

ChloroFibre: history, science and cures ...



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"Chlorofibre: History, Science and Cures" traces the history of Chlorofibre, its scientific attributes and a selection of user testimonies and references.

There is probably no fibre material, natural or otherwise, that is comparable with ChloroFibre. Its unique tribo-electric and related properties are not easily understood by consumers.

Today and in decades past, this unique fibre is produced only by Rhovyl and Teijin. The urban legends surrounding ChloroFibre makes for an interesting study and profitable applications.

Chlorofibres are synthetic fibres made from PVC which is derived from salt and petrochemicals. The term refers to all textile fibres from PVC. They do not support combustion and emit no droplets during

Les chlorofibres sont des fibres textiles synthétiques réalisées à partir du PVC avec une base issue de produits naturels dérivés (sel marin, charbon et pétrole). Elles ne sont commercialisées qu'en fibres coupées.

Le terme désigne l'ensemble des fibres textiles issues du PVC. Elles sont ininflammables et n'émettent pas de gouttelettes lors de la combustion mais dégagent des gaz toxiques. Elles sèchent rapidement, sont imperméables, infroissables et ont un fort coefficient d'isolation thermique, électrique et acoustique.

Apparues en 1949 par la société Rhovyl qui en fait une marque déposée, elles servent principalement dans la confection de vêtements ou de lingeries.

combustion but emit toxic gases (HCl and CO) when burnt. They dry quickly, is waterproof, crease-resistant and have a high coefficient of thermal insulation, electric and acoustic. Commercialized in 1949 by the Society Rhovyl, they are mainly used in the manufacture of clothing or linen.

In 1948, Rhône-Poulenc** formed Society Rhovyl to produce and market an innovative synthetic fibre (Chlorofibre) made from PVC. From 1948 to the beginning of the 1990s, Rhovyl developed in line with changes in the market place and users expectations.

In 1992, with the textile industry in the grip of economic crisis, Rhône-Poulenc sold Rhovyl to Alain Regad, who bought out the company and assumed control.

*** Through a series of mergers and spinned off, Rhone-Poulenc divested its Chemical Division which is today's Rhodia. It merged with Hoechst to form Aventis which later merged with Sanofi to form Sanofi- Aventis, a life science company .*

In 1994, Rhovyl acquired a spinning mill, Filature de l'Avesnois, which became a partner for further development of chlorofibre in the textile chain.

Chlorofibre came to be noticed because of its special properties which were keys for the development of Rhovyl. With high performance products and fibre of innovative characteristics, it became an established material. Rhovyl remains the leading manufacturer of synthetic PVC based fibres and is today one of only two producers of Chlorofibres.

Polyvinyl Chloride or PVC is as ubiquitous a synthetic polymer as one can imagine. Its use as a textile fibre is however very little known. This is not surprising since Chlorofibre is but one amidst a wide variety of synthetic fabric material amongst polyester, polyamide (nylon), Rayon (which is semi-synthetic), polyvinyl alcohol, polypropylene etc which in turn are combined with other fibres including natural fibres to produce a wide variety of textile.



Polymers are large or macro molecules. Clustered together they form crystalline (closely packed) and amorphous (loosely tangled) regions. Polymers with high degree of crystalline regions are stronger, tougher while amorphous regions contributes to softness.

ChloroFibre is PVC which is highly amorphous. It is mechanically spinned to provide added strength. The low crystallinity of ChloroFibre requires the avoidance of high temperatures.



warm by retaining body heat. A good insulator additionally allows for a thinner and lighter fabric. It keeps cold out as well as minimising heat loss.

Still, ChloroFibre stands unique as the only fibre with Tribo-electric property; from which fascination for the fabric arise. Chlorofibre also has a high standing in thermal insulation. As a non absorbent fabric, it can be constructed to wick away perspiration from skin. Its soft to touch feel is also an asset.

Fabric made from ChloroFibre yarn has been linked positively to Rheumatic relieve. Understandably, no manufacturer ventured to make such medical claim which would require costly research to back up such assertions. The 'urban legends' thus resulted escalated to include claims of healings that mixes truth with fictions.

From careful examination of facts and claims it is possible to develop a causal view that relates the properties of ChloroFibre with the observed 'medical' relieves. The 'medically positive' properties of this synthetic yarn can possibly be attributed to its excellent insulating and unique tribo-electric properties which in turn induces negative air ion formation.

ChloroFibre has insulating (low heat conducting) property that is better than most other fabric materials. We generally consider Wool as a good keep warm material and understand that air is a good insulator. Hence thick clothing which traps air keeps

Table 1: Thermal properties of selected fabric materials

Material	Thermal Resistance (M ² °C W ⁻¹ cm ⁻¹)	Thermal Impression **
PVC	0.22	350
Wool	0.19	495
PES	0.15	505
PES/Cotton	0.14	540
Cotton	0.125	550

** lower figure gives warmer feeling

Table 1 compares thermal properties of a selection of fabric materials.

As a clothing fabric, it is important that the material is comfortable under most conditions. Chlorofibre is indeed an outstanding material for cold weather wears. While it is a keep warm material, one should not have the impression that it is then not suitable for all seasons. As a comfort wear, the material is outstanding as a next to skin wear where humidity is maintained at comfortable levels such as in an air conditioned environment. It is therefore a good choice for (next to skin) office-wear and especially as (air condition) sleep wear; an obvious contribution to claims of insomniac relieve.

In the early history of Rhovyl Chlorofibre, its perceived ability to bring relieve to Rheumatic sufferers is its claim to fame. This was attributed to the tribo-electric property of Chlorofibre, a property that stands out. The fabric's warmth and comfort factors probably contributes to bring relieves.

In more recent years, it is recognised that the tribo-electricity of Chlorofibre induced massive negative ions formation. The positive effect of negative ions then became associated with the remarkable healing seen with the use of ChloroFibre in Japan where

such fabric is widely used. While Europe opts to downplay the 'medical' benefits seen with Chlorofibre, in Japan, it took root and progressively developed a following.

Triboelectric series	
<ul style="list-style-type: none"> • Human Hands (dry) • Leather • Rabbit Fur • Glass • Human Hair • Nylon • Wool • Fur • Lead • Silk • Aluminum • Paper • Cotton • Steel (neutral) • Wood • Amber • Hard Rubber • Nickel, Copper • Brass, Silver • Gold, Platinum • Polyester • Styrene (Styrofoam) • Saran Wrap • Polyurethane • PE/ PP (scotch tape) • <u>PolyVinyl Chloride (PVC - Chlorofibre)</u> • Silicon • Teflon 	<p>MORE POSITIVE</p> 
	 <p>MORE NEGATIVE</p>

What is tribo-electricity and negative ions

Tribo-electricity is a fanciful term for static electricity produced by friction (tribo is Greek for friction). That by rubbing against an article, especially that which is a poor conductor of electricity, produces static electricity, is a well known classroom experiment.

Rubbing wool against glass rod or a pair of comb and observing the effect on confetti (or small pieces of paper) is a classic experiment in the teaching of static electricity. By ranking the strength of positive or negative charges, a tribo-electric series is compiled.

It is clear that PVC ranks very well as a substance that generates high negative static.

Negative air ion is generated when the extra electrons are transferred to surrounding air (O2) and moisture (H2O) as the static discharges or waned.

The **negatively charged air** close to the charged Chlorofibre is the source of negative ions to which positive attributes were inferred.

Negative ions in the air cannot be seen but can be detected if present in sufficient concentration. Energy is required for its generation. In air purifier and electro static precipitator, electricity is the energy source. Rain cloud, waterfall and chlorofibre generate air negative ions through frictional energy. An electrical source produces a consistent amount of negative ions while frictional energy sources generates an erratic quantity. Other sources include radiation energy.



USB ionizer in background

Air negative ions are measured in terms of its concentration. The unit of measurement is ion-count per unit volume of air (or ions per cubic centimetre).

While the use of air negative ion generator is finding wide adoption. Its industrial use has already had a long history in electro static precipitator (ESP) used in the removal of ash and dust from smoke stacks in coal fired electricity generation plants. It is used in air purifier for the same purpose. Now, it is found in air conditioners, refrigerators, blow dryers (hair dryers) and as standalone negative ion generator that is used at home, health clubs and in hospital rooms. It is postulated that present in excess of 50,000 per cc of air, negative ions could enhance the body's immune system and 'natural healing' if in excess of 100,000 per cc.

Chlorofibre under the right conditions generates 'massive' amount of tribo-electricity. This claim is widely used in Rhovyl advertisements in the early days.

Following the likes of negative ion water, alkaline water and other negative ion related phenomena, many products are introduced.

The alphabet soup included Tourmaline, salt lamps, bracelet, necklace, pendent, far infra red, scalar energy and even paint often invoking the name of negative ions.

Its Rheumatic cures were recorded in some literatures but is now rarely seen in western medical circle and probably has little consumer following today. However in Japan, Chlorofibre which is produced by Teijin under the brand of Teviron continues to thrive under this application.



Fabric that generates -ve ions. - eye shade -

The link between Tribo-electricity and air negative ion is probably a recent addition. This however is a measurable and explainable fact. Interestingly, the quantum of negative ion per volume of air is easily in the therapeutic range making this fabric an undisputed source of air negative ion generated by the friction of skin against fabric.

Does negative ion cure? There is no medical study other than empirical observations that negative ions produces beneficial effects. The often cited freshness of air near waterfall, in greeneries and on mountain tops is hardly sufficient proof. Negative observations of SAD and other 'ill winds' points to possible influence of positive air ions on mood change especially during winters. However, there are a growing number of positive testimonies from users of negative ion generators, empirical hospital studies and users of 'negative ion' clothing.

The earliest claim of Rheumatic reliefs back in the early days of Rhovyl continues to be the main stay of testimonies. Amongst more methodical studies, a hospital study⁽¹⁾ in Poland in 2002 documented positive results amongst users of Rheumatic blankets made from Rhovyl fabric. The Handbook of Fibre Chemistry recorded the tribo-electric properties of Chlorofibre and its use in Rheumatic relief and Neuralgia. However, the pain relief could be attributed to the other significant property of Chlorofibre, that of a good heat insulator. Nevertheless, that Chlorofibre brings positive relief to Rheumatic and other sufferers of join, muscle and nerve induced pains merits our continue observation of its performance in the absence of more scientific approach.



It is noteworthy that while for Chlorofibre, negative ions are generated through friction of skin against the fabric and the resultant air negative ion is trapped at very high concentration between the fabric and the skin. It is postulated that negative ion penetrates the skin. This pathway differs from air ion generators which spews out negative ions into the atmosphere and is ingested through breathing in the negative ions.

Empirical data are available through user testimonies. Of the hundreds of testimonies studied, we classified and tabulate these in the table 2.

Table 2: Testimonies (191 cases) from 3 unique sources

Ailment	Percentage	Description
Rheumatic	16%	Bone / joints pains including Gout & Arthritis
Other Pain	10%	Muscle, back, neck, etc
Headache	6%	Headache and migraine
Insomnia	10%	Sleeplessness
Diabetics / blood	10%	Blood sugar level, pressure, diabetics

Generally the testimonies agree with early observations that the tribo-electric fabric aids Rheumatic and Neuralgic⁽²⁾ (nerve related pain) sufferers. Blood sugar, blood pressure, blood calcium levels and auto immune cases are also often cited.

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