

**Item No. 424S
Prestressed Concrete Planks**

424S.1 Description

This item shall govern furnishing materials, the construction and erection of precast prestressed concrete members in accordance with the details indicated on the Drawings, reviewed Shop Drawings and these specifications.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses.

424S.2 Submittals

The submittal requirements of this specification item include:

- A. Concrete mix design.
- B. Reinforcement details and placement Drawings.
- C. Curing materials, methods and equipment,
- D. Erection plan and Drawings.

424S.3 Materials

(1) Concrete

Concrete shall be Class H and conform to Item No. 403S, "Concrete for Structures". The minimum release strength shall be 3500 psi (24 mPa).

(2) Reinforcement

Reinforcing steel shall conform to Item No. 406S, "Reinforcing Steel".

(3) Prestressing

Prestressing shall conform to the most current version of TxDOT Item No. 426, "Prestressing". The prestressing steel shall be 1/2 inch (12.7) diameter 270K 7 wire stress relieved, high tensile steel strand conforming to ASTM A 416.

424S.4 Construction Methods

(1) Curing

Careful attention shall be given to the proper curing of concrete. The Contractor shall inform the Engineer or designated representative regarding the methods and procedures proposed for curing, shall provide the proper equipment and necessary

materials and have approval of the Engineer or designated representative of such methods, equipment and materials prior to placing concrete.

Inadequate curing facilities or lack of attention to the proper curing of concrete shall be cause for the Engineer or designated representative to stop all construction until approved curing is provided. Inadequate curing may be cause for rejection of the member.

Curing shall be commenced prior to the formation of surface shrinkage cracks but in no case delayed longer than 1 hour after the concrete has been placed in forms.

An approved water or membrane cure, when permitted, shall be used as an interim measure prior to elevated temperature or other methods of curing.

Concrete shall be cured continuously except as provided for form removal, until the concrete strength as indicated by compressive test of cylinders cured with the members, has reached the "Release Strength" or "Handling Strength" indicated. Members shall be covered to prevent rapid drying for a period of 72 hours after release of stress or after reaching handling strength. All members shall be protected from freezing during the above period.

A period not to exceed 4 hours will be permitted for removal to a storage area prior to resuming the balance of curing and protection required.

A curing day is defined as a calendar day when the temperature, taken in the shade away from artificial heat is above 50°F (10°C) for at least 19 hours or for colder days, if satisfactory provisions are made to maintain the temperature at all surfaces of the concrete above 50°F (10°C) for the entire 24 hours.

All concrete shall be steam or water cured, except that membrane curing may be used as interim curing on the top surface of concrete piling. Only Type 1 membrane curing compound will be permitted for interim curing.

(a) Water Curing

All exposed surfaces of the concrete shall be kept wet continuously for the required curing time. The water used for curing shall meet the requirements for concrete mixing water as specified in Item No. 403S, "Concrete for Structures". Seawater will not be permitted. Water, which stains or leaves an unsightly residue, shall not be used.

Water curing will be permitted as follows:

1. Wet Mat Method

For water curing by wet mat method, cotton mats, polyethylene sheeting or polyethylene burlap blankets may be used.

The mats, sheets or blankets shall not be placed in contact with prestressed concrete member until such time that damage will not occur to the surfaces.

The mats, sheets or blankets shall be adequately anchored and weighted to provide continuous contact with all concrete surfaces. Any concrete surfaces, which cannot be cured by contact, shall be enclosed by mats,

adequately anchored, so that outside air cannot enter the enclosure. Sufficient moisture shall be provided inside the enclosure to keep all of the surfaces of the concrete wet for the required curing time.

2. Water Spray Method

For water curing by the water spray method, overlapping sprays or sprinklers shall be used so that all concrete surfaces are kept wet continuously.

(b) Elevated Temperature Curing

Curing by elevated temperatures will be permitted as follows:

1. Steam Curing

(Steam curing is defined as use of steam above 85°F (29°C) for curing.) When steam curing of concrete is provided, the temperature inside the curing jacket at the surface of the concrete shall not exceed 165°F (74°C) for more than 1 hour during the entire steam-curing period. Concrete exposed to temperatures exceeding 180°F (82°C) will not be accepted.

Sufficient moisture shall be provided inside the curing jacket so that all surfaces of the concrete are wet.

An unobstructed air space of not less than 6 inches (150 mm) shall be provided between all surfaces of the concrete and the curing jacket. Steam outlets shall be positioned so that live steam is not applied directly on the concrete, reinforcing steel or tendons.

The location of steam lines, location of control points for discharge of steam into the curing jacket, and the number and type of openings for steam distribution within the curing jacket shall be arranged so that temperature variation between any points in the enclosure shall not exceed 20°F (-7°C).

Steam curing shall not commence until the concrete has been in place a minimum of 3 hours.

During the application of steam, the temperature inside the curing jacket shall be raised uniformly at a rate not to exceed 40°F (4°C) per hour.

Temperature decrease at the end of the curing operation shall not exceed the same rate.

When elevated temperature curing is used, members shall remain protected until the differential between the temperature inside the curing jacket and the outside air is not more than 25°F (-4°C).

2. Alternate Methods

Other methods of elevated temperature curing may be permitted by the Engineer or designated representative provided temperature maximums, rate of temperature variation, humidity control, etc. are in accordance with the requirements for steam curing. Permission shall be obtained from the

Engineer or designated representative, in writing, for use of any alternate method.

424S.5 Handling, Hauling and Erection

The Contractor shall be responsible for proper handling, lifting, storing, hauling and erection of all members so that they may be placed in the structure without damage.

Unless approved on erection and/or shop drawings, prestressed members shall be maintained in a flat position at all times and shall be picked up and supported near the ends of the member in such a way to prevent torsion. Members may be lifted by other methods approved by the Engineer or designated representative in writing.

No member shall be moved from the casting yard until all requirements for curing and strength requirements have been attained.

424S.6 Defects and Breakage

Failure of individual wires in a 7 wire strand or of wires in a parallel wire tendon is acceptable provided the total area of wire failure is not more than 2 percent of the total cross sectional area of tendons in any member. Failure of entire strand will be subject to structural review.

Fine hair cracks or checks on the surface of the member which, as determined by the Engineer, do not extend to the plane of the nearest reinforcement will not be cause for rejection unless they are numerous and extensive. Diagonal cracks, which indicate damage from torsion, will be subject to a structural review prior to acceptance. Vertical or horizontal cracks, which are 1/16 inch (1.6 mm) or less to the concrete, are acceptable. Cracks in excess of this are subject to review prior to acceptance.

Cracks, which extend into the plane of the reinforcing steel and/or prestressed tendons, but are acceptable otherwise, shall be repaired by sealing with a latex-base adhesive, grout or with epoxy.

Small damaged or honeycombed areas, which are purely surface in nature, (not over 1 inch (25 mm) deep) may be repaired. Damage or honeycomb in excess of this will be tentatively rejected, but will be subject to structural review.

424S.7 Quality of Work

Concrete shall be placed in the forms and spaded, tamped or vibrated until thoroughly compacted and until it entirely covers the surface and has a monolithic finish. The top surface shall be floated and troweled to a uniform smooth surface, then finished with a camel hairbrush or wood float to a gritty texture. The outer edges and joints shall be rounded with approved tools to the radius indicated.

424S.8 Measurement

The work performed and the materials furnished as indicated will be measured by the square foot of top surface area of concrete.

424S.9 Payment

The work performed as indicated will be paid for at the unit price bid per square foot for "Prestressed Concrete Planks", which price shall be full compensation for furnishing and placing all materials, including all reinforcing steel, furnishing and tensioning prestressing steel, for grouting holes and for any other materials, manipulation, transporting, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Pay Item No. 424: Prestressed Concrete Planks _____ Inch x _____ Inch
Per Square Foot.

End

SPECIFIC CROSS REFERENCE MATERIALS
Specification Item No. 424S, "Prestressed Concrete Planks"

City of Austin Standard Specifications

Designation	Description
Item No. 403S	Concrete for Structures
Item No. 406S	Reinforcing Steel.

Texas Department of Transportation: Manual of Testing Procedures

Designation	Description
Tex-426-A	Estimating Concrete Strength by the Maturity Method

American Society for Testing and Materials (ASTM)

Designation	Description
A 416	Steel Strand, Uncoated Seven-Wire for Prestressed Concrete

RELATED CROSS REFERENCE MATERIALS
Specification Item No. 424S, "Prestressed Concrete Planks"

City of Austin Standard Specification Items

Designation	Description
Item No. 405S	Concrete Admixtures
Item No. 410S	Concrete Structures
Item No. 425S	Prestressed Concrete Structures