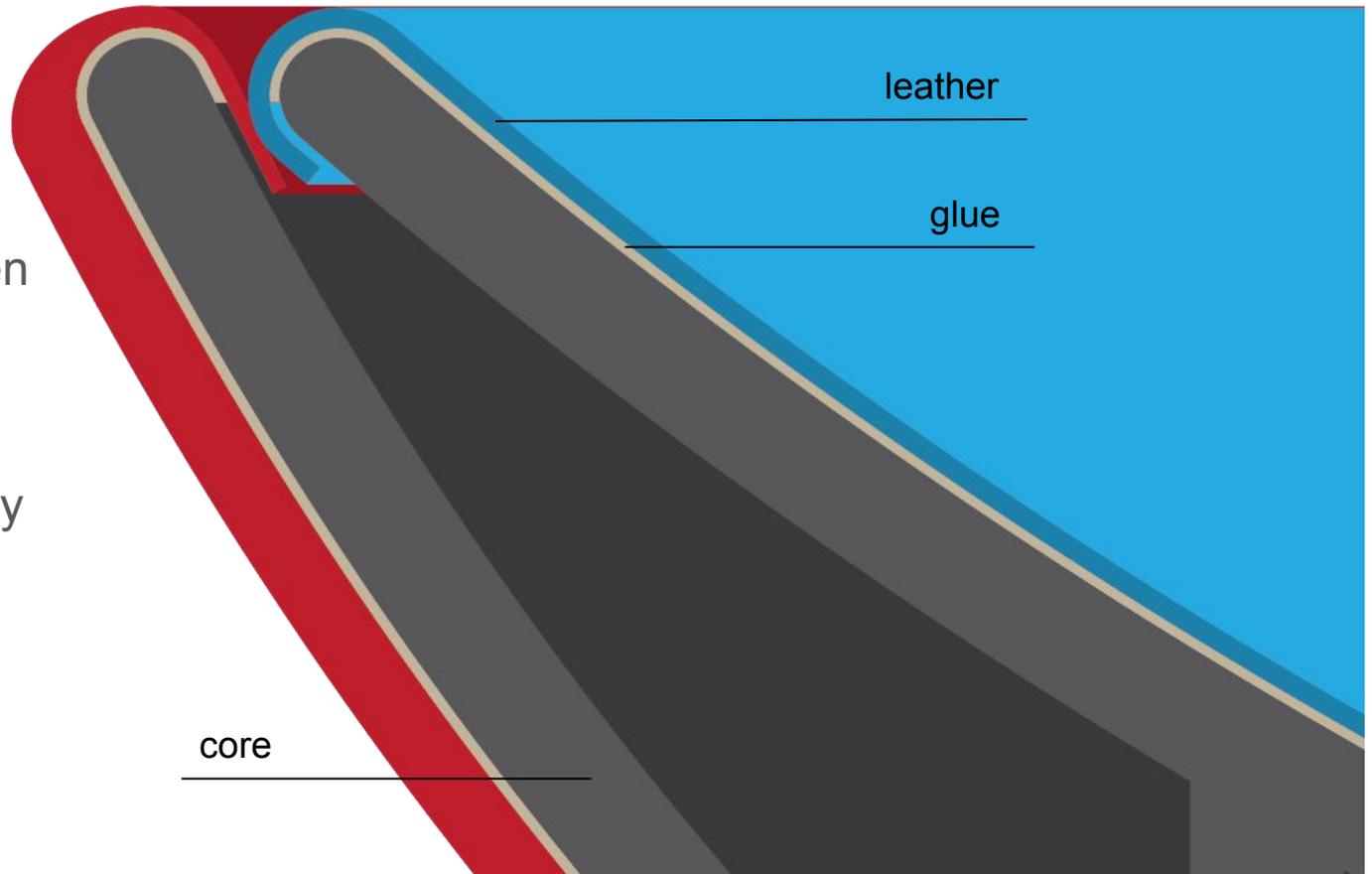


Bowl design

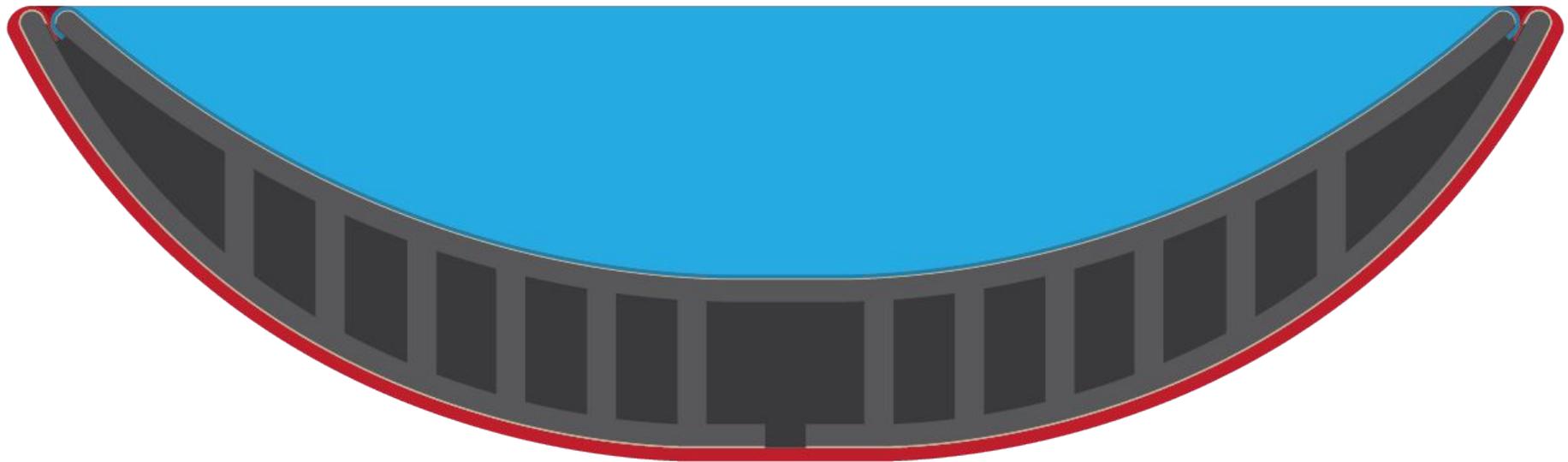
Minimal design:

- one seam
- leather edge hidden between core walls

SLA core provides dimensional stability



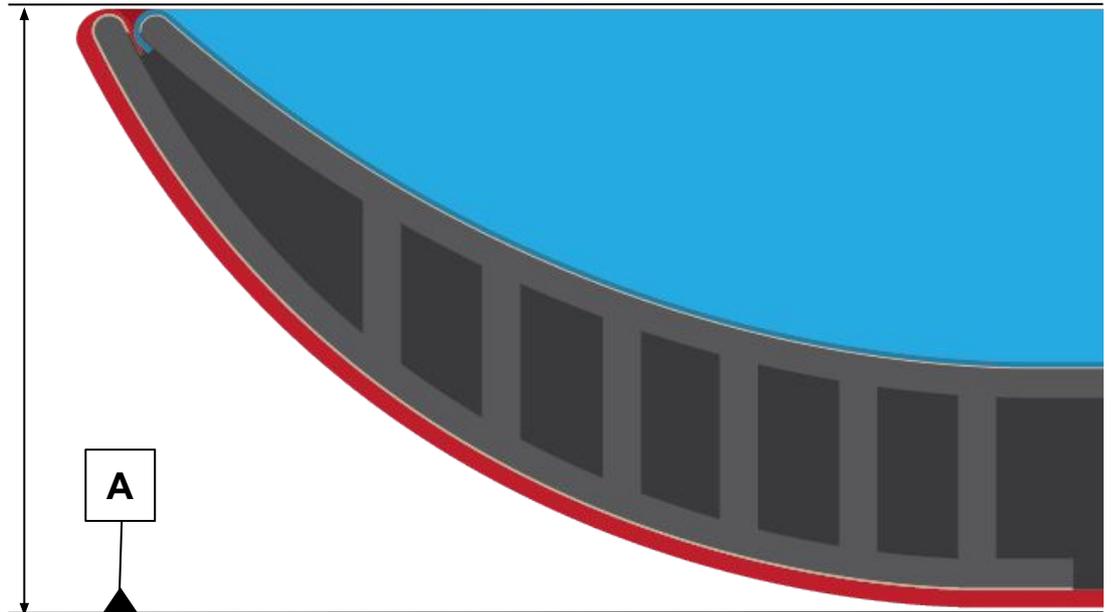
Bowl CAD



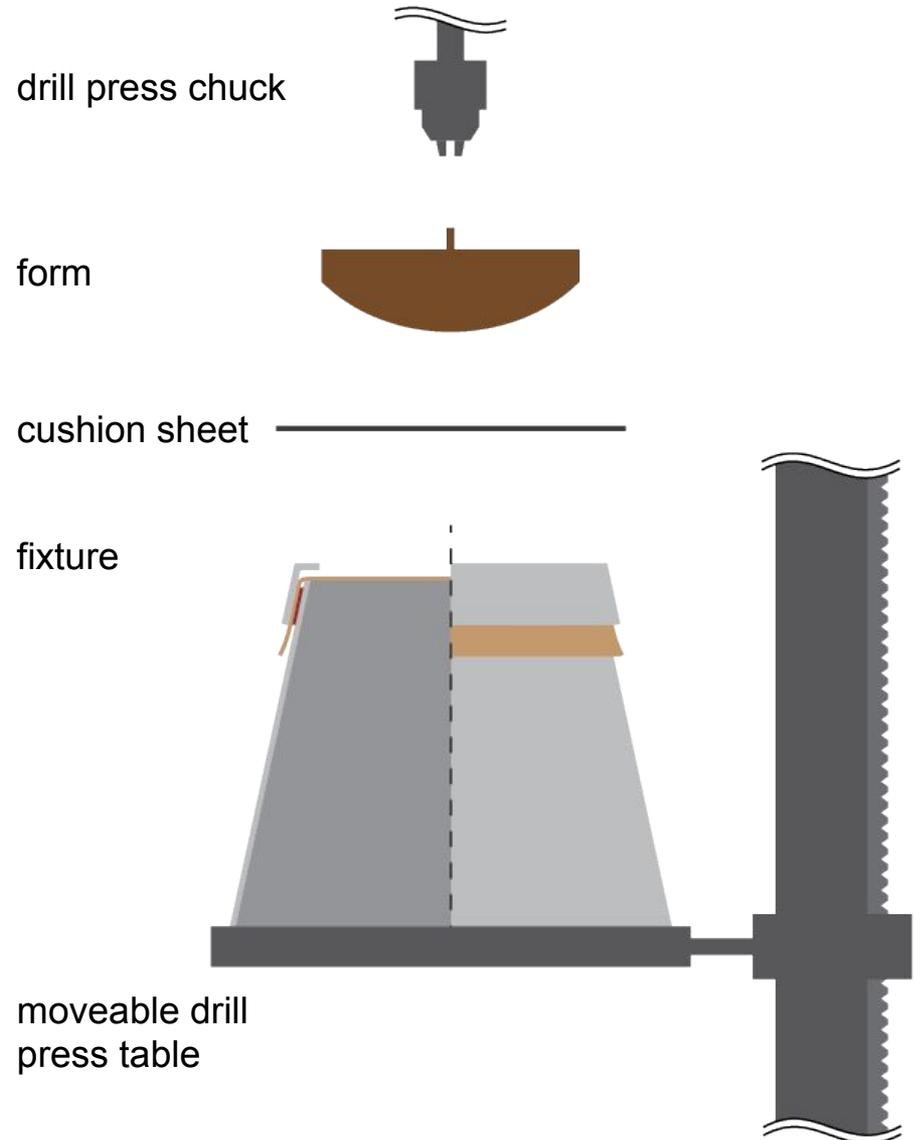
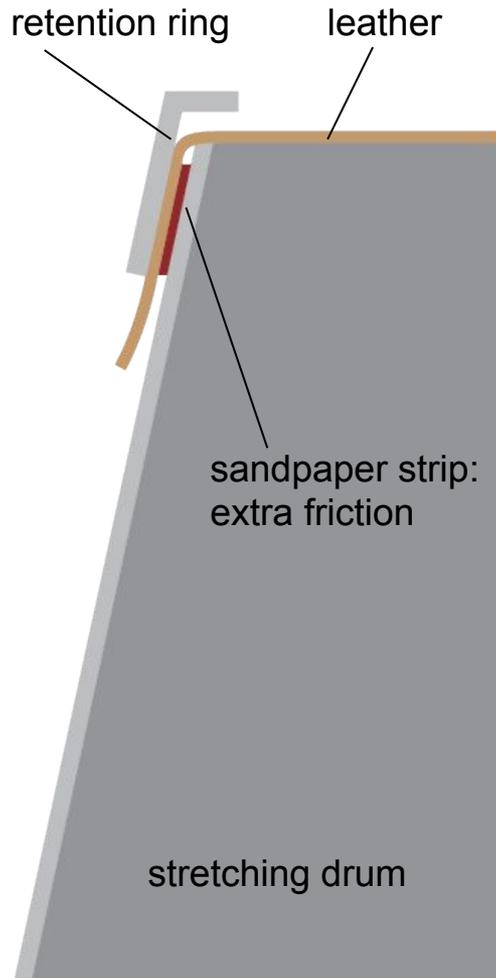
Bowl CAD

Short tolerance stack:

leather	± 0.10 mm
glue	± 0.01 mm
core	± 0.10 mm
glue	± 0.01 mm
leather	± 0.10 mm
total:	± 0.3mm



Leather deformation fixture



Bowl construction: Fixtures

My process step:

1. Lasercut parts and assemble forms
(one for inner leather, one for outer)



2. VHB sandpaper strip to a duct



Production equivalent:

1. Machine forms

2. Machine stretching drum and retention ring

Bowl construction: Form leather

My process step:

3. Stretch leather over drum and use drill press to stretch leather over form



Production equivalent:

3. Press form into leather with a press



(Heat and/or moisture may decrease cycle time)

Bowl construction: Prep core

My process step:

4. SLA core (**single part**)
5. Apply liquid contact cement to core



Production equivalent:

4. Injection mold core (**two parts** that snap together - an inner and outer)
5. Try:
 - spray-on adhesive (if a suitable one can be found for the substrates), or
 - apply heat-activated film adhesive to the core (or to the leather, if it can be stretched with the leather)

Bowl construction: Apply inner leather

My process step:

6. Press inner leather onto core, working from center upwards and stretching out the minimal wrinkles by hand

7. Fold leather in between core walls



Production equivalent:

6. Clamp leather edges to maintain tension and use stretching form to press the leather into inner core part

7. Mechanically fold leather over top edge of inner core part

Bowl construction: Apply outer leather

My process step:

8. Mask inner leather, apply glue to outer wall of core, apply outer leather as with inner



9. "Skive" outer leather with Dremel tool



Production equivalent:

8. Skive outer leather edge

9. Assemble outer leather to outer core part as with inner leather

Bowl construction: Finish bowl

My process step:

10. Fold outer leather between core walls



Production equivalent:

10. Snap or glue inner core and outer core assemblies together

Appendices

Design evolution

Lower, constant curvature works better than high, localized curvature = relatively flat, wide bowl on a pedestal to reach height constraint

Hide pedestal inside bowl to create simple form = double-walled bowl

Original idea had lip to hide seam, double-walled bowl also offered the opportunity to tuck leather edge between the walls

Comparing construction methods:

Methods for approximating a non-developable surface with sheet material:



Deform the sheet material

- + aesthetically clean designs
- + simple to replicate with fixtures



Many seams

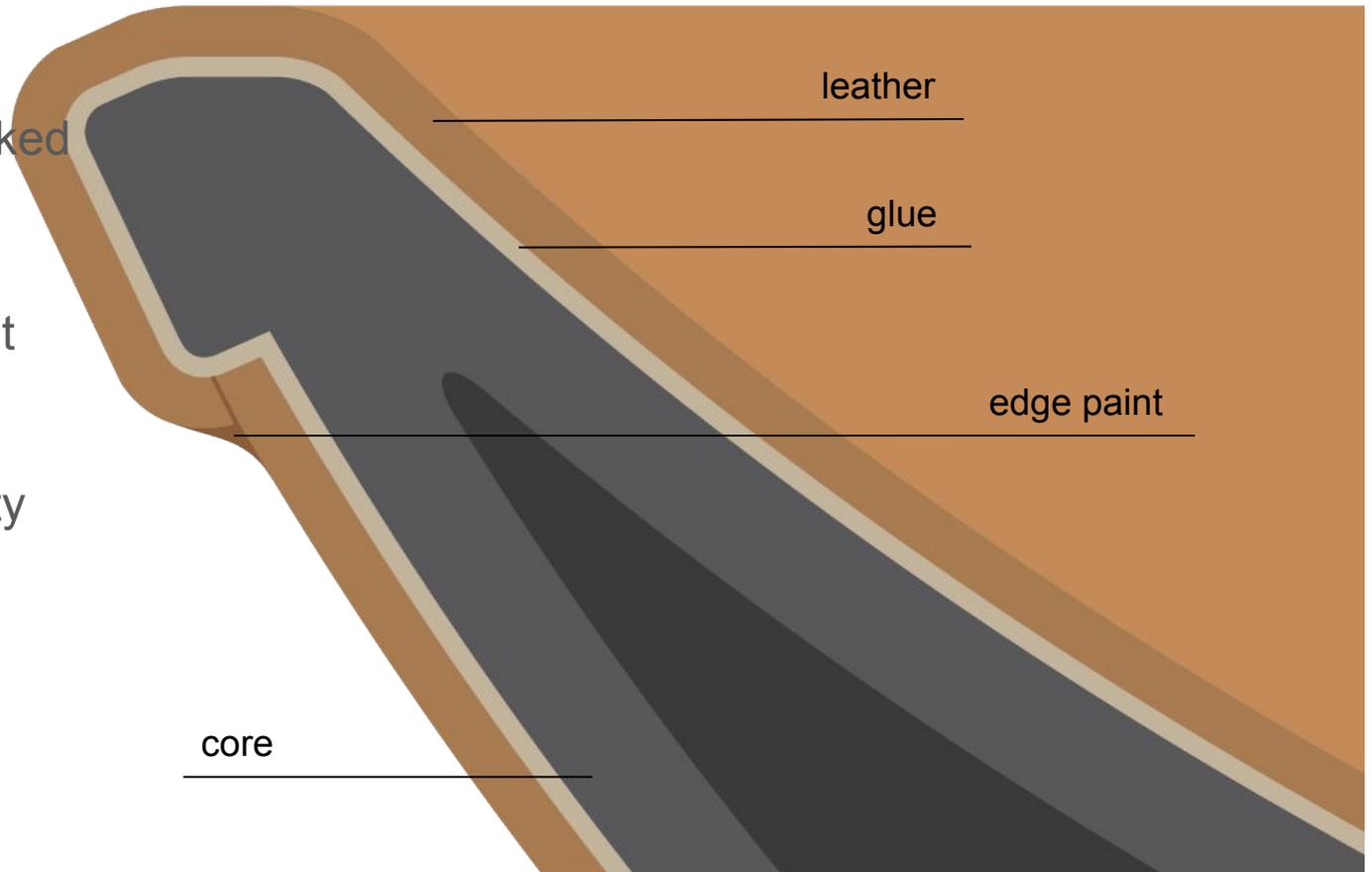
- manufacturing and assembly errors stack at every seam
- may require seam allowances and become bulky

Bowl design

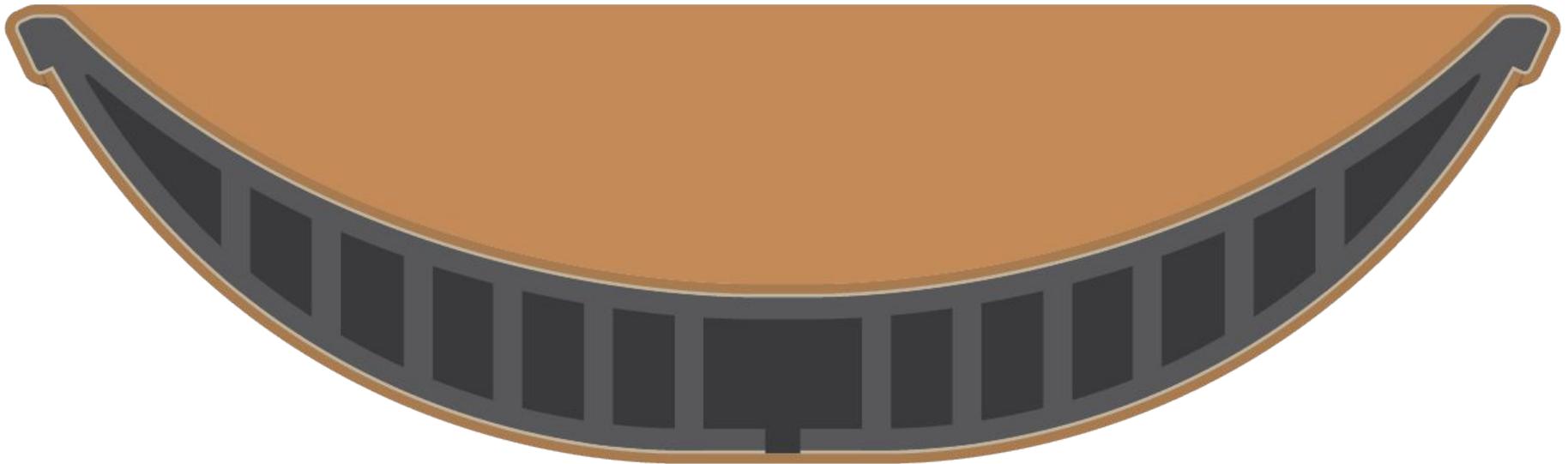
Minimal design:

- one seam: tucked under lip
- seam finished with edge paint

SLA core provides dimensional stability



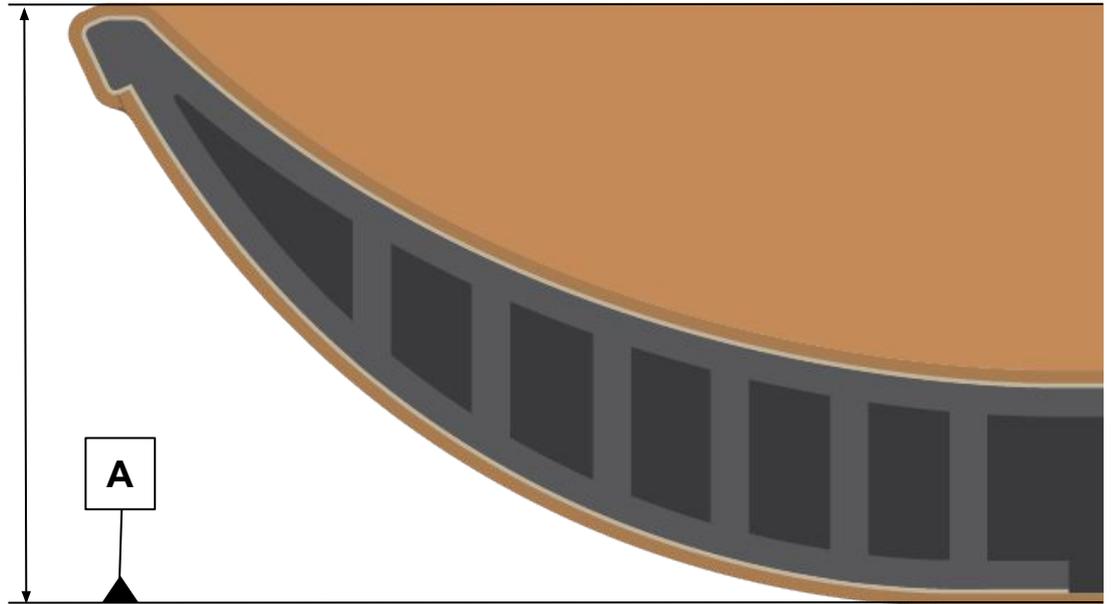
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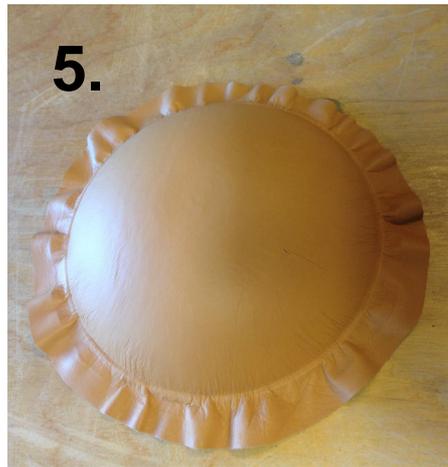
Bowl CAD

Short tolerance stack:

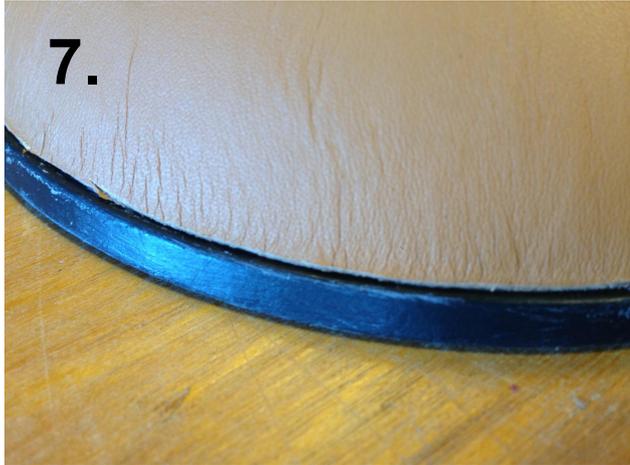
leather	± 0.10 mm
glue	± 0.01 mm
core	± 0.10 mm
glue	± 0.01 mm
leather	± 0.10 mm
total:	± 0.3mm



Bowl construction photos



Bowl construction photos



Bowl construction photos

