

# JOINT FREE SLABS - CONSTRUCTION GUIDELINE

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This guideline has been prepared to provide users of the Building Innovations **joint free slab** (JFS) system a basic understanding of the system, and to provide guidance for the preparation and installation of the system. This Guideline and the accompanying Construction Checklist should be made available to all site personnel that are involved in the construction of a joint free slab.

## Preamble

A joint free slab on grade is very similar in effect to a conventional slab on grade except that the shrinkage is dissipated as evenly as possible throughout the length and breadth of the slab instead of being concentrated at formed and sawn control joints. A crack inducer grid is installed in the slab to promote a 1m grid of fine cracks in the long term, and thereby avoid the large shrinkage movements that are designed to take place at traditional formed and sawn control joints.

As with a conventional slab on grade, the quality of the site preparation, and the proper placing, compaction and curing of the concrete is fundamental to a satisfactory end result. There should be no compromise on any of these aspects of the construction.

## Site Preparation

The building platform should be of uniform compaction with a firm surface. All topsoil must be removed and any soft zones should also be removed upon proof rolling, and made good with fully compacted select fill.

The JFS design incorporates a perimeter and an internal grid of ground restraints (thickenings). The primary function of these is to provide resistance in the form of continuous restraint to shrinkage movement. Ground restraints are intended to provide resistance in the longitudinal as well as the transverse direction. Irregularities in the excavation of the ground restraints are an advantage in this regard.

It is essential that the concrete is able to completely fill all surface deformations and all ground restraints, and hence it is essential that the membrane is loosely fitted to all ground restraints, and it is most desirable that any membrane is of light duty.

All loose material on the building platform and particularly in the excavated ground restraints should be removed.

Sand blinding is not required and is not considered desirable. If the surface of the building platform is to be raised slightly, compacted crusher dust or the like is recommended.

The height of the crack inducer tubes is ideally 25-30% of the slab thickness, hence thicker slabs require larger crack inducers. It is very important therefore to construct slabs without significant variations in the thickness. A tolerance of  $\pm 10$ mm on the specified slab thickness is recommended.

Compressible separation between the slab edges and walls and columns is not generally required.

## Assembly and Installation of the Crack Inducer Grid

The JFS crack inducer grid is a one metre grid of extruded plastic tubes connected using four way injection moulded plastic junctions. The tubes are pre-cut to a length that provides a one metre grid when assembled.

The junctions have a dual role - they connect the tubes and hold them in position, and they provide support for the reinforcement. The junctions generally replace all conventional bar chairs except those around the perimeter, and around penetrations.

Note that the flat base of the junctions is to sit on the ground. Do not install the junctions upside down.

The crack inducer tubes could be thought of as saw-cuts installed in the underside of the slab prior to pouring the concrete. They work in the same manner as saw cuts.

The JFS crack inducer grid is assembled dry (i.e. no adhesives or the like are required) and the tubes should fit snugly onto the junctions. The tubes must be  $\gt$ pushed home $\leq$  onto the junctions to ensure that the one metre grid dimension does not  $\gt$ grow $\leq$ .

Set out dimensions may be provided on the plan for the set-out of the grid in both directions. The dimensions will be referenced to some readily identifiable feature such as a column centre line, and when given these are simply to provide guidance on the positioning of the grid such that junctions are generally

located clear of all ground restraints, and such that the need to cut tubes to length around the perimeter of the slab can be generally avoided.

When set-out dimensions have not been provided, install the grid such that these objectives are achieved.

It is recommended that the grid be assembled with the help of a string line in both directions to maintain true and straight lines at right angles. This is necessary for the junctions to provide the intended support for the reinforcement mesh.

The ends of the crack inducer tubes should not be visible around the formed edge of the slab. They are generally terminated 100 to 400 mm short of the edge form. The crack inducer tubes can be cut to length if necessary but this should not generally be necessary if the job is properly set out.

The installation of the JFS grid is very simple and very fast. An assembly team of two labourers should be able to install 1,500 to 2,000 square metres of grid per day.

## **Reinforcement**

The reinforcement mesh in joint free slabs is typically lighter than in conventional slabs on grade, and it is supported on the JFS junctions.

Specific mesh lap details are provided on the drawings, and it should be noted that the side lap of the mesh sheets is varied to maintain the 200 spacing of the bars throughout. Trimmer details are also provided on the drawing and these must be strictly followed. All slab perimeters in each pour and all penetrations and re-entrant corners are to be trimmed using N12 bars as detailed.

It is generally possible to install most sheets of mesh without the need to cut them, hence steel fixing time should be reduced. The placing and tying of the reinforcement is a simpler and quicker task than in conventional slabs on grade and can readily be undertaken using unskilled labour.

Sheets of mesh are not always welded with the bars square to each other. Each sheet of mesh should be supported on the JFS grid junctions and any discrepancies taken up in the side and end laps. This will minimise the need for conventional bar chairs. Bar chairs will normally be required however around the outer perimeter of the slab and around all penetrations where the mesh has been cut.

## **Concrete**

The concrete grade should suit the purpose of the slab, but it should not be over specified. It is always desirable to minimise shrinkage and thermal contraction, and to this end it is recommended that the concrete in Joint Free Slabs be specified with a target 56 day drying shrinkage of 600 microstrain maximum.

In most slabs that have no applied coverings such as vinyl or ceramic tiles, a shrinkage-reducing admixture may also be specified to achieve the best possible long-term aesthetic result.

In order to properly control the quality of concrete installed in any project, the addition of water after a truck leaves the batching plant should be prohibited. Added water will have an adverse affect on the shrinkage, the strength and the durability of the concrete surface.

All concrete should be compacted using mechanical vibrators, and all concrete should be cured for seven days after placing using an appropriate method or a curing compound. In adverse weather conditions (hot and windy days) the use of aliphatic alcohol is recommended to prevent premature drying of the surface prior to the application of a curing compound.

*Refer to the Building Innovations specification for more comprehensive information on the construction of joint free slabs and the application of surface finishes.*