

# NCG

## HOSE RESTRAINTS



## Standard Product Range



Member of the

**Australasian High Pressure Water Jetting Association**





# NCG AUSTRALIA

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The aim of this catalogue has been to create a handbook that is useful at every level of the supply chain. This handbook strives to provide information not only about the NCG product range, but also useful information on Hose Restraints in general. The benefit will be reduced query times between end users and suppliers, and a more informed product choice.

This handbook is under continual improvement as new information becomes available, as new innovations are made and as safety standards are improved. The information in this handbook has been compiled from the same variety of resources that aided the development of the NCG product. I hope you find this first issue informative, and a reflection of our high product quality.

Michael Lutkajtis  
General Manager

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# HOSE RESTRAINTS

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## What is a Hose Restraint?

A stocking or sock type hose restraint is a woven sleeve of helical design that shrinks and tightens when it is slid onto a hose. When fitted, the device will prevent uncontrolled movement of a pressure hose in the event of coupling disconnection or hose failure. The whipping motion of a failed hose can result in personal injury, property damage or death. Cable or sling type 'whipchecks' prevent a hose from travelling at disconnection, but do not prevent whipping.

## Which hoses need to be restrained?

Any fluid, air or otherwise pressurised hose with the potential to strike an operator, pedestrian or property should be restrained with a double eyed hose restraint.

# NCG HOSE RESTRAINTS

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NCG has designed its standard range of Hose Restraints to withstand worse case scenarios involving bulky couplings and high pressure. The HR2 series offers the highest level of protection and is constructed from the highest quality materials available.

## The Strand

NCG uniquely uses 1x19 2070 Galvanised strand for HR2 hose restraints. 1x19 is a stiff wire that automatically shrinks onto the hose, making the fitting procedure easier and more effective. Compared to other wires in the same diameter, 1x19 has a much higher tensile strength.

## The Heat Shrink

To protect the 'legs' of the hose restraints against damage from a bulky coupling, NCG covers the legs in a thick layer of durable heat shrink protection. An adhesive lining between the heat shrink and the wire strand ensures the protective layer does not move to expose the strand. The outer layer of heat shrink is colour coded for easy size identification.

## Thimble Eyes

The eyes of NCG hose restraints are protected against wear by a formed steel thimble.

## Identification and Compliance

NCG hose restraints are branded and labelled with their size range, individual serial number and minimum breaking load. This information is stamped into the ferrule.

# STRENGTH OF HOSE RESTRAINTS

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The strength of hose restraints is based on the metallic area and grades of wire. Strength ratings are theoretical and based on straight line tensile strength destruction tests. Two separate strength ratings are shown for consideration:

## **UTS (Ultimate Tensile Strength)**

NCG provides UTS ratings for all products – this guarantees the product design has been destruct tested on a NATA accredited and calibrated test bed.

## **ABS (Aggregate Breaking Strength)**

ABS refers to the theoretical strength of the hose restraint. This can be described as the sum of the minimum breaking strengths of the wires used to comprise the hose restraint. As the design of the hose restraint puts forces onto the wires that are absent in a straight line test of a single wire, the real breaking strength (UTS) of the hose restraint is considerably less than the theoretical strength (ABS).

The force exerted when a hose disconnects at pressure is dependent on a number of variables. Each hose apparatus should be considered on its own merit.

# WHEN TO REPLACE A HOSE RESTRAINT

Hose restraints should be inspected regularly for signs of wear and damage, a damaged hose restraint should be replaced immediately. A hose restraint that has been used in the event of a failed hose should be thoroughly inspected immediately for damage. Safety should never be compromised.

Signs of wear, which would indicate a hose restraint needs to be replaced, include:

1. 'Bird caging' of the wires
2. Rust
3. Broken wires or strands
4. Visible 'bubbles' in the unit either slack or when fitted to the hose
5. Heat damage

# HOW TO CHOOSE A HOSE RESTRAINT

The following factors should be considered when deciding which hose restraint is suitable for the particular application.

## The working environment

1. Underground coal environments require at least a copper ferrule for safety purposes (HR4 series). Aluminium alloys corrode in underground environments and also create a spark hazard.
2. Rust prone or underwater environments require stainless steel variations (HR6 and HR7-full stainless series).
3. General purpose above ground environments require only the standard range (HR2 series).

## The hose to be restrained

If the hose is required to be restrained at both ends, particularly in the case of a short hose, it may be worthwhile to attach a hose restraint with eyes at each opposing end. This single hose restraint will restrain the hose at both ends and protect the hose along its entirety.

## Restraining a join in a hose

To restrain a joint in a hose it is recommended that a hose restraint be fitted to each hose with the eyes pointing towards the join, and shackled together with shackles rated at a higher tensile strength to that of the hose restraint.

## The size of the hose

It is important to measure the external diameter of the hose and select the appropriate hose restraint to suit. If the diameter of the hose rests on the border of a size range it is recommended to utilise the higher size range. This will ensure the restraint will fit over bulky fittings and in some cases may contribute extra strength.

# DO'S AND DON'TS

- A. Do ensure the hose restraint is stamped with its size range, strength and serial number for traceability
- B. Do ensure the hose restraint is fitted in accordance with strict fitting procedures
- C. Do ensure hose restraints are stored in a clean dry environment
- D. Do regularly inspect hose restraints for signs of damage and wear
- E. Do not use a hose restraint on a hose of incorrect size
- F. Do not push the mouth of the hose restraint against a flat surface

## Compliance

There is no current Australian Standard for the design of hose restraint safety devices; however, strength rating certificates can be made available on request.

# TYPES OF HOSE RESTRAINTS

## Double Eye One End

This type of hose restraint will secure one end of a pressure hose to prevent hose whipping. This is widely accepted as the minimum level of safety.



## Double Eye Both Ends

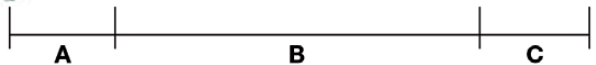
This type of hose restraint secures both end connections and the entire length of the hose. This is a custom restraint and made to order.



## How to measure

- A. Distance to shackle point
- B. Length of hose between couplings
- C. Distance to shackle point

**Total length = A+B+C**

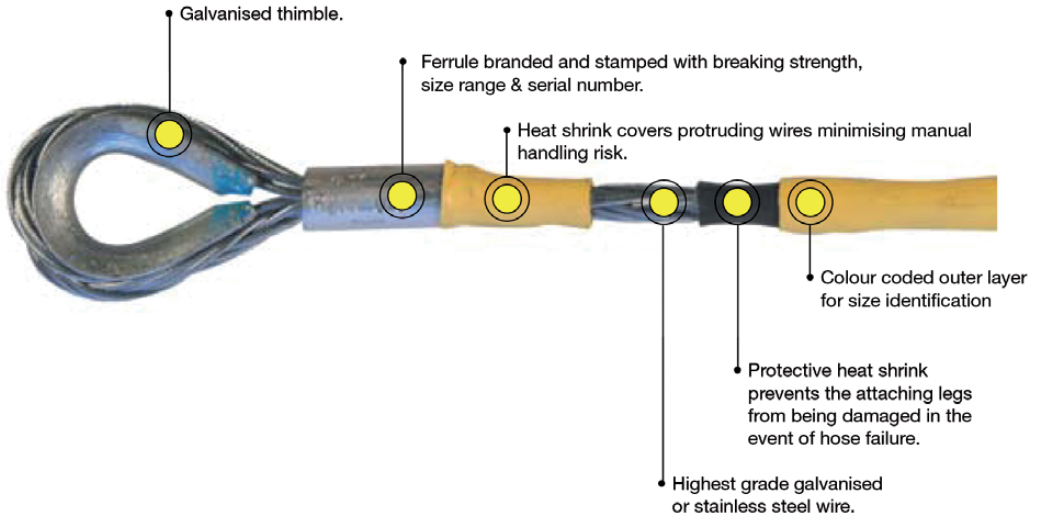


## Offset Eye

Offset eye hose restraints are offered only in cases where two shackle points are not possible due to spatial limitations.



# EYE DESIGN



## FITTING INSTRUCTIONS

1. Always inspect the hose restraint for broken strands or signs of wear. A damaged hose restraint should never be used, always replace a worn hose restraint.
2. Ensure the hose is clean and free of oil, grease and dirt.
3. Slide the hose restraint down the length of the hose until the last rows of plaited wire are well past the coupling and the eyes have enough length to easily reach the anchoring shackles.
4. Run your hands down the hose restraint from the coupling end to the tail to smooth out any bubbles in the plait and ensure the device is utilising its entire grip length.
5. Anchor the hose restraint at the eyes to two horizontally opposed shackle points. It is important that the shackle points be at an equal distance from the hose connection. Uneven load on the hose restraint can greatly reduce the breaking load.
6. Always use shackles of breaking strength greater than the hose restraint.
7. It is recommended that the hose restraint be bound at the tail end with tie wire or a hose clamp, for added security against accidental release.
8. In the case of double ended hose restraints, ensure that the plaited length of the hose restraint is not longer than the length of the hose between the couplings when fitted to the hose. Only use a double ended hose restraint on the specific hose length and diameter it is labelled for.
9. Slight slack in the legs is preferred. This will allow a travel distance for the coupling in disconnection and greatly reduce the load applied to the hose restraint. A travel distance of up to 40mm is recommended.



# HOSE RESTRAINTS – SIZES AND STYLES

## TABLE HR2

### CONSTRUCTION

Two Ply  
Galvanised Strand  
Alloy Ferrules  
Galvanised Thimbles  
Heat Shrink Protection



Product Code	To Fit Hose O.D	Net Grip Length on Mean Hose O.D	Aggregate Breaking Strength of All Strands		Ultimate Tensile Strength (UTS)	Heat Shrink Colour
			kg	kN	kN	
HR2010	10-14mm	350	1500	15	9	Black
HR2014	14-19mm	400	2400	24	15	Black
HR2019	19-28mm	500	3800	38	24	White
HR2028	28-40mm	600	5800	57	35	Brown
HR2040	40-50mm	800	5800	57	35	Orange
HR2050	50-60mm	900	10000	100	62	Yellow
HR2060	60-70mm	900	10000	100	62	Blue
HR2070	70-85mm	1000	10000	100	62	Red
HR2085	85-100mm	1000	16000	158	98	Green
HR2100	100-120mm	1200	16000	158	98	Black
HR2120	120-150mm	1400	21500	211	133	Grey
HR2150	150-190mm	1600	31000	305	191	Light Blue

Available in Offset Eye with the code prefix HRO2

## TABLE HR4

### CONSTRUCTION

Two Ply  
Galvanised Strand  
Copper Ferrules  
Galvanised Thimbles  
Heat Shrink Protection



Product Code	To Fit Hose O.D	Net Grip Length on Mean Hose O.D	Aggregate Breaking Strength of All Strands		Ultimate Tensile Strength (UTS)	Heat Shrink Colour
			kg	kN	kN	
HR4010	10-14mm	350	1500	15	9	Black
HR4014	14-19mm	400	2400	24	15	Black
HR4019	19-28mm	500	3800	38	24	White
HR4028	28-40mm	600	5800	57	35	Brown
HR4040	40-50mm	800	5800	57	35	Orange
HR4050	50-60mm	900	10000	100	62	Yellow
HR4060	60-70mm	900	10000	100	62	Blue
HR4070	70-85mm	1000	10000	100	62	Red
HR4085	85-100mm	1000	16000	158	98	Green
HR4100	100-120mm	1200	16000	158	98	Black
HR4120	120-150mm	1400	21500	211	133	Grey
HR4150	150-190mm	1600	31000	305	191	Light Blue

Available in Offset Eye with the code prefix HRO4

# HOSE RESTRAINTS – SIZES AND STYLES

**TABLE HR6**

**CONSTRUCTION**

Two Ply  
Stainless Steel Strand  
Copper Ferrules  
Stainless Steel Thimbles  
Heat Shrink Protection



Product Code	To Fit Hose O.D	Net Grip Length on Mean Hose O.D	Aggregate Breaking Strength of All Strands		Ultimate Tensile Strength (UTS)	Heat Shrink Colour
			kg	kN	kN	
HR6010	10-14mm	350	1300	13	7	Black
HR6014	14-19mm	400	1900	19	12	Black
HR6019	19-28mm	500	3100	30	19	White
HR6028	28-40mm	600	4500	44	27	Brown
HR6040	40-50mm	800	4500	44	27	Orange
HR6050	50-60mm	900	8000	78	48	Yellow
HR6060	60-70mm	900	8000	78	48	Blue
HR6070	70-85mm	1000	8000	78	48	Red
HR6085	85-100mm	1000	12600	123	79	Green
HR6100	100-120mm	1200	12600	123	79	Black
HR6120	120-150mm	1400	16800	164	103	Grey
HR6150	150-190mm	1600	24000	235	147	Light Blue

Available in Offset Eye with the code prefix HRO6

**TABLE HR7**

**CONSTRUCTION**

Two Ply  
Stainless Steel Strand  
Stainless Steel Ferrules  
Stainless Steel Thimbles  
Heat Shrink Protection



Product Code	To Fit Hose O.D	Net Grip Length on Mean Hose O.D	Aggregate Breaking Strength of All Strands		Ultimate Tensile Strength (UTS)	Heat Shrink Colour
			kg	kN	kN	
HR7010	10-14mm	350	1300	13	7	Black
HR7014	14-19mm	400	1900	19	12	Black
HR7019	19-28mm	500	3100	30	19	White
HR7028	28-40mm	600	4500	44	27	Brown
HR7040	40-50mm	800	4500	44	27	Orange
HR7050	50-60mm	900	8000	78	48	Yellow
HR7060	60-70mm	900	8000	78	48	Blue
HR7070	70-85mm	1000	8000	78	48	Red
HR7085	85-100mm	1000	12600	123	79	Green
HR7100	100-120mm	1200	12600	123	79	Black
HR7120	120-150mm	1400	16800	164	103	Grey
HR7150	150-190mm	1600	24000	235	147	Light Blue

Available in Offset Eye with the code prefix HRO7

# UNDERGROUND OFFSET EYE

TABLE HRO3

**CONSTRUCTION**

Galvanised Strand  
Copper Ferrule  
Soft Eye



Product Code	To Fit Hose I.D.	Net Grip Length on Mean Hose O.D.	Aggregate Breaking Strength of All Strands	
			Kg	Kn
HRO325	1.0"	650	5800	57
HRO332	1.25"	650	5800	57
HRO340	1.5"	650	10000	100
HRO350	2.0"	650	10000	100
HRO363	2.5"	650	16000	158

TABLE HRO5

**CONSTRUCTION**

Stainless Steel Strand  
Copper Ferrules  
Soft Eye



Product Code	To Fit Hose I.D.	Net Grip Length on Mean Hose O.D.	Aggregate Breaking Strength of All Strands	
			Kg	Kn
HRO525	1.0"	650	5000	50
HRO532	1.25"	650	5000	50
HRO540	1.5"	650	7900	78
HRO550	2.0"	650	7900	78
HRO563	2.5"	650	115000	113

# HOSE RESTRAINTS – DOUBLE ENDED (FOUR EYES)

## TABLE HRD

### CONSTRUCTION

Two Ply  
Galvanised Strand  
Alloy Ferrules  
Galvanised Thimbles  
Heat Shrink Protection  
Available in series 2, 4, 6 & 7  
Custom length

### PRODUCT CODE

HRD2\*040†/7300††

\* Denote series

† Denotes size range

†† Denotes total length

Refer to page 5 for total length.



## TABLE HR8

Product Code	Size (mm)	Net restraint length on mean diameter hose (O.D.)	UTS kN
HR8006	6-11	350 mm	5
HR8010	10-14	350 mm	5
HR8014	14-19	400 mm	9
HR8019	19-28	500 mm	15
HR8028	28-40	600 mm	24
HR8040	40-50	800 mm	35
HR8050	50-60	900 mm	35
HR8060	60-70	900 mm	53
HR8070	70-85	1000 mm	53
HR8085	85-100	1000 mm	73
HR8100	100-120	1200 mm	105





# HOSE STRAP

Automatic locking mechanism

Zinc buckle

Woven nylon strap

Flame retardant

Product Code	Strap Width (mm)	Strap Length (mm)	Eyelet Dia. (mm)
NHS1006	25	600	N/A
NHS1008	25	800	N/A
NHS1012	25	1200	N/A
NHS1512	38	1200	13



NHS1012

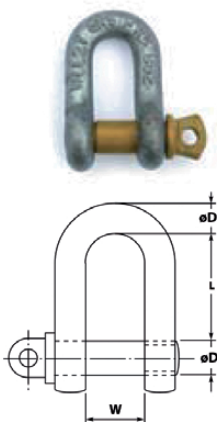


NHS1512

# GRADE S TESTED DEE SHACKLES

Rated to AS2741

Yellow screw pin



Product Code	Breaking Load (kN)	D	W	L	Suit Hose Restraint
DS075	44	8	13	31	10-14mm
					14-19mm
					19-28mm
DS100	58	10	17	37	28-40mm
					40-50mm
					50-60mm
					60-70mm
					70-85mm
DS200	118	13	21	48	85-100mm 100-120mm
DS325	189	16	27	61	120-150mm 150-190mm



# NOTES

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**Vilno Group Pty Ltd T/As National Cable Grips**

16 Yulong Close Moorebank NSW 2170

**Ph.** 02 9600 8488

**Email.** [service@vilno.com.au](mailto:service@vilno.com.au) **Web.** [ncg.com.au](http://ncg.com.au)



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