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1. Pipes

- Hot water, heating, chilled water and cold water pipes passing through equipment rooms, corridors and other spaces within the Palace of Nations must be made from top-quality welded black steel tubes in accordance with standard EN10255, pre-painted with anti-rust paint or Rust-Oleum depending on the application. After installation, anti-rust paint touch-ups must be applied to the welds.
- Pipes passing outdoors or installed in trenches must be made from pre-insulated drawn steel. The insulation must be recreated at every join.
- Pipes supplying the cooling towers must be made from 304 L stainless steel and must not be insulated.
- Connections between pipes of different metals must be made with Straub connectors.
- A vent must be provided at the highest point of each pipe (automatic or manually-operated, to be decided in conjunction with the relevant departments of UNOG).
- Drain points must be provided at each low point.
- Vent and drainage water must be collected for disposal in a PVC or copper collection tray (to be decided in conjunction with UNOG representatives); water must flow to the tray via a Geberit pipe.
- The pipes must be held in place by anti-vibration clamps.
- A filter must be installed on the primary and secondary circuits at each exchanger.
- Equipment (sensors, thermometers, pressure taps, drains, vents, etc.) mounted or welded onto pipes must be positioned in such a way as to facilitate the installation of fixed or removable thermal insulation.
- When positioning equipment, thermowells and label holders, the thickness of the insulation and the thickness of the wrapper must both be taken into account. The pipe insulation standards can be supplied at the request of the company.

2. Marking of the pipes (see Photos 2 and 3)

- All pipes must be marked with arrows indicating the direction of liquid flow. The arrows must be of different colours for supply and return pipes and according to the type of liquid carried, with white writing on the following backgrounds:
 - Dark blue: chilled water supply pipe;
 - Pale blue: chilled water return pipe;
 - Pink: cooling tower supply pipe;
 - Purple: cooling tower return pipe;
 - Red: secondary heating supply pipe;
 - Blue: secondary heating return pipe;
 - Orange: 105 °C primary heating circuit.
- The dimensions of the arrow stickers must be 10 cm x 3 cm or 10 cm x 4 cm, depending on the pipe diameter. The type of liquid, whether the pipe is a supply or return pipe, and the place of distribution must be engraved on each label. Identification must be given every time a pipe passes through a wall, and every 4 lm of straight sections. For heating, cold water and chilled water pipes, arrows must be placed on the insulation finishing sheet. For pipes supplying cooling towers, arrows must be marked directly on the stainless steel pipes.

3. Information plates (see Photos 1, 4, 5 and 6)

A rod to attach a label-holder must be welded onto the pipe. For the chilled water circuits, a black anodised aluminium information plate must be used, with white writing and dimensions of 5 cm x 10 cm, displaying the following information:

- Circuit type;
- Liquid destination;
- Supply or return circuit;
- Liquid temperature;
- Maximum flow rate;
- Liquid type;
- Manometric head (for supply circuits).

For heating circuits, a red plate with white writing must be used for supply circuits and a blue plate with white writing for return circuits; the dimensions of these plates must be 5 cm x 10 cm. These plates must be fixed to each pipe at the feed tanks (for supply and return) and on each of the supply and return pipes. The plates must be fitted with a transparent protective cover. The information on the plates must include:

- Circuit type;
- Liquid destination;
- Supply or return circuit.

4. Training of personnel

Personnel must be specialists in the design and installation of pipes carrying chilled water, cold water and heating water. The company will be requested to supply UNOG with the authorisation certificates of its welders for black steel and stainless steel welding.

All work with pipes must be performed in accordance with the applicable Swiss Canton and Federal standards and regulations. Industry standards must be strictly followed.

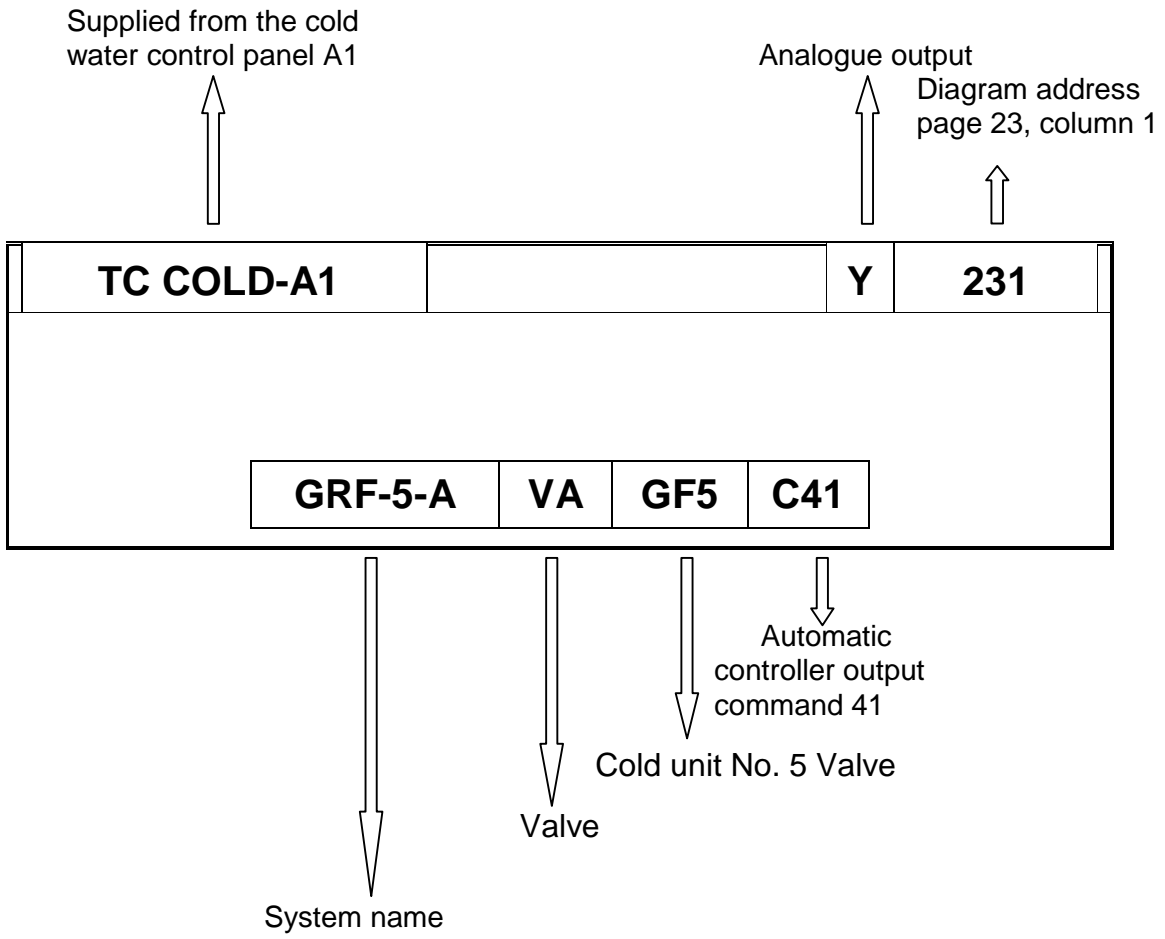
5. Testing of the pipes

The pipes in each installation must be tested. The test must be performed at nominal network pressure x 1.5 for a period of 24 hours.

6. Identification of equipment installed on the pipes (see Photos 7 to 10)

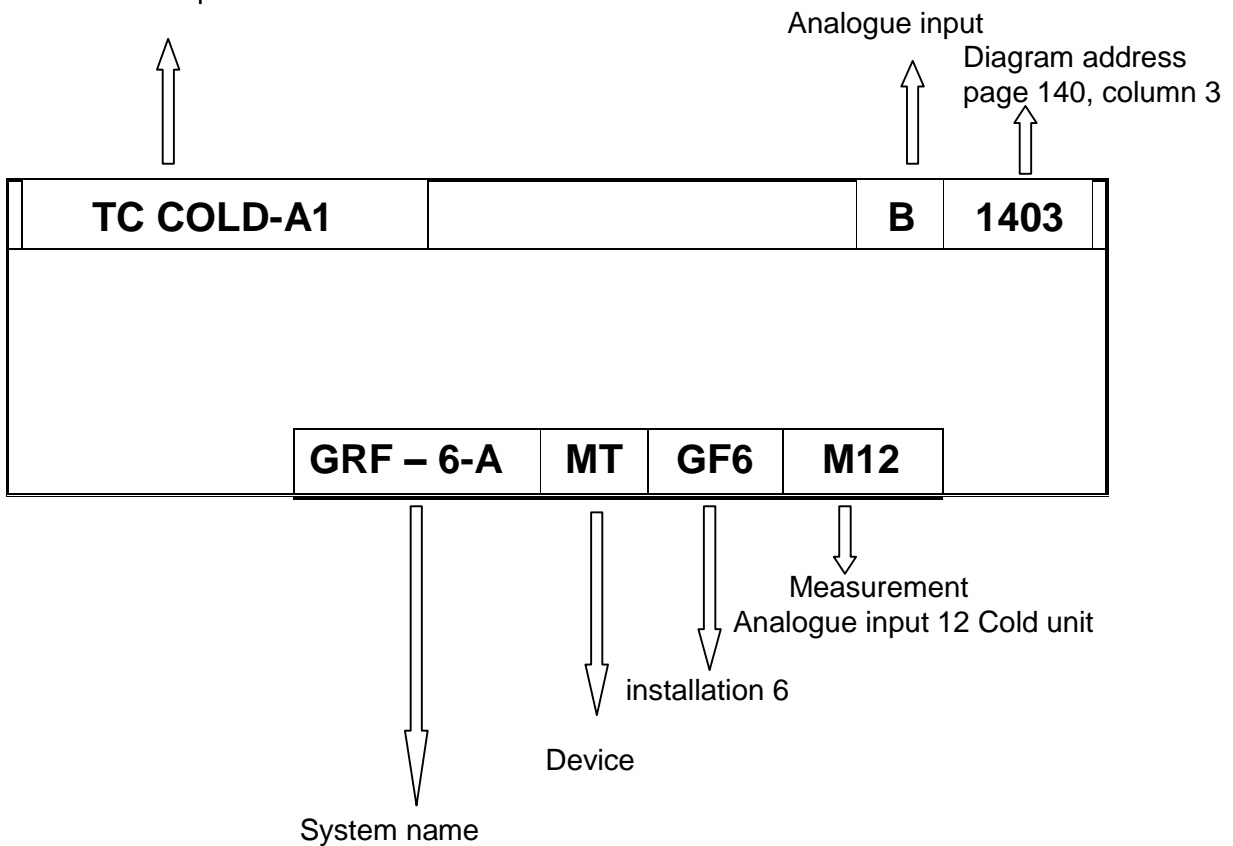
All equipment, sensors, pressure switches, thermostats, flow controllers, control valve servomotors, motorised safety valve servomotors, etc., must be specifically identified using appropriate labels, dimensions: 8 cm x 2 cm, with black writing on a white background, hung on the equipment's power supply cable by means of a ring. Some equipment, such as motorised valves, which are supplied by a control cable and a power cable, must have two sets of identification details (see Photos 9 and 10).

Example for a motorised valve according to the tables in Section 7



Example for a temperature sensor according to the tables in Section 7

Supplied from the cold water control panel A1



7. Diagrams and tables (see Photos 11 and 12)

All safety and control equipment installed on the water circuits must be identified on the diagrams and tables. These identifications must include the same details as those appearing on the information plates on the devices. Use Photos 11 and 12 as examples. Pipe diameters, circuit flow rates, pump and circulator locations, operating pressures and temperatures, liquid types, etc. must appear on the diagrams and tables.

Definitions of MCR acronyms related to water network control equipment

DEVICES	
Code	Type
EB	Coil water
ES	Domestic water
EV	Solenoid valve
MD	Flow rate
MT	Temp measurement
PO	Pump
VA	Valve
MO	Motor

EQUIPMENT	
Code	Type
BAT	Coil
CHA	Heating
CIR	Circuit
DEP	Supply pipe
EAU	Domestic water
ECH	Hot water
ECS	Domestic hot water
GRS	Cold unit
PPE	Pump
PRC	Recovery pump
PRE	Preheating
PRI	Primary
POS	Post-heating
RAD	Radiator
REF	Cooling
RET	Return
SEC	Secondary
TOR	Tower

MEASUREMENTS	
Code	Type
M10/19	Temperatures
M30/39	Pressures
M70/79	Flow rate
M80/89	Metering

INPUTS/OUTPUTS	
Code	Type
B	Analogue input
Y	Analogue output
E	All-or-nothing input
U	All-or-nothing output

8. Standardisation of water control equipment

Description	Brand	Type	Comments
Shut-off valve	BOAX	SF LUG	According to operating temp.
Balancing valve	OVENTROP	HYDROCONTROL	
Three-way tap for pressure gauge	OVENTROP		PN 25
Motorised butterfly valve	KSB SAPAG	T4 LUG LUG	
Vent and drain valve	TRIGRESS	RB 215 or RB 219	Ball valve
Two-way valve	JOHNSON CONTROL		Chilled water, hot water
Servomotor	JOHNSON CONTROL	Progressive	
Safety valve	PNEUMATEX	SV PAC	
Filter on domestic water pipes	JUDO JRG		
Filter on other pipes hot/chilled water	7905 2053		With vent
Pressure control valves, stainless steel	BOA-S		With limit stop
Exchangers	CIPAG or ALFA-LAVAL		Tubular with plates
Expansion tanks	PNEUMATEX		
Automatic steam traps + expansion tanks	PNEUMATEX	Ventopic Flexvent Super	
Pressure sensors	HUBA CONTROL		
Temperature sensors	JOHNSON CONTROL	TS9101-8225	With stainless steel thermowell
Thermometers + pressure gauges	HAENNI JAKO WALTER MEIER BAUMER	-20/+40 °C water chilled 0/+120 °C heating 0/10 bar	Diameter 100 mm Diameter 80 mm
Circulator pumps	KSB EMB, Grundfos		Variable flow rate, diaphragm adjustment
Anti-vibration pipe brackets	SAMVAZ HILTI		

The temperature of the heating network in the Palace of Nations is 110 °C. It is requested that all equipment used for heating be selected for temperatures of 140/150 °C.

9. Photos (not contractually binding)

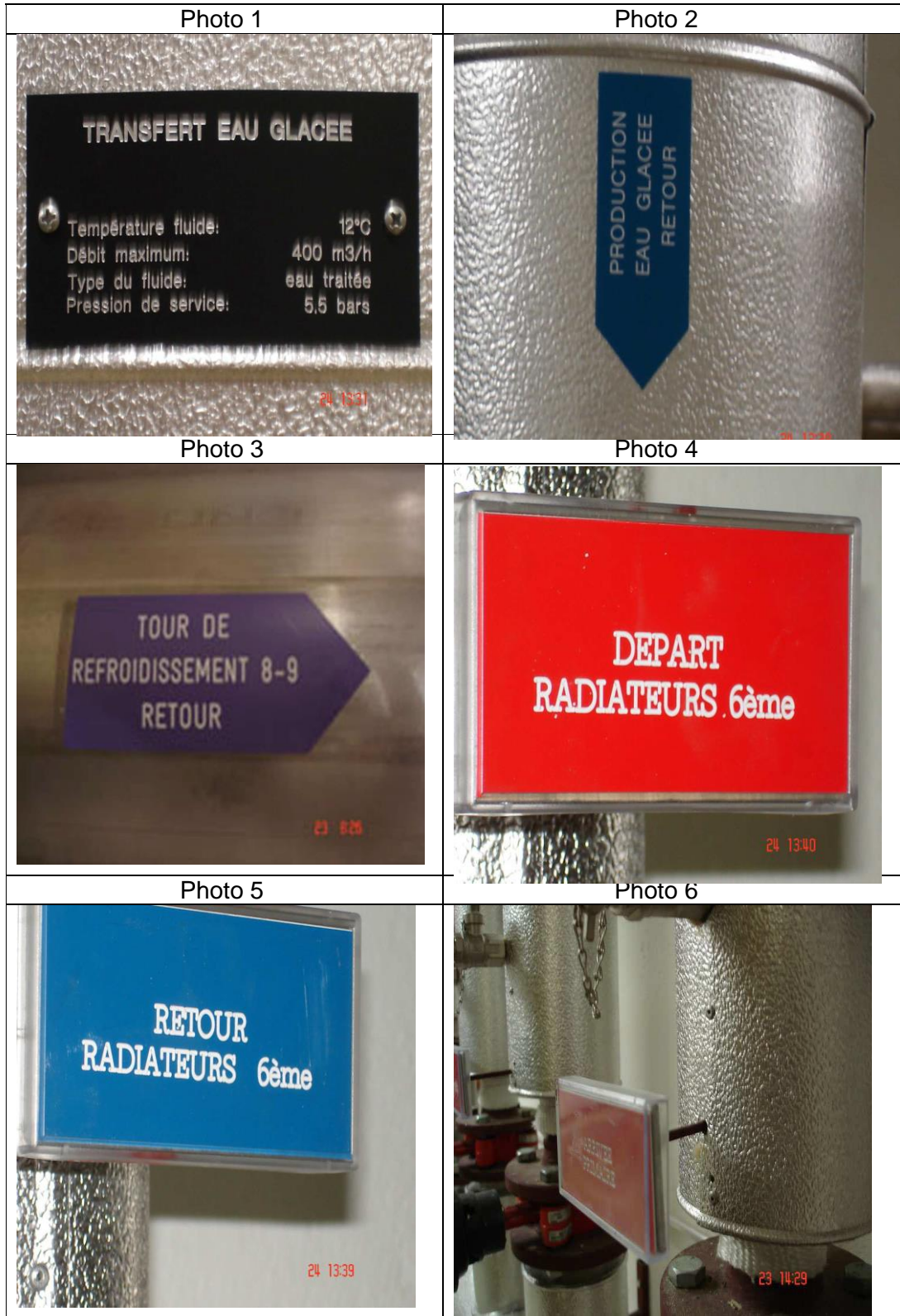


Photo 7



Photo 8



Photo 9

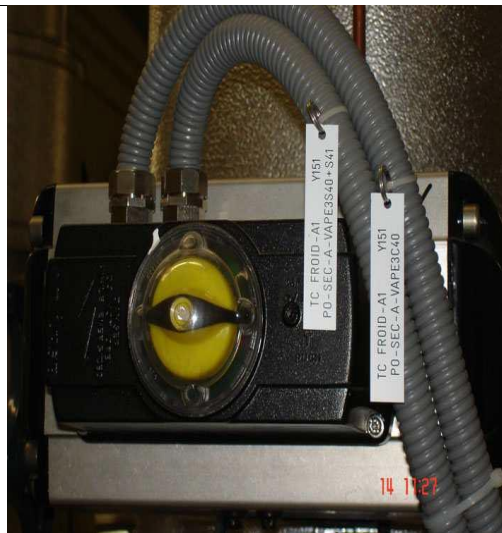


Photo 10



Photo 11

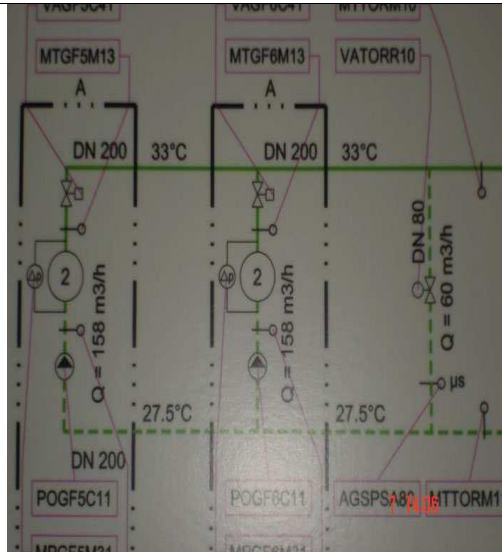


Photo 12

