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D 7.3 – DIVULGATIVE REPORT ON PROJECT RESULTS

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CO	Confidential, only for members of the consortium (including the Commission Services)	



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1. EXECUTIVE SUMMARY

DEMOULTRAGRIP project arises from the need of ULTRAGRIP Consortium to ensure that tools developed in ULTRAGRIP project (FP7-SME-2010-1.262413) are ready and suitable for exploitation and commercialisation.

In this sense, the main objective of DEMOULTRAGRIP project is to bridge the gap between ULTRAGRIP precompetitive tools and a new ready-to-market version that can be commercialised.

Results from DEMOULTRAGRIP project have been summarised and presented in digital format as a HANDBOOK of project results. This handbook has been conceived as an easy tool of information, very useful to the general public and professionals who are interested in the project topics.

It includes a brief description, information and technical specifications of the project tools, that is, the CoF predicting-CAD software and the Design Configurator of soles developed. Furthermore, it also presents a compilation of the different footwear lines that have been developed by industrial partners using the above-mentioned tools.

Finally, it provides an overview of the project guidelines, that include recommendations and criteria about the subject under study, very useful for designers, businessmen and risk prevention managers.

In particular, DEMOULTRAGRIP Handbook includes the following sections:

- 1.- Introduction
- 2.- CoF predicting-CAD software
- 3.- Design configurator of soles
- 4.- Footwear with optimum grip properties
- 5.- Additional information
- 6.- Contacts

2. INTRODUCTION

At present, sole manufacturers design their models to be anti-slip using design criteria, often relying on their intuition and previous experience. However, there are no footwear design tools available on the market able to make prototyping much cheaper, quicker and more effective, taking into account friction that the shoe will be subjected to when used.

In order to give solutions to this problem, ULTRAGRIP project (FP7-SME-2010-1.262413) developed guidelines and specific software for the design of shoe soles, aiming at optimising their performance in relation to slipping.

DEMOULTRAGRIP project resulted from the need of ULTRAGRIP Consortium to ensure that these tools are ready and suitable for exploitation and commercialisation. Therefore, the main objective of DEMOULTRAGRIP project is to bridge the gap between ULTRAGRIP precompetitive tools and a new ready-to-market version that can be commercialised.

DEMOULTRAGRIP HANDBOOK is annexed.



D.7.3-Divulgative Report on Project Results

Annex. DEMOULTRAGRIP HANDBOOK



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Implementation of
high grip designing tools:

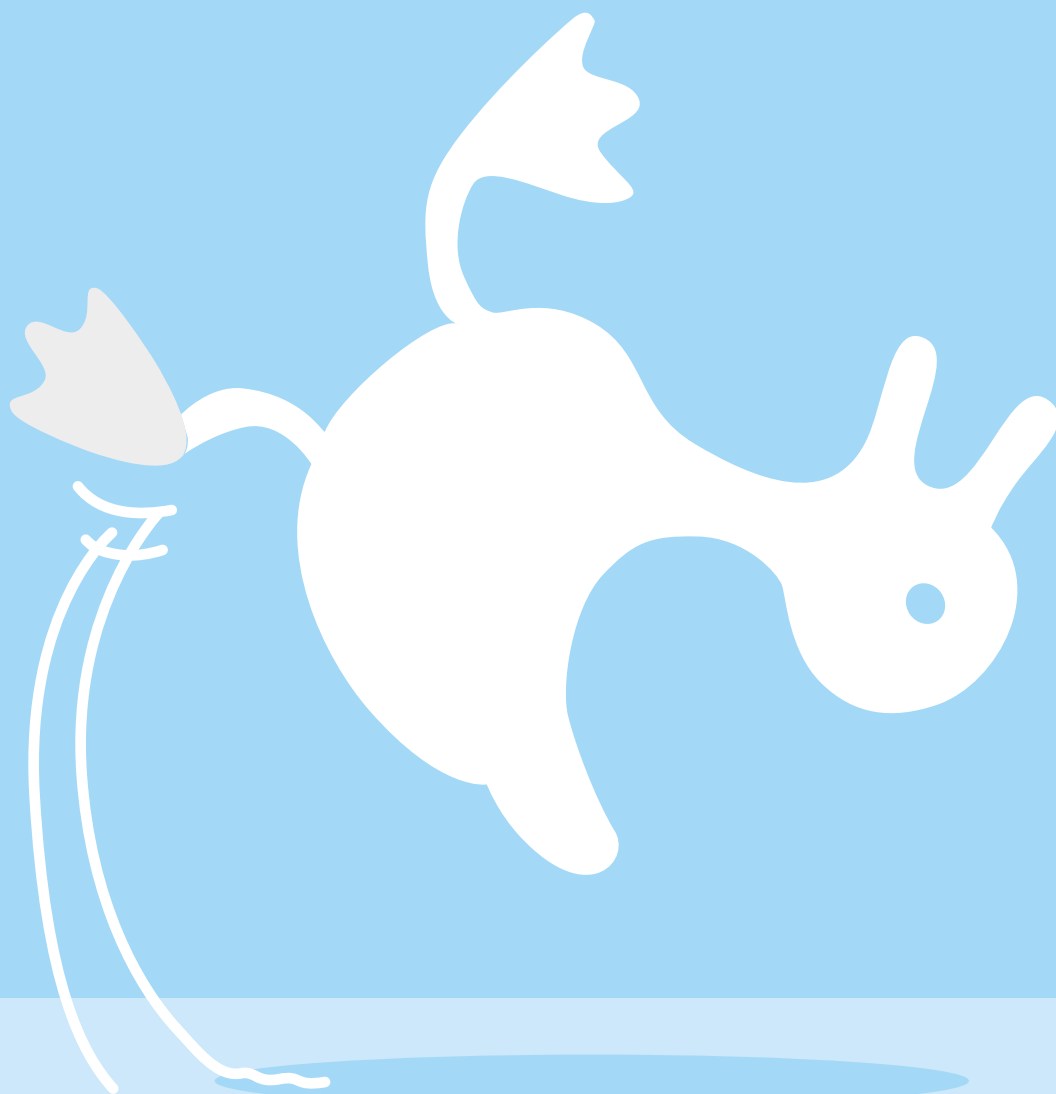
HANDBOOK

INDEX

- 1 - Introduction
- 2 - CoF predicting-CAD software
- 3 - Design configurator of soles
- 4 - Footwear with optimum grip properties
- 5 - Additional information
- 6 - Contacts

Handbook icons guide:

-  Description
-  Usage
-  Technical specifications



INTRODUCTION

DEMOULTRAGRIP – "Implementation of high grip designing tools" is a demonstrative project financed by the European Commission under the Research for SMEs Theme of 7th Framework Programme for Research and Technological Development.

At present, sole manufacturers design their models to be anti-slip using design criteria, often relying on their intuition and previous experience. However, there are no footwear design tools available able to make prototyping much cheaper, quicker and more effective, taking into account friction that the shoe will be subjected to when used.

In order to give solutions to this problem, ULTRAGRIP project (FP7-SME-2010-1.262413) developed guidelines and specific software for the design of shoe soles and floorings, aiming at optimising their performance in relation to slipping.

DEMOULTRAGRIP project results from the need of ULTRAGRIP Consortium to ensure that these tools are ready and suitable for exploitation and commercialisation. Therefore, the main objective of DEMOULTRAGRIP project is to bridge the gap between ULTRAGRIP precompetitive tools and a new ready-to-market version that can be commercialised.

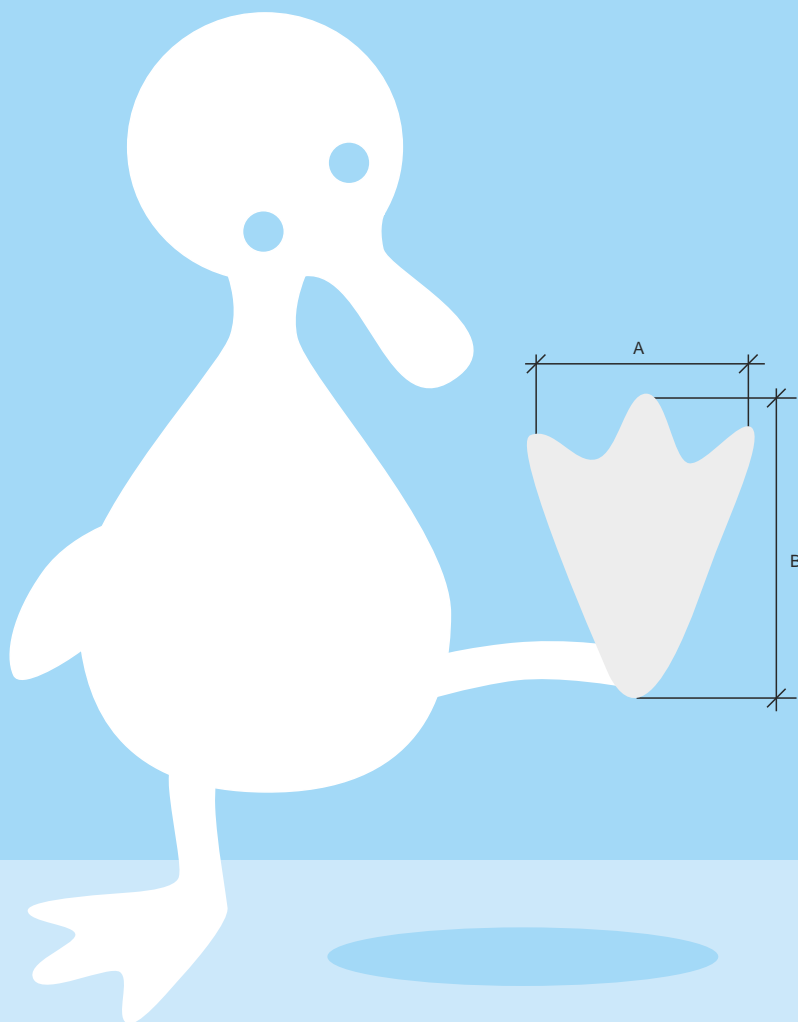
CoF predicting-CAD SOFTWARE



The CoF predicting-CAD software is a tool aimed at the footwear sector, with the ability to design soles and predict their friction behaviour.

This software provides the user with the tools necessary to design a sole tread pattern and set some input parameters that will allow defining the contact area with the ground and calculating the corresponding Coefficient of Friction (CoF), for each type of slip test, and in accordance with applicable standards. Furthermore, the system makes it possible to dynamically modify the tread surface of the sole and thus, proceed to automatically re-calculate the CoF of the designed model.

This software is addressed to high-skilled professionals-technicians that already use and master 3D CAD software solutions.



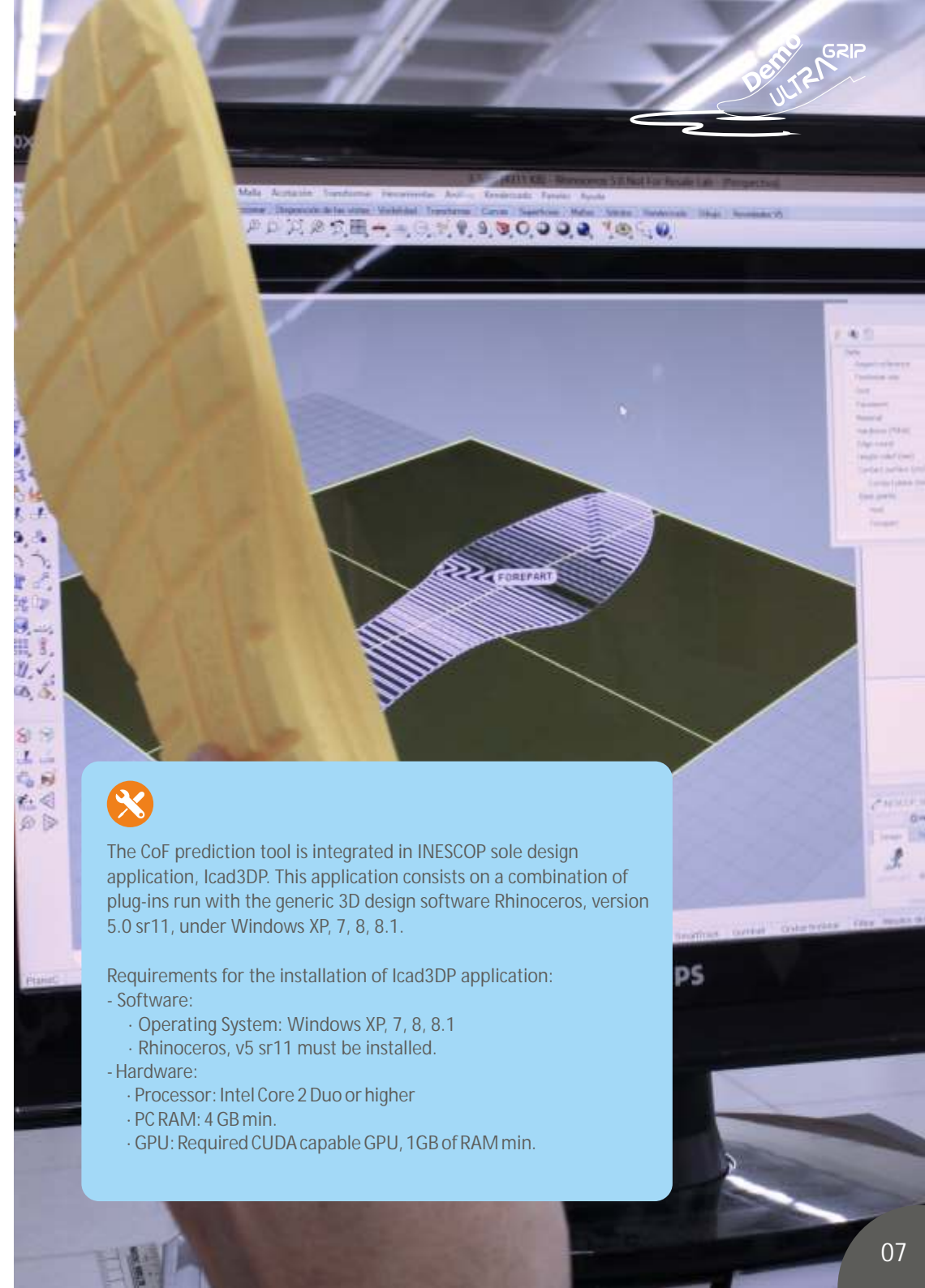
CoF predicting-CAD software



The software application that allows predicting the Coefficient of Friction (CoF) is built in Icad3DP sole design software. In particular, it is available within the tool for sole parametric design.

A footwear tread is designed in a hierarchical way, thus indicating the different levels or layers the sole is comprised of. The design begins from the lines corresponding to the 2D design and a series of surfaces representing the waist of the sole (that is, the curvature that allows for its adaptation to the bottom of the last). When the initial design has been carried out on the different levels, the final geometry is automatically created.

To achieve the predicted CoF for the designed geometry, the contact surface is automatically calculated by the software application and the obtained result is validated before the final CoF value is obtained. The rest of parameters and data have to be manually entered by the user (material, hardness, height...).



The CoF prediction tool is integrated in INESCOP sole design application, Icad3DP. This application consists on a combination of plug-ins run with the generic 3D design software Rhinoceros, version 5.0 sr11, under Windows XP, 7, 8, 8.1.

Requirements for the installation of Icad3DP application:

- Software:
 - Operating System: Windows XP, 7, 8, 8.1
 - Rhinoceros, v5 sr11 must be installed.
- Hardware:
 - Processor: Intel Core 2 Duo or higher
 - PC RAM: 4 GB min.
 - GPU: Required CUDA capable GPU, 1GB of RAM min.

Demo
ULTRA GRIP

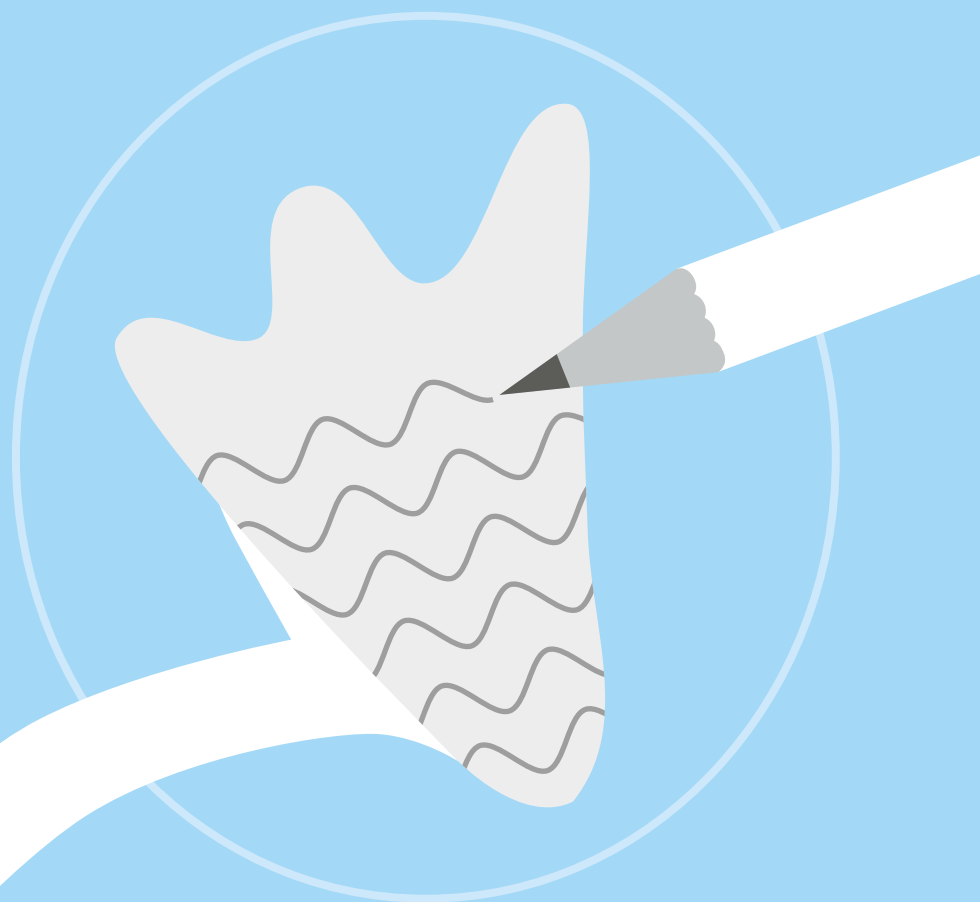
SOLE design configurator



The Sole Design Configurator is a new software tool that allows for designing footwear soles and predicting their slipping behaviour in a qualitative way.

With the Sole Design Configurator, the sole tread can be configured in a simple way using basic geometries. The estimated slip resistance value is considered as a qualitative factor, given that at this stage the design will not be the definitive one, but this value will be completely valid to help rule out wrong designs.

This configurator - available in three different versions (online tool, table device tool and App for PC tablet) - is aimed at the general public and the footwear sector, not necessarily with technical design skills. This is the case, for example, of designers, which are more concerned about the final appearance of the sole than about its technical behaviour or fulfilment of requirements.



Sole design configurator



A 2D design of the tread pattern is generated. To achieve the predicted CoF for the tread pattern created, the contact surface is automatically calculated by the software application and the rest of parameters and data, such as material, hardness, height, size..., have to be manually entered by the user.

The sole design configurator allows the assessment of changes in the soles' coefficient of friction, in a qualitative way, when changes are made in their tread pattern design or material.



1. Web

- Type of application: Web application.
- Special requirements: This software requires Internet access to login and also to access the latest version updates.

- Software:

- Operating System: Windows XP, Vista, 7, 8, 10. Mac OSX 10.6 or higher
- Internet browser: Windows: all. Mac OSX: Google Chrome, Mozilla Firefox, Safari, Opera

- Hardware:

- Processor: Intel Core Duo compatible (or equivalent); 3 GHz or faster recommended
- Memory : 2 GB available RAM (+4GB recommended)
- GPU: DirectX 11 compatible (Shader model 3 or higher)
- Network: Broadband Internet connection (+10 Mbps recommended, Minimum 3Mbps)
- Resolution: Minimum 1024x768
- Storage: 100MB disk space

2. Table design

- Type of application: Desktop application.
- Special requirements: This software requires Internet access to login and also to access the latest version updates.

- Software:

- Operating System: Windows XP, Vista, 7, 8, 10

- Hardware:

- Processor: Intel Core Duo compatible (or equivalent); 3 GHz or faster recommended
- Memory : 2 GB available RAM (+4GB recommended)
- GPU: DirectX 11 compatible (Shader model 3 or above) with at least 1GB RAM
- Network: Broadband Internet connection (+10 Mbps recommended, Minimum 3Mbps)
- Resolution: Minimum 1680x1050
- Storage: 100MB disk space

3. Tablet

- Type of application: Mobile application.
- Special requirements: This software requires Internet access to login and also to access the latest version updates.

- Software:

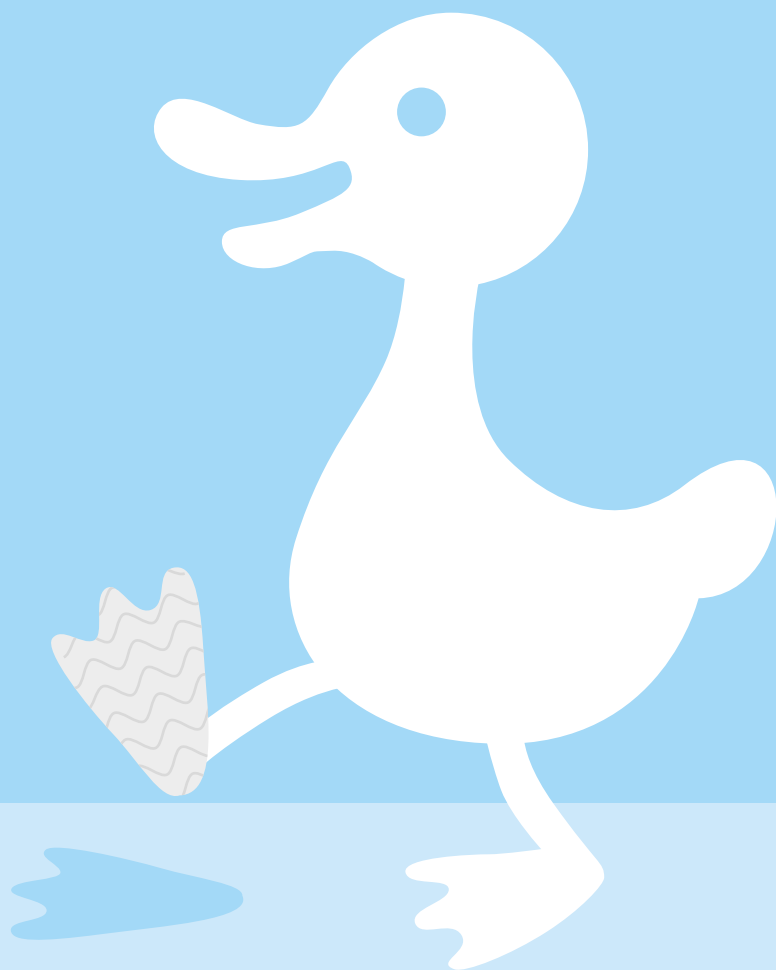
- Operating System: iOS greater than 6.0.

- Hardware:

- Device: Apple iPad. The following versions are recommended:
 - iPad: higher than 2.
 - iPad Mini: higher than 1.

The following versions are not recommended: iPad 1 or 2 and iPad Mini (first version).

- Network: Broadband Internet connection (+10 Mbps recommended, 3Mbps minimum). Wi-Fi recommended
- Storage: 100MB disk space



FOOTWEAR with optimum grip properties



Prototypes of non-slip soles and footwear models have been manufactured by project partners using the software and configurator developed in the project.

The ULTRAGRIP-LINE footwear models include soles of different polymeric nature and for diverse intended uses: high, medium and low requirement levels, corresponding to footwear for professional use, leisure use and home-comfort use, respectively.

Soles have been manufactured with the polymeric materials most frequently used in the footwear sector: VR-NBR, VR-SBR, PUR, TR and TPU.

Footwear with optimum grip properties



The ULTRAGRIP LINE consists of five different anti-slipping sole and footwear models corresponding to sole materials of different nature:

VR-NBR-ULTRAGRIP LINE: Footwear model with optimum grip behaviour for professional use (footwear of high level specifications) manufactured with nitrile-butadiene vulcanised rubber sole.

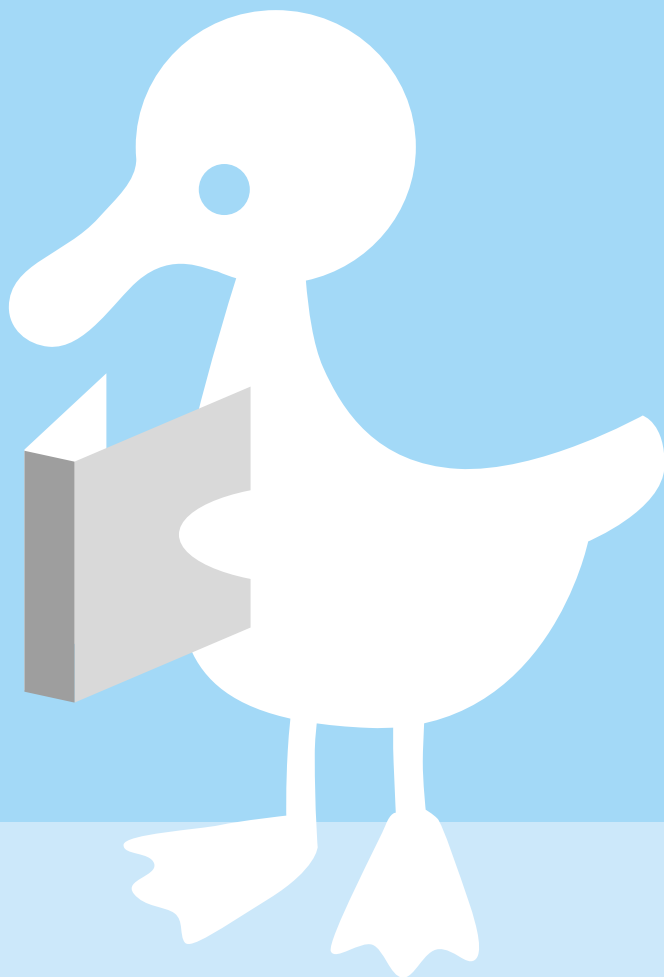
PUR-ULTRAGRIP LINE: Footwear model with optimum grip behaviour for professional use (footwear of high level specifications) manufactured with polyurethane sole.

TPU-ULTRAGRIP LINE: Footwear model with optimum grip behaviour for professional use (footwear of high level specifications) manufactured with thermoplastic polyurethane sole.

TR-ULTRAGRIP LINE: Anti-slipping sole for leisure use footwear (footwear of medium level specifications), manufactured with thermoplastic rubber.

VR-SBR-ULTRAGRIP LINE: Footwear model with anti slipping properties for home-comfort use (medium-low level specifications), manufactured with styrene-butadiene vulcanised rubber sole.





ADDITIONAL information



Further information about ULTRAGRIP and DEMOULTRAGRIP projects are collected in several guidelines, a book and the website of the project (www.demoultragrip.eu).

Guidelines:

- "Implementation of high grip designing tools: guidelines for footwear-sole designers"
- "Implementation of high grip designing tools: guidelines for businessmen and risk prevention responsables"

Book:

- "Implementation of high grip designing tools: slip resistance footwear"

Additional information



- Guidelines for footwear-sole designers

Guidelines addressed to footwear-sole designers, who do not necessarily have a high level of knowledge on materials and slipping science, as they have a more artistic profile and design soles optimising their aesthetic appearance.

- Guidelines for businessmen and risk prevention managers.

Guidelines aimed at providing criteria and recommendations to make it easier for businessmen and risk prevention managers to understand and apply safety regulations in the workplace, especially concerning the risk assessment for the involved workers' health and applicable preventive measures. This represents an update of current reference technical texts and regulations in force.

- Book about footwear slip resistance.

A compilation of know-how regarding slipping and new knowledge gained from ULTRAGRIP and DEMOULTRAGRIP results. This book is presented as a reference document regarding grip in the footwear sector.



For further information about the guidelines and the book, contact INESCOP (info@inescop.es)

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