

Lubricant Solutions for the Glass Industry



LUBRICANTS.
TECHNOLOGY.
PEOPLE.



LUBRITECH
Special Application Lubricants



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Facts and Figures

Company: FUCHS LUBRICANTS (UK) plc, part of the FUCHS Group, based in Hanley, Stoke-on-Trent, England.

LUBRITECH: the Special Application Division of the FUCHS Group.

Product range: LUBRITECH GROUP offers a full range of more than 1,000 special products, including food grade lubricants, adhesive lubricants, lubricating fluids and greases, pastes, solid film lubricants, concrete release agents, aerosols and metal-forming lubricants.

Certifications: ISO 9001: 2015, ISO 21469, Halal, Kosher.

FUCHS has developed, produced and sold lubricants and related specialties for more than 80 years – for virtually all applications and sectors. With over 100,000 customers and 50 companies worldwide, the FUCHS Group is the world's leading independent lubricant supplier.

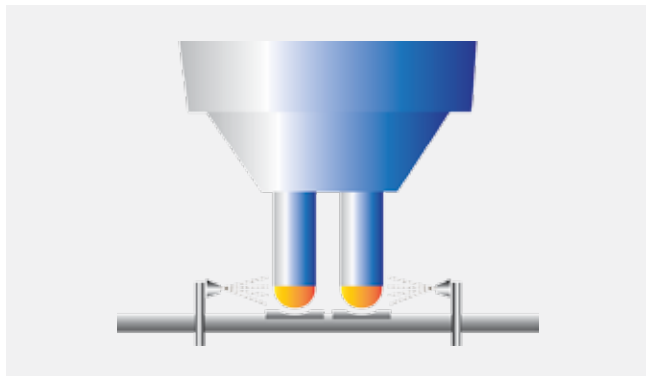
Within the FUCHS Group, **FUCHS LUBRITECH** is the expert for Special Application Lubricants. A team of more than 500 specialists around the world work to meet your needs. However demanding the application, we offer a specialised solution. Service is a crucial and fundamental component of our offering. Our experts offer on-site technical consultation to assure performance, efficiency and process reliability.

The FUCHS "Technical Centre of Excellence for Glass Industry Lubricants" is located within FUCHS UK's LUBRITECH specialist division. The centre provides specialist technical support services to enhance that of the global FUCHS LUBRITECH operations. The centre manages new product development and aids in the transfer of knowledge and technology to local FUCHS companies around the world.

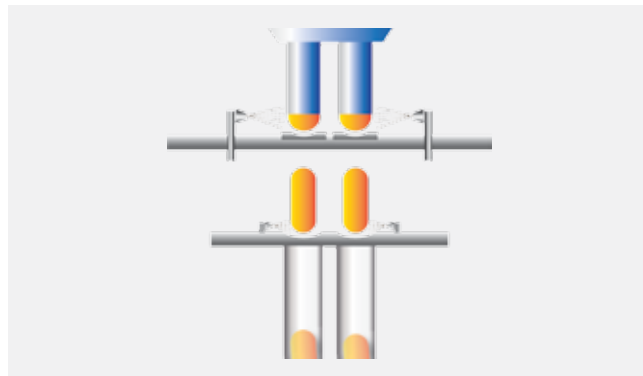
FUCHS LUBRITECH special application lubricants stand for highest performance and sustainability, safety and reliability, and efficiency and cost savings. They represent a promise: **technology that pays back.**

Glass manufacturing process

Shear



Scoop and Delivery



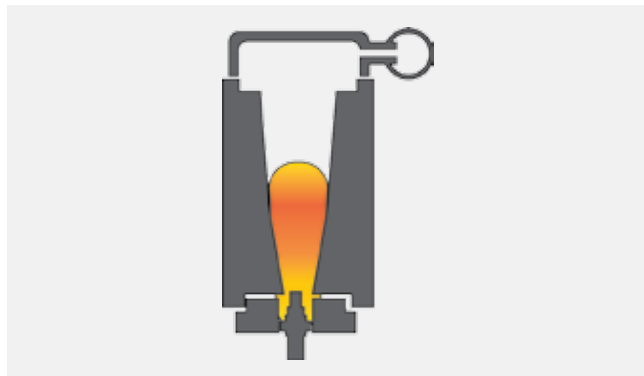
| I.S. Machine | Product Name | Description | Base Type | Notes |
|--|-------------------------|--|-----------------|---|
| Machine & Feeder Lubrication Recommendation: VITROLIS IS X, VDV GLASSLINE Outstanding thermal and oxidation stability combined with ultra-low carbon forming tendencies. Plunger Mechanism Recommendation: VITROLIS PM 46 A specially developed 46cst plunger mechanism lubricant, combining all of the benefits of the VITROLIS ISX grades with a reduced viscosity to ensure smoother operation of the mechanism. | VITROLIS IS X100 UV | ISO 100 synthetic ester based oil recommended for machine servo systems. | Synthetic Ester | Optional in extreme low temperature environments where standard ISO 220 is too viscous. |
| | VITROLIS IS X150 | ISO 150 synthetic oil for all I.S. Machine lubrication systems. | Synthetic Ester | Optional in low temperature environments where standard ISO 220 is too viscous. |
| | VITROLIS IS X220 | ISO 220 synthetic oil for all I.S. Machine lubrication systems. | Synthetic Ester | Optimum performance I.S. Machine Lubrication Oil. Approved and meets specifications of most leading I.S. Machine OEM's. |
| | VITROLIS IS X220 H | ISO 220 synthetic oil for all I.S. Machine lubrication systems. | Synthetic Ester | Elevated temperature flash point and optimum machine performance. |
| | GLASSLINE IS220 SPECIAL | ISO 220, semi-synthetic. Recommended for machine lubrication. | Semi-Synthetic | Semi-synthetic lubricant recommended for glass forming machines and other pneumatic operated glass forming equipment. |
| | VITROLIS PM 46 | ISO 46, fully synthetic. Dedicated plunger lubricant. | Synthetic Ester | Fully synthetic plunger lubricant with extremely low residue formation and high levels of oxidation stability. |

| Shear Mechanism | Product Name | Description | Dilution Ratio | Base Oil | Water Quality |
|---|-------------------------|---|----------------|----------------------|--|
| Shear Spray Lubricants Recommendation: VITROLIS SHEARLUBE, VDV SYNSHEAR F Designed to extend shear blade life and provide excellent shear cut accuracy being biodegradable with excellent thermal and hard water tolerance. | VITROLIS SHEARLUBE 722X | Cost effective product for use with precise dosing systems. | < 1500 to 1 | Synthetic, Vegetable | Softened water recommended. |
| | VITROLIS SHEARLUBE 3344 | Suitable for all types of dosing systems. | < 1250 to 1 | Semi-Synthetic | Softened water recommended but not required. |
| | VITROLIS SHEARLUBE B | Fully Biodegradable mineral oil free shearspray lubricant. | 700 to 1 | Synthetic | Hard or soft water. |
| | VDV SYNSHEAR F | Suitable for all types of dosing systems. | 700 to 1 | Synthetic | Hard or soft water. |

Blank Mould



Neckring Mould



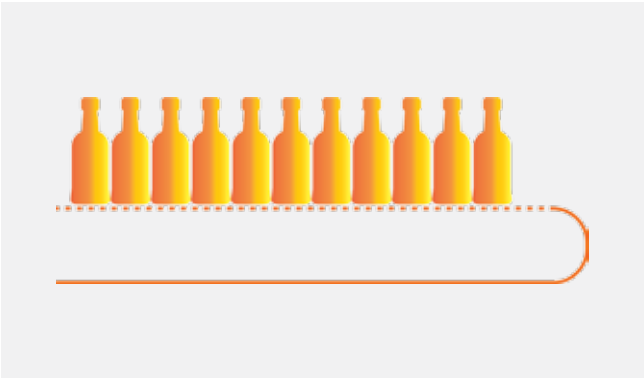
| Delivery Equipment | Product Name | Description | Base Type | Application |
|--|---------------------------|---|----------------------------------|--|
| Delivery lubricants Recommendation: VITROLIS DL HEAVY / LIGHT Designed to reduce the coefficient of friction between the gob and the delivery equipment allowing faster and more consistent loading of the gob. Delivery coatings Recommendation: VITROLIS DC VDV GLASSLINE DDL An epoxy resin graphite which is painted onto the delivery equipment to facilitate the loading of the gob into the blank. | VITROLIS DL LIGHT | Water white delivery oil. 32 cst. | Highly refined white mineral oil | Spray or drip feed. Optimise between 300 – 500 cuts. |
| | VITROLIS DL HEAVY | Water white delivery oil. 68 cst. | Highly refined white mineral oil | Spray or drip feed. Optimise between 300 – 500 cuts. |
| | VITROLIS DL WG | Non-flammable, water based. | Water/Glycol | Spray or drip feed. Optimise as required. |
| | VITROLIS DC GLASSLINE DDL | 2 pack graphite dispersion in high temperature resistant epoxy resin. | Apply within 1 hour | To optimise dry at 80-120°C for 1-2 hours. |

| Mould Equipment | Product Name | Description | Graphite Content | Sulphur Content | Notes |
|---|------------------------------|--|------------------|-----------------|--|
| Blank & Mould Recommendation: VITROLIS MM / VDV BML A premium range of swabbing compounds that provide excellent forming consistency, superior surface quality/ cleanliness, extended swabbing cycles and reduced build up in the forming equipment. They are suitable for all processes including BB, PB and NNPB. Auto Swab Robots Recommendation: VDV SWABMATIC RANGE An OEM approved range of sprayable swabbing compounds giving significantly reduced application rates. Available in sulphur and zero sulphur versions. | VITROLIS MM 3000 VDV BML 334 | Universal grade suitable for beer, wine, spirit, pharmaceutical, cosmetic & perfume bottles. | 3.5-6% | 4-5.5% | Product can be used on BB, PB & NNPB operations on a range of coloured and flint glass ware with medium to heavy gob weights. |
| | VITROLIS MM 3010 VDV BML 328 | Intermediate grade combining high load capability & cleanliness of operation. | 2.5-4% | 4.5% | Hybrid swabbing compound with mid-range graphite content proving to be very successful in producing cleaner brighter ware without the levels of residue and carry over seen from High Graphite content products. |
| | VITROLIS MM 3020 VDV BML 324 | Formulated for where cleanliness and surface glass clarity are important such as high quality wine and spirits containers, pharmaceutical, food and cosmetic jars. | 1.8-2.8% | 4-5.5% | Particularly suitable for production of thin wall/light weight containers by NNPB production methods. |
| | VDV SWABMATIC RANGE | Designed for use in Autoswab Machines for IS Machine Blank Moulds. | 1-3% | 0-4.5% | <ul style="list-style-type: none"> • Zero reject rates • 1Kg = 1 million bottles • Increased production rate • Blank & neck ring • NNPB & Blow/Blow |

Finishing Mould



Conveyor



| | | | | | |
|---|---------------------|--|--|--|--|
| Pre-Coat Pre-coats are often applied to blank & mould equipment to improve productivity following mould changes. VITROLIS SPC pre-coats react immediately at room temperature and apply a lubricating film proven to provide excellent gob loading, parison release and to reduce or eliminate cracking/rejection. The product is designed to eliminate the need for swabbing during start up procedures. | Product Name | Description | Application Rate | | Notes |
| | VITROLIS SPC 100 S | Aerosol Spray. Dry-film blank mould pre-treatment. | 0.2mm to 0.5mm. Apply from a distance of 30cm. | | Ensure clean mould. Touch dry within 2 minutes. For best results 4-6 hours curing. |
| | VITROLIS SPC 100 L | Liquid. Dry-film blank mould pre-treatment. | 0.2mm to 0.5mm. Apply from a distance of 30cm. | | Ensure clean mould. Touch dry within 2 minutes. For best results 2-4 hours curing. |

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|---|------------------------------------|---|----------------------|------------------------|--|
| Neckring A specially formulated light to medium viscosity lubricant and release agent for use on the neck rings. It can be used on all processes and is particularly effective in reducing carry over of lubricant, therefore reducing the problem of ‘dirty neck rings’ on the formed container. | Product Name | Description | Solid Content | Sulphur Content | Notes |
| | VITROLIS NRL 46 VDV NECK RING E | Lubricant and release agent for neck rings. | 1.4% | 4-5% | Designed for NNPB process but can be used on BB and PB operations by applying a slightly lighter film. |

| | | | | |
|---|---------------------|---|---|--|
| Anti-checking Lubricants VDV anti checking lubricants are uniquely designed with fine colloidal graphite particles and specialist wetting agents to eliminate any issues with checks, incisions or imperfections in the swabbing process. | Product Name | Description | Application Rate | Notes |
| | VDV RELEASE AGENT V | Prevents occurrence of cracks or incisions in swabbing process. | Can be applied to blow moulds or bottom plates. | Apply undiluted with appropriate brush/ equipment. |
| | VDV RELEASE AGENT X | Colloidal graphite, low viscosity oil, burning totally without residue. | Especially suited for lead glass and moulded tableware. | Apply undiluted through spraying. |

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|---|---------------------|---|--|--|
| Cold End Coating VITROLIS Cold End Coating are designed to protect and lubricate bottles so that damage does not occur during transport, from high speed handling equipment or inspection prior to packing. | Product Name | Description | Application Rate | Notes |
| | VITROLIS CEC 580 | Sprayable coating for application directly onto containers as they exit the lehr. | Designed for use between 120-150°C. Product is applied in its neat form. | Product is manufactured from food safe ingredients in areas that comply with GMP Practices and are Kosher and Halal certified. |

SwabMatic

Sprayable lubricant technology for swabbing robots.

- 1kg = 1 million+ bottles
- Zero rejection rate
- Increased production rate
- Blank & neckring
- NNPB & Blow/Blow

Automatic swabbing has proven its overall efficiency within the glass forming process. This modern technology has progressively entered the market and is now recognised as standard equipment by glass plants, robot and IS machine OEM's.

The FUCHS swabbing lubricant is playing a key role in the success of the automated swabbing operation. Without the appropriate lubricant parameters, high risks of robot shut-downs and/or inefficient mould swabbing can rapidly take place.

As lubricant experts and exclusive OEM partner, FUCHS has developed SwabMatic technology that fits perfectly with any automated swabbing installation. Targeting a "less is more" approach, SwabMatic generates superior process results at very low application rates.

The SwabMatic range is suitable for all swabbing robots, processes and types of glass.

Pharmaceutical & Flat Glass

PHARMACEUTICAL

| Pharmaceutical / Medicinal Glass | Product Name | Description | Viscosity at 40°C | Flash Point | Notes |
|---|-------------------------|--|-------------------|-------------|--|
| The manufacture of high quality pharmaceutical and medicinal ware has long been a specific focus for FUCHS LUBRITECH. We understand the stringent requirement of providing consistent high quality products to the pharmaceutical industry from standard level to tailor made H1 approved lubricants via our ISO 21469 approved manufacturing facilities. | VITROLIS VIALFORM 45/25 | Oil for the manufacturing of vials and ampoules. | 220cst | >200°C | Oil combination for moulding vials and ampoule neck openings. |
| | VDV SWABPHARMA | Innovative swabbing compound specific to the manufacture of Pharmaceutical ware. | | | Displaying extremely low levels of residue build up. VDV SWABPHARMA has been tested and approved on Borosilicate Glass type 1. |

FLAT GLASS - FLOAT & AUTOMOTIVE

| Cutting Fluids | Product Name | Description | Viscosity | Flash Point | Notes |
|--|----------------|--|----------------|-------------|---|
| The VITROLIS range of cutting fluids are based on low odour hydrocarbons and designed to ensure excellent cleanliness during process. The products can be used for all types of flat glass including hard and soft coated glass, automotive and structural glass and can be selected to offer optimum performance based on type and thickness of material cut. | VITROLIS GB | Universal cutting oil. | 1.15cst (25°C) | 62°C | Suitable for use on car windscreens and windows, laminated glass, float glass and mirrors up to 15mm thick. |
| | VITROLIS GB 24 | Universal cutting oil. | 1.35cst (25°C) | 68°C | Suitable for use on car windscreens and windows, laminated glass, float glass and mirrors up to 15mm thick. |
| | VITROLIS GB 35 | Universal cutting oil. | 1.7cst (20°C) | 62°C | Suitable for glass up to 19mm thick. |
| | VITROLIS GG | Universal evaporating glass cutting oil. | 0,95cst (40°C) | 41°C | Suitable for use on car windscreens and windows, laminated glass, float glass and mirrors up to 15mm thick. |
| | VITROLIS GM | Glass table cutting oil. | 9cst (40°C) | >150°C | Manual and machine cutting of flat glass. |

| Synthetic Drilling Fluids | Product Name | Description | Recommended Concentration (Drilling) (Grinding) | | Notes |
|---------------------------|-----------------|--|---|------|---|
| | VITROLIS DRO DG | Boron Free drilling and bevelling fluid. | 4-6% | 3-4% | Low foaming boron free soluble cutting fluid. |
| | VITROLIS HF BF | Boron Free drilling and bevelling fluid. | 3-5% | 2-3% | Low foaming boron free soluble cutting fluid. |
| | VITROLIS HF | Drilling and bevelling fluid. | 3-5% | 2-3% | Low foaming, water soluble cooling lubricant for drilling and bevelling operations. |

| Synthetic Edge Grinding Fluids | Product Name | Description | Recommended Concentration | Notes |
|--------------------------------|--------------|-------------------------|---------------------------|--|
| | VITROLIS FS | Glass edge-grinding oil | 1-6% | Higher concentration suitable for bevelling. |

Innovative lubricants need experienced application engineers

Every lubricant change should be preceded by expert consultation on the application in question. Only then the best lubricant system can be selected. Experienced FUCHS engineers will be glad to advise on products for the application in question and also on our full range of lubricants.



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