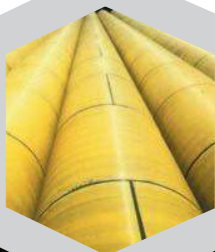


IFS

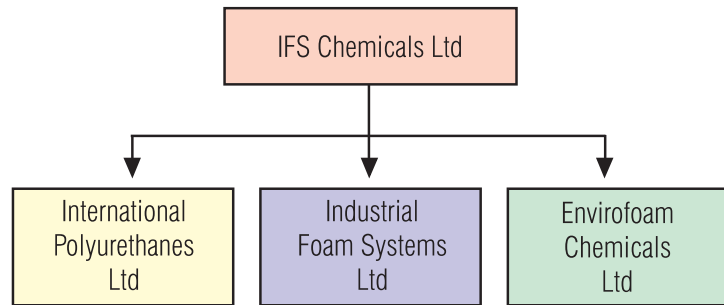
Chemicals Group



Introduction



IFS is a group of four independent companies providing polyurethane chemicals to a wide cross section of industries, including refrigeration, industrial insulation, automotive, marine and leisure. Each company is involved in specific aspects of polyurethane technology with IFS Chemicals acting as a Group Holding Company.



formulating to meet the specific requirements of the customer

The companies provide polyurethane chemicals, equipment and know-how to most polyurethane foam and elastomer areas. In the case of chemical formulations, these are provided on a sale by sample basis with formulations offered to a prospective client and testing trials conducted to confirm the suitability of the chemicals, after which a manufacturing specification is established. The relevant sales company within the Group guarantees to manufacture and supply to that agreed specification. Procedures are in place, continuously reviewed, to ensure that customers receive materials which conform to an agreed high standard with minimal batch to batch variation.

The fact that IFS is truly independent and privately owned means that raw materials used in the various formulations are chosen because of their technical qualities. This is not always the case with larger multinational firms where formulating chemists are obliged to make maximum use of in-house base chemicals. Consequently, IFS is able to optimise a formulation to meet the specific requirements of the customer rather than provide a compromise solution.



Whilst not being formally linked with any particular multinational organisation, IFS does believe in the principle of close and open discussion with its major suppliers for their mutual benefit. By understanding each others aims and constraints, a more successful working relationship can be established to the overall benefit of the ultimate customer. In this regard, IFS have built up a good relationship with its main polyol suppliers, for example a particularly close relationship exists between IFS and ICI, a company which has given both technical and commercial support when required.

IFS has generated an extensive database of polyurethane raw materials to provide maximum flexibility when formulating a database covering all known European and US products as well as an increasing number of new products being manufactured in the Far East.

International Polyurethanes Ltd

As the various markets have evolved, especially within the automotive sector, a new company International Polyurethanes Ltd (IPL), was formed to handle the development and sales of speciality chemicals. The principle of working closely with prospective clients to custom formulate to specific needs has led to significant progress within the marine and automotive industries.

Rolls-Royce sprayed polyurea

Formulated to combine trouble free processing with high mechanical properties, a system was produced to manufacture front and rear bumpers for their range of prestigious cars.



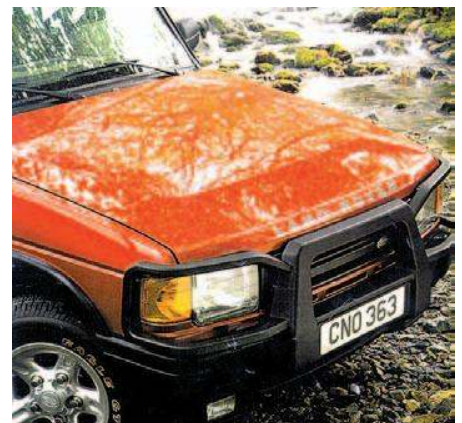
Sub-sea pipeline insulation

A high density foam/elastomer insulation system was developed for a specific type of pipeline laying process. The insulation required high mechanical properties whilst being capable of being applied using a *Controlled Rotational Casting* technique. Since the laying process involved the circular reeling of the pipeline, a relatively high ultimate elongation was required. These conflicting requirements led to a significant development programme and the successful application of this type of sub-sea pipeline, the first of its kind in the world.



Land Rover moulded items

A requirement was highlighted for a polyurethane foam which would be suitable for the manufacture of internal trim items with two specific requirements: low part weight and use of zero ODP blowing agents. A successful development program produced a foam system used in daily production of parts for the Land Rover series of vehicles.



International Polyurethanes Ltd has gained an enviable reputation for solving customer requirements by total dedication to development programmes and working closely with existing and prospective customers.

*working closely
with existing and
prospective clients*

Foam Products

Automotive

Integral-skin moulding grades for steering wheels, arm rests, gear levers etc.

Structural rigid foams for internal items including GMFU (Glass Mat Filled Urethane) systems for seats, parcel shelves etc.

Semi rigid, energy management foams for facias, back-filling behind PVC slush mouldings etc.



General mouldings

Imitation wood products, picture frames, mirror frames, industrial metal detectors etc.

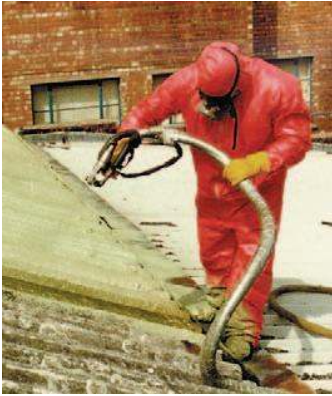


Marine applications

Buoyancy products for sea vessels and pleasure craft. Includes high density foams for sub-sea, syntactic foams and protective coatings.



Foam Products



Construction

Building panels, blockfoam, spray applied insulation, cavity filling, insulated building blocks, double band lamination, modular building and insulated doors.



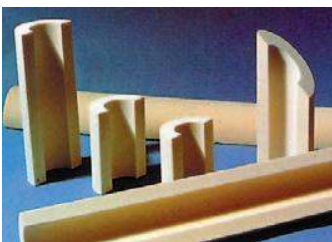
Refrigeration

Cold stores, cold rooms (modular) supermarket display cabinets, commercial and domestic refrigerators, ice-making cabinets, LPG tankers, refrigerated vehicles.



"Handi-Foam"

Convenient small scale foam dispensers of one or two component foam.



General insulation

Hot water cylinders, pipe insulation, drink flasks.

Elastomer products

Sports floors

External binders for children's play areas (used with rubber crumb)
Internal, high performance flooring systems based on two component polyurethanes.



Casting resins

A large selection of materials for solid, cast products with a hardness range from 20 shore A to 80 shore D.

General and high-performance resins for pipeline protection.
Concrete moulding, pipeline joints, table edging, electrical encapsulation.



Tyre filling

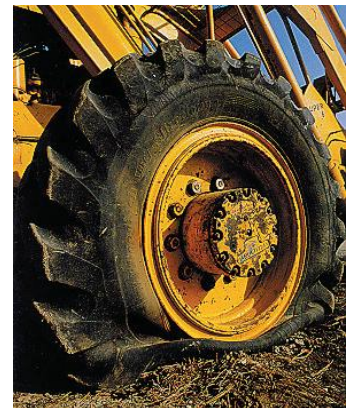
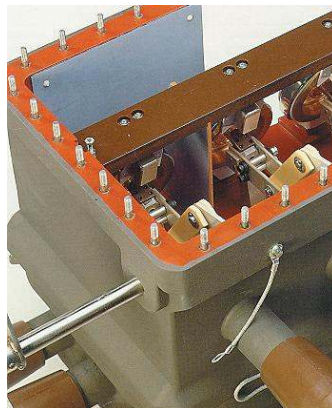
Speciality resins for industrial tyres.

Automotive

Sound deadening mats (filled resins).

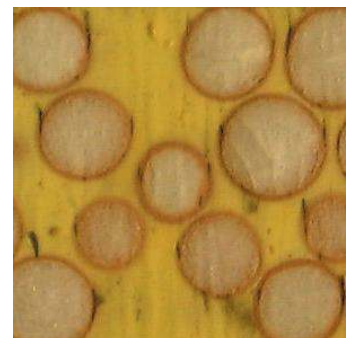
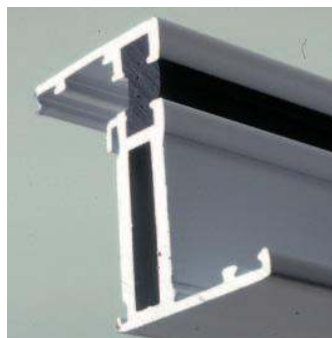
Polyurea RIM

Spray-applied products for high performance elastomers (eg Rolls-Royce bumpers).



High modulus elastomers

Thermal-break resins for the double glazing industry.



Industrial Foam Systems Ltd

Industrial Foam Systems Ltd (IFSL) was established in 1982 with the specific aim of providing fast reacting, low density foam systems to the spray-applied insulation market in the UK and abroad. Early contracts included the supply of chemicals to roofing contractors in Oman and Saudi Arabia where large building projects in the 1980's required significant quantities of low density insulation, externally applied to the exterior of both domestic and institutional buildings.

UK markets were established in Class 1 fire retardant foam for the insulation of agricultural and livestock stores. Essentially spray-applied foam is applied to the internal surfaces of buildings used to store crops such as potatoes, onions and sugar beet. This process eliminates the occurrence of crop damage due to condensation problems associated with storage in un-insulated buildings.

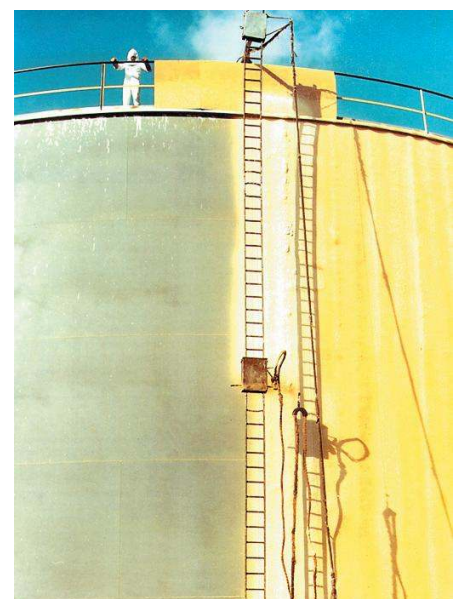
Industrial Foam Systems Ltd remains dedicated to the requirements of the polyurethane contractor in the principal areas of spray-applied insulation, in-situ liquid dispensed insulation and prepolymer systems for the formulation of external athletic and general purpose sports tracks.

Recent developments at Industrial Foam Systems have led to the first natural oil polyol based spray systems in Europe. This allowed the Company to reduce its price by approximately 15%, a benefit welcomed by spray foam contractors. A further development has been the introduction of a zero ODP spray foam which is suitable for external roofing applications and runs at a 1:1 volume ratio.

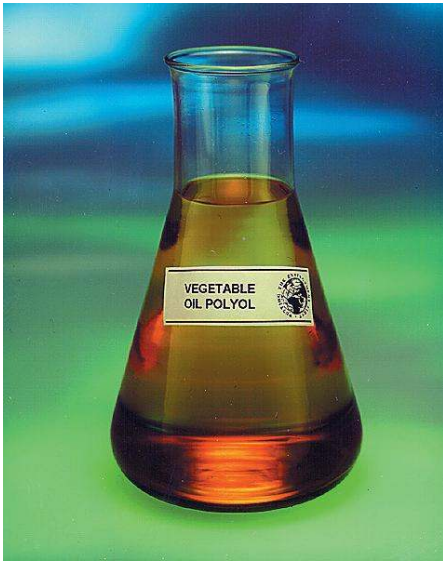
IFS is an active member of the British Rigid Urethane Foam Manufacturers Association (BRUFMA), British Urethane Foam Contractors Association (BUFCA) and British Rubber Manufacturers Association (BRMA). The Managing Director of IFS was President of BRUFMA for the 1997/98 period.



the introduction of a zero ODP spray foam



Envirofoam Chemicals Ltd



Envirofoam Chemicals Ltd (ECL) was formed to exploit the chemistry of naturally occurring oils and fats in the area of polyurethanes. The company was incorporated after discussions with Envirofoam International Inc. which had established some expertise in the area of natural oil chemistry in the late '80s. This move complemented the previous experience of IFS directors with polyol system manufactured from sunflower oil used in polyurethane systems for pipe insulation in India.

ECL has perfected a means of converting natural oils such as rape, palm, coconut and cotton seed oil to polyols suitable for incorporation into PU systems for insulation, moulding and spray-form formulations.

It is the business of ECL to manufacture hardware for the production of natural-oil based polyols, to provide polyol blending equipment and all the technical know-how for its successful application.

With a global market of 6.5 million tonnes of polyurethane chemicals per annum, incorporated into a wide variety of applications, it was felt that if such polyols could be used in a small, but significant number of applications, there would be a clear environmental advantage to be gained, natural oils being easily replenished and utilising low levels of energy in their conversion to polyols.

*manufactured close
to the local market
and immediately
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Many countries interested in participating in the polyurethane industry, have an abundance of natural oils, most of which are technically acceptable for many of the important applications such as refrigeration, general insulation and moulded automotive parts.

An important advantage of using natural oil-based polyols is that they can be manufactured close to the local market and immediately included in the fully formulated systems. In countries where transportation is difficult to achieve, it may prove fruitful to erect a polyol plant to cater for the local market rather than importing polyols via tortuous supply routes.



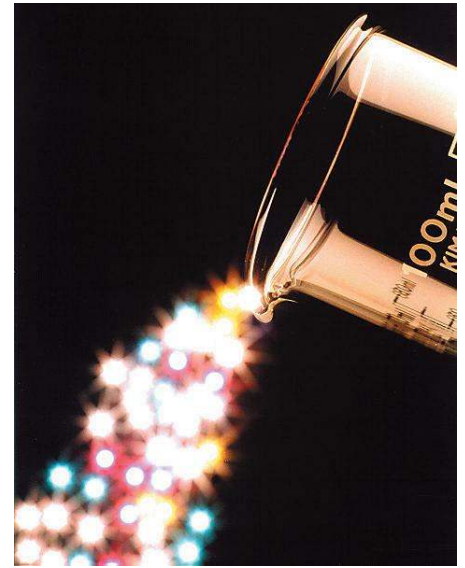
Envirofoam Chemicals Ltd can offer a complete plant for the conversion of oils to polyols as well as full formulation know-how developed over many years in the USA and UK. The formulated products have been developed in close cooperation with existing successful manufacturing companies (as detailed in a paper entitled 'Low Cost Polyols From Natural Oils' given at the Utech conference in Singapore).

Innovation

IFS has always been regarded as an innovative company, generally well ahead of its competitors in finding workable solutions to a variety of problems. IFS has been at the forefront of new developments including superior fire performance, the use of more environmentally acceptable chemicals and the development of high performance chemicals base of polyester technology.

When the CFC/ozone layer issue arose in the mid '80s and other companies were carrying out research into the use of both HCFC 123 and HCFC 141b (both of which are ozone depleting substances), IFS opted for a more environmentally acceptable blowing agent alternative - the use of a blend of zero-ODP blowing agents. By 1988, a commercial and very successful product based on this new technology had been introduced into the UK market, some 5 years before any other company. This concept was described by the Daily Telegraph as *"a breakthrough....in the invention of an insulation material which does not use so-called CFC's and which can be used in refrigerators"*

Similarly, in the areas of reduced global warming, renewable resources and high performance engineering systems, IFS continues to lead the way.



Technical Assistance

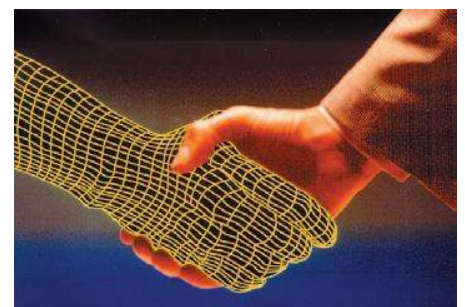
As part of the service provided by IFS to its customers, technical service assistance needs to be both fast and efficient. The Company has placed a great deal of emphasis on giving effective assistance in all areas of polyurethane technology. In addition to the laboratory staff and other experienced personnel at King's Lynn, we have highly regarded technical service managers covering the UK.

One of the prime responsibilities of the technical service managers is to arrange and carry out acceptance trials at customer's premises. They are adept at setting up the dispensing equipment, ensuring that all production parameters are adequate and then running the chemical system in the correct manner.

The technical service managers act as a vital link between the customer and the King's Lynn office, ensuring that all customer concerns are dealt with and overseeing any modifications to formulations prior to implementation.

They also provide the facility to test for various gases which may be of concern to local Health & Safety inspectors. These include MDI, pentane and methylene chloride. They are able to offer advise on how to reduce atmospheric levels of these substances in the workplace before such considerations become a problem with local authorities.

*effective assistance in
all areas of polyurethane
technology*



Quality



IFS runs a formal quality system and has gained approval to ISO9001



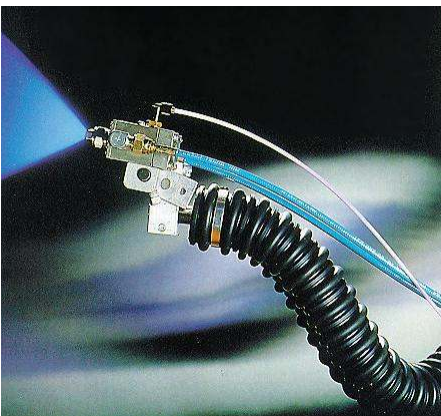
IFS has always been dedicated to the production of high quality chemicals with very good batch to batch consistency. Fully traceable records are kept, incorporating supplier records, in-process materials and finished goods inventory. Samples of every batch of chemicals are kept for future reference and all aspects of the quality system are regularly reviewed in accordance with normal industrial practice.

IFS runs a formal quality system and has gained approval to ISO9001. A design element has been included within the scope of the registration to include the significant contribution and importance of new development products. The certificate of registration, issued by BSI, is number FM33811.

A full time Quality Manager is employed to administer the system, ensuring it's continued improvement and adapting it to incorporate other, non-quality related procedures.

A great deal of emphasis has been placed on subjecting every batch of chemicals to the most rigorous series of tests in order to ensure that the customer is totally happy with the quality of the chemicals supplied. Infra-red fingerprint tests are standard procedures as well as analytical/foam performance tests. In some cases moulded foam items are subjected to detailed testing prior to quality approval for each batch.

Safety



The IFS Group of companies has an ongoing responsibility to its workforce and customers to provide full information on the safety aspects of using polyurethane chemicals and processes. Full COSHH assessments are carried out on all chemicals used by the Company and Safety Data Sheets are issued for all formulated blends and isocyanates supplied by the various Group companies.

In a similar format to the Quality Manual, the Safety Manual contains a number of Safety Procedures, with responsibility designations, which are reviewed regularly. These procedures cover such topics as fire evacuation, reporting of incidents, risk assessment, provisions of safety equipment and safety training.

Premises

IFS is situated in the village of Roydon, close to King's Lynn, Norfolk. Occupying seven interconnecting industrial units totalling almost 60,000 sq. ft. All stocks of raw materials and finished goods are stored inside the factory in metal drums and bulk storage tanks (ranging from 10 to 35 tonnes each).

The factory has 7200 sq. ft. of office and laboratory space with a well equipped development area.



Complete Development Service

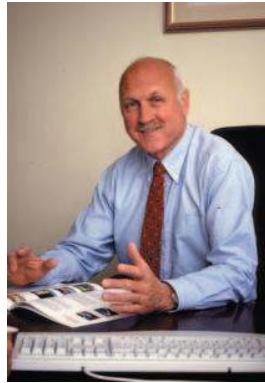
IFS is able to offer a complete in-house development service with laboratory and an on-site machinery hall equipped with low and high pressure dispensing equipment producing sample components for customer evaluation.

By optimising formulations prior to introduction at the customer site and commissioning, IFS minimises any potential disruption to ongoing production processes.



Contacts

The Group has three Directors, each being responsible for a specific area of company activity:



Managing Director: Dr Barrie G Colvin

Responsible for the overall performance of the company, ensuring that the Company conforms to all legislative requirements with regard to employment law, health and safety, environmental issues etc.

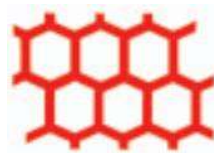
Barrie assists in all Technical Development projects and continually reviews all technical and quality considerations.

Technical Sales Director: Mr Ian J Widdowson

Responsible for the development of sales (except for ECL) and co-ordinating technical service visits.

Financial Director: Mrs Diwy Colvin

Company Secretary, responsible for office administration including personnel issues, accounts etc.



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