

Qualified Partner Programme QPP

Installation Practice

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Convincing cabling solutions

Why installation quality

- Product performance must be preserved by an accurate installation
- Long term warranty requires design integrity to assure performance during the whole operational life of the cabling.
- Standards cover installation practice.
- New cabling categories have performance very close to limit of the hardware; margin for errors do not exist anymore.

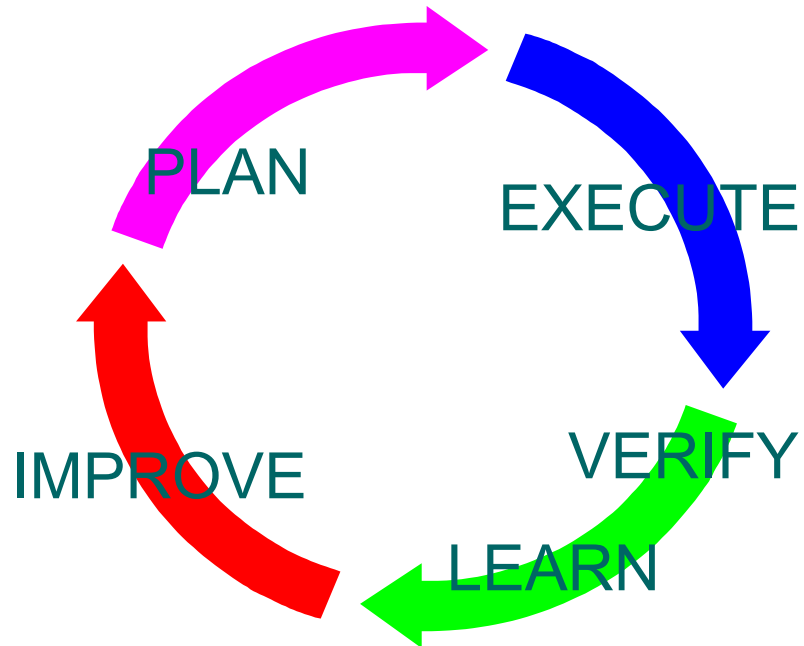
EN 50174

It is recognised that the cabling Installer, operating a quality assurance system in accordance with EN/ISO 9000 series has a common approach to all installation projects



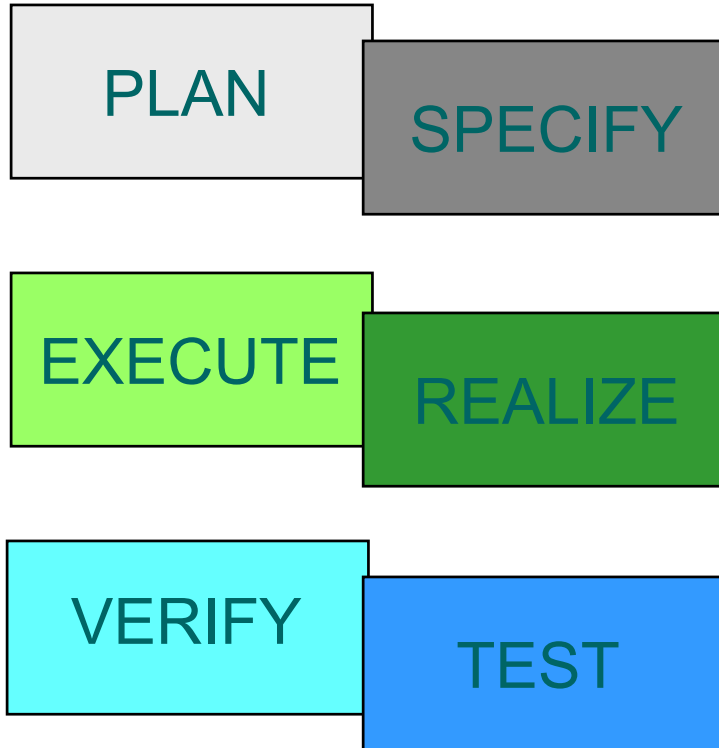
- Compliance with ISO 9000 is not required but suggested
- Consistent approach to cabling is the way to assure quality to customer
- Quality is the signature of the installer and manufacturer
- Quality comes from a structured and ordered approach to the work

EN/ISO 9000



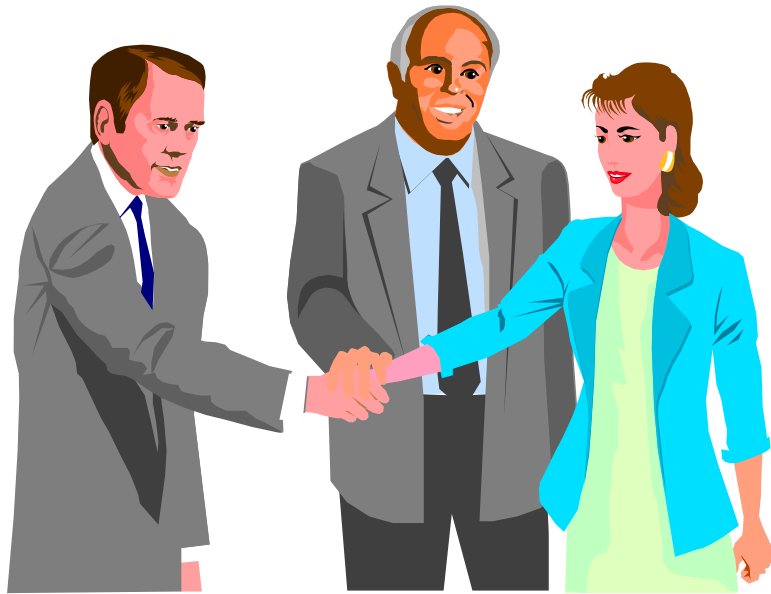
- Quality means continuous improvement process
- Improvement is achieved with learning
- Learning is changing as result of experience
- Experience is the way of capitalizing on errors

The approach



- Cabling installation is part of whole IT project
- IT project will specify cabling requirements
- Installation must be regulated by its specification
- Specifications should cover from planning to test

Installation specification



- Agreed between customer, designer and installer
- Subset of I.T. project specification
- Covering all aspects of cabling
Installers job from planning to consignment including contractual aspect and possibly maintenance.

Planning

- Understand the **PURPOSE**
- Know all elements
- Outline working plan
- Verify it on site
- Document



Logistic



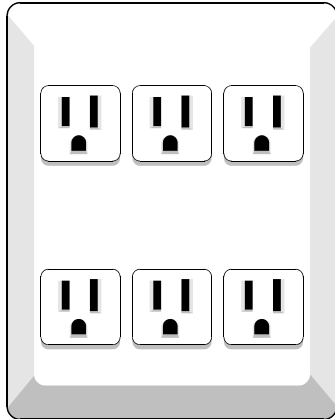
- Parts procurement
- Receiving inspection
- Storing with relative operations
- Move to working area

Safety

- Safety and legal have priority
- Safety is your and your people protection
- Safety precautions are not signs only
- Safety has people as subject to prevent them becoming victims



Safety site premises



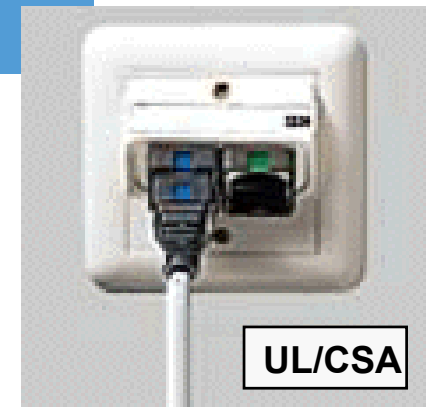
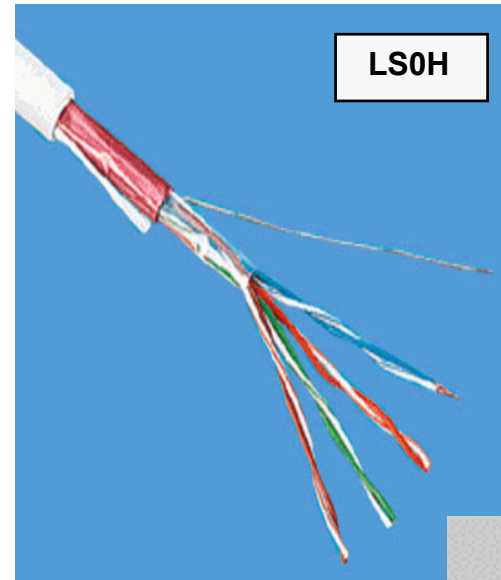
Four categories of exposures are present during the installation:

- Mechanical
- Chemical
- Electrical
- Fire

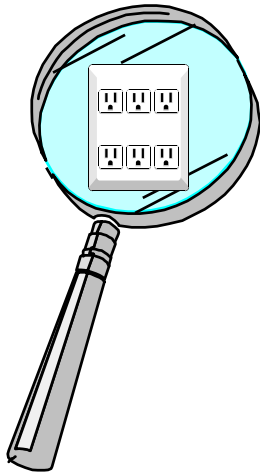
These exposures are related to the premises as well as cabling

Safety cabling components

- R&M cabling components are **SAFE**, as material and performance
- Comply with most stringent European and American norms
- To be used for the specific purpose of cabling



Safety electrical



Protective earthing, grounding and bonding

- Analysis of the building

Protective earthing evaluation

- Measurements and physical verification

Bonding structure decision

- Based on protective earth evaluation decide which bonding structure to adopt for cabling design

Safety optical

Two main cause of exposures:

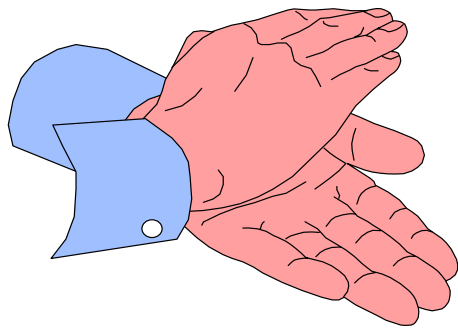
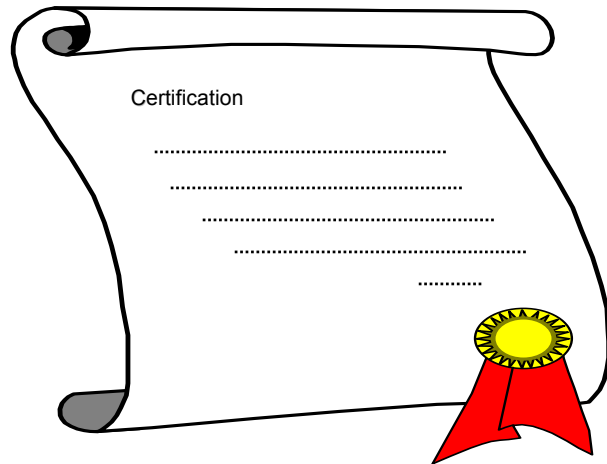
Laser light

- Usage of protected components
- Installer practice

Mechanical

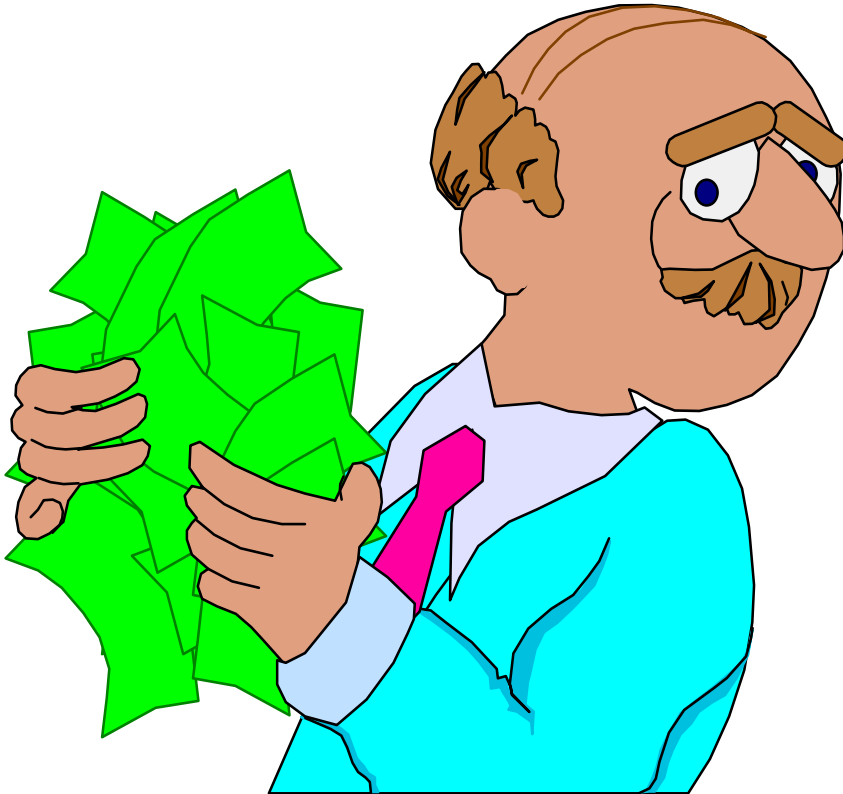
- Skin abrasion/intrusion
- Usage of chemical
- Proper disposal of consumable/debris

Quality assurance



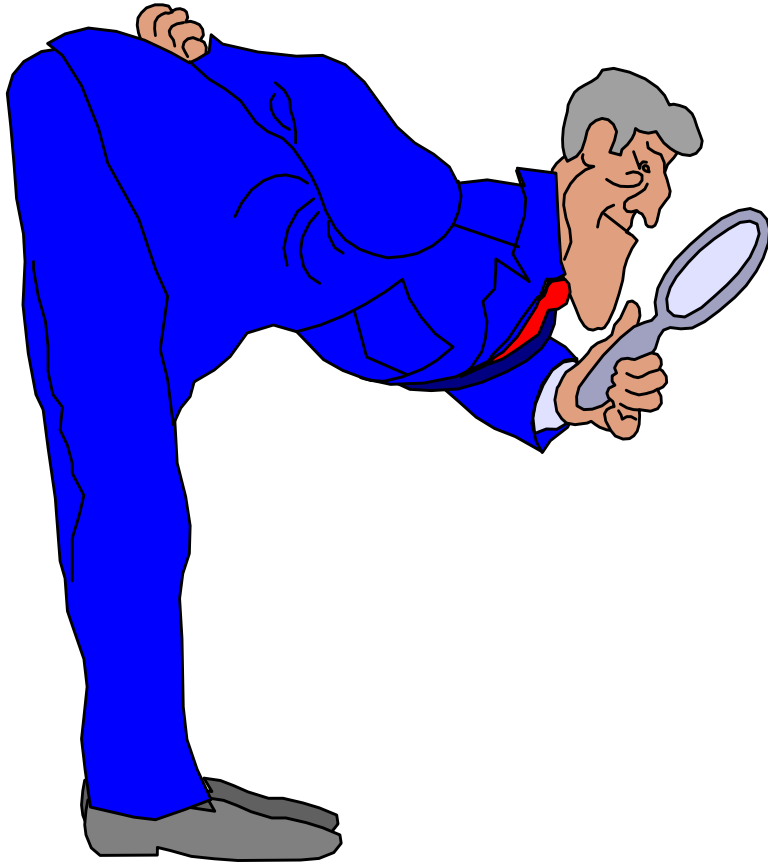
- All activities to guarantee that customers objective is met
- Involve components, building, people, contract, job, tools.
- Establish criteria for consignment

Administration



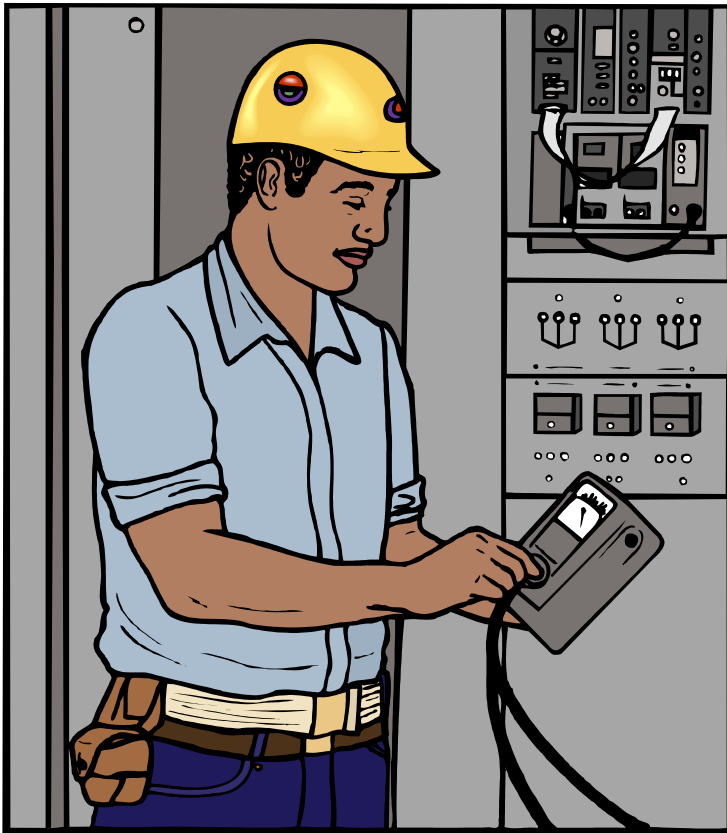
- Continuous changes and relocations require perfect knowledge of network users
- Manual or automatic generation of network plans are the must for the IT administrator
- Methodology and naming convention to be consistent with customer building identification
- All cabling elements to be identified/located

Testing



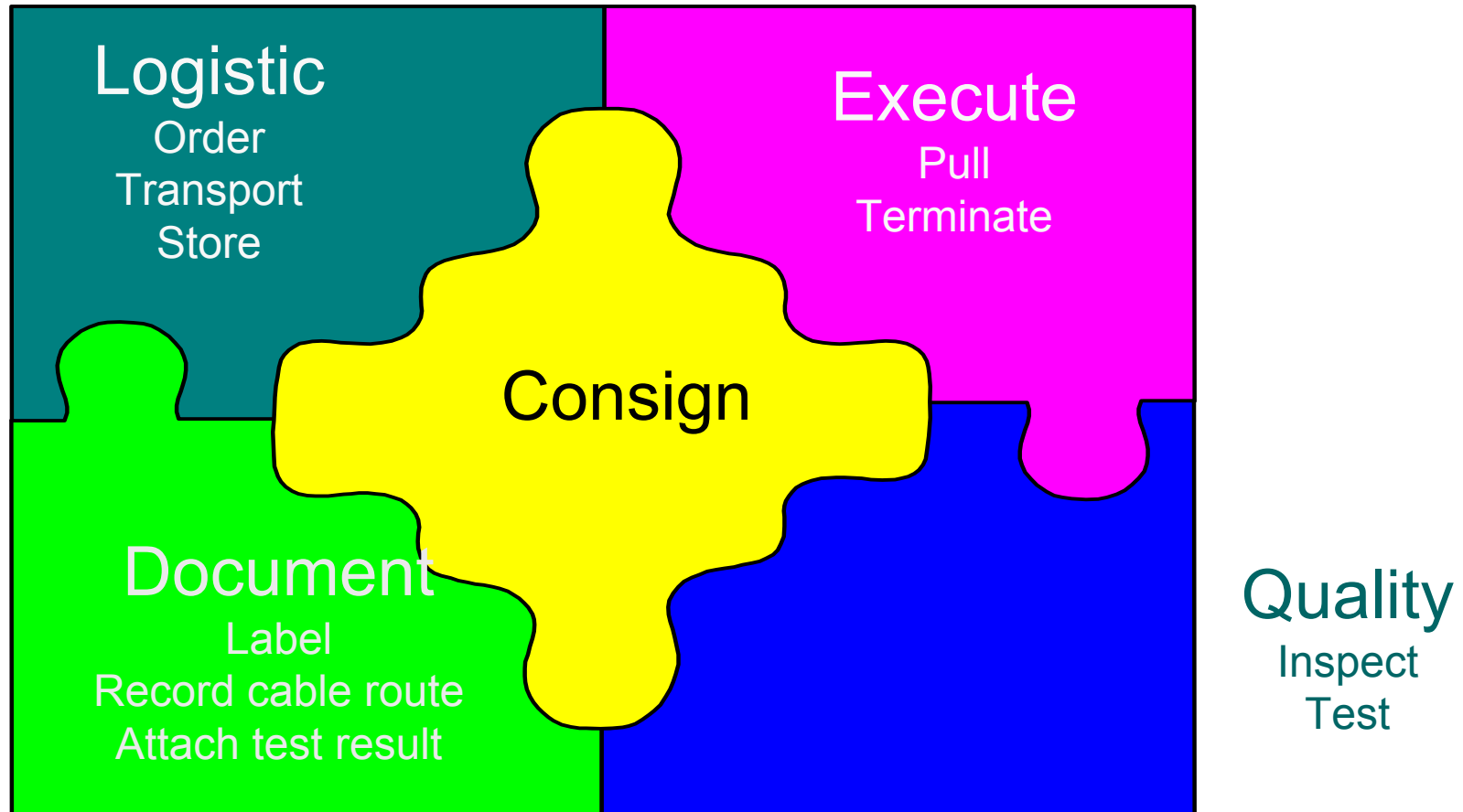
- Testing section to cover purpose, subject of testing, methodology and tools
- Inspection criteria definition
- Link certification, channel certification, limits to be synchronized with IT installation test and cabling producer
- Corrective action to be planned

Maintenance



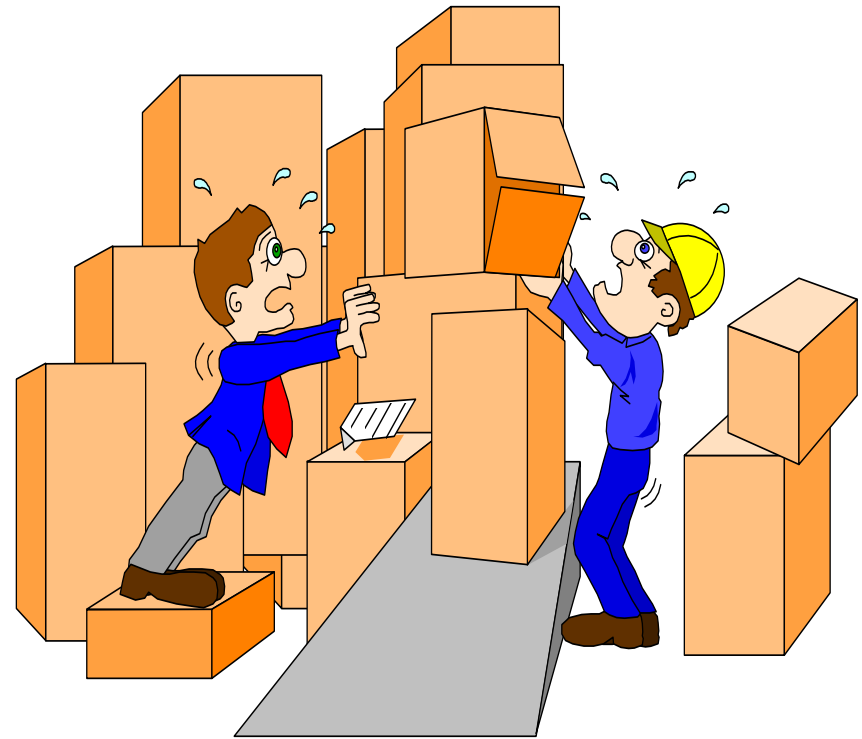
- Preventive maintenance
- Reactive maintenance
- Cabling components do not require maintenance
- To be covered as per customer request

Installation practice



Installation

- During transportation do not expose cabling material to pressure, strokes, environmental agents which visibly give damage to packing
- Store in dry place, indoor and with original packing. Should this be removed, do not expose to sunlight. Bringing material from cold to hot place, maintain packing material and allow temperature to set and eventually moisture to dry-out.



Installation

- Cable can be installed only once!
- Horizontal cable must be used only indoor. In dry room and away from corrosive chemicals.
- Horizontal cable is not supposed to be exposed to rodent animals.

Installation temperature

0 °C to 50 °C

Operating temperature

-20 °C to +60 °C

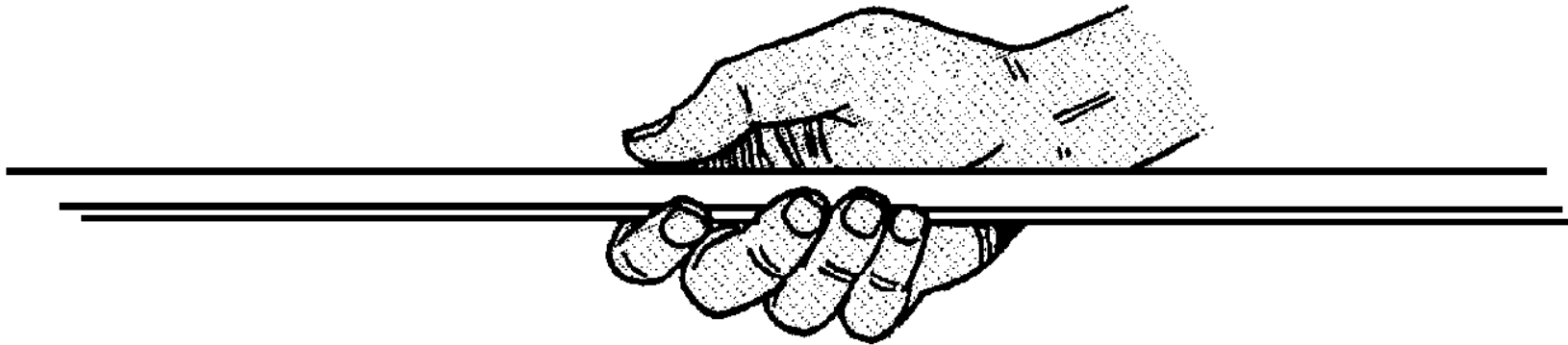
Installation

- Horizontal cable is not intended for carrying electrical power or sustain mechanical loads.
- Horizontal cable is supposed to maintain jacket as much as possible
- Horizontal cable is intended to be used according to specifications and applicable standards

Installation

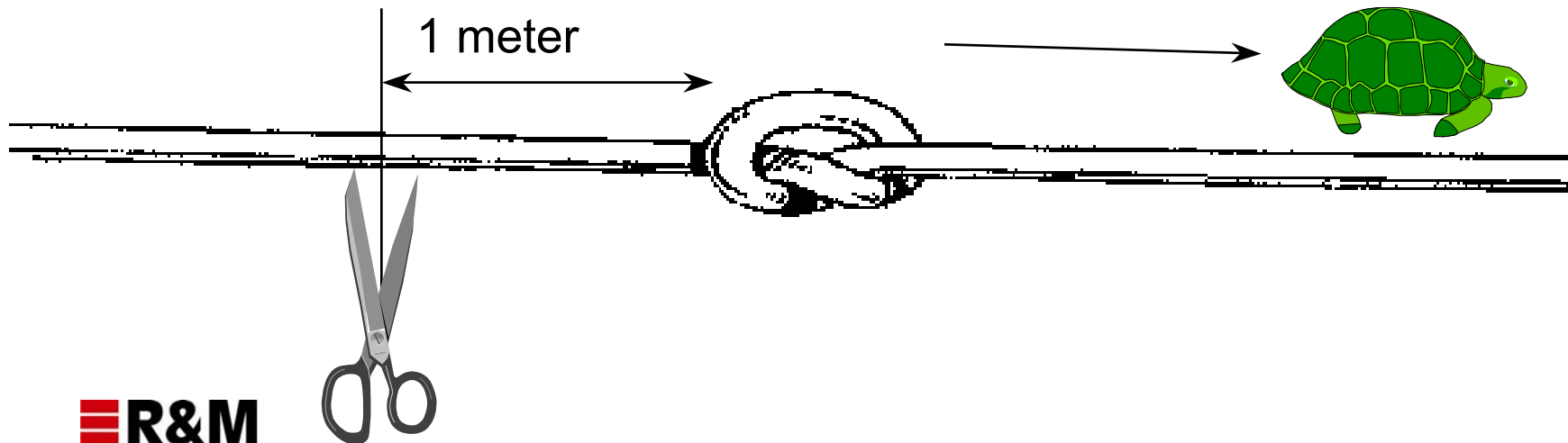
Cable is not supposed to be pulled but to be laid down! However

- Cable pulling by: hand
- Pull continuously with same force
- Never exceed max. pulling force
- Do not kink



Installation

- Cable pulling by: knot
- Never exceed Max pulling force (see data sheet or catalogue)
- Pull slowly, continuously and with same force
- Do not kink
- After pulling remove 1 m before knot



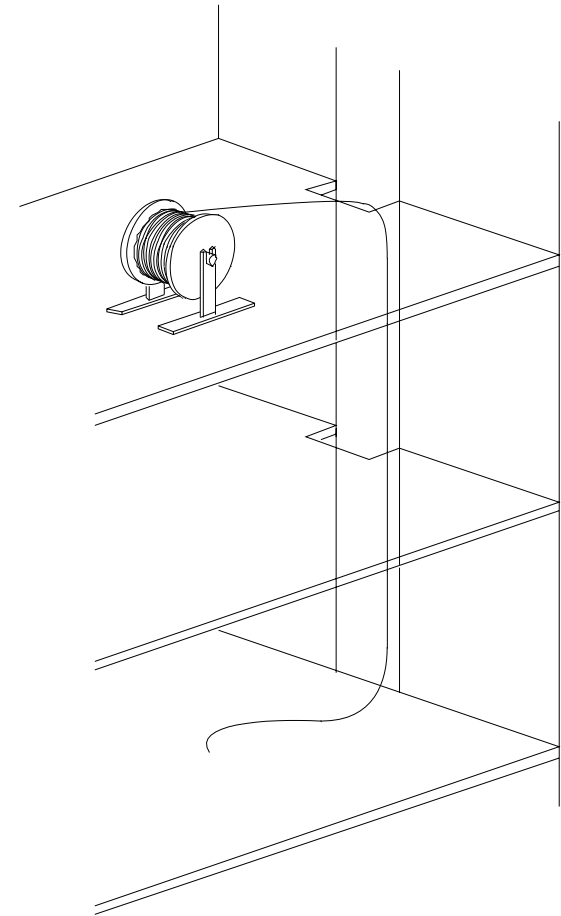
Installation

- Cable pulling by: tool
- Never exceed max. pulling force
(better using fused rods)
- Pull continuously with same force
- Do not kink
- Force spread on large area



Installation

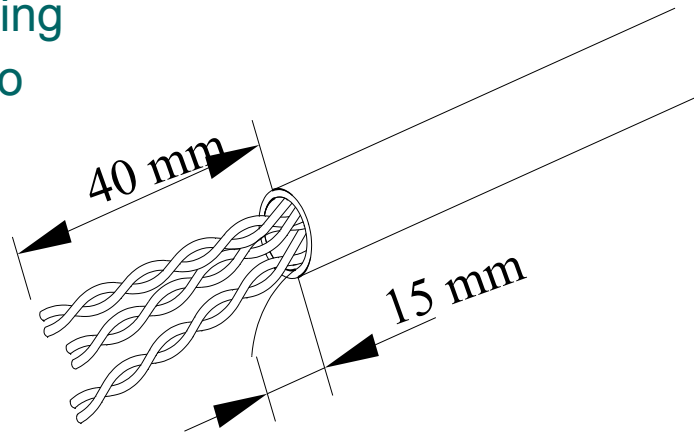
- Backbone cables:
 - Multipairs/ four pair
 - Fibre optic
- Not pulled but possibly lowered
- Fixed at least every floor by straps or positive fastening
- Allow weight relief loop at every other floor
- Never install in elevator rooms or too close to power installation
- Never fill conduit for more than 70%
- Maintain fire barrier at each floor



Installation

Cable preparation

- Pull cable outside the wall or panel for a length of 20-25 cm
- Remove jacket for **10 cm** by using cable stripper and caution not to damage insulation

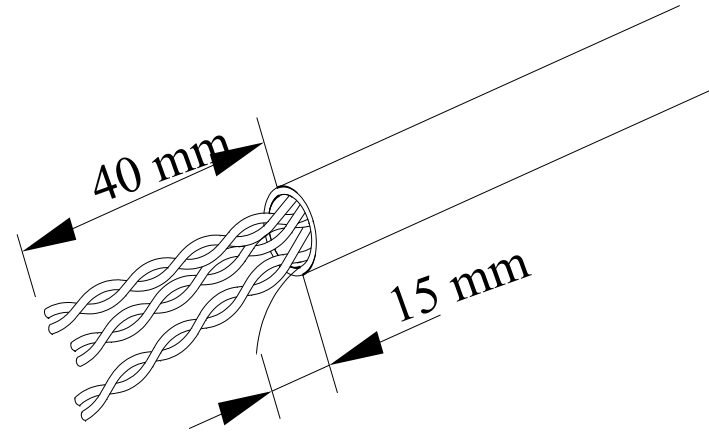


Cat. 6 proposal to reduce by 50%

Installation

Cable preparation

- Prepare pairs in the sequence indicated on the module
- Trim pairs for a length not exceeding 40 mm:
 - Leaving maylar tape and drain wire for FTP cable
 - Removing all for other cables
- Be careful not to untwist and keeping coloured wire together with its white pair.



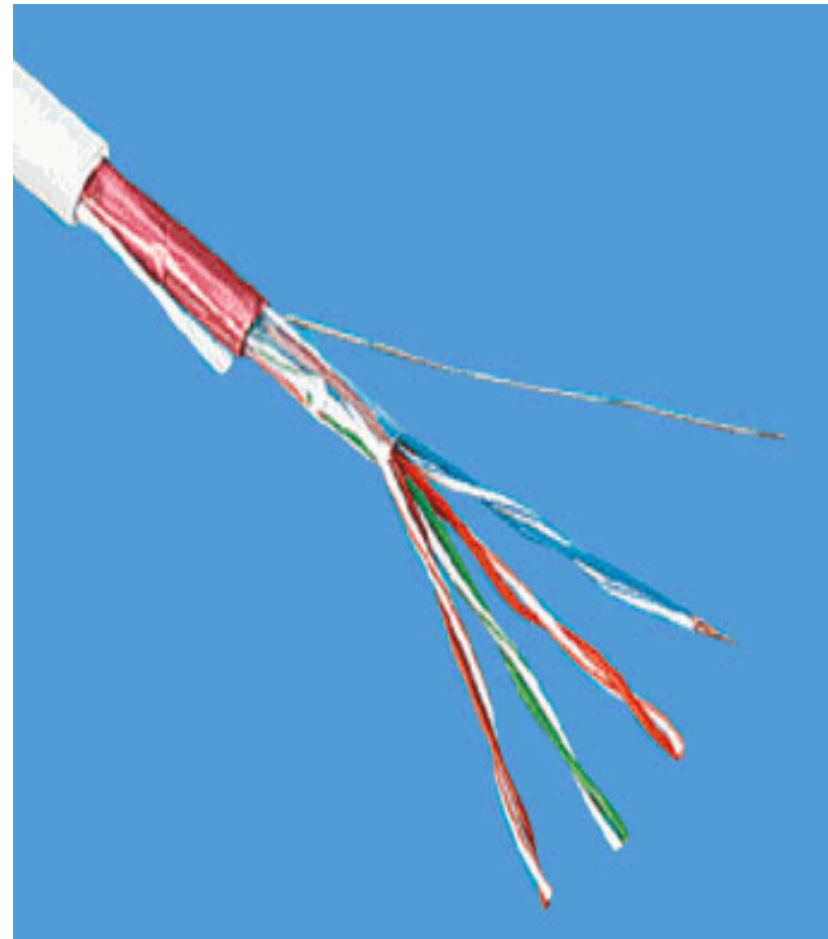
Cat. 6 proposal to reduce by 50%

Installation

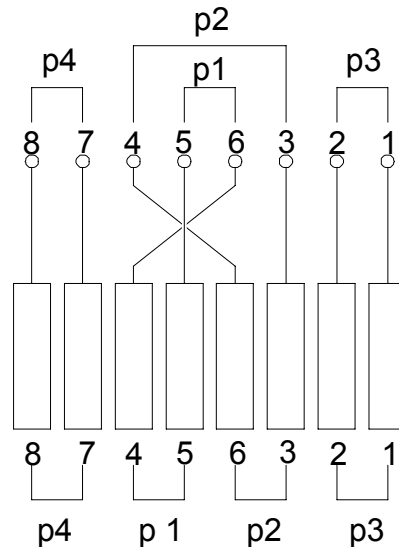
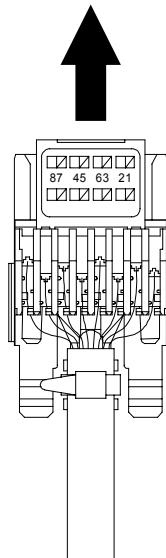
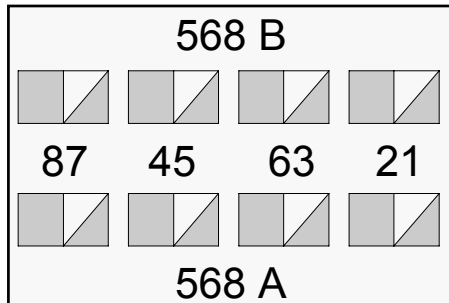
- Module termination is the operation that if completed in a wrong way destroys most of the electrical characteristic of the link
- R&Mfreenet jack has been design to facilitate the operation and to give as less opportunities for error as possible
- Before proceeding to copper cable termination, you must identify carefully the elements of the cable mainly on the screened ones:
- The foil and its conductive side
 - The drain wire that is running along and in contact with the conductive side of the foil
 - The braid in case of S-FTP or S-STP

Installation

- Conductive part of foil is silver coloured, insulated is red or blue
- Mylar tape is of insulated material
- Drain wire runs between conductive part of foil and maylar tape
- R&Mfreenet jack bayonet must be inserted between drain wire and conductive part of foil (FTP) or between foil and braid (other screened



Mounting connection module 4xRJ45u/s



Pin assignment

Colour Code: 568 A

- Pin 1: green / white
- Pin 2: green
- Pin 3: orange / white
- Pin 6: orange
- Pin 5: blue / white
- Pin 4: blue
- Pin 7: brown / white
- Pin 8: brown

Installation

QUALITY



- Inspect
 - What
 - Criteria
- Test
 - Link
 - Certification

Inspection

What?

- the cable route for proper workmanship
- cable laying and pulling
- cable fixing and bending
- damaged caused at site property during cable pulling/fixing
- restoring fire barrier and safety/security installations
- cable complete and correct labelling

Inspection

Criteria

- Sample check of 5% all terminations on panel side
- Sample check of 5% of all terminations on the Terminal Outlet side
- If error is found, increase sample to 10%
- If additional errors are found during second pass check, then inspect 100%

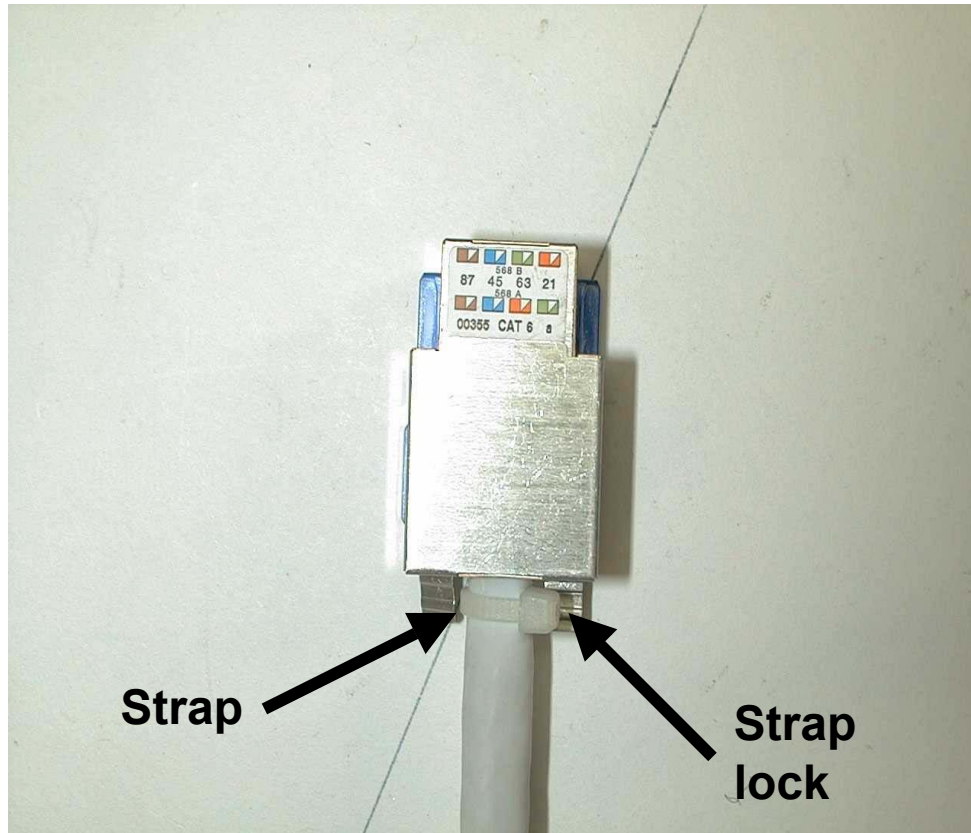
Inspection

Criteria

- Check cable jacket removal < 40 mm for Cat 5e and < 20 mm for Cat 6
- Check pair untwisting < 13 mm for Cat 5e and Cat 6
- Cable bending radius < 8 times cable diameter
- Cable fastening (connector, panel, cable bundle) not too tight (cable should still move after fastening)

FILL UP CHECK LIST !!!!!

Fastening cable to connector



Fastening cable:

- Do not tighten too much to deform cable.
- Strap should be free to rotate with minimum force applied
- Strap lock to be placed underneath the connector cable plate (not as shown in the picture)

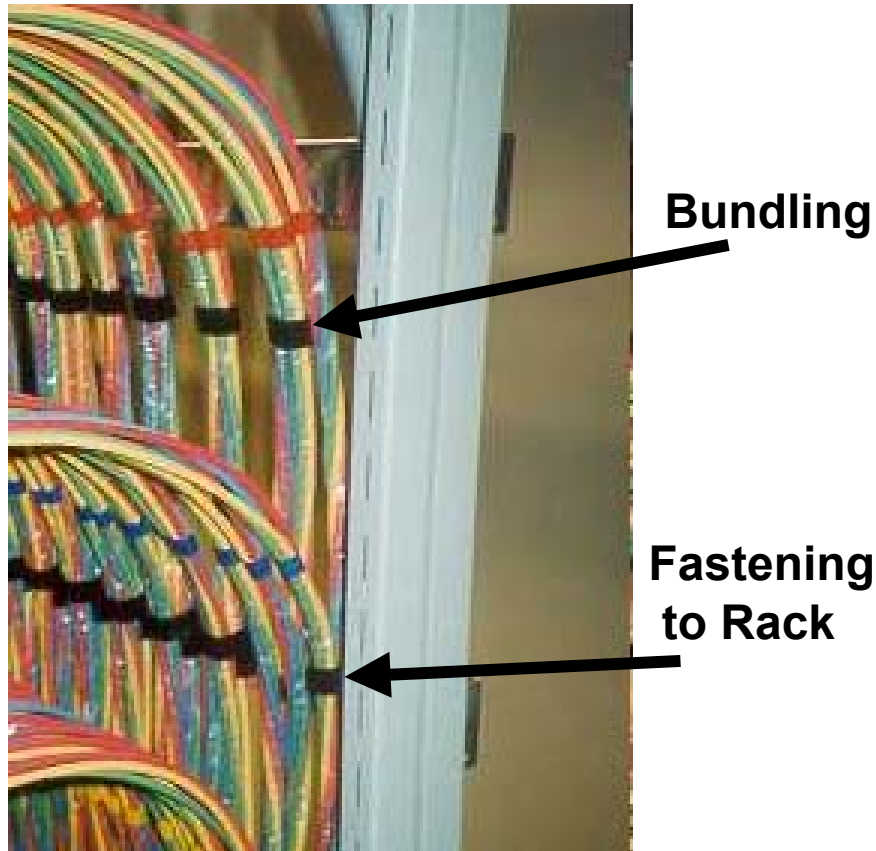
Fastening cable to panel



Fastening cable to panel:

- Do not tighten too much to deform cable.
- Strap should be free to rotate with minimum force applied
- Strap lock to be placed underneath the connector cable plate (as shown in the picture). To do this, first lock the strap, then cut excess length, last rotate 180° with minimum force the strap.

Fastening cable, bundling the cables



Fastening and bundling:

- Do not tighten too much to deform cables.
- Strap should be free to rotate with minimum force applied
- Note large bending radius

Inspection

What?

- the cable termination for manufacturing instruction
- cable management inside the rack and outlet
- complete identification and labelling
- grounding as per design instructions and manufacturers recommendations

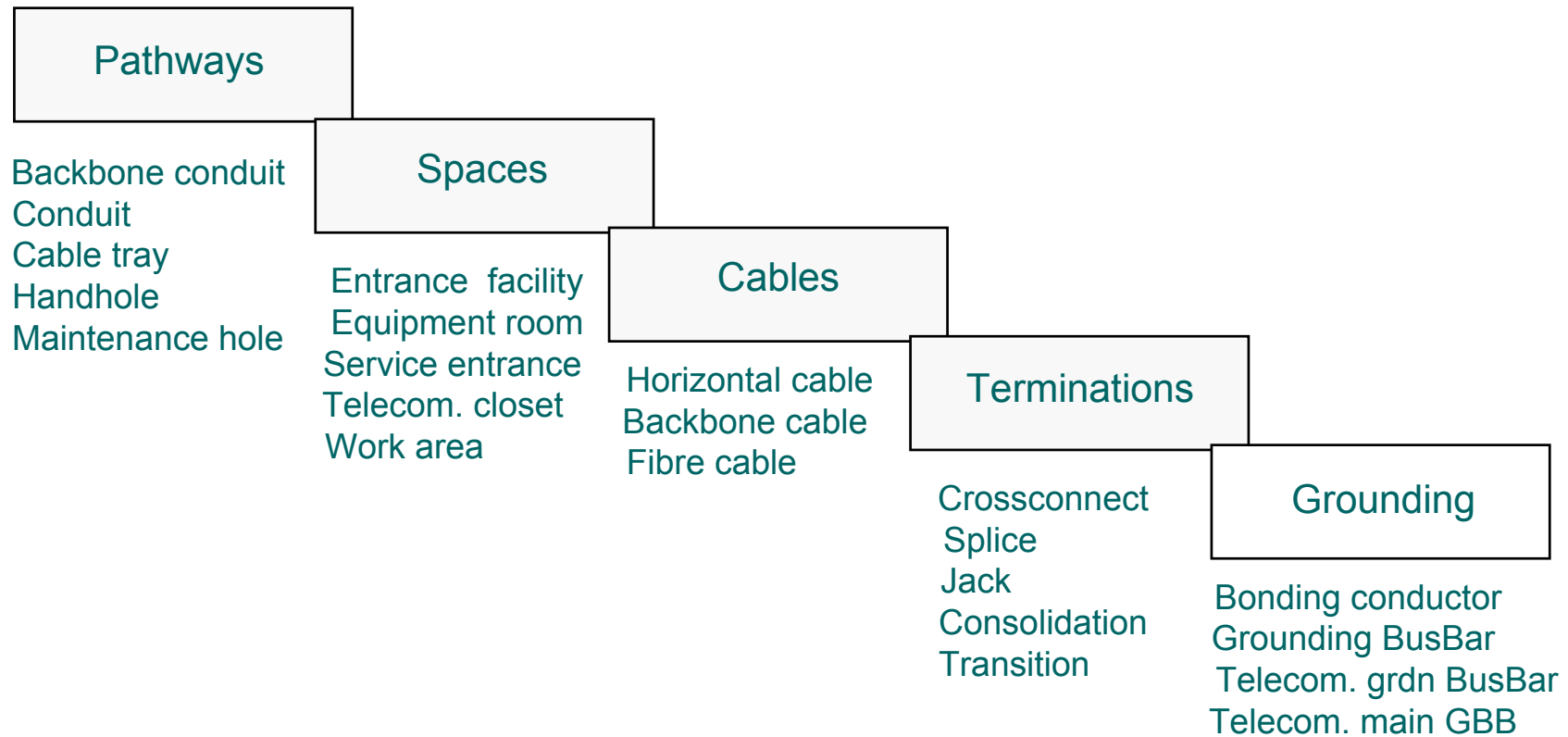
Installation

Labelling

- Labelling means identify by means of a naming convention all elements of the cabling.
- Naming convention may vary depending on:
 - Customer special requirements
 - Local rules
 - Building planner
 - So far only EIA/TIA regulated, ISO in process to include
- Identification must be positive, unique, containing to/from information

Installation

What to identify



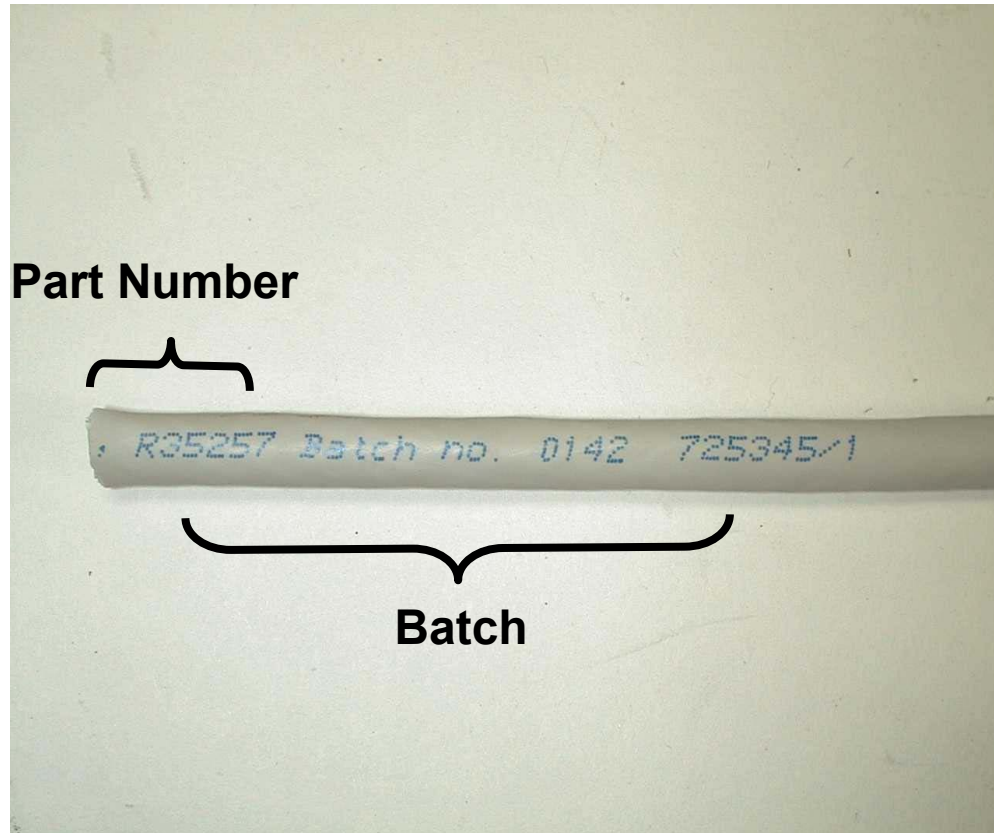
Claim and problem reporting procedure

Should any problem arise that need R&M attention, CLAIM FORM must be filled and sent to R&M Customer Support

Warranty Claims must be mandatorily communicated through CLAIM FORM

- CLAIM FORM must be filled in any part
- Parts must be identified by Part Number and Lot code

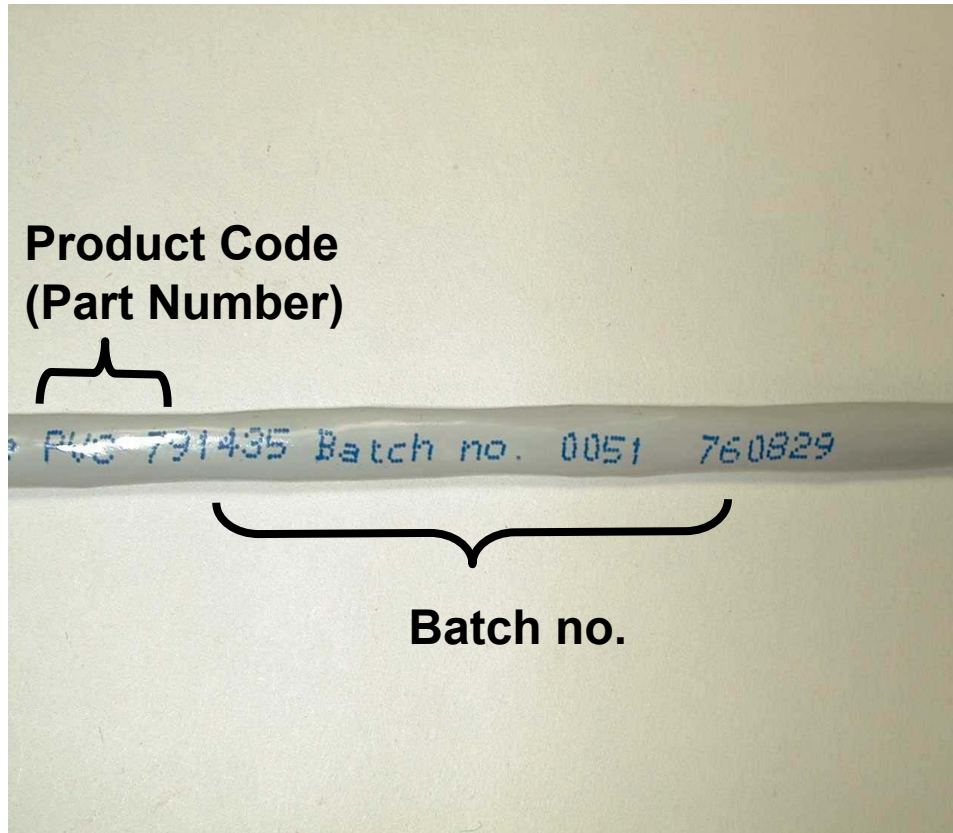
Cable Identification



Picture shows:

- R35257 = Part Number
- Batch no. 0142 725345/1 = production date and production lot number
- Both are blue ink printed

Patch Cord Identification



Picture shows:

- 791435 = Product code (product Part Number) **Not required**
- Batch no. 0051 760829 = Patch cable production identification
- Both are blue ink printed

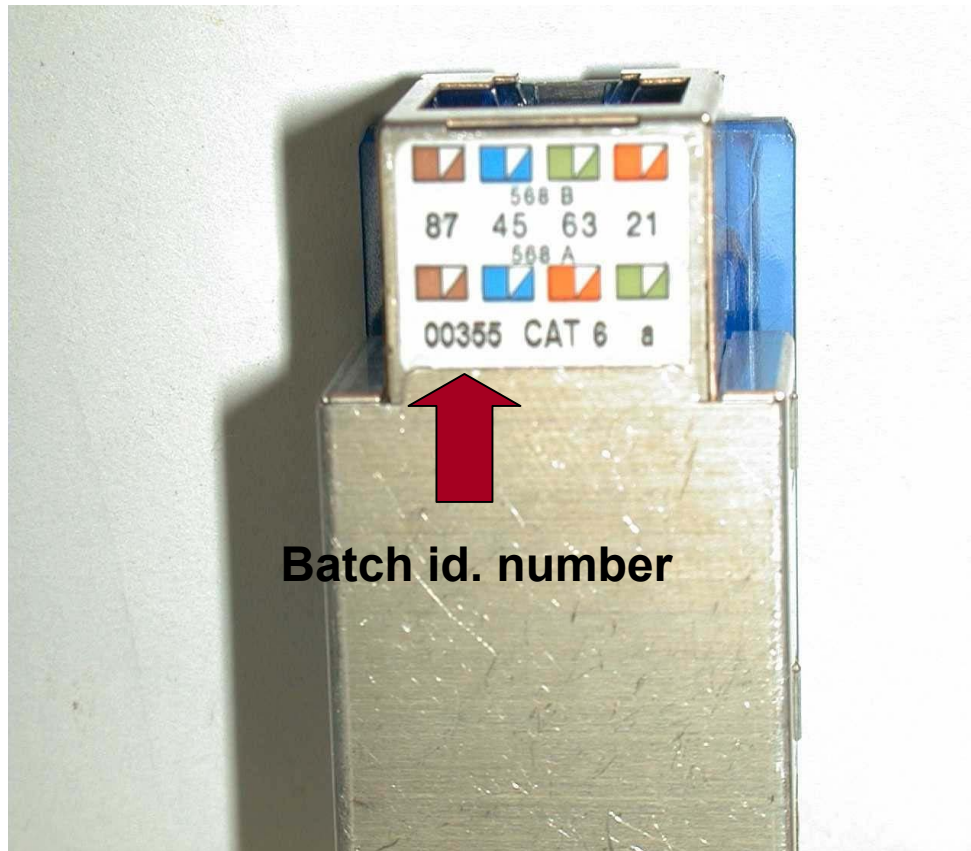
Patch Cord Identification



Picture shows:

- 205256 = Mfg number (Manufacturing number) **Required**
- This number identify patch cord assembly and testing and is blank ink marked

Connector Identification



Picture shows a connection module with red arrow pointing to:

Product batch identification number