
NSG
GROUP

Haze in Windscreens

Contents

- Introduction
- Experimental set up
- Images with different haze levels
- Conclusion and References

- Slide Show

Introduction

- The maximum haze level in windscreens has been set by legislation worldwide at 2%.
- There are many publications and studies made dealing with haze in windscreens and wear and tear of windscreens and how haze – even below 2 % - does impair driving visibility.
- The experimental set up is trying to simulate only one possible scenario for driving at night time.
- The following set of images is trying to visualize what different levels of haze can mean in terms of visibility. It is general knowledge that e.g. rain would worsen the situation.
- Some extracts of the findings of international publications do underline the impact of haze on driving visibility.

Introduction

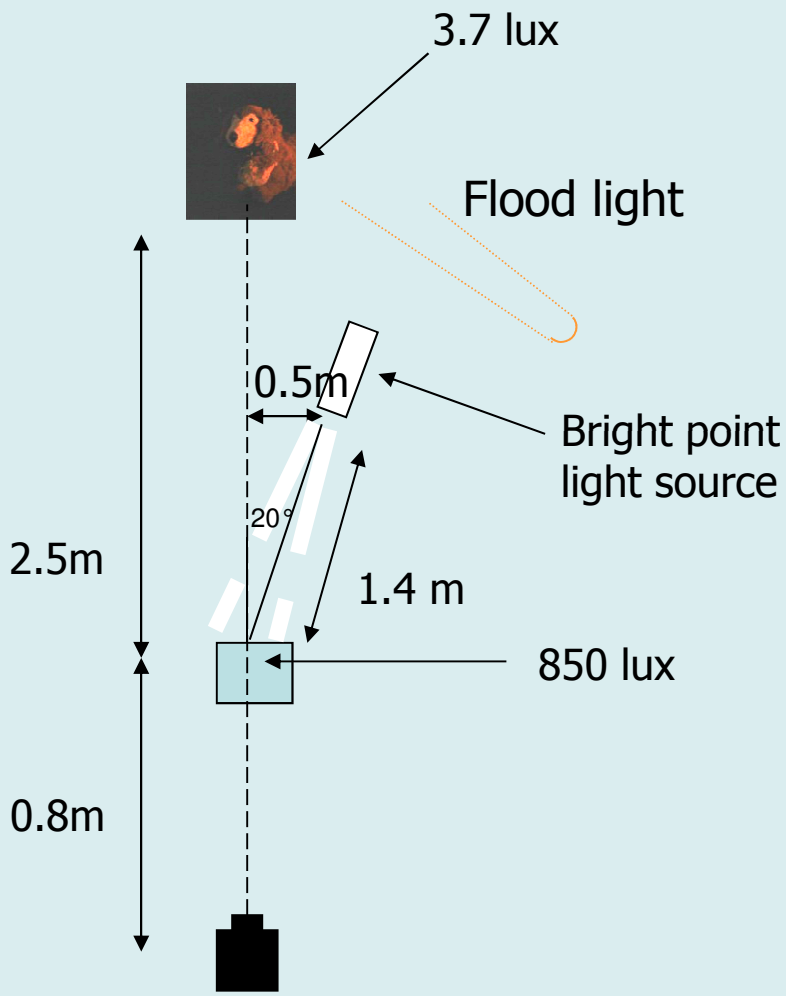
- We have used 4 mm flat colourless float glass, damaged with sand (sand drop test).
- Intention has been to produce certain levels of haze.
- We determined the haze with the haze meter (same system used for taber round robin test).
- Tests were finished in August 2011.
- Demaged glass samples can be examined.

Experimental set up

Camera: Canon EOS 500D
Lens: Canon EF-S 55-250mm
(163 mm used)
Aperture F/5.6
Capture time (for all images taken): 0.5 s

Light source: 35 W LED (850 lx – standard H7 headlamp in approx. 7 m distance)
Image processing:
Setting white point to max reading
(equivalent with auto exposure)

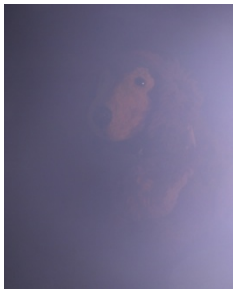
Experimental Set Up



Images with different Haze level


Air


0.06%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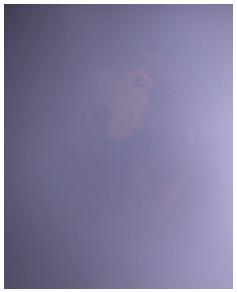
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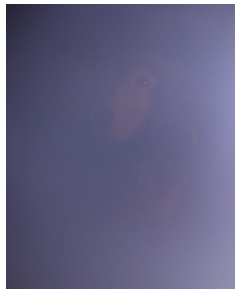
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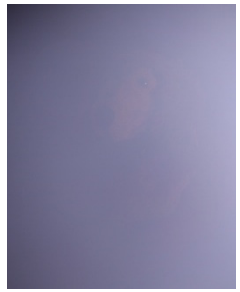
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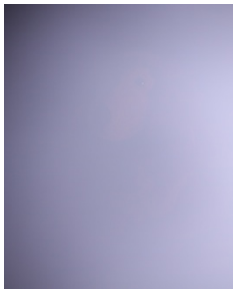
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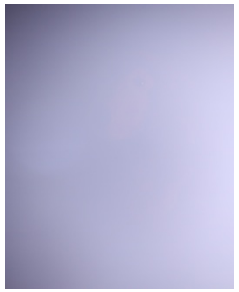

4.94%

Images processed „auto exposure“

Conclusion and References

- "Rompe and Engel (1974) found that for low contrast objects on the road, the risk of accidents increases rapidly with untinted windscreens and haze effects of 1.2%.
- A further study in 1984 showed that the probability of detecting targets of varying contrast decreased from 91% with a clear windshield to 73% with a windshield having a moderate level of haze (Olson 1996). The probability decreased even more when a glare source was introduced.
- Work reported by Weigt (1986) showed that a tinted windscreen of 77.4% transmittance and 1.5% haze performed on a par or worse than various tinted windscreens of illegal transmittance.
- Rompe and Engel (in Weigt 1986) found for viewing objects at the lowest level of contrast through clear windscreens:
  No scatter 75% correct answers.
  1.5% scatter 55% correct answers.
- The research described above would suggest that haze has a serious detrimental effect on driver vision."[1)]

Conclusion and References

- „There is considerable evidence to suggest that windscreen damage that results in the formation of stray light effects may have a negative impact upon driver´s visual perception.“[2)]

- „…the results indicate that driving with a worn windscreen has negative effects on driver behaviour. The problem may be even higher in real traffic since there are other factors, such as mud and rain that effect sight and dazzle.“[3)]

Conclusion and References

1) Loughborough University, PPAD 9/33/39 – Quality and field of vison – a review of the needs of drivers and riders, final report, prepared for the department of transport, Dec. 2000
2) Windscreens and safety: A review, Report 183, April 2001, Monash University, Accident Research Center
3) VTI (Swedish National Road and Transport Research Institute) report No. 657, 2009

Slide Show

1. Picture taken January 13, 2012, 2 p.m., through a Smart windscreen, mileage > 200.000 km, clear sunny day and sun reflection from vehicle ahead (Minolta Dimage A1, 23mm, F/11 1/80 sec)

2. Picture taken January 25, 2012, 3 p.m., through a Mercedes A Class windscreen, mileage 258.000 km, clear sunny day, sun from top left (Minolta Dimage A1, 25mm, F/5,6 1/90 sec)

3. Picture taken January 25, 2012, 3 p.m., through a Mercedes A Class windscreen, mileage 258.000 km, clear sunny day, sun from back (Minolta Dimage A1, 25mm, F/5,6 1/45 sec, focus on glass)

4. Like #3 but focus on building, 1/30 sec

5. Picture taken January 25, 2012, 3 p.m., through a Mercedes A Class windscreen, mileage 258.000 km, clear sunny day, sun from ahead, view at a dark building (Minolta Dimage A1, 39mm, F/5,6 1/500 sec, focus on glass)

6. Macro picture taken January 25, 2012, 3 p.m., through a Mercedes A Class windscreen, mileage 258.000 km, clear sunny day, sun from top ahead (Minolta Dimage A1, 50mm, Macro + 4 dioptre Marco lens, F/5,6 1/250 sec, focus on glass)

Slide Show

7. Picture taken January 23, 2012, 4:30 p.m., through a Mercedes A Class windscreen, mileage 258.000 km, clear sunny day, sun from ahead, behind trees (Minolta Dimage A1, 18,5 mm, F/9,5 1/30 sec, focus on glass)

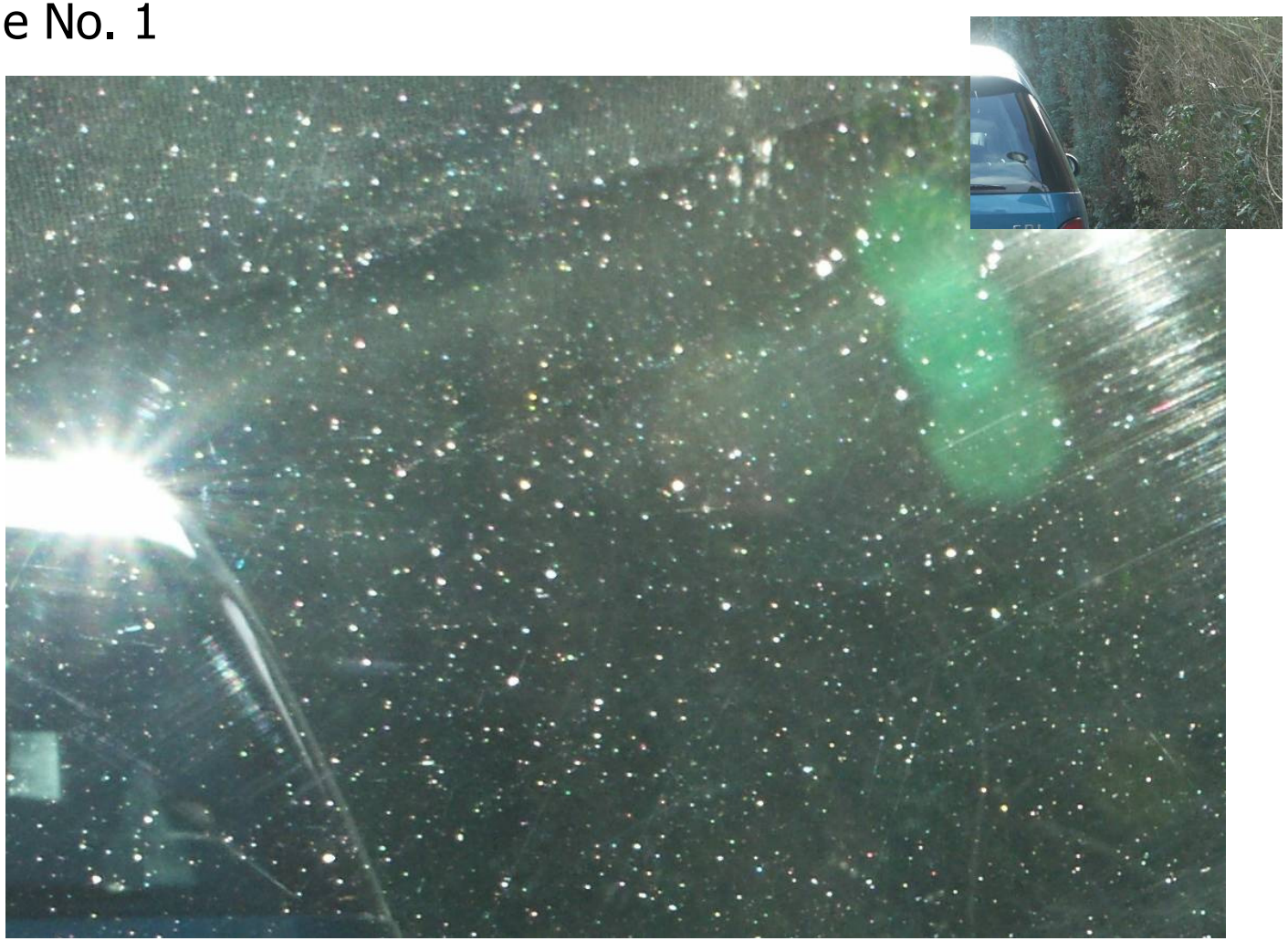
8. Picture taken January 23, 2012, 4:30 p.m., through a Mercedes A Class windscreen, mileage 258.000 km, clear sunny day, sun from ahead, partly covered by rear view mirror (Minolta Dimage A1, 18,5mm, F/9.5 1/45 sec, focus on glass)

9. Picture taken January 23, 2012, 4:30 p.m., through a Mercedes A Class windscreen, mileage 258.000 km, clear sunny day, sun from ahead, behind rear view mirror (Minolta Dimage A1, 49mm, F/9,5 1/90 sec, focus on glass)

10. Macro picture taken January 23, 2012, 4:50 p.m., through a Mercedes A Class windscreen, mileage 258.000 km, setting sun covered by trees and bushes (Minolta Dimage A1, 49mm, Macro + 4 dioptre Marco lens, F/3,5 1/30 sec, focus on glass)

Slide Show

Slide No. 1



Pict 9957

Slide Show

Slide No. 2

Pict 0010

Slide Show

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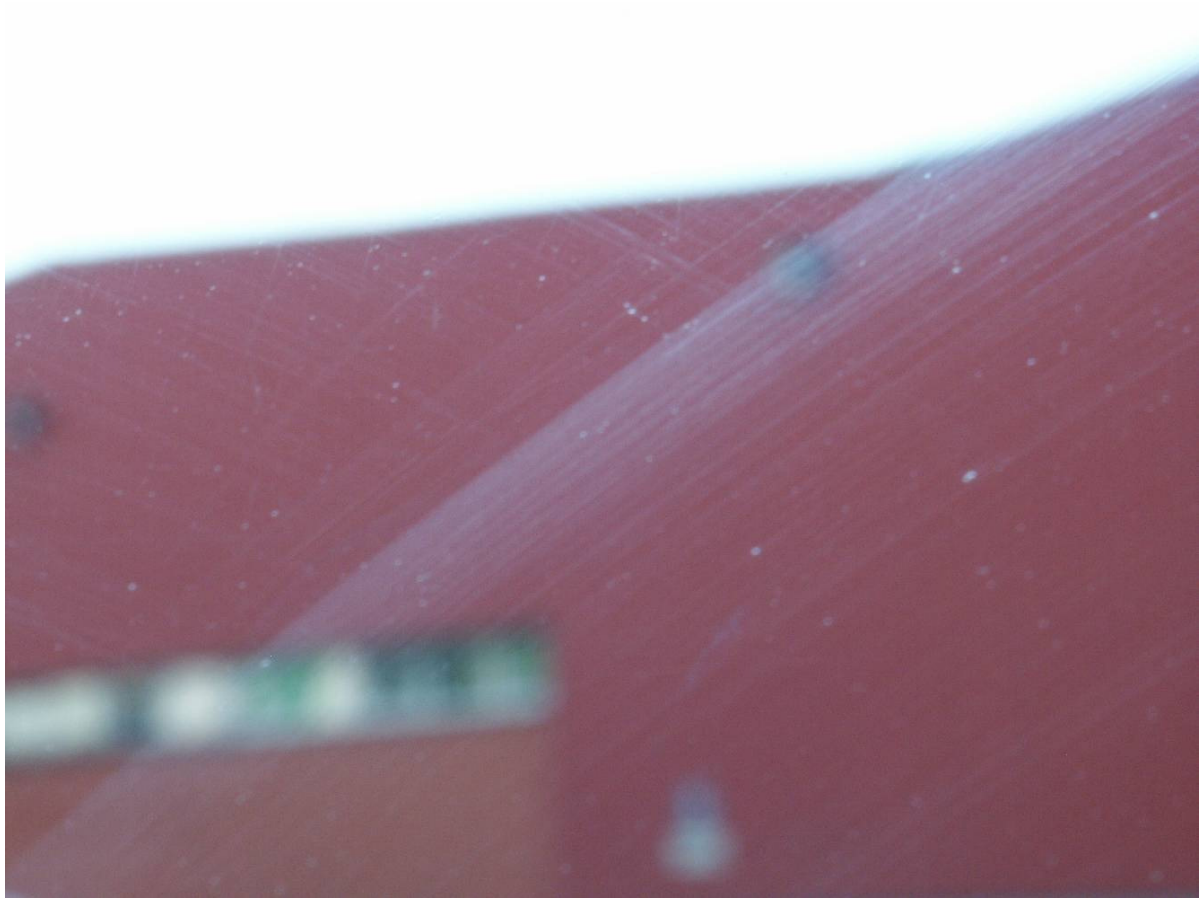

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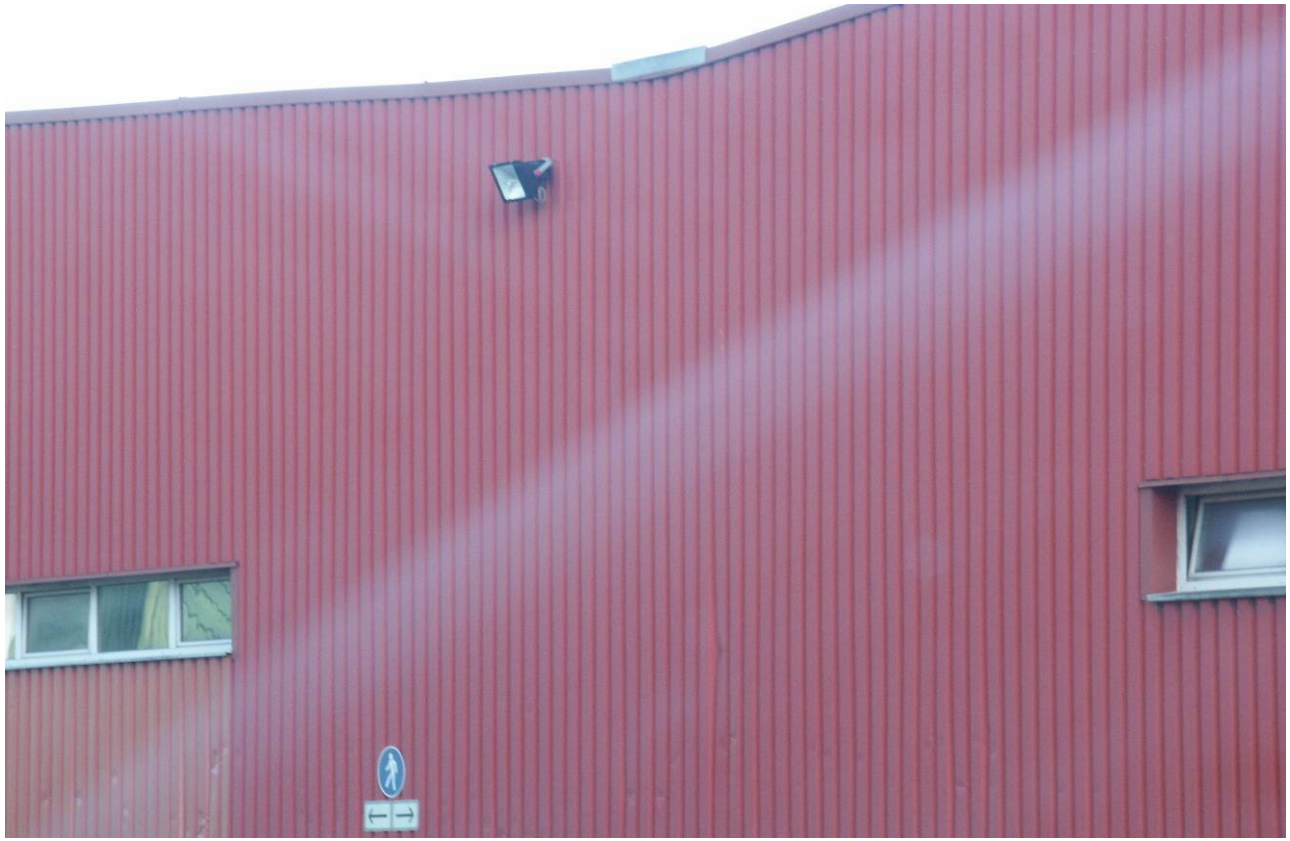

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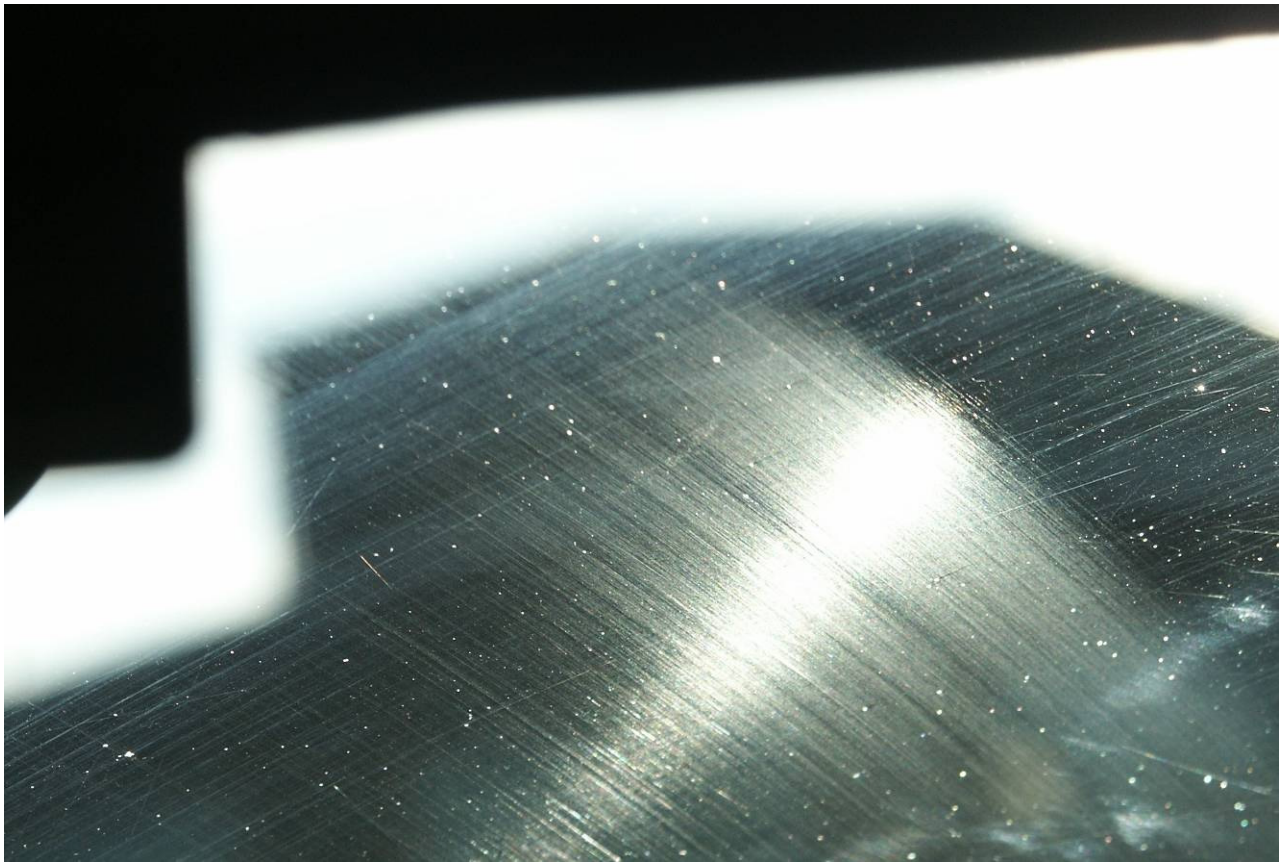

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Slide Show

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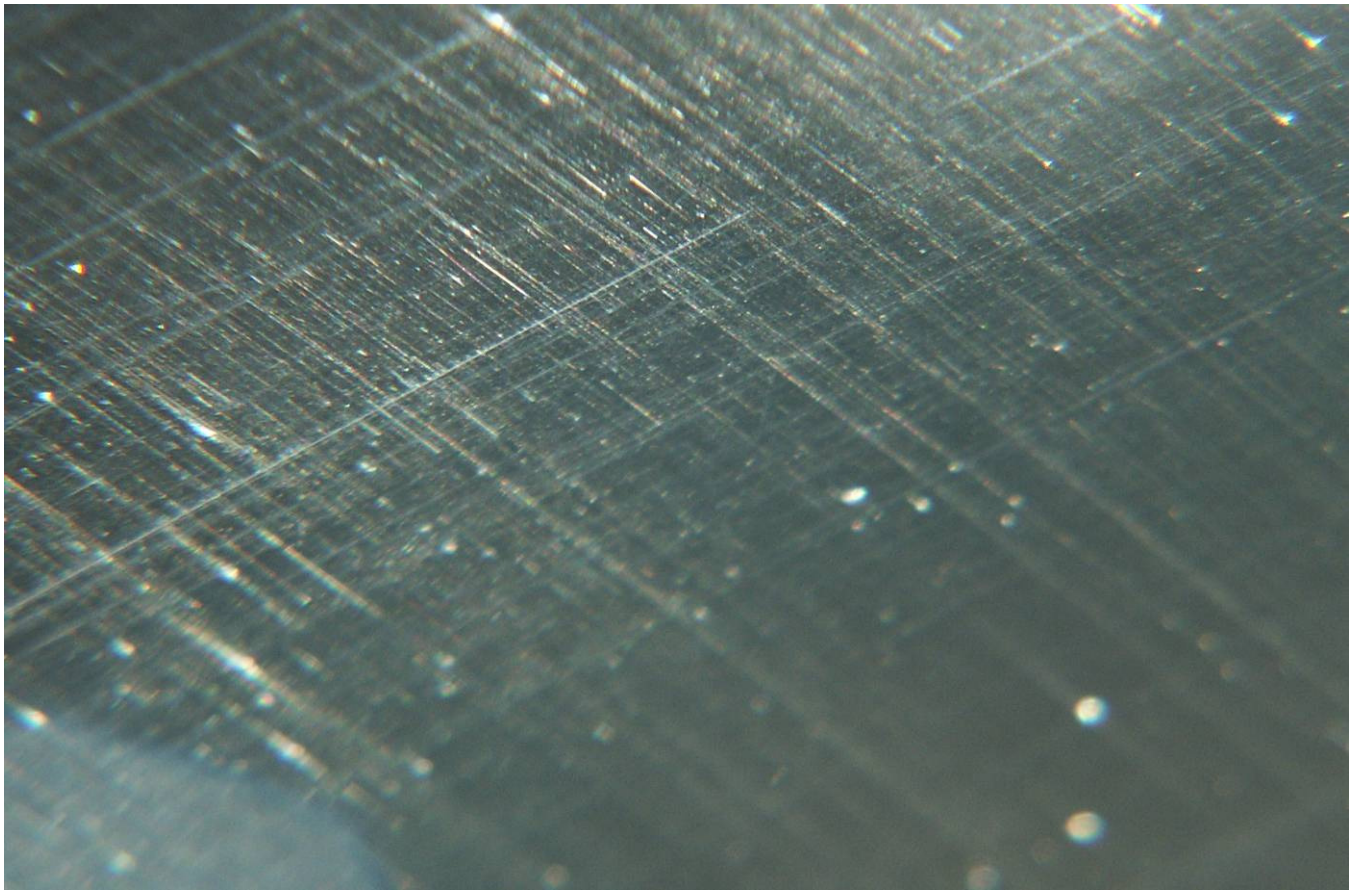

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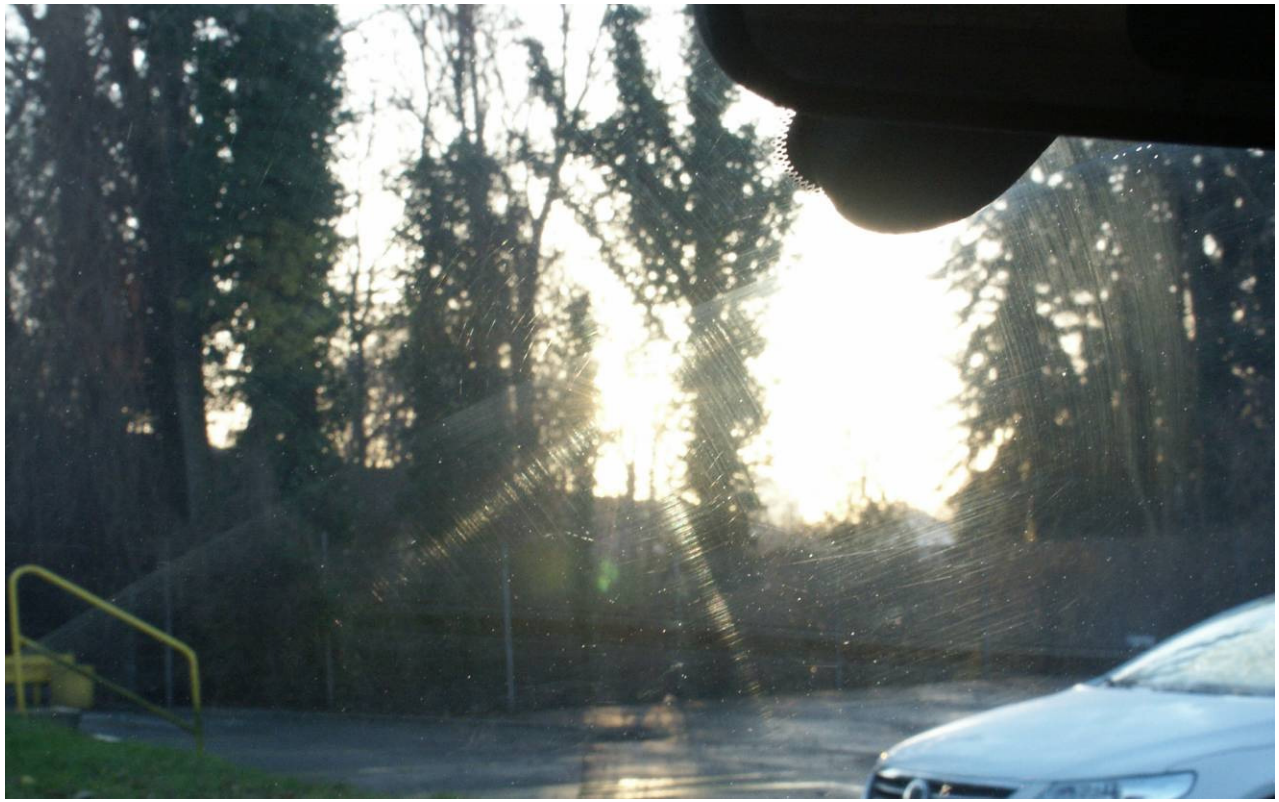


Pict 0002.tif

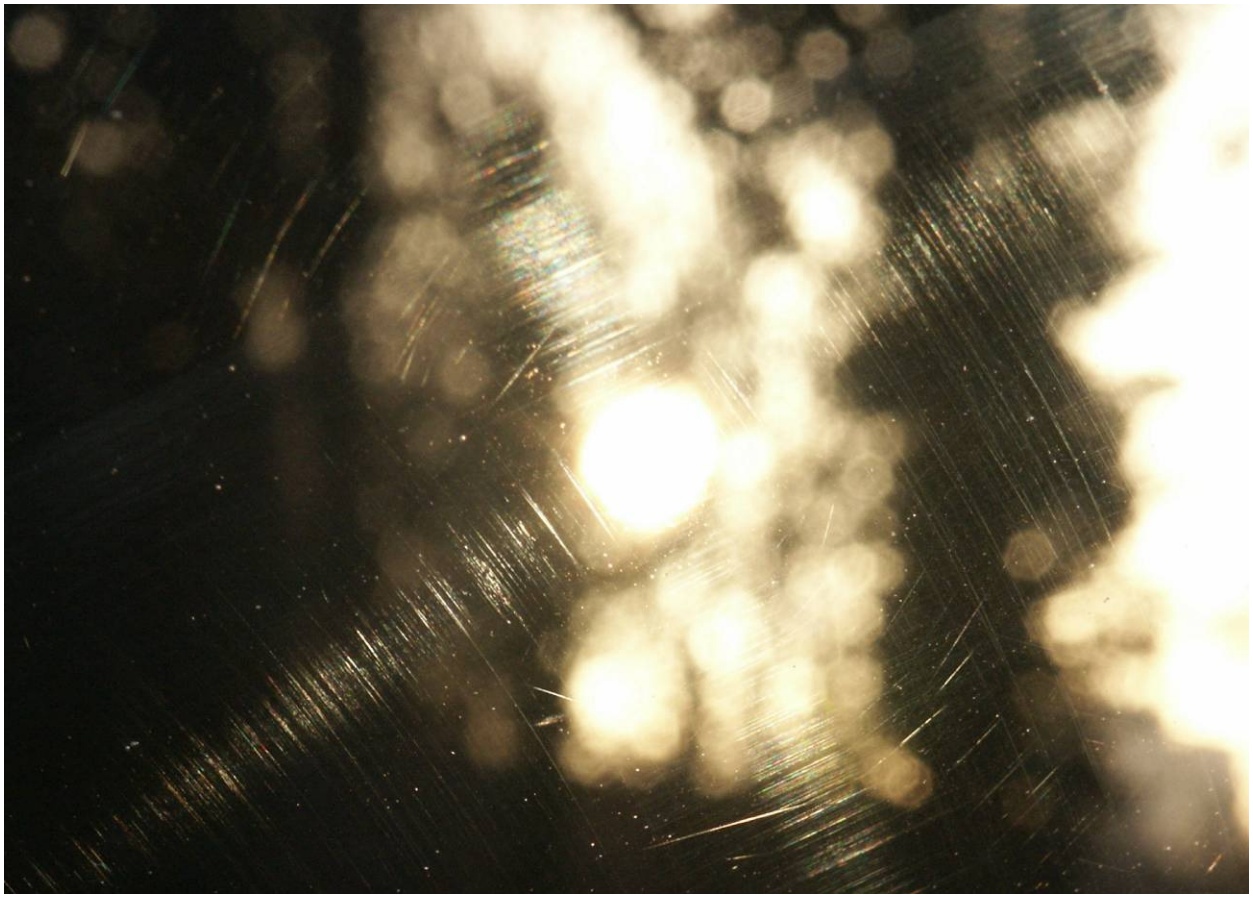
Slide Show

Slide No. 8

Pict 0003.tiff

Slide Show

Slide No. 9



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Slide Show

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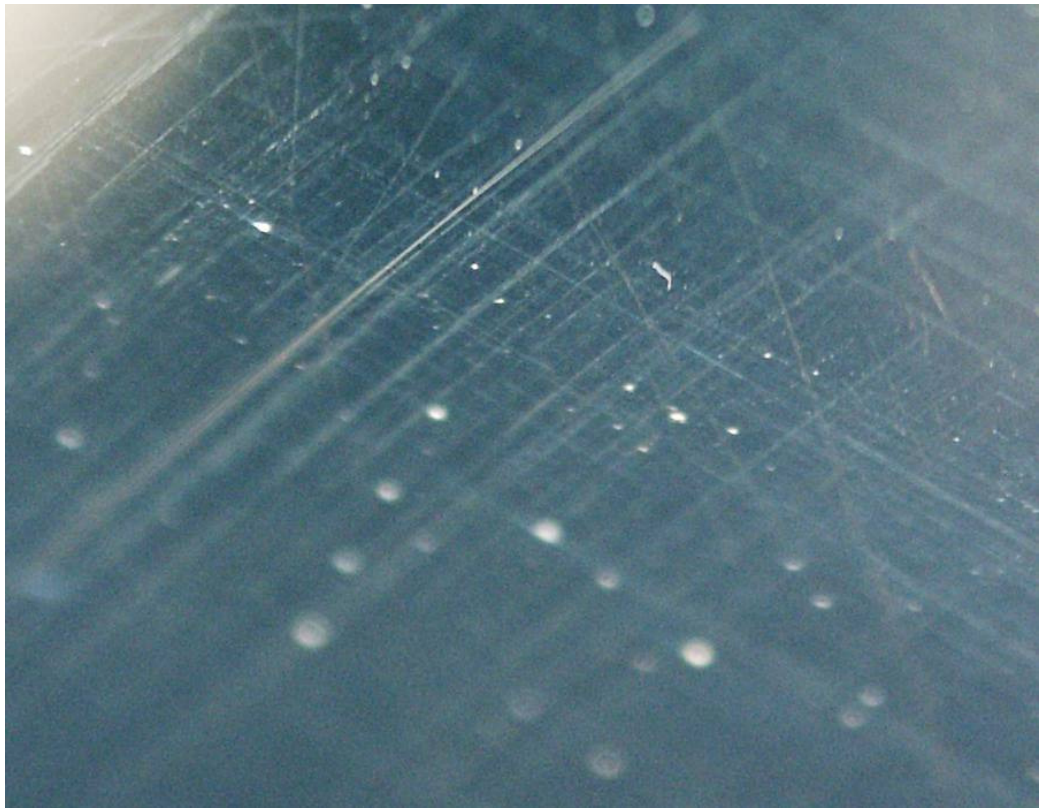

Pict 009.Tiff


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