

Report on the progress of wiper TF subgroup 2 as presented at the 8th IGPG meeting (27th and 28th of November 2013 in Paris (OICA))

1.) A joint meeting between subgroup 1 and 2 was held at VW in Wolfsburg at 21st of August as proposed during the 7th IGPG meeting

- participants:
 - IGPG: Mr. Preußner (Chairman), Mr. Dümmler (MPA),
 - IGPG TF wiper subgroup 1: Mrs. Matthai (Audi), Mr. Meyer (VW), Mrs. Susenburger (VW)
 - IGPG TF wiper subgroup 2: Mr. Terragni (SIP), Mr. Kilian (Evonik), Mr. Kiesewetter (Evonik), Mr. Wiesenberger (Momentive), Mr. Buckel (BMS)
 - guest: Mr. Schwahn (Schwahn Systems)

- content and results

- main topics during this meeting have been
 - introduction of the Straylizer by Schwahn Systems



StrayLizer - Schwahn
Systems.pdf

- further proceeding in the subgroup 2
- summary of the discussion
 - doubts about what is exactly measured by the Straylizer systems have been raised and could not be clarified sufficiently, furthermore the system in its current version is not yet adjusted to measure plastic glazing parts
 - based on the following two items
 - in order to demonstrate if the wiper lab test is reproducible at least 3 test houses need to participate in a round robin following the same test procedure (and using the same test device)
 - in view of the demanding time schedule
 it was decided that the further development of the test method (subgroup 2) is done in parallel for the two principal different test devices (SIP-device and ISO-device)
- agreed next steps:
 - Schwahn Systems will do further adjustments on the Straylizer, and will measure samples in order to compare results measured by the Straylizer with those measured exactly according to DIN 52298
 - two further SIP-devices have to be build and delivered to test houses interested in participating in a round robin using a suitable test procedure for that device
 - further improvements of the ISO-device are needed to get homogeneous scratch distribution on the samples tested with this device

- 2.) A further meeting was held at EDAG in Ingolstadt at 7th of October to finalize a test procedure for the planned round robin test using the ISO-device
- participants: Mrs. Matthai (Audi), Mr. Kolbinger (EDAG), Mr. Terragni (SIP), Mr. Kilian (Evonik), Mr. Wiesenberger (Momentive), Mr. Capellen (BMS), Mr. Buckel (BMS)
 - content and results:
 - discussion regarding the optimization efforts every “ISO-device” using labs (Audi, Evonik, Momentive and BMS) have made since the Wolfsburg meeting
 - decision to use a sample-size-adjusted box as slurry container to ensure a high and constant level of dirt on the sample
 - joint elaboration of a test protocol and a plan for a round robin test including priority (to get first results at the next IGPG meeting)
 - decision to use float glass, coated PMMA, AS4700 coated PC and UVHC 3000 coated PC as test samples as well as 5.000, 10.000 and 20.000 wipe cycles for the round robin
- 3.) Presentation of the results of TF wiper subgroup 2 at the 8th IGPG meeting in Paris on 27th and 28th of November

- content:
 - detailed explanation of the current draft test protocol (see attachment below) which is based on an existing standard instrument and two additional “to be built” components (a wiper blade holder and a sample box)



2013-10-07 Wiper Laboratory Test.pdf

- first round robin results from three test labs and for two wipe cycles indicate
 - a homogeneous haze distribution over the samples¹
e.g. coated PMMA after **10.000** wipe cycles from one test lab

Replicate	final haze [%]									average	std
	measurement										
	1	2	3	4	5	6	7	8	9		
26 Prio 2	0.73	0.86	1.03	0.64	0.73	1.79	0.81	0.84	1.93	1.04	0.48
27 Prio 2	0.95	0.84	0.84	0.77	0.77	0.67	1.03	0.77	0.68	0.81	0.12
28 Prio 2	0.87	1.03	0.84	0.80	0.92	0.82	0.92	1.21	0.79	0.91	0.13

- the possibility to distinguish between not recommendable and suitable coating systems²
e.g. UVHC 3000

Replicate	final haze [%]									average	std	delta haze [%]
	measurement											
	1	2	3	4	5	6	7	8	9			
1	4.70	4.58	3.81	4.38	4.24	3.89	5.25	4.96	4.77	4.51	0.48	4.32
2	3.94	4.96	3.27	3.68	3.57	4.23	3.68	3.88	3.32	3.84	0.52	3.61
3	4.56	4.75	4.14	4.13	3.15	3.95	4.83	3.47	3.48	4.05	0.60	3.85

¹ can be seen by comparing the final haze values at 9 different measurement points on one sample or the low standard deviations gained for the measurement on a single sample

² can be seen by comparing the delta haze values for UVHC 3000 (used for headlamp covers (and one of the coatings with the highest abrasion resistance used for that application) and AS4700 coated PC even after 5.000 cycles

and AS4700 coated PC after **5.000** wipe cycles from one test lab

Replicate	final haze [%]									average	std	delta haze [%]
	measurement											
	1	2	3	4	5	6	7	8	9			
1	0,51	0,51	0,38	0,62	0,48	0,26	0,50	0,50	0,49	0,47	0,10	0,35
2	0,50	0,90	0,32	0,48	0,65	0,28	0,77	0,74	0,28	0,55	0,23	0,42
3	0,21	0,53	0,32	0,19	0,35	0,23	0,20	0,46	0,36	0,32	0,12	0,20

- a good repeatability within the labs³
e.g. coated PMMA after **10.000** wipe cycles from on test lab

Replicate	initial haze [%]		final haze [%]		delta haze [%]
	average	std	average	std	
CAP 3753 - 96	0,27	0,01	0,92	0,31	0,65
CAP 3753 - 97	0,28	0,02	1,18	0,58	0,90
CAP 3753 - 98	0,27	0,01	0,97	0,40	0,70
average delta haze [%]		0,75			
std		0,13			

and also

- a good reproducibility comparing the results of the different labs⁴

wipe cycle no. / sample	average \bar{x}	standard deviation s_x	repeatability standard deviation s_r	reproducibility standard deviation s_R	repeatability r	reproducibility R
5.000 / glass	0,0286	0,0403	0,0159	0,0424	0,04	0,12
5.000 / coated PMMA	0,3356	0,3386	0,2194	0,3831	0,61	1,07
5.000 / AS4700 PC	0,3862	0,1510	0,2335	0,2432	0,65	0,68
5.000 / UV HC 3000 PC	5,3343	1,2448	2,2184	2,2184	6,21	6,21
10.000 / glass	0,0680	0,0373	0,0494	0,0550	0,14	0,15
10.000 / coated PMMA	0,4580	0,2527	0,1028	0,2663	0,29	0,75
10.000 / AS4700 PC	0,6823	0,3303	0,3654	0,4451	1,02	1,25
10.000 / UV HC 3000 PC	8,5178	4,0098	1,6994	4,2431	4,76	11,88

- summary:

- the first results using the test description indicate at least for the good performing samples not only a homogeneous scratch distribution on the individual samples, but also a good repeatability and a good reproducibility comparing the results of the three (so far participating) test labs
 - the tested conditions are reproducible
- furthermore the test procedure allows to distinguish (based on significant haze differences) between not recommendable and suitable coating systems
- subgroup 2 is in time and will present together with subgroup 1 a final proposal regarding a wiper test at the next meeting (25th and 26th of March 2014)

³ can be seen by comparing the results for the three replicates abraded under the same conditions within one lab or the low standard deviations gained calculating the sample average value

⁴ can be seen by comparing the results gained in different labs for the same sample type abraded under the same conditions or by the low reproducibility standard deviations gained