

The art of
transporting
fresh air into mountains



Our history could fill an entire book

The foundations for Protan's business were laid between the wars and the production of ventilation systems started back in 1949. We were the first in Europe to manufacture flexible ventilation ducts and over the years we have built up extensive know-how and broad-based experience, from which our customers benefit. We now supply several hundred kilometres of ventilation ducts a year. Our qualities offer outstanding durability, flexibility and low weight. The long service life of our ventilation ducts means that some of our customers re-use them extensively.

Ventiflex qualities are flame retardant, resistant to chemicals, quick and easy to install and maintenance free.



The Ventiflex system is a world leader.

We have supplied ventilation systems to mines and tunnels on all the world's continents and offer local distribution in many countries. We carry out exhaustive checks and quality control on all our systems before they are delivered. Protan is a driving force in the development of ventilation systems in mines and tunnels and a member of the ITA-AITES through the Norwegian Tunnelling Society.



More than just ventilation.

Protan is Scandinavia's leading manufacturer of technical textiles and PVC roofing. Our head office and largest production facility are in Drammen, about 40 kilometres southwest of Oslo. At our fabrication plant in Nesbyen we make welded and customised products, tailored to our customers' requirements.

Textile and coating make up a unique fabric and the suspension system makes the duct even stronger

Our textiles, which have been developed specially for ventilation ducts, have radial reinforcement to prevent tearing. If a hole should nevertheless occur, our textiles are knitted precisely in order to limit the length of the tear. Our textiles are also designed to be dimensionally stable so as to prevent expansion under high pressure.

The PVC coating on the outside has been developed to withstand damage and mechanical wear, and is thick enough to protect the textile. Internally Ventiflex is designed to offer low flow resistance, which helps save energy. Our unique coating method produces a strong structure and also reduces the risk of delamination. The fabric also comes in a colour that reflects light.

Fully automatic industrial welding method ensures uniformity and high quality.

The suspension system with its plastic eyelets is also unique and employs a strong continuous suspension rib, which runs along the length of the ducting and is welded on. The plastic eyelets contribute to the overall strength of the system. Ventilation ducts in mines and tunnels are exposed to extreme stress, including pressure waves caused by blasting, which put every part of the construction to the test.

Couplings and hooks. We have a wide range of components that contribute to the great flexibility and adaptability of the ventilation system.



Strong suspension and coupling systems that are easy to fit.



The duct is made from a soft, flexible material that is flame-retardant, resistant to chemicals and maintenance free.

Fittings that count

Burst pressures for Ventiflex, safety factor n=1

Diameter (mm)	5000FR	9109FR	9104FR	6298FR	6698FR	7198FRAS
200	220 000	220 000	280 000	420 000	520 000	436 000
300	146 667	146 667	186 667	280 000	346 667	290 667
400	110 000	110 000	140 000	210 000	260 000	218 000
500	88 000	88 000	112 000	168 000	208 000	174 400
600	73 333	73 333	93 333	140 000	173 333	145 333
700	62 857	62 857	80 000	120 000	148 571	124 571
800	55 000	55 000	70 000	105 000	130 000	109 000
900	48 889	48 889	62 222	93 333	115 556	96 889
1000	44 000	44 000	56 000	84 000	104 000	87 200
1100	40 000	40 000	50 909	76 364	94 545	79 273
1200	36 667	36 667	46 667	70 000	86 667	72 667
1300	33 846	33 846	43 077	64 615	80 000	67 077
1400	31 429	31 429	40 000	60 000	74 286	62 286
1500	29 333	29 333	37 333	56 000	69 333	58 133
1600	27 500	27 500	35 000	52 500	65 000	54 500
1700	25 882	25 882	32 941	49 412	61 176	51 294
1800	24 444	24 444	31 111	46 667	57 778	48 444
1900	23 158	23 158	29 474	44 211	54 737	45 895
2000	22 000	22 000	28 000	42 000	52 000	43 600
2100	20 952	20 952	26 667	40 000	49 524	41 524
2200	20 000	20 000	25 455	38 182	47 273	39 636
2300	19 130	19 130	24 348	36 522	45 217	37 913
2400	18 333	18 333	23 333	35 000	43 333	36 333
2500	17 600	17 600	22 400	33 600	41 600	34 880
2600	16 923	16 923	21 538	32 308	40 000	33 538
2700	16 296	16 296	20 741	31 111	38 519	32 296
2800	15 714	15 714	20 000	30 000	37 143	31 143
2900	15 172	15 172	19 310	28 966	35 862	30 069
3000	14 667	14 667	18 667	28 000	34 667	29 067
3100	14 194	14 194	18 065	27 097	33 548	28 129
3200	13 750	13 750	17 500	26 250	32 500	27 250

Y piece



Branch



Tee



Bend



Adapter,
fan section,
nozzle



Multi-directional
details



Subject to changes

Fittings. We offer Y pieces, tees, bends, branches, adapters, fan sections and nozzles in standard versions in all diameters, and also customise fittings on the basis of drawings.

Eyelets. We use plastic eyelets, which are stronger than brass eyelets. The eyelets have a standard spacing of 0.5 metres, which provides optimum flexibility during installation.

Suspension rib. A strong rib that runs along the length of the ducting and is welded on.

Duct qualities

Ventiflex is made in various thicknesses of fabric for different pressures and requirements. We supply diameters of 200 – 3000 mm and lengths of 10 – 500 m.

- Ventiflex 9104FR
- Ventiflex 6298FR
- Ventiflex 6698FR
- Ventiflex 9109FR

We also have one antistatic quality:

- Ventiflex 7198FRAS



Zip coupling:

Simple assembly. Flexible, quick and easy to store.



Velcro coupling:

Simple assembly and disassembly. Flexible, quick and easy to store.



Ventiflex VF coupling:

User-friendly steel coupling with steel ring welded in and VF compression ring on outside.



Ventiflex LP coupling:

Basically the same as the VF coupling, but stronger. Available with nut for tightening by machine.



Shaft ducting.

Shaft ducting comes with steel wires and turn-buckles fitted and with two, three or four suspension ribs, as required.

Hooks. Ducts come with one hook per metre as standard.



VF hook:

Standard hook.

Height to suspension wire can be adjusted by a soft steel wire fitted to the hook.



LP hook:

Attaches straight onto the wire. Simple and quick to fit.



Snap hook:

Attaches straight onto the wire. Simple and quick to fit.



S hook:

Quick-release solution.

Full control of the production chain ensures quality

- The polyester fabrics used in Ventiflex have been developed under our direction and we conduct systematic product development in cooperation with leading textile producers.
- We coat the fabrics with top-grade virgin PVC in our own production facility and carry out high-frequency welding using fully automated machines.
- We have a high capacity in sales and sales support, and provide highly flexible customer follow-up.
- Complete duct systems are delivered to the right place on time.
- We also offer advice, training and assistance with installation.



The entire process from production to delivery is ISO-certified.

Protan AS is approved and certified in accordance with the ISO 9001 quality standard and the ISO 14001 environmental standard.

This means that the entire production chain and every aspect of our business are quality-controlled and operated with as little environmental impact as possible – both locally and globally. We also have the necessary certificates for supplying goods and services globally.

Lifecycle analyses demonstrate that our fabric is a very environmentally friendly product that can be recycled.



We conduct continuous product development in collaboration with leading mines and tunnelling contractors.

Laboratory

Our laboratory in Drammen is where all our qualities are developed and tested.

From the polyester textiles, through the top-grade virgin PVC coat, and the fabrics are all undergoing a continuous development to conform the best combination for a ventilation duct.

Here we have strict routines to test tear and tensile strength, chemical and fire resistance and antistatic performance according to international standards, both before production and continuously to document that we are within the promised specification given.

All tests are stored so we are able to follow a complaint all the way back to the date and hour manufactured in our plant.



Live testing in tunnel environment enable us to give exact values to the performance of our ducts.

Test tunnel

From time to time we perform live tests in real environments. Then we are able to measure air flow resistance both to the surface of the fabrics, and the different types of couplings offered.

We also do high pressure tests to monitor the expansion and behaviour of both duct qualities and couplings. All test and measurements are executed in order to support by facts the quality of Ventiflex ventilation duct system.





Long-term peace of mind

The help we provide can take the form of assistance with installation and maintenance, for example.

If the worst happens and the fabric is holed, we know what needs to be done to achieve a good outcome.

We supply practical, versatile repair kits for Ventiflex.



We are equipped to deal with most repairs.

We are highly experienced when it comes to practical problem solving in the field

During tunnelling it can happen that too little air is reaching the face. A small hole may need repairing. A bend may require straightening or larger ducts may be needed. Or perhaps another duct is required? Talk to us. We've dealt with such challenges before.



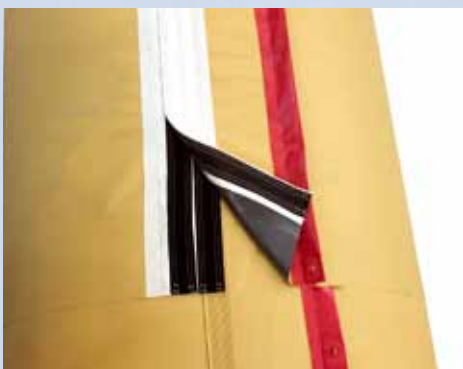
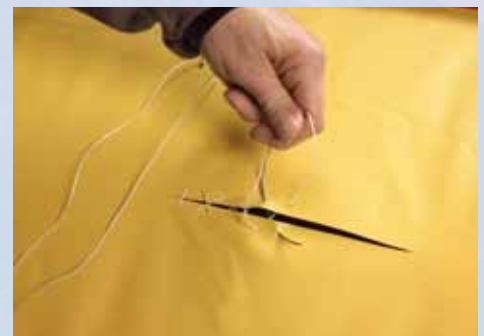
Hot air welded repair.



Glued repair.



Stitched repair.



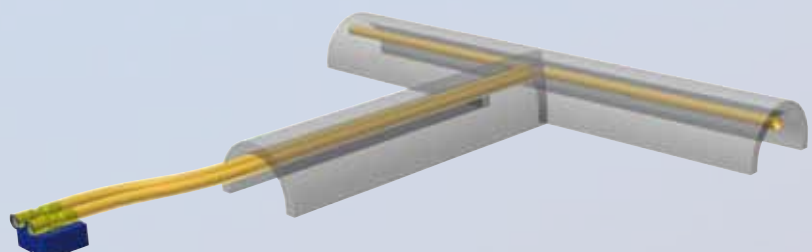
If a mishap occurs, we can also use sleeves that fit easily round the duct with Velcro.



Repair box.

Ventiflexcalc

We assist with calculating the optimum ventilation solution. Ventiflexcalc is a calculation tool that helps create good solutions.



Ventiflex Duo

Protan Ventiflex Duo is a concept that has been developed for use in installations with limited headroom. With its two separate ducts hanging from the same wire, it is both simple and reliable.

The most important advantages of Ventiflex Duo are as follows:

1. A larger cross-section means lower energy consumption for the fan with the same installation height and volume of air
2. More air to the face than with the same fan output
3. No intermediate walls that might cause problems with ruptures, vibrations, etc.
4. Two separate ducts that can function independently
5. Secure couplings with very low friction
6. Protan Ventiflex Duo can be installed very close to the tunnel roof because the suspension system is placed between the ducts.



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