~~SPEA~~ 24-3A05
Spherical Joint Inserts 3/20/24

Purpose: extend rotational range

Annoying: angle of diagonal

- square toolpost to tailstock

← angle ∠ arc angle

~~feed~~ B2DG (5thou) turn 30 thou passes
~~Speed RPM~~ 470 RPM

- compound to 90° (only ~~change~~ adjust compound)
~90°-23° good for roughing

Steps ☆ check tool height! ☆ remove compound backlash
mandrel 800 RPM, feed
1) turn to OD RH tool ☆ gentle ~~touch-off~~
~~2) neutral tool plunge to 0.375~~ ?
3) ~~add~~ neutral ~5° to get angle and go to 0.375 ~~right side~~
4) turn down right side boss (pliers) go to about 20 thou less than max (0.29)
> face > turn left side
5) drill w/ carbide 1/4" (no need ~~for~~ to center drill)

→ split point [cutting edge goes inf into center)
~~no center drill needed~~ → 525 RPM → coolant down flute (orient so gravity brings coolant thru flute)
→ peck light at first → clear chips
→ to zero, eyeball point to edge
→ lock Z-axis
→ peck plunge
→ coolant!
→ go slow
→ increase RPM near end and have someone coolant
→ ~~turbo~~ increase RPM more
→ leave tool in valley for while to reduce chatter

ream 250 RPM
check shoulder fit

measure at 0.640
- slow X out to prevent burr
- last pass go to 0.305
- deburr - test fit
↓ keep going if needed

- part-off 80 to 115 RPM in increments
→ ~~go~~ feed slow! otherwise burn tool!
→ at ~~0.805~~ 0.85" (account for tool width)

init: 0.750" ø → 0.736 −.002

1" stick-out

→ 3 thou off tyle

0.7421 0.7491

0.7358 ~~0.7438~~ ~~0.7410~~

0.7400

~~1st pass~~

→ 8 thou ~~of~~ depth of cut turn

→ set ø before turning

→ measure after and ~~add/subt~~ adjust DRO accordingly

→ go to ~~0.85~~ 0.83 Z ~(0.695 + 0.125)

0.7441

0.7398

0.7357

angle pass

- turn down to 0.625

0.7357

−0.625

0.1107

30 thou passes

0.7357

0.7330

0.7300

0.7270

0.7240

0.7210

0.7180

0.7150

0.7120

0.7090

0.7060

0.7030

0.7057

0.6757

0.6457

0.6400 STOP!

~~0.7360~~

~~0.7100~~

~~0.6800~~

0.6800

~~0.6440~~

0.6500

0.6400

~~0.7100~~

~~0.6800~~

~~0.6500~~

0.6400

go to z 0.29

3/11/14

fix angle (doesn't fit over)

turning

~~4~~ 60 thou passes

3/23/24

~~left side~~ ~~up rig~~ yoke side

full 0.4065 10 thou pass

~~0.3970~~

~~0.3870~~ 0.3860

0.3824

turn

~~0.74~~ ~~0.7400~~

~~.68~~ ~~.6800~~ 0.6736

~~.62~~ ~~.6200~~

~~.56~~ ~~.5600~~

~~.5~~ ~~.5000~~

~~.44~~ ~~.4500~~

.4380 0.4389

full 0.3822 (nr intolerance)

turn ~~0.4374~~ 0.7365 0.7363

0.4995

0.7366 0.4503

0.4988 0.4388

0.4502

0.4390

0.7366 0.7364

0.4997 0.4987

0.4389 0.4506

~~0.4504~~ 0.4388

24-3A05
Spherical joint Inserts (upright) Spnes 4/17/24

steps

1) face (600 RPM)
2) turn to OD (~~6000~~ max) to z .9 (470 RPM) BD26
3) angle (5.32°) (390 - 490 RPM increment)
4) turn to boss OD (.625) to z .29 (20 thou < max z)
5) part-off (80 - 115 increments)
6) turn to smallest OD
7) drill (hotspot-point so center drill small divot then peck w/ lots of coolant) 525 RPM (600 RPM actually ran)

① OD

.7493
.7416
.7361
.7359

small OD ~~to z .29~~ .20

~~.7359~~
~~.7100~~
~~.6800~~
~~.6500~~
.6250 .6249

angle boss length

.3939
.3822

angle

.6483
~~.6200~~ .6257
.6244

small OD (438)

.7359
.70
.65
.6
.55
.5
.45
.438 .4385

③ OD

.742
.736

~~boss OD~~
~~.6015~~
.6244 (no lock!)
.624 .3129