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|--|---|------|-------|------|------|------|--|-------------------------|---------|
| OWNER:  شرکت سست و سویی توستر ایرانیان (سهامی عامه) | BUSHEHR PETROCHEMICAL COMPANY MEG PLANT | | | | | | EPC CONTRACTOR:  Chagalesh-Enerchimi-Steam Joint Venture BUPC-MEG PLANT PROJECT | | |
| | CALCULATION & DATA SHEET OF CONTROL VALVES / ON-OFF VALVES FOR EMERGENCY INSTRUMENT AIR COMPRESSOR | | | | | |  Netherlands | | |
| MC :  شرکت سست و سویی توستر ایرانیان سهامی عامه | Project | Area | Phase | Unit | Dis. | Doc. | Seq. | Contract No : 52-98/445 | |
| Owner Document Number: 17811-45B | BU | 20 | VD | 303 | IN | DSH | 0091 | Rev.: | Page |
| | | | | | | | | 07 | 1 of 17 |






CALCULATION & DATA SHEET OF CONTROL VALVES / ON-OFF VALVES FOR EMERGENCY INSTRUMENT AIR COMPRESSOR

| | | | | | | |
|------------|-------------|---------------------------|-----------------|----------------|-----------------|-----------------|
| 07 | 26/06/2023 | As Built | TvT | KP | JR | |
| 06 | 05/09/2022 | Approved for Construction | TvT | KP | JR | |
| 05 | 13/07/2022 | Approved for Construction | TvT | KP | JR | |
| 04 | 01/06/2022 | Approved for Construction | TvT | KP | LdM | |
| 03 | 07/02/2022 | Approved for Construction | TvT | KP | LdM | |
| 02 | 07/01/2022 | Approved for Construction | TvT | KP | LdM | |
| 01 | 25/10/2021 | Approved for Construction | TvT | KP | LdM | |
| 01 | 20/09/2021 | For approval | TvT | KP | LdM | |
| 00 | 25/02/2021 | For approval | TvT | KP | LdM | |
| Rev | Date | Purpose of Issue | Prepared | Checked | Approved | AC Code |
| | | | | | Class: 1 | Phase: P |

Doc. No : 17811-45B
 Rev. No. : 06
 P&ID. No : BU-20-VD-303-PR-WG-0066
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| 3 | Hand Ball Valve | No Tag.no.: Qty 2 pcs | 6 |
| 4 | Hand Ball Valve | No Tag.no.: Qty 2 pcs | 7 |
| 5 | Hand Ball Valve | No Tag.no.: Qty 7 pcs | 8 |
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Notes:

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|-----|----|------------|------------------|---|---|
| 07 | TT | 26-6-2023 | As Built | CALCULATION & DATA SHEET OF CONTROL VALVES / ON-OFF VALVES FOR EMERGENCY INSTRUMENT AIR COMPRESSOR  |     |
| 06 | TT | 5-9-2022 | For Construction | | |
| 05 | TT | 13-7-2022 | For Construction | | |
| 04 | TT | 1-6-2022 | For Construction | | |
| 03 | TT | 7-2-2022 | For Construction | | |
| 02 | TT | 7-1-2022 | For Construction | | |
| 01 | TT | 25-10-2021 | For Construction | | |
| Rev | By | Date | Description | Sheet | 3 of 17 |
| | | | | Based on P&ID | rev. 06 |



| | | | | | |
|--------------------|----|--------------------------|----------------|--|------------|
| GENERAL | 1 | Tag Number | | No Tag.no.: Qty 1 pc | |
| | 2 | Service | | Hand Ball valve | |
| | 3 | P&ID No. | | BU-20-VD-303-PR-WG-0066 | |
| | 4 | Location | | Compressor Inlet | |
| | 5 | Line/equip. No. | | 2"-INA-7001-511C(N) | |
| | 6 | | | | |
| | 7 | | | | |
| PROCESS CONDITIONS | 8 | Fluid | State | Air | Dry Gas |
| | 9 | Pressure | Norm. Max. | 8 Bar(a) | 8,5 Bar(a) |
| | 10 | Temperature | Norm. Max. | AMB | 65°C |
| | 11 | Design | Press. Temp. | 13.5 Bar(a) | 85°C |
| | 12 | Ambient Temp. | Min. Max. | 5 °C | 52 °C |
| | 13 | Oper. Flow | | 55 Kg/hr / 43 Nm3/hr | |
| | 14 | | | | |
| BODY | 16 | Body Type | | Ball valve, 2-piece, split-body | |
| | 17 | Body Size | Bore | 2" | Full bore |
| | 18 | Guiding | No. Of Ports | - | 2 |
| | 19 | Conn. Type | End Conn. Rat. | RF, ASME B16.5 | 150# |
| | 20 | Body Material | | Carbon steel ASTM A 216 Gr. WCB / A105 | |
| | 21 | Packing/ gasket Material | | RPTFE / 304/graphite | |
| | 22 | Bonnet Type | | bolted | |
| | 23 | Form | Floating ball | | |
| | 24 | Trim | Seat Mat. | RPTFE | |
| | 25 | Ball Mat. | Shaft Mat. | SS 316 | SS316 |
| | 26 | Actuation | Material | Lever handle | CS |
| | 27 | Bolts & Nuts | | B7/2H | |
| | 28 | Shaft | | Anti blow-out | |
| | 29 | Device | | Anti static | |
| | 30 | Fire safe | | Included | |
| | 31 | | | | |
| | 32 | | | | |
| | 33 | | | | |
| | 34 | | | | |
| | 35 | Leakage rate | | API 598 TSO | |
| | 36 | | | | |
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| OPTIONS | 44 | | | | |
| | 45 | | | | |
| | 46 | | | | |
| CERTIFICATES | 47 | 3.1 Material certificate | | ALFA | |
| | 48 | Hydrotest certificate | | 64sb | |
| | 49 | | | | |
| | 50 | | | | |
| | 51 | | | | |
| PURCHASE | 52 | Manufacturer | | According to aproved vendor list | |
| | 53 | Model | | Supplier to advise | |
| | 54 | | | | |
| | 55 | | | | |
| | 56 | | | | |
| | 57 | | | | |

NOTES :

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|-----|----|------------|------------------|--|---|
| 06 | TT | 5-9-2022 | For Construction |  |  |
| 05 | TT | 13-7-2022 | For Construction | | |
| 04 | TT | 1-6-2022 | For Construction | | |
| 03 | TT | 7-2-2022 | For Construction | | |
| 02 | TT | 7-1-2022 | For Construction | | |
| 01 | TT | 25-10-2021 | For Construction | | |
| Rev | By | Date | Description | Sheet 4 of 17 Based on P&ID rev. 06 | |



| | | | | | |
|--------------------|----|--------------------------|----------------|--|-----------|
| GENERAL | 1 | Tag Number | | No Tag.no.: Qty 1 pcs | |
| | 2 | Service | | Hand Ball valve | |
| | 3 | P&ID No. | | BU-20-VD-303-PR-WG-0066 | |
| | 4 | Location | | Compressor Outlet | |
| | 5 | Line/equip. No. | | 2"-INA-7002-539D(N) | |
| | 6 | | | | |
| | 7 | | | | |
| PROCESS CONDITIONS | 8 | Fluid | State | Air | Dry Gas |
| | 9 | Pressure | Norm. Max. | 21 Bar(a) | - |
| | 10 | Temperature | Norm. Max. | 40°C | 55°C |
| | 11 | Design | Press. Temp. | 26 Barg | 85°C |
| | 12 | Ambient Temp. | Min. Max. | 5 °C | 52 °C |
| | 13 | Oper. Flow | | 55 Kg/hr / 43 Nm3/hr | |
| | 14 | | | | |
| BODY | 16 | Body Type | | Ball valve, 2-piece, split-body | |
| | 17 | Body Size | Bore | 2" | Full bore |
| | 18 | Guiding | No. Of Ports | - | 2 |
| | 19 | Conn. Type | End Conn. Rat. | RF, ASME B16.5 | 300# |
| | 20 | Body Material | | Carbon steel ASTM A 216 Gr. WCB / A105 | |
| | 21 | Packing/ gasket Material | | RPTFE / 304/graphite | |
| | 22 | Bonnet Type | | bolted | |
| | 23 | Form | Floating ball | | |
| | 24 | Trim | Seat Mat. | RPTFE | |
| | 25 | Ball Mat. | Shaft Mat. | SS 316 | SS316 |
| | 26 | Actuation | Material | Lever handle | CS |
| | 27 | Bolts & Nuts | | B7/2H | |
| | 28 | Shaft | | Anti blow-out | |
| | 29 | Device | | Anti static | |
| | 30 | Fire safe | | Included | |
| | 31 | | | | |
| | 32 | | | | |
| | 33 | | | | |
| | 34 | | | | |
| | 35 | Leakage rate | | API 598 TSO | |
| | 36 | | | | |
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| OPTIONS | 44 | | | | |
| | 45 | | | | |
| | 46 | | | | |
| CERTIFICATES | 47 | 3.1 Material certificate | | ALFA | |
| | 48 | Hydrotest certificate | | 64sb | |
| | 49 | | | | |
| | 50 | | | | |
| | 51 | | | | |
| PURCHASE | 52 | Manufacturer | | According to aproved vendor list | |
| | 53 | Model | | Supplier to advise | |
| | 54 | | | | |
| | 55 | | | | |
| | 56 | | | | |
| | 57 | | | | |

NOTES :

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|-----|----|------------|------------------|--|---|
| 06 | TT | 5-9-2022 | For Construction |  |  |
| 05 | TT | 13-7-2022 | For Construction | | |
| 04 | TT | 1-6-2022 | For Construction | | |
| 03 | TT | 7-2-2022 | For Construction | | |
| 02 | TT | 7-1-2022 | For Construction | | |
| 01 | TT | 25-10-2021 | For Construction | | |
| Rev | By | Date | Description | Hand Ball Valve Sheet 5 of 17 Based on P&ID rev. 06 | |



| | | | | | |
|--------------------|----|--------------------------|----------------|--|-----------|
| GENERAL | 1 | Tag Number | | No Tag.no.: Qty 2 pcs | |
| | 2 | Service | | Hand Ball valve | |
| | 3 | P&ID No. | | BU-20-VD-303-PR-WG-0066 | |
| | 4 | Location | | Compressor Cooling water | |
| | 5 | Line/equip. No. | | 1 1/2"-CWS-7003-500C(N)/ 1 1/2"-CWR-7008-500C(N) | |
| | 6 | | | | |
| | 7 | | | | |
| PROCESS CONDITIONS | 8 | Fluid | State | Water | Liquid |
| | 9 | Pressure | Norm. Max. | 4,5 Bar(g) | 5 Bar(g) |
| | 10 | Temperature | Norm. Max. | 35°C | 45°C |
| | 11 | Design | Press. Temp. | 7 Bar(g) | 100°C |
| | 12 | Ambient Temp. | Min. Max. | 5 °C | 52 °C |
| | 13 | Oper. Flow | | 1,4 m3/hr | |
| | 14 | | | | |
| BODY | 16 | Body Type | | Ball valve, 2-piece, split-body | |
| | 17 | Body Size | Bore | 1 1/2" | Full bore |
| | 18 | Guiding | No. Of Ports | - | 2 |
| | 19 | Conn. Type | End Conn. Rat. | RF, ASME B16.5 | 150# |
| | 20 | Body Material | | Carbon steel ASTM A 216 Gr. WCB / A105 | |
| | 21 | Packing/ gasket Material | | RPTFE / 304/graphite | |
| | 22 | Bonnet Type | | bolted | |
| | 23 | Form | Floating ball | | |
| | 24 | Trim | Seat Mat. | RPTFE | |
| | 25 | Ball Mat. | Shaft Mat. | SS 316 | SS316 |
| | 26 | Actuation | Material | Lever handle | CS |
| | 27 | Bolts & Nuts | | B7/2H | |
| | 28 | Shaft | | Anti blow-out | |
| | 29 | Device | | Anti static | |
| | 30 | Fire safe | | Included | |
| | 31 | | | | |
| | 32 | | | | |
| | 33 | | | | |
| | 34 | | | | |
| | 35 | Leakage rate | | API 598 TSO | |
| | 36 | | | | |
| 37 | | | | | |
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| OPTIONS | 44 | | | | |
| | 45 | | | | |
| | 46 | | | | |
| CERTIFICATES | 47 | 3,1 Material certificate | | ALFA | |
| | 48 | Hydrotest certificate | | 64sb | |
| | 49 | | | | |
| | 50 | | | | |
| | 51 | | | | |
| PURCHASE | 52 | Manufacturer | | According to aproved vendor list | |
| | 53 | Model | | Supplier to advise | |
| | 54 | | | | |
| | 55 | | | | |
| | 56 | | | | |
| | 57 | | | | |

NOTES :

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|-----|----|------------|------------------|--|---|
| 06 | TT | 5-9-2022 | For Construction |  |  |
| 05 | TT | 13-7-2022 | For Construction | | |
| 04 | TT | 1-6-2022 | For Construction | | |
| 03 | TT | 7-2-2022 | For Construction | | |
| 02 | TT | 7-1-2022 | For Construction | | |
| 01 | TT | 25-10-2021 | For Construction | | |
| Rev | By | Date | Description | Hand Ball Valve Sheet 6 of 17 Based on P&ID rev. 06 | |



| | | | | | |
|--------------------|----|--------------------------|----------------------|---|------------|
| GENERAL | 1 | Tag Number | | No Tag.no.: Qty 2 pcs | |
| | 2 | Service | | Hand Ball valve | |
| | 3 | P&ID No. | | BU-20-VD-303-PR-WG-0066 | |
| | 4 | Location | | Compressor Oil sump drain & block valve | |
| | 5 | Line/equip. No. | | N/A | |
| | 6 | | | | |
| | 7 | | | | |
| PROCESS CONDITIONS | 8 | Fluid | State | Oil | Liquid |
| | 9 | Pressure | Norm. Max. | 3 Bar(a) | 3,5 Bar(a) |
| | 10 | Temperature | Norm. Max. | 45°C | 65°C |
| | 11 | Design | Press. Temp. | 5 Bar(a) | 80°C |
| | 12 | Ambient Temp. | Min. Max. | 5 °C | 52 °C |
| | 13 | Oper. Flow | | | |
| | 14 | | | | |
| BODY | 16 | Body Type | | Ball valve, screwed type | |
| | 17 | Body Size | Bore | 1/2" | Full bore |
| | 18 | Guiding | No. Of Ports | - | 2 |
| | 19 | Conn. Type | End Conn. Rat. | NPT-F | 800# |
| | 20 | Body Material | | SS316 | |
| | 21 | Packing Material | | PTFE / Graphite | |
| | 22 | Bonnet Type | | Screwed | |
| | 23 | Trim | Form | Floating ball | |
| | 24 | | Seat Mat. | PTFE / Graphite | |
| | 25 | | Ball Mat. Shaft Mat. | SS 316 | SS316 |
| | 26 | Actuation | Material | Lever handle | SS |
| | 27 | | | | |
| | 28 | | | | |
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| 43 | | | | | |
| OPTIONS | 44 | | | | |
| | 45 | | | | |
| | 46 | | | | |
| CERTIFICATES | 47 | 3,1 Material certificate | | No | |
| | 48 | Hydrotest certificate | | No | |
| | 49 | | | | |
| | 50 | | | | |
| | 51 | | | | |
| PURCHASE | 52 | Manufacturer | | ALFA | |
| | 53 | Model | | 20r/t | |
| | 54 | | | | |
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| | 57 | | | | |

NOTES :

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|-----|----|------------|------------------|--|---|
| 06 | TT | 5-9-2022 | For Construction |  Hand Ball Valve |  |
| 05 | TT | 13-7-2022 | For Construction | | |
| 04 | TT | 1-6-2022 | For Construction | | |
| 03 | TT | 7-2-2022 | For Construction | | |
| 02 | TT | 7-1-2022 | For Construction | | |
| 01 | TT | 25-10-2021 | For Construction | | |
| Rev | By | Date | Description | Sheet 7 of 17 Based on P&ID rev. 06 | |



| | | | | | |
|--------------------|----|--------------------------|----------------|--|-----------|
| GENERAL | 1 | Tag Number | | No Tag.no.: Qty 9 pcs | |
| | 2 | Service | | Hand Ball valve | |
| | 3 | P&ID No. | | BU-20-VD-303-PR-WG-0066 | |
| | 4 | Location | | Compressor block valve & pulsation drain | |
| | 5 | Line/equip. No. | | N/A | |
| | 6 | | | | |
| | 7 | | | | |
| PROCESS CONDITIONS | 8 | Fluid | State | Air/ water | Dry Gas |
| | 9 | Pressure | Norm. Max. | 21 Bar(a) | - |
| | 10 | Temperature | Norm. Max. | 40°C | 55°C |
| | 11 | Design | Press. Temp. | 26 Barg | 70°C |
| | 12 | Ambient Temp. | Min. Max. | 5 °C | 52 °C |
| | 13 | Oper. Flow | | | |
| BODY | 16 | Body Type | | Ball valve, screwed type | |
| | 17 | Body Size | Bore | 1/2" | Full bore |
| | 18 | Guiding | No. Of Ports | - | 2 |
| | 19 | Conn. Type | End Conn. Rat. | NPT-F | 800# |
| | 20 | Body Material | | SS316 | |
| | 21 | Packing Material | | PTFE / Graphite | |
| | 22 | Bonnet Type | | Screwed | |
| | 23 | Trim | Form | Floating ball | |
| | 24 | | Seat Mat. | PTFE / Graphite | |
| | 25 | | Ball Mat. | SS 316 | SS316 |
| | 26 | Actuation | Material | Lever handle | SS |
| | 27 | | | | |
| | 28 | | | | |
| | 29 | | | | |
| | 30 | | | | |
| | 31 | | | | |
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| 43 | | | | | |
| OPTIONS | 44 | | | | |
| | 45 | | | | |
| | 46 | | | | |
| CERTIFICATES | 47 | 3.1 Material certificate | | No | |
| | 48 | Hydrotest certificate | | No | |
| | 49 | | | | |
| | 50 | | | | |
| | 51 | | | | |
| PURCHASE | 52 | Manufacturer | | ALFA | |
| | 53 | Model | | 20r/1 | |
| | 54 | | | | |
| | 55 | | | | |
| | 56 | | | | |
| | 57 | | | | |

NOTES :

| | | | | | |
|-----|----|------------|------------------|--|---|
| 06 | TT | 5-9-2022 | For Construction |  |  |
| 05 | TT | 13-7-2022 | For Construction | | |
| 04 | TT | 1-6-2022 | For Construction | | |
| 03 | TT | 7-2-2022 | For Construction | | |
| 02 | TT | 7-1-2022 | For Construction | | |
| 01 | TT | 25-10-2021 | For Construction | | |
| Rev | By | Date | Description | Hand Ball Valve Sheet 8 of 17 Based on P&ID rev. 06 | |



| | | | | | |
|--------------------|-----------|----------------------------------|----------------------|--|------------|
| GENERAL | 1 | Tag Number | | XV-71102 | |
| | 2 | Service | | Ball valve | |
| | 3 | P&ID No. | | BU-20-VD-303-PR-WG-0066 | |
| | 4 | Location | | Compressor Cooling water Inlet | |
| | 5 | Line/equip. No. | | 1 1/2"-CWS-7003-500C(N) | |
| | 6 | | | | |
| | 7 | | | | |
| PROCESS CONDITIONS | 8 | Fluid | State | Water | Liquid |
| | 9 | Pressure | Norm. Max. | 4,5 Bar(g) | 5 Bar(g) |
| | 10 | Temperature | Norm. Max. | 35°C | 45°C |
| | 11 | Design | Press. Temp. | 7 Bar(g) | 100°C |
| | 12 | Ambient Temp. | Min. Max. | 5 °C | 52 °C |
| | 13 | Oper. Flow | | 1,4 m3/hr | |
| | 14 | | | | |
| BODY | 15 | Body Type | | Ball valve, 2-piece, split-body | |
| | 16 | Body Size | Bore | 1 1/2" | Full bore |
| | 17 | Guiding | No. Of Ports | - | 2 |
| | 18 | Conn. Type | End Conn. Rat. | RF, ASME B16.5 | 150# |
| | 19 | Body Material | | Carbon steel ASTM A 216 Gr. WCB/ A105 | |
| | 20 | Packing/ gasket Material | | RPTFE / 304/graphite | |
| | 21 | Bonnet Type | | bolted | |
| | 22 | Trim | Form | Floating ball | |
| | 23 | | Seat Mat. | RPTFE | |
| | 24 | | Ball Mat. Shaft Mat. | SS 316 | SS316 |
| | 25 | Bolts & Nuts | | B7/2H | |
| | 26 | Shaft | | Anti blow-out | |
| | 27 | Device | | Anti static | |
| 28 | Fire safe | | Included | | |
| ACTUATOR | 29 | Type | | Rack & Pinion, single acting | |
| | 30 | Close At | Open At | Spring return | Air supply |
| | 31 | Flow Action To | | FTC | |
| | 32 | Fail Position | | FC | |
| | 33 | Pneumatic connection | | 2 x 1/4" NPT-F | |
| | 34 | Instrument Supply Fluid | | Instrument Air / Nitrogen | |
| | 35 | Instrument Supply Fluid pressure | | 6.0 bar(g) | |
| | 36 | Brackets | Coupling | SS316 | SS316 |
| | 37 | Housing material | | Aluminium, epoxy coated | |
| | 38 | | | | |
| POSITION MONITOR | 39 | Type | | N/A | |
| | 40 | Power supply | | N/A | |
| | 41 | Type of switch/transmitter | | N/A | |
| | 42 | Area Classification | | N/A | |
| | 43 | Cable Gland | | N/A | |
| OPTIONS | 44 | Solenoid valves | | see Instrument datasheet Tag. XY-71102 | |
| | 45 | Leakage rate | | API 598 TSO | |
| | 46 | | | | |
| CERTIFICATES | 47 | 3.1 Material certificate | | Yes | |
| | 48 | Hydrotest certificate | | Yes | |
| | 49 | ATEX | | No | |
| | 50 | SIL certificate | Level | No | |
| | 51 | IP certificate | | No | |
| PURCHASE | 52 | Valve Manufacturer | | ALFA | |
| | 53 | Valve Model | | 64sb | |
| | 54 | Actuator Manufacturer | | Air Torque | |
| | 55 | Actuator Model | | AT251 | |
| | 56 | | | | |
| | 57 | | | | |

NOTES :

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|-----|----|------------|------------------|--|---|
| 06 | TT | 5-9-2022 | For Construction |  |  |
| 05 | TT | 13-7-2022 | For Construction | | |
| 04 | TT | 1-6-2022 | For Construction | | |
| 03 | TT | 7-2-2022 | For Construction | | |
| 02 | TT | 7-1-2022 | For Construction | | |
| 01 | TT | 25-10-2021 | For Construction | | |
| Rev | By | Date | Description | Sheet 9 of 17 | Based on P&ID rev. 06 |



| | | | | | |
|-------------|----|--|-------------------|--------------------------------|-------|
| GENERAL | 1 | Tag Number | | XV-71102 | |
| | 2 | Service | | Ball valve | |
| | 3 | P&ID No. | | BU-20-VD-303-PR-WG-0066 | |
| | 4 | Location | | Compressor Cooling water Inlet | |
| | 5 | Line/equip. No. | | 1 1/2"-CWS-7003-501C(N) | |
| | 6 | | | | |
| | 7 | | | | |
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| | 10 | | | | |
| | 11 | | | | |
| | 12 | | | | |
| | 13 | | | | |
| | 14 | | | | |
| Calculation | 15 | 1 1/2" Ball valve, 2-piece, split-body | | k.k. F03 SW8 | |
| | 16 | Break to open (Nm) | End to close (Nm) | 45 Nm | 36 Nm |
| | 17 | | | | |
| | 18 | Actuator Rack & Pinion single acting | | 251U S12 A F05/F07 17DS 6 bar | |
| | 19 | Break to open (Nm) | End to close (Nm) | 65,8 Nm | 44 Nm |
| | 20 | | | Including Safety factor 1,5 | |
| | 21 | | | | |
| | 22 | | | | |
| | 23 | | | | |
| | 24 | | | | |
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NOTES :

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|-----|----|------------|------------------|--|---|
| 06 | TT | 5-9-2022 | For Construction |  |  |
| 05 | TT | 13-7-2022 | For Construction | | |
| 04 | TT | 1-6-2022 | For Construction | | |
| 03 | TT | 7-2-2022 | For Construction | | |
| 02 | TT | 7-1-2022 | For Construction | | |
| 01 | TT | 25-10-2021 | For Construction | | |
| Rev | By | Date | Description | Sheet 10 of 17 Based on P&ID rev. 06 | |





| | | | | | | |
|--------------------|----|--------------------------|----------------|--|-----------------|-------|
| GENERAL | 1 | Tag Number | | No Tag.no: Qty 1 pcs | | |
| | 2 | Service | | Globe valve | | |
| | 3 | P&ID No. | | BU-20-VD-303-PR-WG-0066 | | |
| | 4 | Location | | Compressor Cooling water | | |
| | 5 | Line/equip. No. | | 1 1/2"-CWS-7005-501C(N) | | |
| | 6 | | | | | |
| | 7 | | | | | |
| PROCESS CONDITIONS | 8 | Fluid | State | Water | Liquid | |
| | 9 | Pressure | Norm. Max. | 4,5 Bar(g) | 5 Bar(g) | |
| | 10 | Temperature | Norm. Max. | 35°C | 45°C | |
| | 11 | Design | Press. Temp. | 7 Bar(g) | 100°C | |
| | 12 | Ambient Temp. | Min. Max. | 5 °C | 52 °C | |
| | 13 | Oper. Flow | | 1,4 m3/hr | | |
| BODY | 14 | | | | | |
| | 15 | Body Type | | Globe valve, OS&Y, BB | | |
| | 16 | Body Size | | 1 1/2" | | |
| | 17 | Guiding | No. Of Ports | - | 2 | |
| | 18 | Conn. Type | End Conn. Rat. | RF | 150# | |
| | 19 | Body Material | | Carbon steel ASTM A 216 Gr. WCB/WCC / A105 | | |
| | 20 | Packing Material | | PTFE / Graphite | | |
| | 21 | Bonnet Type | | Bolted | | |
| | 22 | Trim | Form | | Disc | |
| | 23 | | Seat Mat. | | PTFE / Graphite | |
| | 24 | | Disc Mat. | Shaft Mat. | SS 316 | SS316 |
| | 25 | | | | | |
| | 26 | | | | | |
| | 27 | | | | | |
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| 39 | | | | | | |
| 40 | | | | | | |
| 41 | | | | | | |
| 42 | | | | | | |
| 43 | | | | | | |
| OPTIONS | 44 | | | | | |
| | 45 | | | | | |
| | 46 | | | | | |
| CERTIFICATES | 47 | 3.1 Material certificate | | Yes | | |
| | 48 | Hydrotest certificate | | Yes | | |
| | 49 | | | | | |
| | 50 | | | | | |
| | 51 | | | | | |
| PURCHASE | 52 | Manufacturer | | LVF | | |
| | 53 | Model | | 1BR207 | | |
| | 54 | | | | | |
| | 55 | | | | | |
| | 56 | | | | | |
| | 57 | | | | | |

NOTES :



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|-----|----|------------|------------------|--|---|
| 06 | TT | 5-9-2022 | For Construction |  |  |
| 05 | TT | 13-7-2022 | For Construction | | |
| 04 | TT | 1-6-2022 | For Construction | | |
| 03 | TT | 7-2-2022 | For Construction | | |
| 02 | TT | 7-1-2022 | For Construction | | |
| 01 | TT | 25-10-2021 | For Construction | | |
| Rev | By | Date | Description | Sheet | 11 of 17 |
| | | | | Based on P&ID rev. 06 | |






| | | | | | |
|--------------------|----|-----------------------------------|-----------------------|---|----------------|
| GENERAL | 1 | Tag Number | | No Tag.no: Qty 1 pcs | |
| | 2 | Service | | Pressure Control Valve | |
| | 3 | P&ID No. | | BU-20-VD-303-PR-WG-0066 | |
| | 4 | Location | | Compressor Inlet & actuator cooling inlet | |
| | 5 | Line/equip. No. | | N/A | |
| | 6 | | | | |
| | 7 | | | | |
| PROCESS CONDITIONS | 8 | Fluid | State | Air | Dry Gas |
| | 9 | Pressure | Norm. Max. | 8 Bar(a) | 9 Bar(a) |
| | 10 | Temperature | Norm. Max. | 55°C | 65°C |
| | 11 | Design | Press. Temp. | 13.5 Bar(a) | 80°C |
| | 12 | Ambient Temp. | Min. Max. | 5 °C | 52 °C |
| BODY | 13 | Valve Type | | Pressure reducing valve | |
| | 14 | Body Material | | Aluminium | |
| | 15 | Diaphragm Material | | Nitrile | |
| | 16 | Trim | Form | Plug | |
| | 17 | | Seat Mat. | SS316 | |
| | 18 | | Spring Mat. Disc Mat. | SS316 | SS316 |
| | 19 | | | | |
| | 20 | | | | |
| | 21 | | | | |
| ACTUATOR | 25 | Type | | Mechanical, spring type | |
| | 26 | Fail Position | | FC | |
| | 27 | | | | |
| | 28 | | | | |
| | 29 | | | | |
| CONNECTIONS | 31 | Inlet Size | Outlet Size | 1/4" | 1/4" |
| | 32 | Inlet Connection | Outlet Conn. | Threaded NPT-F | Threaded NPT-F |
| | 33 | Inlet Rating | Outlet Rating | 800# | 800# |
| | 34 | | | | |
| SIZING CONDITIONS | 35 | Flow Rate | | 10 Nm³/hr | |
| | 36 | Pressure drop | | 0,1 bar | |
| | 37 | Pressure setpoint | | 6,0 bar(g) | |
| | 38 | | | | |
| | 39 | | | | |
| OPTIONS | 41 | Pressure Gauge | | Yes | |
| | 42 | Material | | Aluminium | |
| | 43 | Range | | 0...11 bar(g) | |
| | 44 | Filter Regulator and drip well | | Yes(Mesh 40) | |
| CERTIFICATES | 45 | 3.1 Material certificate for body | | No | |
| | 46 | 3.1 Material certificate for stem | | No | |
| | 47 | | | | |
| CALCULATIONS | 49 | Sizing calculation | | No | |
| | 50 | | | | |
| | 51 | | | | |
| | 52 | | | | |
| | 53 | | | | |
| PURCHASE | 54 | Manufacturer | | Fisher | |
| | 55 | Model | | 67CFR | |
| | 56 | | | | |
| | 57 | | | | |

NOTES :

| | | | | | |
|-----|----|------------|------------------|--|---|
| 06 | TT | 5-9-2022 | For Construction |  |    |
| 05 | TT | 13-7-2022 | For Construction | | |
| 04 | TT | 1-6-2022 | For Construction | | |
| 03 | TT | 7-2-2022 | For Construction | | |
| 02 | TT | 7-1-2022 | For Construction | | |
| 01 | TT | 25-10-2021 | For Construction | | |
| Rev | By | Date | Description | Sheet 12 of 17 Based on P&ID rev. 06 | |

| | | | | | | | |
|--------------------|----------------------|----------------------------------|----------------|------------|---|----------|--|
| GENERAL | 1 | Tag Number | | | PV-71101 | | |
| | 2 | Service | | | Recycle valve | | |
| | 3 | P&ID No. | | | BU-20-VD-303-PR-WG-0066 | | |
| | 4 | Location | | | Compressor bypass | | |
| | 5 | | | | | | |
| | 6 | | | | | | |
| | 7 | | | | | | |
| PROCESS CONDITIONS | 8 | Fluid | State | | Air | Dry Gas | |
| | 9 | Pressure | Norm. | Max. | 21 Bar(a) | - | |
| | 10 | Temperature | Norm. | Max. | 40°C | 55°C | |
| | 11 | Design | Press. | Temp. | 26 Barg | 70°C | |
| | 12 | Ambient Temp. | Min. | Max. | 5 °C | 52 °C | |
| BODY | 13 | Type Of Body | | | Globe valve | | |
| | 14 | Body Size | | | 1" ANSI RF | | |
| | 15 | Conn. Type | End Conn. Rat. | | RF | 300# | |
| | 16 | Body Material | | | Carbon steel ASTM A216 WCB/WCC | | |
| | 17 | Packing Material | | | PTFE / Graphite | | |
| | 18 | Bonnet Type | | | Integral | | |
| | 19 | Trim | Form | | Disc | | |
| | 20 | | Seat Mat. | | PTFE / Graphite | | |
| | 21 | | Disc Mat. | Shaft Mat. | SS 316 | SS316 | |
| | 22 | Required Seat Tightness | | | IV | | |
| | 23 | Max. Allow. Sound Level (dBA) | | | 85 dBA | | |
| | 24 | Required CV | | | 0.294 | | |
| 25 | Travel % | | | 69 | | | |
| 26 | Trim Characteristics | | | Micro-Flow | | | |
| ACTUATOR | 27 | Positioner controller | | | Electro-pneumatic (I/P) | | |
| | 28 | Interface | | | 4 -20 mA , HART | | |
| | 29 | Fail Position | | | AFC | | |
| | 30 | Pneumatic Conn. | | | 1/4" NPT-F | | |
| | 31 | Instrument Supply Fluid | | | Instrument Air | | |
| | 32 | Instrument Supply Fluid pressure | | | 6.0 bar(g) | | |
| | 33 | Position Monitor | | | Yes 4-20 mA HART | | |
| | 34 | Area Classification | | | Zone 2, Eex'ia | | |
| | 35 | Electric Connection | | | ISO M20 x 1,5 | | |
| | 36 | Cable Gland | | | Yes, Eex 'de' certified (Airpack scope) | | |
| ACCESSORIES | 37 | Ingress Protection | | | IP 65 | | |
| | 38 | Filter Regulator | | | Yes | | |
| | 39 | Gauges | | | Yes | | |
| | 40 | | | | | | |
| SERVICE | 41 | Flow Rate | | | 55 Kg/hr / 43 Nm3/hr | | |
| | 42 | Pressure | Inlet | outlet | 21 bar(a) | 8 bar(a) | |
| | 43 | Pressure drop | | | 0,55 | | |
| | 44 | CV selected | | | 0,188 | | |
| | 45 | | | | | | |
| | 46 | | | | | | |
| | 47 | | | | | | |
| CERTIFICATES | 48 | | | | | | |
| | 49 | 3.1 Material certificate | | | Yes | | |
| | 50 | ATEX | | | No | | |
| | 51 | SIL certificate | Level | | No | | |
| PURCHASE | 52 | | | | | | |
| | 53 | Valve Manufacturer | | | Emerson/Fisher | | |
| | 54 | Valve Model | | | NPS1GX | | |
| | 55 | Actuator Manufacturer | | | Emerson/Fisher | | |
| | 56 | Actuator Model | | | DVC6200 | | |
| 57 | | | | | | | |

| | | | | | |
|-----|----|------------|------------------|--|---|
| 06 | TT | 5-9-2022 | For Construction | INSTRUMENT AND VALVE DATASHEET Pressure Control Valve  |  |
| 05 | TT | 13-7-2022 | For Construction | | |
| 04 | TT | 1-6-2022 | For Construction | | |
| 03 | TT | 7-2-2022 | For Construction | | |
| 02 | TT | 7-1-2022 | For Construction | | |
| 01 | TT | 25-10-2021 | For Construction | | |
| Rev | By | Date | Description | Sheet 13 of 17 Based on P&ID rev. 06 | |

| | | | | | | |
|--------------------|----|--------------------------|------------------|---|--|---------|
| GENERAL | 1 | Tag Number | | No Tag.no.: Qty 2 pcs | | |
| | 2 | Service | | Check Valve | | |
| | 3 | P&ID No. | | BU-20-VD-303-PR-WG-0066 | | |
| | 4 | Location | | Compressor Outlet | | |
| | 5 | Line/equip. No. | | 2"-INA-7002-539D(N) | | |
| | 6 | | | | | |
| | 7 | | | | | |
| | 8 | | | | | |
| PROCESS CONDITIONS | 9 | Fluid | State | | Air | Dry Gas |
| | 10 | Pressure | Norm. | Max. | 21 Bar(a) | - |
| | 11 | Temperature | Norm. | Max. | 40°C | 55°C |
| | 12 | Design | Press. | Temp. | 26 Barg | 85°C |
| | 13 | Ambient Temp. | Min. | Max. | 5 °C | 52 °C |
| | 14 | Oper. Flow | | 55 Kg/hr / 43 Nm3/hr | | |
| | 15 | | | | | |
| | 16 | | | | | |
| | 17 | | | | | |
| | 18 | | | | | |
| BODY | 20 | Type Of Body | | Wafer type | | |
| | 21 | Type Of valve | | Disc style, pulsation service | | |
| | 21 | Body Size | | DN 50 (Process line = 2" ANSI 300# RF) | | |
| | 22 | Body Material | | Carbon steel ASTM A216 WCB | | |
| | 23 | Cracking Pressure | | 0,002 bar | | |
| | 24 | Inlet Connection | Outlet Conn. | | RF | RF |
| | 25 | Inlet Rating | Outlet Rating | | 300# | 300# |
| | 26 | Trim materials | | SS316 | | |
| | 27 | | | | | |
| | 28 | | | | | |
| | 29 | | | | | |
| | 30 | | | | | |
| | 31 | | | | | |
| | 32 | | | | | |
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| 37 | | | | | | |
| 38 | | | | | | |
| 39 | | | | | | |
| 40 | | | | | | |
| OPTIONS | 41 | | | | | |
| | 42 | | | | | |
| | 43 | | | | | |
| | 44 | | | | | |
| | 45 | | | | | |
| CERTIFICATES | 46 | 3.1 Material certificate | | Yes | | |
| | 47 | | | | | |
| | 48 | | | | | |
| | 49 | | | | | |
| | 50 | | | | | |
| | 51 | | | | | |
| PURCHASE | 52 | Manufacturer | | Hoerbigger | | |
| | 53 | Model | | 49D0 | | |
| | 54 | | | | | |
| | 55 | | | | | |
| | 56 | | | | | |
| 06 | TT | 5-9-2022 | For Construction | |      | |
| 05 | TT | 13-7-2022 | For Construction | | | |
| 04 | TT | 1-6-2022 | For Construction | | | |
| 03 | TT | 7-2-2022 | For Construction | | | |
| 02 | TT | 7-1-2022 | For Construction | | | |
| 01 | TT | 25-10-2021 | For Construction | | | |
| Rev | By | Date | Description | | Sheet 16 of 17 Based on P&ID rev. 06 | |

| | | | | | |
|--------------------|----|--------------------------|---------------|--------------------------------|----------|
| GENERAL | 1 | Tag Number | | No Tag.no.: Qty 1 pcs | |
| | 2 | Service | | Check Valve | |
| | 3 | P&ID No. | | BU-20-VD-303-PR-WG-0066 | |
| | 4 | Location | | Compressor Cooling water inlet | |
| | 5 | Line/equip. No. | | 1 1/2"-CWS-7003-500C(N) | |
| | 6 | | | | |
| | 7 | | | | |
| | 8 | | | | |
| PROCESS CONDITIONS | 9 | Fluid | State | Water | Liquid |
| | 10 | Pressure | Norm. Max. | 4,5 Bar(g) | 5 Bar(g) |
| | 11 | Temperature | Norm. Max. | 35°C | 45°C |
| | 12 | Design | Press. Temp. | 7 Bar(g) | 100°C |
| | 13 | Ambient Temp. | Min. Max. | 5 °C | 52 °C |
| | 14 | Oper. Flow | | 1,4 m3/hr | |
| | 15 | | | | |
| | 16 | | | | |
| | 17 | | | | |
| | 18 | | | | |
| BODY | 20 | Type Of Body | | Flanged bolted type | |
| | 21 | Type Of valve | | Swing disc | |
| | 21 | Body Size | | 1 1/2" ANSI | |
| | 22 | Body Material | | Carbon steel ASTM A105 | |
| | 23 | Cracking Pressure | | 0,05 bar | |
| | 24 | Inlet Connection | Outlet Conn. | RF | RF |
| | 25 | Inlet Rating | Outlet Rating | 150# | 150# |
| | 26 | Trim materials | | SS316 | |
| | 27 | | | | |
| | 28 | | | | |
| | 29 | | | | |
| | 30 | | | | |
| | 31 | | | | |
| | 32 | | | | |
| | 33 | | | | |
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| 37 | | | | | |
| 38 | | | | | |
| 39 | | | | | |
| 40 | | | | | |
| OPTIONS | 41 | | | | |
| | 42 | | | | |
| | 43 | | | | |
| | 44 | | | | |
| | 45 | | | | |
| CERTIFICATES | 46 | 3.1 Material certificate | | Yes | |
| | 47 | | | | |
| | 48 | | | | |
| | 49 | | | | |
| | 50 | | | | |
| | 51 | | | | |
| PURCHASE | 52 | Manufacturer | | LVF | |
| | 53 | Model | | 1BR507 | |
| | 54 | | | | |
| | 55 | | | | |
| | 56 | | | | |

| | | | |
|-----|----|------------|------------------|
| 06 | TT | 5-9-2022 | For Construction |
| 05 | TT | 13-7-2022 | For Construction |
| 04 | TT | 1-6-2022 | For Construction |
| 03 | TT | 7-2-2022 | For Construction |
| 02 | TT | 7-1-2022 | For Construction |
| 01 | TT | 25-10-2021 | For Construction |
| Rev | By | Date | Description |

Check Valve




Sheet 17 of 17
 Based on P&ID rev. 06

Sliding Stem Valve Specification

| | | |
|---|---|---------------------------|
| Customer: AIRPACK NEDERLAND BV | Emerson Process Management BV | |
| Contact: | Contact: Jordy Cobben | |
| Customer Reference: Inquiry 17811 VV-0801 (CV) | Sales Office Reference: 083MEE9014 | Lead Time: 5 weeks |
| Item: 200 | Rev: Qty: 1 | |
| Tags: PV-71101 | Date Last Modified: 12/07/2022 | |
| Description: NPS 1 GX DVC6200 Factory Mtgs DVC6200/DVC2000 | | |
| Service Description: Recycle valve | | |

| | |
|--|--|
| Service: Size and Type: NPS 1 GX | Positioner Type: DVC6200,HART Communicating-HC Input Signal: 4 to 20 mA dc (in+output) Access: 67CFR Filter/Regulator Gauges: 0-160 psig/0-11 bar Action: Direct Certification: ATEX,Intrinsic Safe/Flameproof/Type n |
| Body Style: Globe Design Temp: 60 deg C Design Press: 26 bar(a) End Connect/In/Out: CL300/RF Flg/RF Flg Material: WCC Steel Ports: 1 Flow Direction: Up | Controller Type: Action: Measure Element: Range: Output: Mounting: Airset: Mounting: |
| Trim Number: Standard Cage Matl: Not App Retainer Matl: Bushing Matl: Seat Ring Matl: CF3M SST | Transducer: Input Signal: Output Signal: Action: Mounting: Airset: Certifications: |
| VALVE PLUG Material: R31233 Alloy Guiding: Stem Balance: Unbalanced Shutoff Class: ANSI CL IV Port Size: 4.8 mm Characteristic: Micro Flow 4 Deg 39 Min Stem Material: S31603 SST Stem Size: 10 mm | Line In: 1 in, SCH STD Line Out: 1 in, SCH STD Insulation: None Service Cond: Process Fluid: ~NITROGEN Critical Pressure: Shutoff Drop: 21 bar |
| Bonnet Style: Standard Boss Size: Packing: Enviro-Seal Live Loaded PTFE Access: Bolt, Bonnet: SA-193-B7 Studs/2H Nuts NCF2 PackFlg/Bltg: | Max Rated Cv: 0.294 |
| Actuator: Spring & Diaphragm Type/Size: GX/225 Travel: 20 mm Bench Set: Push Down To: PDTC Supply: Air To Actuator: 4.0 to 6.0 barg (58 to 87 psig) Fails Valve: Close (ATO) Handwheel: None | |

| Variable Name | Unit | Normal | | | |
|-------------------------------|---------------|---------------|--|--|--|
| Volumetric Flow Rate Gas (Qg) | Nm3/h | 43.000 | | | |
| Inlet Pressure (P1) | bar(a) | 21.000 | | | |
| Outlet Pressure (P2) | bar(a) | 8.000 | | | |
| Inlet Temperature (T1) | deg C | 55.000 | | | |
| M / Gg | M | 28.130 | | | |
| Specific heats ratio (gamma) | | 1.400 | | | |
| Dynamic Viscosity (Mu) | cP | 0.017 | | | |
| Sizing Coefficient (Cv) | | 0.188 | | | |
| % Open | | 69 | | | |

NOTES:

| | |
|---|---|
| Documents included: - EN10204-3.1 Mat Cert. for body & bonnet - Decl. of Incorp. EC Machinery Directive - Hydrotest & Function/Leak Test Report - EC/PED/ATEX on Assembly | Valve Offered with: - 67CFR Filter Regulator + Gauge 0-11 bar - Standard factory coating on Assembly FPS-2A |
|---|---|

Valve/Regulator Sizing Calculation

| | | |
|---|---|---------------------------|
| Customer: AIRPACK NEDERLAND BV | Emerson Process Management BV | |
| Contact: | Contact: Jordy Cobben | |
| Customer Reference: Inquiry 17811 VV-0801 (CV) | Sales Office Reference: 083MEE9014 | Lead Time: 5 weeks |
| Item: 200 Rev: | Qty: 1 | Rev: B |
| Tags: PV-71101 | Date Last Modified: 12/07/2022 | |
| Description: NPS 1 GX DVC6200 Factory Mtgs DVC6200/DVC2000 | | |
| Service Description: Recycle valve | | |

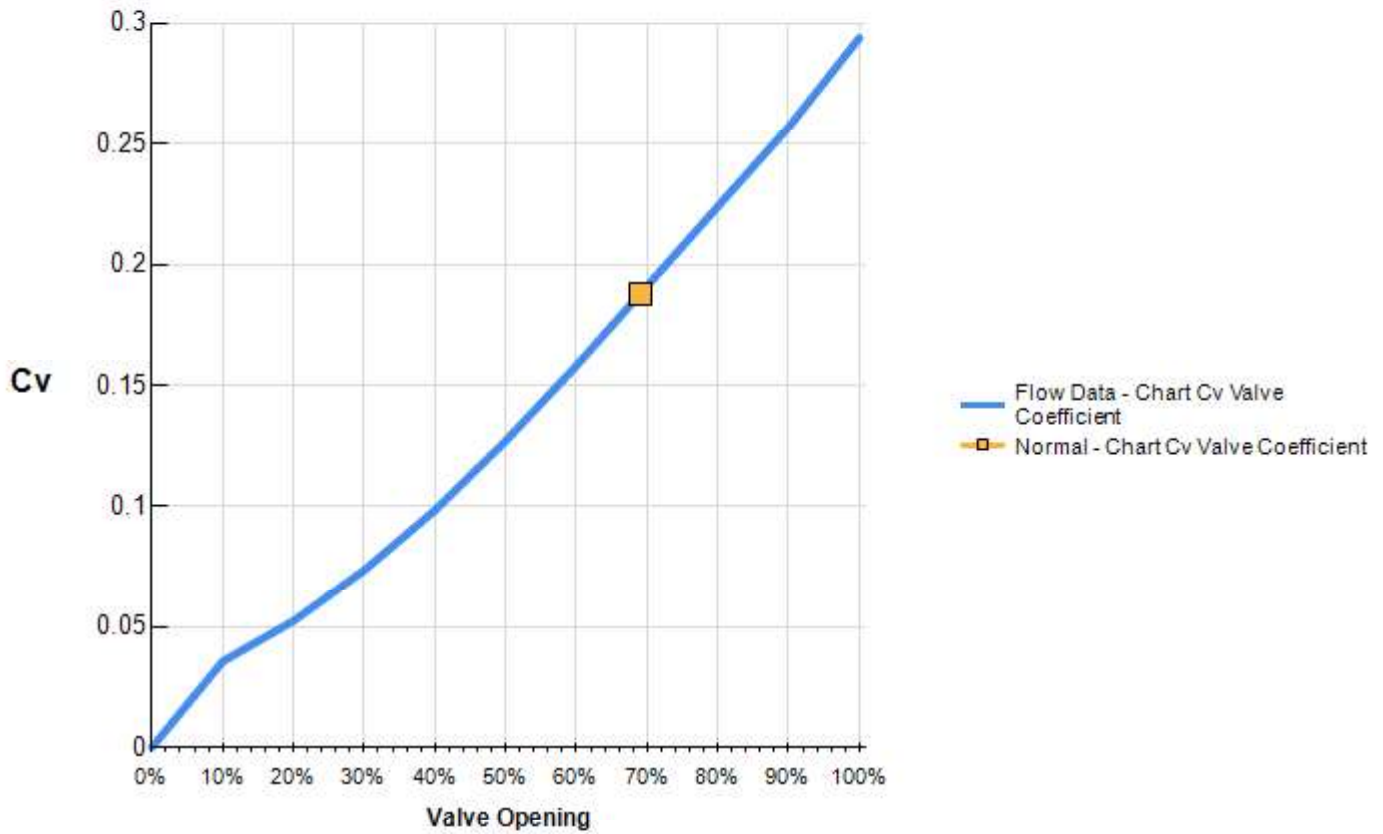
| | | | | |
|------------------|-------------------|-----------------|---------------|--------------------|
| Sizing Type: Gas | Flow is Turbulent | Solving for: Cv | Noise is None | Flow is Volumetric |
| Variable Name | Units | Normal | | |

| SERVICE & SIZING | | |
|-----------------------------------|---------------|------------------|
| Gas | | ~NITROGEN |
| Inlet Pressure (P1) | bar(a) | 21.000 |
| Outlet Pressure (P2) | bar(a) | 8.000 |
| Inlet Temperature (T1) | deg C | 55.000 |
| Volumetric Flow Rate Gas (Qg) | Nm3/h | 43.000 |
| Pressure drop ratio factor (Xt) | | 0.550 |
| Pressure Recovery Factor (Fl) | | 0.930 |
| Valve style modifier (Fd) | | 0.217 |
| Atmospheric Pressure | bar | 1.013 |
| Dynamic Viscosity (Mu) | cP | 0.017 |
| Specific heats ratio (gamma) | | 1.400 |
| Molecular Weight/Specific Gravity | M | 28.130 |
| Inlet Compressibility Factor (Z1) | | 1.000 |
| Pipe Size Up | in | 1 |
| Pipe Schedule Up | | STD |
| Pipe Size Down | in | 1 |
| Pipe Schedule Down | | STD |
| Nominal Valve Diameter (dv) | in | 1.000 |
| Sizing Coefficient (Cv) | | 0.188 |
| % Open | | 69 |
| dP Choked | bar | 11.550 |
| dP/P1 Valve | | 0.619 |
| Fp | | 1.000 |
| VELOCITY OUTPUTS | | |
| M1 Pipe | Mach | 0.003 |
| Mo Valve | Mach | 0.010 |
| M2 Pipe | Mach | 0.009 |
| V1 Pipe | m/s | 1.242 |
| Vo Valve | m/s | 3.704 |
| V2 Pipe | m/s | 3.261 |
| C1 Pipe | m/s | 368.603 |
| Co Valve | m/s | 368.603 |
| C2 Pipe | m/s | 368.603 |
| Item Notes: | | |

Flow Coefficient Graph

| | | |
|---|---|---------------------------|
| Customer: AIRPACK NEDERLAND BV | Emerson Process Management BV | Lead Time: 5 weeks |
| Contact: | Contact: Jordy Cobben | |
| Customer Reference: Inquiry 17811 VV-0801 (CV) | Sales Office Reference: 083MEE9014 | |
| Item: 200 | Rev: | Qty: 1 |
| Tags: PV-71101 | Date Last Modified: 12/07/2022 | |
| Description: NPS 1 GX DVC6200 Factory Mtgs DVC6200/DVC2000 | | |
| Service Description: Recycle valve | | |

Flow Coefficient vs. Valve Opening



Product: GX Valve Size=NPS 1 Trim Style/Characteristic=Micro Flow 4 Deg 39 Min Port Diameter=4.8 mm Trim
 Capacity=Full Capacity Travel=20 mm Balance=Unbalanced