Virginia Department of Transportation

Asphalt Field

Level I & Level II Certification

2016 Study Guide

Asphalt Field Certification
Study Guide
Level I & Level II

Prepared by: The Virginia Department of Transportation
Materials Division
2016

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Acknowledgements

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- Kandhal, P.S. and Mallick, R.B. (1996). *A Study of Longitudinal Joint Construction Techniques in AC Pavements (Interim Report - Colorado Project)*. NCAT Report No. 96-03. http://www.eng.auburn.edu/center/ncat/reports/rep96-3.pdf
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- Kandhal, P.S.; Ramirez, T.L. and Ingram, P.M. (2002). *Evaluation of Eight Longitudinal Joint Construction Techniques for Asphalt Pavements in Pennsylvania*. NCAT Report No. 02-03. http://www.eng.auburn.edu/center/ncat/reports/rep02-03.pdf

IMPORTANT

This manual is a practical guide and not to be used as a source for VDOT specifications.

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Class Agenda

Asphalt Field Level I

Day 1	
Time	**Section**
8:00 – 8:10	Opening Remarks
8:10 – 8:30	Ch 1: Introduction and Project Management, Communication and Safety
8:30 – 9:30	Ch 2: Surface Prep
9:30 – 10:30	Ch 3: Mix Delivery
10:30 – 11:30	Ch 4: Mix Placement
11:30 – 12:30	Lunch
12:30 – 1:45	Ch 5: Joint Construction
1:45 – 3:00	Ch 6: Compaction
3:00 – 4:00	Ch 7: Mat Problems
Day 2	
Time	**Section**
7:30 – 8:30	Written Exam (1 hour)

Asphalt Field Level II

Day 1	
Time	**Section**
8:30 – 9:30	Ch 8: Inspection and Quality Assurance
9:30 – 11:30	Ch 9: Density Testing
11:30 – 12:30	Lunch
12:30 – 3:00	Ch 9: Density Testing (continued)
3:00 – 4:30	Ch 10: Math Problems
Day 2	
Time	**Section**
8:00 – 11:00	Exam

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Preface

This workbook covers asphalt paving, including transportation of materials, surface preparation, laydown, compaction and quality assurance processes. It is aimed at the field personnel who are responsible for these operations – both contractor personnel who do the work and department personnel who oversee and inspect the work.

The course will provide a working knowledge of the techniques and processes used to place asphalt concrete materials, including the surface preparation, hauling and discharging, paving, and compacting procedures. Each step in the placement of asphalt concrete has a role in the overall pavement performance. Additionally, the course attendees will have an understanding of improper handling of materials and the adverse effect to their properties and ultimately the behavior in the finished pavement. We feel having such information will give the technician confidence to make proper day-to-day decisions and will ensure that good quality control is maintained.

It is hoped that the guide will promote a common understanding of the processes involved and thereby result in improved asphalt concrete placement.

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Asphalt Field Certification Information

Course	Certification Components
Asphalt Field Level I Certification	• Prerequisites: None • Written Exam - Before taking the exam you must show photo identification and sign the Technician Certification Application. - You are allowed 1 hour to complete the exam. - You must pass with a minimum score of 70%. If you fail, you have one opportunity for re-testing. Passing exam score results in an Asphalt Field Level I Certification.
Asphalt Field Level II Certification	• Prerequisites: Certified in Asphalt Field Level I • Written Exam - Before taking the exam you must show photo identification and sign the Technician Certification Application. - You are allowed 3 hours to complete the exam. - You must pass with a minimum score of 70%. If you fail, you have one opportunity for re-testing. Passing exam score results in an Asphalt Field Level II Certification.

The written exam must be completed by December 31, 2016

Initial certification will be effective for five (5) years from the calendar year in which you attained certification.

Failure of an exam will require the person to re-attend the regular class in order to become certified.

Your test results and card may be found at the VDOT University website listed below.

- VDOT Employees: https://virtualcampus.vdot.virginia.gov
- All other students: https://virtualcampus.vdot.virginia.gov/external

If you are enrolled in this class or hold any VDOT Materials certifications, do not register as a new user when you go to this site.

If you do not know your logon or password, call (804) 328-3158.

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About This Guide

Various visual cues are used to symbolize several consistent concepts. Below you will see the visual cues as well as a description of each.

	DEFINITION A definition will be provided.

Tools/Equipment/Tests	
	TOOLS AND EQUIPMENT Describes what tools, equipment and tests are required to complete the job safely and with the highest level of quality.

Work Procedure 1.1. Best Practices 1.2. Awareness	
	PROCEDURE Describes a condition where equipment and procedure integrity is at risk. This is used to alert personnel to operating procedures and practices, which if not observed, could result in severe damage to the machine, its components or the end product.

	BEST PRACTICE Describes a best practice to be utilized when possible.

	IMPORTANT Highlights a step in the procedure which is either unusual or very particular to this procedure. May also indicate awareness (additional information) or a cautionary concern in the procedure.

Inspection List and Measurements	
	INSPECTION AND MEASUREMENTS Describes inspection, Quality Assurance and/or Quality Control practices.

Safety	
	SAFETY WARNING Describes a condition where personal safety may be at risk. This is used to alert personnel to operating procedures & practices which, if not observed, may result in personal injury.

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Introduction

The modern use of asphalt for road and street construction began in the late 1800s, and grew rapidly with the emerging automobile industry. Since that time, asphalt technology has made giant strides such that today the equipment and techniques used to build asphalt pavement structures are highly sophisticated.

One rule that has remained constant throughout asphalt's long history in construction is that an asphalt concrete layer is only as good as the materials and workmanship that go into it. No amount of sophisticated equipment can make up for use of poor quality materials, poor sampling and testing techniques or poor construction practices.

Asphalt concrete is composed of three basic components - asphalt binder, mineral aggregate and air voids. Aggregates are generally classified into two groups - coarse and fine, and normally constitute 90 to 96 percent by weight of the total mixture. Asphalt binders are classified by various grading systems and normally constitute 4 to 10 percent of the total mixture. Another very important but often overlooked component of an asphalt mix is air voids. In this course, only asphalt binder, aggregates and other additives are discussed.

There are many different types of asphalts and many different types of aggregates. Consequently, it is possible to make different kinds of asphalt pavements. Among the most common types of asphalt pavements are:

- Asphalt concrete (dense-graded hot or warm mix asphalt)
- Open-graded asphalt or porous friction course
- Ultra-Thin Bonded Wearing Course
- Asphalt Surface Treatments
- Emulsified asphalt mixes (cold mixes)
- Permeable Asphalt Drainage Course
- Others, SMA, In-Place Recycled Mixes

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This program primarily addresses asphalt concrete (AC) produced at conventional plant temperatures or through a warm mix technology. AC is a paving material that consists of asphalt binder and mineral aggregate with appropriate air voids. The asphalt binder, either an asphalt cement or a modified asphalt cement, acts as a binding agent to glue aggregate particles into a dense mass and to waterproof the mixture. When bound together, the mineral aggregate acts as a stone framework to impart strength and toughness to the system. The performance of the mixture is affected both by the properties of the individual components and the combined reaction in the system.

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