

4SH

4SH



	High Pressure Multispiral Hose EN 856 4SH. ISO 3862-1 4SH (MSHA) HOS-4SH...A-STM	64	JIC 37° Hose Connectors	76 - 77
	Internal & External Skive Swage Ferrule for Spiral Hose Type HOS-4SP HF-5002	64	Straight Insert with Female UN/UNF Thread and JIC 37° Female Conical Bore DKJ	76
	Mobile Interlocking Protection Ring AS...-PEK	65	45° Elbow Insert with Female UN/UNF Thread and JIC 37° Female Conical Bore DKJ 45°	77
	Mobile Interlocking Protection Ring Assembly Tools (Conical Sleeve and Plastic Slider) AS...-AT	65	90° Elbow Insert with Female UN/UNF Thread and JIC 37° Female Conical Bore DKJ 90°	77
Metric Thread Hose Connectors (Light and Heavy Series)		66 - 73	ORFS Hose Connectors 78 - 79	
	Straight Insert with Male Metric Thread and 24° Conical Bore CEL (Light Series)	66	Straight Insert with Female UN/UNF Thread for O-Ring Face Seal Connection ORS	78
	Straight Insert with Male Metric Thread and 24° Conical Bore CES (Heavy Series)	67	45° Elbow Insert with Female UN/UNF Thread for O-Ring Face Seal Connection ORS 45°	78
	Straight Insert with Female Metric Nut Thread and 24° Taper / O-Ring DKOL (Light Series)	68	90° Elbow Insert with Female UN/UNF Thread for O-Ring Face Seal Connection ORS 90°	79
	Straight Insert with Female Metric Nut Thread and 24° Taper / O-Ring DKOS (Heavy Series)	69	SAE Code 61 & Code 62 Hose Connectors (3000 PSI and 6000 Series) 80 - 85	
	45° Elbow Insert with Female Metric Nut Thread and 24° Taper / O-Ring DKOL 45° (Light Series)	70	Straight Insert with SAE Flange Adaptor SFL (3000 PSI Series)	80
	45° Elbow Insert with Female Metric Nut Thread and 24° Taper / O-Ring DKOS 45° (Heavy Series)	71	Straight Insert with SAE Flange Adaptor SFS (6000 PSI Series)	81
	90° Elbow Insert with Female Metric Nut Thread and 24° Taper / O-Ring DKOL 90° (Light Series)	72	45° Elbow Insert with SAE Flange Adaptor SFL 45° (3000 PSI Series)	82
	90° Elbow Insert with Female Metric Nut Thread and 24° Taper / O-Ring DKOS 90° (Heavy Series)	73	45° Elbow Insert with SAE Flange Adaptor SFS 45° (6000 PSI Series)	83
BSPP Thread Hose Connectors		74 - 75	90° Elbow Insert with SAE Flange Adaptor SFL 90° (3000 PSI Series)	84
	Straight Insert with Male BSPP Thread and 60° Conical Bore AGR	74	90° Elbow Insert with SAE Flange Adaptor SFS 90° (6000 PSI Series)	85
	Straight Insert with Female BSPP Thread and 60° Taper DKR	74	Hose Assemblies for Types HOS-4SH Order Codes - Same Fitting Type and Connection Size 87	
	45° Elbow Insert with Female BSPP Thread and 60° Taper DKR 45°	75	Hose Assemblies for Types HOS-4SH Order Codes - Different Fitting Type or/and Connection Size 88 - 89	
	90° Elbow Insert with Female BSPP Thread and 60° Taper DKR 90°	75		



High Pressure Multispiral Hose

EN 856 4SH. ISO 3862-1 4SH (MSHA)

Type HOS-4SH...-A-STM



4SH

Product Description

High pressure hydraulic hose. Suitable for conveying petroleum based hydraulic fluids, synthetic esters, biodegradable hydraulic fluids, water glycol based fluids and air. All STAUFF Flex Spiral hose is fully branded Flame Resistant US MSHA approval NO.IC-8/19



Technical Features

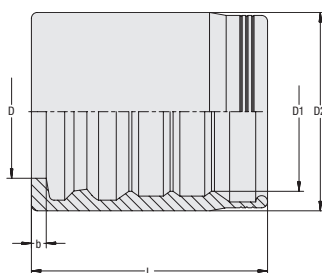
Tube Material	Synthetic rubber, resistant against hydraulic fluids (HL, HLP, HLPD, HVLP, HFA, HFAS, HFB, HFC)
Reinforcement	Four high tensile steel wire spiral layers
Hose Cover Material	Abrasion and ozone resistant synthetic rubber MSHA Approved IC-8/19
Working Temperature	-40°C to +121°C / -40°F to +249.8°F

Item No.	Designation	ID			OD		Working Pressure		Burst Pressure	Bend Radius	Weight	Crimp Dia ¹	External Skive	Internal Skive	
		DN	Dash	Inch	mm	Wire OD mm	Cover OD mm	bar							PSI
2020000272	HOS-4SH-19-A-STM	19	-12	3/4	19.0	28.4	32.2	420	6090	1680	280	1.53	35.2	41	13.2
2020000293	HOS-4SH-25-A-STM	25	-16	1	25.4	35.2	38.7	380	5510	1520	340	2.06	41.8	47	13
2020000312	HOS-4SH-31-A-STM	31	-20	1-1/4	31.8	41.9	45.5	345	5002	1380	460	2.46	50.7	56	16

¹ Crimp Diameter is for reference only, more information in Swaging Guide on Page 102

Internal & External Skive Swage Ferrule for Spiral Hose

Series 5002



Technical Features

Ferrule Type	with Pull-Out Protection (Interlock)
Suitable Hose Type	4SH
Standards	EN 856
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Working Pressure	Maximum working pressures depending on type of hose connector and hose type.

Item No.	Designation	Hose Size			Hose Type	Dimensions (mm/in)					Weight (kg/lbs) ca. per 100
		DN	Inch	Dash		D	D1	D2	L	b	
6100095095	HF-5002-19-W3	19	3/4	-12	4SH	25.5	30.2	39.0	50.0	3.0	15.5
						1.00	1.19	1.54	1.97	.12	34.18
6100095096	HF-5002-25-W3	25	1	-16	4SH	31.0	36.7	46.0	60.0	3.7	22.9
						1.22	1.44	1.81	2.36	.15	50.49
6100095097	HF-5002-31-W3	31	1-1/4	-20	4SH	39.2	47.0	57.0	65.0	4.0	34.1
						1.54	1.85	2.24	2.56	.16	75.19



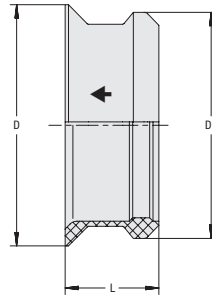
Mobile Interlocking Protection Ring

STAUFF's mobile interlocking protection offers a smart, off-the-shelf solution that transforms a standard ECOVOS hose insert into an interlock connector. This innovation minimizes the need for additional connector inventory, streamlining operations and reducing stock complexity. To ensure quick availability, all nominal widths are now offered in two versions: a standard and an interlock version. With the mobile interlocking protection, only standard ECOVOS hose inserts are required, reducing the number of components by over 50%.

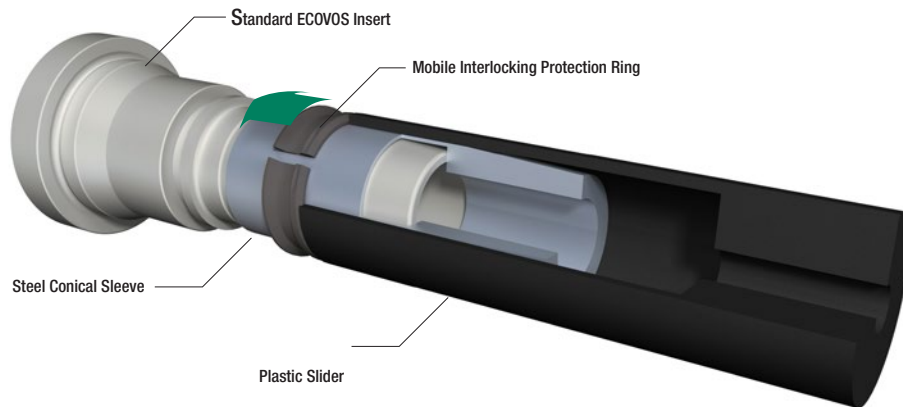
Whether you're working with textile hoses, skived and non-skived hoses with wire mesh, or multispiral hoses for interlock applications, the same connector system applies across all uses. This approach simplifies inventory management, lowers initial investment and storage costs, and offers greater space efficiency—especially for hydraulic express services with mobile workshops.

The modular system's flexibility gives customers a significant advantage, allowing them to create custom interlocking hose connections with a standard ECOVOS hose insert, the mobile interlocking protection ring in sizes 19, 25, 31), and the appropriate swage ferrule from the ECOVOS+ range. It's the ideal solution for maximizing coverage while minimizing components and costs.

Mobile Interlocking Protection Ring Type AS



Item No.	Designation	Hose Size			Dimensions (mm/in)							Weight (kg/lbs) ca. per 100
		DN	Inch	Dash	D	D1	D2	D3	L	L1		
6100087082	HCE-AS-19-PEK	19	3/4	-12	24.0	20.1	18.5	22.5	9.5	5.9	9.6	
					.94	.79	.73	.89	.37	.23	21.17	
6100067262	HCE-AS-25-PEK	25	1	-16	30.0	26.7	25.2	29.1	9.5	5.9	11.9	
					1.18	1.05	.99	1.15	.37	.23	26.24	
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	37.5	33.4	31.8	36.1	11.5	7.8	20.2	
					1.48	1.31	1.25	1.42	.45	.31	44.54	



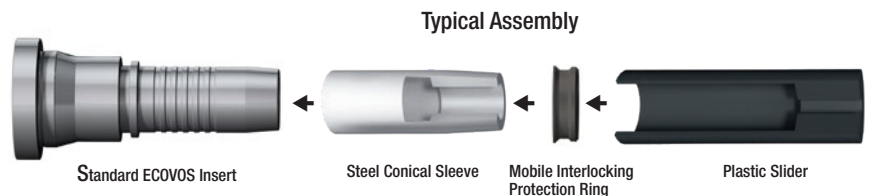
How to assemble

Simple and quick to use: with the appropriate assembly tools (Conical Sleeve and Plastic Slider), the assembly of the Mobile Interlocking Protection Ring is no trouble at all.

The Mobile Interlocking Protection Ring is pushed over the Steel Conical Sleeve using the Plastic Slider until it reaches the end position where it engages securely with a positive fit.

Swaging with a skived spiral hose and ferrule is subsequently performed as usual with the same tools and machines.

Assembly Tools (Steel Conical Sleeve and Plastic Slider) Type AS-.-AT



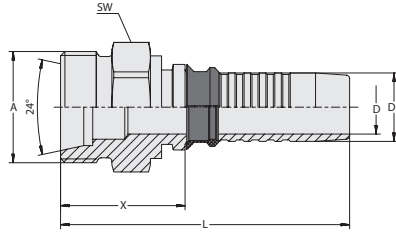
Item No.	Designation	Hose Size		
		DN	inch	Dash
6100128420	HCE-AS-19-AT	19	3/4	-12
6100128421	HCE-AS-25-AT	25	1	-16
6100128422	HCE-AS-31-AT	31	1-1/4	-20



Assembly Tools (Steel Conical Sleeve and Plastic Slider) are available in kit on request.



Straight Insert with Male Metric Thread and 24° Conical Bore Type CE-..L (Light Series)



Technical Features

Suitable Hose Type	4SH
Connection Type	Male Metric Thread
Sealing Type	24° Conical Bore (Shape W acc. to DIN 3861)
Standard	ISO 8434-1
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector



Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)					Weight (kg/lbs) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	SW (Hex)	
6100096333	HCS-19-CE-22L-M-W3	19	3/4	-12	M30x2	-12	4SH	280	14.8	19.1	32.5	78.5	30.0	13.2
								4061	.58	.75	1.28	3.09	1.18	29.00
6100096502	HCS-25-CE-28L-M-W3	25	1	-16	M36x2	-16	4SH	200	20.0	25.9	34.5	89.5	36.0	23.0
								2901	.79	1.02	1.36	3.52	1.42	50.60
6100096642	HCS-31-CE-35L-M-W3	31	1-1/4	-20	M45x2	-20	4SH	175	26.0	32.5	39.5	99.5	46.0	38.5
								2538	1.02	1.28	1.56	3.92	1.81	84.89

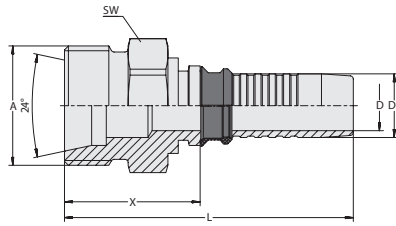
Mobile Interlocking Protection Ring Type AS



Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



**Straight Insert with Male Metric Thread and 24° Conical Bore
Type CE-..S (Heavy Series)**

Technical Features

Suitable Hose Type	4SH
Connection Type	Male Metric Thread
Sealing Type	24° Conical Bore (Shape W acc. to DIN 3861)
Standard	ISO 8434-1
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector



Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)					Weight (%/lbs) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	SW (Hex)	
6100096328	HCS-19-CE-20S-M-W3	19	3/4	-12	M30x2	-10	4SH	420	14.8	19.1	34.5	80.5	30.0	14.8
								6092	.58	.75	1.36	3.17	1.18	32.63
6100096335	HCS-19-CE-25S-M-W3	19	3/4	-12	M36x2	-12	4SH	420	14.8	19.1	37.5	83.5	36.0	20.4
								6092	.58	.75	1.48	3.29	1.42	44.87
6100096499	HCS-25-CE-25S-M-W3	25	1	-16	M36x2	-12	4SH	420	20.0	25.9	38.5	93.5	36.0	25.5
								6092	.79	1.02	1.52	3.68	1.42	56.23
6100096504	HCS-25-CE-30S-M-W3	25	1	-16	M42x2	-16	4SH	420	20.0	25.9	42.5	97.5	46.0	36.4
								6092	.79	1.02	1.67	3.84	1.81	80.26
6100096506	HCS-25-CE-38S-M-W3	25	1	-16	M52x2	-20	4SH	420	20.0	25.9	46.5	101.5	55.0	55.7
								6092	.79	1.02	1.83	4.00	2.17	122.71
6100096644	HCS-31-CE-38S-M-W3	31	1-1/4	-20	M52x2	-20	4SH	420	26.0	32.5	47.5	107.5	55.0	57.30
								6092	1.02	1.28	1.87	4.23	2.17	126.35

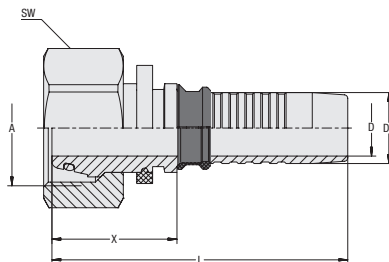
**Mobile Interlocking Protection Ring
Type AS**


Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



Straight Insert with Female Metric Nut Thread and 24° Taper / O-Ring Type DKO-..L (Light Series)



Technical Features

Suitable Hose Type	4SH
Connection Type	Female Metric Nut Thread
Sealing Type	24° Taper with O-Ring
Standard	ISO 8434-1
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Sealing Material	NBR (Buna-N®)
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

4SH

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)					Weight (^{kg} /lbs) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	SW (Hex)	
6100096365	HCS-19-DKO-18L-W-OR-B-M-W3	19	3/4	-12	M26x1.5	-10	4SH	280	14.8	19.1	25.5	71.5	32.0	14.4
								4061	.58	.75	1.00	2.81	1.26	31.64
6100060509	HCS-19-DKO-22L-S-OR-B-M-W3	19	3/4	-12	M30x2	-12	4SH	280	14.8	19.1	30.0	76.0	36.0	18.4
								4061	.58	.75	1.18	2.99	1.42	40.57
6100096396	HCS-19-DKO-28L-S-OR-B-M-W3	19	3/4	-12	M36x2	-16	4SH	280	14.8	19.1	34.0	78.0	41.0	25.0
								4061	.58	.75	1.34	3.07	1.61	55.13
6100096529	HCS-25-DKO-22L-S-OR-B-B-W3	25	1	-16	M30x2	-12	4SH	200	20.0	25.9	45.0	100.0	36.0	32.7
								2901	.79	1.02	1.77	3.94	1.42	72.10
6100049574	HCS-25-DKO-28L-S-OR-B-M-W3	25	1	-16	M36x2	-16	4SH	200	20.0	25.9	33.0	88.0	41.0	28.0
								2901	.79	1.02	1.30	3.46	1.61	61.74
6100096558	HCS-25-DKO-35L-S-OR-B-M-W3	25	1	-16	M45x2	-20	4SH	200	20.0	25.9	36.0	91.0	50.0	42.2
								2901	.79	1.02	1.42	3.58	1.97	92.94
6100096672	HCS-31-DKO-28L-S-OR-B-B-W3	31	1-1/4	-20	M30x2	-16	4SH	175	26.0	32.5	47.5	107.5	50.0	47.3
								2538	1.02	1.28	1.87	4.23	1.97	104.30
2012032256	HCS-31-DKO-35L-S-OR-B-M-W3	31	1-1/4	-20	M45x2	-20	4SH	175	26.0	32.5	37.0	97.0	50.0	43.8
								2538	1.02	1.28	1.46	3.82	1.97	96.47
6100096698	HCS-31-DKO-42L-S-OR-B-B-W3	31	1-1/4	-20	M52x2	-24	4SH	175	26.0	32.5	55.0	115.0	60.0	73.8
								2538	1.02	1.28	2.17	4.53	2.36	162.73

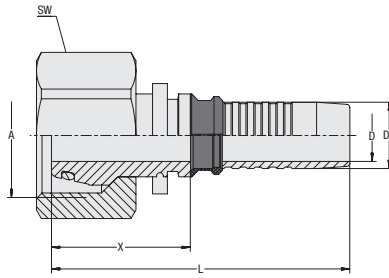
Mobile Interlocking Protection Ring Type AS



Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



**Straight Insert with Female Metric Nut Thread and 24° Taper / O-Ring
Type DKO-..S (Heavy Series)**

Technical Features

Suitable Hose Type	4SH
Connection Type	Female Metric Nut Thread
Sealing Type	24° Taper with O-Ring
Standard	ISO 8434-1
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Sealing Material	NBR (Buna-N®)
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

4SH

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)					Weight (^{kg} /lbs) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	SW (Hex)	
6100096390	HCS-19-DKO-25S-S-OR-B-M-W3	19	3/4	-12	M36x2	-12	420	14.8	19.1	37.0	83.0	41	27.2	
								6092	.58	.75	1.46	3.27	1.61	59.98
6100099052	HCS-19-DKO-25S-S-OR-B-M-W3-SW46	19	3/4	-12	M36x2	-12	420	14.8	19.1	37.0	83.0	46	35.0	
								6092	.58	.75	1.46	3.27	1.81	77.18
6100096553	HCS-25-DKO-30S-S-OR-B-M-W3	25	1	-16	M42x2	-16	420	20.0	25.9	40.0	95.0	50	45.4	
								6092	.79	1.02	1.57	3.74	1.97	100.11
6100096693	HCS-31-DKO-38S-S-OR-B-M-W3	31	1-1/4	-20	M52x2	-20	420	26.0	32.5	47.0	107.0	60	69.0	
								6092	1.02	1.28	1.85	4.21	2.36	152.15

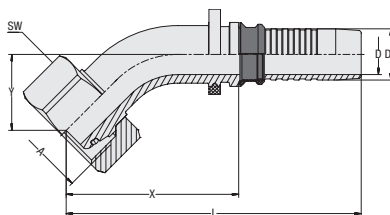
**Mobile Interlocking Protection Ring
Type AS**


Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



45° Elbow Insert with Female Metric Nut Thread and 24° Taper / O-Ring Type DKO-..L 45° (Light Series)



Technical Features

Suitable Hose Type	4SH
Connection Type	Female Metric Nut Thread
Sealing Type	24° Taper with O-Ring
Standard	ISO 8434-1
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Sealing Material	NBR (Buna-N®)
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

4SH

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)						Weight (^{kg} /lb) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	Y	SW (Hex)	
6100096361	HCS-19-DKO-18L-045-S-OR-B-B-W3	19	3/4	-12	M26x1.5	-10	4SH	280	14.8	19.1	67.5	113.5	27.5	32.0	24.20
								4061	.58	.75	2.66	4.47	1.08	1.26	53.36
6100058578	HCS-19-DKO-22L-045-S-OR-B-M-W3	19	3/4	-12	M30x2	-12	4SH	280	14.8	19.1	67.0	113.0	25.5	36.0	25.70
								4061	.58	.75	2.64	4.45	1.00	1.42	56.67
6100096526	HCS-25-DKO-22L-045-S-OR-B-B-W3	25	1	-16	M30x2	-12	4SH	200	20.0	25.9	74.5	129.5	29.5	36.0	39.03
								2901	.79	1.02	2.93	5.10	1.16	1.42	86.06
2014901595	HCS-25-DKO-28L-045-S-OR-B-M-W3	25	1	-16	M36x2	-16	4SH	200	20.0	25.9	80.0	135.0	33.0	41.0	41.80
								2901	.79	1.02	3.15	5.31	1.30	1.61	92.17
6100096556	HCS-25-DKO-35L-045-S-OR-B-B-W3	25	1	-16	M45x2	-20	4SH	200	20.0	25.9	82.5	138.0	34.5	50.0	58.00
								2901	.79	1.02	3.25	5.43	1.36	1.97	127.89
6100096669	HCS-31-DKO-28L-045-S-OR-B-B-W3	31	1-1/4	-20	M36x2	-16	4SH	175	26.0	32.5	85.0	145.0	33.0	41.0	59.05
								2538	1.02	1.28	3.35	5.71	1.30	1.61	130.21
6100096675	HCS-31-DKO-35L-045-S-OR-B-M-W3	31	1-1/4	-20	M45x2	-20	4SH	175	26.0	32.5	99.5	159.5	39.5	50.0	70.70
								2538	1.02	1.28	3.92	6.28	1.56	1.97	155.89

Dimension Y ± 2.5 mm / .10 in

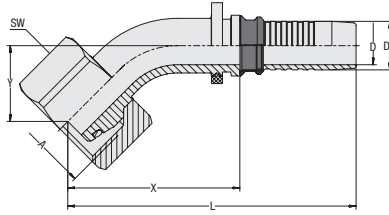
Mobile Interlocking Protection Ring Type AS



Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



**45° Elbow Insert with Female Metric Nut Thread and 24° Taper / O-Ring
Type DKO-..S 45° (Heavy Series)**

Technical Features

Suitable Hose Type	4SH
Connection Type	Female Metric Nut Thread
Sealing Type	24° Taper with O-Ring
Standard	ISO 8434-1
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Sealing Material	NBR (Buna-N®)
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

4SH

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (^{bar} /PSI)	Dimensions (^{mm} / ⁱⁿ)						Weight (^{kg} / ^{lbs}) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	Y	SW (Hex)	
6100096381	HCS-19-DKO-25S-045-S-OR-B-M-W3	19	3/4	-12	M36x2	-12	4SH	420	14.8	19.1	66.0	111.5	29.0	41	33.0
								6092	.58	.75	2.60	4.39	1.14	1.61	72.65
6100096384	HCS-19-DKO-25S-045-S-OR-B-M-W3-SW46	19	3/4	-12	M36x2	-12	4SH	420	14.8	19.1	66.0	111.5	29.0	46	33.0
								6092	.58	.75	2.60	4.39	1.14	1.81	72.77
6100096545	HCS-25-DKO-30S-045-S-OR-B-M-W3	25	1	-16	M42x2	-16	4SH	420	20.0	25.9	83.0	138.0	36.5	50	58.6
								6092	.79	1.02	3.27	5.43	1.44	1.97	129.10
6100096685	HCS-31-DKO-38S-045-S-OR-B-M-W3	31	1-1/4	-20	M52x2	-20	4SH	420	26.0	32.5	101.5	161.5	41.5	60	92.6
								6092	1.02	1.28	4.00	6.36	1.63	2.36	204.18

Dimension Y ± 2.5 mm / .10 in

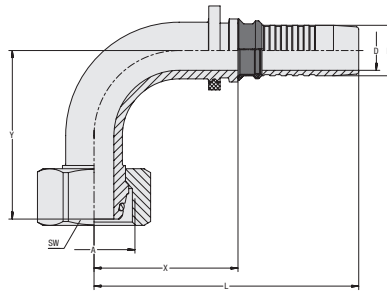
**Mobile Interlocking Protection Ring
Type AS**


Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



**90° Elbow Insert with Female Metric Nut Thread and 24° Taper / O-Ring
Type DKO-..L 90° (Light Series)**



Technical Features

Suitable Hose Type	4SH
Connection Type	Female Metric Nut Thread
Sealing Type	24° Taper with O-Ring
Standard	ISO 8434-1
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Sealing Material	NBR (Buna-N®)
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

4SH

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (^{bar} / _{PSI})	Dimensions (^{mm} / _{in})						Weight (^{kg} / _{lbs}) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	Y	SW (Hex)	
6100096362	HCS-19-DKO-18L-090-S-OR-B-B-W3	19	3/4	-12	M26x1.5	-10	4SH	280	14.8	19.1	56.0	102.0	54.0	32	26.5
								4061	.58	.75	2.20	4.02	2.13	1.26	58.43
6100060510	HCS-19-DKO-22L-090-S-OR-B-M-W3	19	3/4	-12	M30x2	-12	4SH	280	14.8	19.1	57.5	103.0	57.0	36	29.6
								4061	.58	.75	2.26	4.06	2.24	1.42	65.16
6100096395	HCS-19-DKO-28L-090-S-OR-B-B-W3	19	3/4	-12	M36x2	-16	4SH	280	14.8	19.1	63.0	109.0	61.0	41	38.9
								4061	.58	.75	2.48	4.29	2.40	1.61	85.77
6100096527	HCS-25-DKO-22L-090-S-OR-B-B-W3	25	1	-16	M30x2	-12	4SH	200	20.0	25.9	64.0	119.0	61.0	36	43.2
								2901	.79	1.02	2.52	4.69	2.40	1.42	95.15
2014901596	HCS-25-DKO-28L-090-S-OR-B-M-W3	25	1	-16	M36x2	-16	4SH	200	20.0	25.9	72.0	127.0	63.0	41	48.2
								2901	.79	1.02	2.83	5.00	2.48	1.61	106.17
6100096557	HCS-25-DKO-35L-090-S-OR-B-B-W3	25	1	-16	M45x2	-20	4SH	200	20.0	25.9	74.0	129.0	73.0	50	65.9
								2901	.79	1.02	2.91	5.08	2.87	1.97	145.20
6100096670	HCS-31-DKO-28L-090-S-OR-B-B-W3	31	1-1/4	-20	M36x2	-16	4SH	175	26.0	32.5	76.5	136.5	71.0	41	66.8
								2538	1.02	1.28	3.01	5.37	2.80	1.61	147.29
2012032236	HCS-31-DKO-35L-090-S-OR-B-M-W3	31	1-1/4	-20	M45x2	-20	4SH	175	26.0	32.5	90.5	150.5	81.0	50	82.6
								2538	1.02	1.28	3.56	5.93	3.19	1.97	182.13

Dimension Y ± 2.5 mm / .10 in

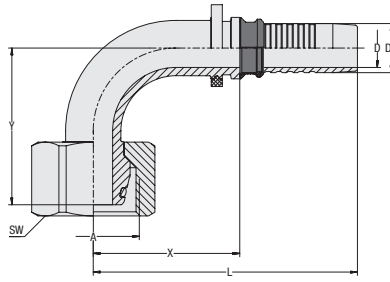
**Mobile Interlocking Protection Ring
Type AS**



Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



**90° Elbow Insert with Female Metric Nut Thread and 24° Taper / O-Ring
Type DKO-..S 90° (Heavy Series)**

Technical Features

Suitable Hose Type	4SH
Connection Type	Female Metric Nut Thread
Sealing Type	24° Taper with O-Ring
Standard	ISO 8434-1
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Sealing Material	NBR (Buna-N®)
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

4SH

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (^{bar} / _{PSI})	Dimensions (^{mm} / _{in})						Weight (^{kg} / _{lbs}) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	Y	SW (Hex)	
6100096386	HCS-19-DKO-25S-090-S-OR-B-M-W3	19	3/4	-12	M36x2	-12	4SH	420	14.8	19.1	57.0	102.5	58.5	41	37.5
								6092	.58	.75	2.24	4.04	2.30	1.61	82.69
6100099050	HCS-19-DKO-25S-090-S-OR-B-M-W3-SW46	19	3/4	-12	M36x2	-12	4SH	420	14.8	19.1	57.0	102.5	58.5	46	37.5
								6092	.58	.75	2.24	4.04	2.30	1.81	82.69
6100096549	HCS-25-DKO-30S-090-S-OR-B-M-W3	25	1	-16	M42x2	-16	4SH	420	20.0	25.9	70.5	125.5	74.0	50	66.2
								6092	.79	1.02	2.78	4.94	2.91	1.97	145.86
6100096689	HCS-31-DKO-38S-090-S-OR-B-M-W3	31	1-1/4	-20	M52x2	-16	4SH	420	26.0	32.5	88.0	147.5	87.0	60	105.6
								6092	1.02	1.28	3.46	5.81	3.43	2.36	232.74

Dimension Y ± 2.5 mm / .10 in

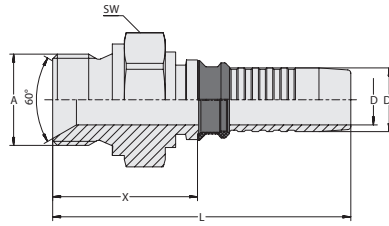
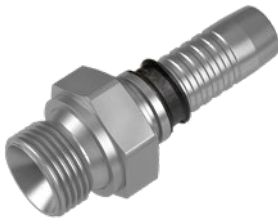
**Mobile Interlocking Protection Ring
Type AS**


Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



Straight Insert with Male BSPP Thread and 60° Conical Bore Type AGR



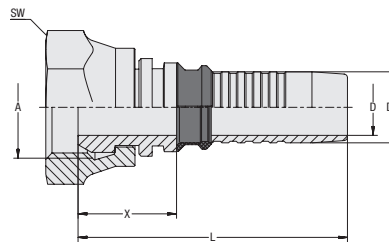
Technical Features

Suitable Hose Type	4SH
Connection Type	Male BSPP Thread
Sealing Type	60° Conical Bore
Standard	ISO 8434-6, BS 5200
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

4SH

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)					Weight (kg/lbs) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	SW (Hex)	
6100096315	HCS-19-AGR-12-M-W3	19	3/4	-12	G 3/4	-12	4SH	250	14.8	19.1	38.0	84.0	32	16.6
								3625	.58	.75	1.50	3.31	1.26	36.60
6100096489	HCS-25-AGR-16-M-W3	25	1	-16	G 1	-16	4SH	200	20.0	25.9	43.0	98.5	41	30.8
								2900	.79	1.02	1.69	3.88	1.61	67.91
6100096632	HCS-31-AGR-20-M-W3	31	1-1/4	-20	G 1-1/4	-20	4SH	180	26.0	32.5	46.5	106.5	50	47.1
								2610	1.02	1.28	1.83	4.19	1.97	103.90

Straight Insert with Female BSPP Thread and 60° Taper Type DKR



Technical Features

Suitable Hose Type	4SH
Connection Type	Female BSPP Nut Thread
Sealing Type	60° Taper
Standard	ISO 8434-6, BS 5200
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Assembly	Ordered separately with corresponding hose connector

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)					Weight (kg/lbs) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	SW (Hex)	
6100060726	HCS-19-DKR-12-C-M-W3	19	3/4	-12	G 3/4	-12	4SH	250	14.8	19.1	24.5	70.5	32	14.5
								3625	.58	.75	.96	2.78	1.26	31.86
6100060725	HCS-25-DKR-16-C-M-W3	25	1	-16	G 1	-16	4SH	200	20.0	25.9	25.0	80.5	41	22.5
								2900	.79	1.02	.98	3.17	1.61	49.61
6100096708	HCS-31-DKR-20-W-M-W3	31	1-1/4	-20	G 1-1/4	-20	4SH	180	26.0	32.5	32.0	92.0	50	48.7
								2610	1.02	1.28	1.26	3.62	1.97	107.38

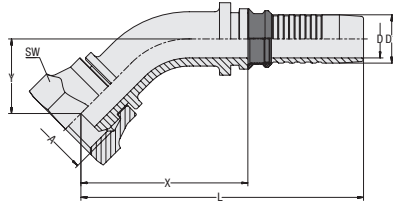
Mobile Interlocking Protection Ring Type AS



Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



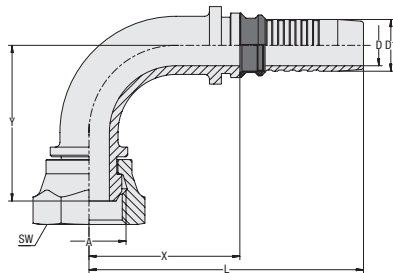
**45° Elbow Insert with Female BSPP Thread and 60° Taper
Type DKR 45°**

Technical Features

Suitable Hose Type	4SH
Connection Type	Female BSPP Nut Thread
Sealing Type	60° Taper
Standard	ISO 8434-6, BS 5200
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector



Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)						Weight (kg/lbs) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	Y	SW (Hex)	
6100096408	HCS-19-DKR-12-045-C-M-W3	19	3/4	-12	G 3/4	-12	4SH	250 3625	14.8 .58	19.1 .75	63.5 2.50	109.5 4.31	31.0 1.22	32 1.26	24.8 54.57
6100096567	HCS-25-DKR-16-045-C-M-W3	25	1	-16	G 1	-16	4SH	200 2900	20.0 .79	25.9 1.02	89.0 3.50	144.0 5.67	38.0 1.50	41 1.61	48.0 105.73

Dimension Y ± 2.5 mm / .10 in

**90° Elbow Insert with Female BSPP Thread and 60° Taper
Type DKR 90°**

Technical Features

Suitable Hose Type	4SH
Connection Type	Female BSPP Nut Thread
Sealing Type	60° Taper
Standard	ISO 8434-6, BS 5200
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Connwctor Assembly	Ordered separately with corresponding hose connector

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)						Weight (kg/lbs) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	Y	SW (Hex)	
6100060724	HCS-19-DKR-12-090-C-M-W3	19	3/4	-12	G 3/4	-12	4SH	250 3625	14.8 .58	19.1 .75	50.0 1.97	94.3 3.71	52.0 2.05	32 1.26	22.2 48.95
6100060722	HCS-25-DKR-16-090-C-M-W3	25	1	-16	G 1	-16	4SH	200 2900	20.0 .79	25.9 1.02	75.5 2.97	130.5 5.14	73.5 2.89	41 1.61	58.1 128.11

Dimension Y ± 2.5 mm / .10 in

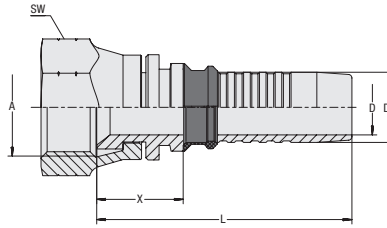
**Mobile Interlocking Protection Ring
Type AS**


Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



Straight Insert with Female UN/UNF Thread and JIC 37° Female Conical Bore Type DKJ



Technical Features

Suitable Hose Type	4SH
Connection Type	Female UN/UNF Nut Thread
Sealing Type	JIC 37° Female Conical Bore
Standard	ISO 8434-2
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector



Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)					Weight (kg/lbs) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	SW (Hex)	
6100096341	HCS-19-DKJ-10-C-M-W3	19	3/4	-12	7/8-14 UNF	-10	4SH	210	14.8	19.1	22.3	66.6	27	13.5
								3000	.58	.75	.88	2.62	1.06	29.77
6100034506	HCS-19-DKJ-12-C-M-W3	19	3/4	-12	1-1/16-12 UN	-12	4SH	210	14.8	19.1	22.6	66.9	32	12.9
								3000	.58	.75	.89	2.63	1.26	28.44
6100096351	HCS-19-DKJ-16-C-M-W3	19	3/4	-12	1-5/16-12 UN	-16	4SH	210	14.8	19.1	24.3	68.6	41	20.0
								3000	.58	.75	.96	2.70	1.61	44.10
6100034507	HCS-25-DKJ-16-C-M-W3	25	1	-16	1-5/16-12 UN	-16	4SH	170	20.0	25.9	24.8	79.1	41	24.0
								2500	.79	1.02	.98	3.11	1.61	52.92
6100096650	HCS-31-DKJ-20-W-M-W3	31	1-1/4	-20	1-5/8-12 UN	-20	4SH	140	26.0	32.5	28.1	86.0	50	43.2
								2000	1.02	1.28	1.11	3.39	1.97	95.26

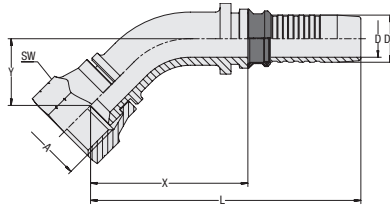
Mobile Interlocking Protection Ring Type AS



Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



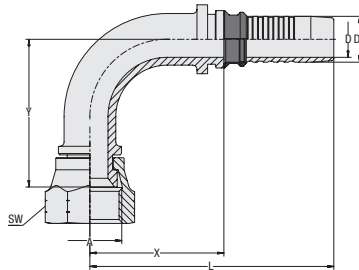
**45° Elbow Insert with Female UN/UNF Thread and JIC 37° Female Conical Bore
Type DKJ 45°**

Technical Features

Suitable Hose Type	4SH
Connection Type	Female UN/UNF Nut Thread
Sealing Type	JIC 37° Female Conical Bore
Standard	ISO 8434-2
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

4SH

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)					Weight (kg/lbs) ca. per 100	
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	Y		SW (Hex)
6100096342	HCE-19-DKJ-12-045-C-M-W3	19	3/4	-12	1-1/16-12 UN	-12	4SH	210	14.8	19.1	60.2	106.0	27.5	32	23.8
								3000	.58	.75	2.37	4.17	1.08	1.26	52.37

Dimension Y ± 2.5 mm / .10 in

**90° Elbow Insert with Female UN/UNF Thread and JIC 37° Female Conical Bore
Type DKJ 90°**

Technical Features

Suitable Hose Type	4SH
Connection Type	Female UN/UNF Nut Thread
Sealing Type	JIC 37° Female Conical Bore
Standard	ISO 8434-2
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)					Weight (kg/lbs) ca. per 100	
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	Y		SW (Hex)
6100034503	HCE-19-DKJ-12-090-C-M-W3	19	3/4	-12	1-1/16-12 UN	-12	4SH	210	14.8	19.1	54.0	100.0	54.5	32	28.1
								3000	.58	.75	2.13	3.94	2.15	1.26	61.85
6100034504	HCE-25-DKJ-16-090-C-M-W3	25	1	-16	1-5/16-12 UN	-16	4SH	170	20.0	25.9	72.0	126.3	67.0	41	43.0
								2500	.79	1.02	2.83	4.97	2.64	1.61	94.82
6100096648	HCE-31-DKJ-20-090-W-M-W3	31	1-1/4	-20	1-5/8-12 UN	-20	4SH	140	26.0	32.5	91.5	151.5	99.0	50	102.7
								2000	1.02	1.28	3.60	5.96	3.90	1.97	226.34

Dimension Y ± 2.5 mm / .10 in

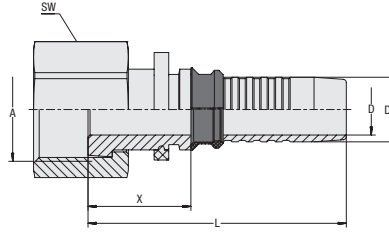
**Mobile Interlocking Protection Ring
Type AS**


Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



Straight Insert with Female UN/UNF Thread for O-Ring Face Seal Connection Type ORS



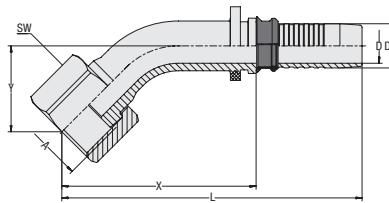
Technical Features

Suitable Hose Type	4SH
Connection Type	Female UN/UNF Nut Thread
Sealing Type	O-Ring Face Seal
Standard	ISO 8434-3
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector



Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)					Weight (kg/lbs) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	SW (Hex)	
6100096432	HCS-19-ORS-12-S-M-W3	19	3/4"	-12	1 3/16"-12 UN	-12	4SH	413	14.8	19.1	41.6	87.6	36	22.8
								6000	.58	.75	1.64	3.45	1.42	.90
6100096586	HCS-25-ORS-16-S-M-W3	25	1"	-16	1 7/16"-12 UN	-16	4SH	345	20.0	25.9	40.3	95.5	41	33.2
								5000	.79	1.02	1.59	3.76	1.61	1.31

45° Elbow Insert with Female UN/UNF Thread for O-Ring Face Seal Connection Type ORS 45°



Technical Features

Suitable Hose Type	4SH
Connection Type	Female UN/UNF Nut Thread
Sealing Type	O-Ring Face Seal
Standard	ISO 8434-3
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)						Weight (kg/lbs) ca. per 100
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	Y	SW (Hex)	
6100116629	HCS-19-ORS-12-045-S-M-W3	19	3/4"	-12	1 3/16"-12 UN	-12	4SH	276	14.8	19.1	60.8	106.8	27.3	36	26.9
								4000	.58	.75	2.39	4.20	1.07	1.42	59.29

Dimension Y ± 2,5 mm / .10 in

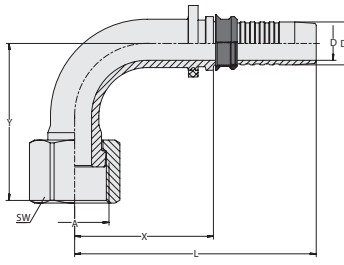
Mobile Interlocking Protection Ring Type AS



Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



**90° Elbow Insert with Female UN/UNF Thread for O-Ring Face Seal Connection
Type ORS 90°**

Technical Features

Suitable Hose Type	◆ 4SH
Connection Type	Female UN/UNF Nut Thread
Sealing Type	O-Ring Face Seal
Standard	ISO 8434-3
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector



Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)					Weight (kg/lbs) ca. per 100	
		DN	Inch	Dash	Thread	Dash			D	D1	X	L	Y		SW (Hex)
6100116630	HCS-19-ORS-12-090-S-M-W3	19	3/4"	-12	1 3/16"-12 UN	-12	◆	276	14.8	19.1	52.8	98.8	58.0	36	29.4
								4000	.58	.75	2.08	3.89	2.28	1.42	64.83
6100096717	HCS-31-ORS-20-090-S-M-W3	31	1 1/4"	-20	1 11/16"-12 UN	-20	◆	210	26.0	32.5	76.3	136.3	78.2	50	67.1
								3000	1.02	1.28	3.00	5.37	3.08	1.97	147.96

Dimension Y ± 2.5 mm / .10 in

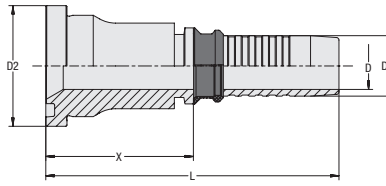
**Mobile Interlocking Protection Ring
Type AS**


Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	◆
6100067262	HCE-AS-25-PEK	25	1	-16	◆
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	◆

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



Straight Insert with SAE Flange Adaptor Type SFL (3000 PSI Series)



Technical Features

Suitable Hose Type	◆ 4SH
Connection Type	SAE Flange Adaptor
Sealing Type	O-Ring Face Seal (O-Ring not included in delivery)
Standard	SAE J 518, ISO 6162-1
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector



Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (^{bare} /PSI)	Dimensions (mm/in)					Weight (^{kg} /lbs) ca. per 100
		DN	Inch	Dash	Inch	Dash			D	D1	D2	X	L	
6100096449	HCS-19-SFL-12-M-W3	19	3/4	-12	3/4	-12	◆	345	14.8	19.1	38.1	46.5	92.5	21.2
								5000	.58	.75	1.50	1.83	3.64	46.75
6100096454	HCS-19-SFL-16-M-W3	19	3/4	-12	1	-16	◆	345	14.8	19.1	44.5	49.0	95.0	29.4
								5000	.58	.75	1.75	1.93	3.74	64.72
6100096598	HCS-25-SFL-16-M-W3	25	1	-16	1	-16	◆	345	20.0	25.9	44.5	48.0	103.0	32.9
								5000	.79	1.02	1.75	1.89	4.06	72.54
6100096603	HCS-25-SFL-20-M-W3	25	1	-16	1-1/4	-20	◆	345	20.0	25.9	50.8	68.0	123.5	49.0
								5000	.79	1.02	2.00	2.68	4.86	108.05
6100096730	HCS-31-SFL-20-M-W3	31	1-1/4	-20	1-1/4	-20	◆	272	26.0	32.5	50.8	69.5	129.5	49.9
								4000	1.02	1.28	2.00	2.74	5.10	110.03
6100096735	HCS-31-SFL-24-B-W3	31	1-1/4	-20	1-1/2	-24	◆	272	26.0	32.5	60.3	50.5	110.5	55.1
								4000	1.02	1.28	2.37	1.99	4.35	121.50

SFL - SAE Code 61 pressure rating are above standard ISO 61612-1:2002.

Mobile Interlocking Protection Ring Type AS



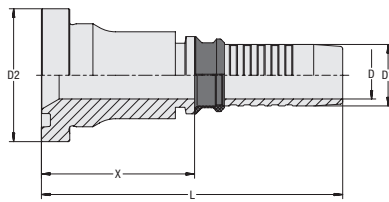
Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	◆
6100067262	HCE-AS-25-PEK	25	1	-16	◆
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	◆

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



STAUFF SAE Flanges and Accessories



**Straight Insert with SAE Flange Adaptor
Type SFS (6000 PSI Series)**

Technical Features

Suitable Hose Type	◆ 4SH
Connection Type	SAE Flange Adaptor
Sealing Type	O-Ring Face Seal (O-Ring not included in delivery.)
Standard	SAE J 518, ISO 6162-2
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

4SH

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (^{bar} /PSI)	Dimensions (mm/in)					Weight (^{kg} /lbs) ca. per 100
		DN	Inch	Dash	Inch	Dash			D	D1	D2	X	L	
6100096468	HCS-19-SFS-12-M-W3	19	3/4	-12	3/4	-12	◆	413	14.8	19.1	41.3	47.5	93.5	23.7
								6000	.58	.75	1.63	1.87	3.68	52.26
6100096476	HCS-19-SFS-16-M-W3	19	3/4	-12	1	-16	◆	413	14.8	19.1	47.6	50.0	96.0	32.8
								6000	.58	.75	1.87	1.97	3.78	72.32
6100096611	HCS-25-SFS-12-B-W3	25	1	-16	3/4	-12	◆	413	20.0	25.9	41.3	60.0	115.0	35.0
								6000	.79	1.02	1.63	2.36	4.53	77.18
6100096618	HCS-25-SFS-16-M-W3	25	1	-16	1	-16	◆	413	20.0	25.9	47.6	47.8	103.0	35.1
								6000	.79	1.02	1.87	1.88	4.06	77.40
6100096622	HCS-25-SFS-20-M-W3	25	1	-16	1-1/4	-20	◆	413	20.0	25.9	54.0	60.5	116.0	49.6
								6000	.79	1.02	2.13	2.38	4.57	109.37
2012031984	HCS-31-SFS-20-M-W3	31	1-1/4	-20	1-1/4	-20	◆	413	26.0	32.5	54.0	72.5	132.5	54.9
								6000	1.02	1.28	2.13	2.85	5.22	121.05

**Mobile Interlocking Protection Ring
Type AS**


Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	◆
6100067262	HCE-AS-25-PEK	25	1	-16	◆
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	◆

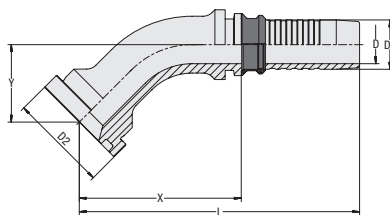
Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



STAUFF SAE Flanges and Accessories



Straight Insert with SAE Flange Adaptor Type SFL (3000 PSI Series)



Technical Features

Suitable Hose Type	4SH
Connection Type	SAE Flange Adaptor
Sealing Type	O-Ring Face Seal (O-Ring not included in delivery)
Standard	SAE J 518, ISO 6162-1
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

4SH

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)						Weight (^{kg} /lbs) ca. per 100
		DN	Inch	Dash	Inch	Dash			D	D1	D2	X	L	Y	
6100096445	HCS-19-SFL-12-045-M-W3	19	3/4	-12	3/4	-12	4SH	345	14.8	19.1	38.1	62.5	108.5	30.0	22.3
								5000	.58	.75	1.50	2.46	4.27	1.18	49.17
6100096451	HCS-19-SFL-16-045-M-W3	19	3/4	-12	1	-16	4SH	345	14.8	19.1	44.5	66.5	112.5	29.0	28.8
								5000	.58	.75	1.75	2.62	4.43	1.14	63.50
6100052710	HCS-25-SFL-16-045-M-W3	25	1	-16	1	-16	4SH	345	20.0	25.9	44.5	82.5	137.5	35.0	40.7
								5000	.79	1.02	1.75	3.25	5.41	1.38	89.74
6100096600	HCS-25-SFL-20-045-M-W3	25	1	-16	1-1/4	-20	4SH	345	20.0	25.9	50.8	92.5	147.5	37.5	48.5
								5000	.79	1.02	2.00	3.64	5.81	1.48	106.94
6100096723	HCS-31-SFL-16-045-B-W3	31	1-1/4	-20	1	-16	4SH	272	26.0	32.5	44.5	81.5	141.5	30.5	55.6
								4000	1.02	1.28	1.75	3.21	5.57	1.20	122.60
6100096726	HCS-31-SFL-20-045-M-W3	31	1-1/4	-20	1-1/4	-20	4SH	272	26.0	32.5	50.8	97.0	157.0	35.0	60.4
								4000	1.02	1.28	2.00	3.82	6.18	1.38	133.07
6100096732	HCS-31-SFL-24-045-B-W3	31	1-1/4	-20	1-1/2	-24	4SH	272	26.0	32.5	60.3	102.5	162.5	40.0	75.4
								4000	1.02	1.28	2.37	4.04	6.40	1.57	166.15

Dimension Y ± 2.5 mm / .10 in

SFL - SAE Code 61 pressure rating are above standard ISO 61612-1:2002.

Mobile Interlocking Protection Ring Type AS



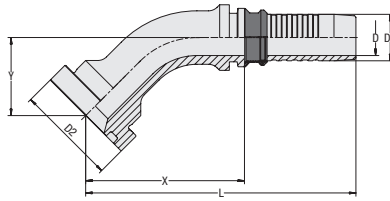
Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



STAUFF SAE Flanges and Accessories



**45° Elbow Insert with SAE Flange Adaptor
Type SFS 45° (6000 PSI Series)**

Technical Features

Suitable Hose Type	◆ 4SH
Connection Type	SAE Flange Adaptor
Sealing Type	O-Ring Face Seal (O-Ring not included in delivery.)
Standard	SAE J 518, ISO 6162-2
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector



Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (^{bar} / _{PSI})	Dimensions (mm/in)						Weight (^{kg} / _{lbs}) Ca. per 100
		DN	Inch	Dash	Inch	Dash			D	D1	D2	X	L	Y	
6100096462	HCS-19-SFS-12-045-M-W3	19	3/4	-12	3/4	-12	◆	413	14.8	19.1	41.3	65.0	111.0	32.0	25.8
								6000	.58	.75	1.63	2.56	4.37	1.26	56.89
6100096471	HCS-19-SFS-16-045-M-W3	19	3/4	-12	1	-16	◆	413	14.8	19.1	47.6	64.2	114.0	30.5	32.3
								6000	.58	.75	1.87	2.53	4.49	1.20	71.22
6100096613	HCS-25-SFS-16-045-M-W3	25	1	-16	1	-16	◆	413	20.0	25.9	47.6	83.5	138.5	36.0	43.7
								6000	.79	1.02	1.87	3.29	5.45	1.42	96.36
6100096620	HCS-25-SFS-20-045-M-W3	25	1	-16	1-1/4	-20	◆	413	20.0	25.9	54.0	97.0	152.0	41.0	58.2
								6000	.79	1.02	2.13	3.82	5.98	1.61	128.33
6100096741	HCS-31-SFS-20-045-M-W3	31	1-1/4	-20	1-1/4	-20	◆	413	26.0	32.5	54.0	101.5	161.0	40.0	67.8
								6000	1.02	1.28	2.13	4.00	6.34	1.57	149.50

Dimension Y ± 2.5 mm / .10 in

**Mobile Interlocking Protection Ring
Type AS**


Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	◆
6100067262	HCE-AS-25-PEK	25	1	-16	◆
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	◆

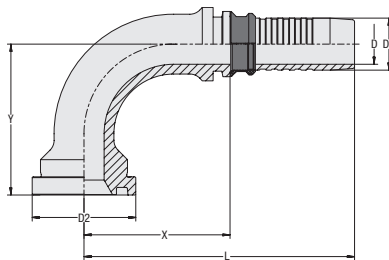
Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



STAUFF SAE Flanges and Accessories



90° Elbow Insert with SAE Flange Adaptor Type SFL 90° (3000 PSI Series)



Technical Features

Suitable Hose Type	4SH
Connection Type	SAE Flange Adaptor
Sealing Type	O-Ring Face Seal (O-Ring not included in delivery.)
Standard	SAE J 518, ISO 6162-1
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

4SH

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (bar/PSI)	Dimensions (mm/in)						Weight (kg/lbs) Ca. per 100
		DN	Inch	Dash	Inch	Dash			D	D1	D2	X	L	Y	
6100096447	HCS-19-SFL-12-090-M-W3	19	3/4	-12	3/4	-12	4SH	345	14.8	19.1	38.1	53.7	99.5	55.5	25.8
								5000	.58	.75	1.50	2.11	3.92	2.19	56.78
6100096452	HCS-19-SFL-16-090-M-W3	19	3/4	-12	1	-16	4SH	345	14.8	19.1	44.5	66.0	112.0	61.5	34.7
								5000	.58	.75	1.75	2.60	4.41	2.42	76.51
6100096457	HCS-19-SFL-20-090-B-W3	19	3/4	-12	1-1/4	-20	4SH	345	14.8	19.1	50.8	62.0	108.0	61.0	39.4
								5000	.58	.75	2.00	2.44	4.25	2.40	86.77
6100096596	HCS-25-SFL-16-090-M-W3	25	1	-16	1	-16	4SH	345	20.0	25.9	44.5	70.0	125.0	72.0	47.4
								5000	.79	1.02	1.75	2.76	4.92	2.83	104.41
6100096601	HCS-25-SFL-20-090-M-W3	25	1	-16	1-1/4	-20	4SH	345	20.0	25.9	50.8	82.0	137.0	79.0	58.0
								5000	.79	1.02	2.00	3.23	5.39	3.11	127.89
6100096606	HCS-25-SFL-24-090-B-W3	25	1	-16	1-1/2	-24	4SH	345	20.0	25.9	60.3	73.0	128.0	69.0	65.9
								5000	.79	1.02	2.37	2.87	5.04	2.72	145.20
6100096724	HCS-31-SFL-16-090-B-W3	31	1-1/4	-20	1	-16	4SH	272	26.0	32.5	44.5	75.5	135.5	68.0	63.4
								4000	1.02	1.28	1.75	2.97	5.33	2.68	139.69
6100096728	HCS-31-SFL-20-090-M-W3	31	1-1/4	-20	1-1/4	-20	4SH	272	26.0	32.5	50.8	88.5	148.5	76.5	72.7
								4000	1.02	1.28	2.00	3.48	5.85	3.01	160.30
6100096733	HCS-31-SFL-24-090-B-W3	31	1-1/4	-20	1-1/2	-24	4SH	272	26	32.5	60.3	93.5	153.5	87.0	87.9
								4000	1.02	1.28	2.37	3.68	6.04	3.43	193.82

Dimension Y ± 2.5 mm / .10 in

SFL - SAE Code 61 pressure rating are above standard ISO 6162-1:2002.

Mobile Interlocking Protection Ring Type AS



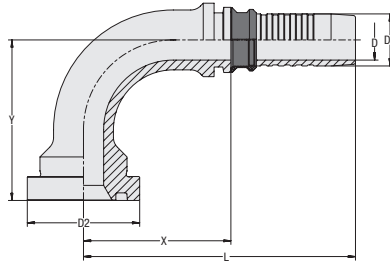
Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



STAUFF SAE Flanges and Accessories



**90° Elbow Insert with SAE Flange Adaptor
Type SFS 90° (6000 PSI Series)**

Technical Features

Suitable Hose Type	4SH
Connection Type	SAE Flange Adaptor
Sealing Type	O-Ring Face Seal (O-Ring not included in delivery.)
Standard	SAE J 518, ISO 6162-2
Material	Carbon Steel
Surface Finishing	Zinc/Nickel-Plating
Mobile Interlocking Protection Ring	Ordered separately with corresponding hose connector

4SH

Item No.	Designation	Hose Size			Connection Size		Hose Type	Working Pressure (^{bar} / ^{PSI})	Dimensions (^{mm} / ⁱⁿ)						Weight (^{kg} / ^{lbs}) ca. per 100
		DN	Inch	Dash	Inch	Dash			D	D1	D2	X	L	Y	
6100096465	HCS-19-SFS-12-090-M-W3	19	3/4	-12	3/4	-12	4SH	413	14.8	19.1	41.3	54.0	100.0	59.0	29.3
								6000	.58	.75	1.63	2.13	3.94	2.32	64.61
6100096474	HCS-19-SFS-16-090-M-W3	19	3/4	-12	1	-16	4SH	413	14.8	19.1	47.6	61.5	107.5	68.0	38.2
								6000	.58	.75	1.87	2.42	4.23	2.68	84.23
6100096610	HCS-25-SFS-12-090-B-W3	25	1	-16	3/4	-12	4SH	413	20.0	25.9	41.3	63.0	118.0	61.0	43.0
								6000	.79	1.02	1.63	2.48	4.65	2.40	94.82
6100096616	HCS-25-SFS-16-090-M-W3	25	1	-16	1	-16	4SH	413	20.0	25.9	47.6	70.5	125.5	73.0	47.4
								6000	.79	1.02	1.87	2.78	4.94	2.87	104.52
6100096621	HCS-25-SFS-20-090-M-W3	25	1	-16	1-1/4	-20	4SH	413	20.0	25.9	54.0	81.0	136.0	80.5	65.6
								6000	.79	1.02	2.13	3.19	5.35	3.17	144.65
2012031985	HCS-31-SFS-20-090-M-W3	31	1-1/4	-20	1-1/4	-20	4SH	413	26.0	32.5	54.0	88.5	148.5	84.0	79.5
								6000	1.02	1.28	2.13	3.48	5.85	3.31	175.30

Dimension Y ± 2.5 mm / .10 in

**Mobile Interlocking Protection Ring
Type AS**

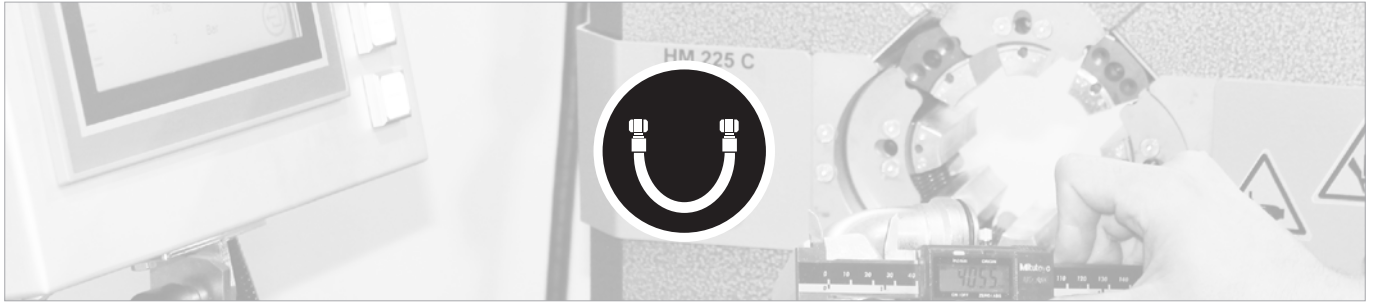

Item No.	Designation	Hose Size			Hose Type
		DN	inch	Dash	
6100087082	HCE-AS-19-PEK	19	3/4	-12	4SH
6100067262	HCE-AS-25-PEK	25	1	-16	4SH
6100104978	HCE-AS-31-PEK	31	1-1/4	-20	4SH

Refer to Page 65 for more information on typical assembly of Mobile Interlocking Protection Ring



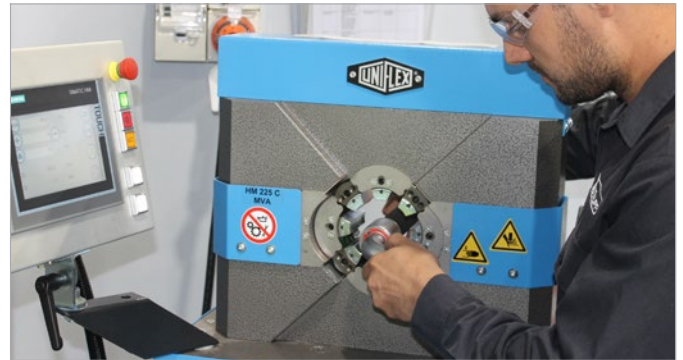
STAUFF SAE Flanges and Accessories





4SH

STAUFF Technology Centre - Hose Production



Hose production

STAUFF Technology Centre provides complete hose production capability for STAUFF Flex hydraulic hose and STAUFF Hose Connectors to meet industry applications per the following scope of capabilities:

- Hose measuring and cutting to DIN 20066 for 2" 6-wire and 3" industrial hose
- Internal and external skiver - internal 5/8" – 2" / externally 3/16" – 2"
- CNC hose crimper - range up to 1-1/4" R15 – 2" industrial hose
- Test bench - to maximum 1600 bar
- Finishing; inspecting, labelling, tagging, end cap protection

Production is carried out by qualified hose technicians using state-of-the-art assembly equipment.

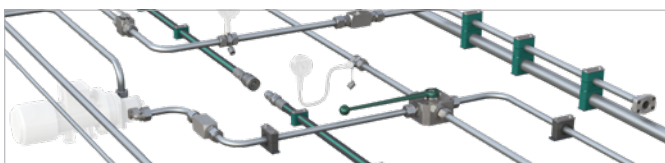
Hose accessories

A range of hose accessories are also available, e.g., various hose protection options according to MDG41 underground coal mining standard, surface mining and other industry-based standards.

Hose testing

Static pressure testing and validation certificates of each hose assembly are available according to the customer's specifications.

Contact STAUFF Technology Centre for more information.



STAUFF Line

STAUFF Technology Centre provides OEM-original equipment manufacturers, custom-designed and ready-to-install connection hydraulic lines and components as well as supplemental services.



Order Codes - Same Fitting Type and Connection Size

HAE	-	4SH	-	25	-	1500	-	DKO	S30	B	-	0	0	0	0
①		②		③		④		⑤	⑥	⑦		⑧	⑨	⑩	⑪

① Standard Hose Assembly

 Hose Connector Standard + Mobile Interlocking Protection Ring (high pressure) **HAE**
② Hose Type

 High Tensile Steel reinforced four spiral hose EN 856 4SH. ISO 3862-1 4SH (MSHA) **4SH**
③ Hose Size

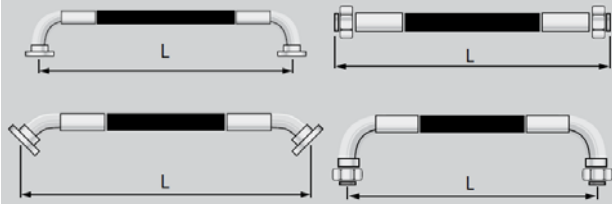
3/4" hose inside diameter	19
1" hose inside diameter	25
1-1/4" hose inside diameter	31

Assembly Length

The length of the hose in mm measured to DIN 20066 (centres).

④ Any hose longer than 99999 mm is classed as non standard. Maximum 5 digits. Refer to diagram below:

Hose assembly length (DIN 20066)



L = Hose assembly length

⑤ Fitting Type

24° Male cone metric external thread defined in L (Light) or in S (Heavy) EN8434-1 ISO17165	CE
24° Female cone O-Ring defined in L (Light) or in S (Heavy) EN8434-1 ISO17165	DKO
60° Male cone BSPP external thread EN8434-6 BS5200	AGR
60° Female cone BSPP nut thread EN8434-6 BS5200	DKR
JIC 37° Male UN/ UNF external thread EN ISO 8434-2 SAE J514	AGJ
JIC 37° Female cone UN/ UNF nut thread EN ISO8434-2 SAE J514	DKJ
Female Flat sealing UN/UNF nut thread SAE J1453	ORS
Flange Standard pressure SAE J518 (3000 PSI Series)	SFL
Flange High pressure SAE J518 (6000 PSI Series)	SFS

⑥ Connection Size

1/4 (BSPP, BSPT, NPT) 7/16 (JIC, UNF)	04
1/2 (JIC, UNF)	05
3/8 (BSPP, BSPT, NPT) 9/16 (JIC, UNF)	06
1/2 (BSPP, BSPT, NPT, SAE) 3/4 (JIC, UNF)	08
5/8 (BSPP, BSPT, NPT) 7/8 (JIC, UNF)	10
3/4 (BSPP, BSPT, NPT, SAE) 1-1/16 (JIC, UNF)	12
1 (BSPP, BSPT, NPT, SAE) 1-5/16 (JIC, UNF)	16
1-1/4 (BSPP, BSPT, NPT, SAE) 1-5/8 (JIC, UNF)	20
1-1/2 (BSPP, BSPT, NPT, SAE) 1-7/8 (JIC, UNF)	24
2 (BSPP, BSPT, NPT, SAE) 2-1/2 (JIC, UNF)	32

Metric Threads (DIN 2353 sizes)

 For Metric threads which are specified in L or S series, define Series and then size. Eg.S30 **L Series:** 06, 08, 10, 12, 15, 18, 22, 28, 35, 42. **S Series:** 06, 08, 10, 12, 14, 16, 20, 25, 30, 38

Metric Threads (non DIN sizes)

For Metric threads which are not specified in L or S series, just define the Metric size and not the pitch size. E.g. M16x1.5 = M16

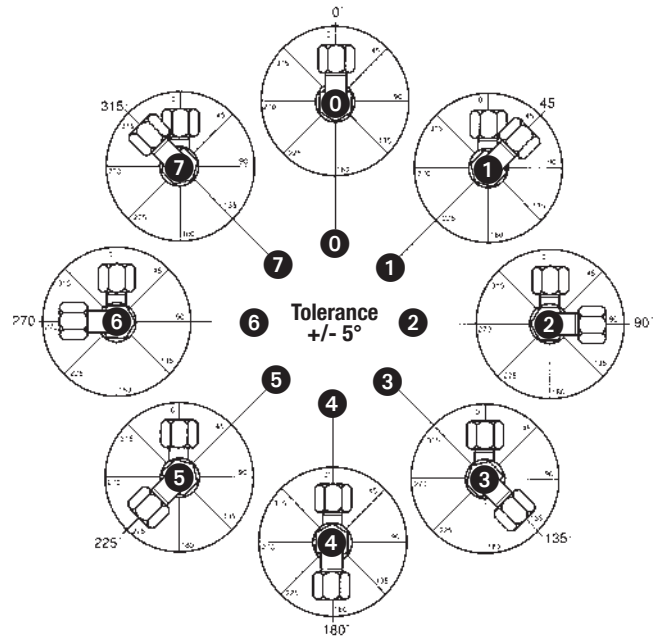
⑦ Angle of Fitting

Straight Insert	(None)
45 Degree Swept Angle Insert	A
90 Degree Swept Angle Insert	B

⑧ Basic Material Of End Connections & Ferrules

 carbon steel **0**
⑨ Orientation Settings

in line (0 degrees)	0	0
45 degree orientation	1	1
90 degree orientation	2	2
135 degree orientation	3	3
180 degree orientation	4	4
225 degree orientation	5	5
270 degree orientation	6	6
315 degree orientation	7	7


⑩ Hose Protection

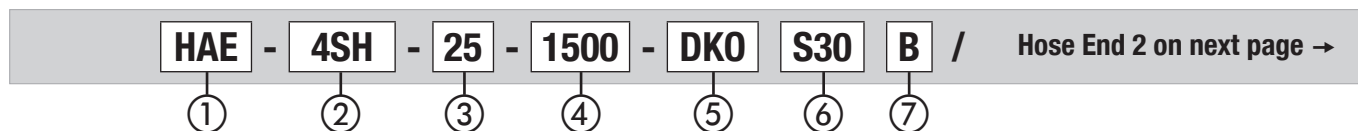
no hose protection	0
Spiral Hose Protector (HPR-SHP)	1
Hose Sleeve (HRP-SLE) (MSHA)	4
Hose Strip (HRP-STR)	8
Hose Velcro® Wrap (HRP-HVW)	9

⑪ Pressure Testing

no testing required	0
Pressure tested to country specific standard. Refer to Appendix. Supplied with certification	1
Air Pressure tested as per customer specification	2
Pressure tested (proof tested) to Mining Design Guidelines MDG41 (Australian standard for Mining Industry - Surface and Underground)	3

4SH


Order Codes - Different Fitting Type and Connection Size - Hose End 1



① Standard Hose Assembly

Hose Connector Standard + Mobile Interlocking Protection Ring (high pressure) **HAE**

② Hose Type

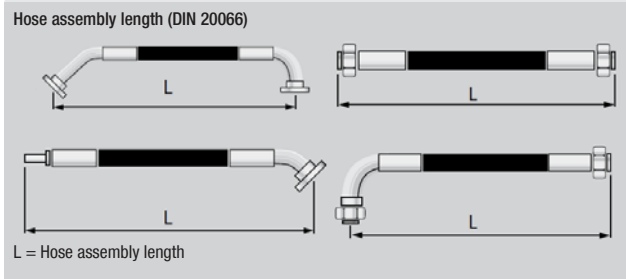
High Tensile Steel reinforced four spiral hose EN 856 4SH. ISO 3862-1 4SH (MSHA) **4SH**

③ Hose Size

3/4" hose inside diameter	19
1" hose inside diameter	25
1-1/4" hose inside diameter	31

④ Assembly Length

The length of the hose in mm measured to DIN 20066 (centres). Any hose longer than 99999 mm is classed as non standard. Maximum 5 digits. Refer to diagram below:



⑤ Fitting Type

24° Male cone metric external thread defined in L (Light) or in S (Heavy) EN8434-1 ISO17165	CE
24° Female cone O-Ring defined in L (Light) or in S (Heavy) EN8434-1 ISO17165	DKO
60° Male cone BSPP external thread EN8434-6 BS5200	AGR
60° Female cone BSPP nut thread EN8434-6 BS5200	DKR
JIC 37° Male UN/ UNF external thread EN ISO 8434-2 SAE J514	AGJ
JIC 37° Female cone UN/ UNF nut thread EN ISO8434-2 SAE J514	DKJ
Female Flat sealing UN/UNF nut thread SAE J1453	ORS
Flange Standard pressure SAE J518 (3000 PSI Series)	SFL
Flange High pressure SAE J518 (6000 PSI Series)	SFS

Note: Only define the second connection and size if different from the first connection

Order of definition of connections

If straight connection on both ends:

Define in the order of "Fitting Type" list. If the hose assembly has the same Fitting Type on both ends, define the smallest connection first.

⑥ Connection Size

1/4 (BSPP, BSPT, NPT) 7/16 (JIC, UNF)	04
1/2 (JIC, UNF)	05
3/8 (BSPP, BSPT, NPT) 9/16 (JIC, UNF)	06
1/2 (BSPP, BSPT, NPT, SAE) 3/4 (JIC, UNF)	08
5/8 (BSPP, BSPT, NPT) 7/8 (JIC, UNF)	10
3/4 (BSPP, BSPT, NPT, SAE) 1-1/16 (JIC, UNF)	12
1 (BSPP, BSPT, NPT, SAE) 1-5/16 (JIC, UNF)	16
1-1/4 (BSPP, BSPT, NPT, SAE) 1-5/8 (JIC, UNF)	20
1-1/2 (BSPP, BSPT, NPT, SAE) 1-7/8 (JIC, UNF)	24
2 (BSPP, BSPT, NPT, SAE) 2-1/2 (JIC, UNF)	32

Metric Threads (DIN 2353 sizes)

For Metric threads which are specified in L or S series, define Series and then size. Eg. S30 **L Series:** 06, 08, 10, 12, 15, 18, 22, 28, 35, 42. **S Series:** 06, 08, 10, 12, 14, 16, 20, 25, 30, 38

Metric Threads (non DIN sizes)

For Metric threads which are not specified in L or S series, just define the Metric size and not the pitch size. E.g. M16x1.5 = M16

⑦ Angle of Fitting

Straight Insert	(None)
45 Degree Swept Angle Insert	A
90 Degree Swept Angle Insert	B

If straight connection on one end and an angled connection on the other end:

Define the straight end connection first.

If angled connection on both ends:

Define in the order of "Fitting Type" list. If the hose assembly has the same Fitting Type on both ends, define the smallest connection first. If the connections are the same size, define in the order of "Angle of Fitting" list.



Order Codes - Different Fitting Type or/and Connection Size - Hose End 2

← Hose End 1 on previous page

DKO	S38	B	-	0	0	0	0
8	9	10		11	12	13	14

⑧ Fitting Type

24° Male cone metric external thread defined in L (Light) or in S (Heavy) EN8434-1 ISO17165	CE
24° Female cone O-Ring defined in L (Light) or in S (Heavy) EN8434-1 ISO17165	DKO
60° Male cone BSPP external thread EN8434-6 BS5200	AGR
60° Female cone BSPP nut thread EN8434-6 BS5200	DKR
JIC 37° Male UN/ UNF external thread EN ISO 8434-2 SAE J514	AGJ
JIC 37° Female cone UN/ UNF nut thread EN ISO8434-2 SAE J514	DKJ
Female Flat sealing UN/UNF nut thread SAE J1453	ORS
Flange Standard pressure SAE J518 (3000 PSI Series)	SFL
Flange High pressure SAE J518 (6000 PSI Series)	SFS

Note: Only define the second connection and size if different from the first connection

Order of definition of connections (see page 97 for diagrams)

If straight connection on both ends:

Define in the order of "Fitting Type" list. If the hose assembly has the same Fitting Type on both ends, define the smallest connection first.

If straight connection on one end and an angled connection on the other end:

Define the straight end connection first.

If angled connection on both ends:

Define in the order of "Fitting Type" list. If the hose assembly has the same Fitting Type on both ends, define the smallest connection first. If the connections are the same size, define in the order of "Angle of Fitting" list.

⑨ Connection Size

1/4 (BSPP, BSPT, NPT) 7/16 (JIC, UNF)	04
1/2 (JIC, UNF)	05
3/8 (BSPP, BSPT, NPT) 9/16 (JIC, UNF)	06
1/2 (BSPP, BSPT, NPT, SAE) 3/4 (JIC, UNF)	08
5/8 (BSPP, BSPT, NPT) 7/8 (JIC, UNF)	10
3/4 (BSPP, BSPT, NPT, SAE) 1-1/16 (JIC, UNF)	12
1 (BSPP, BSPT, NPT, SAE) 1-5/16 (JIC, UNF)	16
1-1/4 (BSPP, BSPT, NPT, SAE) 1-5/8 (JIC, UNF)	20
1-1/2 (BSPP, BSPT, NPT, SAE) 1-7/8 (JIC, UNF)	24
2 (BSPP, BSPT, NPT, SAE) 2-1/2 (JIC, UNF)	32

Metric Threads (DIN 2353 sizes)

For Metric threads which are specified in L or S series, define Series and then size. Eg. S38
L Series: 06, 08, 10, 12, 15, 18, 22, 28, 35, 42. **S Series:** 06, 08, 10, 12, 14, 16, 20, 25, 30, 38

Metric Threads (non DIN sizes)

For Metric threads which are not specified in L or S series, just define the Metric size and not the pitch size. E.g. M16x1.5 = M16

⑩ Angle of Fitting

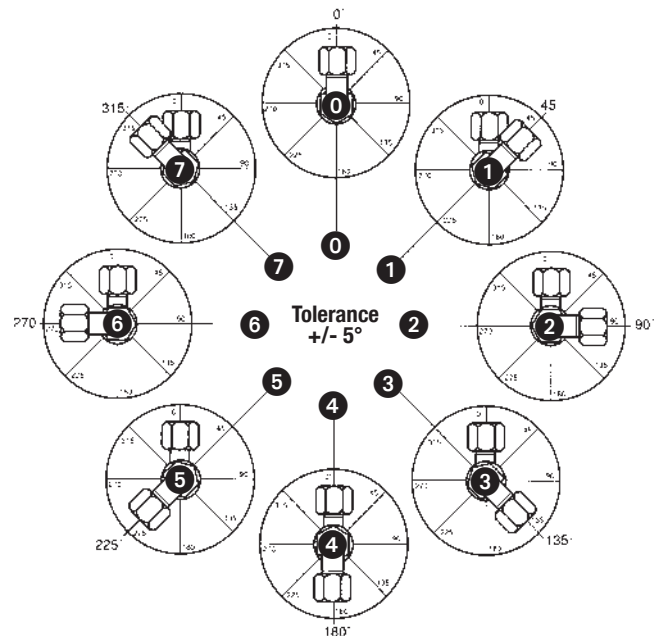
Straight Insert	(None)
45 Degree Swept Angle Insert	A
90 Degree Swept Angle Insert	B

⑪ Basic Material Of End Connections & Ferrules

carbon steel	0
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⑫ Orientation Settings

in line (0 degrees)	0	0
45 degree orientation	1	1
90 degree orientation	2	2
135 degree orientation	3	3
180 degree orientation	4	4
225 degree orientation	5	5
270 degree orientation	6	6
315 degree orientation	7	7


⑬ Hose Protection

no hose protection	0
Spiral Hose Protector (HPR-SHP)	1
Hose Sleeve (HRP-SLE) (MSHA)	4
Hose Strip (HRP-STR)	8
Hose Velcro® Wrap (HRP-HVW)	9

⑭ Pressure Testing

no testing required	0
Pressure tested to country specific standard. Refer to Appendix. Supplied with certification	1
Air Pressure tested as per customer specification	2
Pressure tested (proof tested) to Mining Design Guidelines MDG41 (Australian standard for Mining Industry - Surface and Underground)	3

4SH
