

Interreg VI–A Italia–Österreich Programma di cooperazione

Progetto GRIPALP: Suole ad elevate prestazioni per l'ambiente alpino
Leano Viel - Dolomiticert Scarl

Il primo bando del Programma Interreg VI-A Italia-Austria 2021-2027 e Strategia CLLD Dolomiti Live - infoday veneto
Pieve di Cadore (BL) – 16.02.2023



GRIPALP – Finanziamento e partenariato



Interreg V-A Italia-Austria 2014-2020 - Asse I – III Avviso

Importo di progetto: 460.974,23 €
Contributo FESR: 80%



UNIVERSITÀ
DEGLI STUDI
DI PADOVA

Definizione partenariato



LP, soggetto giuridico della RIR



PP1, aderente RIR



PP2, aderente RIR



Diffusione risultati
alle aziende dello
Sportsystem

Evento finale
novembre 2022
Montebelluna



Obiettivi del progetto GRIPALP



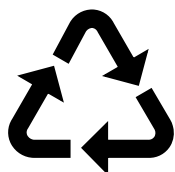
Lo scivolamento è la causa più frequente di infortunio negli sport alpini (arrampicata, trail running, alpinismo, escursionismo, ...)

Selezione dei materiali

VULCANIZED RUBBER



Vulcanization



Devulcanization



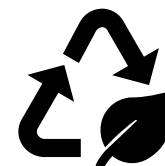
Polluting fillers
(ex.: Carbon Black)

MICROCELLULAR ELASTOMERIC POLYURETHANE

Reaction Injection Molding (RIM)



Chemical recycling



Eco-friendly fillers
(ex.: Cellulose)



Approccio sperimentale

1

PU fossil-based

3 formulations:

- A
- B
- C

Fillers:

- Bio-based (cellulose fibers and cellulose powder)
- Traditional (aluminosilicate, zirconia and dellite HPS)

2

PU fossil-based + Polyol
chemically recycled

2 formulations:

- Ar
- Br

Fillers:

Bio-based (cellulose fibers and
cellulose powder)

3

PU bio-based

2 formulations:

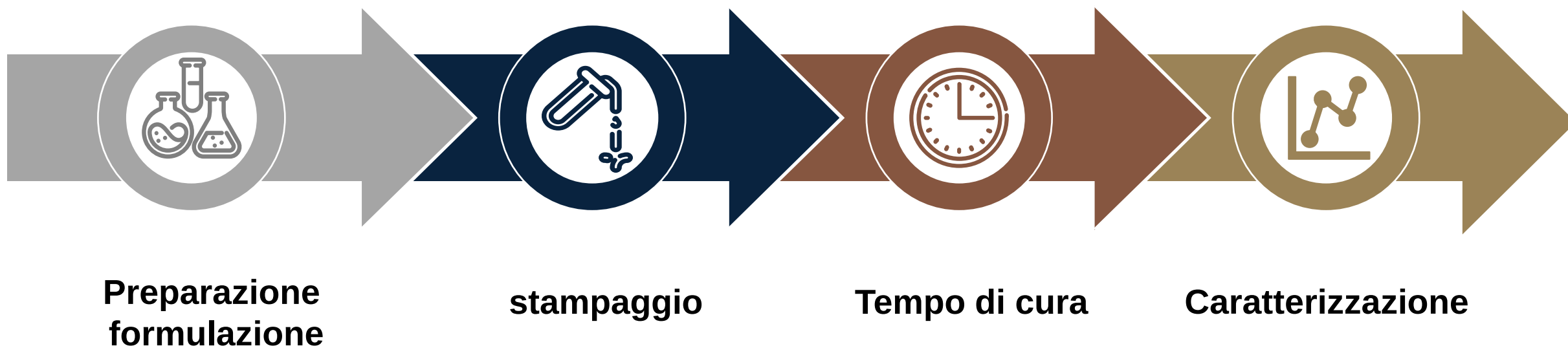
- Ab
- Bb

Fillers:

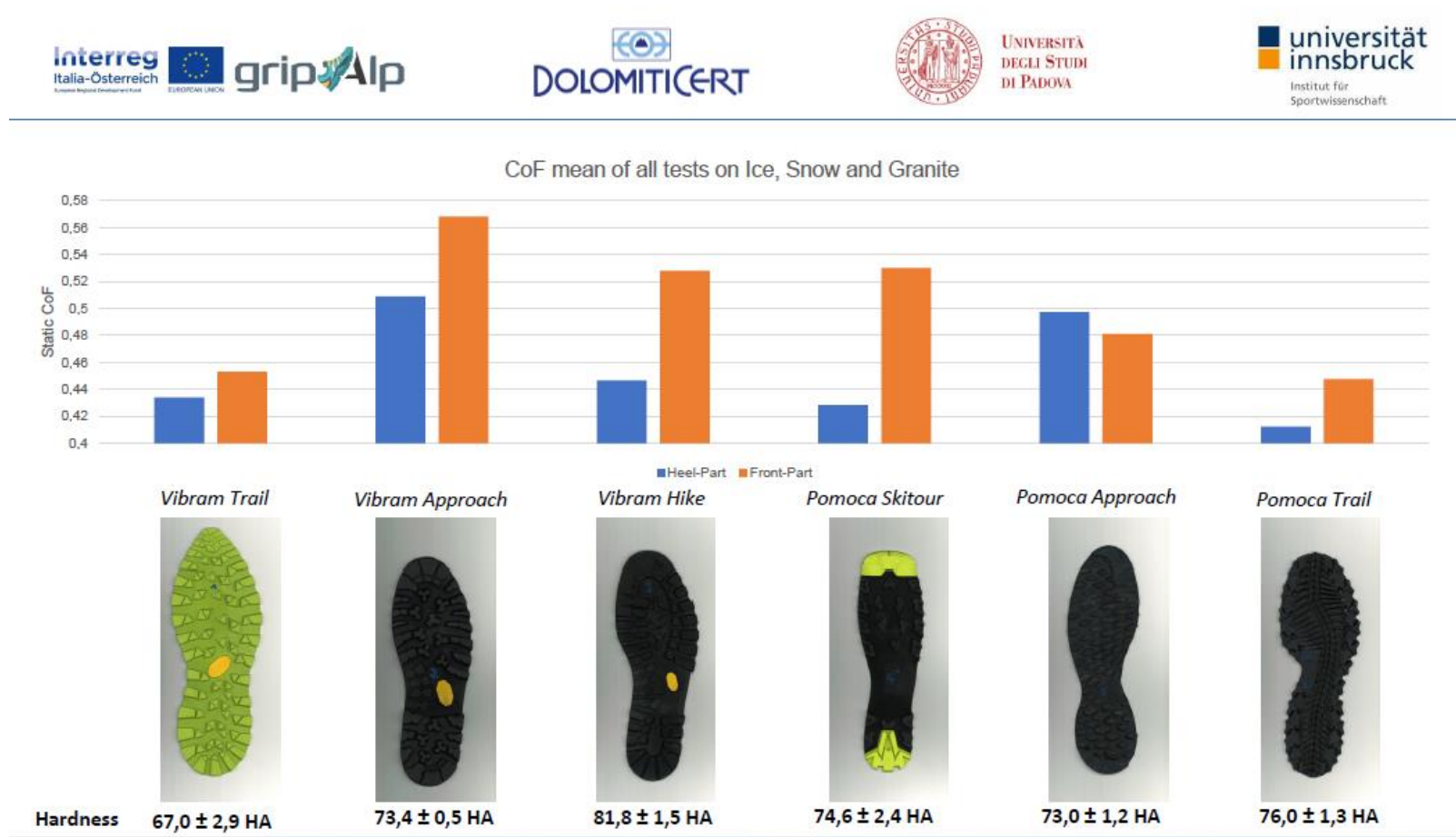
Bio-based (cellulose fibers and
cellulose powder)

Stampaggio per iniezione reattiva (RIM)

- Processo di stampaggio dei Poliuretani Elastomerici



Caratterizzazione dei materiali



Caratterizzazione dei materiali



Valutazione del coefficiente d'attrito su diverse superfici

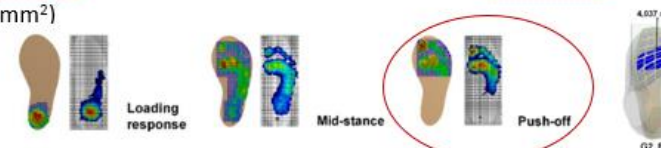
Dolomitcert: Internal method for the CoF evaluation

$$\mu = \frac{F_A}{F_N}$$

Where:

- μ is the Coefficient Of Friction (COF);
- F_A is the Friction Force [N];
- F_N is the Normal Force [N].

F_N is setted at 245 N for a specimen with 55 x 20 mm dimensions (1100 mm²)



From scientific literature [1] an average push off area is about 4000 mm² with a push off force of about 900 N (0,22 Mpa of pressure) on a concrete tile.



[1] Kao-Shang Shih, Shu-Yu Jhou and other, «A Biomechanical Investigation of Athletic Footwear Traction Performance: Integration of Gait Analysis with Computational Simulation», Appl. Sci. 2020, 10, 1672.

Caratterizzazione dei materiali



Preliminar study on shoes test standard: EN ISO 20345

Focus on **outsole**:

Outsole
Abrasion
resistance

(ISO 4649:2017)

Tear
strength

(ISO 34-1:2010)

Density

(ISO 2781:2008)

Static
Coefficient
Of Friction

(INTERNAL
METHOD from ISO
13287)

Dynamic
Coefficient
Of Friction

(INTERNAL
METHOD from ISO
13287)

Shore A
Hardness

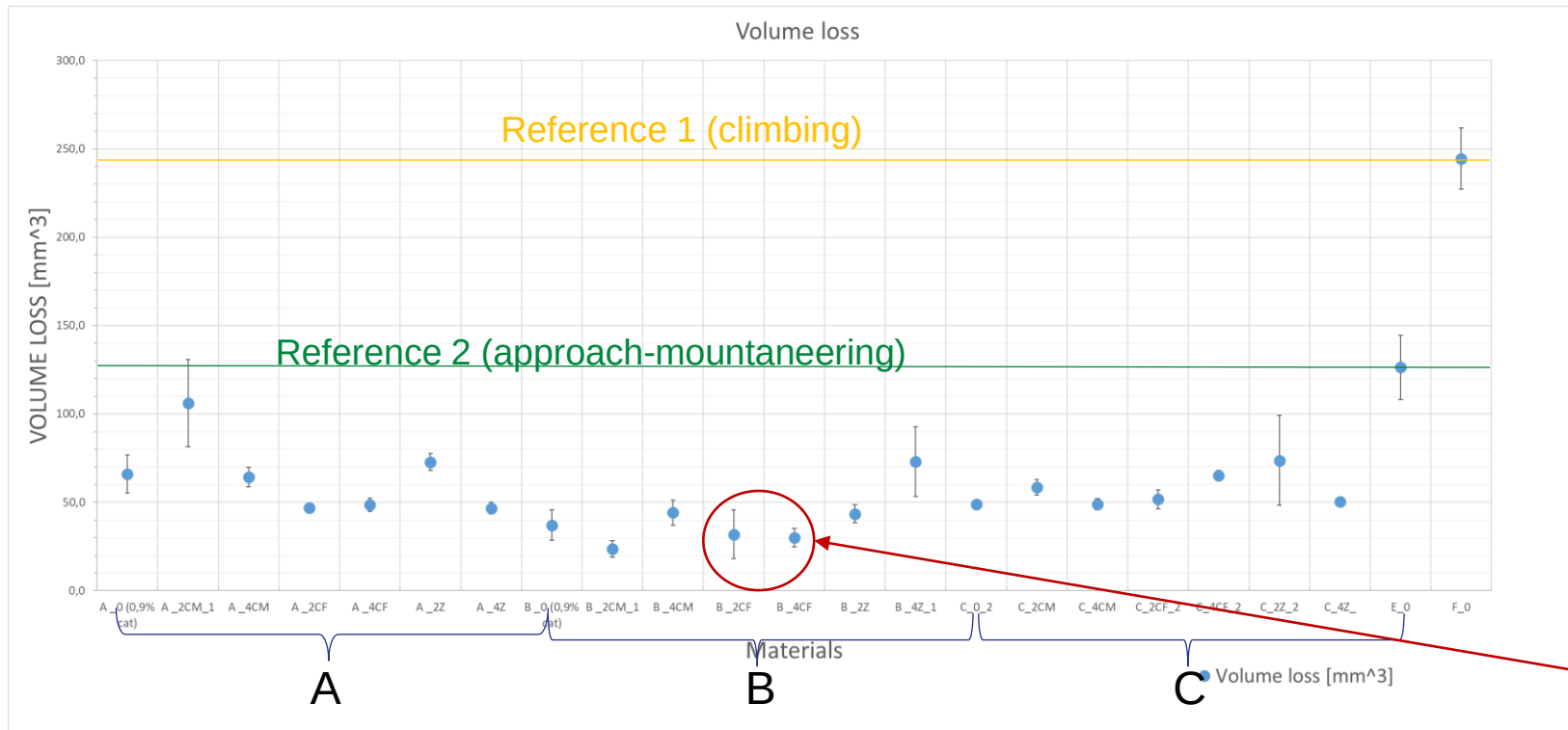
(ISO 868:2003)



Caratterizzazione meccanica dei nuovi materiali.
Test su provini piani, non considerando il disegno della suola

Risultati di progetto

Fossil based elastomeric materials + Fillers: Results



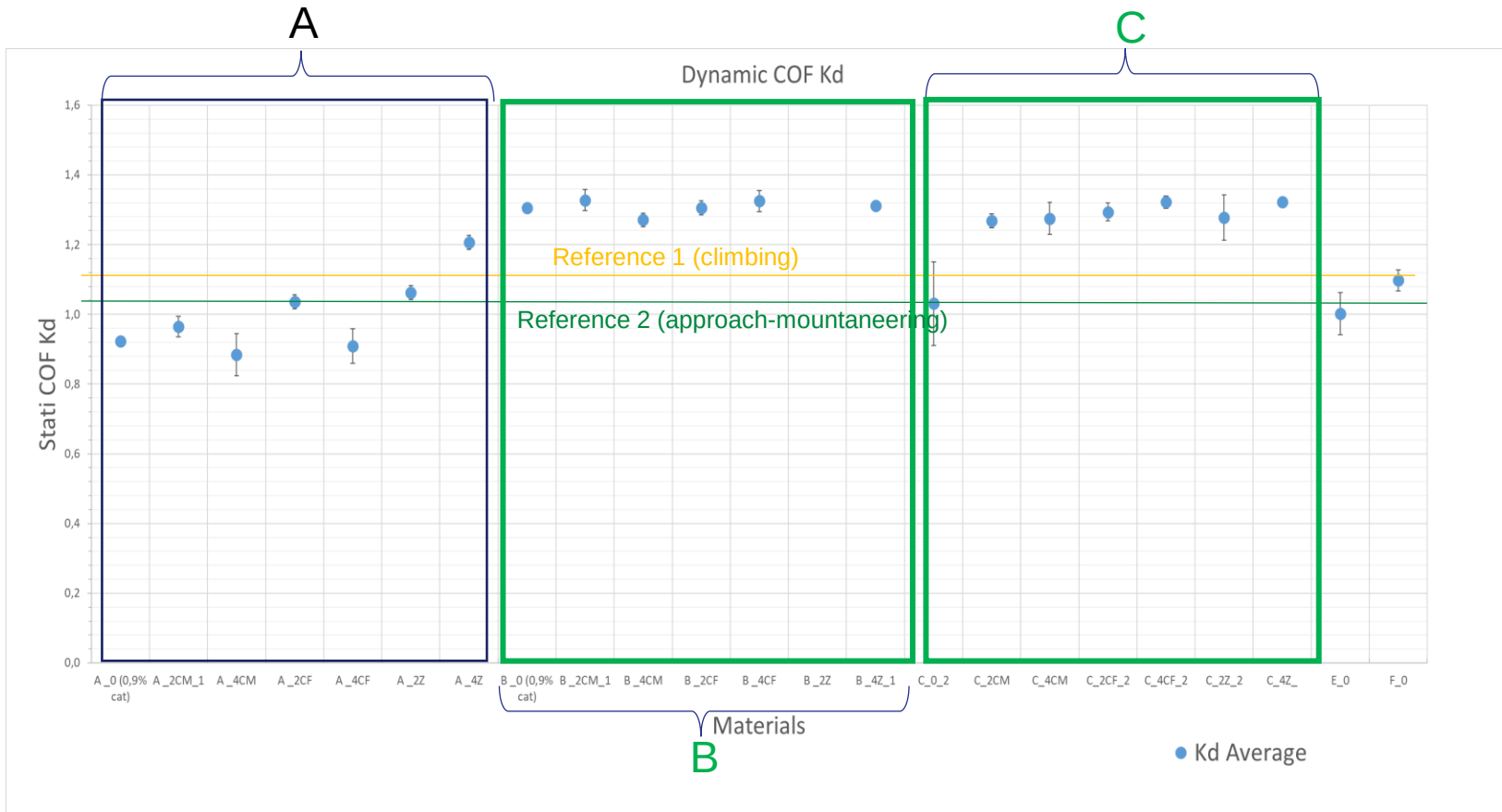
BETTER abrasion resistance =
LESS volume loss = increased
DURABILITY

A, B and C formulations demonstrate
better ABRASION RESISTANCE
than both the reference materials

B formulations demonstrate better
overall ABRASION RESISTANCE
than other materials, in particular
with CELLULOSE FIBERS

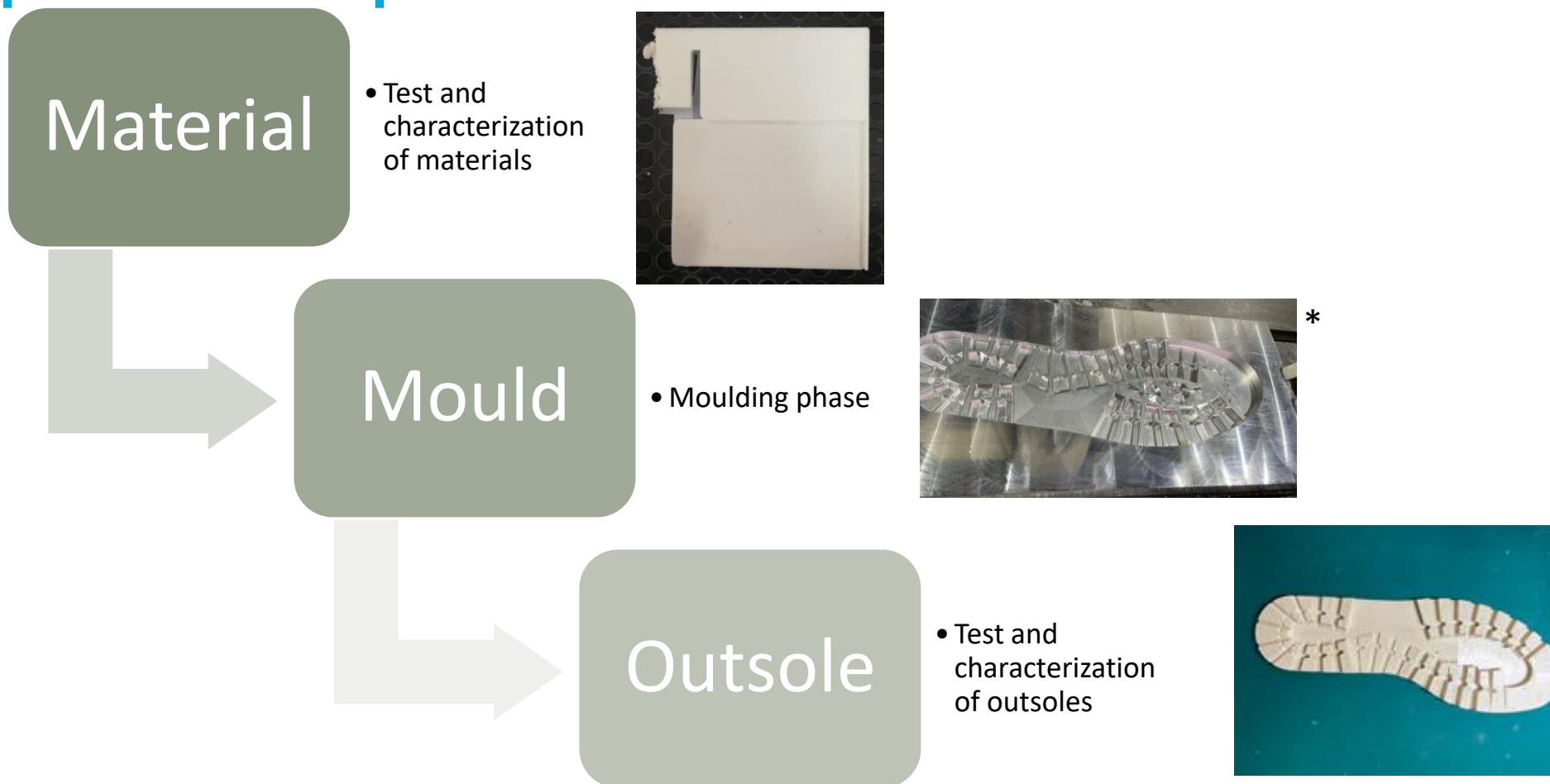
Risultati di progetto

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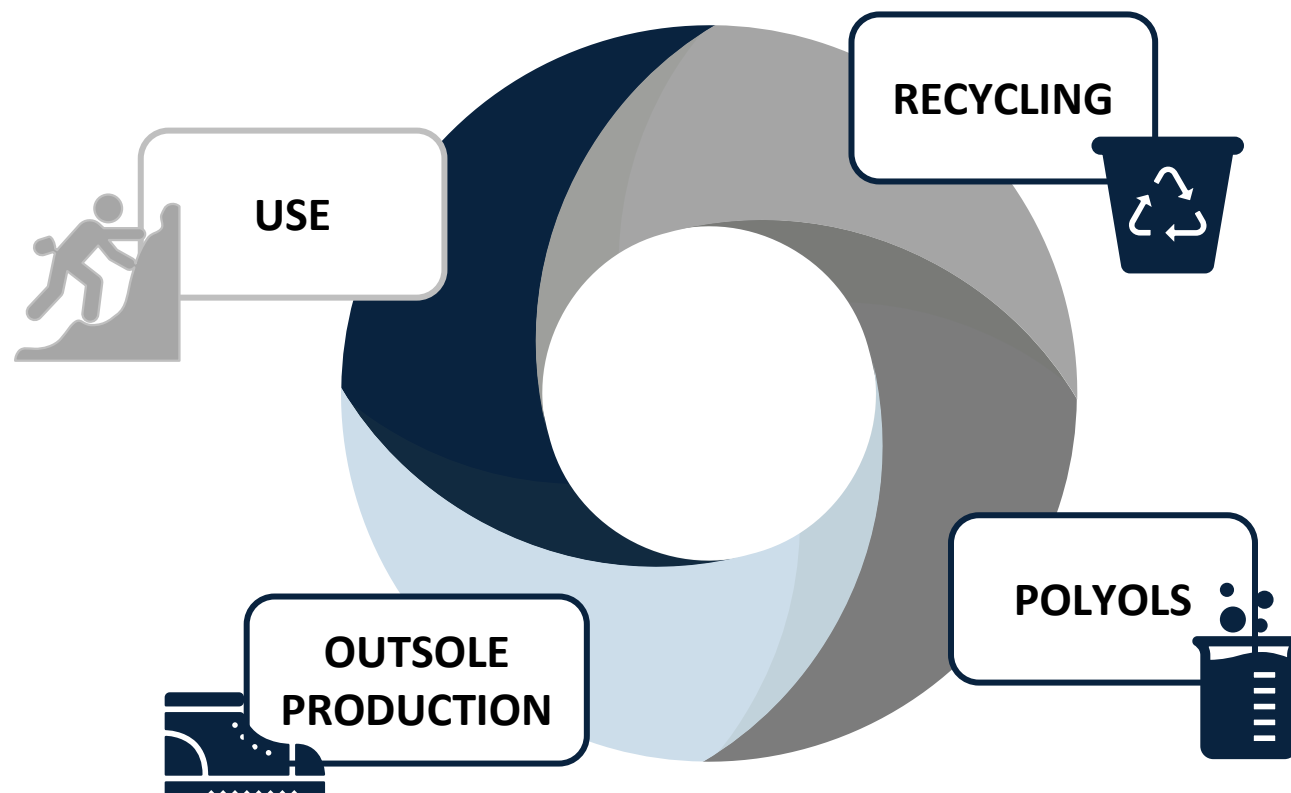
Materials B and C have globally the better Kd

Sviluppi futuri: produzione suole e test



*Puramente per scopi scientifici; tutti i diritti relativi al design dello stampo sono esclusiva proprietà dei produttori

Sviluppi futuri



Grazie per l'attenzione!



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