TIEPPO GROUP SRL
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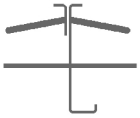
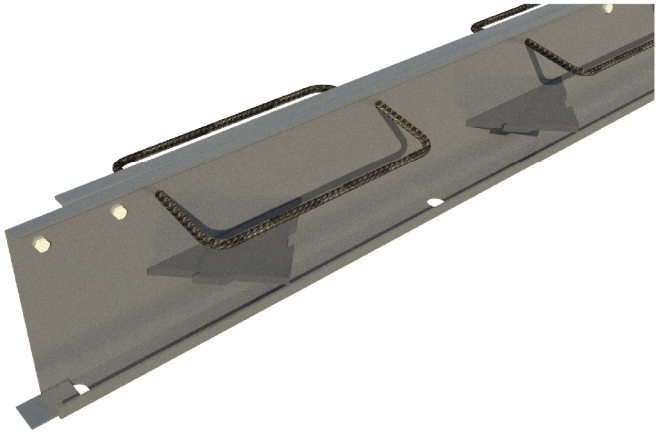
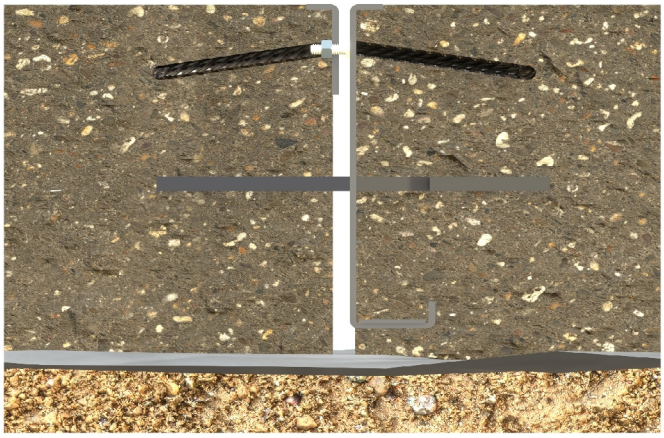
Joint type JV



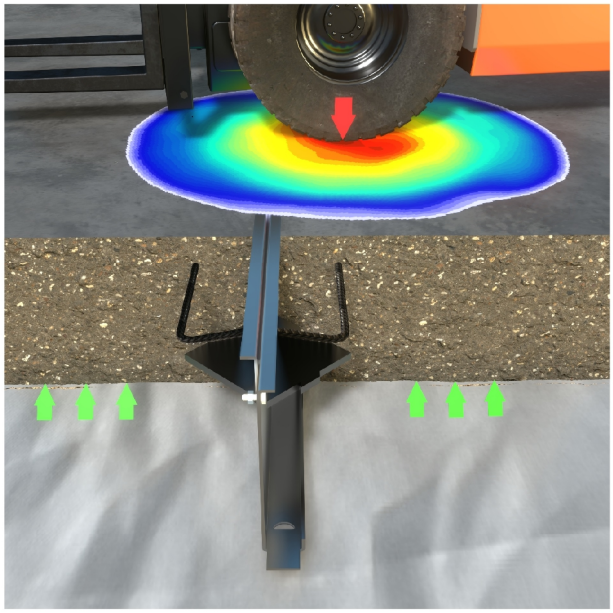




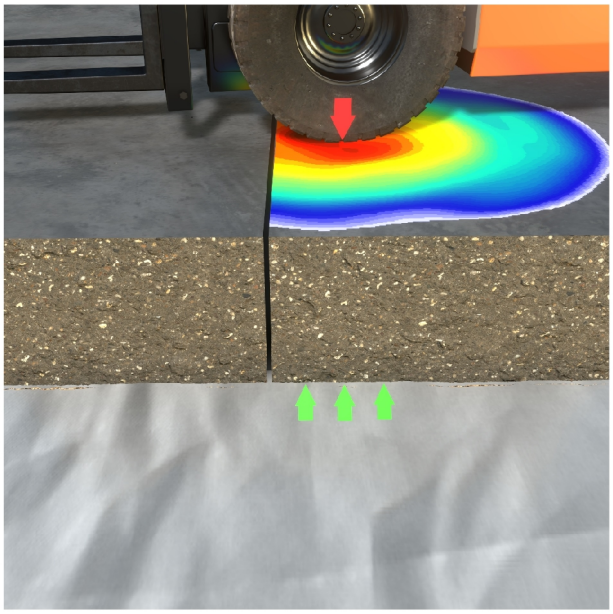
PRODUCT PROPERTIES

The JOINT JV is a prefabricated leave in place free movement joint system, studied for the construction of concrete plates with load transfer mechanisms. The joint also serves the purpose of absorbing movements thermohygrometric the concrete slab: expansion due to temperature changes or shrinkage due to drying shrinkage of concrete (UNI 11146-2005-3.3.3). The joint is composed of a bent sheet in S235 steel having a thickness of 3mm. The second blade is mechanically linked to the first with M6 plastic screws and relative nuts. On the blades are welded bented anchors, which serve as anchorage to the cast plate. The rhomboid bars in S235 steel have varying thickness depending of the height of the joint and a diagonal equal to 180mm and have clings, positioned in the inner side of the support sheet, where the concrete is able to grip.

WITH EXPANSION JOINTS



WITHOUT EXPANSION JOINTS



In the previous images you can see the response of the casting plates to the various stresses and the distribution of loads in the case of the flooring with the presence of the joint.

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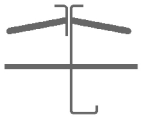
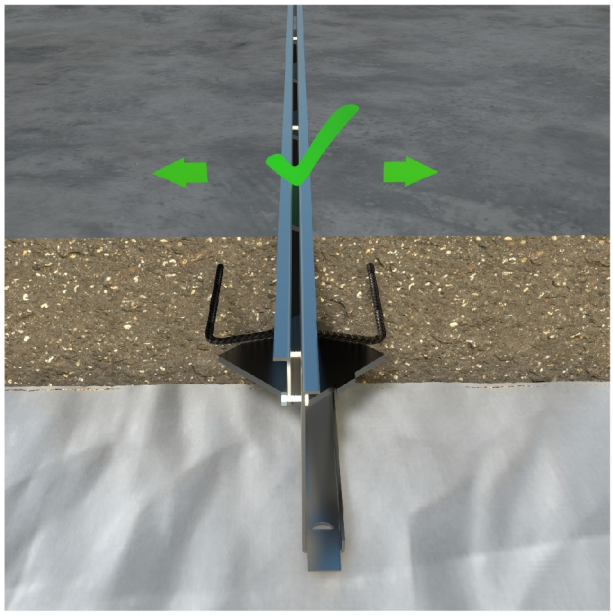
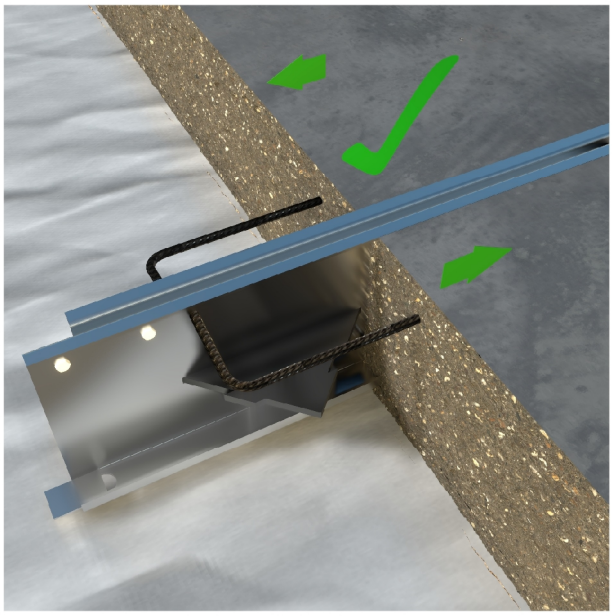


MOVEMENTS ALLOWED

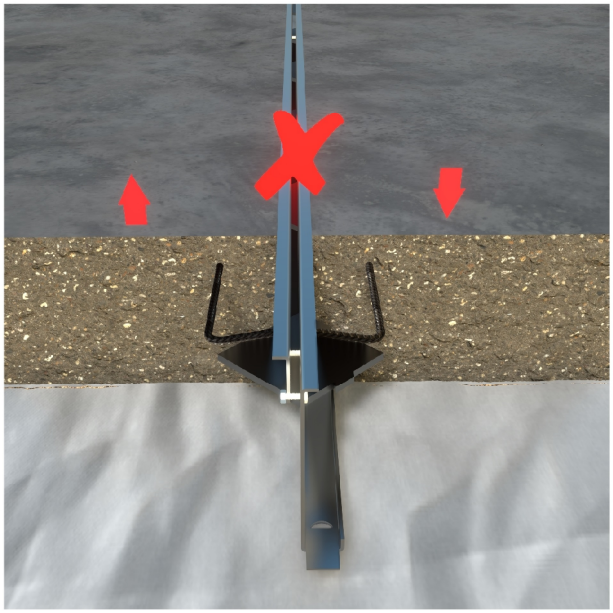
Joints allow the casting plates to move freely along horizontal axes as shown by the green arrows in the following pictures, these movements can be caused by expansion due to temperature changes or shrinkage due to drying shrinkage of concrete. These movements can fall within a range that can vary from a few millimeters up to even 20mm and more.





MOVEMENTS NOT ALLOWED

Casting plates are constrained along the vertical axis as shown in the following picture by the action of the sharing bars. In this way the surface of the different casting plates will remain constantly leveled if subjected to the effect of forces or external loads.



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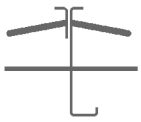
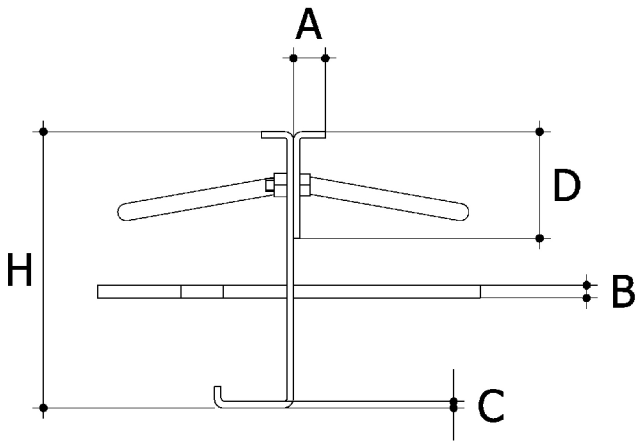
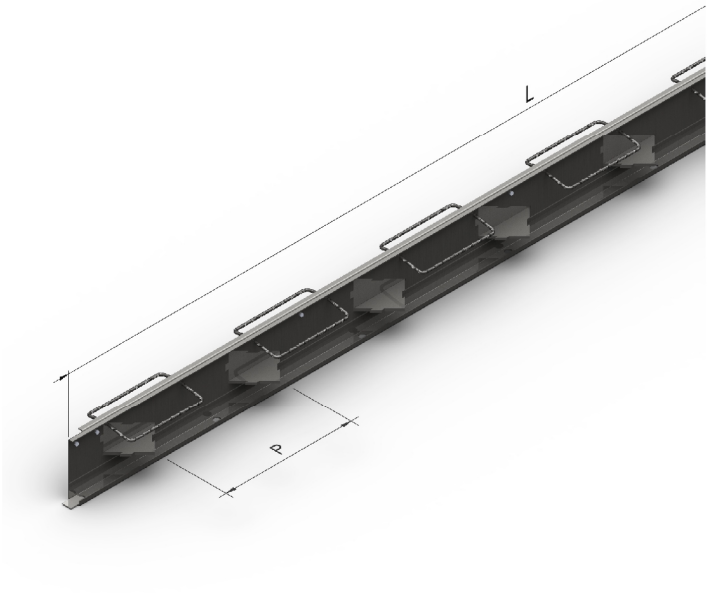


PRODUCT DIMENSIONS





Code	JV100 ÷ 2JV140	2JV150 ÷ 2JV250
H [mm]	100 ÷ 140	150 ÷ 250
A [mm]	15	
B [mm]	6	8
C [mm]	3 Standard – 4 (H > 210)	
D [mm]	50	
L [mm]	2000 – 2990	
P [mm]	428	
SUPPORT SHEET MATERIAL	S235 Standard	
SUPPORT SHEET TREATMENTS	Galvanization by request	

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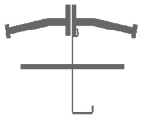
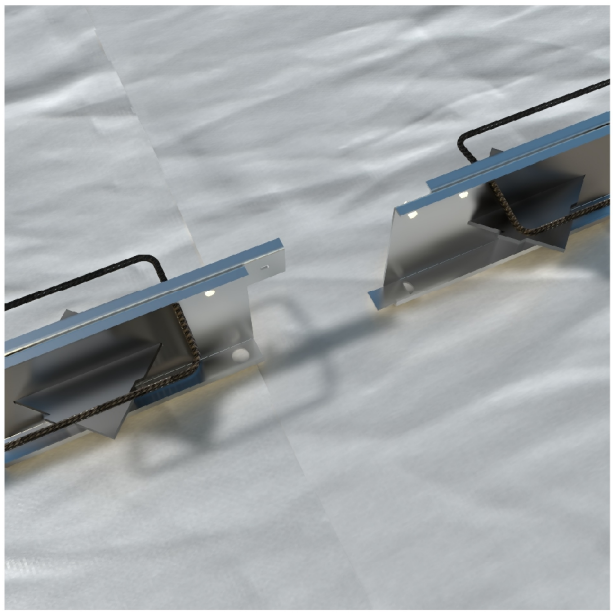


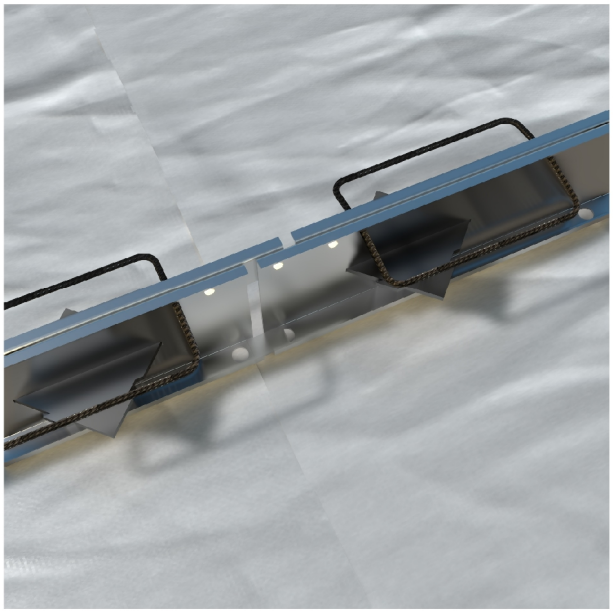
CONNECTION

In order to couple the joints between them and make them fixed is necessary to assist them to the one another (picture 1), unscrew the plastic screw and nut, positioned on ends that sticks out of the joint (picture 2).
Done this you have to slide the joints on one other, up to ensure the continuity between the upper surfaces (picture 2 & 3).
Insert the plastic screw through the slots, and screw the nut to ensure mutual locking of the blades (picture 3 & 4).

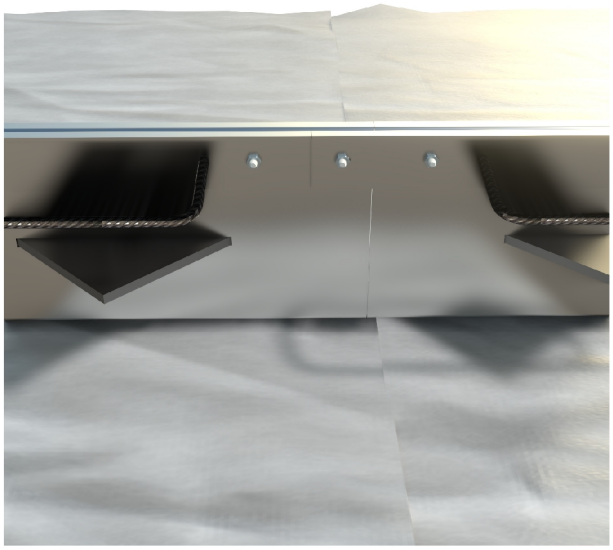
1



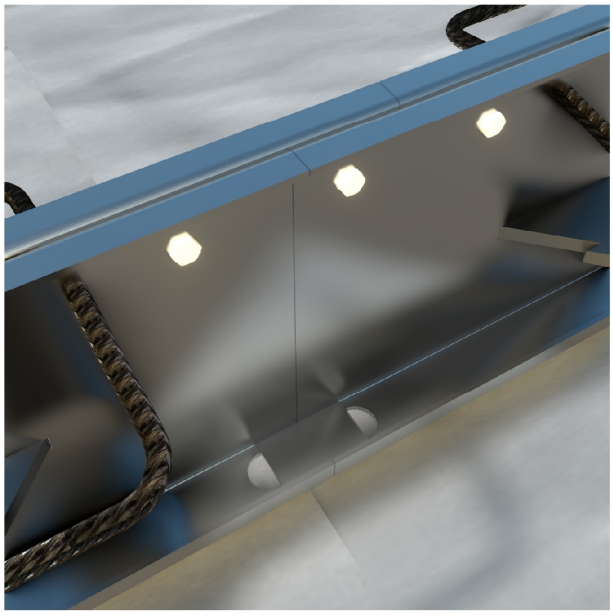
2



3



4



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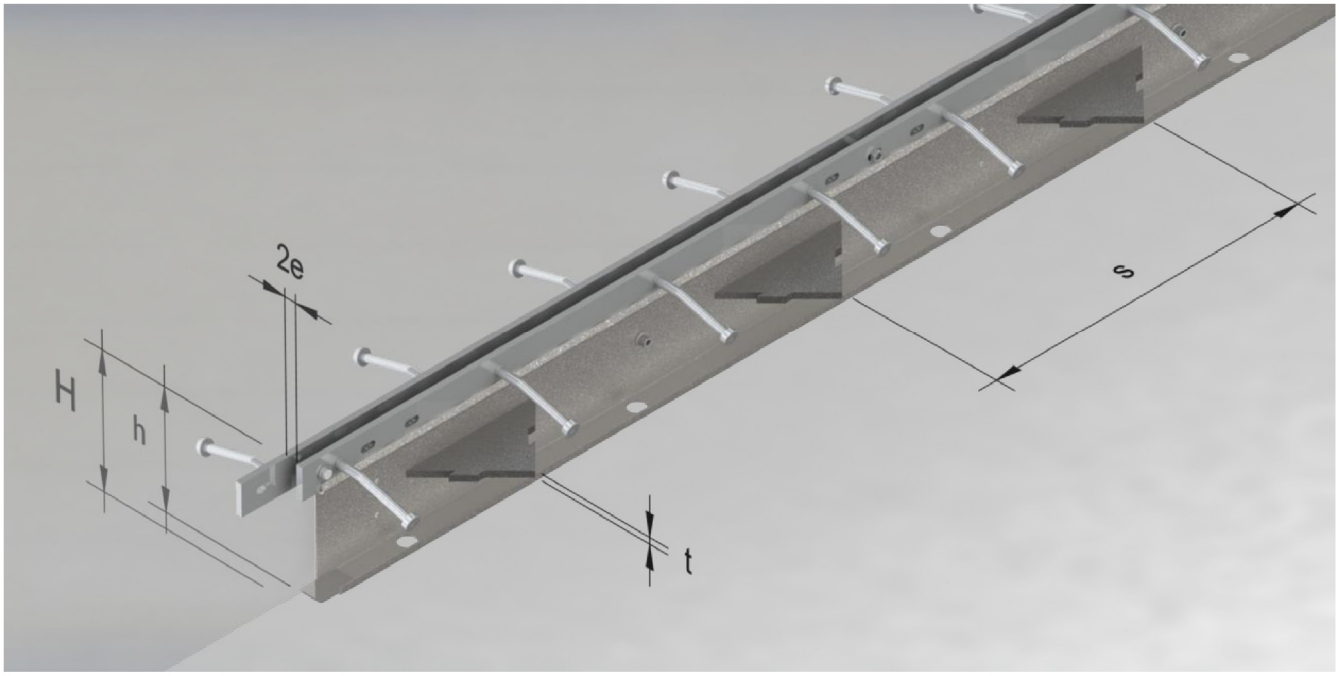
DESIGN TABLES

JOINT TYPE H – H CAD – TC – JV | STEEL GRADE S235



The reported results are derived by following the sector-specific guidance of TR34.4, the previous TR34.3, and the more general requirements of the European regulation for structural design (Eurocodes).

Resistance design values concern the ultimate limit state (ULS) verification against:

- shear failure of rhomboidal steel plate (shear – P_{SH});
- bending failure of the plate or bearing failure of the concrete (bending/bearing – $P_{B,MAX}$);
- concrete punching shear of the plate causing its expulsion for break-out (bursting – $P_{P,MAX}$).

The following concrete resistance classes and flooring thicknesses are considered:

- Concrete class – C25/30, C28/35, C30/37, C32/40, C35/45
- Flooring thickness – H = 100, 120, 150, 170, 200, 220, 250, 270, 300 mm

Horizontality tolerance of the subgrade forces the joint height to be 20 mm less than the floor thickness.

- Joint height, by producer catalogue – h = 80, 100, 130, 150, 180, 200, 230, 250, 280 mm

Based on bar geometry, site conditions and design evaluation (also made to produce the following tables) specific values are selected for:

- Bar thickness “t” or diameter “Ø”
- Joint opening “2e”

being “e” the half opening, the distance of application of load from the face of concrete.

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Joint bearing bar is a steel plate (grade S235), plate thickness and maximum admissible joint opening are:

- H = 100, 120, 150 – steel plate thickness 6 mm, maximum joint opening 15 mm
- H = 170, 200, 220, 250 – steel plate thickness 8 mm, maximum joint opening 20 mm
- H = 270, 300 – steel plate thickness 10 mm, maximum joint opening 20 mm

Plate thickness Joint opening	6 mm 15 mm		C25/30	C28/35	C30/37	C32/40	C35/45
Shear	P_{SH}		114.21	114.21	114.21	114.21	114.21
Bending/Bearing	$P_{B,MAX}$		30.09	30.89	31.36	31.80	32.39
Punching Shear	$P_{P,MAX}$	H = 100	9.10	9.63	9.96	10.29	10.76
		H = 120	10.40	11.00	11.39	11.76	12.30
		H = 150	14.77	15.63	16.17	16.71	17.47

Plate thickness Joint opening	8 mm 20 mm		C25/30	C28/35	C30/37	C32/40	C35/45
Shear	P_{SH}		142.13	142.13	142.13	142.13	142.13
Bending/Bearing	$P_{B,MAX}$		37.83	38.57	39.06	39.53	40.19
Punching Shear	$P_{P,MAX}$	H = 170	17.63	18.65	19.31	19.94	20.86
		H = 200	23.10	24.45	25.30	26.13	27.33
		H = 220	27.14	28.72	29.73	30.71	32.12
		H = 250	33.80	35.77	37.02	38.24	39.99

Plate thickness Joint opening	10 mm 20 mm		C25/30	C28/35	C30/37	C32/40	C35/45
Shear	P_{SH}		177.66	177.66	177.66	177.66	177.66
Bending/Bearing	$P_{B,MAX}$		49.08	54.72	58.48	58.68	58.32
Punching Shear	$P_{P,MAX}$	H = 270	38.63	40.88	42.31	43.70	45.70
		H = 300	46.46	49.17	50.90	52.57	54.98

The design carried loads are expressed in kN, flooring thickness is in mm

Design loads from the tables are intended for a single bearing bar. For distributed loads is to be considered a spacing between bars "s" of 428.5 mm. The load transferred by the joint should not be greater than 50% of the design load for the floor. The remaining 50% should still be carried by the floor.

Design loads for not specified flooring thicknesses, different material mechanical properties or for different bar geometries cannot be obtained by interpolation of the provided data and they will necessarily need extra specific evaluations.
Accountability for a well-designed and properly verified joint, as well as for the flooring slab near the joint, is always held by the professional engineer in charge for the structural design of the entire flooring system. Any responsibility for a proper or not proper use of the presented resistance values cannot be ascribed to TIEPPO GROUP S.r.l. or the producer of this design tables.