

Specialty additives & Graphene for plastics

Avanzare Innovación Tecnológica

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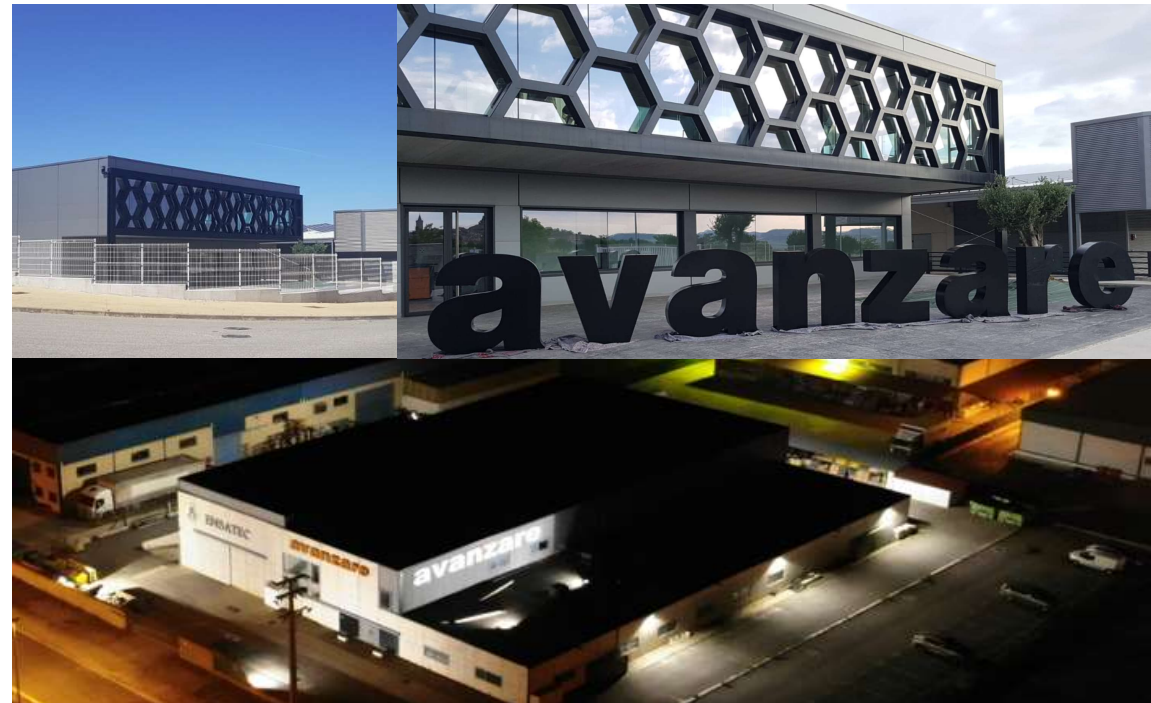
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 www.avanzarematerials.com

About us **avanzare**

- **We develop and produce differential additives for plastic**
- ✓ 10.000 m² production plant.
- ✓ 3.500 m² R&D (fully equipped).
- ✓ 12 Chemistry PhD. (37 R&D – graduates in biology, biochemistry, chemistry, etc.)
- ✓ Mainly focused on differential additives
- ✓ Chemical and additives specialist
- ✓ Taylor made solution
- ✓ 100 % European products.



avanzare Presence in the world



Our Products

Avanzare Innovación Tecnológica



Our additives are specifically made for plastic differentiation of our customer: Additives are available in powder, liquid and also in MB



**Graphene
Electrically and Thermally
Conductive Solutions**



**Colorless & Permanent
Antistatic/ESD additives**



**Anti-counterfeiting
(Chemical tracer)**



**Other: Biocides, Flame
retardant, anti-block**



Density amplifier



Metallic and Magnetic tracer

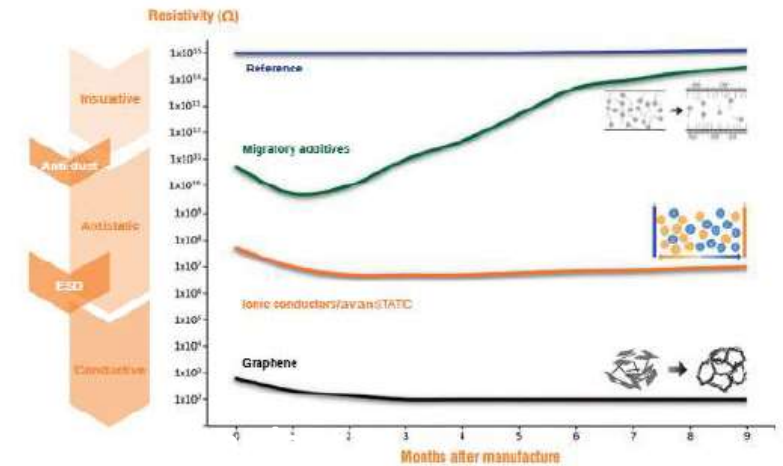
Antistatic **permanent and colorless**



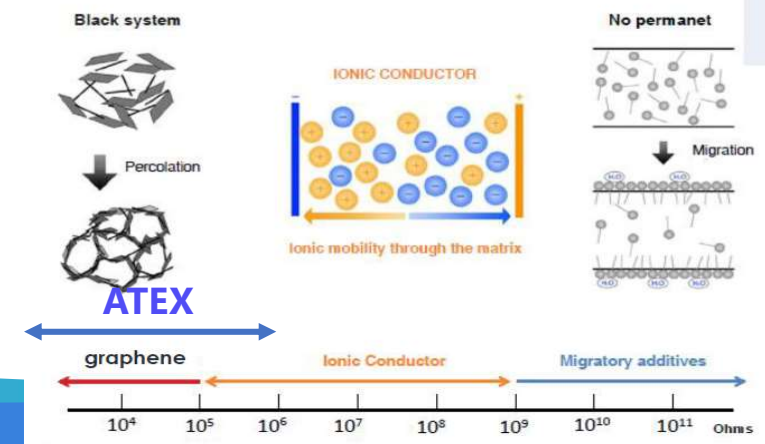
avanzare
inventing the future
Evolution of conductivity with the time

Characteristics:

- ✓ **Static dissipative and ESD levels permanent performance**
- ✓ **Colorless and colorable**
- ✓ **Non-migratory**
- ✓ **Solid, liquid, pellet MB forms available depending on the product**
- ✓ **Food grade in some applications**



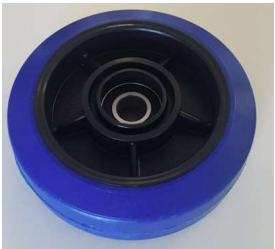
Mechanism to generate antistatic



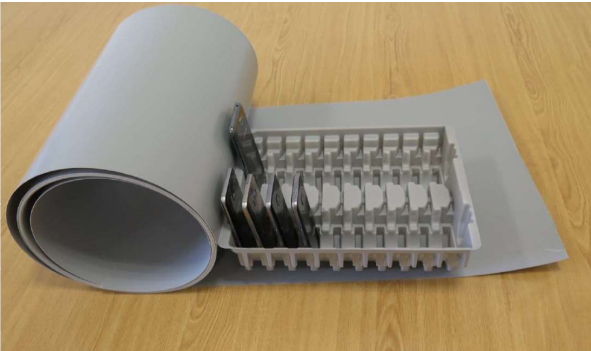
Antistatic / ESD / Dissipative

Permanent and Colorless

Grades and uses



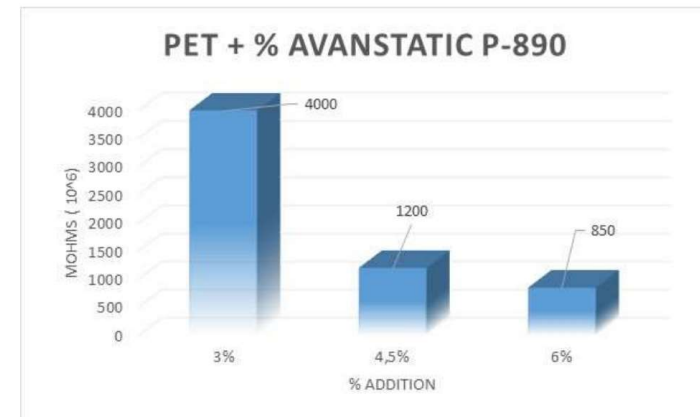
Product	Suitable for	Characteristics	Format	Use Rate %	Superficial Resistivity Level (ohms)
avanDISS 232	HIPS, PS, ABS, PP, PE, PET, PA, etc.	Processing Temp. >230°C, Higher temperature = better performance	Pellet	10-22	10 ¹⁰ -10 ¹⁷
avanDISS 378	PP, PE, ABS, POM, etc.	General Use	Pellet	10-18	10 ¹⁰ -10 ¹⁷
avanDISS 450	PP, PE	FDA, 10/2011	Pellet	15-20	10 ¹⁰ -10 ¹⁹
avanDISS 765	SEBS, SBS, TPE, PP, PE, POM	Processing Temp. <230°C	Pellet	10-22	10 ¹⁰ -10 ¹⁷
avanSTATIC TR 850	SEBS, SBS		Powder	2-6	10 ⁹ -10 ⁸
avanSTATIC P-890	PET, PA, PBT, etc.		Powder	3-6	10 ⁹ -10 ⁸
avaNATUR Nylonstat (L)	PA,	Other grades also available (FDA and MB)	Liquid	2-9	10 ¹² -10 ⁶
avanSTATIC 1050	PVC, TPU, Plastisol	Other grades also available (MB)	Liquid	1-5	10 ⁹ -10 ⁸
avanSTATIC C333	PVC	Other grades also available (Food grade)	Powder	1-10	10 ⁹ -10 ⁷
avanSTATIC TPU MB	TPU	Temp > 225°C	Pellet	1-10	10 ¹⁰ -10 ⁶



avanSTATIC P-890

- Powder system for thermoplastics with some polarity
- Based on functionalized SiO_2 with ionic conductors
- Colored formulations
- Does NOT alter original material mechanical properties
- PET, PA6, PBT, etc.
- Typical dosage:
 - 3-6 %

Limit 10^8 ohms.



Values of surface resistivity of 4 GOhm at 100 V (25 °C /50 H) ESD Standard – EN 61340

	3 %	4,5 %	6 %
avanSTATIC P-890 PET	4 E ⁹ Ohms	1.2 E ⁹ Ohms	8 E ⁸ Ohms



Conductive Solution

avanGRP Conductive; Graphene and Graphene MB for high conductivity plastic application

Product	Suitable for	Characteristics	Format	Use Rate %	Superficial Resistivity Level (ohms)
avanGRP 700 MB	General use	Low dosage of MB, but not critical for mechanical properties	Black, Pellet	30-40	10^4 - 10^5
avanGRP 505 MB	PP, PE, EVA	High dosage of MB, good for mechanical properties.	Black, Pellet	35-60	10^2 - 10^5



Characteristics:

- ✓ **Extremely low resistivity** > 100 Ohms/cm
- ✓ **Range of conductivity** from 1 to 10^6 Ohms/cm
- ✓ **MB available compatible with several Matrix**
- ✓ **Cost-effective**
- ✓ **Non-migratory**

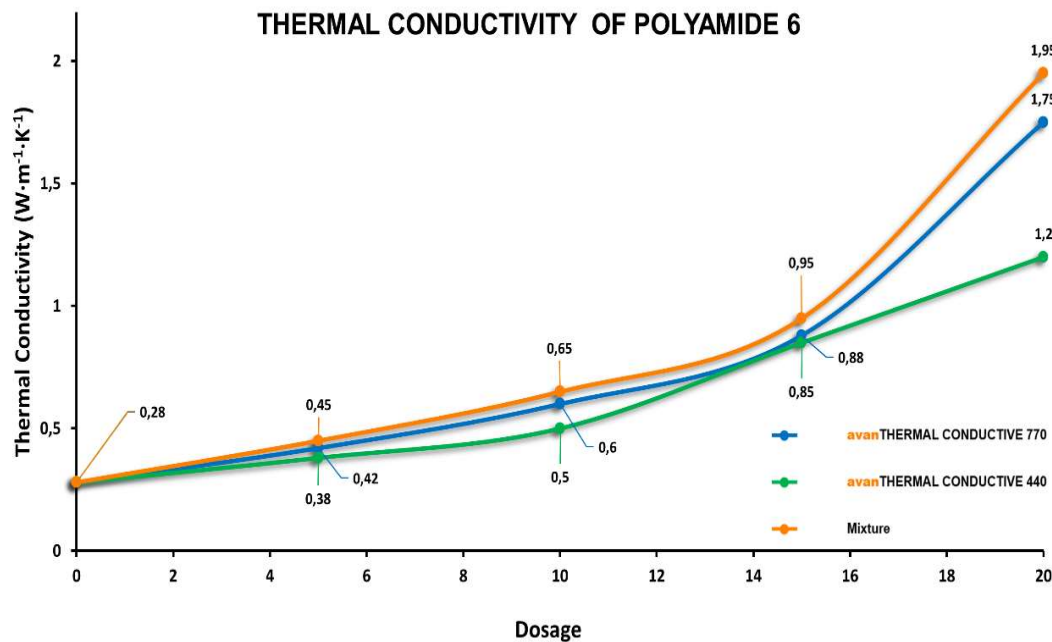
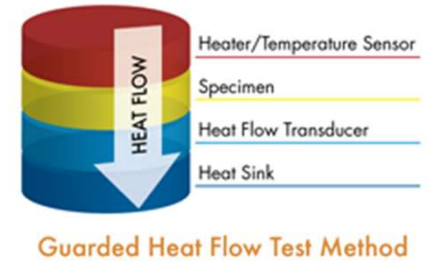




Thermal Conductive solution



avanTHERMAL CONDUCTIVE solutions are a series of very effective additives specifically designed to provide thermal conductivity in plastics



✓ Increase 10 times Thermal dissipation



Metallic Tracer (colorless)



avanSAFE DETECTOR

WHY? Allows to detect plastic parts in processing lines (e.g. food).

APPROACH TO THE COSTUMER:

- ✓ Light Color → Colorable
- ✓ Powder or MB ready to use
- ✓ Electronic and magnetically techniques

APPLICATIONS:

- ✓ Conveyor Belts
- ✓ Composite Tools
- ✓ Compounding
- ✓ Packaging

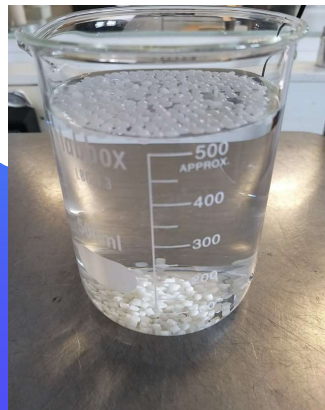


□ Density amplifier



WHY? Allows to amplify the density of a plastic

- ✓ MB compatible with all matrix
- ✓ Density MB from 5,5 to 11 g/cm³.
- ✓ 100 % adjustable, customize your plastic from densities (1.1 - 11 g/cm³)
- ✓ Corrosion and chemical resistivity
- ✓ Valid 10/2011 and FDA (Food grade)
- ✓ Colorable



APPLICATIONS:

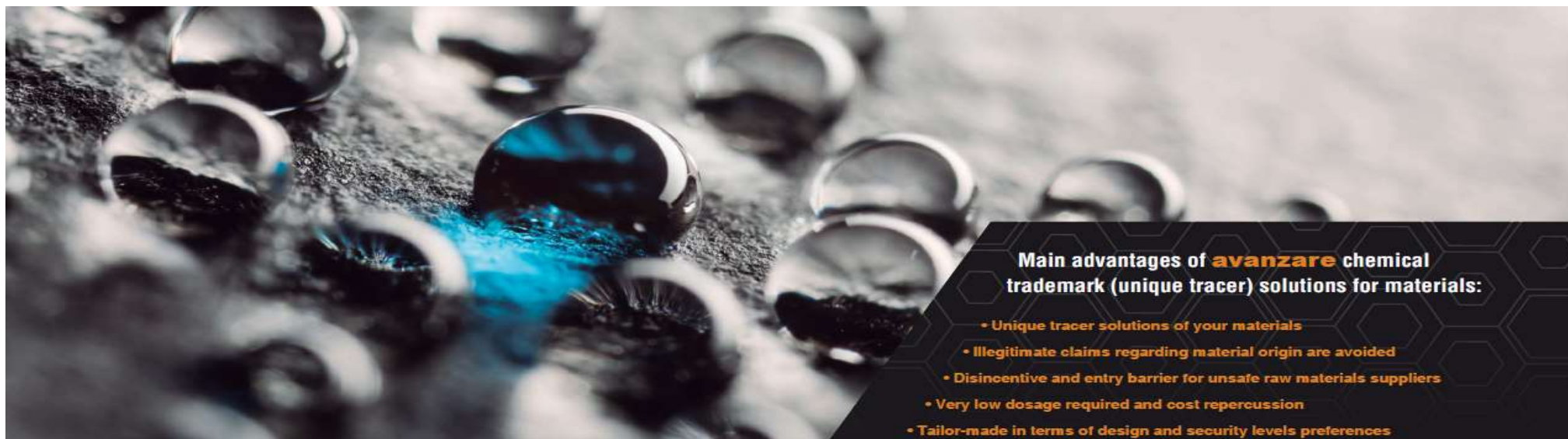
Casino chips, Luxury packaging, fishing tackle, exercise weights, golf clubs, hunting supplies, cutlery, appliances and hunting ammunition

Chemical tracer (anti-counterfeiting)



Unique solutions of tailor-made additives based on organometallic compounds for plastic differentiation/identification, which allow avoiding illegitimate claims.

- ✓ Unique for each customer
- ✓ Fingerprint
- ✓ Extremely low dosage
- ✓ Tailor made



Main advantages of **avanzare** chemical trademark (unique tracer) solutions for materials:

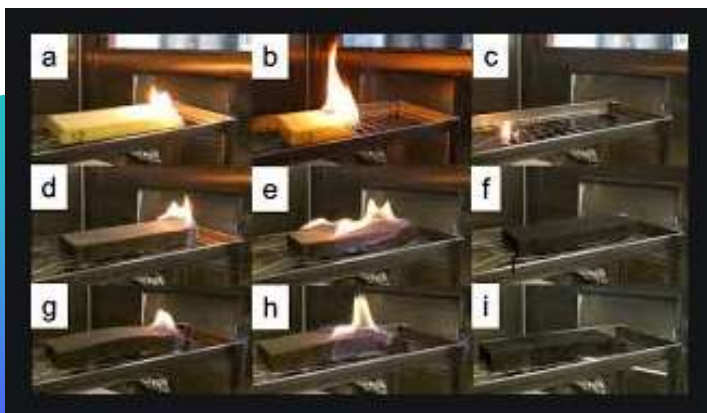
- Unique tracer solutions of your materials
- Illegitimate claims regarding material origin are avoided
- Disincentive and entry barrier for unsafe raw materials suppliers
- Very low dosage required and cost repercussion
- Tailor-made in terms of design and security levels preferences



Flame retardant

avanFIRE (group), is the new grade of flame retardants halogen free plastic

- For passing different normative
- **avanFIRE GR8**, synergetic effect with standard products
- Viscosity tailored final products



avanFIRE GR8

- ❖ Increase the carbonaceous layer (CHAR)
- ❖ reducing dripping
- ❖ distributing the energy produced by the flame (heat)

Antiblocking

avanSI- Selection of minerals for its use as **antiblocking system**.

- Non silicotic, synthetic and natural
- Full range of additive for increase the micro-roughness
- MB or compacted powder.
- Food grade
- Max transparency in PET, PE, BOPP, etc films





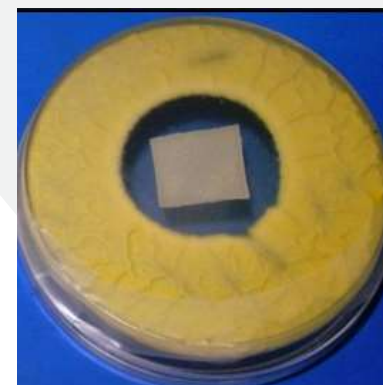
Biocide



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avanZnO BAC is a powerful biocide agent, specially formulated to be introduced in plastics, rubbers and resins matrices.

Food grade solutions available!



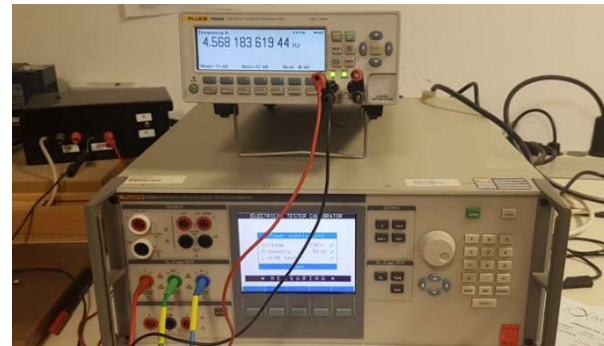
According to the European directive nº 1048/2005 (13/June/2005) and directive (CE) nº 528/2012 regulating the applications of biocides in the industry

Bacteria	Fungi	Algae
Escherichia coli	Aspergillus niger	Cladosporium
Staphylococcus aureus	Aureobasidium pullulans	cladosporioides
Streptococcus faecalis	Chaetomium globosum	Sclerophoma pityophila
Klebsiella pneumoniae	Alternaria alternata	Trichoderma viride
Pseudomonas aeruginosa	Penicillium brevicaulis	Chlorella pyrenoidosa
Salmonella typhimurium	Cladosporium cladosporioides	
	Sclerophoma pityophila	
	Trichoderma viride	

➤ **99,9 % elimination**
➤ Ensayos ISO 22196

We have the capabilities to customize solutions according to customer needs and requirements

- **Certification lab**
- **Pilot plant**
- **Customize solutions.**



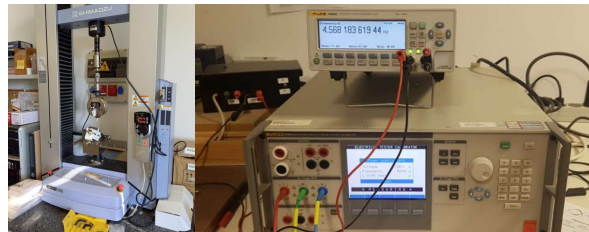
□ Technical capabilities

- ✓ 3.500 m² fully equipped laboratory
- ✓ 12 Chemistry PhDs.
- ✓ European accredited lab for customer trials
- ✓ Customized solutions (adjust recipes)



□ Equipment and Facilities

- ✓ Polymer pilot plant, Extrusion machines (singles and twin screw), Injection samples, R&D filament extrusion for 3-D
- ✓ R&D polymer lab (extrusion machine, injection, MFI analysis, FTIR etc)
- ✓ Aging test, QUV, Xenon, UV-absorption, etc
- ✓ Chemical Characterization: EDAX, RAMAN, SEM, X-Ray, EEA, etc
- ✓ Mechanical Characterization: Impact, mechanical testing, etc
- ✓ Fire lab: radiant panel, Single burning item, Non combustibility test, etc
- ✓ ESD and Conductive area: Conductivity/resistance characterization instruments. (1 Ohms- 1 ¹³ Ohms)



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Materials



Metrology and Calibration



Fire



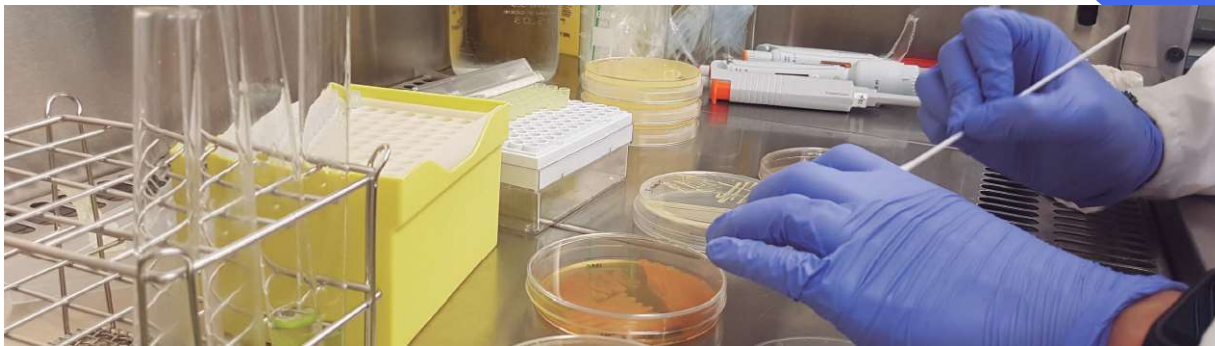
Enclosures



**Testing and
Certification LAB.**



avanzare's capabilities microbiology



Technical capabilities (microbiology lab)

- 200 m² division microbiology)
- 2 PhD division microbiology
- European accredited lab for testing customer trials
- Customized solution (recipes adjust)




avanzare has a fully equipped laboratory of microbiology that allows us to analyze and test each of our products, increasing the quality criteria and comparing their efficiency and effectiveness against a large number of different microorganisms and tests.

- Standard Zone of Inhibition Test (Kirby Bauer Qualitative Test for growth inhibition)
- Quantitative method for the determination of minimum inhibitory concentration of microbial growth
- Test for antimicrobial activity according Japanese Industrial Standard (JIS Z 2801)
- Measurement of antibacterial activity on plastics (ISO 22196:2011)
- Isolation and determination of microorganisms causing contamination
- Other biotechnological applications (on demand)



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