No better protection.

Cryogenic

ELLIOTTS

No better protection.

At Elliotts, we are passionate about taking great care in everything we do making sure you have the best protection. This shouldn't come as a surprise, after all, for more than 55 years, we have been in the business of manufacturing and supplying specialised personal protective clothing and equipment designed to protect users better than anything else.

Elliotts' quality Personal Protective Clothing (PPC) and Personal Protective Equipment (PPE) are proven on the job every day in metal, petrochemical, mining, emergency services, construction and fabrication industries among others. These reliable and popular products are part of a comprehensive range that has evolved over time and is based on the common foundation of ensuring our customers have the best protection available when at work.

Confidence with Cryogenic Protection

Our new generation of CryoSkin® products is based on our 15 years experience in designing and manufacturing specialised gloves and aprons for handling extreme cold cryogenic materials. These products feature the latest material technologies and are designed to offer high levels of performance whilst also providing dexterity and comfort.

Testing to International Standards

Elliotts are committed to providing the best protective solutions that meet and exceed international industry standards. We have invested in testing our CryoSkin® gloves by an independent third-party test house to ensure our products are manufactured to Australian and International standards.

Protection is at the core of what we stand for and we want to make sure you're always protected as well as you can possibly be, especially when at work.

Hazards of Cryogenic Liquids

Cryogenic liquids are typically odourless and colourless when vaporised into their gaseous state. Most of these liquids are also colourless in their liquid form, except for liquid oxygen, which has a distinctive light blue hue. Despite their lack of inherent colour or odour, cryogenic liquids and their vapours have a built-in warning property: the cold boil-off gases condense moisture in the air, creating a highly visible fog. These substances have boiling points below -180°C and are typically used at atmospheric pressure, which means they are constantly boiling during use.

Due to their extremely low temperatures, cryogenic liquids and their boil-off vapours can cause rapid freezing of human tissue, often resulting in frostbite. Even brief contact can cause tissue damage similar to thermal burns, while prolonged exposure may lead to more severe injuries, including blood clots.

Extreme Cold

Contact with uninsulated containers or materials cooled by cryogenic liquids poses additional risks. The extremely cold surfaces can cause skin to stick to the material, resulting in severe tearing injuries when attempting to pull away. This risk extends to non-metallic materials, as they too can become dangerous at low temperatures. At cryogenic temperatures, materials that are soft and pliable at room temperature become hard and brittle, increasing the likelihood of breakage. Furthermore, exposure to cold vapours can rapidly freeze eye fluids, potentially causing permanent eye damage even with brief exposure.

Boiling and Splashing

Cryogenic liquids can boil or splash violently when introduced to a warm container or when warm objects are immersed in the liquid. To minimise these risks, always perform these operations slowly and with care.

Pressure Build Up and Explosions

Cryogenic liquids exhibit significant volume expansion as they transition to their gaseous state. For instance, one volume of liquid nitrogen will expand to approximately 700 volumes of nitrogen gas when warmed to room temperature at one atmosphere. This large expansion can cause rapid pressure increases.

Additionally, cryogens can condense enough moisture from the air to block openings in storage vessels, creating a dangerous build-up of trapped vapour. This pressure build-up can lead to explosions if not properly managed. Therefore, it is essential to store cryogenic liquids in insulated dewars equipped with pressure relief valves to ensure safety.

Safety Considerations

Anyone handling cryogenic liquids should be trained and thoroughly familiar with the properties and safety considerations before handling a cryogenic liquid and its associated equipment.

Eye, hand, and body protection must be worn to prevent contact with liquid cryogens. A risk assessment should be performed on each cryogenic operation to determine the specific Personal Protective Equipment (PPE) required. The following are the minimum PPE requirements for cryogenic operations.

Eyes/Face

A full face shield over safety glasses with side shields or chemical splash goggles are recommended during transfer and handling of cryogenic liquids to minimize injuries associated with splash or explosion.

Hands

When handling cryogenic liquids and working on piping systems with exposed components at cryogenic temperatures, wear loose-fitting gloves, made specifically for cryogenic work. These gloves should be worn to ensure that hands are protected from liquid splashes and that skin will not freeze to cold pipes or metal parts.

A special note on insulated gloves: Gloves will only provide short-term protection from accidental contact with the liquid. No gloves designed to protect against cryogenic liquids should be purposefully immersed in cryogenic liquids.

Feet

Wear closed-toe shoes that cover the top of the foot or boots with trouser legs extended over the top of the boot.

Body

Wear long-sleeved clothing made of non-absorbent material, cuff-less long trousers worn outside boots or overshoes, and an apron made specifically for cryogenic work when handling large quantities of cryogens.

Ears

Ear plugs or earmuffs may be required where excessive noise levels occur near filling and venting operations.

Note: Additional PPE may be required such as breathing protection. A full risk assessment should be conducted to ensure the appropriate PPE is selected.

CryoSkin® Standard – EN511

Testing and Certifications for CryoSkin® gloves

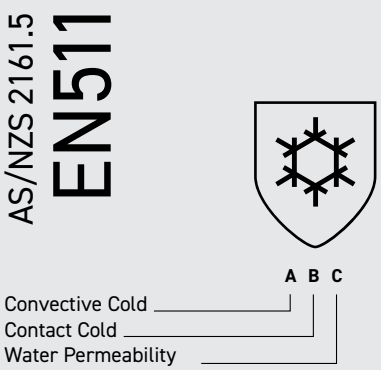
Elliotts' CryoSkin® gloves have been independently tested and are certified by BSI to the following Australian and International Standards.

Australian Standard

AS/NZS 2161.5:1998
Occupational protective gloves
Protection against cold

International Standard

EN 511: 2006
Protective gloves against cold



Protection Against Cold – Performance Levels

Level of Protection	1	2	3	4
A – Convective cold – thermal insulation (ITR)	≤0.10	≤0.15	≤0.22	≤0.30
B – Contact cold – thermal insulation (R)	≤0.025	≤0.05	≤0.10	≤0.15
Level of Protection		**P**		
C – Water permeability		Pass (after 30 minutes)		

EN511 specifics the minimum requirements and test method for gloves that protect against convection cold (in the air) and contact cold (direct touch).

This standard is expressed by a pictogram followed by a series of three performance levels related to the 3 specific protective qualities.

Test methods for the performance levels for safety gloves against cold:

Resistance to convective cold (Levels 1-4):

This ten-minute test involves the glove being placed on an electrically heated mannequin hand set between 30°C and 35°C. The chamber is then cooled down to 20°C below that of the heated hand and constant air flow is applied. The performance level is based on the amount of electrical power required to maintain this constant temperature. (thermal insulation) The more power required, the lower the insulative properties.

Resistance to contact cold (Levels 1–4):

The contact cold resistance test involves placing the test sample, between a hot (maintained at a temperature between 31 - 35°C) and a cold metal plate. The sample is left for 30 minutes, after which the thermal resistance is calculated by determining the difference in temperature between the inner and outer surface of the glove sample. This test measures the thermal resistance of a glove, temperate is not calculated.

Water Proof/ Permeability by water (Levels 0-1):

This test is simply a pass or fail. If the glove cannot withstand water permeating its fabric after 5 minutes of exposure it will fail. The previous version of this standard did submerge the test glove for 30 minutes, but the 2006 revision lowered the time required.

All gloves that achieve this standard must also achieve level 1 of the EN 388 abrasion test.

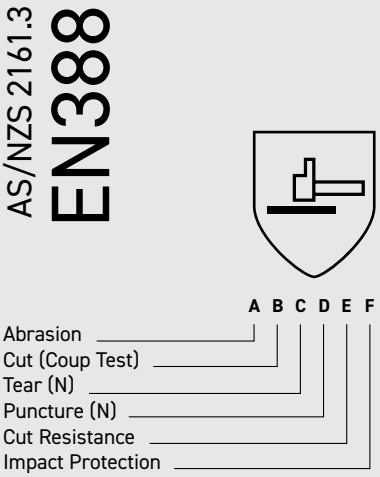
CryoSkin® Standard – EN388

Australian Standard

AS/NZS 2161.3:2020
Occupational protective gloves
Protection against mechanical risks

International Standard

EN 388: 2016 +A1:2018
Protective gloves against mechanical risks



Mechanical Hazards – Performance Levels

Performance Level	1	2	3	4	5
A – Abrasion Resistance (cycles)	100	500	2000	8000	-
B – Blade Cut Resistance (index)	1.2	2.5	5.0	10.0	20.0
C – Tear Resistance (newtons)	10	25	50	75	-
D – Puncture Resistance (newtons)	20	60	100	150	-

Performance Level	A	B	C	D	E	F
E – ISO13997 Cut Resistance (newtons)	2	5	10	15	22	30
F – Impact Protection	PASS (P) or FAIL (no marking)					

Information regarding protection refers to the working surface, i.e. the palm of the glove which has been submitted for testing. The overall classification for gloves with two or more non-interconnected layers does not necessarily reflect the performance of the outermost layer. The protection levels indicated are only valid for new gloves. Gloves which have not been tested under the Blade Cut test (b) will have a letter 'X' shown to indicate not tested or not applicable and only results from the ISO13997 cut test (3) will be displayed as shown on the glove markings. **WARNING: Impact protection tested on knuckle area only and does not apply to the finger.**

EN388 specifies the minimum requirements and test method for gloves that protect against mechanical risks when carrying out work.

This standard is expressed by a pictogram followed by a series of six performance levels related to the 6 specific tests conducted as part of this standard.

Test methods for protection against mechanical risks are as follows:

Abrasion Resistance (Levels 1-4):

A test sample is placed under 9kPa of pressure. Using 180 grit sandpaper, the fabric is then abraded. The resistance to abrasion is measured by the number of rubs required for a breakthrough to occur.

Cut resistance, coup test (Levels 1-5):

A counter-rotating circular blade, under 5 Newtons of force, moves back and forth to create cuts in the test fabric. If the material dulls the blade, this test is considered failed and the TDM cut test is completed. Comparison with a cotton control material serves as a benchmark. An equation results in the index number reported.

Tear resistance (Levels 1-4):

The tear resistance test is measured in Newtons with a tensile strength machine. A pre-cut test sample is fitted into the jaws of the machine, which move apart at a constant rate of speed until the sample is torn completely apart.

Puncture resistance (Levels 1-4):

A 4.5mm steel stylus moves at a constant rate into a test sample until a hole is products. The force, in Newtons, needed to break through the material is then reported.

Cut resistance, TDM test (Levels A-F):

A test sample is placed on a mounting area and a minimum of 3 cuts are made per sample. With each cut, more force is applied until a 50mm cut is made in the material. With each cut, a new blade is used to maintain sharpness. The recorded cuts are then used to calculate the cutting force required to produce a 20mm cut-through. This is the rate of force reported.

Impact test:

The glove is struck with 2.5kg at an impact energy of 5jouls. The transmitted force should be equal to or less than 9kN for a single hit and average 7kN to pass. If this is not achieved, the glove fails this test and given an 'X'.

User Information for CryoSkin® Gloves

IMPORTANT: These gloves have been specifically designed for use when handling liquid gas where there is no risk of ignition. The user should not be exposed to low temperatures for extended periods of time. No gloves designed to protect against cryogenic liquids should be purposefully immersed in cryogenic liquids. Gloves may lose their insulative properties when wet inside so always place dry hands inside the gloves.

These gloves have been designed to protect the hands in the working environment in accordance with EN388:2016, EN21420:2020 and EN511:2006. When selecting a glove based on risk analysis it should be understood that the protection is limited to the risk level and standards mentioned above.

Precautions for use

1. It is recommended to check that the gloves are suitable for the intended use, because the conditions of use in the workplace may differ from the tests performed in the laboratory.
2. New and used gloves should be thoroughly inspected before use. Avoid using heavily soiled, damaged or worn gloves.
3. Put the gloves on dry, clean hands.
4. Ensure the insides of the gloves are dry before putting them on again.
5. These gloves have a high resistance to tearing and should not be used if likely to be caught in moving machinery.

Care Instructions

Cleaning

Washing is not recommended. Do not wring. Do not tumble dry. Do not use bleach. Gloves may be rinsed in water and allowed to drip dry in ambient temperatures. Reshape whilst still damp.

Storage

1. Store gloves in their original packaging, in a dry and cool place.
2. Keep away from direct sunlight, heat and flame.

Glove Materials

Glove Outer Materials

Polyester with PU Coating: Polyester with a polyurethane (PU) coating ensures that the glove can effectively shield the hands from the hazards of extreme cold, providing a reliable barrier against the potential risks associated with handling liquid nitrogen. A polyester with PU coating not only offers thermal insulation but also contributes to the overall durability and longevity of the gloves.

Thermal Liner Materials

3M™ Thinsulate™: 3M™ Thinsulate™ is designed using hydrophobic fibres to provide superior insulated water resistance, whilst keeping the user warm and comfortable. Made from 100% polyester, it is designed to retain warmth and dryness without adding extra weight

Moisture Barrier

Porelle® ePTFE: The Porelle® ePTFE moisture barrier is a microporous PU that is able to provide high levels of protection whilst remaining extremely soft and flexible, not limiting the dexterity or tactility of the glove. This means that the glove is both waterproof and breathable.

Cut Resistant Palm (Industrial glove only)

Knitted Woven Aramid: The knitted woven aramid ensures that the glove not only protects against extreme cold but also minimises the risk of cuts and abrasions, offering comprehensive hand safety in environments where both sharp objects and cryogenic substances pose potential hazards.

CryoSkin®
Cryogenic Protection

Elliotts' CryoSkin® gloves and aprons are essential accessories for those working in extremely cold environments and have been specifically developed for handling extremely cold objects and cryogenic liquids.

They have been designed to provide protection when working with liquid nitrogen and other cryogenic hazards such as handling cryogenic valves, supply cylinders, and hoses, compressed gas filling, and delivery, liquid nitrogen environments, cold rooms, dry ice handling, ultra-low and blast/cryo freezers.

CryoSkin® gloves and aprons are made from a combination of technical, state-of-the-art materials. The unique multilayer construction maximises thermal protection, without compromising dexterity and comfort. The durable waterproof outer shell protects from cryogenic splashes, the Porelle® moisture barrier in the gloves provides an additional liquid barrier and the 3M™ Thinsulate™ Insulation provides thermal protection. 3M™ Thinsulate™ Insulation is warm yet lightweight and powerful yet thin. It helps trap body heat while allowing moisture to escape.

CryoSkin® Range

CryoSkin® Gloves and Aprons are available in two ranges, Scientific and Industrial.

CryoSkin® Scientific

The CryoSkin® Scientific range provides protection when working with cryogenic liquids, such as liquid nitrogen, in scientific applications.

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CryoSkin® Industrial

The CryoSkin® Industrial range provides protection when working with cryogenic liquids, such as liquid nitrogen, in industrial applications.

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CryoSkin® Scientific Gloves & Apron

CRYOSKIN SCIENTIFIC
PROTECTION FROM EXTREME COLD

Applications

CryoSkin® gloves and aprons are ideal for bio-medical, food preparation, laboratories, liquid nitrogen handling and pharmaceutical applications.

- Bio-medical and clinical labs
- Laboratories
- Pharmaceutical
- Frozen food preparation
- Cryogenic liquid and gas producers
- Liquid nitrogen handling
- Anywhere cryogenic liquids are handled.

CryoSkin® Scientific Gloves

CryoSkin® gloves have been designed to provide protection when working with cryogenic liquids, such as liquid nitrogen and other cryogenic hazards. Backed by in-house testing.

CryoSkin® Scientific gloves are made from a combination of technical, state-of-the-art materials. The unique multilayer construction maximises thermal protection without compromising dexterity and comfort.

Features

- Provides splash and short-term exposure protection against cryogenic liquids
- Cryogenic protection for ultra-cold applications down to -196°C. Backed by in-house testing – video available on request
- Waterproof, breathable durable polyester outer shell material with a waterproof breathable Porelle® moisture barrier
- 3M™ Thinsulate™ thermal liner
- Excellent liquid nitrogen protection
- Hanging loop for easy storage

Available in

- 2 Lengths: 420mm Elbow Length and 650mm Shoulder Length
- Various Sizes: SML, MED, LRG, XLG, 2XL

Materials

- Outer: Polyester with PU coating
- Moisture Barrier: Porelle® ePTFE waterproof and breathable membrane
- Thermal Liner: 3M™ Thinsulate™

Testing and Certification

CryoSkin® Scientific gloves have been independently tested and are certified by BSI to the following Australian and International Standards

Part Number – 420mm	Part Number – 650mm	Size
CSGSGL42SML	CSGSGL65SML	SML
CSGSGL42MED	CSGSGL65MED	MED
CSGSGL42LRG	CSGSGL65LRG	LRG
CSGSGL42XLG	CSGSGL65XLG	XLG
CSGSGL422XL	CSGSGL652XL	2XL

Note: No gloves, including the Elliotts' CryoSkin® gloves are recommended for immersion in liquid nitrogen.

EN388 1343

EN511 241

Dexterity 2

PRODUCT CERTIFICATION

BSI Certified Product
AS/NZS 2161.3:2020
BMP No 778187

CryoSkin® Scientific Apron

The CryoSkin® Scientific apron has been designed to provide protection to the torso and upper legs from splashes and contact cold when working with cryogenic liquids such as liquid nitrogen and other cryogenic hazards.

The CryoSkin® Scientific apron is made from a combination of technical, state-of-the-art materials. The unique multilayer construction maximises thermal protection without compromising dexterity and comfort.

Features

- Waterproof, breathable durable polyester outer shell material with 3M™ Thinsulate™ thermal liner
- Excellent cryogenic liquid splash protection
- Excellent contact cold protection
- Adjustable neck and waist straps to ensure a snug fit
- Quick release buckles at the neck and waist for fast fitting and removal

Materials

- Outer: Polyester with PU coating
- Thermal Liner: 3M™ Thinsulate™
- Liner: Cotton/Polyester

Part Number	Dimensions
CSASCI42	1050mm x 600mm

Did you know that cryogenic gloves can only provide protection against liquid nitrogen splashes. No gloves, including CryoSkin® range, are recommended for immersion in liquid nitrogen.

CryoSkin® Industrial Gloves & Apron

Applications

CryoSkin® gloves and aprons are ideal for liquid nitrogen handling, servicing of cryogenic systems, handling of LNG, working at LNG facilities, and in oil and gas.

- Cryogenic liquid handling
- Maintenance of cryogenic systems
- LNG refueling, servicing and transportation
- Mining, oil and gas
- Petrochemical
- Industrial
- Anywhere cryogenic liquids are handled.

CryoSkin® Industrial Gloves

The CryoSkin® Industrial gloves have been designed to provide splash and short-term protection when working with cryogenic liquids, such as liquid nitrogen and other cryogenic hazards. Our in-house testing proves it.

With an all-new woven knitted aramid palm, the high abrasion resistance and TDM cut level C protection safeguards workers against rough surfaces.

Features

- Provides splash and short-term exposure protection against cryogenic liquids
- Cryogenic protection for ultra-cold applications down to -196°C. Backed by in-house testing – video available on request
- Good grip and dexterity
- TDM cut level C protection
- Excellent liquid nitrogen and LNG protection
- Waterproof, breathable outer shell material with Porelle® moisture barrier
- 3M™ Thinsulate™ Thermal Liner provides moisture wicking and comfort over extended periods
- High abrasion resistant palm safeguards against rough surfaces
- Sizes: MED, LRG, XLG, 2XL.

Materials

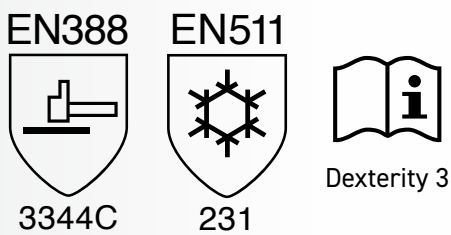
- Outer: Polyester with PU coating
- Palm: Cut Resistant Woven Knitted Aramid
- Moisture Barrier: Porelle® ePTFE waterproof and breathable membrane
- Thermal Liner: 3M™ Thinsulate™

Testing and Certification

CryoSkin® Industrial gloves have been independently tested and are certified by BSI to the following Australian and International Standards

Part Number	Size
CSGIND36MED	MED
CSGIND36LRG	LRG
CSGIND36XLG	XLG
CSGIND362XL	2XL

Note: No gloves, including the Elliotts' CryoSkin® gloves are recommended for immersion in liquid nitrogen.



PRODUCT CERTIFICATION

BSI Certified Product
AS/NZS 2161.3:2020
BMP No 778187

CryoSkin® Industrial Apron

The CryoSkin® apron has been designed to provide protection to the torso and upper legs from splashes and contact cold when working with cryogenic liquids such as liquid nitrogen and other cryogenic hazards.

The CryoSkin® Industrial apron is made from a combination of technical, state-of-the-art materials. The unique multilayer construction maximises thermal protection without compromising dexterity and comfort.

Features

- Waterproof, breathable durable polyester outer shell material with 3M™ Thinsulate™ thermal liner
- Excellent cryogenic liquid splash protection
- Excellent contact cold protection
- Adjustable neck and waist straps to ensure a snug fit
- Quick release buckles at the neck and waist for fast fitting and removal

Materials

- Outer: Polyester with PU coating
- Thermal Liner: 3M™ Thinsulate™
- Liner: Cotton/Polyester

Part Number	Dimensions
CSAIND42	1050mm x 600mm

No better protection.

ELLIOTTS

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