BUILDING
COMMON GROUND

MAX FRANK®

Pecafil®

Guide de mise en oeuvre
Site installation guidelines

Edition
International

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français

english

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Le Matériau

Pecafil® se compose d'un treillis soudé spécifique, dont les dimensions varient selont les applications, qui est encapsulé dans une feuille de polyéthylène rétractée thermiquement. Ce matériau n'altère pas les nappes d'eaux souterraines et ses composants sont recyclables et biodégradables.

Les champs d'application

Pecafil® peut être utilisé comme coffrage, perdu ou réutilisable, pour des fondations, des rives ou des abouts, en plaque de séparation. Une variante est utilisée en protection contre les intempéries ou pour partitionner.

Les outils

- EPI, et outils de marquage
- Cutter (rétractable de préférence)
- Pince coupante
- Clous (90 mm ou plus)

Fondations hors sol

Coffrages circulaires

Massifs, têtes de pieux, pieds de grue, coffrages extérieurs d‘encuvements

Fondations enterrées

Couches de séparation contre palplanches, pieux sécants

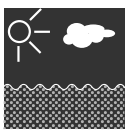
Coffrages réutilisables pour planchers allégés, dalles nervurées

Coffrages de rives

Protection contre les intempéries et poussières, partitions tempo-raires de zones

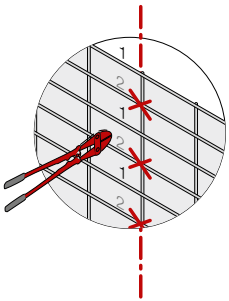
Aucun matériel de levage n‘est nécessaire pour la mise en oeuvre du Pecafil®.

Pas de besoin de connexion électriques.

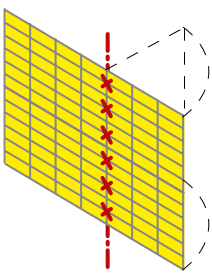


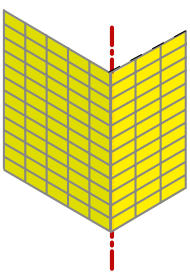
L‘utilisation d‘une feuille de polyéthylène fait du Pecafil® un produit **Durable**, non impactant sur le plan environnemental, qui convient pour les zones de préservation des eaux souterraines.

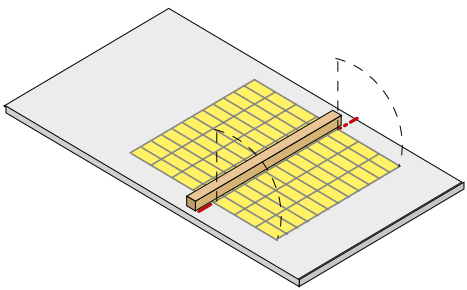
En fonction de l‘usage défini, le Pecafil® **peut être réutilisé plusieurs fois.**

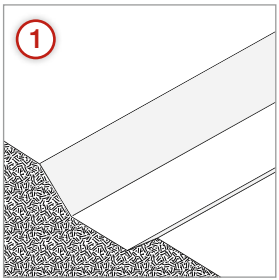


- Délimiter au marqueur la zone de pliage.
- Couper un acier de maille sur deux **(X)** de manière à rendre moins rigide le panneau - voir schéma ci-contre.
- Commencer à couper à la deuxième maille du bas ou du haut.
- Ne couper que la maille pas le polyétylène restant.
- Positionner un bastaing à l'endroit du pli et remonter les bords jusqu'à l'angle souhaité.

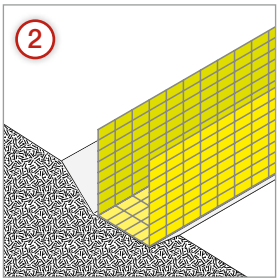




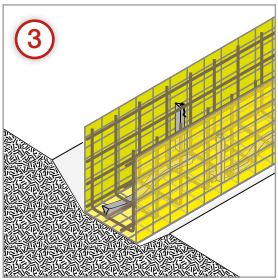




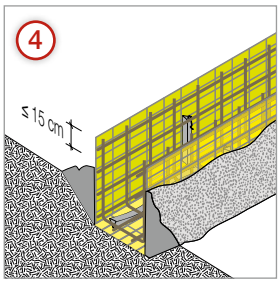
Réaliser une tranchée brute (pas de base d‘agrégats requis)



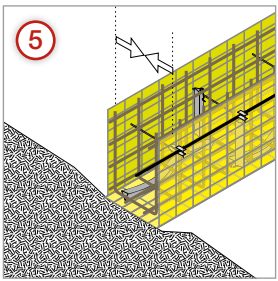
Placer l‘élément de Pecafil® dans la tranchée



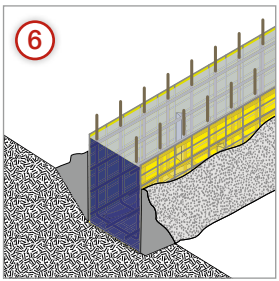
Installation des cales d‘enrobages et de l‘armature



Remblayer à la même hauteur de chaque côté (15 cm maxi non remblayé en haut)

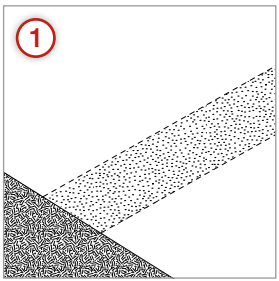


Si l‘on excède 15 cm en débord du remblais, il conviendra d‘utiliser des chaises de renforts ou des systèmes de maintiens alternatifs (cf pages 12-14 et 26-29)

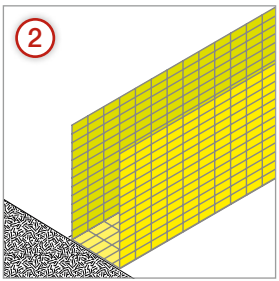


Coulage de la fondation en 1 fois

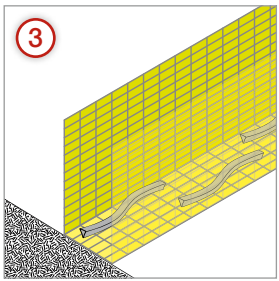
Installation hors sol



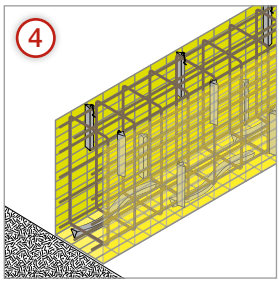
Créer une base fondation plane et appropriée



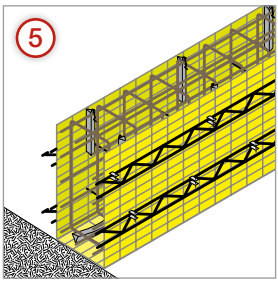
Placer le U en Pecafil® en affleurement de la zone



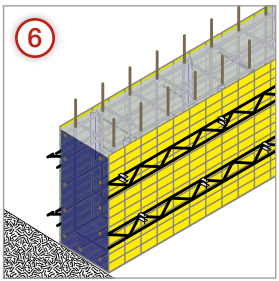
Positionner les cales d‘enrobage horizontales (selon la charge en plastique ou en béton fibré - notre recommandation)



Mettre en place les cales d‘enrobage verticales - notre recommandation est d‘utiliser des réglettes



Positionner les entretoises et les chaises de renforts(cf pages 12 – 14 et 26 - 29)

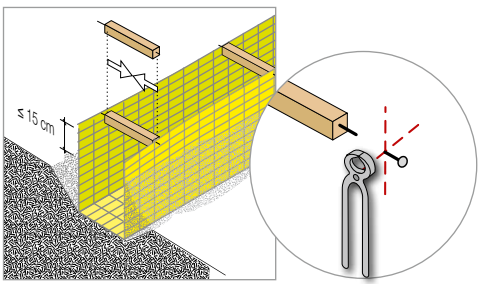


Coulage de la fondation en 1 fois

Solutions de maintien ou d‘entretoises pour Pecafil® - coffrages de fondations enterrées (jusqu‘à environ 15 cm au dessus du remblais)

De manière à limiter les déformations possibles du coffrage perdu en Pecafil®, résultant de la poussée du béton, il est recommmandé de maintenir les parties latérales hautes à l‘aide d‘une entretoise.

Les alternatives suivantes sont:



Bastaing avec clous

Bien que ce système soit relativement résistant à la compression, la résistance à la traction et limitée et il convient d’ajuster l’espacement entre les entretoises.

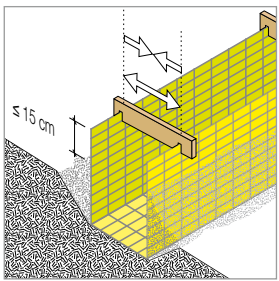
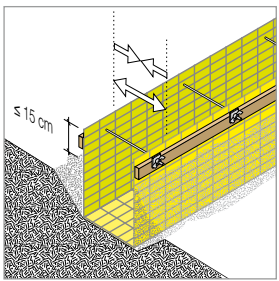
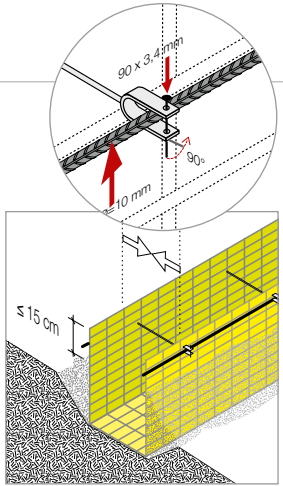


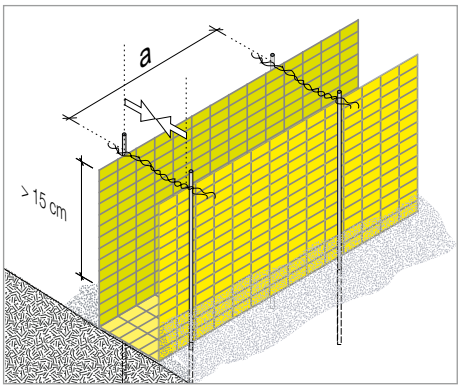
Planche rainurée
jusqu'à 15 cm au dessus du remblais.



Tige avec clavette ou avec écrous
jusqu'à 15 cm au dessus du remblais.

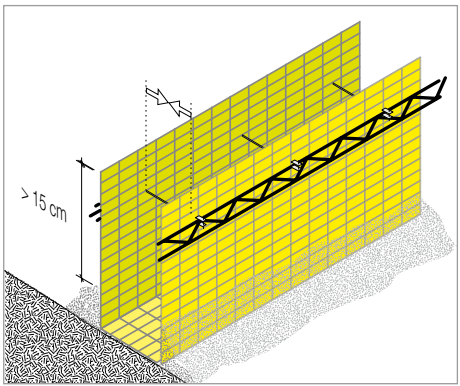


Entretoise Pecafil® avec barre HA (recommandé et fabriqué par MAX FRANK) - jusqu'à 15 cm au dessus du remblais.



Barres de renforts plantées dans le sol et ligaturées

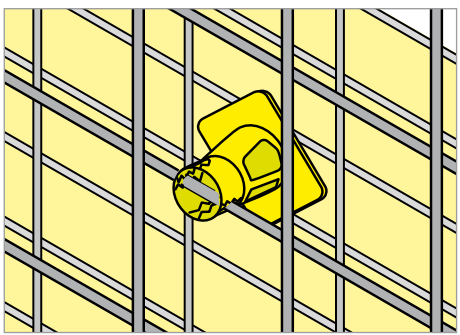
Distance a = 50 - 100 cm



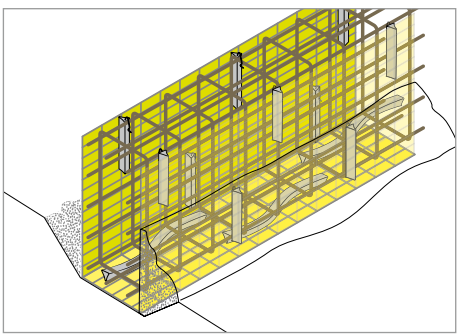
Entretoises Pecafil® avec chaises en A (fabriqué et recommandé par Max Frank) - convient pour des fondations en U jusqu‘ à 180 cm

Cales d‘enrobages recommandées pour le Pecafil®

L‘utilisation de cales appropriées assurera que l‘enrobage requis soit respecté et que le coffrage perdu soit bien solidaire et conforme à la dimension souhaitée.



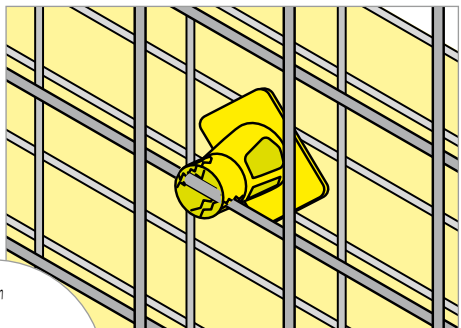
Cales plastiques bi-valentes

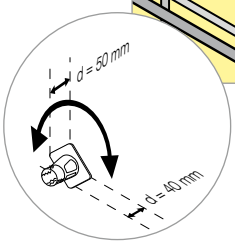


Règles horizontales et réglettes verticales en béton fibré

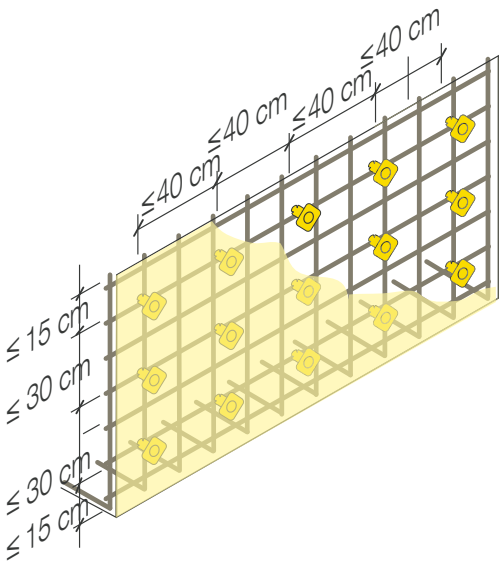
Cale plastique bi-valente pour Pecafil®: pour enrobage des panneaux latéraux

En fonction de la rotation de la cale, elle peut assurer un enrobage variable soit de 25/30 , soit de 40/50 mm.
Cale dite à plateau, elle offre une bonne surface d‘appui.

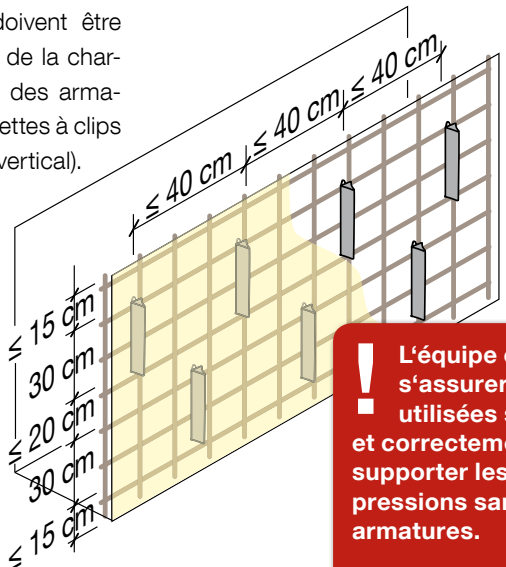




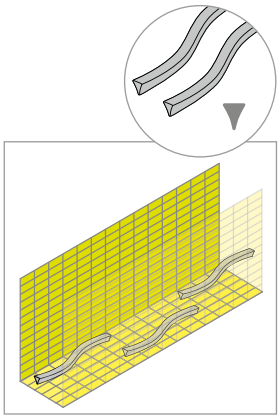
Cales plastiques bi-valentes
pour Pecafil®
8 pcs /m²
(notre recommendation)



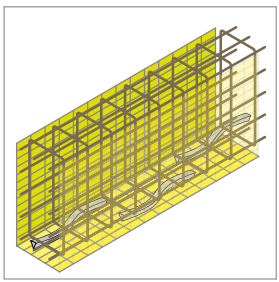
Les cales utilisées doivent être adaptées en fonction de la charge et donc du poids des armatures. (ci-contre : réglettes à clips – recommandées en vertical).



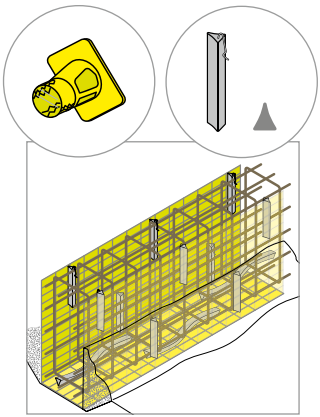
! L‘équipe en charge doit s‘assurer que les cales utilisées sont suffisantes et correctement fixées pour supporter les charges et les pressions sans déformer les armatures.



Positionnement de cales en béton fibré, comme par exemple des cales „serpents“ ou des „bananes“.

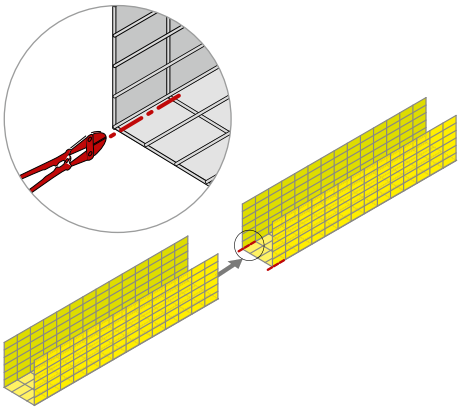


Positionnement des cages d‘armatures



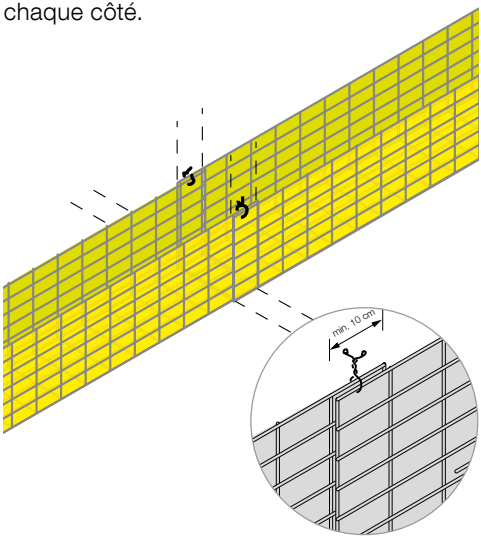
Positionnement des calages latéraux, ici des réglettes.

Recouvrements des U



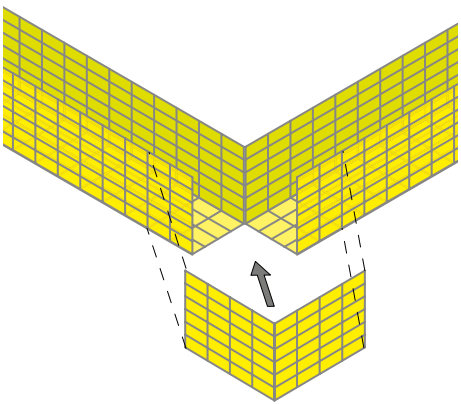
Couper l‘acier dans l‘angle de la dernière maille de part et d‘autre du U, et glisser les deux éléments l‘un dans l‘autre.

Ligaturer l‘acier horizontal supérieur de chaque côté.



Angles des longrines coffrées en U

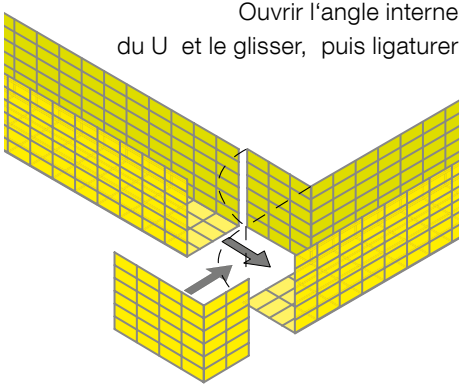
Ouvrir le U en coupant un côté jusqu‘au pli..



Ligaturer une cornière d‘angle à aux U .

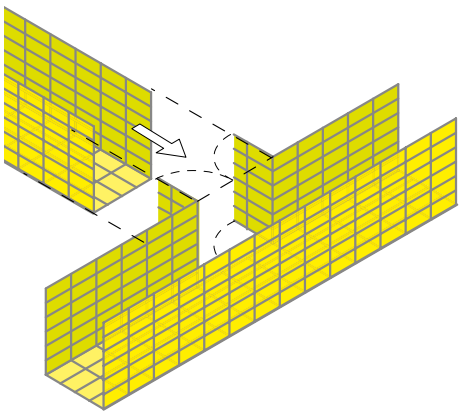
Insérer les U l‘un dans l‘autre.

Ouvrir l‘angle interne du U et le glisser, puis ligaturer

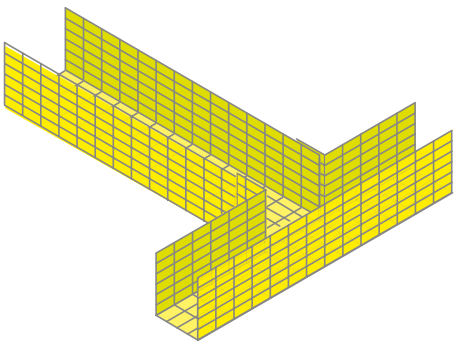


Ligaturer une cornière d‘angle à aux U .

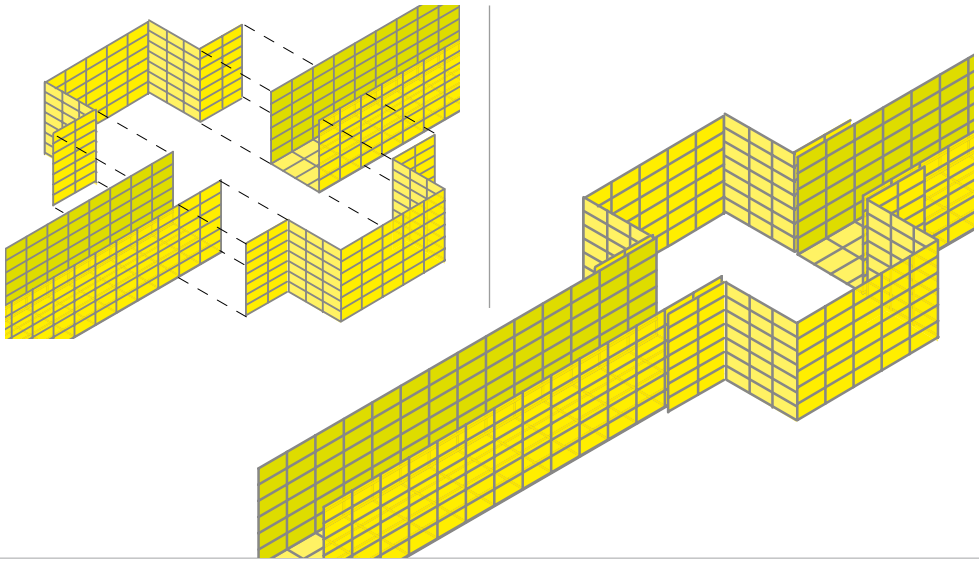
Jonctions en T des coffrages en U



Insérer le U dans les flancs latéraux ouverts du U perpendiculaire.



Jonctions de longrines en U et d'éléments pour têtes de pieux



Jonctions avec des différences de hauteur

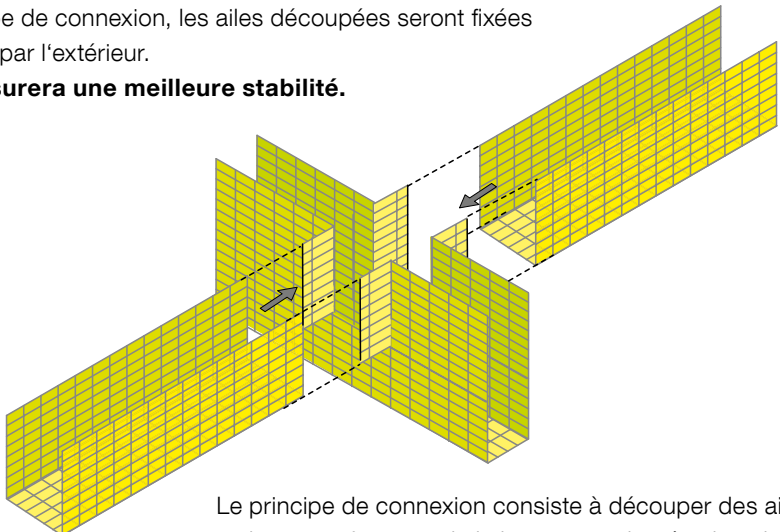
Déterminer la position de l'élément Pecafil® à connecter.
Marquer à la fois la ligne centrale (l'axe) et le contour sur l'élément Pecafil® érigé.

Couper (feuille et barres) de Pecafil® le long de la ligne centrale (axe) et le long du bord inférieur. Ensuite plier les rabats le long du marquage vers l'extérieur.

! Pour faciliter le pliage, couper une barre sur deux de la section de pliage. Il n'est cependant recommandé en revanche de couper les barres du bord.

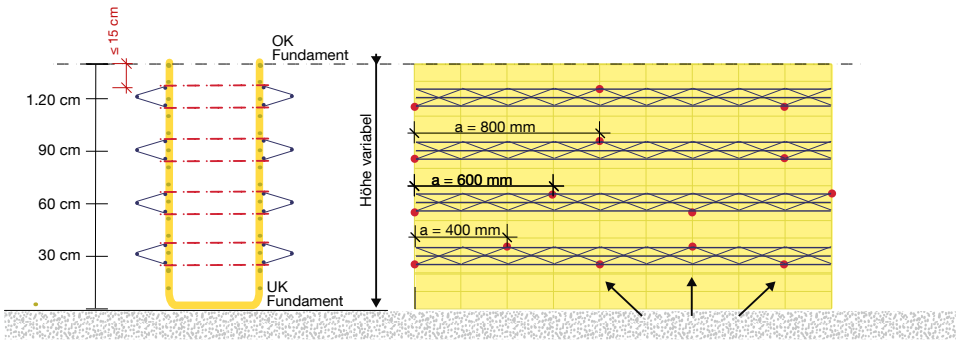
Pour ce type de connexion, les ailes découpées seront fixées (ligaturées) par l'extérieur.

Ce qui assurera une meilleure stabilité.



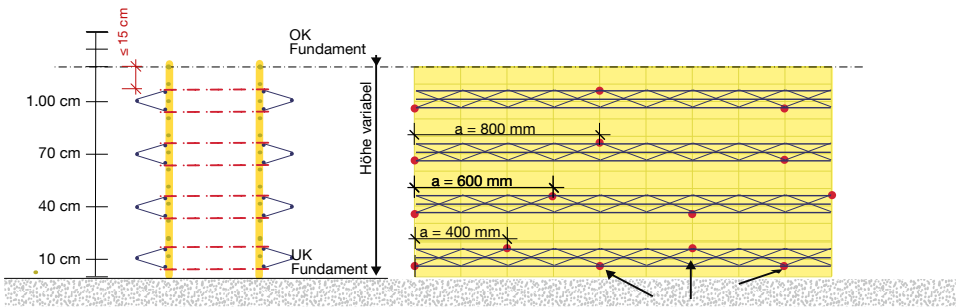
Le principe de connexion consiste à découper des ailes en partie haute en fonction de la hauteur souhaitée , les plier vers l'extérieur et y glisser le U de la longrine perpendiculaire

Utilisation des entretoises Pecafil® et des chaises de renforts pour les coffrages en U

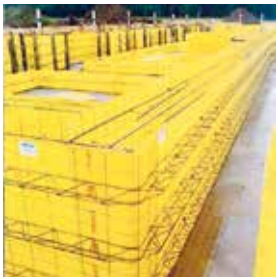


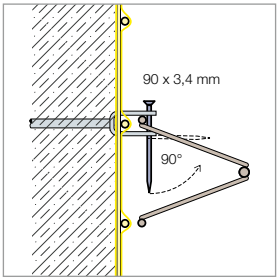
Positionnement des entre-toises Pecafil®

Utilisation des entretoises Pecafil® et des chaises de renforts pour les coffrages avec 2 panneaux latéraux.

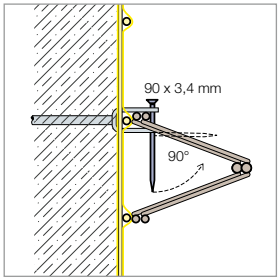


Positionnement des entre-toises Pecafil®



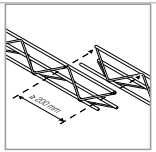


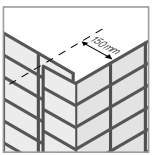
Positionner l'entretoise, glisser la chaise dans la fente et verouiller en insérant le clou dans le trou prévu puis en le „tordant". S'assurer que les entretoises Pecafil® ne soient pas en contact direct avec l'armature.

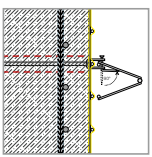


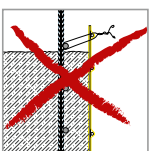
Pour le recouvement des chaises, prévoir 200 mm. au moins pour obtenir un bon résultat.
Verouiller en „tordant" le clou.

- Recouvrement nécessaire de 200 mm pour les chaises de renfort.
- Espacement maximal de 800 mm entre les entretoises Pecafil® (cf pages 26 -27 pour les espacements précis).
- Continuité, pliages, cornières et jonctions en Pecafil®:
  S‘assurer d‘un recouvrement 150 mm minimum
  Bien ligaturer en haut chaque élément l‘un à l‘autre.
- L‘entretoise Pecafil® ne doit pas être en contact direct (toucher) avec la cage d‘armature.
- Les panneaux de Pecafil® ne doivent pas être attachés directement sur l‘armature.
- Le coulage doit être effectué par une personne formée et habilitée
- Ne pas pas déverser le béton d‘une hauteur supérieure à 300 mm et respecter une vitesse régulière de coulage .





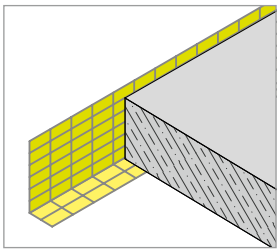




L pour coffrages d‘éléments ponctuels ou de rives de dalles

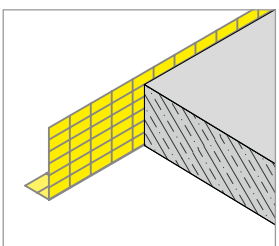
Angle interne

Coffrage perdu
(Exemple : coffrage de rive d‘une dalle)

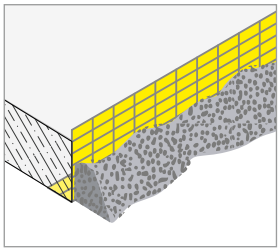


Angle externe

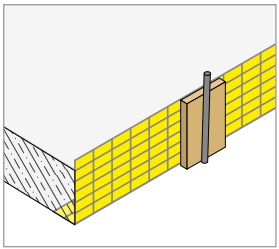
Coffrage réutilisable
(Exemple : coffrage de rive d‘une dalle)



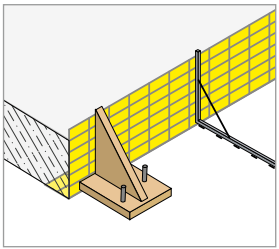
„Gros béton“ (angle interne)

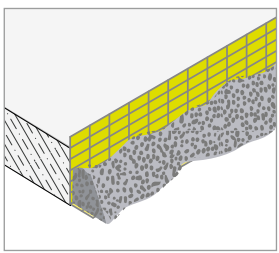


Planche/tige plantée

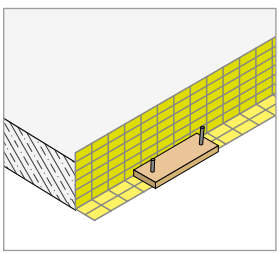


Angle façonné



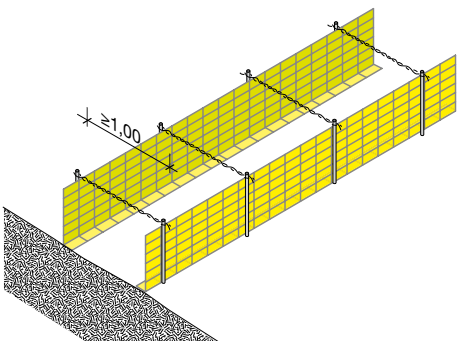


„Gros béton“ (angle externe)

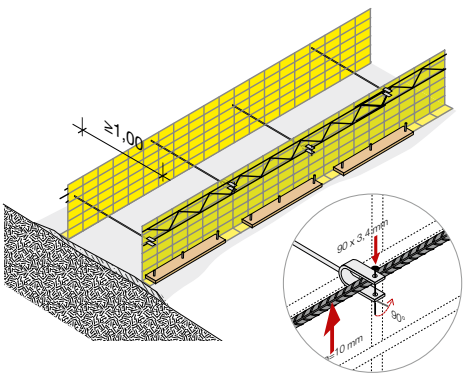


Planche/tige plantée

Pour les fondations larges et en cas de sections très variables sur un même projet, on peut faire le choix de la polyvalence avec deux coffrages en L à la place d'un coffrage en U..

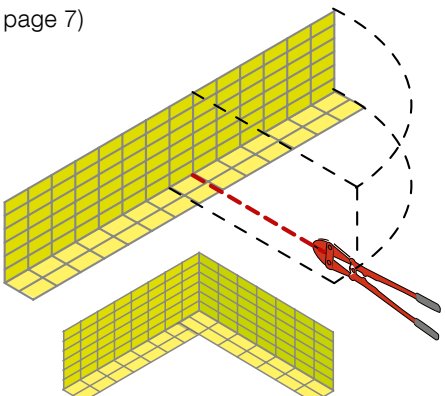


Le Pecafil® plié en L peut être réutilisé si la partie pliée est positionnée vers l'extérieur. Nous recommandons dans ce cas d'avoir un sol traité avec des agrégats compactés ou un béton de propreté pour plus de stabilité.



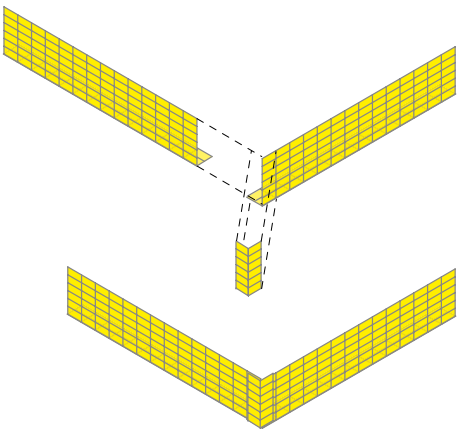
Angles de pièces en L

Couper la base du L et replier vers l'intérieur jusqu'à la butée. Si l'élément est haut, découper une maille sur deux (cf page 7)



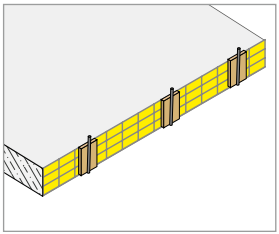
Cornière pliée.

Assembler 2 éléments

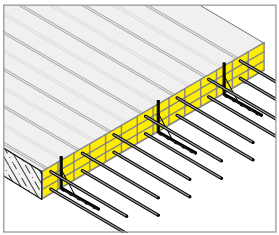


Ligaturer la cornière à chacun des éléments

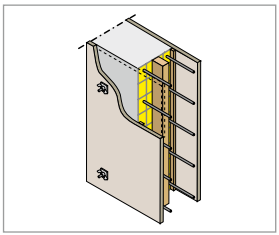
Abouts de coffrages avec ou sans armatures traversantes



Bande coffrante pour coulage sans armatures traversantes.



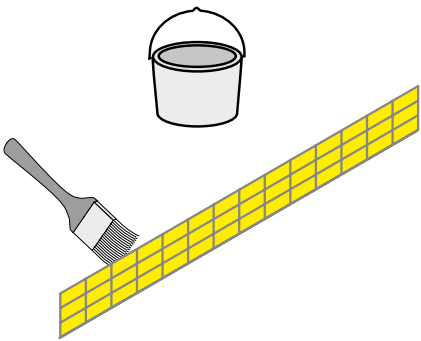
Bande coffrante maintenue par une équerre avec les armatures traversant le polyéthylène, qui sera retirée ensuite.

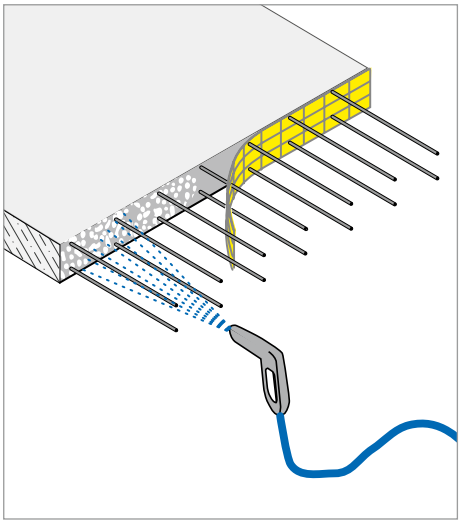


About de coffrage vertical d'un voile avec armatures traversantes retrait de la bande en suivant.

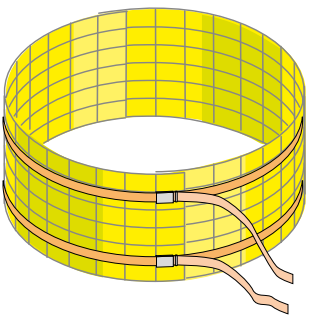
Joint de reprise

L'application d'un désactivant sur le Pecafil® améliore la jonction avec la seconde phase.

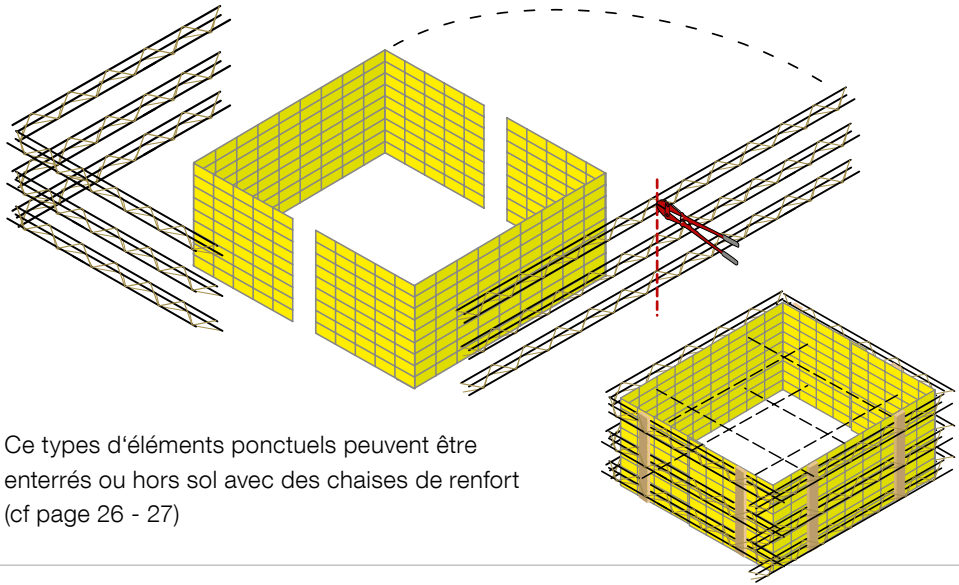




Le coffrage circulaire est fabriqué à partir de panneaux plats, qui sont roulés en usine selon votre demande. Ils peuvent être maintenus pendant la mise en place à l'aide de sangles ou de tiges et de clavettes, ou encore d'écrous de banches.



Massifs et têtes de pieux à partir de panneaux pliés

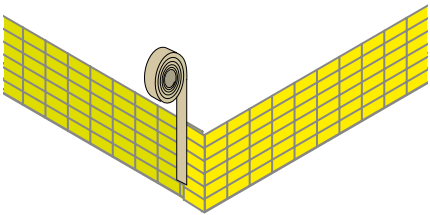


Ce types d'éléments ponctuels peuvent être enterrés ou hors sol avec des chaises de renfort (cf page 26 - 27)

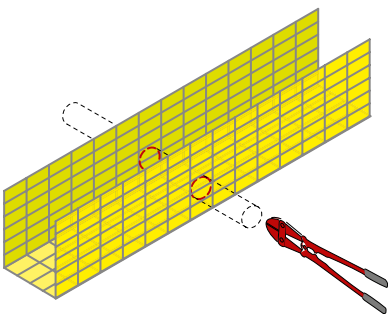
Etanchéité des jonctions/perforations

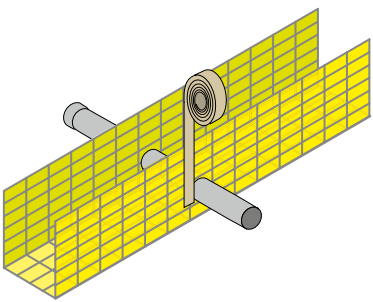
Si nécessaire:

Les jonctions, cornières et autres assemblages d'éléments en Pecafil® peuvent être assurées avec un simple adhésif pour éviter les fuites de béton hors du coffrage.



Tuyaux

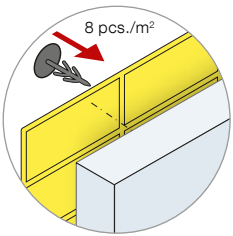


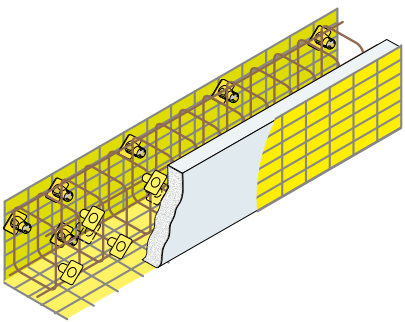


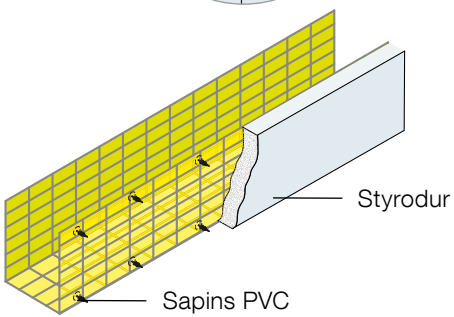
Longrines avec isolation

Une isolation en Styrodur peut être contre-collée sur la face interne Pecafil® en utilisant une colle polyuréthane hybride type Kleber.

On peut également fixer l'isolant par l'extérieur avec des Sapins PVC traversants.

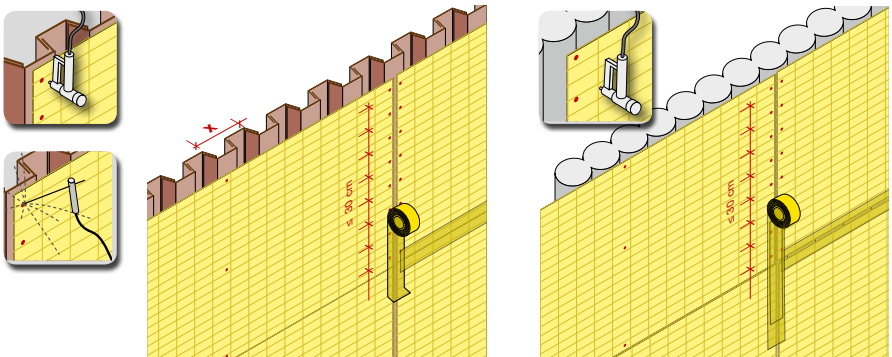






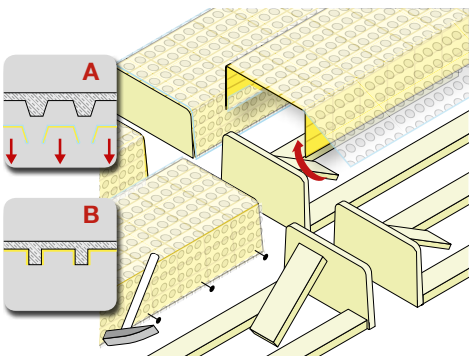
Plaque de séparation pour paplanches et pieux sécants

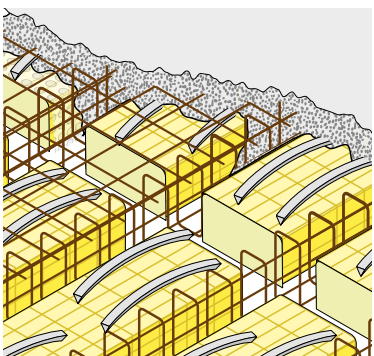
Le montage dépend du cas. Sur des plaplanches on pourra souder le panneau ou le fixer mécaniquement. La connexion des panneaux entre eux peut se faire en soudant les barres horizontales de l'extrêmité des panneaux, ce qui sera pratique si les plaplanches sont retirées. NB : Pecafil version Strong recommandée, plus rigide.



Planchers allégés, dalles nervurées

Les éléments de Pecafil® sont positionnés en continu sur des gabarits et cloués. Les armatures et treillis sont positionnés, calés par des cales en béton fibré avec nervures. Les U peuvent être facilements ajustés et découpés pour gérer les points singuliers.





EPI

Les utilisateurs du Pecafil® doivent porter des gants pour transporter les éléments. Des vêtements de travails appropriés doivent être portés également notament pour éviter toute coupure lors d'un rippage, d'une mise en place d'un panneau, d'une découpe de panneau ou d'une mise en oeuvre d'accessoires .

Précautions spécifiques

Pratiques et méthodes de travail :
Stockage – le matériau étant un treillis encapsulé, il doit être stocké dans un endroit à l'abrit du vent, ou lesté de manière à ne pas pouvoir „s'envoler"..

Manutention– Pendant le transport, le champ de vision libre est essentiel! Si le matériel est entreposé sur site, un soin particulier est requis dans les espaces venteux ou confinés (lestage par exemple).

Toutes les barres coupées doivent être enlevées pour éviter de trébucher, de glisser ou de percer un vêtement de travail ou un EPI.

- Notre service commercial et technique est à votre disposition pour étudier vos chantiers et vous conseiller quant à votre choix et pour la mise en oeuvre.
- Notre habitude est de marquer les références des pièces (massifs, longrines,...).
- Ces instructions sont téléchargeable sur notre site internet.
- Pour toute application spécifique, nous vous recommandons de nous contacter pour vérifier les hypothèses et possibilités..

PECAFIL® Weather

Protection contre les intempéries et les poussières

TU VOIS ?

- Intempéries, poussière, zones fermées
- Idéal pour partionner ou cloisonner pendant les travaux
- Pratique et facile à mettre en place
- Résistant 2 ans aux UV
- Disponible également en version ISO-variante pour isolation thermique

Max Frank GmbH & Co. KG | www.maxfrank.com

Pecafil® site installation guidelines

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The material

Pecafil® universal formwork material consists of a special steel mesh with varying thicknesses and shaped to meet your requirements, and a heat-shrunk layer of polyethylene made from carbon and hydrogen. Pecafil® universal formwork material is environmentally friendly, does not affect groundwater, and is both recyclable and bio-degradable.

The field of application

Pecafil® can be used as lost formwork, as reusable formwork or as formwork stop-end.

The tools

The following tools are required for installation:

- Waterproof marker pen
- Retractable blade craft knife
- Bolt cutter
- Nail (length 90 mm)
- Tying wire

Installation of Pecafil®
above ground

Circular formwork
for foundations

Pecafil® for
single foundations

Pecafil® installed
in-ground

Pecafil® partition formwork, optionally with thermal insulation lining

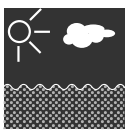
Reusable formwork material for ribbed slabs and panelled slabs

Formwork stop-end with continuity reinforcement

Weather and dust protection and screens

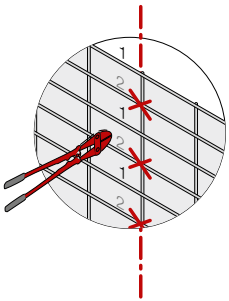
No lifting means are required
for the site installation of Pecafil®.

No electrical current is required
for the site installation of Pecafil®.

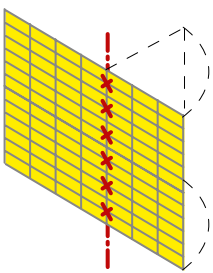


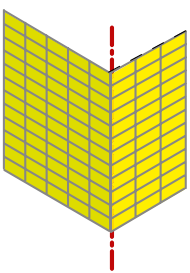
The use of polyethylene sheet makes Pecafil® **environmentally friendly** and suitable for use in ground water preservation areas.

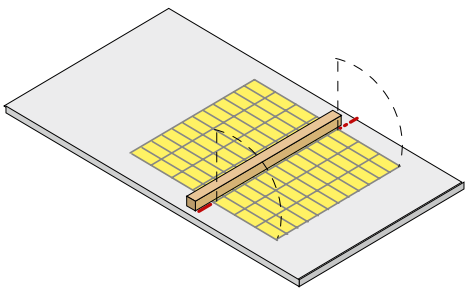
Depending on the construction site,
it is possible to **reuse Pecafil® several times.**

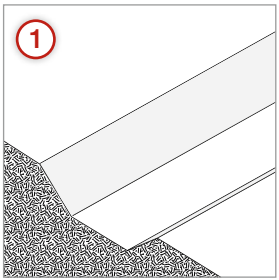


- Mark line of fold on Pecafil®
- Leave top and bottom wire intact and cut alternate wires **(X)** for width of unit.
- Start with each second top or bottom wire.
- Only cut wires at fold – not polyethylene sheet.
- Fold Pecafil® on ground or on appropriate bench.
- A suitable timber straight edge may be used to assist with folding (clean cut).

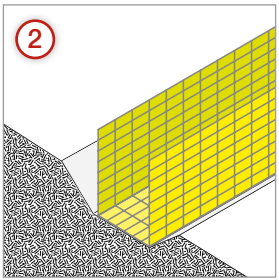




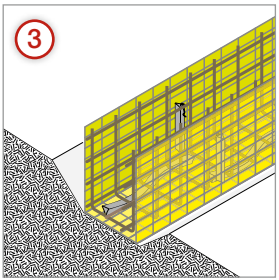




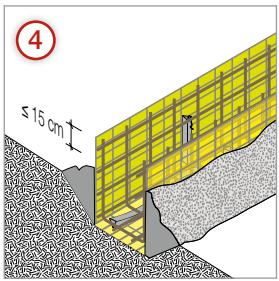
Produce a level trench base (no granular sub-base required)



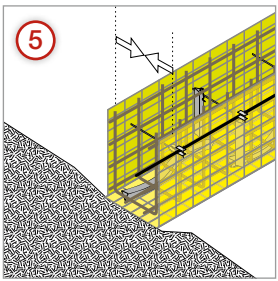
Place Pecafil® formwork elements in position in trench



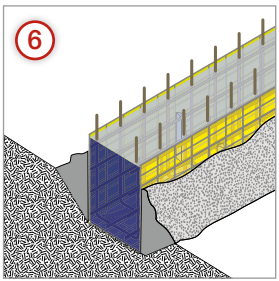
Install reinforcement and spacers



Backfill material equally on both sides

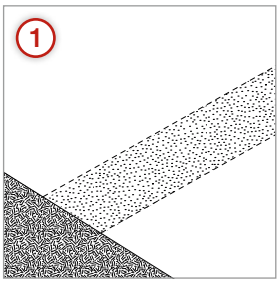


Stiffening via grid supports or other alternatives (see pages 56 – 58) becomes necessary if the formwork protrudes the filling material by more than 15 cm

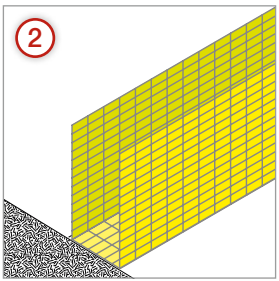


Concrete the entire foundation in one pour

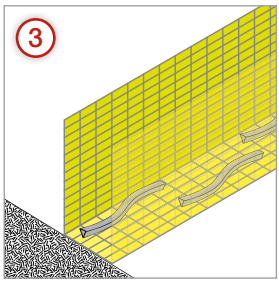
Pecafil® installed above ground



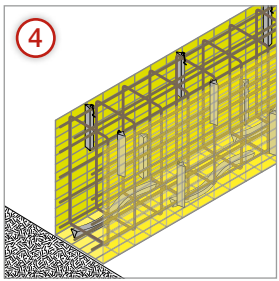
Produce a level foundation base



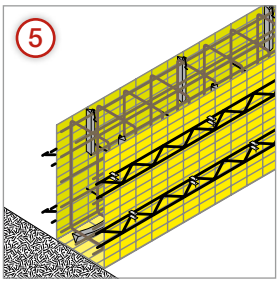
Place Pecafil® formwork elements in a flush position



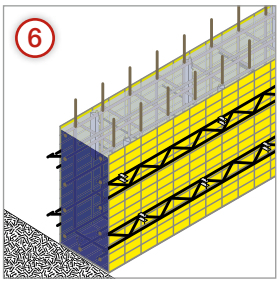
Install concrete spacers on ground



Install reinforcement and lateral concrete spacers



Stiffening via girder supports or other alternatives
(see pages 56 – 58)

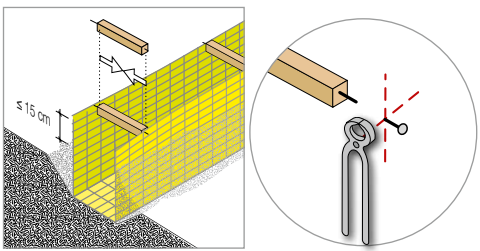


Concrete the entire foundation in one pour

Support of Pecafil® formwork for low foundation heights (up to approximately 15 cm above filling height)

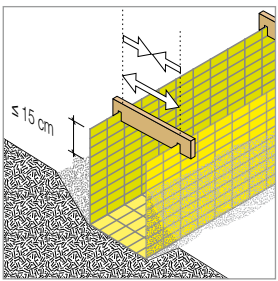
In order to avoid any distortions of the Pecafil® formwork as a result of inner concrete pressure or outer soil pressure prior to concreting, stiffening of the upper formwork edge is necessary even for a formwork of low height.

The following alternatives are possible:

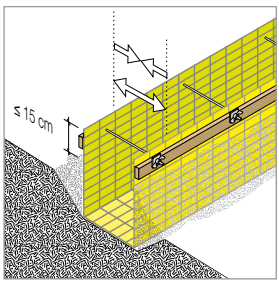


Billet of wood with nail

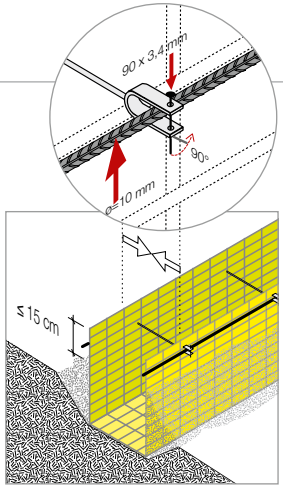
Although this system is compression-proof and resistant to tensile strength only to a limited degree it is well suited for provisional distance spacer installation during assembly and concreting.



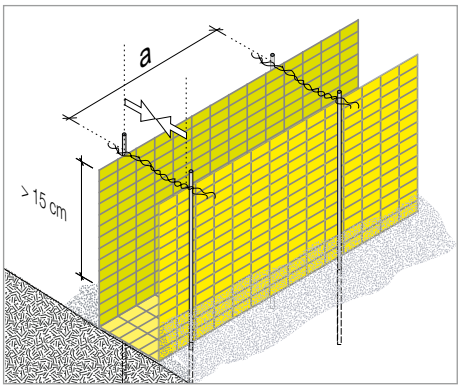
Slotted timber board
Suitable for a foundation height of up to 15 cm above filling



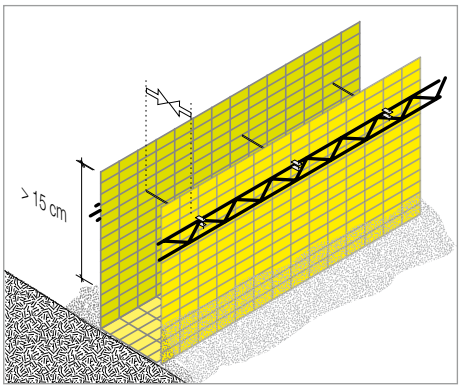
Tying wire with spring clip
Suitable for a foundation height of up to 15 cm above filling



Distance support without formwork girder
Suitable for a foundation height of up to 15 cm above filling



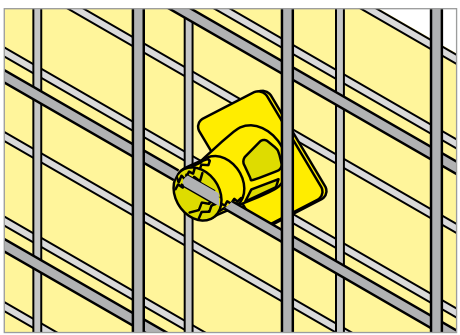
Support posts and tying wire
Distance a = approx. 50 cm
(between plug-in iron)



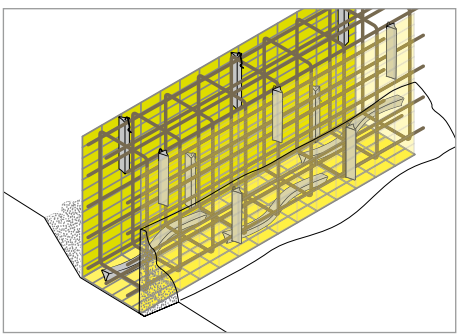
Pecafil® distance spacers with formwork girder – Suitable for foundation heights up to 180 cm

Cover spacers between reinforcement and Pecafil®

The use of cover spacers will ensure that the required cover between the reinforcing steel and the Pecafil® formwork is achieved. Depending on requirements with regard to the quality of the ground beams, Pecafil® plastic spacers or fibre concrete spacers may be used.



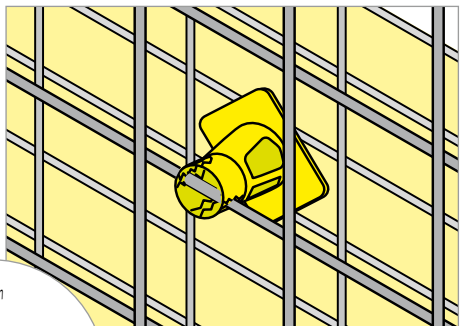
Use of Pecafil® plastic spacer

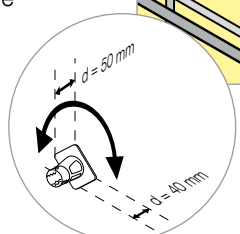


Use of fibre concrete spacers

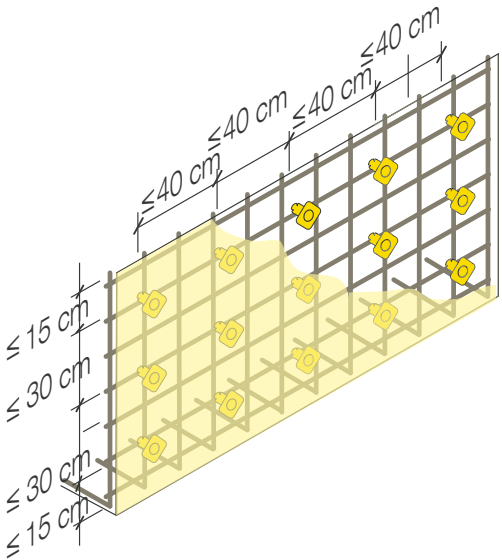
Pecafil® plastic spacer: lateral spacing system between reinforcement and Pecafil®

Due to their rotation through 90° Pecafil® spacers may be adjusted during assembly to achieve concrete covers between 40 mm and 50 mm.
The supporting surface of the Pecafil® spacer being larger than the largest Pecafil® mesh width, punching of the polyethylene sheet is prevented.

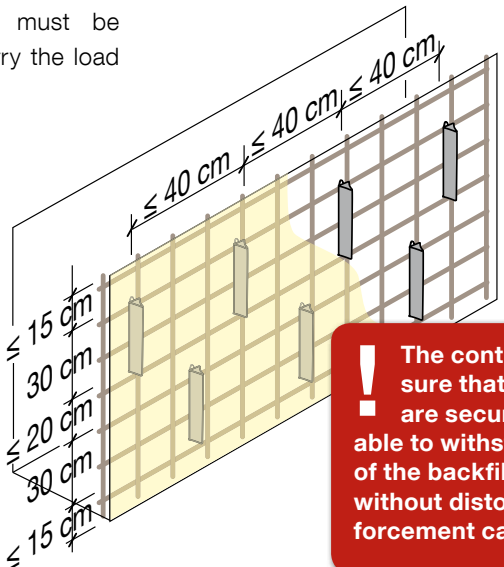




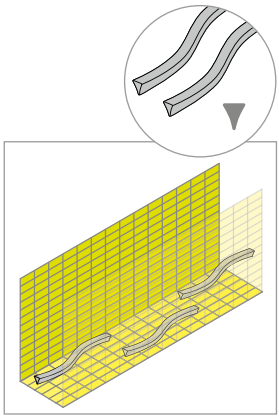
Pecafil® spacers – positioning and quantities required approx. 8 piece per m² (recommendation)



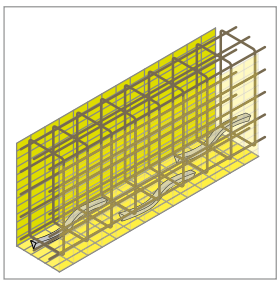
The spacers used must be stable enough to carry the load of the reinforcement.



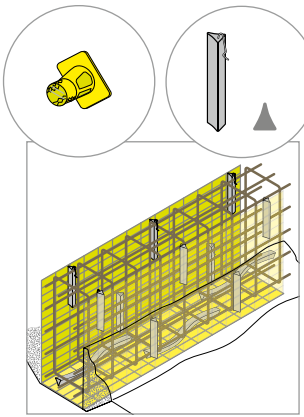
! The contractor must ensure that any paired links are securely tied to be able to withstand the pressure of the backfill on the Pecafil®, without distorting the reinforcement cage.



Insertion of fibre concrete spacers, e.g. type banana or type snake in the base

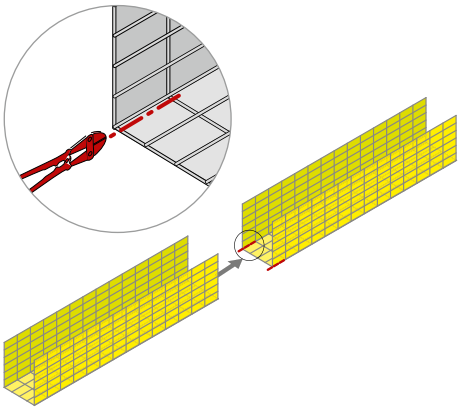


Assembly of reinforcement cage



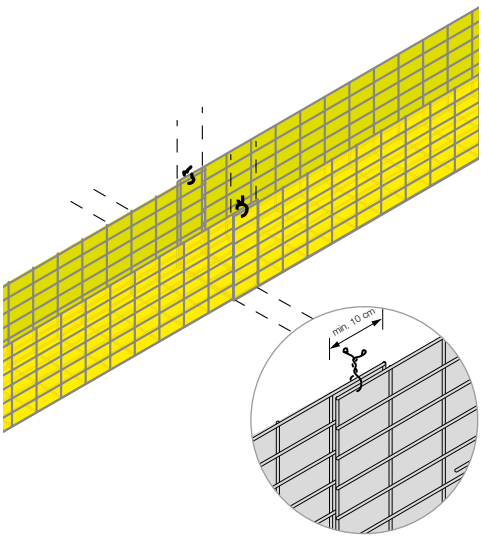
Lateral assembly of clevis type bar spacers or of Pecafil® spacers

Overlap U-shaped formwork



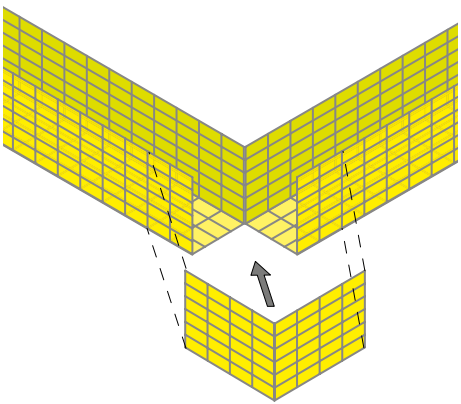
Cut the ultimate wire of the element already installed to enable lapping of the next element

Fix overlap using tying wire.



Beam corner sections U-shaped formwork

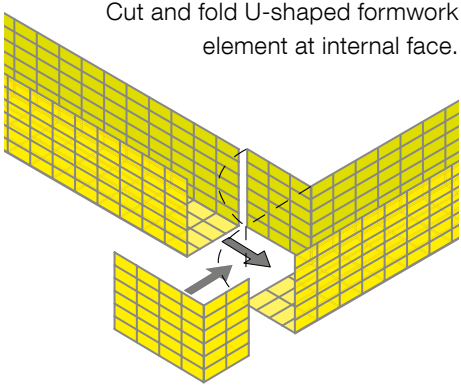
Connect butted lap joint using tying wire.



Connect bent corner element to overlapping U-elements.

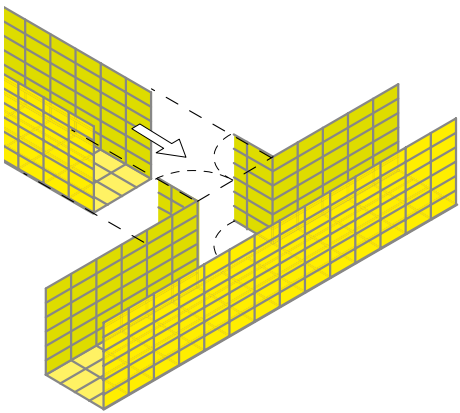
Insert U-element.

Cut and fold U-shaped formwork element at internal face.

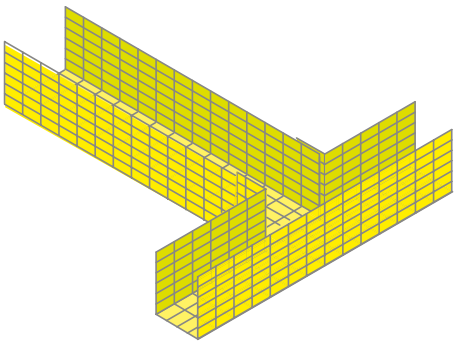


Connect bent corner element to overlapping U-elements.

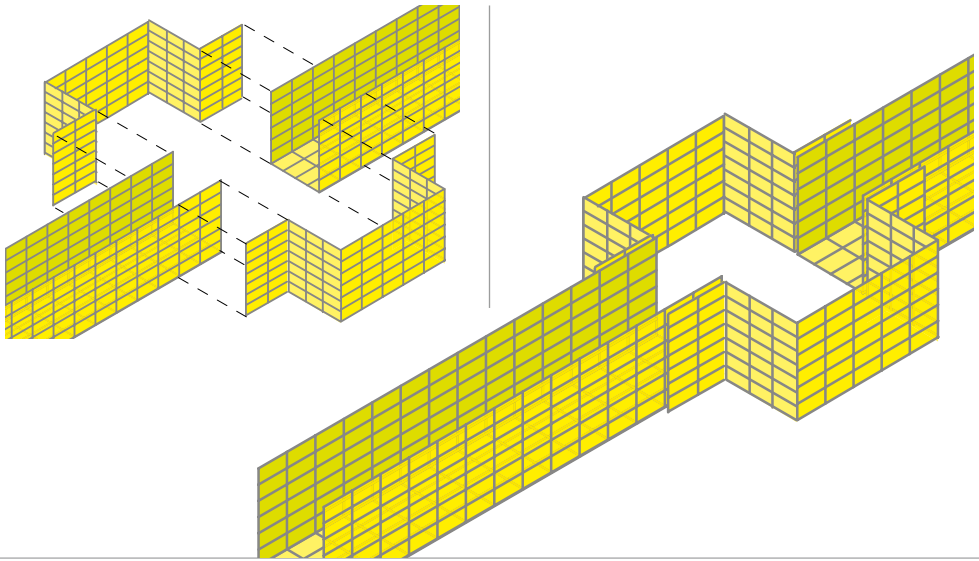
U-shaped formwork - T-intersection



Connect bent out flaps to the outside face of the joining U-beam using a tying wire.



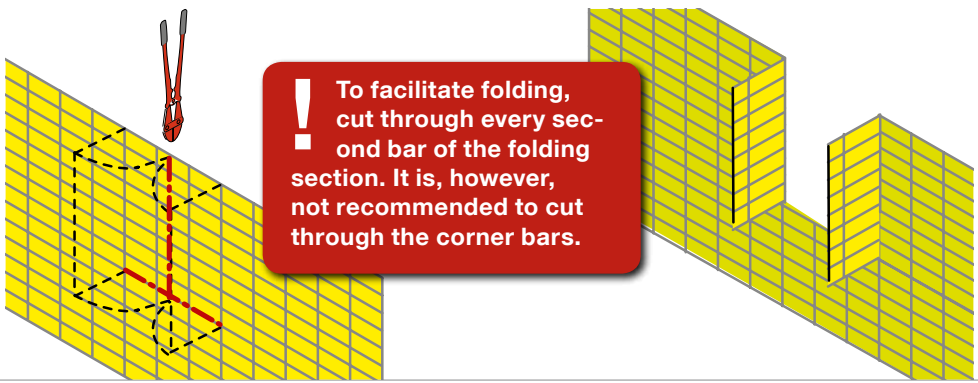
U-shaped formwork combined with widened foundation



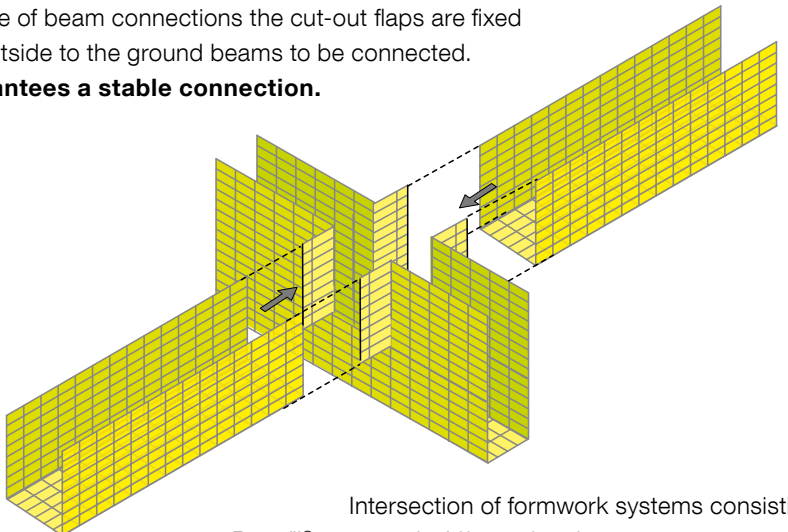
Overlaps of formwork systems with different heights consisting of Pecafil® strips

Determine position of the Pecafil® element to be connected.
Mark both, centre line (axis) and contour on the erected Pecafil® element.

Cut through (foil and bars) of Pecafil® along the centre line (axis) and along the lower edge. Afterwards bend flaps along the marking outward.

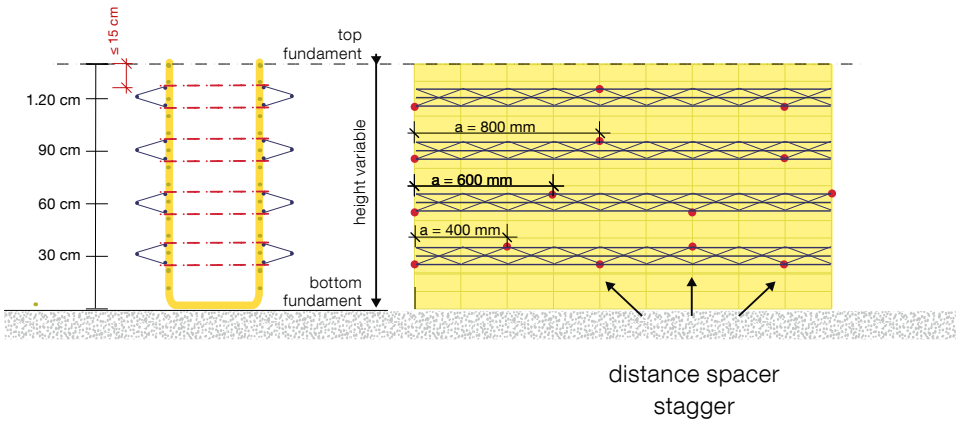


For this type of beam connections the cut-out flaps are fixed from the outside to the ground beams to be connected.
This guarantees a stable connection.

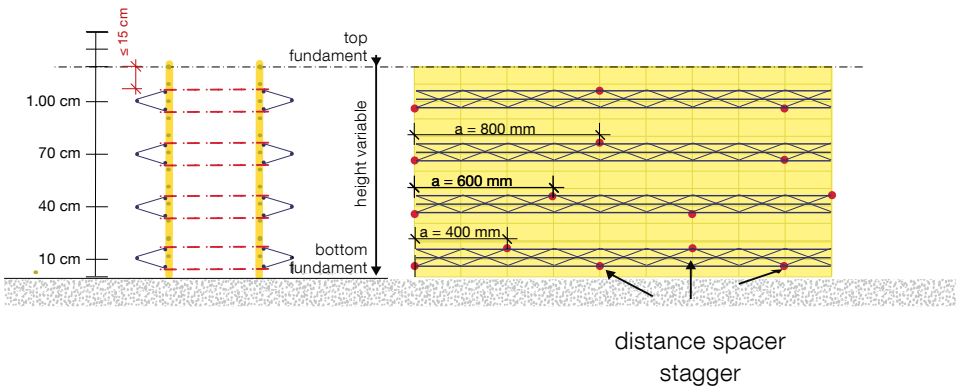


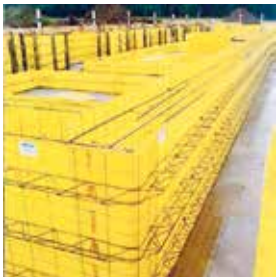
Intersection of formwork systems consisting of Pecafil® strips with different heights – position connecting pieces to the appropriately bent flaps and connect.

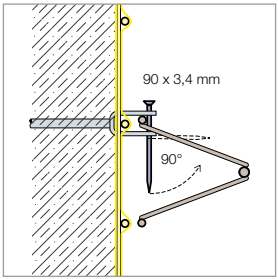
Distance spacer arrangement with U-shaped formwork



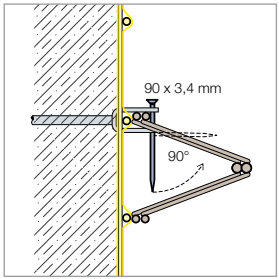
Distance spacer arrangement with two seperate panels





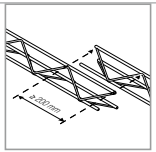


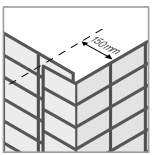
Fixing of formwork girder after pre-assembly of Pecafil® with nails. Ensure that Pecafil® distance spacers do not come into direct contact with the beam cage.

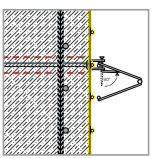


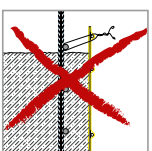
Fixing with a nail in the intersection area of the formwork girders (overlap: at least 200 mm). Lock the nail by bending.

- Formwork girders must be installed with a minimum overlap of 200 mm.
- Distance Pecafil® spacers at 800 mm alternating between upper and lower girder main wires (for exact distances see page 69).
- Bend Pecafil® at intersections.
  Take care of a minimum overlap of 150 mm of Pecafil® sheets.
  Securely fix elements to each other at lap joints.
- Ensure that Pecafil® distance spacers do not come into direct contact with the beam cage.
- Pecafil® sheets must not be tied to the reinforcement.
- Concreting must be done by specialists only.
- Pour in concrete vertically and at continuous speed into all ground beams. Observe a maximum height of fall of 300 mm during concrete pouring.





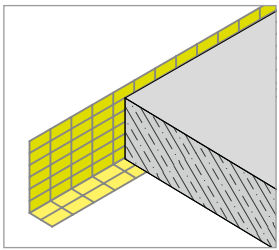




L-shaped formwork bases and slabs

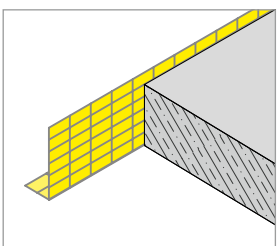
Angle inside

Lost formwork
(Example: corner formwork base slab)

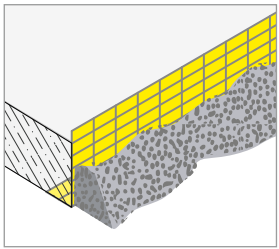


Angle outside

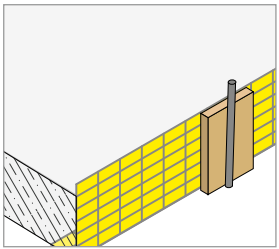
Reusable formwork
(Example: corner formwork base slab)



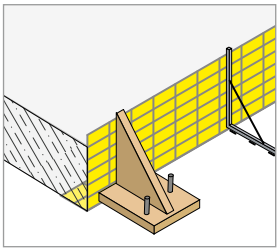
Backfilling (toe-in)

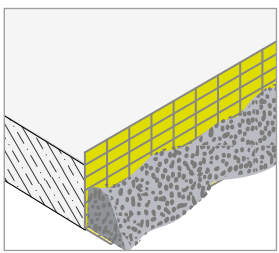


Support posts

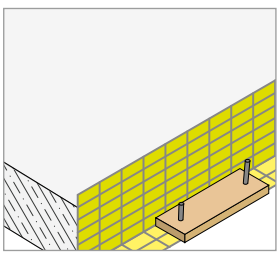


External angle



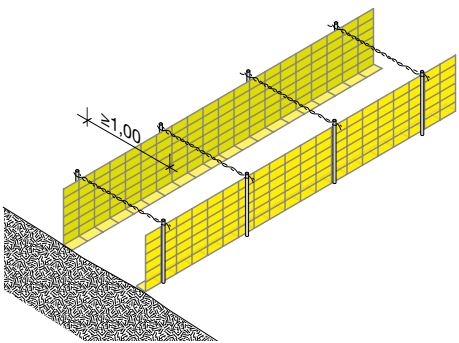


Backfilling (toe-out)

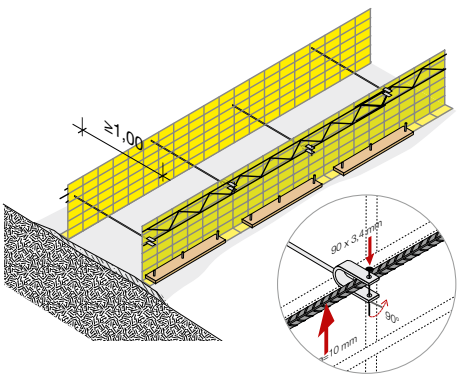


Anchor board

For large foundations and in case of frequently changing ground beam cross sections or projecting ground beams, two Pecafil® L-formworks can be used instead of one U-shaped formwork.

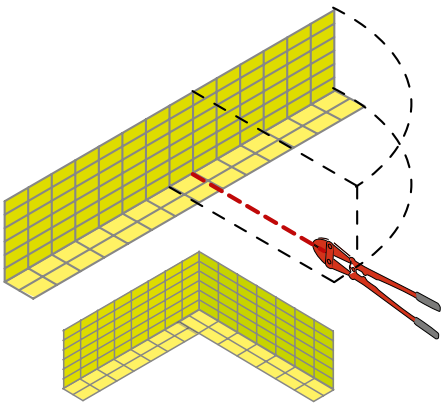


Pecafil® is reusable if it is used for an outside L-angle. We would recommend fixing the material on a pre-concreted granular sub-base.



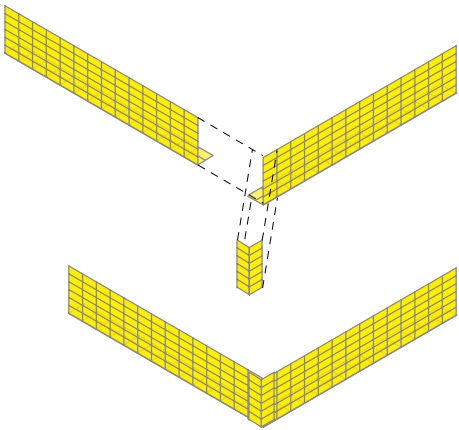
Corner sections with L-shaped formwork

Cut in element base at desired spot using a bolt cutter and subsequently bend to the desired position.



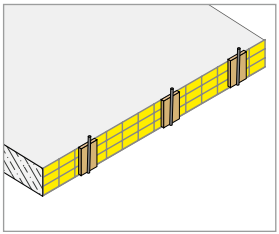
Bent corner element.

Push and tie L-elements together

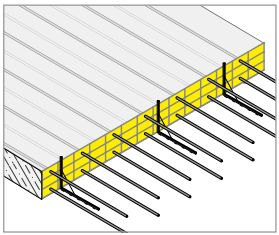


Tie the bent corner angle section to L-elements with overlap.

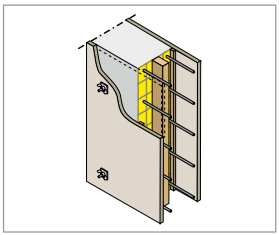
Formwork stop-end with and without continuous reinforcement



Formwork produced for one concrete pour without continuous reinforcement.



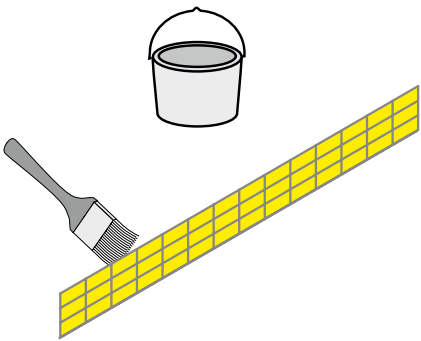
Formwork produced for one concrete pour with continuous reinforcement.

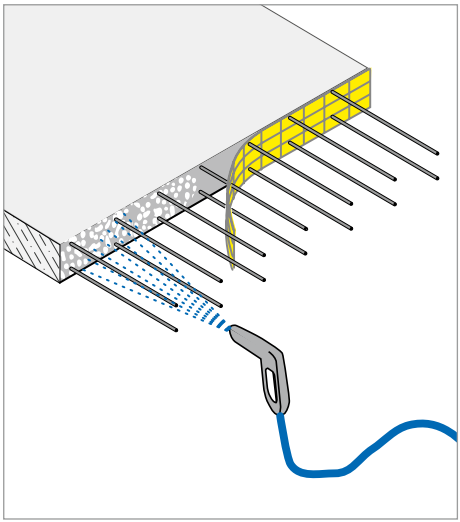


Formwork produced for one concrete pour inside a wall.

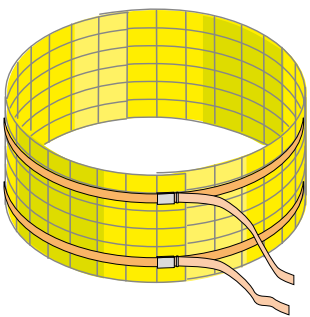
Joints for exposed aggregate concrete

The application of an inhibitor to Pecafil® creates an optimum bond to the adjoining concrete layer.

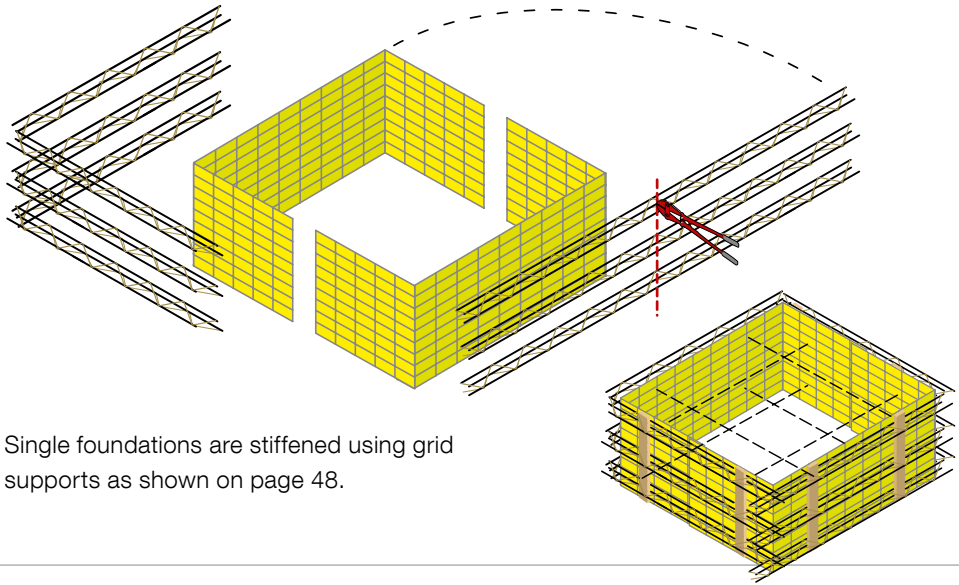




Circular formwork is produced from flat material, which is folded to the desired round shape in our factory.
Circular formwork elements are stiffened using lashing straps or similar.



Rectangular arrangement of single foundations made of flat material

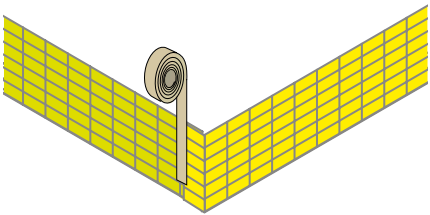


Single foundations are stiffened using grid supports as shown on page 48.

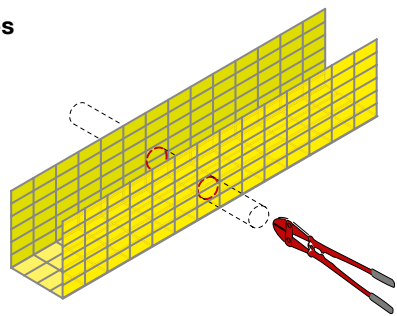
Sealing of overlaps

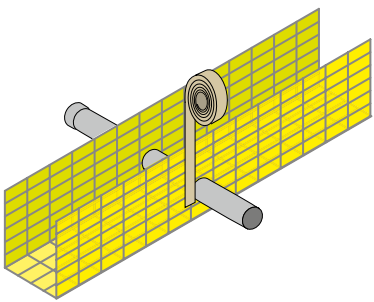
If required:

Overlaps are sealed with a wide adhesive tape order to avoid any leakage of cement laitance.



Liner pipes

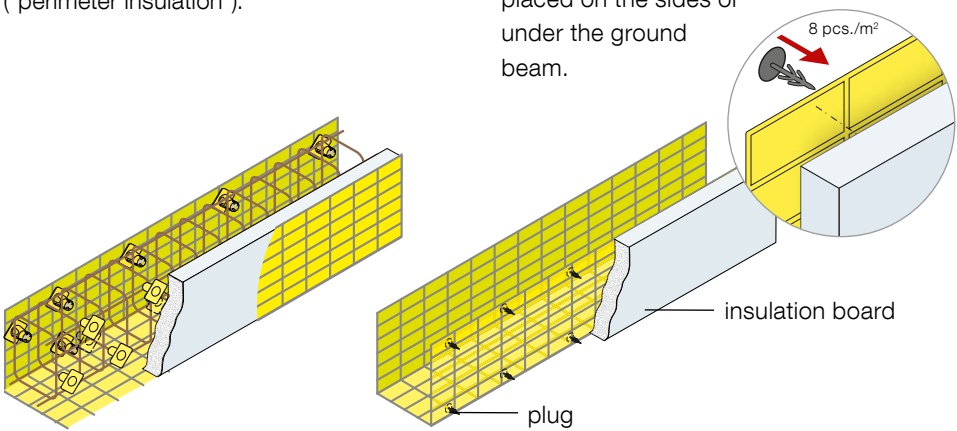




Ground beams with heat insulation

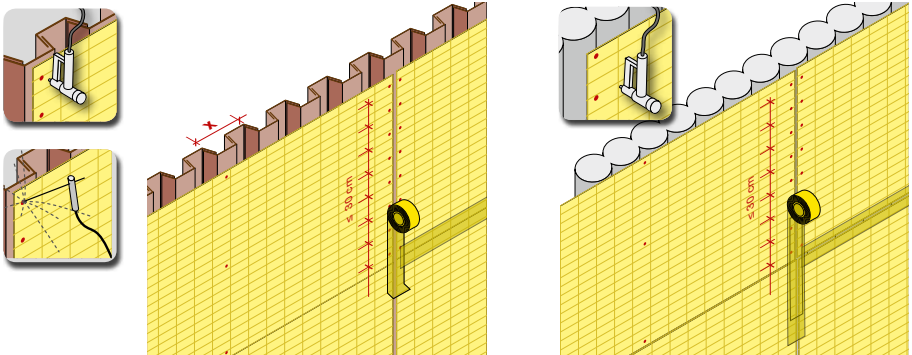
Pecafil® may be securely glued to insulation board using a polyurethane hybrid glue or other insulation materials (“perimeter insulation”).

Pecafil® can also be used in ground heave applications where a specified compressible material should be placed on the sides or under the ground beam.



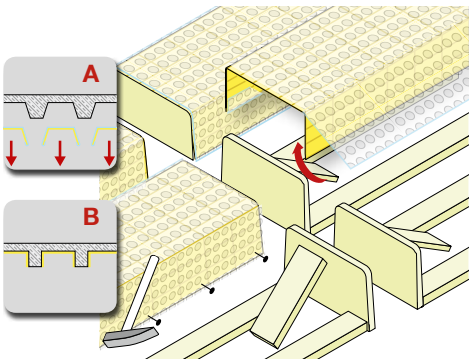
Partition formwork

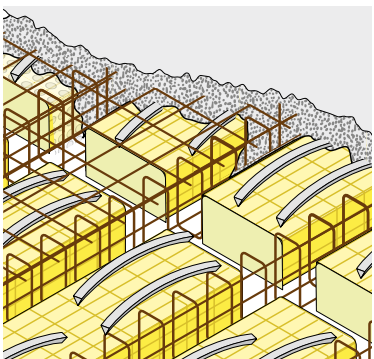
The mounting depends on the substructure. In the case of drilled piles, Pecafil® is mechanically fixed on and for sheet piling it is welded on. The connection of the panels to each other by means of welding the horizontal bars is particularly useful for sheet piling to be extracted later on.



Ribbed slabs

The displacement elements are laid on continuous formwork. Stress bars that are nailed to the substructure provide longitudinal reinforcement. The U-bent Pecafil displacement elements are cut to length using a knife for the foil and a bolt cutter for the wire insert or using an angle cutter.





Protective clothing:

Gloves must be used for transport and handling of Pecafil®. Suitable clothing must be worn to avoid cuts to limbs.

Special precautions:

Work practices:
Storage – to be in a fenced compound or the material should be weighted down to prevent wind dispersal.

Handling – a clear field of vision to be maintained when carrying and care to be taken when placing material in windy and / or confined working spaces.
Remove all offcut wire from work areas to avoid stumbles, slippage and skin puncture.
Keep site traffic away from the excavation of the ground beams made of Pecafil® strips.

- Our technical project office will be delighted to provide you with more detailed information for individual projects. Our technical sales managers can also advise installers on site.
- The individual elements are marked and they can be clearly identified with an installation schedule in order to facilitate installation.
- This installation schedule is enclosed in every Pecafil® delivery consignment.
- For questions or special application kindly get in contact with our technical project office.

MAX FRANK®

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Ce guide de mise en oeuvre est une description condensée des facteurs ayant un effet direct sur le produit MAX FRANK et est basée sur l'état de connaissance des techniques actuelles. Il peut être nécessaire de modifier ces recommandations, à mesure que d'autres informations deviennent disponibles. L'utilisation correcte est de la responsabilité de l'utilisateur, en cas de doute, veuillez consulter votre fournisseur local. Seule la version allemande de guide est juridiquement contraignante. La traduction française est disponible seulement afin de faciliter la compréhension.

This Installation Guideline is a condensed description of factors having a direct effect on the performance of the MAX FRANK product and is based on the present state of the art. It may be necessary to alter these recommendations, as more information becomes available. Correct use is the responsibility of the user, if in doubt please consult your local supplier. The German version of this legal notice is legally binding. The English translation is only for a better understanding.

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FR/FR/GB – 06/18