

pfRICH end ring final metrology

Simon Snydersmith, FNU Archie, Sushrut Karmarkar, Andy Jung

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- ⊗ Top picture shows outer cylinder dimensions without constraint, $R = 649.42 \text{ mm}$
- ⊗ Bottom picture shows outer cylinder with constrained axis direction, $R = 649.56 \text{ mm}$
- ⊗ Nominal $R = 649.32 \text{ mm}$
- ⊗ Both show cylindricity less than 1 mm

Dimensions

	Nominal	Measured	Tol +	Tol -	Dev.
X 1		21.341	1.000	-1.000	
Y 1		576.121	1.000	-1.000	
Z 1		2486.333	1.000	-1.000	
X 2		20.293	1.000	-1.000	
Y 2		633.655	1.000	-1.000	
Z 2		2488.267	1.000	-1.000	
∅		1298.836	1.000	-1.000	
Radius		649.418	0.500	-0.500	
±		0.946	1.000		

Symmetric tolerances
 Flip measurement

Error distribution

Lower (mm) Upper (mm)

[-0.500] [0.500]
[-0.250] [0.250]

Automatic values
 Symmetric

Constraints

Axis
 Orientation: Plane 1 - Normal
 Diameter (mm): 1299.127

Parameters

Entity details

Diameter (mm): 1,299.127
 Radius (mm): 649.564
 Center (mm): (20.806, 604.916, 2,487.295)
 Axis: (-0.006, -0.999, -0.050)
 Standard deviation (mm): 0.220
 Min./Max. deviation (mm): 0.931

Error distribution

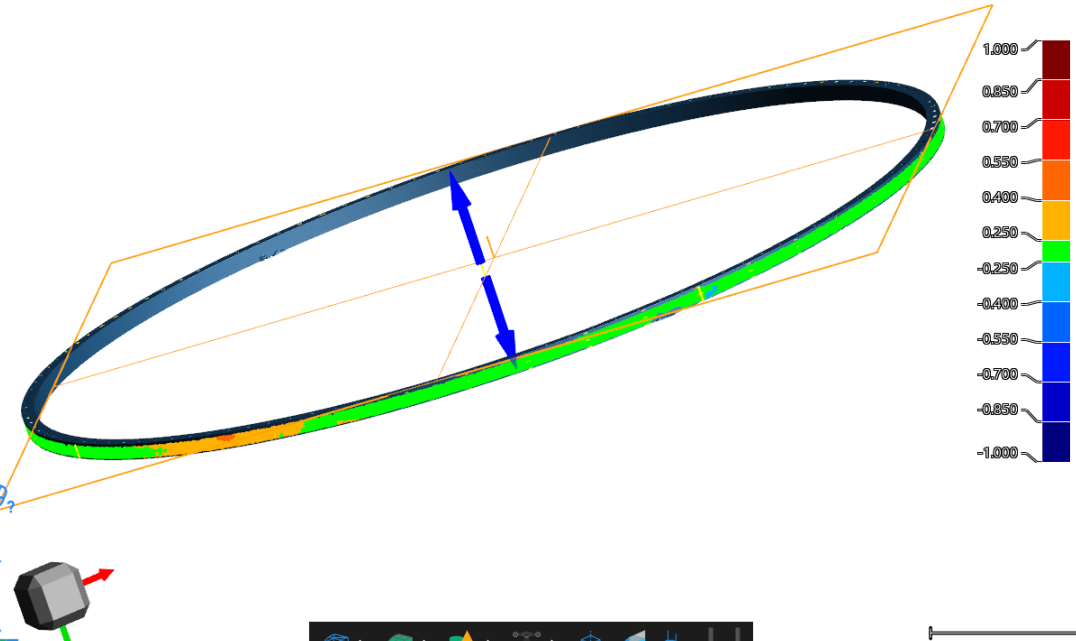
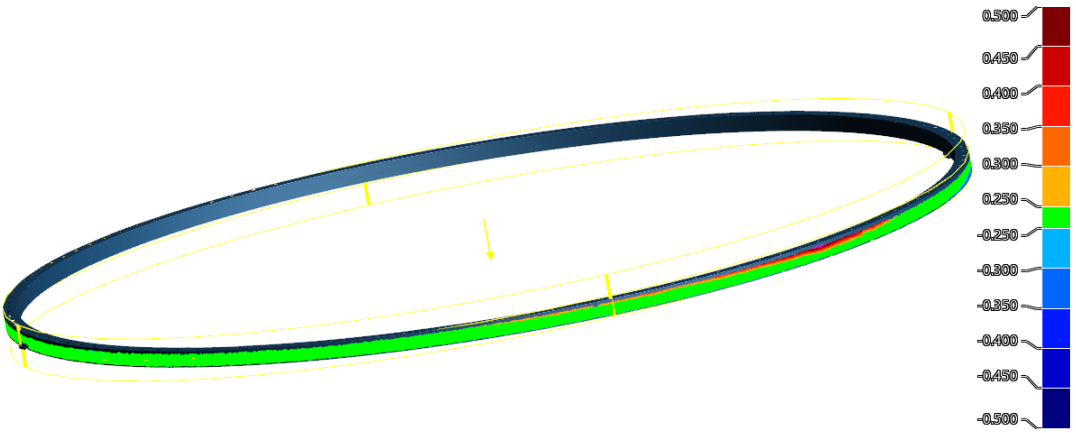
Lower (mm) Upper (mm)

[-1.000] [1.000]
[-0.250] [0.250]

Automatic values
 Symmetric

[Edit color map](#)

OK Cancel



- ⊕ Top picture shows inner cylinder dimensions without constraint, $R = 630.02 \text{ mm}$
- ⊕ Bottom picture shows inner cylinder with constrained axis direction, $R = 630.15 \text{ mm}$
- ⊕ Nominal $R = 630.27 \text{ mm}$
- ⊕ Both show cylindricity less slightly above 1 mm

Dimensions

	Nominal	Measured	Tol+	Tol-	Dev.
X 1	19.978		1.000	-1.000	
Y 1	577.586		1.000	-1.000	
Z 1	2485.428		1.000	-1.000	
X 2	21.675		1.000	-1.000	
Y 2	632.698		1.000	-1.000	
Z 2	2489.066		1.000	-1.000	
\varnothing	1260.046		1.000	-1.000	
Radius	630.023		0.500	-0.500	
\pm	1.019		1.000		

Error distribution

Lower (mm) Upper (mm)

-0.500 0.500

-0.250 0.250

Automatic values Symmetric

Orientation Plane 1 - Normal

Diameter (mm) 1260.305

Parameters

Entity details

Diameter (mm) 1,260.305

Radius (mm) 630.152

Center (mm) (20.830, 605.221, 2,487.252)

Axis (-0.006, -0.999, -0.050)

Standard deviation (mm) 0.229

Min./Max. deviation (mm) 1.051

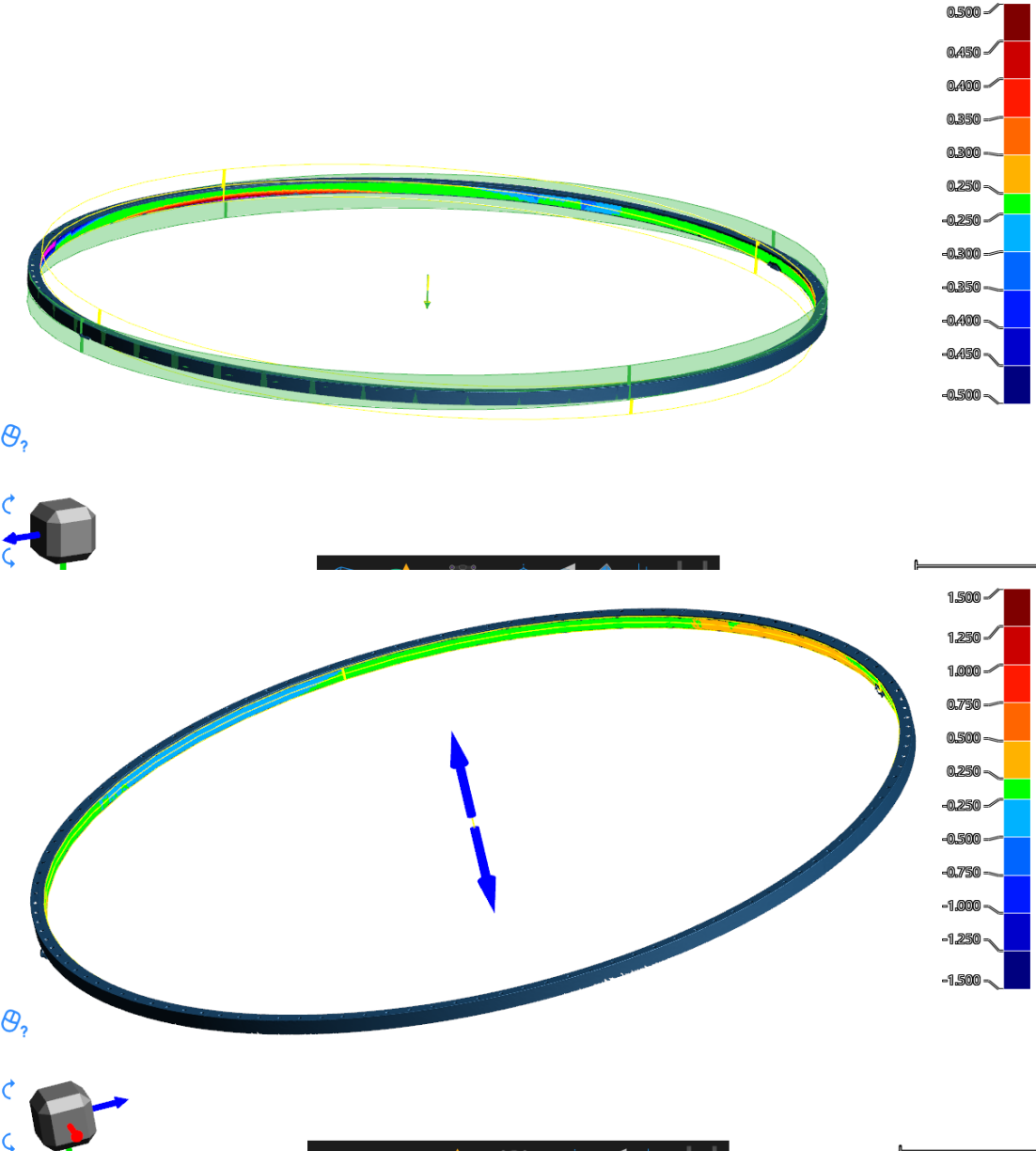
Error distribution

Lower (mm) Upper (mm)

-1.500 1.500

-0.250 0.250

Automatic values Symmetric



- Physically probed each insert location and got a best fit circle.
- Radius of 642.363 mm

Probing compensation: None

Probed points

Show points in report

#	X	Y	Z	Dev.
116	166.181	622.893	1861.959	0.227
117	133.281	623.510	1855.177	0.169
118	100.000	623.835	1850.203	0.210
119	66.598	624.094	1846.997	0.263
120	32.917	624.302	1845.305	0.084

Dimensions

	Nominal	Measured	Tol+	Tol-	Dev.
<input checked="" type="checkbox"/> X	20.800	20.800	1.000	-1.000	
<input checked="" type="checkbox"/> Y	592.846	592.846	1.000	-1.000	
<input checked="" type="checkbox"/> Z	2486.699	2486.699	1.000	-1.000	
<input checked="" type="checkbox"/> \emptyset	1284.726	1284.726	1.000	-1.000	
<input type="checkbox"/> Radius	642.363	642.363	0.500	-0.500	
<input type="checkbox"/> \pm	0.937	0.937	1.000		

Symmetric tolerances

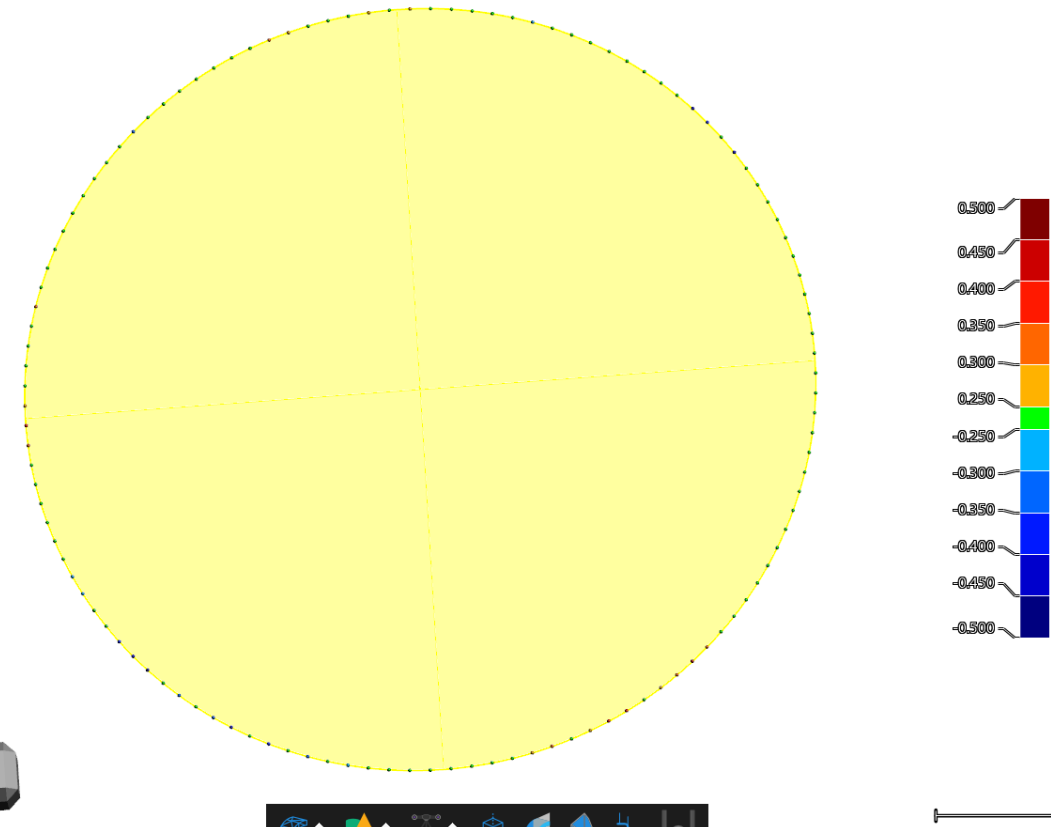
Error distribution

Lower (mm): -0.500, -0.250
Upper (mm): 0.500, 0.250

Automatic values
 Symmetric

[Edit color map](#)

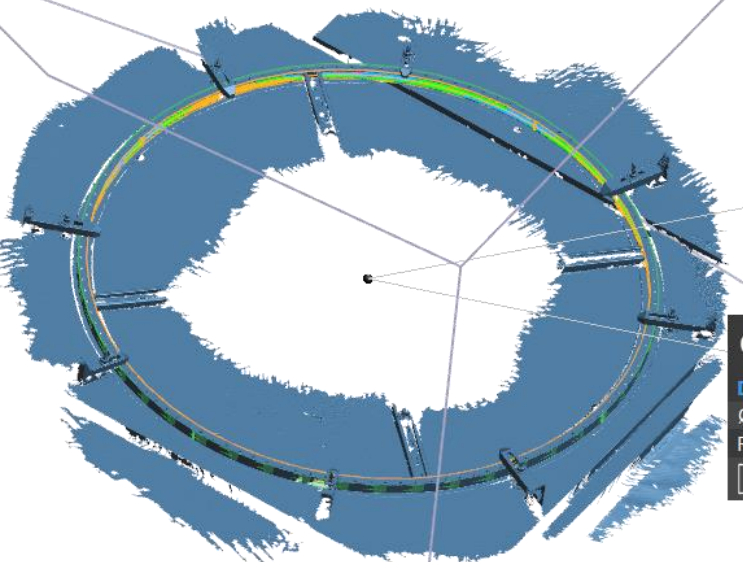
OK Cancel



- ◊ pfRICH end ring is boxed up and sent to the shipping department
- ◊ Will share tracking as soon as it is available.



Metrology while everything in progress – back up slides



inside D (clamped)

Dimension	Nom.	Val.	Dev.	State
Ø±1.000	1260.540	1260.380	-0.160	✓
Radius±0.500	630.270	630.190	-0.080	✓
⊗ 1.000		0.328		✓

Outside D (clamped)

Dimension	Nom.	Val.	Dev.	State
Ø±1.000	1298.640	1299.167	0.527	✓
Radius±0.500	649.320	649.584	0.264	✓
⊗ 1.000		0.254		✓

Inside D (steel bars out)

Dimension	Nom.	Val.	Dev.	State
Ø±1.000	1260.540	1260.411	-0.129	✓
Radius±0.500	630.270	630.206	-0.065	✓
⊗ 1.000		0.370		✓

Outside D (steel bars out)

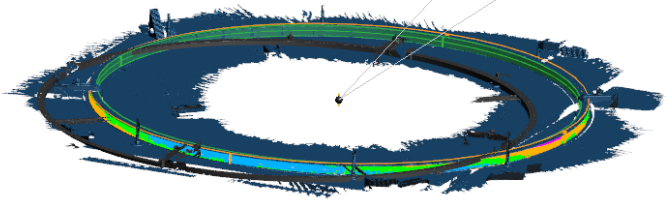
Dimension	Nom.	Val.	Dev.	State
Ø±1.000	1298.640	1299.144	0.504	✓
Radius±0.500	649.320	649.572	0.252	✓
⊗ 1.000		0.297		✓

Inside D (2 opposite toe clamps left)

Dimension	Nom.	Val.	Dev.	State
Ø±1.000	1260.540	1260.437	-0.103	✓
Radius±0.500	630.270	630.218	-0.052	✓
⊗ 1.000		0.535		✓

Outside D (2 opposite toe clamps left)

Dimension	Nom.	Val.	Dev.	State
Ø±1.000	1298.640	1299.167	0.527	✓
Radius±0.500	649.320	649.583	0.263	✓
⊗ 1.000		0.467		✓

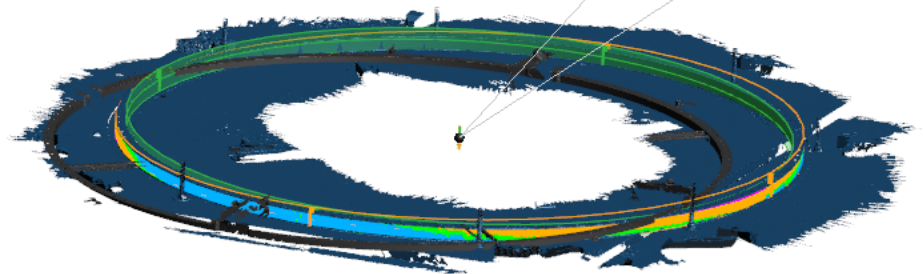
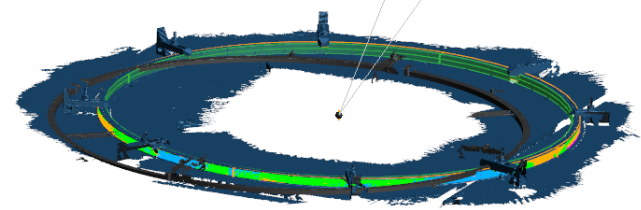


Outside D (free)

Dimension	Nom.	Val.	Dev.	State
Ø±1.000	1298.640	1299.030	0.390	✓
Radius±0.500	649.320	649.515	0.195	✓
⊗ 1.000		0.673		✓


Inside D (free)

Dimension	Nom.	Val.	Dev.	State
Ø±1.000	1260.540	1260.275	-0.265	✓
Radius±0.500	630.270	630.137	-0.133	✓
⊗ 1.000		0.734		✓




- ◊ Final dimensions after all machining and unclamping.
- ◊ We do see a slight relaxation and deformation due to release of the internal residual stresses after machining.

Outside D (free)

Dimension	Nom.	Val.	Dev.	State
Ø±1.000	1298.640	1299.030	0.390	✓
Radius±0.500	649.320	649.515	0.195	✓
 1.000		0.673		✓

Inside D (free)

Dimension	Nom.	Val.	Dev.	State
Ø±1.000	1260.540	1260.275	-0.265	✓
Radius±0.500	630.270	630.137	-0.133	✓
 1.000		0.734		✓

