



PRODUCT INTRODUCTION

STAR AVIATOR

SEALCOATING FOR AIRPORT PROJECTS



*This is the **first** product of its kind in our business.*

STAR AVIATOR;

- Far superior in performance than conventional mix designs where rubber is mixed on the job.
- Meets and/ or exceeds FAA performance tests & Specs.
- STAR AVIATOR contains FAA required rubber. No on the job blending of rubber latex and excessive amounts of water.
- Minimal time needed for sealer preparation.
- No on-the-job inspection (for rubber amounts) is needed.
- Pre-shipment certification for FAA performance tests issued by STAR.
- Independent lab test certification.

PRODUCT BULLETIN



STAR AVIATOR

SEALCOATING FOR AIRPORT PROJECTS SPECIFICATION: FAA P-627

GENERAL DESCRIPTION

STAR AVIATOR is an outstanding sealer that is dramatically superior to the conventional FAA mix design sealers. **STAR AVIATOR** as supplied, already *contains the rubber* per FAA specifications. The rubber is hot blended during the manufacturing process. The superiority in performance has been established in field performance and by independent testing laboratories.

HIGHLIGHTED BENEFITS

STAR AVIATOR, SEALCOATING FOR AIRPORT PROJECTS;

1. **Is a unique product with unconventional technological approach.** No similar products in the industry.
2. **Has far superior performance** to the conventional FAA, mix designs.
3. **Allows mix design control-** Rubber is the most critical component in FAA mix designs. Factory blending of the rubber in **STAR AVIATOR** assures the accuracy of the mix.
4. **Certified** to meet and/ or exceed FAA specifications.
5. **Is Cost Effective &** performs better than mix designs containing much higher rubber latex e.g. at 7% and 10% levels.
6. **Savings in Labor Costs.**

Better performance with STAR AVIATOR

- In fewer coats,
- No need for special equipment, e.g. drag box, etc.
- Time saved by not adding rubber on the job.

APPLICATION NOTES

STAR AVIATOR, is applied using conventional methods, spray, squeegee, brush, etc.

Consult FAA P-627 Specification for details.

Dilution -Max 20% by volume on the amount of concentrated STAR AVIATOR

COMPOSITION OF MIXTURE
Using STAR AVIATOR

Sealcoat Type	STAR AVIATOR	WATER	AGGREGATE	APPLICATION OF THE MIX.
	GALLONS	GALLONS	LBS.	GAL/SQ.YARD
RUBBERIZED SAND SLURRY	100	20 max.	300-800	0.07-0.14
RUBBERIZED EMULSION	100	20 max.	None	0.07-0.11

PRECAUTIONS

Keep out of reach of children

Follow all safety instructions for handling and storage.

Contains refined coal tar. Read the Material Safety Data Sheet (MSDS).

Keep the partially used containers tightly closed.



March 15, 2002

To Whom It May Concern:

This is to certify that;

- A. **STAR AVIATOR**, meets and/ or exceeds the requirements of FAA Specification P-627.
- B. **STAR AVIATOR** contains 4% rubber (Acrylonitrile/butadiene). The product shall be diluted with water at a rate not exceeding 20% by volume of the product.

Mix design COMPOSITION OF MIXTURE, Using STAR AVIATOR

Sealcoat Type	STARAVIATOR	WATER	AGGREGATE	APPLICATION OF THE MIX.
	GALLONS	GALLONS	LBS.	GAL/SQ.YARD
RUBBERIZED SAND SLURRY	100	20 max.	300-800	0.07-0.14
RUBBERIZED EMULSION	100	20 max.	None	0.07-0.11

Test Data & Specification Compliance:

STAR AVIATOR meets and/ or exceeds the requirements of FAA P-627.

Properties	FAA P-627 SPEC.	TEST DATA	COMMENTS
Brookfield Viscosity	Visual Compatibility	Materials appear compatible	Passed
	10-90 Poises	44.4 Poises	Passed
Scuff Resistance	>100 in-Lbs.	8 hrs., 165 in-Lbs.	Passed
> 8 Hr. Torque	24 hrs. 175 in-Lbs.	Passed	
Freeze Thaw	1 Max.	5 cycles 0	Passed
	3 Max.	10 Cycles 2	Passed
Adhesion	5A	5 A	Passed

Please contact the undersigned if you have any questions.

Sincerely,
S.T.A.R, INC.

Girish C. Dubey
President



soil and materials engineers, inc.

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February 26, 2002

Mr. Gurish Dubey
STAR, inc.
1400 Walcutt Road
Columbus, OH. 43228

Re: Coal Tar Sealer Mix Design
FAA P-625
Columbus, Oh.
SME Project No. PP 40879

Dear Mr. Dubey:

We have completed the Coal Tar Sealer Mix Design you requested using the blended coal tar and latex, sand and water samples we received. The mixture was prepared using the FAA P-627 procedure you transmitted to us. We understand the sample of sealer we received was comprised of coal tar emulsion and latex additive added at a rate of 4% by volume. We blended the mixture with aggregate and the water sample we received. The materials were combined and tested in accordance to the FAA P-627 specifications. The mix design and test results completed to date are as follows:

Mix Design

Material	Proportion	Specified
Coal-tar Emulsion	100 gallons	100 gallons
Mix Water	20 gallons	65 gal. max.
Latex Additive	4 gallons	3-6 gal.
Sand Aggregate	300 pounds	300-800 LBS.

Test Property	Test Results	Criteria
Brookfield Viscosity	Materials appear compatible 44.4 poises	Visual Compatibility 10-90 poises
Scuff Resistance	8 hrs. 165 in-LBS. 24 hrs. 175 in-LBS.	>100 in-LBS. >8 hr Torque
Freeze Thaw	5 Cycles 0 10 Cycles 2	1 Max. 3 Max.
Adhesion	5 A	5 A
Fuel Resistance	No Penetration	No Penetration



Detroit
Bay City
Kalamazoo
Lansing
Toledo
Grand Rapids

Consultants in the geosciences, materials, and the environment

Mr. Gurish Dubey
STAR, Inc.
February 26, 2002
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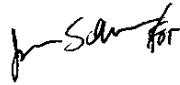
The materials used in the mix design were the products you submitted for our testing.

Based on the FAA P-627 criteria, all materials and mix properties as reported to date, meet the FAA P-627 criteria.

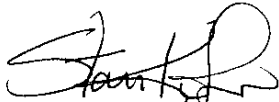
If you have any questions regarding these test results please do not hesitate to contact us.

Very truly yours,

SOIL AND MATERIALS ENGINEERS, INC.



Thomas M. Powell
Materials Consultant



Starr D. Köhn P.E.
Vice President

t:/proj/pp40879lt1.ltr

Consultants in the geosciences, materials, and the environment



STAR AVIATOR

SEALCOATING FOR AIRPORT PROJECTS

SPECIFICATION: FAA P-627

INTRODUCTION

FAA SPECIFICATIONS & Problems

As you know, there is a great deal of confusion with FAA specifications. They have been modified frequently in the last 5-10 years. The current FAA specifications require that sealcoating systems meet certain performance criteria, prior to use on the project. Still a lot of sealcoating professionals are struggling with mix designs and pre-qualification tests. FAA projects are, in general, considered bothersome with too many requirements and controls. Due to the uncertainties with FAA specifications, rejuvenators have encroached aggressively upon sealcoating projects in recent years.

OUR ANSWER

STAR AVIATOR

Why not take the guesswork out by blending the rubber right in the factory while making the sealer. It will assure better performance than post-added (rubber latex added on the job site) mixes. Enter **STAR AVIATOR** which was developed with 5% rubber built in the formulation. We have established that it has **superior performance** than the conventional (post add) mix designs with even higher rubber contents i.e. 7% and 10%.

HIGHLIGHTS of STAR AVIATOR

- ◆ Outstanding Performance against conventional FAA Mix designs where latex rubber is added on the job site.
- ◆ Will meet all the FAA qualifying tests, certified by an independent testing laboratory.
- ◆ Consistent performance through controlled and assured mixes.
- ◆ No on the job mixing required other than adding sand (3-5 lb./gal.) and water (max 25%). Just keep agitated.
- ◆ No need for third-party supervision; our plants will certify the rubber content.

LOGISTICS

STAR AVIATOR is a special product, made-to-order and supplied only in tanker quantities, for specific projects. Storage will not be necessary.

MANUFACTURING

The manufacturing will be similar to that of STAR SEAL SUPREME, except for the amount of rubber. The most commonly used FAA Specification is P-627, which specifies rubber at 3-6% levels.

STAR AVIATOR can be made either:

- As a standard product for P-627 projects (e.g. Rubber at 4%, water at 20% and Sand at 4 lb. levels), or
- In special versions, per project requirements (e.g. different rubber content)

SALES & MARKETING

We strongly believe that STAR AVIATOR will open new opportunities.

Numerous FAA projects come up at all times.

Do you get your fair share of the business?

You are better suited to answer this question. All we can say is that now, with STAR SUPREME – FAA, you are in a position to capture the lost opportunities.

You will have our full technical and marketing support to promote STAR AVIATOR.

CERTIFICATION & BIDS

We will have printed certificates, which can be attached to the bids.

The certification will be with data from an independent testing laboratory, for the standard P-627 specification.

QUESTIONS & ANSWERS

How can we promote this product? Let us think through together and come up with the best introduction and promotion plan for STAR AVIATOR.

Q. WHY SHOULD YOU EVEN CONSIDER STAR AVIATOR?

A. STAR AVIATOR is better than any conventional FAA mix design. It will assure property managers the performance that they expect from sealcoatings, fortified with rubber latex.

Q. WHAT IS UNIQUE?

A. STAR AVIATOR has the rubber pre-blended at the factory thus assuring:

- Accuracy in the rubber content.
- That rubber has become a part of the binder (refined coal tar). Rubber latex, which is mixed in the cold sealer on the job, does not become a part of the binder. It stays as a separate phase.
- Does not require excessive amounts of water. Only 15-25% water is required to achieve a good application consistency.
- Better performance at lower coverage rates i.e. fewer gallons for the job.

Q. HOW CAN BE BEAT THE COMPETITION?

A. Your competitor does not have a product like STAR AVIATOR, which is unique both in performance. You will have distinct advantages in:

- Pricing and Bidding,
- Technical back up, detailed reports and photographs,

- Customized job recommendations.

Q. HOW CAN WE PROMOTE STAR AVIATOR?

A. Strictly at local levels, it will be much easier for us to get our “foot in the door” and demonstrate the superiority of our system. There is no point in approaching FAA directly. It will not accomplish much. It will take years for the FAA to even acknowledge this approach, nonetheless change the specification. For example, we all know that sand loading beyond 5 lb./gallon is not beneficial and over 8 lb. is detrimental to sealer properties. P-628 (with 16-20 lb. of sand) still continues to exist, despite several unsuccessful attempts by PCTC to have it deleted.

I am sure you will have many more questions, which we will attempt to answer to assist you. Your suggestions are invaluable and ever welcome.

PROJECT REPORT



STAR AVIATOR

SEALCOATING FOR AIRPORT PROJECTS

COMPARATIVE STUDY AGAINST CONVENTIONAL FAA SPECIFICATIONS.

OBJECT

To perform a comparative study of **STAR AVIATOR** STAR AVIATOR against the conventional FAA (P-627 & P-628) compositions.

SUMMARY & CONCLUSIONS

1. **STAR AVIATOR** was found to be demonstrably superior in performance to all the conventional FAA mix designs.
2. Amongst the conventional grade, the scrub resistance properties generally deteriorated with the increase in the amount of the rubber content.

MAJOR BENEFITS

STAR AVIATOR is unique in its composition.

7. **Unique product** and technology. No one in the industry offers a similar product.
8. **Performance-** Demonstrably superior to conventional FAA, P-627mix designs in overall performance.
9. **Mix design control-** Rubber is the most critical component in FAA mix designs. Factory blending of the rubber in **STAR AVIATOR** assures that the accuracy of the mix.
10. **Cost Effectiveness-** **STAR AVIATOR** performs better than mix designs containing much higher rubber latex e.g. at 7% and 10% levels.
11. **Savings in labor Cost**

Better performance with **STAR AVIATOR**

- In fewer coats,
- No need for special equipment, e.g. drag box, etc.
- Time saved by not adding rubber on the job.

MATERIALS

STAR AVIATOR is a special proprietary sealcoating composition, specifically developed for FAA projects. As supplied, the product contains 4% Acrylonitrile/ Butadiene Rubber (the polymer meets the requirements of FAA P-627), on the total volume of the sealer. ***No latex rubber or polymer shall be mixed with the product prior to application.*** Just mix with;

- The desired amount of sand, per FAA specifications for the project and

- Water not exceeding 15% -25% (by volume), to attain a good workable consistency.

EVALUATION PROCEDURES

STAR AVIATOR was compared against;

- The conventional FAA mix compositions, using; STAR SEAL (ASTM 5727-00, formerly Fed Std. RP-355 e.)
- Rubber Additive- Macro-Flex Acrylonitrile/ Butadiene Rubber Latex
- Water and sand.

Three (3) samples were made by post adding STAR MACRO-FLEX, to the diluted samples of STAR SEAL (50% by Volume) at;

- a. Five (5)%,
- b. Seven (7)% and
- c. Ten (10)% percent by volume on the volume of the sealer.

No sand was mixed with any of the samples for this study.

1. Scrub Resistance Under Water

The samples that were tested are;

- A. **STAR AVIATOR:** Applied at 20 Mils wet film thickness.
- B. **Conventional FAA mixtures** i.e. compositions where rubber was post added to the sealer according to the FAA mix design recommendations. Post added samples (5,7,10%) were applied at 30 mils wet film thickness on white mylar panels.

The difference in the wet film thickness of the post added samples (30 mils) versus 20 mils for STAR SEAL STAR AVIATOR Grade was to allow all the samples to dry to the same thickness, prior to scrub testing.

The panels were allowed to cure for four (4) days. After the cure the panels are covered with water containing silica sand as an abrasive medium and scrub tested with a brass bristle brush. This test method is a modification of the standard ASTM D-2468, but more torturous (the standard method uses a nylon brush and detergent/water solution as scrub medium).

The test is stopped when a solid line goes across the width of the swatch down to the panel. The cycles are noted at this point and reported as cycles to failure.

The panels were further tested for softness and re-emulsification resistance.

2. Water Absorption / Desorption Characteristics

The wet samples were applied in 30 mils wet film thickness on brushed aluminum panels (pre weighed) and allowed to cure at ambient room temperatures (77 ° F, 50% relative humidity) for one (1) week. The coated panels are weighed again to determine the weight of the coating material.

The cured panels are weighed after one weeks cure to determine the weight of the dry sample on the panels. The cured panels are then suspended in distilled water and taken out after 3, 6, 24, 48, hours, and one week, then dried to remove surface moisture. The panels are weighed after each period and the percentage of water absorbed is calculated from the dry sample weight.

After the completion of one weeks water absorption period, the panels are removed from the water and allowed to release the remaining water. During this period the panels are weighed after 3, 6, 24, and 48 hours or longer to determine the

time taken to release all the absorbed water.

Results and Discussions

1. Wet Scrub Resistance Test (Table II)

1. **STAR AVIATOR** was found to have better scrub resistance; than all the three (3) conventional FAA mix designs.
2. Also, the scrub resistance amongst the conventional mix designs deteriorated with the increasing amounts of rubber.
3. The resistance to softening (hardness) and re-emulsification under water was found to be generally comparable. Only in one case (for FAA -7% rubber), the hardness and resistance to re-emulsification suffered.

Water absorption / Desorption Characteristics (Table III)

The following inferences were made:

ABSORPTION CYCLE:

1. **STAR AVIATOR** had much lower tendency to absorb water, especially in the first 6 hr.. of immersion. It was less than 50% of the best FAA- post add. specimen (with 5% rubber).
2. Amongst the FAA post add. specimens the tendency to absorb water increased with the increasing amounts of the rubber additive; i.e. 5% was the best and 10% the worst.

Written By- Girish C. Dubey
S.T.A.R, INC.



IAL SAFETY DATA SHEET

Material Safety Data Sheet
STAR AVIATOR
SEALCOATING FOR AIRPORT PROJECTS
SPECIFICATION: FAA P-627

Manufacturer:
S.T.A.R., INC.
1150 Milepost Drive
Columbus, Ohio 43228

Emergency Phone No.
Information Phone No.
Date Of Preparation
Date Supersedes

CHEM-TEL 800-255-3924
800-759-1912
July 24, 2002

SECTION I - IDENTIFICATION

Product Name:	STAR AVIATOR- Sealcoating for airport projects.	
Chemical Family	- Refined Coal Tar Pitch Emulsion	H.M.I.S
Chemical Name	- Proprietary	Health = 1
Prepared by	- G.C. Dubey	Fire = 1
		Reactivity = 1

SECTION II- INGREDIENTS

<u>Ingredients</u>	<u>CAS NO.</u>	<u>WT%</u>	<u>Exposure Limits</u>	
			<u>OSHA PEL</u>	<u>ACGIH TLV</u>
<u>Hazardous Ingredients</u>				
Coal Tar Pitch	65996-93-2	27-29%	0.2 mg/m3 (Volatiles)	0.2 mg/m3 (Volatiles)
Listed in SARA Title III, Section 313- No.				
STEL	- N/A*			
LC 50	- N/A			
LD 50	- N/A			
<u>Other Ingredients</u>				
Ethoxylated Amine		1 %		
Specialty Polymers	Proprietary	4-5%	N/D	N/D
Clay	1332-58-7	18-20%	N/A	10mg/m3 (dust)
STEL	- 5 MG/M3 (DUST)			
LC 50	- N/A			
LD 50	- N/A			
Water	7732-18-5	49-50%	N/A	N/A
Listed in SARA Title III, Section 313 - No.				
STEL	- N/A			
LC 50	- N/A			
LD 50	- CTI OVER 320,000			

* N/A = NOT AVAILABLE OR APPLICABLE

Total weight percentage of all the listed ingredients could be below 100, indicating other unlisted ingredients that are not

considered hazardous by any federal (OSHA, WHMIS, SARA), any state or province or local Right-To-Know Regulations.

SECTION III, PHYSICAL DATA

<u>Boiling Point</u>	<u>Vapor Pressure</u>	<u>Vapor Density</u>	<u>Appearance</u>
Over 212 F	(mm Hg) approx. 25	(Air=1) 1	Dark Brown Liquid with Coal Tar odor.
<u>Evaporation Rate</u> (Water=1)	<u>Specific Gravity</u>	<u>pH</u>	<u>Freezing Point</u>
1	1.20 - 1.25	7.00-8.00	32 Deg F/ O Deg C
<u>Miscibility</u>	<u>Threshold Odor</u>	<u>Water/Oil Dist Coeff.</u>	
Dilutable with water	ppm- N/A	1/1	
<u>V.O.C.</u>			
Lb./gal- 0.12, Grams/liter-15			

SECTION IV- FIRE AND EXPLOSION HAZARD DATA

<u>Flammability Classification</u>	<u>Flash Point</u>	<u>Flammable Limits</u>	
	<u>(method used)</u>	<u>LEL</u>	<u>UEL</u>
N/A	N/A	N/A	N/A
<u>Combustion Products</u>	<u>Extinguishing Media</u>		
CO, CO2, Hydrocarbon compounds	Foam, dry chemical, CO2		

Special Fire Fighting Procedures: Cool exposed containers to prevent steam pressure build up. Wear self-contained breathing equipment.

Unusual Fire and Explosion Hazards: Containers may rupture due to steam pressure build-up.

Explosive Power	Burning Rate	
N/A	N/A	
UN/NA/PIN#	Static Sensitive	Impact Sensitive
N/A	NO	NO

SECTION V- HEALTH HAZARD DATA

Threshold Limit Value - 0.2 mg/ m3, coal tar pitch volatiles.

Routes Of Entry- Skin, eyes, inhalation, ingestion.

Effects Of Overexposure - Acute: YES Chronic: YES

Eyes - Overexposure of vapors can cause eye irritation, burning, redness and/or corneal changes, which in absence of recommended first aid may result in severe burns.

Skin - Contact with skin can result in irritation which when accentuated by sunlight may result in photo toxic skin reaction (similar to sunburn). Prolonged and/or repeated contact with the product or volatiles may result in more serious skin disorders including cancer.

Inhalation- The product has very low vapor pressure, therefore, harmful effects are not anticipated. Chronic

inhalation overexposure to vapors. Repeated and/or prolonged contact to high levels of vapor concentration may result in respiratory problems, central nervous system (CNS) effects, cardiovascular collapse.

Ingestion- May cause nausea, cramps, vomiting, diarrhea or acute effects. May be fatal in large amounts.

Unusual Chronic Toxicity: May cause cancer of the skin, lungs, kidney and bladder. Prolonged or repeated contact over many years in the absence of good hygiene and personal protection may lead to changes in skin pigmentation and skin tumors.

Conditions aggravated by exposure and additional health hazards: The test results reported in Koppers Industries, Inc. publication "Using Refined Coal Tar Emulsion Safely" conclusively establish that emissions during the manufacturing, as well as application, of sealcoatings based on refined coal tar are well below the OSHA exposure limits. Refined coal tar is a complex mixture of thousands of chemical compounds, a majority being closed ring, polynuclear aromatic compounds (PNAs) which range from single ring structure to multiple (30-40) rings in their molecular structure. According to NTP, IARC, or OSHA, some of these PNAs have been found to induce cancer in animals under laboratory conditions.

Cancer warning statements for materials derived from coke oven tar, which includes refined coal tar RT-12, are based primarily on crude (unrefined) tars. No data has been established on refined coal tars or sealcoatings based on refined coal tars as potential carcinogens. The cancer warnings are, therefore, affixed on all coal tar derived products, due to the lack of specific data on these products.

Respirable crystalline silica, also used in conjunction with this product is a suspected carcinogen, however, no exposure is expected through the use of this material. This product and sealcoatings in general, have not been tested for chronic exposure effects.

Carcinogenic: IARC- YES ACGIH- YES

EMERGENCY AND FIRST AID PROCEDURES

Eyes- Immediately flush with plenty of water for 15 minutes, call a physician, if condition persists.

Skin- Wash thoroughly with plenty of water and soap.

Inhalation- Move to fresh air, administer oxygen and call a physician.

Ingestion- Do not induce vomiting. Seek physician immediately and show M.S.D.S. or label.

SECTION VI- REACTIVITY DATA

<u>Stability</u>	Conditions to Avoid	Incompatibility (Materials to avoid)
Stable	Keep from freezing.	Strong oxidizing agents.
Hazardous Decomposition Products	- N/A	
Hazardous Polymerization	- Will not occur.	
Conditions to Avoid	-N/A	

SECTION VII- SPILL OR LEAK PROCEDURES

SARA Title III

302 - No

304 -No

313 - No.

RCRA-No.

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Ventilate the area. Wear approved respiratory protection. Wear suitable protective clothing, gloves and eye / face protection. Contain and pick up waste material. Put in a sealed approved container. Dispose of in accordance with federal, state, and local regulations.

For Small Spills: Absorb with an inert material and place in containers.

For Large Spills: Contain material and pump into tanks or other suitable containers. Spills over 45 gallons should be reported to national, state and local emergency response agencies. The telephone number for the National Response Center is 800-424-8802.

Do not flush into sewers or bodies of water. The material will suffocate fish until it settles to the bottom.

WASTE DISPOSAL

This material is not a hazardous waste in either liquid (emulsion) form or as a dried material, according to TCLP (Toxic Characteristic Leaching Procedure) results (EPA method 1311). Recommended disposal by land filling (dry) or incineration shall be selected in accordance with the local, state, and federal regulations.

Reportable Quantity - N/A
Regulations - WHMIS, SARA, State and province.
Hazardous Waste - N/A
TPQ (lb.) - N/A

SECTION VIII- SAFE HANDLING AND PROTECTION INFORMATION

Ventilation: Use local exhaust ventilation to control mists or vapors generated when using this product.

Special- N/A Other- N/A

Respiratory Protection: Use only with adequate ventilation. If ventilation is inadequate, wear approved respiratory equipment.

Protective Gloves: Rubber Gloves, chemically resistant.

Eye Protection: Wear safety glasses, goggles or face shield.

Other Protective Equipment: Wear suitable protective clothing.

Estimated LD50, MG/KG: N/A
Estimated LC50, PPM: N/A
Sensitization: N/A
Irritants: YES

SECTION IX- SPECIAL PRECAUTIONS

1. Keep out of reach of children.
2. For professional and industrial use only.
3. Do not handle until manufacturer's safety precautions have been read and understood.
4. Use only with adequate ventilation.
5. Do not take internally.
6. Avoid contact with eyes and skin.
7. Wash thoroughly after using. Practice safe hygiene principles.
8. Additional Technical Data Sheets and/or M.S.D.S.'s are available upon request.

THE RECOMMENDATIONS AND INFORMATION PROVIDED HEREIN ARE BELIEVED TO BE ACCURATE AS THE DATE HEREOF. HOWEVER, SUCH INFORMATION AND RECOMMENDATIONS ARE PROVIDED WITHOUT WARRANTY OF ANY KIND AND S.T.A.R., INC. DISCLAIMS ANY AND ALL LIABILITY OR LEGAL RESPONSIBILITY FOR USE AND RELIANCE UPON THE SAME.



DETAILED APPLICATION SPECIFICATION

STAR AVIATOR

SEALCOATING FOR AIRPORT PROJECTS

SPECIFICATION: FAA P-627

1.0 Objectives:

This specification covers the application of STAR AVIATOR, is a *premium grade* rubberized protective sealcoating system, especially designed for airport asphalt pavements requiring compliance to FAA P-627.

- 1.1 To extend the service life of asphalt pavements by sealing out:
 - The sun's ultraviolet rays, which result in oxidative decomposition,
 - Deteriorating effects of deicing salts, oils, gasoline, and grease, water and subsequent damage to the sub-base caused by water penetration.
- 1.2 To beautify and enhance the appearance.
- 1.3 To reduce the maintenance costs and extend the service life.
- 1.4 To fill minor surface imperfections and yield an even looking surface.
- 1.5 To provide a limited degree of skid resistance.

2.0 Materials:

2.0 Coal Tar Pitch Emulsion.

- 2.1.1 Coal Tar Pitch Emulsion must meet or exceed ASTM D 5727-00 (formerly Federal specification RP-355e), U.S. Air Force and F.A.A. requirements. The Coal Tar Pitch Emulsion shall also be in compliance with ASTM Specification D 3320-90.
- 2.1.2 The material shall be prepared from straight run high temperature coke-oven tar meeting the requirement of ASTM D 490- 92.
- 2.1.3 The material shall be homogeneous and show no separation or coagulation components that can not be re dispersed with moderate stirring.
- 2.1.4 The material shall be suitable for application and complete coverage, by brush or by approved mechanical methods, to the bituminous surface at a spreading rate of 0.18 - 0.20 gal. (based on the amount of STAR AVIATOR Concentrated) per square yard in a two (2) coat application system.
STAR AVIATOR meets and or exceeds the requirements, as detailed above.

- 2.1 **Sand / Aggregate Specifications:** Sand shall be clean hard and irregular silica sand, free of clay, dust, salt, and organic matter. It must meet the following gradation.

U.S. Sieve Size	Percentage Retained	
	Minimum	Maximum
No. 20 or coarser (0.850 mm)	0	0
No. 30 (0.600 mm)	0	5
No. 40 (0.425 mm)	7	25
No. 50 (0.300 mm)	15	50
No. 70 (0.212 mm)	20	40
No. 100 (0.150 mm)	3	30
No. 140 (0.106 mm)	0	10

No. 200	(0.075 mm)	0	7
Finer than No. 200		0	3

- 2.2 **Water** shall be clean and potable, free of harmful soluble salts, within a temperature range of 50-80 ° F.
- 2.3 **Additive** – None required. Acrylonitrile/butadiene latex rubber (meeting the FAA Specifications) are hot-blended during the manufacturing process.
- 2.4 **Crack Fillers:** Must be certified by the supplier for compatibility with the sealcoating material. Cold pour crack fillers, *STAR STA-FLEX* and the premium grade *STA-FLEX SUPREME*, are recommended. Hot pour rubberized crack fillers may also be used.
- 2.4 **Primers;**
- 2.6.1 **Oil Spot Primers:** Must be certified by the Sealcoat manufacturer for compatibility with the sealcoating material. *STAR S.O.S. Primer/Sealer* is recommended.
- 2.6.2 **Pavement Primer:** Must be certified by the Sealcoat manufacturer for compatibility with the sealcoating material.
- 2.6.3 **Specialty Coatings/Primers** may be recommended by the manufacturer for problematic areas, e.g. rust streaks in the pavement, excessive surface contamination with oil, grease, fat etc. *STAR ONE STEP*, pre-diluted with water (in 1:2 volume ratio; product: water) is recommended. It is also recommended for fresh laid asphalt patches and polished aggregates.

3.0 Surface Preparation:

The pavement surface to be sealcoated must be sound and surface cured to achieve the optimum performance. Sound pavements are those that;

- Have oil free surface (for additional notes-see under new pavements).
- Are compacted proper over the base and sub-base courses and suitable for the desired traffic loads and
- Are well drained and stable.

- 3.1 **New Asphalt Pavement Surfaces:** Cure new asphalt pavement surfaces so that there is no concentration of oils on the surfaces. A period of at least 90 days at +70 ° F daytime temperature must elapse between the placement of a hot-mixed asphalt pavement and the application of STAR AVIATOR.

Perform a water-break-free test to confirm that the surface oils have degraded and dissipated. Cast one gallon of clean water over the surface to be tested. If the water sheets out uniformly, without crawling or showing oil rings, the pavement is suitable for sealcoating.

- 3.2 Clean the surface thoroughly to remove all foreign debris (dirt, gravel, silt, etc.) using air blowers or by flushing with water. Embedded dirt and silt shall be removed with steel bristle hand brooms.
- 3.3 Treat all grease and oil spots by scraping off the excess oil and dirt with a wire bristle broom and coat with **STAR OIL SPOT PRIMER (S.O.S.)** in accordance with directions. **STAR ONE STEP** is recommended for areas contaminated extensively with oil, grease fuel etc.
- 3.4 Make all necessary repairs, patch soft spots, fill all cracks and holes in the pavement. All patched areas must be cured before applying **STAR AVIATOR**.
- 3.5 Old and **or badly oxidized asphalt pavement** with a primer coat of diluted **STAR AVIATOR**, one (1) part by volume thoroughly mixed with Three (3) parts of clean water. Apply the primer at 0.04 to 0.06 Gal./ Sq. yard (based on undiluted sealer). Allow the primer coat to dry thoroughly, about 2-4 hours under normal drying conditions, prior to sealcoating with **STAR AVIATOR**.

4.0 Materials and Recommendations:

4.1 Materials Calculations:

STAR AVIATOR- For a standard two (2) coat sealcoating system, calculate at the rate of 0.18-0.20 gallons of undiluted sealer per square yard of the asphalt surface to be sealcoated.

Ist coat requires- 0.10-0.12 gal./square yard,

IInd. Coat requires- 0.08-0.10 gal./square yard.

Other Ingredients (water, sand/aggregates, etc.)-see section 4.2.

4.2 Recommended Systems:

**COMPOSITION OF MIXTURE
Using STAR AVIATOR**

Sealcoat Type	STAR AVIATOR	WATER	AGGREGATE	APPLICATION OF THE MIX.
	GALLONS	GALLONS	LBS.	GAL/SQ.YARD
RUBBERIZED SAND SLURRY	100	20 max.	300-800	0.07-0.14
RUBBERIZED EMULSION	100	20 max.	None	0.07-0.11

4.3.1. Prime coat- For old, oxidized pavements, a primer coat is recommended. The suggested materials are noted below;

- a. STAR AVIATOR, diluted with clean potable water in 1:3 volume ratio (sealer: water) applied at 0.04 to 0.06 Gal.(undiluted sealer)/ Square yard.
- b. STAR ONE STEP, diluted with clean potable water in 1:2 volume ratio (STAR ONE STEP: Water), applied at 0.05-0.08 gal. (mixed)/ Square Yard.

4.4 Sand Slurry Preparation

- Add the required amount of water to the sealer in the mixing tank and mix thoroughly.
- Keep the mixer running at a moderate rate.
- Add the sand in a steady stream of about one 100 lb. bag per minute. When adding sand, be sure of firm footing and never place hands and arms in the agitating mixer.
- After adding all the sand, close the lid of the mixing tank and raise the speed of the mixer to “high” setting.
- Mix for 10 minutes to allow the contents of the tank to mix thoroughly and break any sand clumps.
- Reduce the agitator speed to moderate setting and keep running. If the mixer is shut off during transport to the job site, it must be restarted and the contents mixed for at least 10 minutes before the application begins. Keep it running during the entire application period.

5.0 Application of Material:

- 5.1 The material shall be applied according to the specifications detailed in Section 4. These systems provide a protective coating that is free of voids, pinholes, and holidays.
- 5.1 The first coat, STAR AVIATOR sand slurry, shall be uniformly applied over the entire surface. If the surface temperature is more than 90 ° F, pre-dampen with a light mist. Avoid puddles. There should be no free standing water.
- 5.2 Allow the first coat to dry sufficiently to take light traffic without scuffing. It will take about 4-6 hours under ideal drying conditions.
- 5.3 If the specification calls for a second coat, apply it perpendicular to the previous coat, if practical.

- 5.4 The completed application shall be allowed to cure at least for 24 hours and then tested for traffic-ability prior to opening for regular use.
- 5.6 The amount of material needed will vary according to the porosity and texture of the pavement. The mix designs (i.e. **STAR AVIATOR** and other ingredients) expressed in section 4 are for guidelines only.

6.0 Method of Application

6.1 Squeegee/ Brush (Hand Application) method:

- 6.1.1. The agitator in the sealer tank should be kept on to keep the material in suspension at all times. The machine should be equipped with a fog bar to be used for pre-dampening if the pavement temperature exceeds 90 ° F.
- 6.1.2. Coat the edges first. Pour a continuous ribbon of the **STAR AVIATOR** along the pavement edge 6-12 inches from curbing.
- 6.1.3 Draw the **STAR AVIATOR** mix away from the pavement edge by pulling a squeegee or brush perpendicular through the ribbon of material at a slight angle. Walk parallel to the pavement edge. Repeat the process in reverse direction pulling the excess material toward the center of the pavement. For best results use a squeegee followed by a brush.
Pour more **STAR AVIATOR** mix to maintain a working ribbon of material and continue across the pavement until it is completely covered.

6.2 Machine Application:

- 6.2.1. When applying by machine, seal the edges of the pavement by hand. The machine should then be used to apply **STAR AVIATOR** mix to the remaining area. A self-propelled machine that squeegees and brushes the sealer into the pores of the pavement is recommended.
- 6.2.2. Spray application should deposit the material per specified coverage rates.

- 7.0 **Striping:** If striping is required, use STAR-BRITE Latex Traffic Paint (TT-P-1952b) or STAR BRITE PLUS, fast drying-100% Acrylic Traffic Paint . Allow the seal coat to dry at least 24 hours before striping. Refer to the Technical Data Sheet for details.

8.0 Precautions:

- 8.1 **STAR AVIATOR** must be protected from freezing. Do not store at temperatures below 32 ° F. Do not apply **STAR AVIATOR** during rainy or foggy weather. Ground and air temperature must be 50 ° F and rising prior to and after application
- 8.2 Drying is retarded by excessive moisture in the air or ground. Examples: rain, fog, prolonged humidity and seasonal extremes (early Spring - late Fall). Under such conditions, allow additional time for initial drying and cure
- 8.3 Follow the recommended coverage rates. IF **STAR AVIATOR** is applied too heavy, the surface will dry first and restrict the water evaporation from the rest of the film, slowing down full curing process.
- 8.4 **STAR AVIATOR** is based on coal tar pitch. Prolonged and/or repeated contact may cause skin irritation. A protective cream should be used. Avoid breathing vapors. Wear protective clothing. See the Material Safety Data Sheet for **STAR AVIATOR** for details.
- 8.5 Keep out of reach of children.

Disclaimer:

These specifications report accurate and reliable information to the best of our knowledge, however, no expressed or implied warranties are extended by the manufacturers due to the fact that the conditions of use and workmanship are beyond the controls of the manufacturer. STAR Inc. assumes no responsibility for the use of information presented herein and hereby disclaims all liability in regard to such use.