

# GYPROC X-RAY PROTECTION

*Lead-free X-Ray Protection system*



# FOR X-RAY AREAS OF HEALTHCARE BUILDINGS



# Gyproc® X-Ray Protection

## Lead-free X-Ray board protection system

Alternative lead-free X-ray shielding materials are developed in the modern era, both for room shielding or for personal protection of the staff working in X-rays areas. The Gyproc® X-Ray Protection lead-free lining system for walls and ceilings in building applications has therefore been developed thoroughly to offer a sustainable lead-free protection where there is a need for X-ray shielding.

Gyproc® X-Ray Protection System comprises a specially designed plasterboard and jointing compound, manufactured using a specific ingredient: barium sulphate. Barium sulphate is a naturally occurring inert mineral, frequently used medically as a radiocontrast agent for X-ray imaging and other diagnostic procedures.



# Sustainability

## Sustainability at the heart of X-Ray

Through its lead-free composition, X-Ray Protection board combines superior quality with reduced health and environmental impacts. This Eco-Innovation is the reflect of Saint-Gobain commitment to more sustainable products and solutions for its customers.



**REDUCED CARBON FOOTPRINT**

A low carbon footprint solution compared to traditional systems with lead

*Did you know that the carbon footprint is reduced by 48% compared to traditional plasterboards system with lead?*




**RESOURCE-EFFICIENT**

100% recyclable and made of natural non-toxic raw materials

*Funny fact: Barium sulphate is harmless if ingested. It is used in pills as contrast agent in radiological tests and then expelled without any side effect*



**REDUCED ENVIRONMENTAL AND HEALTH IMPACT**




**SAFER MATERIAL**

**LEAD-FREE:**  
No hazardous substances and no exposure during installation and use phase.



*Did you know that X-Ray Protection board is easier to recycle compared to other shielding materials for X-Ray?*



**LOW VOC EMITTING MATERIAL**




- INSTALLERS HEALTH & WELL-BEING**
- Easy to cut
  - Easy to install
  - Safe to install (no hazardous product)
  - No need for specific installation tools or special lead accessories
  - Low emissive products
- END-USERS HEALTH & WELL-BEING**
- Low emissive product
  - Acoustic performance

Gyproc® X-Ray Protection solutions get several Sustainability documents that you would need for your Healthcare project:

- EPD
- Eurofins Gold Certificates
- Recycled Content Certificates
- ISO 14001 Certification

## X-Ray Protection board solutions contribute to building labeling schemes

Credits of LEED standards	Possible contribution
Integrative process	1
Optimize energy performance	18
Construction and demolition waste management planning	required
Construction and demolition waste management	2
Building product disclosure and optimization-EPD	1
Building product disclosure and optimization-Sourcing of raw materials	1
Building product disclosure and optimization-material ingredients	1
Low-Emitting materials	3
Acoustic performance	1
Innovation	5
<b>Total</b>	<b>33</b>

Features of WELL standards	Possible contribution
01 Air quality standards	1
04 VOC Reduction	1
11 Fundamental material safety	1
25 Toxic material reduction	1
06 Microbe and mold control	1
26 Enhanced material safety	1
74 Exterior noise intrusion	1
80 Sound reduction surfaces	1
81 Sound barriers	1
97 Material Transparency	1
<b>Total</b>	<b>10</b>

Credits of BREEAM standards	Possible contribution
Hea 02 - Indoor Air Quality	5
Hea 05 Acoustic performance	4
Ene 01 - Reduction of energy use and carbon emissions	15
Mat 01 Life cycle impacts	6
Mat 05 - Designing for durability and resilience 1	1
Wst 01 - Construction waste management	3
Inn 01 - Innovation	10
<b>Total</b>	<b>33</b>



**INCREASED  
SUSTAINABILITY  
BENEFITS**

For additional information on building labels, visit the Green Building Website: <https://www.greenbuilding.saint-gobain.com>



Making Gyproc® X-Ray Protection system the perfect choice for X-Ray Protection in hospitals, dental clinics, veterinary, surgery areas and any other buildings where X-Ray Protection is required.

The X-ray shielding performance of the Gyproc® X-Ray Protection boards has been tested and confirmed by the Public Health Institute of England. Gyproc® X-Ray Protection is the perfect solution to modern healthcare areas, providing reliable lead-free X-rays shielding performance for wall and ceiling linings, in one easy to install dry lining solution that can be scored and snapped like a standard plasterboard.

Gyproc® X-Ray Protection also combines efficient X-Ray shielding with excellent fire resistance and

sound insulation performance, in a system which can be installed and recycled more easily and with significantly lower environmental constraints than traditional lead-lined solutions.

Gyproc® X-Ray Protection presents similar environmental credentials to plasterboards and does not release toxic compounds which could affect the quality of indoor air. Gyproc® X-Ray Protection is fully recyclable.

## Benefits through the life cycle of the building



100% lead-free X-ray shielding properties (lead-equivalence) for the board and jointing system



Indoor air quality



Environmentally friendly



Euroclass A2,s1,d0 reaction to fire and up to EI 120 fire resistance



Stable cost compared to the price volatility of lead



Lighter and easier to cut and screw-fix than lead-lined boards ensuring faster installation



High levels of sound insulation



Fully recyclable

# Application



## System performances

The Gyproc® X-Ray Protection solution provides a simplified approach to effective X-ray protection that enables less complicated installation compared to lead-lining. However, the installation still needs to be carried out by a specialist radiation protection contractor to ensure the final X-ray protection of the concerned area, as specified and designed by a radiation protection specialist.

For an X-ray protected area to achieve specified levels of radiation protection it is reliant on the successful installation of the completed X-ray enclosure, including protection for other elements such as floors, doors and windows and providing attention to detail where radiation leakage could occur. That is why these areas should be installed by a specialist.

	System <sup>2</sup>	Fire Resistance <sup>1</sup>	Sound insulation, field value R' <sub>w</sub>	Width (mm)	Max height (mm)
	1 x 12,5 mm X-Ray Protection fixed to each side of 70 mm XR studs c 450 mm centres 45 mm Isover insulation Gyproc XR 70/70 (450) X-X M45	EI 30	44 dB	95	4400
	2 x 12,5 mm X-Ray Protection fixed to each side of 70 mm XR studs c 450 mm centres 45 mm Isover insulation Gyproc XR 70/70 (450) XX-XX M45	EI 90	52 dB	120	4700

<sup>1</sup> Tested to EN1364-1:1999

<sup>2</sup> Above system values are based on installation of X-Ray boards in full wall height. Contact Gyproc Technical Support for other system applications.

# Product Details



## Gyproc X-Ray Protection

Manufactured to EN 520:2004 + A1:2009 types DFIR, A2,s1,d0 reaction to fire when tested to EN 13501-1:2007 + A1:2009. The board is identified by having a yellow coloured core and printed paper in the front face.

### Product performance

- Tested and certified X-ray shielding performance.
- Small size board format with weight <20 kg per board.
- Screw fix to metal framing like regular board using Gyproc QSTR screws.

Fill and finish all board joints using GypFill® X-Ray Protection Joint Mix jointing compound. The surface of Gyproc® X-Ray Protection board is similar to regular plasterboards and therefore is suitable for most forms of decoration.

### Storage

Boards should be stored on a firm, level surface and protected from dampness and the weather.

### Protection

The boards can be supplied in plastic wrapped packaging. In storage and on-site, it is advisable to keep the boards covered for as long as possible.



### Handling

The boards should always be carried on edge. Boards should not be lifted flat and holding the boards at one end. Boards should be turned on edge whilst in contact with the remaining stack of boards before removal for use.

Dimensions (mm)	
Thickness	12.5
Width	600
Lengths	1800 / 2400
Characteristics	
Weight board	18 kg/m <sup>2</sup>
Longitudinal edge	Tapered
N° of boards per pallet	20 / 40

# Product Details



## GypFill® X-Ray Protection – Joint Mix

Specially formulated ready mix air drying jointing compound, including barium sulphate for filling Gyproc® X-Ray Protection board joints to complete the X-Ray Protection lining system. Manufactured to EN 13963: 2005. 10 litre/bucket.

### Product performance

- Tested and certified X-ray shielding performance.
- Excellent adhesion properties.
- Ready mixed for ease of use.
- Shelf life of 12 months.
- Formulated for excellent workability.

### Application

This jointing compound should be applied directly from the bucket without adulteration to ensure that the X-Ray Protection performance is not compromised.

The product is identified by having a distinct yellow colour.

Easy cleaning of application tools. Use of paper tape in conjunction with joint mix is only needed for outer layer board joints.

Used to fill flush to the surface of under layer board joints and other gaps at perimeters or abutments to complete the integrity of the X-Ray Protection.

Typical product characteristics	
Bucket Weight	20 kg (10 L)
Density	2.0 kg/l
Coverage	0,8 kg/lm (0,4 L/lm)



# Specification

It is important that X-ray protection is designed and then specified correctly followed by specialist installation on site. For all projects where X-ray protection is required, a Radiation Protection Advisor will provide a report on what is required for each area depending on the X-ray equipment that is to be used. On larger healthcare buildings projects, it is very likely that an accompanying Radiation Protection Report will also be needed, with detailed information on the requirements.

The Gyproc® X-Ray Protection solution has been designed and manufactured to comply with specific requirements for use in X-ray protection applications. For all such applications, it is essential to use the services of a suitably qualified and authorised Radiation Protection specialist advisor, who will advise on the required steps to take in order to achieve the most effective level of protection.

Lead thickness (mm)	Power output of the X-Ray device										
	30kV	40kV	60kV	70kV	80kV	90kV	100kV	125kV	130kV	140kV	150kV
0,25	2	2	2	2	2	2	2	2	2	2	2
0,5	2	2	2	2	2	2	2	2	2	2	2
1	2	2	2	2	2	2	2	3	3	3	3
1,5	2	3	3	3	2	2	3	4	4	4	5
2	2	3	4	3	3	3	3	5	5	6	6
2,5	2	3	5	4	3	3	4	6	6		
3	2	3	6	4	4	4	4				
3,5	2	3	6	5	4	4	5				
4				5	5	5	6				
	<b>Number of X-Ray Protection boards (layers) <sup>1</sup></b>										

<sup>1</sup> Note that the number of board layers needed, is not linear to the power output. When using x-ray machines with varying voltage levels, make sure to specify the highest number of board layers needed within the kV range

The values in this table are a recommendation for Gyproc® X-Ray Protection system based on lead equivalence performance from the testing in accordance with IEC 61331-1:2014 and the Monte Carlo simulation method for low source energies or

extreme level of attenuation both performed by the Radiation Metrology Group of Public Health England. Above values include a 10 % safety factor from tested lab values.



# Certification

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Gyproc® X-Ray Protection board (previously branded XRoc) and jointing compounds have been independently tested and certified by the Radiation Metrology Group of Public Health England for lead-equivalence performance in accordance with IEC 61331-1:2014.

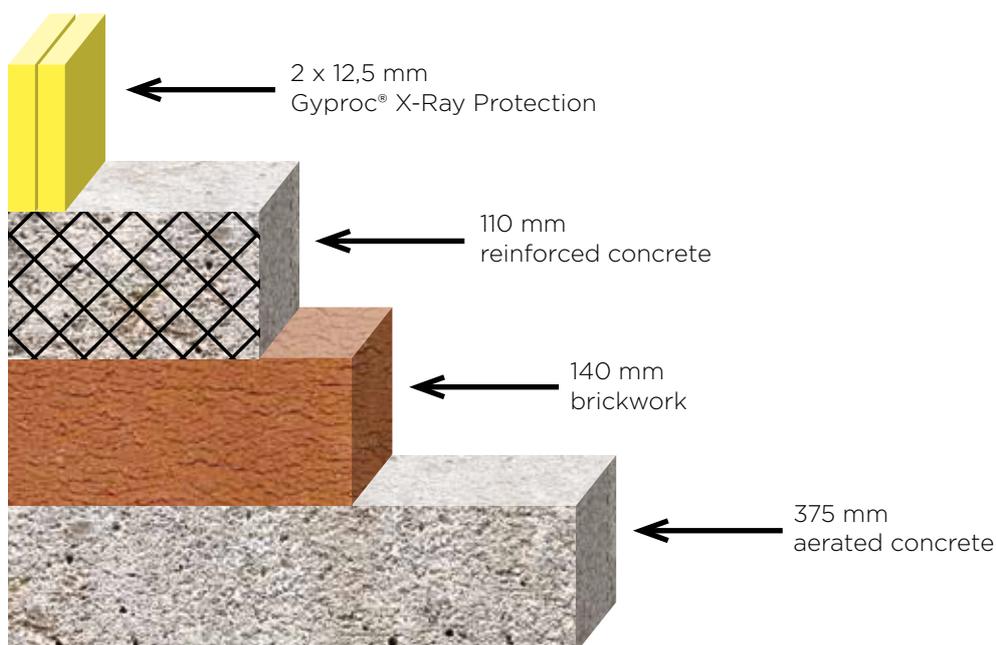
The claimed performance is strictly monitored and maintained during the manufacturing process under the Quality Assurance of ISO 9001 and World Class Manufacturing procedures adopted by all Saint-Gobain Gypsum manufacturing sites.

## Comparison with other classical lead-free X-Ray protection materials

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Besides lead, different materials can be used for X-ray shielding. Heavy materials like brick or concrete are also extensively used as they are easily available at affordable prices. However, in order to ensure efficient X-ray shielding, significant volumes of such materials are required.

As an example, in a room where there is placed an equipment having a radiation output of 80kv with a requirement of 1.5 mm of lead-equivalence, 110 mm of reinforced concrete or 140 mm of brickwork would be needed to ensure the same performance as only 25 mm of Gyproc® X-Ray Protection boards!



# Installation

## Metal profiles

Studs and channels used in Gyproc® X-Ray Protection systems are the same as in regular plasterboards installation. Floor & Ceiling Channels must be securely fixed with suitable fixings at c distance 400 mm.

## Board handling

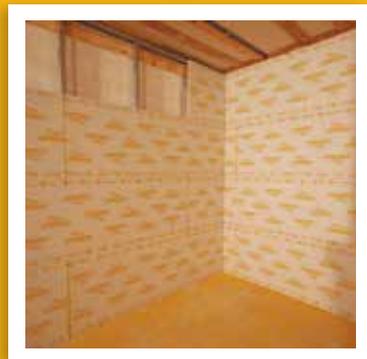
Handle and cutting of Gyproc® X-Ray Protection board is similar to a high density plasterboard. Special cutting tools are not necessary.

## Board installation

Gyproc® X-Ray Protection boards are fixed horizontally to metal framing, positioned at no greater than 600 mm centres. Boards should be installed with the tapered edges butted together and the square cut ends to be scored with a v-shape angle.

## Fixing

Inner layer boards are fixed on their perimeter only to metal framing using Gyproc QSTR screws at 300 mm centres. The outer layer board is fixed to all metal framing at 300 mm centres. Board joints are staggered between layers and each side of the partition by at least one stud spacing and vertically by half a board width.



## Jointing

Transversal edges must be cut with "V" shape to ensure penetration of the jointing compound.

Vertical joints ("V" cut shape) must be filled first. Horizontal joints (tapered edges) must be filled second.

All joints between boards in outer layer should be taped and filled using GypFill X-Ray Protection - Joint Mix jointing compound. In multi-layer systems, inner layer board joints must be filled to the surface but no tape is required. Any joints at perimeters and at abutments with other construction elements also screw heads and any gaps or surface defects in each board layer are filled with GypFill X-Ray Protection - Joint Mix jointing compound to complete the integrity of the X-Ray shielding performance.

## Finishing

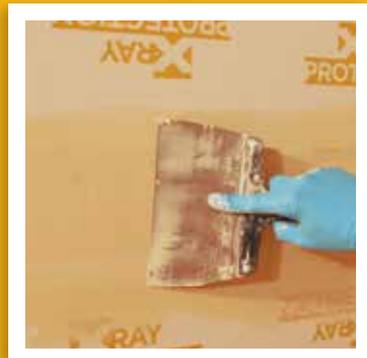
The surface is then prepared like regular plasterboard for the final finish that is required. Paint, tiles, vinyl or any other finishing is possible.

## High Traffic areas

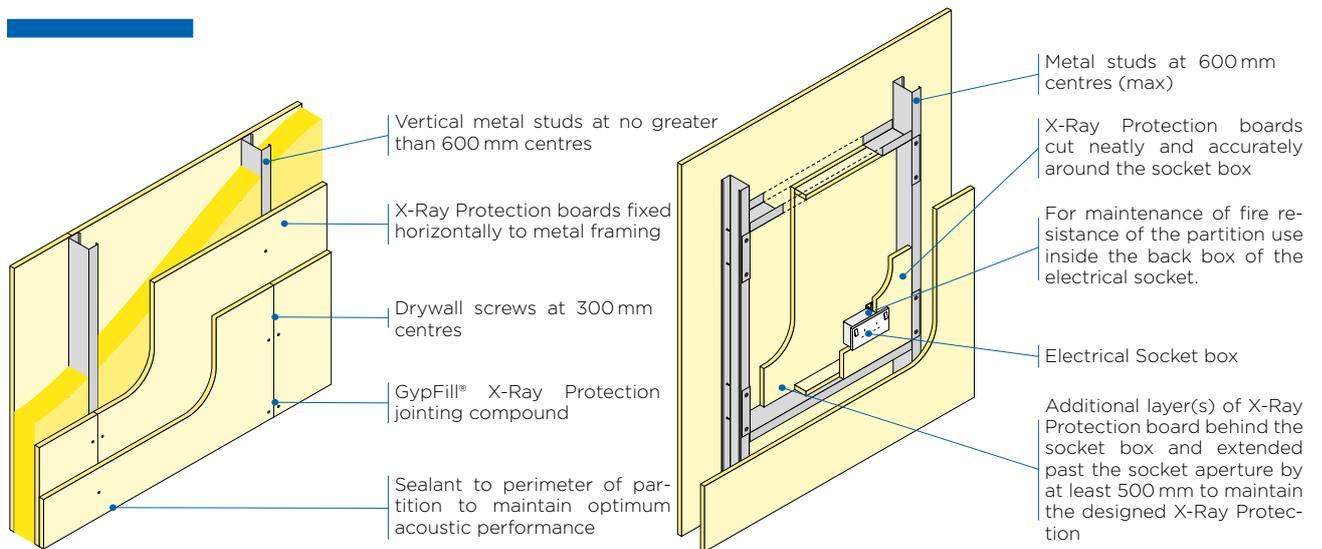
In high traffic areas, where damage to the Gyproc® X-Ray Protection lining could be encountered and may compromise the designed levels of X-Ray Protection, consideration should be given to adding an extra layer of high durability plasterboard such as Gyproc Habito® fixed vertically.

## Services

Gyproc® X-Ray Protection board must not be perforated. It is recommended to install a plasterboard wall-lining with Habito® to allow all the cables, pipes, installations and devices hanged to the wall. In case of perforation of Gyproc X-Ray board for services, special anti X-Ray socket-box or similar must be installed.

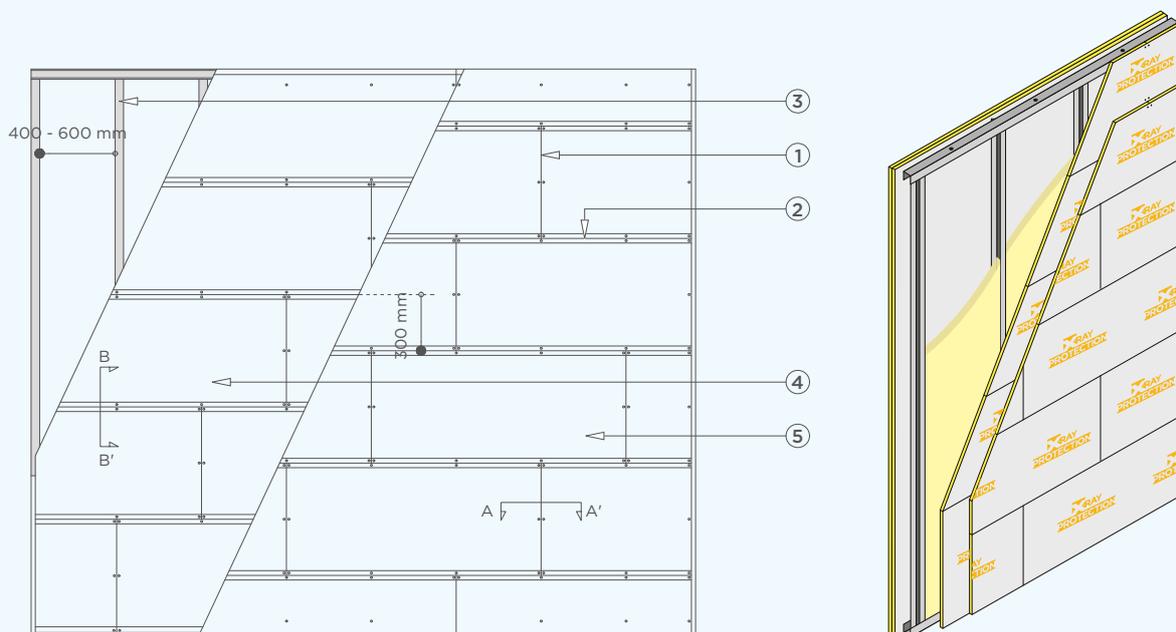


# Design considerations



Electrical switch and socket outlets should ideally be located away from X-Ray protected walls or be surface mounted. However, where this cannot be avoided, the detail above could be used to maintain the integrity of the X-Ray Protection.

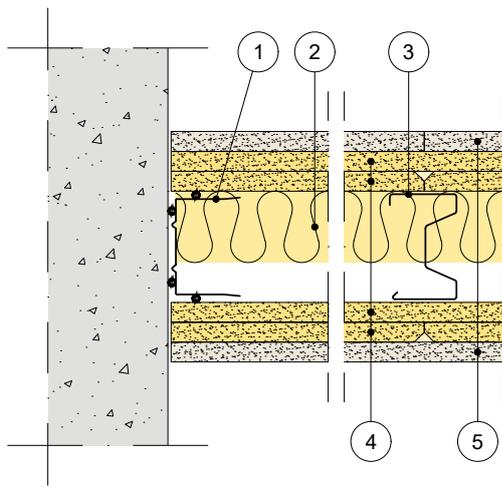
## 2 LAYERS OF GYPROC® X-RAY PROTECTION BOARD STRAGGERED



1. Butt end joint
2. Horizontal joint
3. Metal system. Maximum of 600 mm stud centres.
4. 1st layer of Gyproc® X-Ray Protection board. Fixed horizontally with vertical short edge joints staggered one stud spacing.
5. 2nd layer of Gyproc® X-Ray Protection board. Offset from 1st layer by 300 mm horizontally and one stud spacing vertically.

# Construction details - Partitions

## Connection to heavy construction



### Horizontal

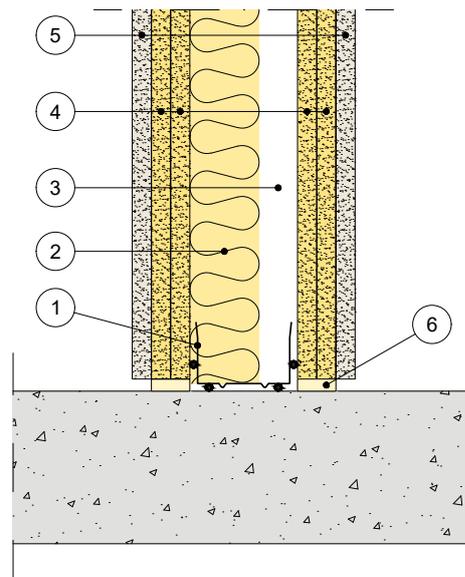
1. Edge profiles Gyproc AC 70/40-120/40 ACOUnomic <sup>1</sup>
2. Mineral wool according to wall type and sound insulation class
3. Studs Gyproc XR 70-120
4. 12.5 mm Gyproc GXS 13 X-Ray Protection Board <sup>2</sup> All board joints to be filled with Gypfill X-Ray Protection JOINT MIX
5. 12.5 mm Gyproc plasterboard as a finishing cladding for simpler surface treatment, can possibly be omitted

### Comments

<sup>1</sup> Sound class can also be obtained by using channel SKP and acoustic sealant.

<sup>2</sup> The required number of board layers is determined according to the current power output and necessary lead equivalence.

## Connection to heavy construction



### Vertical

1. Edge profiles Gyproc AC 70/40-120/40 ACOUnomic <sup>1</sup>
2. Mineral wool according to wall type and sound insulation class
3. Studs Gyproc XR 70-120
4. 12.5 mm Gyproc GXS 13 X-Ray Protection Board <sup>2</sup> All board joints to be filled with Gypfill X-Ray Protection JOINT MIX
5. 12.5 mm Gyproc plasterboard as a finishing cladding for simpler surface treatment, can possibly be omitted
6. Joint filler Gypfill X-Ray Protection JOINT MIX

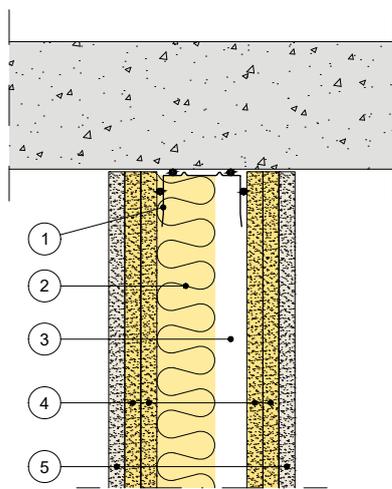
### Comments

<sup>1</sup> Sound class can also be obtained by using channel SKP and acoustic sealant in final layer 12.5 mm Gyproc plasterboard.

<sup>2</sup> The required number of board layers is determined according to the current power output and necessary lead equivalence.

# Construction details – Partitions

## Connection to heavy construction



### Vertical

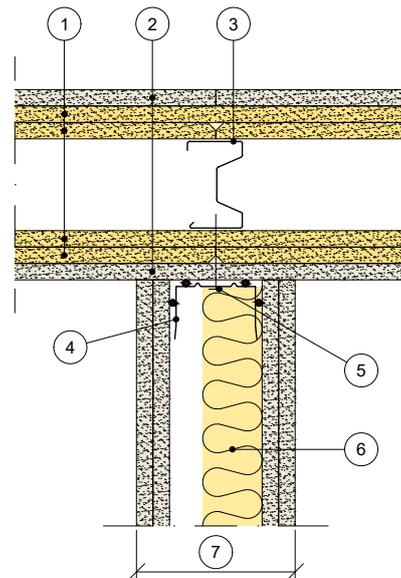
1. Edge profiles Gyproc AC 70/40-120/40 ACOUNOMIC <sup>1</sup>
2. Mineral wool according to wall type and sound insulation class
3. Studs Gyproc XR 70-120
4. 12.5 mm Gyproc GXS 13 X-Ray Protection Board <sup>2</sup> All board joints to be filled with Gypfill X-Ray Protection JOINT MIX
5. 12.5 mm Gyproc plasterboard as a finishing cladding for simpler surface treatment, can possibly be omitted

#### Comments

<sup>1</sup> Sound class can also be obtained by using channel SKP and acoustic sealant.

<sup>2</sup> The required number of board layers is determined according to the current power output and necessary lead equivalence.

## T-Junction



### Horizontal

1. 12.5 mm Gyproc GXS 13 X-Ray Protection Board <sup>1</sup> All board joints to be filled with Gypfill X-Ray Protection JOINT MIX
2. 12.5 mm Gyproc plasterboard as a finishing cladding for simpler surface treatment, can possibly be omitted
3. Studs Gyproc XR 70-120
4. Edge profiles Gyproc AC 70/40-120/40 ACOUNOMIC <sup>2</sup>
5. Screw Gyproc QS 51 cc 400 mm Alternative fastening with expanding metal anchors cc 400 mm
6. Mineral wool according to wall type and sound insulation class
7. Gyproc interior partition

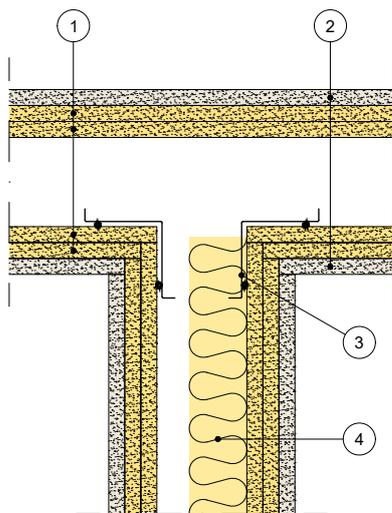
#### Comments

<sup>1</sup> The required number of board layers is determined according to the current power output and necessary lead equivalence.

<sup>2</sup> Sound class can also be obtained by using channel SKP and acoustic sealant.

# Construction details – Partitions

## T-Junction



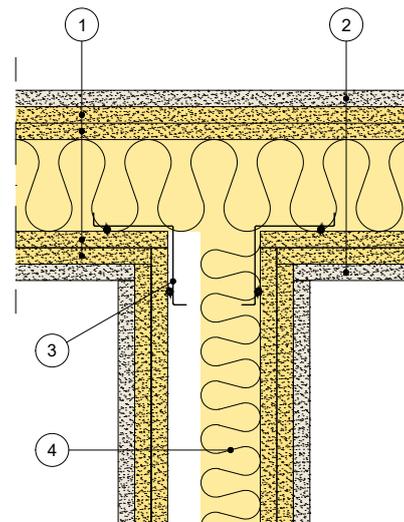
### Horizontal

1. 12.5 mm Gyproc GXS 13 X-Ray Protection Board <sup>1</sup> All board joints to be filled with Gypfill X-Ray Protection JOINT MIX
2. 12.5 mm Gyproc plasterboard as a finishing cladding for simpler surface treatment, can possibly be omitted
3. Corner stud Gyproc AC 60-HR ACOUnomic <sup>2</sup>
4. Mineral wool according to wall type and sound insulation class

### Comments

<sup>1</sup> The required number of board layers is determined according to the current power output and necessary lead equivalence.  
<sup>2</sup> Sound class can also be obtained by using corner stud HR 60/60 and acoustic sealant.

## T-Junction



### Horizontal

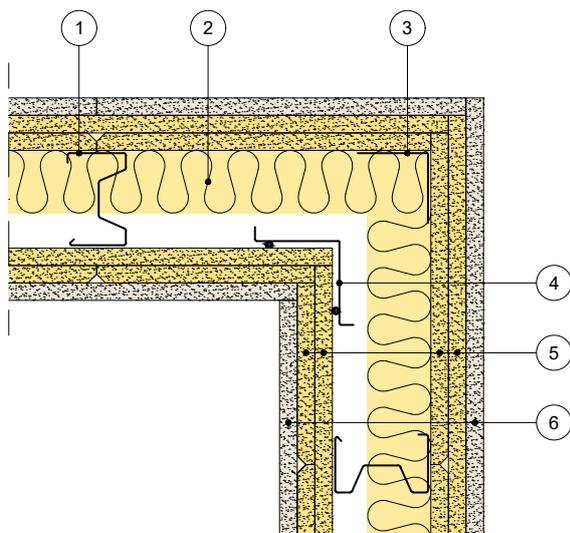
1. 12.5 mm Gyproc GXS 13 X-Ray Protection Board <sup>1</sup> All board joints to be filled with Gypfill X-Ray Protection JOINT MIX
2. 12.5 mm Gyproc plasterboard as a finishing cladding for simpler surface treatment, can possibly be omitted
3. Corner stud Gyproc AC 60-HR ACOUnomic <sup>2</sup>
4. Mineral wool according to wall type and sound insulation class

### Comments

<sup>1</sup> The required number of board layers is determined according to the current power output and necessary lead equivalence.  
<sup>2</sup> Sound class can also be obtained by using corner stud HR 60/60 and acoustic sealant.

# Construction details – Partitions

## Corner



### Horizontal

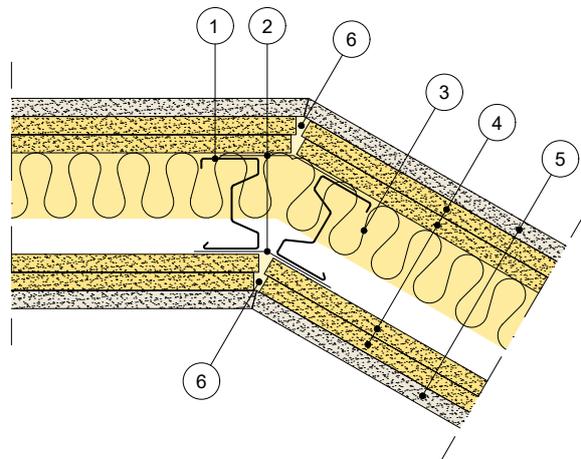
1. Studs Gyproc XR 70-120
2. Mineral wool according to wall type and sound insulation class
3. Corner profile Gyproc H 50/50
4. Corner stud Gyproc AC 60-HR ACOUnomic <sup>1</sup>
5. 12.5 mm Gyproc GXS 13 X-Ray Protection Board <sup>2</sup> All board joints to be filled with Gypfill X-Ray Protection JOINT MIX
6. 12.5 mm Gyproc plasterboard as a finishing cladding for simpler surface treatment, can possibly be omitted

### Comments

<sup>1</sup> Sound class can also be obtained by using corner stud HR60/60 and acoustic sealant.

<sup>2</sup> The required number of board layers is determined according to the current power output and necessary lead equivalence.

## Splayed angle



### Horizontal

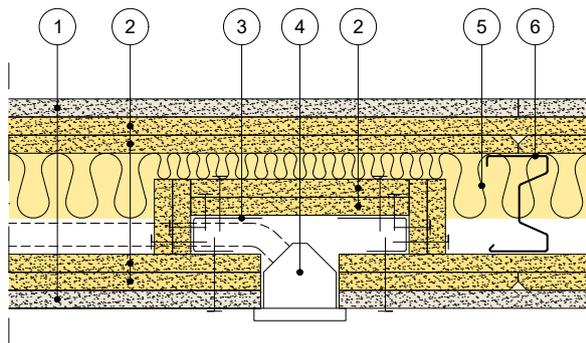
1. Studs Gyproc XR 70-120
2. Variable sheet metal Gyproc VPB 50/50 alt. variable corner profile VH 50/50
3. Mineral wool according to wall type and sound insulation class
4. 12.5 mm Gyproc GXS 13 X-Ray Protection Board <sup>1</sup> All board joints to be filled with Gypfill X-Ray Protection JOINT MIX
5. 12.5 mm Gyproc plasterboard as a finishing cladding for simpler surface treatment, can possibly be omitted
6. Joint filler Gypfill X-Ray Protection JOINT MIX

### Comments

<sup>1</sup> The required number of board layers is determined according to the current power output and necessary lead equivalence.

# Construction details – Partitions

## Electricity box in X-Ray Protection wall



### Horizontal

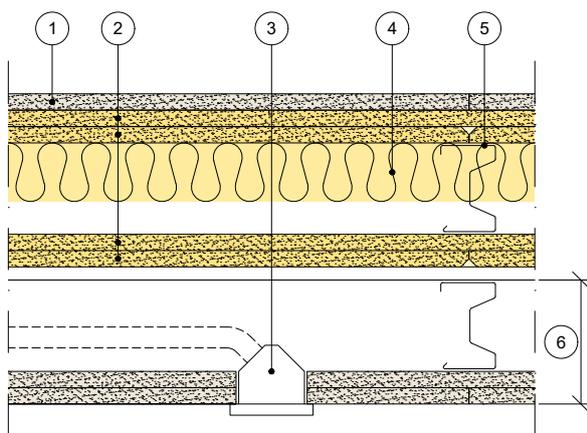
1. 12.5 mm Gyproc plasterboard as a finishing cladding for simpler surface treatment, can possibly be omitted
2. 12.5 mm Gyproc GXS 13 X-Ray Protection Board <sup>1</sup> All board joints to be filled with Gypfill X-Ray Protection JOINT MIX
3. Edge profile Gyproc GK-C
4. Installation box
5. Mineral wool according to wall type and sound insulation class
6. Studs Gyproc XR 70-120

### Comments

<sup>1</sup> The required number of board layers is determined according to the current power output and necessary lead equivalence.

# Construction details – Partitions

## Electrical box in extension wall



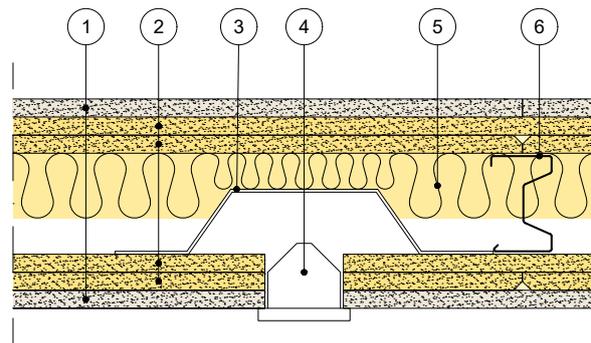
### Horizontal

1. 12.5 mm Gyproc plasterboard as a finishing cladding for simpler surface treatment, can possibly be omitted
2. 12.5 mm Gyproc GXS 13 X-Ray Protection Board <sup>1</sup> All board joints to be filled with Gypfill X-Ray Protection JOINT MIX
3. Installation box
4. Mineral wool according to wall type and sound insulation class
5. Studs Gyproc XR 70-120
6. Gyproc extension wall for installations

### Comments

<sup>1</sup> The required number of board layers is determined according to the current power output and necessary lead equivalence.

## Electrical box in X-Ray Protection wall



### Horizontal

1. 12.5 mm Gyproc plasterboard as a finishing cladding for simpler surface treatment, can possibly be omitted
2. 12.5 mm Gyproc GXS 13 X-Ray Protection Board <sup>1</sup> All board joints to be filled with Gypfill X-Ray Protection JOINT MIX
3. Gyproc Lead Covers, t = 2,0 mm
4. Installation box
5. Mineral wool according to wall type and sound insulation class
6. Studs Gyproc XR 70-120

### Comments

<sup>1</sup> The required number of board layers is determined according to the current power output and necessary lead equivalence.



1. Studs every maximum 600 mm



2. Boards installed horizontally



3. Screws every 300 mm



4. Vertical joints



5. Horizontal joints



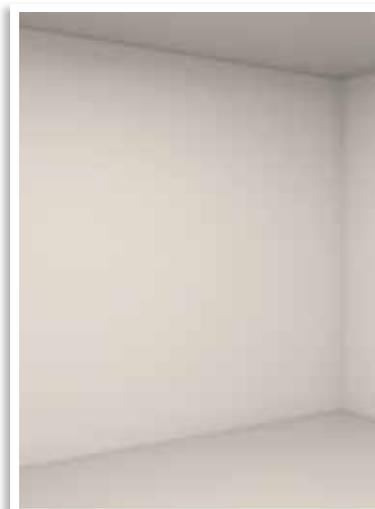
6. 2nd layer of boards



7. Vertical joints 2nd layer



8. Horizontal joints 2nd layer



9. Finishing

## When you choose Gyproc, you also choose a sustainable solution

At Gyproc, we have for several years worked intensively to create products and methods that not only meet the requirements of the market and building legislation, but also for future challenges in terms of resource use, climate and sustainability.

### Nature's own materials

Our products are based on gypsum, a naturally occurring material on earth. Gypsum does not contain environmentally hazardous or toxic substances. These properties are an important starting point for a sustainable building material.

At [www.gyproc.se](http://www.gyproc.se) you can read more about our work in this area.

### Gyproc SystemSäkring

Gyproc SystemSäkring is your security for optimally implementing projects with gypsum-based solutions for lightweight construction technology. With Gyproc SystemSäkring, you can feel confident that all systems have been tested partly by certified institutes, and partly in practice on construction sites. Of course, all systems and products live up to current regulations. Gyproc SystemSäkring also includes technical support and advice that guarantees an optimally completed project – before, during and after work.

### ISO and OHSAS

Gyproc has a quality, environmental, work environment and energy management system with routines and processes that are certified by RISE and meet the requirements of ISO 9001, ISO 14001, OHSAS 18001 and ISO 50001.

### Recycling

Gyproc gypsum boards are a pure recycled product. Gyproc has a program for recycling recycled gypsum, among other things by retrieving gypsum waste from construction sites and retailers.



#### Saint-Gobain Sweden AB

Gyproc, Box 153  
SE-746 24 Bålsta  
Customer Service: +46 (0) 171 41 54 60  
[orderse@gyproc.com](mailto:orderse@gyproc.com)  
Technical Support: +46 (0) 171 41 54 80  
[support@gyproc.com](mailto:support@gyproc.com)  
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