RESEARCH AND INNOVATION CENTER IN SPORTS SURFACES

GRUPO IGOID

Investigación en la Gestión de Organizaciones e Instalaciones Deportivas

Universidad de Castilla-La Mancha

Igoid sportec

Spin off

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RESEARCH AND INNOVATION CENTER IN SPORTS SURFACES

This center, part of the IGOID Group of the University of Castilla-La Mancha, is the result of years of multidisciplinary research in the field of sports facilities and materials. It combines the development of projects and works in different phases of R+D+i, as well as technical work as an accredited testing laboratory (ISO 17025, ENAC accreditation).

Its main line of work is currently to provide solutions and develop projects in the field of **ecological transition** in the sport sector, contributing to sustainability and circularity. To this end, it investigates possible applications of sustainable materials in their use for different elements of sports facilities, with special focus on sports surfaces. His vision is for the sports facilities sector to be seen as a benchmark in the circular economy.

The main lines of research focus on the evaluation and improvement of sports artificial turf structures, the search for natural and biodegradable alternatives, valorisation of agroforestry and plastic waste, extending the useful life of surfaces and increasing their recycling through eco-design.

1. FACILITIES

The center is made up of different laboratories that allow the analysis of the different materials and elements of sports flooring, from the base of the material itself to the installation of a final product.

Materials laboratory

Laboratory equipped to develop physical and chemical tests on both the base materials (raw materials) and the finalist materials used in the manufacture or construction of sports surfaces.

- Universal Testing Machine (tension and compression)
- DSC
- TGA
- Drying stove
- Laboratory water bath
- Infiltrometer
- QUV
- Microscopes
- Sieves set
- Bulk density set
- Precision balances
- Impact pendulum
- Flow Index Meter
- Resilience Meter
- Densimeter
- Climate chamber

Performance and simulated wear Lab

It is a laboratory designed to be able to assemble laboratory specimens that simulate sports surfaces in-situ. It has equipment for the analysis of the function and sports safety in the basal state as well as after different types of wear.

- Performance test
  - AAA
  - AA
  - HIC
  - Horizontal HIC determination (prototipe)
  - Rotational resistance equipment (With FIH implement)
  - Lightweight rotational resistance
  - Ball roll
  - Reduced ball roll
  - Ball bound rebound
  - Infill Splash set
  - Angle ball set
  - Heat Determination
  - Specular Gloss
  - Automatic ball rebound (prototipe)
- Simulated wear
  - Lisport EN
  - Lisport XL
  - Auxiliary equipment for test at -5 ºC
  - Auxiliary equipment for test at 50 ºC
  - Taber Abrader
  - Rolling load

Manufacturing plant

Plant prepared for the on-site extrusion of new recicled polymeric materials or combination of natural materials. The center has the capacity to make enough material for the assembly of samples in the laboratory and even concentrates (batch) for subsequent industrial use. It allows to dope the materials in order to find new applications. It also includes an injector for the preparation of specimens to test the properties of the materials before their application.

- Twin-screw extruder
- Hydraulic injector
- Carver
- Milling machine

Other sections

Finally, one of the most innovative actions of the IGOID Group has been to focus on the athlete in this process. Therefore, it has the capacity to develop any analysis of performand, demands and kinematics when athletes develop activity on different types of sports surfaces.

- GPSport
- WIMU GPS devices
- DXA (bone densitometry)
- BodPod
- Calorimetry equipment
- Tensiomiography equipment
- FLIR thermography camera (Thermohuman software)
- VALD Dual Force Platforms
- Biomechanical motion analysis pack
- Encoder
- Laser jump height measurement
- Resistance sprint device 1080
- Accelerometers model knee-hip
- Accelerometers hip model
- Spirobank
- Mass spectrometer for physiological use
- Gas chromatograph for physiological use
- Tanita (anthoprometric analysis)
- Balancing platforms

2. ACCREDITED TESTS

IGOID has the ENAC accreditation by ISO 17025 for tests on sports surfaces. In addition, it is a testing institute approved by FIFA, World Rugby, FIH and FIBA.

3. I+D+i PROJECTS

Featured project

Title: Circular and safe solution for synthetic turf pitches.
Reference: LIFE22-ENV-ENV-LIFET4C.
Funding entity: European Commission. Programme for Environment and Climate Action (LIFE)
Amount: 3.621.072,00 €.
Call: LIFE.
Dates: 01/04/2023 to 01/04/2027.
Consortium: Green World Compounding S.L., IGOID (University of Castilla-La Mancha), Polytan GmbH, Hauraton GMBH & CO. KG, Sports and Landscape, SL., Espama Comunicación SL.

Other projects currently under implementation

Title: Definition of alternative materials used as infill for sports artificial turf and their influence on safety, sports functionality, and life cycle.
Reference: SBPLY/21/180501/000041.
Funding entity: Scientific research and technology transfer projects Junta de Comunidades de Castilla-La Mancha. Call 2021.
Amount: 119.927,44 €.
Dates: 01/09/2022 to 01/09/2025.
Principal Investigator: Leonor Gallardo Guerrero and José Luis Valverde Palomino.

Title: Design and experimentation of alternative materials for the improvement of the emissions of harmful species and the life cycle of artificial turf sports surfaces.
Reference: PID2021-123177OB-I00.
Funding entity: National Plan, call for Knowledge Generation Projects 2021.
Amount: 198.440,00 €.
Dates: 01/09/2022 to 01/09/2026.
Principal Investigator: Leonor Gallardo Guerrero and José Luis Valverde Palomino.

Title: I+D+i plant for the improvement of the life cycle of artificial sports surfaces.
Reference: EQC2021-006804-P.
Funding entity: National Plan for the Acquisition of Scientific and Technical Equipment (FEDER Funds).
Amount: 857.699,68 €.
Dates: 01/01/2021 to 31/12/2023.
Principal Investigator: Leonor Gallardo Guerrero.

Title: Research of alternative low emission materials for the technical infill of artificial sport turf.
Reference: PTQ2021-012032.
Funding entity: Spanish National research Agency. Torres Quevedo Programme. Call 2021.
Amount: 111.318,90 €.
Dates: 10/11/2022 to 10/11/2025.
Principal Investigator: Enrique Alcántara Alcover.

4. SCIENTIFIC PAPERS PUBLISHED (SPORTS SURFACES)

- Sánchez-Sánchez, J., Felipe, J. L., Hernández-Martin, A., Viejo-Romero, D., Clemente-Suarez, V. J., Gallardo, L., & García-Unanue, J. (2021). Influence of the artificial turf certification on physical performance and muscle damage in football players (QUALTURF PROJECT). Scientific Reports, 11(1), 1-10.
- Sánchez-Sánchez, J., Martínez-Rodríguez, A., Felipe, J. L., Hernández-Martin, A., Ubago-Guisado, E., Bangsbo, J., Gallardo, L., & García-Unanue, J. (2020). Effect of natural turf, artificial turf, and sand surfaces on sprint performance. A systematic review and meta-analysis. International Journal of Environmental Research and Public Health, 17(24), 9478.
- Calderón-Pellegrino, G., Gallardo, L., Paredes-Hernández, V., García-Unanue, J., Giménez, J. V., Colino, E., Felipe, J. L., & Sánchez-Sánchez, J. (2020). Influence of artificial turf temperature on physical performance and muscle contractile properties in football players after a repeated-sprint ability test. Scientific Reports, 10(1), 1-8.
- García-Unanue, J., Fernández-Luna, A., Burillo, P., Gallardo, L., Sánchez-Sánchez, J., Manzano-Carrasco, S., & Felipe, J. L. (2020). Key performance indicators at FIFA Women's World Cup in different playing surfaces. PloS One, 15(10), e0241385.
- Serrano, C., Sánchez-Sánchez, J., López-Fernández, J., Hernando, E., & Gallardo, L. (2020). Influence of the playing surface on changes of direction and plantar pressures during an agility test in youth futsal players. European Journal of Sport Science, 20(7), 906-914.
- Colino, E., Felipe, J. L., Van Hooren, B., Gallardo, L., Meijer, K., Lucia, A., López-Fernández, J., & García-Unanue, J. (2020). Mechanical properties of treadmill surfaces compared to other overground sport surfaces. Sensors, 20(14), 3822.
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- Giménez, J. V., Garcia-Unanue, J., Navandar, A., Viejo-Romero, D., Sánchez-Sánchez, J., Gallardo, L., Hernández-Martín, A., & Felipe, J. L. (2020). Comparison between two different device models 18 Hz GPS Used for time–motion analyses in ecological testing of football. International Journal of Environmental Research and Public Health, 17(6), 1912.
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- Gallardo, L., García-Unanue, J., Haxaire, P., Villacañas, V., Colino, E., & Sánchez-Sánchez, J. (2019). Effect of extrinsic factors and structural components on sport functionality of artificial turf surfaces. Proceedings of the Institution of Mechanical Engineers, Part P: Journal of Sports Engineering and Technology, 233(1), 135-144.
- López-Fernández, J., Gallardo, L., Fernández-Luna, Á., Villacañas, V., García-Unanue, J., & Sánchez-Sánchez, J. (2019). Pitch size and game surface in different small-sided games. Global indicators, activity profile, and acceleration of female soccer players. The Journal of Strength & Conditioning Research, 33(3), 831-838.
- Sánchez-Sánchez, J., Haxaire, P., García Unanue, J., Felipe, J. L., Gallardo, A. M., & Gallardo, L. (2018). Determination of mechanical properties of artificial turf football pitches according to structural components. Proceedings of the Institution of Mechanical Engineers, Part P: Journal of Sports Engineering and Technology, 232(2), 131-139.
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- López-Fernández, J., García-Unanue, J., Sánchez-Sánchez, J., León, M., Hernando, E., & Gallardo, L. (2017). Neuromuscular responses and physiological patterns during a soccer simulation protocol. Artificial turf versus natural grass. Journal of Sports Medicine and Physical Fitness, 58(11), 1602-1610.
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- Plaza-Carmona, M., Vicente-Rodríguez, G., Martín-García, M., Burillo, P., Felipe, J. L., Mata, E., Casajús, J. A., Gallardo, L., & Ara, I. (2014). Influence of hard vs. soft ground surfaces on bone accretion in prepubertal footballers. International Journal of Sports Medicine, 35(01), 55-61.
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5. DOCTORAL THESIS

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- Gallardo, A. M. (2009). Analysis of the satisfaction of practicing sports on natural and artificial grass soccer fields in the Region of Murcia from the point of view of the manager, coach and athlete. University of Castilla-La Mancha.
- Felipe, J.L. (2011). Present and future of artificial turf from the perspective of players, coaches, sports manager and architects. A qualitative approach. University of Castilla-La Mancha
- Sanchez-Sanchez, J. (2014). Efecto f the structural components of support on the mechanical behaviour and the sport functionality of football fields of artificial turf. University of Castilla-La Mancha.
- Lopez-Fernandez, J. (2018). Influence of sports surface on soccer and rugby players performance. University of Castilla-La Mancha.

6. STAFF

Management Team

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7. VALUE CHAIN

The IGOID Group is a consolidated research group of the University of Castilla-La Mancha. In addition, it recently created the spin-off and technology-based company IGOID-SPORTEC, with the aim of completing the cycle of I+D+i, from basic and applied research, to transfer to the market and society.

The IGOID Group develops fundamental or applied research projects, willing to advance knowledge. After that, IGOID-SPORTEC is responsible for continuing with feasibility projects and transfer of results to the market and society, either through innovation or closed services.

This collaboration has led to the obtaining of the seals of Innovative SME (small innovative company) as well as that of Innovative Technology-Based Company.

PYME INNOVADORA

Válido hasta el 20 de diciembre de 2025

empresa innovadora de base tecnológica reconocida por ANCES

8. OTHERS

IGOID is a member of EPSI and the IAKS Sports Surface Expert Circle.

IAKS International Association for Sports and Leisure Facilities Expert Circles

epsi eu

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