



NORDIFA AB

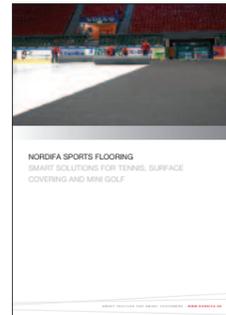
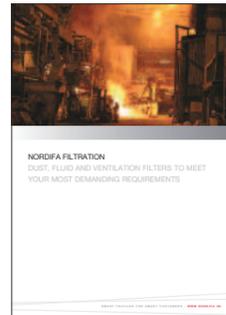
Nordifa, the only dedicated manufacturer of technical textiles in the Nordic region, is located on Flygstaden industrial estate, close to the airport in Halmstad. The 14,000 square metre, state-of-the-art production plant meets the highest environmental standards.

NORDIFA. UNLIMITED OPPORTUNITIES

WOULD YOU LIKE OUR BROCHURES?

Would you like to know what can be done with textiles? Are you working with a concrete project where textiles may be the solution? Our brochures will give you a general idea of Nordifa's three exciting business areas. If you want more in-depth infor-

mation, you can either visit our website – www.nordifa.se – or contact us using the details listed at the bottom of the page. We look forward to hearing from you!

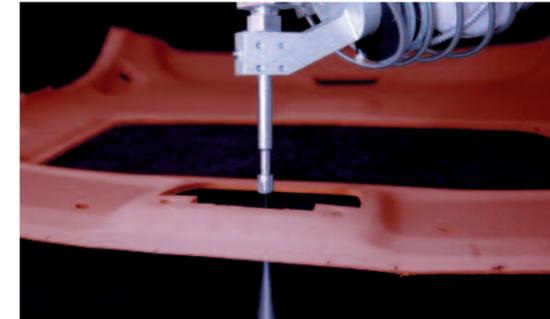
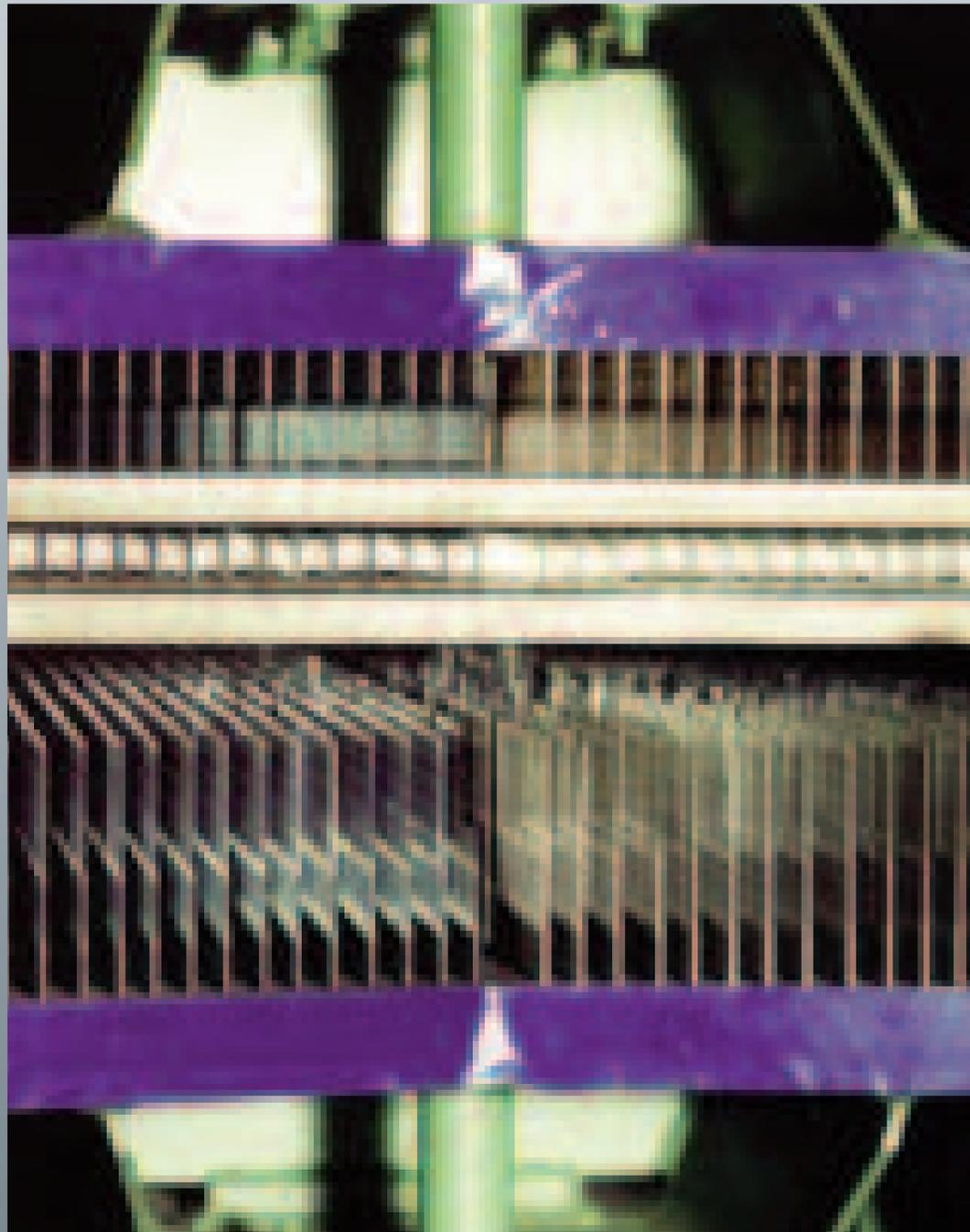


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SMART TEXTILES FOR SMART CUSTOMERS - WWW.NORDIFA.SE



TECHNICAL SOLUTIONS TO PROBLEMS AND CUSTOMISED PRODUCTION FROM FIBRE TO FUNCTION



The water jet cuts moulded products cleanly.



Specialist sewing machine for dust filter production.

Nordifa's operation is totally focused on solving customers' problems and meeting their wishes. In practice, this means that we always start from the function a product is intended to have, and go on to find a solution which meet the requirements.

Unlike most other companies, we do not buy the standard materials available on the international market. Instead, we manufacture our own and, to ensure that we will be able to use the most appropriate raw materials for the job, we work closely with the world's leading fibre manufacturers.

Naturally, we use the production methods which may be required – weaving, knitting, plaiting, fulling and needling. Our partners work to Nordifa's specifications and are closely monitored.

ONLY AT NORDIFA

Nordifa is the only company in the Nordic region with a complete needle felt production process – all the way from fibre to functional product. For this reason, needled products still dominate our operations, but the number of products produced through weaving, for example, is on the increase.

The fact that we have total control over all production stages ensures maximum flexibility and unlimited opportunities to customise the finished products to meet the customer's requirements and needs. (Remember the title of this brochure?)

This is one of the reasons why Nordifa has been the first out with a number of technical innovations, including the manufacture of progressively-layered filter material and the use of a combination of fine and coarse fibres in one and the same product.

THE HUMAN FACTOR

Textile manufacturing has been an important part of the local business sector ever since Isak Wallberg started manufacturing machine felt in Halmstad in the mid-19th Century. Today, Nordifa offers a broad and deep product range – from filter media and sports flooring to textile machine components and interiors.

But owning a unique range of machinery, working in partnership with the world's foremost fibre manufacturers and a solid financial standing are not enough. It is our professional and experienced staff who create the operation

and achieve results. A marketing staff which knows at least as much about the clients' processes as the clients themselves, creative developers who can make the leap between technical areas, machine operators who are prepared to go above and beyond the call of duty, administrators who keep a close eye on the company's finances – together, they make up a company with unlimited possibilities.

THE PROCESS IN BRIEF

We always start by examining closely the operational and functional requirements which govern the choice of material, fibre blend, structure, weight and colour.

Our unique equipment guarantees the perfect fibre blend. This is often a deciding factor for function, e.g. when anti-static fibres are to be added. The fibre materials for weaving yarns are blended equally carefully.

Once the fibres have been carded to create a fibrous web, a number of fibrous webs are placed on top of each other and carded to form a fleece. What makes Nordifa unique is our very wide machinery and the fact that we can decide what patterns to lay and combine different fleece materials.

Processing using barbed needles turns the fleece into needle felt. Weaving and knitting are done using specialist machinery which guarantees that the material will have exactly the density, weight and thickness required.

AFTER TREATMENT AND CHECKS

There are many alternatives – thermo fixing provides surface structure, stable dimensions and wear resistance, environmentally-friendly impregnation to give the material specific properties, calendaring which gives a smooth surface and so on.

In the sewing department, products are put together to exact shapes and dimensions with the help of specialist sewing machines and other equipment. Nordifa has several pressure moulding production lines, and the technique involves the felt being heated up then pressed against a mould, cooled down and, finally, cut using water jets in a fully-automatic robot cell.

The whole production process follows the procedures required by our ISO-based quality management system. All stages are documented.

ADVANCED TEXTILE COMPONENTS FOR THOUSANDS OF APPLICATIONS



Felt – an unrivalled material for sealing.



Weaving specialist products for the industrial sector.

Textiles are versatile materials which can replace plastic, rubber, wood and metals in many areas. No-one is more aware of this than Nordifa – every day, our textile components provide solutions for companies in every conceivable sector.

The fact that we work with many different applications for textiles – not just one – means that our customers benefit from valuable cross-pollination. This results in short take-offs, high quality and low costs whenever a new component is to be developed.

VALUABLE PROPERTIES

A soft textile material is a great shock absorber and will protect the substrate. It can also absorb fluids – anything from stamp ink to lubricating grease. Textiles are also ideal for controlling flows in ventilation systems and to make felt tips for pens. The addition of specialist fibre increases the conductivity of the material to the point where it can counteract static electricity.

But textiles do not just have technical properties. They also offer almost unlimited options with respect to colour, surface texture, thickness etc. This has given interior and furniture designers a completely new material to work with.

TECHNICAL FUNCTIONS

In many cases, textiles are the designers' standard solution for use as seals for fluids, oil, air and gases, as well as between machine parts and components. The same thing applies when it comes to protection for products, people, machines and the environment.

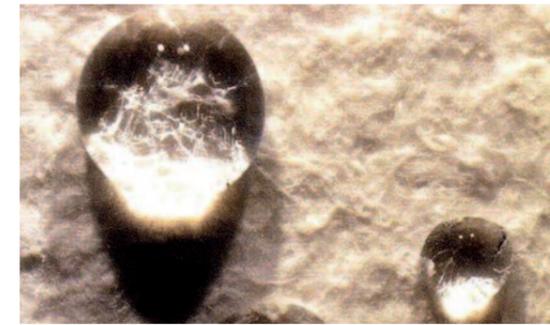
Textiles are used to reduce noise, as well as the effects of blows, impacts and vibration, to eliminate unevenness and to protect against wear and tear. Their insulating properties are also useful, and they are used as protection against heat and cold, aggressive chemicals and emissions.

Textile products can absorb sound, contaminants and fluids, and can be used in the transport and filtration of products, powders, liquids and air.

PRESSURE MOULDING IS THE FUTURE

A production technique with enormous potential is pressure moulding. The technology makes it possible to design self-supporting and noise-suppressing products for vehicles, offices, interiors and machines. Pressure moulding offers designers and builders unlimited opportunities with respect to décor, cladding and interiors. Both Nordifa's pressure moulding technology and the products produced using the technique have already won awards.

AFFORDABLE FILTER MEDIA FOR DEMANDING CUSTOMERS



Liquid-repellent dust filter media.



Nordifa's service department deals with the toughest jobs.

Filtration is a technical process which is used everywhere in society, from the basic coffee maker on the kitchen counter to high-tech separation facilities for nuclear waste. And anything in between.

Effective filtration is essential to profitability and the environment, particularly in the process industry. In the mining and chemicals industries, the raw material produced and sold relies completely on filtration and dewatering. In the production of steel and aluminium, filtration ensures a good working environment. The majority of district heating power plants around the world use textile filters to clean flue gases from the incineration of waste or biofuel.

FLUID, DRY OR VENTILATION?

Nordifa works with three important filtration application areas: fluid filtration, dust arrestance and industrial air conditioning.

What all textile filter products have in common is that they must be carefully tailored to take account of the operating situation. This is particularly important when it comes to wet and dust filtration, since the circumstances and customer requirements can vary enormously from one application to the next. This is where Nordifa's experience and comprehensive production process is the key, since it enables us to adapt the tiniest details of a product's properties to the customer's requirements.

TOUGH REQUIREMENTS

Long service life, consistently low pressure drop, high arres-

tance and the ability to withstand aggressive chemicals are common customer requirements. In the area of fluid filtration, the requirements often include moisture and dry content.

High operating temperatures, frequently in combination with high moisture content, make tough demands on the material's ability to arrest dust. When molten metals are involved, the material must be able to resist the hot particles trapped in the flue gases in the filtration plants.

Finally, Nordifa's ventilation filters are specifically adapted to demanding industrial environments where pressure drop, filter area, service life and recycling are serious considerations.

MORE THAN JUST PRODUCTS

Making high-quality products is not enough. If the products are to work, they need to be backed up by accessories which are as carefully adapted to the operating situation as the products themselves. Customers who want to make sure that everything works smoothly also leave the installation work to us.

No one has been involved in textile filter material longer than Nordifa. That is why we set the standard that others have to live up to. The secret is know-how and the fact that, right from the start, we have made it our business to know at least as much about our customers' processes as they do themselves.

SENSIBLE SURFACE COVER OR TENNIS PR AT STOCKHOLM CENTRAL STATION?



Bolltex Portable at Stockholm Central Station.



Who will be the family golf champion?

When the Eurovision Song Contest kicks off at the ice hockey arena, the ice must be covered in highly-insulating flooring to ensure that the front-row audience is comfortable. The same thing applies when the rough concrete floor of an exhibition hall is to be transformed into a cosy meeting place which encourages relationship-building. And when an event company organises a customer get-together in an underground, Cold War aircraft hangar, it's time to give the floor a makeover.

It is precisely for situations like these that we created Rinktex – a high-insulation and hard-wearing textile flooring that can transform any arena into a concert hall or exhibition centre in a couple of hours. The only limit is imagination, and lower energy consumption is an added bonus. Rinktex is in use all over the world – from the USA and Spain to Russia and Dubai.

BOLLTEX ELITE – THE PEOPLE-FRIENDLY TENNIS FLOOR

These days, the world's elite players prefer the hard-court floor approved by championship organisers. That is as it may be, but there are plenty of amateur players, beginners and coaches who prefer a softer floor with controlled bounce, which is also kinder to joints and muscles. It also provides hall managers with a durable and easily-maintained floor.

A hall covered in Bolltex Elite has unusually good noise properties, since the floor absorbs much of the noise. The attractive look is an added bonus.

TENNIS COURT ON TOUR

With a portable court made from Bolltex Elite tennis clubs

can organise PR events almost anywhere. When it is difficult to attract people to the tennis hall, it is time to take the tennis hall to the people, and organise exhibition matches and have-a-go events where people congregate, even at a shopping centre!

PENTATHLON AT THE CAMPING SITE? OR WORLD CHAMPIONSHIPS REQUIRING MILLIMETRE PRECISION?

Crazy golf, or mini golf as the sport is also known, has many faces.

Sometimes, the course may be located next to a camping site where it leads a hard life, having to cope with everything from storm-force winds and drenching rain to boisterous Friday get-togethers.

Sometimes, the course may be a carefully-designed and precision-built indoor arena used for international championships at which all participants expect to play under exactly the same conditions.

In either case, Nordifa has the ideal material for every type of game: Golfex I is a bit more basic but has excellent weather and wind resistance – the ideal solution for family courses. Golfex II, which is approved for championships, is a more exclusive product with an extra spring layer.

CURLING AND BOWLS

Nordifa offers the right material for all indoor sports requiring an even playing surface with appropriate spring, controlled friction and extreme durability. Our production apparatus enables us to create a substrate with precisely the properties required. The British national sport, bowls, is one example, amateur curling another.

OUR WELL-STOCKED TOOL BOX

Nordifa deals with both common and unusual textile raw materials on an everyday basis. Through our collaboration with the world's leading fibre manufacturers, we play an active role in the development of the materials of the future – we supply our customers with information about technical innovations and provide feedback from experience in the field.

For day-to-day development work, where we analyse products and create new ones, our own laboratory is sufficient. For neutral testing or when more extensive projects are involved, we collaborate with external research institutes and our partners.



SMART TEXTILES FOR SMART CUSTOMERS

TEXTILE RAW MATERIALS AND THEIR PROPERTIES

	SI-units	Factory units	Amorphous silicic acid	CF Carbon fibre	CLF Polyvinyl chloride	CO Cotton	Co-PET Bi-component PE	CV Viscose	EL Elastomers	FL Flax	GF (glassfibre) Silicon dioxide	JU Jute	LCP Aromatic polyester	MAC Modakrylic	MAR Meta-aramid	MTF Stainless steel	OPAN Oxidised pan	PA Polyamide	PAI Polyamide imide	PAN Polyacrylonitrile, homopolymer	PAR Para-aramid	PBO Polybenzoxazole	PE Polythene	PEEK Polyether-ether ketone	PEI Polyester imide	PET Polyester	PF Phenol-formaldehyde	PI Polyimide	PP Polypropylene	PPS Polyphenylene sulphide	PTFE Polytetrafluoroethylene	PVDF Polyvinylidene fluoride	WO Wool (sheep)	
Trade name			Refrasil	Tenax Torayca	Leavil, Termovyl				Lycra				Vectran	Kanecaron	Conex, Nomex	Bekinox, Nasion	Panox	Perlon	Kermel	Dolanit, Aksa	Keviar, Twaron	Zylon	Spectra Dyneema	Zyex		Trevira, Dacron	Kynol	P84	Meraklon Asota	Procon, Torcon	Profilen, Teflon	Kynar		
Staple fibres' tenacity	MPa/(kg/m3)	N/Tex	0,48	1,67	0,27	0,50	0,26	0,18	N/A	0,50	0,45	0,32	N/A	0,32	0,48	0,23	0,16	0,50	0,35	0,55	2,07	3,70	N/A	0,48	0,27	0,50	0,18	0,33	0,43	0,27	0,14	N/A	0,13	
Staple fibres' strength	Mpa	N/mm ²	1240,00	3000,00	360,00	370,00	140,00	270,00	N/A	750,00	1170,00	470,00	N/A	420,00	660,00	1780,00	210,00	570,00	470,00	660,00	3000,00	5900,00	N/A	625,00	345,00	690,00	230,00	465,00	390,00	370,00	300,00	N/A	165,00	
Filament fibres' tenacity	MPa/(kg/m3)	N/Tex	N/A	1,67	0,32	N/A	0,26	N/A	0,07	N/A	1,39	N/A	2,00	N/A	0,50	0,23	0,16	0,62	0,41	N/A	2,30	3,70	0,50	0,65	0,27	0,60	N/A	0,33	0,54	0,27	0,14	0,31	N/A	
Filam. fibres' strength	MPa	N/mm ²	N/A	3000,00	430,00	N/A	140,00	N/A	90,00	N/A	3530,00	N/A	2820,00	N/A	680,00	1780,00	210,00	710,00	540,00	N/A	3330,00	5900,00	470,00	850,00	345,00	830,00	N/A	465,00	490,00	370,00	300,00	560,00	N/A	
Break elongation	%		3	0,4 - 1,8	20 - 40	3-7	40 - 50	9 - 23	600	2-4	2 - 3	1,5 - 2,5	2 - 2,5	15 - 40	18 - 20	1	15 - 27	10 - 19	20 - 30	13 - 18	2 - 3,7	2,5 - 3,5	20 - 30	20	38	8 - 15	20	30	15 - 25	25 - 30	13	20 - 50	25 - 40	
Wet strength, relative	%		100,00	100,00	100,00	100-200	95 - 100	55 - 63	100,00	102,00	100,00	105,00	100,00	90 - 95	75 - 80	100,00	95 - 100	90 - 95	75 - 80	90 - 96	75 - 80	100,00	100,00	100,00	100,00	95 - 100	100,00	75 - 80	100,00	100,00	100,00	100,00	100,00	75 - 85
E modulus**	Gpa	N/mm ² x1000	x	x	x	x	9-34	x	x	50-70	72,00	20-55	x	x	x	x	8,40	x	x	17,77	x	300,00	30,00	x	x	137,00	x	4000,00	42,00	x	x	x	x	
Density	g/cm ³		2,60	1,80	1,35	1,52	1,22-1,38	1,52	1,20	1,49	2,60	1,50	1,41	1,30	1,38	7,90	1,37	1,14	1,34	1,18	1,45	1,56	0,94	1,30	1,28	1,38	1,25	1,41	0,91	1,37	2,10	1,78	1,32	
Moisture absorption	%		0,10	0,10	0,10	7,50	0,40	13,00	1,50	10,00	0,01	17,00	0,10	0,50	2,50	2,00	10,00	4,50	3 - 5	1,50	3,00	0,6 - 2	0,01	0,10	1,25	0,40	6,00	3,00	0,10	0,60	0,10	0,04	16,00	
Working temperature	K= C + 273	Degrees C	1000,00	530,00	80,00	80,00	70,00	135,00	90,00	80,00	240,00	80,00	180,00	80,00	200,00	550,00	300,00	100,00	250,00	130,00	180,00	400,00	65,00	240,00	170,00	135,00	150,00	260,00	90,00	190,00	240,00	130,00	90,00	
Maxtemp bef collapse	K= C + 273	Degrees C	1300,00	1800,00	160 - 180	150,00	110 - 190	190,00	250,00	150,00	845,00	150,00	276 - 322	190 - 200	400,00	1400,00	450,00	250,00	400,00	240,00	425,00	650,00	120,00	335,00	225,00	257,00	250,00	400,00	160,00	285,00	327,00	156,00	130 - 300	
Fire resistance LOI	% oxygen for ignition		x	x	x	16-18	x	16-18	x	16-18	x	16-18	x	30	30	x	50	22	32	19	28	68	x	30	44	21	30-34	47	18-19	43	95	44	25	
Acid resistance dilute/concentrated	U/K *		3/3	4/4	4/4	2/1	3/3	3/2	3/2	1/1	3/3	2/1	4/3	4/4	3/2	4/3	4/3	2/1	4/3	4/3	3/2	4/3	3/3	4/4	3/2	4/3	4/3	4/4	4/4	4/4	4/4	4/4	3/2	
Alkali resistance dilute/concentrated	U/K *		3/2	4/4	4/3	4/3	2/2	3/2	3/2	3/2	4/3	3/2	4/3	4/3	3/3	4/4	4/3	4/3	3/3	3/3	3/3	4/3	3/3	4/4	4/4	2/1	4/3	3/2	4/4	4/4	4/4	4/3	2/1	
Resistance to organic solvents	U/K *		4	4	2	3	3/3	3	2	3	4	3	4	2	3	4	4/3	4	4	3	4	4	3	4	3	3	4	3	3	4	4	3	3	
Resistance to oxidising agents	U/K *		4	4	4	2	3/3	3	2	1	4	1	3	4	3	4	4/3	2	4	3	3	4	1	3	3	4	1	3	3	2	4	4	1	
Resist. to hydrolysis	U/K *		4	4	3	x	1	x	3	x	4	x	3	3	1	3	4	3	4	4	2	2	2	4	4	1	4	2	3	4	4	4	x	
Relative price		Low, medium, high, (L:M:H)	M	H	L	L	M	L	M	L	L	L	H	L	M	M	M	M	M	L	M	H	L	H	H	L	M	M	L	H	H	M	L	
** at 2 % elongation		* U = dilute, K= Concentrated																																
		1- poor	N/A	Not applicable																														
		2- medium	x	Information not available																														
		3- good		LOI values above 25% are regarded low ignitability																														
		4- excellent	Tex	Specifies the weight in grams of 1,000 m of the fibre																														