

규 격 서(구매, 제조.제작 요청용)

□ 구매개요

품명	(한글)* : CB_DB safety valve spare parts on HRS (영문) : CB_DB safety valve spare parts on HRS		
< 연구장비 또는 연구시설 관련 구매 시 추가 작성 >			
구매 종류	<input type="checkbox"/> 연구장비 <input type="checkbox"/> 연구부속장비 <input type="checkbox"/> 연구장비성능향상 <input checked="" type="checkbox"/> 연구장비수리 <input type="checkbox"/> 기타 <input type="checkbox"/> 연구시설구축 <input type="checkbox"/> 시설부속장비 <input type="checkbox"/> 시설성능향상 <input type="checkbox"/> 시설수리		
과제계획 반영여부	<input checked="" type="checkbox"/> 반영 <input type="checkbox"/> 미반영	공동활용 여부*	<input type="checkbox"/> 타부서와 공동활용 가능 <input type="checkbox"/> 타기관과 공동활용 가능 <input checked="" type="checkbox"/> 공동활용 불가능
중복 구매여부	<input type="checkbox"/> 중복 <input checked="" type="checkbox"/> 미중복		
제조사 (제조국가)	LESER (독일)	추정가격* (부가세 포함)	32,566,600원

※ * 표시 필수 입력사항

※ 3천만원 이상 또는 타기관 공동활용가능 연구장비 등 구매 완료 30일 이내 nfec-input.ntis.go.kr 등록 필수

□ 규격 및 사양(기기 구성품 또는 구매물품 내역 등)

1. Safety valve 공통 사항

- 본 물품은 극저온설치에 설치되는 장비로서 이에 합당하는 내구성 및 사양을 충족해야 함
- Certificate EN10204-3.1, Material 규격
- KGS(한국가스안전공사) 사용 승인
- Helium leak test ($\leq 5 \times 10^{-12}$ mbar l/sec) certificate 포함
- 각 valve의 사용 온도는 최대 137 ~ -270℃로 구성 되어 있으며, 각 온도에 대한 제품의 Certificate 제출해야 함.
- KSTAR HRS에 설치 된 safety valve는 대부분 독일 LESER사의 제품이며, 본 구매도 LESER 제품을 우선으로 하며, 부득이하게 그렇지 못할 경우 동등 이상 사양의 제품으로 납품 하는 것을 원칙으로 하며, 사양은 LESER 제품 기준으로 작성 되었다.
- 일반 규격 사항은 사이즈 및 압력등의 간단한 사양이며, 제품 상세 사양을 모두 만족해야 납품이 가능하다, 상세 사양은 첨부 Data sheet를 반드시 참고해야 함.

2. 규격 사항

1) 300PSV900

Sizing - Medium				
1000	Designation	Helium		
1004	Formula	He		
1001	Molar mass	M	4	kg/kmol
1002	Ratio of specific heats	k	5.400	
1003	Compressibility factor	Z	1.000	

Sizing - Service condition				
1100	Maximum allowable working pressure			
1101	Set pressure	p	9	bar-g
1102	Constant superimposed back pressure	paf		
2102	Variable superimposed back pressure			
1103	Built up back pressure	pae		
1104	Backpressure			
1105	Overpressure	dp	10.00	%
1106	Environmental pressure	pu	1.013	bar
1107	Relieving Temperature	T	-263	° C
1111	Operating Temperature		-263	° C
1108	Required massflow	qm,ab	19,198	kg/h
1109	Volume flow to be discharged (working condition)	qvb,ab	371.136	m ³ /h
1110	Volume flow to be discharged (std condition) [T=60 ° F P=14.7 psi]	qvn,ab	66,893.9 74	SCFM
1120	Rupture disc correction factor	Kc	1.000	

Sizing - Calculation				
1200	Certified massflow	qm,zu	31,368.615	kg/h
1201	Certified volumeflow (operating condition)	qvb,zu	606.419	m ³ /h
1203	Certified volumeflow (standard condition)	qvn,zu	185,729.069	m ³ /h
1204	Maximum mass flow	qm,max	34,854.016	kg/h
1205	Maximum volume flow (working condition)	qvb,max	673.799	m ³ /h
1206	Maximum volume flow (standard condition)	qvn,max	206,365.632	m ³ /h
1207	Capacity exceed		63.40	%

Valve - General				
1500	Article number		4414.5712	
1512	Reseller article number			
1513	Quantity of safety valve		1	
1501	Certified coefficient of discharge for steam and gases	K,DG	0.699	
1502	Certified coefficient of discharge for liquid	K,F	0.521	
1453	Orifice		K	
1505	Bonnet / Lifting device		Cap H2	
1506	Body-/ Inlet base material		1.4408 / SA 351 CF8M	
1511	Bonnet		Closed Bonnet	

Inlet connection				
1303	Connection standard	acc. to ASME B16.5		
1304	DN / NPS	2"		
1305	PN / PR	#150		
1306	Flange facing	RF		
Lift				
1507	Standard		11.2	mm

Outlet connection				
1353	Connection standard	acc. to ASME B16.5		
1354	DN / NPS	3"		
1355	PN / PR	#150		
1356	Flange facing	RF		
Valve - Dimensions				
1400	Discharge area	Ao	1,661.903	mm ²
1401	Discharge diameter	do	46	mm
1402	Centre to Face dimensions	a	141	mm
1403	Centre to Face dimensions	b	124	mm
1405	Height	H	556	mm
1406	Weight	M	25	kg
1411	Inlet flange thickness incl. raised face	S1	29	mm
Valve - Calculation				
1200	Certified massflow	qm,zu	31,368.61 5	kg/h
1201	Certified volumeflow (operating condition)	qvb,zu	606.41 9	m³/h
1203	Certified volumeflow (standard condition)	qvn,zu	185,729.06 9	m³/h
1204	Maximum mass flow	qm,max	34,854.01 6	kg/h
1205	Maximum volume flow (working condition)	qvb,max	673.79 9	m³/h
1206	Maximum volume flow (standard condition)	qvn,max	206,365.63 2	m³/h
1207	Capacity exceed		63.4 0	%
1600	Required actual discharge area	Ao, req	1,017.106	mm²
1601	Required discharge diameter	do,req	35.986	mm
1617	Back pressure correction factor	Kb	1.000	
1618	Cold differential test pressure	CDTP	9	bar-g
1620	Cold differential test pressure, manually	CDTP		
Valve - Accessories				
J49	Disc: with sealing plate material VESPEL-SP1			
J85	Version: oil- and grease-free acc. to LWN 325.03,			
Valve - Inspections				
H03	LESER CGA: Inspection certificate 3.1 acc. to DIN EN 10204, Declaration of conformity acc. to PED 97/23/EC			
M86	Seat tightness test with helium, leakage detection in vacuum - Inspection certificate 3.1 included			
N68	UV Stamp			

2) 300PSV901

Sizing - Medium				
1000	Designation	Helium		
1004	Formula	He		
1001	Molar mass	M	4	kg/kmol
1002	Ratio of specific heats	k	5.400	
1003	Compressibility factor	Z	1.000	

Sizing - Service condition				
1100	Maximum allowable working pressure			
1101	Set pressure	p	9	bar-g
1102	Constant superimposed back pressure	p _{af}		
2102	Variable superimposed back pressure			
1103	Built up back pressure	p _{ae}		
1104	Backpressure			
1105	Overpressure	dp	10.00	%
1106	Environmental pressure	p _u	1.013	bar
1107	Relieving Temperature	T	-263	°C
1111	Operating Temperature		-263	°C
1108	Required massflow	q _{m,ab}	6,527	kg/h
1109	Volume flow to be discharged (working condition)	q _{vb,ab}	126.18	m³/h
1110	Volume flow to be discharged (std condition) [T=60 °F P=14.7 psi]	q _{vn,ab}	22,742.836	SCFM
1120	Rupture disc correction factor	K _c	1.000	

Sizing - Calculation				
1200	Certified massflow	q _{m,zu}	20,294.723	kg/h
1201	Certified volume flow (operating condition)	q _{vb,zu}	392.338	m³/h
1203	Certified volume flow (standard condition)	q _{vn,zu}	120,162.143	m³/h
1204	Maximum mass flow	q _{m,max}	22,549.692	kg/h
1205	Maximum volume flow (working condition)	q _{vb,max}	435.932	m³/h
1206	Maximum volume flow (standard condition)	q _{vn,max}	133,513.492	m³/h
1207	Capacity exceed		210.93	%

Valve - General				
1500	Article number		4414.5702	
1512	Reseller article number			
1513	Quantity of safety valve		1	
1501	Certified coefficient of discharge for steam and gases	K _{DG}	0.699	
1502	Certified coefficient of discharge for liquid	K _F	0.521	
1453	Orifice		H+	
1505	Bonnet / Lifting device		Cap H2	
1506	Body-/ Inlet base material		1.4408 / SA 351 CF8M	
1511	Bonnet		Closed Bonnet	

Inlet connection				
1303	Connection standard	acc. to ASME B16.5		
1304	DN / NPS	1 1/2"		
1305	PN / PR	#300		

1306	Flange facing			RF
Outlet connection				
1353	Connection standard		acc. to ASME B16.5	
1354	DN / NPS		2 1/2"	
1355	PN / PR		#150	
1356	Flange facing		RF	
Valve - Dimensions				
1400	Discharge area	Ao	1,075.21	mm²
1401	Discharge diameter	do	37	mm
1402	Centre to Face dimensions	a	129.5	mm
1403	Centre to Face dimensions	b	121	mm
1405	Height	H	496	mm
1406	Weight	M	19	kg
1411	Inlet flange thickness incl. raised face	S1	27	mm
Lift				
1507	Standard			9mm

Valve - Calculation				
1200	Certified massflow	qm,zu	20,294.723	kg/h
1201	Certified volumeflow (operating condition)	qvb,zu	392.338	m³/h
1203	Certified volumeflow (standard condition)	qvn,zu	120,162.143	m³/h
1204	Maximum mass flow	qm,max	22,549.692	kg/h
1205	Maximum volume flow (working condition)	qvb,max	435.932	m³/h
1206	Maximum volume flow (standard condition)	qvn,max	133,513.492	m³/h
1207	Capacity exceed		210.93	%
1600	Required actual discharge area	Ao, req	345.799	mm²
1601	Required discharge diameter	do,req	20.983	mm
1617	Back pressure correction factor	Kb	1.000	
1618	Cold differential test pressure	CDTP	9	bar-g
1620	Cold differential test pressure, manually	CDTP		

Valve - Accessories				
J49	Disc: with sealing plate material VESPEL-SP1			
J85	Version: oil- and grease-free acc. to LWN 325.03,			

Valve - Inspections				
H03	LESER CGA: Inspection certificate 3.1 acc. to DIN EN 10204, Declaration of conformity acc. to PED 97/23/EC			
M86	Seat tightness test with helium, leakage detection in vacuum – Inspection certificate 3.1 included			
N68	UV Stamp			

Valve - Material certificates				
H01	Material test certificate for body acc. to DIN EN 10204-3.1			
L23	Material test certificate for disc acc. to DIN EN 10204-3.1			
L59	Inspection certificate seat/nozzle: EN 10204-3.1.B			

3) 610PSV600

Sizing - Medium

1000	Designation	Helium		
1004	Formula	He		
1001	Molar mass	M	4	kg/kmol
1002	Ratio of specific heats	k	1.630	
1003	Compressibility factor	Z	1.000	

Sizing - Service condition

1100	Maximum allowable working pressure			
1101	Set pressure	p	0.5	bar-g
1102	Constant superimposed back pressure	paf		
2102	Variable superimposed back pressure			
1103	Built up back pressure	pae		
1104	Backpressure			
1105	Overpressure	dp	0.10	bar
1106	Environmental pressure	pu	1.013	bar
1107	Relieving Temperature	T	-263	°C
1111	Operating Temperature		-263	°C
1108	Required massflow	qm,ab		
1109	Volume flow to be discharged (working condition)	qvb,ab		
1110	Volume flow to be discharged (std condition) [T=15 °C P=101,325 Pa]	qvn,ab		

Sizing - Calculation

1200	Certified massflow	qm,zu	1,799.847	kg/h
1201	Certified volumeflow (operating condition)	qvb,zu	235.378	m³/h
1203	Certified volumeflow (standard condition)	qvn,zu	10,639.059	m³/h
1204	Maximum mass flow	qm,max	1,999.83	kg/h
1205	Maximum volume flow (working condition)	qvb,max	261.531	m³/h
1206	Maximum volume flow (standard condition)	qvn,max	11,821.176	m³/h
1207	Capacity exceed			

Valve - General

1500	Article number		4414.5702
1512	Reseller article number		
1513	Quantity of safety valve		1
1501	Certified coefficient of discharge for steam and gases	K,DG	0.604
1502	Certified coefficient of discharge for liquid	K,F	0.45
1503	Lift characteristic steam/gas		Full Lift Safety Valve
1504	Lift characteristic liquid		Safety Relief Valve
1505	Bonnet / Lifting device		Cap H2
1506	Body-/ Inlet base material		1.4408 / SA 351 CF8M
1511	Bonnet		Closed Bonnet

Inlet connection

1303	Connection standard	acc. to ASME B16.5		
1304	DN / NPS	1 1/2"		
1305	PN / PR	#150		

1306	Flange facing	RF		
Outlet connection				
1353	Connection standard	acc. to ASME B16.5		
1354	DN / NPS	2 1/2"		
1355	PN / PR	#150		
1356	Flange facing	RF		
Valve - Dimensions				
1400	Discharge area	Ao	1,075.21	mm ²
1401	Discharge diameter	do	37	mm
1402	Centre to Face dimensions	a	129.5	mm
1403	Centre to Face dimensions	b	121	mm
1405	Height	H	496	mm
1406	Weight	M	19	kg
1411	Inlet flange thickness incl. raised face	S1	27	mm
Lift				
1507	Standard		9	mm
Valve - Calculation				
1200	Certified massflow	qm,zu	1,799.847	kg/h
1201	Certified volumeflow (operating condition)	qvb,zu	235.378	m³/h
1203	Certified volumeflow (standard condition)	qvn,zu	10,639.059	m³/h
1204	Maximum mass flow	qm,max	1,999.83	kg/h
1205	Maximum volume flow (working condition)	qvb,max	261.531	m³/h
1206	Maximum volume flow (standard condition)	qvn,max	11,821.176	m³/h
1207	Capacity exceed			
1600	Required actual discharge area	Ao, req		
1601	Required discharge diameter	do,req		
1618	Cold differential test pressure	CDTP	0.5	bar-g
1620	Cold differential test pressure, manually	CDTP		
Valve - Accessories				
J49	Disc: with sealing plate material VESPEL-SP1			
J85	Version: oil- and grease-free acc. to LWN 325.03,			
Valve - Inspections				
H03	LESER CGA: Inspection certificate 3.1 acc. to DIN EN 10204, Declaration of conformity acc. to PED 97/23/EC			
M86	Seat tightness test with helium, leakage detection in vacuum - Inspection certificate 3.1 included			
N68	UV Stamp			
Valve - Material certificates				
H01	Material test certificate for body acc. to DIN EN 10204-3.1			
L23	Material test certificate for disc acc. to DIN EN 10204-3.1			
L59	Inspection certificate seat/nozzle: EN 10204-3.1.B			

4) 300PSV989

Sizing - Medium

1000	Designation	Helium		
1004	Formula	He		
1001	Molar mass	M	4	kg/kmol
1002	Ratio of specific heats	k	5.400	
1003	Compressibility factor	Z	1.000	

Sizing - Service condition

1100	Maximum allowable working pressure			
1101	Set pressure	p	9	bar-g
1102	Constant superimposed back pressure	paf		
2102	Variable superimposed back pressure			
1103	Built up back pressure	paе		
1104	Backpressure			
1105	Overpressure	dp	10.00	%
1106	Environmental pressure	pu	1.013	bar
1107	Relieving Temperature	T	-263	°C
1111	Operating Temperature		-263	°C
1108	Required massflow	qm,ab	5,643	kg/h
1109	Volume flow to be discharged (working condition)	qvb,ab	109.091	m³/h
1110	Volume flow to be discharged (std condition) [T=60 °F P=14.7 psi]	qvn,ab	19,662.605	SCFM
1120	Rupture disc correction factor	Kc	1.000	

Sizing - Calculation

1200	Certified massflow	qm,zu	7,842.154	kg/h
1201	Certified volumeflow (operating condition)	qvb,zu	151.605	m³/h
1203	Certified volumeflow (standard condition)	qvn,zu	46,432.267	m³/h
1204	Maximum mass flow	qm,max	8,713.504	kg/h
1205	Maximum volume flow (working condition)	qvb,max	168.45	m³/h
1206	Maximum volume flow (standard condition)	qvn,max	51,591.408	m³/h
1207	Capacity exceed		38.97	%

Valve - General

1500	Article number		4414.5682
1512	Reseller article number		
1513	Quantity of safety valve		1
1501	Certified coefficient of discharge for steam and gases	K,DG	0.699
1502	Certified coefficient of discharge for liquid	K,F	0.521
1453	Orifice		F
1505	Bonnet / Lifting device		Cap H2
1506	Body-/ Inlet base material		1.4408 / SA 351 CF8M
1511	Bonnet		Closed Bonnet

Inlet connection

1303	Connection standard		acc. to ASME B16.5
1304	DN / NPS		1"
1305	PN / PR		#300
1306	Flange facing		RF

Outlet connection				
1353	Connection standard	acc. to ASME B16.5		
1354	DN / NPS	2"		
1355	PN / PR	#150		
1356	Flange facing	RF		
Valve - Dimensions				
1400	Discharge area	Ao	415.476	mm ²
1401	Discharge diameter	do	23	mm
1402	Centre to Face dimensions	a	109	mm
1403	Centre to Face dimensions	b	114	mm
1405	Height	H	339	mm
1406	Weight	M	13	kg
1411	Inlet flange thickness incl. raised face	S1	24	mm
Lift				
1507	Standard		5.6	mm
Valve - Calculation				
1200	Certified massflow	qm,zu	7,842.154	kg/h
1201	Certified volumeflow (operating condition)	qvb,zu	151.605	m ³ /h
1203	Certified volumeflow (standard condition)	qvn,zu	46,432.267	m ³ /h
1204	Maximum mass flow	qm,max	8,713.504	kg/h
1205	Maximum volume flow (working condition)	qvb,max	168.45	m ³ /h
1206	Maximum volume flow (standard condition)	qvn,max	51,591.408	m ³ /h
1207	Capacity exceed		38.97	%
1600	Required actual discharge area	Ao, req	298.965	mm ²
1601	Required discharge diameter	do,req	19.51	mm
1617	Back pressure correction factor	Kb	1.000	
1618	Cold differential test pressure	CDTP	9	bar-g
1620	Cold differential test pressure, manually	CDTP		
Valve - Accessories				
J49	Disc: with sealing plate material VESPEL-SP1			
J85	Version: oil- and grease-free acc. to LWN 325.03,			
Valve - Inspections				
H03	LESER CGA: Inspection certificate 3.1 acc. to DIN EN 10204, Declaration of conformity acc. to PED 97/23/EC			
M86	Seat tightness test with helium, leakage detection in vacuum - Inspection certificate 3.1 included			
N68	UV Stamp			
Valve - Material certificates				
H01	Material test certificate for body acc. to DIN EN 10204-3.1			
L23	Material test certificate for disc acc. to DIN EN 10204-3.1			
L59	Inspection certificate seat/nozzle: EN 10204-3.1.B			

※ 조달청 지정정보처리장치(전자견적시스템) 사용에 따른 명확한 규격 및 사양이 요구됨으로 견적서와 필요 시 사진, 카탈로그, 시방서, 도면 등 첨부 요망

☐ 구매사유 및 활용용도

- 저온헬륨설비의 헬륨압축기에 압력 별 Process line에 전 구간에 걸쳐 safety valve가 설치되어 있다. CB_DB의 LESER safety valve 예비품을 구매하여 비상상황에 대처할 수 있도록 하고자 함.