



Exploration & Production

GENERAL SPECIFICATION

HVAC

GS EP HVA 801

Terminology, Definitions, Abbreviations
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08	01/2012	Definitions updating – Refrigerating systems updating
07	01/2011	Definitions adding
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1. Scope

This document defines the different terms used inside all *HVAC* documents, whatever the type, and used in documents, drawings, and during meetings regarding project. Definition of terms given within this specification prevails above any other definition.

For General Specifications (listed in **GS EP HVA 000**) issued before the revision date of the present document, the definitions of the present document have to be applied even when the words, defined in the present General Specification, are not in capital and italic letters within these specifications.

When definitions are given in another document, those definitions are only available for comprehension of that document.

Note: In case of discrepancy between documents (whatever the documents and / or whatever origins), the most expensive solution shall be quoted by *BIDDER*. During the studies (Basic Engineering and / or Detailed Engineering) *CONTRACTOR(s)* shall raise the discrepancy in question to the Company *HVAC SPECIALIST* who will then review and advise which document(s) is (are) to be enforced for the project.

Within *HVAC* documents, expression in CAPITAL CHARACTERS and *italic* are defined within this "Terminology, definitions and abbreviations" specification.

When other words require a definition only to be used in the present document, then the definition is given in a dedicated paragraph of the present document and the defined word, when used, is marked in small and *italic* letters.

All pictures and figures within this specification are indicated for illustration and example purpose only.

2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the EFFECTIVE DATE of the CONTRACT.

Standards

Reference	Title
Not applicable	

Professional Documents

Reference	Title
Not applicable	



Regulations

Reference	Title
Code du travail	Article 232-5-5
Décret du 7 décembre 1984	Décret n°84-1094 du 7 décembre 1984 complétant le code du travail (deuxième partie) et fixant les règles relatives à l'aération et l'assainissement des locaux de travail auxquelles doivent se conformer les maîtres d'ouvrage entreprenant la construction ou l'aménagement de bâtiments destinés à l'exercice d'une activité industrielle, commerciale ou agricole
Directive 98/24/CE	Directive 98/24/CE du Conseil du 7 avril 1998 concernant la protection de la santé et de la sécurité des travailleurs contre les risques liés à des agents chimiques sur le lieu de travail

Codes

Reference	Title
Not applicable	

Other documents

Reference	Title
INRS document ED 984	Valeurs limites d'exposition professionnelle aux agents chimiques en France

Total General Specifications

Reference	Title
GS EP EXP 501	Equipment and piping numbering
GS EP HVA 000	List of HVAC specifications
GS EP HVA 100	HVAC Basis of design

3. Terminology

3.1 Verbs

There are four types of statements in these documents: "shall", "should", "may", "can". They have to be understood as follow:

shall: requirement (application is mandatory unless derogation is formally granted)

should: recommendation

may: permission

can: possibility

The verb "must" is used to express a regulatory obligation.

3.2 Definitions

ACCOMMODATION: space used as public or private rooms, cabins, offices, hospitals, cinemas, games and hobby rooms, hairdressing saloons, pantries and galley area.

ADEQUATE VENTILATION: air volume mechanically blown into a room in order to maintain:

- The level of gas and dust at lower value(s) than the inferior limit of explosivity
- The level of pollutant(s) at lower value(s) than limited values for professional exposure to chemical agents (Refer to "INRS document ED 984" and Directive 98/24/CE)
- The ambient air temperature and ambient air *RELATIVE HUMIDITY* inside range of "WINTER / SUMMER temperature tolerance" associated to "WINTER / SUMMER temperature design point" (Refer to GS EP HVA 100)
- The temperature at lower value than flash point of chemical products
- The quantity of inhalable particles to a lower value than 10 mg/m³, for an exposure of 8 hours (Refer to Décret du 7 décembre 1984 and to "Code du travail, article 232-5-5")
- Level of pollutant(s) (gas, dust) which shall not be increased due to the ventilation, even if final concentration concerned pollutant is lower than limit value.

AIR CHANGE VOLUME: the number of time that air shall be replaced during the time unit. The blown air can be recycled air from other rooms, except when that air is polluted. This parameter shall be expressed in volume per hour (Vol/h); that means volume of the concerned room per hour.

AIR CONDITIONING: defines the process equipment requested to maintain one or several of the following criteria inside a room: temperature, *RELATIVE HUMIDITY*, dust quantity and particles sizes, gas quantity, smell, pressure. These parameters are controlled within the prescribed limits for the enclosure to be air-conditioned.

AIR HANDLING UNIT: factory made encased unit serving as a prime mover of a *VENTILATION* or *AIR CONDITIONING* installation where *OUTDOOR AIR (ODA)*, *RECIRCULATION AIR (REC)*, *EXHAUST AIR (EHA)*, *EXTRACT AIR (ETA)*, is / are treated, etc. It consists of a combination of one or several of the following components:

- Mixing section
- Filter section
- Heat exchanger (water, oil, electrical, ...)
- Heat recovery or heat transfer section
- Humidification section
- FAN section
- SHUT-OFF DAMPER(s)



- Sound attenuator
- Additional equipment such as measuring section, control section...

A unit, serving for *VENTILATION*, air treatment, air *RECIRCULATION*, *EXTRACT* air, is an *AIR HANDLING UNIT*.

AIR VELOCITY (through cooling coil and / or heating coil): *AIR VELOCITY* across the coil is calculated considering the real free air passing section through the coil, in the section of a coil row (front surface of piping, front surface of fins and their corrosion protection shall be deducted from the internal frame section).

APPROVED: means approved in writing, including subsequent confirmation of previous verbal approvals.

AREA: an area is a three-dimensional volume or space.

AUTHORITY: means a statutory body responsible for the regulation of specific codes, standards and practices.

BIDDER: person or Company producing an offer.

BOILER(S) room: rooms where heating equipment uses liquid or gaseous combustibles.

CAPITAL SPARES: expensive or long delivery time spares required to prevent operational failure that may have heavy technical and / or financial consequences. They are part of the scope of supply of the related equipment and only concern vital and critical items.

CERTIFYING AUTHORITY: an independent third party organization that reviews, tests and certifies designs and equipment.

CHECK POINT: a check point is associated to a construction phase. At a period of the construction, *CONTRACTOR* and / or *MANUFACTURER* have to inform *COMPANY* that a piece of equipment, a part of installation concerned by the check point can be inspected. *COMPANY* has to be informed by a fax or e-mail, one month before the date of check point.

CHILLED WATER UNIT: LIQUID CHILLING PACKAGE designed to cool water with or without additive. The water temperature issued from *CHILLED WATER UNIT* must be positive.

COMMISSIONING: the final tests made to verify that the systems fulfill their design purpose and intended services. Commissioning will comprise operational testing under real or simulated conditions for systems or sub-systems.

CONSTRUCTION SPARES: spares required to prevent any delay or pause in the construction / installation works as a consequence of a failure in quantity and/or quality of materials and/or items of equipment.

CONTRACTOR: Organization to which the *ENTITY* has entrusted work, the performance of which is governed by a contract between the *ENTITY* and that organization.

DESIGN POINT: datum which shall be used for calculation notes, selection of equipment, balancing, adjustment during *COMMISSIONING*, *FCT*. The datum is a physical characteristic of machine, equipment, basis of design resulting or not from calculation in accordance with "Basis of design" specification, including over-design as defined by specifications.

DESIGN VALUES: equivalent to *DESIGN POINT*.

DIFFUSER: device which ensures an air distribution inside a room.



DISCREPANCY (applicable for *SHUT-OFF DAMPER*, fire damper): information issued from position switches indicating that damper is open and closed in the same time.

DRY BULB TEMPERATURE: temperature indicated by a dry temperature-sensing element shielded from the effects of radiation.

DUTY RATIO: the ratio of active time to total time.

ENGINEERING: Company working for studies under control of the *COMPANY* or under the control of *CONTRACTOR*.

Note: Any Company which is qualified as "*ENGINEERING*" does not mean that this Company is qualified as "*MANUFACTURER*" and / or "*VENDOR*" and / or "*INTEGRATOR*".

ENTITY: Any unit of the Direction Générale Exploration & Production placed under the responsibility of a Managing Director appointed by the President Exploration Production. The Direction Générale Exploration & Production itself, an affiliate, a project group are all considered as an *ENTITY*.

EMERGENCY SHUT-DOWN: control action undertaken to shut-down equipment or process in response to a hazardous situation.

ESSENTIAL HVAC system: two simultaneous principles define this system:

- the failure of one component of the *HVAC* system shall not affect the performances of the *HVAC* system, in terms of temperature, pressure, humidity, air filtration (particles and gas)
- the maintenance of one component of the *HVAC* system shall not affect the performance of the *HVAC* system, in terms of temperature, pressure, humidity, air filtration (particles and gas).

Ducting must not be considered as part of the system when examination of these two principles.

FACTORY ACCEPTANCE TESTS: checking and performance measurement realized by the *MANUFACTURER* of a piece of equipment to ensure that compliance with Project Specifications, General Specifications, detailed engineering studies, data sheets and drawings, are reached. Dynamic tests are included within *FACTORY ACCEPTANCE TESTS*. These last are realized under Company *HVAC SPECIALIST* supervision (mandatory - no deviation granted).

FACTORY COMPLIANCE TESTS: checking and performance measurement realized by the *MANUFACTURER* of a package or piece of equipment to ensure that compliance with Project Specifications, General Specifications, detailed engineering studies, data sheets and drawings, are reached. Dynamic tests are included within *FACTORY COMPLIANCE TESTS*. These last are realized under Company *HVAC SPECIALIST* supervision (mandatory - no deviation granted).

FAILURE: improper performance of a device or equipment item that prevents design function to be reached.

FAN: rotary-bladed machine which receives mechanical energy and utilizes it by means of one or more impellers fitted with blades to maintain a continuous flow of air or gas passing through it and whose work per unit mass does not normally exceed 25 kJ/kg. The term *FAN* shall be understood as the *FAN* is supplied without any addition to the inlet or outlet.



Figure 1 -Example of *FAN* (casing is not shown)

FAN UNIT: assembled unit supporting the *FAN*, *FAN* motor, pulleys, belt(s) and belt(s) guard (when impeller is not fixed on motor shaft).



Figure 2 - Examples of *FAN UNIT* (casing is not shown)

FINAL DOCUMENTATION: collection of documents and drawings that includes design, engineering, construction, installation, tests, start-up, operation and maintenance of *HVAC* equipment and/or *HVAC* systems.

FIRE DAMPER: equipment installed on a ducting to isolate a part of ducting in case of fire. The isolating capacity is applicable to the fire and the gas. The acceptable leakage of the *FIRE DAMPER* is defined within paragraphs regarding the *FIRE DAMPERS*.

FIRE & GAS SYSTEM: the safety system which monitors the temperature or / and energy flux, the concentration of flammable or / and toxic gases and initiates relevant actions at pre-determinate levels.

FPSO (unit): Floating, Process, Storage and Off-loading unit.

FPU: Floating and Process Unit.

HAZARDOUS AREA: a three dimensional space in which a flammable atmosphere may be expected to be present at such frequencies as to require special precautions for the control of potential ignition sources.

HVAC: Heating, *VENTILATION* and *AIR CONDITIONING*.

HVAC CONTRACTOR: Company which built *HVAC* installation as per detail engineering produced by the *HVAC ENGINEERING* and checks the selected equipment before to buy it.



Note: *HVAC CONTRACTOR* and *HVAC ENGINEERING* can be the same Company (in case *HVAC CONTRACTOR* is agreed by *COMPANY* as *HVAC ENGINEERING* listed within *HVAC VENDORS* list) or may be two different Companies as per *COMPANY* requirements.

HVAC ENGINEERING: Company which produces the *HVAC* basic engineering and / or the *HVAC* detail engineering.

Note: *HVAC CONTRACTOR* and *HVAC ENGINEERING* can be the same Company or may be two different Companies as per *COMPANY* requirements.

HVAC PLANT ROOM: room for which the primary function is to house one or several of the following *HVAC* equipment:

- one or several part(s) of a refrigerating system,
- equipment using / producing hot water or pressurized water (produced via electrical heaters or exchangers) for *HVAC* equipment.
- Note: boiler(s) cannot be located in *HVAC PLANT ROOM*,
- equipment using / producing steam (produced via exchangers),
- equipment ensuring potable water cooling,
- air treatment for *AIR CONDITIONING*.

HVAC SPECIALIST: (or Company *HVAC SPECIALIST*) Specialist in *HVAC* discipline, from the *COMPANY*'s DEV / TEC - MTH department. The *HVAC SPECIALIST* is an employee from the *COMPANY* having an open-ended contract with the *COMPANY*. Person having a fixed term contract are not considered as Company *HVAC SPECIALIST*.

INTEGRATOR: Any Company which installs equipment / pieces of equipment, on construction site, and which connects them together, as per detail engineering produced by the *HVAC ENGINEERING*.

Note: Any Company which is qualified as "*INTEGRATOR*" does not mean that this Company is qualified as "*MANUFACTURER*" and / or "*VENDOR*" and / or "*ENGINEERING*".

GAS DAMPER: Equipment installed on a ducting to avoid the gas transfer from a part of ducting to another part of this ducting. The acceptable leakage of the *GAS DAMPER* is defined within paragraphs regarding the *GAS DAMPERS*.

GRILLE: device ensuring air collection from a room and which is connected to a return air ductwork.

INFORMATION: analogue or digital value provided by a control system, a PLC, and generally speaking by an electrical or pneumatic instrument.

LEVEL OF VOLTAGE:

Terminology in this file	Terminology in French regulation	AC volts	DC volts
VLV	TBT	$U \leq 50$	$U \leq 120$
LV	BT	$50 < U \leq 500$	$120 < U \leq 750$
MV	MT	$500 < U \leq 1,000$	$750 < U \leq 1,500$
HV	HTA HTB	$1,000 < U \leq 50,000$ $U > 50,000$	$1,500 < U \leq 75,000$ $U > 75,000$

LIQUID CHILLING PACKAGE: factory-made unit designed to cool liquid, using an evaporator, a refrigerant compressor, an integral or remote condenser and appropriate controls. It may have means for heating; heating can result from reversing the refrigerating cycle, like a heat pump.

MANUFACTURER: Company which builds a material or a package.

Note: Any Company which is qualified as "MANUFACTURER" does not mean that this Company is qualified as "INTEGRATOR" and / or "VENDOR" and / or "ENGINEERING".

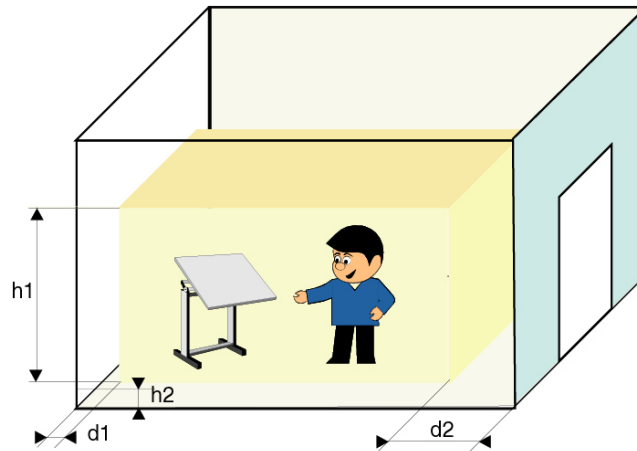
NOMINAL DESIGN POINT: physical characteristic of a machine or of equipment, resulting from calculation in accordance with basis of design, without taking into account the over-design resulting from "Basis of design" specification.

NON ESSENTIAL HVAC system: two independent principles define this system:

- The failure of one component of the HVAC system affecting the performances of the HVAC system, in terms of temperature, pressure, humidity, air filtration (particles and gas) is acceptable.
- The maintenance of a component of the HVAC system affecting the HVAC system, in terms of temperature, pressure, humidity, air filtration (particles and gas) is acceptable.

OCCUPIED AREA (for grilles and air diffusers): corresponds to the three dimensional space where a man is likely to be in usual conditions. The following values limit the occupied area:

	Usual value (in meter)	Tolerance
Height from floor	h1: 1.8	1.3 to 2 m
	h2: 0.1	0 to 0.2 m
Distance from walls	d1: 0.5	0.25 to 0.75 m
	d2: 1	0.5 to 1.5m



OPERATING PROCESS: operating conditions which define types and number of working equipment. The minimum **OPERATING PROCESS** to be studied, shall be:

- Normal operating mode (nominal production)
- ESD1
- ESD0
- Preservation
- Start-up.

OVERPRESSURE: artificial ventilation of an enclosed area to maintain that area at a pressure above the atmospheric pressure or adjacent room.

OWNER: means the "OWNER OF FIELD".

PACKAGE: equipment constituted by assembling of components on a skid and built in factory by a **VENDOR** or a **MANUFACTURER**.

PROJECT LIFE CONTEXT: situation that a platform, FPSO, FPU, etc. (generally speaking, a construction for **COMPANY**) can met from the start-up of its construction to its end of life. The **PROJECT LIFE CONTEXT** includes the **OPERATING PROCESS**.

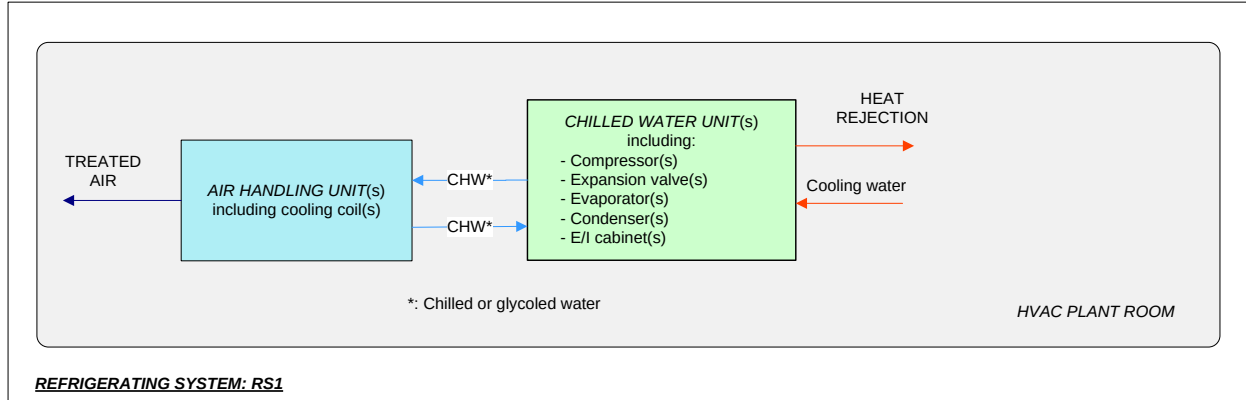
REDUNDANCY: a system design that duplicates components / equipment to provide alternatives in case one component / equipment fails.

REFRIGERANT: fluid used inside a refrigerating system to produce a cooling of medium by evaporation of this refrigerant.

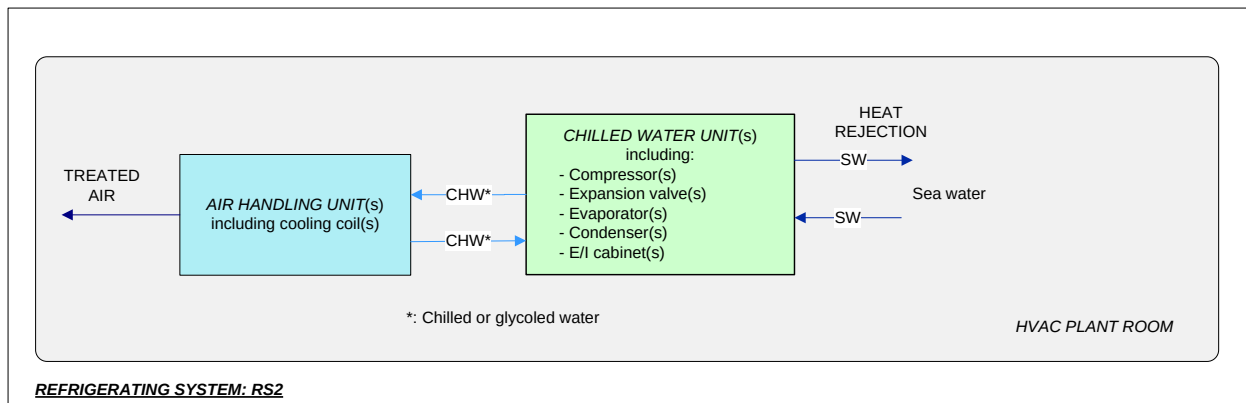
REFRIGERATING SYSTEMS: the refrigerating systems shall be chosen during the different phases of a Project. In order to avoid misunderstanding, the principles of these refrigerating systems are shown hereafter. Only main components of each system are indicated and listed. **REDUNDANCY** is not indicated for main packages, components, piping. These systems have to be developed by **HVAC Engineering**.

In order to clarify the **HVAC** design, the reference of used system (**RSx**, indicated on each scheme) has to be indicated within **HVAC** documents.

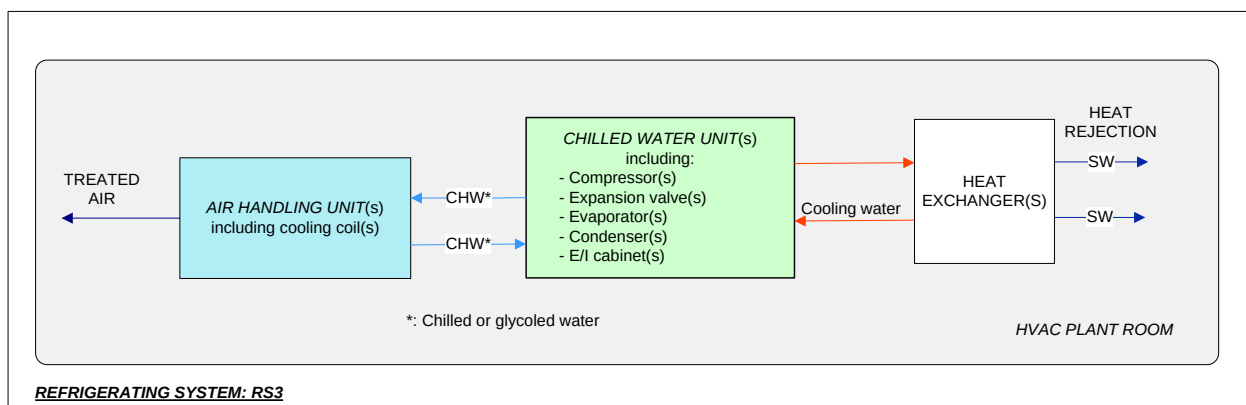
• REFRIGERATING SYSTEM RS1:



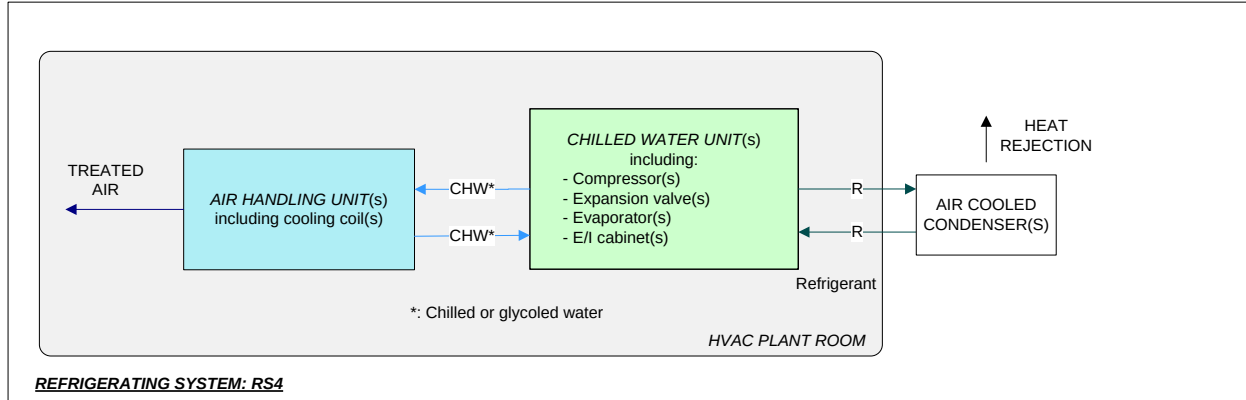
• REFRIGERATING SYSTEM RS2:



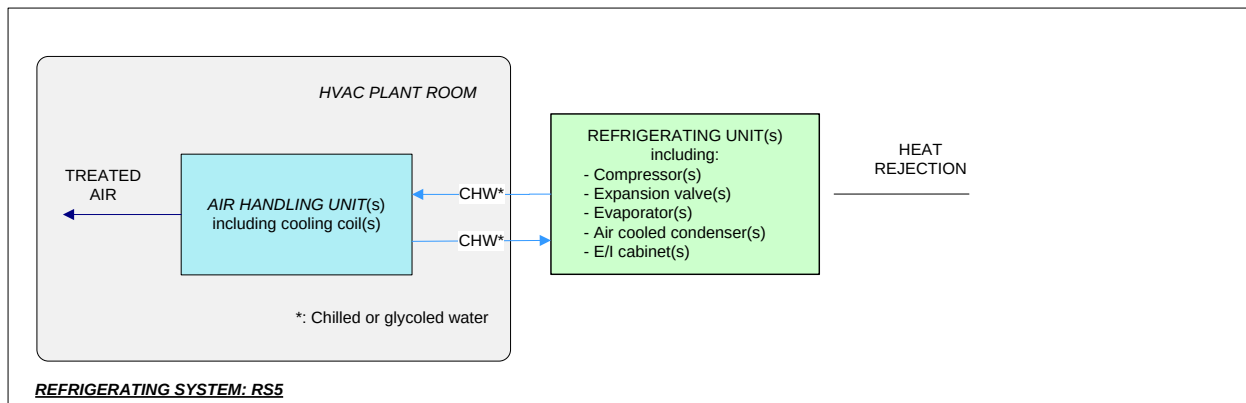
• REFRIGERATING SYSTEM RS3:



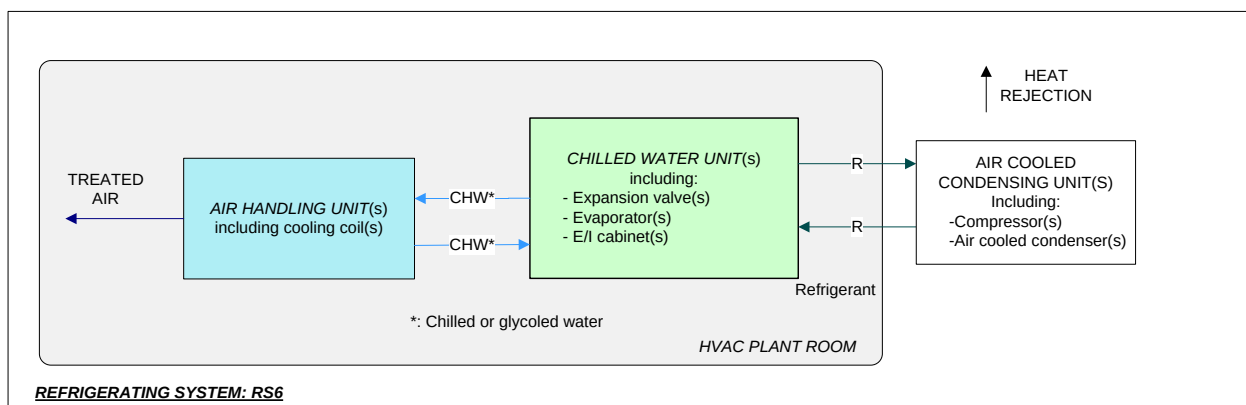
• **REFRIGERATING SYSTEM RS4:**



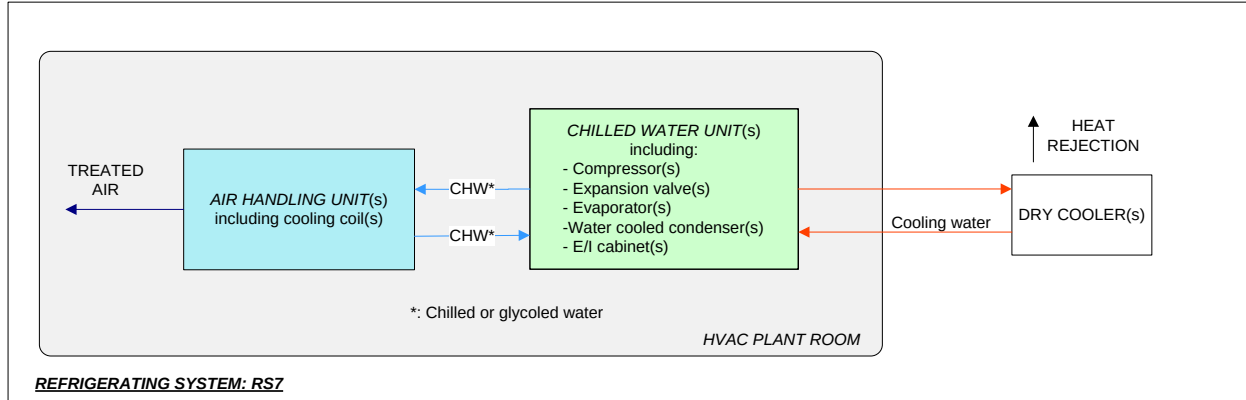
• **REFRIGERATING SYSTEM RS5:**



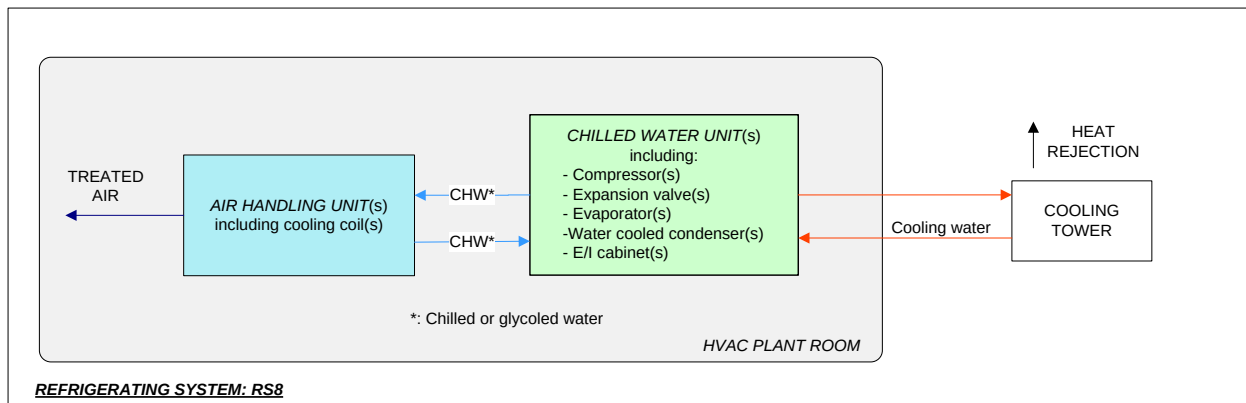
• **REFRIGERATING SYSTEM RS6:**



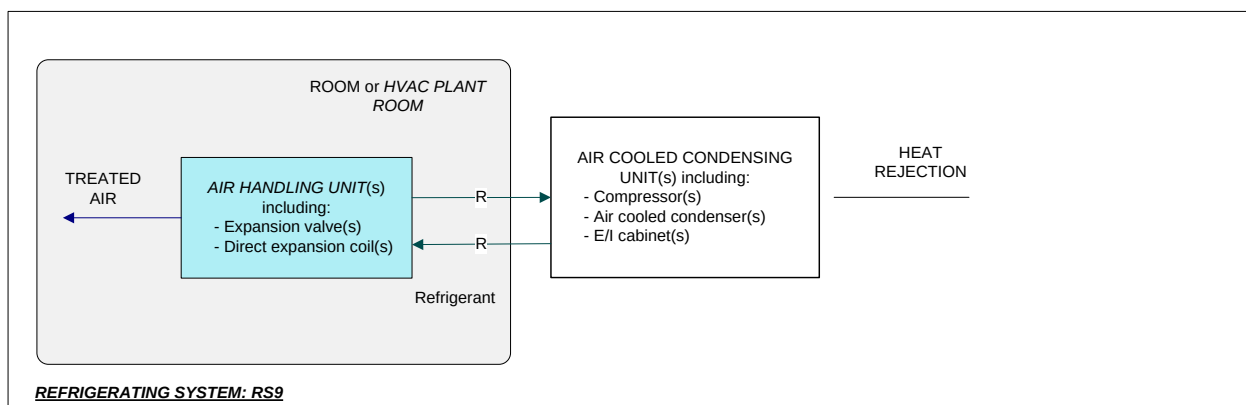
• REFRIGERATING SYSTEM RS7:



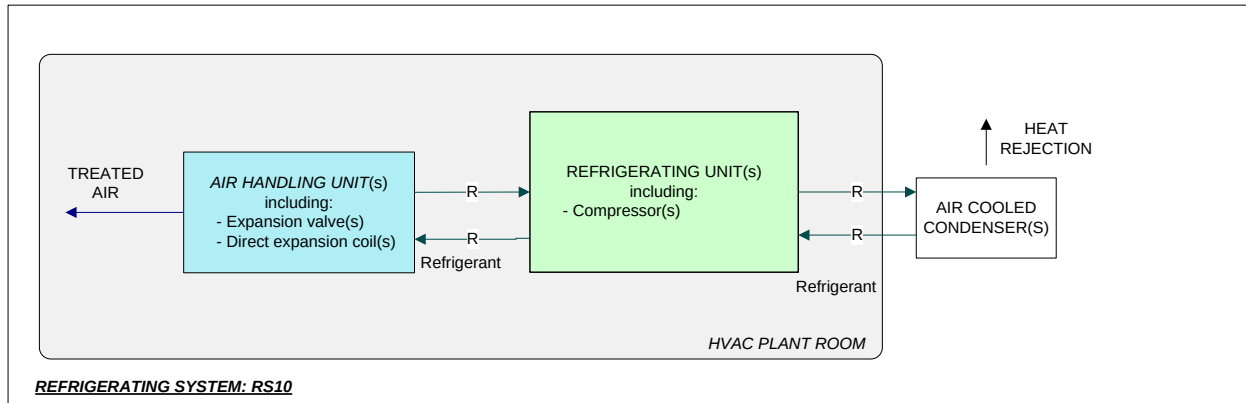
• REFRIGERATING SYSTEM RS8:



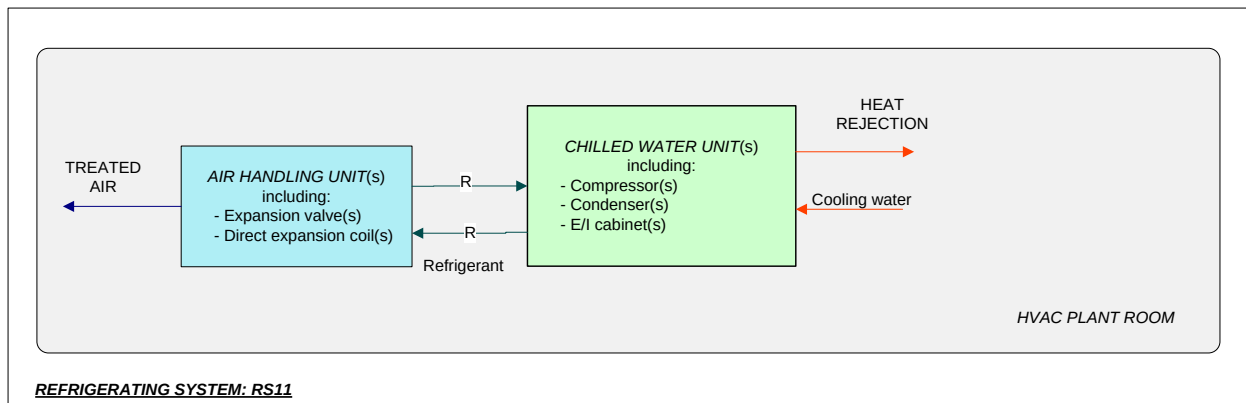
• REFRIGERATING SYSTEM RS9:



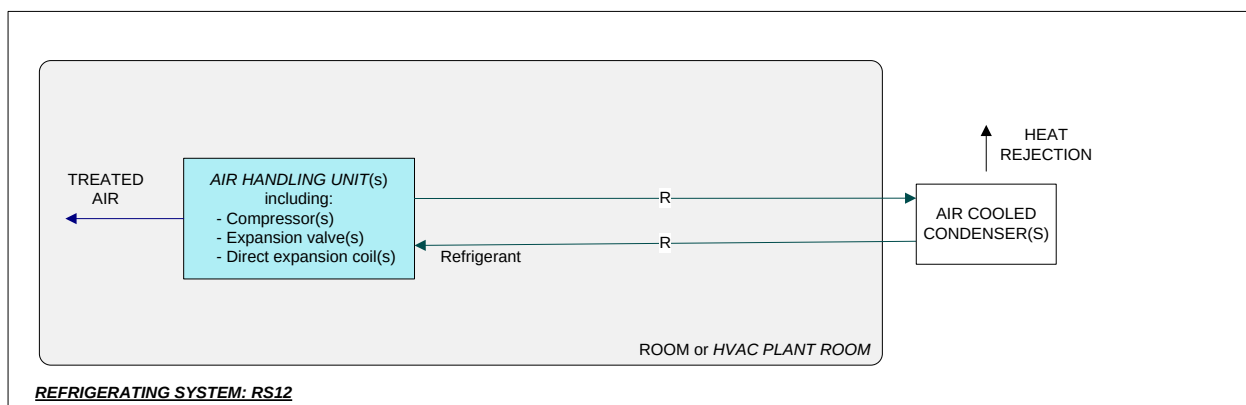
• REFRIGERATING SYSTEM RS10:



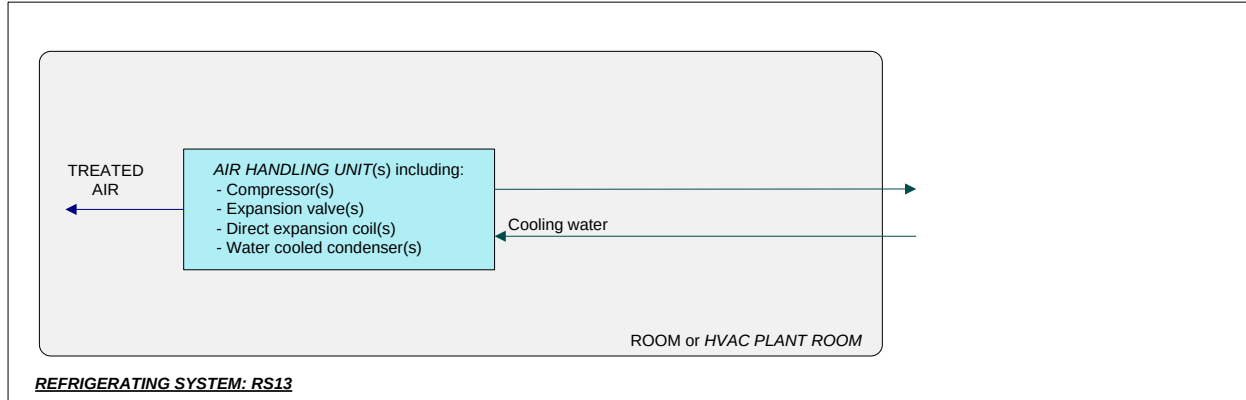
• REFRIGERATING SYSTEM RS11:



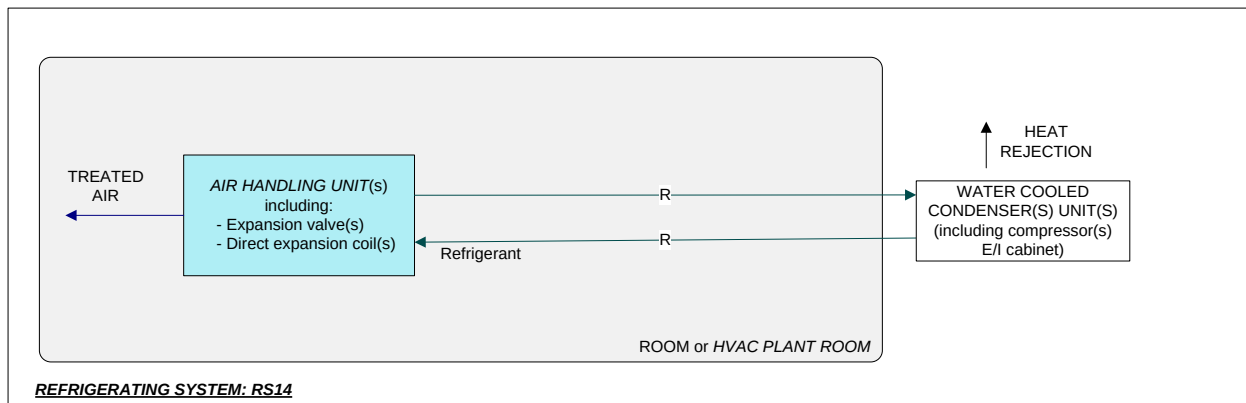
• REFRIGERATING SYSTEM RS12:



• REFRIGERATING SYSTEM RS13:



• REFRIGERATING SYSTEM RS14:



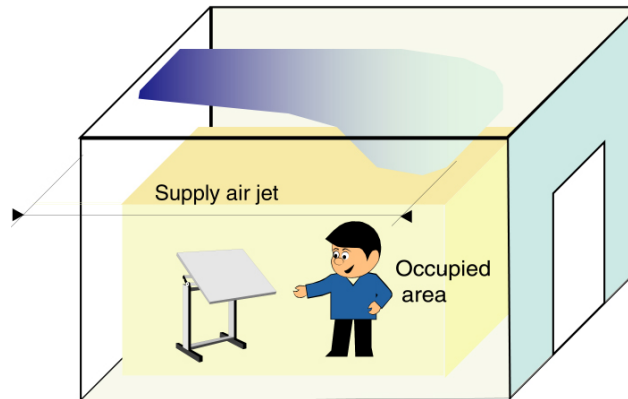
RELATIVE HUMIDITY: ratio, in humid air, expressed as a percentage of the actual water vapour pressure relative to the saturated vapour pressure at the same **DRY BULB TEMPERATURE**.

SUB-CONTRACTOR: see official definition inside the CONTRACT.

SUMMER: corresponds to the period of the year during which refrigeration is necessary to obtain the requested temperature inside a room.

SUPPLIER: Company which builds a material or a package.

SUPPLY AIR JET DIMENSION: corresponds to the diffuser air jet length where the **AIR VELOCITY** is 0.2 to 0.25 m/s.



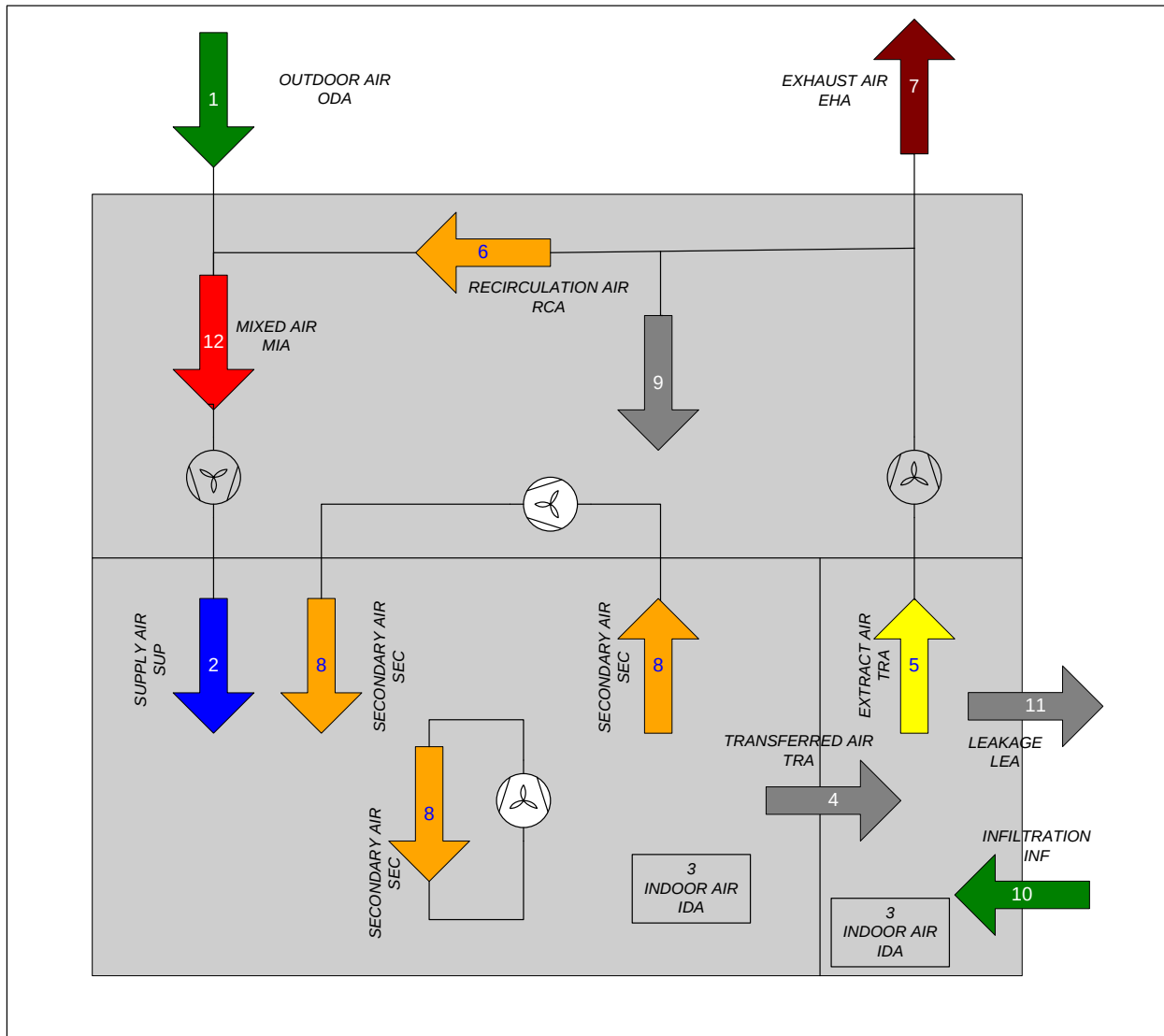
SHUT-OFF DAMPER: equipment used to manually or automatically isolate a part of a ducting. A **SHUT-OFF DAMPER** can only be positioned on fully open or on fully closed.

TREATED ROOM: Room where the temperature and / or **RELATIVE HUMIDITY** and / or pressure and /or number of particles (dust) is modified via an **HVAC** system.

TYPES OF AIR: The following terms have to be used in documents issued from basic engineering, detailed engineering, construction, compliance tests, pre-COMMISSIONING and COMMISSIONING phases and generally speaking in documents related to a Project.

Type of air (for numbering refer to schematic hereafter)	Abbreviation	Colour (drawings, layouts, ...)	Definition
OUTDOOR air (1)	ODA	Green #008000 0,128,0 (RGB)	Air entering to the HVAC system or opening from outdoors before any modification of temperature, water weight, pressure and number of particles (dust).
SUPPLY air (2)	SUP	Blue #0000FF 0,0,128 (RGB)	Air issued from an air treatment (modification of temperature, water weight, pressure and number of particles (dust)) system and blown to a duct or to a space.
INDOOR air (3)	IDA	Grey #808080 128,128,128 (RGB)	Air in the TREATED ROOM or zone.
TRANSFERRED air (4)	TRA	Grey #808080 128,128,128 (RGB)	Air passing from a TREATED ROOM to another TREATED ROOM .

Type of air (for numbering refer to schematic hereafter)	Abbreviation	Colour (drawings, layouts, ...)	Definition
<i>EXTRACT</i> air (5)	<i>ETA</i>	Yellow #FFFF00 255,255,0 (RGB)	Airflow leaving a <i>TREATED ROOM</i> .
<i>RECIRCULATION</i> air (6)	<i>RCA</i>	Orange #FFA500 255,165,0 (RGB)	Extract air which is returned to the air treatment system.
<i>EXHAUST</i> air (7)	<i>EHA</i>	Maroon #800000 128,0,0 (RVB)	Airflow discharged to the atmosphere.
<i>SECONDARY</i> air (8)	<i>SEC</i>	Orange #FFA500 255,165,0 (RGB)	Airflow issued from a room and returned to the same room after any air treatment (modification of temperature, water weight, pressure and number of particles (dust)). Note: only one or several of the above physical properties can be modified.
<i>LEAKAGE</i> (9)	<i>LEA</i>	Grey #808080 128,128,128 (RGB)	Unintended airflow through leakage paths in the system (<i>WALL</i> , door, casing, duct...).
<i>INFILTRATION</i> (10)	<i>INF</i>	Green #008000 0,128,0 (RGB)	Leakage of air into building through the leakage paths in elements of structure separating it from the outdoor air.
<i>EXFILTRATION</i> (11)	<i>EXF</i>	Grey #808080 128,128,128 (RGB)	Leakage of air out of building through the leakage paths in elements of structure separating it from the outdoor air.
<i>MIXED</i> air (12)	<i>MIA</i>	Red #FF0000 256,0,0 (RGB)	Air made of two or more streams of air.



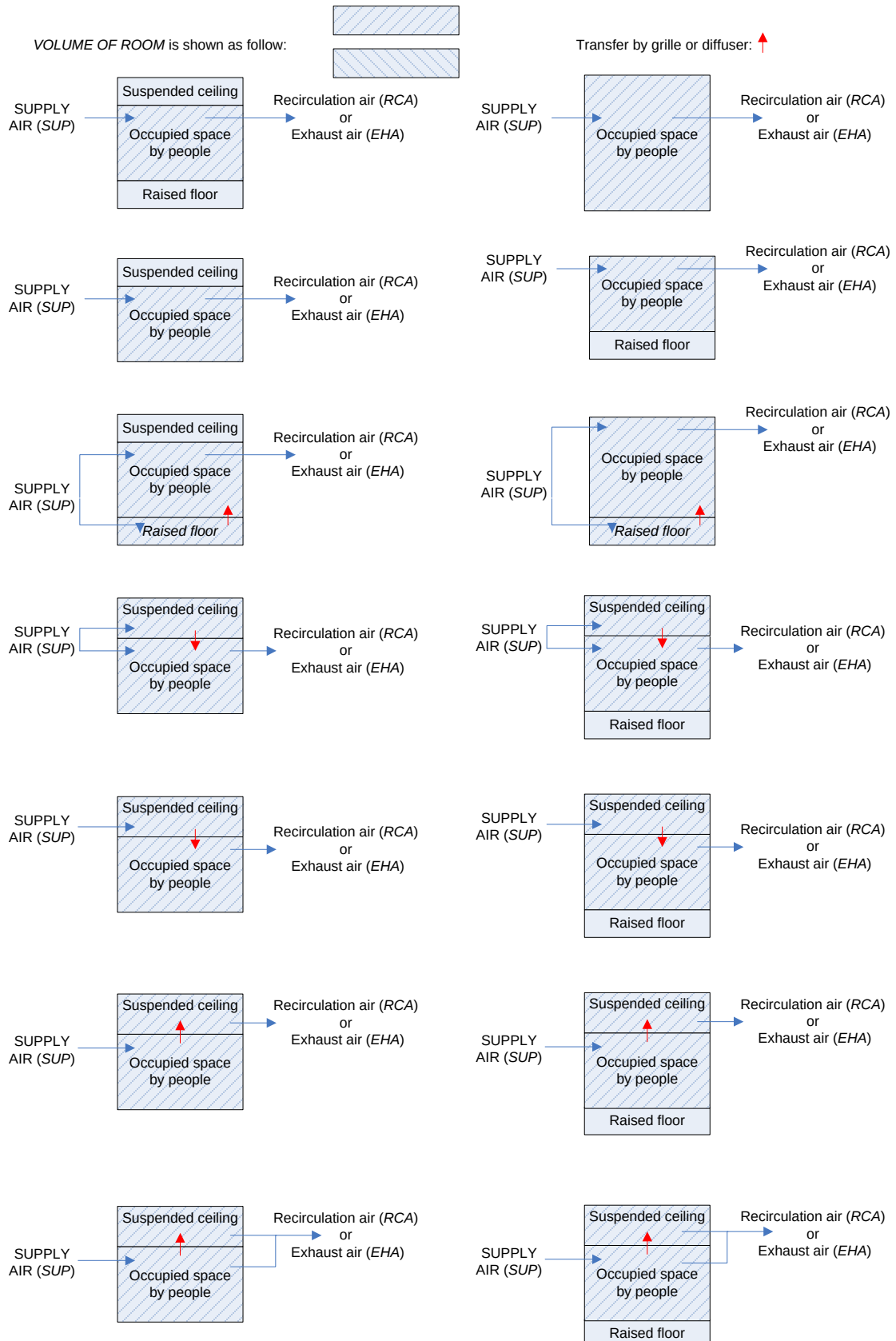
UNDERPRESSURE: artificial *VENTILATION* of an enclosed area to maintain that area at a pressure below the atmospheric pressure or adjacent room.

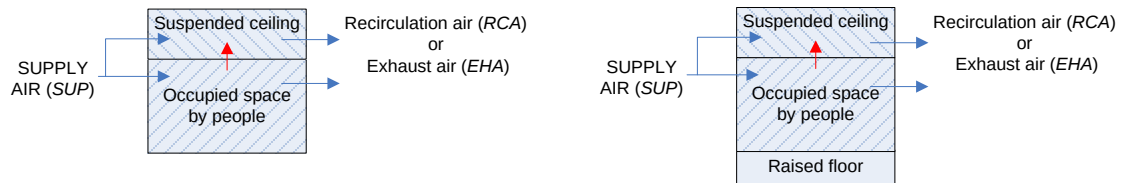
VENDOR: a party which bids to enter into and/or which has entered into an agreement with the *CONTRACTOR* for the supply of goods and services (*HVAC ENGINEERING* and construction excluded) in connection with the work.

Note: Any Company which is qualified as "*VENDOR*" does not mean that this Company is qualified as "*MANUFACTURER*" and / or "*INTEGRATOR*".

VENTILATION: supply of air to an enclosed space, in order to allow an air change, without passing through a heating and / or a cooling and / or a de-humidification equipment.

VOLUME OF ROOM: (this term is used for fresh air flow rate and exhaust air flow rates) corresponds to:



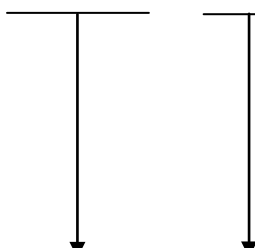


WALL: a partition between two spaces, whatever its position (horizontal, vertical, tilted). Outdoor has to be considered as a space.

WIND_{1hr}: corresponds to the wind velocity at an altitude of 10 meters above the floor or above sea (depending on building location, over the considered duration (1hr for this case).

WINTER: corresponds to the period of the year during which heating is necessary to obtain the requested temperature inside a room.

WORKING POINT: physical characteristic of machine, equipment, measured during *FCT* and / or on site (during commissioning). This reading, including tolerance, shall be in accordance with the *DESIGN POINT*.

Engineering	HVAC CONTRACTOR	MANUFACTURER or Commissioner
NOMINAL <i>DESIGN POINT</i> e.g.: 100 kW ↓ Over-design(s) e.g.: +10% ↓ <i>DESIGN POINT:</i> $100 + \frac{100 \times 10}{100} = 110kW$	Tolerance due to installation e.g.: ± 5% (including tolerances on measurement, ...)  CONTRACTOR order to MANUFACTURER: $110 + \frac{110 \times 5}{100} + \frac{110 \times 3}{100} = 119kW$	Tolerance due to the carrying out e.g.: ± 3%
Reading values		
On site:	During <i>FCT</i> :	
Measured value: 114 kW Taken into account the installation, measurement tolerances, ... capacity can be from: $114 - \frac{114 \times 5}{100} = 108,3kW$ to $114 + \frac{114 \times 5}{100} = 120,7kW$ Equipment is refused: capacity could be inferior to <i>CONTRACTOR</i> order.	Measured value: 120 kW Taken into account the measurement tolerances, capacity can be from: $120 - \frac{120 \times 3}{100} = 116,4kW$ to $120 + \frac{120 \times 3}{100} = 123,6kW$ Equipment is refused: capacity could be inferior to <i>CONTRACTOR</i> order.	
Measured value: 127 kW In taken into account the measurement tolerances, capacity can be from: $127 - \frac{127 \times 5}{100} \cong 120kW$ to $127 + \frac{127 \times 5}{100} \cong 133kW$ Equipment is accepted: capacity is superior to <i>CONTRACTOR</i> order.	Measured value: 127 kW In taken into account the measurement tolerances, capacity can be from: $127 - \frac{127 \times 3}{100} \cong 123kW$ to $127 + \frac{127 \times 3}{100} \cong 130kW$ Equipment is accepted: capacity is superior to <i>CONTRACTOR</i> order.	

This principle shall be applied for equipment which requires maximum value concerning the *DESIGN POINT* and the *WORKING POINT*.

4. Abbreviations

4.1 Abbreviations specific to HVAC documents

Refer also to "Definitions" paragraph, for *TYPE OF AIR*.

Within *HVAC* documents, these abbreviations have to be indicated in CAPITAL CHARACTERS and *italic*.

Abbreviation	Definitions
ACC	Air-Cooled Condenser
ACU	Air Conditioning Unit
AHU	<i>AIR HANDLING UNIT(s)</i>
CWU	<i>CHILLED WATER UNIT</i>
DB	Dry Bulb
D&ID	Ducting and Instrument Diagram
DX	Direct expansion
FCT	<i>FACTORY COMPLIANCE TESTS</i>
HVAC	Heating, <i>VENTILATION</i> and <i>AIR CONDITIONING</i>
HVAC CC	<i>HVAC</i> Control Cabinet
HVAC MCC	<i>HVAC</i> Motor Control Centre (it can include Circuit Breakers Outgoers)
RH	<i>RELATIVE HUMIDITY</i>
RS	<i>REFRIGERATING SYSTEM</i>
SEER	Seasonal Energy Efficiency Ratio
SOD	Shut-Off Damper
WB	Wet Bulb
WCC	Water-Cooled Condenser

4.2 General abbreviations

The following abbreviations are used for *HVAC* discipline and also for other disciplines. They are only given for information and have to be indicated in "CAPITAL CHARACTERS and not in *italic*".

Abbreviation	Definitions
AC	Alternative Current
AI / AO	Analog Input / Analog Output
DC	Direct Current
DI / DO	Digital Input / Digital Output



Abbreviation	Definitions
ESD	Emergency Shut-Down
FAT	<i>FACTORY ACCEPTANCE TESTS (FACTORY COMPLIANCE TESTS</i> has to be used)
F&G	Fire & Gas
FGS	<i>FIRE & GAS SYSTEM</i>
GUI	Graphic User Interface
HIPS	High Integrity Pressure System
HMI	Human Machine Interface
HP	High Pressure
HV	High Voltage
ICSS	Integrated Control and Safety System
I/O	Input / Output
KOM	Kick-Off Meeting
LED	Light Emitting Diode
LP	Low Pressure
LV	Low Voltage
MCC	Motor Control Centre
ME	Maintenance Engineering
MTO	Material Take-Off
MV	Mean Voltage
NC	Normally Closed
NDT	Non Destructive Testing
NO	Normally Open
OC	Operator Console
P&ID	Piping & Instrument Diagram
PC	Personal Computer
PCS	Process Control System
PLC	Programmable Logic Controller
PWHT	Post Weld Heat Treatment
QC	Quality Control
SIL	Safety Integrity Level
UPS	Un interruptible Power Supply



Abbreviation	Definitions
VDRS	Vendor Documents Request Schedule
VDS	Vendor Documents Schedule
VDT	Validation Design Test
VLV	Very Low Voltage
VDU	Video Display Unit
VSD	Variable Speed Drive
WPS	Weld Procedure Specification

Abbreviations for air type: refer to **GS EP EXP 501**

Abbreviations for water type: refer to **GS EP EXP 501**