20 March 2014

DRDC-RDDC-2014-L101

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Scientific Letter

Deck paint failure on HMCS GLACE BAY

The Dockyard Laboratory (A) was asked by Canadian Fleet Atlantic HQ to examine the non-skid deck surface on HMCS GLACE BAY. The coating was relatively new, having been applied in June 2012, but it was already lifting off in large patches on parts of the ship's foc's'le.

An on-site inspection confirmed the deterioration of the coating in at least three regions on the foc's'le (Figure 1). The major damage was localized in patches having areas on the order of a few square feet each. There was no apparent peripheral wear that would be attributed to high foot traffic, nor was the damage in locations that would immediately seem prone to such use. The coating around the affected spots was still attached to the steel substrate, but it could be easily pried up in large pieces with a small lab spatula. In other area, small cracks and pinholes appeared to be leaking rust from the steel deck below. Representative samples of the paint were taken back to the laboratory for further examination.

A cursory microscopic survey of the coating did not reveal any surface problems that could be ascribed to mechanical damage, e.g., gouges caused by ice chipping. There were, however, a number of microscopic cracks having morphological features consistent with shrinkage (Figure 2), i.e., mud cracking. Fourier transform infrared (FTIR) spectroscopy showed no evidence of compositional anomalies such as amine blooming.

Randomly chosen cross-sections of the lifted paint were mounted, polished, and examined microscopically. A selection of images is shown in Figure 3. Consistently, the primer layer was thinner than the 125–150 μm (Ref. [1], page 5-8-16) thickness specified for product C420, *Epoxy Primer for Epoxy Non-Skid* (for which International Intershield 300 is an approved product per Ref. [1], page 5A-25). The topcoat also exhibited overall problems with thickness. The specified thickness should be 750–1000 μm (Ref. [1], page 5-8-16), although the manufacturer does note that the surface profile should exhibit a uniformly rough appearance, with ridges 1.5–2.4 mm high, and no thinner than 0.030″ (760 μm) at the thinnest point (Ref. [2]). It is clear in Figure 3 that the thicknesses of both the primer and the top coat are not within specification. In fact, the combined coating was so thin in some spots that pinholes had formed. Figure 4 shows light coming through such a pinhole.

In addition to thin regions and pinholes, there are many voids in the topcoat (e.g., Figure 3f). While there is no mention of voids in either Ref. [1] or [2], it is generally true that voids indicate deteriorated or poorly-handled product (e.g., at or past its usable pot life), or improper application. Furthermore, such voids usually represent a weakness in the material.

The inconsistent thickness of the topcoat could account for the cracking noted in Figure 2. The International 6GV application guide (Ref. [2], § 5.7.2) cautions that "thick, carelessly applied coats will result in minimum coverage and be subject to mud-cracking and/or blistering." The morphology of the cracks and the observed thickness discrepancies point strongly to an improperly-applied top coat. The pinholes indicate improperly-applied top coat and primer.

The daily inspection reports were obtained from the primary contractor. They are compiled in Annex A and summarized in Table 1 along with the historical weather data recorded at Environment Canada's Shearwater station, approximately 6 km away. A few points worth noting:

(a) The sheets are, overall, lacking in detail; they do not clearly indicate which part of the ship was being painted on that day.

(b) Overall, there is a good correspondence between the weather conditions recorded on the sheets and the historical data. On a few occasions (Rows 2, 3, 8, 22, 23, and 32) there was evidence of precipitation. It is unknown how this might have affected that day's work.

(c) The application guidelines for the primer, Intershield 300, indicates a maximum permitted temperature of 40°C for the surface (Ref. [3], § 2.3.6). On several occasions, this temperature limit was evidently surpassed (Rows 6, 8, and 10).

(d) Similarly, the product datasheets (Refs. [4] and [5]) specify that the coating must be applied at a temperature at least 3°C beyond the dew point. There were occasions (Rows 3, 14, 20, and 21) where this was or nearly was violated.

(e) The batch numbers were not always properly filled out, and on three consecutive days (Rows 9–12) a digit was missing. This was presumably the result of having copied the previous day's batch number from the sheet, instead of having recorded the information directly from the container.

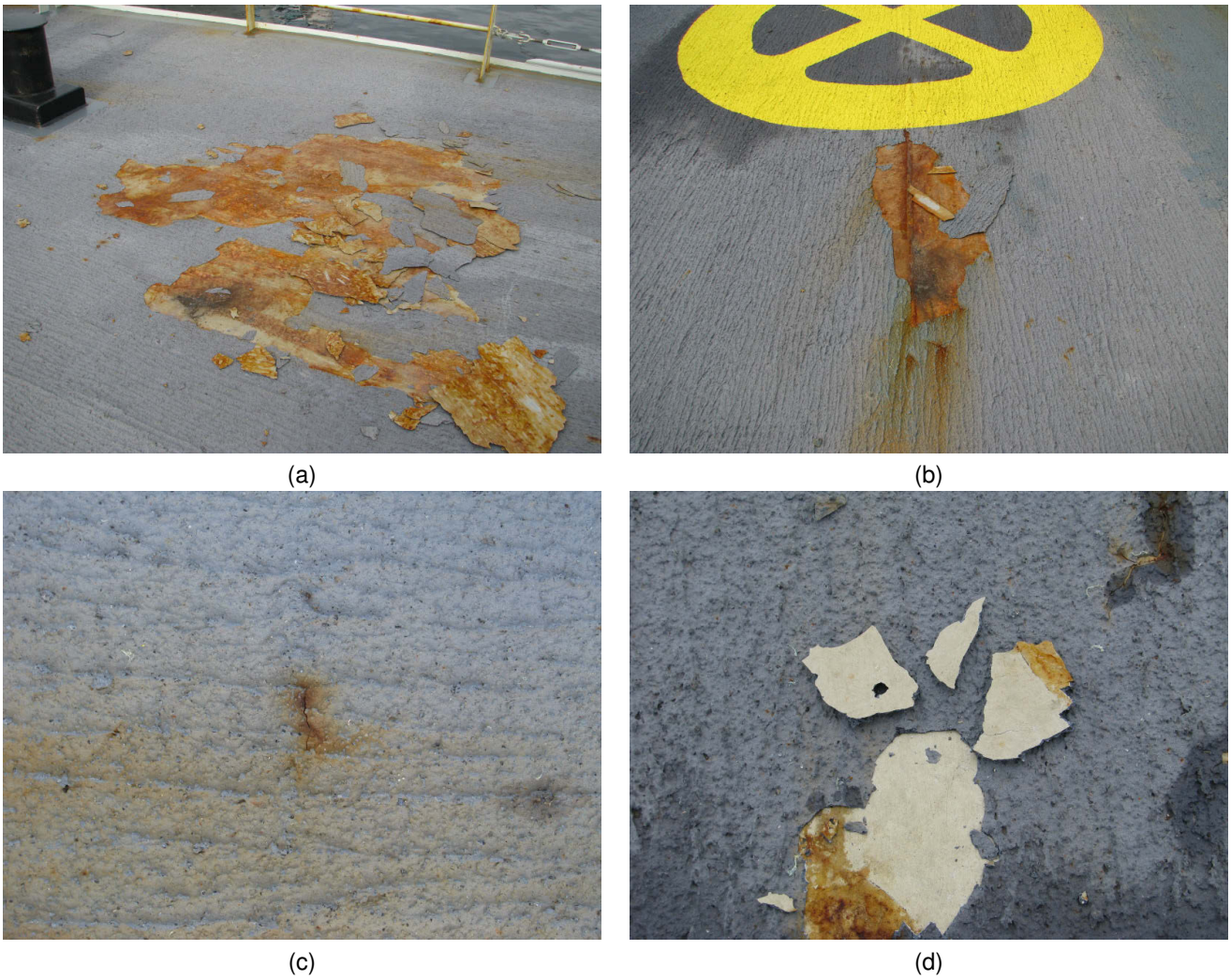
The batch numbers were deciphered according to International's system. The first letter denotes the year sequence (M=2011, N=2012, etc.), and the second the month (B=February, C=March, etc.). In each case the letters *I* and *O* are omitted to avoid confusion. The following series of four digits forms a sequence number, and the final two letters indicate the manufacturing location. All the products were used well within their 12-month shelf life.

The Daily Inspection Reports (DIRs) also do not show any evidence that dry film thickness (DFT) measurements were performed on the primer coat during the course of its application. The PMS2O instructions § 12.2 (Annex B, page 41) mandate such readings along a 2-meter grid. None is recorded, though the final page of the PMS2O Instructions (Annex B, page 45) does include an unclear reference to such measurements, dated July 9th. The only three DIRs for the topcoat 6GV (Table 1, rows 14, 20, and 27) each indicate a DFT of exactly 0.030″, meeting the nominal minimum thickness. This however, is not consistent with the cross-sectional thickness determined microscopically and discussed earlier (Figure 3).

Furthermore, it is not clear from the information on hand that the Ships Paint Manual requirement that "A Certified NACE CIP Level 2 inspector shall carry out all preservation and coating application inspections" was fulfilled. The signature on the DIR sheets matches that of the Service Provider Supervisor (Annex B, page 40). If the subcontractor supervisor is also the NACE inspector, that would suggest a conflict of interest.

To summarize, there is no evidence of chemical deficiency in the coatings, nor of mechanical damage to the surface. While the DIRs are lacking in detail overall, they do suggest some coatings were applied under less than ideal conditions. Microscopic measurements of paint taken from the affected area clearly show that both the primer and top coat were not applied to the specified thickness. Finally, it is reasonable to conclude that the premature failure of the coating can be ascribed entirely to this improper application.

Prepared by **Colin G. Cameron, DRDC – Atlantic Research Centre.**



(a) (b)

(c) (d)

Figure 1: *Photographs of the foc's'le deck on HMCS GLACE BAY: (a,b) two regions showing widespread coating lift-off, (c) one of many small cracks around 1 cm long found at random locations on the deck, and (d) flakes of coating that were easily pried off with a small spatula, revealing a pristine surface underneath.*

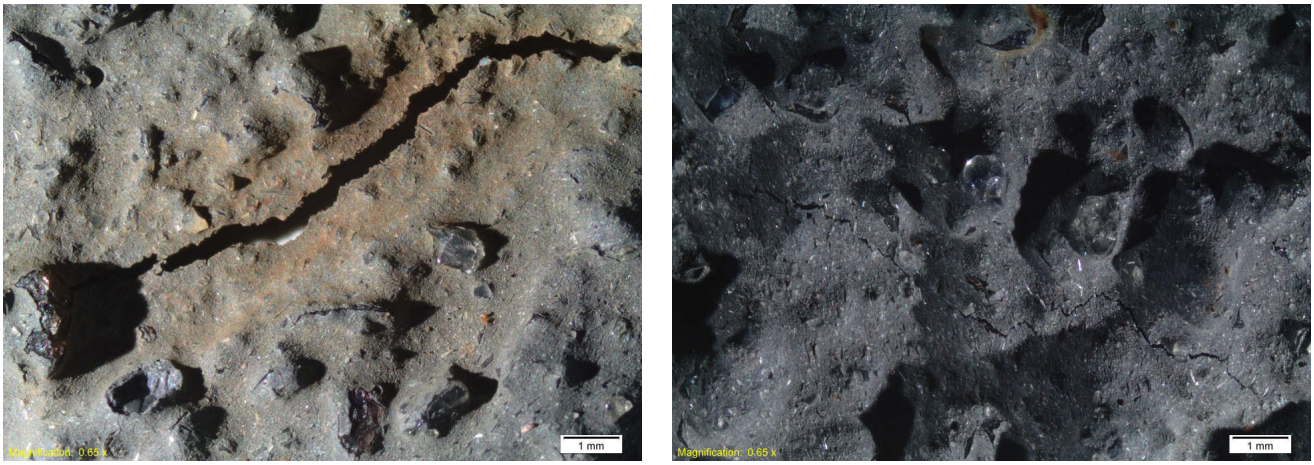
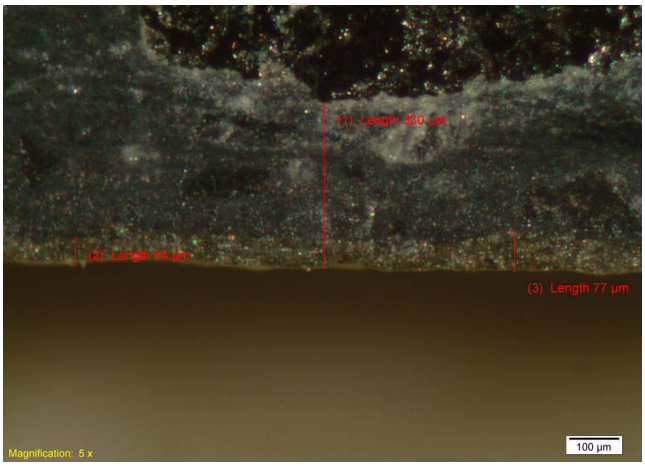
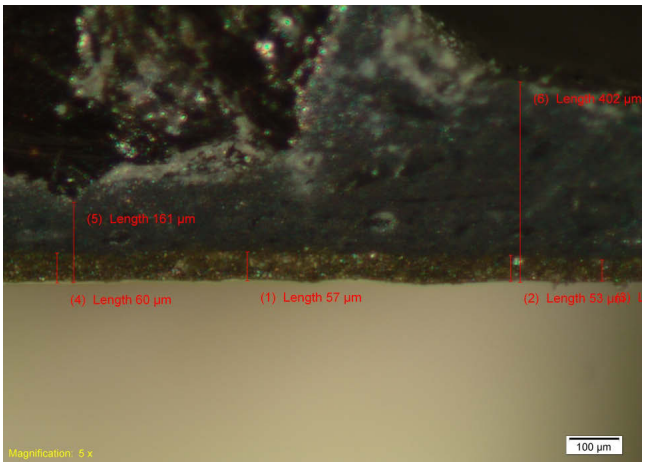


Figure 2: *Microscopic images of the surface of the deck coating. The cracks are consistent with the tearing-apart failure of a material that had shrunk and developed internal stresses. No signs of mechanical damage (i.e., gouges or tool marks) were detected.*

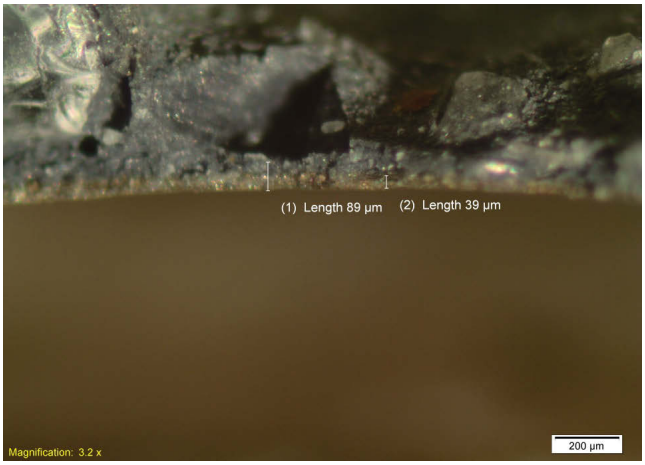
Canada



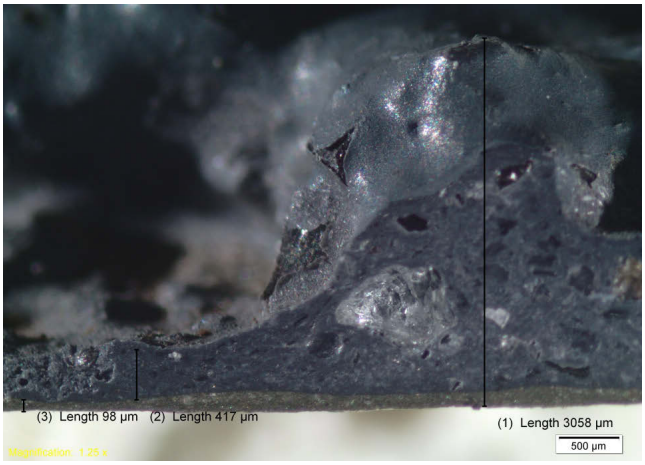
(a)



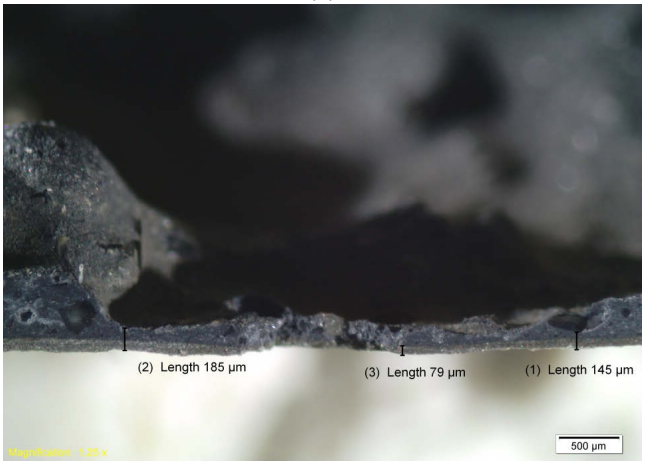
(b)



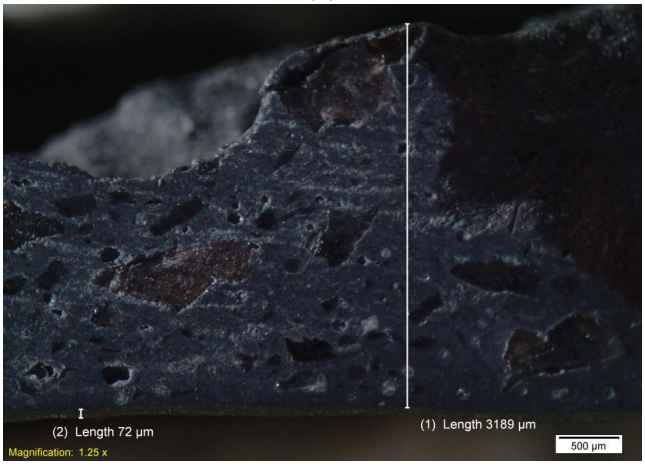
(c)



(d)



(e)



(f)

Figure 3: *Assorted microscopic images of coating cross sections. The thinner, silver-gold layer is Intershield 300 primer, while the thicker blue-grey layer is the Intershied 6GV topcoat.*

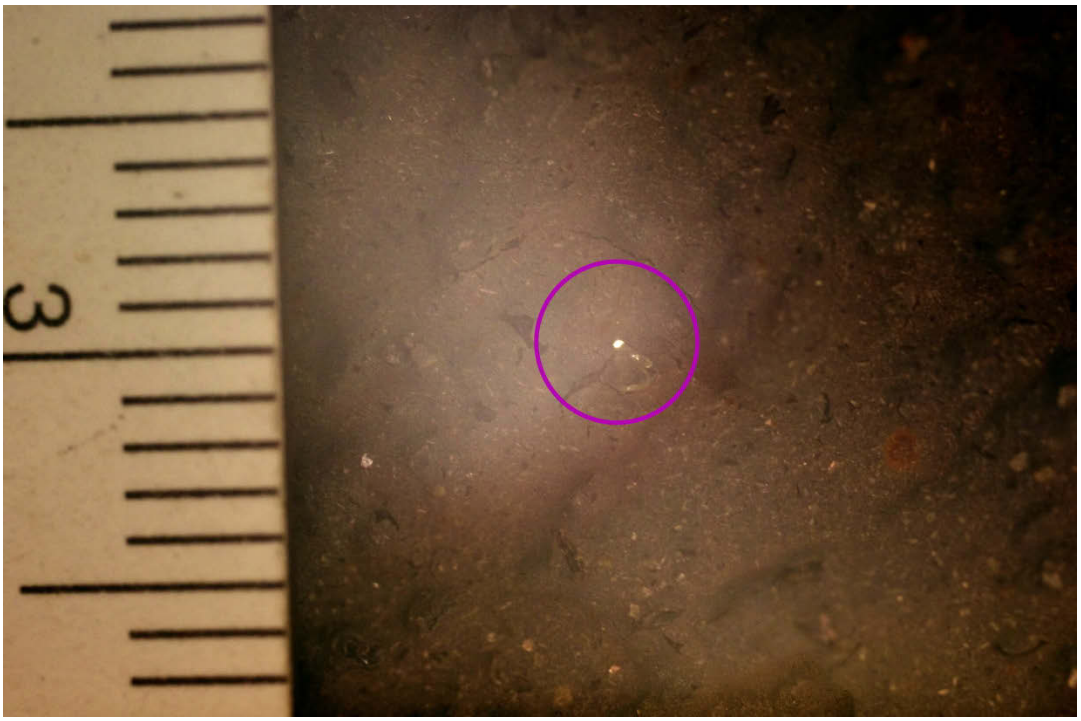


Figure 4: *A pinhole in the coating, allowing light to shine through from behind.*

Table 1: *Tabulated paint application data reported by the contractor, along with the 2012 Environment Canada historical weather data recorded at the Halifax-Shearwater station. The actual sheets are reproduced in Annex A.*

		Contractor-reported Data												Env Can records		
Row #	Page Ref	Date	Time	Weather	Temp (°C) Air	Temp (°C) Surface	humid (%)	dew pt. (°C)	Product	Batch	Base	Appl. Time	coat #	Temp (°C) high	Temp (°C) low	rain (mm)
1	12	521	1450	sun/cloud	18	17	63	10	I-300	ND7395UH	NC6371UH	1500	1	21.7	8.9	0
2	13	601	1445	sun/cloud	23	34	30	5	I-300	ND7395UH	NC6371UH	1500	1	19.1	8.5	0.2
3	14	606	1000	sun/cloud	16	12	73	7[b,c]	I-300	ND7395UH	NC6371UH	1000	1	14.1	7.9	2.8
4	15	607	1530	sun/cloud	19	20	38	5	I-300	ND7395UH	NC6371UH	1530	1	16.2	7.9	0
5	16	608	1600	sunny	23	35	45	10	I-300	ND7395UH	NC6371UH	1615	1	19.9	9.0	0
6	17	611	1400	sunny	29	43[a]	29	9	I-300	ND7395UH	NC6371UH	1430	1	17.2	8.5	0
7	18	612	1620	sunny	20	30	51	10	I-300	ND7395UH	NC6371UH	1630	1	14.7	8.2	0
8	19	613	1700	sunny	27	51[a]	29	7	I-300	ND7395UH	NC6371UH	1700	1	16.1	7.4	0.2
9	20	614	1540	sunny	28	39	40	12	I-300	ND7395UH	NC6371UH[e]	1600	1	23.3	9.7	0
10	21	615	1500	sunny	29	56[a]	34	11	I-300	ND7395UH	NC6371UH[e]	1630	1	21.3	11.7	0
11	22	616	930	sunny	19	18	48	7	I-300	ND7395UH	NC6371UH[e]	930	2	16.6	8.2	0
12	22	616	1500	sunny	20	19	47	8	I-300	ND7395UH	NC6371UH[e]	1500	1	16.6	8.2	0
13	23	618	1600	sunny	26	30	39	11	I-300	NE7676UH	NC7637UH	1600	1	13.8	9.1	0
14	24	619	1000	sunny	18	15	60	10[b]	I-6GV	NC7676UH	NC6371UH	1000	1	16.6	9.6	0
15	25	619	1630	sunny	26	28	55	16	I-300	NE7676UH		1630	2	16.6	9.6	0
16	26	620	1530	sunny	20	37	21	9	300 bronze	NE7676UH	NC6371UH	1500	1	21.8	12.2	0
17	27	621	730	sunny	18	18	66	12	I-990	ND7180UH		730	2	26.4	12.9	0
18	27	621	1000	sunny	25	40[a]	70	8						26.4	12.9	0
19	28	621	N/A	sunny	N/A	N/A	N/A	N/A	I-300	NE7676UH		N/A	1	26.4	12.9	0
20	29	622	N/A	sun/cloud	16	16	74	12[b]	I-6GV	NC7676UH	NC6371UH	630	1	16.9	12.9	0
21	29	622	N/A	sun/cloud	16	16	74	12[b]	I-300	ND7395UH	NC6371UH	N/A	2	16.9	12.9	0
22	30	625	1000	sunny	22	25	75	12	I-990	ND7180UH	NB3802YX	1000	1	21.5	13.2	0.2
23	30	625	1000	sunny	22	25	75	12	I-990	ND7180UH	NB3802YX	1400	2	21.5	13.2	0.2
24	31	627	800	sun/cloud	15	16	82	18[b,d]	I-990	NE7937UH	NB3809YX	800	2	17.7	13.9	0
25	32	627	1130	sunny	30	26	44	17	I-300	ND7395UH	NC6371UH	1230	2	17.7	13.9	0
26	32	627	1130	sunny	30	26	44	17	Interlac 1	ND7445UH		1230	2	17.7	13.9	0
27	33	629	1200	sunny	26	30	55	16	I-6GV	ND6868UH		1200	1	22.6	14.2	0
28	34	702	1000	sunny	30	27	46	18	Interlac 1	ND7443UH		1000	1	24.5	14.8	0
29	34	702	1000	sunny	30	27	46	18	I-990	ND7180UH	NB3802YX	N/A	1	24.5	14.8	0
30	35	704	745	sunny	25	30	58	16	I-990	ND7180UH	NB3802YX	800	2	20.7	13.4	0
31	35	704	745	sunny	25	30	58	16	Interlac 1	ND7180UH		800	2	20.7	13.4	0
32	36	706	1215	sunny	25	30	66	18	I-990	N/A		1230	1	25.1	16.2	2.6

[a] Maximum surface temperature exceeded
[b] Surface temperature near or at the minimum below dew point difference (3 °C).
[c] Dew point recalculated to be 11 °C.
[d] Dew point recalculated to be 12 °C.
[e] Batch listed as NC631UH. Assumed to be NC6371UH.

References

[1] (2009), Specification for Maintenance Painting of HMC Ships, Department of National Defence. D-23-003-005/SF-002.

[2] (2012), Application Guidelines Exterior Deck System Intershield 6LV & Intershield 6GV, International / AkzoNobel. Revision 7.

[3] (2012), Application Guidelines Cargo Holds Intershield 300, International / AkzoNobel. Revision 10.

[4] (2012), Intershield 300 Datasheet, International / AkzoNobel. Publication code 223.

[5] (2012), Intershield 6GV Datasheet, International / AkzoNobel. Publication code 1939.

Canada

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Attachments

Annex A Daily Inspection Reports

Annex B PMS2O Instructions

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Annex A Daily Inspection Reports

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: May 31-12 Report # 1 Customer: DND / SNC Lavalin

Job Name: Cinco Bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 (SP-5) SP-6 SP-7 (SP-10) (SP-11) WJ ___

Abrasive /Grade: (Circle One) Steel Shot ___ Pure Grit ___ Silica Sand ___ Aluminum Oxide ___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average: ____

Coating Application: Brush / Roller ✓ Airless Spray ____

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 300 pm

Product: Intershield 300 Batch # NA7395 UH

Base Batch # NA6371 UH Cure Batch # ____ DFT ____

Coat # ____ Time of Application: ____

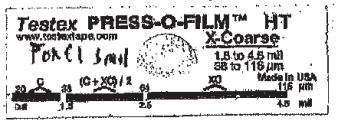
Product: ____ Batch # ____

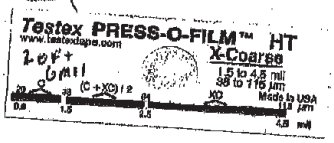
Base Batch # ____ Cure Batch # ____ DFT ____

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
250	Cloudy/Sunny	17.5°C	17.2°C	63.4°C	9.7°C

Work Completed Today: Blast Trac Decks Foxel and Loft get areas Blast Traced Inspected for painting Intershield 300

Verified By: [signature]





Canada

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: January 3 Report # 1 Customer: SNC

Job Name: Glace Bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 (SP-5) SP-6 SP-7 (SP-10) (SP-1) WJ ___

Abrasive /Grade: (Circle One) Steel Shot ✓ Pure Grit ___ Silica Sand ___ Aluminum Oxide ___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average: ____

Coating Application: Brush / Roller ✓ Airless Spray ____

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 300

Product: InterShield 300 Batch # UD73950H

Base Batch # 063710H Cure Batch # ____ DFT ____

Coat # ____ Time of Application: ____

Product: ____ Batch # ____

Base Batch # ____ Cure Batch # ____ DFT ____

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
245	Sunny/cloudy	22.8°C	34°C	30.3°C	4.6°C

Work Completed Today: Blast track + power Tool Deck Level
Inspected By Winston For painting InterShield 300

Verified By: [signature]

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3359 Date: June 26/18 Report # 1 Customer: SNC

Job Name: Glace Bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___ SP 6

Abrasive /Grade: (Circle One) Steel Shot___ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average:____

Coating Application: Brush / Roller ✓ Airless Spray ____

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 1000

Product: Interchield 300 Batch # 007395UH

Base Batch # N6371UH Cure Batch # ____ DFT ____

Coat # ____ Time of Application: ____

Product: ____ Batch # ____

Base Batch # ____ Cure Batch # ____ DFT ____

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
600	Cloudy/Sunny	16°C	12°C	73°C	7°C

Work Completed Today: Power Tool Non traffic Areas Inspected By Winston Aft deck paint Interchield 300

Verified By: [signature]

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: June 07-12 Report # 1 Customer: SNC

Job Name: Gracebay Work Location: DND

Surface Preparation: (Circle One) SP-2 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ (SP2)

Abrasive /Grade: (Circle One) Steel Shot ✓ Pure Grit ___ Silica Sand ___ Aluminum Oxide ___

Preparation Equipment: (Circle One) Blaster – Blast-Trac – Hand & Power Tool – Hydro Blaster - Metalizing

Surface Profile Average: ___

Coating Application: Brush / Roller ✓ Airless Spray ___

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 330

Product: Intershield 300 Batch # ND739 SU1-1

Base Batch # N6271UH Cure Batch # ___ DFT ___

Coat # ___ Time of Application: ___

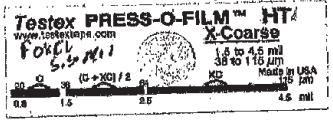
Product: ___ Batch # ___

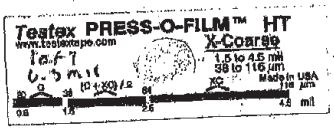
Base Batch # ___ Cure Batch # ___ DFT ___

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
330	Sunny/cloudy	19.4°C	20°C	37.4°C	5.1°C

Work Completed Today: Power Tool Decks left and Foxel NAV traffic Areas Inspected By Winston For Paint Interlshield 300 Blue Track Deck

Verified By: [signature]





Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job #3354 Date: June/03/12 Report # 1 Customer: DnD / SNC

Job Name: Grace Bay Work Location: DnD

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___ SP-2

Abrasive /Grade: (Circle One) Steel Shot ✓ Pure Grit ___ Silica Sand ___ Aluminum Oxide ___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average: ___

Coating Application: Brush / Roller ✓ Airless Spray ___

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 415

Product: InterShield 300 Batch # ND73950H

Base Batch # ND6370H Cure Batch # ___ DFT ___

Coat # ___ Time of Application: ___

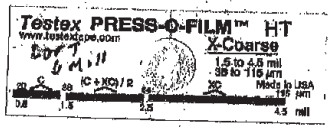
Product: ___ Batch # ___

Base Batch # ___ Cure Batch # ___ DFT ___

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
400	Sunny	22.8°C	35°C	45.1°C	9.9°C

Work Completed Today: Blast Track Foxel and 10Fx and power Tool
Inspected By Winston For InterShield 300

Verified By: Michael Mead



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Canada

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: June 11-12 Report # 1 Customer: SMC

Job Name: CAKE Bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___ Spot

Abrasive /Grade: (Circle One) Steel Shot ✓ Pure Grit ___ Silica Sand ___ Aluminum Oxide ___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average: ___

Coating Application: Brush / Roller ✓ Airless Spray ___

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 23D

Product: InterShield 300 Batch # ND795UH

Base Batch # NE637UH Cure Batch # ___ DFT ___

Coat # ___ Time of Application: ___

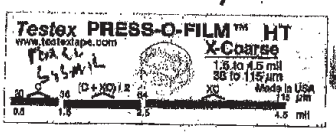
Product: ___ Batch # ___

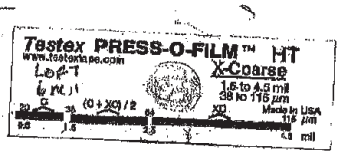
Base Batch # ___ Cure Batch # ___ DFT ___

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
20D	Sunny	28.1°C	43°C	28.5°C	9.4°C

Work Completed Today: Blast Track and power Tool Final and Last Inspect Winston Cap paint InterShield 300

Verified By: [signature]





Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: June12/12 Report # 1 Customer: SNC

Job Name: GlaceBay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ__ Sp2

Abrasive /Grade: (Circle One) Steel Shot ✓ Pure Grit ✓ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average:____

Coating Application: Brush / Roller ✓ Airless Spray ________

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 430

Product: Intershield 300 Batch # ND739SUH

Base Batch # NE6371UH Cure Batch # ________ DFT ______

Coat # ______ Time of Application: ________

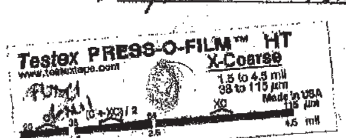
Product: ________ Batch # ________

Base Batch # ________ Cure Batch # ________ DFT ______

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
420	Sunny	20.3°C	30°C	50.6°C	9.6°C

Work Completed Today: Blast Trac and power tool Foxel and Lacl Inspection Winston paint Intershield 300 Blast Trac Bridge Wings

Verified By: [signature]



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Canada

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: June 13-12 Report # 1 Customer: SNC

Job Name: Glace Bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___ Sp2

Abrasive /Grade: (Circle One) Steel Shot ___ Pure Grit ___ Silica Sand ___ Aluminum Oxide ___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing

Surface Profile Average: ___

Coating Application: Brush / Roller ✓ Airless Spray ___

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 800

Product: Intershield 300 Batch # ND7395UH

Base Batch # NC6310H Cure Batch # ___ DFT ___

Coat # ___ Time of Application: ___

Product: ___ Batch # ___

Base Batch # ___ Cure Batch # ___ DFT ___

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
800	Sunny	27.1 °C	51 °C	29.4 °C	7.1 °C

Work Completed Today: Inspect Fokel + Bridge wings + back deck

Stern Paint 300

Blast tape and power Tool

PRESS-O-FILM™ Made in U.S.A. No. Green Reading ... TESTEX NEWARK, DE 19716 U.S.A. X COARSE (1.5 to 4.5 mils) or (40 to 115 µm)

Verified By: Michael Harrod

Testex PRESS-O-FILM™ HT www.testextape.com X-Coarse 1.5 to 4.5 mil 38 to 115 µm Made in USA — Forel 6 mils

Testex PRESS-O-FILM™ HT www.testextape.com X-Coarse 1.5 to 4.5 mil 38 to 115 µm Made in USA — Bow 6 mils

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Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: Jan-14-12 Report # 1 Customer: SNC

Job Name: GLACIBAY Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___ SP2

Abrasive /Grade: (Circle One) Steel Shot ✓ Pure Grit ___ Silica Sand ___ Aluminum Oxide ___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average: ___

Coating Application: Brush / Roller ✓ Airless Spray ___

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 400 N07395UH

Product: INTERSHIELD 300 Batch # [illegible]

Base Batch # NC631UH Cure Batch # ___ DFT ___

Coat # ___ Time of Application: ___

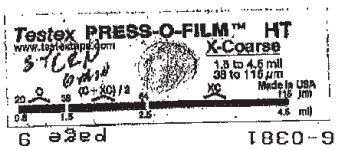
Product: ___ Batch # ___

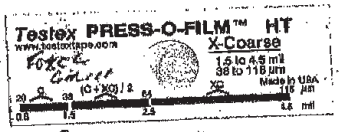
Base Batch # ___ Cure Batch # ___ DFT ___

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
840	Sunny	28°C	39°C	39.7°C	12.2°C

Work Completed Today: Blast track STCRN and FOXCL and power tool
Inspect Winston point 700

Verified By: [signature]





Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: June 15/12 Report # 1 Customer: SNC

Job Name: Black Bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___ Sa 2

Abrasive /Grade: (Circle One) Steel Shot ✓ Pure Grit ___ Silica Sand ___ Aluminum Oxide ___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average: ____

Coating Application: Brush / Roller ✓ Airless Spray ____

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 430

Product: InterShield 300 Batch # ND7395UH

Base Batch # NC6310H Cure Batch # ____ DFT ____

Coat # ____ Time of Application: ____

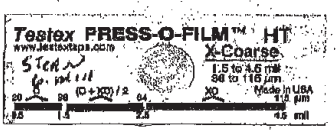
Product: ____ Batch # ____

Base Batch # ____ Cure Batch # ____ DFT ____

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
300	Sunny	28.6°C	56°C	34.2°C	10.7°C

Work Completed Today: Blast Trac Foxel Wings + Stern and Power Tool Inspected By Winston paint 300

Verified By: [signature]



Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3351 Date: June-16-12 Report # 1 Customer: SNC

Job Name: Glace Bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___ SP2

Abrasive/Grade: (Circle One) Steel Shot ✓ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac – Hand & Power Tool – Hydro Blaster - Metalizing

Surface Profile Average: ___

Coating Application: Brush / Roller ✓ Airless Spray ___

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 300

Product: Interseal 300 Batch # ND7395UH

Base Batch # NC6310H Cure Batch # ___ DFT ___

Coat # 2 Time of Application: 930 Bridge Top + Bridge wings 2nd coat 300

Product: 300 Batch # ND7375UH

Base Batch # NC631UH Cure Batch # ___ DFT ___

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
930	Sunny	17.8°C	18°C	48.2°C	6.5°C
300	Sunny	20°C	19°C	46.8°C	7.8°C

Work Completed Today: Blast Trench Foc'sl Lounge + Clean Power Tool paint 2nd coat of 300 on Bridge top and Bridge wings Inspection Winston

Verified By: [signature]

PRESS-O-FILM™ Made in U.S.A. No. Bowling Reading 6 mil TESTEX NEWARK, DE 19715 USA Gage less 2.0 mils or 50 µm X COARSE (1.5 to 4.5 mils) or (40 to 115 µm)

PRESS-O-FILM™ Made in U.S.A. No. Stern Reading 4 mil TESTEX NEWARK, DE 19715 USA Gage less 2.0 mils or 50 µm X COARSE (1.5 to 4.5 mils) or (40 to 115 µm)

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Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: June/13/12 Report # 1 Customer: SNC

Job Name: Glace bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___

Abrasive /Grade: (Circle One) Steel Shot___ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing

Surface Profile Average:___

Coating Application: Brush / Roller ✓ Airless Spray ___

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 4:00

Product: Intershield 300 Batch # NC767GUH

Base Batch # NC7637UH Cure Batch # ___ DFT ___

Coat # ___ Time of Application: ___

Product: ___ Batch # ___

Base Batch # ___ Cure Batch # ___ DFT ___

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
4:00	Sunny	26°C	30°C	39°C	10.9°C

Work Completed Today: power Tool Foxtel wings + stern

Inspection Winston

Verified By: [signature]

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3351 Date: June/19/12 Report # 2 Customer: SNC

Job Name: Gimli Bay Work Location: Dam

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___

Abrasive /Grade: (Circle One) Steel Shot___ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average:____

Coating Application: Brush / Roller ✓ Airless Spray _____

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 1000

Product: InterShield 68HS Batch # NC767604

Base Batch # NC637/04 Cure Batch # _____ DFT 3 mils

Coat # _____ Time of Application: _____

Product: _____ Batch # _____

Base Batch # _____ Cure Batch # _____ DFT _____

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
1000	sunny	18°C	13°C	60.1°C	10°C

Work Completed Today: Non Skid Bridge Top and Bridge Wings. Inspected Winston for paint

Verified By: Richard Marsh

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: June/19/12 Report # 1 Customer: SNC

Job Name: GLACE BAY Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ__

Abrasive /Grade: (Circle One) Steel Shot__ Pure Grit__ Silica Sand__ Aluminum Oxide__

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average:____

Coating Application: Brush / Roller ✓ Airless Spray ____

PRODUCT APPLICATION DATA:

Coat # 2 Time of Application: 430

Product: Intershield 300 Batch # NE76760H

Base Batch # NE76370H Cure Batch # ____ DFT ____

Coat # ____ Time of Application: ____

Product: ____ Batch # ____

Base Batch # ____ Cure Batch # ____ DFT ____

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
430	Sunny	25.6 °C	28 °C	54.9 °C	15.9 °C

Work Completed Today: Power Tool STKN Inspected By Winston
Paint 300 Tape up Foxcl for DAN SKID.

Verified By: [signature]

17 JUL 2012 7:41AM Smith & McCarthy Painting 902-866-0381 page 1

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: June 18 20__ Report # 1 Customer: SNC

Job Name: Glace Bay Work Location: AND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ__ SP2

Abrasive /Grade: (Circle One) Steel Shot ✓ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing

Surface Profile Average:_____

Coating Application: Brush / Roller ✓ Airless Spray NA.

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 300 pm

Product: EWA 300 Bronze Batch # NA

Base Batch # NE767604 Cure Batch # NC637104 DFT _____

Coat # NA Time of Application: NA

Product: NA Batch # NA

Base Batch # NA Cure Batch # NA. DFT NA.

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
330	Sunny	20°	37°	21%	9°
430	Sunny	21°	32°	29%	11

Work Completed Today: [illegible] Hand tooling Hallways And [illegible] Block [illegible] [illegible]

Verified By: [signature]

PRESS-O-FILM™ Made in U.S.A. TESTEX NEWARK, DE 19715 USA X-COARSE (1.5 to 4.5 mils) or (40 to 115 µm)

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Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job #3354 Date: June/21/12 Report # 1 Customer: SNC

Job Name: GraceBay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___

Abrasive /Grade: (Circle One) Steel Shot___ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average:____

Coating Application: Brush / Roller ✓ Airless Spray _____

PRODUCT APPLICATION DATA:

Coat # 2 Time of Application: 730

Product: Interthane 990 Grey Batch # N0718OUH

Base Batch # #83802-YX Cure Batch # _____ DFT _____

Coat # _____ Time of Application: _____

Product: _____ Batch # _____

Base Batch # _____ Cure Batch # _____ DFT _____

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
730	Sunny	12.2°C	18°C	65.9°C	11.8°C
100	Sunny	25°C	40C	70°C	80C

Work Completed Today: Start paint Dado Grey Bridge Top and Bridge Wings

Verified By: [signature]

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: June 21/12 Report # 1 Customer: SNC

Job Name: Glace Bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ___

Abrasive /Grade: (Circle One) Steel Shot___ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average:____

Coating Application: Brush / Roller ✓ Airless Spray ____________

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: ____________

Product: Intershield 300 Batch # NC767764H

Base Batch # NC762370H Cure Batch # ____________ DFT ________

Coat # ________ Time of Application: ____________

Product: ____________ Batch # ____________

Base Batch # ____________ Cure Batch # ____________ DFT ________

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
	Sunny				

Work Completed Today: Finish power tool screen Inspected
Winston paint 300

Verified By: [signature]

17 JUL 2012 7:41AM Smith & McCarthy Painting 902-866-0381 page 2

Canada

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: June 22/12 Report # 1 Customer: SNC

Job Name: Glace bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___

Abrasive /Grade: (Circle One) Steel Shot___ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool -- Hydro Blaster - Metalizing
Surface Profile Average: _____

Coating Application: Brush / Roller ✓ Airless Spray ___________

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 630

Product: Intershield 6GV Batch # NC7676UH

Base Batch # NC637 NVH Cure Batch # ___________ DFT 30 mil

Coat # 2 Time of Application: ND7395UH

Product: Intershield 30 Batch # ___________

Base Batch # NC6310UH Cure Batch # ___________ DFT ___________

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
	Sunny/Cloud	15.8°C	16°C	73.6°C	11.6°C

Work Completed Today: NONSKid ForCL paint Sweep back 300
2nd Coat OK Winston

Verified By: [signature]

17 Jul 2012 7:41AM Smith & McCarthy Painting 902-866-0381 page 4

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3359 Date: June 25/12 Report # 1 Customer: SNC

Job Name: Gateway Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___

Abrasive /Grade: (Circle One) Steel Shot___ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average:____

Coating Application: Brush / Roller ✓ Airless Spray _____

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 1000

Product: Intertuf 990 Batch # N07180UH

Base Batch # N83802YX Cure Batch # _____ DFT _____

Coat # 2 Time of Application: 200

Product: 990 External Topcoat Batch # N07180UH

Base Batch # N83802YX Cure Batch # _____ DFT _____

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
1000	Sunny	22°C	25°C	75°C	12°C

Work Completed Today: Paint Dado 990 Grey on Fuel and Wings & Flood Lops 990 BLACK

Verified By: [signature]

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: June 27/10 Report # 2 Customer: SNC

Job Name: Glace bay Work Location: Ont

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___

Abrasive /Grade: (Circle One) Steel Shot___ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster – Metalizing
Surface Profile Average:____

Coating Application: Brush / Roller ✓ Airless Spray _____

PRODUCT APPLICATION DATA:

Coat # 2 Time of Application: 800

Product: Interthane 990 Black Batch # NE7937UH

Base Batch # N03809YX Cure Batch # _____ DFT _____

Coat # 1 Time of Application: 800

Product: Interlac 1 Shipside Batch # _____

Base Batch # _____ Cure Batch # _____ DFT _____

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
800	Cloudy/Sunny	15.4°C	16°C	81.7°C	17.5°C

Work Completed Today: painting 990 Black

Verified By: Michael Murphy

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 8354 Date: June 27/12 Report # 2 Customer: SNC

Job Name: Glace Bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___

Abrasive /Grade: (Circle One) Steel Shot___ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average:_____

Coating Application: Brush / Roller ✓ Airless Spray ________

PRODUCT APPLICATION DATA:

Coat # 2 Time of Application: 1130

Product: Intershield 300 Batch # ND7395UK

Base Batch # N637 IUK Cure Batch # ________ DFT ______

Coat # 2 Time of Application: 1130

Product: Interlac 1 Batch # ND744SUK

Base Batch # ________ Cure Batch # ________ DFT ______

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
1130	Sunny	30°C	26°C	43.8°C	17°C

Work Completed Today: Inspected By Winston Continue painting Interlac 1 on Foxcl and 300 on sweep deck and wings

Verified By: [signature]

17 Jul 2012 7:42AM Smith & McCarthy Painting 902-866-0381 page 7

Canada

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: June 29/12 Report # 1 Customer: SARC

Job Name: Glace bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___

Abrasive /Grade: (Circle One) Steel Shot___ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average:_____

Coating Application: Brush / Roller ✓ Airless Spray ___________

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 1200

Product: Intershield 6G Batch # NDG868OH

Base Batch # ______________ Cure Batch # ______________ DFT 30Mil

Coat # __________ Time of Application: ______________

Product: ______________________ Batch # ______________

Base Batch # ______________ Cure Batch # ______________ DFT _________

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
1200	Sunny	25.5°C	30°C	54.7%	15.6°C

Work Completed Today: Inspect Clean Deck apply Non Skid
Inspected [illegible]

Verified By: [signature]

17 Jul 2012 7:42AM Smith & McCarthy Painting 902-866-0381 page 8

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job #3354 Date: July-03-12 Report # 1 Customer: SMC

Job Name: Gladstone Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___

Abrasive /Grade: (Circle One) Steel Shot___ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average:____

Coating Application: Brush / Roller ✓ Airless Spray _____

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 1000

Product: Interlac 1 Batch # ND744SUH1

Base Batch # _____ Cure Batch # _____ DFT _____

Coat # 1 Time of Application: _____

Product: 970 Grey Batch # ND718OUH

Base Batch # N838029X Cure Batch # _____ DFT _____

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
1000	Sunny	30.1°C	27°C	46.1°C	17.5°C

Work Completed Today: Inspected for finish paint by Winston Sweep DECK

Verified By: Michael Mont

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: July 04-12 Report # 2 Customer: SNC

Job Name: Glace Bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___

Abrasive /Grade: (Circle One) Steel Shot___ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average:_____

Coating Application: Brush / Roller ✓ Airless Spray _____

PRODUCT APPLICATION DATA:

Coat # 2 Time of Application: 800

Product: Intertherm 990 Batch # ND7180UK

Base Batch # N838024X Cure Batch # _____ DFT _____

Coat # 2 Time of Application: 800

Product: Intertac 1 Batch # ND7180UH

Base Batch # _____ Cure Batch # _____ DFT _____

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
745	Sunny	25°C	30°C	57.5°C	16°C

Work Completed Today: painting Sweep Deck 990 Grey + Black + Intertac 1 base paint on Fence

Verified By: [signature]

Smith & McCarthy Painting Contractors Ltd.	Daily Inspection Report		DOC: Form-056	REV: D
	Approved:	President	Date: 08/01/30	

Our Job # 3354 Date: July-06-12 Report # 2 Customer: SWC

Job Name: Gillies Bay Work Location: DND

Surface Preparation: (Circle One) SP-1 SP-3 SP-5 SP-6 SP-7 SP-10 SP-11 WJ ___

Abrasive /Grade: (Circle One) Steel Shot___ Pure Grit___ Silica Sand___ Aluminum Oxide___

Preparation Equipment: (Circle One) Blaster – Blast-Trac - Hand & Power Tool – Hydro Blaster - Metalizing
Surface Profile Average:_____

Coating Application: Brush / Roller ✓ Airless Spray _____

PRODUCT APPLICATION DATA:

Coat # 1 Time of Application: 1230

Product: Intertherm 990 yellow Batch # _____

Base Batch # _____ Cure Batch # _____ DFT _____

Coat # _____ Time of Application: _____

Product: _____ Batch # _____

Base Batch # _____ Cure Batch # _____ DFT _____

TIME	WEATHER	AIR TEMP	SURFACE TEMP.	HUMIDITY	DEW POINT
1215	Sunny	24.7°C	30°C	65.7°C	17.8°C

Work Completed Today: Paint Deckel on Foxel

Verified By: _____

Annex B PMS2O Instructions

Note: some pages are missing

SNC·LAVALIN

SNC-Lavalin Defence Programs Inc.
Unit 1 – 130 John Savage Ave
Dartmouth Nova Scotia
Canada B3B 0C9
Telephone (902) 480-7550
Fax (902) 468-5304

FAXED
MAY 24 2012

Please sign and return.
Thx.
Anne

Work Completion Form

WEAF Number: OTT-0312C
Ship: Glace Bay
Contractor: Smith & McCarthy Painting Contractors Ltd. – Mount Uniacke NS B0N 1Z0

Job Description
Related Docs: OCL-2510 (MWAV2) OTT-0021 (MWAV3)
Subject: 60M PMS
Action: Carry out the following 60M PM in accordance with the specification to complete the work that has not been done in Shelburne Ship Repair during Docking:
PMS2O Ship Index HY005-03 (2) - Exterior Decks
Spec will be for 100% of upper deck including all ISO sockets, winch seating's crane seating's, locker seating's, gun mount seating ,area Aft of funnel port side. GP crane deck area. Pilotage deck pedestals for Inmarsat and Sat TV. All vents from deck to flange.

Deviations to the above job description including *all* arisings, as agreed to by SNC-Lavalin

Comments and All Readings Taken (clearances, pressures, voltages, ranges etc.) and observations made.

HOUR METER READING:

Was calibrated equipment used to conduct checks?
If so, date of last calibration: _____ and Serial No. _____.

or ISO 9001:2008 Reg No. _____

SNC-Lavalin INC.	Service Provider's confirmation that *all* work that will be billed for this WEAF is complete as identified above.
Signature 12 Jul 12 Date	Tim McCarthy Signature July 12/12 Date
ISSC Quality Assurance Representative	Please Print Name

SHIP	PMS2O INSTRUCTIONS	SHIP INDEX
HMCS GLACE BAY		HY005-03 (2)
SYSTEM	**EQUIPMENT**	**FLEET INDEX**
HL - Hull	Exterior Decks	H026/CDN(1)-0067-00

JOB No	FREQUENCY	TYPE	LOCATION	ALLOCATION	DEPT	PAGE	OF
1	60M	PAINT	IN DOCK	CONTRACTOR	-	3	14

Photographs

2. Take approximately 10 representative photographs of the decks as specified by the ISSC On-Site Representative.

Preparation

3. General. Take the following precautions prior to and while pressure washing and track blasting:

   3.1. Confirm that all items identified in HY005-03 (1) are indeed properly covered and taped.

   3.2. Confirm that all external openings are completely sealed.

   3.3. If the lockers and equipment on the weatherdecks are in place remove them. For bid purposes assume the lockers are in place.

Pressure Wash

4. Pressure wash the deck as follows:

   4.1. On completion of pressure washing the superstructure, wash the weather deck to clean salt deposits, loose paint, and adherent rust in bare areas. Collect and dispose of the effluent in accordance with the instructions in HY005-03 "*Underwater and Above Water Hull*".

   4.2. Degrease areas being cleaned to bare metal and areas with extreme rust stains then rinse with fresh water law SSPC SP1.

5. Conduct a chloride test: law Ref.5 and note 7

Deliverable – Chloride tests on the Exterior Decks (prior to blasting)	
Date: 29 May 12	**Receiving Signature:**

Track Blast

6. Grit blast the decks as follows:

   6.1. Ensure 100% hoarding in is accomplished prior to proceeding with track blasting ships decks.

   6.2. ~~Weather deck blasting is best done with the Z drive Portable Plates HY005-15 removed and the protection in place. Power tool clean the lip of the Z drive Portable Plate coaming in accordance with SSPC SP 11 "Power Tool Cleaning to Bare Metal".~~

   6.3. Remove the guard over the hydraulic lines for the capstan on the sweep deck

SHIP	PMS2O INSTRUCTIONS	SHIP INDEX
HMCS GLACE BAY		HY005-03 (2)
SYSTEM	EQUIPMENT	FLEET INDEX
HL - Hull	Exterior Decks	H026/CDN(1)-0087-00

JOB No	FREQUENCY	TYPE	LOCATION	ALLOCATION	DEPT	PAGE	OF
1	60M	PAINT	IN DOCK	CONTRACTOR	-	4	14

6.4. . Hand tool clean, in accordance with SSPC-SP2 the steel deck up to 4 in. on superstructure, coamings and bulwarks, including pilotage deck support structures.

6.5. The abrasive mixture shall consist of a mix of sufficient size to achieve the required profile and shall be clean and free of contaminants. Surface profile shall be law paint manufacturers' specification. Take surface profile measurements, using replica tape in accordance with NACE Standard RP0287-95 – "Field measurement of Surface Profile of Abrasive Blast Clean Steel Surfaces Using a Replica Tape. Record readings in Hold Point Data Form.

6.6. Power tool clean, in accordance with SSPC-SP11 - "Power Tool Cleaning to Bare Metal" those areas that cannot be track blasted. Roughen the surface to produce a surface profile greater than 25.4 microns. Surface cleanliness is verified using SSPC-VIS 3 93-04 – "Visual Standard for Hand and Power Tool Cleaning". Record readings in Hold Point Data Form.

6.7. Feather edges of intact coatings bordering areas cleaned to bare metal.

6.8. Collect the blast and grinding debris, separate it from other debris and dispose.

6.9. On completion of blast cleaning, visually inspect for cleanliness. Verify cleanliness by placing a clear adhesive tape pressed on the surface at several locations representative of the entire area. Remove tape and check that it is free from dust, dirt or other contamination and record results. If test fails, degrease deck using biodegradable cleaner/degreaser. The ISSC On-Site Representative shall witness test.

6.10. ✓ Prior to painting, carry out MPI on both pedestals (foundations) for the MMS crane and the General Purpose crane.

Hold Point: Surface Profile Measurements and Deck Cleanliness	ISSC On-Site Representative	Service Provider Supervisor
Date:		
Deliverables: Record surface profile data on Hold Point Data Form.		

6.11. Conduct a chloride test: Ref.5 and note 7

SNC-Lavalin	Form : MMS 025	Revision : Rev 0	Revision Date: 03-Apr-2012	Issued By : SNC-Lavalin

SHIP	PMS2O INSTRUCTIONS	SHIP INDEX
HMCS GLACE BAY		HY005-03 (2)
SYSTEM	**EQUIPMENT**	**FLEET INDEX**
HL - Hull	Exterior Decks	H026/CDN(1)-0067-00

JOB No	FREQUENCY	TYPE	LOCATION	ALLOCATION	DEPT	PAGE	OF
1	60M	PAINT	IN DOCK	CONTRACTOR	-	7	14

11.3. In consultation with the ISSC On-Site Representative, lay out a grid for DFT readings where these are called for in this specification. Record DFT readings in accordance with SSPC-PA-2.

11.4. Provide the manufacturer's product information sheet complete with batch numbers prior to painting.

11.5. Apply the workmanship standards as detailed at the end of this work instruction.

12. Paint the weather decks as follows:

12.1. Stripe Coat/Sealer Coat

12.1.1. Brush apply stripe coat to all edges, corners, welds, weld seams and the 4 inch vertical waterways on the superstructure with one coat of paint code C420 to achieve paint manufacturers recommended DFT per coat. Include edges as well as at least one-inch border outside each edge.

12.1.2. Inaccessible areas in way of foundations, vent heads, etc that cannot be blast cleaned 100% to bare metal shall be power tool cleaned to SSPC-SP-11 shall be treated with one coat paint code C420 to achieve paint manufacturers recommended DFT per coat.

12.2. Primer Coat

12.2.1. Apply one (1) primer coat to all Stripe Coated and bared metal areas with one coat of paint code C420 to achieve paint manufacturers recommended DFT per coat.

12.2.2. In consultation with ISSC On-Site Representative, lay out a 2-meter grid.

12.2.3. Record DFT readings at 2 meter spaces in accordance with SSPC-PA-2.

Hold Point: Inspect Primer Coat	ISSC On-Site Representative	Service Provider Supervisor
Date: 6 Feb 12		
Deliverables: Hold Point Data Entry Forms.		

12.2.4. The maximum and minimum cure times before application of subsequent coats shall be in accordance with the manufacturer's recommendation found on the "Product Data Sheet".

SHIP	PMS2O INSTRUCTIONS	SHIP INDEX
HMCS GLACE BAY		HY005-03 (2)
SYSTEM	EQUIPMENT	FLEET INDEX
HL - Hull	Exterior Decks	H026/CDN(1)-0067-00

JOB No	FREQUENCY	TYPE	LOCATION	ALLOCATION	DEPT	PAGE	OF
1	60M	PAINT	IN DOCK	CONTRACTOR	-	8	14

12.3. Non-Skid (Traffic Area)

12.3.1. Verify the surface is clean. The ISSC On-Site Representative shall witness.

Hold Point: Traffic Areas	ISSC On-Site Representative	Service Provider Foreman
Date: 6 Jul 12		

12.3.2. Overcoat the primed area with non-skid deck coating within 48 hours to avoid undue surface contamination.

12.3.3. Take surface temperature, ambient temperature and relative humidity readings at the beginning, approximate middle and end of each day's work (or when the hold point is reached and when environmental conditions change. Record readings in Hold Point Data Entry Form.

12.3.4. Apply Non-Skid to deck area, leaving approx. 3 inch waterways around deck edges and around equipment foundations as well a 4-inch vertical waterway around the superstructure. Leave a 3 inch waterway around the deck markings adjacent to the deck sockets for accommodation pod.

12.3.5. Apply the non-skid paint with a roller as per DND non-skid application procedure in reference 5.

12.3.6. Coat with Non-slip Epoxy primer using code C420 then use code C419 for Epoxy Non-Skid product. Colour US Fed-Std-595B #36076, flat dark grey. Actual coverage rate shall be 28-32 sq.ft/US gallons to achieve a DFT of 750-1000 microns.

Hold Point: Traffic Areas	ISSC On-Site Representative	Service Provider Foreman
Date: 6 Jul 12		

12.3.7. On completion of the coating application, record DFT measurements at 2-meter spaces in accordance with SSPC-PA2. In the space provided on the Hold Point Data Entry Form, draw diagram of area painted and record DFT measurements.

SHIP	PMS2O INSTRUCTIONS	SHIP INDEX
HMCS GLACE BAY		HY005-03 (2)
SYSTEM	**EQUIPMENT**	**FLEET INDEX**
HL - Hull	Exterior Decks	H026/CDN(1)-0067-00

JOB No	FREQUENCY	TYPE	LOCATION	ALLOCATION	DEPT	PAGE	OF
1	60M	PAINT	IN DOCK	CONTRACTOR	-	9	14

12.4. Waterways

12.4.1. Apply one coat of paint code C045 (Tie Coat) to achieve paint manufacturers recommended DFT per coat.

12.4.2. Apply two coats of paint code C061 colour Grey US Fed-Std-595B code 16076 to achieve the paint manufacturers recommended DFT per coat, to weather deck waterways, including 4 inch vertical waterway (on superstructure), and around equipment foundations.

12.5. Vertical Replenishment Area Circle

12.5.1. Apply one (1) coat of paint code C177, colour (**Yellow**) US Fed-Std-595B code 33538 to Vertical replenishment area circle.

12.5.2. The configuration and painting of the area circle shall be iaw Paint Plan DWG 9558974 Rev H.

12.5.3. The ISSC On-Site Representative shall inspect upon completion of treatment.

Hold Point: Inspect Waterways and Vertrep Circle	**ISSC On-Site Representative**	**Service Provider Foreman**
Date:		

Miscellaneous Items

13. Treat the miscellaneous items as follows:

Note: For bid purposes assume 100% of all surfaces identified in the following paragraphs will require blast cleaning to bare metal SSPC SP10, near-white blast clean or SSPC SP11, Power Tool cleaning to bare metal.

13.1. Deck machinery, hatches/coamings, bulwarks, guard-rails/stanchions, storm rails, ladders, stairways, vent plenums, vent trunking, mushroom vents.

13.1.1. For bare metal areas, apply one (1) coat paint code C171 to achieve paint manufacturers recommended DFT per coat. (If 100% cleaned to SP10) or C183 (if cleaned to SP11) to a DFT iaw paint manufacturers recommendations.

13.1.2. Apply one (1) tie coat of paint code C045 to a DFT DFT iaw paint manufacturers recommendations.

SHIP	PMS2O INSTRUCTIONS	SHIP INDEX
HMCS GLACE BAY		HY005-03 (2)
SYSTEM	**EQUIPMENT**	**FLEET INDEX**
HL - Hull	Exterior Decks	H026/CDN(1)-0067-00

JOB No	FREQUENCY	TYPE	LOCATION	ALLOCATION	DEPT	PAGE	OF
1	60M	PAINT	IN DOCK	CONTRACTOR	-	12	14

~~Hold Point:~~ ~~Miscellaneous Items~~	~~ISSC On-Site Representative~~	~~General Contractor On-Site Foreman~~
~~Date:~~		

Completion

14. The work is deemed completed when the following has been accomplished

14.1. Provide all deliverables identified in this specification.

14.2. In company with the ISSC On-Site Representative, perform a complete inspection of the ship's paint work.

Hold Point: Completion	ISSC On-Site Representative	General Contractor On-Site Foreman
Date: 6 Feb 12		

Photographs

15. On completion of the inspection digitally photograph the same items as taken for item 2 above.

Notes:

16. Workmanship Standards.

16.1.1. Uniformly apply all coatings without sags, foreign materials, or other blemishes. As directed by the ISSC On-Site Representative, remove and repair such defects before proceeding with another coat.

16.1.2. Supply all coating materials for the selected system of the same manufacturer. Keep differing lots of materials to a minimum.

16.1.3. Supply paint to the site in new unopened containers. Do not accept product older than the manufacturer's published life or in damaged containers.

16.1.4. Provide, upon request from the ISSC On-Site Representative, a 1 litre size sample of each lot of material complete with certified copies of the manufacturer's quality control testing records.

SHIP	PMS2O INSTRUCTIONS	SHIP INDEX
HMCS GLACE BAY		HY005-03 (2)
SYSTEM	**EQUIPMENT**	**FLEET INDEX**
HL - Hull	Exterior Decks	H026/CDN(1)-0067-00

JOB No	FREQUENCY	TYPE	LOCATION	ALLOCATION	DEPT	PAGE	OF
1	60M	PAINT	IN DOCK	CONTRACTOR	-	14	14

HOLD POINT DATA ENTRY FORM

Date: July-09-12 **Item:** Decks **Component:** _____

Ship Name	Product Used		Coat No.
HMCS GlaceBay	Manufacturer	International	1
	Product Name	300 Intershield	
	Batch no.	ND7395UK N6371UH	

Data Item	Enter Readings			Location(s)
Time of Reading	1000	1200	400	Foxel Bridgewings Bridge Top Sweep Deck
Surface Temp	30°C	50°C	60°C	
Ambient Temp	20°C	25°C	30°C	
Relative Humidity	46.1%	57.5%	65.7%	
DFT over entire area	3	5	6+7	
Chloride Ions levels	less than 3	less than 3	less than 3	

Following space to sketch diagram and denote DFT readings, surface profile and/or chloride ions levels data.

I verify that the above readings are correct and the job has been performed as per SNC-Lavalin environmental and technical requirements.

Signed: _____ (Service Provider) Date: July 09-12

Return to the ISSC On-Site Representative on completion of job.

SNC-Lavalin	Form : MMS 025	Revision : Rev 0	Revision Date: 03-Apr-2012	Issued By : SNC-Lavalin

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