



M.S. RESISTANCES

# Resistances

MAG'

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## Breaking news !



### Edito

Dear Friends,

The growth of M.S. Resistances continues, and to face the high demand of our clients and to be able to assemble the high number of resistors and reduce the delivery time of orders, we have decided in 2011 to:

- install a new production line of grids. This new line will be operating in September, and will allow us to reduce the delivery time from 16 weeks to 8 weeks (this is our target),

- extend the factory with around 600 m<sup>2</sup> of working area and 200 m<sup>2</sup> of new offices,

This is considered as the major investment since 2000.

Thanks to all our partners for your confidence.

We are proud to say that M.S. Resistances is made of Performances.

**Hakam Elasad**  
Managing Director

### MEEE Exhibition 2011

It was an exceptional event for me to be back to MEEE in 2011.

With a great pleasure, I had met my old friends. I do not say customer but Friend, by the way all our contacts are firstly friends.

I thank all people met during MEEE.



### Exhibition in 2011



We intend to participate to the Energetika & Elektrotehnika Exhibition in Saint Petersburg, Russia from the 17<sup>th</sup> to the 20<sup>th</sup> of May 2011.

### New brochures

Please visit our website to discover our new general brochures in Spanish and Russian.

Find this newsletter and more on our website [www.msresistances.com](http://www.msresistances.com) in «News».

# Sales & Marketing

## New projects

### **Neutral Earthing Resistors**

#### **Powerplant in Bangladesh**

12 Neutral Earthing resistors 11 kV and accessories.

#### **Ruwais substations project in the U.A.E.**

M.S. Resistances will supply 28 Neutral Earthing resistors 34,5kV and 11,5 kV.

#### **TNB in Malaysia**

5 Neutral Earthing resistors 33 kV.

#### **Mobile Station in Algeria**

18 Neutral Grounding resistors 10 kV & 30 kV and accessories.

### **Harmonic Damping Filter Resistors**

#### **RTE Project**

In 2011, M.S. Resistances will continue to supply RTE Project (Réseau de Transport Electrique, France) by providing Harmonic Damping Filter resistors for 19 substations.

### **Motor Control**

#### **Mega Yacht, JSS, MSCx32 & H33 projects**

12 Emergency braking resistors including Exhaust Air Hydro cooler for Cruise Vessel and Frigate.

### **Disconnectors**

#### **Toshiba**

In 2011, M.S. Resistances will supply 7 more disconnecting switches, 100 kV, 140 kA/3sec for the High Voltage testing laboratory Toshiba  
(See our Resistances Mag' No3 on our website).

## New partnerships

### **Argentina & Chile**

In 2011, M.S. Resistances intends to reinforce actively its presence in South American's countries. Two partnerships had been concluded with two companies, in Chile and in Argentina to promote our products in these countries and around.



Important investments in electricity fields are in process in this region of the world, and M.S. Resistances had already been contacted to provide its expertise in high voltage resistors for some projects.

## Quality & Satisfaction

### **ABB Sweden**

M.S. Resistances insists on quality of its products, services and processes to satisfy customers always better.

Thanks to our quality chart, our technical experience and our customer care, most of them are fully satisfied of our collaboration.

One of our most faithful customer, the ABB Sweden branch, wrote several words about this thriving collaboration.

*(Please visit our website to see the ABB satisfaction letter)*

# Back to Basis

## Adiabatic & no adiabatic heating (1/2)

### Adiabatic and non-adiabatic phenomena

To understand the adiabatic and non adiabatic phenomena, see the swimming pool example below.

#### Illustration 1:

Take a swimming pool of 1 m<sup>3</sup> capacity with the following dimensions:

- length =1 m,
- width =1 m,
- depth =1 m.

#### Adiabatic:

The pool is filled with water.

The necessary time to fill 0,634 m<sup>3</sup> of water is the time constant.

This value is used to adjust the different protection & control devices as relays, and temperature sensors for a resistor.

As long as the pool is not full it is called adiabatic zone.

#### Non Adiabatic:

Once the pool is full (1 m<sup>3</sup>), if you add water, it goes beyond and this supplementary quantity of water will be evacuated from the swimming pool by its 4 sides.

It is called non-adiabatic zone.

The non adiabatic phenomenon will vary according to some criteria changes.

#### Illustration 2:

Now take a pool of identical 1 m<sup>3</sup> capacity with different dimensions:

- length =2 m,
- width =1 m,
- depth =0,5 m.

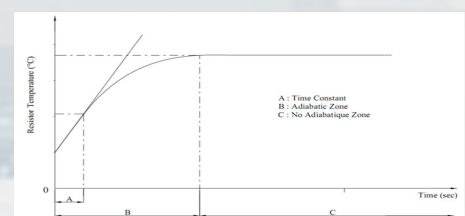
In illustration 1, the water overflows less easily and rapidly than in the illustration 2 as the area is smaller in the first pool (1 x 1 compared with 2 x 1).

The larger the surface is, the more rapid will be the evacuation.

### Adiabatic and non-adiabatic heating phenomenon with resistors

Resistor works roughly the same way, we just replace water by energy (and energy dissipation starts before grid is full of energy):

- 1) the current is injected in the resistor,
- 2) in contact with the resistance elements it is transformed into energy,
- 3) the resistance elements absorb the energy, it is adiabatic heating,
- 4) once resistance elements are saturated, it will exchange the heat with the outside it is no-adiabatic heating.



# Back to Basis

## Adiabatic & no adiabatic heating (2/2)

### Application to resistors conception & dimensioning

#### *Adiabatic:*

The resistance value, current and rated time show the value of energy to be absorbed so the active mass:

$$W = I^2 \times R \times t = mc \Delta \theta$$

Or W = Energy (Joules),

I = Rated current (A),

R = value of the resistance (ohm),

m = active mass (the weight of active elements only) (kg),

C = specific heat (joule/kg/°C)

$\Delta\theta$  = average temperature after the rated time (°K)

t = rated time (sec)

Heavy active mass (the weight of active elements only) must be chosen so that the time constant and the absorption capacity of energy be important.

This illustrates the Neutral Earthing resistors.

#### *Non-adiabatic:*

Once the resistor is saturating, it will begin to exchange energy with the exterior.

In this case, the wider the exchange surface of the resistor is, the better the heat exchange with surrounding air will be, and the better will be the resistor cooling.

This illustrates the Harmonic Damping Filter resistors.

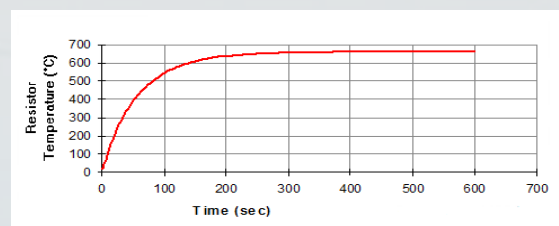
## Standards

In any case, there are maximum overheating temperatures which do not have to be exceeded. According to **IEEE-32 standards**, time rating for resistors is usually of 10, 1 or 10 minutes. It indicates the maximum time without exceeding the allowed temperature rise above ambient temperature.

Temperature rises allowed for Stainless Steel are:



- 760° above ambient for 10, 30 or 60 sec fault,
- 610° above ambient for extended time rating (up to 30 min),
- 385° above ambient for continuous rating.



However, maximum temperatures are lower for other materials, as cast iron for example.

The non respect of these norms and these maximum temperature, in adiabatic or in non-adiabatic situations can lead to tough damages on the resistor but also on the entire installation.

The sold resistors which do not respect these elementary rules are not conformed and represent a high danger for the buyer.

We already informed our customers about these practices used by some competitors which endanger customers. (Please visit our website to see Warning)

# Interview

## The M.S. Resistances Contract Department (1/2)

Mr. Christian Millard is the production manager of M.S. Resistances.  
He organises production planning and manages the Contract Department by supervising procurement, logistics, invoicing,...



**Mr. Millard, could you introduce us the Contract Department of M.S. Resistances?**

The Contract Department is composed of several services:

- The Design service:

To control, check, draw and prepare the manufacturing documents & file.

The manufacturing documents file comprises:

- Necessary documents for assembling the active parts,
- Necessary documents of general assembling,
- The nomenclature of components types, number & specification,
- The follow up documents in accordance with Quality assurance chart & Inspection & Testing Plans for control & traceability,
- Documents to be filled in and signed by each person working on the resistor for traceability:

- o Ohmic value control sheet,
- o Final control sheet,
- o Routine test report,
- o Auto control sheet.

After shipping all the above documents are filed in the general file of projects.

In case of failure on the resistor, we can check if the failed components have been used on other resistors.



- The Procurement service:

To order components and monitor sub-contractors.

Selection of sub-contractors is made according to a strong selection process. Beyond the quality of products or service, we look at ethics, environment respect and manufacturing process. Annually we monitor & evaluate sub-contractors to ensure that quality levels are respected and sustained (Selection process is available on request).



- The Manufacturing service.

To manufacture by respecting quality process and delay.



**What are the different steps to manage an order? (Please visit our website to see process schema)**

1- To make contacts with customers easier, the Project Department receives and registers orders. Then the order's file is transferred to the Contract Department during contract review meeting.

2- A designing check & control is made to be sure that no mistake has been done at tender stage and ensure the solution is workable:

- Electrical calculation checking,
- Mechanical review,
- Selection of components.

3- If difference between customer requirements & proposed solution, we redesign, draw a new solution to be sent to the customer via Project Department.

# Interview

## The M.S. Resistances Contract Department (2/2)

4- If no mistake has been done, the designing & manufacturing follow its normal process. We draw & integrate all components in the enclosure by respecting specifications of customer.

5- Ordering components.

6- Assembling.

7- Installation & Maintenance documents are issued & sent to customer.

### **How your Global Quality chart is implemented in order's process?**

All our order's process is embedded in a global quality chart. Let's see the next steps of order's process.

8- Some of assembling operations are controlled internally and externally according to the In Process Testing.

9- After final assembling, the resistors are subjected to physical and mechanical visual control and are tested according to Routine Test point of control list:

- Visual inspection,
- Dimensions inspection,
- Ohmic value measurement at ambient temperature,
- Power frequency with high voltage test set,
- Insulation resistance measurement.

These tests are made in our laboratory equipped with all instruments and measurement devices according to norms requirements. These devices are controlled and graded annually by a specialized external company.

After routine tests, a signed and stamped test report is submitted to be sent to the customer.

10- Type tests are made on the first manufactured resistor of the series, generally by an external laboratory. The customer can attend to the different tests.

11- After customer's approval and receipt of shipping release, we can pack & dispatch (resistors are not packed before shipping release receipt).

12- When resistor has been received by customer, he receives a questionnaire to inform us about possible comments about the project development or his relation with the different departments of M.S. Resistances. Answers are entirely analyzed by quality department and any relevant comment is followed by corrective actions.

According to ISO 9001 standards, an After sale service and customer complain follows up all customer complaints.

Each complain is attentively analyzed and an answer is given rapidly. The few we receive are treated to give entire satisfaction to the customer.

**Thank you Mr. Millard.**



M.S. Resistances

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