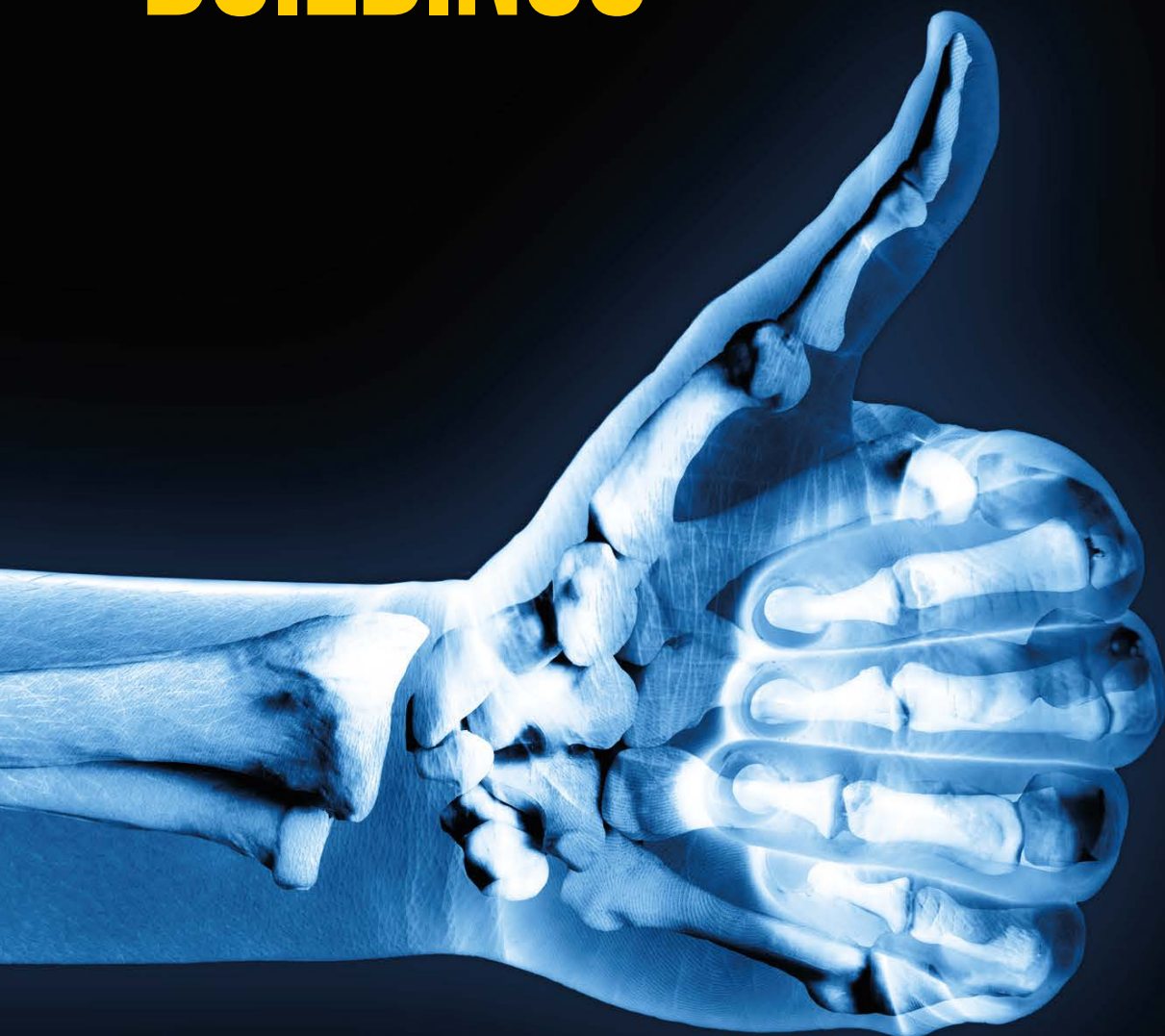


Gyproc® X-Ray Protection

Lead-free X-Ray Protection system



FOR X-RAY AREAS OF HEALTHCARE BUILDINGS

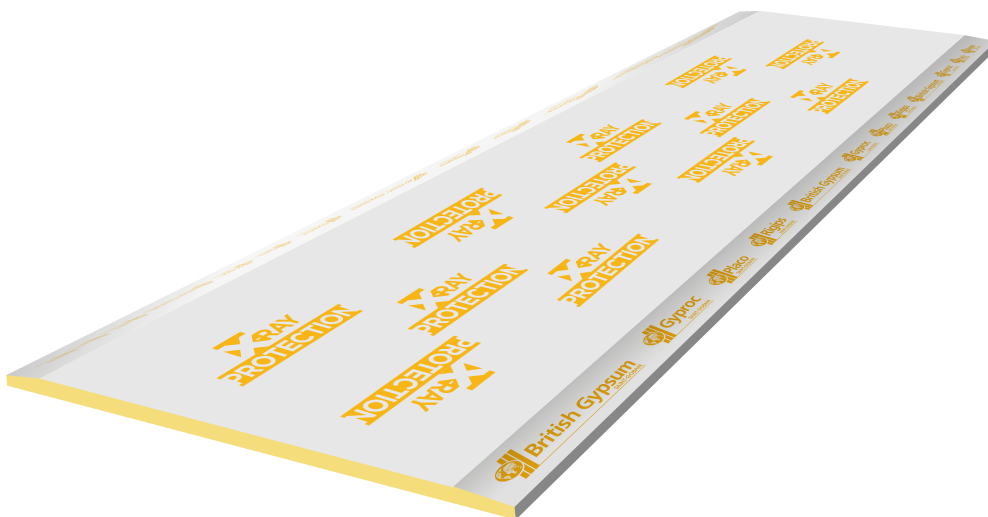


Gyproc® X-Ray Protection

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.





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 retro-fitted 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

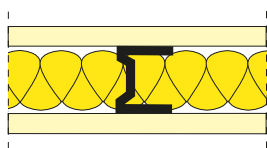
Application



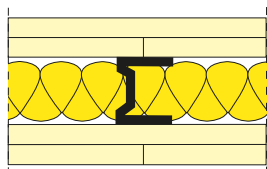
System performances

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	Fire Resistance ¹	Sound Insulation ²	Width (mm)	Max height ⁴ (mm)
1 x 12,5mm X-Ray Protection fixed to each side of 70mm studs @ 600 mm centres 50mm Isover insulation ³	EI30	52 dB	97	3600



System	Fire Resistance ¹	Sound Insulation ²	Width (mm)	Max height ⁴ (mm)
2 x 12,5mm X-Ray Protection fixed to each side of 70mm studs @ 600 mm centres 50mm Isover insulation ³	EI120	57 dB	122	4600

1. Tested to EN1364-1:1999

2. Tested to En ISO 10140-2:2010

3. Density 12kg/m³

4. Max partition height based on limiting deflection of L/240 at 200 Pa



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.
- Scores size format <20 kg per board.
- Screw fix to metal framing like regular board using HD board type drywall screws.

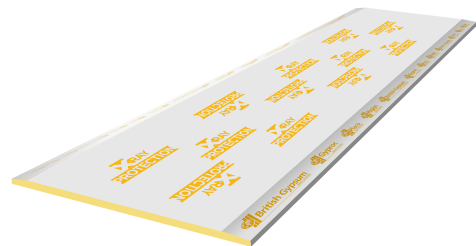
Fill and finish all board joints using **GypFill®** or **Promix® X-Ray Protection** jointing compound. The surface of **Gyproc® X-Ray Protection** board is similar to regular plasterboards and therefore is suitable for most forms of decoration.

Storage

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

Stacking

Packs of boards should be stacked no greater than 4 lifts high from the ground for safe handling on-site. This can be increased to 8 lifts in warehousing, providing the floor loading is checked as being adequate.



Protection

The boards are supplied shrink-wrapped. In storage and on-site, it is advisable to keep the boards covered for as long s 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 ²
Longitudinal edge	Tapered
N° of boards per pallet	40

Product Details



Promix® / GypFill® X-Ray Protection Jointing compound

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.

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

The product is identified by having a distinct yellow colour.

Easy cleaning of application tools. Used in conjunction with joint reinforcement tape 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**.



GypFill® P X-Ray Protection Jointing compound

Specially formulated setting jointing compound, including barium sulphate for filling **Gyproc® X-Ray Protection** board joints to complete the **X-Ray Protection** system. Manufactured to EN 13963: 2005. 25 kg/bag.

Product performance

- Tested and certified X-ray shielding performance.
- Excellent adhesion properties.
- Powder to be mixed with water (9 litres per bag).
- Shelf life of 9 months.
- Formulated for excellent workability.

Application

This jointing compound should be applied following the technical data without adulteration to ensure that the **X-Ray Protection** performance is not compromised.

typical product characteristics	
Bag Weight	25 Kg
Density after mixed	2.0 Kg/l
Coverage of dry product	0,6 kg/lm

The product is identified by having a distinct yellow colour.

Easy cleaning of application tools. Used in conjunction with joint reinforcement tape 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**.



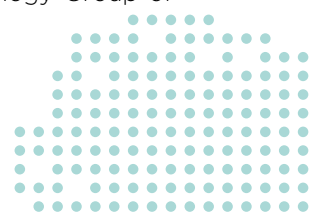
Specification

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					
	Number of X-Ray Protection boards (layers)											

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.



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 offer more sustainable products and solutions for its customers.



REDUCED CARBON FOOTPRINT

A low carbon footprint solution compared to traditional systems with lead

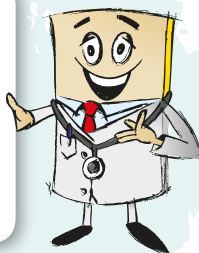
Did you know that the carbon footprint is reduced by 48% compared to traditional plasterboards system with lead?



RESOURCE-EFFICIENT

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

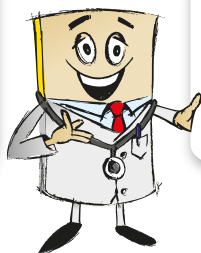
Funny fact: Barium sulphate is harmless if ingested. It is used in pills as contrast agent in radiological tests and then expelled without any side effect



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



REDUCED ENVIRONMENTAL AND HEALTH IMPACT



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



**INCREASED
SUSTAINABILITY
BENEFITS**

For additional information on building labels, visit the Green Building Website:

<https://www.greenbuilding.saint-gobain.com>



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
Total	33



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
Total	10



Credits of BREEM 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
Wst 01 - Construction waste management	3
Inn 01 - Innovation	10
Total	44

Installation

Metal profiles

Studs and channels used in **Gyproc® X-Ray Protection** systems are the same than in regular plasterboards installation.

Floor & Ceiling Channels must be securely fixed with two rows of staggered fixings, each row at 600 mm centres and each fixing 25 mm in from the flange.

If the floor is uneven, a 38 mm thick timber sole plate equal to the width of the channel should be used. If the concrete or screed floor is new, consideration should be given to the installation of a damp-proof membrane between the floor surface and the channel or sole plate.

Handling

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

Board installation

Gyproc® X-Ray Protection boards are fixed horizontally to Saint-Gobain metal framing, positioned at no greater than 600 mm centres.

Boards should be installed with the tapered edges lightly butted together and the square cut ends fixed with 2-3 mm gaps to allow for the jointing compound to penetrate into the gap.

Fixing

Inner layer boards are fixed on their perimeter only to metal framing using HD board type drywall screws at 600 mm centres. The outer layer board is fixed to all metal framing at 300 mm centres, reducing to 200 mm centres at the perimeter of boarded areas and at external corners. 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 cutted with "V" shape to ensure penetration of the jointing compound.

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

All joints between boards should be taped and filled using **Promix® or GypFill® X-Ray Protection** jointing compound. In multi-layer systems, inner layer board joints must be filled to the surface. 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 **Promix® or GypFill® X-Ray Protection** 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.



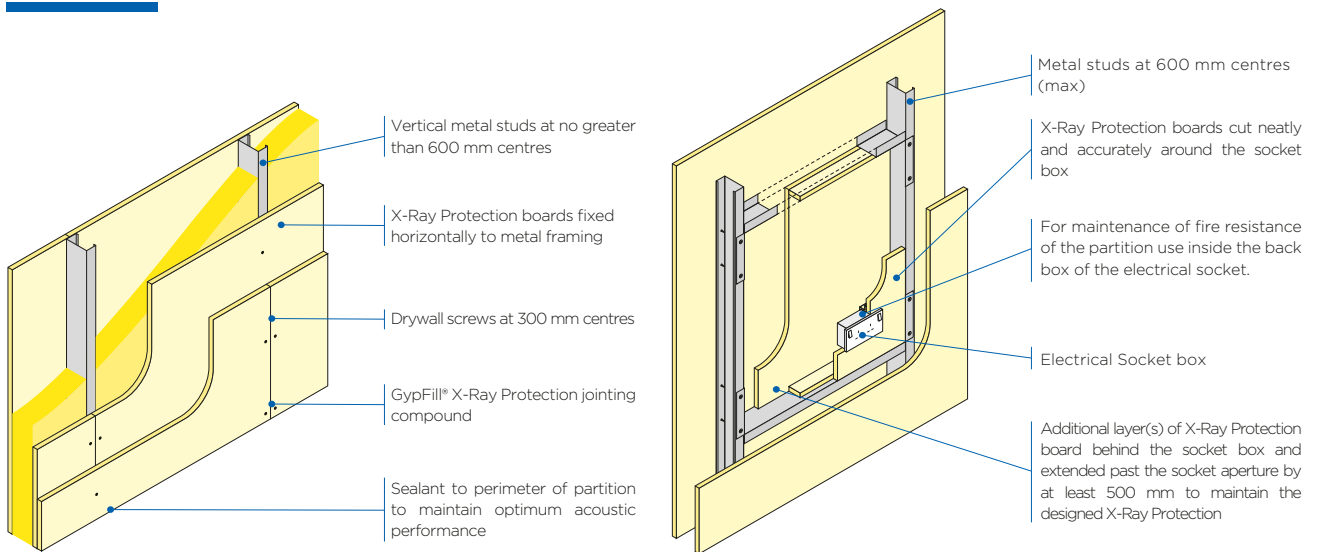
Services

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 must be installed.

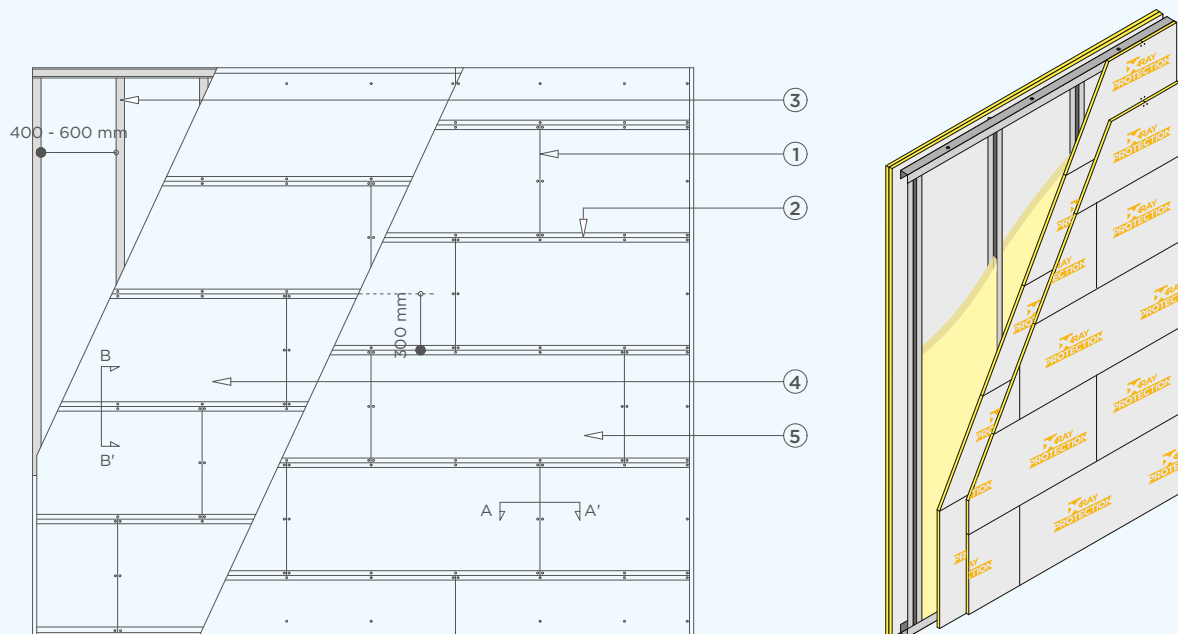


Design considerations



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



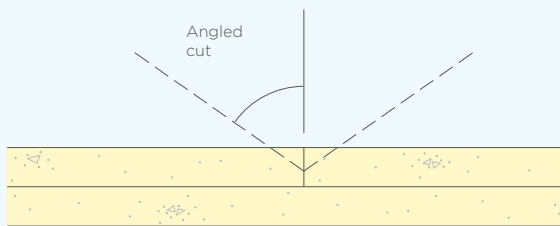
1. Butt end joint
2. Horizontal joint
3. Metal system. Maximum of 600 mm stud centres.

4. 1st layer of Gyproc® X-Ray Protection board. Fixed horizontally staggered at 600 mm.
5. 2nd layer of Gyproc® X-Ray Protection board. Offset from 1st layer by 300 mm, and staggered at 600 mm.

Construction details - Partitions

Board fixing and finishing - joints

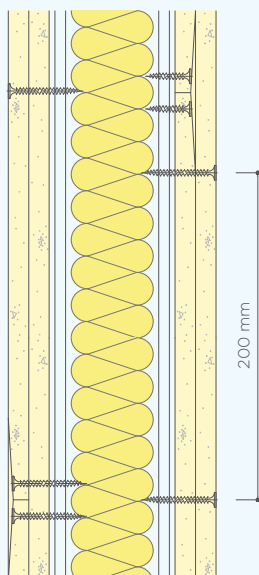
CUT BUTT END JOINT
Section AA'



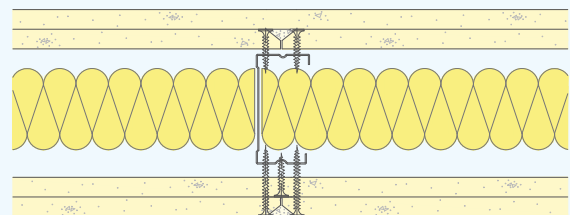
CUT BUTT END JOINT
Section AA'



HORIZONTAL JOINT
Section BB'



VERTICAL JOINT
Section AA'

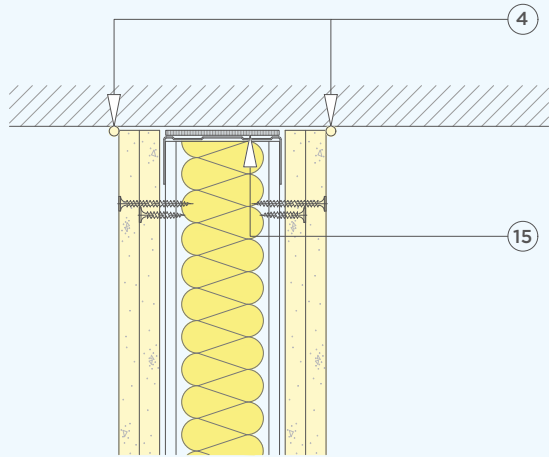


NOTE

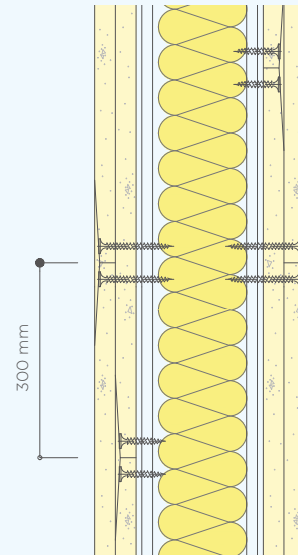
- All the screws must be covered with Gypfill® or Promix® X-Ray jointing compound.
- It must be filled first all transversal joints and second the longitudinal joints

Double layer Gyproc® X-Ray Protection each side

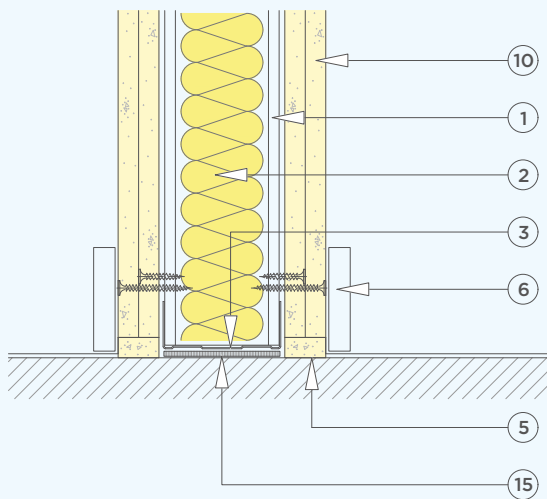
HEARD DETAIL



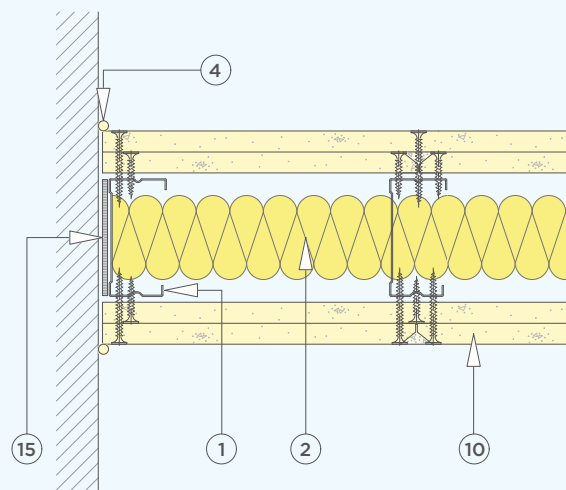
HORIZONTAL OUTER LAYER
Sección BB'



BASE DETAIL



WALL ABUTMENT

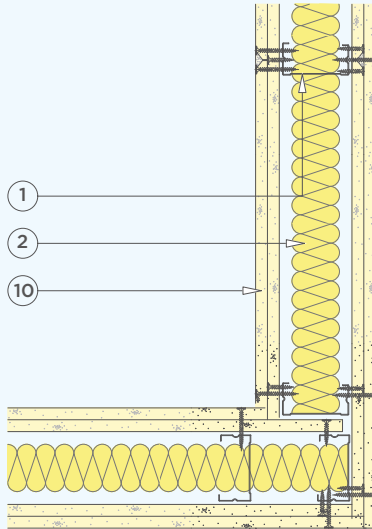


1. Metal Studs
2. Isover Insulation as specification
3. Metal channel
4. Seallant for air lighness and sound insulation
5. Promix® or Gypfill® X-Ray Protection jointing compound
6. Skirting as specification
7. X-Ray Protection door frame as specification (by others)
8. Splay metal

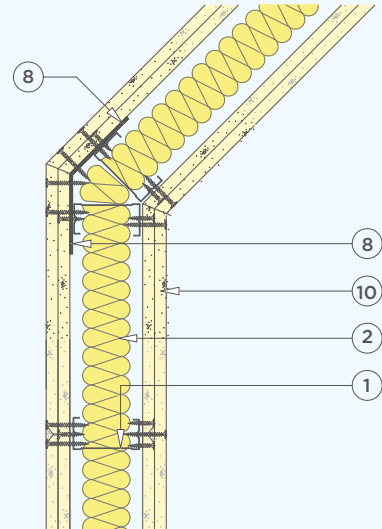
9. Gyproc® X-Ray Protection strip
10. Gyproc® X-Ray Protection Board
11. Habito® Board + Habito® screws
12. Standard Board
13. Special X-ray socket box
14. Standard socket box
15. Airlighness tape

Double layer Gyproc® X-Ray Protection each side

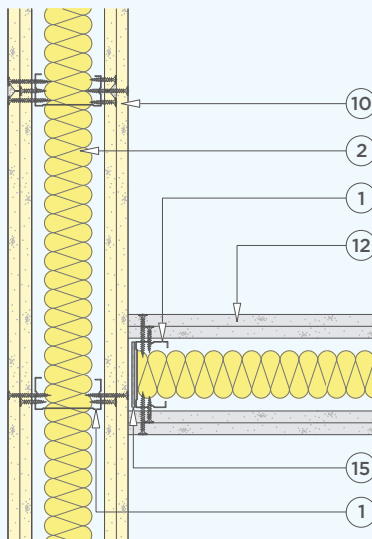
CORNER



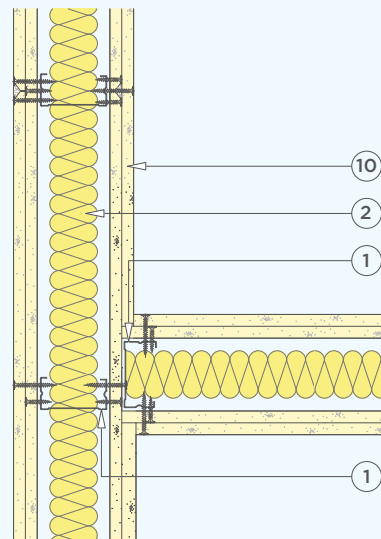
SPLAYED ANGLE



T-JUNCTION - WITH STANDARD PARTITION



T-JUNCTION - WITH LINED X-RAY LINED PARTITION

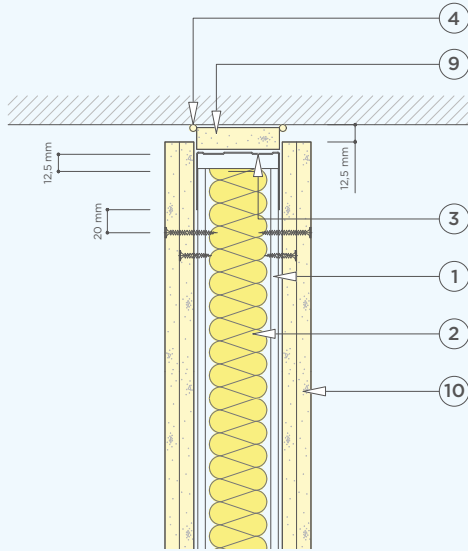


1. Metal Studs
2. Isover Insulation as specification
3. Metal channel
4. Seallant for air lighness and sound insulation
5. Promix® or Gypfill® X-Ray Protection jointing compound
6. Skirting as specification
7. X-Ray Protection door frame as specification (by others)
8. Splay metal

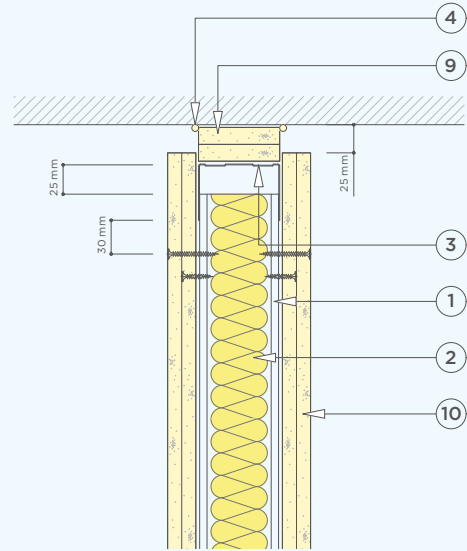
9. Gyproc® X-Ray Protection strip
10. Gyproc® X-Ray Protection Board
11. Habito® Board + Habito® screws
12. Standard Board
13. Special X-ray socket box
14. Standard socket box
15. Airlightness tape

Double layer Gyproc® X-Ray Protection each side

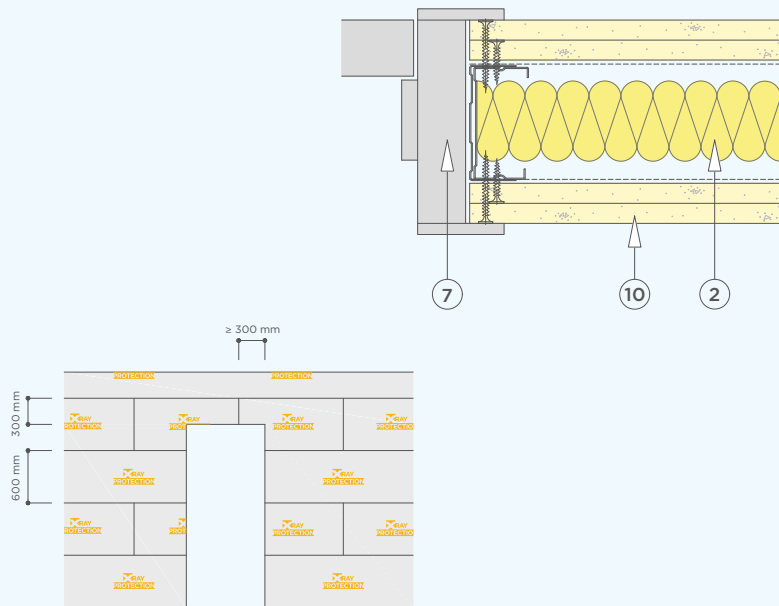
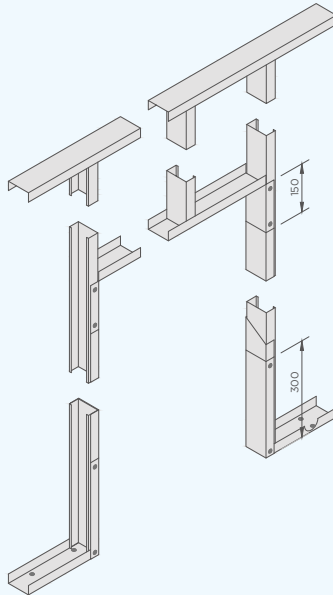
DEFLECTION HEAD DETAIL - 10 MM



DEFLECTION HEAD DETAIL - 20 MM



DOOR OPENING DETAIL

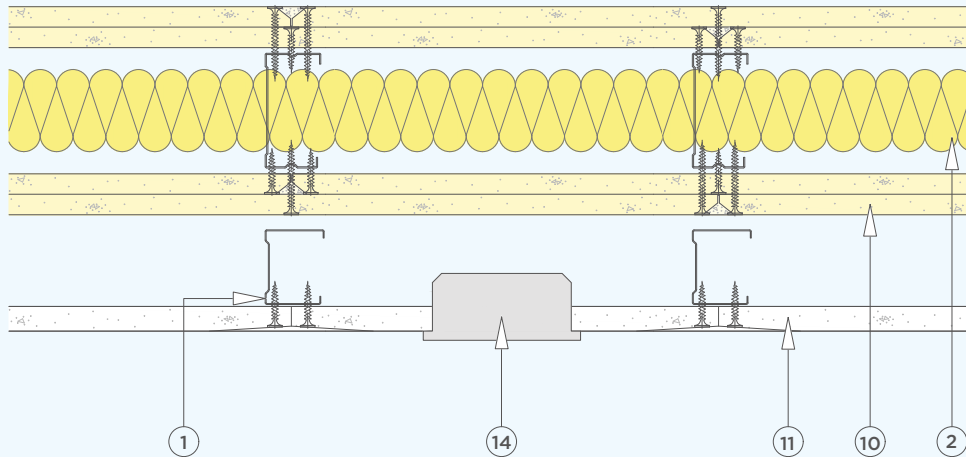


Refer to project requirements or door opening criteria

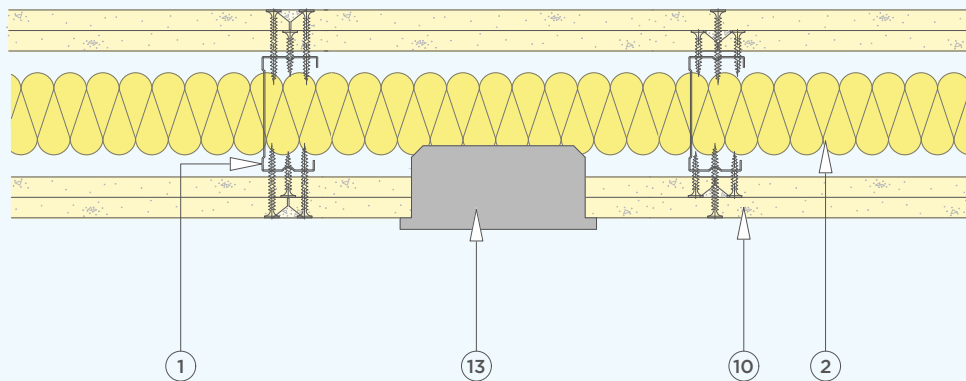
1. Metal Studs
2. Isover Insulation as specification
3. Metal channel
4. Seallant for air lighness and sound insulation
5. Promix® or Gypfill® X-Ray Protection jointing compound
6. Skirting as specification
7. X-Ray Protection door frame as specification (by others)
8. Splay metal
9. Gyproc® X-Ray Protection strip
10. Gyproc® X-Ray Protection Board
11. Habito® Board + Habito® screws
12. Standard Board
13. Special X-ray socket box
14. Standard socket box
15. Airlightness tape

Double layer Gyproc® X-Ray Protection each side plus wall-lining for services

SOCKET BOX DETAIL



USING SPECIAL X-RAY SOCKET BOX



- | | |
|--|---|
| <ul style="list-style-type: none"> 1. Metal Studs 2. Isover Insulation as specification 3. Metal channel 4. Seallant for air lighness and sound insulation 5. Promix® or Gypfill® X-Ray Protection jointing compound 6. Skirting as specification 7. X-Ray Protection door frame as specification (by others) 8. Splay metal | <ul style="list-style-type: none"> 9. Gyproc® X-Ray Protection strip 10. Gyproc® X-Ray Protection Board 11. Habito® Board + Habito® screws 12. Standard Board 13. Special X-ray socket box 14. Standard socket box 15. Airlightness tape |
|--|---|



1._ Studs every 400 or 600 mm



2._ Boards installed horizontally



3._ Screws every 300 mm



4._ Vertical joints



5._ Horizontal joints



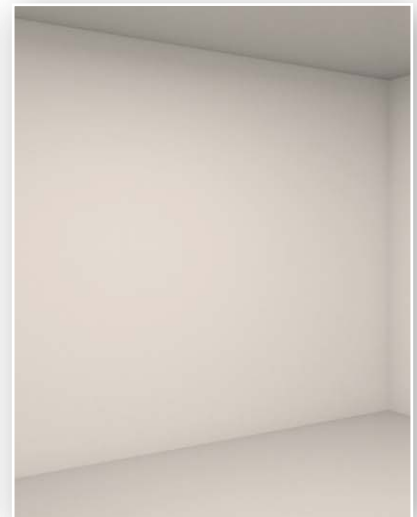
6._ 2nd layer of boards



7._ Vertical joints 2nd layer



8._ Horizontal joints 2nd layer



9._ Finishing

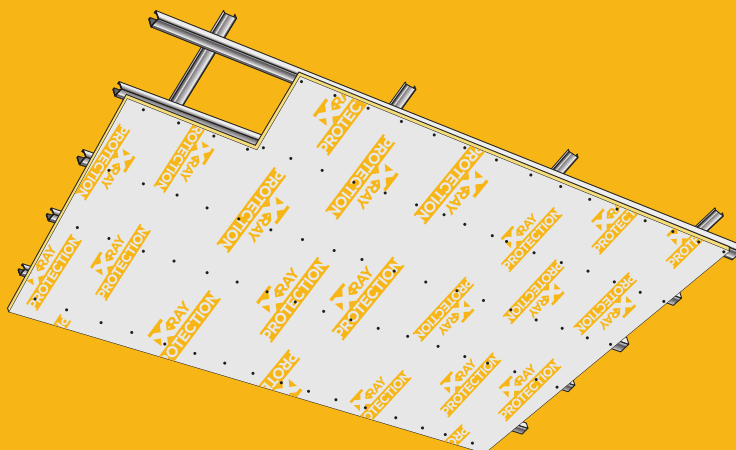
Wall Lining

Gyproc® X-Ray Protection system can be installed as a Wall lining to a concrete wall or masonry background using a suitable metal framed lining. Board installation methodology and jointing process are the same to when used in partition linings.



Ceilings

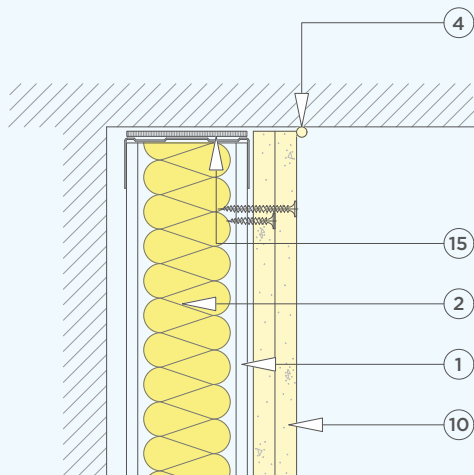
Ceilings are usually not protected against X-rays but it can be done in case of recommendation by radiation protection advisor. Ceiling X-ray shield can be done with **Gyproc® X-Ray Protection** board installed with standard ceiling methodology using an appropriate metal structure according to the weight of the boards.



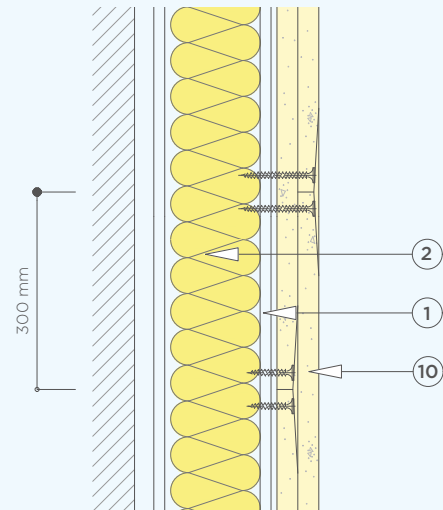
Construction details - Wall Lining

Double layer Gyproc® X-Ray Protection

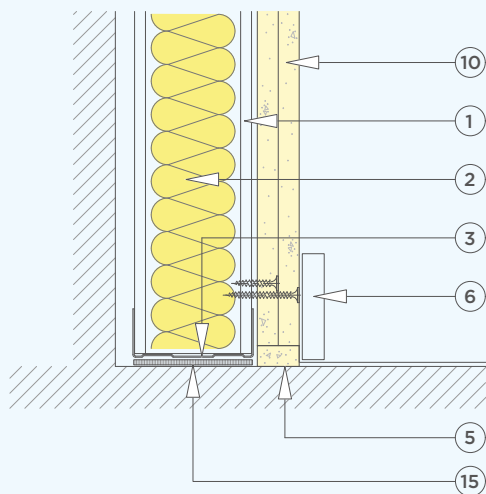
HEAD DETAIL



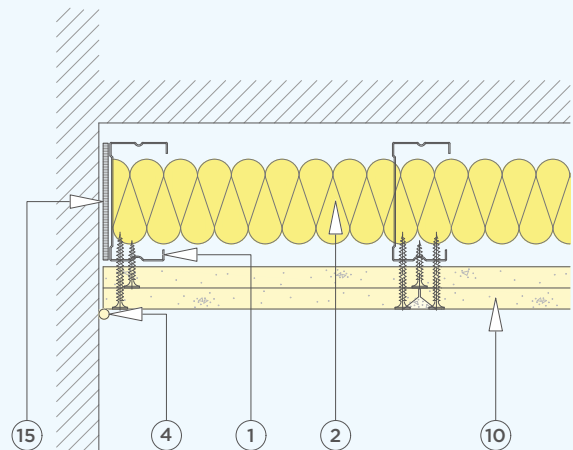
HORIZONTAL OUTER LAYER
Sección BB'



BASE DETAIL



WALL ABUTMENT

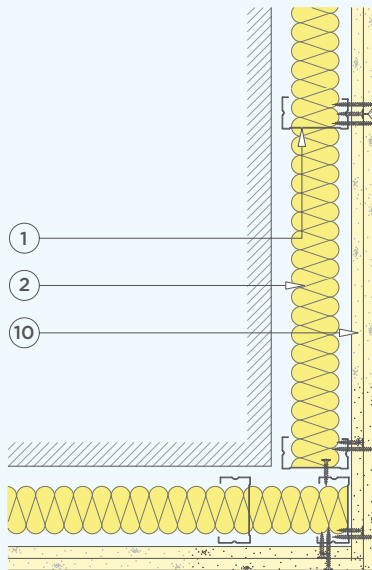


1. Metal Studs
2. Isover Insulation as specification
3. Metal channel
4. Seallant for air lighness and sound insulation
5. Promix® or Gypfill® X-Ray Protection jointing compound
6. Skirting as specification
7. X-Ray Protection door frame as specification (by others)
8. Splay metal

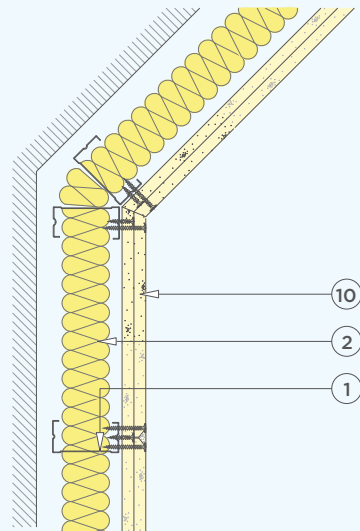
9. Gyproc® X-Ray Protection strip
10. Gyproc® X-Ray Protection Board
11. Habito® Board + Habito® screws
12. Standard Board
13. Special X-ray socket box
14. Standard socket box
15. Airtightness tape

Double layer Gyproc® X-Ray Protection

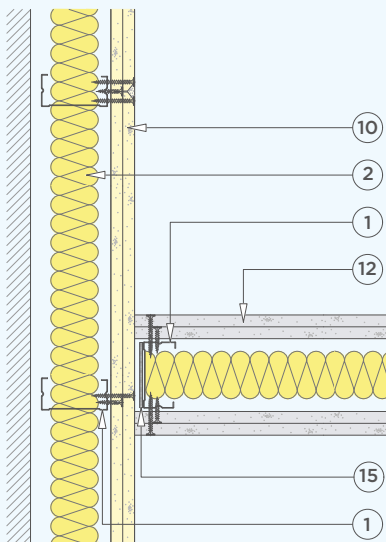
CORNER



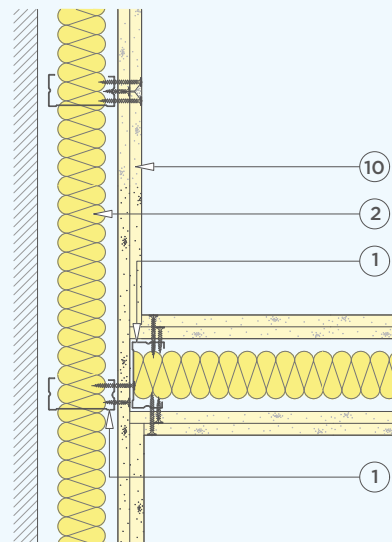
SPLAYED ANGLE



T-JUNCTION - WITH STANDARD PARTITION



T-JUNCTION - WITH LINED X-RAY PROTECTION LINED PARTITION

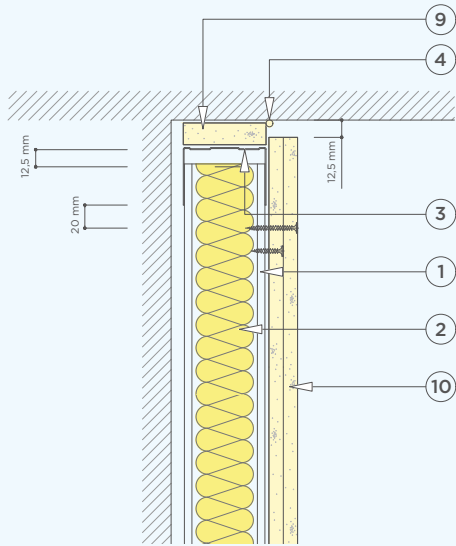


1. Metal Studs
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3. Metal channel
4. Seallant for air lighness and sound insulation
5. Promix® or Gypfill® X-Ray Protection jointing compound
6. Skirting as specification
7. X-Ray Protection door frame as specification (by others)
8. Splay metal

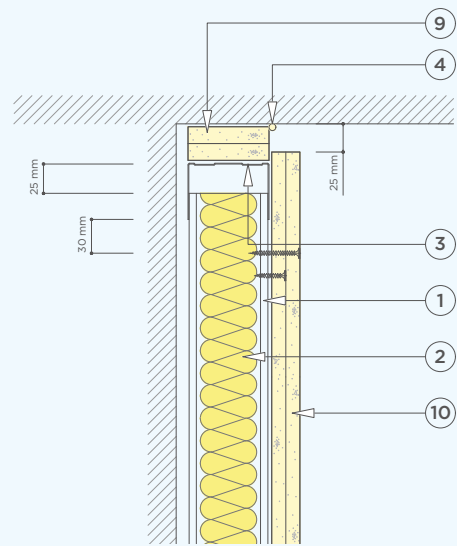
9. Gyproc® X-Ray Protection strip
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11. Habito® Board + Habito® screws
12. Standard Board
13. Special X-ray socket box
14. Standard socket box
15. Airtightness tape

Double layer Gyproc® X-Ray Protection

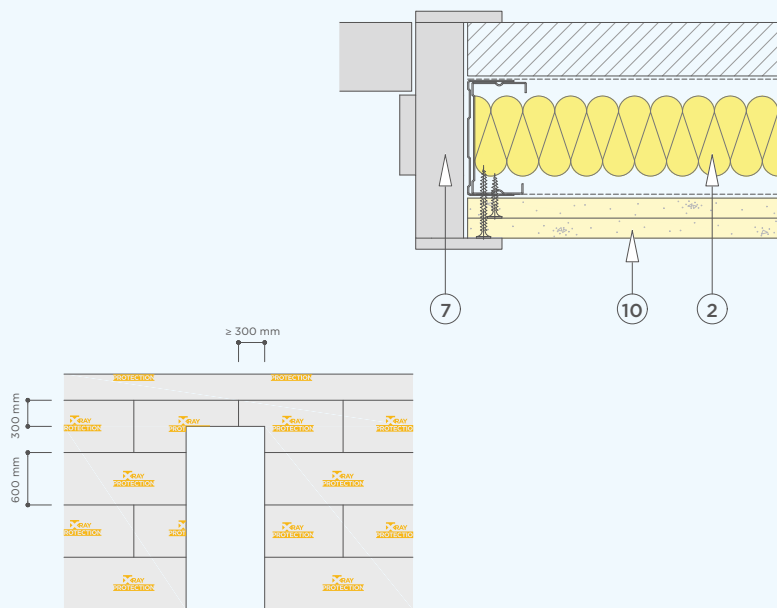
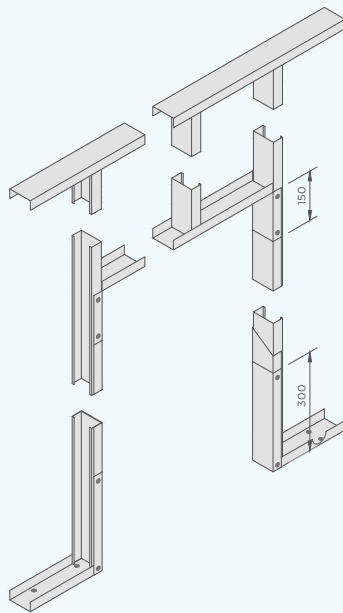
DEFLECTION HEAD DETAIL - 10 MM



DEFLECTION HEAD DETAIL - 20 MM



DOOR OPENING DETAIL

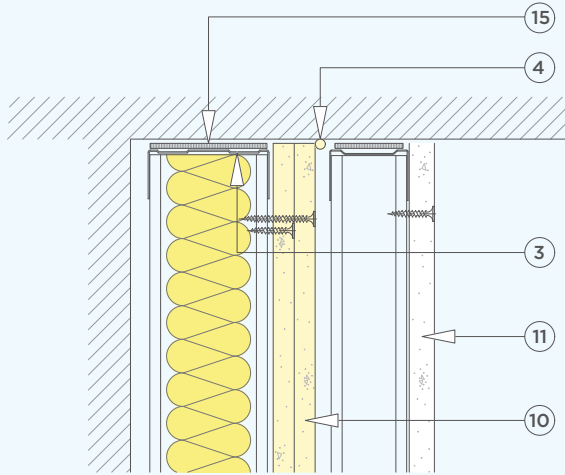


Refer to project requirements or door opening criteria

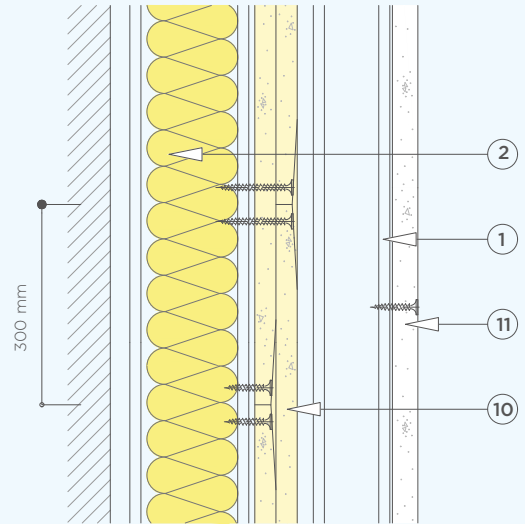
- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Metal Studs 2. Isover Insulation as specification 3. Metal channel 4. Seallant for air lighness and sound insulation 5. Promix® or Gypfill® X-Ray Protection jointing compound 6. Skirting as specification 7. X-Ray Protection door frame as specification (by others) 8. Splay metal | <ol style="list-style-type: none"> 9. Gyproc® X-Ray Protection strip 10. Gyproc® X-Ray Protection Board 11. Habito® Board + Habito® screws 12. Standard Board 13. Special X-ray socket box 14. Standard socket box 15. Airlighness tape |
|--|--|

Double layer Gyproc® X-Ray Protection plus wall-lining for services

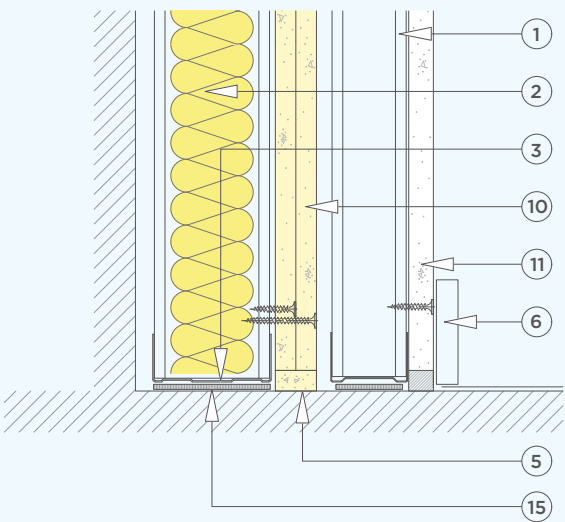
HEARD DETAIL



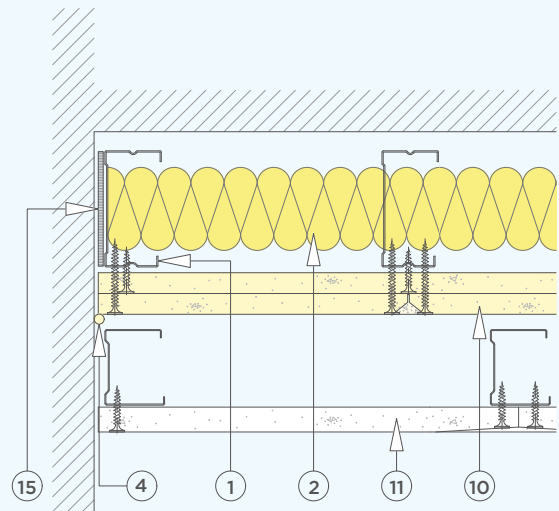
HORIZONTAL JOINT WHERE OUTER BOARD IS NOT X-RAY PROTECTION



BASE DETAIL



WALL ABUTMENT

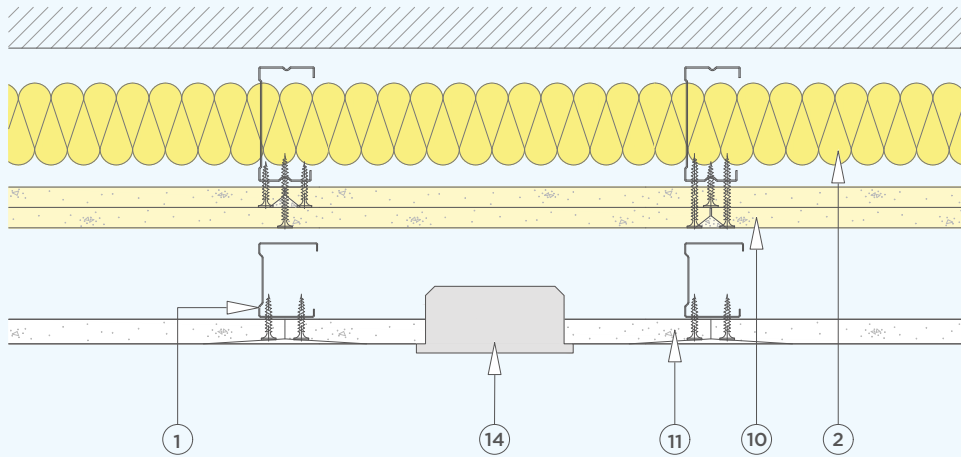


1. Metal Studs
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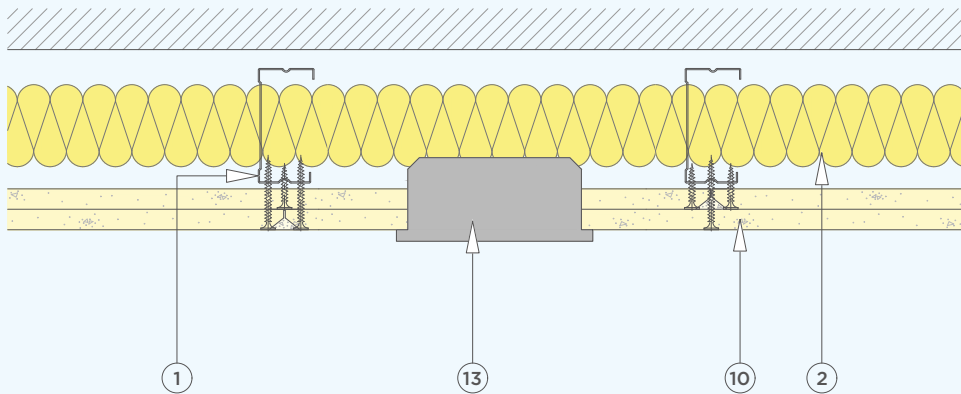
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13. Special X-ray socket box
14. Standard socket box
15. Airlighness tape

Double layer Gyproc® X-Ray Protection plus wall-lining for services

SOCKET BOX DETAIL



USING SPECIAL X-RAY SOCKET BOX



- | | |
|--|---|
| <ul style="list-style-type: none"> 1. Metal Studs 2. Isover Insulation as specification 3. Metal channel 4. Seallant for air lighness and sound insulation 5. Promix® or Gypfill® X-Ray Protection jointing compound 6. Skirting as specification 7. X-Ray Protection door frame as specification (by others) 8. Splay metal | <ul style="list-style-type: none"> 9. Gyproc® X-Ray Protection strip 10. Gyproc® X-Ray Protection Board 11. Habito® Board + Habito® screws 12. Standard Board 13. Special X-ray socket box 14. Standard socket box 15. Airtightness tape |
|--|---|

Saint-Gobain designs, manufactures and distributes materials and solutions which are key ingredients in the wellbeing of each of us and the future of all. They can be found everywhere in our living places and our daily life: in buildings, transportation, infrastructure and in many industrial applications. They provide comfort, performance and safety while addressing the challenges of sustainable construction, resource efficiency and climate change.



SAINT-GOBAIN

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