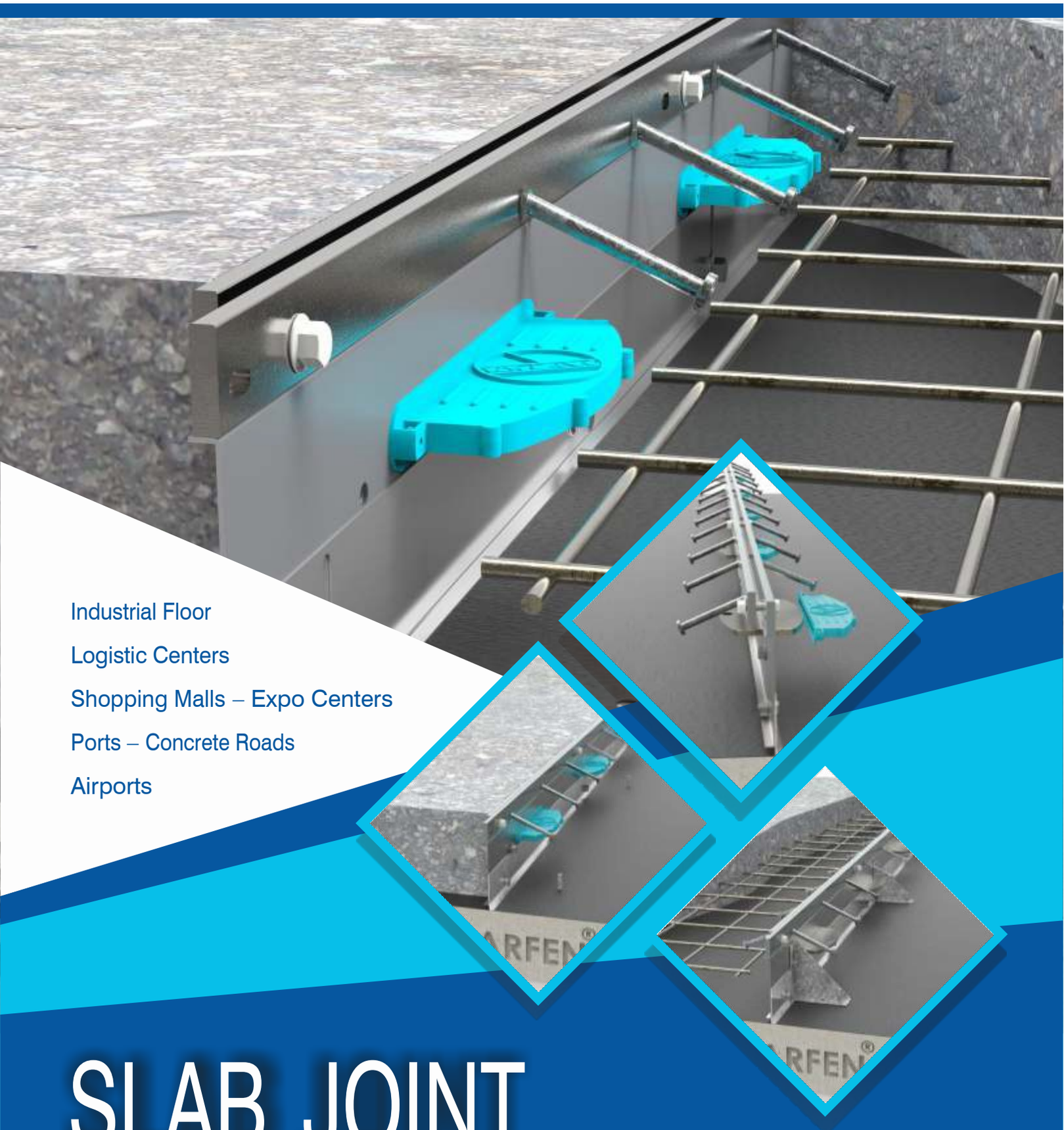
2016 - 2017

ARFEN®

"We Build Solutions"



Industrial Floor

Logistic Centers

Shopping Malls – Expo Centers

Ports – Concrete Roads

Airports

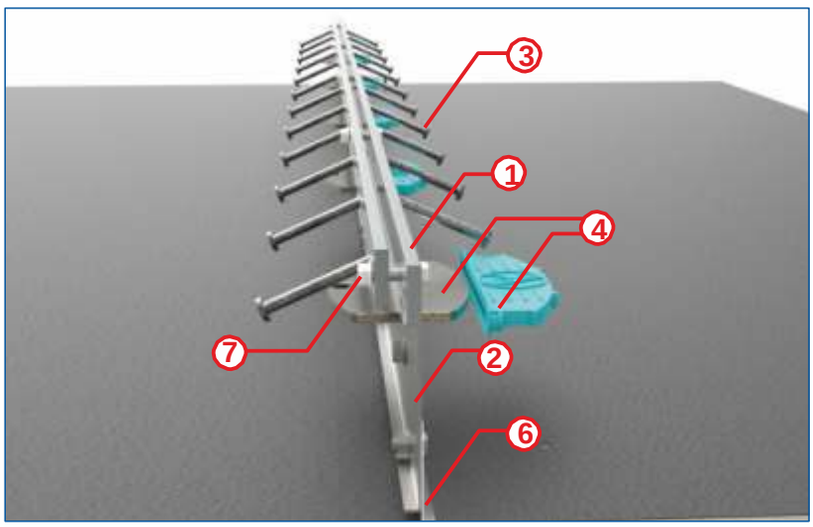
SLAB JOINT

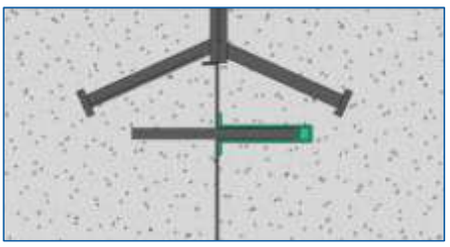
SHRINKAGE - EXPANSION JOINTS

www.arfen.com

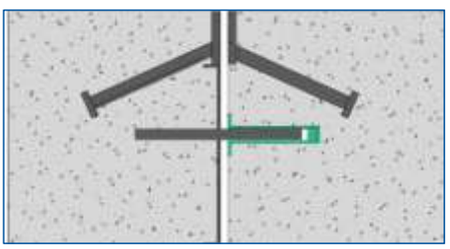
ARFEN® SLAB JOINT

SHRINKAGE - EXPANSIONJOINTS

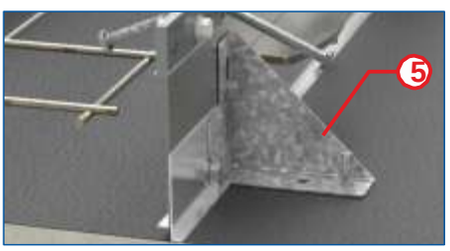




After concrete casting



After opening of joint (1-3 weeks)



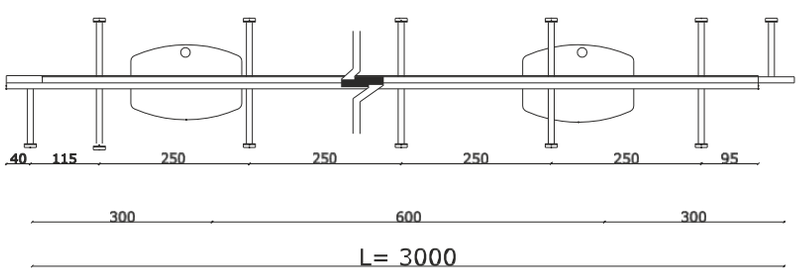
1. Upper Flat Steel ST 37
2. Lower Mould Steel Plate ST 37 (S 235)
3. Anchor Studsı Ø10*100 ST 37 with 250 mm spacing
4. Load Plate and Cover / 8mm ST 52 Steel - Polyamide or ABS Upper Cover
5. Supporting Kit (Optional) ST 37
6. Calibrated Lower Plate (Optional) ST 37
7. Plastic Bolt + Nut Polyamid

Arfen slab expansion joints are steel expansion joints that extend the service life of concrete slabs which are carrying high loads. Slab joints can be easily applied in industrial floors and minimizing uncontrolled crack formation. Steel surfaces are produced as hot dip galvanized and stainless steel (SS 304 grade) as standard. 316 grade stainless steel alternatives can also be produced on floors exposed to aggressive solutions such as milk acids.

ARFEN SLAB JOINT STANDARD SHRINKAGE – EXPANSION JOINTS - With 10 MM Cold Rolled Sheet

TYPE	HEIGHT	LOAD PLATE CENTER (MM)	LENGTH (MM)	RECOMMENDED DEPTH (MM)
SJ 115	115	600	3000	115 – 140
SJ 140	140	600	3000	140 – 165
SJ 165	165	600	3000	165 – 185
SJ 185	185	600	3000	185 – 235
SJ 235	235	600	3000	235 – 285
SJ 285	285	600	3000	285 – 330

The vertical movement is minimized by the load transfer plates and slab joints have ± 20 mm linear movement capacity in longitudal and transversal direction. Slab joints are placed on concrete slabs to prevent random cracks.



PLAN

ARFEN SLAB JOINT MONTAJ AKSESUARLARI

STEEL PLATE SOCKET

T CONNECTION

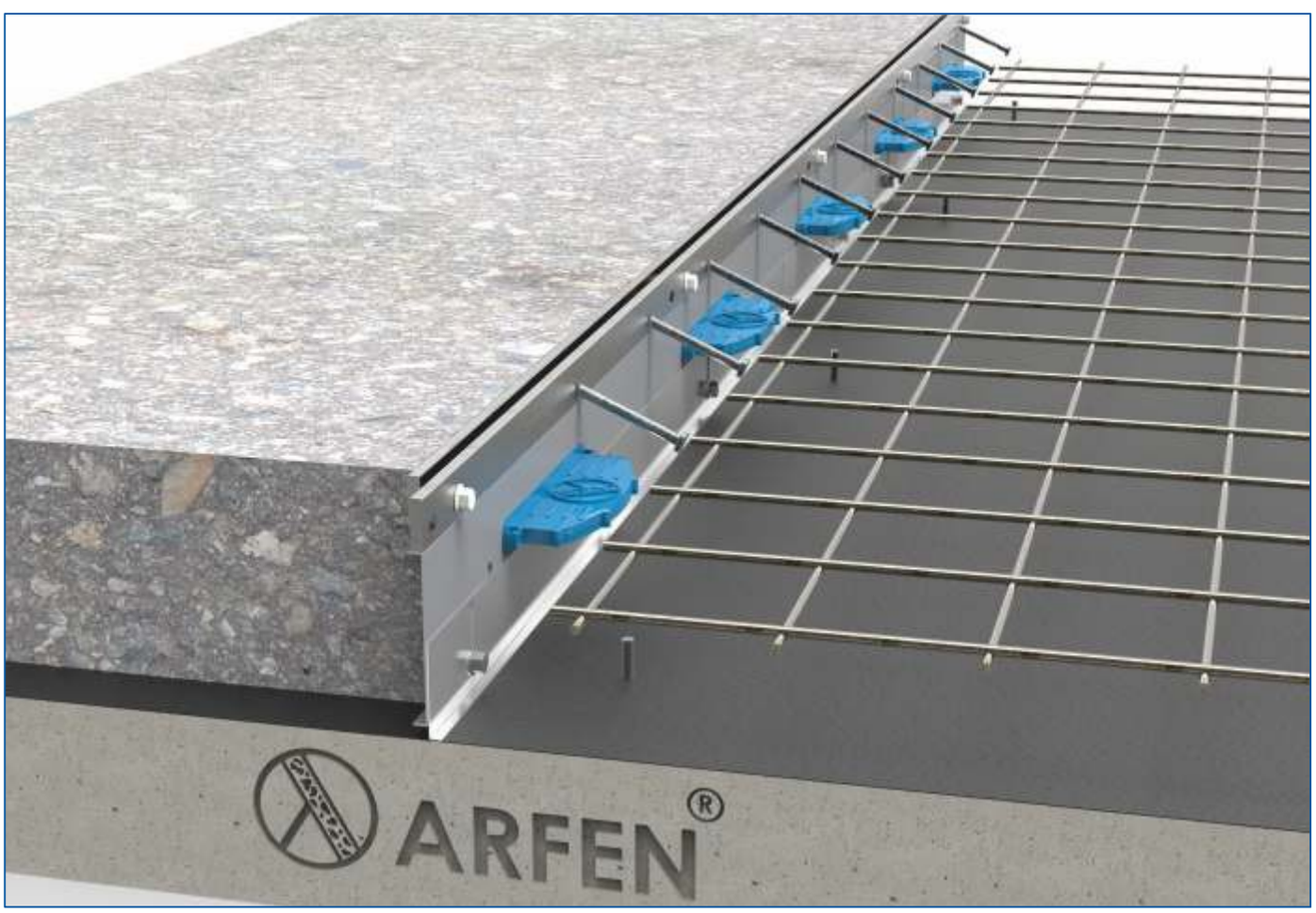
L CONNECTION

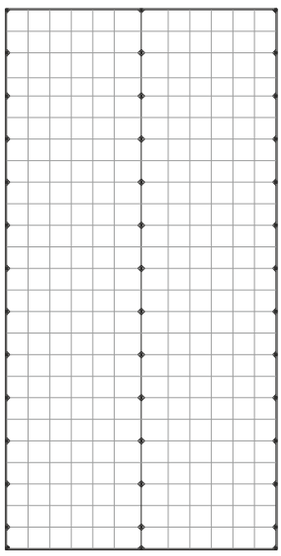
X CONNECTION

In order to ensure long-term use of slab joints and high performance, the load transfer must be done correctly and care should be taken to ensure that both sides of the joint remain at the same level.

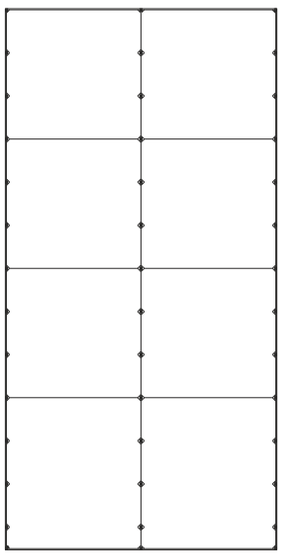
There are two ways to achieve this for vehicle traffic. Joints must be filled with suitable materials such as mastic and the corners should be reinforced with steel plates.

Where concrete slabs are to be cut, the steel sheets on both sides of the joint must be used to protect the edges of the joint. These two lanes also determine the level of concrete slab. If the joint gap is about 9 mm, the joint is filled with elastomeric mastics. If gap is larger than 9mm, the semi-rigid epoxy based mortar is filled with a polyurea based joint filler.



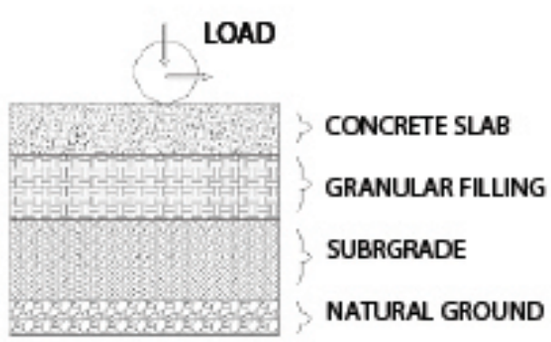


Traditional Joint Quantity
Length 11, Width 25
Total : 2350 mt Joint



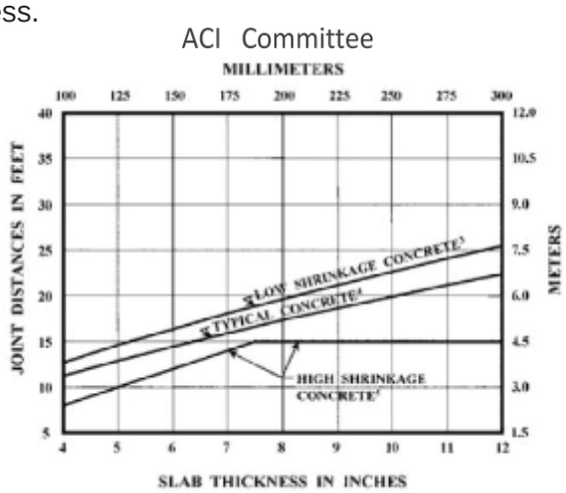
Arfen Slab Joint
Length 1 , Width 6
Total : 250 mt Joint

Traditional Joint Installation and Slab Joint Installation



Concrete Slab System Detail

Below is the shrinkage / crack control joint spacing which should be arranged according to the concrete slab thickness.



There are two basic methods for controlling and preventing cracks on the concrete surface.

The first method is to increase the amount of steel reinforcement that will prevent random crack formation. When cracks are controlled by steel reinforcement and remain in small quantities, aggregate fragments provide charge transfer to the other side of the crack. However, the most important issue to be remembered is that increasing the amount of steel reinforcement in concrete slab causes the formation of traces such as reinforcement mesh on the concrete surface.

Steel Bar Preparation Phase

Concrete Casting Phase

Expanded Joint

ARFEN® SLAB JOINT
SHRINKAGE - EXPANSIONJOINTS

The second and most commonly used method of preventing crack formation and random crack formation is to use Arfen slab joints in concrete slabs. In this method, weak lines are created at predetermined places in the upright, and the concrete is cracked in a straight line along this line. It allows to work without damaging the aesthetic appearance on the concrete surface which cracks down from the concrete surface along this joint. Slab concrete laying is still cracked as normal behavior, but random crack formation is prevented and an unbroken or deformed appearance is provided.

The fact that the floor and granular fillings are well compacted results in a long life of slab concrete and reduced cracking. In addition, shrinkage joints should be placed as square as possible and the length/width ratio should not be more than 1.5. Joint spacings are commonly taken 24 to 30 times the slab thickness. However, steel plates (dowel) are used at certain intervals for the transfer of vertical loads and the transfer of loads for larger joint spacings

Concrete Slab Thickness (mm)	Joint Spacing (mt) (The largest grain diameter is less than 19 mm concrete mix)	Mix
100	2.40	3.00
125	3.00	3.75
150	3.75	4.50
175	4.25	5.25
200	5.00	6.00
225	5.50	6.75
250	6.00	7.50

As is known, concrete expands when the temperature rises and shrinks along with the temperature drop. The temperature change may be due to environmental influences or due to the exothermic reaction of the cement and hydration heat. The thermal expansion coefficient of concrete may vary from 7x10-6 / ºC to 12x10-6 / ºC with the change of concrete class and granulometric structure, even though the average thermal expansion coefficient is 10x10-6 / ºC. In the concrete slabs, the elongation and shortening that can occur from thermal changes are calculated as follows.

$\Delta L : 9{,}9 \times 10^{-6*} \Delta T * L$

$\Delta T = T_{max} - T_{min}$

For example, if a concrete slab with a length of 30 meters is at rest, the temperature difference between the coldest and the hottest days in winter is 40 º C;

ΔL :9,9 x10^{-6}*40 *30 mt = 0,01188 m (11,88 mm). Nonetheless, many international specifications do not find it appropriate to make joints with more than 24 meters clearance.

In the case of airport constructions, if the concrete slab thickness is less than 30 cm, the joint interval can be accepted as 9 meters to 12 meters and if it is more than 30 cm, the joint interval can be accepted as about 15 meters. (Design of concrete airport pavement -Page 26)

Here, the coefficient of 9.9 x10-6 is the coefficient of elongation of one meter section of concrete elements at each level

Slab joints can also be placed when pouring concrete onto the concrete slab surface. It can be quickly installed at the beginning of the surface smoothing process and at the beginning of the first smoothing operation. It is very difficult to cut a straight line in case of delay and extension of the cutting and placing work.

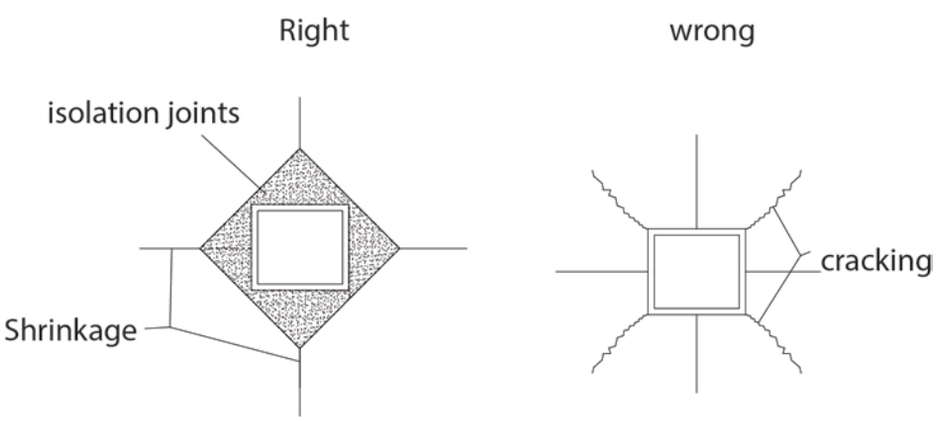
Shrinkage joints can also be cut after the concrete surface has hardened. However, at a point which is very important and must be understood, the prolongation of the cutting process increases the possibility of uncontrolled crack formation before the end of the entire cutting process. This means that there is a high likelihood of uncontrolled crack formation even after cutting. The timing is very important for this job. Joints should be cut without overcoming the amount of energy that holds together the tensile stresses that will form the aggregate pieces in the concrete.

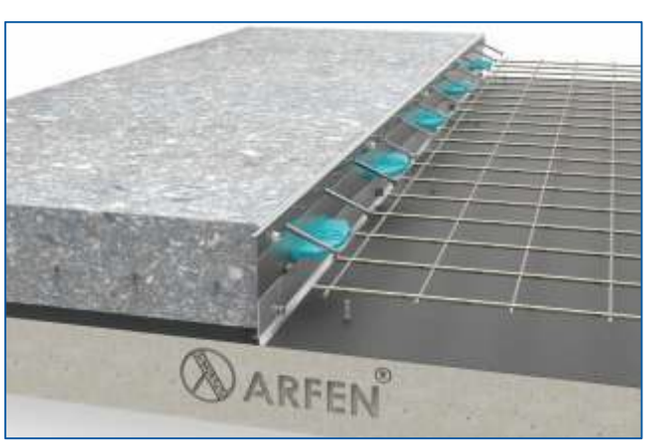
For most concrete mixes this operation is done between the first 6 and 18 hours. Definitely not more than 24 hours.

Because these processes are very difficult and troublesome, the slab joints are the most suitable solution for this kind of joint formation because the timings can not be fully realized in field applications.

If cutting is done by a conventional method at the important points that should not be forgotten, the concrete parts of the joints are broken due to all kinds of vehicles passing over time, and the use of concrete slab reduces the comfort, life and maintenance expenses. It is recommended that steel plates be placed on the edges of the joints as specified in section 6-3, design guide 6-3 (ACI COMMITTEE REPORT) of the ACI 360 R-10 flooring slabs, published by the American Concrete Institute. This proves that ARFEN Slab Joints (Shrinkage and expansion) joints are the right solution as a result.

isolation joints around the column





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