

Ultrawear for Cold Climates: the Scandinavian Experience





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SCANDINAVIAN COUNTRIES v. ALASKA




ULTRAWEAR BACKGROUND



- The "New Chip Seal": an Ultra-Thin Wearing Course over a thick Polymer-Modified Bond Coat :
 1. Tight waterproofing
 2. Perfect Bonding of the ultra-thin layer
- The gap-gradation design :
 1. Increases surface drainability
 2. Enhances Skid-resistance
 3. Reduces the rolling-noise
- The built-in spraying system





ULTRAWEAR BACKGROUND
THE SCANDINAVIAN PRECURSOR

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SKANSKA

1980, SKANSKA Patent : *Better bonding is obtained when tack coat emulsion is broken by hot mix immediately after its application*

Courtesy of SKANSKA

ULTRAWEAR BACKGROUND
THE SCANDINAVIAN PRECURSOR

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SKANSKA's first "Spray-Paver"
Circa 1980

Courtesy of SKANSKA

ULTRAWEAR BACKGROUND
Equipment Evolution

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2. Coarse Aggregates: High Quality & Hard

European Std	Description	ADT x 1000			
		0.5 - 1.5	1.5 - 3.5	3.5 - 7.0	> 7.0
EN-933-3	Flakiness Index, FI	≤ 20	≤ 20	≤ 15	≤ 15
EN-933-5	Crushing Ratio	C _{50/10}	C _{50/10}	C _{50/10}	C _{50/10}
EN-1097-9	Nordic Abrasion Test, A _N	≤ 14	≤ 10	≤ 7	≤ 7
EN-1097-2	Los Angeles Abrasion Value	≤ 25	≤ 25	≤ 20	≤ 20

Courtesy of SKANSKA

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Aggregate Testing



Flakiness Test EN-933-3




Courtesy AKDOT
Nordic Abrasion Value EN-1097-9

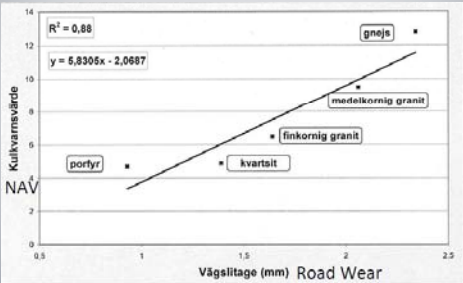


AASHTO T-327 MicroDeval

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Nordic Abrasion Value vs. Road Wear (VTI Road Simulator)



Source: Developing & Upgrading of a prediction model of wear caused by studded tires and an overview of the knowledge of the factors influencing the wear - VTI Nota 7 - 2007 - Sweden

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STT Studded Tire test (Nordic abrasion) vs. Micro-Deval

Source: Quality Assessment of Aggregate for Road Construction - Bjarnason, G. Public Roads Administration, IS-105 Reykjavik, Iceland / Petursson, P. Icelandic Building Research Institute, IS-112 Reykjavik, Iceland Erlingsson, S. Engineering Research Institute, University of Iceland, IS-107 Reykjavik, Iceland

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3. A thicker Application

	Ultrawear "B" & "C"	Scandinavian Type
Polymer-Modified Bond Coat	0.15 – 0.22 Gal. / SY	0.22 – 0.33 Gal. / SY
Asphalt Mix	55 – 80 lbs. / SY	80 – 150 lbs. / SY

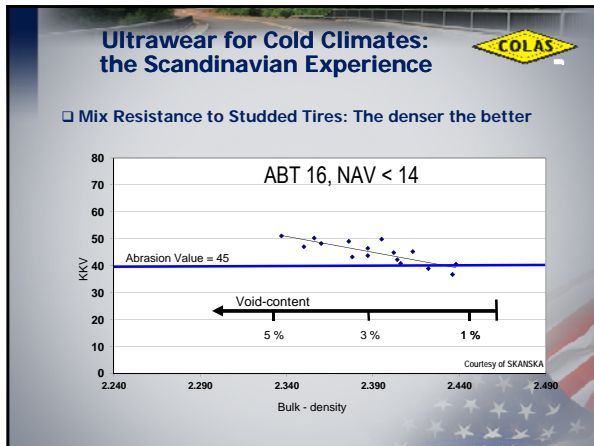
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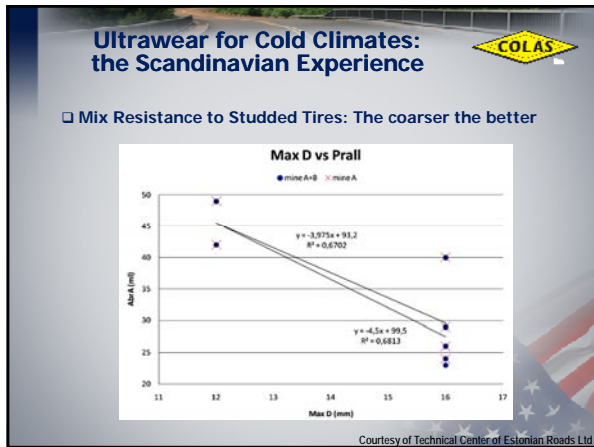
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4. Mix Resistance to Studded Tires: the Prall Test (EN 12697-16 method A - Prall)

Trafik ADTk	Prall
>7000	< 25 cm³
3500-7000	< 32 cm³
1500-3500	< 39 cm³
500-1500	< 50 cm³
< 500	Inget krav

Courtesy of Technical Center of Estonian Roads Ltd
Courtesy of SKANSKA





NOVACHIP Erfarenhetsvärden på Prall i Region Stockholm 2003


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ULTRAWEAR References with Prall in Stockholm Region


Beläggningstyp	Prallvärde	Vägsträcka	Verkligt Kulkvärm 11-16/8-11
Novachip 16, porfyr kkv <6	18 cm ³	E4 Södertälje Syd - Järna, K1	?
Novachip 16, porfyr kkv <6	21 cm ³	Rv 80 Gävle -Sandviken	?
Novachip 16, kkv<9	29 cm ³	Stockholm Stad	?
Novachip 16, porfyr kkv <6	21 cm ³	V73, Landfjärden	5.8
Novachip 11, porfyr kkv <6	27 cm ³	V 227 Dalarö - Handen	5.8
Novachip 11, kkv <14	45 cm ³	Muskövägen	12.5

Trafik ÅDTK, just	Prall
>7000	< 25 cm ³
3500-7000	< 32 cm ³
1500-3500	< 39 cm ³
500-1500	< 50 cm ³
< 500	Inget krav

Courtesy of SKANSKA

**Ultrawear for Cold Climates:
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❑ UltraWear adapted to Studded Tires Traffic:



Courtesy of SKANSKA

1. Denser & Coarser Gradation
2. Use of High Quality Hard Aggregate

❑ The Built-in Spray System allows save on High Quality aggregates

in.	lbs./SY	150 lbs. /cft
3/4	84	Scandinavian UltraWear
1.0	112	
1.5	168	
2.0	224	Conventional Mix

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TACK !

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