

2016.

## X-ray inspection of Rubber hoses (with different defects)

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Defects: burns on surface, hole in side wall of hose, salt inside hose, particle inside of hose, spots on surface.

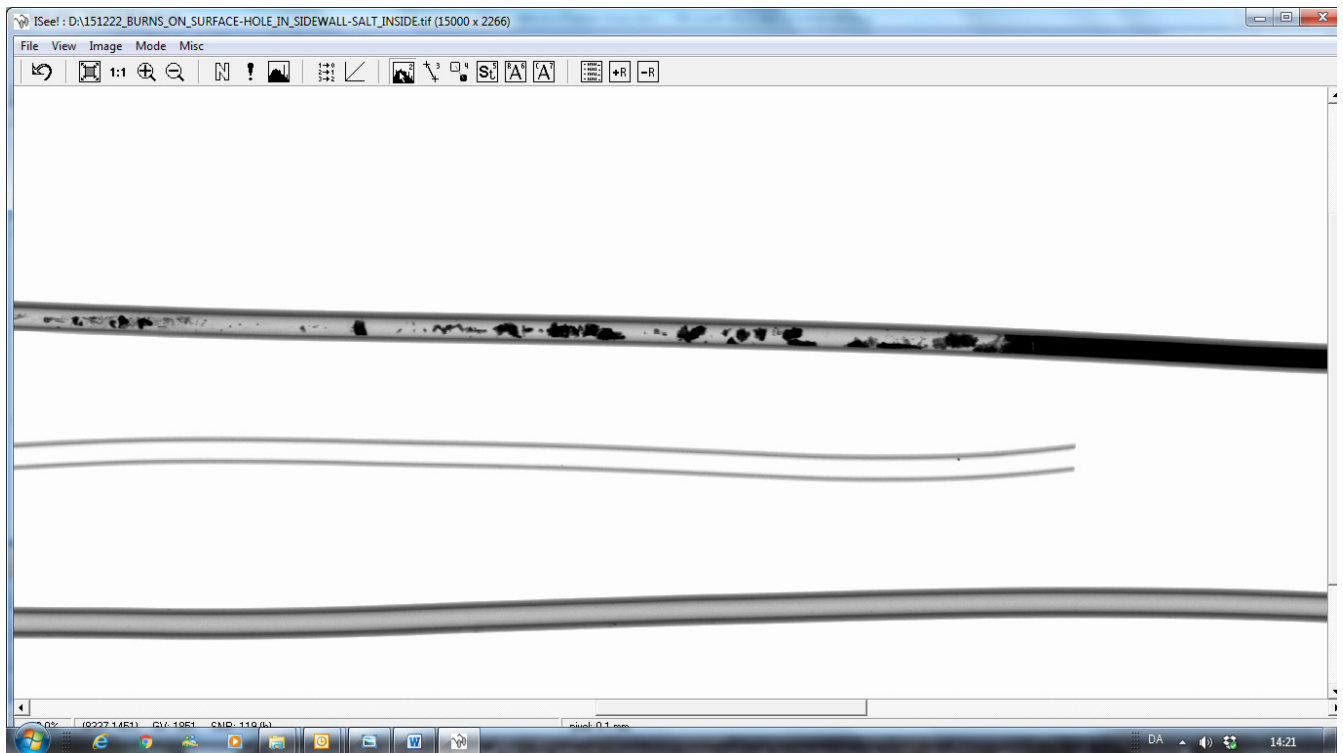
Samples were inspected batch by batch. Inspected using low energy X-rays.

Inclusions, incl. salt shows up as dark spots. Holes in the hoses show up as light areas.

## Rubber Hoses Burnt and w/ salt inside, Image 1

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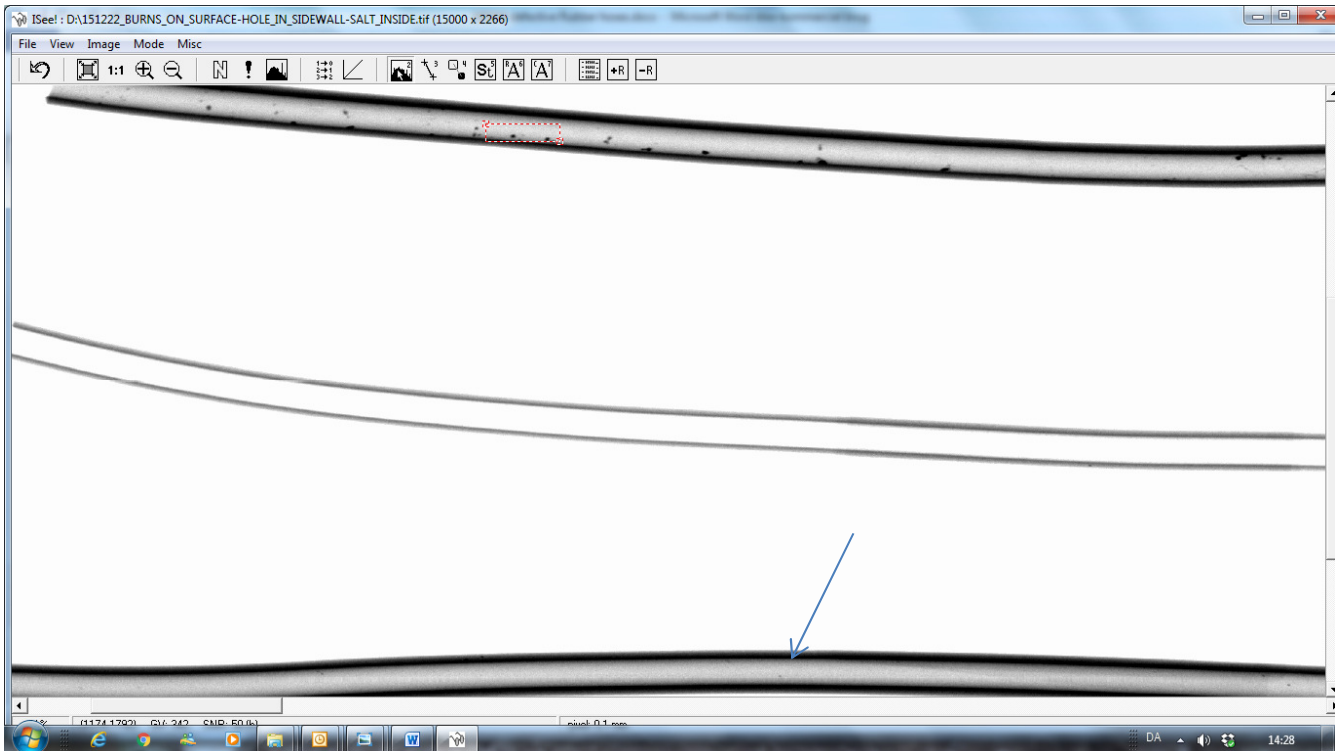




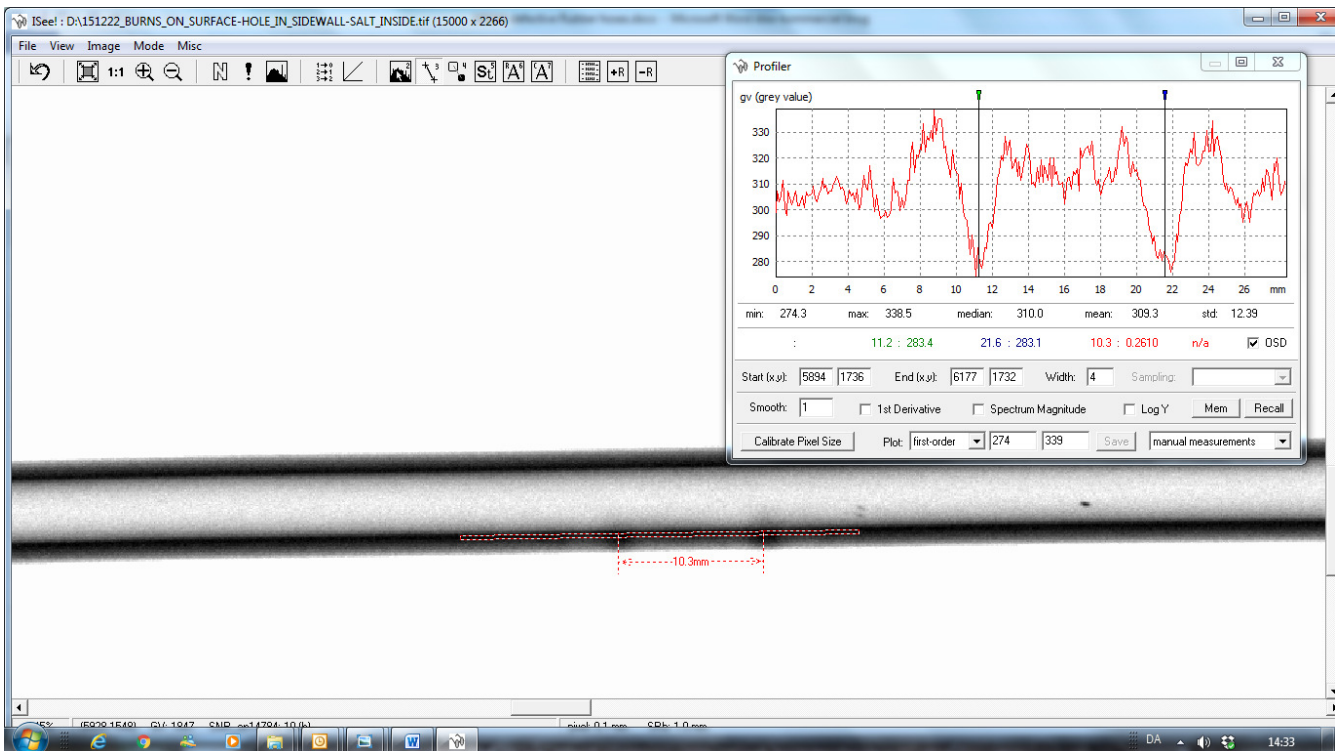
Abundant salt deposits internally to upper hose. The hose in the middle is thinner in wall thickness



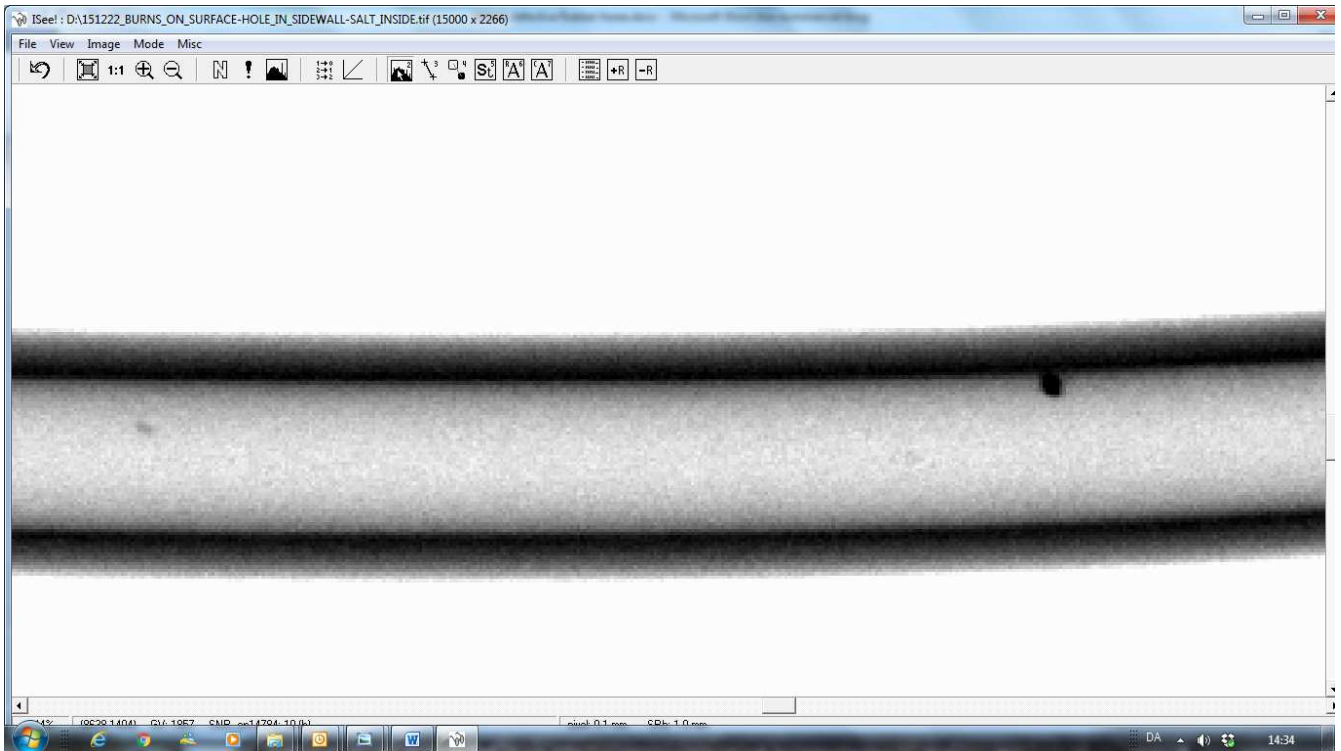
Holes in the wall of the upper and middle hose



Small salt particles in the top and lower hose (arrow)



Dark areas in the wall of the lower hose. Profile line shows irregularities (dips) in the grey level profile (which should be fairly even for an undamaged hose wall)

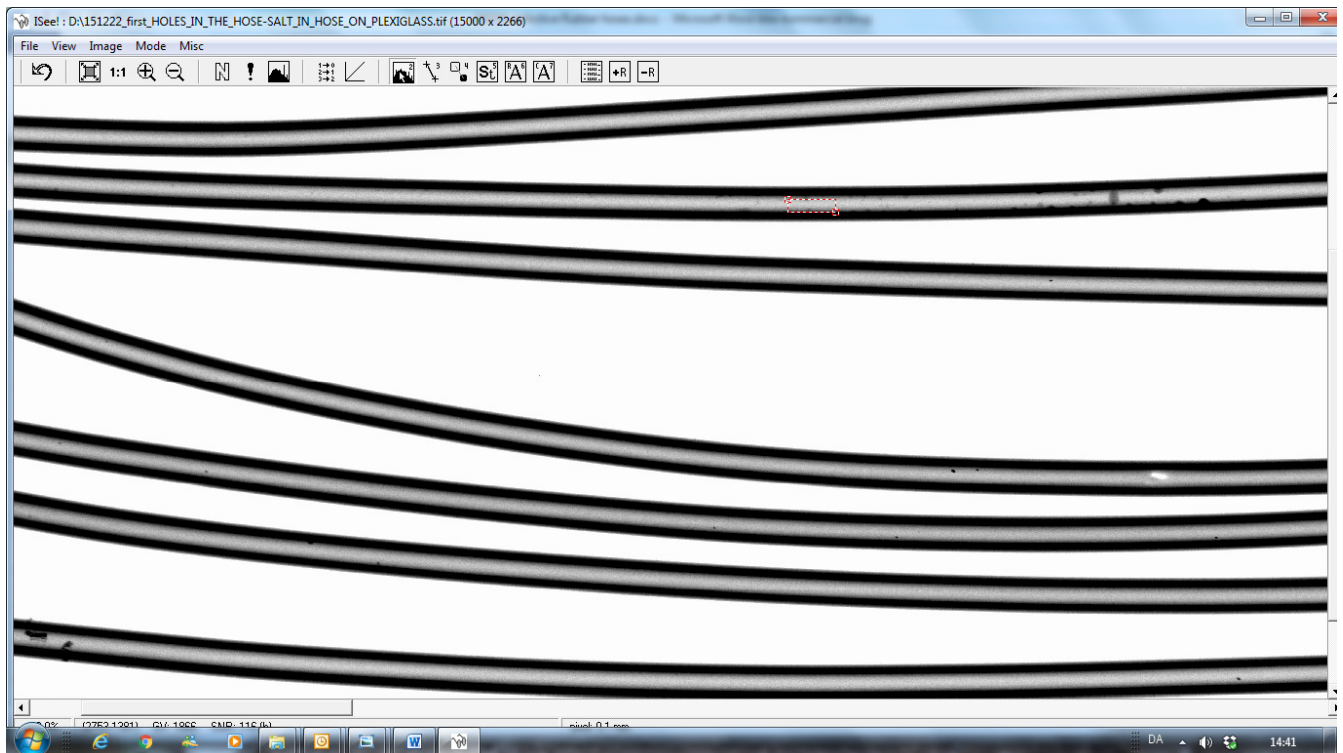


Salt inclusion in hose

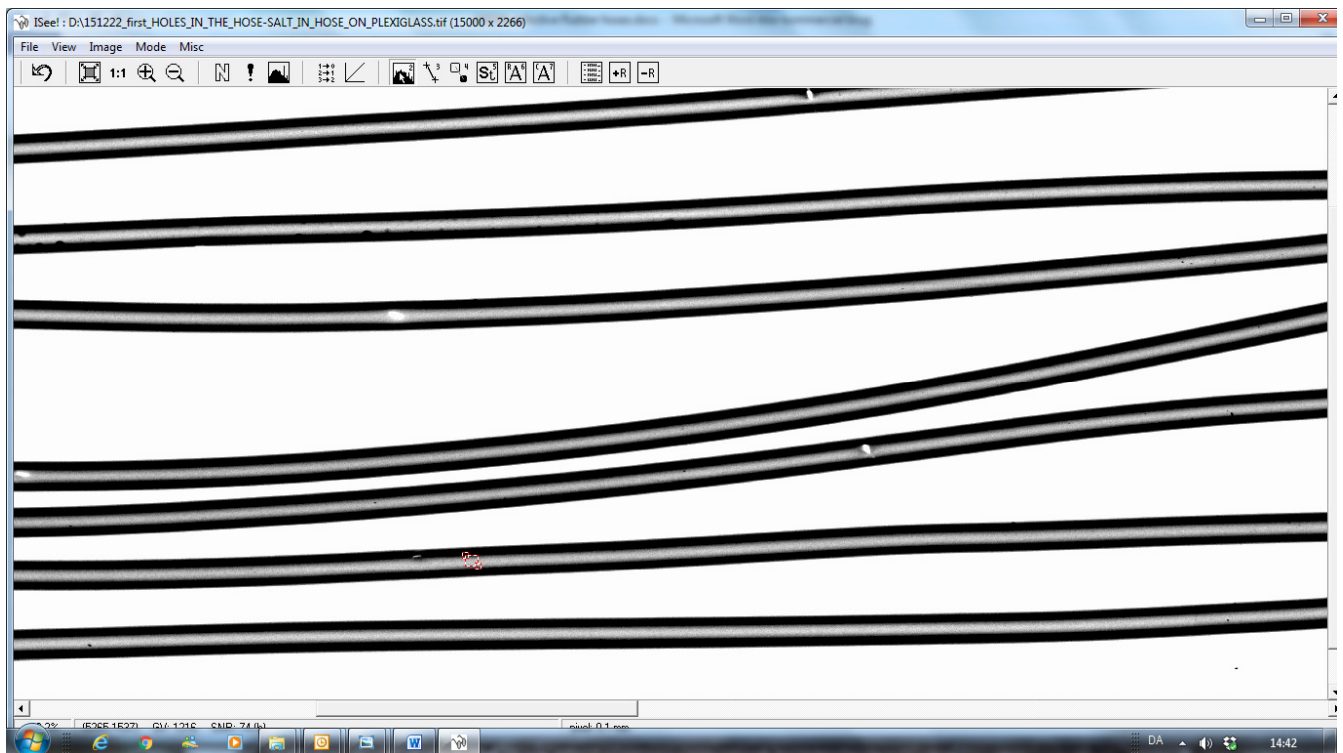
#### Rubber hoses – holes and salt internally (part I)



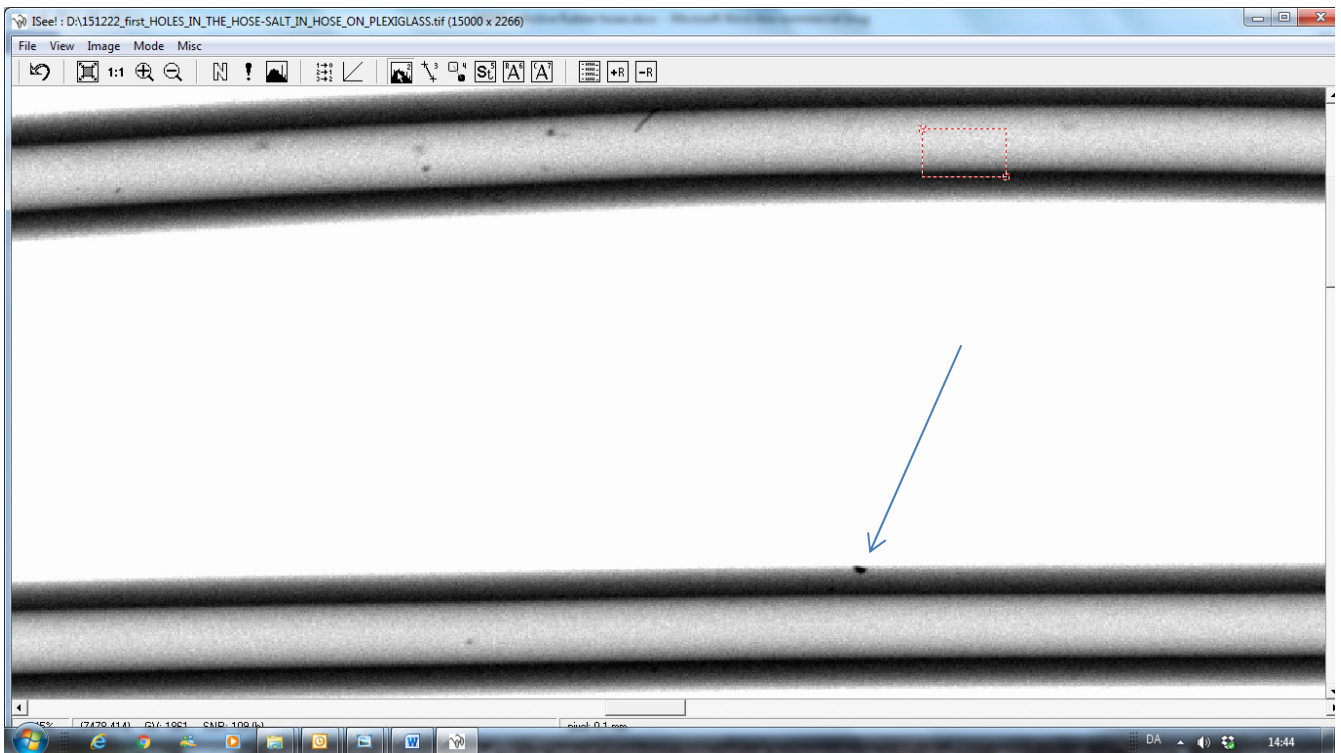




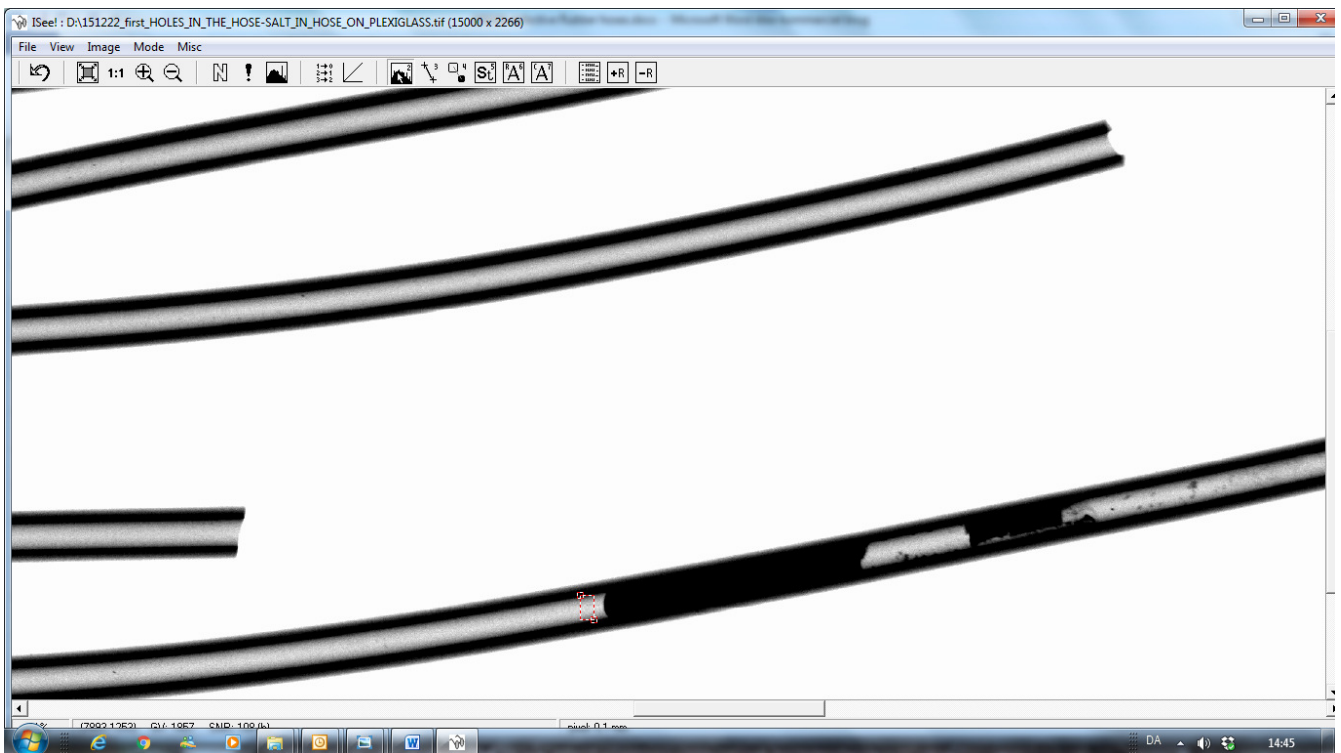
Holes and abundant salt particles in several hoses – left part of image



Holes and abundant salt particles in several hoses – left part of image

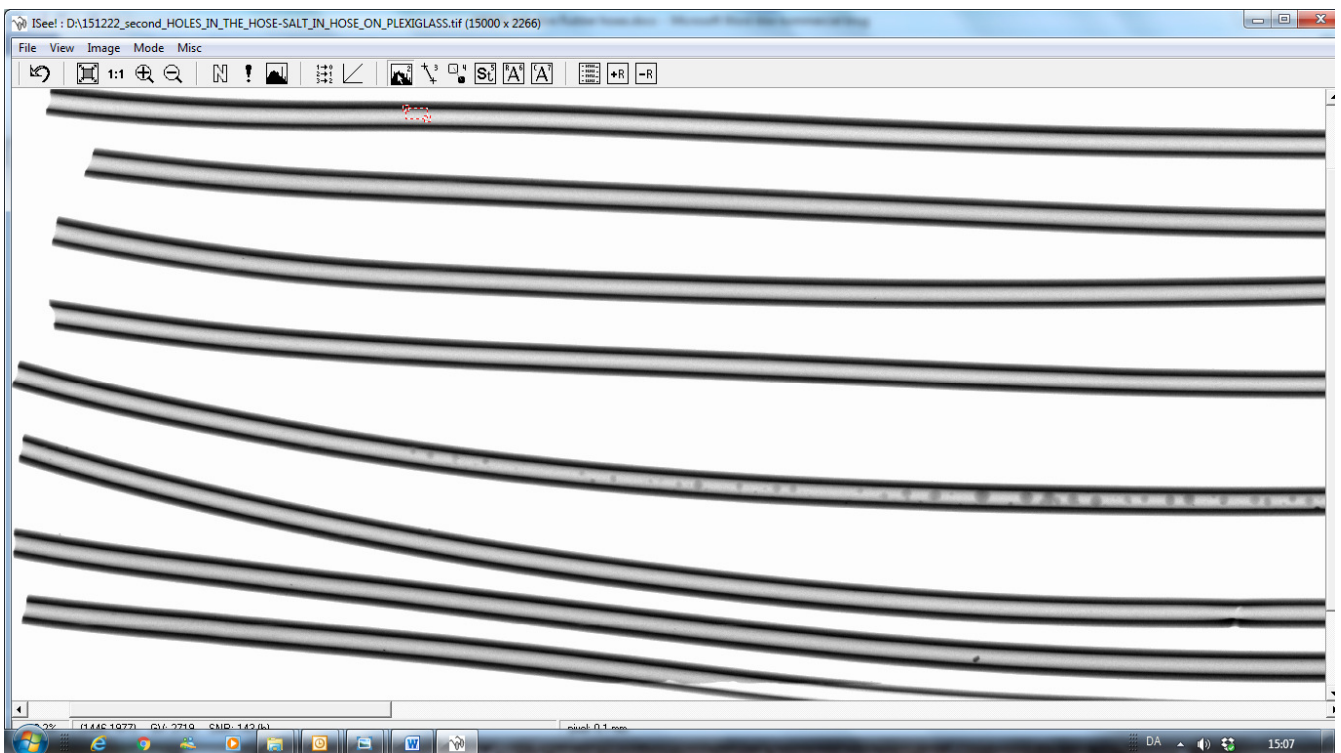


Example of hose with many very small and scattered salt particles, also seen (lower hose) is salt particle on outer surface (arrow).



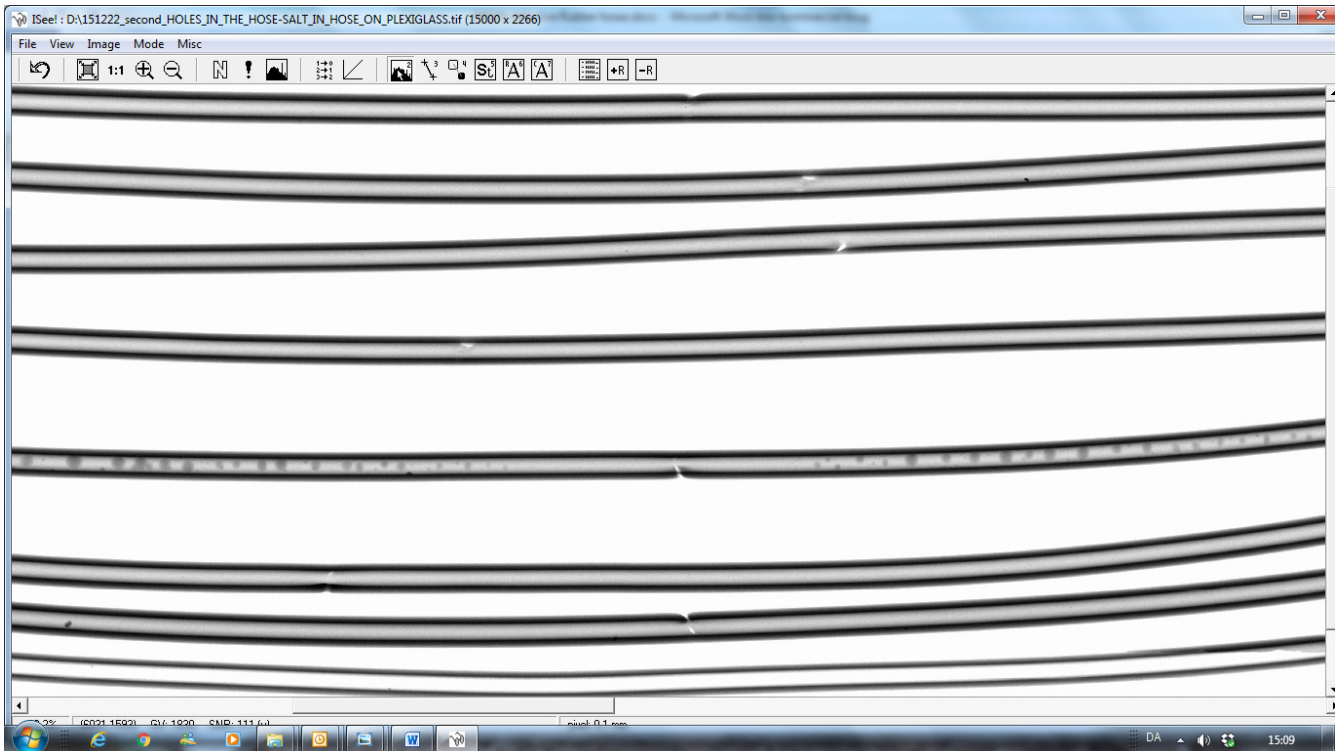
Massive salt deposit

Rubber hoses – holes and salt internally – II

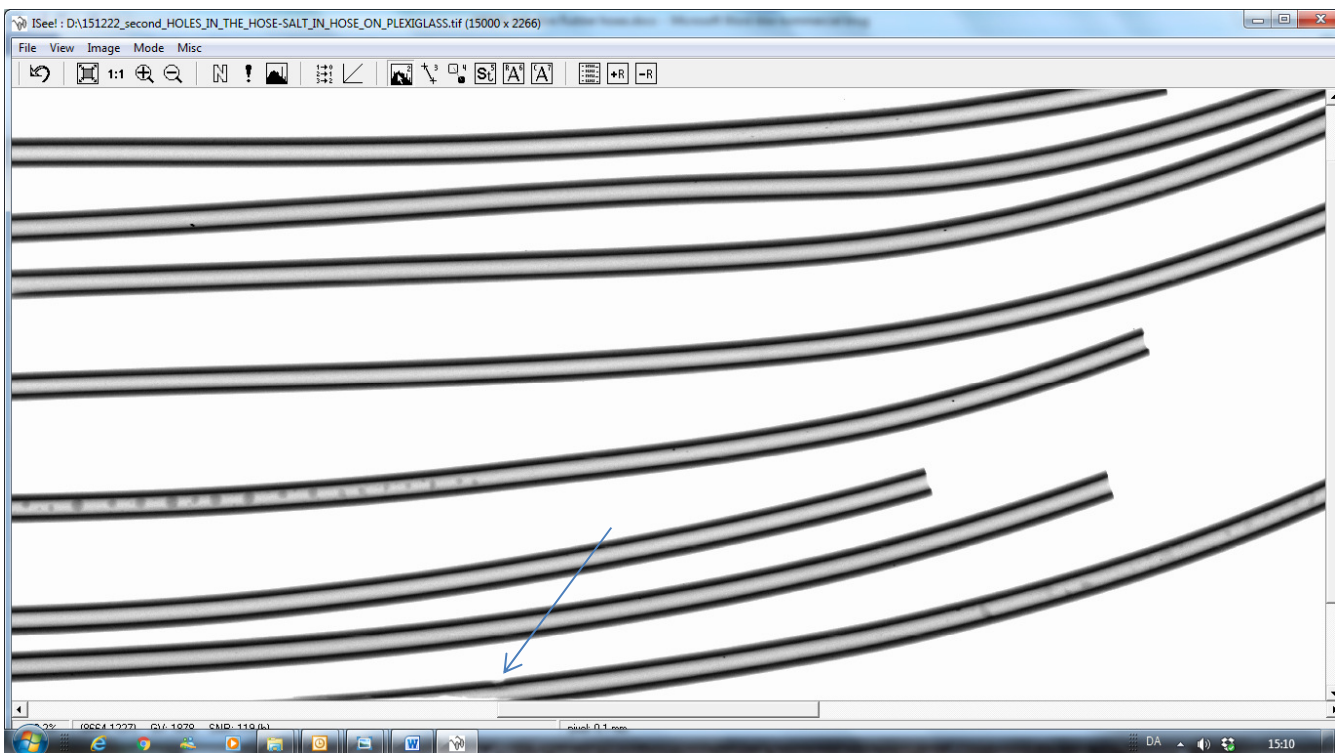


Leftmost part – prominent salt in middle lower hose



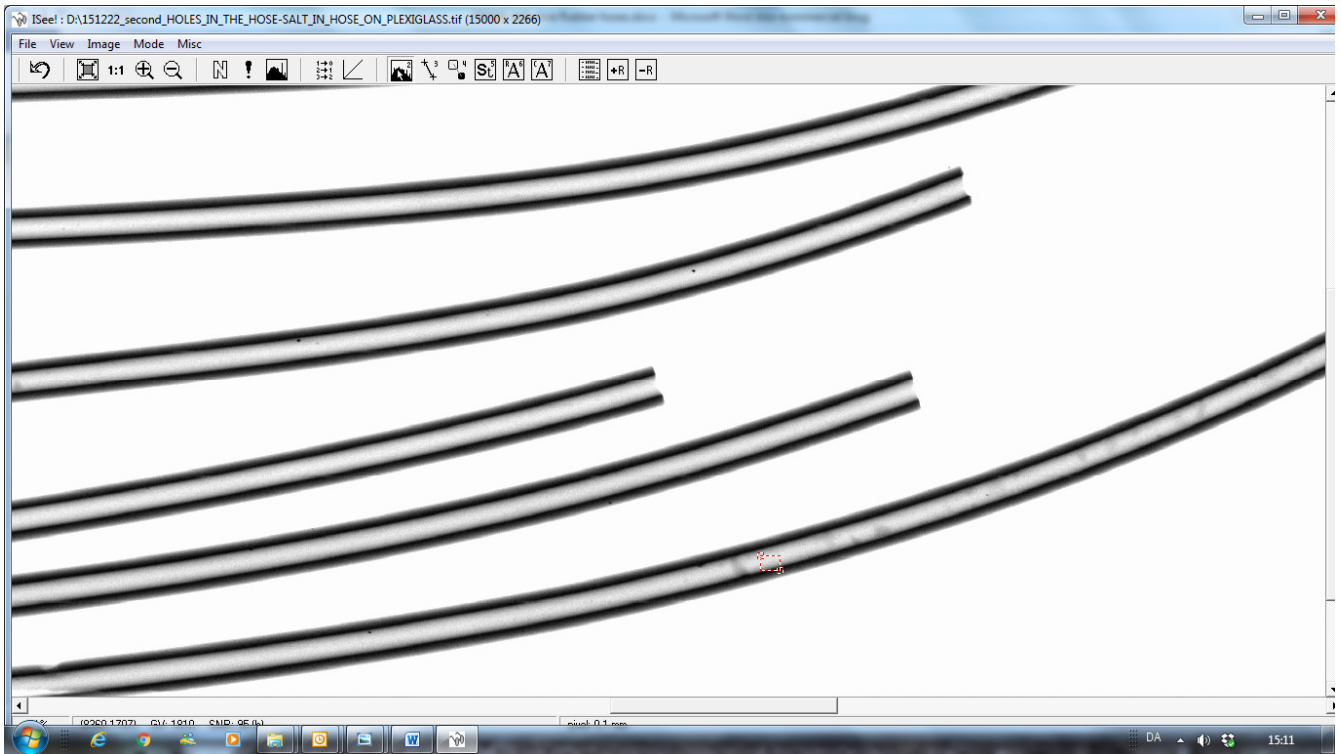


Holes/cracks in all pipes (except the lowest)



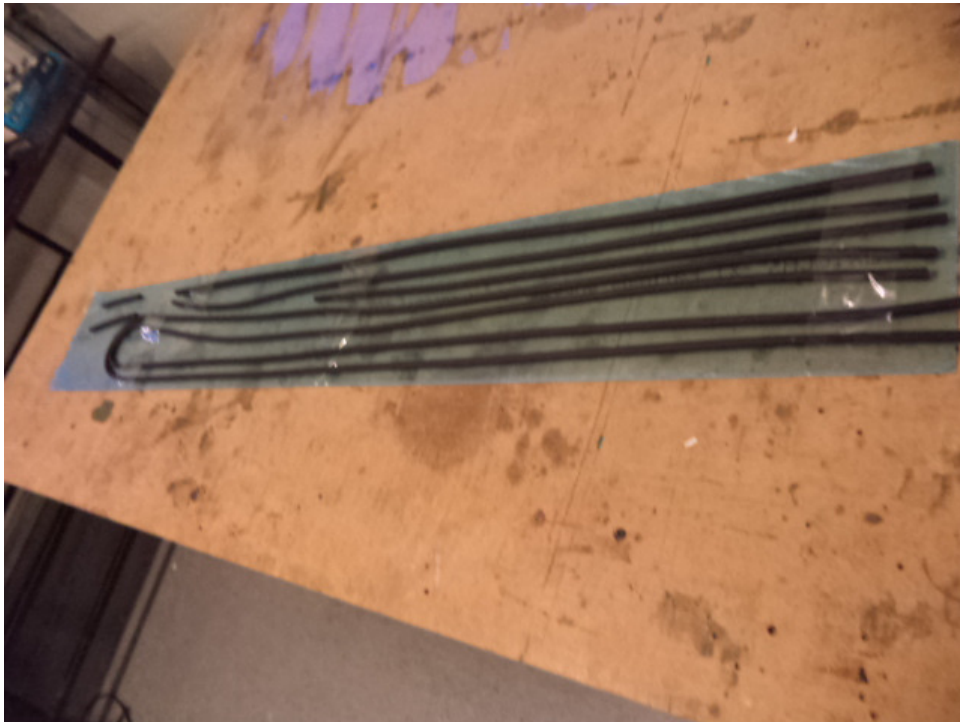
Hole in the lowest pipe (arrow)

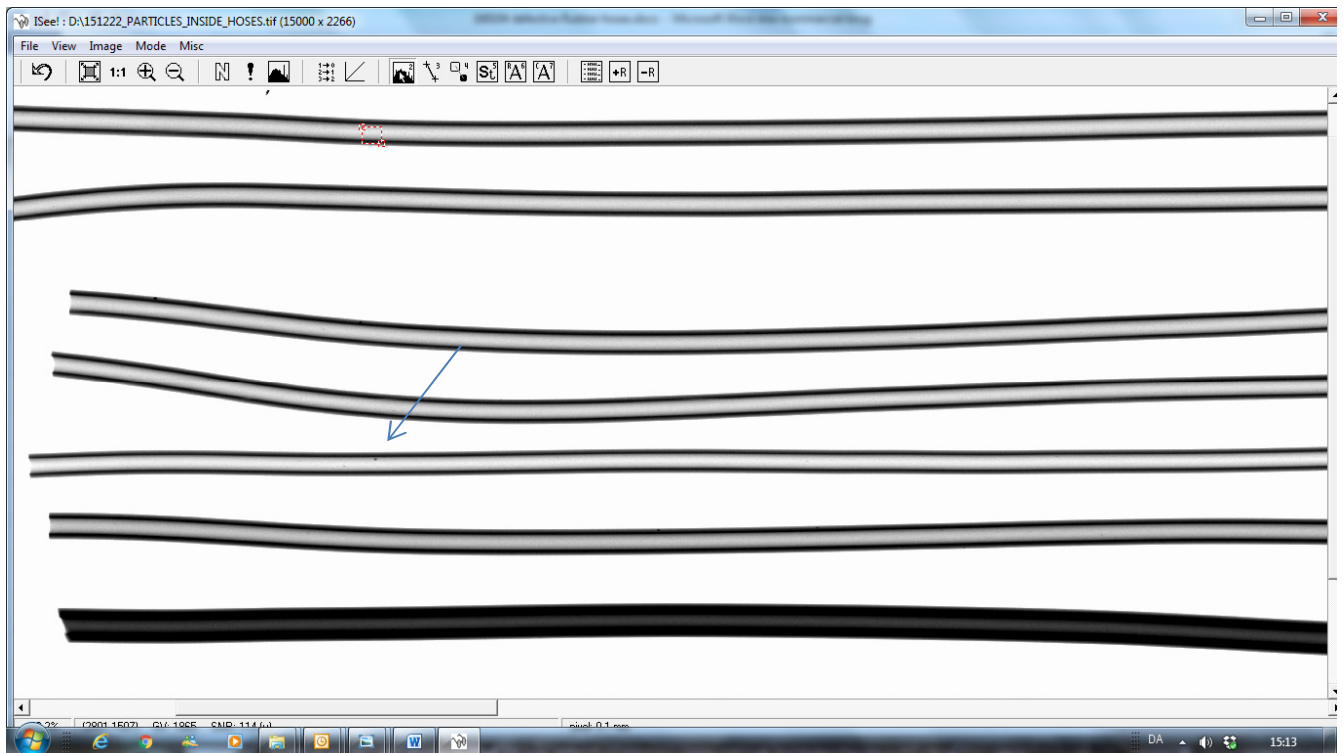




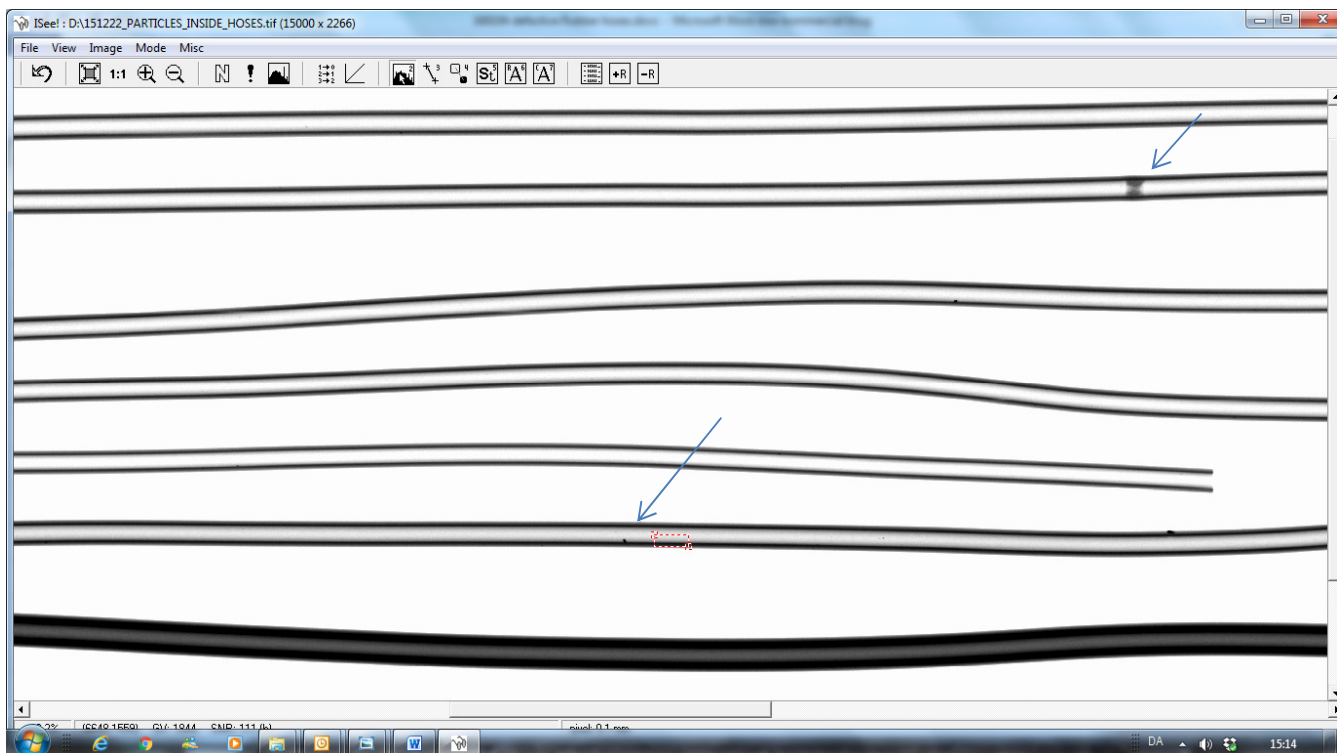
Salt inclusions in lowest pipe

Rubber hoses – particles inside hose

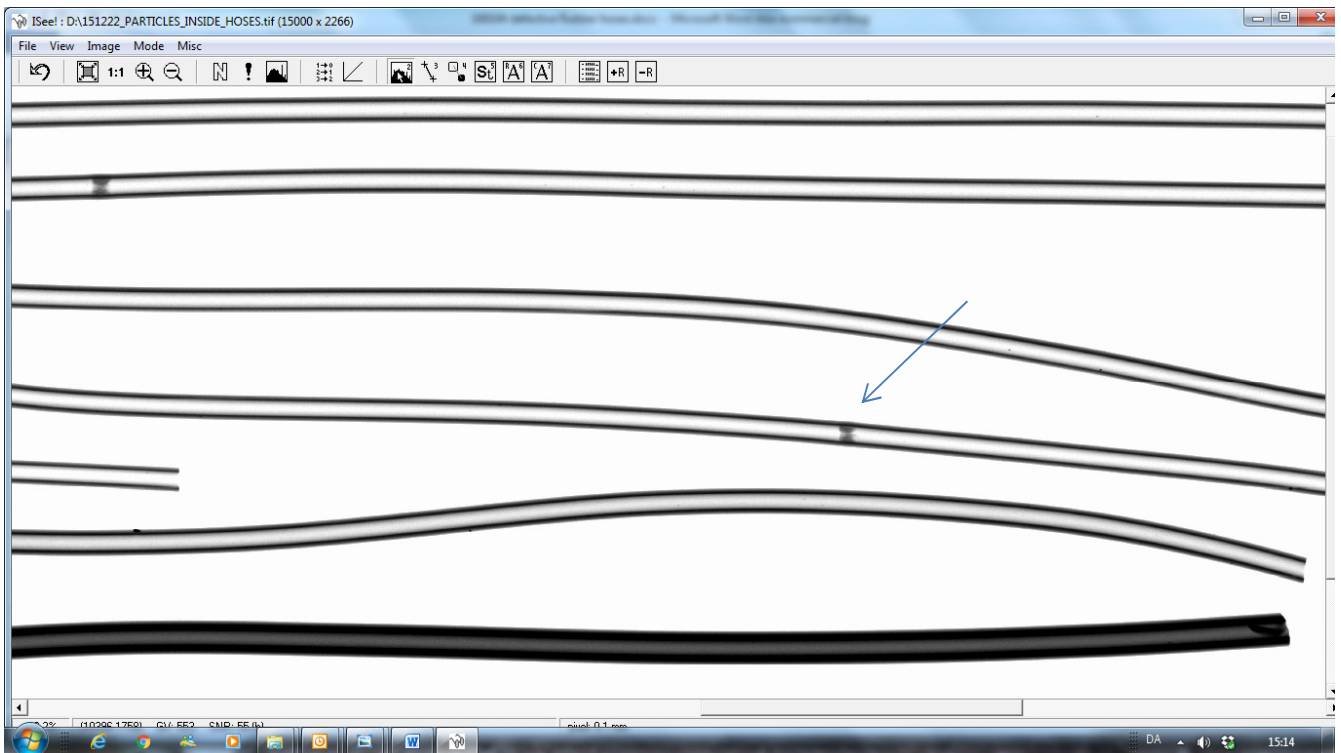




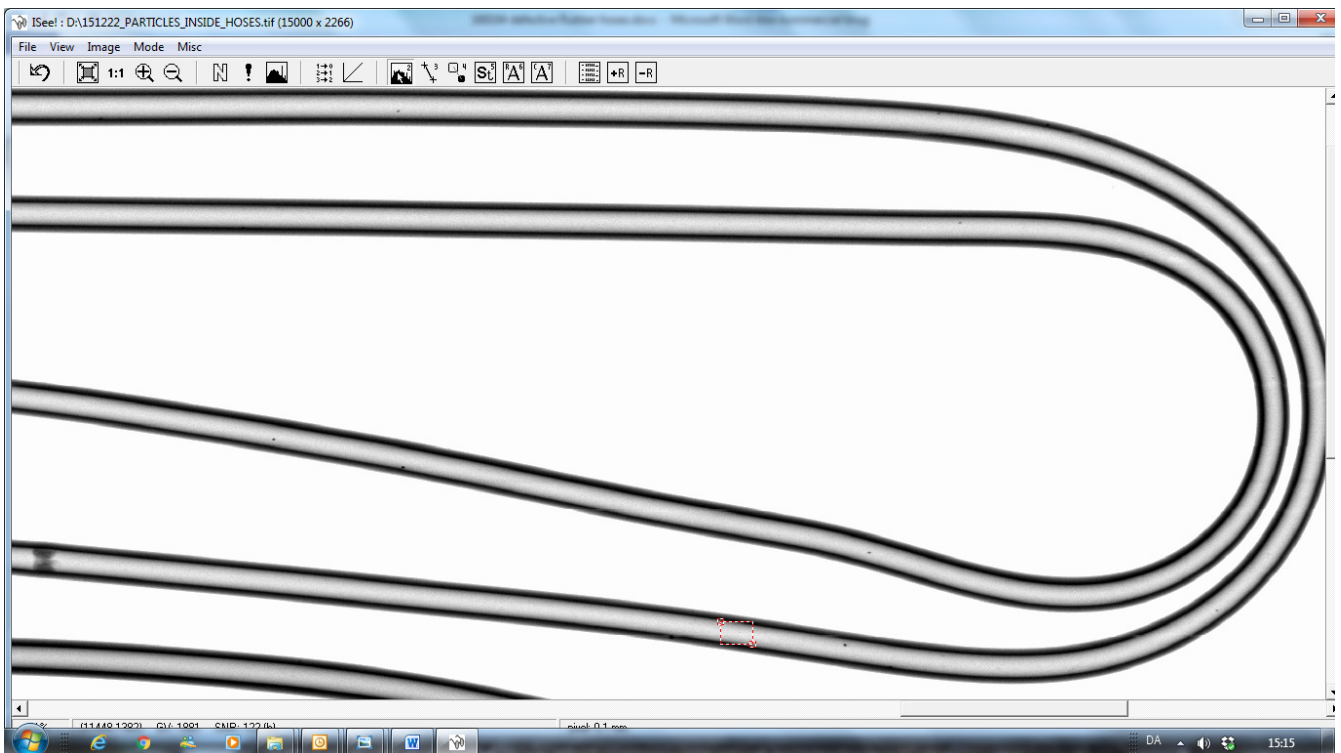
Leftmost part – lowest hose has higher wall thickness. Small particles (eg at arrow)



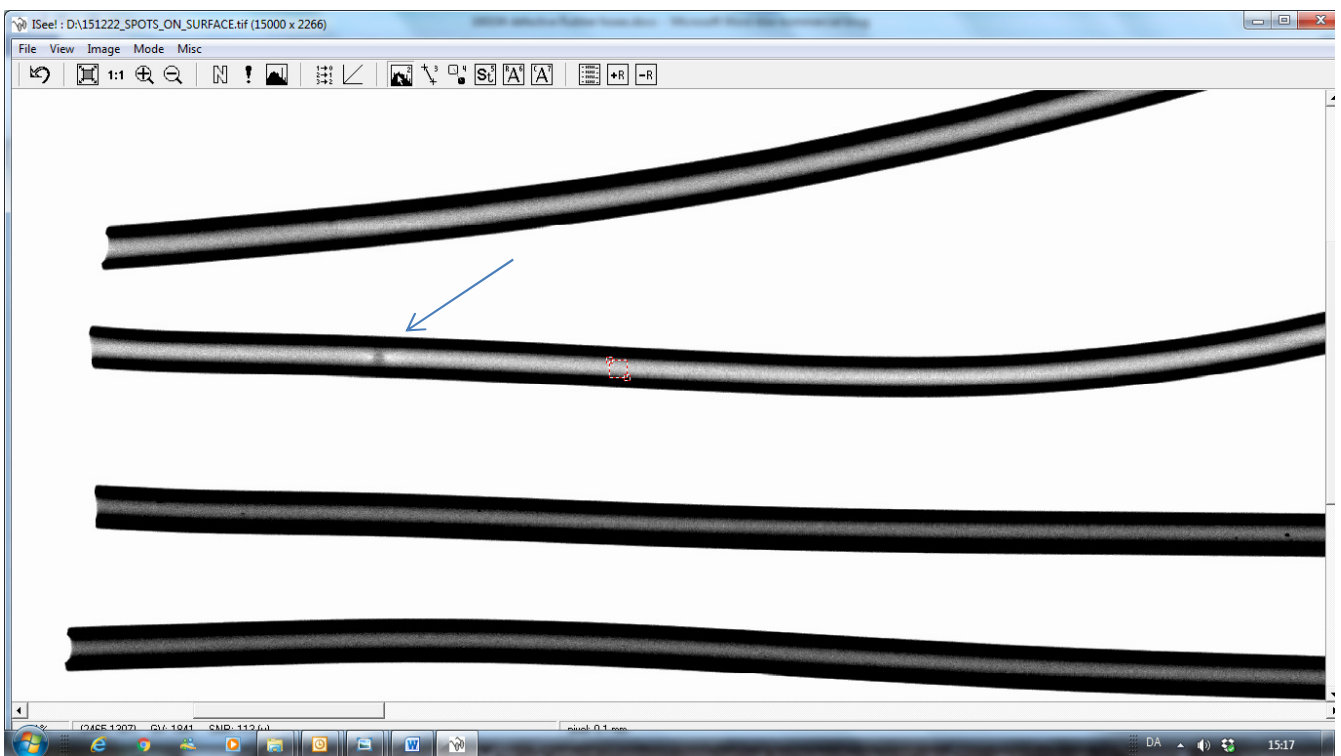
Particles and blockage of hose



Particles and blockage of hose



## Rubber hoses – spots on surface

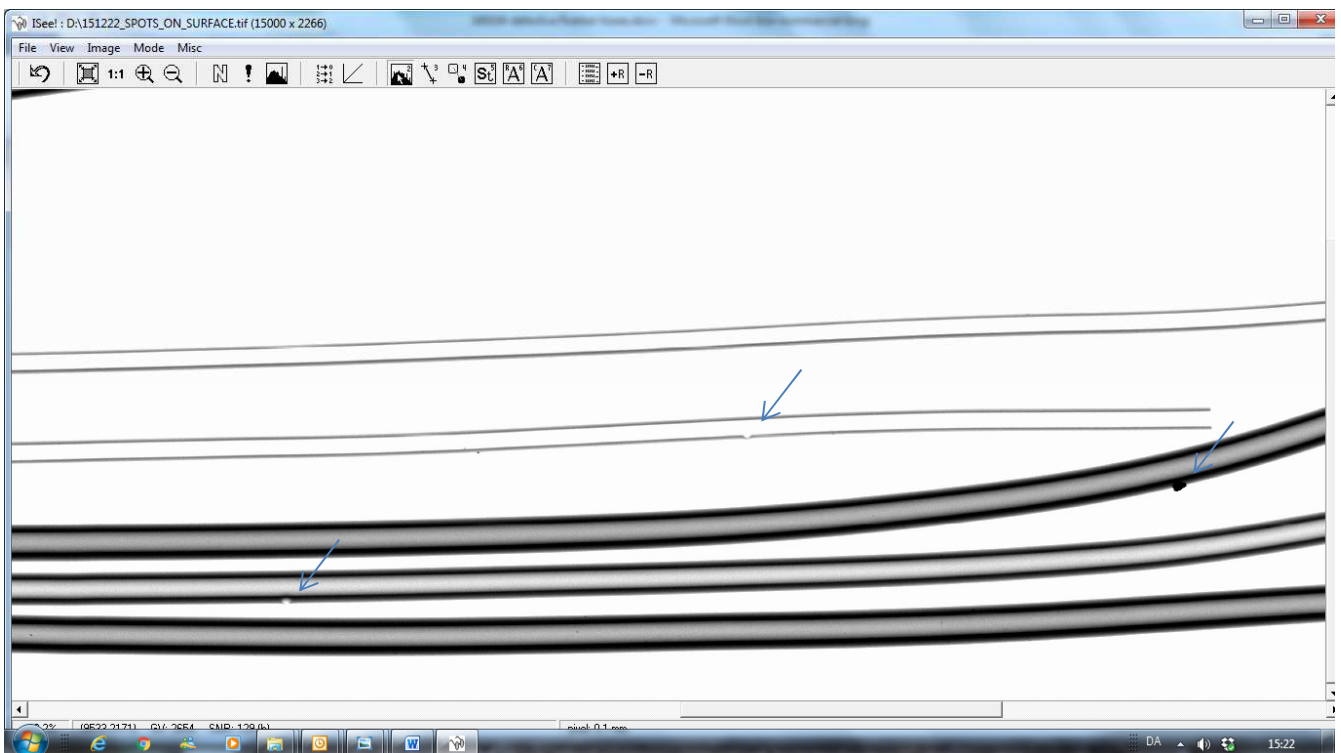


Reduced wall thickness

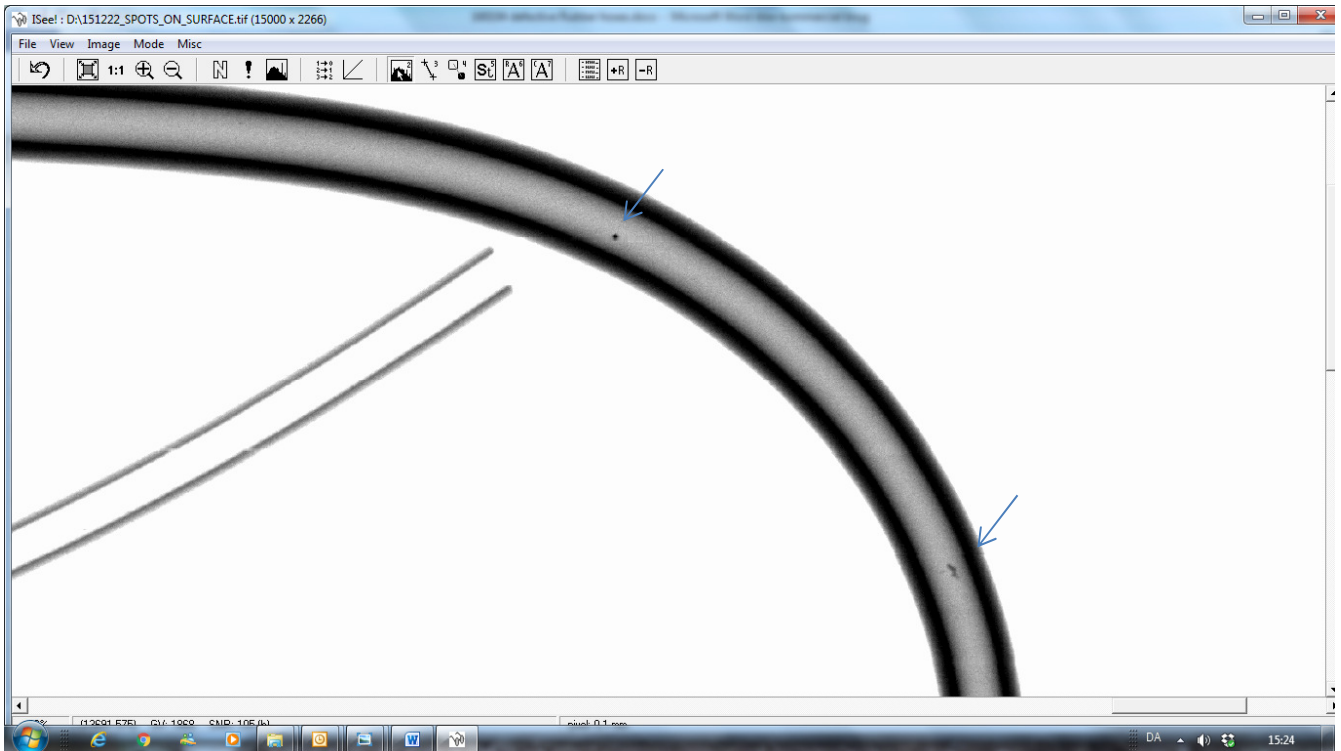




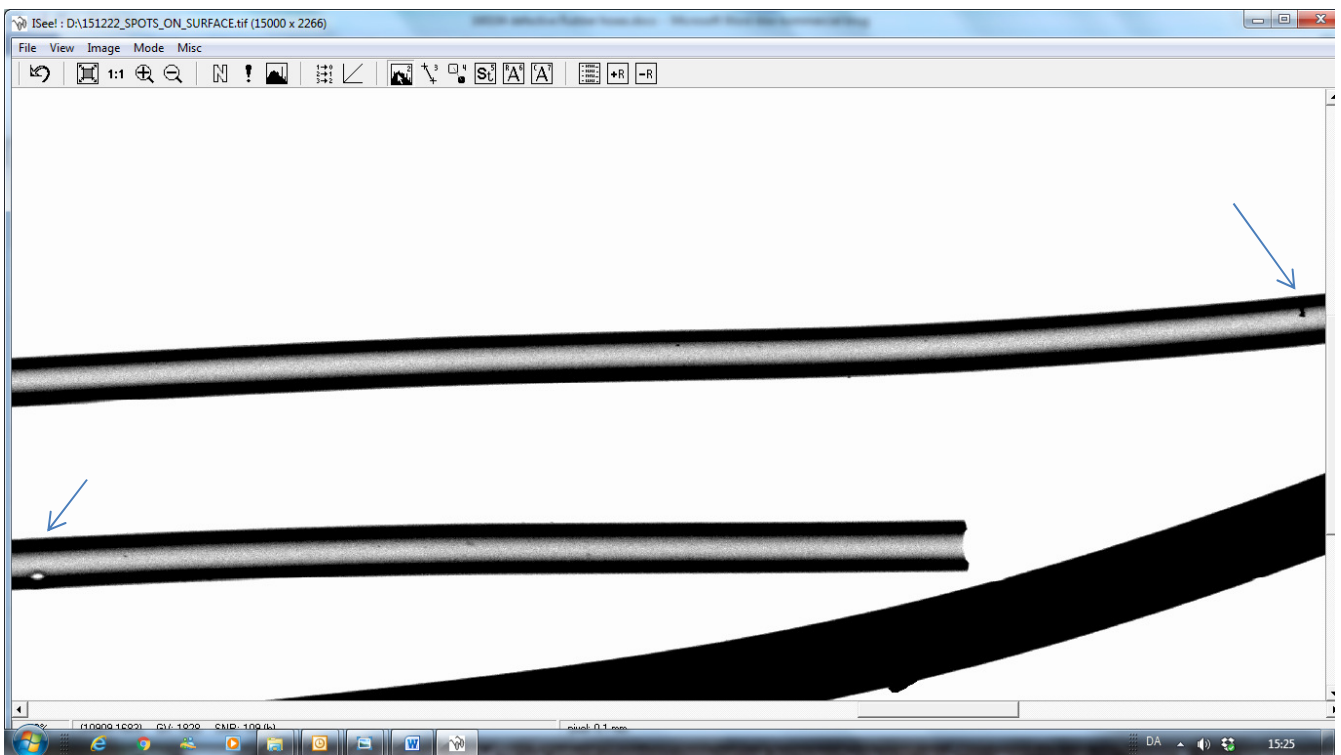
Bottom 3 hoses – leftmost part – these hoses are thicker than the others.



External dents and deposits and a “blow hole”



Particles in wall or externally (or internally)



Blow hole and salt