COMPRESSIVE STRENGTH OF CYLINDRICAL CONCRETE SPECIMENS

(A Modification of AASHTO Designation T 22)

1. This test procedure is the same as specified in AASHTO T 22, with the following exceptions:

(a) Section 6.2 of AASHTO T 22 is revised to read:

6.2 Neither end of compressive test specimens when tested shall depart from perpendicularity to the axis by more than 0.5° [approximately equivalent to 1/32 inch (1 mm) in 4 inches (100 mm)]. The ends of compressive test specimens that are not plane within 0.002 inch (0.050 mm) shall be capped, sawed, or ground in accordance with AASHTO T 231; or if the ends meet the requirements of ASTM C 1231, unbonded caps (neoprene or other qualified elastomeric materials) with metal retainers may be used instead of capping. When used for acceptance testing of concrete, unbonded caps are only allowed for compressive strengths specified in ASTM C 1231. Each test specimen shall be measured to determine its diameter. The diameter shall be the average of two measurements, taken using a caliper, at right angles to each other at about mid-height of the specimen. The individual diameter measurements shall be determined to the nearest 0.01 inch (0.25 mm). Determine and record the average of the two diameter measurements to the nearest 0.01 inch (0.25 mm). That value shall be the diameter used to calculate the cross-sectional area of the test specimen.

(b) Section 7.6 of AASHTO T 22 is revised to read:

7.6 Apply the load until the specimen fails, and record the maximum load carried by the specimen during the test. If desired, the load may be applied until the specimen breaks such that the type of fracture can be determined.

(c) Section 8.1 of AASHTO T 22 is revised to read:

8.1 Calculate the compressive strength of the specimen by dividing the maximum load carried by the specimen during the test by the average cross-sectional area determined in Section 6, and express the result to the nearest 10 psi (50 kPa).

(d) Section 9.1.5 of AASHTO T 22 is revised to read:

9.1.5 Compressive strength of specimen, calculated to the nearest 10 psi (50 kPa). In addition, if the average compressive strength is determined for multiple specimens, average compressive strength to the nearest 10 psi (50 kPa);

(e) Section 9.1.6 of AASHTO T 22 is revised to read:

9.1.6 Type of fracture, if desired (see Figures 2, 5, or 7);

(f) APPENDIX A of AASHTO T 22 – "Compressive Strength of Cylindrical Concrete Specimens Using Neoprene Caps", is replaced in its entirety by ASTM C 1231 – "Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinders".

2. In addition to the exceptions to AASHTO T 22 given in paragraphs (a) and (f) above, the following revisions to ASTM C 1231 shall also apply:

(a) References to ASTM C 31 in ASTM C 1231 shall be replaced with AASHTO T 23.

(b) References to ASTM C 39 in ASTM C 1231 shall be replaced with AASHTO T 22.

(c) References to ASTM C 192 in ASTM C 1231 shall be replaced with AASHTO T 126.

(d) References to ASTM C 617 in ASTM C 1231 shall be replaced with AASHTO T 231.

3. A blank ADOT "Concrete Test Report" laboratory card is provided in Figure 4 (front of card) and Figure 5 (back of card). An example of the use of the ADOT "Concrete Test Report" laboratory card is given in Figures 6 and 7.

ARIZONA DEPARTMENT OF TRANSPORTATION

CONCRETE TEST REPORT

USE CAPITAL LETTERS

WHITE
YELLOW
BLUE

CLASS | CORE OR CYLINDER NUMBER * | CORE OR CYLINDER NUMBER * | DATE BATCHED (MONTH, DAY, YEAR) | TICKET NUMBER | TRUCK OR BATCH QUANTITY (CY) | PRODUCT CODE

* ENTER CORE OR CYLINDER NUMBERS AT THE SITE

PLANT OF ORIGIN OR PIT

PROJECT AND TRACS NUMBER

REQUIRED 28-DAY STRENGTH (PSI)

AT PLANT (AT SITE WHEN NO PLANT INSPECTOR)

	DESIGN WT (S.S.D.) LB/CY	MOISTURE ± (S.S.D.) LB/CY	BATCH WEIGHTS LB/CY
CEMENT			
SAND			
C.A. #1			
C.A. #2			
WATER			

FLY ASH LB/CY

	TYPE	AMOUNT	
ADMIX			OZ./CY OR OZ./CWT
ADMIX			OZ./CY OR OZ./CWT
ADMIX			OZ./CY OR OZ./CWT
A.E.A.			OZ./CY OR OZ./CWT

PLANT INSPECTOR'S SIGNATURE

BATCH TIME (MILITARY TIME)

Max. mlg. rated mix speed		rpm
Min. mlg. rated mix speed		rpm
Actual mix. speed		rpm
Time mixed		min
No. of rev.		

AT SITE

DATE SAMPLED (MONTH, DAY, YEAR) | SAMPLED BY

QTY INSTRUCT REP BY TEST (CY) | WATER ADDED GAL./CY

SAMPLE TIME (MILITARY TIME)

DIR | STATION + | PLACED IN - PART OF STRUCTURE | STRUCT. NO

ENTRAINED AIR SPEC	TO		%
ENTRAINED AIR CONTENT			%
SLUMP SPEC	TO		IN.
MEASURED SLUMP			IN.

IF NO BATCH WEIGHTS, THERE IS NO FINAL W/C RATIO

FINAL W/C RATIO		LB/LB
MAX W/C RATIO		LB/LB

CONCRETE TEMP		°F
AIR TEMP		°F

FIELD INSPECTOR'S SIGNATURE

Additional Mix time	
Time mixed at plant	
Total time mixed plant and site	
Mix rev. at Plant	
Mix rev. at site	
Total No. of Mix Rev. at Plant & Site	

AT LAB

LAB NUMBER

DATE REC'D IN LAB	/	
TIME REC'D IN LAB	:	MILITARY TIME
DATE TESTED	/	
TIME TESTED	:	MILITARY TIME

LENGTH/ HEIGHT	DIAMETER	CROSS-SECTIONAL AREA	LOAD	STRENGTH
IN.	IN.	SQ. IN.	LB.	PSI
IN.	IN.	SQ. IN.	LB.	PSI
IN.	IN.	SQ. IN.	LB.	PSI
			AVERAGE**	PSI

REQUIRED STRENGTH (PSI) | AGE (H = HOURS, D = DAYS)

AT LAB

LAB NUMBER

DATE REC'D IN LAB	/	
TIME REC'D IN LAB	:	MILITARY TIME
DATE TESTED	/	
TIME TESTED	:	MILITARY TIME

LENGTH/ HEIGHT	DIAMETER	CROSS-SECTIONAL AREA	LOAD	STRENGTH
IN.	IN.	SQ. IN.	LB.	PSI
IN.	IN.	SQ. IN.	LB.	PSI
IN.	IN.	SQ. IN.	LB.	PSI
			AVERAGE**	PSI

REQUIRED STRENGTH (PSI) | AGE (H = HOURS, D = DAYS)

LAB | LAB CODES: P = PROJECT, R = REGIONAL, C = CENTRAL

**OR REPORTED RESULT AS REQUIRED BY SPECIFICATIONS

REMARKS

LABMAN SIGNATURE AND DATE

LABMAN SIGNATURE AND DATE

SUPERVISOR SIGNATURE AND DATE

TEST METHOD

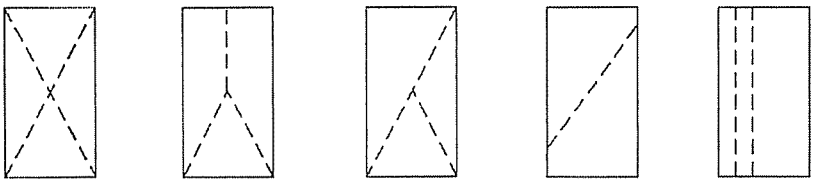
SAMPLING	T 141
FABRICATION AND CURING	T 23 or T126
AIR CONTENT	T 152
SLUMP	T 119
CONCRETE TEMP	C 1064
LENGTH/HEIGHT OF CORES	T 148
COMPRESSIVE STRENGTH	ARIZ 314

T = AASHTO TEST
C = ASTM TEST

ADOT 44-9337 R03/05

SEE BACK ALSO

FIGURE 4



AGE: _____

SPECIMEN IDENTIFICATION	INDICATE TYPE OF FRACTURE (✓)				
	CONE	CONE & SPLIT	CONE & SHEAR	SHEAR	COLUMNAR

AGE: _____

SPECIMEN IDENTIFICATION	INDICATE TYPE OF FRACTURE (✓)				
	CONE	CONE & SPLIT	CONE & SHEAR	SHEAR	COLUMNAR

ADOT 44-9337 R03/05 (Back)

FIGURE 5

ARIZONA DEPARTMENT OF TRANSPORTATION

USE CAPITAL LETTERS

CONCRETE TEST REPORT

WHITE ☒ YELLOW ☐ BLUE ☐

CLASS	CORE OR CYLINDER NUMBER *	CORE OR CYLINDER NUMBER *	DATE BATCHED (MONTH DAY YEAR)	TICKET NUMBER	TRUCK OR BATCH QUANTITY	PRODUCT CODE
P	20		03 07 05	275	10 CY	140700

* ENTER CORE OR CYLINDER NUMBERS AT THE SITE

PLANT OF ORIGIN OR PIT: ABC CONCRETE

PROJECT AND TRACS NUMBER: STP-999-C(999)B H999901C

REQUIRED 28-DAY STRENGTH: 4000 PSI

AT PLANT (AT SITE WHEN NO PLANT INSPECTOR)

BATCH TIME: 11:44 MILITARY TIME

	DESIGN WT (S.S.D.) LB/CY	MOISTURE ± (S.S.D.) LB/CY	BATCH WEIGHTS LB/CY
CEMENT			
SAND			
C.A. #1			
C.A. #2			
WATER			

FLY ASH LB/CY

	TYPE	AMOUNT	
ADMIX			OZ/CY OR OZ/CWT
ADMIX			OZ/CY OR OZ/CWT
ADMIX			OZ/CY OR OZ/CWT
A.E.A.			OZ/CY OR OZ/CWT

Max. mfg. rated mix speed	rpm
Min. mfg. rated mix speed	rpm
Actual mix. speed	rpm
Time mixed	min
No. of rev.	

PLANT INSPECTOR'S SIGNATURE

EXAMPLE

AT SITE

DATE SAMPLED (MONTH DAY YEAR)	SAMPLED BY	QTY IN STRUCT REP BY TEST	SAMPLE TIME
03 07 05	JOE SAMPLER	207 CY	12:05 MILITARY TIME

WATER ADDED GAL/CY: 2

DIR	STATION	PLACED IN - PART OF STRUCTURE	STRUCT. NO
NB	22 + 25	MAIN ROAD - Lt. of ℄	

Additional Mix time	2
Time mixed at plant	
Total time mixed plant and site	
Mix rev. at Plant	
Mix rev. at site	20
Total No. of Mix Rev. at Plant & Site	

ENTRAINED AIR SPEC	TO	%
ENTRAINED AIR CONTENT		%
SLUMP SPEC	000 TO 450	IN.
MEASURED SLUMP	275	IN.

IF NO BATCH WEIGHTS, THERE IS NO FINAL W/C RATIO

FINAL W/C RATIO		LB/LB
MAX W/C RATIO		LB/LB

CONCRETE TEMP	66	°F
AIR TEMP	60	°F

FIELD INSPECTOR'S SIGNATURE: PAUL INSPECTOR

AT LAB

LAB NUMBER	165
DATE REC'D IN LAB	03/08
TIME REC'D IN LAB	13:25 MILITARY TIME
DATE TESTED	04/04
TIME TESTED	05:49 MILITARY TIME

LENGTH/HEIGHT	DIAMETER	CROSS-SECTIONAL AREA	LOAD	STRENGTH
120 IN.	601 IN.	2837 SQ. IN.	124190 LB.	4380 PSI
120 IN.	600 IN.	2827 SQ. IN.	119630 LB.	4230 PSI
120 IN.	601 IN.	2837 SQ. IN.	141670 LB.	~~4990~~ PSI
				AVERAGE** 4310 PSI

REQUIRED STRENGTH: 4000 PSI

AGE: 28 D (H = HOURS, D = DAYS)

AT LAB

LAB NUMBER	
DATE REC'D IN LAB	/
TIME REC'D IN LAB	: MILITARY TIME
DATE TESTED	/
TIME TESTED	: MILITARY TIME

LENGTH/HEIGHT	DIAMETER	CROSS-SECTIONAL AREA	LOAD	STRENGTH
IN.	IN.	SQ. IN.	LB.	PSI
IN.	IN.	SQ. IN.	LB.	PSI
IN.	IN.	SQ. IN.	LB.	PSI
				AVERAGE** PSI

REQUIRED STRENGTH: PSI

AGE: H = HOURS, D = DAYS

LAB: P — LAB CODES: P = PROJECT, R = REGIONAL, C = CENTRAL

**OR REPORTED RESULT AS REQUIRED BY SPECIFICATIONS

REMARKS: COMPRESSIVE STRENGTH OF CYLINDER 165C ELIMINATED - DIFFERS BY MORE THAN 10% FROM THE AVERAGE OF THE THREE CYLINDERS.

LABMAN SIGNATURE AND DATE: ED LABMAN 04/04/05

LABMAN SIGNATURE AND DATE:

SUPERVISOR SIGNATURE AND DATE: KIM SUPERVISOR 04/04/05

TEST METHOD

SAMPLING	T 141
FABRICATION AND CURING	T 23 or T 126
AIR CONTENT	T 152
SLUMP	T 119
CONCRETE TEMP	C 1064
LENGTH/HEIGHT OF CORES	T 148
COMPRESSIVE STRENGTH	ARIZ 314

T = AASHTO TEST
C = ASTM TEST

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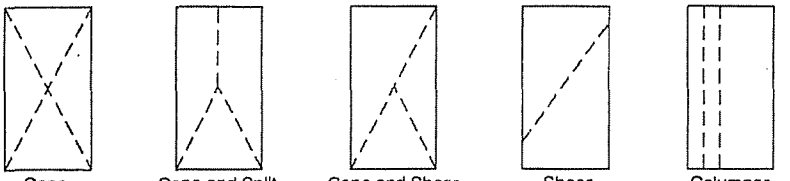
SEE BACK ALSO

FIGURE 6



AGE: 28 DAY					
SPECIMEN IDENTIFICATION	INDICATE TYPE OF FRACTURE (✓)				
	CONE	CONE & SPLIT	CONE & SHEAR	SHEAR	COLUMNAR
165A	✓				
165B	✓				
165C	✓				

AGE:					
SPECIMEN IDENTIFICATION	INDICATE TYPE OF FRACTURE (✓)				
	CONE	CONE & SPLIT	CONE & SHEAR	SHEAR	COLUMNAR

EXAMPLE

ADOT 44-9337 R03/05 (Back)

FIGURE 7