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A brazed stainless-steel wiggler vacuum chamber

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The SSRL beamline 9 wiggler has 8 periods, is 2.1 m long, and has a 2.0 T field at a magnet gap of 21 mm. The major engineering challenge of the wiggler chamber is in the vertical dimension; the beam stay-clear is 16.75 mm, the length of the field along the beam is 210 cm. In the tolerance budget, we allow 1.45 mm per side for chamber wall thickness and .25 mm total for chamber straightness. The chamber is fabricated in seven segments. The inner surface of each segment is cut using wire EdM after the outside is machined. The assembly is brazed in a hydrogen furnace using pure copper in the joints. We achieved a straightness of .31 mm and a leak-free vacuum chamber with a base vacuum of approximately $1\text{E-}10$ torr.