

AUTHOMATIC MANAGED THERMAL PLANT WITH SANIFYING SYSTEM

We can say that our thermal plant can be seen as divided into two different aspects, very closed o each other: TREATMENT and MANAGING.

TREATMENT

The treatment area is made of a number of BLOCKS, equipped with a stainless steel frame, and fireproof panels; each block is made of a different number of SEATS displayed according to the specific design of the ward. The BLOCKS are equipped internally with all the piping requested to feed each SEAT for treatment:

- Thermal water.
- Drinkable water to clean the basins.
- Compressed Air.
- Steam.
- Drain.
- Electrical plant in low tension according to the CE 72/23 directive.
- Data pipeline for the PC management.

The dimensions of the BLOCK are:

- height cm. 150
- depth cm. 42 (cm.55 sink depth)
- the length depends on the step of each SEAT that can be: cm.90 / 80 / 75.

The BLOCK can have SEATS equipped only on one side to place against the wall, otherwise it can have SEATS on both sides; in this case it can be placed in the centre of the room.

Independently to the solution, each visible side of the BLOCK is furred with melamminic panels with a plastic surface finish resistant to scratches, heat and other chemical agents that are particularly aggressive in the thermal environment. The color of the panels is usually white but of course it's possible to have a wide range of colors to choose from.

The therapies available on each SEAT are:

STEAM JET INHALER (CU)

The inhalations are an individual treatment. The thermal water is sucked up by the Venturi effect through a small jet; this cause the water to fragment in small drops about 10 micron wide. The mixture of thermal water and steam are carried by the pipe to the patient, reaching the maximum temperature of 38°C. The patient is seated, with his mouth opened, at the same level of the steam jet, keeping a distance of at least 20/30 centimeters, breathing normally. Usually one application a day for a maximum of 12 days is suggested. The length can increase gradually from 8 minutes on the 1st day until 12 minutes; instead the customer can request a fixed time of 10 minutes.

The steam jet inhalation is indicated for chronicle pathologies of the first respiratory tracts: nose, pharynx, larynx, windpipe and bronchus.

WATER FLOWING AEROSOL (AF)

The water flowing aerosol is an individual treatment. The thermal water is sucked up by the Venturi effect through the nebulizer and it is fragmented, by the effect of the compressed air, in very small drops about 2 or 4 micron wide. The average temperature is about 28-30°C.

The therapy can be made both trough the mouth, with a small mask and trough the nose with the fork, according to the pathology of the patient. Usually one application a day for a maximum of 12 days is suggested. The length can increase gradually from 8 minutes on the 1st day until 12 minutes; instead the customer can request a fixed time of 10 minutes.

The water flowing aerosol is indicated for chronicle pathologies of both the higher and the lower respiratory tract: nose, pharynx, larynx, windpipe and lungs.

SONIC WATER FLOWING AEROSOL (AF/VIB)

This particular treatment, discovery of the French physiologist Guillermin, is different from the aerosol because it joins the effect of the small fragmentation of the water to the sonic wave flow. The aerosolic micelle, exposed to a flow of sonic waves at the frequency of 100 Hertz, acquire a particular kinetic movement that can ease the penetration of the active principles of the thermal water inside the nasal cavity and the internal ear trough the Eustachian tube. The water flowing sonic aerosol is indicated for the chronic rhino-sinusitis, chronic otitis.

IONIC WATER FLOWING AEROSOL (AF/J)

The ionic water flowing aerosol joins the benefits of the flowing thermal water the negative ion-therapy. The usual aerosol pipe is connected to an ion generator that provides a negative charge to the mixture. This charge avoids the small particles to join in bigger agglomerates, reaching the deeper parts of the lungs. Besides this the negative charge helps the absorption of the particles by the mucosa of the respiratory tract and a better use of the oxygen by the cells. The treatment requires a special mask that makes possible the breathing with the nose or with the mouth.

The ionic water flowing aerosol is indicated for allergic and non allergic asthma.

MEDICAL AEROSOL (AF/M)

The compressed air, passing through the Venturi duct, suck up the medicine injected inside the nebulizer. This treatment doesn't use the thermal water but many times helps as adjuvant.

HUMAGE (HU)

The Humage is based on inhaling the gas released by the thermal water gurgling inside a jar. The treatment is completely dry and consequently the particles are very small. This helps a very fast absorption by the tissues in contact with the flow.

MICRONIZED SHOWER (DM)

The micronized shower consist in an aerosol with bigger particles injected directly inside the nose cavity by the rhino-jet. This abundant water flow allows a fluidification of the secretions. During the treatment the patient should keep one nostril closed with his finger while in the other one he keeps the rhino-jet, after half the time he should change the nostril. At the same time it's suggested to swallow frequently. The micronized shower is a treatment that is well tolerated by babies and young boys.

NASAL SHOWER (DN)

The nasal shower consists in the washing of the nasal cavity with thermal water at 37°C and atmospheric pressure, allowing the cleansing of the mucosa out of crusts and other solid bodies. As the micronized shower the patient should keep one nostril closed with his finger and change it after half time of the treatment.

On the same SEAT it's possible to provide one or two and in some cases even three different therapies, making the whole ward much more productive and flexible.

For example in a ward composed of 50 seats divided in 25 inhalers and 25 aerosols, at the starting time the first treatment, according to the posology, is the inhalation and after 15 minutes rest the aerosol. In this case for the first 25/30 minutes only 25 devices are working while the other 25 are stopped and every person over the 25th should wait for his turn.

When starting with the aerosol there'll be only other 25 devices working and the other ones maybe stopped and the 26th person waiting for his turn. In the case of 50 multi-treatment SEATS, composed as inhalers and aerosols, in every moment it' possible to have 50 devices ready.

The most recommended combinations of therapies on the same SEAT are:

- CU/AF Steam jet inhalation / Water flowing aerosol
- CU/AF/S Steam jet inhalation / Water flowing aerosol / Sonic aerosol
- CU/AF/J Steam jet inhalation / Water flowing aerosol / Ionic aerosol
- CU/DM Steam jet inhalation / Micronized shower
- CU/AF/DM Steam jet inhalation / Water flowing aerosol / Micronized shower
- AF/DM Water flowing aerosol / Micronized shower
- AF/S Water flowing aerosol / Sonic aerosol
- AF/J Water flowing aerosol / Ionic aerosol
- AF/H Water flowing aerosol / Humage
- AF/M Water flowing aerosol / Medical aerosol
- DN/DM. Nasal shower / Micronized shower

The division among the SEATS is made by some unbreakable plastic separator.

They provide privacy to the patient and prevent from water sprinkles. It's possible to have different shapes from the "standard" one rectangular or the "luxury" one rounded and as high as the SEAT.

Each seat is equipped with a basin. The cleaning of the basin is guaranteed by the automatic device that can work continuously or intermittently during the treatment; in the first case the water start to flow in the basin as the treatment starts and ends with it; in the other case the water flows for 20 seconds every 2 minutes stop; at the end of the therapy the water flows for 20 seconds and stops.

Each SEAT is equipped with an electronic device managed by microprocessor.

This controller is named " Thermal Controller ". It is composed by the following parts:

1) User interface:

- 1.1) Magnetic sensor to start the SEAT manually
- 1.2) Treatment selection button
- 1.3) Treatment length button
- 1.4) Treatment start button
- 1.5) LCD display for messages

2) Power interface:

- 2.1) Electro-valve start for the treatment
- 2.2) Electro-valve start for the basin
- 2.3) Lighten of the booked SEAT

Automatic functions provided by the Thermal Controller:

- 1) Time decreasing of the treatment.
- 2) Memory of the time elapsed in case of feeding failure and automatic reload of parameters after feeding restore.
- 3) Real time data exchange with the ward PC by serial line (RS 422).
- 4) Interface connection to badge readers both magnetic, transponder and bar code.

MANAGING

The managing area of the ward is made by a Personal Computer that constantly exchange data with the SEATS through the serial cable RS 422; On the other hand the PC connects to the managing system software through the standard ethernet cable with the TCP-IP protocol.

This data exchange allows a total control of what the SEATS can provide to the patient according to the posology established on the medical folder on the managing software. Besides that, the patient receives a badge and he is free to go to the ward and request the treatment. On the other side the manager can see in real time the situation of the ward, the number of people, the number of treatments, and the statistics on the kind of treatments made.

Besides that, it's possible to overview the status of each SEAT planning the maintenance, the sanitification process at the end of each day.

SOFTWARE FUNCTIONS

By the TSID (Thermal System Inhalant Division) software it is possible to:

1) CUSTOMER MANAGEMENT

1.1) Automatic booking, using the badge on the ward PC, of the first available SEAT and setting of type, length according to the medical folder.

2) MAINTENANCE MANAGEMENT

- 2.1) Possibility to put some SEATS out of order for maintenance, while the other ones are still working.
- 2.2) Possibility to put some BLOCKS out of order to save money when the ward works during the off season.

3) STATISTICS

3.1) On the ward PC a log file is automatically written after every treatment with the following data:

- a) Client code (if assigned)
- b) Type of treatment
- c) Length of the treatment
- d) Date of starting
- e) Time of starting

3.2) Each request for the treatment on the SEAT corresponds to a data exchange with the managing software in order to load the parameters for the type of treatment, length, authorization to start. After the system confirmation, the treatment can be counted and, if the badge is not prepaid, charged on the customer's bill.

4) SANIFICATION

Automatic start of the SANIFICATION process: the operator, using the wardPC console just activates the function. This procedure aims to eliminate every bacterial storage inside the thermal water loop or inside the compressed air circuit. In fact the proliferation can start both from the well and from the patient himself. In both cases the accessories for the treatment can be easily contaminated.

