Hikvision Anti-corrosion Camera Housing

To: GUOE, LINR
Cc: CAAG,YAGK, FNM, GUOS, GUOC, YAVY

1 General

Customer	:	Hikvision		
Participants	:	Hikvision	:	Mr. Yuan (Material Engineer) Mr. Guan (Product manager, Anti-corrosion camera)
		EMS	:	E. Guo, W. Liang
Application	:	Anti-corrosion camera housing		
Material	:	Grivory XE 5107 (GVL-5H V0)		
Potential	:	50 t/a		
SOP	:	12.2022		
USP	:	Excellent material performance (low temp. impact resistance & high strength)		

2 Summary / Conclusion / Opportunities

- **PPS+40GF (Celanese)** is pre-selected as 1st material candidate for Hikvision **Black product series** as its better chemical resistance performance
- **PA+50GF (EMS or local supplier)** is pre-selected as 1st material candidate for Hikvision **Grey product series** as PPS's yellowing issue in weathering test
- **Impact/ drop test** standard was not fixed yet which might change above selection
- Grey color matching support will be needed for Grivory GVL-5H V0

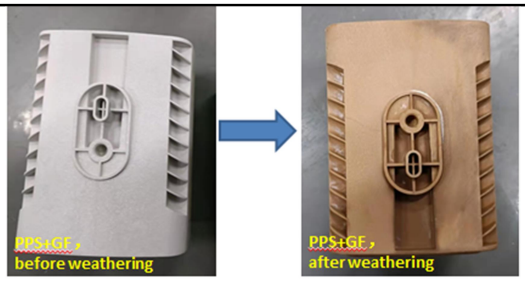
3 Back ground information

Customer & Project information

- Material evaluation were done with specimen and molded part of existing tool
- Project schedule: 3d model fixed (Mar.2022) -> tool construction (Apr.2022)
- Weathering/ Salt mist, cyclic/ Flowing gases corrosion test results as below
  - PPS+GF showed good strength retention, although serious color change happened in weathering test
  - PC+GF also showed good strength retention, even better than Polyamide. However, PC+GF won't be considered as its too low strength value

Test Item	Test Condition	Tensile Strength Retention (Strength)					Standard
		XE 11119	XE 5107	PC+10GF (Sabic)	PPS+GF40 (Celanese)	PPA+GF30	
Weathering	**Xenon lamp, 1000 hrs**	**87% (130MPa)**	**96% (211MPa)**	99%	**97%* (190MPa)**	95%	GB 3836.1 IEC 60079-0-2007 ISO 4892-2
Environmental testing: Salt mist, cyclic (Sodium chloride solution)	**5% NaCl solution, PH 6.5-7.2 (Salt spray 2hrs, heat storage 7 days@40C, R.H.93%, 4 cycles)**	**85% (127MPa)**	**85% (180MPa)**	99%	**97% (190MPa)**	87%	GB/T 2423.18-2021 IEC 60068-2-52
Environmental testing: Flowing mixed gas corrosion test	**SO2: 50ppb~750ppb H2S: 5ppb~25ppm NO2: 50ppb~750ppb Cl2: 5ppb~70ppb**	**90% (135MPa)**	**87% (191MPa)**	98%	**98% (191MPa)**	90%	GB/T 2423.51-2020 IEC 60068-2-60
Initial Strength	Tensile Strength, MPa	**150**	**220**	55	**195**	130	ISO 527

*Remark: * PPS part showed serious color change after weathering test*



- **Fogging test** is on-going as Hikvision needs to check whether moisture absorption of Polyamide would affect imaging of its camera
- No material could pass the 20J impact test, while **impact performance** is biggest advantage of Polyamide vs. PPS. Test criteria is under evaluation
- PPS+GF is pre-selected as 1st candidate for Hikvision Black color series product
- PA+GF is pre-selected as 1st candidate for Hikvision Grey color series product

Part & test requirement

- High strength
- Weathering resistance (ISO 4892-2)
- Salt mist resistance (GB/T 2423.18; IEC 60068-2-52)
- Corrosion gases resistance (GB/T 2423.51; IEC 60068-2-60)

4 Action plan

No.	Measures	Resp.	Date
1	Color ship of GVL Grey application	GUOE	Done
2	Follow through 3D model building & tool construction status	LIAW	2022.04.29

5 Attachment

#1 Mechanical properties comparison

Best Regards
William Liang
AD/TCS Engineer, Industry

Attachment #1: Mechanical properties comparison

Test Item	Unit	XE 11119	XE 5107	PC+10GF (Sabic)	PPS+GF40 (Celanese)	PPA+GF30	
Tensile E-Modulus	**MPa**	**16500**	**16500**	/	**14700**	/	ISO527
Tensile strength at break	**MPa**	**130**	**205**	/	**195**	/	
Elogation at break	**%**	**1.5**	**2.5**	/	**1.8**	/	
Impact strength							ISO 179 1eU
23C	**kJ/m2**	**30**	**90**	/	**53**	/	
-30C	**kJ/m2**	**30**	**90**	/	**53**	/	
Notched Impact strength							ISO 179 1eA
23C	**kJ/m2**	**8**	**30**	/	**10**	/	
-30C	**kJ/m2**	**8**	**30**	/	**10**	/	

Remark: all data from TDS, PPS+GF40 from Celanese Fortron 1140L4 DW