

6.7 CETRIS® PD and CETRIS® PDB Floor Systems on Joists

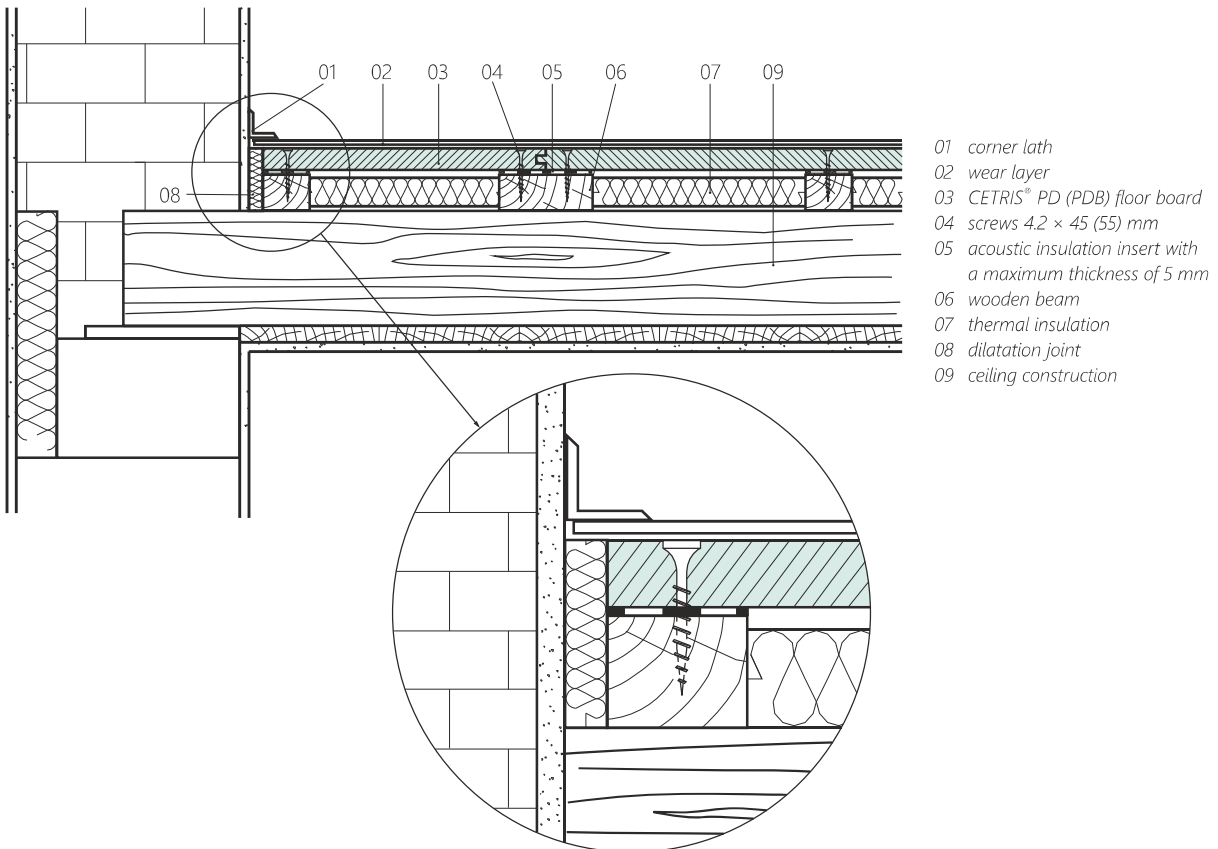
The CETRIS® PD and CETRIS® PDB cement-bonded particleboards on joists are used both for floors in new houses and for reconstruction of old floors.

6.7.1 Description of the Construction

The classic fixed structure of the floors consists of the single or bi-directional beams (wooden prisms – pillows, steel beams, and the like). The beams are covered with CETRIS® PD and CETRIS® PDB cement-bonded particleboards in one layer screwed to the beams. The CETRIS® PD and CETRIS® PDB floor boards are laid tightly without gaps and the joints are secured with dispersion glue to ensure the interaction of the boards. Heat and sound insulation is placed between the beams as required and acoustic insulation with a maximum thickness of 5 mm is also laid over the beams to prevent formation of sound bridges. The floor is finished around the walls with a dilation joint with a width of

15 mm. It is recommended to place a 15 mm wide mineral wool or polystyrene strip into the dilatation joints along the vertical constructions to prevent clogging of the dilatation joint during subsequent works. This tape is cut at the desired height after completion of the final surface finishing of the floating floor before installation of the floorings. The beams must have an adequate load-bearing capacity, set on a load-bearing construction. It is necessary to verify their deflection. If the load-bearing construction is flat, the beams should be installed on the full length of the structure.

Vertical cross-section – Floor boards on beams



6.7.2 Load Tables

The static calculation of the load-bearing capacity of the CETRIS® PD and PDB floor boards was done for boards mounted on beams (unidirectional mounting) or on a grid (bi-directional mounting). The span of the beams in the grid is the same in both directions (square field). The interaction of the CETRIS® PD (PDB) boards is ensured by a tongue and groove joint and its glue bonding. The calculation is done assuming the elastic behaviour of the material while respecting the following mechanical and physical characteristics:

| | |
|---------------------------|---------------------------------|
| Flexural tensile strength | $f = \min. 9 \text{ N/mm}^2$ |
| Modulus of elasticity | $E = \min. 4500 \text{ N/mm}^2$ |
| Density | $\rho = 1400 \text{ kg/m}^3$ |

When determining the load capacity, the dead weight of the board was also taken into consideration. The maximum normal stress in the terminal fibres shall not exceed 3.60 N/mm² (a 2.5 multiple of safety is achieved). The maximum elastic deflection of the board from the opera-

ting load including dead weight shall not exceed 1/300 of the span. The calculation was used to verify that concentrated load is decisive for the load capacity of the CETRIS® cement bonded particleboards according to ČSN 73 00 35 (load on building structures). Specification of the maximum usable load of the board respects Article 6 of ČSN 73 00 35 standard, which stipulates that in the case of ceilings, staircases, flat roofs and terraces, a concentrated standard vertical load whose value in kN is equal to the value of the standard usable uniform load per 1 m² of the ceiling.

It is assumed that this concentrated load acts on a square area with side of length 100 mm. The calculation further assumes that the load acts directly on the board surface and in case of the application of load distribution layers, the load capacity of the CETRIS® floor boards shall be higher, but this must be verified by a calculation for each individual case. The static calculation results are given in the following tables and graphs.

Load-bearing capacity of CETRIS® PD and CETRIS® PDB floor boards in the case of one-direction beams

Max. deflection L/300, max. flexural tensile stress 3.6 N/mm², loaded area 100 x 100 mm

| Interval (m) | Maximum load F (kN) | | | | | | | | | | | | |
|-----------------|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | Th. 16 mm | Th. 18 mm | Th. 20 mm | Th. 22 mm | Th. 24 mm | Th. 26 mm | Th. 28 mm | Th. 30 mm | Th. 32 mm | Th. 34 mm | Th. 36 mm | Th. 38 mm | Th. 40 mm |
| 0,200 | 1,532 | 1,940 | 2,396 | 2,899 | 3,451 | 4,052 | 4,700 | 5,396 | 6,140 | 6,932 | 7,773 | 8,661 | 9,598 |
| 0,250 | 1,335 | 1,691 | 2,089 | 2,529 | 3,010 | 3,534 | 4,100 | 4,708 | 5,357 | 6,049 | 6,783 | 7,559 | 8,376 |
| 0,300 | 1,200 | 1,520 | 1,878 | 2,274 | 2,707 | 3,179 | 3,688 | 4,235 | 4,820 | 5,443 | 6,104 | 6,802 | 7,539 |
| 0,350 | 1,099 | 1,393 | 1,721 | 2,085 | 2,483 | 2,916 | 3,384 | 3,886 | 4,423 | 4,995 | 5,602 | 6,244 | 6,920 |
| 0,400 | 1,020 | 1,293 | 1,599 | 1,937 | 2,308 | 2,711 | 3,146 | 3,614 | 4,114 | 4,646 | 5,211 | 5,809 | 6,438 |
| 0,450 | 0,922 | 1,212 | 1,499 | 1,817 | 2,165 | 2,544 | 2,953 | 3,392 | 3,862 | 4,363 | 4,894 | 5,455 | 6,047 |
| 0,500 | 0,802 | 1,144 | 1,415 | 1,716 | 2,045 | 2,403 | 2,790 | 3,207 | 3,651 | 4,125 | 4,628 | 5,160 | 5,720 |
| 0,550 | 0,703 | 1,010 | 1,343 | 1,628 | 1,942 | 2,282 | 2,651 | 3,047 | 3,470 | 3,921 | 4,400 | 4,906 | 5,439 |
| 0,600 | 0,620 | 0,893 | 1,235 | 1,551 | 1,851 | 2,176 | 2,528 | 2,906 | 3,311 | 3,742 | 4,199 | 4,683 | 5,192 |
| 0,650 | 0,550 | 0,794 | 1,101 | 1,476 | 1,769 | 2,081 | 2,418 | 2,781 | 3,168 | 3,581 | 4,020 | 4,483 | 4,972 |
| 0,700 | 0,488 | 0,708 | 0,985 | 1,323 | 1,695 | 1,994 | 2,318 | 2,667 | 3,039 | 3,436 | 3,857 | 4,303 | 4,773 |
| 0,750 | 0,435 | 0,634 | 0,884 | 1,190 | 1,559 | 1,915 | 2,227 | 2,562 | 2,920 | 3,303 | 3,708 | 4,138 | 4,590 |
| 0,800 | 0,387 | 0,568 | 0,795 | 1,073 | 1,409 | 1,807 | 2,141 | 2,465 | 2,810 | 3,179 | 3,570 | 3,984 | 4,421 |
| 0,850 | 0,345 | 0,509 | 0,715 | 0,970 | 1,276 | 1,639 | 2,062 | 2,373 | 2,707 | 3,063 | 3,441 | 3,841 | 4,263 |
| 0,900 | 0,307 | 0,456 | 0,644 | 0,877 | 1,157 | 1,489 | 1,878 | 2,288 | 2,610 | 2,954 | 3,320 | 3,706 | 4,114 |
| 0,950 | 0,272 | 0,408 | 0,580 | 0,793 | 1,049 | 1,354 | 1,711 | 2,124 | 2,518 | 2,851 | 3,204 | 3,578 | 3,973 |
| 1,000 | 0,240 | 0,364 | 0,522 | 0,717 | 0,952 | 1,232 | 1,560 | 1,940 | 2,375 | 2,752 | 3,094 | 3,456 | 3,838 |
| 1,050 | 0,211 | 0,325 | 0,469 | 0,648 | 0,864 | 1,121 | 1,423 | 1,773 | 2,174 | 2,630 | 2,989 | 3,339 | 3,710 |
| 1,100 | 0,184 | 0,288 | 0,420 | 0,584 | 0,783 | 1,020 | 1,298 | 1,621 | 1,991 | 2,412 | 2,887 | 3,227 | 3,586 |
| 1,150 | 0,159 | 0,254 | 0,375 | 0,526 | 0,709 | 0,927 | 1,184 | 1,482 | 1,823 | 2,212 | 2,651 | 3,119 | 3,466 |
| 1,200 | 0,136 | 0,223 | 0,334 | 0,472 | 0,641 | 0,842 | 1,079 | 1,354 | 1,669 | 2,029 | 2,434 | 2,889 | 3,350 |
| 1,250 | 0,115 | 0,194 | 0,296 | 0,423 | 0,578 | 0,763 | 0,982 | 1,235 | 1,527 | 1,860 | 2,235 | 2,656 | 3,126 |
| 1,300 | 0,095 | 0,166 | 0,259 | 0,375 | 0,517 | 0,687 | 0,888 | 1,121 | 1,390 | 1,696 | 2,042 | 2,430 | 2,863 |
| 1,350 | 0,076 | 0,141 | 0,225 | 0,332 | 0,462 | 0,618 | 0,803 | 1,018 | 1,265 | 1,548 | 1,867 | 2,226 | 2,626 |
| 1,400 | 0,059 | 0,118 | 0,195 | 0,292 | 0,412 | 0,556 | 0,726 | 0,924 | 1,153 | 1,414 | 1,710 | 2,042 | 2,412 |
| 1,450 | 0,043 | 0,097 | 0,167 | 0,256 | 0,366 | 0,499 | 0,656 | 0,840 | 1,051 | 1,293 | 1,567 | 1,875 | 2,219 |
| 1,500 | 0,029 | 0,077 | 0,141 | 0,223 | 0,325 | 0,447 | 0,592 | 0,762 | 0,959 | 1,184 | 1,438 | 1,724 | 2,044 |



Load-bearing capacity of CETRIS® PD and CETRIS® PDB floor boards in the case of two-direction beams

Max. deflection L/300, max. flexural tensile stress 3.6 N/mm², loaded area 100 x 100 mm

| Interval (m) | Maximum load F (kN) | | | | | | | | | | | | |
|-----------------|---------------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|
| | Th. 16 mm | Th. 18 mm | Th. 20 mm | Th 22 mm | Th. 24 mm | Th. 26 mm | Th. 28 mm | Th. 30 mm | Th. 32 mm | Th. 34 mm | Th. 36 mm | Th. 38 mm | Th.40 mm |
| 0,200 | 1,999 | 2,530 | 3,124 | 3,781 | 4,500 | 5,282 | 6,126 | 7,033 | 8,002 | 9,030 | 10,125 | 11,281 | 12,501 |
| 0,250 | 1,692 | 2,142 | 2,645 | 3,201 | 3,810 | 4,472 | 5,187 | 5,955 | 6,776 | 7,646 | 8,573 | 9,553 | 10,585 |
| 0,300 | 1,487 | 1,882 | 2,325 | 2,814 | 3,349 | 3,932 | 4,560 | 5,236 | 5,958 | 6,723 | 7,538 | 8,400 | 9,308 |
| 0,350 | 1,340 | 1,697 | 2,096 | 2,537 | 3,020 | 3,545 | 4,113 | 4,722 | 5,374 | 6,063 | 6,798 | 7,576 | 8,395 |
| 0,400 | 1,229 | 1,557 | 1,924 | 2,329 | 2,773 | 3,255 | 3,776 | 4,336 | 4,935 | 5,567 | 6,243 | 6,957 | 7,710 |
| 0,450 | 1,143 | 1,448 | 1,789 | 2,167 | 2,580 | 3,029 | 3,514 | 4,036 | 4,593 | 5,181 | 5,811 | 6,476 | 7,177 |
| 0,500 | 1,074 | 1,361 | 1,682 | 2,036 | 2,425 | 2,848 | 3,304 | 3,795 | 4,319 | 4,872 | 5,464 | 6,090 | 6,750 |
| 0,550 | 1,017 | 1,289 | 1,593 | 1,930 | 2,298 | 2,699 | 3,132 | 3,597 | 4,095 | 4,619 | 5,180 | 5,774 | 6,400 |
| 0,600 | 0,969 | 1,229 | 1,519 | 1,840 | 2,192 | 2,575 | 2,988 | 3,432 | 3,907 | 4,407 | 4,943 | 5,510 | 6,108 |
| 0,650 | 0,913 | 1,177 | 1,456 | 1,764 | 2,102 | 2,469 | 2,866 | 3,292 | 3,748 | 4,227 | 4,742 | 5,286 | 5,860 |
| 0,700 | 0,836 | 1,133 | 1,401 | 1,698 | 2,024 | 2,378 | 2,760 | 3,171 | 3,611 | 4,073 | 4,569 | 5,094 | 5,647 |
| 0,750 | 0,768 | 1,094 | 1,354 | 1,641 | 1,956 | 2,299 | 2,669 | 3,066 | 3,492 | 3,938 | 4,419 | 4,926 | 5,462 |
| 0,800 | 0,708 | 1,019 | 1,312 | 1,591 | 1,896 | 2,229 | 2,588 | 2,974 | 3,387 | 3,820 | 4,286 | 4,779 | 5,299 |
| 0,850 | 0,655 | 0,945 | 1,274 | 1,546 | 1,843 | 2,167 | 2,516 | 2,892 | 3,294 | 3,715 | 4,169 | 4,649 | 5,155 |
| 0,900 | 0,608 | 0,879 | 1,219 | 1,505 | 1,795 | 2,111 | 2,452 | 2,818 | 3,211 | 3,621 | 4,064 | 4,532 | 5,026 |
| 0,950 | 0,566 | 0,820 | 1,140 | 1,469 | 1,752 | 2,060 | 2,394 | 2,752 | 3,136 | 3,537 | 3,970 | 4,428 | 4,910 |
| 1,000 | 0,527 | 0,766 | 1,067 | 1,435 | 1,713 | 2,015 | 2,341 | 2,692 | 3,068 | 3,460 | 3,884 | 4,333 | 4,806 |
| 1,050 | 0,491 | 0,717 | 1,002 | 1,351 | 1,677 | 1,973 | 2,293 | 2,637 | 3,005 | 3,390 | 3,806 | 4,246 | 4,710 |
| 1,100 | 0,459 | 0,673 | 0,942 | 1,273 | 1,644 | 1,934 | 2,249 | 2,587 | 2,948 | 3,326 | 3,734 | 4,167 | 4,622 |
| 1,150 | 0,428 | 0,631 | 0,887 | 1,201 | 1,580 | 1,899 | 2,208 | 2,540 | 2,896 | 3,267 | 3,668 | 4,093 | 4,542 |
| 1,200 | 0,400 | 0,593 | 0,836 | 1,135 | 1,496 | 1,866 | 2,170 | 2,497 | 2,847 | 3,212 | 3,607 | 4,026 | 4,467 |
| 1,250 | 0,374 | 0,557 | 0,789 | 1,074 | 1,419 | 1,828 | 2,134 | 2,456 | 2,801 | 3,161 | 3,550 | 3,963 | 4,398 |
| 1,300 | 0,349 | 0,524 | 0,745 | 1,018 | 1,347 | 1,739 | 2,101 | 2,419 | 2,759 | 3,073 | 3,497 | 3,904 | 4,333 |
| 1,350 | 0,325 | 0,492 | 0,704 | 0,965 | 1,281 | 1,656 | 2,069 | 2,383 | 2,719 | 2,829 | 3,381 | 3,849 | 4,273 |
| 1,400 | 0,302 | 0,462 | 0,665 | 0,915 | 1,219 | 1,579 | 2,002 | 2,350 | 2,681 | 2,612 | 3,124 | 3,698 | 4,216 |
| 1,450 | 0,281 | 0,434 | 0,628 | 0,869 | 1,160 | 1,507 | 1,914 | 2,318 | 2,646 | 2,418 | 2,895 | 3,429 | 4,024 |
| 1,500 | 0,260 | 0,406 | 0,593 | 0,825 | 1,105 | 1,439 | 1,832 | 2,287 | 2,612 | 2,440 | 2,897 | 3,407 | 3,974 |

The results of the static calculation indicate the following application options for CETRIS® floor boards:

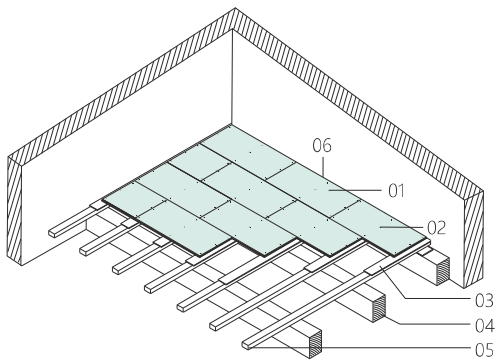
| Standard load (kNm ²) and nature of the room | Recommended load-bearing construction for the CETRIS® PD (PDB) floor boards | |
|---|---|---|
| | Single direction beams | Two-direction beams (grids) |
| <p>0,75</p> <p>Lofts, inaccessible terraces and flat roofs with a roofing element span of up to 9 m.</p> | <p>Beam span 621 mm / Board thickness 18 mm</p> | <p>Beam span 621 mm / Board thickness 16 mm</p> |
| <p>1,50</p> <p>Residential apartments including ante-chambers and corridors, rooms in hostels, hotels, rooms in nurseries and childcare centres, bedrooms of school dormitories and sanatoria, hospital wards, polyclinics, other healthcare facilities, surgeries and waiting rooms.</p> | <p>Beam span 621 mm / Board thickness 22 mm</p> | <p>Beam span 621 mm / Board thickness 20 mm</p> |
| <p>2,00</p> <p>Rooms and offices of research institutions, office buildings, reading rooms, classrooms without heavy equipment or material storage, agricultural rooms and areas.</p> | <p>Beam span 414 mm / Board thickness 22 mm</p> | <p>Beam span 621 mm / Board thickness 24 mm</p> |
| <p>3,00</p> <p>Halls and corridors in the above-mentioned buildings with the exception of schools, lecture halls, mess halls, cafés and restaurants.</p> | <p>Beam span 414 mm / Board thickness 28 mm</p> | <p>Beam span 621 mm / Board thickness 30 mm</p> |
| <p>4,00</p> <p>Halls and corridors of messes, cafés, restaurants, schools, railway stations (areas open to public), theatres, cinemas, clubs, concert halls, sports halls, department stores, museums, exhibition halls and pavilions, libraries and archives of industrial buildings.</p> | <p>Beam span 414 mm / Board thickness 32 mm</p> | <p>Beam span 621 mm / Board thickness 34 mm</p> |

Note: Cases of higher useful load or large solitary loads must be solved individually. The load capacity of two-layer CETRIS® board constructions is solved in Chapter 6.8 Two-layer CETRIS® board floors on beams



6.7.3 Laying of CETRIS® PD and CETRIS® PDB Floor Boards

1. The CETRIS® PD and CETRIS® PDB floor boards are laid as the final constructions after completion of the “wet” building construction work (after erection of the partition walls, after plastering, etc.). In a case where a light partition (plasterboard, CETRIS® on a grid) is to be installed, its weight must be considered during the design of the dimensions and layout of the floor beams. In this case, it is necessary to consider the possibility of noise transmission via the floor from one room to another.
2. The width of the beam is based not only on the load-bearing capacity requirement but also on the requirement for sufficient anchoring of the CETRIS® PD (CETRIS® PDB) floor sections in the load-bearing construction. For the wooden beams, it applies that the width of the beams at the contact point of two CETRIS® PD (CETRIS® PDB) boards must be at least 80 mm. It is recommended to place a flexible insert between the beams and the load-bearing construction (rubber, solid felt, PE foil layer of minimum thickness 5 mm) to reduce sound transmission. At the same time, the beams can be height-adjusted using supports or wedges. We anchor the balanced beams in the base, for a wooden base, we use screws, for concrete, we use drive-in dowels. The floor beams are laid at axial distances according to the required load.
3. It is recommended to separate CETRIS® PD and CETRIS® PDB boards from the beams with a separating layer (unwoven fabric, felt, rubber, cardboard) to prevent potential knocking of the floor. It is sufficient to lay a strip of the same width as the beam along its full length.
4. The tongue edge at the wall must be cut off.
5. The CETRIS® PD (CETRIS® PDB) boards are laid tightly against each other and the joint is fixed with glue. The following alkali-resistant dispersion glues are recommended: UZIN MK33, MAPEI – ADESIVIL D3, SCHÖNOX HL, HENKEL PONAL SUPER 3 (PATEX SUPER 3), etc. When using CETRIS® boards without tongue and groove, it is necessary to glue the joints (polyurethane glue, e.g. DenBraven polyurethane glue for use on wood, SOUDAL PU glue 66A, etc.). Immediately screw the floor board after application of the glue and setting of the board. The excessive (expelled) glue is removed after pushing the boards against each other to ensure that the joint is fully filled with glue. The maximum screw spacing is 300 mm in the direction of the joists (400 mm in the case of the CETRIS® boards of thickness 26 mm and above); the screws must be min. 25 mm and max. 50 mm from the board edge.

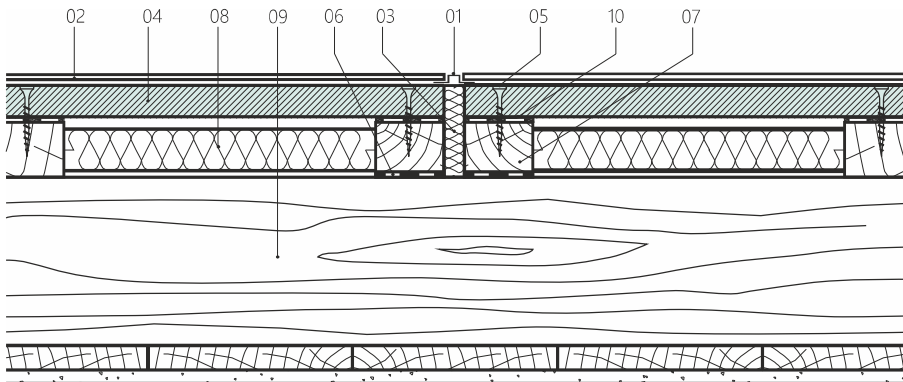


Floor boards on beams – laying procedure

- 01 CETRIS® PD (PDB) floor boards
- 02 CETRIS® screw
- 03 supporting and adjusting washer
- 04 existing joist
- 05 beams
- 06 dilatation joint

6. When laying CETRIS® PD (CETRIS® PDB) floor boards, cross joints should be avoided and the contact joints should be supported, at least, in one direction. The individual rows of the boards are laid with overlaps depending on the spacing of the beams, but at least by 1/3 of the board length. The minimum size of the finally cut board is 250 mm. Around the vertical joints (walls, pillars, etc.) it is necessary to keep a dilatation joint of minimum width 15 mm.
7. In the case of single-direction beams, CETRIS® PD (CETRIS® PDB) boards are laid with the longer side perpendicular to the beams.
8. Around the doors the CETRIS® PD (CETRIS® PDB) boards should be laid in such a manner as to avoid the creation of a cross-joint.
9. If additional thermal insulation is applied between the beams by backfill (e.g. LIAPOR) up to the beam height, it is recommended to overfill the space between the beams to allow for additional compaction. It is suitable to place full surface paper cardboard on the backfill to prevent penetration of the grain into the floor boards during their installation and also to prevent squeaking of the floor.

Floor boards on beams – solution of dilatation



- 01 dilatation profile
- 02 wear layer
- 03 dilatation joint
- 04 CETRIS® PD floor boards (CETRIS® PDB)
- 05 CETRIS® screw
- 06 supporting and adjusting washer
- 07 beams
- 08 heat and sound insulation
- 09 ceiling construction
- 10 separating washer



6.8 Two-layer CETRIS® Board Floors on Beams

Wear layer – the beams may be covered with basic CETRIS® boards in two and more layers. The given solution is considered mainly for reason of better availability of basic boards as compared with floor boards. This method is often applied also in the case of various (changing) beam axial distances (reconstruction of old wooden floors), or in case of a requirement for high floor load capacity.

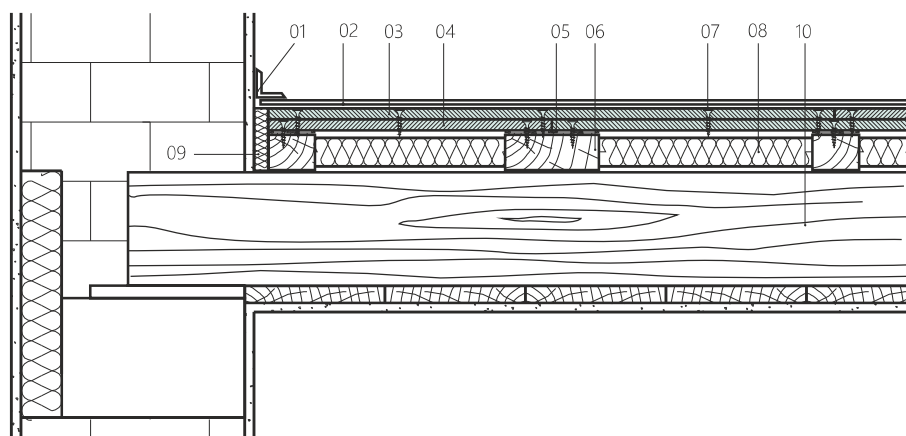
Note:

- The total load capacity is achieved only after screw-jointing of both CETRIS® board layers! For this procedure to be effective, it is necessary to ensure perfect interaction of both CETRIS® boards (at best joined with screws for perfect transmission of shear and tensile stress). If the layers are not perfectly bonded, each of them behaves as a separate layer, which results in the risk of significant sags.
- The first (lower) layer of the CETRIS® boards of thickness 18 mm inclusive are not fully walkable in the case of a beam spacing of 625 mm and above. During assembly, the workers may move only at the locations of the beams (joists).

6.8.1 Description of the Construction

The classic fixed structure of the floors consists of the single or bi-directional beams (wooden prisms – pillows, steel beams, and the like). The beams are covered with CETRIS® cement-bonded particleboards in two layers screwed. Due to static action, the largest CETRIS® board dimensions are suitable. The first layer of CETRIS® boards is laid tightly without gaps and anchored with screws to the beams. The shorter sides of the boards are laid on the beams. The second layer of CETRIS® boards is laid with an overlap in both directions, such that the shorter side again lies on the beams (the overlap is equal in the perpendicular direction to the direction of the joists). The boards in the second layer are again laid tightly without gaps and anchored with screws to ensure the interaction of both board layers. Heat and sound insulation is placed between the beams as required. To prevent formation of sound bridges acoustic insulation is also laid under the beams. The floor is finished around the walls with a dilation joint with a width of 15 mm. The beams must have an adequate load-bearing capacity, set on a load-bearing construction. It is necessary to mainly verify their deflection. If the load-bearing construction is flat, the beams should be installed on the full length of the structure.

Two-layer CETRIS® board floors on beams



- 01 corner lath (skirting)
- 02 wear layer
- 03 CETRIS® board, upper layer
- 04 CETRIS® board, bottom layer
- 05 base and levelling acoustic layer
- 06 wooden beams
- 07 CETRIS® screws 4.2 x 35 (45, 55) mm
- 08 heat and sound insulation
- 09 dilation joint of thickness 15 mm
- 10 ceiling construction

6.8.2 Load Tables

In the case of compliance with the technological procedure for laying the boards (and especially joining of the two layers) the design of this floor type may be based in the static calculation of the load-bearing capacity for CETRIS® floor boards. Joint action of the two CETRIS® board layers must be ensured by their mutual jointing – by screwing or riveting (the maximum distance of the joining elements in the longitudinal and transverse direction is 300 mm).

In the case of perfectly secured joint action of both layers the load-bearing capacity of the two-layer floor is equal to the load-bearing capacity of the single-layer CETRIS® PD (CETRIS® PDB) floor glued in the tongue and groove connections of the same total thickness, reduced by 25% for safety reasons. Other calculation assumptions and load tables are given in Chapter 6.7 CETRIS® PD and CETRIS® PDB Floor Systems on Joists.



Load-bearing capacity of two-layer CETRIS® board cladding in the case unidirectional assembly on beams
 Max. deflection L/300, max. flexural tensile stress 3.6 N/mm², loaded area 100 x 100 mm

| Span (m) | Maximum load F (kN) | | | | | | | | | | | | | |
|-------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | Th. 24 mm 12+12 | Th. 26 mm 12+14 | Th. 28 mm 14+14 | Th. 30 mm 16+14 | Th. 32 mm 16+16 | Th. 34 mm 18+16 | Th. 36 mm 18+18 | Th. 38 mm 20+18 | Th. 40 mm 20+20 | Th. 42 mm 22+20 | Th. 44 mm 22+22 | Th. 46 mm 24+22 | Th. 48 mm 24+24 | Th. 50 mm 26+24 |
| 0,200 | 2,589 | 3,039 | 3,525 | 4,047 | 4,605 | 5,199 | 5,830 | 6,496 | 7,198 | 7,937 | 8,711 | 9,522 | 10,369 | 11,251 |
| 0,250 | 2,258 | 2,651 | 3,075 | 3,531 | 4,018 | 4,537 | 5,087 | 5,669 | 6,282 | 6,927 | 7,603 | 8,311 | 9,050 | 9,821 |
| 0,300 | 2,030 | 2,384 | 2,766 | 3,176 | 3,615 | 4,082 | 4,578 | 5,102 | 5,654 | 6,235 | 6,844 | 7,481 | 8,147 | 8,841 |
| 0,350 | 1,862 | 2,187 | 2,538 | 2,915 | 3,318 | 3,747 | 4,202 | 4,683 | 5,190 | 5,724 | 6,283 | 6,868 | 7,480 | 8,118 |
| 0,400 | 1,731 | 2,033 | 2,359 | 2,710 | 3,085 | 3,485 | 3,908 | 4,356 | 4,829 | 5,325 | 5,846 | 6,392 | 6,961 | 7,555 |
| 0,450 | 1,624 | 1,908 | 2,214 | 2,544 | 2,897 | 3,272 | 3,670 | 4,092 | 4,536 | 5,003 | 5,492 | 6,005 | 6,540 | 7,099 |
| 0,500 | 1,534 | 1,802 | 2,093 | 2,405 | 2,739 | 3,094 | 3,471 | 3,870 | 4,290 | 4,732 | 5,196 | 5,681 | 6,189 | 6,717 |
| 0,550 | 1,456 | 1,712 | 1,988 | 2,285 | 2,603 | 2,941 | 3,300 | 3,679 | 4,079 | 4,500 | 4,942 | 5,404 | 5,887 | 6,390 |
| 0,600 | 1,388 | 1,632 | 1,896 | 2,180 | 2,483 | 2,806 | 3,149 | 3,512 | 3,894 | 4,297 | 4,719 | 5,160 | 5,622 | 6,103 |
| 0,650 | 1,327 | 1,561 | 1,814 | 2,085 | 2,376 | 2,686 | 3,015 | 3,363 | 3,729 | 4,115 | 4,520 | 4,943 | 5,386 | 5,848 |
| 0,700 | 1,271 | 1,496 | 1,739 | 2,000 | 2,279 | 2,577 | 2,893 | 3,227 | 3,580 | 3,951 | 4,340 | 4,747 | 5,173 | 5,616 |
| 0,750 | 1,170 | 1,436 | 1,670 | 1,921 | 2,190 | 2,477 | 2,781 | 3,103 | 3,443 | 3,800 | 4,175 | 4,567 | 4,977 | 5,405 |
| 0,800 | 1,057 | 1,355 | 1,606 | 1,848 | 2,108 | 2,384 | 2,678 | 2,988 | 3,316 | 3,660 | 4,022 | 4,401 | 4,796 | 5,209 |
| 0,850 | 0,957 | 1,229 | 1,546 | 1,780 | 2,031 | 2,298 | 2,581 | 2,881 | 3,197 | 3,530 | 3,879 | 4,245 | 4,627 | 5,026 |
| 0,900 | 0,867 | 1,117 | 1,408 | 1,716 | 1,958 | 2,216 | 2,490 | 2,780 | 3,085 | 3,407 | 3,745 | 4,099 | 4,469 | 4,854 |
| 0,950 | 0,787 | 1,016 | 1,283 | 1,593 | 1,889 | 2,138 | 2,403 | 2,684 | 2,980 | 3,291 | 3,618 | 3,960 | 4,318 | 4,691 |
| 1,000 | 0,714 | 0,924 | 1,170 | 1,455 | 1,782 | 2,064 | 2,321 | 2,592 | 2,879 | 3,180 | 3,497 | 3,828 | 4,175 | 4,537 |
| 1,050 | 0,648 | 0,841 | 1,068 | 1,330 | 1,631 | 1,973 | 2,242 | 2,505 | 2,782 | 3,074 | 3,381 | 3,702 | 4,038 | 4,388 |
| 1,100 | 0,587 | 0,765 | 0,974 | 1,216 | 1,493 | 1,809 | 2,165 | 2,420 | 2,689 | 2,972 | 3,269 | 3,581 | 3,906 | 4,246 |
| 1,150 | 0,532 | 0,696 | 0,888 | 1,111 | 1,368 | 1,659 | 1,988 | 2,339 | 2,600 | 2,874 | 3,162 | 3,464 | 3,779 | 4,108 |
| 1,200 | 0,481 | 0,632 | 0,809 | 1,015 | 1,252 | 1,522 | 1,826 | 2,167 | 2,513 | 2,779 | 3,058 | 3,350 | 3,656 | 3,976 |
| 1,250 | 0,433 | 0,572 | 0,736 | 0,927 | 1,145 | 1,395 | 1,676 | 1,992 | 2,344 | 2,686 | 2,957 | 3,241 | 3,537 | 3,847 |
| 1,300 | 0,388 | 0,515 | 0,666 | 0,841 | 1,042 | 1,272 | 1,532 | 1,823 | 2,147 | 2,507 | 2,859 | 3,134 | 3,421 | 3,722 |
| 1,350 | 0,346 | 0,464 | 0,602 | 0,763 | 0,949 | 1,161 | 1,400 | 1,669 | 1,969 | 2,302 | 2,668 | 3,030 | 3,308 | 3,599 |
| 1,400 | 0,309 | 0,417 | 0,544 | 0,693 | 0,865 | 1,061 | 1,282 | 1,531 | 1,809 | 2,117 | 2,457 | 2,830 | 3,198 | 3,480 |
| 1,450 | 0,275 | 0,374 | 0,492 | 0,630 | 0,789 | 0,970 | 1,176 | 1,406 | 1,664 | 1,950 | 2,266 | 2,613 | 2,992 | 3,364 |
| 1,500 | 0,243 | 0,335 | 0,444 | 0,572 | 0,719 | 0,888 | 1,079 | 1,293 | 1,533 | 1,799 | 2,093 | 2,416 | 2,770 | 3,155 |

The load capacity of two-layer CETRIS® board cladding in the case unidirectional assembly on a grid
 Max. deflection L/300, max. flexural tensile stress 3.6 N/mm², loaded area 100 x 100 mm

| Span (m) | Maximum load F (kN) | | | | | | | | |
|-------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | Th. 24 mm 12+12 | Th. 26 mm 12+14 | Th. 28 mm 14+14 | Th. 30 mm 16+14 | Th. 32 mm 16+16 | Th. 34 mm 18+16 | Th. 36 mm 18+18 | Th. 38 mm 20+18 | Th. 40 mm 20+20 |
| 0,200 | 3,375 | 3,961 | 4,595 | 5,275 | 6,002 | 6,773 | 7,593 | 8,461 | 9,376 |
| 0,250 | 2,857 | 3,354 | 3,890 | 4,466 | 5,082 | 5,734 | 6,430 | 7,164 | 7,939 |
| 0,300 | 2,512 | 2,949 | 3,420 | 3,927 | 4,469 | 5,042 | 5,653 | 6,300 | 6,981 |
| 0,350 | 2,265 | 2,659 | 3,084 | 3,542 | 4,030 | 4,547 | 5,099 | 5,682 | 6,297 |
| 0,400 | 2,079 | 2,441 | 2,832 | 3,252 | 3,701 | 4,175 | 4,682 | 5,218 | 5,783 |
| 0,450 | 1,935 | 2,272 | 2,636 | 3,027 | 3,445 | 3,886 | 4,358 | 4,857 | 5,383 |
| 0,500 | 1,819 | 2,136 | 2,478 | 2,846 | 3,239 | 3,654 | 4,098 | 4,568 | 5,063 |
| 0,550 | 1,724 | 2,024 | 2,349 | 2,698 | 3,071 | 3,464 | 3,885 | 4,331 | 4,800 |
| 0,600 | 1,644 | 1,931 | 2,241 | 2,574 | 2,930 | 3,305 | 3,707 | 4,133 | 4,581 |
| 0,650 | 1,576 | 1,852 | 2,149 | 2,469 | 2,811 | 3,171 | 3,557 | 3,965 | 4,395 |
| 0,700 | 1,518 | 1,783 | 2,070 | 2,379 | 2,708 | 3,055 | 3,427 | 3,820 | 4,235 |
| 0,750 | 1,467 | 1,724 | 2,001 | 2,300 | 2,619 | 2,954 | 3,314 | 3,695 | 4,096 |
| 0,800 | 1,422 | 1,671 | 1,941 | 2,230 | 2,540 | 2,865 | 3,215 | 3,584 | 3,974 |
| 0,850 | 1,382 | 1,625 | 1,887 | 2,169 | 2,470 | 2,786 | 3,127 | 3,487 | 3,866 |
| 0,900 | 1,346 | 1,583 | 1,839 | 2,114 | 2,408 | 2,716 | 3,048 | 3,399 | 3,770 |
| 0,950 | 1,314 | 1,545 | 1,795 | 2,064 | 2,352 | 2,653 | 2,977 | 3,321 | 3,683 |
| 1,000 | 1,285 | 1,511 | 1,756 | 2,019 | 2,301 | 2,595 | 2,913 | 3,249 | 3,604 |
| 1,050 | 1,258 | 1,480 | 1,720 | 1,978 | 2,254 | 2,543 | 2,854 | 3,184 | 3,532 |
| 1,100 | 1,233 | 1,451 | 1,687 | 1,940 | 2,211 | 2,494 | 2,801 | 3,125 | 3,467 |
| 1,150 | 1,185 | 1,424 | 1,656 | 1,905 | 2,172 | 2,450 | 2,751 | 3,070 | 3,406 |
| 1,200 | 1,122 | 1,399 | 1,627 | 1,873 | 2,135 | 2,409 | 2,705 | 3,019 | 3,350 |
| 1,250 | 1,064 | 1,371 | 1,601 | 1,842 | 2,101 | 2,370 | 2,663 | 2,972 | 3,298 |
| 1,300 | 1,011 | 1,304 | 1,576 | 1,814 | 2,069 | 2,305 | 2,623 | 2,928 | 3,250 |
| 1,350 | 0,961 | 1,242 | 1,552 | 1,787 | 2,039 | 2,122 | 2,536 | 2,887 | 3,204 |
| 1,400 | 0,914 | 1,184 | 1,501 | 1,762 | 2,011 | 1,959 | 2,343 | 2,774 | 3,162 |
| 1,450 | 0,870 | 1,130 | 1,436 | 1,738 | 1,984 | 1,814 | 2,171 | 2,572 | 3,018 |
| 1,500 | 0,829 | 1,080 | 1,374 | 1,715 | 1,959 | 1,830 | 2,173 | 2,555 | 2,980 |



6.8.3 Laying of CETRIS® Boards

1. The CETRIS® board floor is laid as the final construction after completion of the "wet" building construction processes (after erection of the partition walls, after plastering, etc.). In a case where a light partition (plasterboard, CETRIS® on a grid) is to be installed, its weight must be supported by a floor beam. In this case, it is necessary to consider the possibility of noise transmission via the floor from one room to another.
2. The width of the beam is based not only on the load-bearing capacity requirement but also on the requirement for sufficient anchoring of the CETRIS® boards in the load-bearing construction. For the wooden beams, it applies that the width of the beams at the contact point of two CETRIS® boards must be at least 80 mm. It is recommended to place a flexible insert between the beams and the load-bearing construction (rubber, solid felt, PE foil layer of maximum thickness 5 mm) to reduce sound transmission. At the same time, the beams can be height-adjusted using supports or wedges. We anchor the balanced beams in the base, for a wooden base, we use screws, for concrete, we use drive-in dowels.
3. It is recommended to separate the CETRIS® board from the beams with a separating layer (unwoven fabric, felt, rubber, soft PE foil) to prevent potential knocking of the floor. It suffices to lay a strip of the same width as the beam along its full length.
4. The first layer of CETRIS® boards is again laid tight against each other with a cross-joint. The boards are set and screw-jointed immediately. In the case of single-direction beams the first CETRIS® board layer is laid with the longer side perpendicular to the beams and the shorter side supported by the beams. The maximum screw spacing is 300 mm in the direction of the joists; the screws must be min. 25 mm and max. 50 mm from the board edge. Around the vertical joints (walls, pillars, etc.) it is necessary to keep a dilatation joint of minimum width 15 mm.
5. In the second layer, the CETRIS® boards are laid with an overlap such that the shorter side again lies on the beams (the overlap is equal to the length of one field). The boards are again laid tight against each other with cross joint. The board is set and screw-jointed immediately with the bottom layer. The maximum screw spacing in the longitudinal and transverse directions is 300 mm (400 mm in the case of the CETRIS® boards of thickness 26 mm and above). The screws must be min. 25 mm and max. 50 mm from the board edge. Around the vertical joints (walls, pillars, etc.) it is necessary to keep dilatation joint of minimum width 15 mm.

Note: In the case of insertion of softened PE foil between the two CETRIS® board layers for increased impact sound transmission loss, it is necessary to use milled floor boards CETRIS® PD (PDB) in the second layer. If non-milled boards are used, different levels of local compression may occur resulting in irregularities in the cross-joints of the CETRIS® boards. The CETRIS® PD (PDB) floor board is glued in the tongue and groove joints and screwed to the bottom CETRIS® board layer.

6. Around the doors, the CETRIS® boards are laid in such a manner as to avoid the creation of a joint.
7. If additional thermal insulation is applied between the beams by backfill (e.g. LIAPOR) up to the beam height, it is recommended to overfill the space between the beams to allow for additional compaction. It is suitable to place full surface paper cardboard on the backfill to prevent penetration of the grain into the floor boards during their installation and also to prevent squeaking of the floor.

Laying of double-layer CETRIS® board floors on joists

