



INDIAN FOOTWEAR MARKET, its SEGMENTS AND CURRENT FOOTWEAR MATERIALS TECHNOLOGY

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Abstract:

The Indian footwear market is segmented between organized and unorganized segment. The organized segment caters to about 1/3rd of the market while the rest 2/3rd is fetched by small unorganized players. India is the second largest producer of footwear next to China. The organized sector is represented by major domestic and international players like Bata, Liberty, Adidas, Metro etc and the unorganized comprises of small cottage industry based manufacturers.

So the majority of Indian footwear industry is dominated by small and medium scale enterprises. These firms also include the subcontractors or assemblers of the bigger manufacturers. As subcontractors or assemblers, these small and medium size firms put together parts of the shoe such as the uppers, or parts of the components such as the toe puffs, counters and top lifts.

The purpose of this paper is to review the areas where the current footwear material can significantly affect the way of footwear sector is practiced, and also we will discuss the implementation.

Keywords: Advance Technology, Opportunity, Material, Market structure.

1. Introduction: Indian Footwear Industry:

The footwear market is a labour intensive and technology based market requiring huge capital investment, which sets the entry barriers high. The retailers like Bata are targeting the middle and upper middle section of the society where as players like Metro, Nike, Reebok and woodland is catering to the need of upper section the society.

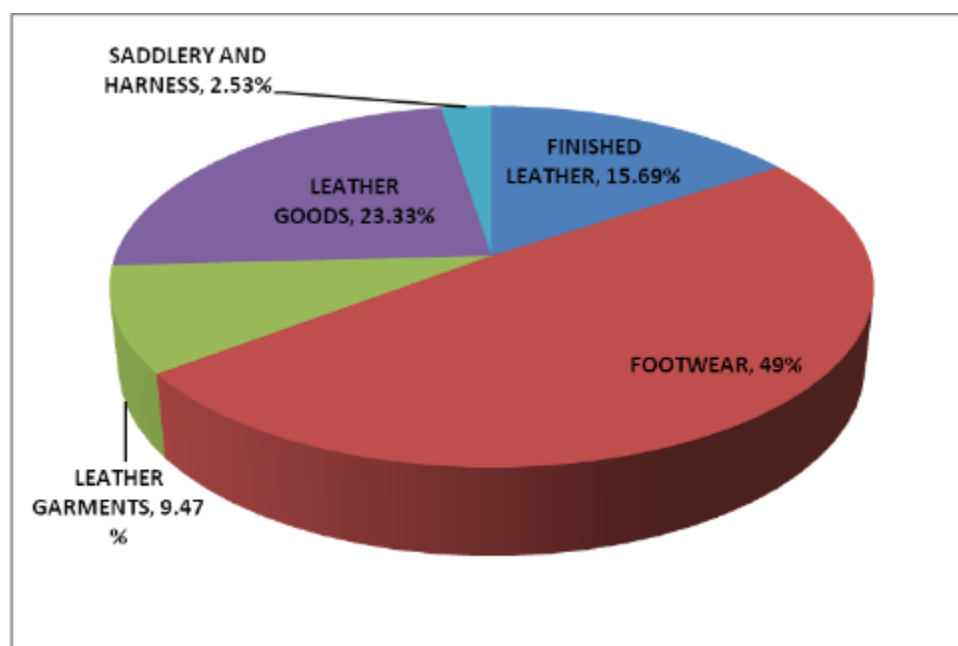
Footwear sector is a very significant segment of Leather and Non Leather products in India. The size of Indian Domestic Footwear Industry is estimated to be worth 1919 million pairs where leather and non-leather Footwear per capita consumption is estimated to be approx. 1.61 pairs. The major component of footwear sector is a design,

product development, clicking, closing, component, lasting & finishing. Advanced technologies in the area of shoe design systems, automation, cost savings and productivity improvements as well as enabling new developments in footwear sector in India.

1.1 Industry Coverage

The Indian Footwear Industry is the second largest footwear manufacturing industry in the world with an approximate annual production of 2065 million pairs as per the CLE report. India has huge domestic market having consumption of nearby 95% of the total annual production.

As per DGCIS data, India have exported all type of footwear worth USD \$ 2775.77 million in the financial year 2016-17. As per CLE report, in the year 2016-17, the %age share of the Footwear in all leather and leather products is around 49% shown in the following figure.



1.2 Footwear product segment:

Increasing standards of living coupled with awareness, the large section of rural people have started using non-leather products.

Sports shoes consumption is increasing since later part of 80's. The consumption of sports shoes segment is growing among youths & middle aged group as they have fascination for sports shoes.

It appears that they need not be really for sports purpose but, it is a way of style and casual life. The sports shoe segment includes major players like Lotto, Adidas, Puma, Liberty, Reebok and Nike.

The application segment of the Indian non-leather product segment consists of footwear, belts, bags, upholstery items and garments (excluding textiles). With the introduction of synthetic materials there is surge in demand in the non-leather utilitarian goods and accessories which consist of the following:

1.3 The Footwear Industry product coverage includes leather footwear, which are dress shoes, non-leather footwear, sports footwear, slippers and sandals, and parts of footwear.

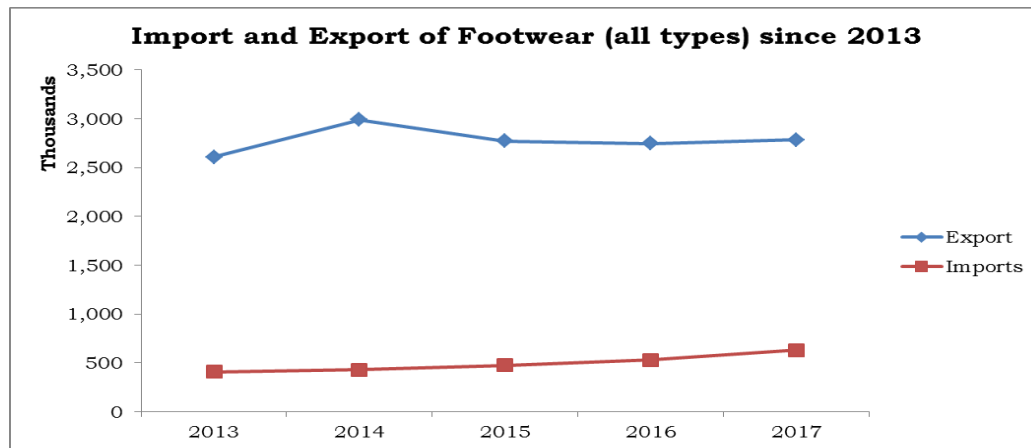
- **Leather Footwear** – includes all type of footwear with upper of leather
- **Sports Footwear** - includes footwear with uppers of leather, rubber, plastic, textile or other materials, specifically for athletic or sports purposes.
- **Slipper and Sandals** - includes footwear with uppers of leather, rubber, plastic, textile or other materials

and outer soles of leather, rubber, plastic, wood, cork or other materials.

- **Safety Footwear** – includes footwear with uppers of leather, rubber, plastic or other material with toe caps and outer soles of rubber, plastic, cork, or other materials.
- **Parts of Footwear** - includes stiffeners, outer soles, uppers, gaiters, shoe shanks, cleats, toe caps, rubber straps, or similar articles.

2. IMPORT AND EXPORT OF FOOTWEAR IN INDIA

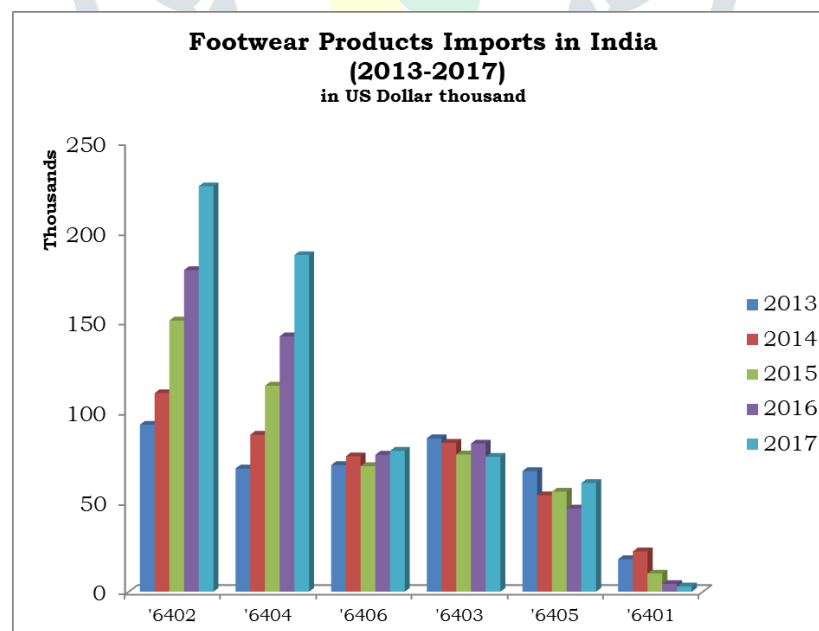
As per the data from Directorate General of Commercial Intelligence & Statistics (DGCI&S), INDIA's footwear exports have a good balance since last 5 years. There is also balance in the import of the footwear. It indicates that the Indian footwear market is well established.



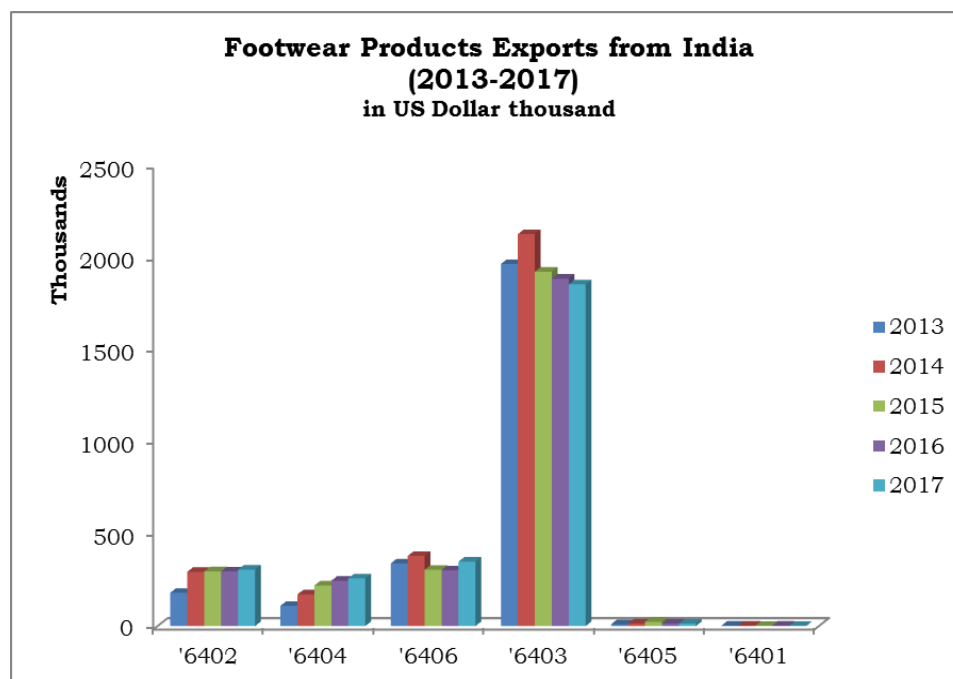
Source: DGCI&S, India

In India, the consumption of non-leather products is growing rapidly on account of price, design, durability and maintenance, which consist of canvas rubber and plastic based items.

Lower economic segment of population mostly use non-leather products. In view of high cost of leather, even the middle class households also using non-leather footwear. As the overall footwear market is growing in India, the demand for the non-leather footwear is also increasing. Following graphs show the import and export data of non-Leather Footwear in India since 2013.



Source: DGCI&S, India



Source: DGCI&S, India

The Globally, the non-leather products sector has been growing at a faster and healthier rate than two decades before with more emphasis on the comfort, recycling, rapid reach, mass customization as core driving principles. As textile technology is evolving consumer are preferring vegan fashion, which refers to adopting non-leather products.

This is due to the advancement of the non-leather materials and the technology advancement. The manufacturing bases had shifted to the Asian countries. Major countries who are presently dominating the manufacturing base are Vietnam, China, Malaysia, South Korea, Bangladesh amounting close to 75% of world trade manufacturing India is net exporter of various non-leather Footwear Products. India has increased world market share for Footwear with outer sole of Rubber or Plastic. With the Global revenue of 53 Billion USD in 2017 alone by Adidas and Nike, this sector also caters the lowest segments of the products such as PVC shoes, Hawaii, low cost sandals, etc.

India has exported of USD\$1885641 for only HS Code 6403 in FY 2016, which has 6% annual increase in world market share.

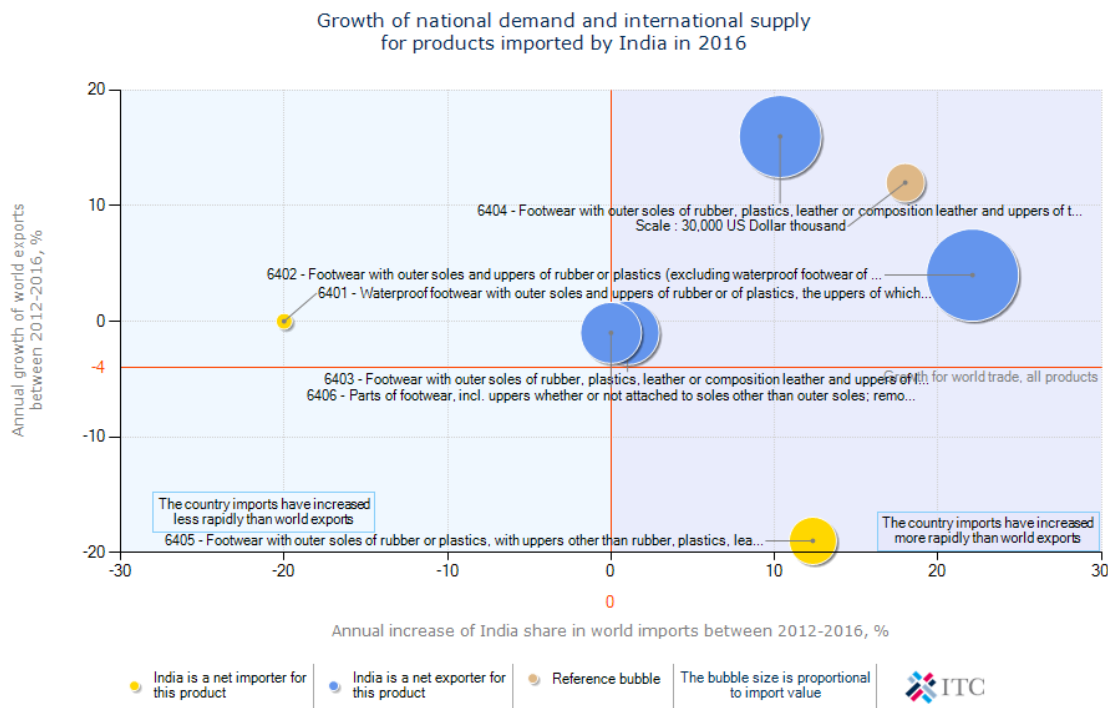


Figure: India Import Growth vs World Export Growth

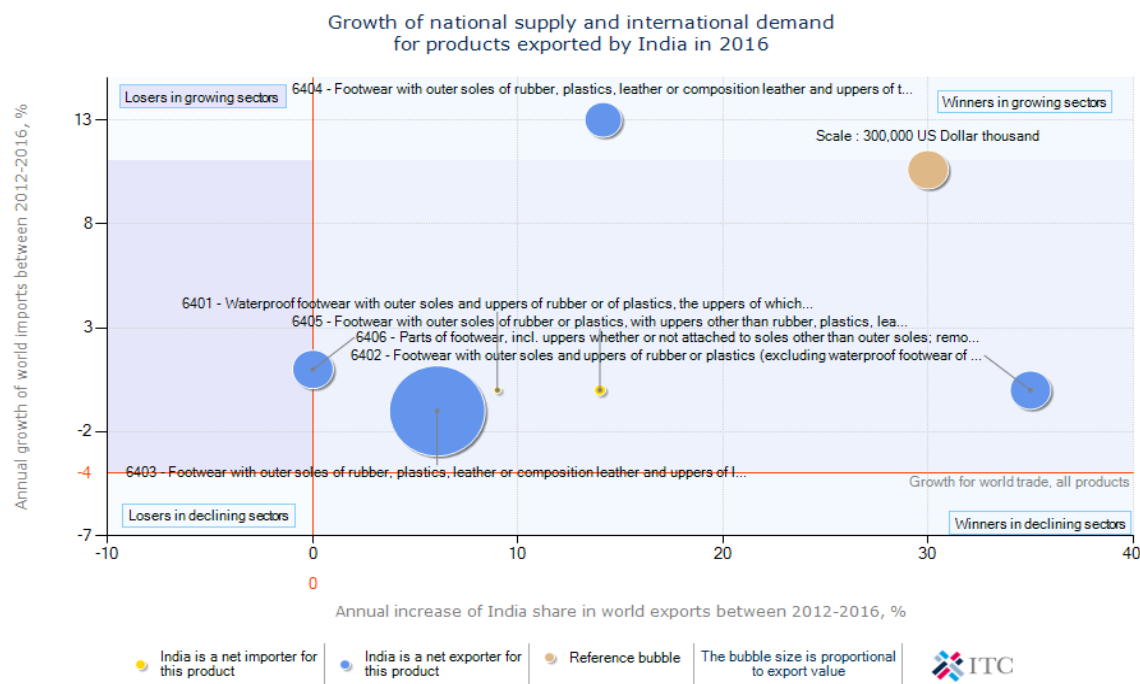


Figure: India Export Growth vs World Import Growth

Source: ITC Trade Map -Trade statistics for international business development

3. CURRENT FOOTWEAR MATERIALS TECHNOLOGY

3.1 Leather

Leather has been used on sport footwear for many years now. The most common is form cow and calf leather, followed by pig, goat, sheep, Kangaroo (for soccer cleats) Alligator, Ostrich etc. Cow leather is by far the most common leather found on footwear and cow leather comes in many different styles, grades and prices.

For sports footwear coated leather is mostly used, this leather product starts out as medium to low quality split leather. The surface may be pressed or rolled smooth. This hide is then laminated to a thin film of flexible stretchable PU or PVC this synthetic surface is made by colored resin, white and black are the most common colors.

3.2 Synthetics or Coated Fabrics

This class of material offers the shoe designer a huge variety of colors, textures and features at a range of prices. These synthetic materials are now high performance and are often a composite made of two layers.

- A backing layer made of woven or non-woven polyester fibers
- An external surface by “dry lamination process” or by “wet process”.

3.3 Outsole

The Basic Outsole Types are Rubber Cup sole, Cut and Buff EVA wedge sole, Combination Cut and Buff/Cupsole, Two piece EVA rubber sole, Vulcanized Rubber sole, Lightweight EVA Outsole, EVA Sole unit, Injection moulded EVA, Injection moulded plastic Sole unit, Blow moulded Air Bag Sole Unit.



Figure: – EVA Outsole

❖ Outsole Types

- **Air Bag Midsole:** The air bag midsole is made by the blow moulding process. The midsole starts out as hot semi-liquid plastic extrusion tube (called a parison).

A steel mould clamps around the tube and the air is injected inside to fill the bag and inflates the shape to fill the mould.



Figure: – Air Bag Midsole

The tooling and machines are very expensive. The plastic can be tinted and the bag top and bottom surfaces can be painted. In this case the air bag is attached to an EVA tray that is then bonded to the shoe outsole by cold cement process. The type of sole unit is great for running and cross training. The air bag does look cool but due to the blow moulding process the plastic walls of the bag can be a little thick. This sole unit requires an EVA Compression mould, Rubber compression mould and blow moulds.

- **Compression Moulded EVA or CMEVA:** The standard two part sole is made with light weight CM EVA midsole, bonded to a rubber outsole. The EVA foam is expanded into blocks then cut down to fit into a mould.



Figure: - Compression Moulded EVA sole

The mould is heated causing the EVA to re-expand and fill the compression mould. The density and durometer is set by how much foam is compressed into the mould and the formula of the foam. The foam hardness gives more definition to the sole design. A midsole is bonded to the rubber in the stock fitting room before the unit meets the upper in assembly. This sole unit requires an EVA compression mould and a rubber compression mould.

3.4 Injected Midsole: Many firms have been experimenting with foamless injection moulded midsoles. The shoe has a stiff moderating plate under the heel to keep the shoe stable.

The Midsole structure is likely made of Nylon or TPU plastic. The rubber tread is attached by stock fitting. This sole unit requires an EVA Compression mould for the midsole hidden inside, Rubber compression mould for the tread and Injection moulds for the midsole component.

❖ **Injection EVA Midsole:** This running shoe uses an injection moulded EVA midsole with rubber inserts. The Injected midsole has a thicker, smoother skin than compression moulded EVA midsole.



Figure: - Injection EVA Midsole

The Injected EVA midsole has a more uniform density and better detail definition than the compression moulded EVA. This unit is very light, very flexible but will wear quickly. The Injection moulded tooling has a high production rate but the moulds are over \$3,000 per sizes and requires an expensive machine. The compression EVA tooling is half the price and can be made in the most basic pressing room. This sole unit requires an EVA injection mould and rubber compression mould.

❖ **The EVA Wedge:** This classic Die Cut EVA wedge midsole is bonded to a compression moulded rubber bottom.



Figure: - The EVA Wedge

The top wedge shape of the EVA is cut by pressing the EVA with a profile roller while a blade splits off the bottom layers. The white layer is buffed and bonded to the rubber bottom. All three parts are then buffed to create the angled side wall. Labour intensive but required very little tooling. In fact one bottom tool can be trimmed to make 4 to 6 sizes. This New Balance shoe requires a rubber compression tool.

❖ **Poured PU Midsole:** The shoe is made by PU foam direct attach. In this process the Upper is clamped into the top of a mould. The mould is filled in two shots, first the sole is moulded, once the bottom cools in a few minutes a second shot of light weight PU will fill the space between the Upper and bottom. The PU fuses directly to the upper.



Figure: - Poured PU Midsole

3.5 Rubber cupsole: This classic cup shoe with a one piece rubber cupsole.



Figure: - Rubber cupsole

The white side wall and black rubber are moulded together in one operation. The mould has a middle plate allowing the two parts to be formed separately, before the rubber is fully cured the middle plate is removed the rubber colors can fuse together without a messy seam. The side logo is painted after moulding. Inside you will find a die-cut piece of EVA foam. The stitch groove is an under cut in the mould but the stretchable rubber is

easily removed after moulding. The channel stitching is done after assembly. This requires only a rubber compression mould.

The cup sole mould can be made with no foam filler inside. The cheapest shoes may have rubber egg crate filler.

❖ **PU poured Air:** This classic air bag shoe midsole is made by over moulding PU but in this case the air bag is clipped in heel and exposed.



Figure: - PU poured Air Sole

This classic air bag shoe midsole is made by over moulding PU but in this case the air bag is clipped in heel and exposed. The window is where the clamps hold the bag in place and they stop the PU from covering the bag. The rubber sole is made by compression. The Yellow part with specs is the same PU part holding the air bag but this area is masked off and painted. After the PU parts are cleaned and painted, they are bonded to the rubber parts by the stock fitting line. The toe channel stitching is done after assembly. This outsole requires a rubber compression tool, Air bag mould and PU midsole mould.

3.6 Cup & Cut and buff sole: This indoor soccer shoe is a combination cupsole and cut and buff. The rubber is pressed then the EVA wedge is cement in place.



Figure: - Cup & Cut and buff sole

The EVA is then buffed down to match the rubber side wall. This construction is more flexible and lighter than a standard rubber cupsole. This outsole requires a rubber compression mould.

3.7 Classic Vulcanized Outsole: This outsole is standard vulcanized shoe construction. This is how Vans makes it's shoes, and how the Converse All Star is made.



Figure: - Classic Vulcanized Outsole

The sole bottom is bonded to the upper, then striped rubber foxing tape wraps them both. After this assembly operation is done the entire shoe is cooked to cure the rubber making the bonds permanent. This outsole requires a rubber compression mould for the bottom and a specialized vulcanize production factory.

3.8 Injection moulded Outsole: This soccer cleat outsole is made by injection moulding process. Cleated shoes for soccer, football and baseball require stiff supportive bottoms with heavy cleats.



Figure: - Injection Moulded Outsole

Cleated shoes are made by the cold cement process. The Sole unit may be sewn to the upper after the cementing operation. This outsole requires a plastic injection mould.

4. Foams for Shoes: There are many types of foam used to make shoes, various types of foam found inside the uppers of shoes and outsoles. Generally foam is divided into two types, “**Open Cell**” and “**Closed Cell**” foam. Density, compression set resistance and breathability is important to understand when selecting foam.

For EVA foam a density of 25”C” is okay for upper padding but way too soft for the midsole.

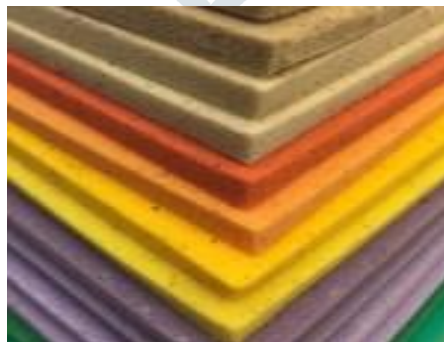


Figure: – EVA Foam

Foam with poor compression set will be crushed flat after just a few days.

Open cell foam is exactly what it sounds like, the plastic compound that makes up the foam cells is open, air and water are free to enter and exit the foam just like a dish washing sponge. Open cell foam is generally softer.

4.1 Reticulated open cell foam: Reticulated foam is the most open style of foam. This type is often used for ventilation features. Reticulated foam is almost skeletal looking. Air and water flow freely through reticulated foam.

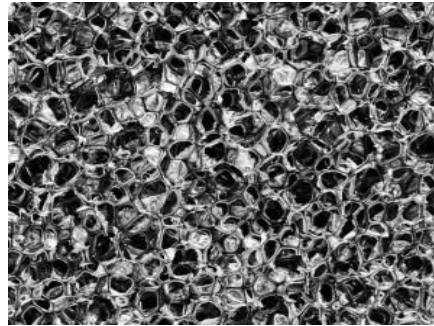


Figure: – Reticulated Open Cell Foam

Memory foam is a variation of polyurethane with additional chemicals increasing its viscosity and density. Memory foam has the feature of very slow return rate. Watch out- Memory foam may freeze into a solid block in cold weather boots.

4.2 Common Foams used in the industry

- ❖ **EVA (ethyl vinyl acetate):** The most common midsole material for sports shoes. EVA is light weight, durable, easy to form and resists compression set. EVA can be hot pressed, cold pressed, die cut, injected and machined to make midsoles or inserts.
- ❖ **Closed cell PU (Polyurethane):** Also a common foam for shoes. PU foam is “blow” into Moulds. The liquid compound expands and foams air cells to fill Moulds. Used to make durable midsoles for hiking boots and can be made into entire sole units, tread and midsole all in one.
- ❖ **PE (Polyethylene):** Expanded into sheets PE foam is easily die cut and laminated. Parts are then pressed into shape for internal pads and tongues. Due to its weakness in compression set PE foam is not used under foot. PE foam is closed cell and water proof
- ❖ **SBR (Styrene butadiene rubber):** A very soft foam often laminated between two layers of fabric. SBR is closed cell and is used to make parts water proof. SBR foam is often used as a lighter replacement for Neo-Prene rubber but is not as stretchable.
- ❖ **Open Cell PU (Polyurethane):** Maybe the most common foam used in sports shoe footwear construction. PU foam is one cell so care must be taken so that it does not absorb glue. Thin layers of PU are laminated to fabric to provide backing substance. PU foam is also use to make tongue foam and collar foam. Due to its softness open Cell PU foam cannot be used under foot.
- ❖ **Latex Rubber foam:** Latex foam is easily formed into complex shapes in open top Moulds. Latex is used for upper padding but not as a midsole material. High density latex foam sheet is often used to make die cut footbeds.

5. Conclusion:

Advance polymeric material is responsible for the softness and durable of the product. Now a day the working condition is very fast. The quality as well quantity of the product is also improved through the advance material. This material is also helpful to new development of foot bed and soles.

New advanced material have the potential of achieving cost savings and productivity improvements as well as enabling new developments in Footwear sector. There is a general feeling the footwear industrialist that the much of the future growth and development in footwear sector would depend upon how effectively these new material are adopted in the footwear sector.

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