Concrete Strength

2024

Proficiency Pack

Date: _____

Name: _____

Employer: _____

AASHTO T 24: Obtaining and Testing Drilled Cores of Concrete and Sawed Beams

PROFICIENCY CHECKLIST

Rev: 12/26/2019

Applicant_____

Employer_____

PART I - CORES	Trial 1	Trial 2
1. Cores not taken until 3,000 psi is achieved on Maturity Meter		
2. Size of core taken corresponds to design thickness of pavement		
a) For pavements less than 12" take a 4" core		
b) For pavements 12" or greater take a 6" core		
3. Ensure core bit is perpendicular to the driving surface		
4. Extract Core, taking care not to damage or drop		
a) Wipe surface water from core and allow remaining surface moisture to evaporate		
b) Mark core for identification		
5. Maintain the integrity of moisture consistent with AASHTO T 24		
a) Within 1 hour of extraction, place core in a plastic bag or non-absorbent container		
b) Maintain ambient temperature of core 60-80ºF (16-26ºC) and out of direct sunlight		
6. Determine the length (Pavement Depth) of core in its original form according to AASHTO T 148		
7. Determine the mean diameter of the core, check tolerances		
8. Cores will be tested at 28 days of age		
a) If water is used during preparation, complete as soon as practicable within 2 days of drilling and extraction		
b) Minimize exposure to water during end preparation		
c) Core remained sealed except.		
• During measuring and end preparation procedure		
• A maximum of 2 hour to permit capping		
d) Cores remained sealed in container a minimum of 5 days after last being wetted		
9. Reporting		
a) Core length per AASHTO T 148		
b) Test results per AASHTO T 22		
c) Dimensions per AASHTO T 24		
d) Dates of all procedures during the 28 days, from extracting to testing a core AASHTO T 24		
e) Locations of embedded metal and defects if any		
f) Report any deviations from AASHTO T 24		

PART II SAWED BEAMS		
1. Sawing Beam sawed surfaces smooth, plane, parallel and handled with care to avoid damage		
2. Beam Dimensions Cross section = 150mm x 150mm (6" x 6") Width = by size of aggregate and thickness of slab Length at least 530mm (21")		
3. Maintain the integrity of moisture consistent with AASHTO T 24		
a) Beam covered with moist wet burlap and plastic sheeting during transport and storage		
b) Beams submerged in lime-saturated bath at 73.5 ± 3.5ºF (23.0±2.0ºC) for at least 40 hours		
c) Test the beam promptly after removal from water and covered with moist cover until testing		
4. Testing		
a) Beam tested within 7 days of sawing		
b) Beam tested per AASHTO T 97		
5. Reporting a) Test results per AASHTO T 97 b) Moisture conditions		

Pass Pass

Fail Fail

Examiner: _____ Date: _____

AASHTO T 148: Measuring Length of Drilled Concrete Cores

PROFICIENCY CHECKLIST

Rev: 03/03/2020

Applicant_____

Employer_____

Trial #	1	2
Calibration		
1. Calibrated the measuring device		
Procedure		
5. Removed any base particles from the core		
6. Inserted the core, placing the driving surface down onto the studs		
7. Centered core in the measuring device		
8. Used the correct holes for the core size		
5. Nine locations measured to the nearest 0.05"		
6. Measurements from the bottom of the top plate subtracted from the calibrated height.		
7. Record the calculated lengths to the nearest 0.05"		
8. Reported the average length of 9 measurements to 0.1"		
	PASS	PASS
	FAIL	FAIL

Examiner: _____ Date: _____

AASHTO T 231: Capping Cylindrical Concrete Specimens

PROFICIENCY CHECKLIST

Applicant_____

Employer_____

Trial #	1	2
General		
1. Capping plates and alignment device checked and in good condition		
2. Qualified capping material tested for strength every 3 months and reports are kept in a Quality Control Manual		
3. Test specimens prepared and cured in accordance with AASHTO T 23, and T 24		
4. Test specimens measured per AASHTO T 148		
5. End conditions are checked		
- Removed coatings or deposits and roughed with a wire brush if needed		
- Uncapped end from a plane is perpendicular to the axis not to exceed 0.125 in (3mm)		
6. Types of Capping Material High Strength Gypsum Plaster Neat Hydraulic Cement Paste Neat Portland Cement Paste Sulfur Mortar		
Sulfur Mortar Capping was Used, Procedure Below		
1. Sulfur mortar heated to about 265°F (130°C)		
2. Sulfur pot 2/3 full, added only dry sulfur (Discarded sulfur after heated 5 times)		
3. Selected the correct size of alignment device and set up the blocks accordingly		
4. Lightly oiled the plate		
5. Warmed the capping plate with hot sulfur, allowed to cool, and removed		
6. Lightly oiled the plate again		
7. Set the specimen into the sulfur keeping it against the alignment blocks		
8. Waited till sulfur hardened		
9. Tapped the plate with a rawhide mallet on both sides of the specimen		
10. Removed the specimen with cap without damaging it, repeated steps for the other end		
11. Checked finished caps for soundness and planeness of no more than 0.002 in (0.05mm)		
12. Stored sulfur capped specimen in a moist condition until tested		
	PASS	PASS
	FAIL	FAIL

Examiner: _____ Date: _____

ASTM C1231: Use of Unbonded Caps in Determination of Compressive Strength of Hardened Cylindrical Concrete Specimens

PROFICIENCY CHECKLIST

Rev: 02/14/2018

Applicant_____

Employer_____

Trial #	1	2
General		
9. Pads qualify for use, records kept		
10. Examined pads for excessive wear or damage		
11. Examined retainers for grooves, protrusions, or indentations		
12. Recorded each use of pads		
Unbonded Cap Procedure		
1. Pads inserted in the retainers before placing on the specimen NOTE: dusting of talc or corn starch if needed on specimen and pads		
2. Completed load application, testing, calculation and reporting of results in accordance with AASHTO T 22		
	PASS	PASS
	FAIL	FAIL

Examiner: _____ Date: _____

AASHTO T 22: Compressive Strength of Cylindrical Concrete Test Specimens

PROFICIENCY CHECKLIST

Rev: 02/19/2022

Applicant_____

Employer_____

Specimen Preparation	**TRIAL**	**1**	**2**
1. Reduced to Length /Diameter ratio of 2 to 1 and length of specimen reported to nearest 0.01"			
2. Ends checked for perpendicularity to axis does not exceed 0.5º			
3. No projections exceeded 0.2 inch			
4. Diameter of the ends did not depart more than 0.1" from the mean diameter of the core			
5. Mass of the specimen reported to the nearest 0.1 lbs.			

Bonded or Un-bonded Caps

1. Follow procedure for Bonded caps in AASHTO T 231			
2. Follow procedure for Unbonded Caps in ASTM C1231			

Compression Testing

1. Equipment verification within 13 months			
2. Two diameter measurements taken at the mid-section of the specimen, measured to 0.01" , reported average to 0.01"			
3. Specimens kept moist			
4. Lower and upper bearing surfaces wiped clean			
5. Axis of the specimen centered under the upper bearing block			
6. Zero setting checked prior to testing and adjusted when necessary			
7. Spherical block rotated prior to contacting the specimen			
8. Load applied continuously and without shock at the specified rate of 35 ± 7 psi/s			
9. No rate adjustment made while the cylinder was yielding			
10. The maximum load recorded			
11. Cylinders tested to failure and the type of fracture determined and recorded			
12. Specimen tested within the time tolerance			
13. Calculation and reporting of results in accordance with AASHTO T 22			

PASS PASS

FAIL FAIL

Examiner: _____ Date: _____

AASHTO T 97: Test for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)

PROFICIENCY CHECKLIST

Rev: 12/26/2019

Applicant_____

Employer_____

Trial #	1	2
General		
4. Apparatus verified per ASTM E4		
5. Test specimens prepared and cured in accordance with AASHTO T 23, and T 24		
6. Apparatus, applied a load and support blocks were in a vertical position and in contact with the rod or ball		
Procedure		
1. Moist-cured specimens tested soon after removal from moist storage		
2. Molded specimens: Turned on its side with respect to position as molded and centered on support blocks Sawed specimens: Positioned so that the tension face corresponds to the top or bottom as cut from the parent material		
3. Centered the loading system		
5. Load blocks were in contact with surface of specimen at third points		
5. Load applied between 3% and 6 % of the estimated ultimate load		
6. Used a feeler gauge to check for gaps between the specimen and the load applied		
7. Eliminated gaps in excess of 0.10mm (0.004 inches) width across the entire specimen: grind, cap or used leather shims on the specimen contact surface		
8. Eliminated gaps in excess of 0.40 mm (0.015 inches) only by capping or grinding		
9. Loaded the specimen continuously and without shock		
10. Load applied at a constant rate to the breaking point		
11. Load applied at a rate that increases the maximum stress between 0.9 and 1.2 MPa/min (125 and 175 psi), until rupture		
12. Specimen measured after testing to the nearest 1.3 mm (0.05 in)		
13. Calculations: Fracture in middle third used: **$R = PL/bd^2$** Fracture in middle third of the span length by not more than 5% used **$R = 3Pa/bd^2$** Fracture in outside of the middle third by more than 5% Test **results discarded**		
	PASS	PASS
	FAIL	FAIL

Examiner: _____ Date: _____