

CONCEALED GRID CEILING SYSTEMS GUIDELINES

DESIGN GUIDELINES

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1. 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.

2. QUALITY ASSURANCE

All Saint-Gobain Construction Products are manufactured according to SABS standards. Gyproc RhinoBoard® is manufactured according to ISO 9001 Quality management System and ISO 14001 environmental management system. The installer should have experience and knowledge of the installation of ceiling systems.

3. BUILDING STRUCTURE

Concrete Soffit: Gypframe™/DONN T37K Main Tee and Gypframe™/DONN T32K Cross Tee or Gypframe™ N Main Bar and Gypframe™ N Cross Furring Channel framework should be used where soffit is concrete and hangers fixed using appropriate fixings. Steel or timber bracing are not to be used.

Timber Joist or Purlins: Steel or Timber bracing and Gypframe™/DONN T37K Main Tee or Gypframe™ N Main Bar should be used. Building structure should be at 1200mm centres. Gypframe™/DONN T37K Main Tee and Gypframe™ N Main Bar can also be suspended from timber floors and purlins.

4. 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 (9.5°) and the ceiling is suspended more than 2m.
- The ceiling mass exceeds 20kg/m².
- The main ceiling framework is 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

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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.

Ceiling Drop

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

5. RELATIVE HUMIDITY (RH)

Gyproc ceilings lined with RhinoBoard® or Gyptone™ ceilings are suitable for use under normal occupancy conditions. Buildings in which these linings are used should be dry, glazed and enclosed, with environmental conditions of not greater than 70% RH at 10°C to 21°C. For high humidity or high moisture conditions, MoistureResistant™ shall be used.

6. VAPOUR CONTROL

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

Two coats of vapour resistant sealer applied to the face of the lining will provide water vapour control. Install vapour membrane between framework and ceiling lining.

7. CEILING FRAMEWORK

Gypframe™/ Donn T37k Main Tees

The ceiling grid (concealed grid) consist of Gypframe™/DONN T37K Main Tee (3600mm) framework spaced at 1200mm centres. The grid is then suspended from the structure using the appropriate hanger. The suspension system shall support the ceiling assembly described with a maximum deflection of 1/360 of the span.

Gypframe™/ DONN T32k Cross Tees

Install Gypframe™/DONN T32K Cross Tee (1200) clipped into Gypframe™/DONN T37K Main Tee at 600mm, 400mm, 300mm centres with capping of galvanised **steel**.

Gypframe™ UltraSTEEL® Brandering

Gypframe™ UltraSTEEL® Brandering should be installed onto Gyproc Suspension Bracket. Gyproc Suspension Bracket are fixed to the timber joists/trusses using 32mm Gyproc Grabber Screws.

Maximum joist/tie beam spacing shall be 1200mm centres.

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Timber Brandering

Timber brandering can be fixed directly onto the joists/trusses. The size of timber brandering used will depend on the joists/truss spacing.

Brander Sizes - Truss/Joist Spacing:

UP to 1000mm = 38mm x 38mm Timber brandering

1000mm to 1200mm = 38mm x 50mm Timber brandering (with the 50mm dimension vertical)

1200mm to 1400mm = 50mm x 76mm Timber brandering (with the 76mm dimension vertical.)

Gypframe™ N Main Bar

The ceiling grid (concealed grid) consist of Gypframe™ N Main Bar (3660mm) framework spaced at 1000mm centres. The grid is then suspended from the structure using the appropriate hanger. The suspension system shall support the ceiling assembly described with a maximum deflection of 1/360 of the span.

Gypframe™ N Cross Furring Channel

Install Gypframe™ N Cross Furring Channel (3600) clipped into Gypframe™ N Main Bar at 280mm, 400mm, 480mm, 600mm centres.

8. SUSPENSION - RIGITONE® BOARD LININGS

Gypframe™/ Donn Framework

Gypframe™/DONN T37K Main Tee are installed at maximum 1200mm centres. The Gypframe™/DONN T37K Main Tee shall be suspended using 25mm x 25mm Gyproc Galvanised Angle at 1200mm centres along the length of the Gypframe™/DONN T37K Main Tee. In addition to this, the Gypframe™/DONN T32K Cross Tee should be installed at 300mm centres. Additional Gypframe™/DONN T32K Cross Tee should be fixed to the Gypframe™/DONN T37K Main Tee using Gyproc Angle Cleats.

Gypframe™ N Framework

Gypframe™ N Main Bars are installed at maximum 1000mm centres. The Gypframe™ N Cross Furring Channel shall be suspended using 25mm x 25mm Gyproc Galvanised Angle at 1000mm centres along the length of the Gypframe™ N Main Bar. In addition to this, the Gypframe™ N Cross Furring Channel should be installed 280mm (9 notches) centres. Additional Gypframe™

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N Cross Furring Channel should be fixed to the Gypframe™ N Main Bar using Gyproc Angle Cleats.

9. CEILING HANGERS

Hangers should be suitably fixed to the structure using suitable fixing devices. Gypframe™/DONN T37K Main Tee shall be suspended from the structure using 25mm x 25mm Gyproc Galvanised Angle 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.

Steel brandering shall be suspended from the structure using Gyproc Suspension Bracket (for steel Brandering). 25mm x 25mm Gyproc Galvanised Angles shall be used to suspend Gypframe™/DONN T37K Main Tee grid from purlins or timber joists/trusses. Building structure should be at 1200mm centres.

Timber brandering can be fixed directly onto the joists/trusses. The size of timber brandering used will depend on the joists/truss spacing. Timber branders should be spaced at max 600mm centres.

Gypframe™ N Square Angle can be fixed at 1000mm intervals. The space between the wall and the first suspension point is not more than 400mm. Measure 17mm above the perimeter angle and mark the bottom level of the Gypframe™ N Square Angle hangers. Using a fish line or laser-level, transfer the mark to the Gypframe™ Square Angle hangers. Cut the Gypframe™ N Square Angle hangers on the fish line or laser-level mark.

NB: In situations where only the Gypframe™ is used as a perimeter angle, the bottom level of the hangers can be determined using the shorter side (17mm) of the Gypframe™ N Square Angle.

10. CEILING PERIMETER DETAIL

Where shadowline perimeter detail is required for skimmed ceilings, use 9.5mm and 12.5mm Gypframe™/ DONN Plaster Trim. Use 9.5mm Gypframe™/ DONN Plaster Trim with a skimmed 9.5mm Gyproc RhinoBoard®, 12.5mm Gypframe™/ DONN Plaster Trim with a skimmed 12.5mm Gyproc RhinoBoard®. Gypframe™/ DONN Plaster Trim shall be fixed to the perimeter wall at 300mm centres and are not to carry the ceiling framework load. Ceiling framework hangers to not exceed 150mm from the perimeter wall.

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Gyproc QuickCornice™ and Gyproc Rhino Cove Cornice™ should be fixed to the perimeter wall using Gyproc RhinoBed®, Cornice adhesive, Flexible adhesive respectively.

For Fire rated ceilings, we recommend using Gyproc Rhino Cove Cornice™ fixed to perimeter wall using Gyproc RhinoBed®.

11. DYNAMIC LOADS ON CEILINGS

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 LINING

Tightly butt boards together. The boards shall be installed with the longer side running perpendicular to the direction of branding or Gypframe™/DONN T32K Cross Tee. The boards shall be installed with the shorter side joints staggered by at least 300mm and centered on ceiling framework where required install additional framing. For a two-layer lining, stagger joints between layers by at least 600 mm.

For single layer lining onto a steel framework: fix boards securely using 25mm RhinoBoard® Gyproc Sharp-point Screws at maximum 150mm centres.

For Double layer lining onto a steel framework: fix first layer using 25mm RhinoBoard® Gyproc Sharp-point Screws at maximum 150mm centres and fix second layer with 42mm RhinoBoard® Gyproc Sharp-point Screws at maximum 150mm centres.

For single layer lining onto a timber framework: Fix boards securely using 32mm Gyproc Grabber Screws at maximum 150mm centres. For plastered ceilings only 32mm Gyproc Grabber Screws must be used. Do not use semi-clout nails.

Position fixings not less than 13mm from cut edges and 10mm from bound edges of boards. Set heads in a depression; do not break paper or gypsum core.

13. THERMAL PERFORMANCE

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.

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14. CLIMATIC ZONES

Refer to SANS 10400 XA and SANS 204.

15. ACOUSTIC PERFORMANCE

Isover Soundlite® / Cineplex® / Glasswool 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.

Gyptone™ and Rigitone® boards are perforated and designed to provide sound absorption when used in conjunction with an air space behind the ceiling. Increased levels of sound absorption can be achieved by installing glasswool insulation onto the ceiling.

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).

Where sound insulation room-to-room is required, sound attenuation (Dncw) 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. 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.

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.



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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

16. CONTROL/ EXPANSION JOINT

Gyproc Control Joints may be required in certain ceilings to relieve stresses induced by expansion and contraction of the structure. Control joints are visible and may impinge on the aesthetics of the building. Consequently, the position of the control joints should be determined by the architect/designer. Control joints shall be specified where any of the conditions listed below exist;

- Control joints are required to relieve stress induced by expansion or contraction of drywall due to:
 - Where excessive movement is likely to occur.
 - RhinoBoard® internal stresses, this is mostly due to thermal and moisture changes.
 - Where the building/ substrate structural system/ material changes.
 - Drywall abuts with plywood, chipboard...etc. (or any other type of cladding)
- Guidance as recommended for preparation of expansion joints in RhinoBoard® ceilings
 - Interior ceilings with perimeter relief: Control joints shall be installed so that linear dimensions between control joints shall not exceed 15m and total area between control joints does not exceed 225m².
 - Interior ceilings without perimeter relief: Control joints shall be installed so that the linear dimensions between control joints shall not exceed 9m and total area between control joints does not exceed 81m².
 - Exterior ceilings and soffit: Control joints shall be installed so that linear dimensions between control joints shall not exceed 9m and total area between control joints not exceed 81m².
 - A control joint is desired or incorporated as a design accent or architectural feature.

Gyptone™ Rigitone® Expansion Joints:

Gyptone™ Rigitone® boards should be cut 10mm short of the perimeter walls and should not be fixed to the perimeter channel.

17. SERVICES

The plenum can be used to route all service requirements including ducting, pipework, electrical cables and conduits. Where light fittings, access panels and similar components are incorporated as part of the design requirements, consideration must be given to maintaining the integrity of the ceiling to meet fire resistance and sound insulation requirements.

18. FIRE PERFORMANCE

Fire rating shall be in accordance with SANS 10177-2. Concealed grid ceiling can achieve full fire rating (Stability, Integrity & Insulation).

Where fire / smoke baffles are required, these can be created using RhinoBoard® FireStop® fixed to a metal or timber frame. The framework should be fixed to the building structure to avoid undue loading of the ceiling suspension grid or, alternatively, additional hangers should be incorporated to support the ceiling alongside the fire/smoke baffle.

19. FIXTURES

Fixings to the system should always be made into the ceiling grid or to supplementary framing. Where heavy loads are anticipated, an independent suspension should be provided from the structure.

20. CEILING SYSTEMS FINISHES AND SPACINGS

Rigitone® Finish

Additional care and attention should be taken when jointing Rigitone® boards so as not to fill the perforations and impair the acoustic performance of the finished ceiling.

Skimmed Finish

For a skimmed finish, apply Gyproc RhinoLite® to a minimum thickness of 3mm. Gyproc Skimmed Ceiling System offers a durable ceiling lining.

Jointed Finish

For a jointed finish, Gyproc RhinoLite® shall be applied 300mm wide on the tapered side of the board and 600mm wide on the butt jointed sides.

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M-Strip Finish

Install Gyproc M-strip Joints to the joint locally manufactured spot/cover all the screw heads Gyproc RhinoLite®.

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Branding

FINISH	BOARD TYPE	BRANDER SPACINGS	CEILING SYSTEM
M-STRIP	6.4	400	GYPROC M-STRIP CEILING SYSTEM_ STEEL BRANDING
M-STRIP	6.4	400	GYPROC M-STRIP CEILING SYSTEM_ TIMBER BRANDING
SKIMMED	6.4	300	GYPROC SKIMMED CEILING SYSTEM_6.4mm
JOINTED	9.5	500	GYPROC JOINTED CEILING SYSTEM_9.5mm
SKIMMED	9.5	400	GYPROC SKIMMED CEILING SYSTEM_9.5mm
JOINTED	12.5	600	GYPROC JOINTED CEILING SYSTEM_12.5mm
SKIMMED	12.5	600	GYPROC SKIMMED CEILING SYSTEM_12.5mm

21. JOINTS

Gyproc RhinoBoard® boards to be lightly butt together with all joints staggered. Centre all ceiling joints on ceiling framework. Additional ceiling framework to be provided as necessary to ensure support to all vertical edges of boards.

For two-layer lining, stagger joints between layers by at least 600 mm.

For two layer boarding framing must support the outer layer.

22. PAINTING: PLASTER FINISH/ JOINTED FINISH

Saint-Gobain Construction products reference: Gyproc RhinoLite® / Gyproc RhinoLite® CreteStone® / Gyproc RhinoLite® Natural Plus® / Gyproc RhinoGlide®. Primer: As per manufacturers recommendation. Paint to be applied as per project specification. Do not use epoxy paints.

23. CURVED CEILINGS

Planning – Key Factors

Board joints should be avoided on the apex of the curve for the exposed layer of board. The positioning of all framework, therefore, needs to be determined at the design stage.

Degree of Curvature

In common with other sheet materials, board-ends have a tendency to remain straight. The minimum radius, therefore, will be influenced by the board characteristics, the length of curve, the support centres, and the occurrence of board joints.

Board Finishing

Whilst a good quality finish can be achieved using normal jointing techniques, a plaster skim finish may be considered (with the exception of Gyptone™ and Rigitone® boards), particularly where there are a number of butt-end joints on the curve.