

SECTION 725

PORTLAND CEMENT CONCRETE

725.1 GENERAL:

Portland cement concrete shall be composed of cementitious materials, ~~portland cement or portland Pozzolan cement, Pozzolonc Materials,~~ fine and coarse aggregates, water, and, if provided for or allowed, certain chemical admixtures and additives.

~~All of the materials used for concrete shall be in accordance with these specifications and requirements for the particular material as provided herein.~~

~~Remove this paragraph and transfer it to Section 725.7 PROPORTIONING Weighing and metering devices used for the purpose of proportioning materials shall fulfill requirements as to accuracy and tolerance prescribed by the Weights and Measures Division of the State of Arizona and shall be sealed and certified in accordance with the procedures established by this agency. This certification shall not be over 12 months old and shall be renewed whenever required by the Engineer. When portable plants are set up at a new or temporary location, the scales and scale assembly shall be inspected and certificate issued regardless of the date when the scales were last tested. The Engineer may require the Contractor to run a quick scale check at any time with certified weights furnished by the Contractor and order the scale recertified if necessary.~~ [JDH1]

TABLE 725-1			
CONCRETE CLASSES MINIMUM REQUIREMENTS			
Class of Concrete	Minimum- Cementitious Materials Content (Lbs. Per Cu Yard)	Minimum Compressive Strength (1)	
		at 14 Days psi	at 28 Days psi
AA	600	3200	4000
A	520	2400	3000
B	470	2000	2500
C	420	1600	2000

~~(1) As tested in accordance with ASTM C-39. Maximum slump 5 inches when tested in accordance with ASTM C-143.~~

Class AA concrete shall be used as specified.

Class A concrete shall be used for concrete structures, either reinforced or non-reinforced, and for concrete pavements.

Class B concrete may be used for curbs, gutters and sidewalks.

Class C concrete may be used for thrust blocks, encasements, fill or

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over-excavation, etc.

725.2 PORTLAND CEMENT CEMENTITIOUS MATERIALS:

Cementitious materials to be used or furnished under this specification shall be Portland cement, conforming ~~with to~~ the requirements of ASTM C-150, Type II, low alkali, or Portland Pozzolan Cement, conforming ~~with to~~ the requirements of ASTM C-595, Type IP (MS), low alkali, except when another type including high early strength is specified in the special provisions or shown on the plans. Type V cement ~~conforming to the requirements of ASTM C-150 (ASTM C-150)~~ shall be specified in the special provisions for use in concrete which will be exposed to contact with soils or waters containing water soluble sulfates (as SO₄) in concentration greater than 0.20% by weight of soil or 1500 PPM in solutions. ~~Pozzolonic Supplementary cementitious (pozzolanic)~~ materials shall not be used as ~~an additional cementitious materials replacement directly added ingredient~~ in concrete in combination with Portland Pozzolan Cement.

Cementitious materials shall be sampled and tested as prescribed in ~~the~~ applicable ASTM specifications. The Contractor shall obtain and deliver to the Engineer a certification of compliance signed by the ~~material cement~~ manufacturer, identifying the ~~material cement~~ and stating that the cementitious material delivered to the batching site complies with ~~these the appropriate~~ specifications. When requested by the Engineer, the Contractor shall furnish him with 3 copies of said certification. The cost of furnishing tested cementitious materials shall be considered as included in the contract bid price and no additional allowance will be made therefore.

When suitable facilities, as recommended by the Concrete Plant Manufacturer's Bureau, and approved by the Engineer, are available for handling and weighing bulk cementitious materials, such facilities shall be used. Otherwise the cementitious material shall be delivered in original unopened sacks that ~~have been filled at the mill and~~ bear the name or brand of the manufacturer. The type of cementitious material, and the weight ~~of cement~~ contained in each sack shall be plainly marked thereon.

Cementitious materials shall be stored in such manner as to permit ready access for the purpose of inspection and identification, and so as to be suitably protected against damage by contamination or moisture. Should any lot of bulk cementitious material be delivered to the site show evidence of contamination, the Engineer may require that such lot be removed from the site.

~~A cement shall not be mixed with any other brand or type unless written permission has first been obtained from the Engineer.~~

~~All cement used in the manufacture of concrete for any individual structure shall be of the same brand unless otherwise approved by the Engineer.~~

725.2.1 Supplementary Cementitious (PozzolonicPozzolanic) Materials (SCM): ~~Supplementary cementitious (Pozzolonicpozzolanic)~~ materials to be used in concrete or furnished under this specification shall conform to the appropriate ASTM requirements ~~of ASTM C-618, as follows:~~

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<u>Fly ash or natural pozzolan</u>	<u>ASTM C-618 and C-311</u>
<u>Silica Fume</u>	<u>ASTM C-1240</u>

~~If an approved pozzolanic material is used, 15~~ Up to 25 percent by weight of the Table 725-1 minimum ~~portland cement~~pozzolanic materials requirements ~~shall~~ may be replaced ~~an approved fly ash or natural pozzolan~~. ~~The replacement ratio shall be 1.2 pounds of pozzolan per pound of replaced portland cement. If the class of concrete is not from Table 725-1, the amount of pozzolanic material used will be 17.5 percent of the combined weight of pozzolanic material and portland cement.~~Additional pozzolanic material in excess of the minimum Table 725-1 requirements may be incorporated into a concrete mix design to achieve enhanced performance, upon approval of the Engineer or Agency.

~~Pozzolans shall be sampled and tested as prescribed in ASTM C-618 and ASTM C-311.~~ The Contractor shall obtain and deliver to the Engineer a certification of compliance signed by the Pozzolan supplier identifying the Pozzolan material and stating the Pozzolan delivered to the batching site complies with the appropriate applicable specifications. The cost of furnishing tested Pozzolan shall be considered as included in the contract bid price and no additional allowance will be made therefore.

Pozzolanic materials shall be handled and stored in the same manner as other portland cementitious materials. When facilities for handling a bulk Pozzolan are not available, the Pozzolan shall be delivered in original unopened sacks bearing the name and brand of the supplier, the type and source of the Pozzolan, and the weight contained in each sack plainly marked thereon.

~~A Pozzolan shall not be mixed with any other brand or type unless written permission has first been obtained from the Engineer. All Pozzolan used in the manufacture of concrete for any individual structure shall be of the same type, and from the same source unless otherwise approved by the Engineer.~~

725.3 AGGREGATES:

Aggregates shall be crushed rock or gravel or a combination thereof and sand conforming to the requirements prescribed in Section 701. Prior to the delivery of the aggregates, the Contractor will be required to furnish samples for testing, and shall notify the Engineer as to when and where they will be available. Thereafter, additional required samples shall be furnished at the expense of the Contractor, but the cost of testing and making the grading analysis will be borne by the Contracting Agency. Samples shall be taken by the Engineer or in the presence of the Engineer.

No method which may cause the segregation, degradation or the combining of materials of different grading shall be used.

725.4 AGGREGATE GRADING:

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Aggregates for each batch of concrete to be prepared shall be combined from materials separately stored in the various sizes and gradations as prescribed in Section 701. The relative proportions of each aggregate used will be as required to meet the provisions of this specification and will be the responsibility of the Contractor.

Except where the amount of concrete for any one job is 10 cubic yards or less, various sizes of both coarse and fine aggregate shall be proportioned by weight unless permission to do otherwise has first been obtained from the Engineer. Aggregates that are proportioned by volume shall be measured in containers of known capacity. Regardless of the method employed, either by weight or volume, each individually stored size of aggregate shall be proportioned separately, but not necessarily weighed individually.

The maximum size of the aggregate shall not be larger than one-fifth of the narrowest dimension between forms of the members for which the concrete is to be used, or larger than 3/4 of the minimum clear spacing between reinforcing bars.

725.5 WATER:

The amount of water shall be varied in accordance with the percentage of free moisture in the material and the requirements of the workability of the aggregate.

The equipment for measuring and supplying the water in the mixer shall be so constructed and arranged that the amount of water to be added to the mixture can be measured, in gallons or by weight, positively and that the predetermined quantity of water required can be discharged rapidly in one operation into the mixing drum without dribbling. Tanks or other equipment for measuring and discharging water into the mixer shall be sufficiently accurate that the amount of water delivered to the mixer for any batch shall not vary more than 1 percent from the required quantity. Adequate means for determining and checking the accuracy of the equipment shall be provided and made available to the Engineer at all times.

The water used for mixing with concrete shall be potable and free from oil, vegetable matter and other deleterious substances, and shall conform to the following requirements:

Water for prestressed concrete shall not contain chlorides calculated as sodium chloride in excess of 1,000 parts per million nor sulphates calculated as sodium sulphate in excess of 1,000 parts per million nor any sulphates calculated as sulphate in excess of 1,000 parts per million. Water shall not contain an amount of impurities that will cause a change in the time of setting of portland cement of more than 25 percent nor a reduction in the compressive strength of portland cement mortar of more than 5 percent compared to results obtained with distilled water.

725.6 ADMIXTURES:

Admixtures of any type, except as otherwise specified, shall not be used unless written

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authorization has been obtained from the Engineer.

If an ~~air-entraining~~air entraining agent is authorized, the amount used will be limited to the extent that the amount of entrained air by volume shall not be more than 6 percent. ~~Air-entraining~~Air entraining agents complying with AASHTO M-154 or ASTM C-260 will be permitted as long as strength requirements are met. Any admixture shall be measured accurately by mechanical means into each batch by equipment and in a method approved by the Engineer. Any admixtures used shall be included in the bid price for that item.

725.7 PROPORTIONING:

All proportioning equipment shall comply with the standards of the Concrete Plant Manufacturer's Bureau and the certification requirements of the Arizona Rock Products Association. The proportioning shall consist of combining the specified sizes of aggregates, each stored in a separate bin with cement, Pozzolanic Materials, and water as herein provided. Weigh hoppers shall be charged from bins located directly over the weigh hoppers or from conveyor belts. When conveyor belts are used, there shall be a separate belt for each size of aggregate.

Bulk cement shall be weighed in an individual hopper and shall be kept separate from the aggregates until the batch ingredients are released for discharge. The cement hopper shall be attached to a separate scale for individual weighing.

All Pozzolan that is to be incorporated into the concrete as a separate ingredient shall be weighed. When the cement scales are used for weighing both cement and Pozzolan, the cement shall be weighed first. If separate scales are provided, they shall be accurate to ± 0.3 percent of the scale capacity.

Scales utilized in the proportioning device may be of the springless dial-type or of the multiple-beam type. If the dial-type, the dial shall be of such size and so arranged that it may be read easily from the operating platform.

If the multiple beam-type, the scales shall be provided with an indicator operated by the main beam which will give positive visible evidence of over or under weight. The indicator shall be so designed that it will operate during the addition of the last 400 pounds of any weighing. The over travel of the indicator hand shall be at least $1/3$ of the loading travel. Indicators shall be enclosed against moisture and dust.

Weighing equipment shall be as recommended by the Concrete Plant Manufacturer's Bureau and be insulated against vibration or movement of other operating equipment in the plant. When the entire plant is running, the scale reading at cutoff shall not vary from the weight designated by the Engineer more than 1 percent for cement, Pozzolan or Cement Pozzolan, $1 \frac{1}{2}$ percent for any size of aggregate, nor 1 percent for the total aggregate in any batch.

When proportioned at a central mixing plant there shall be an approved moisture meter,

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accurate within 1/2 percent, installed to indicate the moisture in the fine aggregate.

A concrete mix design carrying the producer's designated mix number of the concrete being furnished under these specifications shall be submitted to the Contracting Agency at least once each year. In the event there is any change in the source of material, another mix design shall be submitted.

725.8 MIXING:

Machine mixing will be required in all cases other than those in which it would obviously prove to be impractical; in which latter event hand mixing will be permitted, only to the extent necessary. Regardless of the method employed, mixing shall be commenced as soon as possible after the cement is placed in contact with the aggregates.

The temperature of materials as charged in the mixer shall be such that the temperature of the mixed concrete at the time it is placed in final position does not exceed 90°F. When the atmospheric temperature at the time of placing concrete is less than 40°F the temperature of the concrete, as placed, shall not be less than 60°F.

All concrete mixers shall be of such design and construction, and so operated, as to provide a thoroughly and properly mixed concrete in which the ingredients are uniformly distributed.

725.8.1 Paving and Stationary Mixers: Paving and stationary mixers shall comply with the standards of the Concrete Plant Manufacturer's Bureau and the certification requirements of the Arizona Rock Products Association. They shall be equipped with an accurate automatic timing device so designed and constructed as to lock the discharge lever before aggregate, cement and Pozzolan enter the drum, and release such lever only after the specified mixing time has elapsed. The regulation of the setting of said device shall be under the supervision of the Engineer. Water control equipment as described in this specification shall also be provided with each concrete mixer.

Mixers shall be maintained in proper and serviceable working condition, and any part or portion thereof that is out of order, or becomes worn to such extent as to detrimentally affect the quality of mixing, shall be promptly repaired or replaced.

The proper proportions of aggregate, cement, Pozzolan and water for each batch of concrete shall be placed in the mixer, and shall be mixed for a period of not less than 50 seconds after all such materials are in the drum.

The rotating speed at which the mixer shall be operated shall conform to that recommended by the manufacturer.

The total volume of materials mixed in any one batch shall neither exceed the water level capacity of the mixer nor the manufacturer's catalog rated capacity of the mixer.

725.8.2 Transit Mixers: Transit mixers shall be high quality equipment and meet the

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requirements of the Truck Mixer Manufacturer's Bureau and the certification requirements of the Arizona Rock Products Association. Ready mix concrete shall comply with ASTM C-94 except as herein specified.

The total elapsed time between the addition of water at the batch plant and depositing the complete mix shall not exceed 90 minutes. Each mixer and agitator shall have attached thereto in a prominent place a metal plate or plates, installed by the manufacturer, on which is plainly marked the capacity of the drum in terms of the volume of mixed concrete and the speed of rotation for the agitating and mixing speeds of the mixing drum or blades.

Each mixer shall have an identification number painted on the truck in such a location that it can be easily read from the batching platform.

The total volume of materials introduced into the mixer for mixing purposes shall not exceed the manufacturer's guaranteed mixing capacity. If the concrete so mixed does not meet the uniformity requirements of this section, the amount of materials charged into the mixer shall be reduced.

The rotation speed at which the mixer shall be operated shall conform to that recommended by the manufacturer.

The total volume of materials mixed in any one batch shall neither exceed the water level capacity of the mixer nor the manufacturer's catalog rated capacity of the mixer.

Each batch of concrete placed in the mixer shall be mixed for not less than 70 nor more than 100 revolutions of the drum or blades, at the speed designated by the manufacturer of the equipment as mixing speed. Additional mixing shall be at the agitating speed designated by the manufacturer of the equipment. The revolving of the drum shall be continuous until the concrete is completely emptied from the drum. Before any portion of the materials for any batch of concrete is placed therein, the drum of the mixer shall be completely emptied of the previously mixed batch.

At the time of delivery to the job site, the Engineer shall be provided with a legible weighmaster's weigh master's certificate (delivery ticket) which shall contain the following information:

Date and Truck Number.

Name of the Supplier.

Name of the Contractor.

Specific designation of job (name and location).

Number of cubic yards in the batch.

Type of cement.

Type of Pozzolan, if any.

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Time the transit mixer is loaded.

Amount of water added at the job site at request of receiver, and his signature or initials.

Suppliers' mix design code number.

Type and amount of admixture, if any.

Serial number of the ticket.

The type, capacity and manner of operation of the mixing and transporting equipment for ~~ready-mix~~ ready mix concrete shall conform to the current Standards for Operation of Truck Mixers and Agitators of the National ~~Ready-Mixed~~ Ready Mixed Concrete Association and the Truck Mixer and Agitators Standards of the Truck Mixer Manufacturer's Bureau. Water shall not be added to the batch during transit. Additional water may be added at the point of discharge to adjust slump providing the slump after such water addition does not exceed the maximum allowed by these specifications and that water so added is mixed into the batch for a minimum of 30 additional revolutions at mixing speed. Loss of cement mortar during discharge which in the opinion of the Engineer would be of sufficient amount to affect the homogeneity of the concrete will be cause for rejection of the load. The Contractor shall be responsible for all concrete to which water is added at the job site.

725.8.3 Hand Mixed Concrete: Hand mixed concrete shall be prepared on a watertight level platform in batches of not to exceed 1/3 cubic yard each. The required amount of coarse aggregate shall first be spread on the platform in an even and uniform layer, over which the proper proportion of fine aggregate shall then be likewise spread. The combined depth of both such layers shall not be greater than one foot. The required quantity of cement shall then be evenly distributed over the fine aggregate; following which the entire batch shall be turned with shovels at least twice before the water is added. The proper amount of water shall then be uniformly sprinkled or sprayed over the batch, which shall thereafter be returned with shovels not less than 3 times before being removed from the platform.

725.8.4 ~~Drybatched~~Dry batched Unmixed Concrete: Should the Contractor elect to use ~~drybatched~~dry batched unmixed concrete, an accurate automatic batch weight recorder shall be provided to record the quantities of cement, aggregate and water batched into the containers; the weight of cement shall be recorded on either a separate charge from the aggregate or on the same chart using a separate needle. The recorder shall produce an autographic readable record on a visible chart of the weights of each of the materials batched. After batching, the needle on the chart shall return to zero. The chart scale along the ordinate shall be such that the major portion of the chart is used to record the total weights of the aggregates and water, and the cement. The date of batching, the container number and the batching certificate number shall be recorded on the recorder chart at the time of batching. The recorder charts, or copies thereof, shall become the property of the Contracting Agency and shall be submitted upon

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request.

All ~~drybatched~~dry batched unmixed concrete delivered to the job site shall be stored in containers so constructed that the cement cannot come in contact with the water and aggregate within the container. Any admixture added to powder form shall be added to the cement; added in liquid form, it shall be added to the water.

The contents of the container shall be discharged into a mixer at the job site. Following discharge of the first container into the mixer, the mixer shall be operated at mixing speeds during the discharge of the remaining containers. After the contents of the last container have been discharged into the mixer, the concrete shall be mixed as specified in this specification for transit mixers, and drum or turbine type mixers.

Any spillage of cement, aggregate, water or admixture during the filling, transporting, or the discharging of the container, shall be cause for rejection of the container or the contents of the mixer if any portion of the rejected container is discharged into the mixer.

725.9 LOADING AND TRANSPORTATION OF MATERIALS AND MIXED CONCRETE:

The compartments of trucks or other equipment used for the purpose of transporting proportioned aggregates, bulk cement or mixed concrete, shall be sufficiently high and tight, and otherwise suitably constructed and adequately protected, to prevent loss or leakage of the contents thereof during transit or charging.

725.10 TESTS AND TEST METHODS:

~~Concrete specimens for compression tests will be taken in the field by a representative of the Engineer in accordance with ASTM C-172 and C-31 or AASHTO T-23, except as noted hereinafter.~~

725.10.1 Concrete shall be sampled in accordance with ASTM C172 for determination of temperature, slump, unit weight and yield (when required) and air content (when required) as well as for fabrication of test cylinders for compressive strength determination at 28 days. Samples shall be of sufficient size to perform all the required tests and fabricate the necessary test cylinders but in no case less than 1 cubic foot. Concrete shall be sampled during discharge of the middle portion of the batch. At the discretion of the Agency and/or Engineer or his representative, a sample may be obtained at the beginning of the discharge if the properties of the concrete do not appear to be within the specification limits for slump or temperature. All testing shall be done by a certified technician meeting the requirements of the ACI Concrete Field Testing Technician, Grade I.

Temperature of the concrete mixture will be determined in accordance with ASTM C1064. Slump of the concrete mixture will be determined in accordance with ASTM C143. Air content of the concrete mixture (when required) will be determined in

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accordance with ASTM C231 or C173, whichever is applicable. Unit weight and yield of the concrete mixture (when required) will be determined in accordance with ASTM C138. All compressive strength test specimens will be made, cured, handled, protected, and transported in accordance with the requirements of ASTM C31. The contractor shall provide and maintain for the sole use of the testing laboratory/technician adequate facilities for safe storage and proper curing of concrete test cylinders on the project site including sufficient access on weekends and holidays to allow the timely pick-up of cylinders specimens. Any and all deviations from the standard procedure of any test method shall be promptly identified and corrected. Any deviations shall be clearly noted by the testing laboratory on all written reports. Testing results obtained from non-standard testing procedures may be considered invalid and discarded by the Agency and/or Engineer.

~~Concrete samples shall be taken from the approximate middle 50 percent of the batch in an uninterrupted stream from the chute directly into the wheelbarrow or similar equipment. Where excessive slump is suspected, a controlling slump test may be made from any portion of the batch, except for the approximate 5 percent on each end of the discharge. If excessive slump is verified, at any time, the remainder of the load shall be rejected and removed from the project and a set of cylinders for compressive strength shall be taken from the batch, if any concrete from the batch was placed. The rate of discharge of the batch shall be regulated by the rate of revolutions of the drum and not by the size of the gate opening. Specimens for compression tests shall be stored in the field in accordance with methods approved by the Contracting Agency and protected from vibration and other disturbances, for a minimum of 28 hours and maximum of 76 hours. A maximum storage period would be involved only where weekends or holidays are involved. Cylinders stored in the field for the maximum period shall have the same validity as cylinders that have been stored overnight and brought in the following day.~~

725.10.2 In accordance with ACI 318 Chapter 5 Section 5.6.2.4, a cylinder strength test shall be the average of the strengths of at least two 6 inch by 12 inch cylinders or at least three 4 inch by 8 inch cylinders made from the same sample of concrete and tested at 28 days. An adequate number of cylinder specimens will be made for each 50 cubic yards or not less than each half-day's placement of each class of concrete. All specimens will be tested in a laboratory approved by the Agency and/or Engineer in accordance with ASTM C39 for concrete acceptance. Should an individual cylinder show evidence of improper sampling, molding, curing, or testing, the results shall be discarded and the compressive strength shall be the result of the average of the remaining cylinder(s). Additional cylinder specimens may be made and tested at other ages to obtain additional compressive strength information and may not be considered as acceptance tests.

~~Not less than 4 cylinder specimens will be made for each 50 cubic yards of each class of concrete with a minimum of 4 specimens for each class placed or not less than 4 specimens for each half-day's pour. Specimens will be tested in a laboratory designated by the Engineer in accordance with ASTM C-39 at the expense of the Contracting Agency.~~

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~~Two cylinders shall be tested at 14 days. If their strength meets or exceeds the minimum 14-day requirements, the Contracting Agency will accept the concrete. The Engineer may test the other two cylinders at 28 days or discard at 60 days.~~

~~If this strength does not meet the 14-day requirement, the Contractor shall schedule and pay for two cores to be taken, on the 29th day, from the area of concrete represented by the cylinders. The Engineer shall be present when the coring is accomplished or additional cores will be required.~~

~~The Engineer will test the remaining two cylinders on the 28th day. If this test meets or exceeds the 28-day minimum compressive strength requirement, the Contracting Agency will accept the concrete and the Contractor may cancel the scheduled coring.~~

725.10.3 If the 28-day strength test does not meet the compressive strength requirements, the contractor may choose to contest the compressive strength results of any test for purposes of acceptability or payment. This may involve an engineering study to determine the acceptability of the concrete in question or core testing to determine in-place concrete strengths. If core testing is performed, at least three representative cores shall be obtained, conditioned and tested in accordance with ASTM C42 from each concrete member or area of concrete to be tested at locations designated by the Agency and/or Engineer. Cores damaged subsequent to or during removal shall be rejected and additional core samples taken. Cores must be obtained and delivered to a laboratory acceptable to the Agency and/or Engineer in time to allow complete strength testing within 48 days of original concrete placement. The contractor may elect to have a representative present during sampling and testing. A core strength test shall be the average of the results of the three cores. Should an individual core show evidence of improper sampling, curing, or testing, the results shall be discarded and the compressive strength shall be the result of the average of the remaining core(s). Results of the core strength testing will replace the results of the cylinder strength test for that sample.

~~If the 28-day cylinder test does not meet the minimum 28-day compressive strength requirement, the cores will be tested in accordance with ASTM C-42 in a laboratory designated by the Contracting Agency. If the cores meet or exceed the minimum 28-day strength, the concrete will be accepted by the Contracting Agency.~~

~~If the strength of the 28-day cylinders and the strength of the cores as calculated in accordance with ASTM C-42 are deficient, the Contractor shall remove all of the concrete represented by the failing test specimens with the exception that if the Contractor believes that the deficient concrete was confined to a single batch, he may immediately cut a minimum of 4 additional cores, two on either side of the affected batch. The cores would be compared with the minimum specified compressive strength, for the purpose of defining the confines of the deficient concrete. All coring done to establish this premise would be at the expense of the Contractor. Evaluation of the cores shall be by the Engineer, or by a substitute agent designated by the Contracting Agency, and his decision shall be final.~~

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725.11 ACCEPTANCE:

Concrete represented by a cylinder strength test obtained in accordance with section 725.10.2 shall be acceptable if the 28-day strength meets or exceeds the specified design strength. Concrete achieving at least 85% of the specified 28-day strength will be evaluated by the Agency and/or Engineer for acceptability. Core strength tests obtained in accordance with section 725.10.3 shall be considered satisfactory if their average is equal to or greater than 85 percent of the specified strength and no single core is less than 75 percent of the specified strength. If the core strength test meets or exceeds the minimum 28-day strength, the concrete will be accepted by the Agency at full contract price. All concrete failing to meet the acceptability requirement as evidenced by tests of either standard cylinder or drilled core specimens shall be rejected, removed and replaced by the Contractor at the contractor's expense, unless the Contractor can submit evidence that will indicate to the Agency and/or Engineer that the strength and quality of the concrete is such that the concrete should be considered acceptable and be allowed to remain in place.

When concrete is accepted on the basis of cylinder or core strength tests of less than 100% of the required minimum 28-day compressive strength, an adjustment in the concrete unit price may be made for the quantity of concrete represented by such strength tests in accordance with the following schedule:

Adjustment in Concrete Unit Price Based on Cylinder or Core Strength Testing

<u>Percent of Specified Minimum 28-day Compressive Strength Attained (Nearest 1%)</u>	<u>Percent of concrete Unit Price Allowed</u>
<u>100 % or greater</u>	<u>100</u>
<u>95-99</u>	<u>95</u>
<u>90-94</u>	<u>90</u>
<u>85-89</u>	<u>85</u>

~~Concrete represented by a strength test of at least 95% of the required 28-day compressive strength will be acceptable. All concrete failing to meet this requirement as evidenced by tests of either standard cylinder or drilled core specimens shall be rejected, removed and replaced by the Contractor at the Contractor's expense.~~

~~When concrete is accepted on the basis of strength tests of less than 100% of the required minimum 28-day compressive strength, an adjustment in the contract unit price~~

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will be made for the quantity of concrete represented by such strength tests in accordance with the following schedule:

Adjustment in Contract Unit Price for Strength Deficiency

Percent of Specified Minimum 28-Day Compressive Strength Attained (Nearest 1%)	Percent of Concrete Unit Price Allowed
100% or greater	100
98-99	90
96-97	85
95	80