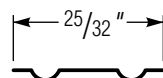


## Concealed DX® Technical Data

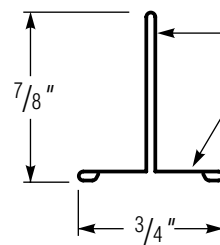
### Features

The DONN Concealed DX ceiling suspension system offers four types of concealed systems to accommodate different requirements of accessibility and flexibility. The *nonaccessible system* is recommended for applications where a monolithic, concealed suspended ceiling is desired, but access to the plenum is not needed. The *single-leaf access system* provides upward access through a single ceiling tile in areas where only limited access is required, such as for valve adjustments. When a larger area for plenum access is needed, the *bi-parting access system* provides quick access through the upward pivot of four adjacent ceiling tiles. In areas permitting only minimum clearances above the ceiling, the *downward access system* provides downward removal of adjacent tiles.

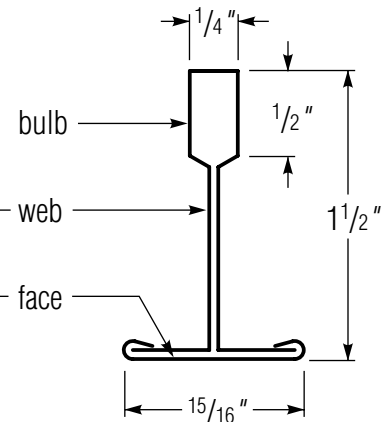
- Two-directional DX suspension systems are assembled with double-webbed, intermediate-duty or heavy-duty main tees and connecting cross tees, in 4'x4' grid modules.
- 1½" intermediate-duty or heavy-duty main tees combine with 1" or 1½" cross tees to meet application requirements.
- Three types of access are offered to meet "percentage of direct access" requirements.
- DX high-tensile steel locking cross tee-ends provide pull-out tension values in excess of 300 lbs.
- With the Quick Release DX Clip, cross tees can be easily removed without tools. Simply rotate the main tee at the cross tee intersection (see Field Service Tip Sheet AC241QRC for details). Tees are reusable; no repairs or rework is required.
- Meets or exceeds national tension and compression requirements.
- DX cross tees can-tilever during installation and will not drop out.
- Standard kerfed and back-cut ceiling tiles available in 12"x12" size to meet application requirements.



Flat Spline

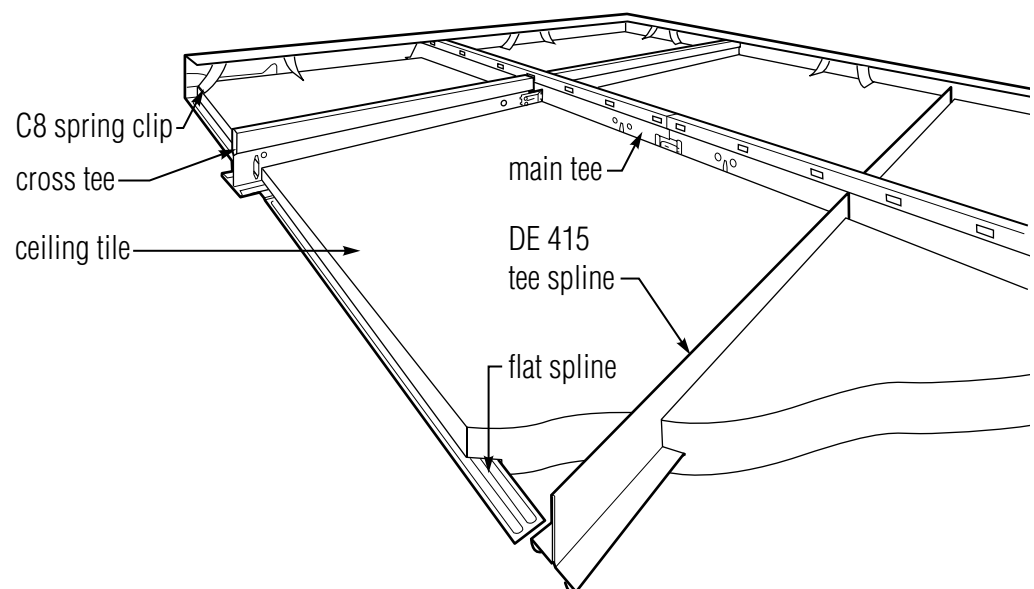


Tee Spline



Main Tee and Cross Tee

All DX access components are compatible with the basic system and each can be installed easily, quickly and economically. The basic direct hung grid assembly readily adapts to various accessibility needs and locations and provides smooth interfacing with recessed lighting and air delivery systems. Fire-rated systems are also available.



## Concealed DX Performance Data

### DX Cross Tee Load Test Data

Cross Tee	Length	Height	Lbs./LF	Tee Spline	Length	Height	Lbs./LF	Access Spline	Length	Height	Lbs./LF
DX 216	2'	1"	17.1	DE 209	2'	½"	N/A	BPA 216	2'	1"	20.0
DX 316	3'	1"	10.1	DE 315	3'	¾"	N/A	BPA 316	3'	1"	6.0
DX 416	4'	1"	5.0	DE 415	4'	¾"	N/A	BPA 416	4'	1"	4.5
DX 422	4'	1½"	8.2	DEN 415	4'	¾"	N/A	BPA 224	2'	1½"	35.0
DX 522	5'	1½"	4.3	DT 416	4'	1"	5.0	BPA 324	3'	1½"	16.0
DX 424	4'	1½"	13.7	<b>Access Spline Length Height Lbs./LF</b>				BPA 424	4'	1½"	6.0
DX 524	5'	1½"	6.4	FCC/FCZ	2'	1½"	N/A	BPA 524	5'	1½"	3.5

### DX Main Tee Load Test Data

Main Tee	ASTM Class	Length	Height	4' Hanger Spacing (Lbs./LF)	5' Hanger Spacing (Lbs./LF)	6' Hanger Spacing (Lbs./LF)
DX 24	Int.	12'	1½"	12.4	6.1	3.6
DX 26	H.D.	12'	1½"	16.3	7.3	4.9

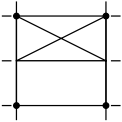
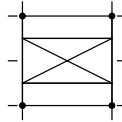
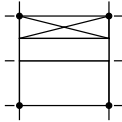
### DX Connection Values in Pounds

Type Intersection	Tension	Compression
Main Tee Splice (DX 24)	320	478
Main Tee Splice (DX 26)	334	888
Cross Tee Connection	351	326

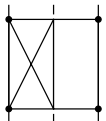
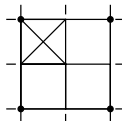
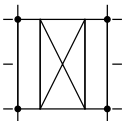
**Note:** All load test data based on 1/360 of the span deflection and as tested per ASTM C635.

## Maximum Fixture Weight

### Main Tee to Main Tee

			
Fixture	24"x48"	24"x48"	12"x48"
Planning Module	48"x48"	48"x48"	48"x48"
Hanger Spacing	48"	48"	48"
DX 24	75 lbs.	70 lbs.	75 lbs.
DX 26	75 lbs.	75 lbs.	75 lbs.

### Cross Tee to Cross Tee

			
Fixture	24"x48"	24"x24"	24"x48"
Planning Module	48"x48"	48"x48"	48"x48"
Hanger Spacing	48"	48"	48"
DX 422	52 lbs.	62 lbs.	40 lbs.
DX 424	70 lbs.	62 lbs.	70 lbs.

**Note:** The above data is based on 48" wire spacing, board weight of 1 lb./sq. ft., maximum deflection of tees not to exceed 1/360 of the span and suspension installed in accordance with ASTM C636.

The DX 416 and 522 cross tees should not be used to support light fixtures without hanger wires.

Fixture weight is based on single fixture only. For end-to-end fixtures or other configurations not shown consult your USG Interiors, Inc. representative or a qualified engineer.

Fixture weights are for nonfire-rated installation only. Consult UL design number for specific fixture location and suspension requirements on fire-rated designs.

Ashlar conditions shall be pinned through the clip.

All sides of light fixtures adjacent to a tee.

Data subject to change.

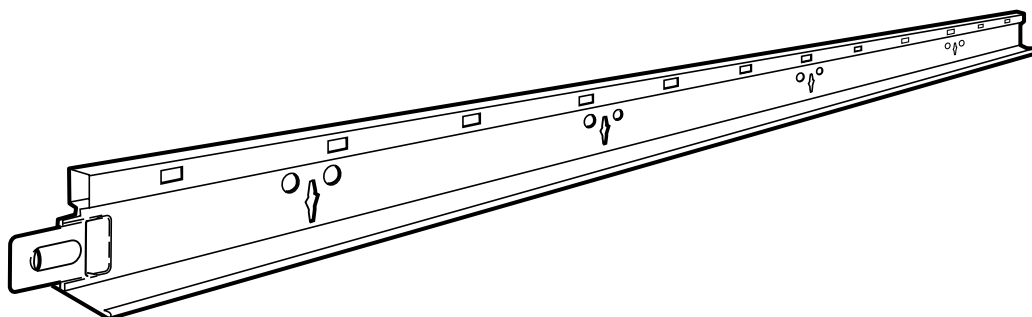
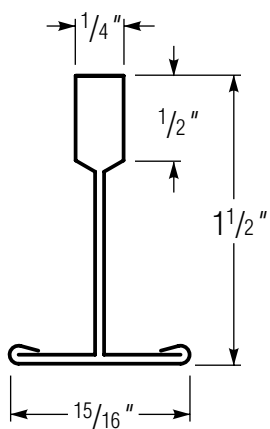
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## Basic System Components—Concealed DX

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### DX 24 Main Tee (12' lengths punched 3" from end and 6" o.c.)

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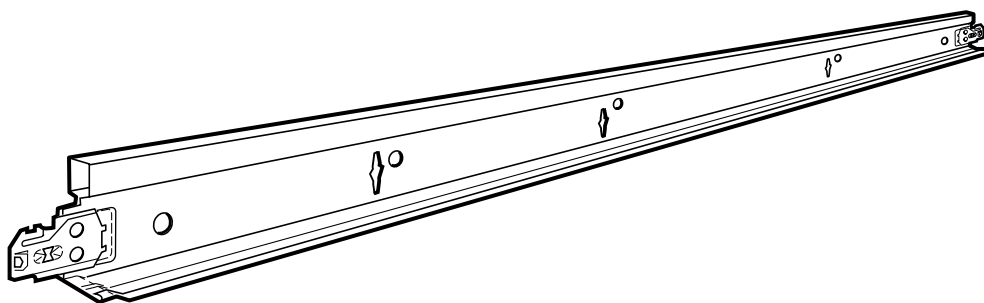
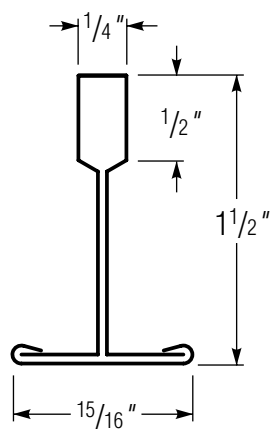


**Note:** Also available in DX 26 heavy-duty.

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### DX 424 Cross Tee\* (4' lengths punched 12" o.c.)

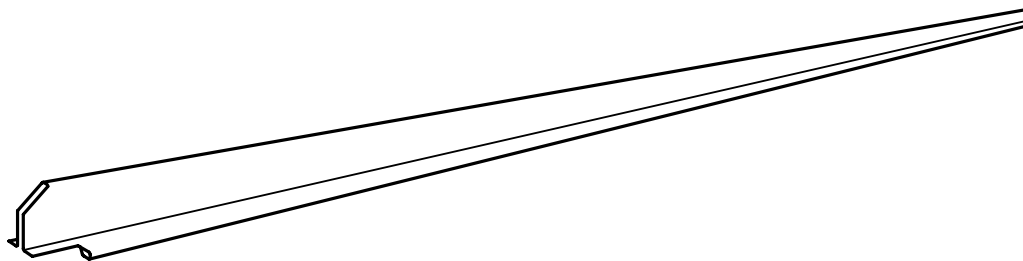
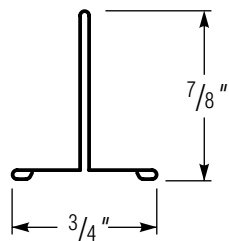
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### DE 415 Tee Spline (4' lengths)

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\*Substitution of DX 422 and DX 416 cross tees can be made to the system shown. Consult performance data and fixture weight sections on page 2 for maximum allowable loading of these components.

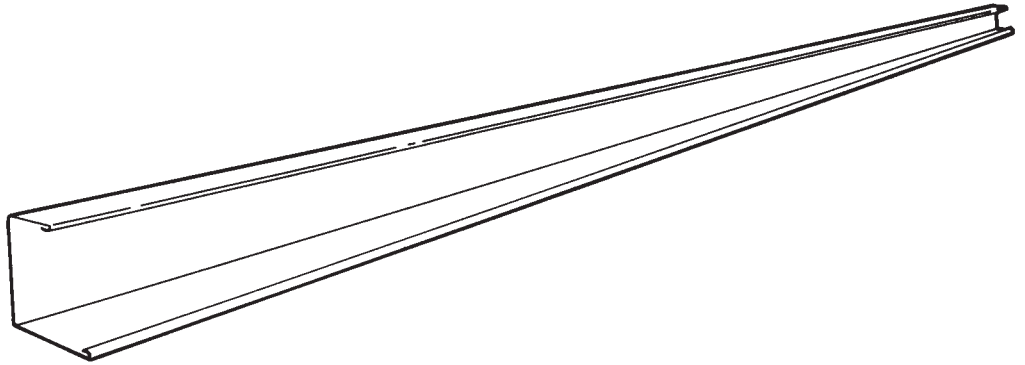
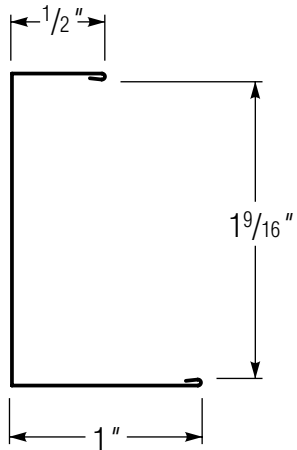
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## Basic System Components—Concealed DX

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### US 25 Wall Molding (10' lengths)

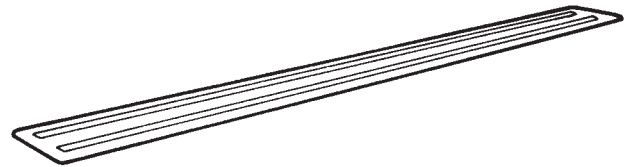
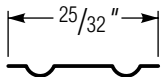
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### E 5 & E 10 Flat Splines

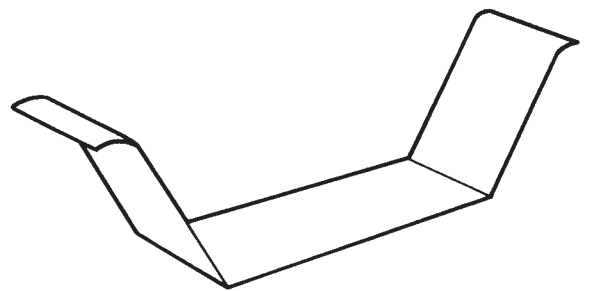
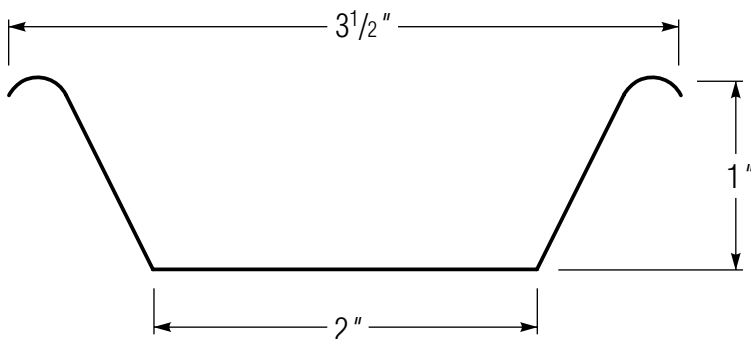
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### C 8 Spring Clip

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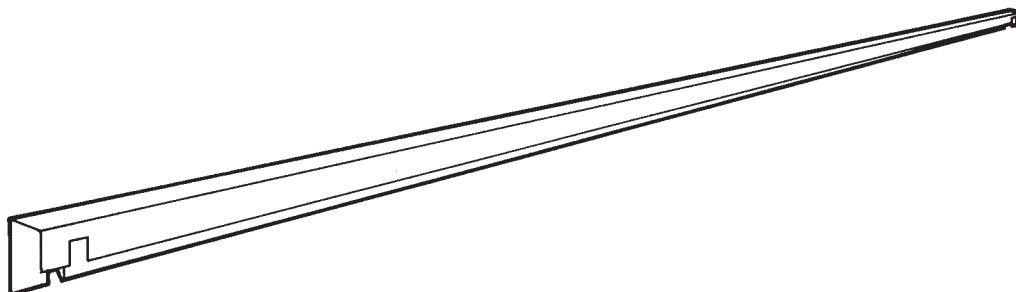
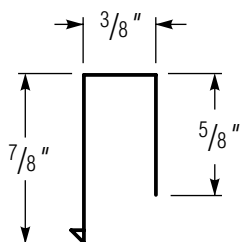
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## Accessory Components—Concealed DX

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### Locking Stabilizer Bar (1', 2', 3', 4', and 5' lengths)

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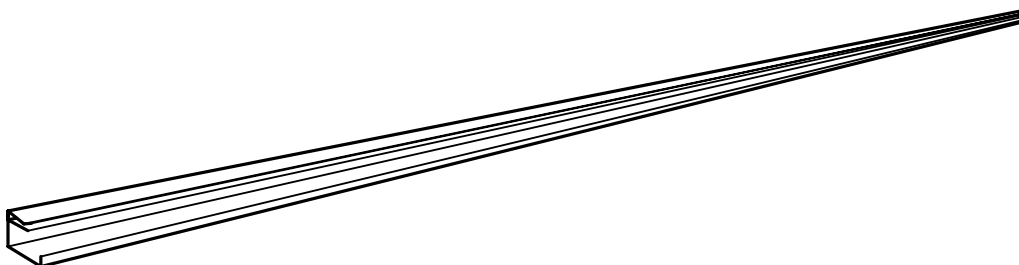
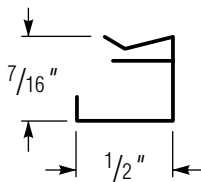


**Note:** Stabilizer bar replaces cross tees in one-directional systems.  
Bars can be locked in place by opening tabs under mounted bulb.

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### Mitered Vinyl Light Frame (1', 2', 3', and 4' lengths)

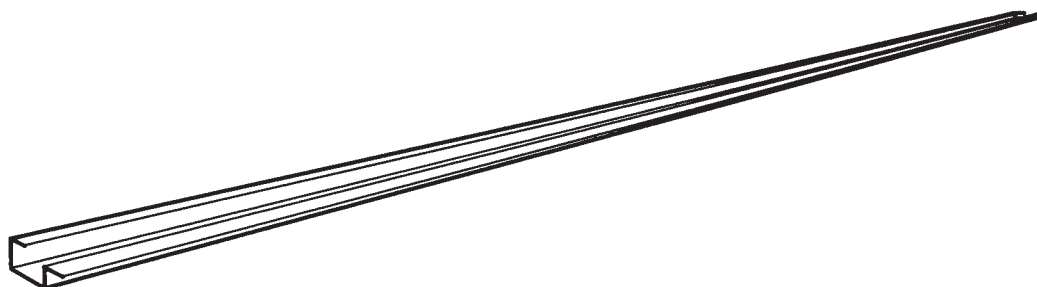
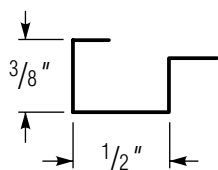
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### Metal Light Frame (1', 2' end lengths; 2' and 4' side lengths)

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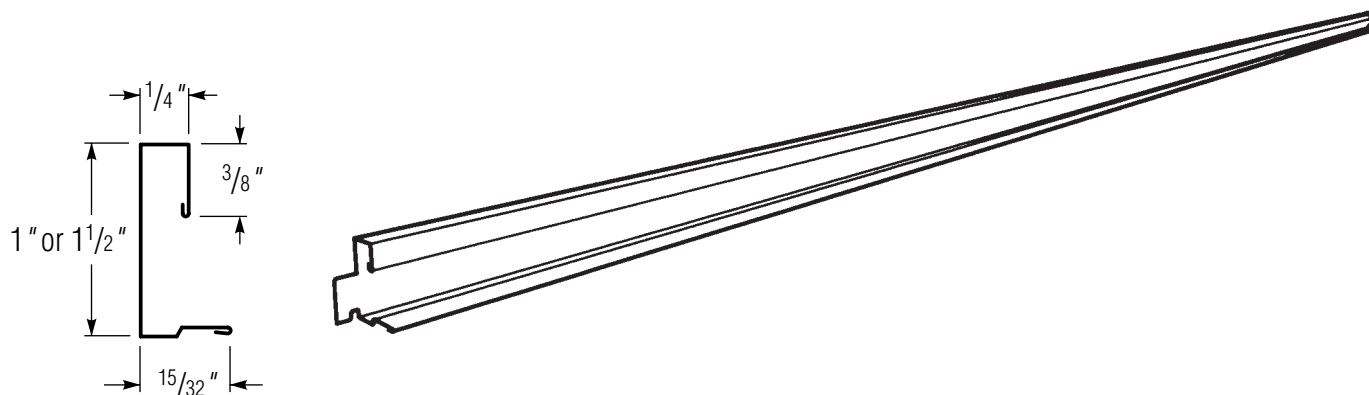
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## Bi-Parting and Single-Leaf Access Components—Concealed DX

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### BPA Access Spline (2', 3', 4', and 5' lengths)

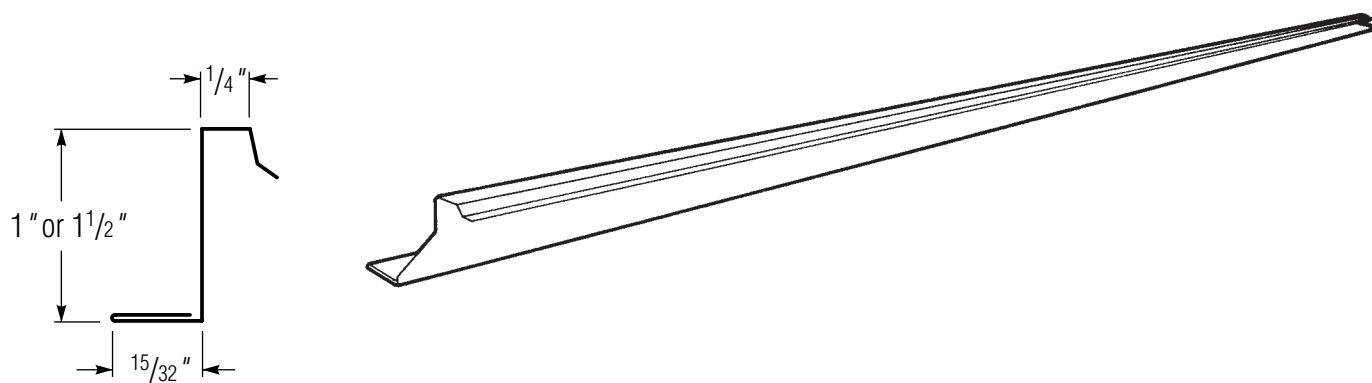
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### BPA Closing Spline (11" and 23" lengths)

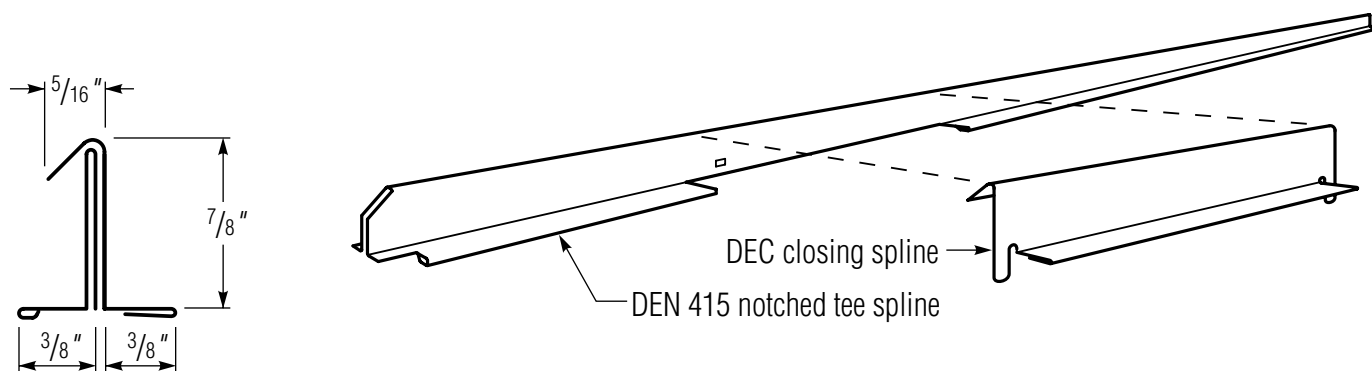
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### DEN 415 Notched Tee Spline & DEC Closing Spline

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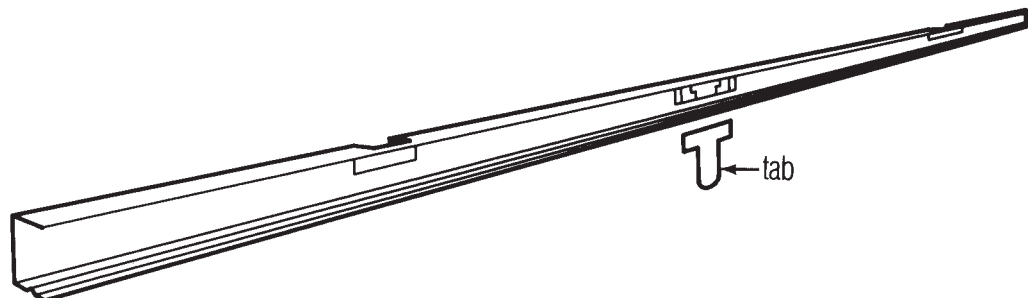
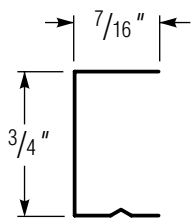
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**Downward Access Components—Concealed DX**

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**FCC Downward C Spline (2' lengths)**

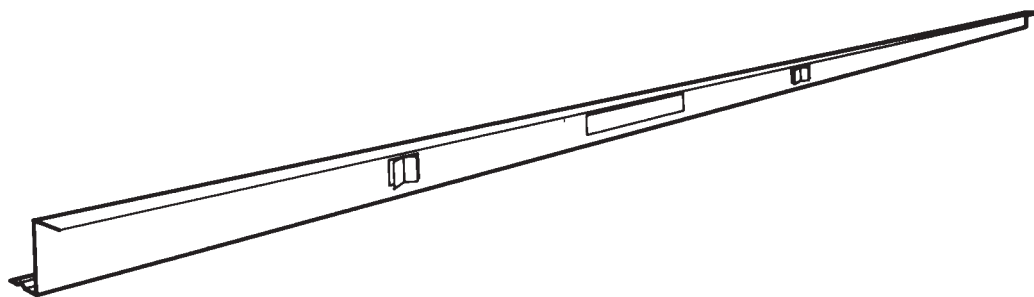
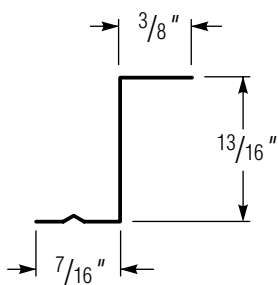
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**FCZ Downward Z Spline (2' lengths)**

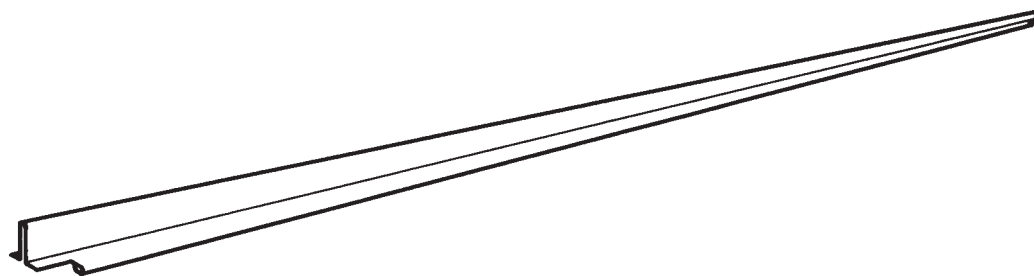
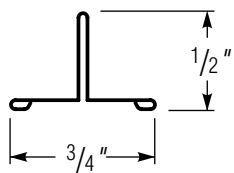
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**DE 209  $\frac{1}{2}$ " Tee Spline (2' lengths)**

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## Applications—Concealed DX

### Reflected Ceiling Plan & Details

**Det. 1** Main Tee and Cross Tee

**Det. 2** DE 415 Spline

**Det. 3** Flat Spline

**Det. 4** Perimeter Detail

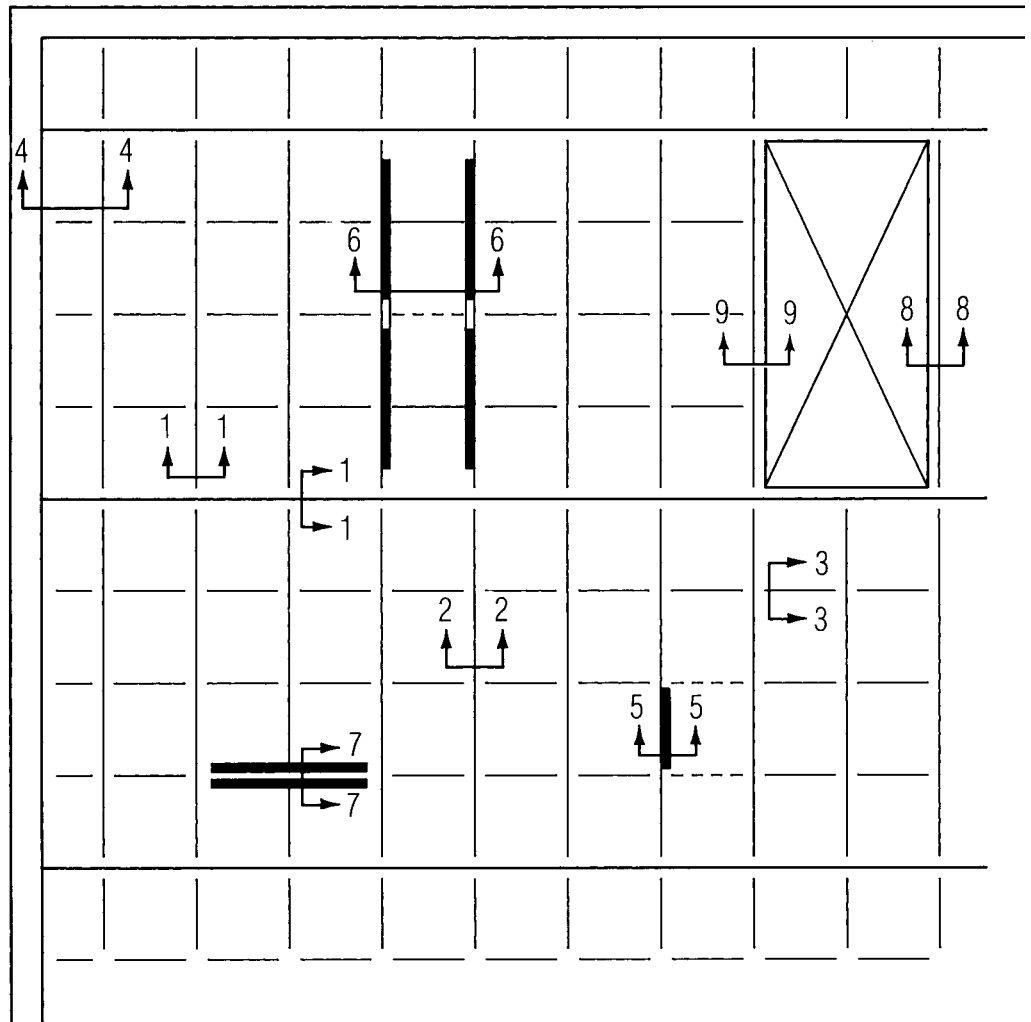
**Det. 5** Single-Leaf Access

**Det. 6** Bi-Parting Access

**Det. 7** Downward Access

**Det. 8** Fluorescent Fixture

**Det. 9** Fluorescent Fixture



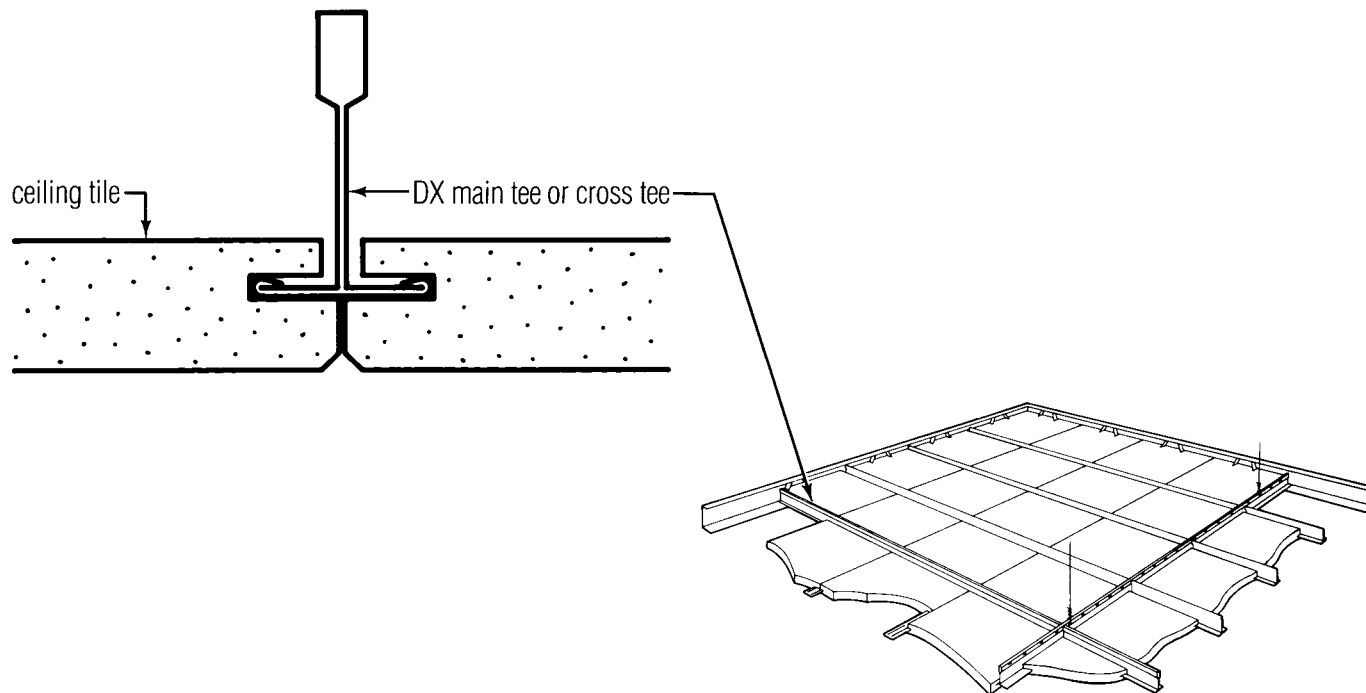


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## Applications—Concealed DX

### Main Tee and Cross Tee

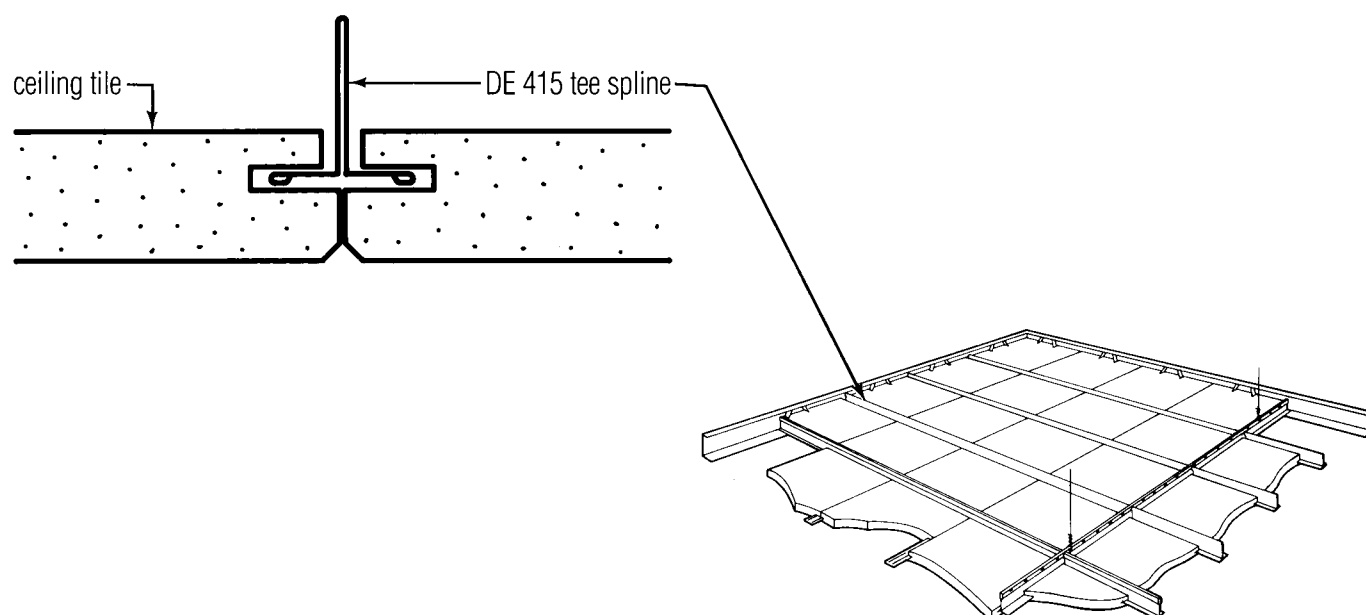
Detail #1



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### DE 415 Tee Spline

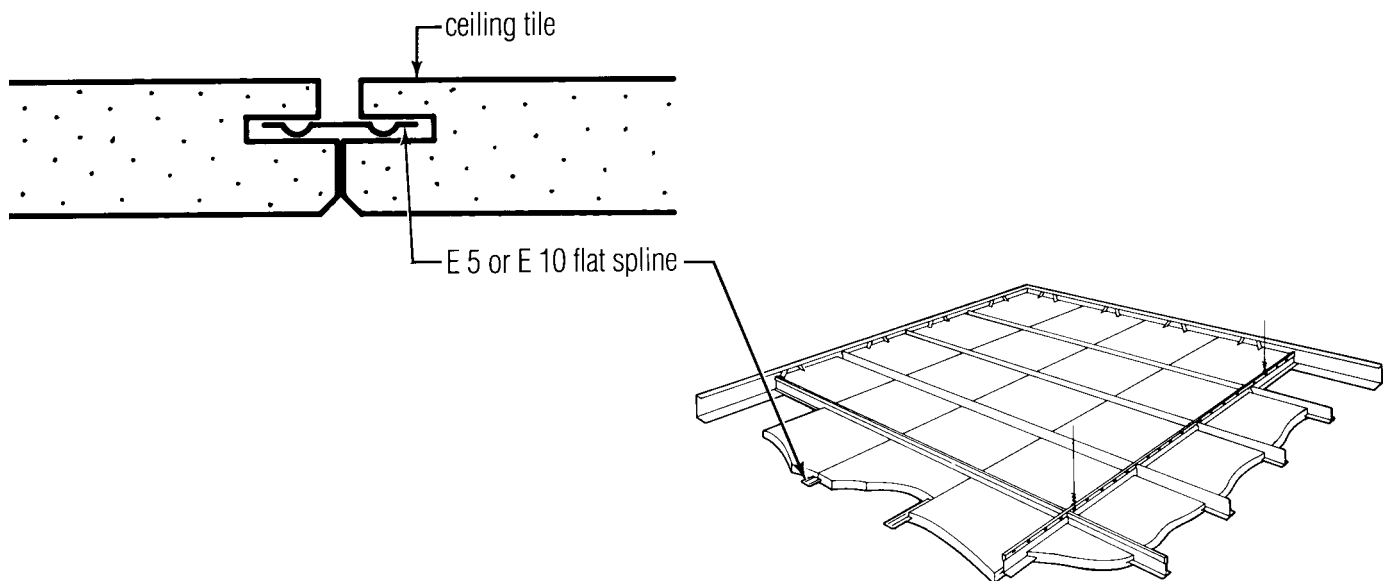
Detail #2



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**Applications—Concealed DX****Flat Spline****Detail #3**

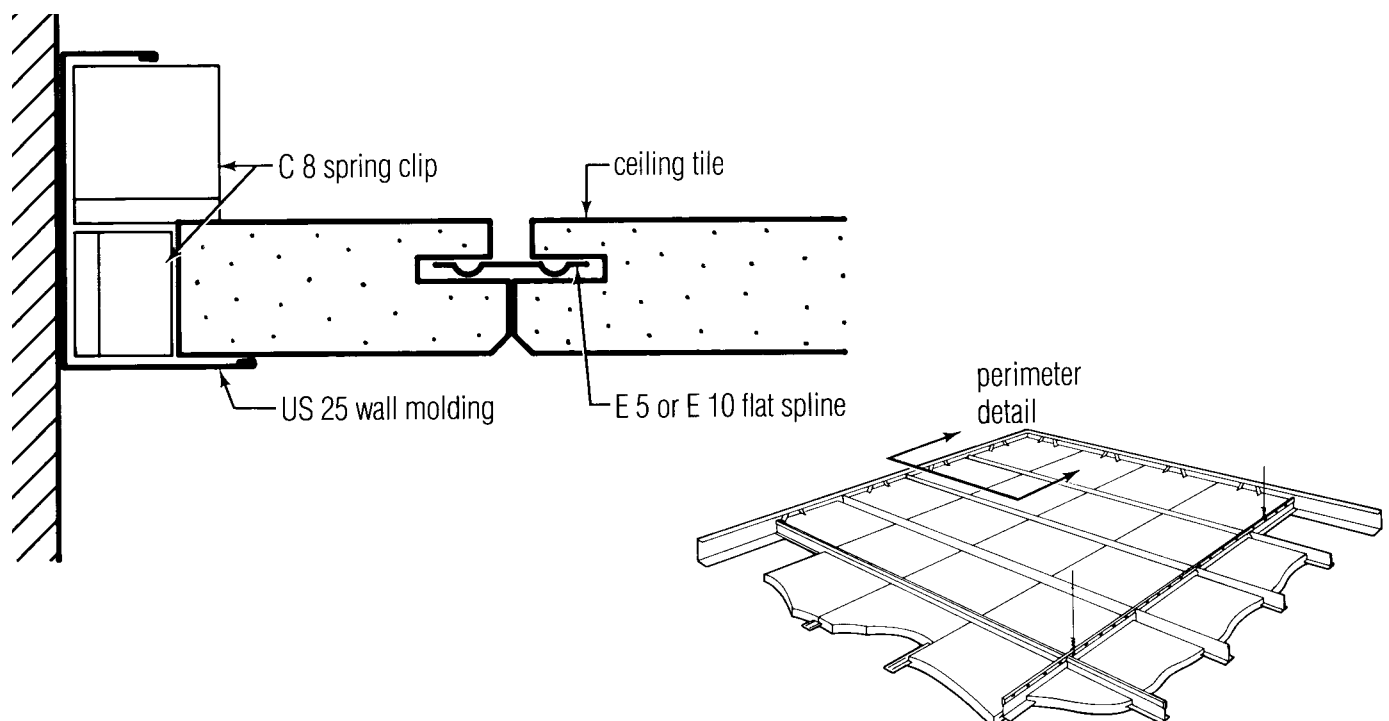
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**Perimeter Detail****Detail #4**

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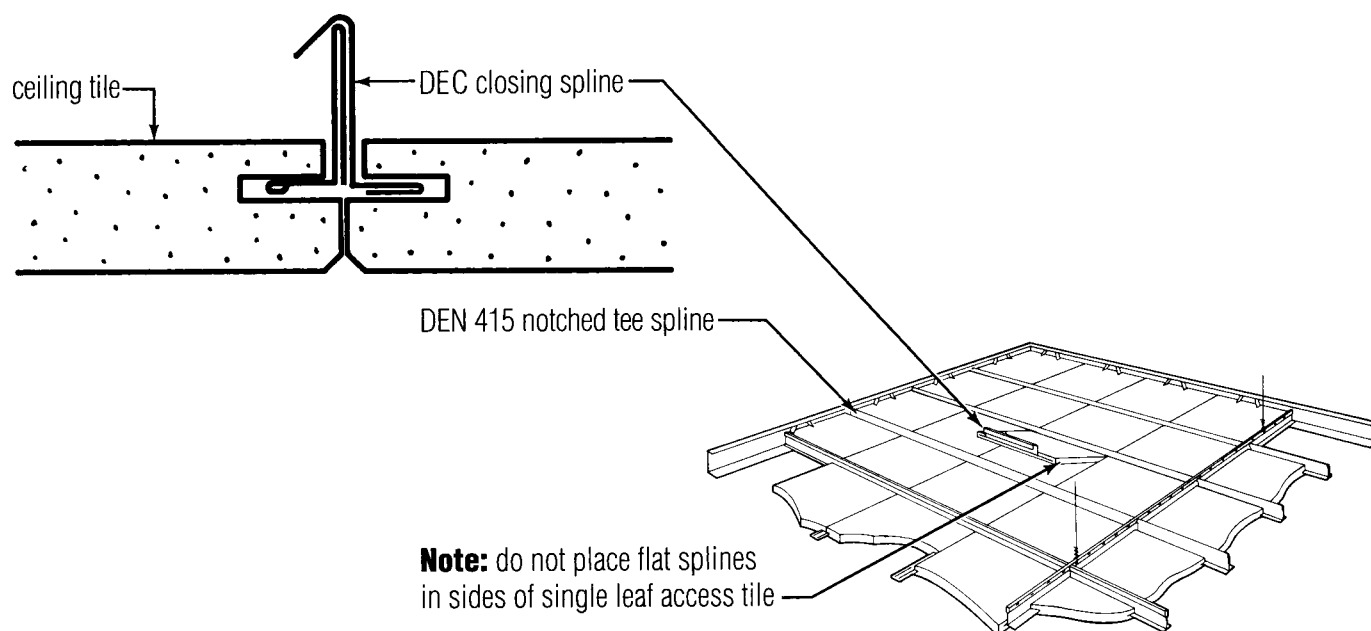


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## Applications—Concealed DX

### Single-Leaf Access

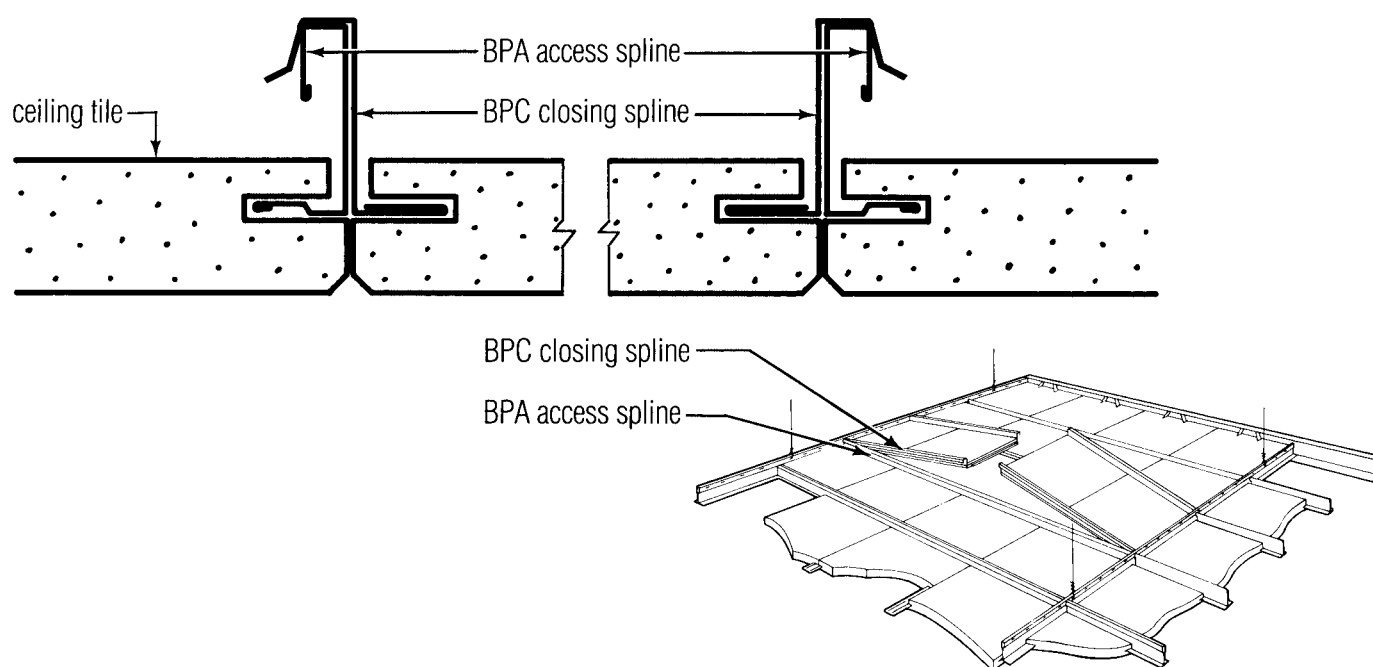
Detail #5



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### Bi-Parting Access

Detail #6

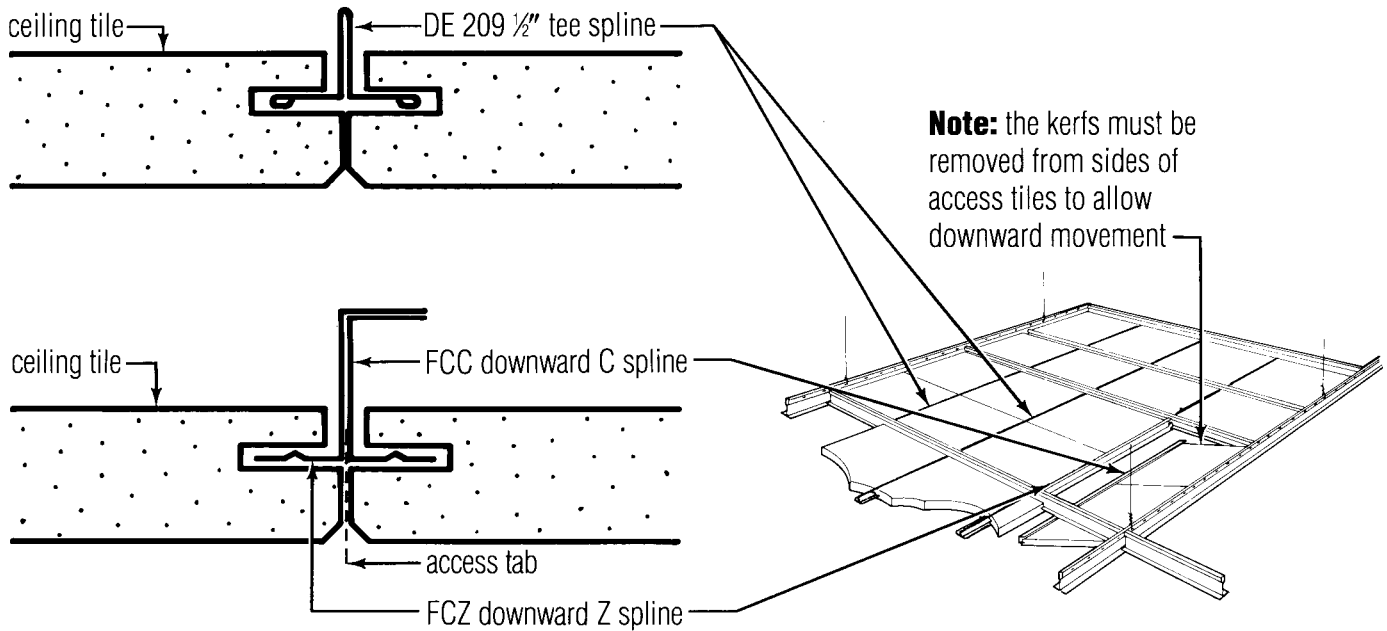


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## Applications—Concealed DX

### Downward Access

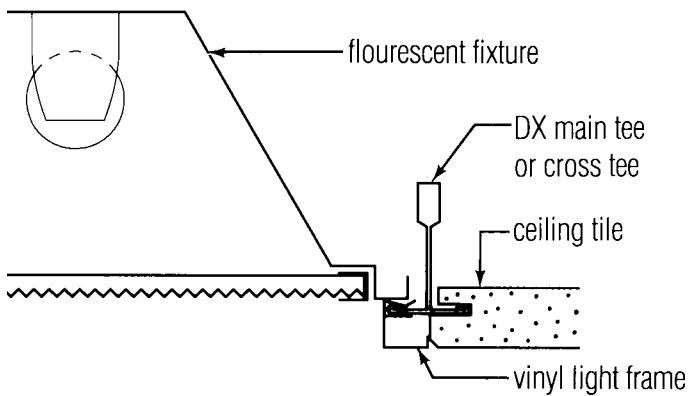
**Detail #7**



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### Fluorescent Fixture (with vinyl light frame)

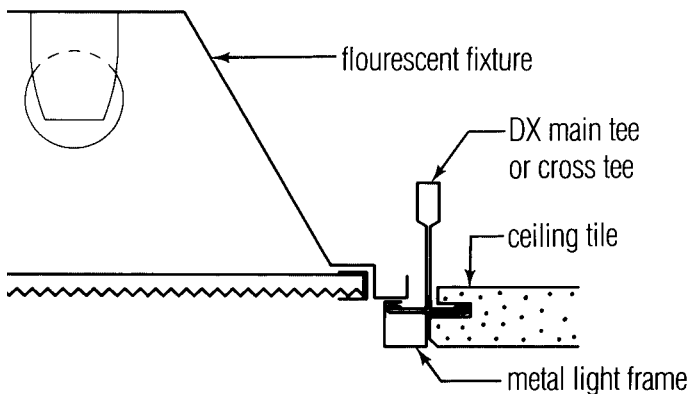
**Detail #8**



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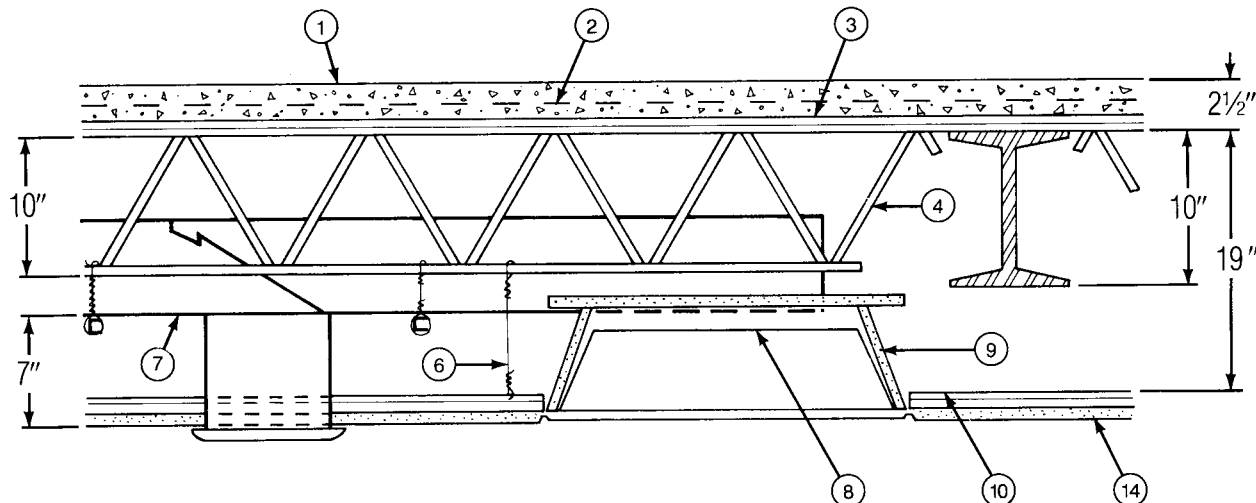
### Fluorescent Fixture (with metal light frame)

**Detail #9**



## Fire-Rated Concealed DX

### Concealed DX Fire-Rated Assembly—UL Design G022



## UL Directory Information

Design No. G022

Restrained Assembly Rating—2 Hour

Unrestrained Assembly Rating—2 Hour

Unrestrained Beam Rating—2 Hour

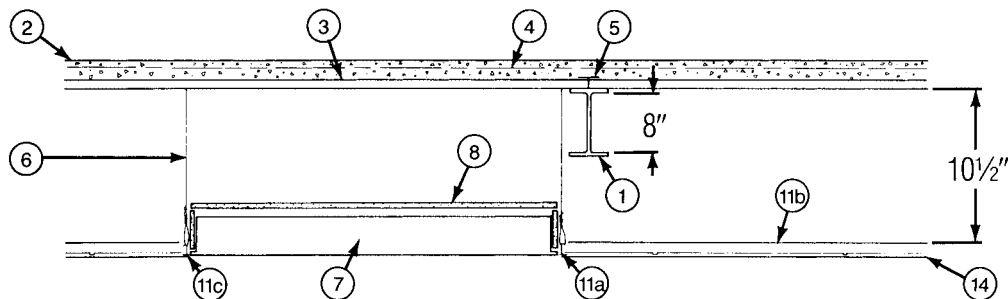
Beam—W10 x 19, minimum size.

1. Normal weight concrete—Carbonate or siliceous aggregate, 150 ±3 pcf unit weight, 5,000 psi compressive strength.
  2. Welded wire fabric—6 x 6—W1.4 x W1.4.
  3. Metal lath— $\frac{3}{8}$ " rib, 3.4 lbs./sq. yd. expanded steel; tied to each joist at every other rib, and midway between joists at side lap with 18 SWG galvanized steel wire.
  4. Steel joists—Type 10J2, minimum size; spaced 24" o.c. and welded to end supports.
  5. Bridging—(Not Shown)— $\frac{1}{2}$ " diameter steel bar, welded to top and bottom chords of each joist.
  6. Hanger wire—Galvanized steel, 12 SWG minimum diameter tied to lower chord of joists, spaced not over 48" o.c. along tees at the intersection of main tees and cross tees and at each corner of the light fixtures.
  7. Air ducts—Minimum 24 MSG galvanized steel. Duct opening not to exceed 57 sq. in. per each 100 sq. ft. of ceiling area. Area of individual duct openings not to exceed 113 sq. in. Maximum dimension of openings 12". Outside face of duct covered with  $\frac{1}{16}$ " thick ceramic fiber paper. Ducts supported by 1  $\frac{1}{2}$ " deep, 0.053" thick (16 gauge) cold-rolled steel channels, 48" o.c. maximum damper—0.063" thick (15 gauge) galvanized steel, 14"x14". Protected on both surfaces with  $\frac{1}{16}$ " ceramic fiber paper and held open with a fusible link (Bearing the UL listing mark). Damper top overlap duct outlet 1" minimum. In lieu of the dampers described above, Duct Outlet Protection System A as described in the Design Information Section may be used with steel ducts.
  8. Fixtures, recess light—(Bearing the UL listing mark). Fluorescent lamp type, steel housing, 2'x4' size. Fixtures spaced so their area does not exceed 16 sq. ft. per 100 sq. ft. of ceiling area. Wired in conformance with the National Electrical Code.
  9. Fixture protection—Mineral and fiber boards\*— $\frac{5}{8}$ " thick, cut into pieces to form a three-sided enclosure, trapezoidal in cross-section, approximately  $\frac{1}{2}$ " longer and wider than the fixture with sufficient depth to provide at least  $\frac{1}{2}$ " clearance between the fixture and the enclosure. The top piece rests on the two side pieces.
  10. Steel framing members\*—For use with 12"x24" tile only. Main runners spaced 48" o.c. Cross tees 48" o.c. perpendicular to main runners. Border tile supported by minimum 0.016" thick (26 gauge) painted-steel angle with 1" legs; or minimum 0.016" thick (26 gauge) steel channel. 1 $\frac{1}{2}$ " deep, 1" bottom flange and 1 $\frac{1}{2}$ " top flange.
  11. Closing spline—Z-shaped,  $\frac{3}{4}$ " deep,  $\frac{1}{2}$ " top flange,  $\frac{1}{2}$ " bottom flange, 23 $\frac{1}{2}$ " long, 0.022" thick steel. Bottom flange to have an indentation at mid flange that runs the length of the spline.
  12. Access spline—Channel-shaped,  $\frac{3}{4}$ " deep,  $\frac{1}{2}$ " top flange,  $\frac{1}{2}$ " bottom flange, 47 $\frac{1}{8}$ " long, 0.022" thick steel. Bottom flange to have indentation at mid flange that runs the length of the spline.
  13. Cross tee spline—Inverted T-shaped,  $\frac{1}{8}$ " deep,  $\frac{3}{4}$ " wide base, 47 $\frac{1}{8}$ " long, 0.021" thick steel.
  14. Steel spline—Flat,  $\frac{1}{16}$ " wide, 11 $\frac{1}{8}$ " long, 0.010 to 0.015" thick painted steel with two indentations which run the length of the spline.
  - 14A. Alternate steel framing members\*—(Not Shown). For use with 12"x12" tile only:
    - A. Main runners—Nominal 12' long, spaced 48" o.c.
    - B. Cross tees—Nominal 4' long spaced 24" o.c. at sides of light fixtures, and 48" o.c. away from light fixtures.
    - C. Cross tee splines—Nominal 4' long, spaced 12" o.c. between cross tees. Each end tab rests on flange or main runner. Access spline (in lieu of cross tee spline)—1" or 1 $\frac{1}{2}$ " deep, nominal 48" long, spaced 12" o.c. perpendicular to main runners. Each end tap engaged in slot of main runner.
    - D. Notched cross tee splines—Nominal 4' long, as required in lieu of cross tee splines. Each end tab rests on flange of main runner.
    - E. Closing splines—Nominal 11" long, 1" deep, supported by access splines. Alternate closing splines—1" or 1 $\frac{1}{2}$ " deep, nominal 11" and 23" long, supported by access spline. Accessible tile areas for items A through E not to exceed 7 sq. ft. per 100 sq. ft. of ceiling area.
- USG Interiors, Inc.—Main runners and cross tees—Type DXL, DXLA, ZXLA. Types DXLR, DXLRA cross tees. Cross tee splines—Type DE or DT. Notched cross tee access splines—Type DEN. Closing splines—Type PAT. Access and alternate closing splines—Type BPA/PAT.
15. Acoustical material\*—Nominal 12"x12" or 24" tile (See Item 10). (S) = surface perforations.

\*Bearing the UL classification marking

## Fire-Rated Concealed DX

### Concealed DX Fire-Rated Assembly—UL Design D010



## UL Directory Information

Design No. D010

Restrained Assembly Rating—2 and 3 Hour (See Items 2 and 17.)

Unrestrained Assembly Rating—2 and 3 Hour (See Items 2 and 17.)

Unrestrained Beam Rating—3 Hour (See Items 2 and 17.)

1. Beam—W8 x 20 minimum size.
2. Normal weight or lightweight concrete—Normal weight concrete—carbonate or siliceous aggregate, 154 ±3 pcf unit weight, 4,500 psi compressive strength. Lightweight concrete—expanded shale, clay or slate aggregate by rotary-kiln method, 117 pcf unit weight, 4,500 psi compressive strength, 2% to 5% entrained air.
 

Minimum Concrete Topping Thickness, In.	Restrained Assembly Rating, Hr.	Unrestrained Assembly Rating, Hr.
2 1/4	2	2
3	3	3
3. Steel floor and form units\*—Composite 1 1/2" or 3" deep phosphatized/painted or galvanized units. No. 22 MSG minimum fluted units 20/20 MSG minimum cellular units. Coverage is for all fluted, all cellular, or any blend of fluted and cellular. Welded to supports 12" o.c. Adjacent units button-punched or welded together 36" o.c. along side joints.  
 Wheeling Corrugating Co., Div. of Pittsburgh Steel Corp.—24", 30" or 36" wide, Type SB-B16LF, 24" or 36" wide; Types SB-P21LF, SB-P31LF; 30" wide, Type SB-150 or SB-150N; 24" wide, Types SB-200, SB-300.  
 Alternate construction—Noncomposite units of the same type listed above may be used provided allowable loading is calculated on the basis of non-composite design.
4. Welded wire fabric—No. 6x6-10/10 SWG.
5. Joint cover—2" wide pressure-sensitive adhesive cloth tape following the contour of the units.
6. Hanger wire—No. 12 SWG galvanized steel, pigtailed through steel floor units. Maximum spacing of 48" o.c. along main runners, at each corner of a light fixture, and at the midpoint along each side of a light fixture.
7. Fixtures, recessed light—(Bearing the UL listing mark). Fluorescent-lamp type, steel housing, 2'x4' size. Nine air slots, 3/16" wide x 4" long, located on horizontal flange of each long edge, uniformly spaced. Tape used over slots when no air boot attached to fixture. Fixtures spaced so their area does not exceed 16 sq. ft. per 100 sq. ft. of ceiling area. Wired in conformance with the National Electrical Code. Fixtures and ballasts must be considered for these ambient temperature conditions before installation.
8. Fixture protection—batts and blankets\*—1 1/4" thick, cut into pieces to form a five-sided enclosure, rectangular in cross section, approximately 1/8" longer and wider than the fixture with sufficient depth to provide at least 1/2" clearance between the fixture and the protection enclosure. The pieces are held together by 18 SWG galvanized steel wire at each corner. For fixtures with air boots attached, cut nominal 7 1/2" x 8 1/2" notch in top center of each side piece to accommodate boot inlet.  
 USG Interiors, Inc.
9. Flexible air duct—Made of Class 1 Flexible Air Duct Material, (bearing the UL listing mark). Maximum inside diameter 6".
10. Air boot—One air boot attached to each side of a light fixture. Two 1/2" wide x 1/4" deep tabs at base of boot, 39" o.c., inserted into end air slots in light fixture and bent perpendicular to secure boot tightly to light fixture. 3" x 7 1/2" oval inlet near center of side of boot for connection of flexible duct. Each boot is 40" long, 7" high, 2" wide, made of 23 MSG galvanized steel.
11. Steel framing members—
  - A. Main runners—Nominal 12' long, spaced 24" or 48" o.c. Main runners face away from light fixtures.
  - B. Cross tees—Nominal 2' long, spaced 48" o.c. at ends of light fixture

when fixtures are parallel to main runners. Nominal 4' long, spaced 24" o.c. at sides of light fixture when fixtures are perpendicular to main runners. Tab at end of cross tee inserted into slot in main runner and secured with 1 1/4" long Type S12 steel screw inserted through hole in tab.

- C. Light fixture support spline—Nominal 23 1/2" and 47 1/2" long, adjacent to sides and ends of light fixture, hooked over top of main runner or cross tee.
- D. Access splines—1" or 1 1/2" deep, nominal 48" long, spaced 12" o.c. perpendicular to main runners. Each end tab engaged in slot in main runner.
- E. Closing splines—1" or 1 1/2" deep, nominal 11" and 23" long, supported by access splines. Accessible tile areas for Items A through E not to exceed 34 sq. ft. per 100 sq. ft. of ceiling area.  
 USG Interiors, Inc.—Type BPA/PAT.
- F. Main runners—Nominal 12' long, spaced 48" o.c.
- G. Cross tees—Nominal 4' long, spaced 24" o.c. at sides of light fixtures, and 48" o.c. away from light fixtures.
- H. Cross tee splines—Nominal 4' long, spaced 12" o.c. between cross tees. Each end tab rests on flange of main runner.
- I. Notched cross tee access splines—Nominal 4' long, as required in lieu of cross tee splines. Each tab rests on flange of main runner.
- J. Closing splines—Nominal 11" long, 1" deep, supported by access splines. Accessible tile areas for items F through J not to exceed 7 sq. ft. per 100 sq. ft. of ceiling area.

USG Interiors, Inc.—Main runners and cross tees—Type DXL. Type DXLR cross tees. Cross tee splines—Type DE or DT. Notched cross tee access splines—Type DEN. Closing splines—Type PAT.

12. Cross tee spline—(Not shown). Inverted T-shaped, 3/8" deep, 3/8" wide base, nominal 4' long, 0.021" thick painted steel. Ends supported by lower flange of main runners. Used between adjacent rows of inaccessible tile.
13. Stabilizer bar—(Not shown). Nominal 2' or 4' long. Channel-shaped, 3/8" deep, 3/8" and 1/8" long legs, 0.021" thick galvanized steel. Provided with 1/4" wide notch at each end to fit over main runners. Tab at notch location engaged under upper flange of main runner. Spaced alternating 24" and 48" o.c. between main runners; not directly over accessible tiles or adjacent to light fixtures. For support at wall, flanges of bar clipped about 1 1/2" from end, flattened out, and bent perpendicular to length of bar. This tab inserted between back of wall molding and wall.
14. Steel spline—Flat, 1 3/8" wide, 11 3/8" long, 0.010-0.015" thick painted steel, with two indentations which run along length of spline. Inserted into kerfed edges of tiles parallel to main runners away from light fixtures and perpendicular to main runners between light fixtures. Also, cut in half and used in kerfs to adjacent accessible tiles to prevent uplift of tiles.
15. Wall molding—(Not shown). Two types—Min. 0.016" thick (26 gauge) steel channel, 1 3/8" high with 1/2" upper and 1" lower flange; or, min. 0.016" thick (26 gauge) steel angle, with 3/4" vertical leg and 1" horizontal leg.
16. Hold-down clips—(Not shown). Made of No. 30 MSG spring steel, 3/8" wide, 3/8" deep, with a span of 4 3/8"; used at periphery of ceiling to press tile flush to wall molding. In addition, one clip placed behind each tile edge against wall channel in last tile row to maintain tight tile joints.
17. Acoustical material\*—Nominal 12"x12" kerfed edge tile. (S) = surface perforations. Celotex Corp.—Type 3/4" N (S); 3/4" O (S); 3/4" R (S). When type O or R acoustical material is used, the Restrained and Unrestrained Assembly Ratings are 2 Hour.

\*Bearing the UL classification marking.

## **DONN Concealed DX Acoustical Suspension System—Specification**

Note to specifier: The following specification for the concealed DX Acoustical Suspension System is a guide in the preparation of a specification for a modular concealed grid suspension system. Delete such items that are not related to the particular project. Where blank spaces occur, provide information incidental to the particular project for which the specification is prepared.

The International System of Units (Metric Units) is available upon request. Section 09 \_\_\_\_\_.

### **Part 1—General**

#### **1.01 Related Work**

- A. Related work specified elsewhere:
  - 1. Gypsum Board Systems: Section \_\_\_\_\_.
  - 2. Acoustical Ceilings: Section \_\_\_\_\_.
  - 3. Integrated Assemblies: Section \_\_\_\_\_.
  - 4. Air Handling: Section \_\_\_\_\_.
  - 5. Lighting: Section \_\_\_\_\_.
- B. Work installed but furnished under other sections:  
(Include applicable requirements.)
- C. Work furnished but installed under other sections:  
(Include applicable requirements.)

#### **1.02 System Description**

- A. Suspended ceiling system consisting of main tees and cross tees together to form modules of 48"x48" for the installation of tiles, air diffusers and light fixtures. Main tees installed in conjunction with cross tees, tee splines, flat splines and access splines for use with 12"x12" or 24"x24" tile.

#### **1.03 Quality Assurance**

- A. Subcontractor qualifications: Installer shall have successful experience in installation of ceiling suspension systems on projects with requirements similar to requirements specified.
- B. Requirements of regulatory agencies: Codes and regulations of authorities have jurisdiction.
- C. Source quality control: Manufacturer will provide test certification for suspension system as required to meet performance standards specified by various agencies.

#### **1.04 References**

- A. ASTM C635, Standard Specifications For Metal Suspension Systems For Acoustical Tile And Lay-in Panel Ceilings.
- B. ASTM C636, Recommended Practice For Installation Of Metal Suspension System For Acoustical Tile And Lay-in Panels.
- C. ASTM E119, Standard Methods of Fire Tests of Building Construction and Materials.
- D. Cisca Ceiling Systems Installation Handbook.
- E. Underwriters Laboratories, Inc. (UL): Fire Resistance Directory—listing and classification.

#### **1.05 Submittals**

- A. Samples: Submit data for suspension system main tees and cross tees for review and acceptance.
- B. Shop drawings:
  - 1. Reflected ceiling plans: Submit ceiling suspension system layout to indicate ceiling modules and related lighting and mechanical systems.
  - 2. Assembly drawings: Indicate module dimensions, accessory attachments and installation of related components.
- C. Manufacturer's data:
  - 1. System details: Submit manufacturer's descriptive literature or standard drawings showing details of system with project conditions clearly identified, and manufacturer's recommended installation instructions.
  - 2. Exposed trim to be manufacturer's standard white color.
- D. Maintenance materials: Provide \_\_\_\_\_ percent of amount of main tees and cross tees installed.

#### **1.06 Delivery, Storage and Handling**

- A. Delivery of materials: Deliver materials in original, unopened packages clearly labeled with manufacturer's name, item description, part number, type and class, as applicable.
- B. Inspection: Promptly inspect delivered materials, file freight claims for damage during shipment, and order replacement material, as required.
- C. Storage: Store in manner that will prevent warpage, scratches, or damage of any kind. Prevent interference to/by other trades and any other adverse job conditions due to storage location or methods.
- D. Handling: Handle in such manner to ensure against racking, distortion or physical damage of any kind.

#### **1.07 Project Conditions**

- A. Existing conditions: (Include specific alteration work requirements for the project.)
- B. Environmental requirements:
  - 1. Building conditions: Building shall be enclosed with all windows and exterior doors in place and glazed, and the roof watertight before installation of suspension system.
  - 2. Interior temperature/humidity in building: Climatic conditions in areas to receive ceiling suspension systems shall range from 60 °F (16 °C) to 85 °F (29 °C) and relative humidity of not more than 80% shall be maintained before installation of components.
- C. Coordination with other work:
  - 1. General: Coordinate with other work supported by or penetrating through the ceiling, including mechanical and electrical work and partition systems.
  - 2. Mechanical work: Ductwork above suspension system shall be complete, and permanent heating and cooling systems operating.
  - 3. Electrical work: Installation of conduit above suspension system shall be complete before installation of suspension system.
- D. Protection:
  - 1. Personnel: Follow good safety and industrial hygiene practices during handling and installing of all products and systems, with personnel to take necessary precautions and wear appropriate personal protective equipment as needed. Read material safety data sheets and related literature for important information on products before installation. Contractor to be solely responsible for all personal safety issues during and subsequent to installation; architect, specifier, owner and manufacturer will rely on contractor's performance in such regard.
  - 2. Existing completed work: Protect completed work above suspension system from damage during installation of suspension system components.

### **Part 2—Products**

#### **2.01 Manufacturer**

- A. Concealed DX grid suspension system as manufactured by USG Interiors, Inc., Chicago, IL, U.S.A.

#### **2.02 Materials**

- A. General: ASTM C635, commercial quality, prepainted and pretreated cold-rolled steel; exposed surfaces prefinished in manufacturer's standard enamel paint finish.
- B. Suspension system components:
  - 1. Main tee: (Intermediate)(Heavy) duty classification; double-web design; 1½" high x 144" long; rectangular top bulb; ⅝" face with roll-formed steel cap; cross tee holes and hanger wire holes at 6" o.c.; convenience holes at approximately 2" o.c.; integral reversible splices.
  - 2. Cross tees:
    - a. 1½" high by 48" long, roll-formed into double-web design with rectangular bulb; ⅝" face and a prepainted steel cap, high tensile steel end clenched to web.
    - b. 1" high by 48" long, roll-formed into double-web design with rectangular bulb; ⅝" face and a prepainted steel cap, high tensile steel end clenched to web.
    - c. Main tees and cross tees shall be positively locked, yet shall be removable without need for the use of tools.



**C. Splines:**

1. Single-leaf access splines: Roll-formed steel,  $\frac{7}{8}$ "x48" long, notched tee spline with rest-on end detail, used in conjunction with  $\frac{7}{8}$ " high x 11" long closing spline.
2. Bi-parting access splines: Roll-formed steel, (1") x (24", 36", 48") (1 $\frac{1}{2}$ " high) x (24", 36", 48", 60") long,  $\frac{1}{2}$ " face width, bi-parting access with rest-on end detail, used in conjunction with (1") x (11", 23") (1 $\frac{1}{2}$ " x (11", 23") closing spline.
3. Downward access splines: Roll-formed, C spline section used in conjunction with Z spline section. Shall have sliding lock connection thru use of exposed tab.
4. Tee splines: Double-web design, roll-formed steel.
  - a.  $\frac{1}{2}$ " high x 24" long, tear drop web,  $\frac{3}{4}$ " face flange, rest-on end detail.
  - b.  $\frac{7}{8}$ " high x (36") (48") long, tear drop web rest-on end detail,  $\frac{3}{4}$ " face flange.
  - c. 1" high x (36") (48") long,  $\frac{1}{2}$ " face width, square top bulb, rest-on end detail.
5. Flat splines: stamped steel, 11" long.

**D. Accessories:**

1. Wall molding: Channel shape with 1" and  $\frac{1}{2}$ " exposed legs, surface finished in manufacturer's standard white color.
2. Shadow mold and angle mold available from manufacturer's standard catalog; exposed surface finished in manufacturer's standard white color.
3. Light fixture trim:
  - a. Vinyl extruded channel shape with mitered corners, attaching to the tee flanges to trim out the tees and tile edges. Exposed surfaces in white to match the tile.
  - or
  - b. Formed steel channel shape, attaching to the tee flanges to trim out the tees and tile edges. Exposed surfaces prefinished in manufacturer's standard white color.
4. Attachment clips, hold-down clips, centering clips, additional splines for access or load carrying and cross tee hole dies are available from manufacturer's standard catalog.

**E. Attachment Devices:**

1. Hanger wire: Galvanized carbon steel; soft temper; prestretched; yield stress load at least three times design load but not less than 12 gauge.

**2.03 Fabrication**

- A. Manufacturing: Conform to ASTM C635 (Intermediate) (Heavy) Duty Main Tee Classification; designed to support ceiling assembly with maximum deflection of 1/360 of the span.
- B. Main tees: Roll-formed, non-handed integral splice design; cross tee holes 3" from ends, spaced 6" o.c.; hanger wire holes 6" o.c.; and convenience holes spaced approx. 2" o.c. in the bulb.
- C. Cross tees: Roll-formed, lower flange extended and offset or butt cut; high tensile steel ends clenched to the web; double-locking and self-indexing design.
- D. Finish: Manufacturer's standard metal cleaning and finishing process.

**2.04 Performance**

- A. Main tees: Intermediate Duty DX 24 (1 $\frac{1}{2}$ " height x 144")
  1. Simple span uniform load.  
Supported 4' o.c. 12.4 lb/LF  
Supported 5' o.c. 6.1 lb/LF
  2. Tension value—320 lbs.
  3. Compression value—478 lbs.
- B. Main tees: Heavy Duty DX 26 (1 $\frac{1}{2}$ " height x 144")
  1. Simple span uniform load.  
Supported 4' o.c. 16.3 lb/LF  
Supported 5' o.c. 7.3 lb/LF
  2. Tension value—334 lbs.
  3. Compression value—888 lbs.

**C. Cross tees: (1 $\frac{1}{2}$ " height x 48" or 60")**

DX 422 DX 522  
DX 424 DX 524

**1. Simple span uniform load.**

Supported 4' o.c. 8.2 lb/LF (DX 422)  
13.7 lb/LF (DX 424)  
Supported 5' o.c. 4.3 lb/LF (DX 522)  
6.4 lb/LF (DX 524)

**2. Tension value—351 lbs.**

**3. Compression value—326 lbs.**

**D. Cross tees: (1" height x 12", 24" or 48")**

DX 116  
DX 216  
DX 416

**1. Simple span uniform load.**

Supported 2' o.c. 17.1 lb/LF (DX 216)  
Supported 4' o.c. 5.0 lb/LF (DX 416)

**2. Tension value—351 lbs.**

**3. Compression value—326 lbs.**

**Part 3—Execution**

**3.01 Inspection**

- A. Examine areas to receive materials for conditions which will adversely affect installation. Provide written report of unacceptable surfaces.
- B. Do not start work until unsatisfactory conditions are corrected.
- C. Work to be concealed: Verify work above ceiling suspension system is complete and installed in manner which will not affect layout and installation of suspension system components.
- D. Beginning of installation shall signify acceptance of conditions in areas to receive ceiling suspension system.

**3.02 Preparation**

- A. Field dimensions must be verified prior to installation.

**3.03 Installation**

- A. Standard reference: Install in accordance with ASTM C636, CISCIA installation standards, and other applicable code requirements.
- B. Manufacturer's reference: Install in accordance with manufacturer's current publications.
- C. Drawing reference: Install in accordance with approved shop drawings.
- D. Hanger Wires:
  1. Spacing: Space hanger wires on main tees a maximum of 48" o.c. or as required, attaching hangers directly to structure above, or as required to support loads.
  2. Limitations: Do not support wires from mechanical and/or electrical equipment, piping, or other equipment occurring above ceiling.
- E. Accessories: Install accessories as applicable to meet the project requirements.

**3.04 Cleaning**

- A. Immediately remove any corrosive substances or chemicals that would attack painted finishes (i.e. wall paper adhesives).
- B. Touch up all minor scratches and spots, as acceptable, or replace damaged sections when touch-up is not permitted.
- C. Painting: Repainting of trim shall be with a high-quality-solvent base paint and applied as recommended by paint manufacturer.
- D. Removal of debris: Remove all debris resulting from work of this section.

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