5 STAR XTREME AUTOBODY PRODUCTS
TECHNICAL DATA INFORMATION
DATED: FEBRUARY 2017

PRODUCT NUMBER DESCRIPTION
#5180 – ORIGINAL KLEARKOTE 2.1 VOC

PRODUCT DESCRIPTION
5180 is a medium solids two component polyurethane clearcoat formulated to offer Refinishers ease of application, great flow and leveling, superior gloss and excellent distinctness of image in a productive 2K polyurethane clearcoat. 5180 is compliant under current 2.1 VOC regulations (EPA test method 24). Can be used over all solvent and water based basecoats.

PRODUCTS
#5180-1 Original Klearkote 2.1 VOC, Gallon
#5180-4 Original Klearkote 2.1 VOC, Quart

*#5181 Original Hardener, Fast 2.1 VOC Quart
*#5182 Original Hardener, Medium 2.1 VOC Quart
*#5183 Original Hardener, Slow 2.1 VOC Quart
* Also available in half pints
CAUTION ACCELERATOR NOT RECOMMENDED

SURFACE PREPARATION
Apply Undercoats and Basecoat per manufacturer's instruction. Over OEM or completely cured previously painted substrates scuff with a grey scuff pad or 600 grit then wipe clean with #5903 Compliant FinalWipe water-borne surface cleaner. Allow basecoat adequate flash time (follow manufacturer's recommendation) Follow basecoat manufacturer's recommendation for recoat intervals.

MIXING DIRECTIONS
Mix 4 parts 5180 with 1 part 5181, 5182, or 5183 by volume. Activator selection should be based on the size of the part to be painted and the temperature of both the air and part at time of painting.

APPLICATION

Number of Coats: 2-3	Application Density: full wet coats
Overlap: 50%	Flash: 10-15 mins between coats
Film Thickness Range:	Dry 1 mil – 6 mils
	Wet 3 mils – 6 mils
Application Conditions:	Minimum Temp 50°F (Substrate Temp.)
	Max Temp 100°F (Substrate Temp.)
	Ambient Humidity Less than 80% preferred

POT LIFE
When properly covered at 77°F, 5180 will maintain a sprayable viscosity for at least from 3-5 hours depending on activator selection.

ADDITIVES
ACCELERATOR: N/A
FISHEYE: N/A
FLEX ADDITIVE: Not required

Note: Do not spray when surface temperature is below 50°F.

CLEAN-UP & STORAGE
Clean spray equipment immediately after use with compliant gun wash solvent.

SUBSTRATES:
Commercially available basecoats with a VOC less than 6.6 lbs/gal or 6.3 lbs/gal (SCAQMD Rule 1151 Group 1. Properly prepared previously painted substrates.

GUN SETUPS:
CONVENTIONAL
Gravity Feed 1.3 – 1.5 mm tip
Siphon Feed 1.6 – 1.8 mm tip
HVLP 1.3 mm – 1.5 mm

AIR PRESSURES
Conventional @ Gun PANEL OVERALL
Gravity Feed 35-40 psi 45 psi
Siphon Feed 35-45 psi 45-50 psi
HVLP @ Cap 6-8 psi 9-10 psi

FLASH/DRY TIMES

	5181 @ or above 65ºF	**5182 @ or above 75ºF**	**5183 @ or above 85ºF**
Flash Between Coats	10-15 min	10-15 min	10-15 min
Dust Free	15-20 min	20-30 min	20-30 min
Sand/Polish	8-10 hours	10-12 hours	12-14 hours

Force Dry (Convection Heat)	**5181**	**5182**	**5183**
Purge time before applying heat	30 min	30 min	30 min
Force Dry Time	40 min@ 140ºF	40 min@ 140ºF	40 min@ 140ºF
Sand and Buff	After Cool Down		

AIR DRY
6-8 HOURS @ 77˚F
#5181 8-10 HOURS
#5182 10-12 HOURS
#5183 12-14 HOURS

TECHNICAL DATA
Density: 9.93 lbs/gal (unactivated)
Solids
By Weight: 34.2%
By Volume: 34.3%
VOC (Volatile Organic Content): 2.1 lbs/gal
Viscosity: 17-20 Seconds Zahn #2
Flash Point: -4°F
Theoretical Coverage: 549 sq ft per gal @ 1 mil thickness

*NOTE: Some spray gun manufacturers have specific recommendations for specific spray guns & product viscosity, always check spray gun manufacturer's recommendation.

FIRST AID:
In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention. For skin: Wash thoroughly with water. If difficulty in breathing is experienced, get medical attention immediately. If swallowed, do not induce vomiting, get medical attention immediately. See Material Safety Data Sheet.

SAFETY INFORMATION - FOR INDUSTRY USE ONLY
Danger: Vapor and spray mist harmful. Overspray may cause lung damage. May cause allergic skin and respiratory reaction, effects may be permanent. Flammable liquid and vapor. Harmful if inhaled.May affect the brain or nervous system causing dizziness, headache, or nausea. May cause eye, skin, nose, and throat irritation. Contents: See product label for contents and CAS #'s.The contents of this package must be blended with other components before the product can be used. Any mixture of components will have hazards of all components. Before opening the packages, read all warning labels. Follow all precautions. The material is designed for application only by professional trained personnel using proper equipment under controlled conditions, and is not intended for sale to the general public.

TECHNICAL TESTING RESULTS - 2017

Abstract:
The #5180 2.1 VOC urethane clearcoat was mixed with #5182 2.1 VOC Normal Hardener, sprayed and tested for adhesion loss, hardness, weathering resistance, gloss, and coat uniformity. The sample was mixed and applied as per the 5 STAR XTREME technical data sheet at 4:1 ratio of clearcoat to hardener. The results of the experiment showed that the clearcoat applied to test panels was curing correctly, maintained structural adhesion and visual integrity.

Purpose:
The tests performed and data collected for #5180 2.1 VOC urethane clearcoat with #5182 hardener will be used to provide an appropriate array of physical properties to be used in qualitative comparision with other clearcoat and hardener mixes.

Results and Discussion:
#5180 2.1 VOC Urethane Clearcoat with #5182 2.1 VOC Normal Hardener

Pendulum Hardness

Days after application	Oscillation count
1	26
3	54
7	55

The pendulum hardness test was performed on a Konig Elcometer 3040 Pendulum Hardness Tester. The total oscillations from a start angle of six degrees was observed. The results in the above table show film hardness increasing thus curing over the time after initial application. The effective complete curing happens in less than 72 hours from time of application.

Cross-hatch Adhesion/Gitterschnitt

Test	Day 1 ASTM Rating	Day 3 ASTM Rating	Day 7 ASTM Rating
1	5B	5B	5B
2	5B	5B	5B
3	5B	5B	5B

The cross-hatch test is used to determine the adhesion loss of film layers to the material being coated. The test was performed to ASTM D3359 procedure and rated on the corresponding scale. The application of the clearcoat to a standard base showed no adhesion loss over each time interval thus the 5B rating for each replicate.

Gloss

Sample reading	Day 1	Day 3	Day 7
1	91.0	90.5	89.9
2	91.0	90.3	90.2
3	90.7	89.5	90.1
4	91.1	91.2	91.0
5	91.2	91.0	90.7
Average	91.0	90.5	90.4
Standard Deviation	0.18708287	0.667083	0.454973

The gloss test was performed in 5 replicates with readings using a BYK-Gardner micro-gloss instrument at a reflection angle of 60 degrees from the normal. The data collected shows virtually no change in gloss over the testing period.

Wavescan DOI

Signals	Day 1	Std. Dev.	Day 3	Std. Dev.	Day 7	Std. Dev
DOI	96.8	0.3	96.1	0.5	96.2	0.7
B	-6.1	0.2	-5.5	0.2	-5.5	0.5
SW	13.6	0.5	16.3	1.9	14.9	2.0
LW	10.6	0.3	14.4	4.0	12.8	3.0
du	1.0	0	1.0	0.0	1.0	0.0
Wa	4.3	1.1	4.8	1.0	4.4	0.5
Wb	13.1	0.6	15.7	1.2	15.3	2.1
Wc	13.0	0.8	20.0	5.6	17.2	6.0
Wd	23.9	0.5	26.1	3.5	25.6	1.7
We	16.0	1.8	15.2	2.2	17.6	1.1

The DOI or Distincness of Image reading was measured in triplicate using a BYK-Gardner wave-scan dual instrument at a reflection angle of 20 degrees from the normal. The change in DOI measurement is indicatative of the clarity and resolution of a reflected image on the coated surface. The values for DOI remain virtually constant therefore quality of the reflected image does not diminish over the testing period.

QUV

		INITIAL GLOSS			250 HRS			500 HRS			750 HRS			1000 HRS		
	Sample	20	60	85	20	60	85	20	60	85	20	60	85	20	60	85
White	FS-5180	81.5	89.4	89.2	83.5	90.9	89.5	66.5	83.7	88.6	25.3	56.2	57.2	9.6	32.9	37.3
	Competitor A	89.6	96.1	98.2	89.1	95.6	97.2	79.6	92.6	95.6	6	37.4	65.2	1.9	13.3	46.9
Blue	FS-5180	81.2	88.5	85.3	84.3	90.8	87.8	71.5	84	87.7	24.8	54	57.3	10.9	38.1	46
	Competitor A	88.7	96.5	98	87.5	96.3	97.1	78.9	93.1	95.3	21.5	56.5	64.1	1.2	13.4	42.6

	Sample	ΔE 250 Hrs	ΔE 500 Hrs	ΔE 750 Hrs	ΔE 100 Hrs
White	FS-5180	8.75	16.85	19.57	19.25
	Competitor A	18.51	28.91	32.61	28.87
Blue	FS-5180	3.09	6.46	7.28	7.52
	Competitor A	6.00	10.94	13.19	16.37

	Sample	ΔB 250 Hrs	ΔB 500 Hrs	ΔB 750 Hrs	ΔB 100 Hrs
White	FS-5180	8.38	16.39	19.11	18.84
	Competitor A	18.11	28.36	32.05	28.42
Blue	FS-5180	2.47	4.98	5.31	5.81
	Competitor A	5.33	10.06	12.17	14.85

The QUV data shows the gloss readings at 20, 60, and 85 degrees from the normal angle at intervals of 250 hours. The data collected also shows the ΔE and ΔB values at the same time intervals. The gloss readings on both white and blue samples maintained consistent readings for 500 hours uninterrupted.

Conclusion

The array of tests completed over the one week period since application showed very positive results for the #5180 urethane clearcoat with #5182 hardener. The pendulum hardness showed that complete curing occurs in less than 72 hours. The cross-hatch tests showed no adhesion loss from the basecoat after one week. The gloss and wavescan DOI readings both show consistent values for each testing interval over the week.

KEEP OUT OF REACH OF CHILDREN.

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