

Electronic Liner Measurement Report

Job ID: 18-xxx

0. Vessel/Job data

Vessel:	Vessel 1	Location:	Ijmuiden, Port Talbot, NL
Engine Type:	6 S70 MC	Job date:	
Engine ID:	☺	Service Engineer:	
Running hours:	43.081	Job order by:	

1. Service scope – work done

- a) measurement of all cylinder liner wear
- b) measurement of piston ring coating thickness
- c) camera based visual liner inspection

2. Liner wear analysis

~ liner general

The engine shows very similar wear pattern at all liners.

The wear pattern is typical for S-Type engines.

All liners show full gas tight piston rings.

All liners show very small distortion in way of lower support which is typical for S-Type engines (green arrow).



~ liner L1 to L4 & L6

The wear is smoothly increasing from BDC upwards. This is a sign of good cylinder lubrication performance and proper distribution.

All liners show very strong ovality in the upper 400mm stroke beyond engine makers recommendation. Worst case is liner 3 with 1.95mm ovality (recommended 0,7mm).

The increase in ovality is smooth and no sudden loads on rings are expected.

The strong ovality has negative impact on piston ring life time (increased fatigue) and piston ring grooves in piston crown (increased wear).

The ovality is expected to be partly wear and partly thermal distortion. We recommend to release the cylinder cover bolts to remove tension on liners and retighten them in proper sequence and torque.

We recommend re-measuring after this “relaxing” procedure.



~ liner L5

The wear pattern is that of a new liner and according the stated running hours.

3. Liner wear trend analysis

No previous data available.

4. Piston ring measurements

~ piston rings general

The piston ring distribution is as follows:

All rings are uncoated.



~ cylinder 2

The piston rings found coated except in "T" position with well used coating but good condition.

If coated rings are installed, we recommend to fit them as ring "T" due to highest impact in gas sealing and lub oil distribution. It is assumed, that a fully coated ring package was installed and ring "T" is already worn. Full gas sealing is achieved. No action but normal monitoring recommended.

5. Piston ring trend analysis

No previous data available.

6. Piston ring Inspection

No data available.

7. Digital Liner Inspection

Picture were taken with double lens camera system HorizonV1, therefore two sets of pictures per liner are available. Camera C1 is pointed at the liner wall in aft (180°) direction while camera C2 is pointed vertically upward to focus on cylinder cover items.

~ general

Soot deposits:	low
Carbon deposits:	low
Lubricator grooves & injectors:	clear & intact
Starting air valve:	clear, no cracks
Exhaust valves:	low deposits, intact, little pitting
Exhaust valve seats:	not visible
Fuel injectors:	clear, normal injection pattern
Wave cut/honing pattern:	visible at mid stroke

If no specific liner comments are stated below, normal monitoring is recommended for the liner.



~ liner L3

Liner shows local black patches in way of high wear area. This is considered a sign for the piston rings not properly pressing against the liner wall probably due to locally increased ovality.


Report created on 22nd March 2018


Appendix 1 – Action lights definition


Appendix 2 – 3D-Liner Views


Appendix 1

Action lights definition

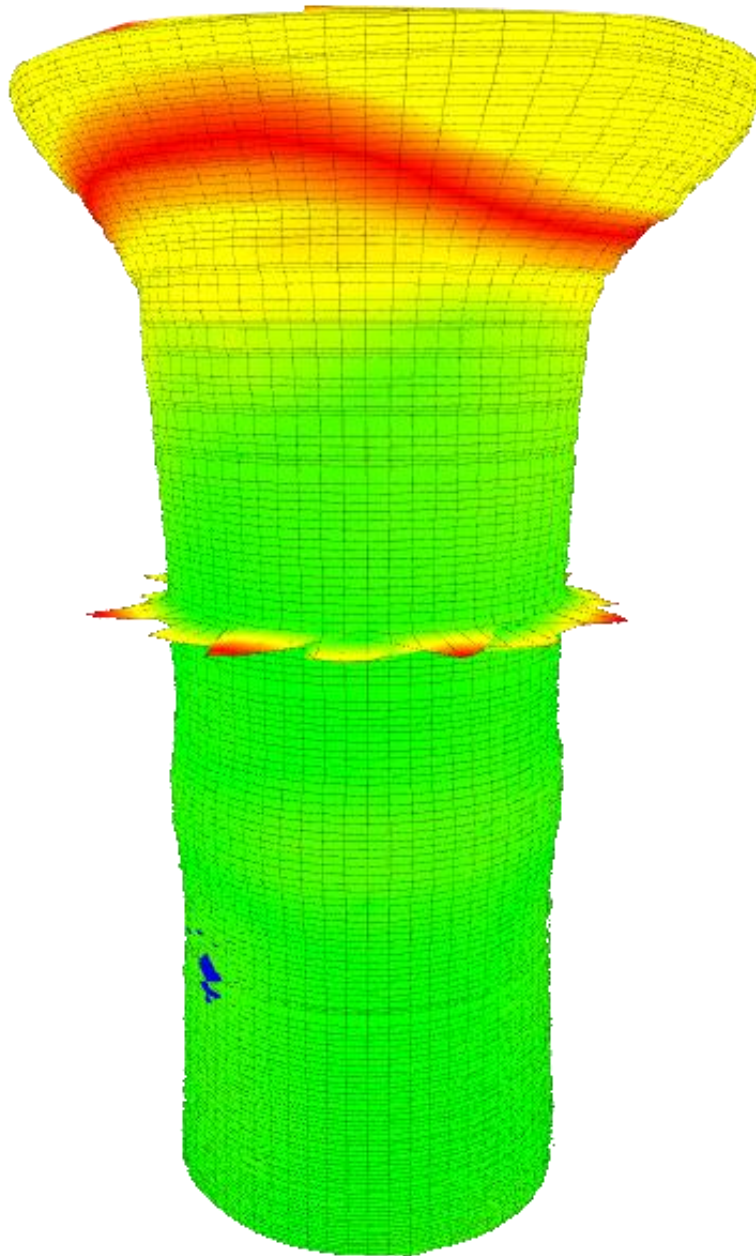
 Normal monitoring (12 month) recommended

 Action within next 6 month recommended

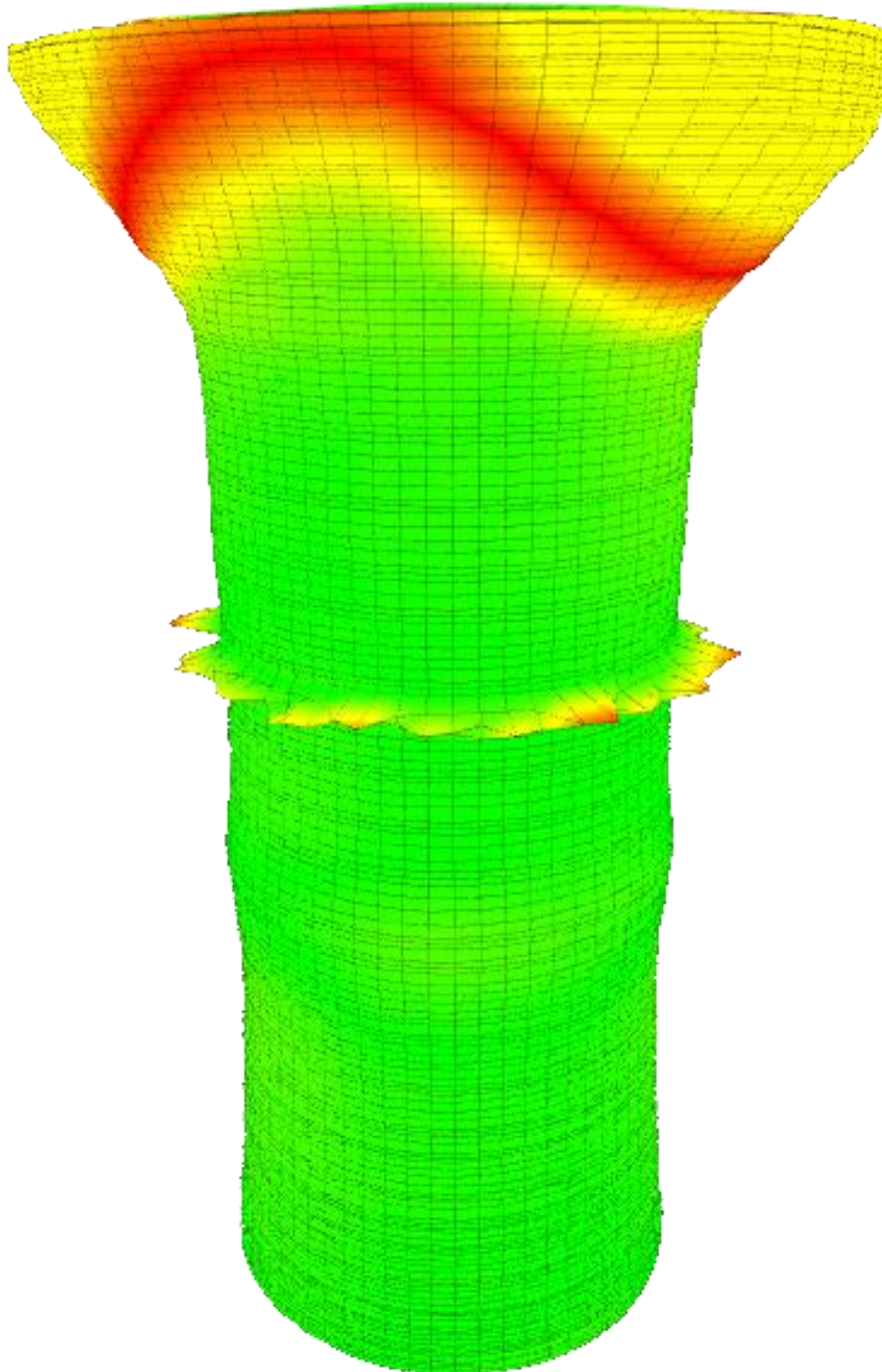
 Action within next 3 month recommended

 Action recommended

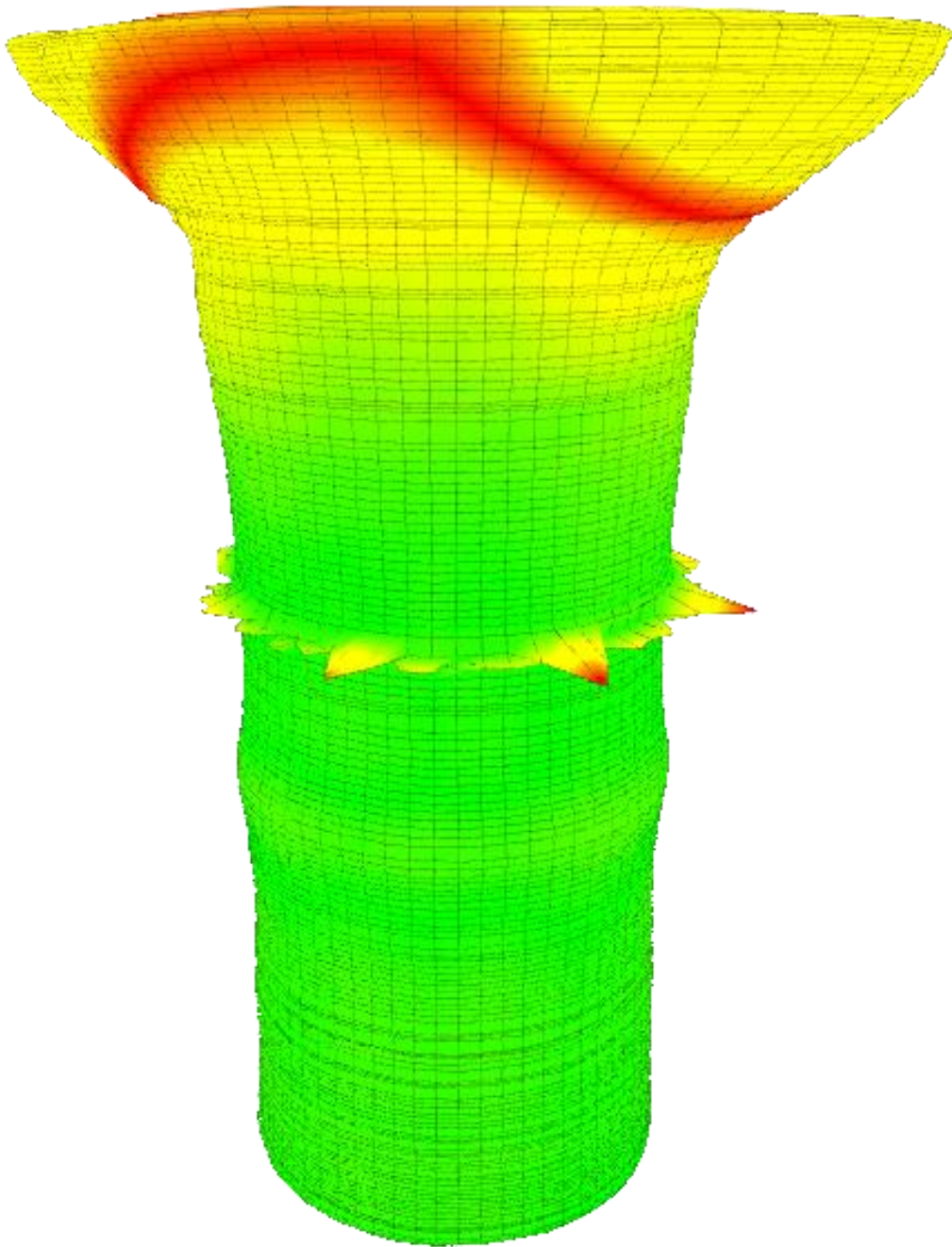
3D Liner Views



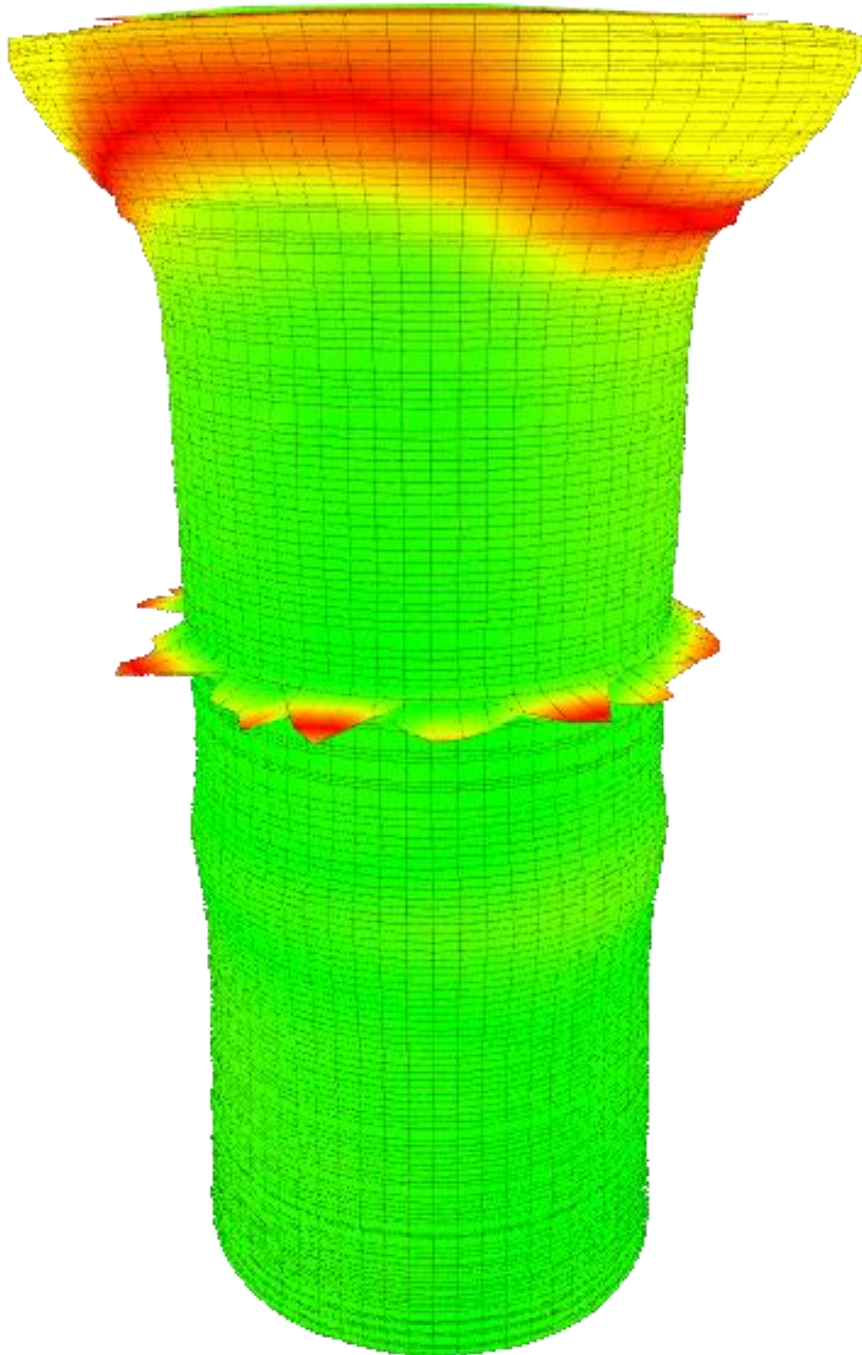
Liner1



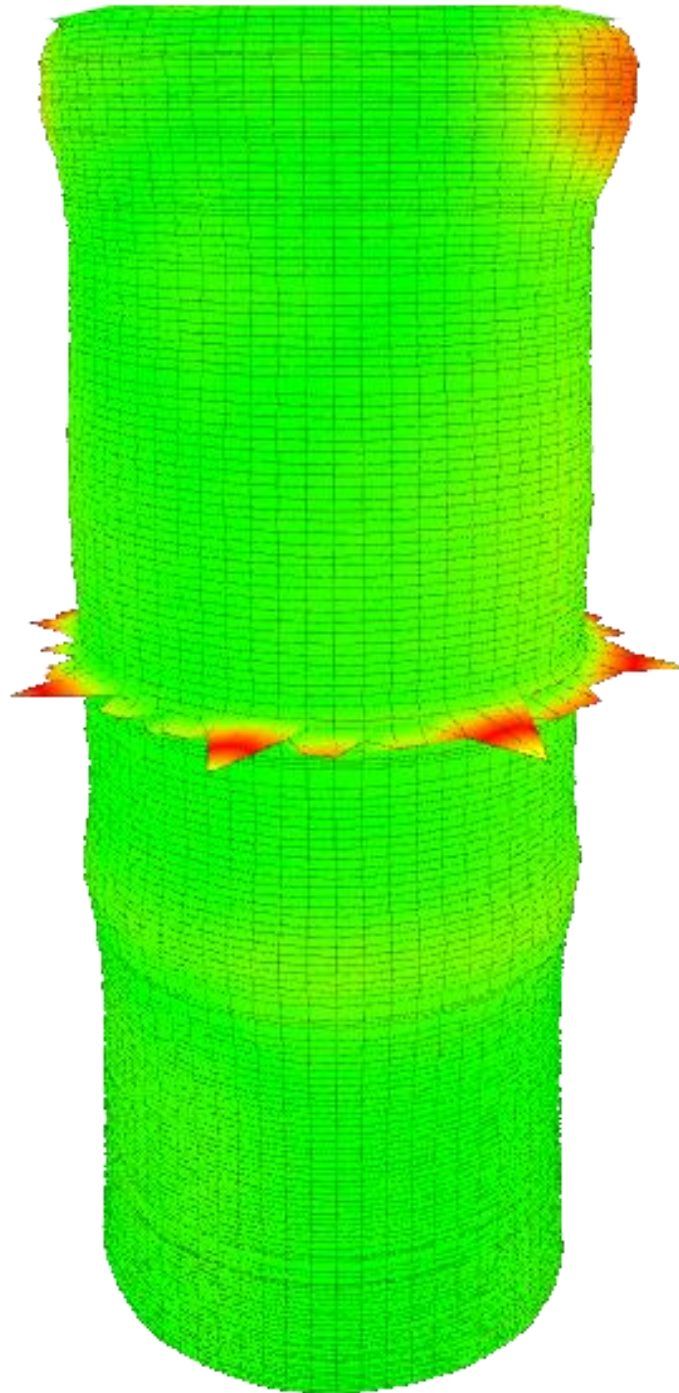
Liner 2



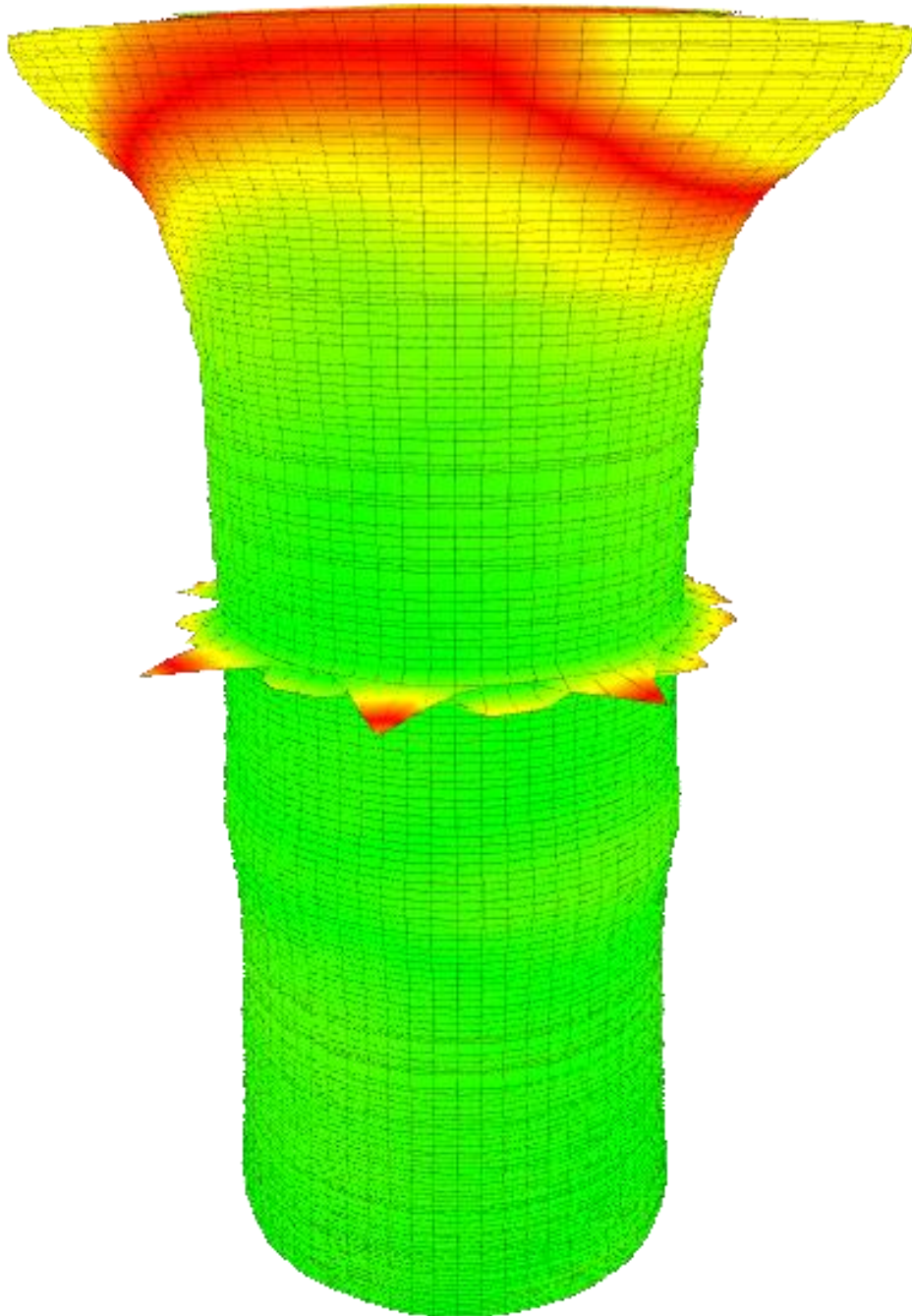
Liner 3



Liner 4



Liner 5



Liner 6