Acoustic Floating Floor Systems
Farrat is a specialist engineering company that manufactures solutions for vibration control, thermal isolation and precision levelling applications in the global construction, industrial and power generation sectors. We produce structural and acoustic vibration isolation systems, thermal break connections and machine levelling mounts as well as other ancillary products serving a variety of end user applications.

Our multi-disciplinary team encompasses mechanical, structural, acoustic and construction engineering specialists and is backed up with 50 years of technical expertise. We work closely with project teams and clients to provide technical advice, specification guidance and develop creative solutions designed to provide long term and reliable performance, build-ability and value. This customer focus drives the innovation and continuous product development of our comprehensive, versatile and cutting edge product portfolio which is then rigorously tested and accredited to the latest standards.

Taking care of the entire design, manufacture and installation process, we support our clients through responsive customer support, product availability, and a rapidly expanding global distribution network.
Acoustic Floating Floor Systems
Introduction

Welcome to Farrat’s guide to high-performance, acoustic floating floors.

We have prepared this brochure to serve as a resource for architects, acoustic consultants and structural engineers to assist when designing and specifying spaces where vibration control or high levels of sound insulation are required.

Whether you use this brochure to gain a basic understanding of the concepts involved in the different types of floating floors or use the technical data provided to design bespoke systems, Farrat’s team of specialist engineers are on hand to provide assistance at every step of the process.

Structural Floor Dynamics

Modern buildings tend to be lighter in weight, smaller and include longer spans so therefore are more dynamic in nature. There is also an increasing trend for buildings and spaces to have multiple uses, therefore it is critical that designers consider disturbing frequencies and their harmonics as well as the natural frequency modes of the floor and structure to ensure sufficient levels of noise and vibration isolation are achieved.

Structures can be tuned to minimise resonance effects by adding mass and/or stiffness to change the dynamic characteristics. Alternatively, vibration control measures can be incorporated to provide vibration mitigation as well as enhance airborne and impact noise reduction.

Incorporating a floating floor for noise or vibration isolation is often far more cost effective than the necessary increase in size and weight of steel or concrete required to suitably stiffen a structure. As the vibration is isolated at source, the acoustic performance is also generally much higher.

Typical Applications

- Cinemas
- Recording & broadcast studios
- Music practice rooms
- Dance studios
- Theatres
- Concert halls
- Conference centres
- Bowling alleys
- Buildings located near major road or rail networks
- Residential dwellings
- Offices
Why choose Farrat Acoustic Floating Floors?

Farrat’s Isomat and Jack-Up floating floors...

- Used in a wide range of buildings to protect sensitive areas from noise sources or to contain noise sources within their areas
- Offer flexibility in delivery as well as being easy, fast and economical to install
- Provide a high degree of impact, shock and vibration control through a combination of mass addition and structural decoupling by constructing the floating slab on elastometric or coil spring isolators tuned to specific frequencies
- Provide a high degree of airborne noise isolation through the incorporation of an air layer between the structural slab and the floating slab
- Offer unparalleled flexibility in design, layout, acoustic and load carrying capacity
- Are laboratory tested to national and international standards
- Are supported by Farrat’s specialist team of structural and acoustic engineers

Standards Compliance

Elastomeric Compounds & Isolators

Our compounds conform with the requirements and testing procedures set out in BS 6177:1982 and BS EN 1337-3:2005.

Acoustic Testing

Our acoustic floating floor systems have been laboratory tested in accordance with BS EN ISO 140-4 & 7:1998 in a UKAS accredited laboratory.

Full test data is available on request.

Quality Assurance

Farrat Isolevel Ltd operates an ISO 9001:2008 approved quality assurance system.

Benefits of Natural Rubber

Natural rubber is used in most of Farrat’s elastometric isolators and provides the best characteristics for building isolation applications including:

- Low stiffness/high resilience allowing natural frequencies as low as 6Hz
- Long service life (50 yrs+) without deterioration or stiffening
- Efficient use of material providing high cost effectiveness
- Low ratio of dynamic-to-static stiffness
- Low creep rate under compression load
- Virtually no maintenance

Alternative synthetic elastomers have a high ratio of dynamic-to-static stiffness as well as a limited service life, particularly under constant compression load.

This is compensated for by increasing the required static strain to lower the natural frequency of the isolation system resulting in inefficient and under-performing isolation systems.

- Nightclubs
- Hotels
- Gyms
- Plant rooms
- Hospital operating theatres
- Sensitive medical equipment areas
- Anechoic/reverberation chambers
- Instrument & nano-technology facilities
- HVAC & generator installations
- Manufacturing facilities (CMM rooms etc)
Floating Floor Variants

Elastomeric or Coil-Spring Isolators?
Each of the options on this page are available with elastomeric or coil-spring isolators.

<table>
<thead>
<tr>
<th>ELASTOMERIC</th>
<th>SPRINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantages</td>
<td>Disadvantages</td>
</tr>
<tr>
<td>Lower cost</td>
<td>Less isolation</td>
</tr>
<tr>
<td>Less deflection</td>
<td>(f_n = 6 - 14\text{Hz})</td>
</tr>
</tbody>
</table>

Coil-spring isolators are more expensive than elastomeric ones, however allow for higher performance from lightweight floating elements.

Floating floor performance is achieved by extra mass in the floating element. Such floors are more economical than Jack-Up floors and create a full area, homogenous slab with minimal flanking.

Concrete floating floors (density \(\sim 2360\text{kg/m}^3\)) are the most common type due to their high strength, weight and versatility. The thickness of the concrete slab should be kept above 90mm to avoid excessive surface cracking. Mesh reinforcement is typically used, but where no walls or structural elements are supported by the floor, fibre reinforcement can be used. Slab designs should be checked by a structural engineer.

Screed floating floors (density \(\sim 2100\text{kg/m}^3\)) are ideal for smaller areas where it is not economical to pour concrete, where the slab thickness ranges from 50 to 100mm and in lower impact environments such as recording studios and music rooms.

Dry system floating slabs can be created from 2 – 3 layers of acoustic plasterboard (12.5 or 15mm thick) sandwiched between 15 or 18mm thick ply or 2 – 3 layers of cement particle board (typically 18mm thick).

Since there is no drying time, such systems have the advantage that acoustic walls can be built off the edges of the floor and floor coverings can be installed immediately after the floor has been laid.
To Jack-Up or not Jack-Up?

The acoustic and structural performance of a Jack-Up floating floor is exactly the same as the equivalent non-jacked up system. The increased cost and installation time is only necessary in a few specialised circumstances:

- A very low or adjustable air-gap is required
- It is deemed likely that the isolators may need to be replaced in the future
- The slab is required to take high loads (e.g., used as a storage area) before it is raised

What about Bridging?

The biggest cited advantage of jack-up systems is that isolation is guaranteed by the fact that the whole slab is lifted. There is no opportunity for any debris to be left in the cavity and any bridging is broken when the slab lifts.

When any of our systems are installed by Farrat’s specialist floating floor installation team, AcouStruct (see page 13), we provide a guarantee of complete isolation so there is no risk of bridging.
Isolator Specification

### Table of Sound Insulation Values

<table>
<thead>
<tr>
<th>Construction</th>
<th>Weight</th>
<th>Height</th>
<th>Airborne Sound Insulation $R_w$ - dB</th>
<th>Floating Floor Element $\Delta R_w$ - dB</th>
<th>Impact Sound Insulation $\Delta L_w$ - dB</th>
<th>Typical Elastomeric Isolator Specification</th>
<th>KEY: $f_{\text{DL}} xx.xHz$</th>
<th>IMNR 44</th>
<th>IMNR 50</th>
<th>IMNR 70</th>
</tr>
</thead>
<tbody>
<tr>
<td>18mm Plywood 15mm Dense plasterboard (x2)</td>
<td>46 Kg/m$^2$</td>
<td>95 mm</td>
<td>61</td>
<td>+9</td>
<td>+28</td>
<td>19.2Hz</td>
<td>9.1Hz</td>
<td>23.8Hz</td>
<td>11.3Hz</td>
<td>7.1Hz</td>
</tr>
<tr>
<td>18mm Plywood 15mm Dense plasterboard (x3) 15mm Plywood</td>
<td>63 Kg/m$^2$</td>
<td>116 mm</td>
<td>63</td>
<td>+11</td>
<td>+29</td>
<td>17.1Hz</td>
<td>8.8Hz</td>
<td>21.2Hz</td>
<td>11.0Hz</td>
<td>7.0Hz</td>
</tr>
<tr>
<td>18mm Cement particle board (x2)</td>
<td>46 Kg/m$^2$</td>
<td>86 mm</td>
<td>61</td>
<td>+9</td>
<td>+29</td>
<td>19.7Hz</td>
<td>9.2Hz</td>
<td>24.4Hz</td>
<td>11.4Hz</td>
<td>7.1Hz</td>
</tr>
<tr>
<td>18mm Cement particle board (x3)</td>
<td>69 Kg/m$^2$</td>
<td>104 mm</td>
<td>63</td>
<td>+11</td>
<td>+30</td>
<td>16.1Hz</td>
<td>8.7Hz</td>
<td>19.9Hz</td>
<td>10.8Hz</td>
<td>6.9Hz</td>
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<tr>
<td>60mm Sand/ Cement screed 15mm Plywood</td>
<td>142 Kg/m$^2$</td>
<td>124 mm</td>
<td>&gt;64</td>
<td>+12</td>
<td>+32</td>
<td>13.6Hz</td>
<td>9.3Hz</td>
<td>19.2Hz</td>
<td>12.3Hz</td>
<td>6.9Hz</td>
</tr>
<tr>
<td>150mm Sand/ Cement screed 15mm Plywood</td>
<td>359 Kg/m$^2$</td>
<td>218 mm</td>
<td>&gt;76</td>
<td>+24</td>
<td>&gt;36$^*$</td>
<td>8.1Hz</td>
<td>7.2Hz</td>
<td>12.4Hz</td>
<td>10.2Hz</td>
<td>5.7Hz</td>
</tr>
<tr>
<td>100mm Insitu concrete 15mm Plywood</td>
<td>263 Kg/m$^2$</td>
<td>168 mm</td>
<td>50mm Air-gap &gt;75</td>
<td>100mm Air-gap &gt;77</td>
<td>50mm Air-gap &gt;23</td>
<td>100mm Air-gap &gt;25</td>
<td>&gt;35</td>
<td>10.3Hz</td>
<td>8.0Hz</td>
<td>14.5Hz</td>
</tr>
<tr>
<td>150mm Insitu concrete 15mm Plywood</td>
<td>513 Kg/m$^2$</td>
<td>218 mm</td>
<td>50mm Air-gap &gt;78</td>
<td>100mm Air-gap &gt;80</td>
<td>50mm Air-gap &gt;26</td>
<td>100mm Air-gap &gt;28</td>
<td>&gt;36$^*$</td>
<td>8.4Hz</td>
<td>7.0Hz</td>
<td>10.9Hz</td>
</tr>
<tr>
<td>200mm Insitu concrete 15mm Plywood</td>
<td>625 Kg/m$^2$</td>
<td>268 mm</td>
<td>50mm Air-gap &gt;80</td>
<td>100mm Air-gap &gt;82</td>
<td>50mm Air-gap &gt;28</td>
<td>100mm Air-gap &gt;30</td>
<td>&gt;38$^*$</td>
<td>7.3Hz</td>
<td>6.4Hz</td>
<td>10.4Hz</td>
</tr>
</tbody>
</table>

Notes on Acoustic Performance

- Configurations based on a 12m x 6m room with 75mm x 75mm x 50mm elastomeric isolators at 600mm centres and 90 x 55 x 63mm spring isolators at 400mm centres.
- Some available test values are only "predicted from test results" rather than directly tested as the performance of our products was too high for the laboratory to test at some frequencies.
- Further acoustic data is available on request. Site test data is available to validate predictions.

Damping

Whilst low-stiffness natural rubber has the best combination of physical properties for use in building vibration isolation, low-hardness grades have very little inherent damping (similar is true for springs which have essentially no natural damping). For applications where damping is required, we have a range of high-stiffness natural and synthetic nitrile based elastomeric isolators.
Isolator Properties

**IMNR 44**
- Hardness (IRHD): 44+/−3
- Static Compression Modulus: 1.3
- Dynamic to Static Ratio: 1.2
- Damping @ $f_n$: 2.0%
- Max Static Pressure [Overload] (N/mm²): 0.26 (0.39)
- Creep: Minimal
- Operating Temperature (°C): -50 to +70
- Operational Life (years): 60

**IMNR 50**
- Hardness (IRHD): 50+/−3
- Static Compression Modulus: 2.0
- Dynamic to Static Ratio: 1.5
- Damping @ $f_n$: 2.3%
- Max Static Pressure [Overload] (N/mm²): 0.40 (0.60)
- Creep: Minimal
- Operating Temperature (°C): -50 to +70
- Operational Life (years): 60

**IMNR 70**
- Hardness (IRHD): 70+/−3
- Static Compression Modulus: 3.5
- Dynamic to Static Ratio: 2.4
- Damping @ $f_n$: 5.4%
- Max Static Pressure [Overload] (N/mm²): 0.70 (1.05)
- Creep: Moderate
- Operating Temperature (°C): -50 to 70
- Operational Life (years): 60

**COIL SPRINGS**

<table>
<thead>
<tr>
<th>Farrat Isolator</th>
<th>OSI 75–63</th>
<th>OSI 100–63</th>
<th>OSI 125–83</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height [A] (mm)</td>
<td>63</td>
<td>63</td>
<td>83</td>
</tr>
<tr>
<td>Base Dimension [BxC] (mm)</td>
<td>90 x 55</td>
<td>90 x 55</td>
<td>90 x 55</td>
</tr>
<tr>
<td>Spring Constant (kN/mm)</td>
<td>0.07</td>
<td>0.09</td>
<td>0.06</td>
</tr>
<tr>
<td>Design Load (kN)</td>
<td>0.75</td>
<td>1.00</td>
<td>1.25</td>
</tr>
<tr>
<td>Block (Max) Load (kN)</td>
<td>1.10</td>
<td>1.47</td>
<td>1.84</td>
</tr>
<tr>
<td>Design Load Deflection (mm)</td>
<td>11±2</td>
<td>11±2</td>
<td>20±2</td>
</tr>
</tbody>
</table>

This is a small selection of the spring units we have available. If you require something that is not listed here please contact us on +44 (0)161 924 1600
Design Considerations

Supporting Walls on Floating Floors

Where walls are to be built off a floating floor, it is usually necessary to increase the isolator area or decrease the spacing of the pads to provide support for the additional line load of the wall. Using this method, any wall types, even dense blockwork can be supported by the floating floor without compromising the acoustic performance.

A quicker and cheaper alternative to supporting walls on a floating slab is to separately isolate them using Farrat FAVIM stud isolation strips and AWTH washes.

A very high level of sound insulation performance can still be achieved with this method.

Point Loads/Heavy Equipment

Farrat floating floors are usually rated for 5kN/m² loading in addition to the dead load of the floating element construction. Where it is required to support higher loads, similar to supporting walls, the isolator area must be increased or the spacing decreased.

For floors that are to support very heavy equipment or point loads from steel columns or raked seating supports, location of these additional loads would need to be planned in advance so that the isolators can be installed in the correct position.

Steel Columns and Floating Floors

There are two ways to interface steel columns with floating floors. The first is described above, where the column is fixed directly to the floating element, then the isolator sizing or spacing underneath that area of the floating element is altered to account for the load.

The second is where the steel column punches through the floating element and is independently isolated with its own isolator under the baseplate. Each method has its own advantages and disadvantages. Whether they are significant or not to your application will guide you towards which option is most suitable.

- Easier to build - fewer structural implications
- Independent deflection can damage finishes
- Isolators need to be precisely designed for individual load scenarios
- Acoustic detailing is very important, acoustic washers and bushes are required
- No independent deflection
- Installed directly onto concrete - no additional isolation required
- Care must be taken to align column and isolator mid-span
- Limits the extent of further structure that can be supported
- Columns cannot be relocated once the slab is cast
The acoustic performance of our floating floor systems is so high that incorporating mineral wool in the cavity only has a very small effect on the overall sound insulation. However mineral wool can play an important factor in boosting the low frequency performance of a lightweight floating floor.

Under most circumstances, having 50% of the cavity filled with mineral wool increases the airborne and impact sound insulation by 1dB (in terms of overall Rw). When the cavity is 100% filled, this increases to 2dB, however for lightweight floors a performance increase of up to 6dB at 100Hz can be achieved.

The density of the mineral wool has very little effect, as the mineral wool acts as a sound absorber of reverberation in the cavity, rather than being effective as a barrier.

Care must be taken when planning to install mineral wool at a stage of the program which could result in it getting wet and trapping moisture under the floating floor.

**Acoustic Test Data**

![Acoustic Test Data graph](image)

Performance increase provided by fully filling cavity with mineral wool insulation.

**Mineral Wool in Jack-Up Systems**

Using mineral wool in a Jack-Up system may seem counter-intuitive, however it is possible. For air-gaps lower than 100mm the concrete can be poured onto, and the Jack-Up mounts placed between high-density mineral wool. The Jack-Up mounts can be placed on packers which also double as thermal insulation.

**Mineral Wool Occupying Isolator Air-Gap**

The air-gap formed by Farrat isolators can be fully filled with mineral wool of densities up to 45kg/m³. Above this density, the insulation displaces too much of the air in the cavity and can contribute to air-gap stiffening (page 12). Where an insulation density >45kg/m³ is required, the air-gap can be increased using incompressible packers, ensuring there is enough air in the cavity to avoid the negative effects of air-gap stiffening.
Air-Gap Stiffening

When the volume of air in the cavity is low in relation to the surface area of the floating element above it, a phenomenon occurs called ‘air-gap stiffening’. As the floating element vibrates, it compresses the air in the cavity, which causes it to behave more like a solid than a gas. In small rooms, the effect is generally negligible, however in large rooms, the effect can significantly undermine the acoustic performance of the floor.

The results of our acoustic testing show that air-gaps less than 35mm should be avoided to reduce the likelihood of encountering air-gap stiffening unless venting can be incorporated without compromising the acoustic performance. Where very dense insulation (>45Kg/m³) is being used, it displaces air in the cavity, reducing the available air volume. Therefore an air-gap in addition to the depth of the insulation should be allowed.

Air-Gaps and Natural Frequency

The airborne and impact sound insulation performance of a floating floor are very closely tied to the height of the acoustic air-gap and the natural frequency of the isolators when they are under load.

For the most efficient and effective solutions, increasing the air-gap and decreasing the natural frequency should be done in tandem:

- **Decreasing the natural frequency can be achieved by:**
  - Adding mass to the floating element
  - Smaller / softer isolators
  - Wider spacing of isolators

- **Increasing the air-gap can be achieved by:**
  - Thicker isolators
  - Packers incorporated with the isolators
  - Joists on top of the isolators

### Specifying a Floating Floor

In its simplest form, a specification for a floating floor can be an airborne (R_w or D_{nTw}) and / or impact (L_{nTw}) acoustic performance requirement along with an indication of the available or preferred construction materials (eg. timber or concrete). This way we can do all of the hard work for you in terms of selecting the most appropriate system to meet the requirements.

For a more advanced specification (e.g. to be included in an NBS specification), more detail is usually required. This would normally include:

- **Topping grade / density:**
  - eg: 100mm C28/35 concrete min 2300kg/m³
  - or: 15mm plywood, x2 layers dense plaster board, 15mm plywood

- **Air-gap height:**
  - eg: Minimum air-gap 50mm

- **The natural frequency the floor should achieve at a given load case:**
  - eg: Maximum 12Hz @ Dead Load + 20% Live Load

**Air-gap height**

<table>
<thead>
<tr>
<th>Air-gap height</th>
<th>25mm</th>
<th>50mm</th>
<th>75mm</th>
<th>100mm</th>
<th>150mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural frequency</td>
<td>-</td>
<td>12Hz</td>
<td>10Hz</td>
<td>8Hz</td>
<td>6Hz</td>
</tr>
<tr>
<td>( \Delta R_w / \Delta L_w ) (Approx)</td>
<td>- / -</td>
<td>+2 / +4</td>
<td>+4 / +7</td>
<td>+6 / +9</td>
<td></td>
</tr>
</tbody>
</table>

**Frequency**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>63</th>
<th>125</th>
<th>250</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>4000</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRI (dB)</td>
<td>47</td>
<td>54</td>
<td>69</td>
<td>78</td>
<td>82</td>
<td>86</td>
<td>84</td>
</tr>
</tbody>
</table>

Farrat has extensive experience in specifying and designing floating floors for all manner of situations. We would be happy to contribute this experience and provide you with assistance free of charge.

### Case Study - Westfield, Stratford City

Westfield 2 in the high profile London Olympic Park at Stratford City is Europe’s largest urban shopping mall with a vibrant leisure and entertainment offering. Farrat was chosen as a key supplier to this project as a result of the excellent quality of products and services supplied on to a similar VUE cinema scheme in White City. The cinema was on top of the shopping centre which was at the heart of what was at the time the largest single construction site in Europe.

Farrat Acoustic Floating Floors were chosen for the ease, speed and flexibility of installation. We created accurate installation drawings for each auditorium showing exact isolator and formwork locations and quantities. The performance from the previous White City project proved that the alternative method of placing the walls next to the floors and isolating them with Farrat FAVIM and AWTH acoustic washers gave excellent acoustic performance results, and fitted efficiently into the construction program.

- 16 screen cinema
- 630 Isolators for the raked seating structure
- 2,155m of Farrat FAVIM supplied under walls
- 1,598m² of Isomat floating floors
- 5,367 Isomat Isolators
Installation

AcouStruct Ltd is Farrat’s sister company. It is a specialist contracting company set up to act as a high quality installer of Farrat Acoustic Floating Floors and other structural vibration isolation systems.

The performance of acoustic and vibration isolation systems is fundamentally reliant on the minimisation of mechanical bridging and noise flanking which is not always easy to achieve and only accomplished with high standards of workmanship. AcouStruct was established to provide a service to clients where such installations can be carried out quickly, economically and to a very high standard.

Why choose AcouStruct?

- Direct access to Farrat’s 50 years experience in acoustic & vibration isolation system design and manufacture.
- A company core competence is to construct floating concrete slabs and other building elements that are guaranteed to be COMPLETELY, 100% separated/isolated/decoupled from the surrounding structure to minimise any potential for mechanical bridging and noise flanking.
- Flexibility in services offered due to a wide range of expertise and experience.
- Inclusion of construction of non-acoustic corridor floors etc bordering the acoustic floors/elements allowing main-package cost savings.
- AcouStruct has a long list of successfully completed jobs for high profile clients.

Sustainability

Farrat and AcouStruct take sustainability and environmental responsibility very seriously. AcouStruct is Carbon Smart™ certified, with a carbon footprint of 129.96 tonnes CO₂e. Efforts are underway to reduce this even further.

Before each project, we undertake a waste mitigation exercise to limit the amount of waste we generate by effective planning. We use FSC/PEFC certified timber (BREEAM Tier 3) and recycled aggregates in our CEM II/III concrete (BREEAM Tier 3) meaning we can ensure you have the ability to achieve the maximum amount of credits under BREEAM MAT 03. All of the materials we use in our floating floors are 100% recyclable.
Isomat Floating Floor - Typical Installation Sequence

Fig 14.1 Ensure floor area is clean, clear of debris and level. Bond the lateral isolation strips to the perimeter walls at the edges, as well as any protrusions into or through the floor.

- If the perimeter walls are not in place, erect lateral formwork first.

Fig 14.2 Mark out an appropriate grid for the isolators, typically 600–610mm cross centres.

- The grid will be different for 2440x1220mm plywood sheets than it would be for 2400x1200mm sheets.
- Extra isolators may be needed to support corners and cuts.
- Mineral wool can be added between isolators, see page 11.

Fig 14.3 Place ply sheets onto isolators and secure in place by screwing into some corner isolators.

- Ensure no fixings bridge to the structural slab.
- Always use new plywood.
Lay DPM (damp proof membrane) onto ply deck with 300mm overlapped and taped joints.

**OR** Use dry system floating floor (see page 6).

Lay reinforcement mesh (if required) onto finished deck to appropriate cover.

- Use plastic spacers to ensure mesh is at the correct height.

Pour floating concrete slab or screed. Power float if required.

- Do not allow the concrete to spill over the lateral isolation by overfilling.
Jack-Up Floor – Typical Installation Sequence

Undertake a level survey taking measurement points where Jack-Up boxes are to be placed. Structural slab should be within ±10mm. Low points can be accommodated by adjustment in the Jack-Up mount, however high points must be ground down. Make sure surfaces (floor & perimeter walls) are dry and clear of lumps of concrete (remove anything larger than 10mm as they may break through the DPM). Construct perimeter formwork if required. Typically this should be 25–50mm higher than slab thickness. Bond perimeter isolation strips to any permanent interfaces (perimeter walls, service protrusions etc). Height should be from the floor to the final datum.

Mark out grid lines for Jack-Up boxes, then place clear damp proof membrane (DPM) (either 1 layer of 1000gms or 2 layers of 500gms laid at 90° to each other) as a bond breaker under and around all edge faces of a jacked-up slab. All joints are to be overlapped by at least 300mm and taped using min. 50mm wide specialist DPM joint line tape. DPM must be fitted neatly into corners and edges to avoid localised slab thickness reductions.

Place Jack-Up boxes onto a grid and reinforcement mesh to correct height to cover the entire area making sure it is brought right to the edges and corners of the slab. In order to maintain the correct cover on the mesh the Jack-Up boxes may have to be rotated by 90° to support the upper mesh bar. Tie wire all mesh sheets together every 400mm. Mesh MUST NOT damage/tear any of the DPM. If it does repair with extra DPM and tape. Some Jack-Up boxes may have to be moved slightly to fit into exact mesh grid to avoid cutting mesh.

Example mesh specification for Jack-Up floor:
- 100mm slab – 1 layer of A393 mesh
- 150mm slab – 1 layer of A393 mesh
- 200mm+ slab – 2 layers of A252 mesh

Ideally use mesh with no flying ends. Slab construction should be checked by a structural engineer.
Final check that boxes are within ±10mm, supporting mesh, that mesh is supported in between boxes and that there is no DPM damage. Pour concrete taking care not to dislodge or tip any Jack-Up boxes. If this occurs correct immediately.

Power float if required taking care not to dislodge or tip any boxes. Alternatively trowel finish with screed layer on top to provide finished levels and cover exposed Jack-Up box tops. If the perimeter formwork is to be removed, we suggest doing this within 48hrs of the concrete pour.

Leave slab for 2 to 4 weeks to allow concrete to reach adequate strength. Jack-Up slab according to project specific instructions. This is a time consuming process, allow time for doing this (at least 2mins/m²/mm).

If any isolators need to be replaced through overloading or change in use then do one isolator at a time, remove Jack-Up box cap, unload bolt, replace isolator and re-tighten the bolt.
Case Study - Milton Court, The Heron

The Milton Court project was part of a major redevelopment by the Guildhall School of Music and Drama to expand its City of London facilities. Part of the Heron development which also includes residential accommodation, the lower floors of the scheme house the school’s new facilities. Due to the complexity of the steel design, acoustically isolating each area was vital.

Farrat designed and manufactured low frequency laminated natural rubber bearing assemblies which would support the internal steel box structure and precast floating floors. The rehearsal studios and gyms at basement level were addressed in the form of box in box designs containing a built up Jack-Up floor. Farrat also specified and supplied specialist acoustic pads, washers and bushes to suit a wide range of pressures as well as thermal break connections.

- 608 seat world class concert hall
- 227 seat theatre, further theatres, rehearsal rooms & a TV studio suite
- Over 1,310 elastometric bearings & pads
- Both Jack-Up & precast floating floors designed to $f = 9$Hz
Place precast planks onto steel sections, keeping all joint gaps to a minimum. Planks may need to be pre-designed or cut on site to fit around any intruding structures such as columns or angles in perimeter walls. Farrat can provide Isofoam to create a resilient but acoustically sealed interface between isolated and non-isolated structures.

- Seal all perimeter edges of the precast slabs to avoid concrete overspill.
- Pre-cast slabs can include reinforcement loops to tie into concrete if required.

Construct perimeter formwork if required and pour concrete slab.

- Pour concrete carefully at perimeter edges and around protrusions through the slab to prevent bridging caused by overspill.
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Precision Levelling Solutions
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