|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Tag | Stus | Bus | Cod | Type | Characteristic | Rating | Connection | Trim Form | Bonnet | Body | Plug | Seat Ring | Guide | Stem | Packing | Gasket | Rated  CV |
| PV-1006 | FLC | FF | 501G | Globe | EQ% | 600 | RF | Balnced  CGV | STD | A216WCB | SUS  316  STL | SUS  316  STL | SCS  14A  HCR | SUS  316 | TFE  FIBER | T/#  1806  GR | 616 |
| PV-1011 | FC | FF | 510  D | Globe | Linear | 600 | RF | MULTI-STEP PLUG, BLANCE TYPE  MSCGV | STD | A216WCB | SUS 316/HCR+SS | SUS 316 /SS | SUS 316 | SUS 316 | TFE  FIBER | T/#  1806  GR | 18.82 |
| PV-1045 | FC | H. T | 550G | Globe | Linear | 600 | RF | Balnced  Multi  Hole  Cage | FIN  EXT. | A216WCB | SUS  410  HT | SUS  410  HT | SUS  410  HT | SUS  316 | GRAF  OIL | T/#  1806G | 196.1 |
| PV-2015 | FC | FF | 501G | Globe | Linear | 600 | RF | Balnced  CGV | FIN  EXT. | A216  WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | GRAF  OIL | T/#  1806G | 117 |
| USV-2038 | FC | 24V  DC | 501G |  | Linear | 600 | RF | Balnced | FIN  EXT. | A351CF8C | SUS  321  /STL | SUS321/STL | SUS  321/HCR | SUS321 | GRAFOIL | T/#  1808G | 215 |
| FV-2040 | FO | H. T | 501G | Globe | EQ% | 600 | RF | Balnced  CGV | FIN  EXT. | A351  CF8C | SUS  321  SS | SUS  321  SS | SUS  321  HCR | SUS  321 | GRAF  OIL | T/#  1808G | 16 |
| PV-2073 | FC | FF | 550G | Globe | Linear | 600 | RF | Balnced  MULTI HOLE CAGE | FIN  EXT. | A216-WCB | SUS 410 /HT | SUS 410 /HT | SUS 410 /HT | SUS  316 | GRAF  OIL | T/#  1806G | 387 |
| FV-2072 | FO | H. T | 501G | Globe | EQ% | 600 | RF | Balnced  CGV | FIN  EXT. | A216  WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | GRAF  OIL | T/#  1806G | 209 |
| FV-2091 | FC | FF | 501G | Globe | EQ% | 600 | RF | Balnced  CGV | FIN  EXT. | A216  WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | GRAF  OIL | T/#  1806G | 879 |
| FV-2061 | FC | H.T | R2.2 | Butterfly | Approximate EQ% | 600 | RF | TRIPLE ECENRIC | STD | A216WCB | A351CF8M/ENP+STL | SUS 316 STL | SUS  316  HCR | Inc. | GRAF  OIL | ------ | 4648.2 |
| USV-2094 | FO | 24V  DC | 501T | Globe | EQ% | 600 | RF | Unbalnc  SS | FIN  EXT | A105 | SUS  316  /STL | SUS316/STL | SUS  440C/HT | SUS316 | GRAFOIL | T/#1890-S | 13 |
| HV-2097 | FC | FF | 510D | Globe | Linear | 600 | RF | Balnced  MULTI STAGE CAGE  OVER | FIN  EXT. | A216WCB | SUS  410  HT | SUS  410  HT | 410 SS /HT | SUS 316 | GRAF  OIL | T/#  1806G | 7 |
| FV-2079 | FO | H. T | 501G | Globe | EQ% | 600 | RF | Balnced  CGV | STD | A105 | SUS  410  /HT | SUS  410  /HT | SCS  24/  PH | SUS  316 | GRAF  OIL | T/#1806G | 7.4 |
| FV-2233 1 | FC | FF | 501T | Globe | Linear | 900 | RTJ | Unbalnc  SS | STD | SUSF 304L | SUS 316/ STL | SUS 316/ STL | SUS 316  PS | SUS 316 | TFE  FIBER | T/#  1808G | 7.2 |
| FV-2233 2 | FC | FF | 501G | Globe | EQ% | 600 | RF | Balnced  CGV | STD | A105 | SUS  410  /HT | SUS  410  /HT | SCS  24  /PH | SUS 316 | TFE  FIBER | T/#  1806G | 9.64 |
| LV-2372 | FLC | H. T | 501G | Globe | EQ% | 1500 | RTJ | Balnced  CGV | STD | A216WCB | SUS 410 /HT | SUS 410 /HT | SCS 24 /PH | SUS 316 | TFE  FIBER | T/# 1806G | 48.8 |
| FV-2417 | FLC | H. T | 501G | Globe | EQ% | 1500 | RTJ | Balnced  CGV | STD | A216WCB | SUS 410 /HT | SUS 410 /HT | SCS  24  /PH | SUS 316 | TFE  FIBER | T/#  1806G | 209 |
| LV-2403 | FC | FF | 501G | Globe | Linear | 900 | RTJ | Balnced  CGV | STD | A351CF8 | SUS 316 /STL | SUS 316 /STL | SUS 316 /HCR | SUS 316 | GRAF  OIL | T/# 1806G | 29 |
| LV-2419 | FC | FF | 501G | Globe | Linear | 600 | RF | Balnced  CGV | STD | A351  CF8 | SUS 316 | SUS 316 | SCS  14A  HCR | SUS 316 | GRAF  OIL | T/#  1806G | 103.8 |
| PV-2406 | FC | FF | 501G | Globe | Linear | 300 | RF | Balnced  CGV | STD | A351  CF8 | SUS 316  STL | SUS 316  STL | SCS  14A  HCR | SUS 316 | GRAF  OIL | T/#  1806G | 913 |
| LV-2441 | FC | FF | 501G | Globe | EQ% | 900 | RTJ | Balnced  CGV | STD | A351CF8 | SUS 316 /STL | SUS 316 /STL | SUS 316 /HCR | SUS 316 | GRAF  OIL | T/#  1806G | 108 |
| TV-2457 | FC | FF | 710E | Butterfly | Approximate EQ% | 300 | Wafer | Ecentric  HPBV | STD | A351  CF8 | A351  CF8M  PS | SUS 316  PS  HG Type | SUS 316  Hcr | SUS 630  PH | GRAF  OIL | ------- | 3008 |
| LV-2474 | FC | FF | 501G | Globe | EQ% | 900 | RTJ | Balnced  CGV | STD | A351CF8 | SUS 316 /STL | SUS 316 /STL | SUS 316 /HCR | SUS 316 | TFE  FIBER | T/#  1806G | 25.4 |
| PV-2481 | FC |  | 501G | Globe | Linear | 300 | RF | Balnced | STD | A351  CF8 | SUS 316  STL | SUS 316  STL | SCS  14A  HCR | SUS 316 | TFE  FIBER | T/#  1806G | 1050 |
| FV-2531 1 | FC | FF | 501T | Globe | Linear | 300 | RF | Unbalnc  SS | STD | A216-WCB | SUS 316 | SUS 316  STL | SUS  440C  HT | SUS 316 | TFE  FIBER | T/#  1890S | 110 |
| FV-2531 2 | FC | FF | 501G | Globe | EQ% | 300 | RF | Balnced | STD | A216-WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | TFE  FIBER | T/#  1806G | 650 |
| FV-2536A | FC | FF | 501G | Globe | Linear | 300 | RF | Balnced  CGV | STD | A216-WCB | SUS 410 /HT | SUS 410 /HT | SCS  24  /PH | SUS  316 | TFE  FIBER | T/#  1806G | 820 |
| PV-2536B | FC | FF | 501G | Globe | Linear | 300 | RF | Balnced | STD | A216-WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | TFE  FIBER | T/#  1806G | 1050 |
| PV-2608 | FC | FF | 501T | Globe | Linear | 900 | RTJ | Unbalnc  SS | STD | A105 | SUS 440C/HT | SUS 440C/HT | SUS 440C/HT | SUS 316 | TFE  FIBER | T/#  1806G | 3.46 |
| HV-3011 | FC | FF | 501T | Globe | Linear | 300 | RF | Unbalnc  SS | STD | A351  CF3 | SUS 316  STL | SUS 316  STL | SUS 316  PS | SUS 316 | TFE  FIBER | T/#  1890-316 | 16 |
| PV-3042 | FLC | H. T | 730E | Butterfly | Approximate EQ% | 600 | RF | TRIPLE ECENRIC | STD | A216WCB | A351CF8M/ENP | SUS 316 /PS | SUS 316 /Hcr | Inc. | GRAF  OIL | ------ | 4406 |
| FV-3041 | FLC | H. T | 501G | Globe | EQ% | 600 | RF | Balnced  CGV | STD | A216WCB | SUS 410 /HT | SUS 410 /HT | SCS  24  /PH | SUS 316 | TFE  FIBER | T/#  1806G | 9.7 |
| LV-3161A | FC | H. T | 510D | Globe | Linear | 900 | RTJ | Balnced  OVER PLUG FLOW  MSCGV | STD | A351CF8 | SUS 316 /SS | SUS 316 /STL | SUS 316 | SUS 316 | TFE FIBER | T/# 1806G | 65 |
| LV-3161B | FC | H. T | 510D | Globe | Linear | 900 | RTJ | Balnced  OVER PLUG FLOW  MSCGV | STD | A351CF8 | SUS 316 /SS | SUS 316 /STL | SUS 316 | SUS 316 | TFE FIBER | T/# 1806G | 65 |
| PV-3166 | FO | FF | 501G | Globe | Linear | 900 | RTJ | Balnced  CGV | STD | A351CF8 | SUS 316 /STL | SUS 316 /STL | SUS 316 /HCR | SUS 316 | TFE FIBER | T/# 1806G | 66.1 |
| FV-3171 | FC | FF | 501G | Globe | Linear | 900 | RTJ | Balnced  CGV | STD | A216WCB | SUS 410 /HT | SUS 410 /HT | SCS 24 /PH | SUS 316 | TFE FIBER | T/# 1806G | 289 |
| FV-3169 | FC | FF | 510D | Globe | Linear | 900 | RTJ | Balnced  MULTI STEP PLUG  MSCGV | STD | A216WCB | SUS 410 /HT | SUS 410 /HT | 410 SS /HT | SUS 316 | TFE FIBER | T/# 1806G | 34 |
| LV-3192 | FC | H. T | 501G | Globe | EQ% | 150 | RF | Balnced  CGV | STD | A351CF8 | SUS 316 /STL | SUS 316 /STL | SUS 316 /HCR | SUS 316 | TFE FIBER | T/# 1806G | 540 |
| FV-5020 | FC | FF | 501T | Globe | EQ% | 300 | RF | Unbalnc  SS | STD | A105 | SUS  316 | SUS  316  STL | SUS  440C  HT | SUS  316 | TFE  FIBER | T/#  1890S | 9.55 |
| FV-5041 | FC | FF | 501G | Globe | EQ% | 150 | RF | Balnced | STD | A351CF8 | SUS  316  STL | SUS  316  STL | SCS  14A  HCR | SUS  316 | TFE  FIBER | T/#  1806G | 320 |
| TV-5064 | FC | FF | 710E | Butterfly | Approximate EQ% | 300 | Wafer | Ecentric  HPBV | STD | A351CF8 | A351CF8M  PS | SUS  316  PS  HG TyPE | SUS  316  HCR | SUS  630  PH | GRAF  OIL | --- | 3952 |
| PV-5069 | FC | FF | 501G | Globe | Linear | 300 | RF | Balnced  CGV | FIN  EXTN. | A216WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | GRAF  OIL | T/#  1806G | 408 |
| FV-5093 | FC | H. T | 501G | Globe | EQ% | 300 | RF | Balnced  CGV | STD | A216WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | TFE  FIBER | T/#  1806G | 148 |
| FV-5107 | FC | FF | 501T | Globe | EQ% | 300 | RF | Unbalnc  SS |  | A105 | SUS  316 | SUS  316  /STL | SUS  440C/HT | SUS  316 | TFE FIBER | T/#  1890-S | 1.17 |
| FV-5161 | FC | FF | 501G | Globe | EQ% | 300 | RF | Balnced  CGV | STD | A216WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | TFE  FIBER | T/#  1806G | 327 |
| PV-5091A | FC | H. T | 501T | Globe | Linear | 300 | RF | Unbalnc  SS | STD | A216WCB | SUS  316  STL | SUS  316  STL | SUS  440C  HT | SUS  316 | TFE  FIBER | T/#  1890S | 8 |
| PV-5091B | FC | H. T | 501T | Globe | Linear | 300 | RF | Unbalnc  SS | STD | A216WCB | SUS  316 | SUS  316  STL | SUS  440C  HT | SUS  316 | TFE  FIBER | T/#  1890S | 66 |
| PV-5109 | FC | FF | 501T | Globe | Linear | 300 | RF | Unbalnc  SS | STD | A216WCB | SUS  316 | SUS  316  STL | SUS  440C  HT | SUS  316 | TFE  FIBER | T/#  1890S | 121 |
| FV-5203 | FC | H. T | 501G | Globe | EQ% | 300 | RF | Balnced  CGV | STD | A216WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | TFE  FIBER | T/#  1806G | 320 |
| PV-5207A | FO | H. T | 501T | Globe | Linear | 300 | RF | Unbalnc  SS | STD | A105 | SUS  316  STL | SUS  316  STL | SUS  440C  HT | SUS  316 | TFE  FIBER | T/#  1890S | 4 |
| PV-5207B | FC | H. T | 501T | Globe | EQ% | 300 | RF | Unbalnc  SS | STD | A216  WCB | SUS  316 | SUS  316  STL | SUS  440C  HT | SUS  316 | TFE  FIBER | T/#  1890S | 38 |
| FV-5239 | FC | FF | 501G | Globe | EQ% | 300 | RF | Balnced  CGV | STD | A216WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | TFE  FIBER | T/#  1806G | 155 |
| FV-5441 | FC | FF | 501T | Globe | EQ% | 300 | RF | Unbalnc  SS | STD | A105 | SUS  440C  HT | SUS  440C  HT | SUS  440C  HT | SUS  316 | TFE  FIBER | T/#  1890S | 3.53 |
| FV-5321 | FC | H. T | 501G | Globe | EQ% | 300 | RF | Balnced  CGV | STD | A216WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | TFE  FIBER | T/#  1806G | 492 |
| FV-5336 | FC | FF | 501G | Globe | EQ% | 300 | RF | Balnced  CGV | STD | A216WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | TFE  FIBER | T/#  1806G | 48 |
| FV-5337 | FC | FF | 501G | Globe | EQ% | 300 | RF | Balnced  CGV | STD | A216WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | TFE  FIBER | T/#  1806G | 162 |
| HV-5338 | FC | FF | 501T | Globe | Linear | 300 | RF | Unbalnc  SS | STD | A105 | SUS  316 | SUS  316  STL | SUS  440C  HT | SUS  316 | TFE  FIBER | T/#  1890S | 15 |
| FV-5367 | FC | FF | 501G | Globe | EQ% | 600 | RF | Balnced  CGV | STD | A216WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | TFE  FIBER | T/#  1806G | 13.8 |
| FV-5383 | FC | FF | 501T | Globe | EQ% | 150 | RF | Unbalnc  SS | STD | SUS  F304 | SUS  316 | SUS  316 | SUS  316  PS | SUS  316 | TFE  FIBER | T/#  1890-316 | 8.3 |
| FV-5407A | FC | FF | 510D | Globe | Linear | 600 | RF | BLANC TYPE OVER PLUG FLOW  MSCGV | STD | A105 | SUS  410/  HT | SUS  410/  HT | 410 SS/  HT | SUS316 | TFE FIBER | T/#  1806G | 1.43 |
| FV-6031 | FC | FF | 501G | Globe | EQ% | 600 | RF | Balnced  CGV | STD | A216WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | TFE  FIBER | T/#  1806G | 29 |
| PV-6025 | FC | H. T | 720C | Butterfly | Approximate EQ% | 600 | RF | Ecentric  HPBV | STD | A216-WCB | A351CF8M  /PS | SUS630/PH  HG Type | SUS  316/Hcr | Inc. | GRAFOIL | --- | 3272 |
| FV-6070 | FC | H. T | 501G | Globe | EQ% | 600 | RF | Balnced  CGV | FIN  EXTN. | A216WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | GRAF  OIL | T/#  1806G | 665.4 |
| FV-6059 1 | FC | FF | 501G | Globe | EQ% | 900 | RTJ | Balnced  CGV | STD | A351CF8 | SUS  316/  STL | SUS  316/  STL | SUS  316/HCR | SUS316 | GRAFOIL | T/#  1806G | 40 |
| LV-6051 | FC | FF | 720C | Butterfly | Approximate EQ% | 900 | RTJ | Ecentric  HPBV | STD | A351CF8 | A351CF8M/PS | SUS316/PS | SUS  316/Hcr | SUS630/PH | GRAFOIL | ---- | 2117 |
| FV-6081 | FC | FF | 510D | Globe | Linear | 1500 | RTJ | UnblnceTYPE OVER PLUG FLOW  MSCGV | STD | SUSF304L | SUS  316  /HCR+SS | SUS316/SS | SUS  316 | SUS316 | TFE FIBER | T/#  1806G | 1.12 |
| FV-6086 | FC | FF | 510D | Globe | Linear | 900 | RTJ | Balnce  TYPE OVER PLUG FLOW  MSCGV | FIN  EXTN. | A351CF8 | SUS  316/  HCR+SS | SUS316/SS | SUS  316 | SUS316 | GRAFOIL | T/#  1806G | 14.5 |
| USV-6082 | FC |  | S1.2 | Butterfly |  |  |  |  |  |  |  |  |  |  |  |  |  |
| FV-6082 | FC | FF | 501T | Globe | Linear | 150 | RF | Unbalnc  SS | STD | A351  CF8 | SUS  316  STL | SUS  316  STL | SUS  316  PS | SUS  316 | TFE  FIBER | T/#  1890-316 | 7.2 |
| LV-6082 | FC | FF | 501T | Globe | Linear | 150 | RF | Unbalnc  SS | STD | A351  CF8 | SUS  316  STL | SUS  316  STL | SUS  316  PS | SUS  316 | TFE  FIBER | T/#1890-316 | 27 |
| PV-7002A | FLO | FF |  | Globe | Linear | 1500 |  | Multi Flow  Over  Balnced | Normalising | A217  WC6 | 316  STST  +  Stelit | 316  STST  +  Stelit | 420  ST.ST | AG  38 | GRAFOIL | 316  ST.ST  Graphit | 46.6  23.3 |
| PV-7002B | FLO | FF |  | Globe | Linear | 1500 |  | Multi Flow  Over  Balnced | Normalising | A217  WC6 | 316  STST  +  Stelit | 316  STST  +  Stelit | 420  ST.ST | AG  38 | GRAFOIL | 316  ST.ST  Graphit | 467  407 |
| PV-7002C | FLO | FF |  | Globe | Linear | 1500 |  | Multi Flow  Over  Balnced | Normalising | A217  WC6 | 316  STST  +  Stelit | 316  STST  +  Stelit | 420  ST.ST | AG  38 | GRAFOIL | 316  ST.ST  Graphit | 467  407 |
| PV-7004 | FC | FF | 510  D | Globe | Linear | 600 | RF | Balnced  over plug flow  MSCGV | FIN  EXTN. | A216WCB | SUS  410/  HT | SUS410/HT | 410  SS/  HT | SUS316 | GRAFOIL | T/#  1806G | 930 |
| TV-7002 | FLO | FF |  | Gate |  | 1500 | RJ |  |  | A182 F11 | ER 410  NiMo |  |  | AISI  431 | Graphit |  | 0.39 |
| TV-7003 | FLO | FF |  | Gate |  | 1500 | RJ |  |  | A182 F11 | ER 410  NiMo |  |  | AISI  431 | Graphit |  | 3.96 |
| TV-7004 | FLO | FF |  | Gate |  | 1500 | RJ |  |  | A182 F11 | ER 410  NiMo |  |  |  | Graphit |  | 3.96 |
| PV-7025A | FLO | FF |  | Globe | Linear | 1500 |  | Multi Flow  Over  Balnced | Normalising | A217  WC6 | 316  STST  +  Stelit | 316  STST  +  Stelit | 420  ST.ST | A636 | GRAFOIL | 316  ST.ST  Graphit | 134  116 |
| PV-7025B | FLO | FF |  | Globe | Linear | 1500 |  | Multi Flow  Over  Balnced | Normalising | A217  WC6 | 316  STST  +  Stelit | 316  STST  +  Stelit | 420  ST.ST | A636 | GRAFOIL | 316  ST.ST  Graphit | 134  116 |
| TV-7026 | FLO | FF |  | Gate |  | 1500 | RJ |  |  | A182 F11 | ER 410  NiMo |  |  | AISI  431 | Graphit |  | 0.51 |
| TV-7027 | FLO | FF |  | Gate |  | 1500 | RJ |  |  | A182 F11 | ER 410  NiMo |  |  | AISI  431 | Graphit |  | 0.51 |
| PV-7028 | FC | FF | 720C | Butterfly | Approximate EQ% | 600 | RF | Ecentric  HPBV | STD | A217WC6 | A351  CF8M/PS | SUS316/PS HG | SUS  316  /Hcr | Inc. | GRAFOIL | --- | 2702 |
| TV-7025A | FC | FF |  | Gate |  | 600 | RF |  |  | A182 F11 | ER 410  NiMo |  |  | AISI  431 | Graphit |  | 7.8 |
| TV-7025B | FC | FF |  | Gate |  | 600 | RF |  |  | A182 F11 | ER 410  NiMo |  |  | AISI  431 | Graphit |  | 7.8 |
| PV-7031A | FLO | FF |  | Globe | Linear | 600 | RF | Multi Flow  Over  Balnced | Normalising | A216WCB | 316L  STST  +  Stelit | 316L  STST  +  Stelit | 420  ST.ST | A636 | GRAFOIL | 316L  ST.ST  Graphit | 829  619 |
| PV-7031B | FLO | FF |  | Globe | Linear | 600 | RF | Multi Flow  Over  Balnced | Normalising | A216WCB | 316L  STST  +  Stelit | 316L  STST  +  Stelit | 420  ST.ST | A636 | GRAFOIL | 316L  ST.ST  Graphit | 829  619 |
| PV-7031C | FLO | FF |  | Globe | Linear | 600 | RF | Multi Flow  Over  Balnced | STD | A216WCB | 316L  STST  +  Stelit | 316L  STST  +  Stelit | 420  ST.ST | A636 | GRAFOIL | 316L  ST.ST  Graphit | 111  63 |
| PV-7031D | FLO | FF |  | Globe | Linear | 600 | RF | Multi Flow  Over  Balnced | STD | A216WCB | 316L  STST  +  Stelit | 316L  STST  +  Stelit | 420  ST.ST | A636 | GRAFOIL | 316L  ST.ST  Graphit | 111  63 |
| TV-7032 | FLO | FF |  | Gate |  | 600 | RF |  |  | A182 F11 | ER 410  NiMo |  |  | AISI  431 | Graphit |  | 6.6 |
| TV-7033 | FLO | FF |  | Gate |  | 600 | RF |  |  | A182 F11 | ER 410  NiMo |  |  | AISI  431 | Graphit |  | 6.6 |
| PV-7051A |  |  |  | Globe | Linear | 600 | RF | Cascade  Under  Balnced | Normalising | A216WCB | 316L  STST  +  Stelit | 316L  STST  +  Stelit | 420  ST.ST | A636 | GRAFOIL | 316L  ST.ST  Graphit | 238  182 |
| PV-7051B |  |  |  | Globe | Linear | 600 | RF | Cascade  Under  Balnced | Normalising | A216WCB | 316L  STST  +  Stelit | 316L  STST  +  Stelit | 420  ST.ST | A636 | GRAFOIL | 316L  ST.ST  Graphit | 238  182 |
| TV-7052 |  |  |  |  |  | 600 | RF |  |  | A182 F11 | ER 410  NiMo |  |  | AISI  431 | Graphit |  | 2.6 |
| TV-7053 |  |  |  |  |  | 600 | RF |  |  | A182 F11 | ER 410  NiMo |  |  | AISI  431 | Graphit |  | 2.6 |
| PV-7034 | FC | FF | 510  D | Globe | Linear | 600 | RF | Balnced  over plug flow  MSCGV | FIN  EXTN. | A216WCB | SUS  410/  HT | SUS410/HT | 410  SS/  HT | SUS316 | GRAFOIL | T/#  1806G | 703 |
| TV-7071A | FC | FF |  | Angle |  | 600 | RF |  |  | A182 F11 | ER 410  NiMo |  |  | AISI  431 | Graphit |  | 0.6 |
| TV-7071B | FC | FF |  | Angle |  | 600 | RF |  |  | A182 F11 | ER 410  NiMo |  |  | AISI  431 | Graphit |  | 0.6 |
| FV-5301 | FC | FF | 501G | Globe | Linear | 300 | RF | Balnced  CGV | STD | A217  WC9 | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  316 | TFE  FIBER | T/#  1806G | 320 |
| FV-7091 | FLC | FF | 501G | Globe | EQ% | 150 | RF | Balnced  CGV | STD | A351  CF8 | SUS  316  STL | SUS  316  STL | SCS  14A  HCR | SUS  316 | TFE  FIBER | T/#  1806G | 114.5 |
| PV-7056 | FC | FF | 501G | Globe | Linear | 300 | RF | Balnced  CGV | FIN  EXTN. | A216  WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  630  PH | GRAF  OIL | T/#  1806G | 2587 |
| PV-7101 | FC | FF | 501G | Globe | Linear | 300 | RF | Balnced  CGV | FIN  EXTN. | A216  WCB | SUS  410  HT | SUS  410  HT | SCS  24  PH | SUS  630  PH | GRAF  OIL | T/#  1806G | 2774 |
| FV-2150 | FC | H. T | 501G | Globe | EQ% | 600 | RF | Balnced  CGV | STD | A216  WCB | SUS  410  /HT | SUS  410  /HT | SCS  24  /PH | SUS  316 | GRAF  OIL | T/#  1806G | 19.6 |
| HV-2031 | FC | FF | 550G | Globe | Linear | 600 | RF | Balnced  Multi  Hole  Cage  Over | FIN  EXTN. | SUSF 321 | SUS  321  HCR +SS | SUS  321  SS | SUS  321  HCR | SUS  321 | GRAF  OIL | T/#  1808G | 6 |
| LV-6021A | FC | FF | 501G | Globe | EQ% | 600 | RF | Balnced  CGV5070 | FIN  EXTN. | A216  WCB | SUS  410  /HT | SUS  410  /HT | SCS  24  /PH | SUS  316 | GRAF  OIL | T/#  1806G | 334 |
| LV-6021B | FC | FF | 550G | Globe | EQ% | 600 | RF | Balnced  MHCGV | FIN  EXTN. | A216WCB | SUS  410/  HT | SUS  410/  HT | SUS  410/  HT | SUS  316 | GRAFOIL | T/#  1806G | 156 |
| LV-5070 | FC | FF | 501T | Globe | EQ% | 300 | RF | Unbalnc  SS | STD | A217  WC9 | SUS  440C  /HT | SUS  440C  /HT | SUS  440C  /HT | SUS  316 | TFE  FIBER | T/#  1890S | 23.65 |
| PV-2361 | FLC | FF | 510D | Globe | Linear | 1500 | RTJ | Balnced  MULTI STEP PLUG  MSCGV | FIN  EXTN. | A217WC6 | Inc. | Inc. | Inc. | SUS  316 | GRAF  OIL | T/#  1806G | 114 |
| PV-2363 | FLO | H. T | 720C | Butterfly | Approximate EQ% | 1500 | RTJ | Ecentric  HPBV | STD | A217WC6 | A351CF8M/PS | SUS 316 /PS HG | SUS 316 /Hcr | Inc. | GRAF  OIL | ------ | 4414 |
| LV-2016 | FC | H. T | 510D | Globe | Linear | 600 | RF | Balnced  over plug flow  MSCGV | FIN  EXTN. | A217WC9 | SUS  410/  HT | SUS410/HT | 410  SS/HT | SUS316 | GRAFOIL | T/#  1806G | 4.78 |
| HV-2371 | FC | FF | 510D | Globe | Linear | 900 | RTJ | Balnced  over plug flow  MSCGV | FIN  EXTN. | A217WC9 | SUS  410/  HT | SUS410/HT | 410  SS/  HT | SUS316 | GRAFOIL | T/#  1806G | 14 |
| FV-7141 | FC | FF | 510D | Globe | Linear | 1500 | RTJ | Balnced  over plug flow  MSCGV | STD | A216  WCB | SUS  410/  HT | SUS  410/  HT | 410  SS/  HT | SUS316 | TFE FIBER | T/#  1806G | 39.6 |
| TV-2220 | FLO | FF | 720  C | Butterfly | Approximate EQ% | 600 | RF | Ecentric  HPBV | STD | A216WCB | A351CF8M/PS | SUS630/PH | SUS  316 /Hcr | SUS630/PH | TFE FIBER | ------ | 501 |
| FV-6059 2 | FC | FF | 501G | Globe | Linear | 600 | RF | Balnced | STD | A216WCB | SUS  410  /HT | SUS410/HT | SCS  24  /PH | SUS316 | TFE FIBER | T/#  1806G | 17.5 |
| FV-6059 1 | FC | FF | 501G | Globe | EQ% | 900 | RTJ | Balnced  CGV | STD | A351CF8 | SUS  316/  STL | SUS316/STL | SUS  316/HCR | SUS316 | GRAFOIL | T/#  1806G | 40 |
| HV-0511 | FC | FF | 501  T | Globe | EQ% | 150 | RF | Unbalnc  SS | STD | A216WCB | SUS  316 | SUS316/STL | SUS  440C/HT | SUS316 | TFE FIBER | T/#  1890-S | 87.7 |
| LV-0511 | FC | FF | 501  G | Butterfly | Linear | 300 | RF | Unbalnc  HPBV | STD | A351CF8 | SUS  316  /STL | SUS316/STL | SUS  316/HCR | SUS316 | TFE FIBER | T/#  1806GR | 142 |
| USV-2041 | FC | 24VDC | 501G | Globe | Linear | 600 | RF | Balnced  CGV | FIN  EXTN. | A351CF8C | SUS  321  /STL | SUS321/STL | SUS  321/HCR | SUS321 | GRAFOIL | T/#  1808G | 70 |
| LV-7251 | FC | FF | 501  T | Globe | Linear | 300 | RF | Unbalnc  SS | STD | A217WC9 | SUS  316  /STL | SUS316/STL | SUS  440C/HT | SUS316 | TFE FIBER | T/#  1890-S | 7.4 |
| PV-3194 | FC | FF | 501  G | Globe | EQ% | 150 | RF | Balnced  CGV | STD | A351CF8 | SUS 316 | SUS 316 | SCS 14A  HCR | SUS 316 | TFE  FIBER | T/#  1806G | 167 |
| TV-5277 | FC | FF | 710  E | Butterfly | Approximate  EQ% | 300 | Wafer | Ecentric  HPBV | STD | A351CF8 | A351CF8M  PS | SUS 316  PS  HG TYPE | SUS 316  HCR | SUS  630  PH | GRAF  OIL |  | 4117 |

1. Control valves shall have removable trims and sufficient clearance shall be allowed for access and removal.
2. Where cage guided control valves are specified, balanced trim should be considered for large sized valves.
3. For globe body control valves, the trim construction shall be either single-seated with heavy duty top guiding for

the plug, Double-seated with top and bottom guiding for the plug, or cage type. For liquid services with a high pressure

drop i.e., (boiler feed water), and gas service (pressure let down), cage trims shall be specified to have the plug supported

at the critical area.

1. Balance type control valve in place of single seat valve in high pressure service shall be considered.
2. For oxygen services, body and trim materials shall be AISI-316 stainless steel. Body casting shall internally be

completely machined to a smooth surface to remove any casting imperfections.

1. The minimum requirement for the body material is that the valve shall have a cast steel body, and the trim, consist

of plug, seat ring and stem, shall have stainless steel 316, unless otherwise specified by the nature of process fluid being

handled and/or requested through relevant data sheet.

1. Small-sized valves for erosive services shall have their plug and seat rings made for solid satellite No. 6. For

economical reasons hardened stainless steel 440°C may be used as trim material if this is suitable for the particular process

conditions.

1. When valves are used for sour gas services the trim and bolting material construction shall comply with the recommendation

of National Association of Corrosion Engineers (NACE) MR-01-75 latest revision.

1. Guide bushing shall be a corrosion resistant material. It is preferred that the guide bushing material be a minimum

of 125 brinnel harder than the trim, i.e., 17-4 PH (Precipitation Hardened) stainless steels or better.

1. Butterfly valves trim material shall be suitable for specified service conditions and compatible with the piping

material.

1. Butterfly valves trim material including disks, shafts, bushings, body and/or disk seating surfaces, internal keys

and pins and screws when in contact with the contained fluid shall be selected from Table 1, if not specified in data

sheet.

1. A control valve consist of two major sub-assemblies, a valve body sub-assembly and an actuator. The valve body

sub-assembly is the portion that actually controls the passing fluid. It consist of a housing, internal trim, bonnet and

sometimes a bottom flange.

1. Top entry or cage guided valves have the advantages of easy trim removal. Valves of this type usually have stream lined

body passages to permit increased flow capacity.

1. For services at high pressure drops, the application of a conventional valve trim often results in very high fluid velocities

and unacceptable high noise levels.

1. Where this would be the case, the fluid velocity must be controlled by using a valve trim having specially designed

multiple orifices in series and/or in parallel, or having a tortuous path forcing the fluid to change the direction continuously,

causing high turbulence friction.

1. Where control valves with a very low capacity factor (CV) are required, these may be of the miniature valve type with

flanged or threaded connections and a needle trim.

**TABLE 1 - BASIC MATERIALS FOR BUTTERFLY VALVES**

|  |  |  |
| --- | --- | --- |
| **1** | **2** | **3** |
| COMPONENT | MATERIAL | BS REFERENCE |
| Body | Cast iron | 1452 |
| Body with integral seat | Austenitic cast iron | 3468 |
| Disk |  |  |
| Spheroidal graphite iron | 2789 |
| Handwheel  Disk with integral seat  Rings fitted to body or disk for sealing, seating, or rataining purposes |
| Carbon steel | 1501.151  1503.221  1504.161 |
|  | Stainless steel | 1501: Part 3 |
|  |  | 1503 |
|  |  | 1504, 3100 |
|  |  | 1504 |
|  | Gunmetal | 1400 |
|  | Aluminum bronze | 1400 |
|  | Rings of deposited metal or resilient + material | |
| Shaft | Carbon steel | 970: Part 1 |
| Stainless steel | 970: Part 4 |
| Aluminum bronze | 2672 or 2874 |
| Nickel copper alloy | 3076 |
| Shaft bearings seals (when fitted) | No requirement in this Standard | |
| Internal fastenings | Carbon steel |  |
| Stainless steel |
| Phosphor bronze | 2870, 2873 |
| Aluminum bronze | 2872, 2874, 2875 |
| Nickel copper alloy | 3076 |

1. The minimum globe control valve body size to be used shall be 1 inch screwed, unless flange type is specified,

and the internal trim size shall be in accordance to the requirements as specified in data sheet.

1. Body sizes smaller than 1 inch may be used for special applications, and pressure regulation services. For valve

sizes smaller than 1 inch, reduced trim in 1 inch size bodies normally will be preferable.

1. Control valves with inherent high pressure-recovery characteristics can cause cavitation when fluid pressure and

temperature conditions would indicate. Valves with low pressure recovery, special trim should be used to minimize or

prevent cavitation.

1. Control valve flow characteristics are determined principally by the design of the valve trim. The three inherent characteristics

available are quick opening, linear, and equal percentage. These are shown in Fig. 18. A modified percentage

characteristic generally falling between the linear and equal percentage characteristics is also available.

1. Linear trim provides equal increases in CV for equal increases in stem travel. Thus the CV increase is linear with

plug position throughout its travel.

1. Equal percentage trim provides equal percentage increases in CV for equal increments of stem travel. This is accomplished

by providing a very small opening for plug travel near the seat and very large increases toward the

more open position. As a result, a wide rangeability of CV is achieved.

1. Characteristic of the inner valve shall normally be equal percentage except where system characteristics indicate

otherwise. Linear and quick opening characteristics shall be used where required. In general linear trim shall be used

only for Split-Range service or where control valve pressure drop remains constant over the range of 10% to 100% of

flow capacity.

1. Oversized bodies with reduced trims shall be used for valves in severe flashing or cavitating service. Angle

type or multiple seat type valves may be considered for this service.

1. Stainless steel trim valves are recommended on installation having pressure over 35 bar.
2. The internal parts of a valve which are in flowing contact with the controlled fluid. Examples are the plug, seat ring,

cage, stem and the parts used to attach the stem to the plug. The body, bonnet, bottom flange, guide means and gaskets

are not considered as part of the trim.

1. Anti-Noise trim: A combination of plug and seat ring or plug and cage that by its geometry reduces the noise generated by fluid flowing

Through the valve.

1. Anti-Cavitation trim: A combination of plug and seat ring or plug and cage that by its geometry permits non-cavitating operation or reduces

the tendency to cavitate, thereby minimizing damage to the valve parts, and the downstream piping.

1. Balanced trim: An arrangement of ports and plug or combination of plug, cage, seals, and ports that tends to equalize the pressure

above and below the valve plug to minimize the net static and dynamic fluid flow forces acting along the axis of the

stem of a globe valve.

30. Erosion resistant trim: Valve trim which has been faced with very hard material or manufactured from very hard material to resist the erosive

effects of the controlled fluid flow.

1. Soft seated trim : Globe valve trim with an elastomeric, plastic or other readily deformable material used either in the valve plug or seat

ring to provide tight shutoff with minimal actuator forces. See ANSI B16.104 for leakage classifications.

1. Ball valves may be considered for On-Off service and for large sizes on throttling service. Unless equipped with a special trim, i.e. anti-cavitation or

low-noise design, ball valves should not be used on throttling services with a differential pressure of more than 10 bar.

1. The body size of a control valve in throttling service should have the same size as the calculated trim size, however oversized bodies may be required

up to the size of the adjacent piping (for example, to reduce the outlet velocity).

1. TRIM**:** The term TRIM covers all those parts of the valve assembly that are in contact with the line medium consisting of, but not limited to, the seat ring

plug, stem, plug guide bushing and cage.

1. The trim and particularly the seat ring(s) shall be of the easy/quick replaceable type. A bottom flange shall be provided for those valves that require access from

the bottom, for trim removal. A bottom flange is not permitted on control valves on service below 0°C. In butt welding-end control valves the entire assembly of trim

and seat shall be removable from the top. For valves that operate at high or low process temperatures, special attention shall be paid to the clearances between plug

and guide bushing, and in addition for cage type trims to the clearance between plug and cage, in order to prevent the valve from sticking.

For valves operating on fluids with a tendency towards coking, special attention shall be paid to the trim construction to prevent the valve from sticking. When ball

valves are used on slurry services; they should be equipped with a scraper type of seat construction. For trims that are not of the one-piece plug type and stem

assembly, the plug/stem construction shall be provided with a locking device to prevent accidental separation.

1. Trim components shall not be screwed or welded to the valve body for globe or cage style trim. They shall not be welded for eccentric style trim.

The valve stem connection to the actuator stem shall be adjustable with positive locking of the adjustment. The trim for butterfly valves should be of the balanced

type which can be used-up to the fully open position. The shaft and disc shall be capable of withstanding a pressure drop across the valve of at least 1.25 times the

pressure drops in the closed position. For valve, operating on fluid that solidifies at ambient temperature, attention shall be paid that the fluid cannot

penetrate the clearance between stem and bushing in order to prevent sticking of the stem after a plant shutdown.

1. When, after proper selection of the control valve and its location, cavitation is unavoidable, preference should be given to hardened trim materials. For

single seated valves, a change in flow direction through the valve may, however already be sufficient. Where hardened trim materials and/or a

change in flow direction are not adequate or feasible, valves with special anticavitation trims should be considered For applications, where anti-cavitation trims are

not available, two valves in series may also be considered. This solution requires the COMPANY approval. The application of restriction orifice (s) downstream the

control valve to reduce the pressure drop across the valve requires the COMPANY approval.

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