

PSPC-COT Test Results in JAPAN

Industry Joint Working Group/COTCPS
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Method of Making Test Panels

- 4 types of panel is prepared
 - Epoxy coatings with shop primer and without shop primer.
 - Vinyl Paint
 - Tar-Epoxy Paint
 - Shop primer is inorganic zinc shop primer
- The final coatings is applied on shop primer after 1 month exposure.
- The tap water washing is done before main coatings.
- Foreign matters to be cleaned with a soft sponge etc.



Test condition (Vapor test)

Temperature: 60°C

Humidity : Approx. 100%

Gas compositions:

Inert gas : (Nitrogen: 83% ,Carbon dioxides: 13%,Oxygen: 4%)

Sulfur dioxide: 300ppm

Hydrogen sulfide: 200ppm

Above gas is pumping every 2days to maintain the gas density.



Test equipment (Vapor test)

Test cabinet

Chamber Capacity : Approximately 135 Liter

Indicator :

Digital Temperature and humidity indication,

Digital Indication Gas Flow, Concentration, Recorder

Temp Set-Up :

25 ~ 60 Digital Set-Up (Cycle Test can be added)

Humidity :

60 ~ 98% RH Digital Set-Up (Cycle Test can be added)

Gas Flow :

0 ~ 200CCM/min (Electronic mass flow controller with Shut off function)

Gas Concentration :

10ppb ~ 500ppm (the type, concentration, indication and Automatic concentration set-up functions are optional.)

Total Flow : 360 liter/h

Weight : 85Kg (without bomb tank)

Cooler : Contained a cooler for dehumidification (200W)



Test condition (Immersion test)

- Low Sulfur A Fuel Oil (JIS K 2205)
(As substitute for Distillate Marine Fuel Grade A
(ISO 8217))
- Add:
 - Naphthenic acid to AN 2.5 mg KOH
 - BT in a 1:1 ratio up to a total concentration of 8%
 - H₂S in water solution. Concentration 5 ppm
 - 5% sea water
 - Homogenize in ultrasonic bath.



Comparison Table DMA/LSA Heavy oil

Characteristic	Unit	Limit	DMA	LSA
Density at 15°C	g/cm ³	max.	0.8900	0.83
Viscosity at 40°C	mm ² /sb	min. max.	1.50 6.00	2.37(at 50°C)
Flash point	°C	min.	60	68.5
Pour point (upper)	°C			
Winter grade		max.	-6	-7.5
Summer		min.	0	
Sulfur	%(m/m)	max.	1.50	0.0825
Cetane index	-	min.	40	55.9
Carbon residue on 10%(v/v) distillation /Bottom	%(m/m)	max.	0.30	0.31
Ash	%(m/m)	max.	0.01	0
Appearance	-	-	Clear and bright	Clear and bright



Test equipment (Immersion test)

40°C

60°C







After 3 months / 40°C immersion

Maker 5	42B1	42B2	42S1	42S2
Initial				
3 months				
Blister	4(S2)	4(S2)	2(S5)	1(S2)

Maker5 42 shows blister on a par with 1 and 2 months investigation.



After 3months / 40°C immersion

Maker 1	42S1	42S2
Initial		
3months		
Blister	0	3(S2)/Water phase



Maker1 42S2 shows blister on water phase.



After 3months / 40°C immersion

	VinylB1	VinylB2
Initial		
3months		

Vinyl system shows decaying of the film.



Test results

Table. Generation status of BLISTER / after 3months

Maker	Immersion test								Chamber test			
	40°C				60°C				PE		ME	
	BP	SP	BP	SP	BP	SP	BP	SP	BP	SP	BP	SP
1				Bw			Bo	Bo		*		*
2												
3												
4		-	-	-		Bwo						
5			Bo	Bo			Bo	Bo				
6						Bo						
7												

BP/SP: Blasted panel / Shop primer panel

Bw: Blistering on water phase

Bo: Blistering on oil phase

*: Blistering area is limited to the lower part of test panel, and the part is steadied by test panel rack.



Conclusion

- Some products showed blistering
we have to draw a conclusion after comparing these results and actual ship's results.
- Tar Epoxy Paint had no blistering in all test
- Vinyl paint showed defects (rust ,soft ,peeling...) in all test.

