IFIB Number: **IFIB-SACT-ACT-19-37**

Reference: **Q&A #3**

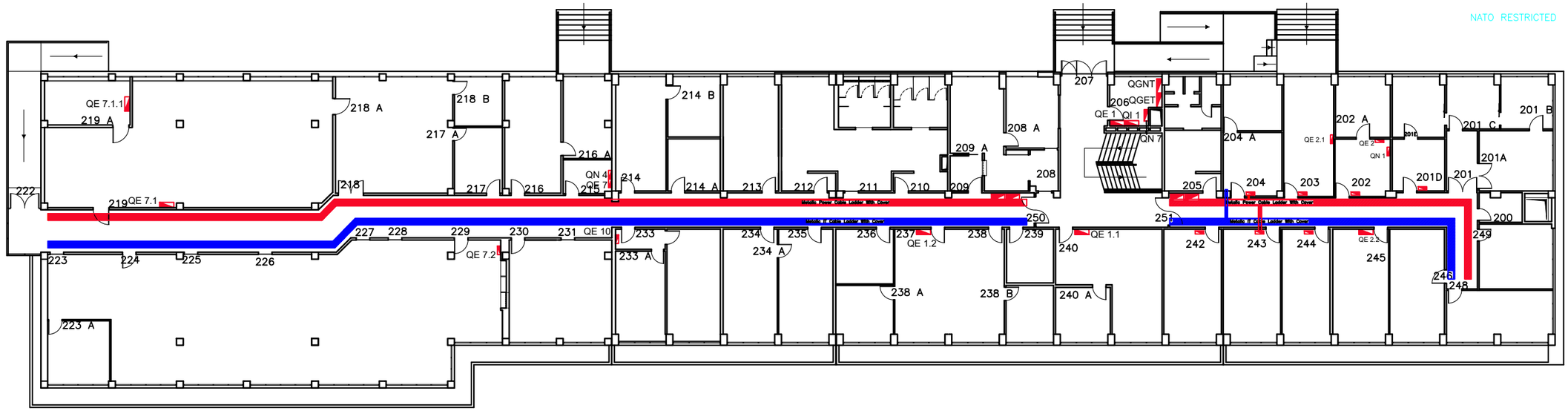
Date of Issue: **2 Aug 2019**

The following questions were raised with respect to subject IFIB/RFP. Responses are to provide clarification.

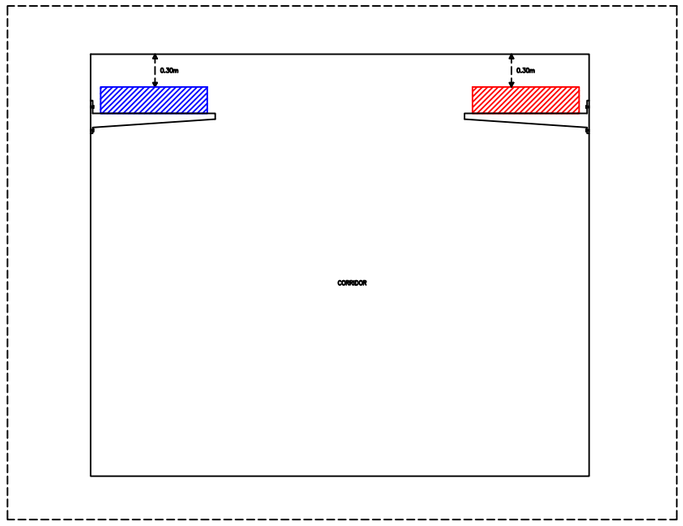
Question	Response
1. **We were told during the June survey that you wanted nothing suspended from the ceilings of the halls and corridors and not even in the middle of the walls. We could only install tray or plastic pipes on the wall by the ceiling or by the floor. Is it to do as it is in Modification #1 (metal suspended rails) or we keep what we were told in the survey ?**	The metal trays mentioned in the modification #1 are incorrect and should be against the wall. We would like the following specifications done: Cable Tray Layout V2.pdf - drawing with the position of the conduits in the corridors. The tray is the same (metal with cover) and the instalation is in line with the information provided during the site survey (in a stay against the Wall). Duct Layout_1.pdf - drawing with the position of the conduits in walls with Windows. The instalation is in line with the information provided during the site survey (the network cables and power cables separeted into two diferente conduits). Duct Layout_2.pdf - drawing with the position of the conduits in walls without Windows (the network cables and power cables separeted into two diferente conduits). Electrical Philosophy V4.pdf - document updated according to the info provided on the drawings. No changes, only ajustments.

Cable Tray Layout V2.pdf

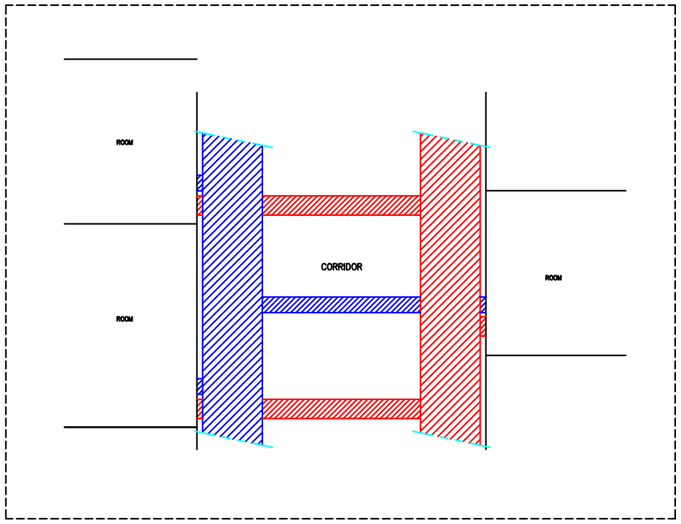
NATO RESTRICTED



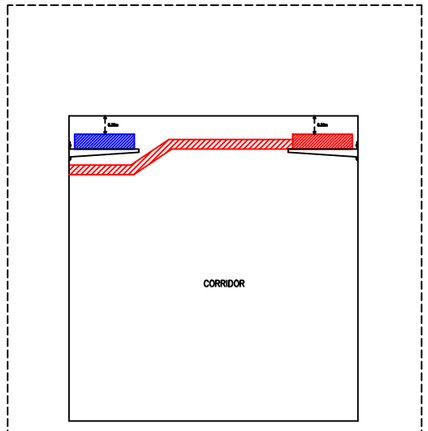
FRONT VIEW



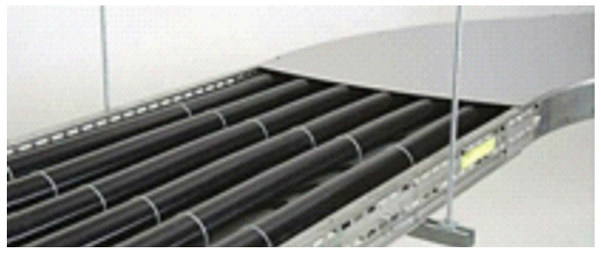
UP VIEW



FRONT VIEW CROSSING



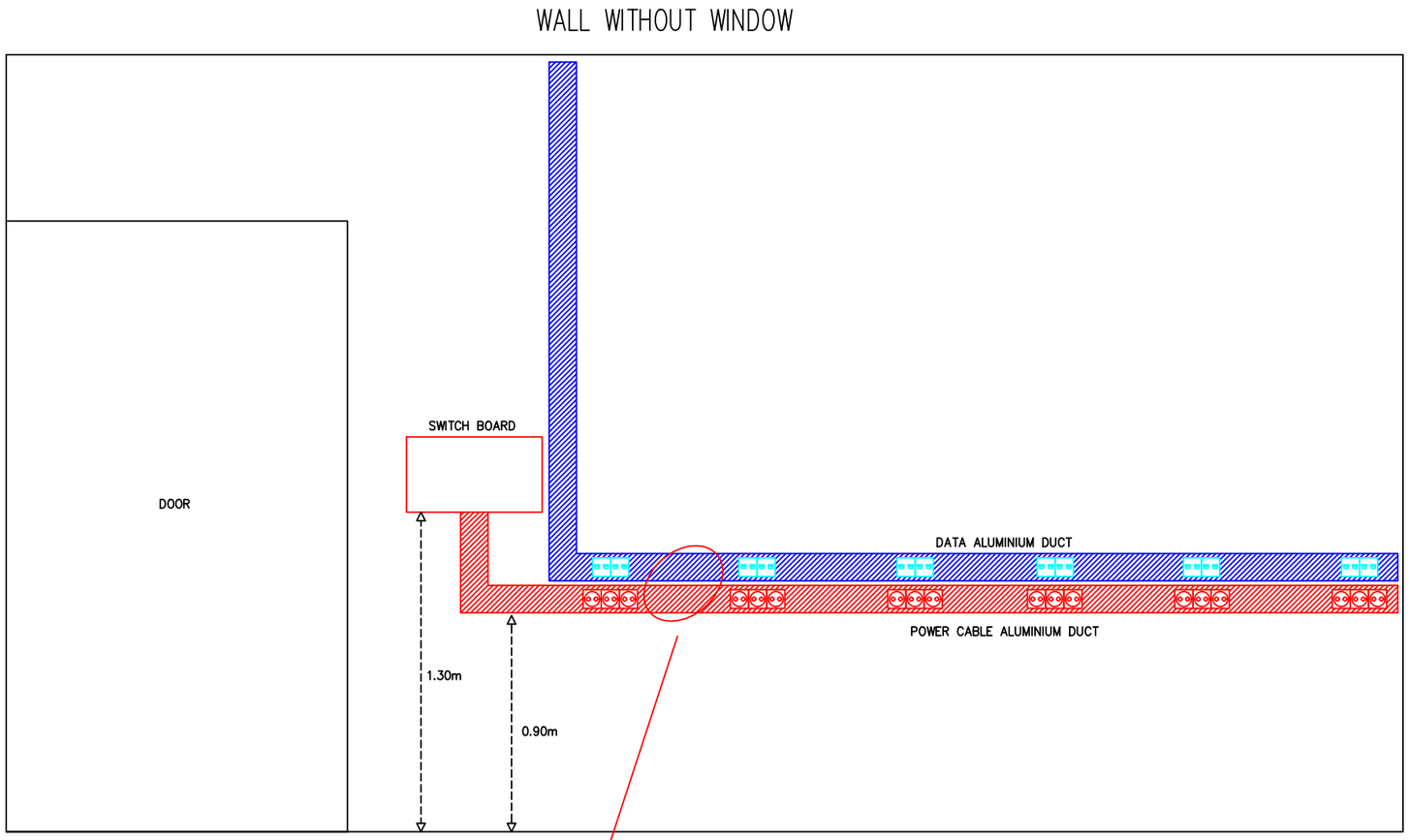
CABLE TRAY



REV.	DATE	CHANGES	SIGNATURE

PROJECT.		NAVAL STRIKING AND SUPPORT FORCES NATO	ATM EFAGO – Manutenção Hospitalar, A.C.E.
DRAW	2019.07.17 AVN		ELECTRIC PROJECT
COPY			
VERIF.			
APROV.			
The Engineer VAZ NUNES		ROOM TYPE	1 EL 401
SCALE N/S		ELECTRIC INSTALATION CABLE TRAY LAYOUT DATA AND POWER	REPLACE : REPLACED FOR :

Duct Layout_1.pdf



WHITE ALUMINIUM DUCT

REV.	DATE	CHANGES	SIGNATURE

PROJECT.		NAVAL STRIKING AND SUPPORT FORCES NATO
DRAW	2019.07.17 AVN	
COPY		
VERIF.		
APROV.		
The Engineer VAZ NUNES		ROOM TYPE
SCALE N/S		ELECTRIC INSTALATION TRUNKING SYSTEM DATA AND POWER

ATM
EFAGO – Manutenção Hospitalar, A.C.E.

ELECTRIC PROJECT

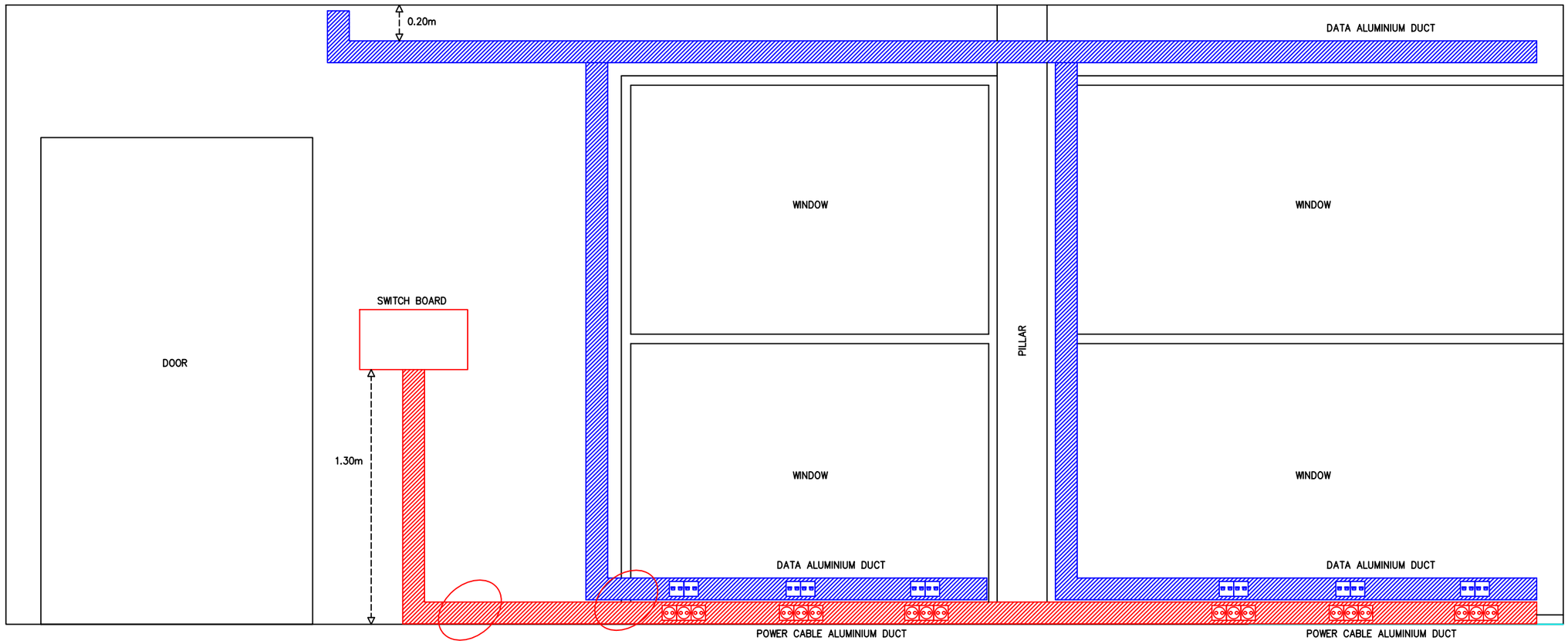
1 EL | 400–1

REPLACE :

REPLACED FOR :

Duct Layout_2.pdf

WALL WITH WINDOW



WHITE ALUMINIUM DUCT

WHITE ALUMINIUM DUCT

REV.	DATE	CHANGES	SIGNATURE

PROJECT.		NAVAL STRIKING AND SUPPORT FORCES NATO	ATM EFAGO – Manutenção Hospitalar, A.C.E.
DRAW	2019.07.17 AVN		ELECTRIC PROJECT
COPY			
VERIF.			
APROV.			
The Engineer VAZ NUNES		ROOM TYPE	1 EL 400–2
SCALE N/S		ELECTRIC INSTALATION TRUNKING SYSTEM DATA AND POWER	REPLACE : REPLACED FOR :

July 2019

ATM
Manutenção Total

CONSULTANCY SUPPORT

(ELECTRICAL ENGINEERING)

ELECTRIC PRINCIPLE

ATM Ref 1100001286

NATO
OTAN

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INDEX

0

1- INTRODUCTION

The three days visit the facilities gave an idea of the needs that are inherent to the activity.

In this sense we think in a philosophy as flexible as possible that allows the constant adaptations of the building needs, reliable and simple in regard to maintenance.

2. PHILOSOPHY

The system will have three kinds of network:

Each network have his own purpose:

Normal network - will be the one that has the less importance. It will be connected to this network all the equipment's that can stay without energy in case of failure in the supplier;

Emergency network – this will be the network that, when exists a failure on the supplier, will can stay without energy during the start of the power generators (normally during 30 seconds), and during the return of normal network (normally 1 second)

Critical network – this will all the equipment that can never stay without energy.

In the facilities must be very well defined where each of these networks must actuate.

What we propose is that exists electric distribution columns in the corridors and each space have is own switch Board. The main objective of this philosophy is to isolate only in the room an failure and to be easy for the maintenance personnel to identify de cause of the failure.

In the entrance of each corridor (left or right) will be installed an electrical switch board to guarantee the selectivity and from where the electrical columns will start.

In this solution we will have many advantages like:

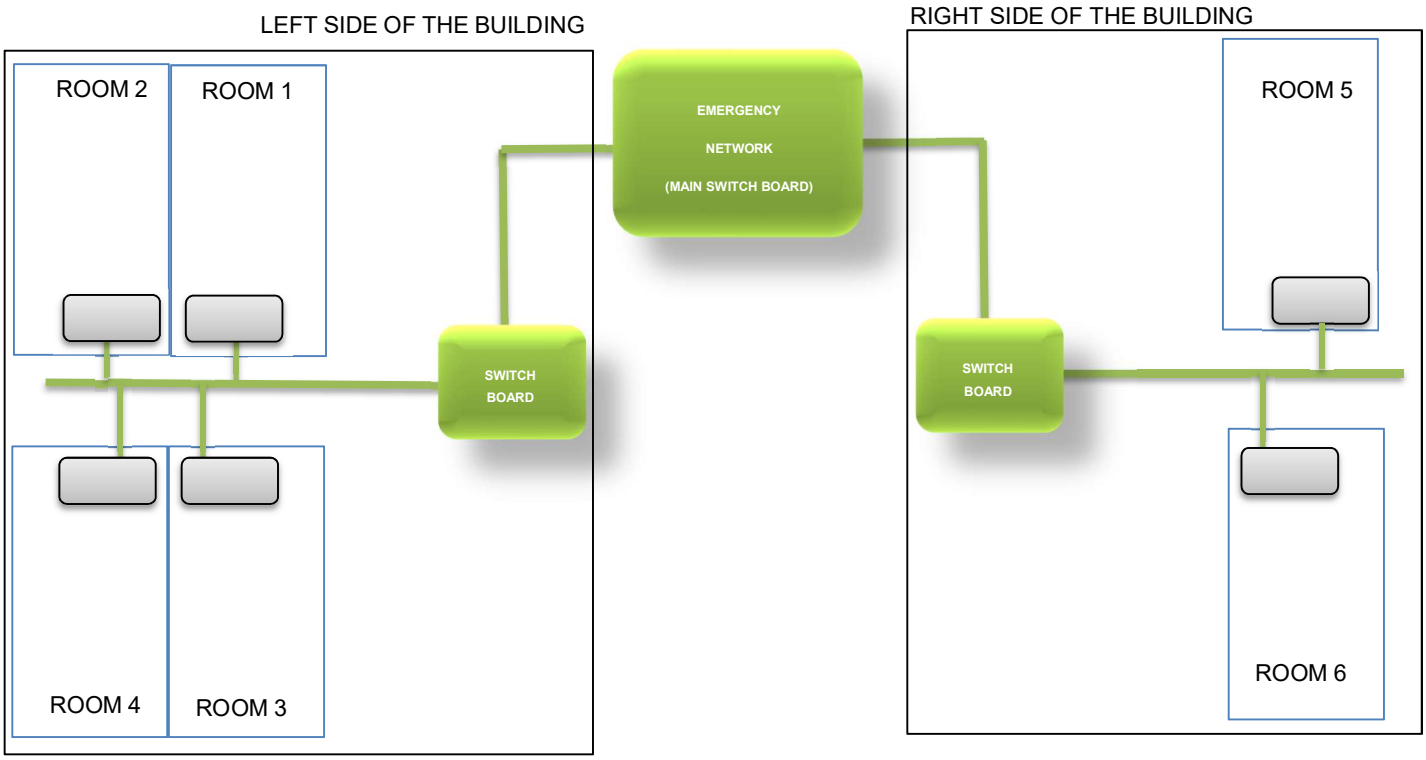
Selectivity between protections;

Easier to understand the electrical installation;

Fast response in case of failure;

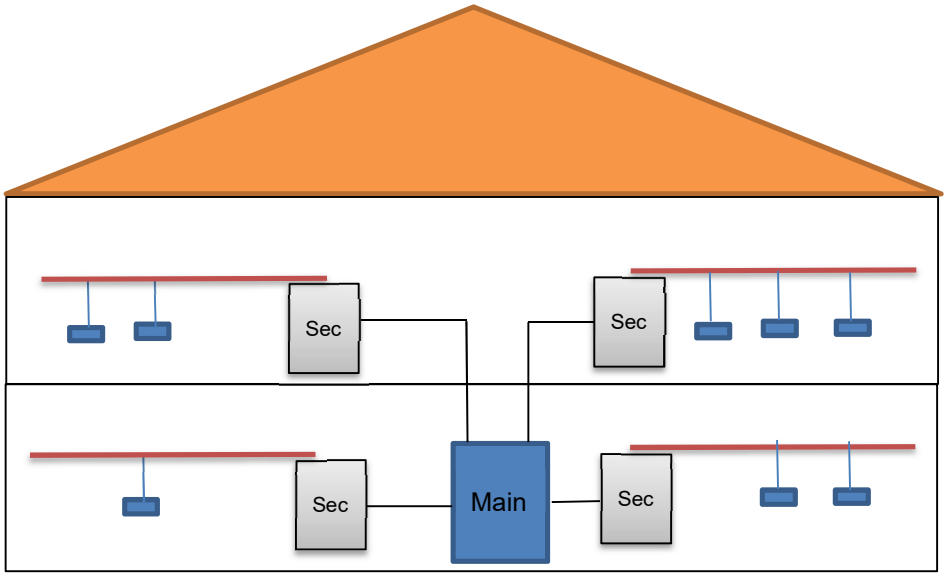
Flexibility in the adaptation every time that changes occurs in the installation;

Reliability;



This solution is the same for the normal network, and each switch board can be divided to have all the networks inside.

Each side (left and right) and each floor have his own partial distribution switch board

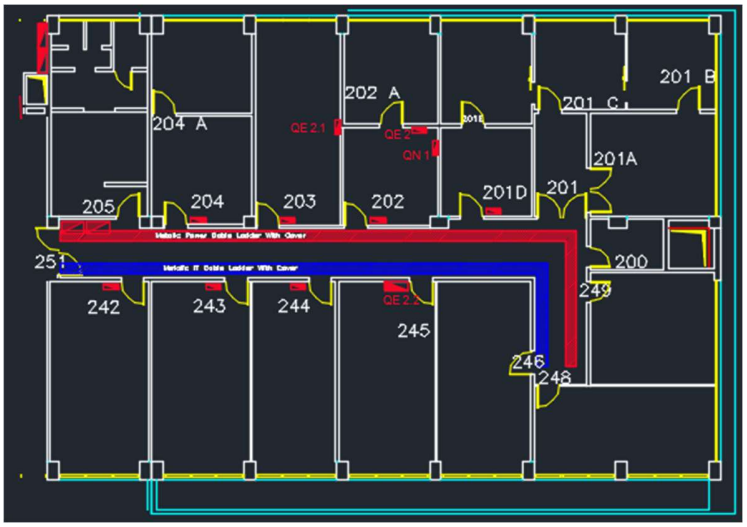


The energy distribution columns will be made with cable in metallic tray with cover

Cable tray distribution:

Metallic tray with cover to transport the cables and goes one cable to each room switch board.

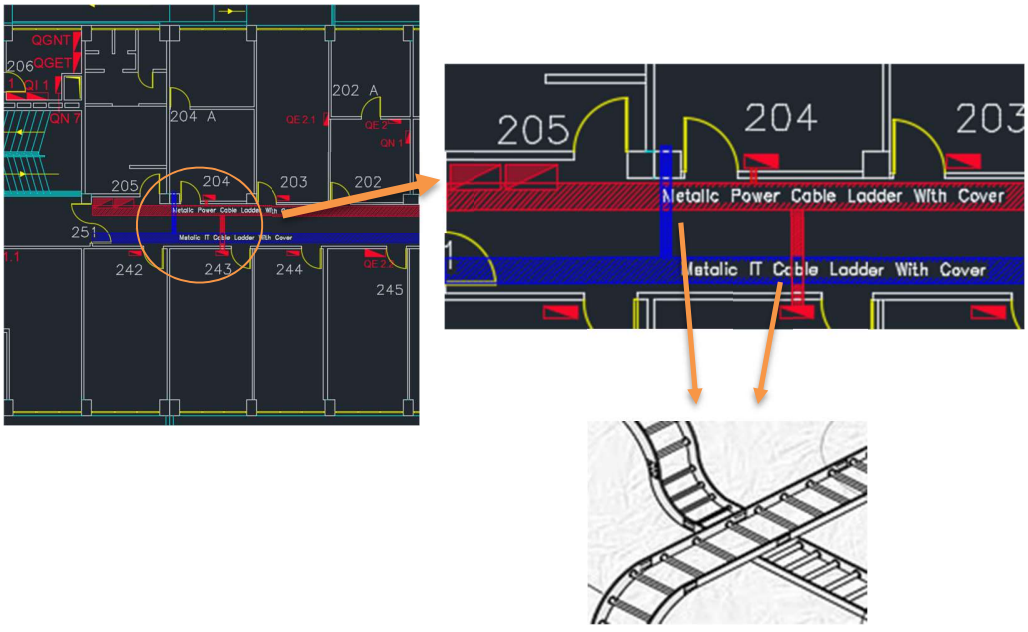
Montagem em Esquadro



RED – Metalic Power Cable Ladder with Cover

BLUE – Metalic IT Cable Ladder with Cover

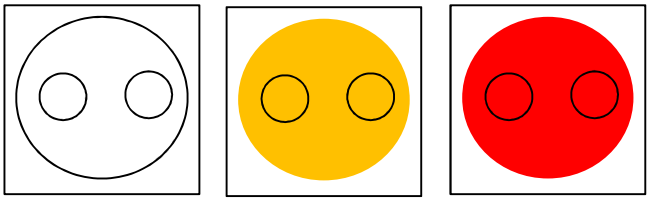
Cross Section on corridors:



White – Power Outlet from the normal network (NORMAL)

Orange – Power Outlet from the emergency network (Power Generator) (EMERGENCY)

Red – Power Outlet from de UPS network (CRITICAL)

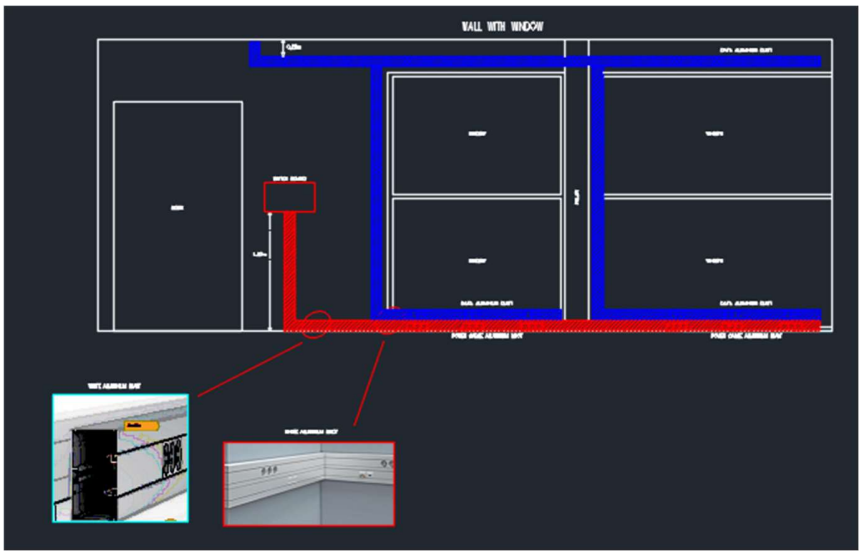


The outlets can be identified with Coloradd (for color-blind personnel)

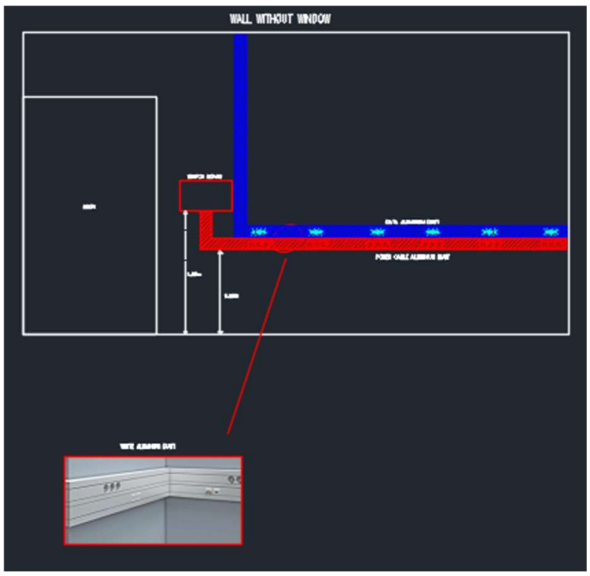
Cable distribution inside the rooms:

The cables will be installed in a white lacquered aluminium trunking system

Rooms and/or walls with windows:



Room and/or walls without window



3. LEGISLATION

Each electric installation must fulfil the flowing legislation:

RTIEBT (Regras Técnicas das Instalações Eléctricas de Baixa Tensão), Portaria nº949-A/2006 de 11 September)

ITED Manual

4. MATERIALS

All the materials to be used must have CEE identification, fulfil all the security legislation and be adequate for the use that will have.

All electric materials must have IEC approval

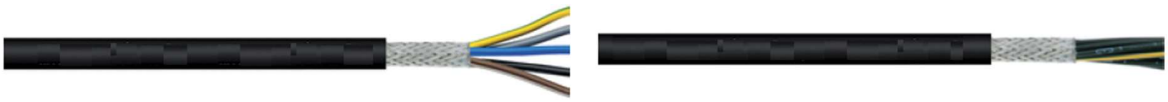
Switch Boards – EN 60529 and EN 50102 and produced according to IEC 60439-1

The material must have protection according IEC60529, IEC 60364 and IEC 61140

Description of the material characteristics:

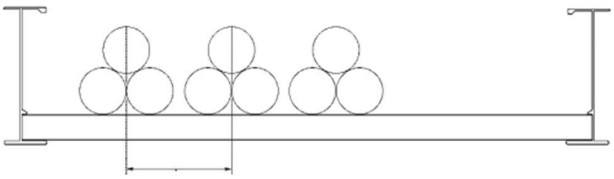
Cables: All cables (power and IT) must be shielded with a good resistance to efforts, halogen-free, highly flame retardant, EMC/screened, does not produce opaque smoke.

Cables must be identified at the output of the switch boards and at the input of the following switch boards.



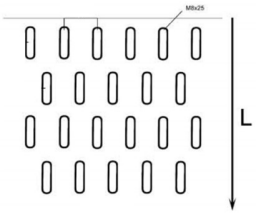
The shield must be ground connected

In case of use monopolar power cables they must be installed in cable tray as follow:

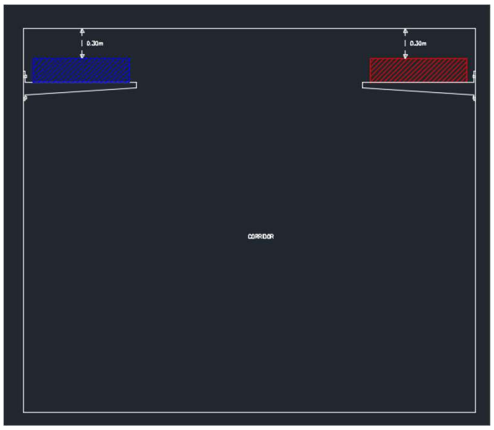


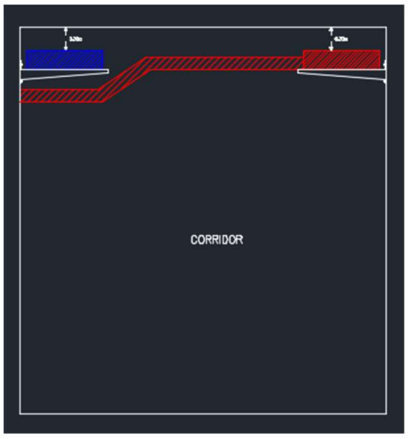
Each group represents a L1, L2 and L3 set from the same circuit.

Cable Tray: the cables ladder must be galvanized, corrosion resistant metal or metal with a corrosion resistant finish (ISO EN 1461), with small holes to dissipate the heat but avoid direct access to cables.



The maximum distance between tray supports is 1.5 meters

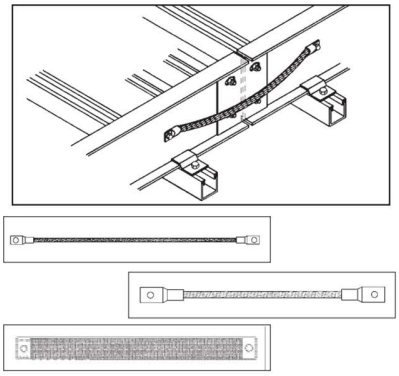




Trunking system: white lacquered aluminium trunking system

Ground Connections: all the metallic components and shield of the cables must be ground connected

The cable tray must be connected between pieces with naked cooper cable as indicated in the following picture:



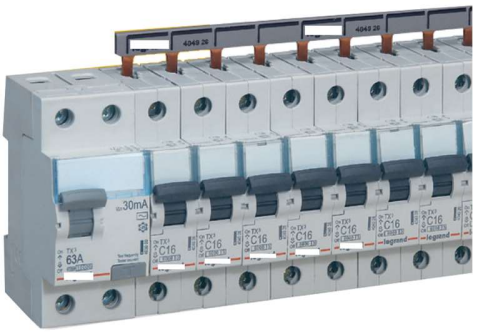
Switch Board: the switch board must have a 30% of free space for future installation for new circuits, if needed, RCD (Residual Current Device) must have de following rules:

Different RCDs to lights and to power outlets;

Each RCD have, at maximum, 6 circuit breakers

RCD sensitivity – 300mA

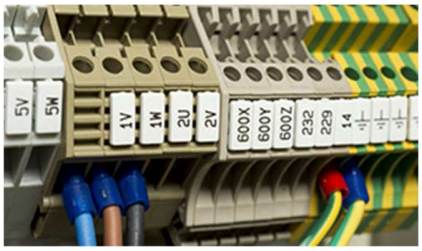
RCD must be aside of is own circuit breaker and a busbar to connect them, example:

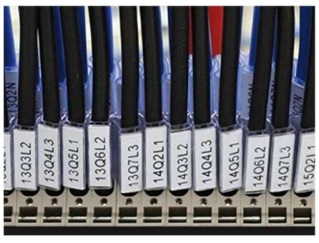


All single phase circuit breakers must have two poles (can have only one trigger).

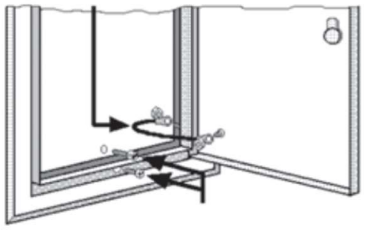
The maximum power outlets in each circuit breaker are 12 (2 worksations)

All the cables and terminals must be identified with adequate labels, example:





The switch board must be ground connected:



Schematics: all switch board must have a schematic inside

Circuit Breakers: for the room switch boards the ICC mínimum are 10 kA

Cupper Busbar: maximum current per mm2 must be 2A (2A/mm2) and Icc minimum will be 10kA

Power Outlets: all power outlets must be Schuko type and have three type of colours:

White – Normal nertwork socket;

Orange – Emergency network socket;

Red – Critical network socket.

All materials must be approved by the inspection before being installed.