

# HEIGHT SAFETY

高空安全

## HEIGHT SAFETY STANDARDS 高空安全防护标准

All SANHE harnesses and lanyards are independently tested and certified by SAI Global in accordance with CE Standards and Australian and New Zealand Standard

Whereas some brands will 'self-certify' or claim to use a third party assurance program, SANHE invests in the most respected and much stricter SAI Global Certification process and Quality Assurance Program.

Independent auditing of SANHE products by SAI Global ensures retailers, HSE officers and end users can have the utmost confidence that SANHE harnesses and lanyards meet or exceed the protection as required by CE Standards and Australian Standards. In fact, SANHE internal QC specifications require the product's performance to exceed CE Standards and Australian standards in some cases by as much as 400% (see page 6)

舒适，耐用和合理的价格

comfort, performance and affordable pricing.

所有SANHE安全衣和缓冲器都已通过CE认证和澳洲认证

和其它品牌自称通过第三方认证机构测试不同，SANHE已通过最严格的国际认证机构SAI的质量检测和产品认证。

SANHE产品通过SAI的独立审核确保了零售商，HSE官员和使用者能拥有最有保证的产品，SANHE的安全衣和缓冲器符合甚至已经超出了CE标准和澳洲标准。实际上，SANHE内部QC标准要求产品效果需要超出CE标准和澳洲标准400%（请见下一页）

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# SANHE HARNESS & LANYARD COMPLIANCE

SANHE内部标准  
的最低标准

审核结果

CE和澳标要求 Requirements	CE和澳标标准 Criteria for CE and Australian Standards Compliance	Minimum Criteria for SANHE in-house Standards compliance	Assessment of results
Appendix A Webbing resistance to light	Polyester Webbing >70% strength exposed vs. unexposed	Polyester Webbing >70% strength exposed vs. unexposed	Complies
Appendix B Static break test of lanyard webbing	Minimum breaking strength shall be 15kN	>23kN	Exceeds standards by >150%
Appendix C Static loading for attachment points	Harness on a dummy is subjected to static loads on attachment points and must not fracture more than 10% of the cross section area at any one point	0% Fracture	Exceeds standards significantly
	There shall be no breakage of more than 20% of the stitches in any one stitch pattern of a load bearing stitching at a webbing junction	0% Fracture	Exceeds standards significantly
	There shall be no failure of attachment hardware.	0% Fracture	Complies
	Pull up force Applied 15kN with 3 minute hold - Dummy must not release	20kN 3 Minutes	Exceeds standards by >133%
	<20% of stitches in any one stitch; and or no fracturing affecting more than 20% of the contact area of a joint if made by means other than stitching	13kN 3 Minutes	Exceeds standards by >133%
	Inverted pull up force applied 10kN with 3 minute hold - Dummy must not release	0% Fracture	Exceeds standards significantly
Appendix D Dynamic loading tests for fall arrest attachment points	Harness on a 100kg Rigid Dummy and using 12mm 3 strand Hauser laid rope without Energy Absorber, 2m in length	Same	Complies
	Raise and then drop dummy from a point at least 1.8m above anchorage point (2m+1.8m = 3.8m free fall)	SANHE in-house requirement to drop over a 4m free fall	Complies
	Drop Dummy feet first; adjust buckles and repeat but with head first drop.	Drop dummy feet first and repeat with head first drop no buckle adjustment allowed - REPEAT 4 TIMES	Exceeds standards by >400%
	Webbing Slippage allowance per any one adjusting device e.g. a buckle, measured at the centre line of the webbing shall not exceed 25mm (measured after each drop)	Drop dummy feet first and repeat with head first drop no buckle adjustment allowed - REPEAT 4 TIMES	Exceeds standards by >400%
	Total slippage allowance over all adjusting devices shall not exceed 50mm in total	Measured after 4 feet first and 4 head first drops over 4m	Exceeds standards by >400%
	Dummy shall remain securely suspended in the harness	Assessed after 4 feet first and 4 head first drops over 4m	Exceeds standards by >400%
	No complete break of webbing or complete failure of any one pattern of stitches or joint made by another means, at a webbing junction in any leg strap or belt if fitted and no failure of any attachment hardware	Assessed after 4 feet first and 4 head first drops over 4m	Exceeds standards by >400%
Appendix E Dynamic loading tests for pole strap assemblies and the harness attachment point	Dropped over a distance connected on both side Dees with pole strap adjusted to 2m length and dummy dropped over a 1.8m distance, 300mm on the horizontal. Two drops, one inverted	Dropped over a distance connected on both side Dees with pole strap adjusted to 2m length and dummy dropped over a 1.8m distance, 300mm on the horizontal. REPEAT 2 TIMES	Exceeds standards by >200%
	Slippage not to exceed 25mm in any one adjusting device and 50mm in total.	Measured after 2 feet first and 2 head first drops over 1.8m	Exceeds standards by >200%
	Dummy shall remain securely suspended in the harness	Assessed after 2 feet first and 2 head first drops over 1.8m	Exceeds standards by >200%
	No complete break of webbing or complete failure of any one pattern of stitches or joint made by another means, at a webbing junction in any leg strap or belt if fitted and no failure of any attachment hardware	Assessed after 2 feet first and 2 head first drops over 1.8m	Exceeds standards by >200%
Appendix F Static loading tests for pole strap assemblies and the harness attachment point	Pole strap points - 15kN for 3 minutes with the belt tightened around a 350mm cylinder and the pole straps around a 10mm dia pulled in the opposite direction	20kN 3 minutes	Exceeds standards by >133%
	<20% of stitches in any one stitch; and or no fracturing affecting more than 20% of the contact area of a joint if made by means other than stitching	0% Fracture	Exceeds standards significantly
	There shall be no webbing failure or hardware failure	0% Failure	Complies
Appendix G Static Break Strength and "pull out" force for Lanyard and Energy (Shock) Absorber element combined.	Test 1 - Energy Absorber permanent deformation of break/pull out shall be greater than 2kN	2.5kN Minimum	Exceeds standards by >125%
	Test 2 - Energy Absorber when fully pulled out shall withstand, 15kN without releasing load (for 3 minutes)	>23kN	Exceeds standards by >150%
	Test 2 - Energy Absorber when fully pulled out shall withstand, 15kN without releasing load (for 3 minutes) when using the adjustable Rope Lanyard	>15kN	Complies
	Test 3 - for Twin Tailed (twin legged), 15kN end to end static pull test hold for 3 minutes	>23kN	Exceeds standards by >150%
Appendix H Dynamic Loading test for lanyard and Energy Absorber Assembly	To ensure the Energy Absorber restricts the forces on the attachment point to less than 6kN Braking Force after then resultant 100kg dropped from a 3.8m free fall	<6kN on a 125kg weight dropped from a 4m free fall	Exceeds standards by >125%
	The load displacement shall not exceed 5.75m length from the anchorage fall attachment point	Shall not exceed 5.75m length	Complies with displacement length but with higher wearer weight rating

# HARNESSES 安全衣

SANHE full body harnesses have been medically engineered and certified to provide the wearer with maximum safety, comfort and versatility while working at height.

SANHE harnesses have been engineered in consultation with Orthopaedic and General Surgeons. Each SANHE Harness is designed to ensure the body can tolerate and survive all forces placed on it in the event of a fall. Furthermore SANHE webbing straps and the fall arrest hardware are ergonomically designed to minimise impact on the human body in the event a fall incident.

SANHE harness webbing has been specifically woven to reduce slippage and ensure maximum buckle grip. Research and development analysed webbing and buckle design including material composition which was integral in achieving unrivalled comfort, safety and zero buckle slippage even during extended wear.

Engineered to minimise incidental harm in the event of a fall, the SANHE range boasts the addition of buckle padding to significantly reduce the risk of injury from harness buckles. Further protecting the wearer is the ergonomic placement of the chest strap, which is positioned below the breast line and the shoulder strap adjustment buckles. This considered chest strap placement is designed to minimise throat and facial injury in the event of a fall.

Another feature of SANHE harnesses, also designed to reduce the risk of throat and facial injury is the inclusion of extended belay loops in preference over a frontal chest Dee ring. SANHE belay loops provide a more balanced weight distribution than the more commonly used frontal chest Dee ring.

Further wearer protection is provided by the inclusion (AS STANDARD EQUIPMENT) of LSANHEs Medically Trialled suspension trauma strap - designed to alleviate and minimise post fall Orthostatic Intolerance (suspension trauma syndrome).

Enhancing the unique combination of harness design features, the SANHE range Complies to CE and Australian Standards criteria.

Independently audited by third party body SAI Global.

SANHE全身式安全衣已通过医学设计和认证，为穿戴者在高空作业时提供最大的安全性、舒适性和多功能性。

SANHE安全衣的设计是基于骨科和普通外科医生的意见。每一件SANHE安全衣都是为了确保身体在高空跌落的时候能够承受所有的力量并生存下来。此外，SANHE带料和防坠落五金件都能减少高空坠落对人体的影响。

SANHE安全衣带料是经过特殊编织，以减少滑动并确保最大扣抓力。研究和分析了带料和扣带设计，包括他们的材料组成。用以实现无与伦比的舒适性、安全性和扣带零滑动是不可或缺的。

在设计上，为了在高空坠落时尽量减少伤害，SANHE安全衣增加了扣垫，大大降低了扣带对人体造成伤害的风险。为了进一步保护穿戴者的是人体工程学放置的胸前扣带，位于乳房线和肩带调节扣的下方的胸前扣带，进一步保护了穿戴者高空坠落时喉咙和面部受伤。

SANHE安全衣的另一个特点，也是为了降低喉咙和面部受伤的风险，是包含了延长腿部拉环，而不是胸前D环。SANHE腿部拉环比常用的胸前D环更能提供一个平衡的重量分布。

SANHE的医疗悬挂式创伤带为穿戴者提供进一步的穿着保护（作为标准设备），这个设计能减轻和尽量减少坠落矫正性不耐受力（悬挂式创伤综合症）。

SANHE安全衣系列符合CE和澳大利亚标准，具有独特的组合设计特点。

通过SAI国际认证的独立审核。

# HARNESSE SELECTION GUIDE

安全衣选择指导



型号  
材质  
后背D环  
胸前腿部拉环  
肩部拉环  
大侧边D环  
独立踩脚包  
加皮扣带  
快速插扣  
后背网兜  
扣带圆垫  
腰垫&腿垫  
反光条

HARNESSE NAME	ESSENTIAL	TACTICIAN Riggers	TACTICIAN Multi Purpose	ELITE Riggers	ELITE Multi Purpose
Harness Part Number	H101	H201	H202	H301	H302
Material	UV Stabilised Polyester	UV Stabilised Polyester	UV Stabilised Polyester	UV Stabilised Polyester	UV Stabilised Polyester
Rear Dee Ring	✓	✓	✓	✓	✓
Frontal Belay Loops	✓	✓	✓	✓	✓
Confined Space Shoulder Loops	✗	✓	✓	✓	✓
Large Side Dee Rings	✗	✗	✓	✗	✓
Trauma Strap Fitted AS STD	✗	✓	✓	✓	✓
Slotted Buckles	✓	✓	✓	✗	✗
Quick Fit Buckles	✗	✗	✗	✓	✓
Backing Triangle Mesh	✗	✓	✓	✗	✗
Padding Under Buckles	✗	✓	✓	✓	✓
Waist, Legs & Rear Belt Padding	✗	✗	✗	✗	✓
Reflective Stitching	✓	✓	✓	✓	✓
Certified & Approved to CE and Australian Standards	✓	✓	✓	✓	✓
APPLICATION					

KEY:

- FALL ARREST
- FRONTAL ATTACHMENT
- SCAFFOLDING
- WAREHOUSE
- CONSTRUCTION
- UTILITIES
- TOWER
- LADDER
- HEAT RESISTANT
- ROOFING
- CONFINED SPACE
- POSITIONING/ RESTRAINT

# CORRECT FITTING OF A LINQ HARNESS

1. 检查安全衣，以确保它适合您的身高高度，并确保所有部件都处于良好的工作状态。

1

Inspect harness to make sure it is fit for your height safety application and that all components are in good working condition.

2

Hold harness by the Rear / Dorsal Dee Ring and arrange harness straps to avoid any crossed or twisted straps.

3

Don the harness as you would put on a jacket.

3. 像穿外套一样穿上安全衣

4. 背后D环必须位于背板中心位置

4

The "Dee" ring must be positioned between the shoulder blades.

2. 拿着安全衣的 后背D环，并确保安全衣的背带不会有 任何交叉或扭曲。

Adjust shoulder strap to approx 100mm of extra webbing above buckle to ensure sub-pelvic strap is positioned correctly and forms a seat

6

6. 保证右腿带安装在右边扣带上，左边腿带安装在左边口袋上，确保没有扭曲。

Secure left leg strap to left leg buckle and right leg strap to right leg buckle, making sure the webbing is not twisted.

5

Connect the chest strap across the upper body, and then connect the waist strap (if fitted - multipurpose models).

5. 链接上身胸前扣带，链接腰带（可适合于多种型号）

8

The belay loops must be brought together and fixed with an approved connector (Note: Never use single belay loops - always use in pairs)

8. 腿部拉环必须连接在一起，用经批准的连接器固定（注意：不要使用单一环带——总是成对使用）

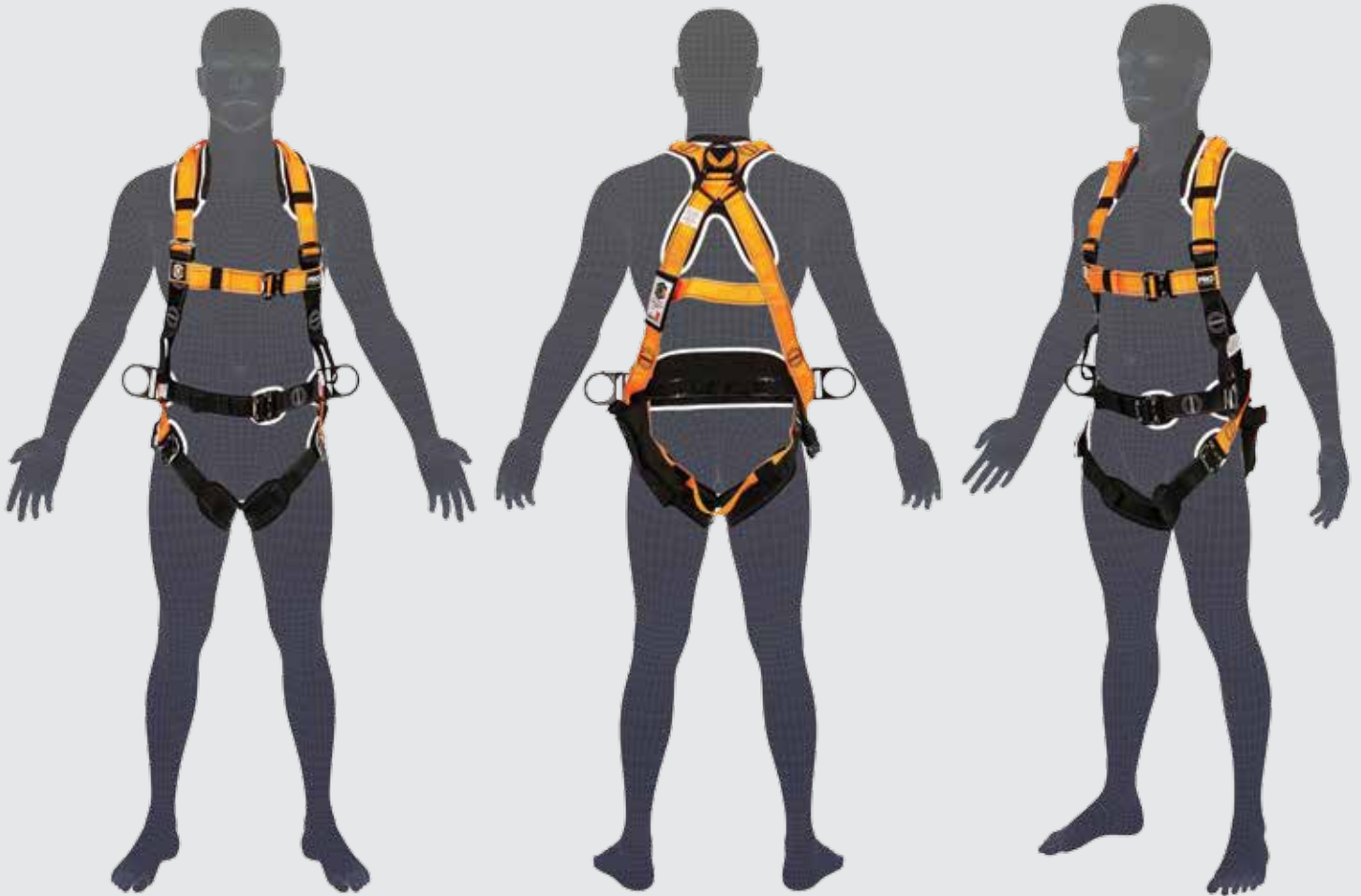
7

Adjust all straps and buckles for a firm, comfortable fit. Have a work mate check all connections.

7. 调整所有带料和扣带，已确保穿戴舒适。请同伴检查所有部件已合拢。

# HARNESSES SIZE GUIDE

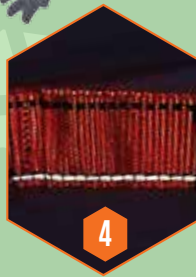
		Wearer Weight in kilograms																					
		45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135		140	145
CHEST measurement in cm	145+	XL SIZE submit chest and thigh measurements																			125		
	140																				120		
	135																				115		
	130	110																					
	125	105																					
	120	100																					
	115	90																					
	110	80																					
	105	70																					
	100	60																					
95	50																						
90	40																						
85	30																						
		Shorter	1.65m	1.69m	1.73m	1.77m	1.81m	1.85m	1.89m	1.93m	and taller												
		Wearer Height in meters																					



H302 ELITE MULTI-PURPOSE Harness pictured



Buckle Connectors



Retro Reflective detailing



**ALSO AVAILABLE**  
H101SS  
Stainless Steel Hardware  
and/or  
Any combination of  
permanently attached  
lanyard  
and/or  
with Quick-Release Buckle  
connectors

## STANDARD FEATURES

- Medically designed for maximum moment of impact safety
- Harness Design minimises wearer injury during and after fall
- Pebble-weave Webbing Design provides maximum grip precluding incidental buckle slippage
- Integrated Webbing strap and hardware placement minimises impact injury
- Combined belay loop sub pelvic strap positioning reduces risk of throat and facial injury
- High Tenacity Polyester Webbing for enhanced resistance to UV and common solvents
- 160kg Wearer capacity (combined weight of wearer; clothes and tools) when used in conjunction with a SANHE Shock Absorbing Lanyard
- Unisex design with articulated chest strap and shoulder adjustment points

摔伤只是那些在高处工作的人所面临的危险的一部分。使用安全衣能防止因挤压损伤导致的相关的类似症状和并发症，由此导致的重要器官的血流不足会导致畸位不耐受，这被广泛证明会导致死亡。

当挂在安全带上时，腿带的止血带效应，再加上重力的作用和无法释放腿上的绳索的压力，会导致一种称为静脉汇集的状况。身体和腿部肌肉无法或被限制将血液抽回心脏。悬挂时，即使安全衣有一个腰带或臀部的骨盆下带，安全衣就可以简单地限制血液回流到心脏，

# ORTHOSTATIC INTOLERANCE

正畸不耐症

矫正不耐受的最初症状是腿部刺痛或麻木、恶心、头晕、出汗、心悸和混乱。接下来就会出现昏厥，这将会加重悬吊损伤。研究发现，在悬挂在安全衣上失去知觉后，大脑损伤和死亡可以在4至6分钟内发生。

Injuries from falling are only part of the dangers faced by those working at heights. Harness suspension presents with similar symptoms and complications associated with crush injuries, and the resulting lack of blood flow to the vital organs leading to orthostatic intolerance is widely proven to cause death.

Whilst hanging in a harness, the tourniquet effect of the leg webbing, coupled with the effect of gravity and an inability to release the pressure of the webbing on the legs, leads to a condition known as VENOUS POOLING. The body and leg muscles are unable or are severely restricted from pumping blood back to the heart. When in suspension, a harness simply restricts blood flow back to the heart even if the harness has a cradle or sub pelvic bum strap for the buttocks.

Initial symptoms of orthostatic intolerance are tingling or numbness in the legs, nausea, dizziness, sweating, palpitations and confusion. Fainting occurs next, which, in a harness, will serve to exacerbate the suspension trauma by eliminating movement altogether while still keeping the subject upright. Research has found that after losing consciousness while suspended in a harness, brain damage and death can occur within four to six minutes<sup>(1)</sup>.

Even if a climber or worker is rescued alive in their harness after suffering orthostatic intolerance, they are still in grave danger due to the large amount of deoxygenated blood in their legs that may cause a heart attack or kidney failure when it returns to the body's vital organs. Research by Flora and Holzl found that of eight rock climbers who were alive after hanging in a harness from periods of half an hour to eight hours, all died after they were rescued, surviving from half an hour to 11 days<sup>(2)</sup>.

While each individual's tolerance to suspension varies, everyone is susceptible. This means that using a harness designed to enable blood flow in the event of prolonged suspension is critical, as is the quick rescue and recovery of the victim.

The SANHE range of harnesses and lanyards are specifically designed to reduce the likelihood of orthostatic intolerance. Featuring a unique Standing Step Harness, they eliminate the tourniquet effect and allow the wearer to stand and stimulate the muscles that pump blood back to the body's vital organs. The resulting increased blood flow reduces the risk of suspension trauma and associated dangers.

The Suspension Trauma Standing Step is fitted as standard equipment to the Tactician and Elite harnesses and is available as an addition to all other harnesses in the SANHE range.

即使登山者或工人在忍受了矫正性不耐受力后活着从安全衣中救出，它们仍然处于严重的危险之中，因为它们腿部有大量的脱氧血液，当它们回到身体的重要器官时，可能会导致心脏病发作或肾衰竭。弗洛拉和Holzl的研究发现，在8个攀岩者中，他们都是用安全衣吊起的，都是悬挂半小时至八小时的时间，在获救后全部死亡，只存活了半小时至11天（2天）。

虽然每个人对悬挂的容忍度各不相同，但每个人都是易感染的。这意味着，在长期悬浮的情况下，使用设计能够使血液流动的安全带是至关重要的，对受害者的快速抢救和恢复是非常重要的。

SANHE的安全衣是专门为降低静位不耐受的可能性而设计的。它们具有独特的站立式脚镣，消除止血带的影响，并允许穿戴者站立和刺激肌肉，将血液输送回身体的重要器官。由此引起的血流增加降低了悬浮损伤和相关危险的风险。

## References:

1. Nelson B. Climbing harnesses. How long can you safely hang from your harness? (1979)  
Off Belay Magazine (USA) (August 1979)
2. Flora G and Holzl HR. Fatal and non-fatal accidents involving falls into the rope (1972)  
Papers of the Second International Conference of Mountain Rescue Doctors (Austria) (1972)



SANHE缓冲器是个人防护设备（PPE）的重要组成部分，个人防护设备（ppe）的关键部件，用于在高空安全工作，作为安全衣和锚地之间的连接，设计用于在坠落时吸收能量。

通过广泛的现场研究和开发，以及工程和质量控制的实施，SANHE已经开发了很多适合不同体型的缓冲器。根据工人的反馈和现场观察，在所有工人（即使是大码体型）体重大于160公斤的情况下，缓冲器的能量吸收范围限制在6kn以下

优质的材料已经被用于设计SANHE缓冲器，以确保他们在坠落时的强度，其中包括：

- 1.为保护160公斤以上的工人（包括工具和设备）而设计的超长缓冲包
- 2.锻造缓冲五金件
- 3.缝合模式是由计算机控制的机械缝，精确使用抗紫外线的聚酯纤维绳（10kg）断裂强度

# LANYARDS

缓冲器

SANHE lanyards are critical pieces of personal protection equipment (PPE) for working safely at heights as the connection between the harness and an anchorage, designed to absorb energy in the event of a fall.

Through extensive research and development on site, as well as engineering and quality control implementation, SANHE has developed a lanyard range suitable for a wide range of worker's body types. Based on worker feedback and site observation, the SANHE lanyard range restricts energy absorption to significantly less than 6kN in the event of a fall for all workers (even plus-sized ones) up to 160kg

Quality materials have been used to engineer the SANHE lanyard range, ensuring their strength in the event of a fall. These include:

- An Extended Length Energy Absorber designed to protect a worker of up to 160kg (including tools and equipment)
- Drop forged lanyard hardware
- Stitching patterns are sewn by computer controlled bar tacking machinery for precision using UV resistant high tenacity polyester yarn with 100 newton (10kg) breaking strength

和SANHE安全衣一样，SANHE缓冲器也通过了第三方SAI的审核认证，通过CE和澳标认证。

As with the SANHE harness range, SANHE lanyards are third party audited by SAI Global to CE and Australian Standards criteria clearly visible on all SANHE lanyard labels.



SANHE防坠落系统是为了降低高空坠落造成损伤二设计的。如使用正确，SANHE高空安全设备能减少高空作业所带来的危险。请注意你眼前工作空间下面的区域，寻找一个安全地带。安全区也称为最小自由空间（mfs），锚点与地面之间的一条直线；最近的危险障碍物或平台。

高空坠落安全衣系统不会在坠落过程中时阻止障碍物对人体造成的伤害，而是能确保工作区域以下的mfs足够让防坠落系统停止人体与障碍物的接触。

# MINIMUM FREE SPACE

最小可用空间

如果产品警告标示：产品下降不超过2M。 ，则mfs标准和风险显著降低。

The SANHE Fall Arrest System is designed to minimise the impact of a fall. When used and fitted correctly, your SANHE height safety equipment will minimise the danger associated with working at heights.

Be mindful of the area beneath your immediate work space and seek out a safety zone. The safety zone is also referred to as Minimum Free Space (MFS), a straight vertical line between the point of anchorage and the ground; the nearest dangerous obstacle or platform.

The Fall Arrest Harness System will not prevent impact with obstacles or obstructions in the path of a fall. It is imperative that you ensure the MFS below the work area is sufficient enough to allow the Fall Arrest System to halt contact with the obstacle(s).

MFS criteria and risks reduce significantly if product warning labels are heeded products are marked FALL NOT TO EXCEED 2M

It is the duty of the user to be familiar with the MFS available and apply the following formula:

使用者应熟悉MFS和熟悉应用以下公式：

**LENGTH OF LANYARD**      缓冲器长度

+

**LENGTH OF SHOCK ABSORBER**      缓冲包长度

+

**HARNESS STRETCH**      安全衣强度

+

**DISTANCE BETWEEN HARNESS ATTACHMENT POINT AND UPPER BACK**      安全衣挂点和上背部的距离

+

**SAFETY CLEARANCE AT THE BOTTOM OF FALL**      坠落底部的安全间隙

To illustrate a worst case scenario, which is when the anchor point is at the worker's feet, (to be avoided at all times) the MFS is calculated as follows: 以说明最坏的情况，即当锚点在工人的脚，（要随时避免）mfs计算如下：

Lanyard Length + Shock Absorber element = 2m + 1.75m (maximum extension of the shock absorber element in an extreme fall) + harness system stretch 0.40m + distance from anchor point (at feet) to harness attachment point say 1.8m (for a person of 2m height): **Add 0.5m provisional distance if wearer weight is**

**>136kg**

绳索长度+避震元件=2m+1.75M（避震元件在极端下落时的最大延伸）+拉杆系统从锚点（在脚处）延伸0.40M+拉杆点，以拉杆连接点为1.8M（对人而言）高度为2米）：如果佩戴者的体重是

>136公斤

2m+1.75m+0.4m+1.8m = 5.75m (a wearer >136kg should take extra care in the calculation of their MFS)

2M+1.75M+0.4 M+1.8M=5.75M(佩戴者体重大于36kg在计算其mfs时应格外小心)

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