

Arizona AGC Pavement Preservation Series

Chip Seal Guide for Application and Construction

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Chip Seal Guide - Application and Construction



Foreward

This guide is a collection of chip seal best practices and recommendations for the state of Arizona. Chip Seals are important pavement preservation applications, and when they are constructed properly will increase the life of a pavement. There will be instances where conditions or available materials dictate that the contractor or supplier or specifying agency need to deviate from these recommendations. It is important that the **contractors, suppliers, and agencies work together** and **use common sense** to modify procedures and practices contained in this document.

In 2003, The Arizona Chapter of Associated General Contractors Pavement Preservation Committee developed this guideline to identify “best practices” to be used during the application of chip seal. This revision was done by the current Pavement Preservation Committee, re-established in 2011.

The committee is comprised of contractors, material suppliers, aggregate producers and agency personnel. **Special thanks** to our partners in the Arizona Department of Transportation: **Bill Hurguy**, State Materials Engineer and **Janet Doerstling** Pavement Materials Testing Manager for their contributions to this revision.

Chip Seal Guide – Application and Construction

■ Overview

- Introduction
- Surface Preparation
- Materials
- Aggregate and Binder Application Rates
- Construction Procedures
- Special Chip Seal Procedures
- Summary
 - Check Lists, Chip Seal Design, Various Tables
- Bibliography

Introduction

The intent of this guideline is to aid in the design, testing, quality control, construction procedures, quality assurance, measurement and payment for the application of Chip Seal in Arizona.

Surface Preparation

- Crack Sealing/Filling
- Patching
- Scrub Sealing

Crack Sealing & Filling



- Standard crack repair treatments are an important part of all preparation work and should never be overlooked.
- Crack treatments are initially low in cost and provide the highest benefit.

HP Cold or Hot Patch (Pothole Patching)



Courtesy Crafc0, Inc.

Remove and Replace Patches. Do you seal around them?



Scrub Sealing



New Construction (Non Pavement Applications)



Materials

■ Chip Seal Aggregate

Proper Stockpile Management

Aggregate Characteristics

Aggregate Gradation

■ Chip Seal Binders

Emulsified Binder Materials/Modified Emulsions

Polymer Modified Binder Materials

Asphalt-Rubber Binder

Cut-back Binder Materials

Aggregate and Binder – Application Rates

■ **Chip Seal Design (Variables to Consider)**

Aggregate Gradation and Available Quality

Type of Binder

Existing Roadway (Pavement) Condition

Previous Maintenance Efforts

Traffic Conditions (Volume, Trucks?)

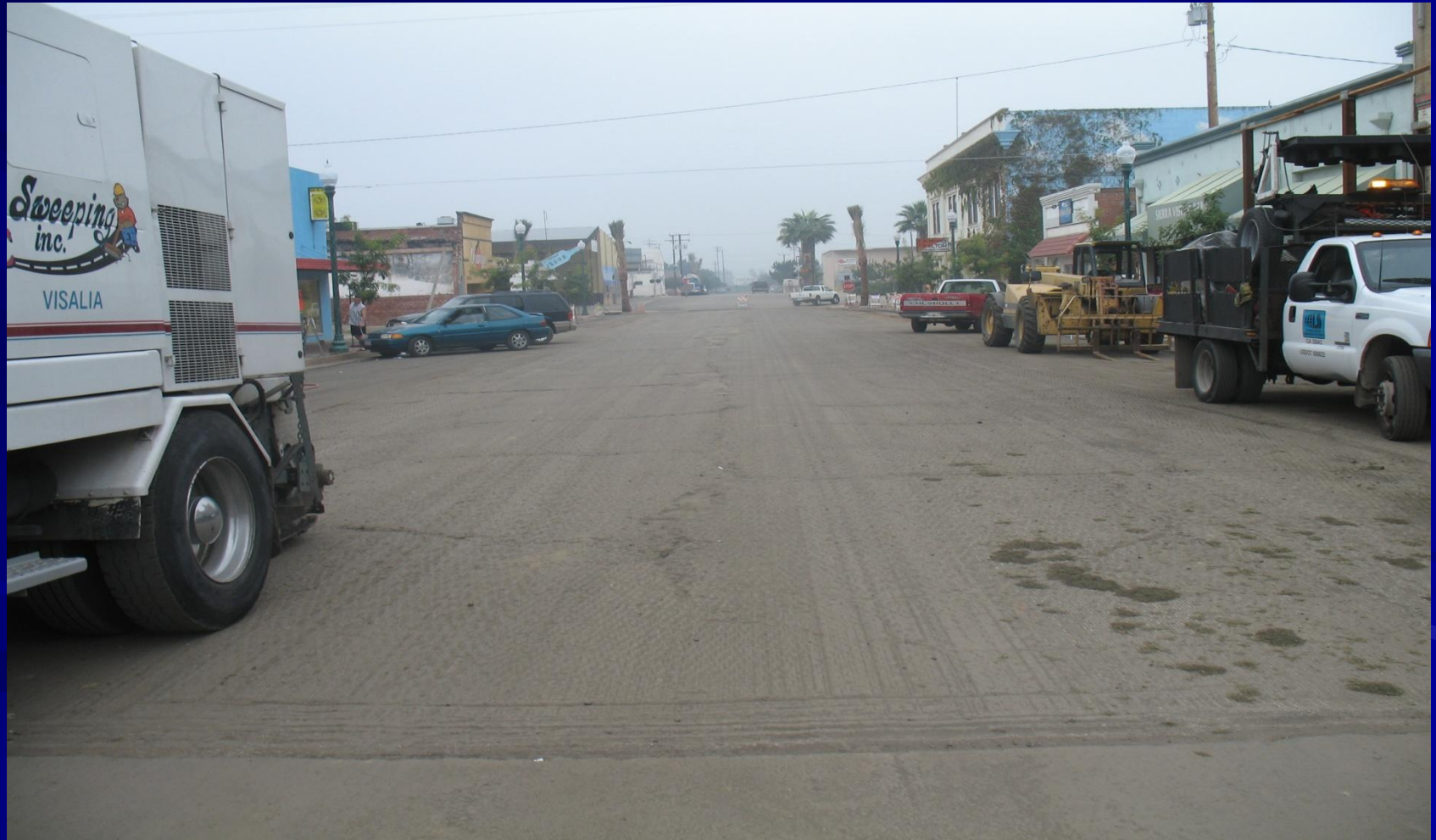
Topography (Hills and Curves)

Weather and Environmental Conditions

Construction Procedures

- Surface Preparation (Sweeping and Cleaning)
- Ambient Temperature (65° F and Rising?)
 - Recommended Chip Seal Application (Elevation)
- Binder Application (Volume Measurement)
- Aggregate Application
- Rolling
- Aggregate Hauling
- Sweeping
- Traffic Control

Construction Procedures - Surface Preparation



Construction Procedures - Ambient Temperature

Ambient Temperature – 65 Degrees F
(And Rising)

Surface Temperature – 85 Degrees F
(And Rising)

Construction Procedures - Binder Application



Construction Procedures - Aggregate Application



Construction Procedures - Rolling



Construction Procedures - Aggregate Hauling



Construction Procedures - Sweeping (Loose Aggregate Removal)



Construction Procedures – Traffic Control

- Traffic control devices shall be carried out in accordance with agency requirements and, if necessary, conform to the requirements of the Manual on Uniform Traffic Control Devices.



Special Chip Seal Procedures

- Fog Seal Applications
- Double Chip Seals
- Scrub Seals
- Cape Seals
- Modified Binders

Special Chip Seal Procedures - Fog Seal Application



Special Chip Seal Procedures - Double Chip Seals



Special Chip Seal Procedures - Scrub Seals



Special Chip Seal Procedures - Cape Seals



Special Chip Seal Procedures - Modified Binders



Summary

- Note: 13 Bullet Points concerning important requirements that **MUST** be used to obtain a quality chip seal project.

Checklist Materials & Construction Techniques/Application

	Yes	No
1. Does the Aggregate meet the specified requirements?	_____	_____
2. Is Aggregate Stockpiled so that it will not become contaminated?	_____	_____
3. Is the moisture content of the aggregate appropriate?	_____	_____
4. Is area free of debris, cars, people, or equipment?	_____	_____
5. Has the binder been sampled for testing?	_____	_____
6. Is the binder at the correct temperature for application?	_____	_____
7. Has the binder application rate been determined & corrected for temp.?	_____	_____
8. Has the aggregate application rate been determined?	_____	_____

Checklist Materials & Construction

Techniques/Application

	Yes	No
1. Is traffic control in compliance with approved plan?	_____	_____
2. Have pavement markers been considered?	_____	_____
3. Is the ambient temperature at 65 degrees F?	_____	_____
4. Is the pavement clean and dry?	_____	_____
5. Is there a chance of rain during the daily production?	_____	_____
6. Has the aggregate spreader been properly calibrated?	_____	_____
7. Is the proper equipment available for loading and transporting the aggregate to the aggregate spreader?	_____	_____
8. Is there adequate aggregate supply available on site to keep up with the distributor truck?	_____	_____
9. Are all the distributor trucks calibrated, and nozzles and bar height adjusted?	_____	_____
10. Is the aggregate spreader in position, with the dump truck attached before starting the aggregate application?	_____	_____
11. Is the application of the aggregate being done in a timely manner directly behind the distributor?	_____	_____
12. Are adequate rollers available to keep up with the binder & aggregate app.	_____	_____
13. Are the rollers keeping pace with the aggregate spreader?	_____	_____
14. Has embedment been checked after rolling?	_____	_____
15. Has the excess aggregate been swept before opening to full speed traffic?	_____	_____

Appendices

- Appendix A (Chip Seal Design)
- Appendix B (Quantities of Binder and Aggregate)
- Appendix C (Temperature Volume Correction for Emulsions)
- Appendix D (Temperature Volume Correction for Hot Asphaltic Materials)
- Appendix E (Calculations for Application Rate)

Bibliography

- A Basic Emulsion Manual (AEMA & Asphalt Institute)
- Recommended Performance Guidelines (AEMA)
- Chip Seal (Ken Hill - Bearcat Manufacturing)
- Chip Seal Inspection Workbook (ADOT Course 303)
- Construction Manual (ADOT ITCG Section IV, pages 31-48)
- Chip Seal Application Check List (LTAP)
- Seal Coat Hand Book (Minnesota DOT)
- Chip Seal Manual (Montana DOT)
- Pavement Maintenance Effectiveness, Preventative Maintenance Treatments (FHWA)

Questions?