

Item Number	Standard	Unit	01837.20	00251.99	01824.20	00462.99	01836.20	00260.99
Technique	Komanda			Needlepunch	Komanda	Needlepunch	Komanda	Needlepunch
Composition	100% Dyneema®	%	100% Dyneema®	100% Dyneema®	100% Dyneema®	100% p-Aramid	100% p-Aramid	100% p-Aramid
Color	white		white	white	white	yellow	yellow	yellow
Weight	100	gsm	200	200	200	170	170	240
Thickness	1	mm	1,67	0,84	2,1	1,38	2,5	
MD Tensile Strength	> 480	N/5cm	> 700	> 1000	> 160	> 390	> 250	
CD Tensile Strength	> 700	N/5cm	> 1800	> 1650	> 290	> 360	> 400	
Cut Resistance	EN 388	Protection Level	3	4	3	3	min. 3	
Tear Resistance	EN 388	Protection Level	4	4	3	4	min. 3	
Puncture Resistance	EN 388	Protection Level	---	3	4	---	---	---

Nonwovens for Cut/Stab & Soft Ballistic Protection

End-Uses

- Fragment protection
 - Bomb suits EOD
 - Vests
 - Bomb blankets
- Stab protection
- Anti-Trauma
- Slash protection
- Cut protection
- Puncture protection

Performance Characteristics

- Ballistic properties according to Standard STANAG 2920
- Stab protection according to Standard HOSDB, NIJ, VPAM and more – Protection against knife and spike
- Cut and puncture resistance according to EN388 standards
- Lightweight, high-performance materials
- Various nonwoven structures available, weight range between 40 - 450 g/m²
- Durability
- Multilayer solutions incorporating scrims, UD's, fabrics (free of binders)
- Blending of different material (intimate blend, 2-side construction)
- Various after-treatment options: antistatic, water repellent, etc.
- Material modifications possible in order to enhance comfort



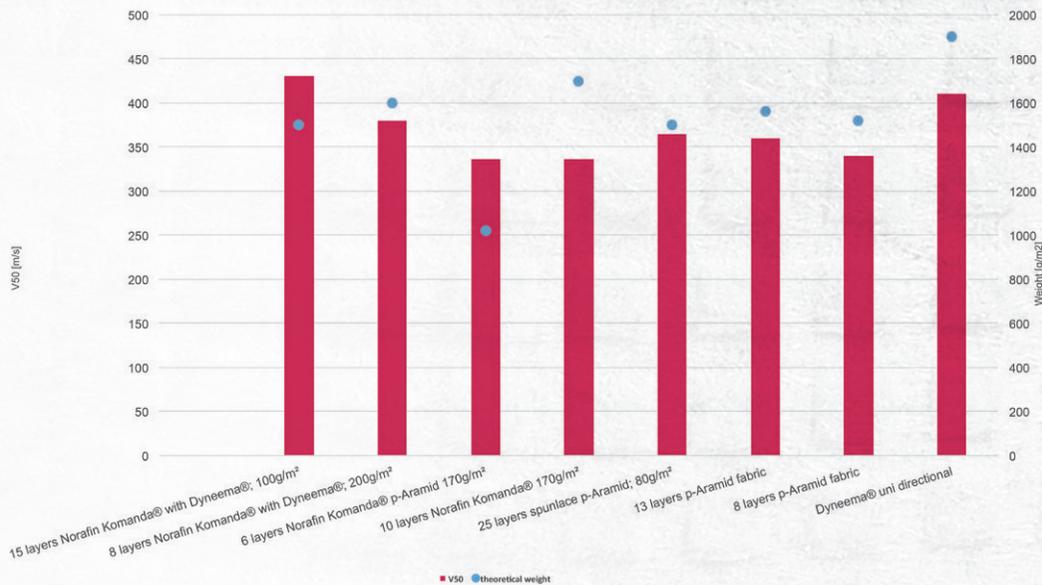
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Norafin serves industrial markets offering high-quality, custom engineered spunlaced and needle punched materials targeting a wide range of market segments including law enforcement, police, military or private sector. Norafin's technical nonwovens used as ballistic material offer important product features answering the market's requirements for safety, durability and lightweight constructions.

Tests according to STANAG 2920 have shown excellent performance of Norafin Komanda® material against 1,1g fragment. The correlation between protection (V50) and weight of the ballistic panel is demonstrated in the graph below. Compared to existing ballistic solutions in the market (fabrics), V50 is significantly increased by using Norafin Komanda® for fragment applications.



The stability and durability of Norafin Komanda® after the impact is visible in the pictures below.



Strikeface: During the shooting the nonwoven is catching the fragments efficiently due to the high strength in combination with high flexibility and density.
Bodyside: The fragment is stopped in the middle of the ballistic panel.

Abrasion in accordance to ISO 12947



The Martindale-Method simulates natural wear, where the textile sample is rubbed against a standard abrasive surface with a specified force. The results of more than 200.000 cycles for Norafin Komanda® with Dyneema® show good mechanical stability and high strength of the nonwoven product during the life-cycle in a ballistic vest.