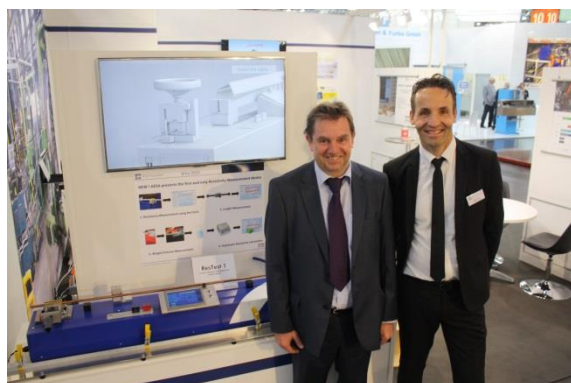


Conductivity / Resistivity

How to ascertain the conductivity / resistivity value of rods and drawn wires?



"Conductivity's option" has been introduced at Wire Dusseldorf 2016

ResTest Supervision	
$\alpha_L AL = 16.6E-6 \text{ 1/K}$	Measured Resistance 124.29 $\mu\Omega/m$
Humidity = 50%	Measured Temperature T 21.5 $^{\circ}C$
Duration = 5 min	Length Measurement
	Measured Length at T 110.70 mm
	Sample Length at Tn 1674.70 mm
	Volume Measurement
	Measured Mass 229.35 g
	Volume at Tn 0.23 mm ³
	Resistivity 17.07 $10E-9 \Omega m$
	Conductivity 58.60 $10E6 \text{ S/m}$
	Back

Example of conductivity's screen (on any ResTest equipment)

The conductivity / resistivity measurement is the first step in electrical cable production monitoring, although maybe the most critical. The measurement requires specific precautions. The mastery of influencing factors is crucial. Paradoxically, the Conductivity / Resistivity is rarely measured today and theoretical values (extracted from tables) are used instead. AESA recently introduced a true, straightforward, three steps novel solution to experimentally measure the conductivity / resistivity of class 1 sample conductors. We have interviewed several continuous casting and wire drawing factories (key players) in Europe and Middle East about this new solution.

Q: Which parameter do you have to know precisely, Conductivity or Resistivity?

A: Both, but conductivity is the most important one.

Q: For which material do you have to know the conductivity?

Here the answer varies according to the type of activity of each interviewed company.

A: Copper, Aluminium, Alloy.

Q: Which range of conductor diameters do you have to measure?

A: Usually between 8 and 15 mm, maximum 18 mm.

Q: Why is the conductivity so important for you?

A: Mastering this parameter enables securing the cross-section of the conductor. Moreover, the conductivity is imposed by the norms. It must be provided to our customers.

Q: How do you determine the conductivity today?

A: We first straighten the sample and then measure its linear resistance. We weight it and finally we use the density of the material given by a table to deduct its conductivity.

Q: When do you have to measure the conductivity?

A: Usually after the continuous casting process, but also after the drawing process.



AESA Cortailod

- Q: *Is it a systematic or sampling measurement?*
- A: **We measure it systematically. It can represent up to 200 measurements per day. For the time being, Nexans limits the measurement to some customers, but it will be systematically done in the near future.**
- Q: *Which problems are you faced with the current method?*
- A: **The density is a theoretical value and may be relatively far away from reality (unknown uncertainties). Also the methodology itself is not easy to handle (e.g. the temperature's stabilisation or/and the measurement of the average diameter).**
- Q: *How do you evaluate the AESA solution?*
- A: **It responds perfectly to our needs. A complete mastering of the uncertainties enables reproducible results. The comparison tests performed by Midal show a lower dispersion of the values with the AESA solution.**
- Q: *Do you know any equivalent solution?*
- A: **No at all. This is why we had to develop our own solution, with all the imperfections mentioned above.**
- Q: *Are you considering the acquisition of such a solution?*
- A: **All the interviewed companies are considering such an investment. Only the timeframe varies.**

AESA Cortaillod has developed this novel unequivocal and true approach as a user-friendly option usable with any equipment of the AESA ResTest family. The measurement is realized in three steps, the linear resistance (R) at temperature T, the sample length (L) and finally the section (S) through the volume measurement. The measured parameters are keyed-in via a user interface and the conductivity / resistivity is then automatically computed and displayed.

For more information, please contact asea@aesacortaillod.com or visit our website www.aesacortaillod.com