

# Three-Way Valve



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A MEMBER OF THE ARCA FLOW GROUP

|    |                                    |  |                               |   |  |           |           |                             |  |
|----|------------------------------------|--|-------------------------------|---|--|-----------|-----------|-----------------------------|--|
| 1  | Customer:                          | thyssenkrupp Industries India Pvt. Ltd.  | ARTES-Ref.                    | 5504109   |  |           |           |                             |  |
| 2  | Plant:                             | Baruch, Gujrat   | Pos.                          | 1   |  |           |           |                             |  |
| 3  | Service:                           | Reheater Steam Bypass Control  | Qty.:                         | 1   |  |           |           |                             |  |
| 4  | TAG No.                            | HAJ01 AA401  | S/N:                          | 3165162.1   |  |           |           |                             |  |
| 5  | <b>Pipeline</b>                    |  | Connection A1                 | Connection A2   | Connection A3                                    |           |           |                             |  |
| 6  | Dimensions                         | Ø D x s mm   | 508,0 x 12,7                  | 508,0 x 12,7  | 406,4 x 9,53                                     |           |           |                             |  |
| 7  | Material                           |  | SA106 Gr.C                    | SA106 Gr.C  | SA106 Gr.C                                       |           |           |                             |  |
| 8  | Weld ends                          | Ø D x s mm   | 508,0 x 12,7                  | 508,0 x 12,7  | 406,4 x 9,53                                     |           |           |                             |  |
| 9  | Flange ends                        |  | --                            | --  | --   |           |           |                             |  |
| 10 | <b>Valve Design</b>                |  | Connection A1                 | Connection A2   | Connection A3                                    |           |           |                             |  |
| 11 | Nominal Pipe Size                  | NPS  | 20"                           | 20"   | 16"  |           |           |                             |  |
| 12 | Nominal Pressure (Rating Class)    | class  | 600                           | 600   | 600  |           |           |                             |  |
| 13 | Design Pressure                    | kg/cm <sup>2</sup> (g)   | 45                            | 45  | 45   |           |           |                             |  |
| 14 | Design Temperature                 | °C   | 380                           | 380   | 380  |           |           |                             |  |
| 15 | Material                           |  | SA105                         | SA105   | SA105  |           |           |                             |  |
| 16 | <b>Hydraulic Test Pressure</b>     | <sup>1)</sup>  | <b>72,0 kg/cm<sup>2</sup></b> |   |  |           |           |                             |  |
| 17 | <b>Operational conditions</b>      | Load Case  | Load Case                     | Load Case   | Load Case  | Load Case | Load Case |                             |  |
| 18 | Medium:                            | 30% TMCR   | 50% TMCR                      | 60% TMCR  | 80% TMCR   | 100% TMCR | 100% BMCR |                             |  |
| 19 | Valve Inlet (A1)                   | t/h  | 116,70                        | 144,00  | 168,00   | 203,00    | 298,00    |                             |  |
| 20 | Valve Outlet (A2)                  | t/h  | 0,00                          | 0,00  | 0,00   | 133,00    | 232,00    |                             |  |
| 21 | Bypass Flow (A3)                   | t/h  | 116,70                        | 144,00  | 168,00   | 70,00     | 66,00     |                             |  |
| 22 | Temperature                        | °C   | 233,50                        | 261,20  | 291,00   | 298,00    | 332,00    |                             |  |
| 23 | p inlet (A1)                       | kg/cm <sup>2</sup> (g)   | 12,50                         | 15,60   | 19,10  | 23,70     | 34,00     |                             |  |
| 24 | p outlet (A2)                      | kg/cm <sup>2</sup> (g)   | -                             | -   | -  | 23,68     | 33,97     |                             |  |
| 25 | p bypass (A3)                      | kg/cm <sup>2</sup> (g)   | 12,48                         | 15,57   | 19,07  | 23,69     | 33,99     |                             |  |
| 26 | Kvs value                          | m <sup>3</sup> /h  | 11.780                        | 11.780  | 11.780   | 11.780    | 11.780    |                             |  |
| 27 | <b>Valve type</b>                  | <b>Type W - Distributor</b>  |                               |   |  |           |           |                             |  |
| 28 | <b>Material:</b>                   |  |                               |   | <b>Valve Parameters</b>                          |           |           |                             |  |
| 29 |                                    |  |                               |   | K <sub>VS</sub> -Value: 11.780 m <sup>3</sup> /h |           |           |                             |  |
| 30 | Body: SA105                        |  |                               |   | Δp actuator: 3 bar                               |           |           |                             |  |
| 31 | Stem: 1.4923                       |  |                               |   | Control characteristic: linear                   |           |           | Dimensions: approx. 1440 mm |  |
| 32 | Plug: SA216 WCB                    |  |                               |   |  |           |           | approx. 790 mm              |  |
| 33 | Gaskets: Graphite                  |  |                               |   |  |           |           |                             |  |
| 34 |                                    |  |                               |   |  |           |           |                             |  |
| 35 |                                    |  |                               |   |  |           |           |                             |  |
| 36 |                                    |  |                               |   |  |           |           |                             |  |
| 37 |                                    |  |                               |   |  |           |           |                             |  |
| 38 | <b>Design &amp; Tests acc. to:</b> | ASME BPVC Section VIII Division 1; IBR   |                               |   |  |           |           |                             |  |
| 39 |                                    |  |                               |   |  |           |           |                             |  |
| 40 | Leakage:                           | <sup>2)</sup>  |                               | approx. 1,5% of Kvs (Class I acc. ANSI/FCI 70-2-2006) |  |           |           |                             |  |
| 41 | <b>Installation requirements:</b>  |  |                               |   |  |           |           |                             |  |
| 42 |                                    |  |                               |   |  |           |           |                             |  |
| 43 | <b>Actuator type:</b>              | pneumatic (regulating type) (mounted on 3-way-valve)   |                               |   |  |           | 3165163   |                             |  |
| 44 | Model:                             | ProtACT PRY.B2.351D.PRH, double acting, fail safe position in case of power (air) or signal loss "Fail in Place" |                               |   |  |           |           |                             |  |
| 45 |                                    | Positioner SIEMENS Sipart PS2 Type: 6DR5123-0NN31-0AA4-Z F01 + 6DR4004-8J + 6DR4004-K; with HART                 |                               |   |  |           |           |                             |  |
| 46 |                                    | incl. 2 volume booster ROTORK YT-300P1, air set NORGREN B82G-2GK-AD3-RMG; gauge block; el. connection            |                               |   |  |           |           |                             |  |
| 47 |                                    | 1/2" NPT; pneum. connection 1/4" NPT; piping stainless steel / opening & closing time: approx. 20 sec.           |                               |   |  |           |           |                             |  |
| 48 |                                    | air pressure: 4bar(g)  |                               |   |  |           |           |                             |  |
| 49 | <b>Remarks:</b>                    | Inlet A1 always open, Outlet A2 and A3 controlled  |                               |   |  |           |           |                             |  |
| 50 |                                    | Internal components demountable (via packing case)   |                               |   |  |           |           |                             |  |
| 51 |                                    | Flow factor expressed in cubic meters per hour (Kvs)   |                               |   |  |           |           |                             |  |
| 52 | <sup>1)</sup>                      | - hydraulic test pressure acc. to ASME BPVC Section VIII Div.1 - UG99 - hold time 10 minutes                     |                               |   |  |           |           |                             |  |
| 53 | <sup>2)</sup>                      | A leakage test is not performed!   |                               |   |  |           |           |                             |  |
| 54 | Revision:                          | 0  | 1                             | 2   | 3  | 4         | 5         |                             |  |
| 55 | Date:                              | 15.12.2020   | 14.01.2021                    | 02.03.2021  | 08.03.2021                                       |           |           |                             |  |
| 56 | Prepared:                          | H. Roßmann   | P. Schüler                    | P. Schüler  | P. Schüler                                       |           |           |                             |  |
| 57 | Checked:                           | P. Schüler   | R. Feldmann                   | R. Feldmann   | R. Feldmann                                      |           |           |                             |  |