



Richard Hough Limited
www.richardhough.co.uk



RHL – World Leaders in Fibre Roll Manufacture for over 200 years

Richard Hough Limited (incorporating Modern Rollers) manufacture a specialist range of fibre covered rolls for metal processing.

Richard Hough Limited is a private company with over 200 years experience in the manufacture of pressed fibre rolls. Industry leading manufacturing facilities and the combined experience of Richard Hough Limited and Modern Rollers ensure the highest roll quality and performance.



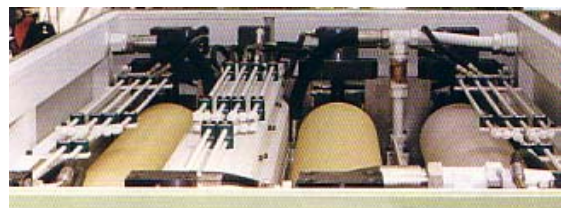
Viledon® Fibre Rolls for Metal Processing

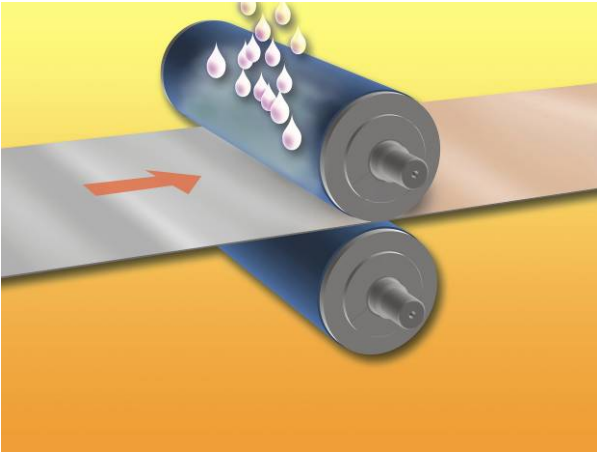
Viledon® fibre rolls have been specially developed in several material grades to suit a wide variety of applications in the steel and automotive industries including:

**Automotive Blank Washers – Blanking Lines – Slitting Lines - Cold Strip Mills
Sendzimir Mills - Pickling Lines – Annealing Lines - Electrolytic Cleaning Lines
Hot Dip & Electro-Galvanising Lines – Tin-Plating Lines – Coil Coating Lines**

Viledon® rolls are effective in improving line productivity when used in the following roll positions:

1. Wringer / Wiper / Squeegee / Oiler Rolls
2. Driving / Transporter Rolls
3. Deflector Rolls
4. Pressing / Snubber / Hold Down Rolls
5. Bridle / Tension Rolls
6. Supporting Rolls





Oiling

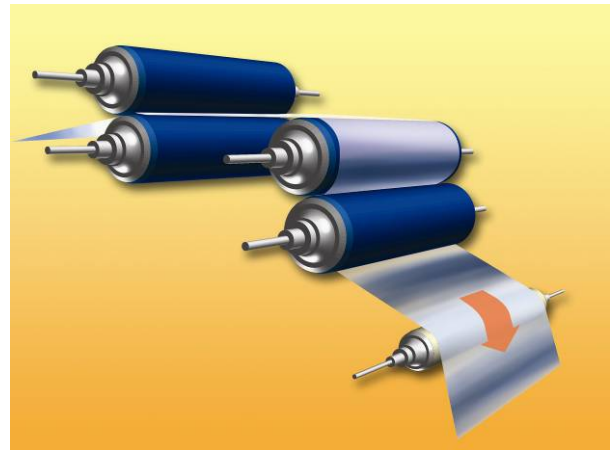
Oiling applications in the steel and automotive industry ensuring a thin and even layer of anti-corrosion oil, cooling oil or deep drawing oil on the surface of sheet metals...

- after pickling, galvanizing and cutting
- before cold-rolling (Sendzimir frames)
- before pressing processes

Driving and Guiding

Supporting and guiding or driving and braking of sheet metals ensuring constant and efficient conveying and deflection within:

- pickling and cleaning lines
- cold-rolling (pass mill) lines
- cutting machines



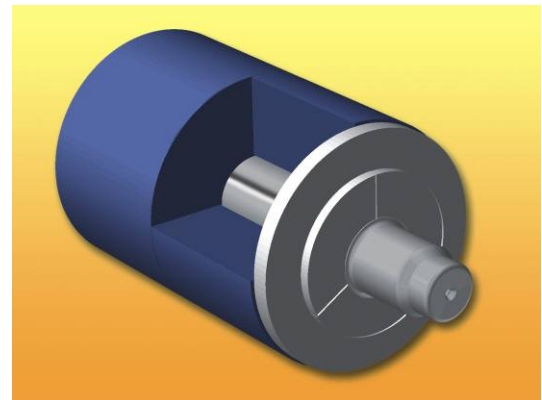
Wringing

Efficient removal of liquids (inc. acids, caustics, other chemicals, oils and oil emulsions) from the surface of sheet metals...

- during cold-rolling (Sendzimir frames)
- after pickling
- during cleaning
- blank washers

VILEDON® FIBRE ROLLS – CONSTRUCTION

VILEDON® fibre rolls are constructed from grooved high-grade steel centre shafts and steel end plates which retain a highly compressed micro-porous fibre cover of mixed fibres coated with a synthetic binder material. A range of Viledon® materials is available to suit various steel and automotive industry applications.



VILEDON® fibre roll

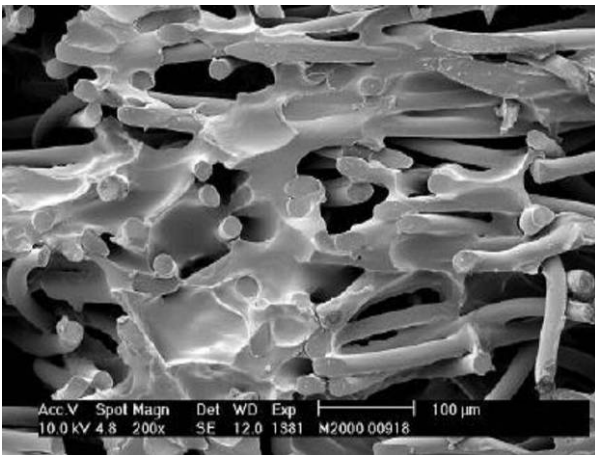


Fig 1. Viledon® material interior (200x)

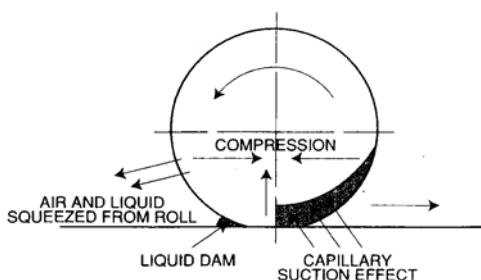
Viledon® roll covers are composed of a fibre based matrix with a porous surface and interior. The fibres are bonded together mechanically and by thermal and chemical treatment. The cover has about 40% void volume (small interconnected cavities) – see Fig. 1. The resilience of the fibres and the elastic characteristics of the binding system ensure the porous/open structure has a high degree of flexibility, elasticity and strength.

VILEDON® FIBRE ROLLS – PERFORMANCE

Wringing and Oiling Performance

The special structure of Viledon® roll covers ensures high performance in wringing and oiling applications. Viledon® rolls operate under the principle of holding back a liquid from in front of the nip and creating a powerful capillary suction condition behind the nip (see Fig. 1). This combination accurately controls the amount of residual liquid carried forward, which can be varied by adjusting the applied pressure to the rolls.

Fig 1. Viledon® roll action



Under mechanical load in the nip, the porous structure is compressed like a sponge and air and liquid is evacuated from its cavities. Within the nip, the void volume is reduced and the density is locally increased. As the roll turns, the pressure is relieved immediately after the nip and the cover decompresses. As the void cavities open up the Viledon® material sucks in additional liquid from the substrate surface.

The suction effect enables a very high squeezing performance and helps to achieve a uniform film layer of the remaining liquid (e.g. oil film).

Removal of Surface Impurities

The porous / open surface structure and flexibility of the Viledon® material provide a cleaning effect. Impurities like dust or pieces of metal can be removed from the substrate surface through migration into the material's cavities and remain there. This effect avoids scratches or imprints on the substrate surface during subsequent processing steps (e.g. deep drawing or pressing). To remove these absorbed particles the roll cover can be reground.

Driving and Guiding Performance

Although a compact roll cover (e.g. rubber or polyurethane) has a better coefficient of friction on dry surfaces, Viledon® roll covers show a higher coefficient of friction in wet and oily environments (typical values see table below). Under these conditions, compact roll coverings tend to have a reduced adhesion, or even a temporary loss of friction to the substrate surface. This loss usually occurs in periodic intervals and is known as the 'stick-slip effect'. In contrast a porous Viledon® roll cover performs like a tyre tread avoiding hydroplaning effects. Viledon® maintains a high coefficient of friction resulting in stable driving performance and guiding control, which allows higher line speeds.

Coefficient of Friction under various metal surface conditions

	Viledon®	Rubber	Polyurethane
Dry	0.4	0.5	0.45
Aqueous	0.3	0.2	0.2
Oil	0.3	0.1	0.1

Mechanical Performance

The porous open structure of Viledon® leads to a different behaviour under mechanical stress compared to compact roll coverings (e.g. rubber and polyurethane), as can be seen in Figs. 3 and 4. Viledon® shows a smoother stress reaction than a compact, closed covering. Stress peaks are on a lower level and are not mainly concentrated in the nip area but are distributed over a larger internal area. In contrast the compact roll covering displays a high degree of compressive strain, concentrated under the nip.

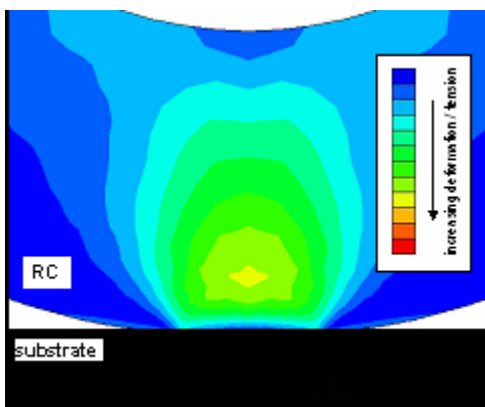


Fig 3 Viledon® under load in nip

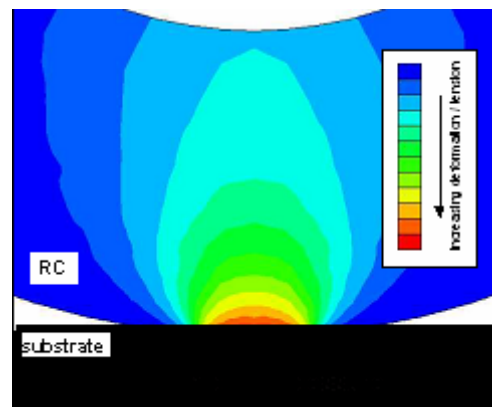
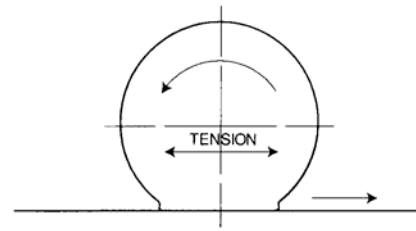


Fig 4. Compact cover under load in nip

The stress distribution property of Viledon® results in excellent resistance to unusual mechanical stress, e.g. caused by rough/sharp edges, rivets, or splices of sheet metal. Compared to a compact roll, the risk of cutting or tearing out of the roll cover material is substantially lower (see Fig. 5).

In addition, if a cut or local damage does occur, the Viledon® cover has a tendency to 'self heal'. Due to its basic flexibility and deformability, localised defects can be levelled out and closed by surrounding material with continued running.

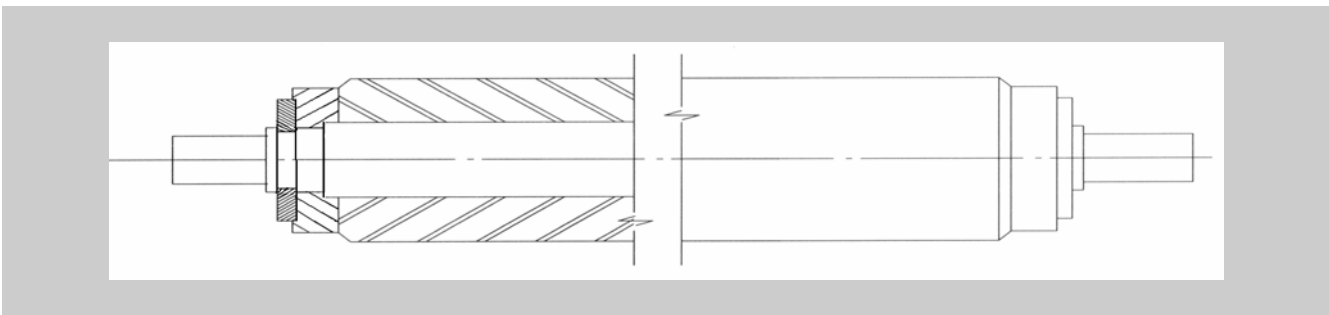
Fig 5. Typical PU/rubber roll under pressure
 PU / rubber rolls are non compressible, so the nip pressure causes the roll to bulge out under tension at each side. This tends to cause cuts or damages to enlarge.



Chemical Performance

The Viledon® roll cover range has been specially designed for various chemical environments. The use of different fibres and binding systems allows the chemical resistance to be adapted to specific needs and reduces chemical ageing to a minimum. Each Viledon® cover material is tested in several standard media (oils, acids, bases etc) to select a chemically best suited formulation.

VILEDON® ROLL SPECIFICATIONS



- Cover Material - Viledon® non-woven – compressed fibres coated with a synthetic binder material
- Centre Material - Carbon Steel BS970 080M40
- End Plate Material - Mild Steel BS970 070M20
- Hardness - up to 90° shore 'A'
- Profile - Parabolic camber
- Applied Load - < 75 kg / linear cm
- Operating Temperature - maximum 80-100°C

VILEDON® BENEFITS:

- Superior wringing effect for both aqueous and oily liquids
- Thin and uniform liquid coating on the metal surface
- Cleaning effect - efficient and permanent absorption of impurities from the substrate surface
- Excellent coefficient of friction even under wet or oily conditions – no stick-slip effect
- Excellent resistance to mechanical load and damage – self-healing of small cuts or damages
- Viledon® rolls can be reground to remove unusual surface damage
- Viledon® rolls can be recovered many times

OPERATIONAL BENEFITS:

- Lower consumption of processing liquids
- Energy cost savings in drying processes
- Less substrate damages (e.g. scratches), less contamination of processing liquids
- Increased line speed, higher production efficiency
- Prolonged roll cover service intervals and increased lifetime resulting in:
Reduced maintenance costs
Improved machinery utilisation

Richard Hough Limited

incorporating Modern Rollers

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