EXPOSED GRID CEILING SYSTEMS GUIDLINES

Contents Page

DESIGN GUIDELINES

CONTENTS

CONSTRUCTION STANDARDS/ DESIGN CRITERIA

The ceiling should be constructed in accordance to Saint-Gobain Construction Products. The erection of the ceiling should comply with SABISA guidelines for suspended ceilings.

1. QUALITY CONTROL

The installer should have experience and knowledge of the installation of ceiling systems or be a SABISA approved installer. Gypframe™/ DONN metal framing should be inspected by a recognised site authority. Ceiling tiles should be inspected after each installation and before finishing. The installation of the suspended ceiling shall be strictly in accordance with the latest specification and coordinated ceiling layout drawings. Manufacturer's specification should be properly interpreted and adhered to. Ceilings should be set out from the centre to give balanced widths of tiles at the perimeter. A number of grid layouts are possible, depending on the grid selected and the choice of ceiling tile.

2. DELIVERY, STORAGE, AND HANDLING

Storage time on site should be as short as possible with environmental conditions as near as possible to those specified for occupancy. Any storage area should be clean, dry, secure and fully protected from the weather with cartons stored off the ground. Cartons of materials should never be rolled, dropped or slid and under no circumstances used as a work base or substituted for ladders, scaffolding etc.

3. SITE PREPARATION

Verify that site conditions are suitable for the commencement of work and that all labelled materials are as indicated in the Saint-Gobain Gyproc specification document or as instructed by the manufacturer. Ensure that there are no damaged materials. The building should be weather proof before the installation of the Gyproc Ceiling lining. All wet trades shall be completed and adequately dry prior to the installation of ceiling products. This includes grinding of terrazzo floors, floor screed, brickwork and plastering of walls. All windows and exterior doors shall be in place and fully glazed and the roof and/or intermediate floor slabs shall be watertight prior to the start of the ceiling installation.

4. BUILDING STRUCTURE

Hangers should be suitably fixed to the structure using suitable fixing devices. Main tees shall be suspended from the structure using hangers spaced at 1200mm centres. In areas where this

cannot be achieved where the fixing structure is more than 1200mm centres, consideration should be given to install a Sub-grid.

5. SUB-GRID

A sub-grid is not required when a continuous length of hanger is used.
A sub-grid is required when:

- The hangers are out of plumb by more than 25mm for every 150mm depth (9.5º) and the ceiling is suspended more than 2m.
- The ceiling mass exceeds 20kg/m.
- The main tees are required to run parallel to the suspending structural members. i.e. parallel to the trusses if main tees are suspended from the trusses or parallel to the purlins if the main tees are suspended from the purlins.

We suggest consulting a structural engineer to assist with the design of the sub-grid. Construct the sub-grid using Gyproc Burgess Channel. The sub-grid shall be installed with the primary grid perpendicular to the directions of the Main Tees and at 1200mm centres. The Gyproc Burgess Channel shall be suspended using a continuous length of hanger at every 2400mm centres.

6. RELATIVE HUMIDITY (RH)

The grid is suitable for use in heated occupied buildings in conditions up to 95% relative humidity (RH90). Gyproc Gyprex tiles are suitable up to RH70 and Isover Glasswool tiles are suitable up to RH95.

7. WATER VAPOUR CONTROL

Whilst the vinyl surface can provide an effective vapour control layer, it may be necessary to complete the integrity where the boards abutt metal grid sections. This is achieved by sealing with continuous beads of water vapour resistant mastic, which should be applied to the back of the metal sections prior to laying the tiles. Care should be taken to ensure that the mastic sealant does not damage the vinyl surface of the tiles.

Other precautions, such as ceiling void ventilation, may be necessary to reduce the risk of interstitial condensation.

8. LIGHT REFLECTANCE

Light reflectance is the ability of a surface to reflect light back into a space. The light reflectance of a variety of ceiling tiles measured in South Africa indicated a reflectance range from 0.8 to 0.92, with the mean being 0.84 from a sample group of 30 tiles. A reflectance of 0.85 is considered to be high. The intensity and number of luminance can be optimised depending on the light reflection of the ceiling tiles. Consult a lighting specialist for further guidance.

9. CEILING FRAMEWORK

Fixing points for suspending the metal grid are required at 1200mm centres. Suitable fixing devices should be used when fixing to the structure. Gypframe™/ DONN Main Tees are fixed to the wall with angle cleats which are attached to the tee web and are secured through the wall angle or perimeter trim to the wall. This is to stabilize and align the ceiling as well as to avoid displacement of the tees during erection. Tee's are fixed after the first row of cross tee's have been clipped into the main tee, this enables erection from a fixed reference point. For greater spans, contact the manufacturer for details.

Perimeter cross tees must be suspended ±100mm from the perimeter angle. When using a lightweight tile e.g. Mineral fibre, the above is not required.

The ceiling framework is designed such that when supported at recommended centres and loaded as recommended, the maximum deflection of the grid is not more than L/360 of the suspension span.

10. BRACING OF FRAMEWORK

Gyproc Angle Cleats are fixed to the wall to ensure straight grid and stability. Provide diagonal bracing as per project requirements.

11. CEILING HANGERS

Fixing points for suspending the metal grid are required at 1200mm centres. Suitable fixing devices should be used when fixing to the structure. Consult a fixing specialist for further guidance.

The ceiling grid must be suspended from a concrete soffit using a continuous length of pre-stretched 2.5mm Gyproc Suspension Wire or 19mm Gyproc Hanger Strap. To provide a more

robust suspension support, which restricts any flexing grid when pressure is applied from below, Gyproc Galvanised Steel Angle 25mm x 25mm shall be used.

Where ductwork is so extensive as to make it impossible to install hangers in an area, the mechanical trades shall provide proper framing of adequate strength to support the ceiling from their framing. Under no circumstances is the ceiling grid to be suspended from any of the service installations.

Care should be taken to ensure that the fixing used for suspension points (especially into concrete) should be able to support a safety factor of three times the design load of the ceiling.

12. CEILING TILE

Lay 1200mm x 600mm ceiling tile into the ceiling grid for 1200mm x 600mm grid. Lay 600mm x 600mm ceiling tile into the ceiling grid for 600mm x 600mm grid. The maximum allowable ceiling tile weight is 20kg/m^2. In areas subject to draught Gyproc Hold-down Clips should be used. The use of Gyproc Hold-down Clips should be determined by the structural engineer.

13. HOLD DOWN CLIPS

In areas susceptible to draft, ceiling Gyproc Hold-down Clips shall be installed. 2x Gyproc Hold-down Clips per Cross Tee, 4x Gyproc Hold-down Clips per tile. Gyproc Hold-down Clips are used to assist with the acoustic performance of ceiling tiles, i.e. by holding the tiles in place. Gyproc Hold-down Clips assist by keeping the tiles in place where excess updraft is experienced in a building.

14. PERIMETER TRIMS

Perimeter angles, Gyproc/ DONN SM25 and Gyproc/ DONN M6 are fixed to the perimeter wall at 300mm centres and are not to carry the ceiling framework load. Gypframe™/ DONN Main Tee hangers to not exceed 400mm from the perimeter wall.

15. CEILING LOADING

Care should be taken to ensure that the fixing used for suspension points (especially into concrete) should be able to support a safety factor of three times the design load of the ceiling.

16. THERMAL PERFORMANCE

Thermal performance of the ceiling is drastically reduced by thermal bridging as a result of the exposed framework. Isover glasswool insulation can be laid over the ceiling to provide the required standard of thermal insulation. Contact Saint-Gobain Technical Solution Centre for further guidance. Insulation shall be laid securely with closely butted joints, leaving no gaps.

17. CLIMATIC ZONES

Refer to SANS 10400 XA and SANS 204.

18. FIRE RATING

Ceiling tiles shall be tested in accordance with SANS 10177-2. Exposed grid ceilings may not achieve the full fire rating (Stability, Integrity & Insulation) due to the exposed framework. Exposed grid ceilings may achieve integrity and stability only unless otherwise stated in the specification.

19. ACOUSTIC PERFORMANCE

Isover Glasswool and Gyproc Rigitone® tiles are designed to provide sound absorption.

Where sound insulation room-to-room is required, sound attenuation (CAC) can be improved by the installation of Isover glasswool insulation onto the ceiling. Alternatively, other design considerations should be adopted such as extending adjoining partitions into the plenum void or installing a plenum barrier.

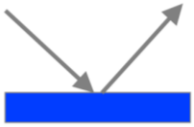
When using acoustic ceiling tiles consideration should be given to the transmission of sound via the ceiling void. This is referred to as (CAC) - Ceiling Attenuation Class. CAC can be improved by laying glasswool insulation on the ceiling tiles or installing a non-perforated ceiling tiles above the acoustic tiles.

The best CAC performance can be achieved by using Gyprex® tiles. CAC is a measure for rating the performance of a ceiling system as a barrier to airborne sound transmission through a common plenum between adjacent closed spaces such as offices. The higher the CAC rating, the better the performance.

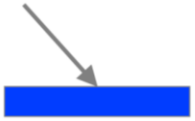
NRC (or Noise Reduction Coefficient) is the number which rates the effectiveness of a material at absorbing sound. NRC (Noise Reduction Coefficient) measures how well materials stop sound

from reflecting (how much sound they can absorb). The NRC is the percentage of sound that a surface absorbs (in other words, hits a surface and doesn't reflect back again into the room).

Sound Absorption is the amount of sound energy absorbed by a material. It is frequency and density dependent. It is normally expressed as a co-efficient where 1.0 equals total absorption and 0 is total reflection.



Absorption of 0



Absorption of 1.0

A single value can be expressed as a Sound Absorption Class A – E. α_w is split into intervals.

classification	α_w-value
A	0,90 ; 0,95 ; 1,00
B	0,80 ; 0,85
C	0,60 ; 0,65 ; 0,70 ; 0,75
D	0,30 ; 0,35 ; 0,40 ; 0,45 ; 0,50 ; 0,55
E	0,15 ; 0,20 ; 0,25
not classified	0,00 ; 0,05 ; 0,10

EN ISO 11654
European Standard

20. CONTROL JOINT

Control joints are predetermined separations that are designed to relieve internal stresses created by expansion and contraction of the building structure, commonly created from thermal or humidity movement.

Provision shall be made for control joints.

21. SERVICES INSTALLATION

Mechanical, electrical, air-conditioning, plumbing and other services (e.g. sprinklers) shall be installed prior to the start of any ceiling installation. and the respective trades shall make available to the ceiling contractor, prior to the start of the ceiling installation, adequate descriptive literature, samples and shop drawings of any item that is to be carried by or fixed to the ceiling. Ceiling systems are not designed to carry excess or additional structural loads. It is therefore recommended that catwalks are installed where access is required to other services above the ceiling, and that personnel walkways are installed above the installed ceiling. It is recommended that appropriate suspension is used to support these loads independently of the ceiling system.

This applies also to bulkheads, signs and other appendages. Any load that is installed below the ceiling should be independently supported.

22. LIGHTING FIXTURES

Accurately plan the position of light fixtures with suitable suspension as necessary to adequately support the weight of the light fixture. Extra support is required in areas where light fixtures are installed. If the light fixture if more than 15kg/m^2, independent supports should be provided for light fixtures.

23. MAINTENANCE

Ceiling tiles can be cleaned using a damp cloth or soft brush. Most standard mild detergents can only be used on vinyl faced tiles.