



Marine Glass Solutions

Complete certified glass solutions designed for your application

www.glasshape.com

Complete Marine Glass Solutions

When it comes to glass, **Glasshape®** understand that quality, performance, durability and safety standards are paramount to designers, builders and owners of superyachts, luxury launches and working boats.

Combining 30 years of industry knowledge and technical capability **Glasshape** has developed unique proprietary manufacturing processes addressing the specific needs of the marine sector to provide premium turnkey glass solutions.

At **Glasshape**, we take a customised approach. We work with clients to confirm their needs and establish the appropriate glass solutions. Our complete turnkey service includes consultation, digital measurement, CAD design, certification, manufacturing and installation. We also audit existing vessels for refit purposes. With the **Glasshape** tailored turnkey approach, clients are assured their glass solutions are effortlessly fulfilled.

**“Providing a Client
centric turnkey
approach, ensures
worry free
results.”**



Overview

Glasshape offer a comprehensive portfolio of fully certified marine glass for a wide range of applications. The range includes laminated or monolithic marine glass for external use, toughened (tempered) glass for interior and exterior applications, security laminates, digitally printed ceramic ink and other decorative glass solutions. These can all be supplied as flat, and many can include simple or complex curves.

We are proud to offer a toughened (tempered) AND laminated solution that can also be curved to your specifications.

Our digital site measure service utilises the latest scanning hardware to produce electronic templates with unmatched accuracy, doing away with the need for physical templates that are cumbersome and time consuming to use.

Our range is marine certified where applicable, backed by comprehensive warranties and validated by international accreditation with proven performance in builds from the world over.

Flagship Marine Glass Projects:



"Athena" - Refit Project



"Bigfish" - McMullen & Wing - Aquos Yachts



"Hull 037" - Christensen



"Invictus" - Delta



"Netto" - Nordlund



"HMNZS Wellington" - NZ Navy



"Ohana" - Fitzroy



"77EB" - Riviera



"Khalilah" - Palmer Johnson



Quality
ISO 9001



Contents:

Exterior 05

(Windows, Windscreens, Portholes, Deadlites, Windbreaks, Balustrades)

- Superior Laminating Technology - Marine Glass
- Thermal Resistant Glass
- Heated Glass
- Security
 - Intruder Resistant Glass
 - Bullet Resistant Glass

Interior 17

(Doors, Balustrades, Floors, LiftShafts, Bathrooms, Partitioning, Cabinetry)

- Toughened (tempered) Glass

Enhanced Glass 19

- **VisionInk®** – Digitally Printed Ceramic Ink
- Switchable Privacy Glass
- LED Glass

Technical Details 26

- Digital Site Measure and CAD services
- Capabilities
 - Dimensions & Capabilities
 - Compound Shapes, Uneven Radii, Tangents
 - Oversize Capabilities



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Superior Laminating Technology

Specifically designed to meet the rigorous demands of exterior marine applications, the **DuraShield Marine**® portfolio is fully certified and is set apart from the competition by its high-performance interlayer. The laminate technology overcomes delamination typically displayed in marine windows and windshields, while delivering exceptional strength and clarity.

Whether monolithic, laminated or multi-laminated, each pane is engineered to meet Class and Rule requirements. With more than a decade of proven capabilities in flagship builds with yards the world over, **DuraShield Marine** has an international reputation for quality, performance, durability and safety, making it perfect for new build and refit projects alike.

Certification and Compliance

All **DuraShield Marine** is manufactured to ISO 21005:2012 and is tested to ISO614:2012 standards. The product also complies with MCA LY2, LY3, and BSMA25 and Class requirements. **DuraShield Marine** is endorsed on builds classed to Lloyds Register, DNV-GL, ABS, RINA, BV, and many world-renowned Flag States.

Turnkey Marine Glass Solution

With a portfolio of products that cover both exterior and interior applications, a design team with digital site measure capabilities (page 27), our years of specific marine experience and installation teams that can be deployed anywhere in the world, **Glasshape** can proudly offer a genuine turnkey solution. For refit projects we are also able to offer an audit service where we can identify specific glass elements that need to be addressed.

Features & Benefits:

- Overcomes delamination typically displayed in marine windows and windshields
- Retains clarity and high levels of light transmission
- Eliminate the need for storm covers
- Customised solutions curved to your specifications
- Tinted, low-iron & non-reflective glass types available
- Numerous thicknesses, flat, 2D and 3D curves
- Combine with **VisionInk** (see page 19)
- Configured to meet IACS requirements



"Bigfish" McMullen & Wing - Aquos Yachts



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6.6 by 2.2 metres

**Largest windows installed on a
SuperYacht in the United States**

**KHALILAH,
Palmer Johnson**



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Solar Heat Gain Control

Ezone™ Marine is a technologically advanced glazing solution to help moderate inbound solar heat gain. Perfect for pilot houses or any area on a vessel that experiences excessive exposure to the sun. It is a quality alternative to double glazed units potentially contributing to significant weight, and on-going fuel savings.

A pyrolytic process embeds invisible heat-reflective materials to the glass, allowing light to enter, but reflecting much of the inbound heat. It is possible to configure **Ezone Marine** to maximize heat retention for vessels in cooler climates.

Specifying **Ezone Marine** with **DuraShield Marine** delivers all the benefits of exceptional thermal performance and the ultimate in strength and clarity. It can be supplied in laminated form that may eliminate the need for storm covers, or monolithic toughened (tempered) form which may require storm covers.

Features & Benefits:

- Decreased solar heat gain, cooler working conditions and improved comfort
- High levels of visual light transmission
- Potential to reduce HVAC requirements,
- Alternative to Double Glazed Units (due to dramatic reduction in impact of structural flex on window performance)
- Reduced overall weight with likely positive effect on fuel consumption
- Customised solutions curved to your specifications
- Various low-iron & non-reflective glass types available
- Numerous thicknesses, flat, 2D and 3D curves
- Combine with **VisionInk** (see page 19)
- Configured to meet IACS requirements



"Bigfish" McMullen & Wing - Aquos Yachts



Quality
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ABS



D'NATALIN IV

Fog & Frost Control

DuraShield Heat-R™ is a wire-free glazing solution for windows susceptible to fogging or freezing over. The technology features a metallic coating between the interlayer and glass that conducts power evenly to gently warm the window with absolutely no obstruction to visibility from wires, making it ideal for pilothouses.

Incorporating **DuraShield Heat-R** with **DuraShield Marine** and the benefits the high performance interlayer provides delivers exceptional visibility as well as the ultimate in strength and clarity in extreme (freezing) climates.

DuraShield Heat-R windows are custom built and manufactured to internationally recognised standards. Heating power can be adjusted to the conditions of the moment as required.

Features & Benefits:

- Prevention of fogging or freezing
- No visible wires
- Eliminate need for warm-air blowers
- Heating power is adjusted depending on operating conditions
- Supplied in both flat and curved forms
- Customised solutions curved to your specifications
- Can be produced as a laminated safety glass
- Can be designed to eliminate the need for storm covers
- Can be configured to meet IACS requirements



"HMNZS Wellington" - NZ Navy



Quality
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Intruder Resistant Glass

ArmourShield® is a polycomposite-glass laminate that maintains the appearance of normal glass while offering significant protection from deliberate, sustained attack. Attack weapons simply bounce off the window. In the event the window glass surface is compromised, the tough inner-core of the polycomposite remains un-penetrated protecting individuals and property inside.

ArmourShield protects the critical operational areas of a vessel such as the engine room or pilothouse, and can be installed to offer guest and crew protection in other areas by slowing down and restricting intruder entry.

ArmourShield comes in a number of thicknesses geared to provide a variety of security levels, resulting in protection from physical attack from five to thirty minutes (as detailed under AS3555.1 level 2). It must be installed in an approved framing system.

Features & Benefits:

- Superior attack resistance compared to standard laminated glass
- Elastic properties mean weapons 'bounce' off the glass surface
- Customised Certified Intruder Resistant Glass tailored for your individual project
- Lightweight vs. glass-only products of similar thickness & attack resistance
- Can be incorporated with tinted glass
- Enhanced design options available by combining **SwitchShield** or **VisionInk**
- Tested and Certified to meet AS 3555.1 Level 2
- Can be configured to meet IACS requirements
- Marine certified where applicable



"Lady-M" Palmer Johnson

Intruder Resistant Glass



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Bullet Resistant Glass

AmmoShield® bullet resistant glass encapsulates exceedingly high velocity projectiles without allowing penetration through the panel, making it ideal for use in areas of high risk or where the threat of fire-arms is prevalent.

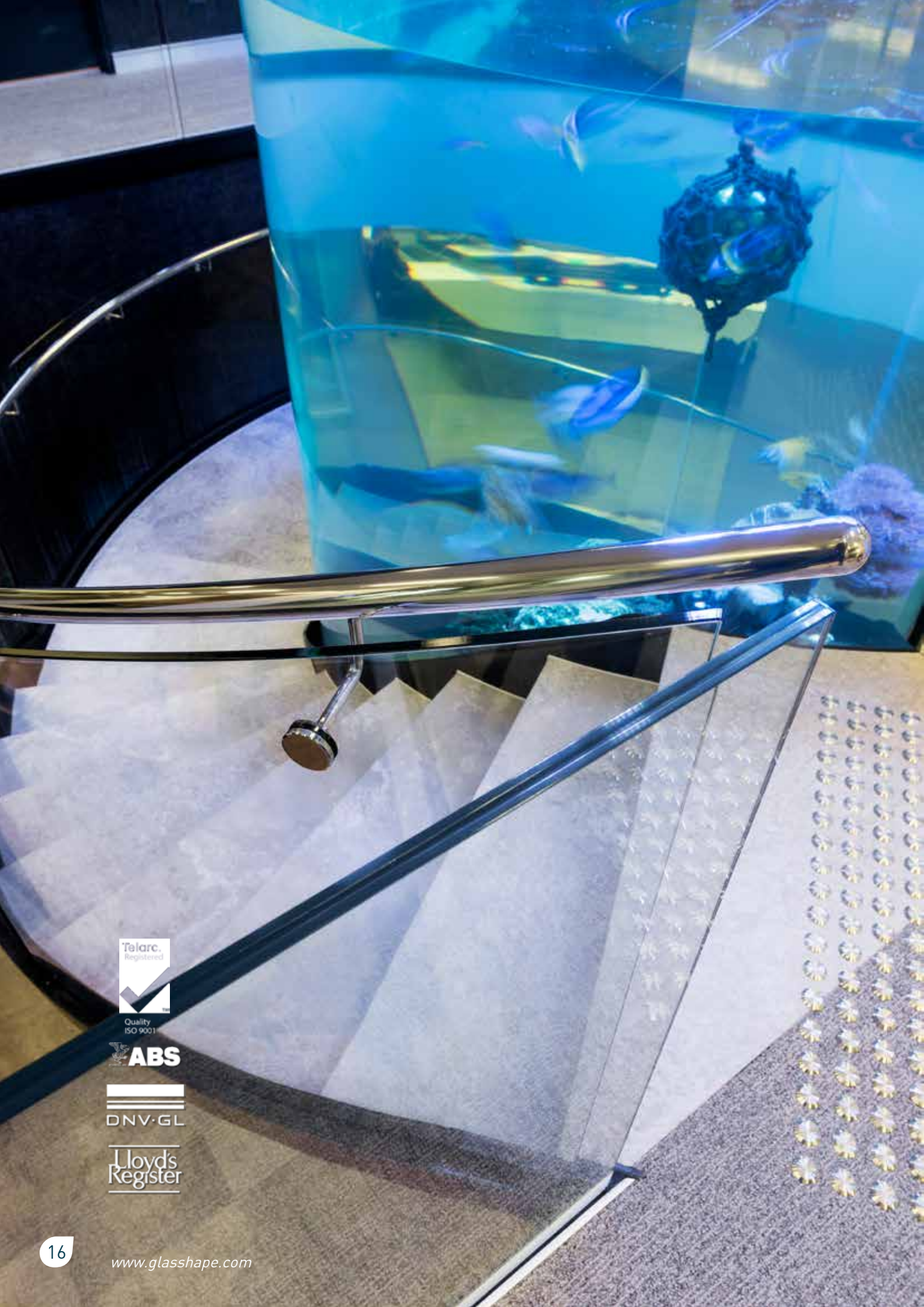
AmmoShield is a polycomposite-glass laminate, custom-constructed to meet clients' specified protection levels. These may range from physical attack with hand weapons to gun-fire and can be tested and certified to: AS 3555.1 Intruder Level 2, AS/NZS 2343 Ballistic Levels G0, G1, G2, R1, R2.

Ideal for areas deemed to be critical to the vessel's operation or where personnel and property protection is at high risk, **AmmoShield** is typically used in windscreens, windows, doors and port-holes, hull windows, master state-rooms and panic-rooms. It must be installed in an approved ballistic framing system.

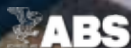
Features & Benefits:

- Range of protection levels available
- Customised Certified Bullet Resistant Glass tailored for your project
- Lightweight vs. glass-only products of similar thickness & attack resistance
- Enhanced design options available by combining **SwitchShield** or **VisionInk**
- Tested and Certified to meet AS/NZS 2343 ballistic levels G0, G1, G2, R1, R2
- Can be incorporated with tinted glass
- Can be configured to meet IACS requirements
- Marine certified where applicable





Quality
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Curved Toughened (Tempered) Glass

With more than 30 years' experience in producing curved glass solutions in architectural contexts, **Glasshape** can provide unrivalled design opportunities for glass in a marine context. Maximise the use of space and light without compromising on design, quality or safety, through the use of **TemperShield®**. The structural properties of **TemperShield** enable large spans to be covered with the use of minimal framework.

We are able to custom curve toughened glass including complex designs with uneven radii, conical and even spherical shapes. Feature balustrading, glass floors, spiral staircases, lift shafts, shower screens, partitioning, and cabinetry are typical applications. When combined with **VisionInk** (see page 19) you can vastly extend the possibilities for this remarkable substrate.

Features & Benefits:

- Opens up design possibilities
- Maximise space & light without compromising design, quality or safety
- Open & frameless mounting methods
- Large panels (3900 x 2440) available
- Variety of thickness, tint, low-iron options available, combine with **VisionInk**
- 2D & 3D custom designs
- Uneven radii
- Flat solutions
- Marine certified where applicable



"Ohana" Fitzroy Yachts

Interior Glass



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ABS

DNV-GL

**Lloyd's
Register**

Digitally Printed Ceramic Ink

With pinpoint accuracy up to 720dpi and inks, that once toughened (tempered), become a part of the glass itself. **VisionInk** represents the cutting edge of glass print technology and provides the most powerful resistance to scratching, UV light & weather deterioration and an easily maintained surface that withstands the test of time.

VisionInk removes all the limitations of screen printing:

- Print any design, from simple lines to detailed imagery
- Six spot colours combine to create an unrivalled colour palette; bespoke premixed colours can be created too
- Complete predictability, repeatability & durability
- Extend black-out borders to include your brand/insignia (in colour if you wish)

VisionInk combines the durability of ceramic inks with the versatility of digital printing

- Precision control of ink thickness for prediction & manipulation of Visible Light Transfer and Solar Heat Gain variables
- Surface can be cleaned as per normal glass with no impact on the graphic
- Perfectly suited to both interior and exterior applications, with a 10yr warranty

VisionInk can replicate *any* image, design or pattern with brilliant accuracy, vibrant colours and sharp resolution. From simple lines to full colour photos, **VisionInk** allows architects, engineers and designers to explore new possibilities in modern and sustainable design in interior and exterior marine applications.

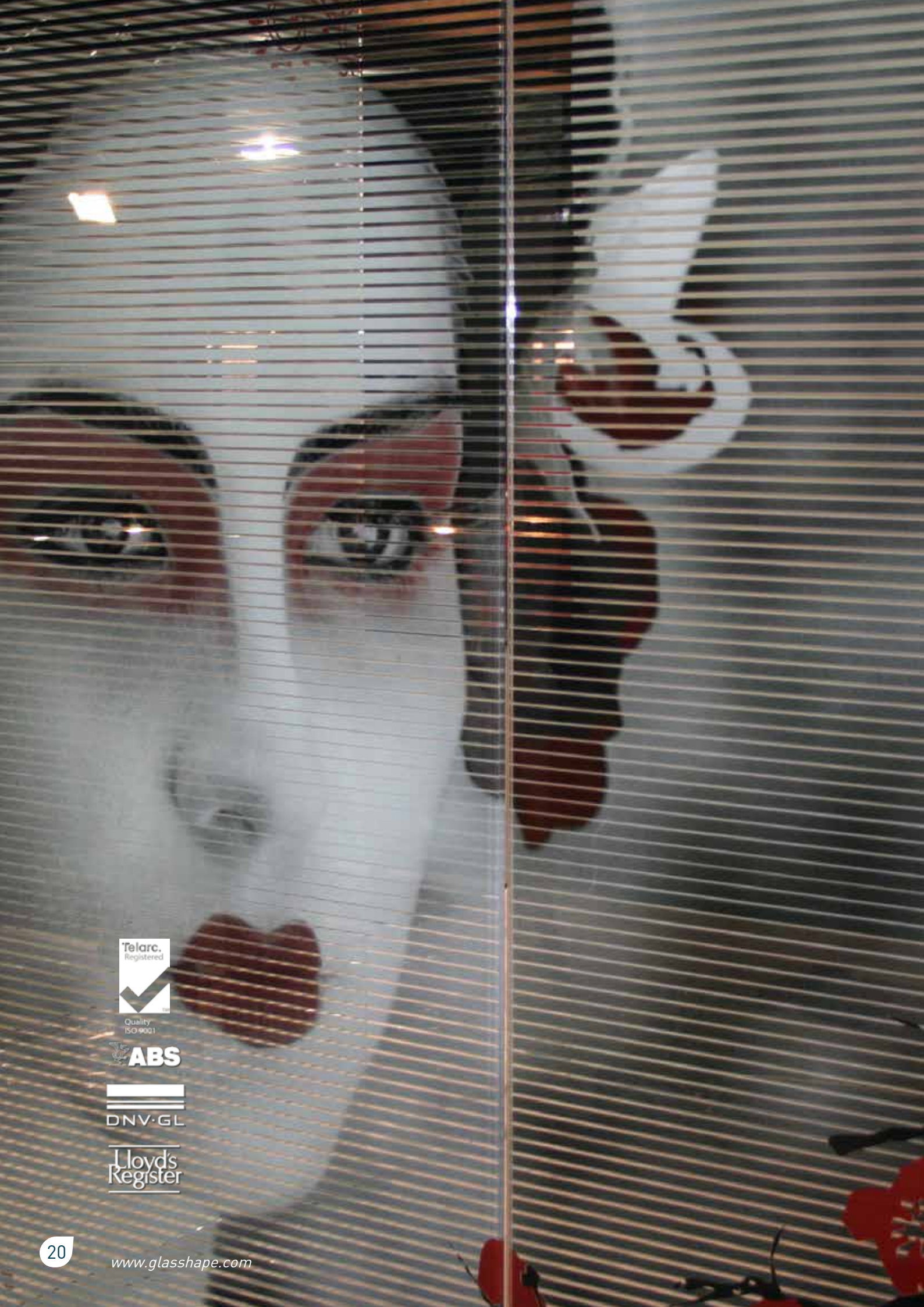
Colour Matching

VisionInk uses 6 'spot' colours (blue, green, white, orange, red & black – BGWORK) to generate the hundreds of thousands of other colours possible with ceramic inks. This is a close match to the CMYK (cyan, magenta, yellow, black) 'Process' colour that paper based print methods use. Our software will convert any image file colour-mode to BGWORK but bright pinks are not possible to print – this is due to a lack of magenta in our colour mix (a magenta ceramic ink given current technology would need to be toxic (lead or cadmium based)). The best results come when we convert an image file that is in RGB colour mode.

Applications & Project Size

From small insignia or splash-back to nameplates or internal fit-outs, **VisionInk** is a versatile design solution.





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Solar Heat Gain & Visible Light Transfer

- Opacity, translucency & ink layer thickness can be precisely manipulated
- Control light diffusion & transmission
- SHG and VLT values of most designs can be predicted allowing clients to calculate thermal and solar performance

Imitation of natural materials

- Photo realistic replication of scarce natural resources
- Not subject to the same risks of deterioration
- Access to otherwise restricted finishes (e.g. native timbers)

Specialty Process - Double Vision

Our printing technology together with the transparent properties of glass mean we can print 'image two' directly on top of 'image one' resulting in different images viewed on each side of the glass. This can be useful in one-way glass applications or privacy control for example.

Specialty Application - Slip Resistant Ink

This is a specialty ink outside of our BGWORK standard spot colours. With a selection of patterns that are tested using the ANSI A137.1 Dynamic Co efficient of friction test.

Certified to:

- AS4586 (Australia)
- AS/NZS 3661.1 (New Zealand)
- ANSI A131.1 (United States)

It is the combination of printed and non printed areas that create the best resistance. Any design featuring printed and non printed areas using this ink will provide a level of slip resistance although it will not necessarily be certified as such. We can test any bespoke design for certification as required. This ink is toughened into the glass, it offers unrivalled durability versus alternative non-slip solutions that typically wear off over time.

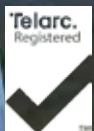
NB: we can print any spot or process colour under the slip resistant ink



Slip Resistant Ink



Double Vision



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Switchable Glass – On-Demand Privacy

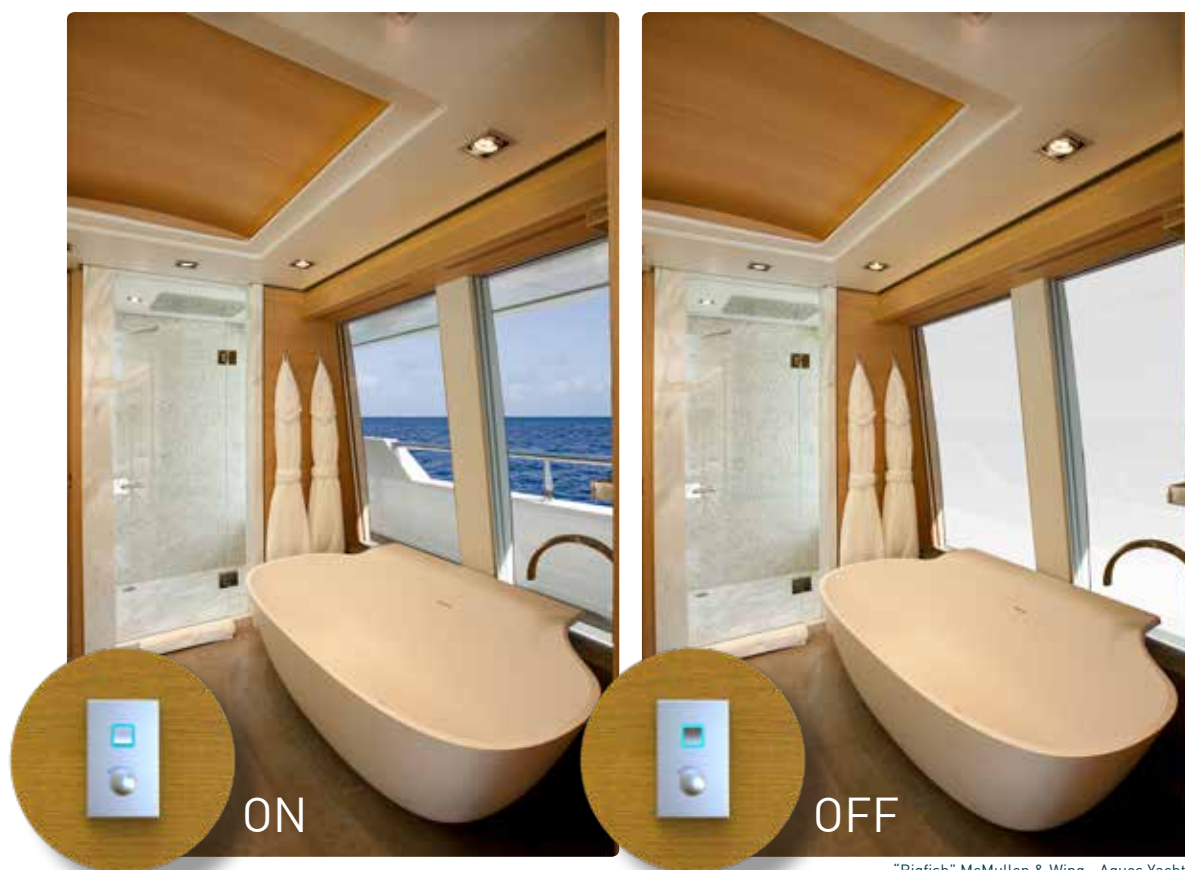
Switchable glass is an innovative glass product that is ideal for areas where privacy may be required at times and not at others. Applicable to windows, vision panels in doors, interior partitioning, shower screens, and skylights as examples. The natural state for **SwitchShield®** is fully opaque. When turned on, the window becomes completely clear, and with the use of a standard dimmer, can be any level of translucency between.

SwitchShield can also be used as a rear projection screen for an innovative display.

SwitchShield is a PD-LCD (Polymer- Dispersed Liquid Crystal Display) film and interlayer laminated between two panes of Grade A safety glass. The glass component can be printed with VisionInk if required.

Features & Benefits:

- Effortless adjustment between visibility and privacy
- Dimmable
- Protects furnishings and other items from UV damage
- Economical (operates on 110 AC)
- Can be incorporated with tinted glass or **VisionInk**
- Interior & exterior applications
- Grade A Safety Glass
- Can be configured to meet IACS requirements
- Marine certified where applicable



"Bigfish" McMullen & Wing - Aquos Yachts

Privacy Glass



Quality
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LED Glass – innovative lighting possibilities

PowerGlass® by **Glasshape** introduces a new dimension to glass and lighting technology. Naval architects and designers can specify glass embedded with bright and colourful LED lighting for functional or purely aesthetic reasons.

PowerGlass delivers lighting that is both practical and visually stunning with applications internally and externally including windows, walls, handrails, walkways, stairwells and nameplates.) The configuration and colour choices of the LEDs is vast and the technology behind **PowerGlass** is as striking as the product itself. LEDs are embedded into a completely transparent conductive interlayer sandwiched between two layers of glass. A low voltage power and LED operation signal pass through the interlayer, providing a safe lighting effect.

Features & Benefits:

- Programmable
- LEDs can be placed in any configuration
- Red, Green, Blue (RGB) and White LED's
- Combine with VisionInk for extended design possibilities
- Laminated for additional safety
- Marine certified where applicable



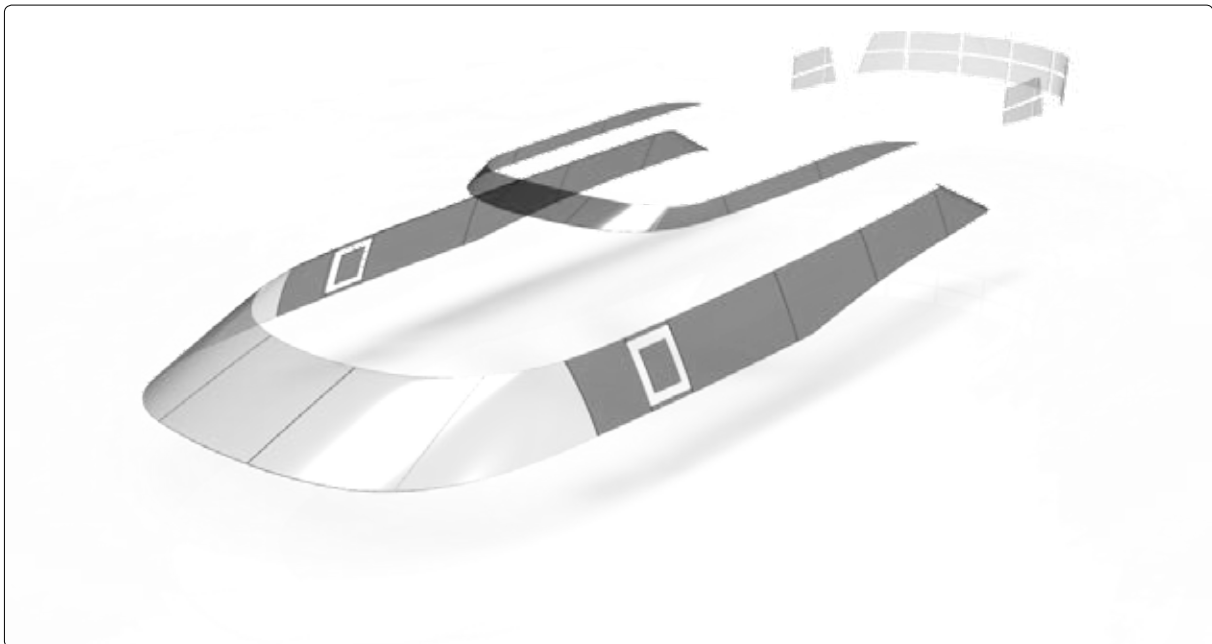
LED Glass

Digital Site Measurement Services

Our digital site measure service utilises the latest scanning hardware to produce electronic templates with unmatched accuracy, doing away with the need for physical templates that are cumbersome and time consuming to use. These electronic templates convert into 3D renders that can be approved by the client ahead of production. This added layer of checks and balances means inaccurate measurements and human error are practically eliminated from the process.

In the event that at a later stage a replacement piece of glass is required, we have the exact record of what was produced and can reproduce it precisely.

As an additional service, **Glasshape** can provide scanned data to the builder for use in other areas of the construction for the fitting of other non-glass related components.



"Ohana" 3D CAD Model



"Ohana" Fitzroy Yachts

Dimensions & Capabilities

Products	Even Curving	Uneven Curving	3D Curving	Site Measure	Standard Dimensions
DuraShield Marine	✓	✓	✓	We recommend a site measure on complex glass shapes.	3900 x 2440mm
Ezone Marine	✓	✓	✓		3900 x 2440mm
DuraShield Heat-R	✓	-	-		3900 x 2440mm
TemperShield	✓	✓	✓		3900 x 2440mm
ArmourShield	✓	-	-		2400 x 1800mm
AmmoShield	✓	-	-		2400 x 1800mm
VisionInk	✓	✓	✓		3900 x 2440mm
SwitchShield	✓	✓	-		3000 x 1800mm
PowerGlass	-	-	-		3900 x 2440mm

Oversize Capabilities:

For non-curved panes we are able to offer a maximum size of 7600 x 3300 (209 x 130inches). This reduces to 7200mm (283½inches) if heat soak is required. It is possible to manufacture flat toughened (tempered) laminated and printed panes up to 15000 x 3200 (15 x 3.2metres, 591 x 126inches) – we can work with you to supply to your specification.

Compound shapes, uneven radii, tangents

Please contact one of the Glasshape team to organise, calculate and test what the possibilities are, there are restrictions in some case, but Glasshape prides itself on finding solutions. It is recommended that you supply a CAD file with the desired curve, if you don't have a CAD file one can be made.

* Some "J" shape and uneven panels may not be able to be toughened please enquire directly.



"Zembra" - Nordhavn



Quality
ISO 9001



About Us

Established in 1986, we are a leading innovator, designer and manufacturer of curved, toughened, laminated and digital ceramic print specialty glass. Family owned, based in Auckland, New Zealand, with offices in Australia and the US, **Glasshape's** philosophy of growth through innovation, ingenuity and customer service sees it deliver best-in-class glazing solutions in a variety of categories, with notable success in marine, architectural (residential and commercial), high security and heavy machinery projects.

We're driven to exceed our client's design and performance requirements using our extensive industry knowledge and technical expertise to provide the perfect solution. **Glasshape** provide customised turnkey solutions from initial consult through to installation, with proven global success backed by comprehensive warranties and validated by international accreditation.

Our Vision:

"Delivering a premium experience in bent and specialty glass products and services to our glass, metal & fabrication customers".

Our Mission:

"Through strategic investment in people, product, process, design and technology, we build sustainable relationships with all stakeholders to supply and deliver premium glass products and services".

Our Values:

Respect

We act in a professional and friendly manner towards everyone we do business with and treat our customers, suppliers and staff the way we'd like to be treated ourselves.

Humility

We recognize that there's always a better way to do things, we look to others for ideas and we're open to suggestions for continuous improvement.

Integrity

We strive to maintain a culture of accountability, uprightness, commitment to doing the best for our customers colleagues, stakeholders and the environment taking responsibility for everything we do.

Empathy

We support each other as if our own family.

Trust

We know that with trust comes speed, and with speed comes action and with action we get results!

Honesty

We believe that honesty will win us work and retain our customers and create a safe and happy work environment.





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