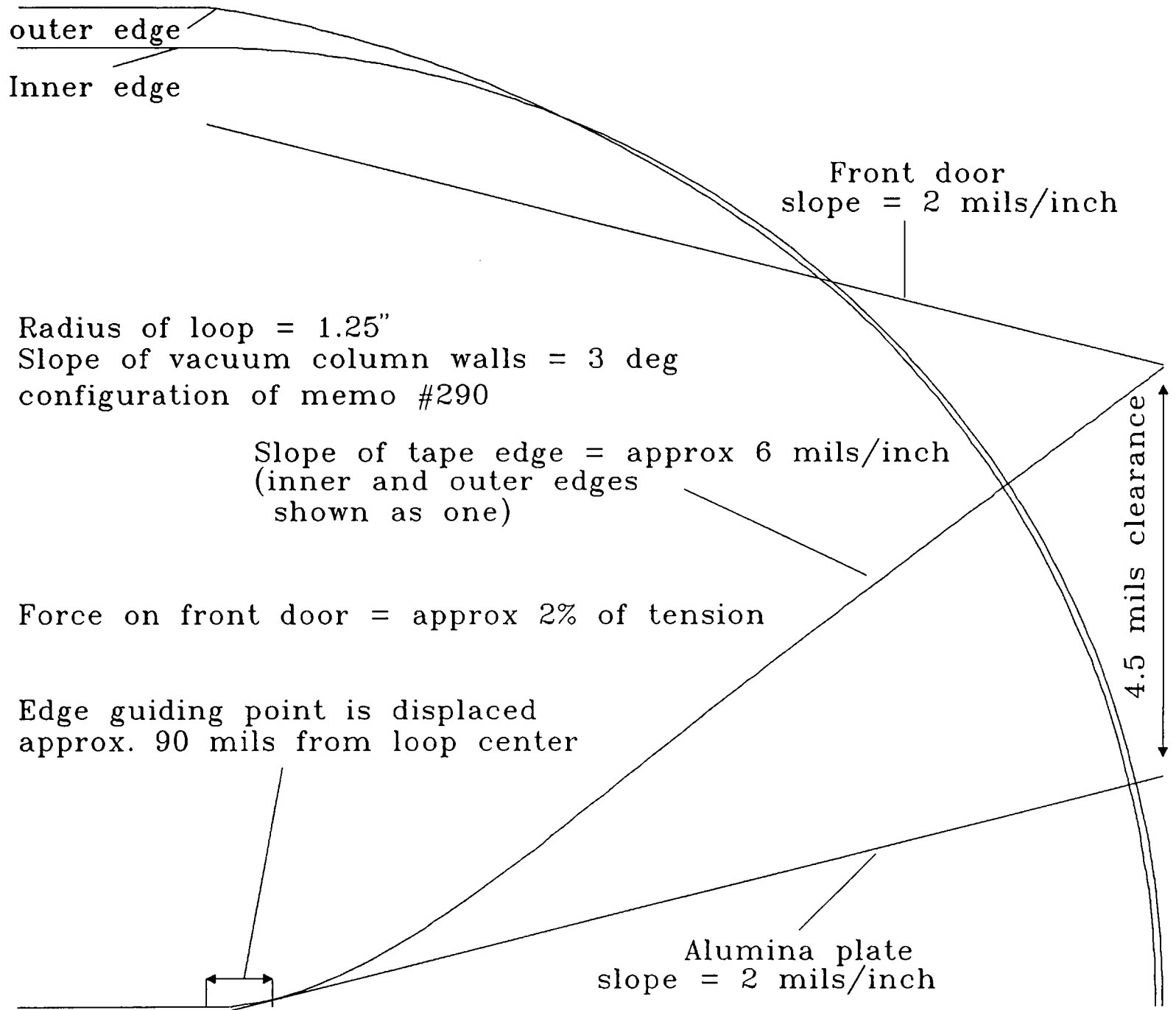


Figure 1. Front and side views of loop - showing profile and clearance