Module 12 - Environ Racks and Cabinets

- Choosing the Right Rack
- Choosing the Right Location
- Environ Rack Installation
- The Environ Range of Racks

Choosing the Right Rack

What is the application?

- Cables and Patching
- Switches and Patching
- Switch and Server
- Audio Visual (AV)
- Server only
- CCTV

There are many different combinations, and each will bring its own requirement(s).

1

Weight Loading
Consider the weight loading and whether the rack is capable of taking the intended solutions

2

Future Planning
Plan for the future, leaving a minimum of 25% spare capacity within racks that contain switches, servers and AV equipment

3

Shared Facilities
If the rack will be used in a shared space or network (i.e. Landlord and Tenant using the same cabling infrastructure) then consider a Co-Location (CL) rack. They are popular in Data Centres, where the end-user can lease ½, ⅓ or ¼ of a rack. Each section of a CL rack must be totally isolated from the other to ensure security, and must have a separate lock from all the others, whether that is achieved by way of combination locks or different

keys. The downside of having separate keys is the need to keep a strict record of all key holders and the fact that they can be easily copied. Combination locks provide the best low-cost solution.

4

Heat Load

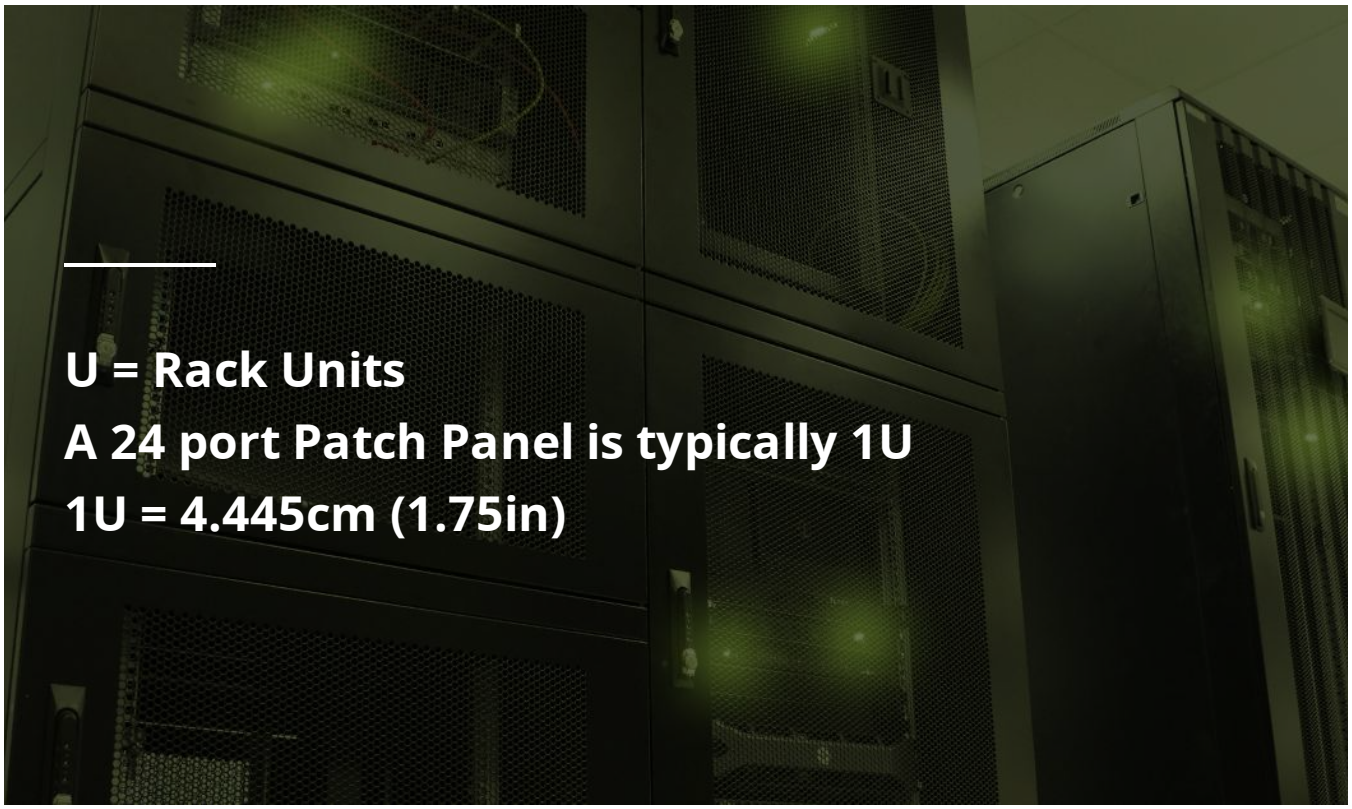
Consider heat load in racks that will be used to house switches and servers. You can calculate this using the Kw (Kilowatt) rating of the equipment. This is usually expressed as both start-up and run load, the latter being a smaller value. Doing this will give you an idea about whether you will need to have some form of cooling installed within the location. You can increase the airflow through the rack with fans fitted to the rack roof.

Additional cooling requirements are usually the responsibility of the Designer or Consultant, however on the odd occasion when working directly for the end-user they may push this on to the installer.

Generally speaking, cabinet door perforation of 67% is more than adequate for the majority of applications. Studies have shown that anything above 67% perforation is not usually required because it does not offer any additional cooling advantage. However, it is recognised that in some cases, up to 85% can be specified as a requirement.

The application may only require a small amount of equipment, where it would be overkill to install a floor standing 42U Cabinet - it would be better suited to a wall mounted cabinet. Given the amount of equipment they can hold, they usually do not need any additional cooling.

Excel Environ Wall Racks can be installed by a single engineer. They are designed so that the back panel is mounted to the wall, then the top, bottom and two sides are mounted on to that, followed by the side panels and door.



U = Rack Units
A 24 port Patch Panel is typically 1U
1U = 4.445cm (1.75in)

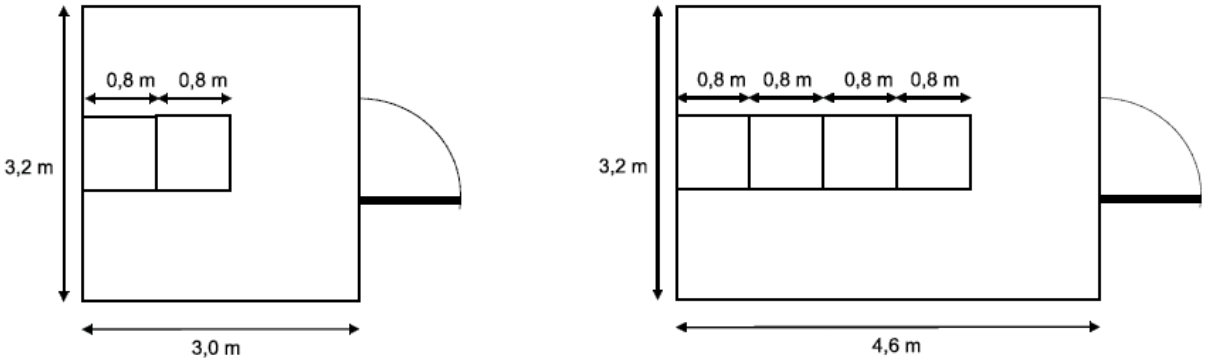
Choosing the Right Location

It is not just about the choice of cabinet, where and how it is placed also has major importance.

EN50174-2 provides guidance on the space and the free area around the cabinet

1. This is important for the ongoing operation and maintenance of the system
2. It wouldn't be great if it was not possible to change switches and servers in the future because there was limited access to open the doors sufficiently

EN50174-2 provides guidance for rooms containing cabinets housing cabling components only and those that have additional active equipment - the latter is the most common



Minimum dimensions for rooms housing active equipment in addition to cabling components

The room would be scaled accordingly for larger termination point counts

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1. Spaces shall provide a minimum of 2.6m from the finished floor of unobstructed height

2. Lighting shall provide a minimum of 500 lux measured 1 m above the finished floor in front (and at the rear, if applicable) of the cabinets

3. Rooms should be provided with doors that (i) are a minimum of 1m wide and 2.13m high, (ii) do not have a doorsill, (iii) are fitted with a lock or locking system, (iv) have either no centre post or a removable centre post to facilitate access for large equipment

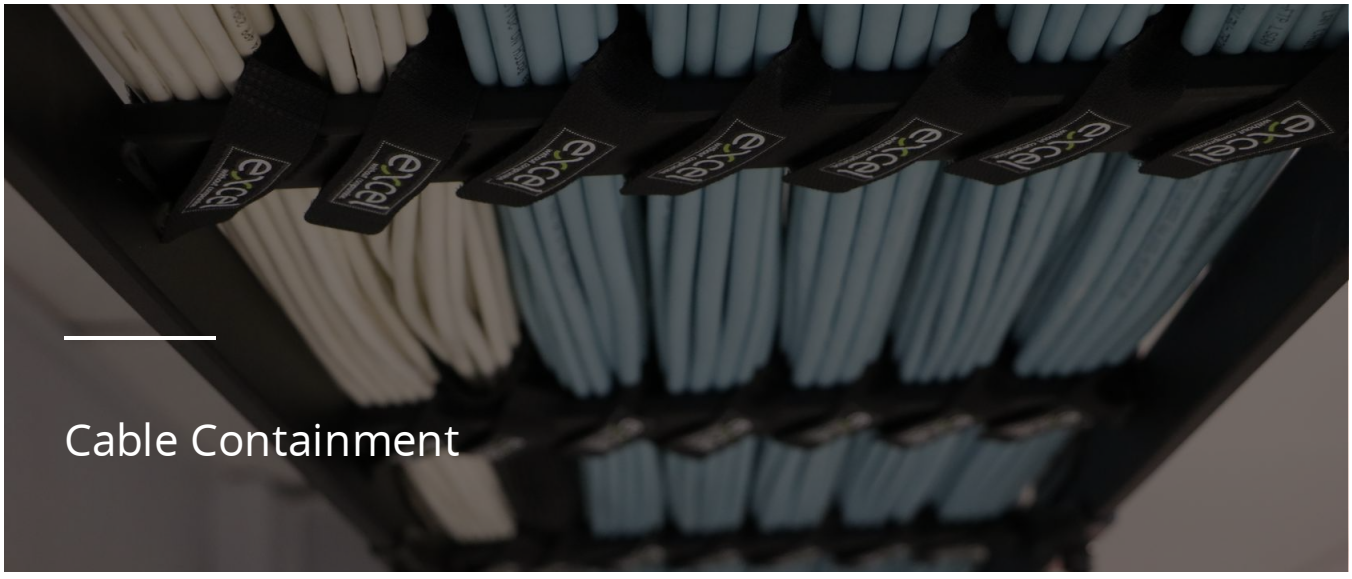
All this guidance is intended to ensure that both the installation and the ongoing maintenance is as easy and as straightforward as possible.

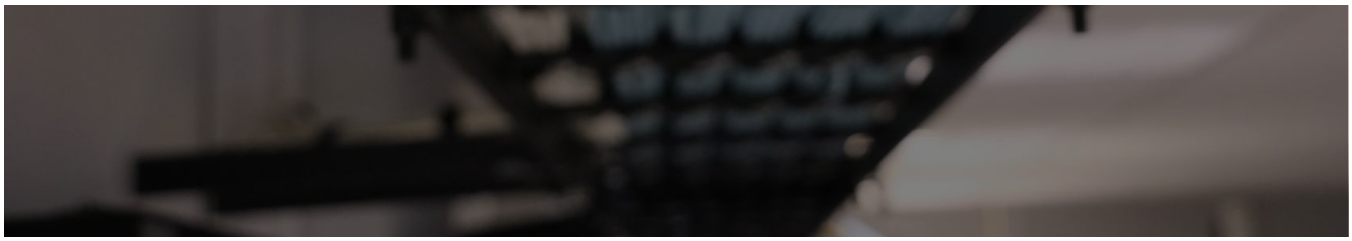
Environ Rack Installation

Within this section we will cover best practices concerning how the cabling is installed within the cabinet, including:

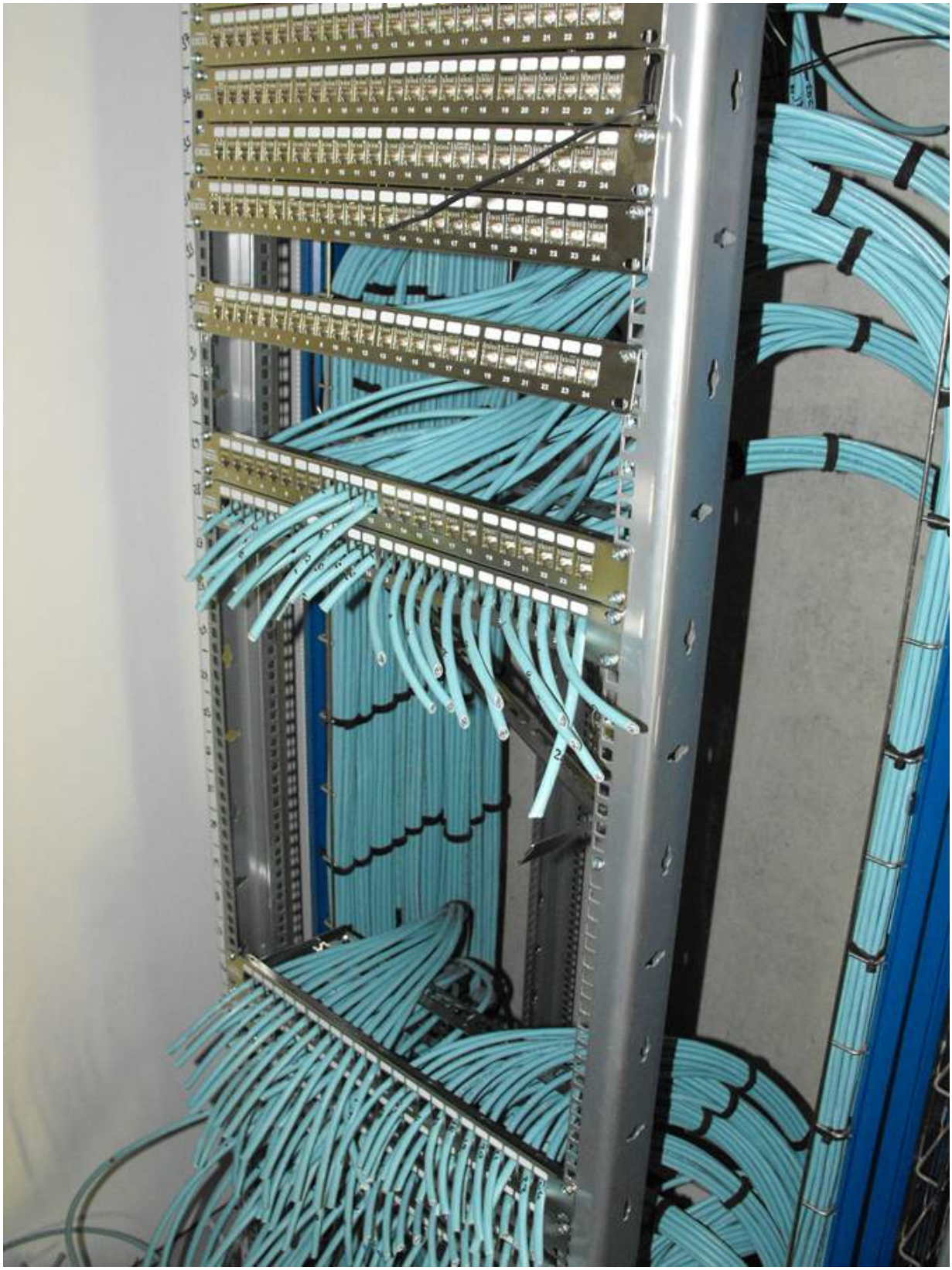
- Entry/Exit of the cables
- Cable Dressing
- Cable Tray
- Patch Panel install/Dressing
- Management Bars
- Cable Ties

Remember, the rack is the key area that the end-user sees and he will judge your workmanship on the overall project on how you complete this element.





- Cable tray or basket should be installed vertically within the cabinet to support the cable bundles
- Cables should be in neat bundles of a maximum of 24
- Excel recommend the use of hook and loop ties (Velcro style) at regular intervals - preferably every 300mm
- The unsupported length of cable from the patch panel management tray should have a gentle and consistent curve without any sagging



A rack during cable installation

This shows bundles of 12 from each side, as that was what was requested by the consultant. We will discuss this a little further as we move on.

Many Installers use an unloaded patch panel frame as a template to aid in dressing the cables within the rack

Cable Socking is allowed but must not be used to hide poor workmanship and does not remove the need for cable ties

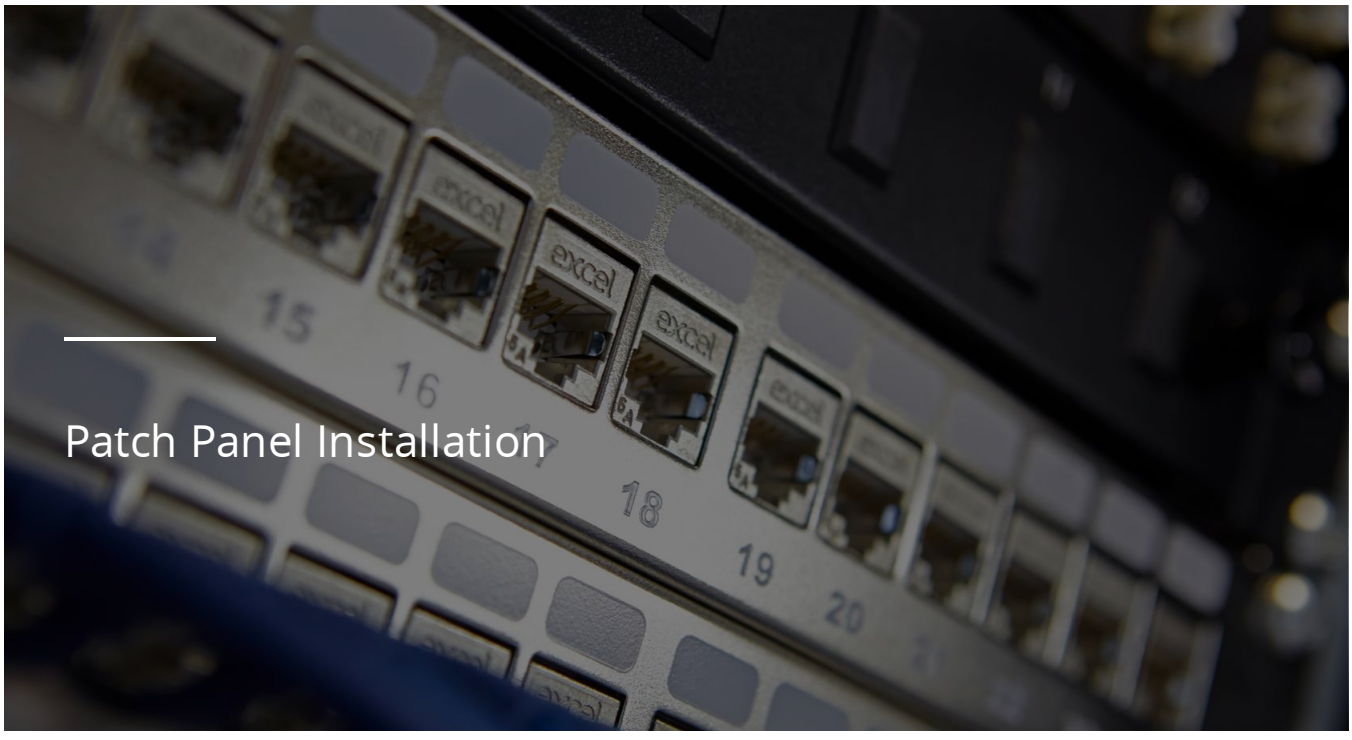


Waterfall Brackets

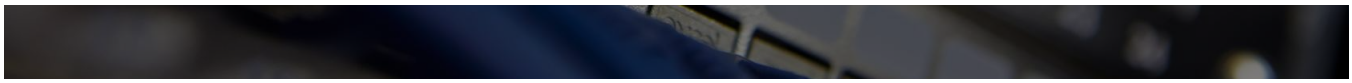
- Waterfall brackets must be robust in both design and construction to support the number of cables required.

- Waterfalls are required for any drop basket tray - you should not just have bundles come over the side of a basket tray, as this puts too much pressure on the cables at the bottom of the bundle, exceeding minimum bend radii and degrading a cable's performance over time.
- For any drop from tray to cabinet over 500mm from the tray, you must also install a vertical section of tray to support the cables.
    - The weight of 300 cables is significant and can put strain on the cables if not supported correctly
    - They will also put undue crushing pressure on the bottom cables impacting performance

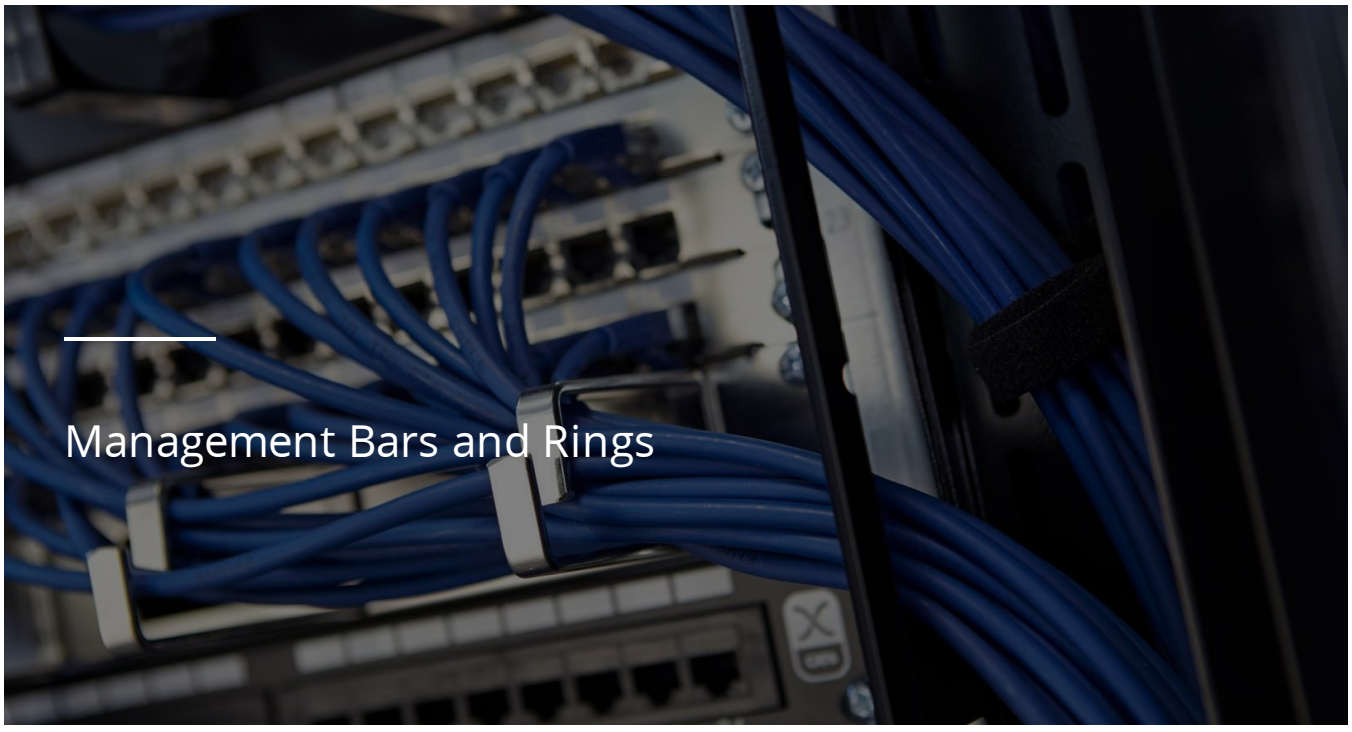
> The part number for the retrofit waterfalls from Excel for use with Basket Tray is **542-055**. The ideal scenario is to remove the section of wire basket immediately above the waterfall as well as filing down any sharp edges.



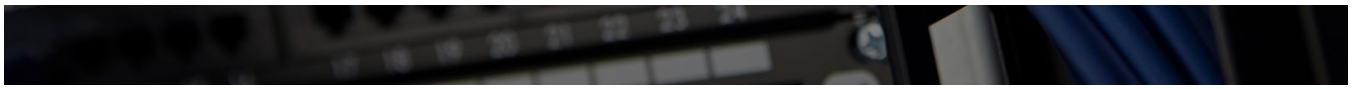
Patch Panel Installation

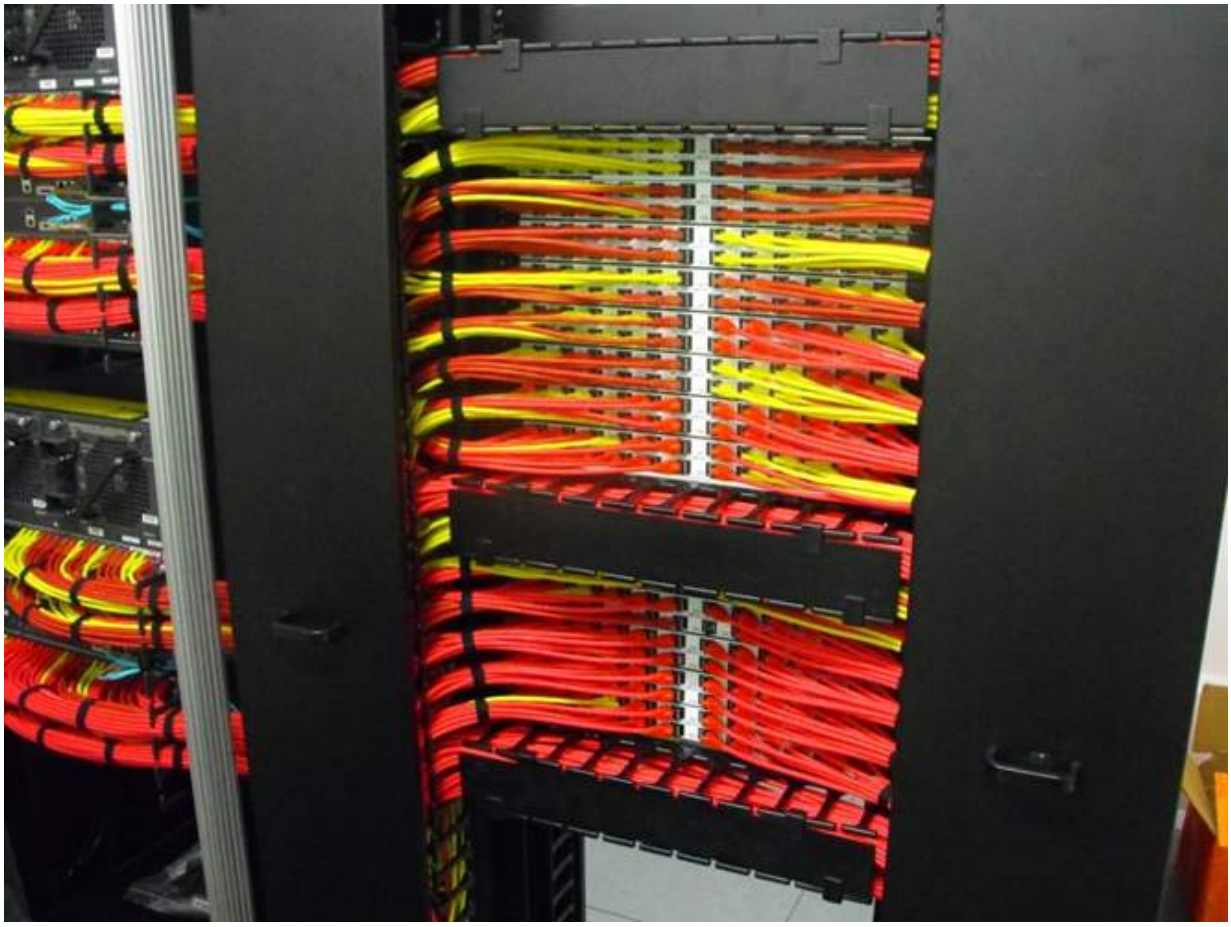


- There are no rules as to whether you dress bundles of 24 from one side or a bundle of 12 from each side
- That said it is recommended to have two bundles of 24 from one side then the next two bundles from the opposite side
    - Better and more even distribution
    - Better for troubleshooting and fault rectification
        - *If you want to pull a patch panel forward from the front it is not easy when you have 2 x 12. If it is a 24 cable bundle it is easier to release some of the cable-ties and turn the panel 90 degrees to gain access*
- Every cable must be retained on the rear management bar individually with the nylon ties provided
- Poor dressing in the rear of mixed use racks can also lead to the cooling airflow being compromised



Management Bars and Rings





312 outlets in the space of 13U. With normal use this would be 19/20U.

- Best practice dictates that for every 2U of patch panels you must install a management bar to accommodate the patch leads
- The only relaxation of this rule is if high density angled products are used, such as the Excel Angled Jack. These dress the patch lead horizontally to the side management
- The use of HD Angled products can increase the capacity of a rack by as much as 50%

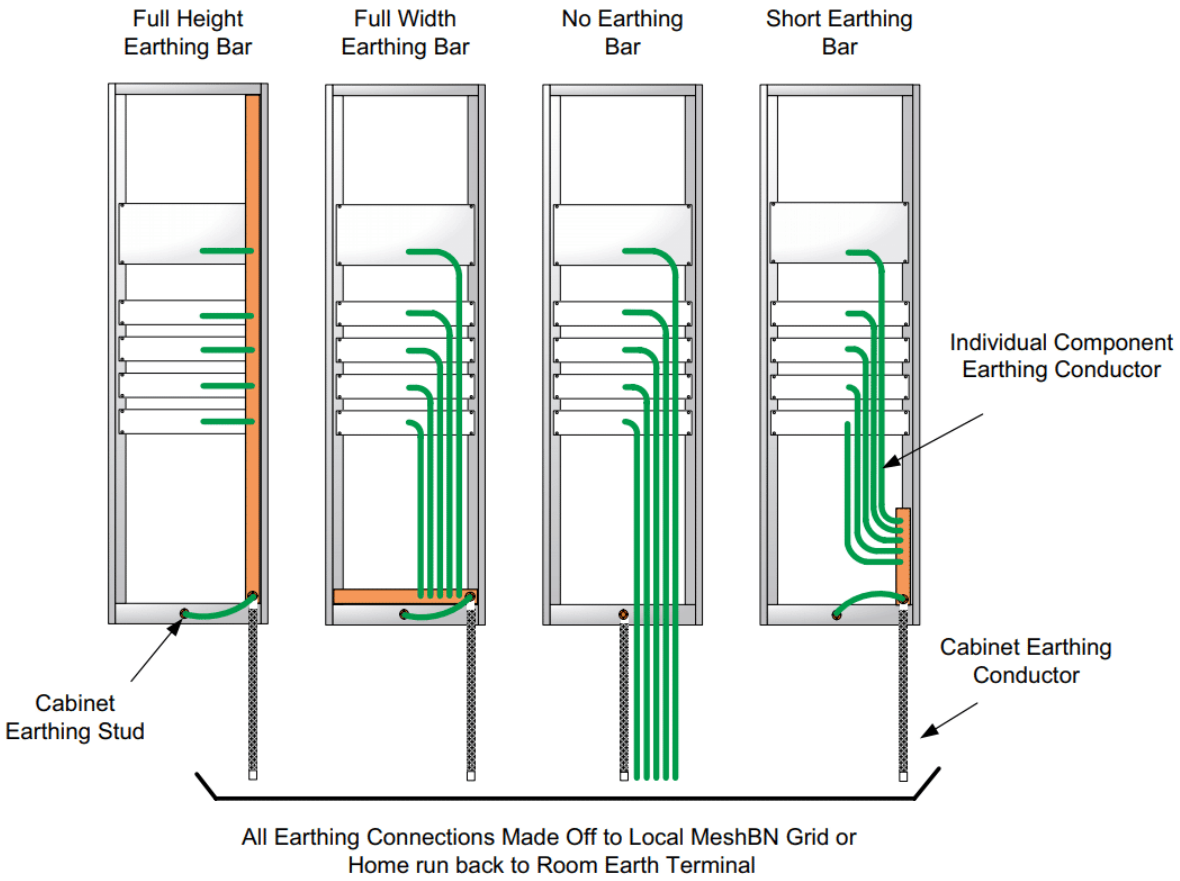


Cabinet Bonding

- There are two forms of bonding required within IT cabinets
    - Safety Bonding
    - Functional Bonding

- The former is typically provided by the Electrical Trade and comes by way of the electrical supply and the grounding system within the comms room, (TMGB) Telecoms Main Grounding Busbar, that is also to be provided The Electrical Trade
- The TMGB provides a clean route to earth for any spurious and harmful signals and is connected to the rack's earth stud
- Grounding and bonding of all IT cabling systems should be carried out in accordance with EN50174-2 and EN50310 standards
- Each component of the cabinet (panel, roof & door etc.) will have a separate earth stud. They should be connected to each other using the straps provided to the rack's earth stud
- Do not coil an earthing conductor around a screwdriver to make it look neat and tidy - you are forming a coil which can restrict the transmission of signals

- When installing a piece of equipment which requires a signal earth, always install the equipment, then attach the earth connection, then connect up the power
- Do not daisy chain earthing conductors; the only exception to this is where there is a run of metallic cable containment when each length must be grounded onto the next
    - Daisy chaining earth conductors runs the risk of all items downstream not being bonded if the link is broken to install new equipment and it is not connected back correctly



- This image provides options for rack earthing and bonding
- The first option is the most preferable and easiest to maintain
- The Excel option is to install a full height earth bar
    - The cost difference is minimal

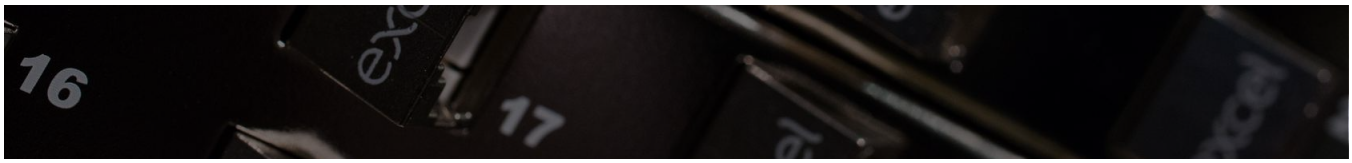
- All of these options connect to either the Mesh Bonding Network underneath the raised floor or directly to the TMGB

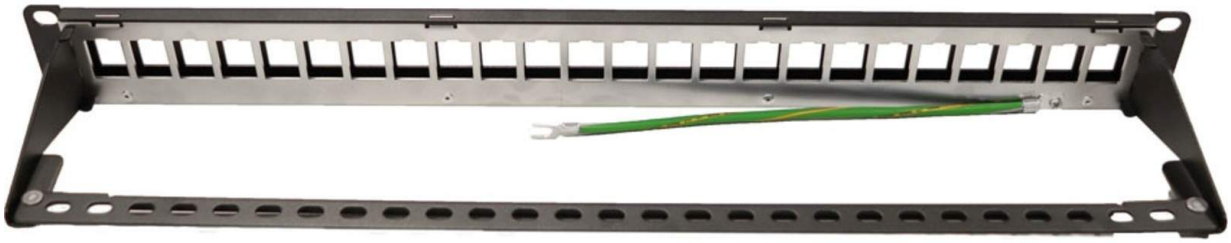
- Within the UK the specification for the rack earth connection is covered by **BS6701:2016 + A1:2017 Telecommunications equipment and telecommunications cabling specification for installation, operation and maintenance**
    - 5-2.2.4 Earthing of racks, frames and cabinets (to the TMGB)
    - Not less than:
        - 4mm2 for a rack ≤ 21U
        - 16mm2 for a rack > 21U

If the install is outside the UK, please check on your local requirements, however these values have been seen as consistent across the EU.



Screened Patch Panel Bonding





- Every screened patch panel should be bonded to the rack profiles. This is important for both safety and functional performance.
- Just mounting them on the profiles is not sufficient:

    - Many profiles are either painted or galvanised, which impairs the conductivity
    - The mounting point of the panel frame is powder coated

- They must be connected to the earth bar individually
    - Do not group or daisy chain them
    - Do not coil the attached lead

- Mounting the screened keystone jacks in the frame is sufficient as they are both chrome plated. You don't need to bond each jack.

> If there is no earth bar in the rack, use serrated/castellated washers between the panel frame and the profiles. When the screws are tightened they cut into the powder coating and the galvanised profiles to create the contact. Doing this needs to be clearly documented with evidence provided.

Lesson 4 of 4

The Environ Range of Racks

The full Environ range:



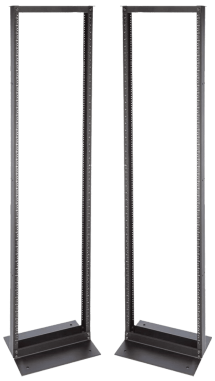
ER & CR Series
Equipment and Communications Racks



SR Series
Server Racks



CL Series
Co-Location Racks



OR Series



WR Series



RR Series

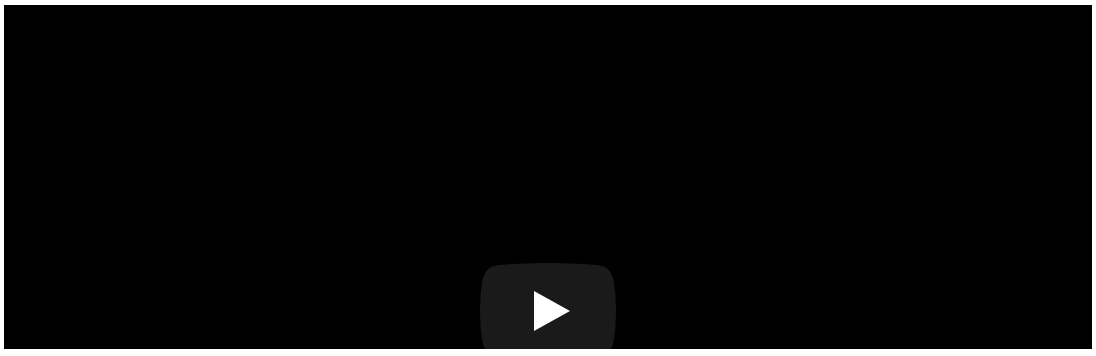
Open Racks and Frames | Wall Racks | Residential Racks and Enclosures

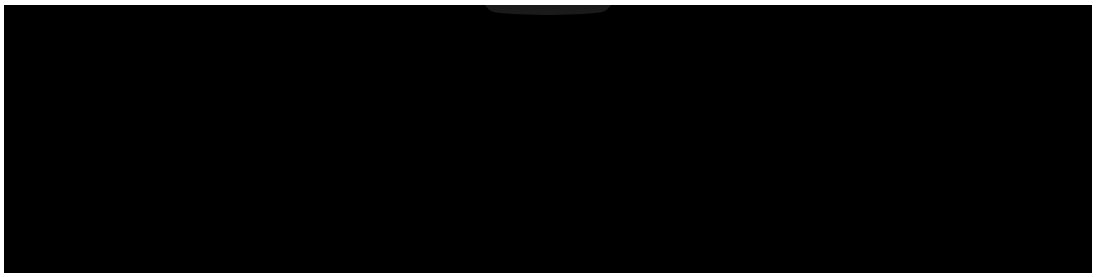
CONTINUE

CR Series

Suitable for everyday applications across the full spectrum of vertical markets.

- The CR and ER have a common chassis and a number of the same features
- Black or Grey-White
- 600Kg load capacity
- 600mm or 800mm wide
- 600mm, 800mm or 1000mm deep
- 15U, 20U,24U, 29U, 33U 42U or 47U height options available.
- Solid Glass Front and solid metal rear door.
- They are intended for housing minimal active equipment, due to the lack of ventilation
- Whilst they can house active equipment and can be fitted with fan units in the roof, they are primarily intended for the passive cabling components

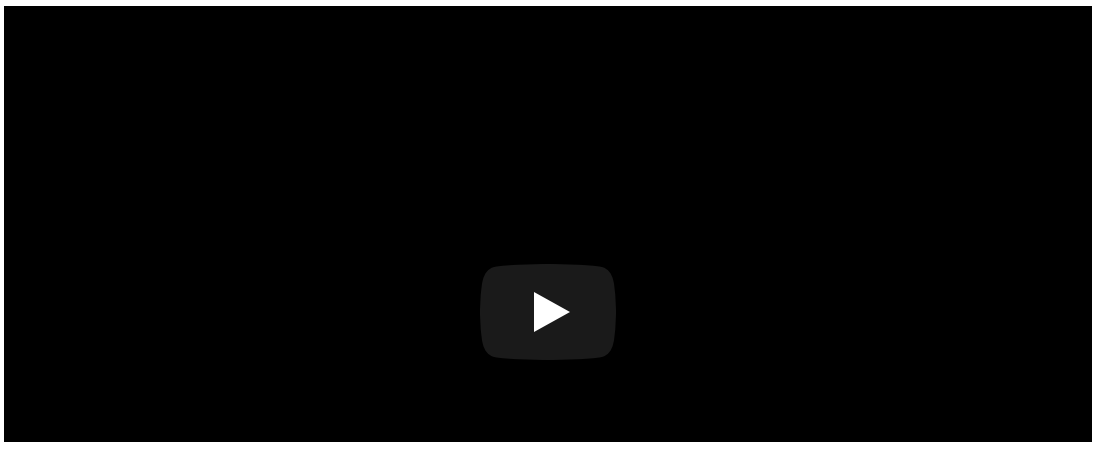


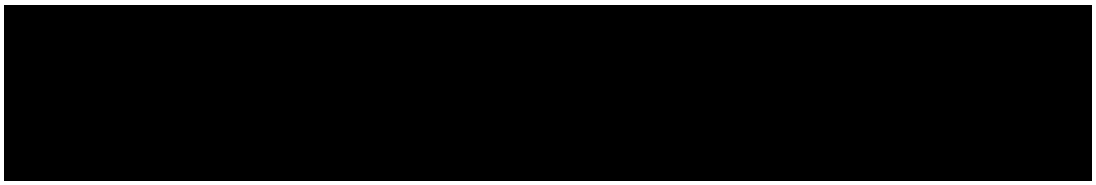


ER Series

Suitable for everyday applications across the full spectrum of vertical markets.

- The CR and ER have a common chassis and a number of the same features
- Black or Grey-White
- 600Kg load capacity
- 600mm or 800mm wide
- 600mm, 800mm or 1000mm deep
- 29U, 42U or 47U height options available.
- 70% wave vented front door and wardrobe rear doors
- Wardrobe doors are split 50/50 and are designed to allow the ease of installation of active equipment from the rear





SR Series

Suitable for applications that require a large number of servers and equipment.

- Designed to house a large amount of servers
- Black or Grey-White
- 1300Kg Load Capacity
- 600mm or 800mm wide
- 1000mm or 1200mm deep
- 29U, 42U or 47U height options available
- 70% wave vented front door and wardrobe rear doors
- High Density Vertical Management (800 wide only)
- Split side panels, to make it easier for removal
- Bespoke configurations are also available, each one is also has casters and jacking feet to allow easy movement to final location



CL Series

Suitable for applications in a shared facility where enhanced security is paramount.

- Designed specifically for shared environments where a secure location is need for different users
- Black or Grey-White
- 2 or 4 compartment options as standard
- 600Kg Load Bearing
- 42U or 47U height options
- 600mm or 800 mm wide by 1000mm deep
- Combination lock and unique keys for each compartment
- Removable side panels
- Secure segmented vertical cable management to each compartment
- These cabinets have been used by flexible office providers, where they have a number of tenants sharing the floor of a building each one wanting to house their own servers and switches



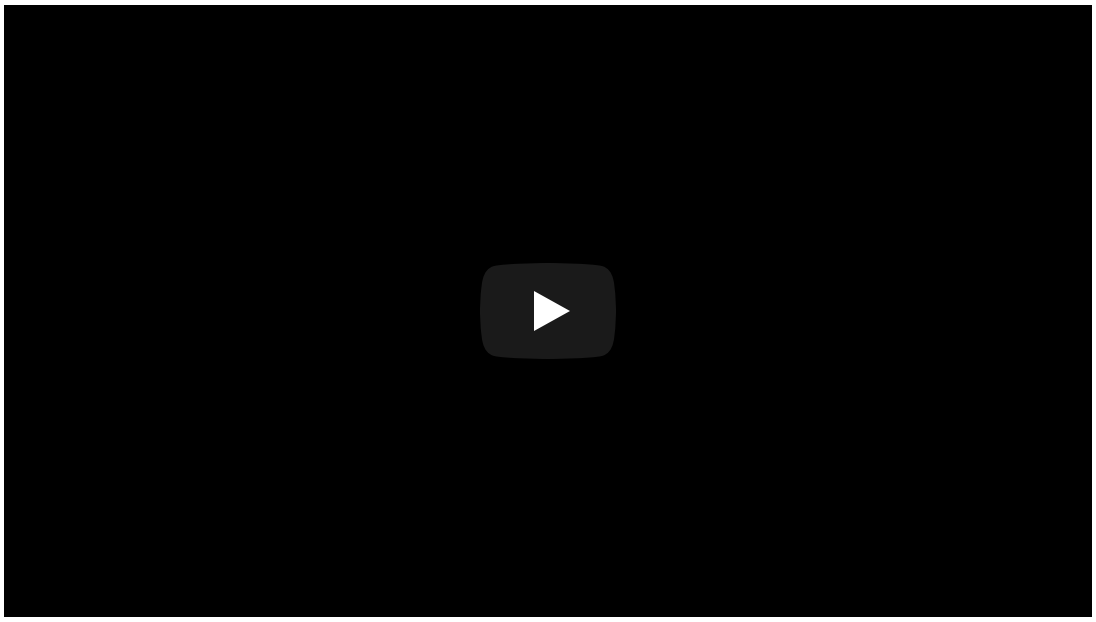
OR Series

Suitable for high-density patching applications where strong cable management is critical.

- 2 Post Open Frames are very popular for housing patching fields within a comms room
- Reduced footprint required, saving valuable space
- Ideal for high density environments
- Not designed for active equipment
- 1500Kg static load bearing
- Has M6 threaded screws rather than cage nuts
- 42U , 48U and 52U heights available
- 150mm, 300mm and 380mm wide vertical side management available, each one with lockable front doors
- Kit available to convert into 4 post frame

It is common to see 2 or 3 of these frames together in a row. When that is the case it is recommended to have the wider vertical management between the frames, with the smaller sections at each end of the

row.
The application of the 4 post frame version allows for a large amount of patching to be contained within a small space when it may no be possible to get two side by side within the room.
Whilst not intended for active equipment some clients have mounted a small number of switches in them particularly when in the 4 post configuration.



WR Series

Suitable for smaller-scale applications that do not require large quantities of equipment.

- 63Kg load bearing
- 390mm, 500mm or 600mm depth
- 6 heights (6U,9U,12U,15U,18U,21U)
- Black or Grey-White
- Glass Front Door
- Lockable quick release side panels
- Fully assembled or flat-packed

- One man installation
    - Template provide for holes to be drilled
    - Mount rear panel on the wall
    - Then assemble the other panels onto the rear panel

Note: Ensure wall surface is even when mounting to avoid distortion of the wall rack and door functionality



RR Series

Suitable for applications where space is limited, and installation access is restricted.

- Multifunctional
- Sturdy Metal construction.
- Designed for both Copper and Fibre Installations as well as AV equipment.
- Wide range of sizes and configurations
- Versions suitable for Risers, Equipment Rooms and Dwellings



Environ Accessories

There are a wide range of accessories available including:

- Shelves
- Plinth Kits
- SR Anti-Tilt Kits
- Combination Locks
- Roof Mount Fans Trays
- Blanking Panels
- Cable Tray
- Earth Bonding Kits and Bars
- Vertical Management
- A complete range of Power Strips, including intelligent

More information online

For full information about each Environ Rack family, please visit the Excel website.

VISIT WEBSITE