



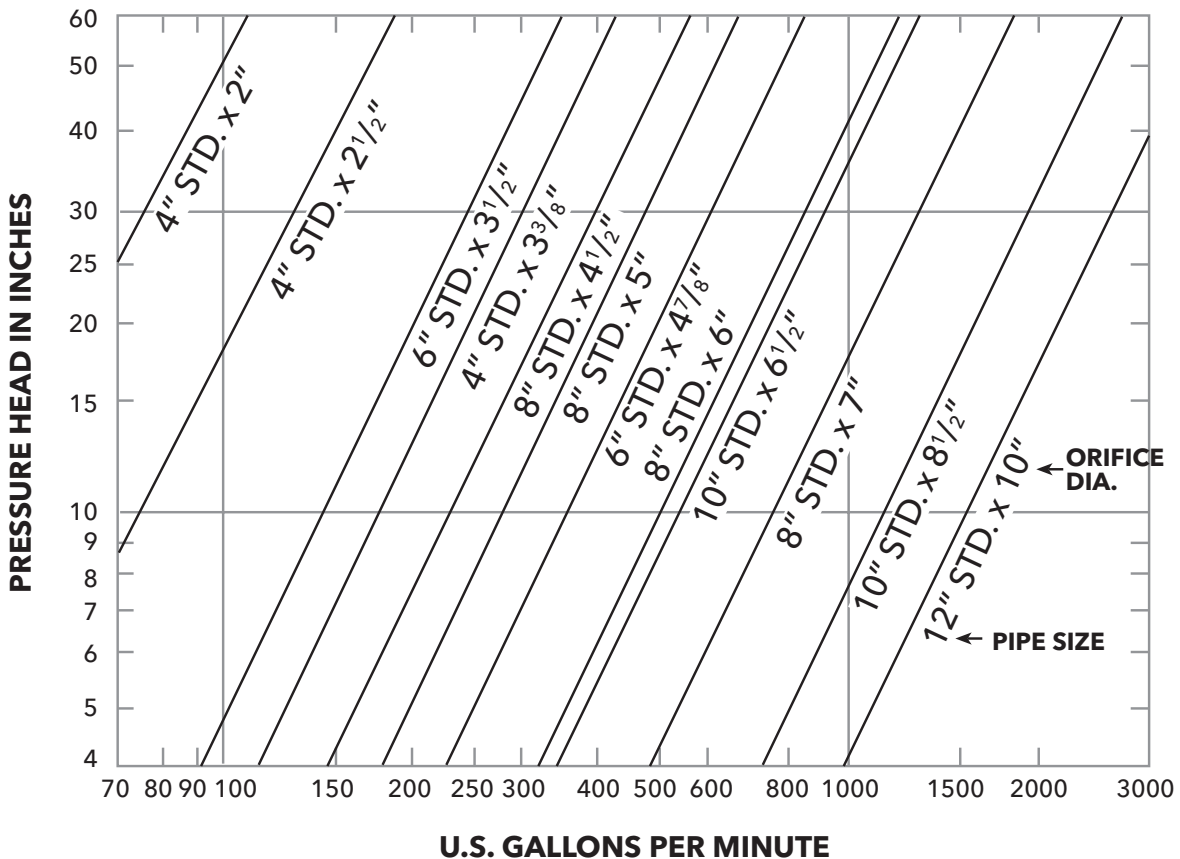
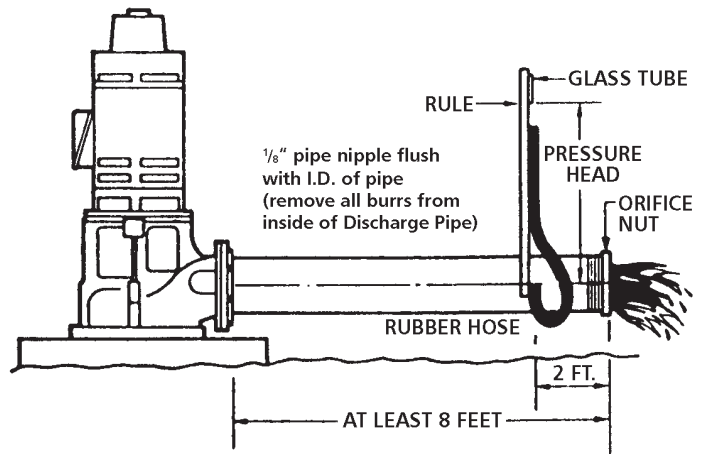
# Measuring Flow (Orifice Method)

## 200.E.07

### Measuring Water Using An Orifice

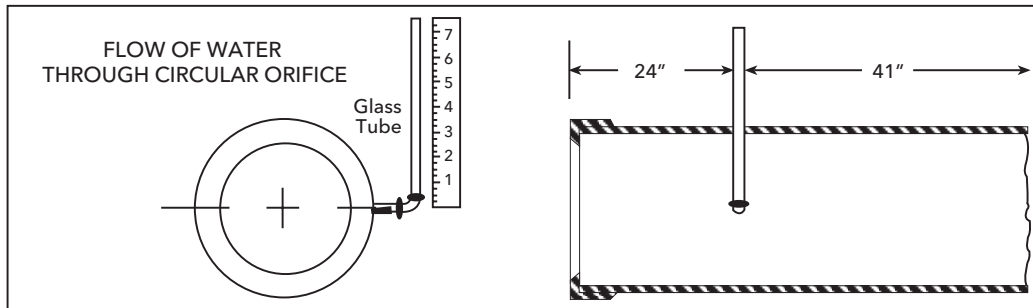
The use of an orifice is one of the simplest methods of accurately measuring the discharge from a vertical turbine pump in the field. The equipment and method is as illustrated.

- a. Discharge pipe must be horizontal and measuring tube connection in center of pipe.
- b. Pipe must be flowing full with clear water free of sand and air, with a minimum pressure head 2" above top of pipe.
- c. Pressure head is the vertical distance from the horizontal center line of the orifice to the level of the water in the measuring tube.
- d. Rubber hose and glass tube must be free of air bubbles.



# Measuring Flow (Orifice Method for Water)

## 200.E.08



### Flow in Gallons Per Minute

| Head in Inches | 3.000" Orifice 4" Pipe | 4.000" Orifice 6" Pipe | 5.000" Orifice 6" Pipe | 6.000" Orifice 8" Pipe | 8.000" Orifice 10" Pipe | 10.000" Orifice 12" Pipe |
|----------------|------------------------|------------------------|------------------------|------------------------|-------------------------|--------------------------|
| 6              | 108                    | 160                    | 305                    | 408                    | 825                     | 1200                     |
| 6½             | 111                    | 167                    | 316                    | 421                    | 850                     | 1250                     |
| 7              | 115                    | 172                    | 328                    | 433                    | 878                     | 1300                     |
| 7½             | 119                    | 179                    | 339                    | 446                    | 906                     | 1350                     |
| 8              | 122                    | 185                    | 350                    | 458                    | 935                     | 1400                     |
| 8½             | 125                    | 190                    | 361                    | 471                    | 963                     | 1440                     |
| 9              | 128                    | 195                    | 372                    | 483                    | 992                     | 1480                     |
| 9½             | 130                    | 200                    | 383                    | 495                    | 1016                    | 1520                     |
| 10             | 133                    | 205                    | 393                    | 508                    | 1040                    | 1560                     |
| 10½            | 137                    | 210                    | 402                    | 521                    | 1060                    | 1600                     |
| 11             | 140                    | 215                    | 412                    | 533                    | 1080                    | 1635                     |
| 11½            | 143                    | 220                    | 421                    | 545                    | 1100                    | 1670                     |
| 12             | 146                    | 225                    | 430                    | 556                    | 1120                    | 1705                     |
| 12½            | 149                    | 230                    | 439                    | 567                    | 1139                    | 1740                     |
| 13             | 151                    | 234                    | 448                    | 578                    | 1158                    | 1775                     |
| 13½            | 154                    | 239                    | 457                    | 589                    | 1176                    | 1810                     |
| 14             | 157                    | 243                    | 465                    | 599                    | 1194                    | 1845                     |
| 14½            | 159                    | 247                    | 473                    | 609                    | 1212                    | 1875                     |
| 15             | 162                    | 250                    | 480                    | 618                    | 1230                    | 1905                     |
| 15½            | 164                    | 254                    | 488                    | 637                    | 1248                    | 1940                     |
| 16             | 167                    | 257                    | 495                    | 636                    | 1266                    | 1970                     |
| 16½            | 170                    | 261                    | 503                    | 645                    | 1284                    | 2000                     |
| 17             | 172                    | 264                    | 510                    | 654                    | 1302                    | 2030                     |
| 17½            | 175                    | 268                    | 517                    | 663                    | 1319                    | 2060                     |
| 18             | 178                    | 271                    | 524                    | 672                    | 1336                    | 2089                     |
| 18½            | 180                    | 275                    | 530                    | 681                    | 1353                    | 2118                     |
| 19             | 183                    | 278                    | 536                    | 690                    | 1370                    | 2146                     |
| 19½            | 185                    | 282                    | 542                    | 699                    | 1387                    | 2175                     |
| 20             | 187                    | 285                    | 548                    | 708                    | 1404                    | 2204                     |
| 20½            | 190                    | 289                    | 554                    | 717                    | 1421                    | 2232                     |
| 21             | 192                    | 292                    | 560                    | 726                    | 1438                    | 2260                     |
| 21½            | 195                    | 295                    | 566                    | 735                    | 1455                    | 2288                     |
| 22             | 197                    | 299                    | 572                    | 744                    | 1471                    | 2316                     |
| 22½            | 199                    | 302                    | 578                    | 752                    | 1486                    | 2343                     |
| 23             | 201                    | 305                    | 584                    | 760                    | 1500                    | 2360                     |
| 23½            | 203                    | 307                    | 590                    | 768                    | 1515                    | 2382                     |
| 24             | 205                    | 310                    | 596                    | 776                    | 1529                    | 2409                     |
| 24½            | 207                    | 314                    | 602                    | 784                    | 1543                    | 2435                     |
| 25             | 210                    | 317                    | 608                    | 791                    | 1557                    | 2461                     |
| 25½            | 212                    | 320                    | 614                    | 798                    | 1571                    | 2487                     |
| 26             | 214                    | 323                    | 620                    | 805                    | 1585                    | 2513                     |
| 26½            | 216                    | 326                    | 626                    | 812                    | 1599                    | 2539                     |
| 27             | 219                    | 329                    | 632                    | 818                    | 1613                    | 2565                     |
| 27½            | 221                    | 332                    | 638                    | 825                    | 1627                    | 2590                     |
| 28             | 222                    | 335                    | 644                    | 831                    | 1641                    | 2610                     |
| 28½            | 224                    | 337                    | 650                    | 838                    | 1655                    | 2630                     |
| 29             | 226                    | 340                    | 656                    | 844                    | 1669                    | 2650                     |
| 29½            | 228                    | 343                    | 662                    | 851                    | 1683                    | 2670                     |
| 30             | 230                    | 346                    | 668                    | 857                    | 1697                    | 2690                     |
| 30½            | 232                    | 348                    | 674                    | 863                    | 1711                    | 2713                     |
| 31             | 235                    | 351                    | 680                    | 869                    | 1725                    | 2736                     |
| 31½            | 236                    | 354                    | 686                    | 876                    | 1739                    | 2759                     |
| 32             | 239                    | 357                    | 692                    | 882                    | 1753                    | 2782                     |
| 32½            | 240                    | 360                    | 697                    | 889                    | 1767                    | 2806                     |
| 33             | 242                    | 363                    | 703                    | 895                    | 1781                    | 2828                     |
| 33½            | 244                    | 366                    | 709                    | 901                    | 1795                    | 2850                     |
| 34             | 246                    | 369                    | 715                    | 907                    | 1809                    | 2873                     |

| Head in Inches | 3.000" Orifice 4" Pipe | 4.000" Orifice 6" Pipe | 5.000" Orifice 6" Pipe | 6.000" Orifice 8" Pipe | 8.000" Orifice 10" Pipe | 10.000" Orifice 12" Pipe |
|----------------|------------------------|------------------------|------------------------|------------------------|-------------------------|--------------------------|
| 34½            | 248                    | 372                    | 720                    | 913                    | 1823                    | 2896                     |
| 35             | 250                    | 375                    | 726                    | 919                    | 1837                    | 2919                     |
| 35½            | 252                    | 377                    | 732                    | 925                    | 1851                    | 2941                     |
| 36             | 254                    | 380                    | 737                    | 931                    | 1865                    | 2964                     |
| 36½            | 256                    | 383                    | 743                    | 937                    | 1879                    | 2980                     |
| 37             | 257                    | 385                    | 748                    | 943                    | 1893                    | 3002                     |
| 37½            | 259                    | 388                    | 754                    | 949                    | 1904                    | 3024                     |
| 38             | 260                    | 390                    | 759                    | 955                    | 1915                    | 3046                     |
| 38½            | 262                    | 393                    | 765                    | 961                    | 1926                    | 3068                     |
| 39             | 263                    | 396                    | 770                    | 967                    | 1936                    | 3088                     |
| 39½            | 265                    | 398                    | 776                    | 974                    | 1948                    | 3110                     |
| 40             | 266                    | 401                    | 781                    | 979                    | 1960                    | 3130                     |
| 40½            | 267                    | 403                    | 786                    | 985                    | 1972                    | 3146                     |
| 41             | 269                    | 406                    | 790                    | 990                    | 1983                    | 3160                     |
| 41½            | 271                    | 408                    | 795                    | 996                    | 1994                    | 3179                     |
| 42             | 272                    | 411                    | 800                    | 1001                   | 2006                    | 3199                     |
| 42½            | 274                    | 413                    | 805                    | 1007                   | 2018                    | 3219                     |
| 43             | 275                    | 415                    | 810                    | 1012                   | 2030                    | 3230                     |
| 43½            | 277                    | 418                    | 815                    | 1018                   | 2041                    | 3250                     |
| 44             | 278                    | 420                    | 820                    | 1023                   | 2052                    | 3263                     |
| 44½            | 280                    | 422                    | 824                    | 1029                   | 2063                    | 3280                     |
| 45             | 281                    | 425                    | 828                    | 1034                   | 2074                    | 3298                     |
| 45½            | 283                    | 427                    | 832                    | 1040                   | 2085                    | 3316                     |
| 46             | 284                    | 429                    | 837                    | 1045                   | 2096                    | 3334                     |
| 46½            | 285                    | 432                    | 842                    | 1051                   | 2107                    | 3351                     |
| 47             | 287                    | 434                    | 847                    | 1056                   | 2118                    | 3368                     |
| 47½            | 289                    | 437                    | 851                    | 1062                   | 2129                    | 3389                     |
| 48             | 290                    | 440                    | 855                    | 1067                   | 2140                    | 3405                     |
| 48½            | 292                    | 442                    | 859                    | 1073                   | 2151                    | 3426                     |
| 49             | 293                    | 444                    | 863                    | 1078                   | 2162                    | 3443                     |
| 49½            | 294                    | 446                    | 868                    | 1084                   | 2172                    | 3460                     |
| 50             | 296                    | 448                    | 872                    | 1089                   | 2182                    | 3477                     |
| 50½            | 298                    | 450                    | 876                    | 1095                   | 2192                    | 3494                     |
| 51             | 300                    | 453                    | 880                    | 1100                   | 2202                    | 3511                     |
| 51½            | 301                    | 455                    | 884                    | 1105                   | 2212                    | 3527                     |
| 52             | 302                    | 457                    | 888                    | 1110                   | 2222                    | 3544                     |
| 52½            | 303                    | 459                    | 892                    | 1115                   | 2232                    | 3560                     |
| 53             | 304                    | 461                    | 896                    | 1120                   | 2242                    | 3575                     |
| 53½            | 305                    | 463                    | 900                    | 1125                   | 2252                    | 3591                     |
| 54             | 307                    | 465                    | 904                    | 1130                   | 2262                    | 3602                     |
| 54½            | 309                    | 467                    | 908                    | 1135                   | 2272                    | 3618                     |
| 55             | 310                    | 469                    | 912                    | 1140                   | 2282                    | 3634                     |
| 55½            | 311                    | 471                    | 915                    | 1145                   | 2291                    | 3650                     |
| 56             | 313                    | 472                    | 919                    | 1150                   | 2300                    | 3667                     |
| 56½            | 314                    | 474                    | 923                    | 1155                   | 2309                    | 3684                     |
| 57             | 315                    | 476                    | 927                    | 1160                   | 2318                    | 3702                     |
| 57½            | 316                    | 478                    | 930                    | 1165                   | 2326                    | 3719                     |
| 58             | 317                    | 480                    | 934                    | 1170                   | 2334                    | 3736                     |
| 58½            | 318                    | 482                    | 938                    | 1175                   | 2341                    | 3752                     |
| 59             | 320                    | 485                    | 942                    | 1180                   | 2348                    | 3768                     |
| 59½            | 321                    | 487                    | 945                    | 1185                   | 2355                    | 3784                     |
| 60             | 323                    | 489                    | 948                    | 1190                   | 2362                    | 3800                     |

**CAUTION:** Orifice pipe must be level. Piezometer tube must enter at center of pipe. Piezometer tube must be flush with inside of pipe. Orifice opening must be accurately sized. Edges of orifice must be sharp. Water must be free of gas and air.

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