

INDUSTRIAL RUBBER TERMS DEMYSTIFIED

*Well known for 30 years, J-Flex
presents a guide to terms commonly
used in the rubber industry.*



A GLOSSARY OF TERMS USED IN THE RUBBER INDUSTRY

When it comes to industrial rubber, J-Flex knows some of the terminology can be an issue for customers and even our own personnel to be fair. So we've pulled together a comprehensive 'Glossary of Terms' to help us all.

In this publication we have looked at 35 industrial rubber terms and provided an explanation of what they are or a definition if there is an industry standard.

| INDUSTRY TERM | ASTM REFERENCE | BS REFERENCE | ISO REFERENCE |
|--|----------------|-----------------|---------------|
| ABRASION RESISTANCE | | | |
| Abrasion properties of rubber are difficult to define. Many different abrasion machines have been designed but they do not always give similar results. The most common abraders are AKRON, Dunlop and DuPont. Results are recorded as volume loss per standard test piece, or as the difference in volume loss when compared with a standard material of known abrasion value. Indices of relative abrasion are also used. | D394 | BS 903 Part A9 | |
| ACCELERATED AGEING | | | |
| Heat ageing is widely used as a method of evaluating long term ageing properties. Hardness and dumbbell type tensile test pieces are placed in an air circulating oven for a specific period of time at a given temperature (e.g. 7 days at 70°C). The properties of the rubber are then tested and compared with the properties before ageing. The percentage retained for each property is recorded (change in hardness is recorded in degrees). | D573 | BS 903 Part A19 | /// ISO 188 |
| CHEMICAL RESISTANCE | | | |
| This is usually expressed as the change in properties (such as hardness, strength and elongation at break) caused by the presence of chemicals under defined conditions (including concentration, time and temperature). | | | |
| COEFFICIENT OF FRICTION | | | |
| Ratio of the force needed to move an elastomer over a given surface to the total forces pressing on the elastomer and surface. | | | |
| COMPRESSION SET | | | |
| A cylindrical button of rubber of known thickness is compressed to a fixed height (typically 70% or 75% of its original height) at a defined temperature for a specific period of time. The button is then released, allowed to recover (typically for 30 mins) and the thickness is measured. Compression Set is the height that is not recovered expressed as a percentage of the amount by which it was compressed. $\% \text{ Comp. Set} = \frac{\text{original height} - \text{recovered height}}{\text{original height} - \text{compressed height}} \times 100$ | D395 | BS 903 Part A6 | // ISO 815 |
| DIAPHRAGM RUBBER SHEETINGS | | | |
| Premium grade elastomer reinforced fabric sheetings intended primarily for diaphragm applications. | | | |

| INDUSTRY TERM | ASTM REFERENCE | BS REFERENCE | ISO REFERENCE |
|--|----------------|-----------------|---------------|
| DIAPHRAGM SEALS | | | |
| Precisely produced diaphragms and sensitive flap valves for use in gas controls, valves, actuators, regulators, pumps and metering equipment. | | | |
| DIE CUT GASKETS | | | |
| Press cut and hand cut gaskets in all types of rubber and non-metallic materials. | | | |
| DIELECTRIC STRENGTH / ELECTRICAL PROPERTIES | | | |
| The resistance of an elastomer to the conducting of an electrical current. Anti-static and conductive properties of rubbers are defined by measuring their electrical resistance. Typical measurements are obtained through the thickness of a sample by using 25mm sq. electrodes under a pressure of 45N and applying a voltage of 500V DC @ approx. 6mA. (Energy dissipated into the test piece is limited to 3W max.) The surfaces should be cleaned before measuring. Patterned surfaces should be wetted with a conductive solution or paint. Results should be recorded in Ω , defining the conditions of testing. | D991 & D257 | BS 2050 | |
| ELONGATION AT BREAK | | | |
| Elongation is defined as the length at breaking point expressed as a percentage of its original length (i.e. length at rest) e.g. if a rubber reaches twice its length before breaking its elongation is 100%. | D412 | BS 903 Part A2 | // ISO 37 |
| FABRICATED SLEEVES | | | |
| Fabricated sleeves from a variety of rubber and composite materials primarily used to connect, discharge or compensate movement. | | | |
| FLAME RESISTANCE | | | |
| Flame resistance testing requires a standard burner and fuel which gives a flame of known characteristics. Rubber samples are then placed at a certain position in the flame and removed after an ignition period. The time taken for the rubber to self-extinguish is recorded with notes regarding afterflow and any hot particles emitted by the sample at any stage | | BS 2011 | |
| FLUID RESISTANCE / VOLUME SWELL | | | |
| <p>Fluid resistance is commonly measured by the effect of the fluid on the volume of the rubber exposed as a volume change (e.g. +100% indicates that the volume of the rubber has doubled as a result of exposure to the fluid, -10% indicates that the volume of rubber has decreased as a result of exposure to the fluid). Volume change is measured by determining the weight of a sample in air and water before and after exposure to the fluid under defined conditions. The sample is normally totally immersed in the fluid.</p> $\text{Volume Change \%} = \frac{(W3 - W4) - (W1 - W2)}{(W1 - W2)} \times 100$ <p>Fluid resistance may also be defined in the same way as chemical resistance (above) i.e. by change in properties of the rubber. W1 Wt in air (initial) W2 Wt in water (initial) W3 Wt in air (swollen) W4 Wt in water (swollen)</p> | D471 | BS 903 Part A16 | /// ISO 1817 |
| FOAM IMPACT PROTECTION PROFILES | | | |
| Impact protection foam profiles provide highly visible protection on sharp corners, edges, machinery, racking and vehicles - preventing accidents in the workplace. | | | |

| INDUSTRY TERM | ASTM REFERENCE | BS REFERENCE | ISO REFERENCE |
|---|----------------|-----------------|----------------|
| HARDNESS | | | |
| Measured in degrees and based on the penetration into the rubber of a defined indenter under a set load. Three scales are commonly used: IRHD (International Rubber Hardness Degrees), Shore A and Shore D for hard materials over 90° Shore A. IRHD is preferred for most specifications but Shore A is also in widespread use. | D2240 | BS 903 Part A26 | // ISO 48 |
| HYSTERESIS | | | |
| The build up of heat in an elastomer sample caused by rapid deformation | | | |
| INFLATABLE SEALS | | | |
| Specially fabricated elastomer seals designed to inflate with air to form a tight barrier between two surfaces. | | | |
| MODULUS | | | |
| Modulus is measured as the force per unit area required to extend a rubber to a stated percentage of its original length e.g. to 100%, 200% or 300%. It is often written as M100 = 3.0 MPa (i.e. modulus at 100% = 3.0 Mpa). | D412 | BS 903 Part A2 | // ISO 37 |
| MOULDED SILICONE RUBBER SEALS | | | |
| Precisely moulded seals for pharmaceutical, food, beverage and other clean industries – available in small and high volume. | | | |
| NEOPRENE, NITRILE & EPDM SHEETINGS | | | |
| Normally thin gauge precisely calendered elastomer sheet made from Neoprene, Nitrile & EPDM. | | | |
| OZONE RESISTANCE | | | |
| Ozone causes cracking in rubber. Test pieces are usually placed under a small degree of tension e.g. by bending round a mandrel or stretching by 5%. The sample is exposed under static conditions to a controlled atmosphere containing ozone (typically 50 pphm). The cracks are graded by standard photographs, by measurement or by description, e.g. 'visible under 10 x magnification' 'visible to the unaided eye' etc. Results may be recorded as the time taken to reach a particular grade of cracking, or by the grade of cracking apparent after a fixed period of time. | D1149 | BS 903 Part A43 | /// ISO 1431/1 |
| REBOUND RESILIENCE | | | |
| The measure of the rebound (bounce) of a metal ball dropped at a given height onto an elastomer sample. Resilience is measured on standard test equipment (of which there are several types – e.g. Dunlop, Tripsometer, Lupke, Rebound). Standard test pieces are struck by the 'hammer' and the 'bounce back' of the hammer measured. This is expressed as a percentage of the flight path of the hammer | D1054 D2632 | BS 903 Part A8 | // ISO/R 1767 |
| RUBBER BELLOWS | | | |
| Moulded or fabricated protective covers for hydraulic rams and sensitive equipment. Stock range also available. | | | |
| RUBBER EXTRUSIONS | | | |
| Rubber profiles, sections and seals produced by extrusion technique. | | | |

| INDUSTRY TERM | ASTM REFERENCE | BS REFERENCE | ISO REFERENCE |
|--|----------------|---|---------------|
| RUBBER MOULDINGS | | | |
| Rubber components produced by compression, transfer or injection methods. | | | |
| SPECIFIC GRAVITY / DENSITY | | | |
| Density is defined as the mass per unit volume and is measured by weighing the rubber sample in air and water. S.G. $\frac{\text{Weight in Air}}{\text{Weight in air} - \text{weight in water}}$ | | BS 903 Part A1 | /// ISO 2781 |
| SILICONE SHEETINGS | | | |
| High performance sheet rubber made from silicone elastomer. | | | |
| TEAR STRENGTH | | | |
| Tear Strength is measured as the force required to tear a standard piece. The standard test pieces are designed to produce weak points where a tear is initiated | D624 | BS 903 Part A3 | /// ISO 34 |
| TENSILE STRENGTH | | | |
| This is measured in various units and is expressed as a force per unit area. A standard dumbbell type test piece of known cross sectional area is used which is stretched until it breaks. The force required to do so is then recorded and expressed as force per unit area. | D412 | BS 903 Part A2 | // ISO 37 |
| THERMAL CONDUCTIVITY | | | |
| The ability of an elastomer to conduct heat. | | | |
| VITON ADHESIVE | | | |
| A flexible multi-purpose adhesive made from Viton fluoroelastomer with good adhesion at high temperatures. | | | |
| VITON SEALANT | | | |
| Special caulk sealant made from Viton fluoroelastomer – ideal as a gap sealer in corrosive and hazardous environments. | | | |
| VITON SHEETINGS | | | |
| High performance rubber sheet made from Viton fluoroelastomer. | | | |
| VULCANISED JOINED RINGS | | | |
| Sealing rings normally made from extruded sections and cords c/w fully vulcanised joints. | | | |
| WEATHER RESISTANCE | | | |
| Weather resistance is a fairly subjective test and it is necessary to state clearly the conditions under which the exposure took place i.e. dates, geographic location, angle and direction of exposure relative to the sun etc. The properties of test pieces are measured before and after exposure and expressed as percentage changes (with exception of hardness changes which are usually recorded in degrees). The change in any property may be measured but the most common are hardness, tensile strength, elongation at break and modulus at 100% and 300%. | D1171 | BS 903 Part A53 BS 903 Part A54 BS 903 Part A55 | |

We hope you've found 'Rubber Terms Demystified' useful and interesting.

Of course we won't have included all the potential industrial rubber terms so if you need a term defining, please contact us and we'll do our very best to help.

Check out the download area of our website www.j-flex.co.uk for other product information, data sheets and more.

Please note: This guide is intended to assist understanding of the most frequently used terms from the rubber industry. The information contained should be used in conjunction with the national and international standards and legislation relating to properties and safe application of rubber. Ultimately it is the direct responsibility of the customer to make the final decision as to the suitability of a rubber material for a particular application.

J-FLEX RUBBER PRODUCTS

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