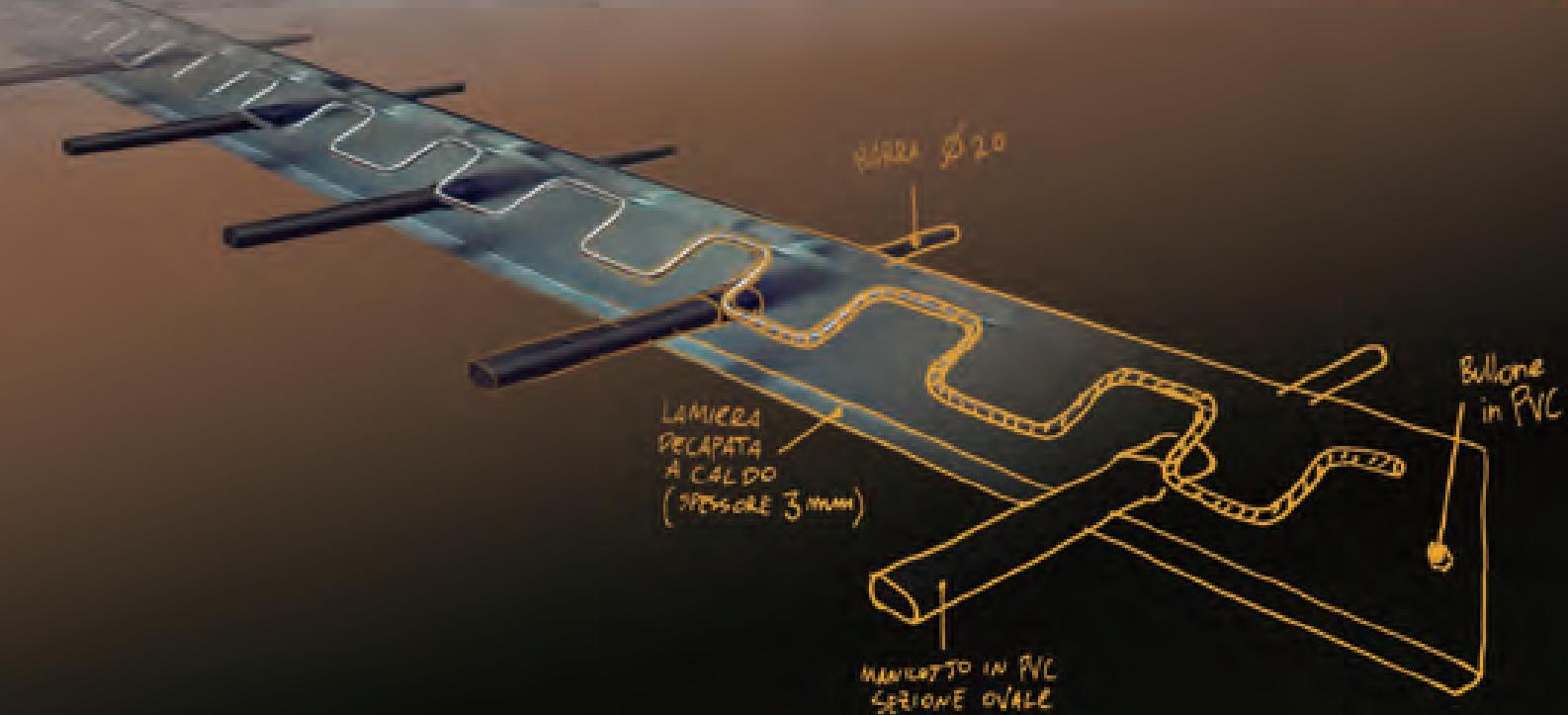


EN

Ideal Joint System®

Classic / Performance / Dual



WHAT ARE CONSTRUCTION JOINTS?



Construction joints are used in slabs-on-grade to allow slab movement at transitional load bearing points from one concrete slab to the next. Traditional construction joints are considered worldwide as the Achilles' heel of concrete slab placement (roads, airports, industrial and commercial floors). Concrete slabs-on-grade are subject to different internal and external forces and pressures. Joint deterioration occurs through load bearing weight transferring from one side of the joint to the other causing micro-shocks at the point of load cycle. In summary, a true construction joint must allow relative horizontal transition which is typically due to the thermal expansion and contraction or humidity induced shrinkage. At the same time it must not allow relative vertical transition and relative rotation due to traffic movement and load bearing weights. Figure 1 summarises the relative movements that a construction joint is subject to in a slab-on-grade.

FIG. 1

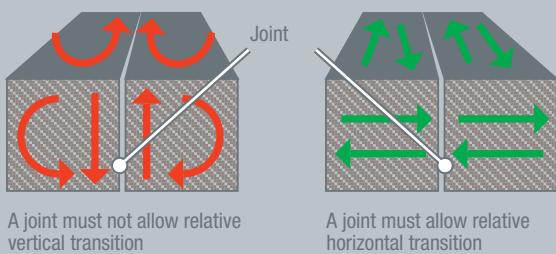


FIG. 2

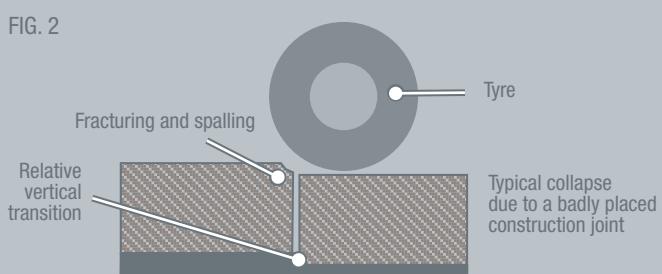


FIG. 3



The absence or improper use of a construction joint will lead to slab failure with continual defects and joint deterioration due to the relative horizontal, vertical and rotational strains and pressures. Continual vehicular traffic transferring over a badly placed construction joint will cause fracturing and spalling (Figures 2 & 3). Rectifying these problems afterwards can be very costly and in some cases the entire concrete slab may need to be destroyed and replaced. Using the patented Ideal Joint systems will offer long term benefits and cost savings for every slab-on-grade project.

TRADITIONAL METHODS FOR A CONSTRUCTION JOINT

The most common solution for a construction joint is the one referred to as a dowel joint system. It is constructed with steel rods approximately 400mm long and 20mm in diameter; they are placed through the concrete form work every 600mm perpendicular to the plane of the slab. Ensuring the correct placement of doweled joints requires a lot of time and effort. Often, through the lack of care and placing the steel dowels unevenly in spacing or at the incorrect angle, joint failure is inevitable causing long term damage to the joint and slab-on-grade (Figure 5).

FIG. 4



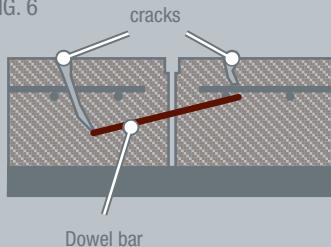
Lack of alignment of dowel bars in a construction joint cast with partial formwork

FIG. 5



Example of incorrect fabrication of a construction joint

FIG. 6

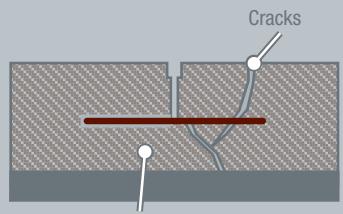


Dowel bar

Cracks caused by a lack of alignment of the dowel bars

FIG. 7

Damage caused by partial formwork



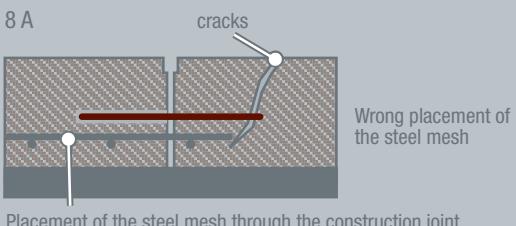
Concrete spillage under a partial formwork

Even if the dowel joint is positioned correctly they are usual knocked out of place and moved during the concrete placement (Figure 4). The fact that the steel dowels have moved will greatly reduce the support that they were intended to give to the joint. The dowel bars that are misplaced or out of line now increase the risk of cracking the actual concrete (Figure 6). An irregular surface between the two sides of the construction joint will produce uneven load transfer and slab movement, which in turn produces weak points allowing cracks to appear in the slab (Figure 7).

WHERE TO PLACE THE STEEL MESH OR WELDED STEEL

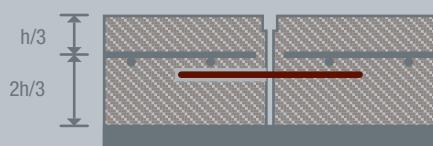
When concrete slab-on-grade needs to be re-enforced with steel mesh it is important that the mesh is placed in the correct area of the concrete slab. Placement of the steel mesh through the construction joint is a very common mistake and can potentially cause cracks and failure (Figure 8a). Correct placement for the steel mesh should be placed one third of the slab's thickness starting from the upper section of the slab-on-grade (Figure 8b).

FIG. 8 A



Wrong placement of the steel mesh

FIG. 8 B

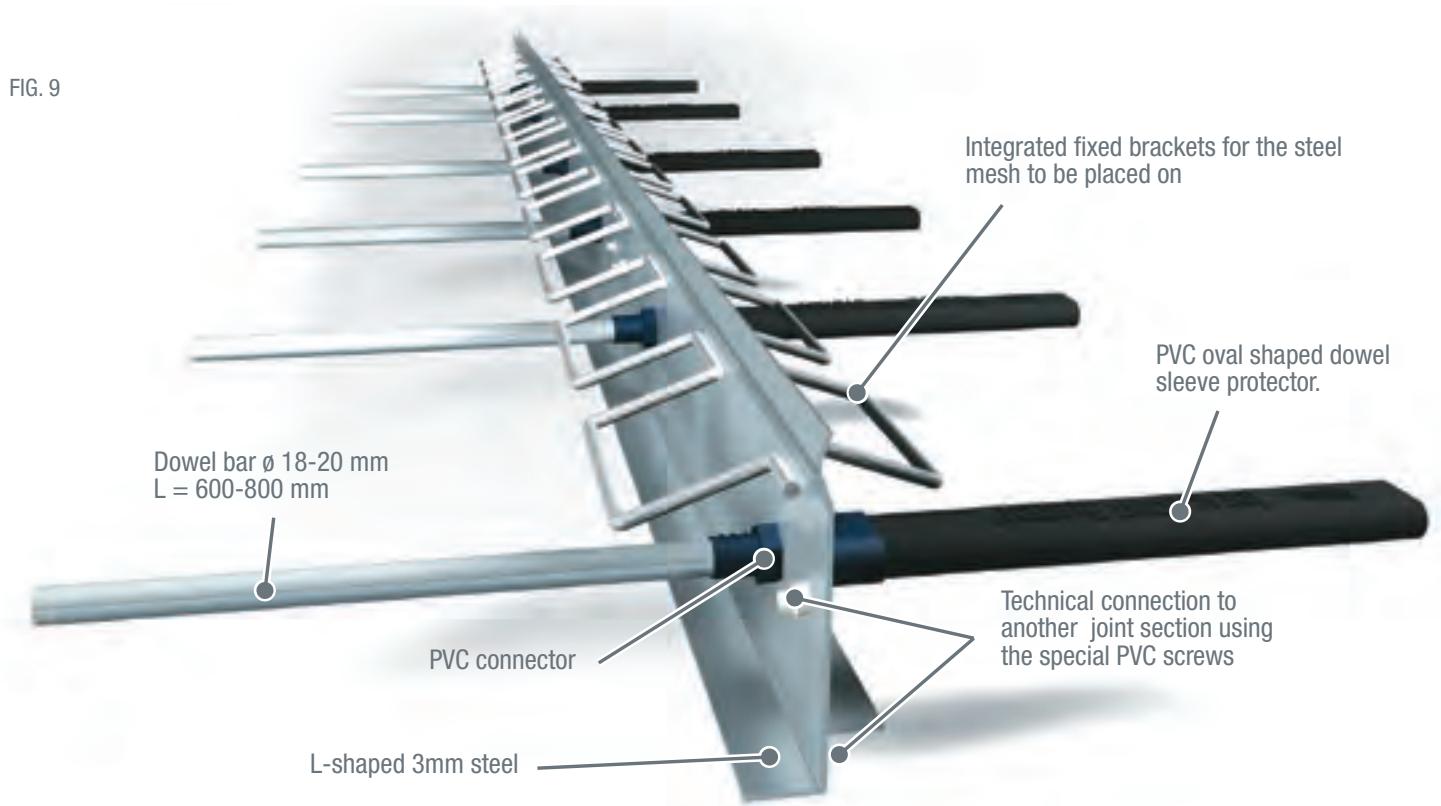


Correct placement of the steel mesh

IDEAL JOINT SYSTEM®

THE JOINT THAT SLIDES

FIG. 9



IDEALWORK has the solution for performing the perfect construction joint that has addressed all the previously mentioned construction joint issues. IDEAL JOINT SYSTEM® has been carefully designed and developed to offer engineers, specifiers and contactors the most innovative construction joint in the flooring industry today. The IDEAL JOINT SYSTEM® will distribute load transfer evenly allowing horizontal, and lateral movement between each independent section of the slab-on-grade.



Detail of Ideal Joint System® installed and ready for the concrete placement.



Detail of Ideal Joint System® ready for the next placement of concrete.

IDEALWORK PATENT

FIG. 12



PVC connector plays several roles:
 - it is the assembly element for the two independent steel forms
 - It is a guide for the dowel bar to slide comfortably through the metal forms into the PVC oval shaped dowel sleeve protector.

HOW IT WORKS

IDEAL JOINT SYSTEM® makes something really complicated very easy. A fixed dowel bar system does not allow any bidirectional movement of adjacent slabs-on-grade (Figures 17a & 17b). The patented PVC connector plays several roles in the IDEAL JOINT SYSTEM®. First, the PVC screw connector is the assembly element for the two independent steel forms separating the actual slabs-on-grade. Secondly, it is a guide for the dowel bar to slide comfortably through the metal forms into the PVC oval shaped dowel sleeve protector. Once the concrete has hardened the hydration and early concrete stresses will snap the external connection frame of the PVC guide, leaving the joint free for movement (Figures 14a & 14b). Once the horizontal, vertical and lateral movement begins the internal connection framework of the PVC connector will collapse, allowing total independent movement (Figures 15a & 15b).

FIG. 14 A

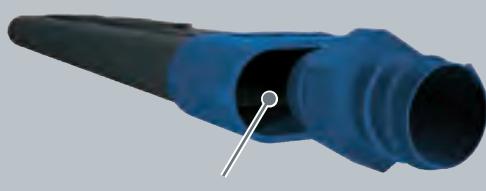


FIG. 14 B

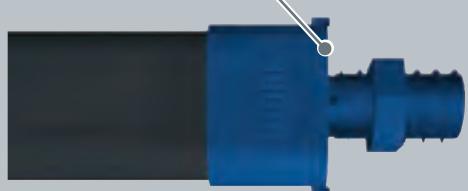


FIG. 15 A

Sections of the PVC oval shaped dowel sleeve protector.

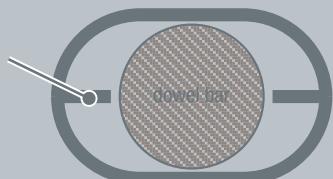
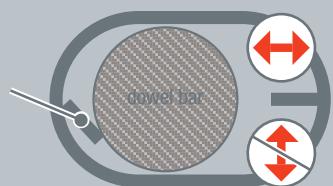


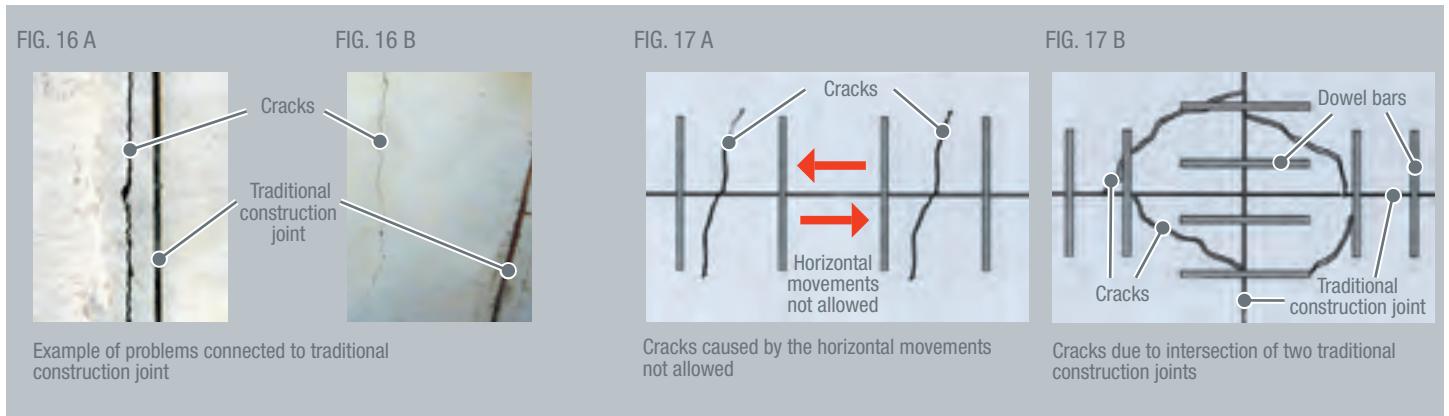
FIG. 15 B

Once the horizontal, vertical and lateral movement begins the internal connection framework of the PVC connector will collapse, allowing horizontal movement.



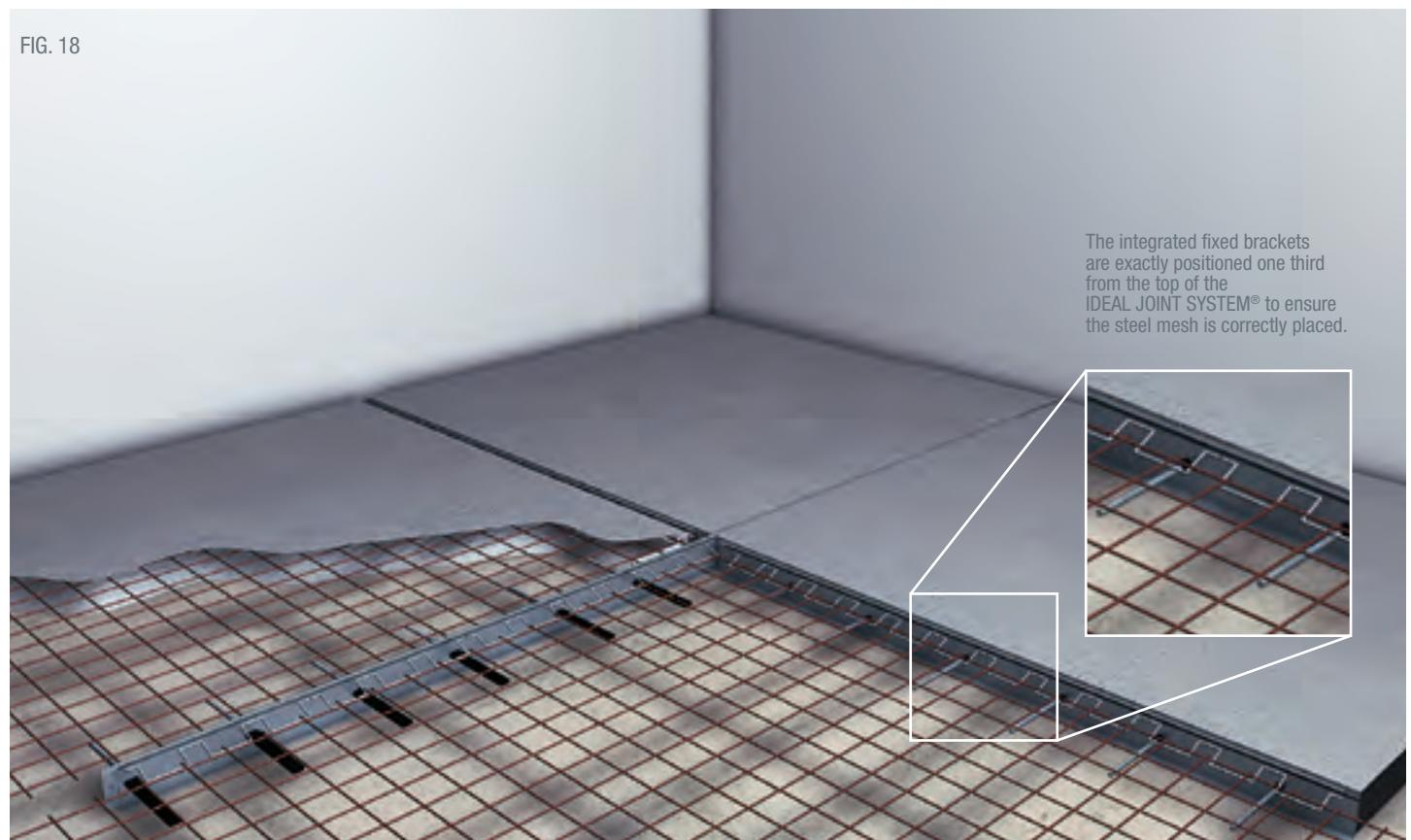
WHY PVC?

To find a workable balance between structural requirements and simple installation, many concepts were considered. It was necessary to make the installation simple and with as few stages on the job site as possible to reduce the risk of making forgetful mistakes (See the table listing other methods). Most other methods are hand crafted and simple steps, like making a construction joint, can be easily forgotten or ignored. 95% of the IDEAL JOINT SYSTEM® is pre-manufactured and ready for simple placement on the job site. The actual installation is the further 5%; placing the dowel bars and one simple PVC screw.



CORRECT PLACEMENT OF STEEL MESH OR WELDED STEEL.

To solve the problem of the steel mesh being positioned incorrectly the IDEAL JOINT SYSTEM® has integrated fixed brackets for the steel mesh to be placed on (Figure 18). The integrated fixed brackets are exactly positioned one third from the top of the IDEAL JOINT SYSTEM® to ensure the steel mesh is correctly placed. IDEAL JOINT SYSTEM® has a full technical specification written by engineer ROBERTO TROLI from ENC Lab (The Laboratory approved by the Ministry of Public Works and certified by the Ministry of the Universities and Research in Science and Technology) and technical documentation written by RENZO AICARDI, former member of the Executive Board CON.PAV.I. (Italian Association of Industrial Floors) and now technical manager of ENCOPE (National Agency of Manufacturing Pavements and Coatings).



APPLICATION FIELDS

IDEAL JOINT SYSTEM® is specially designed to withstand continual use from heavy traffic such as forklift trucks with wheels that are highly destructive to incorrectly formed construction joints.

Main fields of application:

- Industrial floors
- Heavy Industries

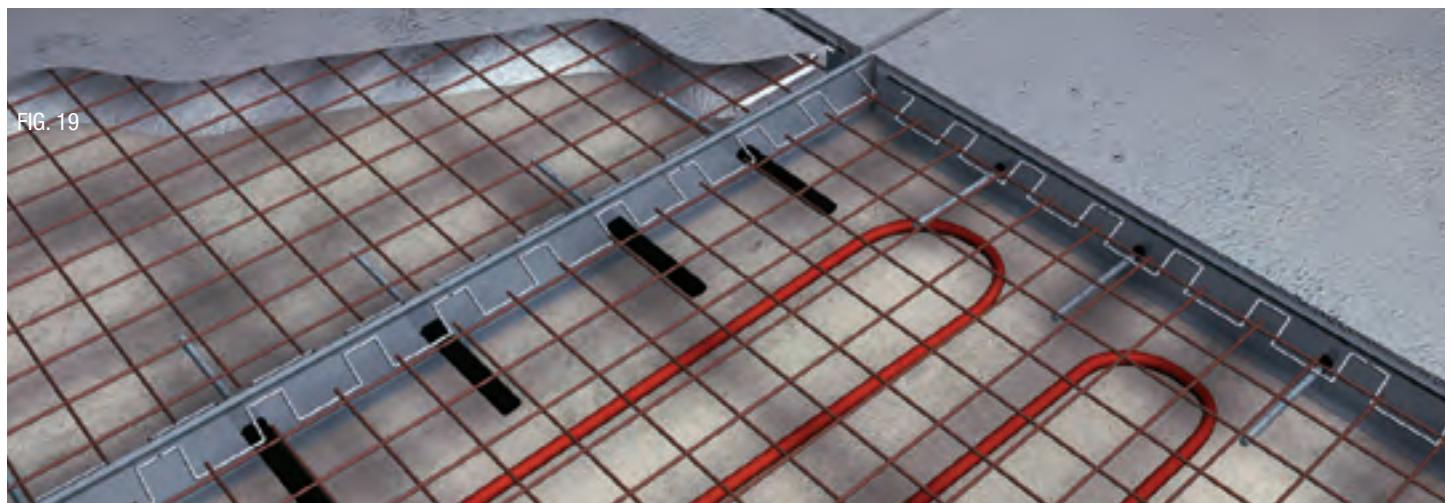
- Logistics
- Exhibition Halls

- Distribution centers
- Shopping Centres

- Airports
- Docks

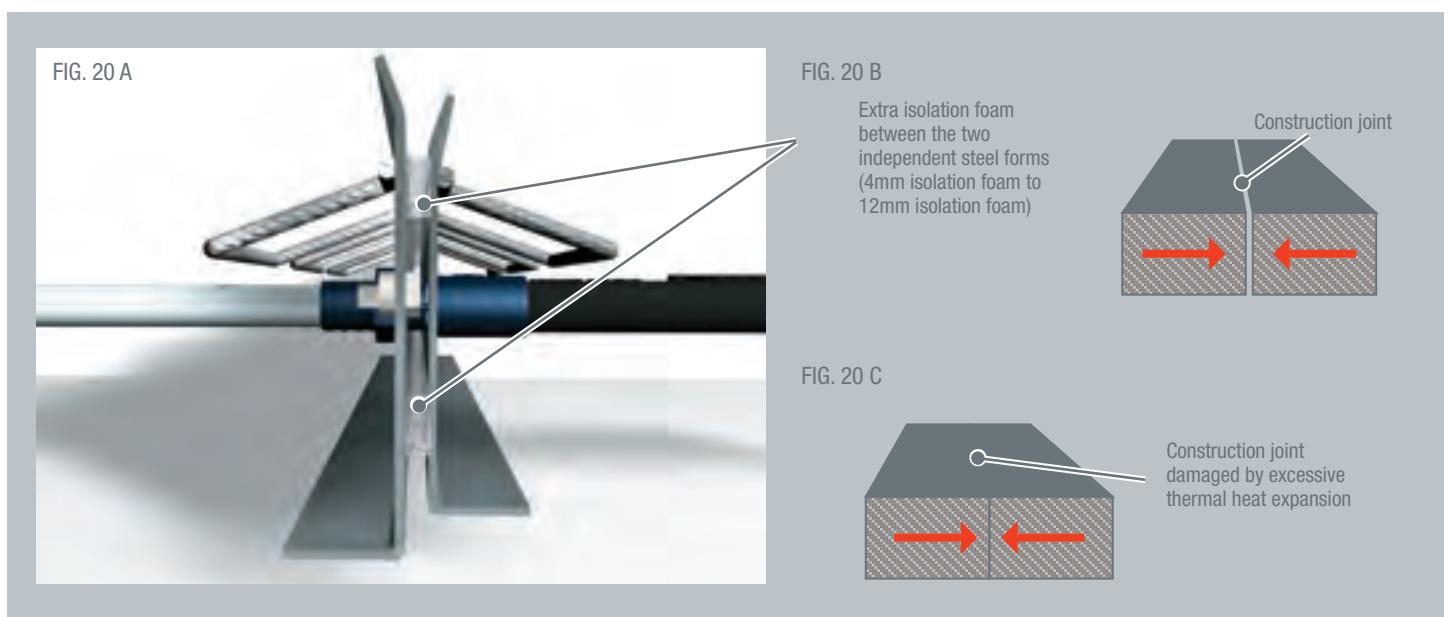
EXTERIOR FLOORING

IDEAL JOINT SYSTEM® can also be used for floors that require radiant or under floor heating systems (Figure 19).



EXTERIOR FLOORING

External construction joints have different requirements to internal construction joints. Exposure to a wider range of temperatures and other weather related issues such as rain, snow and ice need to be considered when specifying construction joints. High temperatures cause slabs-on-grade to expand; if the construction joint has not been correctly designed to allow for this excessive movement then spalling and cracking may appear (Figures 20b & 20c). IDEAL JOINT SYSTEM® offers the flooring engineer a simple solution to allow for excessive thermal heat expansion, simply by adding extra isolation foam between the two independent steel forms (4mm isolation foam to 12mm isolation foam) (Figure 20a). Another consideration for external use is the galvanised option on the steel forms for optimal protection against frost and winter slat erosion (Galvanized steel forms not dowel bars).



INDIVIDUAL JOINTS FOR INDIVIDUAL CRITERIA

IDEALWORK has developed an entire range of preformed construction joints to meet and solve all the criteria for the design of construction joints for slab-on-grade specifications. Each of these joints offer different solutions to individual project requirements, whilst maintaining the multi directional movement and easy to use characteristics shared throughout all IDEAL JOINT SYSTEMS®.



IDEAL JOINT SYSTEM CLASSIC



The first joint system to be developed and it is still the most used joint system by far.

- The most popular multipurpose construction joint
- Pre-manufactured and ready to use
- Available in standard steel or galvanized finish
- 100mm steel form depth with 25mm increments to 250mm
- Custom joints deeper than 250mm can be made to special order



IDEAL JOINT SYSTEM PERFORMANCE



Additional reinforcement for use in areas that are subject to increased heavy traffic.

- High impact and abrasion joint reinforcement bar
- Heavy traffic location, airports, gas stations, farmyards
- Pre-manufactured and ready to use
- 100mm steel form depth with 25mm increments to 250mm
- Custom joints deeper than 250mm can be made to special order



IDEAL JOINT SYSTEM DUAL



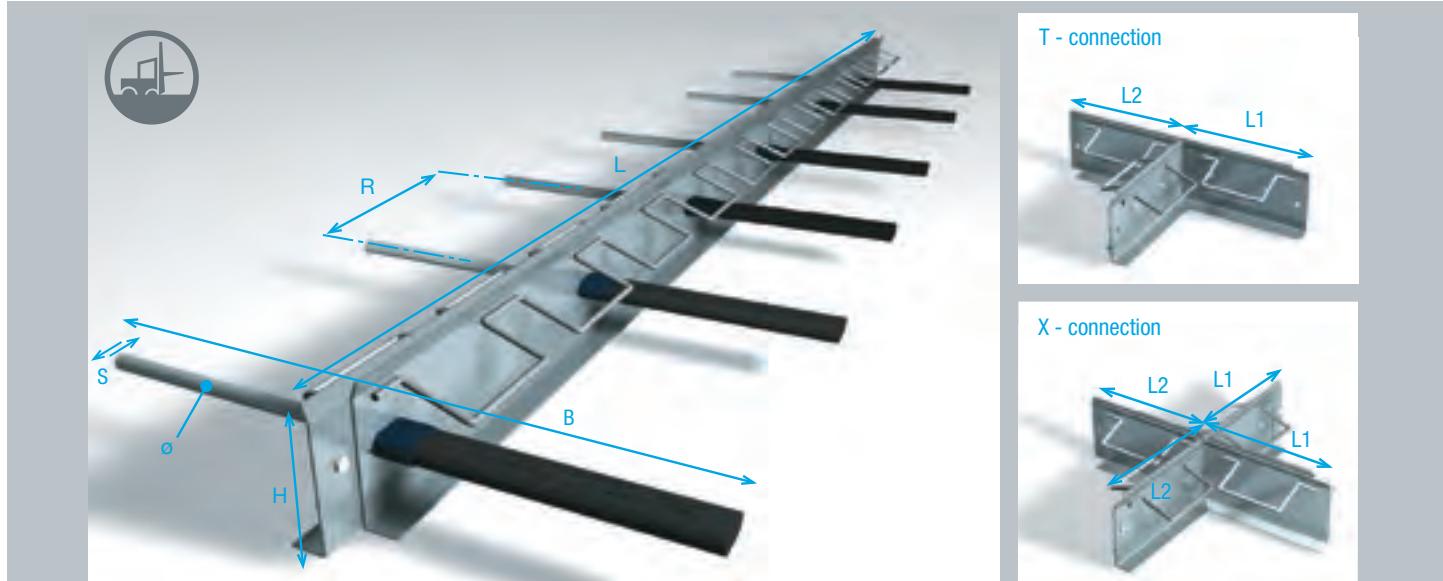
Designed for interior projects such as shopping malls, exhibition centres and other areas where the construction joint needs to be higher than the concrete ready to accept marble, granite, tile or other finished products.

- Allows one continual joint from the construction joint to the finished floor joint
- Pre-manufactured and ready to use
- 100mm steel form depth with 25mm increments to 250mm
- Custom joints deeper than 250mm can be made to special order

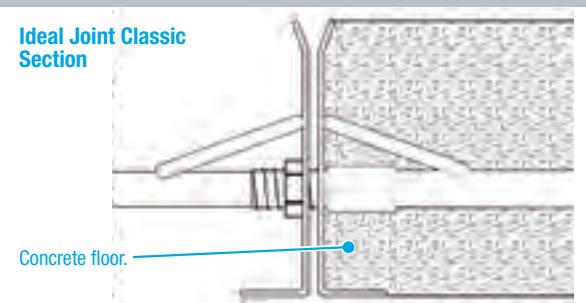
Ideal Joint System® Classic

IDEAL JOINT SYSTEM® CLASSIC is suitable for all types of industrial flooring and should replace any traditional hand crafted dowel joint systems. It can also be used as isolation joints or as control joints to separate individual pours as part of a flooring design allowing all the joints to have the same appearance. This reduces the need for saw cutting and risking thermal cracking during the hydration period.

IDEAL JOINT SYSTEM® CLASSIC is made from two L-shaped 3mm steel forms joined via the unique hardened plastic connectors. The top of the steel L-shaped forms incorporates a V-shaped flared opening. The V-shaped opening offers higher impact resistance and larger surface area for joint sealing with traditional silicone mastic or polyurethane. The only joint system that is sold and delivered ready to use; simply put the joint in place and slide in the dowel bars. The special oval shaped connection and dowel bar sleeve have been calibrated to optimise the performance for horizontal and lateral movement for load transfer.



Code	H (mm)	Ø Dowel bars (mm)	B (mm)	Weight (Kg)*	Features
IJS-100	100	18	600	32,91	
IJS-100Z	100	18	600	32,91	Galvanized
IJS-125	125	18	600	33,24	
IJS-125Z	125	18	600	33,24	Galvanized
IJS-150	150	18	600	39,90	
IJS-150Z	150	18	600	39,90	Galvanized
IJS-175	175	18	600	44,91	
IJS-175Z	175	18	600	44,91	Galvanized
IJS-200	200	20	800	48,09	
IJS-200Z	200	20	800	48,09	Galvanized
IJS-225	225	20	800	54,09	
IJS-225Z	225	20	800	54,09	Galvanized
IJS-250	250	20	800	60,12	
IJS-250Z	250	20	800	60,12	Galvanized



T and X connections

Code		height (mm)	L1 (mm)	L2 (mm)	Weight (Kg)	
T	X				T	X
IJS-100-T	IJS-100-X	100	250	300	3,85	7,70
IJS-125-T	IJS-125-X	125	250	300	4,40	8,80
IJS-150-T	IJS-150-X	150	250	300	5,00	10,00
IJS-175-T	IJS-175-X	175	250	300	5,55	11,10

L = 3000mm (Length of a single joint)

R = 500mm (Distance between dowel bars)

S = 32mm (Maximum lateral movement allowed)

Ideal Joint system joints can be made on request with customized measurements decided by the Works Management.

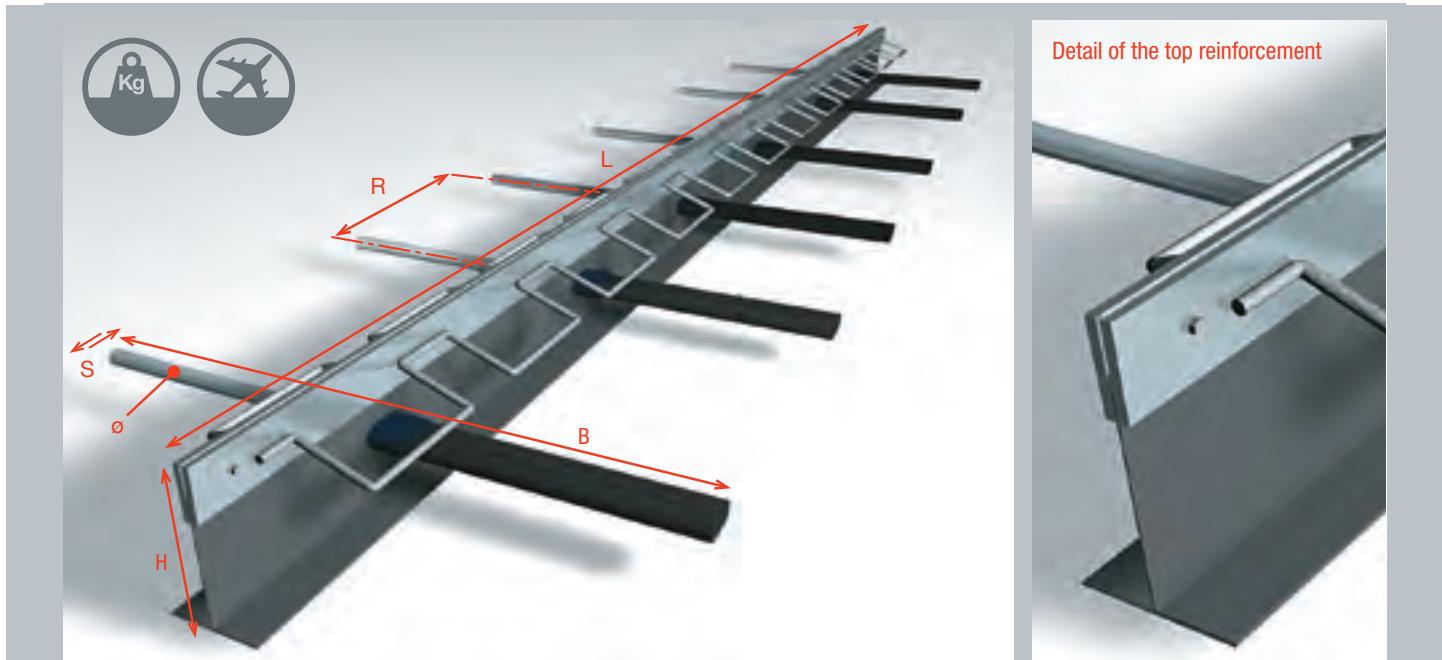
* Weight of the assembled joint, dowel bars included

Technical drawings in AutoCAD or JPG format can be downloaded directly from our website: www.idealwork.com

Ideal Joint System® Performance

IDEAL JOINT SYSTEM® PERFORMANCE should be used in areas where heavy traffic is to be expected. Farmyards, airports and logistics centres are all places that experience abnormal heavy traffic and objects being dragged across the floor.

IDEAL JOINT SYSTEM® PERFORMANCE evolved from the CLASSIC joint system with the need for higher impact and abrasion. A wider, heavier grade of steel is used to form the top section of the L-shaped steel forms; this additional reinforcement offers the highest level of protection. The top of the steel form still maintains a V-shaped flared edge detail to optimise protection and larger surface area for joint sealing with traditional silicone mastic or polyurethane. The only joint system that is sold and delivered ready to use; simply put the joint in place and slide in the dowel bars. The special oval shaped connection and dowel bar sleeve have been calibrated to optimise the performance for horizontal and lateral movement for load transfer.



Code	H (mm)	Ø Dowel bars (mm)	B (mm)	Weight (Kg)*	Features
IJS-PER125/6Z	125	18	600	31,45	6 mm top reinforcement galvanized
IJS-PER150/6Z	150	18	600	32,35	6 mm top reinforcement galvanized
IJS-PER175/6Z	175	18	600	33,25	6 mm top reinforcement galvanized
IJS-PER200/6Z	200	20	800	39,45	6 mm top reinforcement galvanized

L = 3000mm (Length of a single joint)

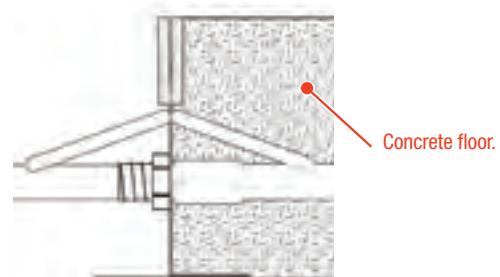
R = 500mm (Distance between dowel bars)

S = 32mm (Maximum lateral movement allowed)

Ideal Joint system joints can be made on request with customized measurements decided by the Works Management.

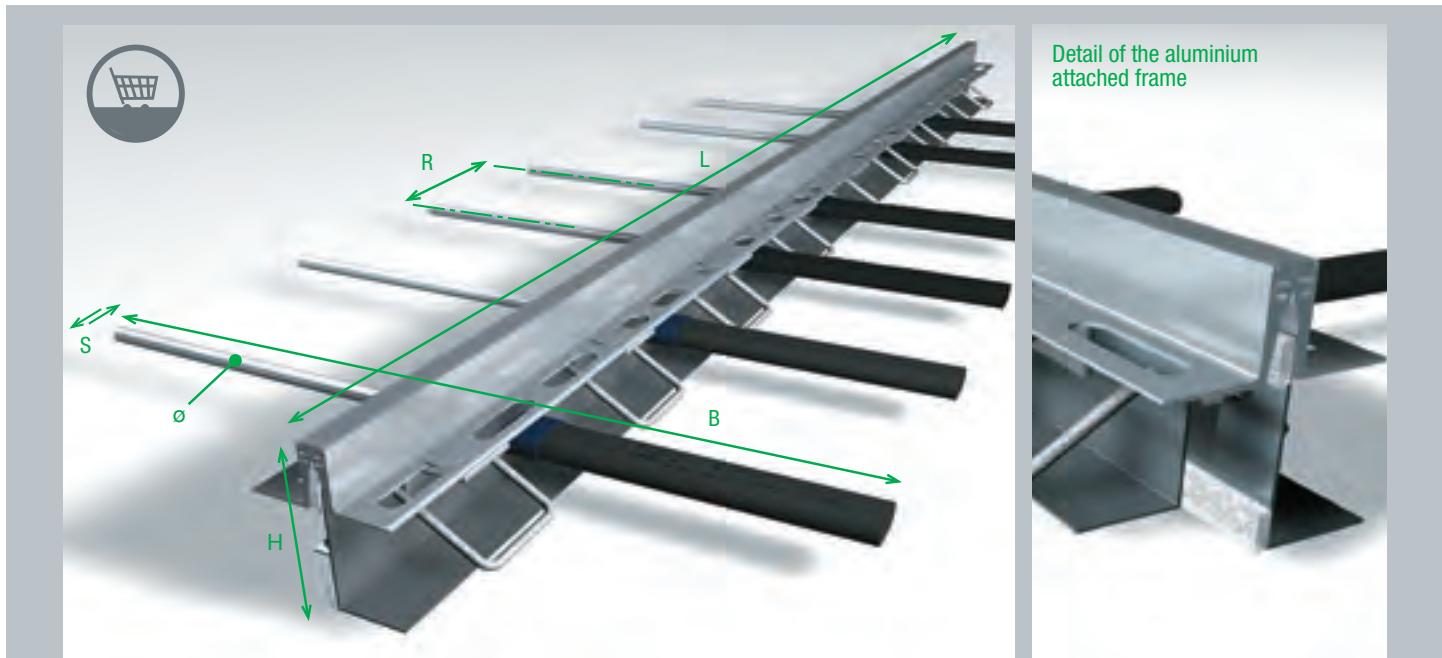
* Weight of the assembled joint, dowel bars included

Ideal Joint Performance - Section



Ideal Joint System® Dual

IDEAL JOINT SYSTEM® DUAL is specifically designed to be placed in concrete subfloors where the joint needs to be continued through for a finished product such as tile, marble, granite or travertine. IDEAL JOINT SYSTEM® DUAL offers in one simple product the construction joint and the transfer joint to the final finished floor level. Utilising this unique characteristic in the construction of the subfloors eliminates the need for a secondary joint in the finished flooring and guarantees true joint alignment. IDEAL JOINT SYSTEM® DUAL is designed for use in shopping malls, museums, supermarkets and exhibition centres that require secondary floor finishes over the concrete subfloor. IDEAL JOINT SYSTEM® DUAL works in the same manner as all our other joint systems. The addition of an aluminium attached frame that stands higher than the subfloor level is what gives the dual usage to the construction joint. IDEAL JOINT SYSTEM® DUAL The only joint system that is sold and delivered ready to use; simply put the joint in place and slide in the dowel bars. The special oval shaped connection and dowel bar sleeve have been calibrated to optimise the performance for horizontal and lateral movement for load transfer.



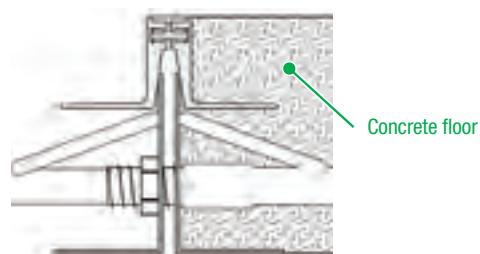
Code	H (mm)	Ø Dowel bars (mm)	B (mm)	Weight (Kg)*
IJS-DUAL125	125	18	600	33,00
IJS-DUAL150	150	18	600	35,40
IJS-DUAL175	175	18	600	37,80
IJS-DUAL200	200	20	800	45,30

L = 3000mm (Length of a single joint)
R = 500mm (Distance between dowel bars)
S = 32mm (Maximum lateral movement allowed)

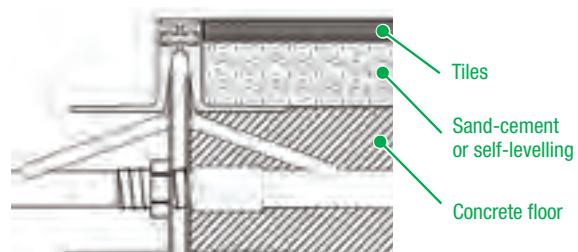
Ideal Joint system joints can be made on request with customized measurements decided by the Works Management.

* Weight of the assembled joint, dowel bars included

Ideal Joint System Dual section of concrete floor



Ideal Joint System Dual section of tiles floor



BENEFITS OF USING IDEAL JOINT SYSTEM®



BENEFITS FOR THE DESIGNER & ENGINEERS

- True dimensional characteristics
- Perfect load bearing weight distribution
- Standard depth specifications
- Easy to translate from design to installation



BENEFITS FOR THE INSTALLER

- Quick and easy to install
- Ready to use without additional parts needing assembly
- Reduced installation labour costs
- Stops concrete spillage under the joint
- Joints sealing can be performed the next day
- Simple purchasing and shipping



BENEFITS TO THE END USER

- Reduced maintenance and repair costs
- Reduced slab curling
- Long term joint protection

SPECIFICATION ITEMS

IDEAL JOINT SYSTEM® CLASSIC

Patented bi-directional construction/movement joint called Ideal JOINT SYSTEM® CLASSIC, height....., consisting of two opposing L-shaped plates in 3 mm thick hot pickled plate joined together by screw-threaded PVC connectors and complete with bi-directional PVC sleeves, metal bars and reinforcement stringer. IDEAL JOINT SYSTEM® CLASSIC is supplied on site ready assembled in 3-metre sections, which, thanks to the relative undercut on the plates, can be easily joined together using the special PVC screws that are provided. On request by the Works Management the flanges may be more widely spaced by the insertion of adhesive polyethylene foam covering to absorb thermal expansion.

IDEAL JOINT SYSTEM® PERFORMANCE

Patented bi-directional construction/movement joint called IDEAL JOINT SYSTEM® PERFORMANCE, height....., consisting of one plate in 3 mm thick hot pickled plate bent to a T shape, complete with bi-directional PVC sleeves, metal bars, double upper reinforcement plate fitted with adhesive polyethylene foam covering and reinforcement stringer. IDEAL JOINT SYSTEM® PERFORMANCE is supplied in 3-metre long modules that can be assembled with PVC screws.

IDEAL JOINT SYSTEM® DUAL

Patented bi-directional construction/movement joint called IDEAL JOINT SYSTEM® DUAL, height....., consisting of two opposing L-shaped plates in 3 mm thick hot pickled plate, spaced apart by the insertion of adhesive polyethylene foam covering, complete with bi-directional PVC sleeves, metal bars and reinforcement stringer. A special aluminium section is anchored on top of the bars, which consists of three elements slotted together to allow both contraction and expansion movements between 3 and 10mm. The bars are joined together by screw-threaded PVC connector. IDEAL JOINT SYSTEM® DUAL is supplied on site ready assembled in 3-metre sections, which, thanks to the relative undercut on the plates, can be easily joined together using the special PVC screws that are provided.

INSTALLATION



Positioning on the joint line.



Installation with PVC screws.



Installation of the plastic sleeves and dowel bars.



Concrete placement.



Finishing of the concrete slab.



Concrete can be on both side of Ideal Joints at the same time or alternate days to separate two placements.

WORKING ALONGSIDE DESIGNERS AND ARCHITECTS

AN EXAMPLE OF A “MADE-TO-MEASURE” IDEALWORK JOINT

The work involved the erection of three vertical adjoining warehouses for storing semi-finished and finished products, with an approx. total surface area of 5000 m² and a height of 26 m.



The load-bearing structure is in steel sections, which allows the installation of automatic systems for storage shelf handling. The foundation consists of a 90 cm thick reinforced concrete slab, a 10 cm thick non-reinforced floor rough, a 60 cm slab with double cross reinforcement and a 20 cm thick cement screed structurally bonded to the slab and reinforced with electrically welded mesh. The division into three adjoining warehouses and the expanse of the foundation slab meant dividing the floor into 15 sectors joined together by structural joints, which allow expansion along the horizontal axis avoiding differential movements along the vertical axis as is necessary for a steel construction. A hinged performance of the structural joints was taken into consideration in the calculation stage.



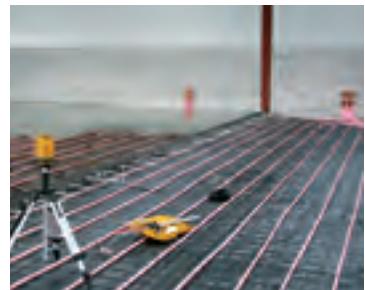
The use of Ideal Joint 70 cm deep joints allowed the structural slab and the overlying floor to be made within the space of 12-16 hours with two separate “wet on wet” casts, thereby obtaining single slab structural performance. The thickness of the slab could therefore be reduced since the system provides monolithic performance while at the same time offering a high quality and aesthetic standard due to the total lack of macro or micro cracks.



SOME REFERENCES

FIERA DI MILANO Milan
SAN MARCO AIRPORT S.p.A. Venice
BOCCONI UNIVERSITY ROOMS Milan
THERMAL POWER PLANT Bando (FE)
ADRIA MOTOR RACING CIRCUIT Adria (RO)
COOP TORINO Turin Corso Umbria
COOP NOVARA Novara
COOP BORGOMANERO Borgomanero
IPERMERCATO DESPAR Shopping mall Sant'Ilario (RE)
TOGNANA PORCELLANE S.p.A. Casier (Tv)
BARILLA S.p.A. - Warehouse Genoa
GRUPPO BENETTON OLIMPIAS S.p.A. Villorba (TV)
BENETTON S.p.A. Osiek (Croatia)
LORO PIANA S.p.A. Romagnano Sesia (NO)
GRAPPA NONNINO S.p.A. Udine
ENICHEM S.p.A. Marghera (VE)
SAN MARCO PETROLI S.p.A. Marghera (VE)
COOP Costruzioni Budrio (Bo)
HP CENTER S.p.A. (Motori Polini) Alzano Lombardo (BG)
AUTOTRASPORTI GHIRARDI Alzano Lombardo (BG)
LAICNER Vipiteno (BZ)
RUBINETTERIA CIMBERIO S.p.A. Pogno (NO)
RUBINETTERIA OTTONE & MELODA S.p.A. San Maurizio (NO)
OCEAN S.p.A. Shipyard Monfalcone
F.Ili NASCIO Shipyard Casarsa Ligure
PESCA MAR Valli di Chioggia
BIOS LINE Ponte S. Nicolò (PD)

FRIGOR REVISION Mestrino (PD)
AERMACCHI Vengono Superiore (VA)
COGEFRIN S.p.A. Castelmaggiore (BO)
DANA S.p.A. Montano Lucino (Co)
SERVOMECH Angola Emilia (Bo)
S.A.M.M.O. S.p.A. Cesena
GEOTEC Loreo Adria
FABRIZIO OVIDIO FERRAMENTA S.p.A. Mansuè
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PRISMA Ormelle (TV)
CANTINA SOCIALE di PONTE DI PIAVE Ponte di Piave (TV)
UNIFLAIR ITALIA S.p.A. Conselve (PD)
SAIMP S.p.A. Tradate (VA)
GASCHET Castel di Caleppio (BG)
RODADA Muggio (MI)
BERTO PASQUALE Udine
PERUSI Fruit and vegetables wholesale Sona (VR)
AR.TI.CA. Arre (PD)
MENON Lugagnano (VR)
LAMINAM S.r.l. Fiorano Modenese (MO)
FORGIALUMINIO S.p.A. Pedavena Feltre (BL)
BONALDO S.n.c. Galliera Veneta (PD)
MASCHIETTO EREDI San Vendemiano (TV)
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AGRICOLA BAGNOLESE Arre (PD)
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