

**THATCHAM**

TRAINING CENTRE



**EVALUATION REPORT  
ON THE  
ANEST IWATA W 400**

**CONDUCTED BY  
THATCHAM  
TRAINING CENTRE**

**FEBRUARY 1998**



**REPORT OF THE EVALUATION OF THE PAINT  
TRANSFER EFFICIENCY  
OF THE ANEST IWATA W400  
GRAVITY SPRAY GUN  
CARRIED OUT BY THE  
MOTOR INSURANCE REPAIR  
RESEARCH CENTRE,  
THATCHAM TRAINING  
AT THE REQUEST OF THE  
ANEST IWATA CORPORATION**

**12th February 1998**

## **OBJECTIVE**

To confirm that the Anest Iwata W400 Gravity Spray Gun can achieve a paint transfer efficiency (weight) of greater than 65% based on the ASTM D5286-95 test methods for testing transfer efficiency.

## **METHOD**

Paint materials used for evaluation of the spray gun were 2K HS Primer, 2K HS direct gloss, water based base coat and 2K HS lacquer onto aluminium foil and painted steel substrates simulating a refinish process.

It was decided to spray all panels in an upright position in a conventional down draft spray booth keeping the spray within the area of the foil/panel (see Appendix A3)

At 2.0 Bar inlet pressure to the gun, the transfer efficiency was assessed with various fluid nozzle sizes, spray distance from the panel and spraying techniques. Appendix B1 details the variables assessed together with the number of samples prepared at each variable.

All aluminium foils were given one coat of paint, the number of gun passes per panel detailed in the result sheets Appendix B6.

The steel panels were prepared with the normal substrate for the particular paint being sprayed, the paint being sprayed as in a refinish operation. For details of number of gun passes and number of coats applied see result sheets Appendix B6.

Before evaluation began, paint fluid flow, viscosity and solids of the paint were measured (see Appendix B2).

Foils were pre-weighed and then reweighed after coating and stoving to give 'dry-up' material. The spray gun was weighed before and after the paint application to determine 'wet spray material'. A wire was attached to the gun to maintain the correct spraying distance. Each aluminium foil was secured to a steel backing panel and placed on the spraying jig for spraying. After spraying, the foils were placed into a further spray booth on a steel backing panel for stoving.

Steel panels after preparation (see Appendix B3) were pre-weighed and then reweighed after coating and stoving to give 'dry-up' material. The spray gun was weighed before and after the paint application to determine 'wet spray material'. A wire was attached to the gun to maintain the correct spraying distance. Each panel was placed on the spraying jig for spraying. After spraying the panels were placed in a further spray booth for stoving. Paint thickness measurements were carried out before spraying and after spraying and stoving. See Appendix B5 for paint thickness applied.

## **RESULTS**

See Appendix B6 for recorded results and calculations

Appendix A1 summaries the results.

## **NOTE**

Because of the large rise in viscosity especially when carrying out the Direct Gloss evaluation, the foils sprayed last in this evaluation, namely those sprayed using the W400 162 gun, were repeated with newly mixed material to determine if this rise in viscosity had a dramatic effect on transfer efficiency. This exercise was also repeated for the 2K HS clear lacquer.

Results are recorded in Appendix B6 Result Sheets 2+ for D.G. and 4+ for lacquer and show the rise in viscosity had little effect on Transfer Efficiency although paint fluid flow was lower. See Appendix A1 for result comparison.

## **CONCLUSION**

The Anest Iwata W400 Gravity Spray Gun complies with the requirements of the Environmental Protection Act 1990 Part 1 - 1997 Revision as detailed in PG6/34 (97) when used as detailed in this report achieving a Transfer efficiency (weight) of greater than 65%.

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- A1 Summary of Results T.E.
- A2 Transfer Efficiency (T.E.) Calculations
- A3 a) Position of Panels in Spray Booth  
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- B1 Variables assessed and Panel Numbers
- B2 Method for Material Solids  
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- B4 Spraying and Stoving of Test Samples
- B5 Paint Thicknesses on Steel Panels (Microns)
- B6 Result Sheet 1      2K Primer  
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Result Sheet 4      Clear Lacquer 2K HS  
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SUMMARY OF RESULTS T.E.

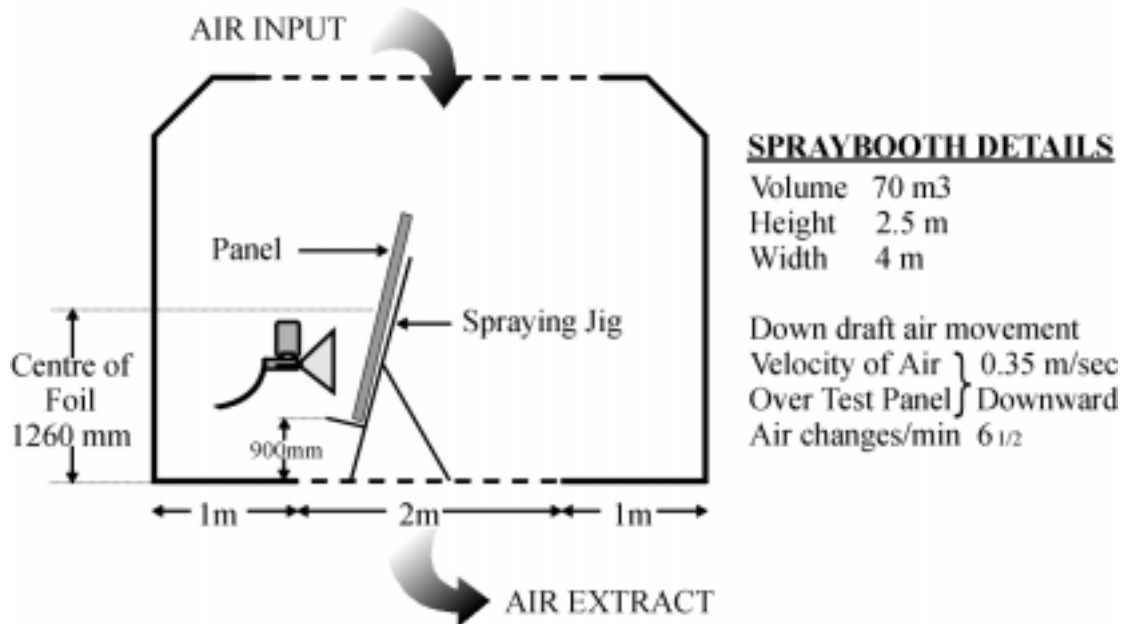
Substrate	W400-122 Gun		W400-142 Gun		W400-162 Gun		W400-182 Gun	
	Spray Distance 150mm		Spray Distance 150mm	200mm	Spray Distance 150mm	200mm	Spray Distance 150mm	200mm
Primer - Foil							95.6	91.9
Primer - Steel								92.1
Direct Gloss - Foil			80.0	75.2	80.9	75.8		
Direct Gloss - Steel			76.9		79.6			
Base Ct. - Foil	74.0		81.5	73.5				
Base Ct. - Steel	68.0		76.4					
Clear Lac. - Foil			74.8	70.8	78.0	73.0		
Clear Lac. - Steel			74.7		74.9			
Direct Gloss - Foil <b>RETEST</b>					83.8	74.1		
Clear Lac. - Foil <b>RETEST</b>					76.7	73.3		

**APPENDIX A2****TRANSFER EFFICIENCY (T.E)  
CALCULATIONS (WEIGHT)**

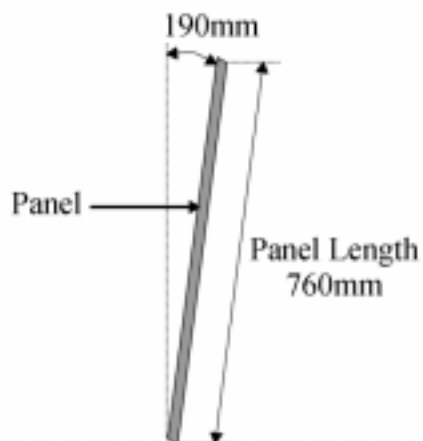
1. Weight of Foil/Steel panel
2. Weight of Foil/Steel panel + 'Dry-up'
3.  $(2-1) = \text{Weight of 'Dry-up'}$
4. Wet Spray Material  
i.e. Gun weighed before and after application - weight difference.
5. Spray Solid =  $(4 \times \text{Av. Mat. Solids})$
6.  $\text{T.E. (weight)} = (3 \div 5) \times 100\%$

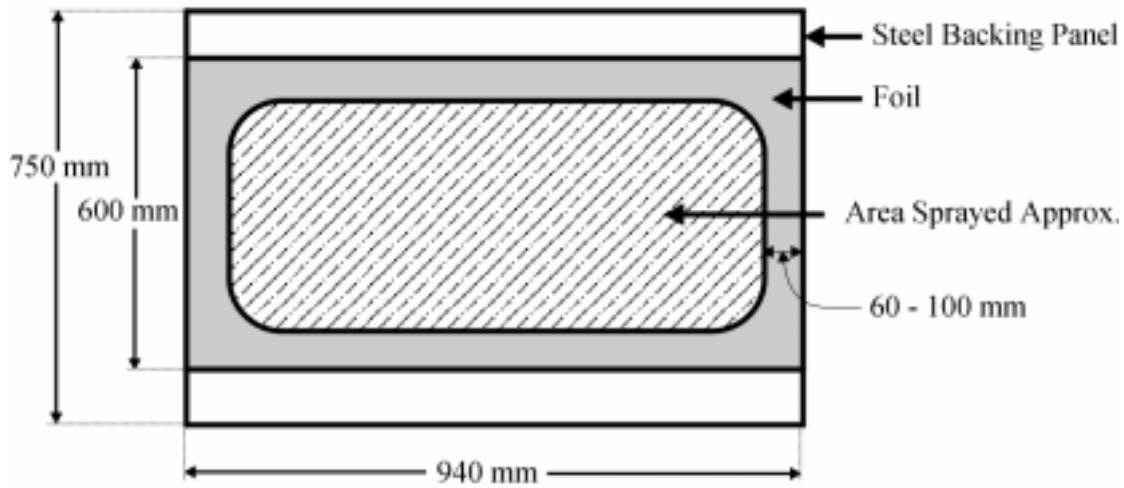
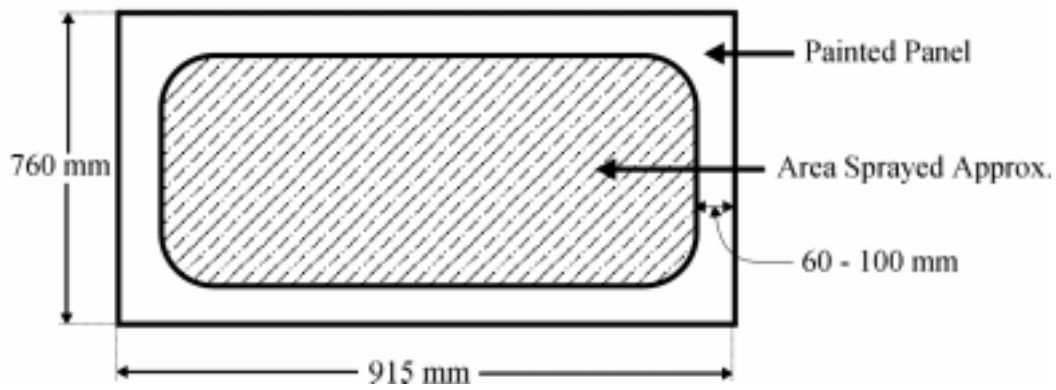
## APPENDIX A3

### a) POSITION OF TEST PANELS IN SPRAY BOOTH



### PANEL IN UPRIGHT POSITION



**APPENDIX A3 contd.****b) FOIL TEST SAMPLE - SIZE AND AREA SPRAYED****c) STEEL PANEL TEST SAMPLE - SIZE AND AREA SPRAYED**

**APPENDIX B1****VARIABLES ASSESSED AND PANEL NUMBERS****ALUMINIUM FOIL**

<b>Spray Product</b>	<b>Gun</b>	<b>Spray Distance</b>	<b>Panel Position</b>	<b>Number of Foils</b>
1) 2K HS Primer	W400-182 (1.8mm)	150 mm 200 mm	Upright “	Three Three
2) 2K HS Direct Gloss	W400-142 (1.4mm)	150mm 200mm	Upright “	Three Three
	W400-162 (1.6mm)	150mm 200mm	Upright “	Three Three
3) Water Based Base Coat	W400-122 (1.2mm)	150mm	Upright	Three
	W400-142 (1.4mm)	150mm 200mm	Upright “	Three Three
4) 2K HS Clear Lacquer	W400-142 (1.4mm)	150mm 200mm	Upright “	Three Three
	W400-162 (1.6mm)	150mm 200mm	Upright “	Three Three

**STEEL PANELS**

<b>Spray Product</b>	<b>Substrate</b>	<b>Gun</b>	<b>Spray Distance</b>	<b>Panel Position</b>	<b>Number of Panels</b>
1) 2K HS Primer	Etch Primer	W400-182	200mm	Upright	Two
2) 2K HS Direct Gloss	Etch Primer + 2K HS Primer	W400-142	150mm	Upright “	Two
		W400-162	150mm		Two
3) Water Based Base Coat	Etch Primer +2K HS Primer	W400-122	150mm	Upright “	Two
		W400-142	150mm		Two
4) 2K HS Clear Lacquer	Etch Primer +2K HS Primer + Water Based Base Coat	W400-142	150mm	Upright “	Two
		W400-162	150mm		Two

## APPENDIX B2

### MATERIAL SOLIDS

Paint was weighed into a pre-weighed aluminium foil dish (approx. size 215mm x 215m). By tipping the dish the paint was allowed to run and cover the bottom. After stoving at 130°C for 120 minutes (see Result Sheet 3, Appendix B6 for details of base coat stoving), the dishes were allowed to cool and re-weighed.

Calculation:

1. Aluminium dish weight
2. Wet material weight
3. 'Dry-up' material & dish weight
4. 'Dry up' weight = (3 - 1)
5. Material solids = (4 ÷ 2)

#### Note

All paint was mixed by weight using the s.g of each material. This was considered a more accurate way of mixing than by volume.

### VISCOSITY

The viscosity was tested using a DIN 4 Cup

### PAINT FLUID FLOW THROUGH THE GUN

After setting up the gun, it was weighed, the paint sprayed for 20 seconds in the booth and the gun re-weighed. Weight difference gave paint fluid flow for 20 seconds (S)

## APPENDIX B3

### PREPARATION OF STEEL PANELS FOR T.E. - EVALUATION AS PER REFINISH PROCESS

Mild steel flat sheet 1mm thick 760mm x 915mm.

1. Both sides cleaned using scotchbrite grey and solvent wipe  
Then Cleaned twice again
2. One side spray coated with Stadox 1K full primer thinned 50% with 1K  
thinner - 2 coats applied with 10 minute flash off between coats.

Flash off at 20°C for 20 minutes

Stoved at 70°C for 40 minutes

These panels used for 2K HS Primer T.E. evaluation after grey scotchbrite and  
tack cloth.

3. For base coat and direct gloss, one coat of Stadox 1K full primer applied, flashed off  
at 20°C for 20 minutes.  
2 coats of Stadox 2K HS Fuller thinned 4:1 with Fuller hardener applied using W400  
Gun 1.8mm fluid tip, flash off between coats at 20°C for 10 minutes, and stoved at  
65°C for 40 minutes.  
P500 dry flat and spirit wiped, tack wiped prior to applying base coat or direct gloss for  
T.E.
4. For Lacquer T.E. evaluation the panels sprayed for base coat T.E. evaluation were grey  
scotched fully coated with base coat, two coats applied with drying in between, and  
stoved at 70°C for 40 minutes. After grey scotch and tack wipe, lacquer applied for  
T.E.

## **APPENDIX B4**

### **SPRAYING AND STOVING OF TEST SAMPLES**

All foils and steel panels were placed onto the panel spray jig inside the spray booth in an upright position. All panels/foils were sprayed keeping the sprayed material within the area of the panels/foils (See Appendix A3 for details).

Foils were sprayed with one coat of paint, the number of gun passes being 3 to 4 (see test result sheet for exact number of passes) using a slow spraying speed.

The steel painted panels were sprayed as per data sheet instructions on the use of the particular paint product to give an acceptable finish.

2K HS Primer - three coats applied with 5 minutes flash off between coats

2K HS Direct Gloss - half a coat followed directly by one full coat

Waterbased Base Coat - two coats with drying in between coats

2K HS Clear Lacquer - half a coat followed directly by one full coat

In order to maintain the correct spraying distance from the panels, a wire was attached to the spray gun handle extending to the side of the gun, then forward for the correct distance, towards the panel. When spraying the tip of the wire was kept just above the panel surface. The wire did not interfere with the spray pattern.

Air pressure at the inlet to the gun was continually monitored and maintained at 2.0 Bar with the gun pulling air.

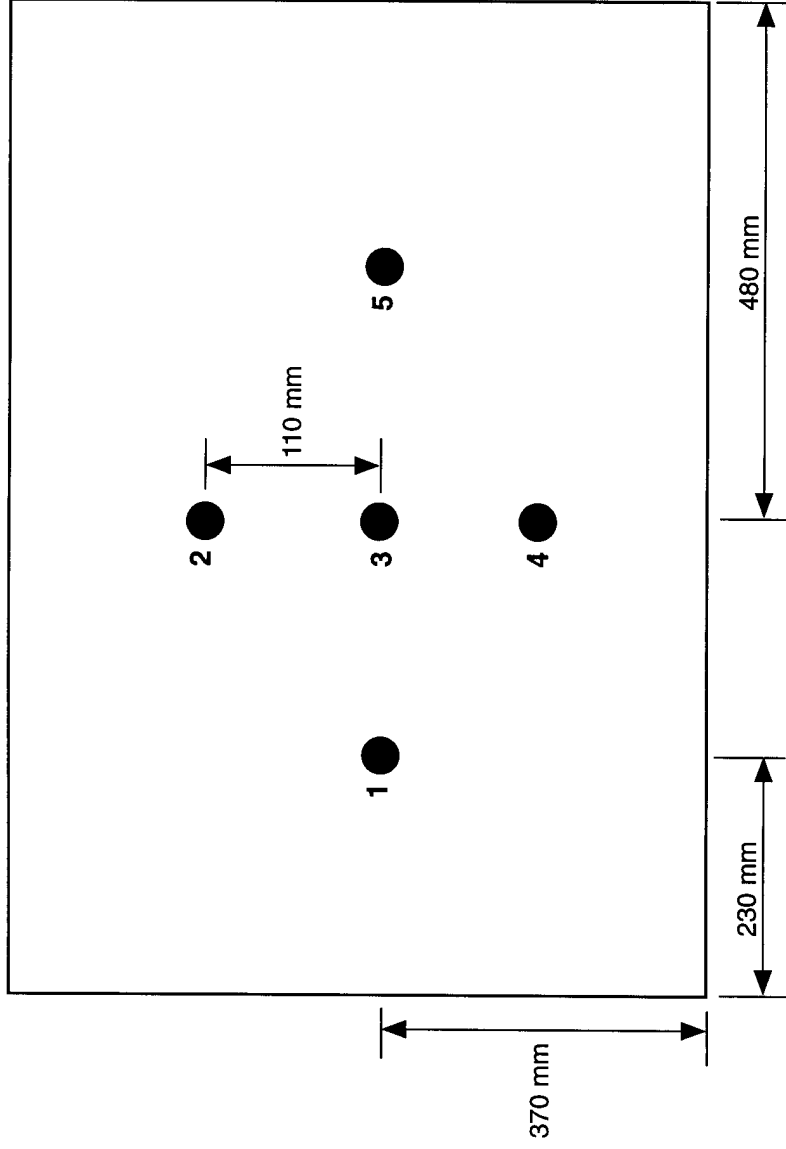
After spraying, the panels/foils were placed in a further booth for stoving at the relevant schedules (See Appendix B6 Result Sheets).

For the steel panels, a control panel having the same substrate as the panels being painted was stoved at the same time to determine any weight loss due to the substrate.



**APPENDIX B5 contd.**

- Hole positions in paper sheet placed over painted steel panel through which paint thickness was measured.



RESULT SHEET 1

Date: 13.1.1998

1. Materials: Primer - Standox 2KHS Fuller (020 78325)  
 Viscosity: 38S DIN 4 18°C  
 Spray Temp. 20°C  
 Spray Humidity 58%  
 Mix Ratio 4:1 (Mixed by wt. 6.24g Primer: 0.96g Hardener)
- Stoving Schedule: -Foil 70°C for 90 minutes  
 -Steel ---"-----  
 Solids Temp/Time 130°C for 120 minutes

2. Material Solids

Panel Disk No.	(1) Aluminium Foil Weight	(2) Wet Material	(3) Dry-up & Foil	(4) (3)-(1) Dry Up	(5) (4)/(2) Material Solids	Average Material Solids
1.	6.77	12.16	14.54	7.77	0.6390	0.6403
2.	6.33	8.35	11.68	5.35	0.6407	
3.	7.34	13.16	15.78	8.44	0.6413	

3. Transfer Efficiency (TE) On Foil

Foil No.	Gun Model	Paint Adj.	Pressure at Gun	Spray Distance	Foil Position	Number of Gun Passes	Paint Output	(1) Foil Weight	(2) Dry-up & Foil	(3)-(1) Dry Up	(4) Wet Spray Material	(5) Spray Solid	(6) T.E. (3)/(5)	T.E. Average
39	W400 182	Fully Open	2.0 Bar	150mm	Up Right	3	100.6grm in 20S	24.91	66.62	41.71	67.8	43.412	96.1	95.6
41	"	"	"	"	"	3		24.86	63.69	38.83	63.8	40.851	95.1	
42	"	"	"	200mm	"	3		24.69	57.09	32.40	55.2	35.345	91.7	91.9
43	"	"	"	"	"	3		24.83	57.78	32.95	56.1	35.920	91.7	
44	"	"	"	"	"	3		26.20	62.24	36.04	60.9	38.994	92.4	

RESULT SHEET I (CONTINUED)

APPENDIX B6 (Cont'd)

Materials: 2K HS Primer

For Steel Panels - Made up Fresh Primer  
Material Solids

Panel Dish No.	(1) Aluminium Foil Weight	(2) Wet Material	(3) Dry-up & Foil	(4)(3)-(1) Dry Up	(5) (4)/(2) Material Solids	Average Material Solids
4.	6.98	9.91	13.34	6.36	.6418	
5.	8.51	9.26	14.45	5.94	.6415	0.6416
6.	6.00	14.90	15.56	9.56	.6416	

4. Transfer Efficiency (TE) On Steel Panel

Substrate Etch Primer

Panel No.	Gun Model	Paint Adj.	Pressure at Gun	Spray Distance	Panel Position	Number of Gun Passes	Number of Coats	Paint Output	(1) Panel Weight	(2) Dry-up & Panel	(3)(2)-(1) Dry Up	(4) Wet Spray Material	(5) Spray Solids	(6) T.E. (3)/(5)	T.E. Average	Paint Thickness Applied
P1	W400 182	Contr	ol Panel	for	weight	1oss			4923.2	4922.4	-0.8					
P2	"	Fully	2.0 Bar	200mm	Upright	4	3	85 gm	4953.2	5052.7	*99.5+	169.0	108.43	92.5		123.4
P3	"	Open	"	"	"	4	F/O 5 min 3	20S "	4942.3	5036.8	*95.3	162.2	104.07	91.6	92.1	108.6

\* Weight adjusted for loss of weight on control panel in accordance with ASTM procedures

RESULT SHEET 2

Date: 19.1.1998

1. Materials: Direct Gloss Standox 2K HS Provence Green Ford 20567-600  
 Viscosity: Start 45S DIN 417°C End 58S DIN 417°C Stoving Schedule: -Foil 70°C for 90 minutes  
 Spray Temp. 21°C -Steel ----  
 Spray Humidity 36% RH Solids Temp/Time 130°C for 120 minutes  
 Spray Time 65 minutes approx  
 Mix Ratio 2:1 (Mixed by wt. 1014.6g D.G.: 500 gm Hard Kurtz)

2. Material Solids

Panel Disk No.	(1) Aluminium Foil Weight	(2) Wet Material	(3) Dry-up & Foil	(4) (3)-(1) Dry Up	(5) (4)/(2) Material Solids	Average Material Solids
1.	5.37	7.99	9.90	4.53	0.5670	0.5662
2.	6.36	7.93	10.85	4.49	0.5662	
3.	4.91	5.50	8.02	3.11	0.5655	

3. Transfer Efficiency (TE) On Foil

Foil No.	Gun Model	Paint Adj.	Pressure at Gun	Spray Distance	Foil Position	Number of Gun Passes	Paint Output	(1) Foil Weight	(2) Dry-up & Foil	(3)(2)-(1) Dry Up	(4) Wet Spray Material	(5) Spray Solid	(6) T.E. (3)/(5)	T.E. Average
57	W400	Fully	2.0 Bar	150mm	Up	4	40.7 gm	24.09	36.50	12.41	27.3	15.457	80.3	80.0
58	142	Open	"	"	Right	4	in 20S	23.47	38.04	14.57	32.3	18.288	79.7	
59	"	"	"	"	"	4		22.99	37.60	14.61	32.2	18.232	80.1	
60	W400	"	"	200mm	"	4		25.05	38.90	13.85	32.6	18.458	75.1	75.2
61	142	"	"	"	"	4		22.87	37.97	15.10	35.6	20.156	74.9	
62	"	"	"	"	"	4		23.03	37.65	14.62	34.1	19.307	75.7	

Materials: Direct Gloss

Foil No.	Gun Model	Paint Adj.	Pressure at Gun	Spray Distance	Foil Position	Number of Gun Passes	Paint Output	(1) Foil Weight	(2) Dry-up & Foil	(3)(2)-(1) Dry Up	(4) Wet Spray Material	(5) Spray Solid	(6) T.E. (3)(5)	T.E. Average
63	W400	Fully	2.0 Bar	150mm	Up	4	56.6gm in 20S	25.26	38.08	12.82	28.1	15.910	80.6	
64	162	Open	"	"	Right	4		23.53	36.65	13.12	28.8	16.306	80.5	80.9
65	"	"	"	"	"	4		23.66	38.14	14.48	31.3	17.722	81.7	
66	W400	"	"	200mm	"	4		26.25	39.48	13.23	30.9	17.496	75.6	
67	162	"	"	"	"	4		24.94	36.78	11.84	27.6	15.627	75.8	75.8
68	"	"	"	"	"	4		24.26	36.77	12.51	29.1	16.476	75.9	

Substrate Etch Primer + 2K Primer

4. Transfer Efficiency (TE) On Steel Panel

Panel No.	Gun Model	Paint Adj.	Pressure at Gun	Spray Distance	Panel Position	Number of Gun Passes	Number of Coats	Paint Output	(1) Panel Weight	(2) Dry-up & Panel	(3)(2)(1) Dry Up	(4) Wet Spray Material	(5) Spray Solid	(6) T.E. (3)(5)	T.E. Average	Paint Thickness Applied
P9	W400		Control	Panel	for	weight	loss		5039.7	5038.4	-1.3					
P10	142	Fully Open	2.0 Bar	150mm	Upright	5on <sup>1</sup> / <sub>2</sub> ct. 6 on full coat	1 <sup>1</sup> / <sub>2</sub> acts No F/O	40.7 in 20S	4965.3	4986.7	*21.4 +1.3 =22.7	52.2	29.55	76.8	76.9	51
P11	"	"	"	"	"	"	"		4985.9	5008.2	*23.6	54.2	30.68	76.9		59
P12	W400	"	2.0 Bar	150mm	Upright	5on <sup>1</sup> / <sub>2</sub> ct. 5 on full coat	1 <sup>1</sup> / <sub>2</sub> acts No F/O	56.6 in 20S	4969.0	4989.3	*21.6	47.5	26.89	80.3	79.6	55
P13	162	"	"	"	"	"	"		4963.6	4983.3	*21.0	47.1	26.66	78.8		53

\* Weight adjusted for loss of weight on control panel in accordance with ASTM procedures

**RESULT SHEET 2+ RE-TEST DUE TO HIGH VISCOSITY AT FINISH OF 19.1.98 TEST**

Date: 20.1.1998

1. Materials: Direct Gloss Standox 2K HS Provence Green Ford 20567-600  
 Viscosity: Start 31S DIN 4 20°C End 40S DIN 4 19°C  
 Spray Temp. 20 °C  
 Spray Humidity 35% RH  
 Spray Time 20 minutes approx  
 Mix Ratio 2:1 (Mixed by wt. 507.3 g D.G.: 250 gm Hard Kurtz)
- Storing Schedule: -Foil 70 °C for 90 minutes  
 Solids Temp/Time 130°C for 120 minutes

2. Material Solids

Panel Dish No.	(1) Aluminium Foil Weight	(2) Wet Material	(3) Dry-up & Foil	(4) (3)-(1) Dry Up	(5) (4)-(2) Material Solids	Average Material Solids
1.	5.43	5.24	8.28	2.86	.5439	.5460
2.	5.56	8.74	10.34	4.78	.5469	
3.	6.10	7.11	9.99	3.89	.5471	

3. Transfer Efficiency (TE) On Foil

Foil No.	Gun Model	Paint Adj.	Pressure at Gun	Spray Distance	Foil Position	Number of Gun Passes	Paint Output	(1) Foil Weight	(2) Dry-up & Foil	(3)-(1) Dry Up	(4) Wet Spray Material	(5) Spray Solids	(6) T.E. (3)/(5)	T.E. Average
81	W400	Fully	2.0 Bar	200mm	Up	3	59.3gm in 20S	23.49	36.83	13.34	33.3	18.182	73.4	74.1
82	162	Open	"	"	Right	3		23.60	37.43	13.83	33.7	18.400	75.2	
83	"	"	"	"	"	3		24.35	36.73	12.38	30.8	16.817	73.6	
84	W400	"	"	150mm	"	4		23.58	42.11	18.53	40.3	22.004	84.2	83.8
85	162	"	"	"	"	4		23.69	42.43	18.74	41.1	22.441	83.5	
86	"	"	"	"	"	4		23.64	41.42	17.78	38.9	21.239	83.7	

## APPENDIX B6 (Cont'd)

## RESULT SHEET 3

Date: 14.1.1998

1. Materials: Water based Base Coat Standox Vauxhall Oriental Blue Met. 24L 97196-900  
 Viscosity: 26S DIN 4 20°C -Foil 35°C for Stoving Schedule:  
 20 minutes then 70°C for 45 minutes - Steel  
 Spray Temp. 20°C  
 -----  
 Spray Humidity 38-40% RH Solids Temp/Time 40°C for 45 minutes, 130°C for 70 minutes  
 Spray Time 60 minutes approx  
 Mix Ratio 4:1 (Mixed by wt. 1528.1g Base Coat: 375gm Ve Wasset)

## 2. Material Solids

Panel Disk No.	(1) Aluminium Foil Weight	(2) Wet Material	(3) Dry-up & Foil	(4) (3)-(1) Dry Up	(5) (4)/(2) Material Solids	Average Material Solids
1.	6.52	13.09	8.12	1.6	0.1222	0.1235
2.	5.79	7.90	6.78	0.99	0.1253	
3.	6.66	10.25	7.92	1.26	0.1229	

## 3. Transfer Efficiency (TE) On Foil -

Foil No.	Gun Model	Paint Adj.	Pressure at Gun	Spray Distance	Foil Position	Number of Gun Passes	Paint Output	(1) Foil Weight	(2) Dry-up & Foil	(3)(2)-(1) Dry Up	(4) Wet Spray Material	(5) Spray Solid	(6) T.E. (3)/(5)	T.E. Average
48	"	"	"	150mm	"	4		24.32	27.84	3.52	38.3	4.730	74.4	74.0
49	"	"	"	"	"	4		24.17	27.74	3.57	38.6	4.767	74.9	
50	"	"	"	"	"	4		24.65	28.13	3.48	38.7	4.779	72.8	

RESULT SHEET 3 (CONTINUED)

APPENDIX B6 (Cont'd)

Materials: Water Based Base Coat

Foil No.	Gun Model	Paint Adj.	Pressure at Gun	Spray Distance	Foil Position	Number of Gun Passes	Paint Output	(1) Foil Weight	(2) Dry-up & Foil	(3)(2)-(1) Dry Up	(4) Wet Spray Material	(5) Spray Solid	(6) T.E. (3)(5)	T.E. Average
51	W400	Fully	2.0 Bar	150mm	Up	3	66.8gm in 20S	25.88	29.75	3.87	37.9	4.681	82.7	
52	142	Open	"	"	Right	3		26.37	30.02	3.65	36.5	4.508	81.0	81.5
53	"	"	"	"	"	3		25.08	28.74	3.66	36.7	4.532	80.8	
54	W400	"	"	200mm	"	3	"	25.01	28.95	3.94	43.0	5.311	74.2	
55	142	"	"	"	"	3		24.40	28.24	3.84	42.3	5.224	73.5	73.5
56	"	"	"	"	"	3		24.38	27.97	3.59	39.9	4.928	72.8	

Substrate Etch + 2K HS Primer

4. Transfer Efficiency (TE) On Steel Panel

Panel No.	Gun Model	Paint Adj.	Pressure at Gun	Spray Distance	Panel Position	Number of Gun Passes	Number of Coats	Paint Output	(1) Panel Weight	(2) Dry-up & Panel	(3)(2)-(1) Dry Up	(4) Wet Spray Material	(5) Spray Solid	(6) T.E. (3)(5)	T.E. Average	Paint Thickness App'ed
P4	W400	"	"	"	"	"	"	"	5034.3	5033.9	-0.4					
P5	122	Fully Open	Control 2.0Bar	Panel 150mm	for Upright	weight 4	loss 2 F/O Till Dry	55.1g in 20S	4992.8	4998.5	5.71+ * * =6.1	74.6	9.21	66.2	68.0	12.4
P6	"	"	"	"	"	4	"		5000.3	5006.2	*6.3	73.2	9.04	69.7		12.4
P7	W400	"	2.0 Bar	150mm	Upright	4	"	66.8 in 20S	5005.1	5012.0	*7.3	75.7	9.35	78.1	76.4	15.0
P8	142	"	"	"	"	4	"		4956.8	4963.2	*6.8	73.8	9.11	74.6		14.2

\* Weight adjusted for loss of weight on control panel in accordance with ASTM procedures

## RESULT SHEET 4

Date: 16.1.1998

1. Materials: Standox 2K HS 1acquer - 02082497  
 Viscosity: 24S DIN 4 18°C  
 Spray Temp. 20°C  
 Spray Humidity 42 - 44% RH  
 Spray Time 65 minutes approx  
 Mix Ratio 2:1 (Mixed by wt. 990g Lacquer: 500 gm Hardener)
- Stoving Schedule: -Foil 70°C for 90 minutes  
 -Steel -----  
 Solids Temp/Time 130°C for 120 minutes

## 2. Material Solids

Panel Dish No.	(1) Aluminium Foil Weight	(2) Wet Material	(3) Dry-up & Foil	(4) (3)-(1) Dry Up	(5) (4)/(2) Material Solids	Average Material Solids
C-1.	6.75	10.15	12.09	5.34	.5261	.5255
C-2.	5.86	10.25	11.23	5.37	.5239	
C-3.	5.98	10.81	11.67	5.69	.5264	

## 3. Transfer Efficiency (TE) On Foil

Foil No.	Gun Model	Paint Adj.	Pressure at Gun	Spray Distance	Foil Position	Number of Gun Passes	Paint Output	(1) Foil Weight	(2) Dry-up & Foil	(3) (2)-(1) Dry Up	(4) Wet Spray Material	(5) Spray Solid	(6) T.E. (3)/(5)	T.E. Average
69	W400	Fully	2.0 Bar	150mm	Up	3	56.2g	24.3	35.57	11.27	28.9	15.187	74.2	74.8
70	142	Open	"	"	Right	3	in 20S	23.9	37.27	13.37	33.5	17.604	75.9	
71	"	"	"	"	"	3		23.49	36.67	13.18	33.7	17.709	74.4	
72	"	"	"	200mm	"	3		25.4	36.88	11.48	30.9	16.238	70.7	70.8
73	"	"	"	"	"	3		23.19	35.98	12.79	34.3	18.025	71.0	
74	"	"	"	"	"	3		23.53	37.11	13.58	36.5	19.181	70.8	

RESULT SHEET 4 (CONTINUED)

APPENDIX B6 (Cont'd)

Materials: 2K HS Lacquer

Foil No.	Gun Model	Paint Adj.	Pressure at Gun	Spray Distance	Foil Position	Number of Gun Passes	Paint Output	(1) Foil Weight	(2) Dry-up & Foil	(3)(2)-(1) Dry Up	(4) Wet Spray Material	(5) Spray Solid	(6) T.E. (3)(5)	T.E. Average
75	W400	Fully	2.0 Bar	150mm	Up	3	58.5gm in 20S	25.19	37.3	12.11	29.8	15.66	77.3	
76	162	Open	"	"	Right	4		23.81	39.58	15.77	38.4	20.19	78.2	78.0
77	"	"	"	"	"	4		23.36	39.64	16.28	39.5	20.757	78.4	
78	W400	"	"	200mm	"	3	"	25.13	36.39	11.26	29.6	15.555	72.4	
79	162	"	"	"	"	3		24.67	36.89	12.22	31.8	16.711	73.1	73.0
80	"	"	"	"	"	3		23.30	36.11	12.81	33.1	17.394	73.6	

4. Transfer Efficiency (TE) On Steel Panel Substrate Etch + 2K Primer + Base Coat

Panel No.	Gun Model	Paint Adj.	Pressure at Gun	Spray Distance	Panel Position	Number of Gun Passes	Number of Coats	Paint Output	(1) Panel Weight	(2) Dry-up & Panel	(3)(2)-(1) Dry Up	(4) Wet Spray Material	(5) Spray Solid	(6) T.E. (3)(5)	T.E. Average	Paint Thickness Applied
P14	W400	"	Control	Panel 150mm	for Upright	weight 4	loss 1 1/2ct	56.2g in 20S	5041.3	5041.0	-0.3					34
P15	142	Fully Open	2.0 Bar	"	Upright	4	No F/O		5010.4	5025.7	15.3+3	39.9	20.97	74.4	74.7	
P16	"	"	"	"	"	4	"		5016.3	5034.2	*18.2	46.2	24.28	75.0		41
P17	W400	"	2.0 Bar	150mm	Upright	4	"	58.59g in 20S	5003.0	5020.5	*17.8	45.4	23.86	74.6	74.9	42
P18	162	"	"	"	"	4	"		4966.3	4982.1	*16.1	40.8	21.44	75.1		44

\* Weight adjusted for loss of weight on control panel in accordance with ASTM procedures

**RESULT SHEET 4+ RETEST TO CHECK PREVIOUS WORK DUE TO POSSIBLE VISCOSITY RISE**      **Date: 20.1.1998**

1. **Materials:** Standox 2K HS Clear Lacquer  
**Viscosity:** Start 28S DIN 4 20°C End 28S DIN 4 20°C      Stoving Schedule: -Foil 70°C for 90 minutes  
**Spray Temp.** 20°C  
**Spray Humidity** 35% RH      Solids Temp/Time 130°C for 120 minutes  
**Spray Time** 20 minutes approx  
**Mix Ratio** 2:1 (Mixed by wt. 49.5g Lacquer: 250gm hardener Kurz)

2. **Material Solids**

Panel Dish No.	(1) Aluminium Foil Weight	(2) Wet Material	(3) Dry-up & Foil	(4) (3)-(1) Dry Up	(5) (4)/(2) Material Solids	Average Material Solids
C-1.	6.50	7.37	10.38	3.88	0.5265	0.5335
C-2.	5.62	7.96	9.91	4.29	0.5389	
C-3.	5.96	7.57	10.01	4.05	0.5350	

3. **Transfer Efficiency (TE) On Foil**

Foil No.	Gun Model	Paint Adj.	Pressure at Gun	Spray Distance	Foil Position	Number of Gun Passes	Paint Output	(1) Foil Weight	(2) Dry-up & Foil	(3) (2)-(1) Dry Up	(4) Wet Spray Material	(5) Spray Solid	(6) T.E. (3)/(5)	T.E. Average
87	W400	Fully	2.0 Bar	200mm	Up	3	67.3g	25.25	39.53	14.28	36.6	19.526	73.1	73.3
88	162	Open	"	"	Right	3	in 20S	24.96	38.87	13.91	35.5	18.939	73.4	
89	"	"	"	"	"	3		24.69	37.42	12.73	32.5	17.339	73.4	
90	"	"	"	150mm	"	4		23.60	38.83	15.23	37.7	20.113	75.7	76.7
91	"	"	"	"	"	4		23.72	39.54	15.82	38.8	20.700	76.4	
91	"	"	"	"	"	4		24.30	40.59	16.29	39.2	20.913	77.9	