



WILLMOTT DIXON

SINCE 1852

Fixings & Anchors Policy

Version 12 - October 2020



This Fixings & Anchors Policy
must be addressed in the
Quality Plan and the individual
Package Quality Plan

**EVERYTHING
COMPLETED WITH
PRIDE**

**Building on
BETTER** 

CONTENTS

Introduction	3
Categories of fixings	4
Basic Fixings	4
Safety Critical Fixings	4
Who is responsible for designing and specifying fixings and anchors?	5
Who needs to do what?	6
Supply Chain Partners	6
Willmott Dixon Operation Teams	7
Substrates	8
NICEIC 18th Edition	9
Fixing and Anchors Tracker Template	10
Good Site Practice	11
Fixing Boards	11
Torque Setting and Calibration	11
Impact Drivers and Tek guns	11
Pull Out Requirement	12
Typical Example for Fixing Types	13

INTRODUCTION

We are responsible for ensuring our Supply Chain Partners use appropriate fixings or anchors for the elements they are installing. This policy was created to set out the standards we expect from all our teams, our Supply Chain Partners and their Designers.

In the civil engineering, transport and nuclear sectors, all supports and fixings that carry any load are:

- Designed to take the load
- Specified by the installation company
- Installed by operatives trained to install those specific fixings
- Installers are supervised by a competent person

As a result of this compliance, these industry sectors are confident that fixings are being designed and installed correctly and will perform as designed with no post-installation testing required.

In the construction industry, we do not currently have that confidence and recent failures highlight that we are at risk of suffering a fixing failure with potentially fatal consequences.

The solution is not complex but does involve a significant change for our people, our Consultants and most importantly our Supply Chain Partners and their Designers.

The consequences of incorrectly specified and installed fixings and anchors.....



CATEGORIES OF FIXINGS

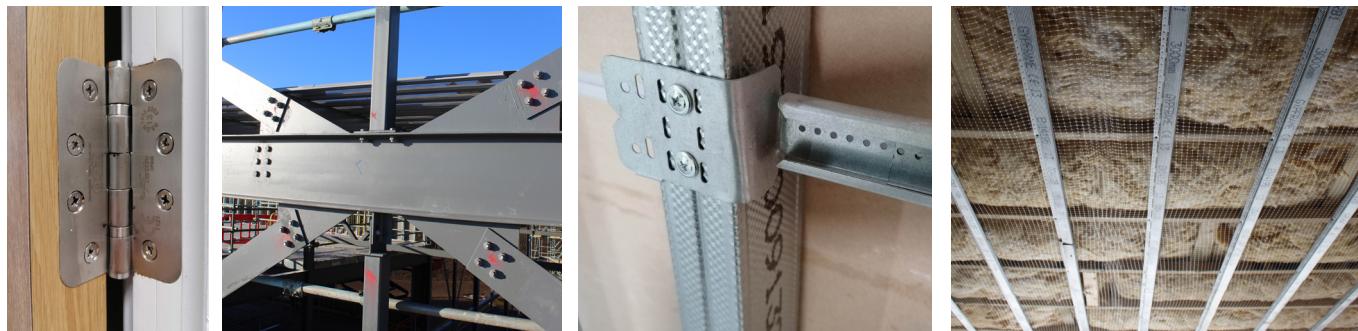
There are two categories of fixings and anchors that we are concerned with regardless of what substrate they are being fixed into. In this policy the term fixings is deemed to cover all fixings, anchors, bolts, nails and screws.

Basic Fixings - these are fixings that either take low loads, have a low risk to safety should they fail, or are wholly part of a complete system or manufactured element.

Basic fixings need to be identified by the Supply Chain Partner so we can check they are used in the correct location. Fixings that are an integral part of plant, equipment and FFE etc. do not need to be identified.

All fixings that are wholly part of a designed system or product are classed as basic fixings as the manufacturer or designer for that system has designed and specified those fixings.

Examples - plasterboard system screws, fixings for skirting boards and architrave, fixings for external wall cladding to the support rails, screws for door hinges, integral fixings for items of plant such as screws holding the outer case of a boiler together, fixings connecting timber frame wall panels together, connection bolts on a structural steel frame.



Safety Critical Fixings - any fixing that, if it failed, could cause harm to the end user or the general public should be considered Safety Critical. Also any fixing that connects a designed system to a separate substrate must be classed as a Safety Critical.

Examples - drop-in anchors holding up M&E containment, fixings connecting masonry support to structure, hold down bolts for balustrade posts, wire hanger anchors for suspended ceilings, fixings for wall hung cabinets or independant partitioning systems (IPS), anchors for lift car guide rails, fixings for windows and doors.



Examples - fixings that hold down a timber frame to a concrete floor slab, hold down straps for a timber trussed roof onto wall plate / blockwork walls, window strap fixings back to masonry, fixings for support brackets for M&E components, brickwork support fixings where fixed to steel columns.



The project team should review each package with the Supply Chain Partner (SCP) and agree which fixings are Safety Critical and what needs to be identified on the Fixings and Anchor Tracker.

WHO IS RESPONSIBLE FOR DESIGNING AND SPECIFYING FIXINGS?

Unless specifically identified by the primary design consultant (Architect, Structural Engineer, M&E designer), **the SCP who is supplying and installing the fixing is responsible for the design and specification of the fixing they propose.** In practice, the vast majority of fixings will remain the responsibility of the SCP to specify and ensure they are suitable for the proposed application.

The SCP may obtain information regarding the fixings selection from other sources (manufacturers, fixing suppliers etc.) but ultimately they retain overall responsibility for the selection of the fixing. They are making a choice over which fixing or fixing method to use and must be responsible for that choice. This does not impart a formal design responsibility on the SCP in the same way as a Contractor Design Portion (CDP) element and therefore does not need to be reflected in their order. This is not a Professional Indemnity (PI) insurable item.

Example - whilst a structural engineer may specify the hold down bolts and the structural connection bolts for a steel frame, they will not design and specify the fixings that connect other elements to the steel frame such as fixings for masonry and masonry support angles.



The Structural Engineer must provide the loading information and substrate specification to allow the SCP (and their supporting manufacturers or fixings suppliers) to make the correct selection. Fixings manufacturers (Hilti, Fischer, Ejot etc) and suppliers (VJT, Kernow Fixings, Fixfast etc) offer advice and information to help SCP's in selecting the correct product for the application.

Under the BS 8539:2012 Code of practice for the selection and installation of post-installed anchors in concrete and masonry, Fixing Manufacturers and Suppliers will become the designer and specifier of the fixings. They are providing this service to the SCP and it does not remove the overall responsibility from the SCP. In some instances, the SCP may need to employ an Structural Engineer to carry out design for complex installations.

WHO NEEDS TO DO WHAT?

SUPPLY CHAIN WORKS/GOODS PARTNERS MUST ENSURE THAT:

1. All safety critical and basic fixings are agreed with the Project Team and recorded on a **Fixings and Anchors Tracker** (see template attached) prior to commencing works.
2. Evidence is provided that the proposed fixing will achieve the designed loading (manufacturers data, load calculations etc.)
3. Any party who is selecting fixings (the Specifier) take into account the following design considerations;
 - a) Ability of the structure to support the applied load / action
 - b) Concrete condition (old, new, cracked, non-cracked)
 - c) Robustness, redundancy and progressive collapse
4. All loading information or substrate performance information required to make a fixing selection has been obtained from the Structural Engineer and forwarded to the fixing manufacturer or supplier.
5. Full technical data must be provided by the Manufacturer/Supplier to the Specifier before the specification and/or use of the same can be accepted.
6. The correct anchor is obtained as per the specification, and that the product in question has either UKAS (United Kingdom Accreditation Service) accredited certification or an European Technical Assessment (ETA) issued by an appropriate Technical Assessment Body as identified on the website of EOTA (European Organisation for Technical Assessment) or the NANDO (New Approach Notified and Designated Organisations) website of the European Commission.
7. The installer is trained in the correct installation of the specified fixing and is supervised by a competent supervisor who has completed a training course delivered by a Construction Fixings Association (CFA) approved training organisation such as the CFA themselves, Fischer, Hilti etc.
8. Any proposal to change the fixing to an alternative is subjected to the full selection procedure of the BS 8539:2012 (Clause 10).
9. The strength of the base material is at least that assumed by the Specifier in the selection of the fixing. If site pull tests are required, they must be:
 - Carried out by a CFA approved tester
 - To the appropriate procedure
 - In the correct location; and
 - The results recorded and retained in project documentation and communicated to the Specifier.
10. Once the installation is complete, and prior to service loading, the installation should be certified by the competent supervisor as being fit for loading.
11. Calibration records / certificates of torque wrenches and measuring tools to be issued to Willmott Dixon.

WILLMOTT DIXON OPERATIONAL TEAMS MUST ENSURE THAT:

1. The specification and installation of all fixings and anchors is recorded and included within the Quality Plan - please refer to 'Fixings and Anchors Tracker Template' which is included within this policy.
2. Any supporting information relating to the selection of a fixing is appropriate to the proposed installation (i.e. data sheets for concrete fixings if the SCP is fixing into concrete).
3. Any changes to the proposed fixings are confirmed by the SCP and all the supporting information confirming the suitability of the fixing has been provided prior to installation.
4. Installed fixings are checked against the Fixings and Anchor Tracker and any discrepancies are rectified by the SCP either by:
 - Replacing the fixings for the original specified fixings or;
 - Obtaining confirmation of the suitability of the substitute fixings as noted above.

All further works must cease until either of the above options have been completed.

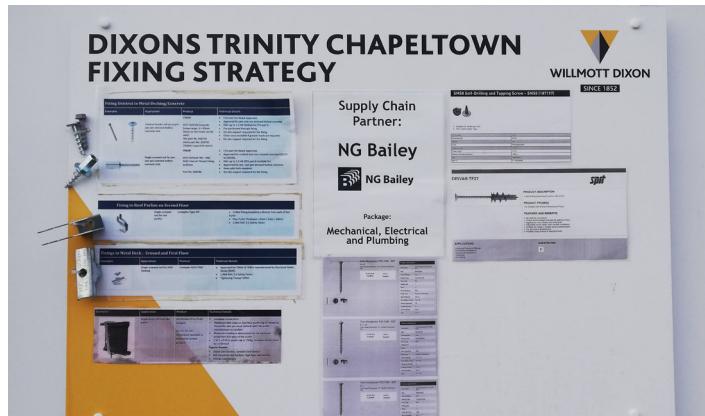
5. Any party undertaking pull tests on fixings are CFA approved.

Website: <http://www.the-cfa.co.uk/approved-testers/>

Also all full members of the CFA (Fischer, Hilti, ITW etc.) are able to carry out pull-out tests to CFA standards in addition to the approved testers.

All requests for pull-out testing must be made using CFA Form 8539/04, which is available from the CFA website: <http://www.the-cfa.co.uk/publications-and-downloads/cfa-8539-forms/>.

6. Calibration certification for testing equipment or torque wrenches is recorded in the Quality Plan.



SUBSTRATES

Concrete

When fixing into concrete, a pull test is required to confirm that the designed loadings can be achieved. This requirement can become quite onerous but fortunately a British Standard exists that will help in the majority of circumstances. BS8539:2012 deals with the selection and installation of post-installed anchors in concrete and masonry. By following the process set out in the standard, we can rely on manufacturers performance test data rather than on site pull-out testing.

Compliance with the standard is the responsibility of everyone involved with fixings, right from the specification point up to their installation which shall be overseen and certified by the responsible supervisor.

As per BS8539:2012, site pull-out testing is not required if anchors have an European Technical Assessment (ETA) and the installation is undertaken by competent operatives and is in accordance with the applications covered by the ETA. The main manufacturers such as Fischer, Hilti, SIG, etc. can provide published performance data including their ETA certificates. www.eota.eu/pages/etassessments/default.aspx



Masonry

As noted above, when fixing into masonry a pull test is required to confirm that the designed loadings can be achieved. Site pull-out testing is not required if fixings have an ETA for use in masonry. Please note that the masonry on-site must be representative of the masonry types included in any test data or ETA (i.e. density, strength etc.) and the installation is undertaken by competent operatives.

Steel

Fixings into steel are not covered by the BS8539:2012, however we still need to ensure their correct installation and performance. SCP's are still required to obtain the relevant data demonstrating that the proposed fixing can accommodate the proposed load into the substrate. Suitability of the fixing can be confirmed using manufacturers data alone providing that the substrate is equal to, or exceeds, the criteria stated in the data sheets. Pull tests on fixings into steel usually results in the fixing head shearing off before the fixing pulls through the substrate so are of very limited use.

Timber

Fixings into timber are again not covered by the BS8539:2012 but still need to be confirmed as being suitable for the proposed load. As timber and timber manufactured products such as plywood or OSB (orientated strand board) are a variable product and will have different structural properties from product to product, each individual type of installation will require a pull test. If you are fixing into softwood timber studs, OSB patressing and Cross Laminated Timber (CLT) walls, you will need to carry out separate pulls test for each substrate.

NICEIC 18th EDITION WIRING REGULATIONS

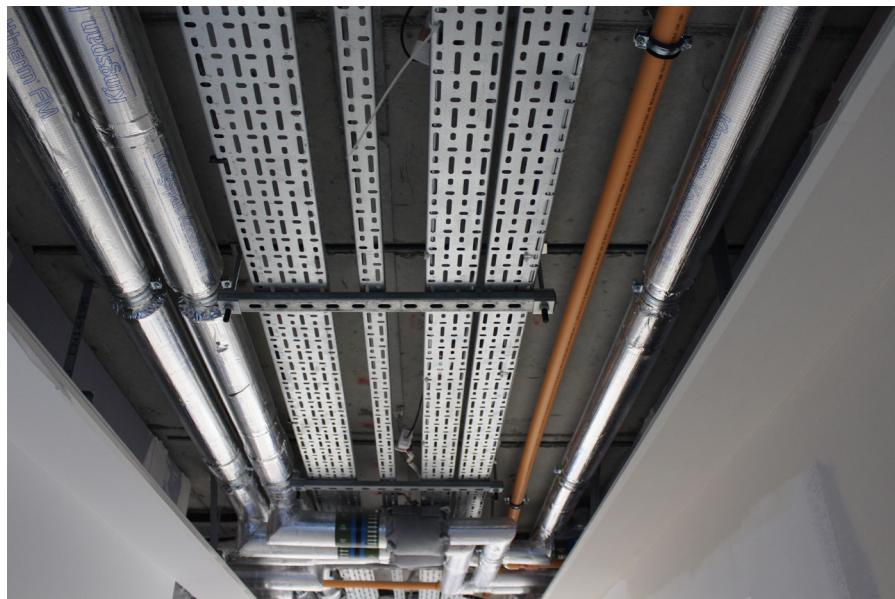
Following recent cases where fire-fighters died after becoming tangled in cables, the 18th Edition Wiring Regulations have been amended to prevent the premature failure of cable supports. Unfortunately the regulations are not fully prescriptive as to what premature means and there has been some debate over what is compliant.

Research from the BRE has shown that plastic plug fixings (such as rawlplugs, nail plugs) have softened and failed at relatively low temperatures in simulated tests when used with metal ancillaries to secure cables.



To avoid differing standards across our business, the following will be mandatory on all projects designed under the 18th Edition and/or commencing from 1st April 2019.

- All cables must be supported via non-combustible elements to avoid premature failure in the case of a fire. **Plastic plugs with fixings which support cables and cable management components are banned.**
- Plastic conduit is acceptable if installed in conjunction with non-combustible components such as concrete screws and metal clips / cable ties. There are proprietary system available for metal clips within plastic conduit / dado trunking.
- **Plastic clips or plastic base holders for cable ties are banned.**



Residential communal areas and corridors etc. are not exempt and non-combustible fixings must be used.

Please note that it may be possible to use combustible fixings within an individual residential dwelling **but only when those areas do not form part of an escape route form that dwelling (hallway, lobby, room within a room etc).** This exemption must be agreed with Building Control on a project by project basis.

FIXING AND ANCHORS TRACKER TEMPLATE (suggested template - to be included within Quality Plan with the following headers as a minimum)

Typical Packages (Add packages as required)	Name of Supply Chain Goods Partner (SCP)	Date Fixing Specification Register* requested from SCP	Date Fixing Specification Register* complete with data sheets (ETA or similar)	Date Fixing Board set up on site if required	Date Operative Training provided (Manufacturer TBT or certification)	Date Supervisor competence confirmed (CFA fixings training or similar)	Date Pull Out Test completed (if required) VJT Technologies/CFA can attend site and assist?**	Date Install Approved & Signed Off
Balustrading								
Brickwork & Blockwork								
Capping / Parapet								
Cladding System								
Curtain Walling								
Dry Lining								
Electrical								
Mechanical								
Rainscreen Cladding								
SFS & sheathing board								
Windows								

* The Fixing Specification Register is located within section 11 of the Package Quality Plan

** Contact details for these organisations are available from your Regional Quality Team

EXAMPLES OF GOOD SITE PRACTICE

These Fixing Boards have been created by our Supply Chain Partners to ensure that only the correct fixings are used.



Fixing boards should include the proposed fixing and where it will be used so everyone can check that the correct fixings are being used in the correct location. It is good practice to locate these boards near to the SCP's stores so that when operatives collect fixings, they can check for themselves.

Torque Setting and Tool Calibration

Fixings should be installed to the correct torque as per the specifiers /manufacturers information. Over-tightening can be as damaging as not tight enough.

Torque wrenches must be used to confirm that the required torque has been achieved. Torque settings achieved should be recorded and issued to the Customer within the O&M information. These should be inspected and calibrated annually. A torque wrench can be rendered useless through receiving an impact i.e.being dropped.

All torque wrenches used to confirm torque of installed fixings must have a valid calibration certificate which should be recorded in the Quality Plan.

Impact Drivers & Tek Guns

Impact drivers are commonly incorrectly used on sites and could cause fixing failures. Impact drivers are suitable for driving fixings into timber and some masonry/concrete applications due to the high torque generated.

However, when fixing into metal (thin and thick gauge), Tek screw guns or specialised screw guns must be used to avoid stripping the thread from fixings, overdriving and burning out self-tapping drill points. Be aware that some fixings state a maximum speed (RPM) for the installation tool. This should be checked prior to commencing and recorded in the Fixings Strategy.

Plasterboard fixings must be installed flush or just below the board surface. Depth restrictors, shrouds or specialist screw guns must be used when installing plasterboard to avoid overdriving fixings. Overdriven fixings cause "nail pops" in finished work and could compromise the fire performance of the wall.

PULL OUT REQUIREMENT MATRIX

What is the substrate being fixed into?

Concrete, cracked concrete or masonry?

Metal, timber inc. hot and cold rolled steel, metal, decking, plywood, OSB, CLT etc.

What type of fixing is being proposed?

Post - installed anchors such as:
 Drop in anchors
 Shield anchors
 Expansion anchors
 Concrete screws
 Resin anchors

Fired anchors
 (gas, powder, electric)

These anchors are covered by BS8539:2012. Code of practice for the selection and installation of post-installed anchors in concrete and masonry

New Build

Refurbishment

Does the proposed anchor have a European Technical Assessment (ETA) covering it's proposed use?

A pull out test **WILL** be required as the performance of the substrate is unknown - BS8539:2012

Yes

No

A pull out test **WILL NOT** be required if ETA's are available for the chosen fixing and are installed by a trained operative under the supervision of a competent supervisor, unless otherwise required in the Contract Documents

A pull out test **WILL** be required. BS8539:2012 specifies the minimum number of pull out tests to be carried out: 2.5% of the fixings of each type when tested to 1.5% x applied load **OR** 5% of the fixings if testing to 1.25 x applied load

All fixings and anchors are to be installed by trained operatives under the supervision of a competent supervisor.
 Please note - pull out tests may still be needed under the requirements of the Contract.

These anchors are **NOT** covered by BS8539:2012.

However, confirmation must be sought from the SCP that the proposed fixing is suitable for the intended application and evidence must be recorded.

Some European Technical Assessments are available and should be sought from the specifier / manufacturer / supplier

Fixings into these substrates is **NOT** covered by BS8539:2012

However confirmation must be sought from the SCP that the proposed fixing is suitable for the intended application and evidence must be recorded.

Some European Technical Assessments are available and should be sought from the specifier / manufacturer / supplier

Any specific technical requirements of the proposed fixings (such as torque etc.) must be discussed in a Tool Box talk with the installer.

A pull out test **WILL** be required to confirm the designed loading is being achieved in variable substrates such as timber

Installers of fired anchors must hold a valid training certificate for the system being installed.

A pull out test **WILL** be required to confirm the designed loading is being achieved.

TYPICAL EXAMPLES OF FIXING TYPES

Element	Basic Fixing	Safety Critical Fixing
Cantilevered glass canopy on stainless frame fixed to masonry	Bolted glass components Steel to glass components	Fixings for stainless steel frame to masonry
Masonry channel restraint system	Slotted wall tie	Fixing for channel through insulation into structure
Metal copings	Fixings for copings to bracket	Fixings for brackets to structure
M&E containment	Fixings joining containment lengths and bends etc Unistrut components (threaded rod, nuts and washers etc.)	Fixings for Unistrut to substrate Fixings for wire hangers to substrate
Light fittings in an MF grid ceiling	Fixings forming part of the light fitting or suspension system	Fixings for suspension system to substrate
Rainscreen cladding	Fixings for sub grid components (cladding rails to helping hand brackets) Fixings for cladding panels Fixings for flashings and trims	Fixings for helping hand brackets back to structure
Roof trusses	Fixings for nail plates Fixings for timber bracing	Fixings for trusses clips onto wall plates
Temporary works/edge protection	Fixings that form part of a proprietary temporary works system (Kwikform etc)	Fixings for edge protection into structure (N.B. green concrete will always require pull out tests)
Timber frame	Frame to frame connection fixings Nails for sheathing boards Fixings for panels into timber sole plate	Fixings for timber sole plate into structure
Timber fire door set into partition	Fixings for hinges, ironmongery, door closer etc.	Fixings back to partition structure