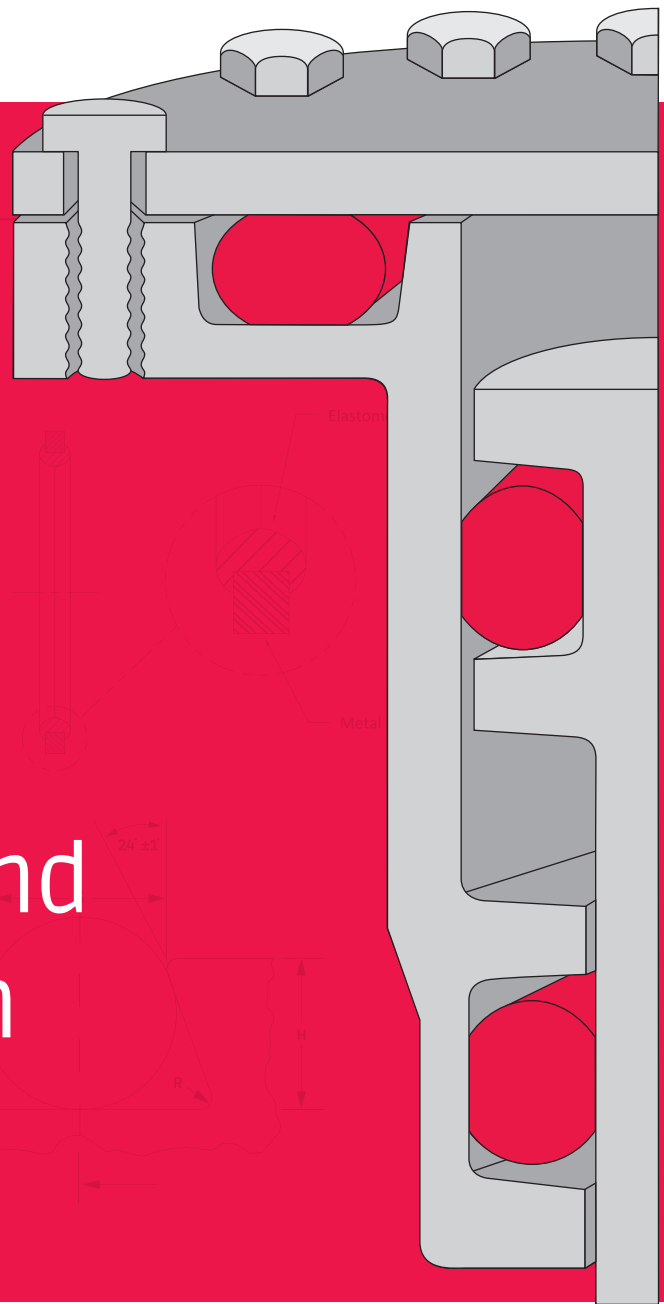


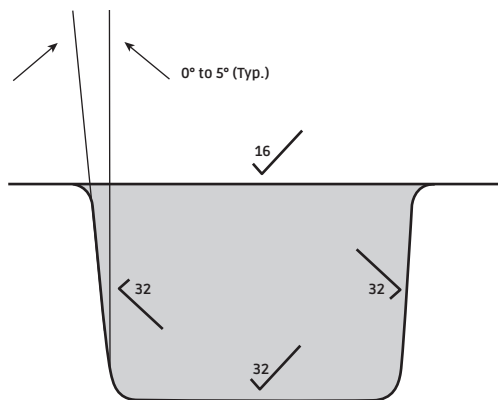
# Seal Design Guide

## Seal Types and Gland Design

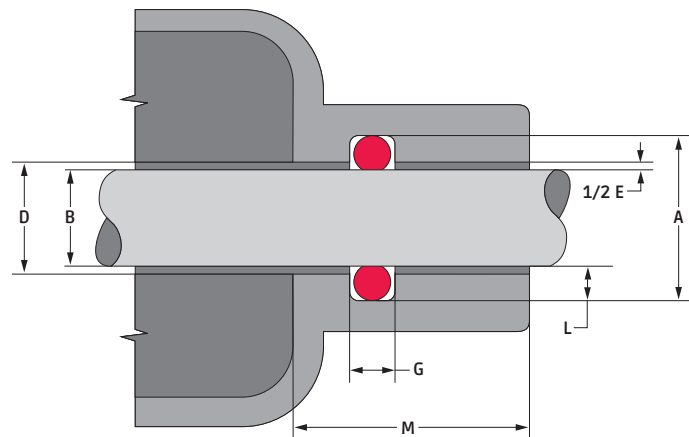
Section 6:

Rotary O-ring Seal





Finishes are RMS values



**TABLE G Rotary O-Ring Seal Gland Dimensions Under 900 PSI**

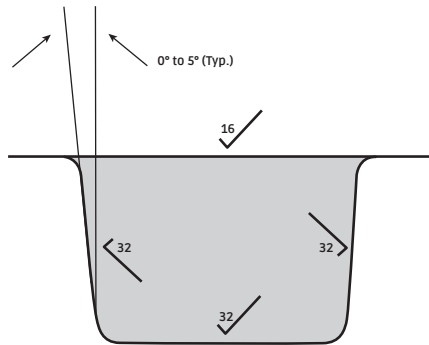
| AS568        | L<br>Gland Depth | E<br>Diametrical<br>Clearance | M<br>Bearing<br>Lenth Min. |
|--------------|------------------|-------------------------------|----------------------------|
| -004 to -045 | .065 to .067     | .012 to .016                  | .700                       |
| -102 to -163 | .097 to .099     | .012 to .016                  | 1.030                      |
| -210 to -258 | .133 to .135     | .016 to .020                  | 1.390                      |

- 16 RMS rod finish max
- Due to centrifugal force, do not locate groove in shaft
- Locate seal as close as possible to lubricating fluid
- Feet per minute = (RPM x shaft diameter (inches) x 3.1416) / 12
- To allow for heat transfer, bearing length should be 10 times the cross section of the o-ring used

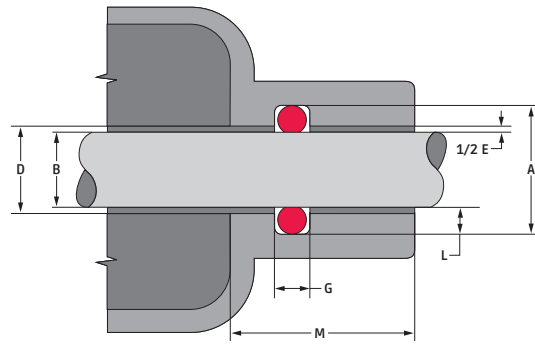
| AS568<br>Number | O-Ring Dimensions |             |            | Shaft<br>Diameter<br>B | Groove<br>Diameter<br>A | Rod Bore<br>Diameter<br>D | Groove<br>Width<br>G |
|-----------------|-------------------|-------------|------------|------------------------|-------------------------|---------------------------|----------------------|
|                 | I.D. ± Tol.       | W. ± Tol.   | O.D. (ref) |                        |                         |                           |                      |
| Tolerance       |                   |             |            | + .000<br>- .001       | + .003<br>- .000        | + .003<br>- .000          | + .004<br>- .000     |
| - 004           | .070 ± .005       | .070 ± .003 | 0.210      | .072                   | .202                    | .084                      | .075                 |
| - 005           | .101 ± .005       |             | 0.241      | .103                   | .233                    | .115                      |                      |
| - 006           | .114 ± .005       |             | 0.254      | .116                   | .246                    | .128                      |                      |
| - 007           | .145 ± .005       |             | 0.285      | .147                   | .277                    | .159                      |                      |
| - 008           | .176 ± .005       |             | 0.316      | .178                   | .308                    | .190                      |                      |
| - 009           | .208 ± .005       |             | 0.348      | .210                   | .340                    | .222                      |                      |
| - 010           | .239 ± .005       |             | 0.379      | .241                   | .371                    | .253                      |                      |
| - 011           | .301 ± .005       |             | 0.441      | .303                   | .433                    | .315                      |                      |
| - 012           | .364 ± .005       |             | 0.504      | .366                   | .496                    | .378                      |                      |
| - 013           | .426 ± .005       |             | 0.566      | .428                   | .558                    | .440                      |                      |
| - 014           | .489 ± .005       |             | 0.629      | .491                   | .621                    | .503                      |                      |
| - 015           | .551 ± .007       |             | 0.691      | .553                   | .683                    | .565                      |                      |

**TABLE G Rotary O-Ring Seal Gland Dimensions Under 900 PSI**

| AS568<br>Number | O-Ring Dimensions |             |            | Shaft<br>Diameter<br>B   | Groove<br>Diameter<br>A  | Rod Bore<br>Diameter<br>D | Groove<br>Width<br>G     |
|-----------------|-------------------|-------------|------------|--------------------------|--------------------------|---------------------------|--------------------------|
|                 | I.D. ± Tol.       | W. ± Tol.   | O.D. (ref) |                          |                          |                           |                          |
| Tolerance       |                   |             |            | <b>+0.000<br/>-0.001</b> | <b>+0.003<br/>-0.000</b> | <b>+0.003<br/>-0.000</b>  | <b>+0.004<br/>-0.000</b> |
| - 016           | .614 ± .009       | .070 ± .003 | 0.754      | .616                     | .746                     | .628                      | .075                     |
| - 017           | .676 ± .009       |             | 0.816      | .678                     | .808                     | .693                      |                          |
| - 018           | .739 ± .009       |             | 0.879      | .741                     | .871                     | .753                      |                          |
| - 019           | .801 ± .009       |             | 0.941      | .803                     | .933                     | .815                      |                          |
| - 020           | .864 ± .009       |             | 1.004      | .866                     | .996                     | .878                      |                          |
| - 021           | .926 ± .009       |             | 1.066      | .928                     | 1.058                    | .940                      |                          |
| - 022           | .989 ± .010       |             | 1.129      | .991                     | 1.121                    | 1.003                     |                          |
| - 023           | 1.051 ± .010      |             | 1.191      | 1.053                    | 1.183                    | 1.065                     |                          |
| - 024           | 1.114 ± .010      |             | 1.254      | 1.116                    | 1.246                    | 1.128                     |                          |
| - 025           | 1.176 ± .011      |             | 1.316      | 1.178                    | 1.308                    | 1.190                     |                          |
| - 026           | 1.239 ± .011      |             | 1.379      | 1.241                    | 1.371                    | 1.253                     |                          |
| - 027           | 1.301 ± .011      |             | 1.441      | 1.303                    | 1.433                    | 1.315                     |                          |
| - 028           | 1.364 ± .013      |             | 1.504      | 1.366                    | 1.496                    | 1.378                     |                          |
| - 029           | 1.489 ± .013      |             | 1.629      | 1.491                    | 1.621                    | 1.503                     |                          |
| - 030           | 1.614 ± .013      |             | 1.754      | 1.616                    | 1.746                    | 1.628                     |                          |
| - 031           | 1.739 ± .015      |             | 1.879      | 1.741                    | 1.871                    | 1.753                     |                          |
| - 032           | 1.864 ± .015      |             | 2.004      | 1.866                    | 1.996                    | 1.878                     |                          |
| - 033           | 1.989 ± .018      |             | 2.129      | 1.991                    | 2.121                    | 2.003                     |                          |
| - 034           | 2.114 ± .018      |             | 2.254      | 2.116                    | 2.246                    | 2.128                     |                          |
| - 035           | 2.239 ± .018      |             | 2.379      | 2.241                    | 2.371                    | 2.253                     |                          |
| - 036           | 2.364 ± .018      |             | 2.504      | 2.366                    | 2.496                    | 2.378                     |                          |
| - 037           | 2.489 ± .018      |             | 2.629      | 2.491                    | 2.621                    | 2.503                     |                          |
| - 038           | 2.614 ± .020      |             | 2.754      | 2.616                    | 2.746                    | 2.628                     |                          |
| - 039           | 2.739 ± .020      |             | 2.879      | 2.741                    | 2.871                    | 2.753                     |                          |
| - 040           | 2.864 ± .020      |             | 3.004      | 2.866                    | 2.996                    | 2.878                     |                          |
| - 041           | 2.989 ± .024      |             | 3.129      | 2.991                    | 3.121                    | 3.003                     |                          |
| - 042           | 3.239 ± .024      |             | 3.379      | 3.241                    | 3.371                    | 3.253                     |                          |
| - 043           | 3.489 ± .024      |             | 3.629      | 3.491                    | 3.621                    | 3.503                     |                          |
| - 044           | 3.739 ± .027      |             | 3.879      | 3.741                    | 3.871                    | 3.753                     |                          |
| - 045           | 3.989 ± .027      | ▼           | 4.129      | 3.991                    | 4.121                    | 4.003                     | ▼                        |



Finishes are RMS values



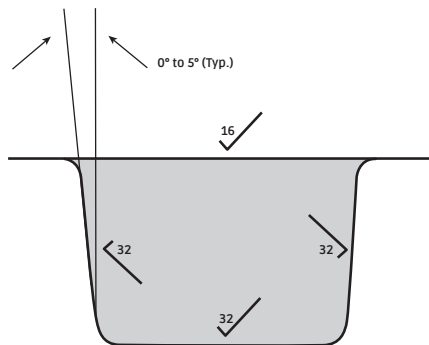
- 16 RMS rod finish max
- Due to centrifugal force, do not locate groove in shaft
- Locate seal as close as possible to lubricating fluid
- Feet per minute =  $(\text{RPM} \times \text{shaft diameter (inches)} \times 3.1416) / 12$
- To allow for heat transfer, bearing length should be 10 times the cross section of the o-ring used

**TABLE G Rotary O-Ring Seal Gland Dimensions Under 900 PSI**

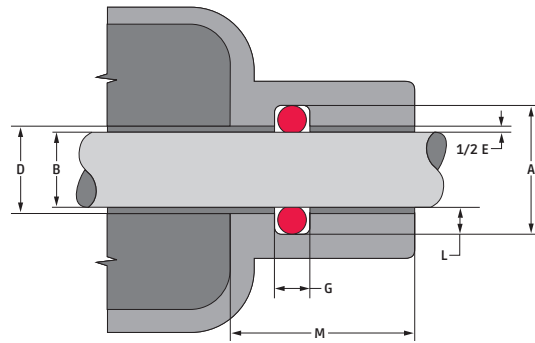
| AS568 Number | O-Ring Dimensions |             |            | Shaft Diameter B | Groove Diameter A | Rod Bore Diameter D | Groove Width G   |
|--------------|-------------------|-------------|------------|------------------|-------------------|---------------------|------------------|
|              | I.D. ± Tol.       | W. ± Tol.   | O.D. (ref) |                  |                   |                     |                  |
| Tolerance    |                   |             |            | + .000<br>- .001 | + .003<br>- .000  | + .003<br>- .000    | + .004<br>- .000 |
| - 102        | .049 ± .005       | .103 ± .003 | 0.255      | .051             | .245              | .063                | .108             |
| - 103        | .081 ± .005       |             | 0.287      | .083             | .277              | .095                |                  |
| - 104        | .112 ± .005       |             | 0.318      | .114             | .308              | .126                |                  |
| - 105        | .143 ± .005       |             | 0.349      | .145             | .339              | .157                |                  |
| - 106        | .174 ± .005       |             | 0.380      | .176             | .370              | .188                |                  |
| - 107        | .206 ± .005       |             | 0.412      | .208             | .402              | .220                |                  |
| - 108        | .237 ± .005       |             | 0.443      | .239             | .433              | .251                |                  |
| - 109        | .299 ± .005       |             | 0.505      | .301             | .495              | .313                |                  |
| - 110        | .362 ± .005       |             | 0.568      | .364             | .558              | .376                |                  |
| - 111        | .424 ± .005       |             | 0.630      | .426             | .620              | .438                |                  |
| - 112        | .487 ± .005       |             | 0.693      | .489             | .683              | .501                |                  |
| - 113        | .549 ± .005       |             | 0.755      | .551             | .745              | .563                |                  |
| - 114        | .612 ± .009       |             | 0.818      | .614             | .808              | .626                |                  |
| - 115        | .674 ± .009       |             | 0.880      | .676             | .870              | .688                |                  |
| - 116        | .737 ± .009       |             | 0.943      | .739             | .933              | .751                |                  |
| - 117        | .799 ± .010       |             | 1.005      | .801             | .995              | .813                |                  |
| - 118        | .862 ± .010       |             | 1.068      | .864             | 1.058             | .876                |                  |
| - 119        | .924 ± .010       |             | 1.130      | .926             | 1.120             | .938                |                  |
| - 120        | .987 ± .010       |             | 1.193      | .989             | 1.183             | 1.001               |                  |
| - 121        | 1.049 ± .010      |             | 1.255      | 1.051            | 1.245             | 1.063               |                  |
| - 122        | 1.112 ± .010      |             | 1.318      | 1.114            | 1.308             | 1.126               |                  |
| - 123        | 1.174 ± .012      |             | 1.380      | 1.176            | 1.370             | 1.188               |                  |
| - 124        | 1.237 ± .012      |             | 1.443      | 1.239            | 1.433             | 1.251               |                  |
| - 125        | 1.299 ± .012      |             | 1.505      | 1.301            | 1.495             | 1.313               |                  |
| - 126        | 1.362 ± .012      |             | 1.568      | 1.364            | 1.558             | 1.376               |                  |
| - 127        | 1.424 ± .012      |             | 1.630      | 1.426            | 1.620             | 1.438               |                  |
| - 128        | 1.487 ± .012      |             | 1.693      | 1.489            | 1.683             | 1.501               |                  |
| - 129        | 1.549 ± .015      |             | 1.755      | 1.551            | 1.745             | 1.563               |                  |
| - 130        | 1.612 ± .015      |             | 1.818      | 1.614            | 1.808             | 1.626               |                  |
| - 131        | 1.674 ± .015      | ▼           | 1.880      | 1.676            | 1.870             | 1.688               | ▼                |

**TABLE G Rotary O-Ring Seal Gland Dimensions Under 900 PSI**

| AS568<br>Number | O-Ring Dimensions |             |            | Shaft<br>Diameter<br>B | Groove<br>Diameter<br>A | Rod Bore<br>Diameter<br>D | Groove<br>Width<br>G |
|-----------------|-------------------|-------------|------------|------------------------|-------------------------|---------------------------|----------------------|
|                 | I.D. ± Tol.       | W. ± Tol.   | O.D. (ref) |                        |                         |                           |                      |
| Tolerance       |                   |             |            | +0.000<br>-0.001       | +0.003<br>-0.000        | +0.003<br>-0.000          | +0.004<br>-0.000     |
| - 132           | 1.737 ± .015      | .103 ± .003 | 1.943      | 1.739                  | 1.933                   | 1.751                     | .108                 |
| - 133           | 1.799 ± .015      |             | 2.005      | 1.801                  | 1.995                   | 1.813                     |                      |
| - 134           | 1.862 ± .015      |             | 2.068      | 1.864                  | 2.058                   | 1.876                     |                      |
| - 135           | 1.925 ± .017      |             | 2.131      | 1.927                  | 2.121                   | 1.939                     |                      |
| - 136           | 1.987 ± .017      |             | 2.193      | 1.989                  | 2.183                   | 2.001                     |                      |
| - 137           | 2.050 ± .017      |             | 2.256      | 2.052                  | 2.246                   | 2.064                     |                      |
| - 138           | 2.112 ± .017      |             | 2.318      | 2.114                  | 2.308                   | 2.126                     |                      |
| - 139           | 2.175 ± .017      |             | 2.381      | 2.177                  | 2.371                   | 2.189                     |                      |
| - 140           | 2.237 ± .017      |             | 2.443      | 2.239                  | 2.433                   | 2.251                     |                      |
| - 141           | 2.300 ± .020      |             | 2.506      | 2.302                  | 2.496                   | 2.314                     |                      |
| - 142           | 2.362 ± .020      |             | 2.568      | 2.364                  | 2.558                   | 2.376                     |                      |
| - 143           | 2.425 ± .020      |             | 2.631      | 2.427                  | 2.621                   | 2.439                     |                      |
| - 144           | 2.487 ± .020      |             | 2.693      | 2.489                  | 2.683                   | 2.501                     |                      |
| - 145           | 2.550 ± .020      |             | 2.756      | 2.552                  | 2.746                   | 2.564                     |                      |
| - 146           | 2.612 ± .020      |             | 2.818      | 2.614                  | 2.808                   | 2.626                     |                      |
| - 147           | 2.675 ± .022      |             | 2.881      | 2.677                  | 2.871                   | 2.689                     |                      |
| - 148           | 2.737 ± .022      |             | 2.943      | 2.739                  | 2.933                   | 2.751                     |                      |
| - 149           | 2.800 ± .022      |             | 3.006      | 2.802                  | 2.996                   | 2.814                     |                      |
| - 150           | 2.862 ± .022      |             | 3.068      | 2.864                  | 3.058                   | 2.876                     |                      |
| - 151           | 2.987 ± .024      |             | 3.193      | 2.989                  | 3.183                   | 3.001                     |                      |
| - 152           | 3.237 ± .024      |             | 3.443      | 3.239                  | 3.433                   | 3.251                     |                      |
| - 153           | 3.487 ± .024      |             | 3.693      | 3.489                  | 3.683                   | 3.501                     |                      |
| - 154           | 3.737 ± .028      |             | 3.943      | 3.739                  | 3.933                   | 3.751                     |                      |
| - 155           | 3.987 ± .028      |             | 4.193      | 3.989                  | 4.183                   | 4.001                     |                      |
| - 156           | 4.237 ± .030      |             | 4.443      | 4.239                  | 4.443                   | 4.251                     |                      |
| - 157           | 4.487 ± .030      |             | 4.693      | 4.489                  | 4.683                   | 4.501                     |                      |
| - 158           | 4.737 ± .030      |             | 4.943      | 4.739                  | 4.933                   | 4.751                     |                      |
| - 159           | 4.987 ± .035      |             | 5.193      | 4.989                  | 5.183                   | 5.001                     |                      |
| - 160           | 5.237 ± .035      |             | 5.443      | 5.239                  | 5.433                   | 5.251                     |                      |
| - 161           | 5.487 ± .035      |             | 5.693      | 5.489                  | 5.683                   | 5.501                     |                      |
| - 162           | 5.737 ± .035      |             | 5.943      | 5.739                  | 5.933                   | 5.751                     |                      |
| - 163           | 5.987 ± .035      | ▼           | 6.193      | 5.989                  | 6.183                   | 6.001                     | ▼                    |



Finishes are RMS values



- 16 RMS rod finish max
- Due to centrifugal force, do not locate groove in shaft
- Locate seal as close as possible to lubricating fluid
- Feet per minute = (RPM x shaft diameter (inches) x 3.1416) / 12
- To allow for heat transfer, bearing length should be 10 times the cross section of the o-ring used

**TABLE G Rotary O-Ring Seal Gland Dimensions Under 900 PSI**

| AS568 Number | O-Ring Dimensions |             |            | Shaft Diameter B | Groove Diameter A | Rod Bore Diameter D | Groove Width G   |
|--------------|-------------------|-------------|------------|------------------|-------------------|---------------------|------------------|
|              | I.D. ± Tol.       | W. ± Tol.   | O.D. (ref) |                  |                   |                     |                  |
| Tolerance    |                   |             |            | +0.000<br>-0.001 | +0.003<br>-0.000  | +0.003<br>-0.000    | +0.004<br>-0.000 |
| - 201        | 0.171 ± .005      | .139 ± .004 | 0.449      | .173             | .439              | .189                | .144             |
| - 202        | 0.234 ± .005      |             | 0.512      | .236             | .502              | .252                |                  |
| - 203        | 0.296 ± .005      |             | 0.574      | .298             | .564              | .314                |                  |
| - 204        | 0.359 ± .005      |             | 0.637      | .361             | .627              | .377                |                  |
| - 205        | 0.421 ± .005      |             | 0.699      | .423             | .689              | .439                |                  |
| - 206        | 0.484 ± .005      |             | 0.762      | .486             | .752              | .502                |                  |
| - 207        | 0.546 ± .007      |             | 0.824      | .548             | .814              | .564                |                  |
| - 208        | 0.609 ± .009      |             | 0.887      | .611             | .877              | .627                |                  |
| - 209        | 0.671 ± .009      |             | 0.949      | .673             | .939              | .689                |                  |
| - 210        | 0.734 ± .010      |             | 1.012      | .736             | 1.002             | .752                |                  |
| - 211        | 0.796 ± .010      |             | 1.074      | .798             | 1.064             | .814                |                  |
| - 212        | 0.859 ± .010      |             | 1.137      | .861             | 1.127             | .877                |                  |
| - 213        | 0.921 ± .010      |             | 1.199      | .923             | 1.189             | .939                |                  |
| - 214        | 0.984 ± .010      |             | 1.262      | .986             | 1.252             | 1.002               |                  |
| - 215        | 1.046 ± .010      |             | 1.324      | 1.048            | 1.314             | 1.064               |                  |
| - 216        | 1.109 ± .012      |             | 1.387      | 1.111            | 1.377             | 1.127               |                  |
| - 217        | 1.171 ± .012      |             | 1.449      | 1.173            | 1.439             | 1.189               |                  |
| - 218        | 1.234 ± .012      |             | 1.512      | 1.236            | 1.502             | 1.252               |                  |
| - 219        | 1.296 ± .012      |             | 1.574      | 1.298            | 1.564             | 1.314               |                  |
| - 220        | 1.359 ± .012      |             | 1.637      | 1.361            | 1.627             | 1.377               |                  |
| - 221        | 1.421 ± .012      |             | 1.699      | 1.423            | 1.689             | 1.439               |                  |
| - 222        | 1.484 ± .015      |             | 1.762      | 1.486            | 1.752             | 1.502               |                  |
| - 223        | 1.609 ± .015      |             | 1.887      | 1.611            | 1.877             | 1.627               |                  |
| - 224        | 1.734 ± .015      |             | 2.012      | 1.736            | 2.002             | 1.752               |                  |
| - 225        | 1.859 ± .018      |             | 2.137      | 1.861            | 2.127             | 1.877               |                  |
| - 226        | 1.984 ± .018      |             | 2.262      | 1.986            | 2.252             | 2.002               |                  |
| - 227        | 2.109 ± .018      |             | 2.387      | 2.111            | 2.377             | 2.127               |                  |
| - 228        | 2.234 ± .020      |             | 2.512      | 2.236            | 2.502             | 2.252               |                  |
| - 229        | 2.359 ± .020      |             | 2.637      | 2.361            | 2.627             | 2.377               |                  |
| - 230        | 2.484 ± .020      | ▼           | 2.762      | 2.486            | 2.752             | 2.502               | ▼                |

**TABLE G Rotary O-Ring Seal Gland Dimensions Under 900 PSI**

| AS568<br>Number | O-Ring Dimensions |             |            | Shaft<br>Diameter<br>B | Groove<br>Diameter<br>A | Rod Bore<br>Diameter<br>D | Groove<br>Width<br>G |
|-----------------|-------------------|-------------|------------|------------------------|-------------------------|---------------------------|----------------------|
|                 | I.D. ± Tol.       | W. ± Tol.   | O.D. (ref) |                        |                         |                           |                      |
| Tolerance       |                   |             |            | +0.000<br>-0.001       | +0.003<br>-0.000        | +0.003<br>-0.000          | +0.004<br>-0.000     |
| - 231           | 2.609 ± .020      | .139 ± .004 | 2.887      | 2.611                  | 2.877                   | 2.627                     | .144                 |
| - 232           | 2.734 ± .024      |             | 3.012      | 2.736                  | 3.002                   | 2.752                     |                      |
| - 233           | 2.859 ± .024      |             | 3.137      | 2.861                  | 3.127                   | 2.877                     |                      |
| - 234           | 2.984 ± .024      |             | 3.262      | 2.986                  | 3.252                   | 3.002                     |                      |
| - 235           | 3.109 ± .024      |             | 3.387      | 3.111                  | 3.377                   | 3.127                     |                      |
| - 236           | 3.234 ± .024      |             | 3.512      | 3.236                  | 3.502                   | 3.252                     |                      |
| - 237           | 3.359 ± .024      |             | 3.637      | 3.361                  | 3.627                   | 3.377                     |                      |
| - 238           | 3.484 ± .024      |             | 3.762      | 3.486                  | 3.752                   | 3.502                     |                      |
| - 239           | 3.609 ± .028      |             | 3.887      | 3.611                  | 3.877                   | 3.627                     |                      |
| - 240           | 3.734 ± .028      |             | 4.012      | 3.736                  | 4.002                   | 3.752                     |                      |
| - 241           | 3.859 ± .028      |             | 4.137      | 3.861                  | 4.127                   | 3.877                     |                      |
| - 242           | 3.984 ± .028      |             | 4.262      | 3.986                  | 4.252                   | 4.002                     |                      |
| - 243           | 4.109 ± .028      |             | 4.387      | 4.111                  | 4.377                   | 4.127                     |                      |
| - 244           | 4.234 ± .030      |             | 4.512      | 4.236                  | 4.502                   | 4.252                     |                      |
| - 245           | 4.359 ± .030      |             | 4.637      | 4.361                  | 4.627                   | 4.377                     |                      |
| - 246           | 4.484 ± .030      |             | 4.762      | 4.486                  | 4.752                   | 4.502                     |                      |
| - 247           | 4.609 ± .030      |             | 4.887      | 4.611                  | 4.877                   | 4.627                     |                      |
| - 248           | 4.734 ± .030      |             | 5.012      | 4.736                  | 5.002                   | 4.752                     |                      |
| - 249           | 4.859 ± .035      |             | 5.137      | 4.861                  | 5.127                   | 4.877                     |                      |
| - 250           | 4.984 ± .035      |             | 5.262      | 4.986                  | 5.252                   | 5.002                     |                      |
| - 251           | 5.109 ± .035      |             | 5.387      | 5.111                  | 5.377                   | 5.127                     |                      |
| - 252           | 5.234 ± .035      |             | 5.512      | 5.236                  | 5.502                   | 5.252                     |                      |
| - 253           | 5.359 ± .035      |             | 5.637      | 5.361                  | 5.627                   | 5.377                     |                      |
| - 254           | 5.484 ± .035      |             | 5.762      | 5.486                  | 5.752                   | 5.502                     |                      |
| - 255           | 5.609 ± .035      |             | 5.887      | 5.611                  | 5.877                   | 5.627                     |                      |
| - 256           | 5.734 ± .035      |             | 6.012      | 5.736                  | 6.002                   | 5.752                     |                      |
| - 257           | 5.859 ± .035      |             | 6.137      | 5.861                  | 6.127                   | 5.877                     |                      |
| - 258           | 5.984 ± .035      | ▼           | 6.262      | 5.986                  | 6.252                   | 6.002                     | ▼                    |