

Generic Site Preparation Guide

The following copyright notice protects this book under Copyright laws which prohibit such actions as, but not limited to, copying, distributing, modifying, and making derivative works.

Copyright ©Bull SAS 2019

Printed in France

Trademarks and Acknowledgements

We acknowledge the right of proprietors of trademarks mentioned in this manual.

All brand names and software and hardware product names are subject to trademark and/or patent protection.

Quoting of brand and product names is for information purposes only and does not represent trademark and/or patent misuse.

Hardware

February 2019

**Bull Cedoc
357 avenue Patton
BP 20845
49008 Angers Cedex 01
FRANCE**

The information in this document is subject to change without notice. Bull will not be liable for errors contained herein, or for incidental or consequential damages in connection with the use of this material.

Table of Contents

Preface	p-1
Intended Readers	p-1
Chapter 1. General Recommendations	1-1
1.1. Introduction	1-1
1.2. Safety of Personnel	1-2
Chapter 2. Fitting out the Premises	2-1
2.1. Checking Access	2-1
2.2. Data Center Layout	2-1
2.3. Computer Room Floor	2-2
2.3.1. Primary Floor	2-2
2.3.2. Raised Floor	2-2
2.4. Installation Planning	2-4
2.5. Electrical / Electromagnetic Interference	2-4
2.6. Fire Protection	2-4
2.7. Water Damage	2-4
Chapter 3. Air Quality	3-1
3.1. Air-Conditioning System Requirements	3-2
3.2. Environmental Conditions	3-2
3.3. Checks and Alarms	3-3
Chapter 4. Power Supply	4-1
4.1. Electrical Installation	4-2
4.2. Cabling Requirements	4-3
4.3. Power Supply Cable Sockets	4-4
4.4. Grounding Circuit	4-5
4.4.1. Electric Protection Wire Characteristics	4-5
4.4.2. Grounding the Raised Floor	4-5
4.5. Neutral Power System	4-6
Chapter 5. Coolant Requirements	5-1
5.1. Environmental Conditions for Optimized Cooling	5-2
5.1.1. Chilled Water Characteristics	5-2
5.1.2. Water Treatment Recommendations	5-3
5.2. Preparing the Cooling Unit for the Installation of Equipment	5-4

Preface

This guide explains how to prepare a Data Processing Center for equipment, in compliance with the standards in force.

Intended Readers

This guide is to be used by all personnel and trade representatives involved in the site preparation process.

Chapter 1. General Recommendations

1.1. Introduction

Important It is mandatory to comply with the procedures, design requirements and recommendations set out in this guide. All the standards referred to in this guide are applicable in France. Equivalent standards must be applied and complied with in other countries.

The construction of the Data Processing Center and the installation of ancillary facilities must meet the level of safety required by the standards and laws in force in the country where the equipment is to be installed and the Customer's requirements in terms of continuity of service.

Site preparation must take all the following aspects into account:

- Safety of personnel
- Primary / raised floor
- Power supply
- Water supply
- Air-conditioning
- Sound-proofing
- Protection from sunlight
- Access control
- Fire protection
- Water protection

Note In the case of a water-cooled equipment installation, the customer is responsible for supplying the complete water installation. The water installation must comply with the standards in force.

Site preparation must be completed by the pre-arranged delivery date. Any delay due to non-completion of the site by the pre-arranged date will be considered as the customer's responsibility.

The customer shall bear the cost of the works to be carried out to attain stipulated safety and continuity of operation requirements.

On request, the Customer Service Representative can supply a list of the services available for the equipment. These services include water supply installation, Data Processing Center site assessment and conformity inspections.

1.2. Safety of Personnel

The customer is responsible for informing and protecting personnel by setting up appropriate equipment.

Sound Proofing

The sound level in the Computer Room may be relatively high due to room structure, air-conditioning and hardware ventilation systems.

Air Renewal

A fresh air supply is recommended for the wellbeing and health of personnel. The fresh air supply must input directly to the air-conditioning unit and must be filtered in compliance with local health authority regulations (D.D.A.S.S. Regulations in France).

Electrical Installation

D025  **DANGER**

D025:

To ensure the protection of personnel and equipment, bipolar magneto-thermic circuit breakers must be installed in compliance with the safety standards in force.

Grounding Circuit

D028  **DANGER**

D028:

For the protection of personnel and hardware, it is mandatory for the grounding network to be compliant with Data Processing Center requirements and the standards in force.

A single, equipotential grounding circuit dedicated to data processing systems is required. If the building has several, separate grounding shafts, it is mandatory for them to be interconnected to eliminate the occurrence of different transient potentials within the same unit.

Data Center Layout

It is mandatory for the layout to take the safety of personnel into account. Access for stretchers must be provided around equipment and cabinets.

Fire Protection

The personnel in the Data Processing Center must be informed of the safety procedures.

Chapter 2. Fitting out the Premises

2.1. Checking Access

The route from the unloading bay to the Computer Room must be checked to ensure that the equipment can be carried into the premises easily and that floors can support temporary overloads.

D008  **DANGER**

D008:

The loaded rack cabinet is extremely heavy and will require the use of an elevator.

It is mandatory for the loaded rack cabinet to be transported vertically, as indicated on the packing.

Important According to the NFP 001-005 standard, access doors must be at least 2.04 m high to allow rack-mounted equipment to be transported vertically.
If the equipment is transported on a pallet, access doors must be at least 2.20m high.

2.2. Data Center Layout

When planning the layout, the following criteria must be taken into account:

- Headroom
- Easy access
- Exposure and location of windows and doors
- Location of electrical and telephone sockets
- Location of pillars and radiators

Important Site layout must provide sufficient clearance around equipment for easy access, addition of extensions and protection from direct sunlight.
Usage of wall and floor carpets is not recommended in the Data Processing Center, due to electrostatic hazards.

Important It is recommended to make room for the removal of packing items in the Computer Room and ancillary premises.

2.3. Computer Room Floor

For optimum installation of equipment, you are advised to equip your Computer Room with both a primary and raised floor.

2.3.1. Primary Floor

Important The customer must know the maximum load possible of the primary floor in terms of weight/m² and the load concentration.
With the Customer Service Representative they must check that the load for the system configuration planned is within the site constraints.

The primary floor and wall risers located at raised floor level must be coated with dustproof paint or varnish.

It is recommended that the floor slopes slightly but sufficiently and is equipped with a drain.

2.3.2. Raised Floor

Important The customer must know the classification of the raised floor in particular for the installation of a water cooled equipment. If in doubt, contact the Customer Service Representative.

A raised floor compliant with the Standard NF EN 12825 in force is mandatory.

If required, the classification specific to each equipment is given in the equipment site preparation guide.

C025  CAUTION

C025:

If the air-conditioning unit(s) is (are) placed on brackets in the room, it is mandatory to electrically isolate these brackets from the raised floor slabs, crossbeams, and actuators.

W062  WARNING

W062:

Electrostatic discharge may cause electronic equipment to dysfunction. Effective static control is necessary in the Computer Room. ESD-safe flooring should be used to protect equipment from damage. The raised floor structure (actuators and spars) should be grounded in several points within the room.

It is recommended that the raised floor is built with 60 cm x 60 cm slabs. This matches the standard width of Bull Cabinets.

At the actuator base, the structure must be meshed with $\geq 10 \square \square^2$ section, flat, tin-plated copper braiding compliant with the Standard NF EN 50.147-2 in force.

Important For very heavy systems, it is recommended to add freely set, flat headed, hydraulic jacks under the raised floor prior to installing the system. For more information consult the Bull support web site : <http://support.bull.com>.

The plenum space must be higher than 30 cm (60 cm in the case of a cooling unit installation) to allow the correct circulation of conditioned air. In the case of the plenum space is not compliant with these values, consult the Customer Service Representative.

2.4. Installation Planning

The installation must be planned so that any changes and / or extensions may be implemented with minimum service disruption. It is recommended to plan installation of the following elements:

- Cabinets and equipment
- Cable ways
- Extension cables
- Power and telephone sockets
- Storage cabinets
- Water supply connection

The requirements may differ according to the type of the system being installed, particularly if water cooled equipment is included.

Note For an installation that includes water-cooled equipment, it is advisable to separate the water supply aisles from the cable aisles.

2.5. Electrical / Electromagnetic Interference

Generators of electromagnetic interference may adversely affect equipment operation.

The environment in which the machine is to be installed must have interruption thresholds lower than those defined by the EN61000-4 standard.

2.6. Fire Protection

The customer is responsible for site safety and must ensure that all necessary precautions are in place.

The Customer Service Representative must be informed if gas is used as an extinguishing agent.

2.7. Water Damage

It is recommended to install leak detection devices, connected to alarm or remote surveillance centers and/or to a water circuit shut-off device.

It is necessary to plan a way to evacuate water in case of leak.

Refer to the equipment specific site preparation guide for details

Chapter 3. Air Quality

Important **ATTENTION:** Please read carefully the safety instructions before you perform the procedures described in this manual.

ATTENTION : Merci de lire attentivement les consignes de sécurité avant d'effectuer les procédures décrites dans ce manuel.

ACHTUNG : Bitte lesen Sie sorgfältig die angegebenen Sicherheitshinweise, bevor Sie die Verfahren in diesem Handbuch beschrieben durchführen.

Multilingual Safety Notices Guide, 86 X1 12FL

Note The Bull Support Web site may be consulted for general site preparation information and specific requirements for your equipment:
<http://support.bull.com>

3.1. Air-Conditioning System Requirements

A fully automatic air-conditioning system specially designed for the Data Processing Center and compliant with the requirements of NF EN ISO 14644-1 class ISO 8 is highly recommended.

This installation is at the customer responsibility. If needed, contact the Customer Service Representative.

W035  **WARNING**

W035:

If the air-conditioning system is shut down, operational conditions must be re-established, in compliance with temperature (3 degrees per hour) and hygrometry (5% per hour) gradients, AT LEAST ONE HOUR before powering on equipment.

Important To ensure the highest equipment reliability, the climatic requirement for the computing environment is the recommended envelope as defined by the ASHRAE in its "Thermal guidelines for data processing environments, 2011 edition":

- **Dry-bulb temperature must not exceed the threshold of 27°C (upper limit of the recommended envelope. The critical threshold is set to 35°C (upper limit of ASHRAE A2 class).**
 - **Humidity range:
noncondensing conditions and
relative humidity: < 60% and
dewpoint: 5.5-15°C**
-

To ensure continuity of service, the air-conditioning system must comprise at least two redundant assemblies, each providing at least 66% of the total cooling power.

The effectiveness of air-conditioning unit filters must comply with the "A.S.H.R.A.E" test, more or equal to 36% (to be checked with manufacturers).

3.2. Environmental Conditions

The Computer Room must meet the environmental conditions set out below.

Cleaning

Dust has an adverse effect on the operation of data processing systems and their environment.

Air Flow

It is recommended to align the cable ways with the air flow to facilitate air circulation under the raised floor.

3.3. Checks and Alarms

A monitoring system must be installed to record any disruption in the air-conditioning system. The thermal and hydrometry data provided by this system should be stored for at least the last three months.

Chapter 4. Power Supply

Important **ATTENTION:** Please read carefully the safety instructions before you perform the procedures described in this manual.
ATTENTION : Merci de lire attentivement les consignes de sécurité avant d'effectuer les procédures décrites dans ce manuel.
ACHTUNG : Bitte lesen Sie sorgfältig die angegebenen Sicherheitshinweise, bevor Sie die Verfahren in diesem Handbuch beschrieben durchführen.

Multilingual Safety Notices Guide, 86 X1 12FL

Note The Bull Support Web site may be consulted for general site preparation information and specific requirements for your equipment:
<http://support.bull.com>

4.1. Electrical Installation

The customer is responsible for the supply of the complete electrical installation, from the power delivery station through to the cable outlets at the base of the server cabinet. The electrical installation must comply with the standards in force.

Lightning flashes to, or nearby, structures (or services connected to the structures) are hazardous to people, to the structures themselves, their contents and installations as well as to services.

D025  **DANGER**

D025:

To ensure the protection of personnel and equipment, bipolar magneto-thermic circuit breakers must be installed in compliance with the safety standards in force.

D024  **DANGER**

D024:

An AC power supply compliant with the Lightning Protection Standards NF C15.100 and IEC 62305 in force is mandatory.

W069  **WARNING**

W069:

Electrical installations in the computer room must be protected from lightning to avoid any abnormal surges.

W031  **WARNING**

W031:

The installation of an on-line Uninterruptible Power Supply (UPS) is strongly recommended to ensure continuity of service and to protect the equipment in the event of a mains failure.

The UPS may be installed in the Computer Room or in an ancillary room.

4.2. Cabling Requirements

C029  **CAUTION**

C029:

It is mandatory for power lines and terminal boxes to be located within the immediate vicinity of the system and to be easily accessible. Each power line must be connected to a separate, independent electrical panel and bipolar circuit breaker.

France:

Power sockets and plugs must be compliant with the Decree 88-1056 Article 20-IV in force.

Important **The raceways must comply with the European requirements of the Standard EN 50.174-1-2 in force. In the case of a non raised-floor equipped computer room, this standard contains recommendations about the cabling way and protection.**

It is recommended to label cables at both ends. The labels should indicate the equipment to which the cable is connected at one end and its physical location at the other.

4.3. Power Supply Cable Sockets

Except if the use of a junction box was agreed at the pre sales level, the delivered Bull rack cabinets power cables are pre-equipped with sockets.

Important To be performed by a certified electrician only.

Europe, Brazil

PDU/UPS power cables are equipped with ready-mounted IEC60309 plugs. The Customer is responsible for supplying and installing appropriate sockets for connection to the site power supply.

Note Power Cables are hard wired directly to the UPS without a plug, except UPS 7.5 & 10 KVA models.



Figure 4-1. Plug and socket

United States of America

Equipment power cables may be equipped with ready-mounted NEMA L6-30P plugs. The Customer is responsible for supplying and installing appropriate sockets for connection to the site power supply.

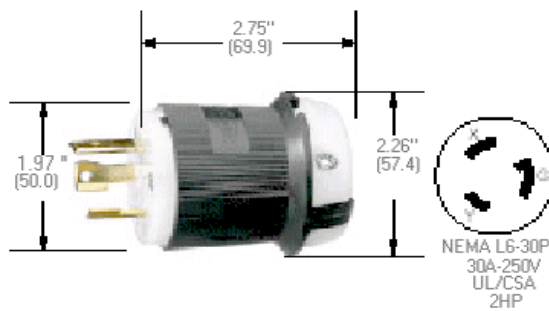


Figure 4-2. US plug characteristics

4.4. Grounding Circuit

The electronic components inside the equipment are sensitive to high-frequency electromagnetic interference. To ensure correct hardware operation, high-frequency interference must be limited via an equipotential ground circuit and metallic braid shielded cables.

D028  **DANGER**

D028:

For the protection of personnel and hardware, it is mandatory for the grounding network to be compliant with Data Processing Center requirements and the standards in force.

A single, equipotential grounding circuit dedicated to data processing systems is required. If the building has several, separate grounding shafts, it is mandatory for them to be interconnected to eliminate the occurrence of different transient potentials within the same unit.

4.4.1. Electric Protection Wire Characteristics

Important Electric protection wire characteristics must be compliant with the Standards NF C15.100 and EN 50174-2 in force.

4.4.2. Grounding the Raised Floor

Important The raised floor must be grounded in compliance with the Standard EN 50174-2 in force.

4.5. Neutral Power System

A TN-S neutral point connection system is mandatory for the equipment. All Bull equipments are designed and tested in conformity with this system. To construct the system, a protective conductor (PE) is connected to the neutral conductor at the origin of the installation. As the Neutral and the PE wire are connected to the same output point of the source, the voltage measured between Neutral and Ground at any point in the installation be close to 0 Volt.

At the secondary winding of the power supply interface, the Neutral point is directly connected to the grounding shaft measurement strip, or to the nearest outlet. This connection is called the Neutral reference wire.

D026  **DANGER**

D026:

When defining a neutral point connection, the output Neutral point of a power source or power supply interface must always be directly connected (referenced) to the nearest grounding shaft strip and never to a grounding point.

Important The equipment grounding conductor wire (PE) must be integrated in the same wireway as the phase and neutral wires.

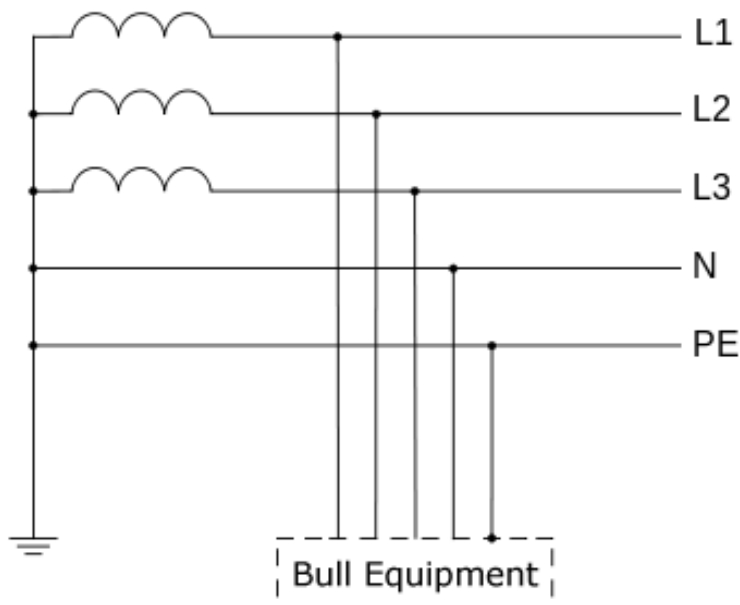


Figure 4-3. Grounding circuit diagram for a TN-S neutral point connection

Chapter 5. Coolant Requirements

Important **ATTENTION:** Please read carefully the safety instructions before you perform the procedures described in this manual.

ATTENTION : Merci de lire attentivement les consignes de sécurité avant d'effectuer les procédures décrites dans ce manuel.

ACHTUNG : Bitte lesen Sie sorgfältig die angegebenen Sicherheitshinweise, bevor Sie die Verfahren in diesem Handbuch beschrieben durchführen.

Multilingual Safety Notices Guide, 86 X1 12FL

Note The Bull Support Web site may be consulted for general site preparation information and specific requirements for your equipment:
<http://support.bull.com>

5.1. Environmental Conditions for Optimized Cooling

A cooling unit is required to supply chilled water to water-cooled cabinets at the correct temperature.

It is recommended to follow the general recommendations of the ASHRAE "Thermal guidelines for data processing environments, 2011 edition" and vendor specific requirements for cabinet equipments.

5.1.1. Chilled Water Characteristics

Important To ensure the maximum life expectancy of exchangers, chilled water must comply with the VGB chilled water regulations (VGB-R 455P).

Chilled water used must be soft enough to prevent deposits, but must not be so soft that heat exchanger corrosion occurs.

If the chilled water contains elements favorable to rust, a rust inhibitor must be added.

The following table lists the chilled water requirements.

Chilled Water Characteristic	Unit	Requirement
pH		7<pH<9
Corrosion inhibitor		required
Sulfide	mg/dm ³	<10
Sulphate	mg/dm ³	<100
Sulphite	mg/dm ³	<10
Chloride	mg/dm ³	<50
Bacteria	CFUs/ml	<1000
Total hardness (CaCO ₃)	mg/dm ³	<200
Solid evaporation residues	mg/dm ³	<500
Conductivity	μS/cm	10-500
Free carbon dioxide	mg/dm ³	<5
Cl ₂	mg/dm ³	<1
Nitrate and nitride	mg/dm ³	<100
H ₂ S	mg/dm ³	<0.05
Ammonium	mg/dm ³	<2
Iron	mg/dm ³	<1
Manganese	mg/dm ³	<0.1
Aluminium	mg/dm ³	<0.2
Nitrate	mg/dm ³	<100
Particle size	μm	<500
Suspended matter	mg/dm ³	<3

5.1.2. Water Treatment Recommendations

The following table lists common water impurities and recommended treatments:

Impurity	Treatment
Mechanical pre-treatment (dp < 1 mm)	Filter the water
Excessive hardness	Soften the water using ion exchange
Moderate presence of mechanical impurities and hardness formers	Add dispersing agents or stabilising agents
Moderate presence of mechanical impurities	Add passivation agents and inhibitors
Biological impurities (bacteria and algae)	Add biocides

5.2. Preparing the Cooling Unit for the Installation of Equipment

The cooling unit must be correctly prepared for the installation of equipment. Refer to the site preparation guide specific to the equipment.

Important The water supply installation should be performed by an air-conditioning specialist/plumber.

Bull Cedoc
357 avenue Patton
BP 20845
49008 Angers Cedex 01
FRANCE