Arizona AGC Pavement Preservation Series

Chip Seal Guide for Application and Construction

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Chip Seal Guide - Application and Construction
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 were 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 over looked.

- Crack treatments are initially low in cost and provide the highest benefit.

Courtesy Crafco, Inc.
HP Cold or Hot Patch (Pothole Patching)

Courtesy Crafco, 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)
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
Note: 13 Bullet Points concerning important requirements that MUST be used to obtain a quality chip seal project.
Checklist Materials & Construction Techniques/Application

1. Does the Aggregate meet the specified requirements?  
   Yes      No

2. Is Aggregate Stockpiled so that it will not become contaminated?  
   Yes      No

3. Is the moisture content of the aggregate appropriate?  
   Yes      No

4. Is area free of debris, cars, people, or equipment?  
   Yes      No

5. Has the binder been sampled for testing?  
   Yes      No

6. Is the binder at the correct temperature for application?  
   Yes      No

7. Has the binder application rate been determined & corrected for temp.?  
   Yes      No

8. Has the aggregate application rate been determined?  
   Yes      No
Checklist Materials & Construction Techniques/Application

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