

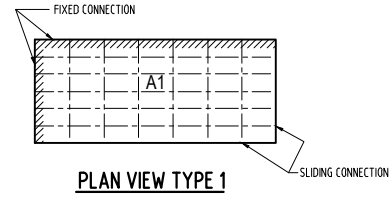
SEISMIC BRACING ARRANGEMENTS

THREE POSSIBLE OPTIONS FOR BRACING SUSPENDED CEILING AGAINST SEISMIC LOADING ARE SHOWN BELOW.

PERIMETER FIXING

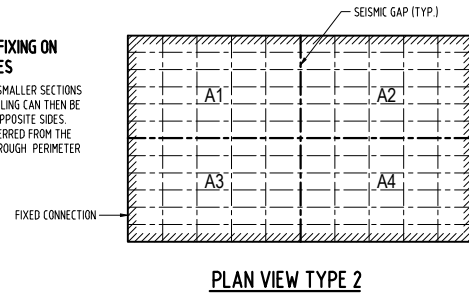
TYPE 1 - PERIMETER FIXING ON ADJACENT EDGES.

CEILING IS FIXED TO THE PERIMETER ON TWO ADJACENT SIDES AND A SEISMIC SLIDING JOINT IS USED ON THE OPPOSITE SIDES. LATERAL LOADS ARE TRANSFERRED FROM THE CEILING TO THE PERIMETER THROUGH A PERIMETER FIXING.



TYPE 2 - PERIMETER FIXING ON MORE THAN TWO EDGES

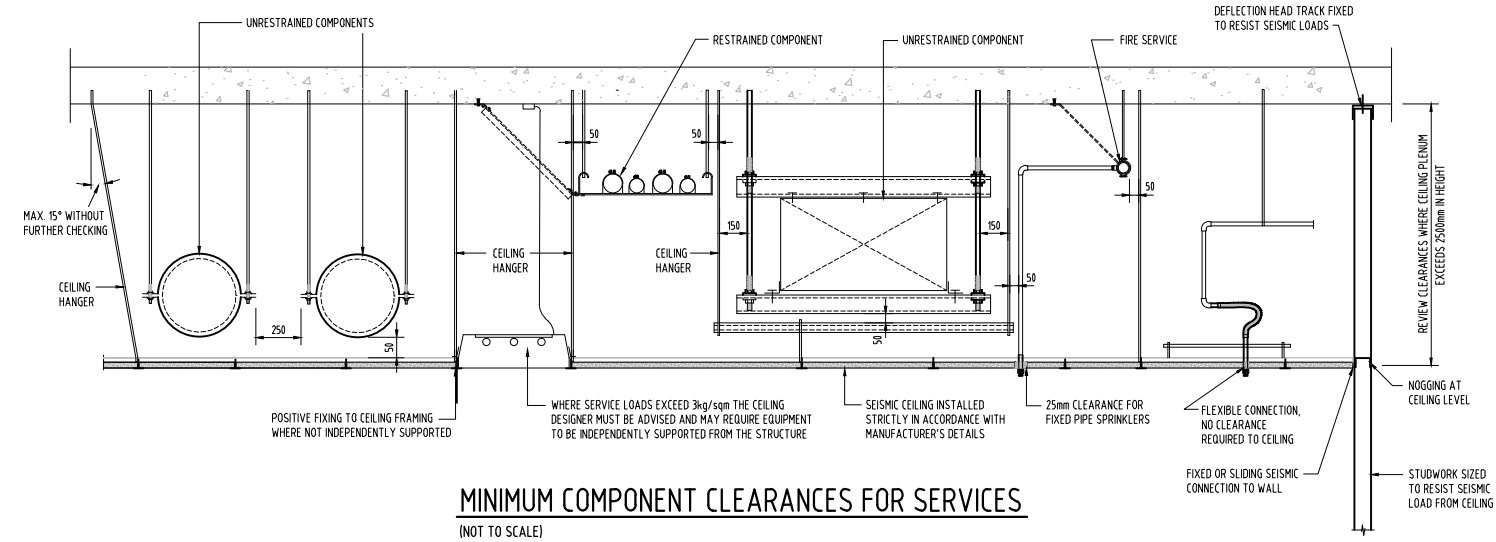
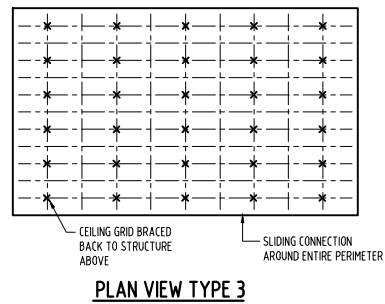
THE CEILING IS SPLIT UP INTO SMALLER SECTIONS USING SEISMIC JOINTS. THE CEILING CAN THEN BE FIXED TO THE PERIMETER ON OPPOSITE SIDES. LATERAL LOADS ARE TRANSFERRED FROM THE CEILING TO THE PERIMETER THROUGH PERIMETER FIXING.



BACK BRACING

TYPE 3 - BACK BRACING

THE CEILING IS BRACED BACK TO THE STRUCTURE ABOVE WITH COMPRESSION STRUTS AND TENSION WIRE BRACES OR DIAGONAL TENSION/COMPRESSION STRUTS. A SEISMIC SLIDING JOINT AROUND THE ENTIRE PERIMETER IS REQUIRED AS THE CEILING MAY NOT BE BRACED TO BOTH THE STRUCTURE ABOVE AND THE PERIMETER.



STRUCTURAL DESIGN CRITERIA

- BUILDING IMPORTANCE LEVEL = IL xx
- EARTHQUAKE ANNUAL PROBABILITY OF EXCEEDENCE = 1/xxxx
- EARTHQUAKE PROBABILITY FACTOR $Kp = x.x$
- EARTHQUAKE SITE HAZARD FACTOR $Z = x.x$
- EARTHQUAKE SITE SUB-SOIL CLASSIFICATION = Xx
- EARTHQUAKE COMPONENT IMPORTANCE FACTOR = 1.0
- MAXIMUM SEISMIC CEILING MASS = xx kg/m²

INSPECTION

- THE CONTRACTOR SHALL GIVE THE ENGINEER AND DPTI CONSTRUCTION ADVISORS 24 HOURS NOTIFICATION FOR INSPECTION OF CEILING FRAMING PRIOR TO INSTALLATION OF CEILING TILES.
- AS PER SECTION 4.12 OF AS2785:2000 THE INSTALLER SHALL ENSURE THAT THE CEILING COMPLIES WITH THE FOLLOWING BEFORE REQUESTING AN INSPECTION:
 - THE CONTRACT SPECIFICATION.
 - THE MANUFACTURER'S INSTALLATION SPECIFICATION.
 - THE SUSPENDED CEILING STANDARD, AS2785:2000.

CEILING BACK BRACING NOTES (TYPE 3)

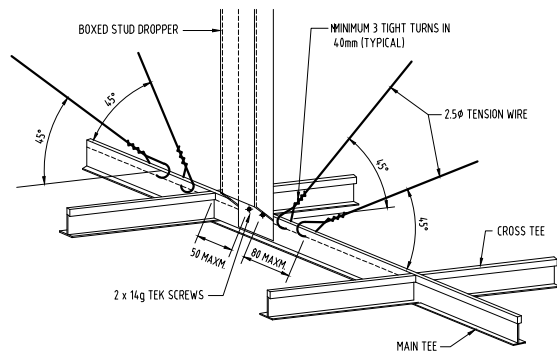
- ALL WORK SHALL BE IN ACCORDANCE WITH AS/NZS 2785:2000 SUSPENDED CEILING - DESIGN AND INSTALLATION.
- BRACES MUST BE PLACED A MINIMUM OF HALF THE SPACING DISTANCE FROM THE PERIMETER.
- THE COMPRESSION STRUT MUST BE CONNECTED TO THE MAIN TEE ONLY AND BE WITHIN 50mm OF A CROSS TEE CONNECTION.
- ANGLED WIRE AND STUD BRACES MUST BE FIXED AT 40-45° TO THE PLANE OF THE CEILING GRID.
- ALL SCREWS AND ANCHORS MUST BE INSTALLED WITH A MINIMUM EDGE DISTANCE AND SPACING OF 3x NOMINAL FIXING DIAMETERS.
- SPLICES MAIN TEES SHALL BE LOCATED AWAY FROM BACK BRACING FIXING POINTS. BACK BRACED CEILING MUST NOT BE FIXED TO PERIMETER STRUCTURE.
- ALL CEILING TILES SHALL BE INSTALLED WITH HOLD-DOWN CLIPS AS PER TILE MANUFACTURER'S SPECIFICATIONS.
- THE PROJECT ENGINEER SHALL CONFIRM THAT SUPPORT STRUCTURES HAVE SUFFICIENT CAPACITY TO RESIST EARTHQUAKE LOADS RESULTING FROM CEILING AND WALL FRAMING.

DESIGN ASSUMPTIONS

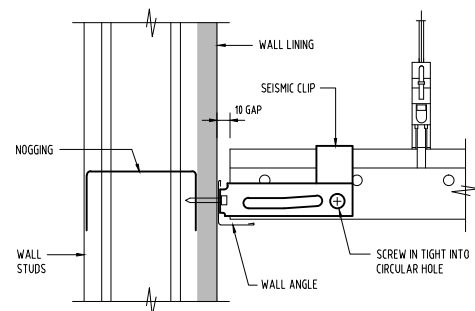
THE FOLLOWING ASSUMPTIONS AND LIMITATIONS ARE TYPICAL OF CEILING MANUFACTURERS AND SHOULD BE CHECKED WITH THE MANUFACTURER ON EACH PROJECT.

- SUSPENDED CEILING ARE NOT DESIGNED TO ACT AS PRIMARY BUILDING FRAMES. HENCE THEY SHOULD NOT BE INCLUDED AS PART OF A PRIMARY SEISMIC LOAD RESISTING SYSTEM OR TO TRANSFER LOADS BETWEEN STRUCTURAL ELEMENTS OF THE BUILDING.
- A SINGLE CEILING SYSTEM SHALL BE USED, AS SUBSTITUTIONS WILL VOID MANUFACTURER DESIGNS, TESTING AND WARRANTIES.
- DESIGN AND INSTALLATION OF ALL SYSTEMS MUST BE IN ACCORDANCE WITH THE DETAILS CONTAINED IN CEILING MANUFACTURER'S TECHNICAL INFORMATION.
- PARTITION WALLS MUST NOT BE BRACED BY THE CEILING UNLESS SPECIALLY DESIGNED TO DO SO. ALL INTERIOR PARTITION WALLS MUST BE SUPPORTED INDEPENDENTLY FROM CEILING; OTHERWISE THEIR WEIGHT MUST BE INCLUDED IN THE CEILING SEISMIC MASS CALCULATIONS, INCLUDING SPECIFIC CONSIDERATION OF THE SEISMIC LOAD ON EACH INDIVIDUAL CEILING MEMBER.
- ANY ITEM WEIGHING MORE THAN 10kg MUST BE INDEPENDENTLY SUPPORTED AND BRACED WITH AN APPROPRIATE ISOLATION GAP TO CEILING UNLESS APPROVED BY THE ENGINEER.
- SUSPENDED CEILING ARE TO BE NON-TRAFFICABLE.

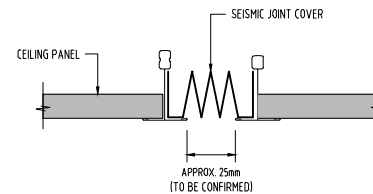
SEISMIC BACK BRACING DETAILS



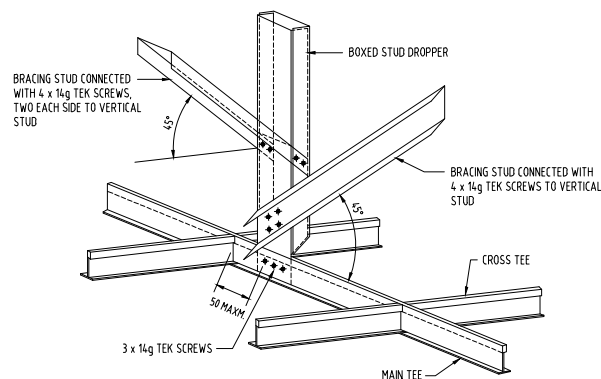
REFER TO MANUFACTURER'S TECHNICAL LITERATURE FOR BRACE CAPACITY AND EXACT DETAILS.



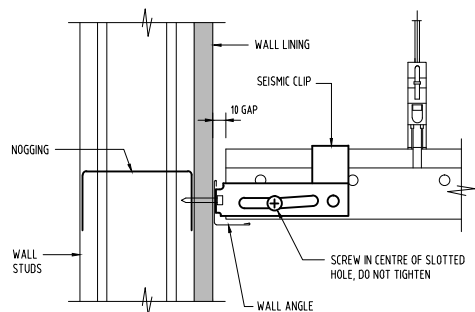
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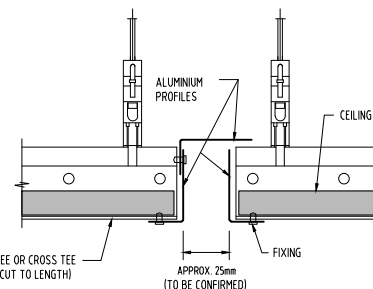
SEISMIC CEILING JOINT EXAMPLE



REFER TO MANUFACTURER'S TECHNICAL LITERATURE FOR BRACE CAPACITY AND EXACT DETAILS.



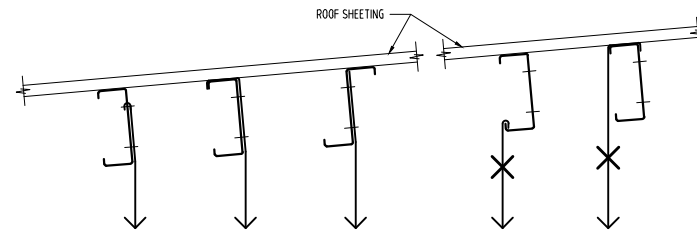
REFER TO MANUFACTURER'S TECHNICAL LITERATURE FOR BRACE CAPACITY AND EXACT DETAILS.



SEISMIC CEILING JOINT EXAMPLE

CONDITION BEING CONSIDERED	MINIMUM CLEARANCES	
	Horizontal	Vertical
UNRESTRAINED COMPONENT TO UNRESTRAINED COMPONENT (Where allowed by AS 1170.4 - 2007)	250mm	50mm
UNRESTRAINED COMPONENT TO RESTRAINED COMPONENT	150mm	50mm
RESTRAINED COMPONENT TO RESTRAINED COMPONENT	50mm	50mm
PENETRATION THROUGH STRUCTURE SUCH AS WALL OR FLOOR	50mm	50mm
UNRESTRAINED SERVICES PASSING THROUGH THE CEILING	25mm	25mm
SPRINKLER HEADS WITH FLEXIBLE DROPPERS	NIL	NIL

NOTE: CEILING HANGERS AND BRACES ARE CONSIDERED TO BE RESTRAINED COMPONENTS FOR THE PURPOSE OF THIS TABLE, HENCE 150mm HORIZONTAL CLEARANCE IS REQUIRED BETWEEN CEILING HANGERS AND UNRESTRAINED SERVICES.



HANGING FROM ROOF PURLINS

REV: DATE AMENDMENTS INT:

Government of South Australia
Department of Planning, Transport and Infrastructure

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SETTING OUT OF THE WORK IS THE RESPONSIBILITY OF THE CONTRACTOR
ALL DIMENSIONS TO BE VERIFIED ON SITE
DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE SUPERINTENDENT
THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONTRACT DOCUMENTS

CONTRACT EXECUTION
CONTRACTOR: _____ DATE: _____
WITNESS: _____ DATE: _____

CONTRACT NAME: _____
SEISMIC BRACING FOR SUSPENDED CEILING
SITE ADDRESS: _____

DRAWING TITLE: _____
EXAMPLE DETAILS
06.02.2015
CONTRACT NO.: _____ DRAWN BY - CHECKED BY: _____
PSC JOB NO.: _____ SCALE AND SHEET SIZE: N.T.S.
DTE/ASSET NO.: _____ SHEET NO.: _____
DTE/DRAWING NO.: _____ REVISION: _____

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