

SAFETY DATA SHEET

ENERGY SPRING NS CALSU 2X — Calcium Sulphonate Complex Grease

Issued in accordance with Singapore Standard SS 586-3:2022 (16-section GHS format). This document supersedes all previous versions.

SECTION 1 - Identification of the substance / mixture and of the supplier

1.1 Product identifier	NS CALSU 2X
Product family	Extreme-pressure lubricating grease, NLGI consistency grade 2, thickened with a calcium sulphonate complex soap on a mineral base oil of 460 mm²/s at 40 °C. The load-carrying capacity of this product is built into the soap structure itself rather than supplied by sulphur-phosphorus additives, so it does not deplete across the relubrication interval. The same overbased carbonate structure provides the water and salt resistance and the rust inhibition. Operating temperature range -20 °C to +160 °C, with short peaks to +180 °C. Classification: DIN 51825 KP2P-20; ISO 6743-9 L-XBEIB 2.
Grade(s)	NLGI 2 by ASTM D217, worked penetration 265 to 295 units (0.1 mm) at 25 °C.
Chemical identity	Mixture (lubricating grease)
CAS number	Not applicable (mixture)
1.2 Relevant identified uses	Extreme-pressure grease for heavily loaded bearings working wet and hot. Industrial: continuous casting and steelworks plant, paper machine press and dryer sections, cement and mineral processing, overhead and harbour cranes, conveyors and vibrating screens. Marine and offshore: deck machinery, winches and equipment exposed to sea water. Applied by grease gun, centralised lubrication system or single-point automatic lubricator. Industrial / professional use.
Uses advised against	Any use other than that stated above. Not for use as an engine oil, gear oil, hydraulic fluid, fuel, solvent, cleaning agent or mould release agent, nor for any medicinal, food-contact or personal-care purpose. Not approved for incidental food contact (NSF H1). Do not use above +160 °C in continuous service, or above +180 °C in short peaks, or below -20 °C. The upper service limit is set by the thickener. Note that the base oil flash point (> 220 °C) is lower than the dropping point (>= 280 °C) for this product; neither figure is a service temperature - see Section 9. Grease compatibility. This product is compatible with lithium and lithium complex soap greases. Compatibility with other thickener systems, in particular polyurea and bentonite (clay) thickened products, is to be confirmed before mixing. When converting equipment from another grease, purge the bearing or system completely and re-grease at short intervals until only the new product is discharging, bearing in mind that dead spots may retain the old grease. Not a substitute where a grease containing molybdenum disulphide, graphite or another solid lubricant is specified: this product contains no solid lubricant.
1.3 Supplier of the safety data sheet	ENERGY SPRING PTE LTD 3 Temasek Avenue, #21-00 Centennial Tower Singapore 039190 Tel: +65 6993 9836 E-mail: info@energy-spring.sg Web: https://energy-spring.sg/
Manufactured / blended by	Product supplied under a manufacturing agreement. Manufacturer details available from ENERGY SPRING PTE LTD on request.

1.4 Emergency telephone number	ENERGY SPRING PTE LTD (office hours, Mon - Fri 09:00 - 18:00 SGT): +65 6993 9836 Singapore - emergency services (SCDF: ambulance and fire): 995 Singapore - Drug and Poison Information Centre (DPIC), Singapore General Hospital, 24-hour hotline: +65 6423 9119 Outside Singapore: contact the local emergency services or the national poison information centre for the country in which the incident occurs.
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Product	NLGI consistency grade	Product type	GHS classification
NS CALSU 2X	2	Calcium sulphonate complex grease	Classified - see Section 2

SECTION 2 - Hazards identification

2.1 Classification of the substance or mixture	GHS classification (SS 586-2 / SS 586-3): Serious eye damage, Category 1 - H318 Skin sensitisation, Category 1 - H317 Hazardous to the aquatic environment, long-term (chronic), Category 3 - H412 Physical hazards: not classified. Supplemental labelling: EUH208 applies. See 2.2.
Basis of the classification	The mixture has been assessed against the classification criteria of SS 586-2 using the generic concentration limits and the summation and additivity rules. No substance-specific concentration limit has been relied on. - Serious eye damage. The calcium sulphonate declared second in Section 3 is classified Eye Dam. 1; H318 and is present at 3 % w/w or above. An Eye Dam. 1 ingredient at 3 % w/w or above classifies the mixture Eye Dam. 1; H318. Met at the lower bound of the declared range, so this classification does not depend on where in that range the component sits. - Skin sensitisation. Three of the calcium sulphonate components are classified Skin Sens. 1B; H317 and are present at 1 % w/w or above, the largest at up to 10 % w/w. The endpoint is assessed ingredient by ingredient against the 1.0 % w/w generic concentration limit; the additivity principle does not apply to it. The limit is exceeded, so the mixture is classified Skin Sens. 1; H317. See the note on the origin of this classification below. - Chronic aquatic hazard. Derived by the summation method from the phenolic antioxidant and the alkylated triaryl phosphate (each Aquatic Chronic 1; H410, M = 1, each below 1 % w/w) and the calcium sulphonate carrying Aquatic Chronic 3; H412 (below 5 % w/w). At the upper bound of each range: Chronic 1: sum of (M x Chronic 1) = 1.98 %, against a 25 % threshold. Not met. Chronic 2: (10 x M x Chronic 1) + Chronic 2 = 19.8 %, against a 25 % threshold. Not met. Chronic 3: (100 x M x Chronic 1) + (10 x Chronic 2) + Chronic 3 = 203 %, against a 25 % threshold. Met. The mixture is therefore Aquatic Chronic 3; H412. - Skin corrosion / irritation. The calcium sulphonate carrying Skin Irrit. 2; H315 is present below 5 % w/w, against a 10 % w/w additivity threshold. Not met. - Acute toxicity. The calculated acute toxicity estimates for the mixture are 174,600 mg/kg by the oral route and 110,000 mg/kg by the dermal route. Not met. - Carcinogenicity. The mineral base oil contains less than 3 % (w/w) DMSO extract when tested by IP 346. Not met. - Aspiration toxicity. The product is a grease and is not capable of being aspirated in the sense of the criterion. Not applicable. - Germ cell mutagenicity, reproductive toxicity, respiratory sensitisation, STOT (single and repeated exposure), and all physical hazard classes: criteria not met.

2.2 Label elements



GHS05
Corrosion



GHS07
Exclamation mark

Signal word	DANGER
Hazard statements	H318: Causes serious eye damage. H317: May cause an allergic skin reaction. H412: Harmful to aquatic life with long lasting effects.
Supplemental information	EUH208: Contains calcium sulphonate. May produce an allergic reaction. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin, resulting in disorders such as oil acne or folliculitis. Used grease may contain harmful impurities. Not classified as flammable, but will burn.
Precautionary statements	Prevention: P261: Avoid breathing mist, vapours or spray. P272: Contaminated work clothing should not be allowed out of the workplace. P273: Avoid release to the environment. P280: Wear protective gloves, protective clothing and eye / face protection. Response: P302 + P352: IF ON SKIN: Wash with plenty of water and soap. P333 + P313: If skin irritation or rash occurs: Get medical advice / attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P310: Immediately call a POISON CENTER or doctor. Disposal: P501: Dispose of contents and container to an approved waste disposal plant, in accordance with local regulations.
Note on the pictograms	Both pictograms are required. GHS05 carries the serious eye damage classification; GHS07 carries the skin sensitisation classification. Where GHS05 appears, GHS07 is not used for skin or eye irritation, but it is still required for skin sensitisation, which is a separate hazard class.

Origin of the skin sensitisation classification	The sensitising components are the thickener, not additives. Calcium sulphonate complex is what gives this grease its load-carrying capacity, water resistance and rust inhibition, and it is necessarily present at several per cent - well above the 1.0 % w/w generic concentration limit for a Category 1B skin sensitizer. The skin sensitisation endpoint is assessed ingredient by ingredient against that limit; the additivity principle does not apply to it. The classification is derived from the component classifications by the generic concentration limit, no sensitisation testing having been carried out on the finished mixture. The practical consequence is that contact is to be prevented rather than merely limited. Once a worker is sensitised, reactions may be provoked by exposures well below those tolerated by others, and removal from exposure is usually necessary. See Sections 7, 8 and 11.
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Concentration limits on which this classification depends	Eye damage, 3 % w/w. The Eye Dam. 1 component is declared from 3 % w/w upward, so the limit is met throughout the range. Below 3 % w/w the mixture would classify Eye Irrit. 2 - H319 instead, replacing GHS05 and DANGER with GHS07 and WARNING. Chronic aquatic, 2.5 % w/w. The two Aquatic Chronic 1 components total below 2 % w/w. Should their combined content reach 2.5 % w/w the mixture would classify Aquatic Chronic 2 - H411, which adds the GHS09 pictogram and makes the product a marine pollutant shipped as UN 3082, Class 9, packing group III. The margin is roughly 0.5 % w/w. Skin irritation, 10 % w/w. The Skin Irrit. 2 component is below 5 % w/w against a 10 % additivity threshold.
2.3 Other hazards - high-pressure injection from grease equipment	This is the principal physical hazard associated with this product in service. A hand-operated grease gun readily develops several hundred bar at the nozzle, and powered, centralised and single-point equipment more. Grease escaping from a nozzle, coupler, hose or fitting at that pressure can penetrate intact skin and inject grease deep into the tissue, where it may cause local necrosis. The entry wound is typically no more than a pinprick and may be almost painless at first; pain and tissue damage characteristically appear some hours after the injection, by which time damage is advancing. Injuries to the fingers and hand are the common presentation, since the hand is used to steady the coupler. Never place any part of the body in front of a grease nozzle or over a coupler while pressure is applied, do not use a hand to check for a blocked or leaking fitting, and depressurise the equipment before clearing a blockage. Any suspected injection injury is a surgical emergency and the casualty is to be sent to hospital immediately - do not wait for symptoms to develop, and obtain medical attention even where there is no apparent wound. See Section 4.
Hot equipment and hot grease	This product is rated for continuous service to +160 °C with peaks to +180 °C, which means it is used on equipment substantially hotter than a conventional lithium soap grease would tolerate. Bearing housings, purge points and adjacent surfaces may be hot enough to cause immediate and severe thermal burns, and grease purged from a hot bearing will itself be hot. Stop and isolate the machine, and allow it to cool, before opening a bearing housing. Wear heat-resistant gloves and a face shield where hot product may be released.
Eye contact	The product causes serious eye damage. This is the most severe health hazard it presents and the reason for the DANGER signal word. Eye protection is a label requirement wherever the product is dispensed, purged or handled in a way that could splash. Immediate and prolonged irrigation is essential if contact occurs - see Section 4.
Skin effects	The product is a skin sensitiser: repeated contact may cause an allergic skin reaction, which may be delayed by 24 to 72 hours after exposure. Once a worker is sensitised, reactions may be provoked by very low exposures, and removal from exposure is usually necessary. Prolonged or repeated contact may also cause defatting of the skin, and grease held against the skin by contaminated clothing or a glove liner can clog the pores, resulting in oil acne or folliculitis.
Used and contaminated grease	In service the grease picks up wear metals, water and oxidation products, and in the steel, cement and mineral processing duties for which this product is intended it also picks up abrasive process contamination. Purged and waste grease should be handled with the same precautions as the fresh product and skin contact avoided.
Slip hazard	Grease dropped or purged onto a walking surface, or trodden from a greasing point onto a stair or ladder rung, produces a severe and persistent slip hazard which is not removed by sweeping. Clean up immediately with absorbent material and a degreasing agent.
Fire behaviour	Combustible; will burn if ignited. Not classified as a flammable solid. Grease absorbed into lagging, rags or absorbent material burns readily; dispose of contaminated rags and cleaning materials properly in order to prevent fires.
PBT / vPvB	PBT: not applicable. vPvB: not applicable. No ingredient is considered to meet the PBT or vPvB criteria at 0.1 % w/w or higher. One component has the potential to accumulate in organisms - see Section 12.

SECTION 3 - Composition / information on ingredients

Component	EC number	Approx. % w/w	GHS classification
Solvent-refined mineral base oil*	Proprietary	Balance	Not classified
Calcium sulphonate (overbased, thickener)	EC 271-529-4	5 - < 10	Skin Sens. 1B; H317
Calcium sulphonate	EC 932-231-6	3 - < 5	Eye Dam. 1; H318 Skin Irrit. 2; H315 Aquatic Chronic 3; H412
Calcium sulphonate	EC 263-093-9	1 - < 5	Skin Sens. 1B; H317
Calcium sulphonate	EC 274-263-7	1 - < 5	Skin Sens. 1B; H317
Phenolic antioxidant	EC 204-881-4	0.25 - < 1	Aquatic Acute 1; H400 (M = 1) Aquatic Chronic 1; H410 (M = 1)
Triaryl phosphate, alkylated	EC 700-990-0	0.25 - < 1	Aquatic Acute 1; H400 (M = 1) Aquatic Chronic 1; H410 (M = 1)

- Substance / mixture: Mixture. Chemical nature: a calcium sulphonate complex thickener system with additives in solvent-refined mineral oil.
- * The mineral base oil and petroleum distillates used are severely refined and contain less than 3 % (w/w) DMSO extract when measured by IP 346. On that basis no carcinogen classification applies to the base oil or to the mixture.
- The calcium sulphonate components are the thickener system, not additives. Their combined content is what gives the product its load-carrying capacity, water resistance and rust inhibition, and it is also the reason the mixture is classified for skin sensitisation - see the note in Section 2.
- The base oil makes up the balance of the formulation and is not classified as hazardous to health or the environment.
- Components shown as proprietary are identified by chemical family, their precise identifiers being withheld to protect confidentiality. Full identification is available to a physician or to a competent authority on request, and to a downstream user where required for the purposes of a workplace risk assessment.
- Concentrations are shown as ranges to protect confidentiality or to reflect batch-to-batch variation. Where a range straddles or begins at a classification cut-off, the classification in Section 2 has been assessed at the worst case within the range, and the cut-off is identified in the concentration limits in Section 2.
- There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

SECTION 4 - First aid measures

4.1 Description of first aid measures - General	Instantly remove any clothing soiled by the product. In the event of serious problems, call a doctor or summon medical assistance urgently. Show this safety data sheet to the medical personnel in attendance. When administering first aid, ensure that appropriate personal protective equipment is worn.
Eye contact	PRIORITY - the product causes serious eye damage. Flush the open eye immediately with plenty of water for at least 15 minutes, holding the eyelids apart. Remove contact lenses if present and easy to do, and continue rinsing; removal of contact lenses after an eye injury should otherwise only be undertaken by skilled personnel. Obtain medical attention immediately - call a poison centre or doctor. Continue irrigation while transport to medical care is arranged.
Skin contact	Remove contaminated clothing. Wipe off the bulk of the grease, then flush the skin and hair with running water and wash with soap. Do not use solvents, petrol or abrasive cleaners. If irritation or a rash occurs, obtain medical advice: the product is a skin sensitiser and further exposure should be prevented. Launder contaminated clothing before reuse and do not allow it out of the workplace. Hot product: cool the affected area immediately with cold running water for at least 15 minutes. Do not attempt to remove grease adhering to burned skin. Obtain medical attention for thermal burns. This product is used at bearing temperatures up to 160 °C, so burns may be severe. HIGH-PRESSURE INJECTION INJURY - where high-pressure equipment is in use, injection of product under the skin can occur. Send the casualty to hospital immediately. Do not wait for symptoms to develop, and obtain medical attention even in the absence of an apparent wound. State that this is a high-pressure injection injury. Keep the limb elevated and immobilised. Do not apply hot soaks. Take this safety data sheet to the hospital.

Inhalation	No treatment is necessary under normal conditions of use: the product is a semi-solid grease and does not generate vapour or mist at ambient temperature. If fumes, aerosols or combustion products have been inhaled, remove the person from the contaminated area to fresh air and consult a doctor in the event of symptoms.
Ingestion	Rinse the mouth thoroughly and give a glass of water. Do not induce vomiting. First aid is not generally required; if in doubt, contact a poison information centre or a doctor. Never give anything by mouth to an unconscious person.
4.2 Most important symptoms and effects, both acute and delayed	Eyes: risk of serious damage to the eyes. Pain, redness, watering and possible chemical burns on direct contact. Skin: allergic skin reaction (itching, redness, rash, eczema), which may be delayed by 24 to 72 hours after contact. Dryness or dermatitis after prolonged contact; oil acne or folliculitis where grease is held against the skin. Thermal burns from hot product. Injection injury: a small entry wound with little initial pain, followed by delayed onset of pain, swelling and tissue damage some hours after the injection. Local necrosis may result if the product is not surgically removed. Ingestion: no significant effects expected from incidental amounts.
4.3 Indication of any immediate medical attention and special treatment needed	Treat symptomatically. No specific antidote is required. Note to physician - eye exposure. The product is classified as causing serious eye damage. Persistent symptoms after adequate irrigation warrant ophthalmological assessment, including fluorescein staining and assessment for chemical burn. Note to physician - high-pressure injection. These injuries require prompt surgical intervention, and possibly steroid therapy, to minimise tissue damage and loss of function. Because entry wounds are small and do not reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anaesthetics and hot soaks should be avoided, since they can contribute to swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign material should be performed under general anaesthesia, and wide exploration is essential. Note to physician - sensitisation. A persistent or recurrent eczematous reaction in a worker handling this product warrants dermatological assessment and patch testing, with the calcium sulphonate components in mind. Full composition details are available from ENERGY SPRING PTE LTD on request.

SECTION 5 - Fire-fighting measures

5.1 Extinguishing media	Suitable: foam, dry chemical powder, carbon dioxide. Water spray or fog for large fires only. For larger fires use alcohol-resistant foam, or water spray with a suitable surfactant added. Unsuitable: water delivered as a full jet, which may spread burning material.
5.2 Special hazards arising from the substance or mixture	Combustible; will burn if ignited. Not classified as a flammable solid. Grease absorbed into lagging, rags or absorbent material burns readily. During a fire, gases hazardous to health may be formed. Thermal decomposition or combustion liberates carbon oxides and other toxic gases and vapours, together with a complex mixture of airborne solid and liquid particulates; oxides of sulphur and phosphorus and calcium compounds are to be expected from the thickener and additive system. Do not approach containers suspected to be hot. Containers exposed to fire may rupture.
5.3 Advice for fire-fighters	Alert the fire brigade and tell them the location and nature of the hazard. Wear self-contained breathing apparatus and full protective clothing. Cool fire-exposed containers with water spray from a protected location, and remove containers from the path of the fire if it is safe to do so. Move containers from the fire area if this can be done without risk. Prevent, by any means available, spillage and fire-fighting water from entering drains or water courses; collect contaminated fire-fighting water separately. Decontaminate equipment thoroughly after use.

SECTION 6 - Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures	Avoid contact with skin and eyes. Wear impervious gloves and safety goggles; the product causes serious eye damage. Beware of slippery surfaces and floors. Clear the area of non-essential personnel and, for a large spillage, move upwind. Control personal contact by using protective equipment. Beware of hot product near operating machinery. See Section 8.
6.2 Environmental precautions	Do not allow the product to enter drains, sewers, surface water or groundwater, and do not allow it to penetrate the ground. Use appropriate containment to prevent uncontrolled release; dike for later disposal. Prevent entry into waterways, sewers, basements and confined areas. Stop the flow of material if this can be done without risk. Advise the emergency services and the relevant authorities if contamination of drains or waterways occurs. Note that this product is denser than water (see Section 9). Unlike a mineral oil or a lithium soap grease it will not reliably float, so surface recovery methods may not be effective in a water release.
6.3 Methods and material for containment and cleaning up	Clean up all spills immediately. Trowel or scrape up the bulk of the material and place it in a clean, dry, sealed and labelled container for disposal. Absorb residues with a liquid-binding material such as sand, diatomite, sawdust or a proprietary inert absorbent. Finish with a degreasing agent to remove the slip hazard from the surface, and collect the washings for disposal rather than flushing them to drain. Recover product wherever possible. Dispose of the material collected according to regulations.
6.4 Reference to other sections	See Section 7 for safe handling, Section 8 for personal protective equipment and Section 13 for disposal.

SECTION 7 - Handling and storage

7.1 Precautions for safe handling	Limit all unnecessary personal contact. Avoid contact with skin and eyes. Wear protective clothing, impervious gloves and eye protection where risk of exposure occurs - the product causes serious eye damage and is a skin sensitiser. Use in a well-ventilated area. Do not eat, drink or smoke when handling. Always wash hands with soap and water after handling. Work clothes should be laundered separately and not allowed out of the workplace. Do not carry cleaning cloths impregnated with the product in trouser pockets. Grease equipment - never place any part of the body in front of a grease nozzle or over a coupler while pressure is applied. Do not use a hand to locate a blocked or leaking fitting. Depressurise the gun or lubrication line before clearing a blockage, changing a coupler or breaking a connection. Inspect hoses and couplers for damage before use and replace them on a planned basis. See Sections 2 and 4. Stop, isolate and lock out machinery, and allow it to cool, before opening a bearing housing or gearcase. This product is used at bearing temperatures up to 160 °C, so allow adequate cooling time. Where greasing points must be served with the machine running, use extended lines to bring the greasing point away from moving parts. Avoid contact with incompatible materials (see Section 10). Avoid physical damage to containers and keep them securely sealed when not in use. Use good occupational work practice.
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7.2 Conditions for safe storage, including any incompatibilities	Store in the original containers in a cool, dry, well-ventilated area. Keep containers securely sealed and clearly labelled, including the hazard statements and the EUH208 statement. No smoking, naked lights or ignition sources. Store away from incompatible materials and away from foodstuff containers; avoid contamination of water, foodstuffs, feed or seed. Protect containers against physical damage and check regularly for leaks. Keep out of the reach of children. Prevent any seepage into the ground. Suitable containers: metal can or drum, or packaging as recommended by the manufacturer. Storage class: combustible solids. Local regulations concerning the handling and storage of water-polluting products are to be followed. Grease may separate oil slowly in storage; a small amount of oil on the surface of the grease is normal and is stirred back in. Store drums and kegs upright and protected from water ingress. Container warning: empty containers retain product residue and can be hazardous. Do not cut, weld, braze, solder, drill, grind or expose such containers to heat, flame or sparks. Empty containers should be scraped out as far as practicable, properly closed and disposed of through an approved contractor.
7.3 Specific end use(s)	Lubrication of heavily loaded bearings in wet and hot service requiring an NLGI 2 calcium sulphonate complex grease. Operating temperature range -20 °C to +160 °C with peaks to +180 °C; base oil viscosity 460 mm²/s at 40 °C, which sets the speed and temperature range over which the grease is suitable (Section 9). Refer to the product technical data sheet for relubrication intervals. See Section 1 for grease compatibility.

SECTION 8 - Exposure controls / personal protection

8.1 Control parameters — occupational exposure limits

Component / parameter	Source	TWA (8 h)	STEL / Ceiling
Oil mist, mineral	Singapore PEL (WSH Regulations)	5 mg/m ³	10 mg/m ³ (STEL)
Oil mist, mineral (inhalable fraction)	ACGIH TLV	5 mg/m ³	-
Calcium sulphonate components (Section 3)	Singapore / ACGIH / EU	None established	None established
Phenolic antioxidant; triaryl phosphate	Singapore / ACGIH / EU	None established	None established

8.1 Control parameters - note	The base oil is a mineral oil, so the Singapore permissible exposure level for mineral oil mist applies wherever mist or aerosol may be generated. In practice, because of the product's semi-solid consistency, the generation of mists and dusts is unlikely to occur. No occupational exposure limit is established for the calcium sulphonate, phenolic antioxidant or triaryl phosphate components. Exposure to them should be minimised as far as reasonably practicable, as is appropriate for a sensitising and eye-damaging product. No biological limit value has been allocated. DNEL / PNEC: not determined for this mixture.
8.2 Exposure controls - general considerations	Consider the hazards of this material (Section 2), the job activities and other substances in the workplace when selecting personal protective equipment, and use the information in this data sheet as an input to a risk assessment of local circumstances. The user should read and understand all instructions and limitations supplied with any protective equipment. Because the mixture causes serious eye damage and is a skin sensitiser, the control strategy should be the elimination or minimisation of contact rather than reliance on personal protective equipment alone. A worker who has become sensitised may react at exposures well below those tolerated by others and will normally have to be removed from exposure altogether. Define procedures for the safe handling and maintenance of controls, and educate and train workers in the hazards and control measures relevant to normal activities with this product.

Engineering controls	Provide adequate ventilation, matched to conditions. Where applicable use process enclosures or local exhaust ventilation. Provide an eyewash unit and washing facilities with a suitable skin cleanser at every point where the product is dispensed, purged or handled - this is the practical consequence of the eye damage classification and is not optional. Where greasing points are difficult or hazardous to reach, fit extended lubrication lines or an automatic lubrication system rather than relying on access under guard. Insulate or guard hot surfaces.
Eye and face protection	Chemical goggles to EN 166 or national equivalent, as a minimum, wherever the product is handled in a way that could splash. Wear a face shield in addition where grease is dispensed under pressure, where a bearing is being purged, or where hot product may be released. Safety glasses with side shields alone are not adequate for a product classified as causing serious eye damage. Contact lenses may pose a special hazard; soft lenses may absorb and concentrate irritants. Where lenses are worn, a written policy should cover their use, removal and the first aid response, and first-aid personnel should be trained in removal.
Hand protection	Impervious gloves of nitrile butyl rubber (NBR), to EN ISO 374. Minimum breakthrough time 480 minutes; recommended material thickness 0.38 mm or greater. The exact breakthrough time is to be established with the glove manufacturer and observed. Avoid long-term and repeated skin contact. Gloves must only be worn on clean hands. Replace gloves immediately if damaged or contaminated internally - this is critical for a sensitising product, since a glove holding grease against the skin is worse than no glove. Use a skin protection cream for preventive skin care, and wash and dry the hands thoroughly after glove use. Use heat-resistant gloves when working on hot equipment, and impervious gloves when handling used grease.
Respiratory protection	Not relevant under normal conditions of use, given the physical form of the product. Use suitable respiratory protection if fume is generated from overheated or burning product, or for entry into a confined space containing degraded product. A dust or particulate filter (type P1 or better) is appropriate where airborne particulate may be generated.
Skin and body protection	Wear suitable protective clothing which prevents skin contact, and safety footwear. Overalls and a barrier cream are appropriate for routine greasing work. Change contaminated clothing promptly and launder it separately; grease held against the skin by clothing is a common cause of oil acne and folliculitis and, for this product, of sensitisation. Discard contaminated footwear that cannot be cleaned.
Hygiene measures	Always observe good personal hygiene. Wash hands with soap and water after handling the material and before eating, drinking or smoking, and at the end of work. Use a suitable skin cream after washing. Do not use solvents, petrol or abrasive cleaners to remove grease from the skin. Routinely wash work clothing and protective equipment to remove contaminants. Practise good housekeeping. Keep the product away from foodstuffs, beverages and feed.
Environmental exposure controls	Avoid release to the environment. Prevent discharge to drains, surface water, groundwater and soil. Local regulations concerning water-polluting products are to be followed. Keep absorbent and containment materials at greasing and dispensing points. See Sections 6, 12 and 13.

SECTION 9 - Physical and chemical properties

Physical state at 20 °C	Solid (semi-solid paste; grease)
Appearance / colour	Light brown
Odour	Characteristic; slight
Odour threshold	Not determined
pH	Not applicable (non-aqueous product)
NLGI consistency grade	2 (ASTM D217)
Worked penetration at 25 °C	265 to 295 units (0.1 mm), ASTM D217
Dropping point	>= 280 °C (ASTM D2265)
Base oil kinematic viscosity at 40 °C	460 mm ² /s (ASTM D445)

Operating temperature range	-20 °C to +160 °C continuous, with short peaks to +180 °C. The upper limit is set by the thickener.
Thickener / base oil	Calcium sulphonate complex soap thickener; solvent-refined mineral base oil
Product classification	DIN 51825 KP2P-20; ISO 6743-9 L-XBEIB 2
Melting / freezing point	Not applicable to a grease
Initial boiling point / range	Not determined; not relevant to classification
Flash point	> 220 °C (Cleveland open cup). Flash point is a property of the base oil and is not a measure of the maximum service temperature. Note that for this product the flash point is LOWER than the dropping point (≥ 280 °C), the reverse of the usual position for a soap-thickened grease. Neither figure is a service temperature; the service limit is +160 °C continuous.
Flammability	Not applicable; combustible, will burn if ignited
Upper / lower explosion limit	Not determined
Auto-ignition temperature	Not determined; not relevant to classification
Decomposition temperature	Not determined; see Sections 5 and 10
Explosive properties	Not determined; not relevant to classification
Oxidising properties	Not determined; not relevant to classification
Vapour pressure	Not determined; negligible
Vapour density (air = 1)	Not determined
Density	1.05 g/ml at 25 °C. Note that this is greater than the density of water. Unlike mineral oils and conventional soap greases, this product will not reliably float on water - a consequence of the overbased calcium carbonate in the thickener. This bears on spill response (Section 6) and on mobility (Section 12).
Solubility in water	Insoluble
Solubility in other solvents	Not determined
Partition coefficient n-octanol/water	Not applicable to a mixture
Evaporation rate	Not determined
Solids content	No added solid lubricant. The product contains no molybdenum disulphide, graphite or other solid lubricant; its load-carrying capacity derives from the soap structure.
Other information - DMSO extract (mineral oil only), IP 346	< 3 % w/w
9.2 Other information	The product repels fresh and sea water, holds its consistency and protects bearing surfaces against rust in continuously wet service, resists softening under heavy working and vibration, and shows low oil bleed in automatic lubricators. Refer to the product technical data sheet for performance test results.

SECTION 10 - Stability and reactivity

10.1 Reactivity	Stable under normal conditions of use. The product does not pose reactivity hazards beyond those set out below.
10.2 Chemical stability	Stable under normal conditions of storage, handling and use, and hazardous polymerisation will not occur. In service, oxidative degradation is accelerated by high bearing temperature, water contamination and catalytic wear metals; observe the relubrication interval. This product is designed for sustained service at elevated temperature and does not soften in the way a lithium soap grease does.
10.3 Possibility of hazardous reactions	No dangerous reactions known under normal conditions of storage and use.
10.4 Conditions to avoid	Extremes of temperature and direct sunlight. Prolonged exposure above the service temperature, which promotes oxidation, thermal degradation and oil separation. Sources of ignition. Contact with incompatible materials.

10.5 Incompatible materials	Strong oxidising substances. Strong acids. Strong bases. Note that the thickener is an overbased calcium carbonate structure and will react exothermically with strong acids. Greases of a different thickener type - not a chemical hazard, but the practical incompatibility which most often causes trouble with this class of product. This product is compatible with lithium and lithium complex soap greases; compatibility with polyurea and bentonite (clay) thickened products is to be confirmed before mixing. See Section 1.
10.6 Hazardous decomposition products	None under normal conditions of storage and use. Thermal decomposition or combustion may liberate carbon oxides and other toxic gases and vapours, together with oxides of sulphur and phosphorus and calcium compounds from the thickener and additive system. See Section 5.

SECTION 11 - Toxicological information

11.1 Basis for assessment	Information given is based on data on the components and on the toxicology of similar products, together with the calculated acute toxicity estimates for the mixture. Unless indicated otherwise, the data presented is representative of the product as a whole rather than for individual components.
Exposure routes	Eye and skin contact are the primary routes of exposure, although exposure may occur following accidental ingestion. Injection through the skin from pressurised grease equipment is a distinct and serious route of exposure - see Sections 2 and 4.
Acute toxicity	Based on available data, the classification criteria are not met. Calculated acute toxicity estimate, oral: 174,600 mg/kg. Calculated acute toxicity estimate, dermal: 110,000 mg/kg. Component data: Calcium sulphonate (EC 271-529-4): LD50 rat, oral > 16,000 mg/kg. Calcium sulphonate (EC 274-263-7): LD50 rat, oral > 5,000 mg/kg (OECD TG 401); LD50 rabbit, dermal > 5,000 mg/kg (OECD TG 402). Phenolic antioxidant: LD50 rat, oral > 2,930 mg/kg (OECD TG 401); LD50 rat, dermal > 5,000 mg/kg (OECD TG 402). Triaryl phosphate, alkylated: LD50 rat, oral > 5,001 mg/kg. Acute inhalation toxicity: not classified on available data.
Serious eye damage / eye irritation	CLASSIFIED: Serious eye damage Category 1 - H318, causes serious eye damage. The classification derives from the calcium sulphonate component declared second in Section 3, which is classified Eye Dam. 1; H318 and is present at 3 % w/w or above, at or above the 3 % generic concentration limit. Component testing by OECD TG 405 reports that it may cause burns; another of the calcium sulphonate grades was not irritant by the same method. Direct eye contact carries a risk of serious and potentially permanent damage. Immediate and prolonged irrigation followed by medical attention is essential - see Section 4.
Respiratory or skin sensitisation	CLASSIFIED: Skin sensitisation Category 1 - H317, may cause an allergic skin reaction. Three of the calcium sulphonate components are classified Skin Sens. 1B; H317 and are each present above the 1.0 % w/w generic concentration limit, the largest at up to 10 % w/w. The endpoint is assessed ingredient by ingredient; the additivity principle does not apply to it. Signs and symptoms may include itching, redness, rash and eczema, and may be delayed by 24 to 72 hours after exposure. Once a worker is sensitised, subsequent reactions may be provoked by very low exposures. Component data: testing of calcium sulphonate grades of this type by OECD TG 406 reports no sensitising effect for the substances individually. The classification of the mixture is derived from the component classifications by the generic concentration limit; no sensitisation testing has been carried out on the finished mixture. Respiratory sensitisation: criteria not met.

Skin corrosion / irritation	Based on available data, the classification criteria are not met. The calcium sulphonate carrying Skin Irrit. 2; H315 is present below 5 % w/w, against a 10 % w/w additivity threshold; component testing by OECD TG 404 reports it as slightly irritating, and another of the calcium sulphonate grades as not irritant. Prolonged or repeated skin contact without proper cleaning can nonetheless clog the pores of the skin, resulting in disorders such as oil acne or folliculitis.
Germ cell mutagenicity	Based on available data, the classification criteria are not met. Component testing by OECD TG 471 was negative.
Carcinogenicity	Based on available data, the classification criteria are not met. The mineral base oil and petroleum distillates are severely refined and contain less than 3 % DMSO extract by IP 346.
Reproductive toxicity	Based on available data, the classification criteria are not met.
STOT - single exposure	Based on available data, the classification criteria are not met.
STOT - repeated exposure	Based on available data, the classification criteria are not met.
Aspiration hazard	Based on available data, the classification criteria are not met. The product is a grease and is not capable of being aspirated in the sense of the criterion.
Notes to physician	Treat symptomatically. For eye exposure and for high-pressure injection injury, see the notes in Section 4.3.
Additional information - used grease	Used grease may contain harmful impurities that have accumulated during use, including wear metals, water, oxidation products and, in steel, cement and mineral processing duties, abrasive process contamination. The concentration of such impurities depends on the service and they may present risks to health and to the environment on disposal. All used grease should be handled with caution and skin contact avoided as far as possible.

SECTION 12 - Ecological information

12.1 Toxicity	CLASSIFIED: Aquatic Chronic 3 - H412, harmful to aquatic life with long lasting effects. The classification is derived by the summation method from the component data in Section 3; the arithmetic is set out in Section 2. Acute aquatic hazard: criteria not met. Ecotoxicological data have not been determined for the finished product. Component data: Calcium sulphonate (EC 932-231-6): LL50 fish, 96 h between 1 and 10 mg/l (OECD TG 203); LL50 Daphnia, 48 h 2.9 mg/l (OECD TG 202); EC50 algae, 96 h 29 mg/l. Calcium sulphonate (EC 271-529-4): LC50 fish, 96 h > 10,000 mg/l (OECD TG 203); EC50 Daphnia, 48 h > 100 mg/l (OECD TG 202). Calcium sulphonate (EC 274-263-7): LC50 fish, 96 h > 1,001 mg/l; EC50 Daphnia, 48 h > 1,001 mg/l; EC50 algae, 72 h > 1,000 mg/l. Phenolic antioxidant: EC50 Daphnia, 48 h 0.61 mg/l (OECD TG 202); NOEC Daphnia, 21 d > 0.39 mg/l. Triaryl phosphate, alkylated: LC50 fish, 96 h 0.8 mg/l; EC50 Daphnia, 48 h 0.202 mg/l; NOEC fish, 90 d 0.093 mg/l; NOEC Daphnia, 21 d 0.0399 mg/l. This is the most aquatically toxic component and, with the phenolic antioxidant, the driver of the chronic classification.
12.2 Persistence and degradability	Not determined for the mixture. Component data: one calcium sulphonate grade is readily biodegradable (OECD TG 301B) and the alkylated triaryl phosphate reaches 61 % in 28 days, also readily biodegradable; another calcium sulphonate grade reaches only 8.6 % in 28 days and is not easily biodegradable, and the phenolic antioxidant reaches 30 % (OECD TG 302C) and is not readily degradable. The product as a whole is not to be regarded as readily biodegradable.
12.3 Bioaccumulative potential	Not determined for the mixture. The phenolic antioxidant may accumulate in organisms. No ingredient meets the PBT or vPvB criteria.
12.4 Mobility in soil	Not determined for the mixture. Semi-solid under environmental conditions; low mobility in soil, and will adsorb to soil particles rather than migrate. Behaviour in water differs from that of an oil or a conventional soap grease: at 1.05 g/ml the product is denser than water and will not reliably float. See Sections 6 and 9.

12.5 Results of PBT and vPvB assessment	The product does not contain any substance fulfilling the PBT or vPvB criteria.
12.6 Endocrine disrupting properties	The mixture does not contain components identified as having endocrine disrupting properties at 0.1 % w/w or above.
12.7 Other adverse effects	Harmful to aquatic life with long lasting effects. Water hazard class WGK 2 (German regulations): significantly water-endangering. Do not allow the product to reach groundwater, a watercourse or the sewage system. No evidence of ozone-depleting properties was found in the current literature. The product is a mixture of non-volatile components which will not be released to air in significant quantities under normal conditions of use.

SECTION 13 - Disposal considerations

13.1 Waste treatment methods - product	Recycle wherever possible, or consult the manufacturer for recycling options. Do not discharge into the sewerage system, surface water or the natural environment, and do not dispose of with household waste. Discharge, treatment or disposal may be subject to national, state or local law. In Singapore, waste lubricant is a toxic industrial waste under the Environmental Public Health (Toxic Industrial Waste) Regulations and must be collected by a licensed toxic industrial waste collector. Because the product is classified for serious eye damage and skin sensitisation, waste should be assessed as hazardous waste unless the waste holder's own assessment shows otherwise. For supply into the EU: European waste catalogue code 12 01 12* - spent waxes and fats. The code is to be assigned by the waste holder according to the origin of the waste.
Contaminated packaging	Empty containers retain product residue and can be hazardous; their labelling, including the hazard statements and the EUH208 statement, must remain legible until the container is cleaned. Scrape out as far as practicable, close properly and dispose of through an approved collector or contractor, or recycle if possible. Do not cut, weld, drill or apply heat to empty containers (see Section 7).

SECTION 14 - Transport information

General	Not classified as a dangerous good for transport by any mode, and not a marine pollutant. An Aquatic Chronic 3 (H412) classification does not meet the criteria for UN 3082, environmentally hazardous substance, liquid, n.o.s., which requires Aquatic Acute 1 or Aquatic Chronic 1 or 2. See the concentration limits in Section 2, which identify the point at which this section would change. The description shown may not apply to all shipping situations. Consult the applicable dangerous goods regulations for additional description requirements and for mode-specific or quantity-specific shipping requirements.
14.1 UN number	Not applicable - not regulated (ADR, RID, ADN, IMDG, IATA, DOT)
14.2 UN proper shipping name	Not applicable - not regulated. Commercial description: lubricating grease.
14.3 Transport hazard class(es)	Not applicable - non-dangerous goods
14.4 Packing group	Not applicable - not regulated
14.5 Environmental hazards	Marine pollutant: No. Not classified as environmentally hazardous for land transport.
14.6 Special precautions for user	None applicable under the transport regulations. Keep separate from foodstuffs. Handle in accordance with Sections 6, 7 and 8.
14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code	Not applicable. The product is not carried in bulk as cargo.

SECTION 15 - Regulatory information

15.1 Safety, health and environmental regulations specific to the product	Singapore: - Classification and labelling in accordance with SS 586-2 and SS 586-3. The product is classified hazardous (Eye Dam. 1, H318; Skin Sens. 1, H317; Aquatic Chronic 3, H412) and must be supplied with a full GHS label bearing the GHS05 and GHS07 pictograms, the signal word DANGER, the hazard statements, the supplemental statement EUH208 and the precautionary statements listed in Section 2. Every endpoint has been assessed against the generic concentration limits and the summation and additivity rules of SS 586-2; no substance-specific concentration limit has been relied on. - Workplace Safety and Health Act and subsidiary regulations - the permissible exposure level for mineral oil mist applies (Section 8). Employers should include the serious eye damage and skin sensitisation classifications, the high-pressure injection risk from grease equipment and the elevated service temperature of this product in their risk assessment. - Environmental Public Health (Toxic Industrial Waste) Regulations: waste grease - see Section 13. - Fire Safety Act and Fire Safety (Petroleum and Flammable Materials) Regulations: not applicable.
Notes for supply into other territories	- European Union: REACH Regulation 1907/2006 and Regulation (EU) 2020/878 (safety data sheet format); CLP Regulation 1272/2008, including Annex VI Part 3 Note L for the base oils (DMSO extract < 3 %, IP 346). A Unique Formula Identifier and a poison centre notification under CLP Article 45 / Annex VIII are required for a classified mixture placed on the EU market. Regulation (EC) 2037/2000 (ozone-depleting substances): none contained. Regulation (EC) 850/2004 and Regulation (EU) 2019/1021 (persistent organic pollutants): none contained. Directive 2012/18/EU (Seveso III), Annex I: no named substances contained; an Aquatic Chronic 3 classification does not fall within hazard category E1 or E2. - German regulations: water hazard class WGK 2 (see Section 12). Local rules on the handling and storage of water-polluting products apply. - The regulatory information given is not intended to be comprehensive; other regulations may apply to this material in a particular territory of supply.
Chemical inventory status	Inventory status for the declared components is available from ENERGY SPRING PTE LTD on request for the territory of supply, including the European Union (REACH), the United States (TSCA), Australia (AIC), Canada, China, Japan, the Republic of Korea, New Zealand, the Philippines and Taiwan.
15.2 Chemical safety assessment	No chemical safety assessment has been carried out for this mixture.

SECTION 16 - Other information

Performance level	Meets or exceeds DIN 51825 KP2P-20 and ISO 6743-9 L-XBEIB 2. In the ISO designation the letters correspond to a lowest service temperature of -20 °C and a highest service temperature of +160 °C, which agrees with the operating range in Section 9. Refer to the product technical data sheet for the full specification and performance test results. Performance claims are commercial statements and form no part of the hazard classification.
Revision date	12 September 2026
Revision number	Rev. 0
Reason(s) for revision	First issue by Energy Spring Pte Ltd.
Reference(s)	Singapore Standard SS 586-2:2022 and SS 586-3:2022 (classification, labelling and safety data sheets for hazardous chemicals and dangerous goods). ASTM D217 (cone penetration of lubricating grease), ASTM D445 (kinematic viscosity), ASTM D2265 (dropping point), IP 346 (DMSO extract), DIN 51825 and ISO 6743-9 (designation and classification of lubricating greases), OECD Test Guidelines 202, 203, 301B, 302C, 401, 402, 404, 405, 406 and 471. Composition, component classification, toxicological and ecotoxicological data derive from the component suppliers' data. Physical and product data derive from the NS CALSU 2X technical data sheet, Version 1.0, September 2026. Classification of the mixture carried out by the generic cut-off, summation and additivity methods using substance data and the calculated acute toxicity estimates; no testing has been carried out on the finished mixture.

Recommended uses and restrictions on use	See Section 1.
Full text of hazard statements referred to in Sections 2 and 3	H315: Causes skin irritation. H317: May cause an allergic skin reaction. H318: Causes serious eye damage. H319: Causes serious eye irritation. H400: Very toxic to aquatic life. H410: Very toxic to aquatic life with long lasting effects. H411: Toxic to aquatic life with long lasting effects. H412: Harmful to aquatic life with long lasting effects. EUH208: Contains [name of sensitising substance]. May produce an allergic reaction.
Training	Suitable training on the safe handling and storage of this product should be given to employees on the basis of all the information in this safety data sheet, with particular attention to eye protection and the eye irrigation response, to the prevention of skin contact given the sensitisation classification, to the high-pressure injection risk from grease guns and centralised and single-point lubrication equipment, to the elevated service temperature and the risk of thermal burns, and to the prevention of release to drains and watercourses.
Abbreviations and acronyms	ACGIH - American Conference of Governmental Industrial Hygienists; ADN / ADR / RID - European agreements concerning the international carriage of dangerous goods by inland waterway, road and rail; Aquatic Acute / Chronic - hazardous to the aquatic environment, short-term / long-term; ASTM - American Society for Testing and Materials; ATE - acute toxicity estimate; CAS - Chemical Abstracts Service; CLP - Classification, Labelling and Packaging Regulation; DIN - Deutsches Institut fuer Normung; DMSO - dimethyl sulphoxide; DNEL - derived no-effect level; EC / EINECS - European Community number / European Inventory of Existing Commercial Chemical Substances; EC50 - median effective concentration; EP - extreme pressure; EUH - supplemental EU hazard statement; Eye Dam. / Eye Irrit. - serious eye damage / eye irritation; GHS - Globally Harmonized System; IATA - International Air Transport Association; IMDG - International Maritime Dangerous Goods; IP - Energy Institute test method; ISO - International Organisation for Standardisation; LC50 / LD50 / LL50 - lethal concentration / dose / loading 50 %; M-factor - multiplying factor for aquatic classification; MARPOL - International Convention for the Prevention of Pollution from Ships; NBR - nitrile butyl rubber; NLGI - National Lubricating Grease Institute; NOEC - no observed effect concentration; NSF H1 - registration for lubricants with incidental food contact; OECD TG - Organisation for Economic Co-operation and Development Test Guideline; PBT - persistent, bioaccumulative and toxic; PEL - permissible exposure level; PNEC - predicted no-effect concentration; REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals; Skin Irrit. / Skin Sens. - skin irritation / skin sensitisation; STEL - short-term exposure limit; STOT - specific target organ toxicity; TWA - time-weighted average; UFI - unique formula identifier; vPvB - very persistent and very bioaccumulative; WGK - Wassergefahrdungsklasse (German water hazard class); WSH - Workplace Safety and Health.
Note on the scope of this data sheet	This data sheet covers NS CALSU 2X only. It must not be used for any other consistency grade or any other product in the NS CALSU range. A different NLGI grade or base oil viscosity would require Section 9 to be replaced, and a different thickener or additive treat rate would require Section 2 to be recalculated.

This dossier supplements the technical notifications for use, but does not replace them. The information which it contains is based on our knowledge relating to the product in question on the date indicated.

The information is given in good faith. The user's attention is also drawn to the possible risks incurred if a product is employed for uses other than those for which it was designed.

This information dossier does not, under any circumstances, discharge the user from the obligation of being aware of, and of applying, all the texts which govern his sphere of activity. He shall be solely responsible for taking the precautions associated with the use which he makes of the product.

All the statutory provisions referred to are intended simply to assist the recipient in fulfilling the obligations incumbent upon him. This enumeration must not be considered to be exhaustive. The recipient must ensure that no other obligations are incumbent upon him, as a result of texts other than those cited, relating to the holding and handling of the product, for which he alone is responsible.

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