|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 00 | $\mathrm{Z}_{\mathrm{Q}}^{\mathrm{Z}} \mathrm{H} \text { I } \mathrm{K}$ | Z H D A K | $\underset{Q}{Z} \text { HKAK }$ | $\begin{aligned} & \mathrm{Z} \text { H K A O A } \\ & \mathrm{K} Q \end{aligned}$ | $\begin{aligned} & \text { Z HKA H K } \\ & \text { A KQ } \end{aligned}$ | $\begin{aligned} & \mathrm{Z} \mathrm{H}_{\mathrm{K}} \mathrm{~N} \text { K } \\ & \mathrm{A} K \mathrm{~K} \end{aligned}$ | $\begin{aligned} & \mathrm{ZHKNG} \\ & \mathrm{~N} K \mathrm{~K} \end{aligned}$ |
| 01 | $\underset{Q}{Z} H \text { I H K }$ | $\mathrm{Z} \text { H D A K }$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{H} \text { K A K }$ | $\begin{aligned} & \mathrm{Z} H \mathrm{D} \text { A O A } \\ & \mathrm{K} \end{aligned}$ | $\begin{aligned} & \mathrm{ZHKAHO} \\ & \text { AKQ } K \text { K } \end{aligned}$ | $\begin{aligned} & \mathrm{ZHKAHK} \\ & \mathrm{AK} \mathrm{~K} \end{aligned}$ | $\begin{array}{l\|l} \mathrm{Z} H \mathrm{H} N \mathrm{~K} \\ \mathrm{~A} \mathrm{~K}_{\mathrm{K}} \end{array}$ |
| 02 | Z H D O Q | Z HKEK ${ }^{\text {C }}$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{HK} \text { EK E }$ | Z H D A H K | $\mathrm{Z}_{\mathrm{Q}} \mathrm{H} \text { G T G T }$ | $\underset{Q}{Z} H \text { K T K T }$ |  |
| 03 | Z H D O Q | Z H K E Q | $\mathrm{Z}_{\mathrm{Q}} \mathrm{HK} \text { K D O }$ | $\begin{aligned} & \mathrm{Z} \\ & \mathrm{~K} \\ & \mathrm{Q} \end{aligned}$ | $\mathrm{Z}_{\mathrm{Q}}^{\mathrm{H} K \mathrm{~T}} \mathrm{~K} \mathrm{E}$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{HK} \text { K A G T }$ | $\underset{T}{\mathrm{Z}} \mathrm{H} \mathrm{D} \text { TAK }$ |
| 04 | Z A Q | Z A D E Q | ZADEDE | Z A D T A | $\begin{aligned} & \text { ZADED } \\ & T \text { Q } \end{aligned}$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{P} \text { N D T }$ |  |
| 05 | Z T G S Q | $\begin{aligned} & \text { Z A H A U } \\ & \text { E Q } \end{aligned}$ | $\mathrm{Z} \text { A H T G }$ | $Z_{G} \mathrm{~T}_{\mathrm{Q}} \mathrm{NH}$ | $\begin{aligned} & \text { Z A H THTT} \\ & \text { G Q } \end{aligned}$ | $\begin{aligned} & \mathrm{Z} \text { U N P N M } \\ & \mathrm{E} \mathrm{Q}_{\mathrm{C}} \end{aligned}$ |  |
| 06 | $\text { Z } \mathrm{Z} \text { H K G }$ | Z P A E Q | $\begin{aligned} & \mathrm{Z} P \mathrm{P} \text { T } \\ & \hline \end{aligned}$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{HTTUAE}$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{PT} \text { TUAE }$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{P} \text { T U T E }$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{P} \text { T P T E }$ |
| 07 | Z A H E Q | $\mathrm{Z}_{\mathrm{Q}} \mathrm{~A} H E K \mathrm{G}$ | $\begin{aligned} & \mathrm{ZPAUHE} \\ & \mathrm{Q} \end{aligned}$ | ZAUTHE | ZAPTHE | $\begin{aligned} & \hline Z A P T U A \\ & U H E X Q \end{aligned}$ |  |
| 08 | $\underset{F}{\mathrm{Z}} \mathrm{~A} \text { HE Q }$ | $\begin{aligned} & \mathrm{ZAP} \\ & \mathrm{E} \text { Q } \end{aligned}$ | $\mathrm{Z} \text { Q A P E }$ | $\begin{aligned} & \mathrm{Z} A \mathrm{P} \text { A P } \\ & \mathrm{E} \end{aligned}$ | Z U T M P E | $\begin{aligned} & \text { Z A P T M P } \\ & E \quad Q \end{aligned}$ |  |
| 09 | Z A H E Q | $\begin{aligned} & \mathrm{ZAP} \\ & \mathrm{E} \text { Q } \end{aligned}$ | ZAUTHE | $\mathrm{Z}_{\mathrm{Q}} \mathrm{MTHUNE}$ | $\begin{aligned} & \mathrm{Z} \text { M T P E } \\ & \mathrm{Q} \end{aligned}$ | $\begin{aligned} & \text { ZAA U T M T } \\ & \text { U H E } \mathrm{C} \end{aligned}$ |  |
| 10 | Z A H O Q | Z A P O Q | $\begin{aligned} & \text { Z A P E H } \\ & \text { O } \mathrm{Q} \end{aligned}$ | $\begin{aligned} & \text { Z A U E P O } \\ & \text { Q } \end{aligned}$ | $\begin{aligned} & \text { Z A PEP P } \\ & O G Q Q \end{aligned}$ | $\begin{aligned} & \text { Z M T U E H } \\ & \mathrm{O}_{\mathrm{Q}} \\ & \hline \end{aligned}$ | $\begin{aligned} & Z_{O}^{\text {M T T U E P }} \\ & \text { O } \end{aligned}$ |
| 11 | Z E P O Q | Z E P H P | $\mathrm{Z}_{\mathrm{Q}}^{\mathrm{Z}} \mathrm{C} \text { U P O }$ | ZAUEPG Q | Z A U E U E P 0 Q | $\begin{aligned} & \text { Z M T U E P } \\ & \text { O Q } \end{aligned}$ |  |
| 12 | ZOUGQ | $\begin{array}{ll} \mathrm{Z} O \mathrm{O} \\ \mathrm{G} Q \end{array}$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{AUOUG}$ | $\underset{Q}{Z O M E U G}$ | $\begin{aligned} & \mathrm{ZOOMEXO} \\ & U G Q \end{aligned}$ | $\begin{aligned} & \text { ZAME M } \\ & \text { E UGQ } \end{aligned}$ |  |
| 13 | Z O H G Q | Z E U G Q | $\begin{aligned} & \mathrm{Z} E \mathrm{E} O \mathrm{O} \\ & \mathrm{G} Q \end{aligned}$ | $\begin{aligned} & \mathrm{ZOOUGU} \\ & G \mathrm{Q} \end{aligned}$ | $\begin{aligned} & \text { Z EMEAU } \\ & \text { G Q } \end{aligned}$ | $\begin{aligned} & \hline \text { Z EME M U } \\ & O \text { UGQ } \end{aligned}$ |  |
| 14 | Z O H K Q | Z O U G Q | Z E M G Q | $\begin{aligned} & \text { Z E A E M } \\ & \text { G Q } \end{aligned}$ | Z E M O M | $\begin{aligned} & \mathrm{Z} E \mathrm{E} \text { OMO } \\ & \mathrm{U} \text { G Q } \end{aligned}$ |  |
| 15 | ZOHKQ F | ZOUQ | $\mathrm{ZOMMG}$ | $\underset{Q}{Z O M O U G}$ | $\mathrm{ZOMOM} \mathrm{M}$ | $\begin{aligned} & \mathrm{Z} \\ & \mathrm{G} \text { E M O O M } \end{aligned}$ |  |
| 16 | Z O U Q | Z O U K H Q | Z O UKE U | $\mathrm{Z}_{\mathrm{Q}} \mathrm{AMKU}$ | $\begin{aligned} & \text { ZENEAUK } \\ & \text { HEQ } \end{aligned}$ | $\begin{aligned} & \hline \mathrm{ZENEAM} \\ & \mathrm{OX} Q \end{aligned}$ |  |
| 17 | Z O U Q | $\begin{array}{ll} \mathrm{Z} & 0 \\ \mathrm{U} & \mathrm{U} \end{array}$ | $\mathrm{Z} \text { Q A G A }$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{ENGA}$ | $\begin{aligned} & \text { Z E A G A G } \\ & \text { E A Q } \end{aligned}$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{ENG} \mathrm{~N}$ |  |
| 18 | Z O A Q | $\mathrm{Z} O \text { A O A }$ | $\mathrm{Z} O \text { A K A }$ | $\mathrm{ZONOA}$ | $\begin{aligned} & \mathrm{ZEAGAGE} \\ & \mathrm{~A} Q \end{aligned}$ | Z E N G N |  |
| 19 | ZOA Q | $\mathrm{Z} O \text { A O A }$ | Z O A K A | $\mathrm{ZONOA}$ | $\begin{array}{ll} \mathrm{Z} \\ \mathrm{~T} & \mathrm{O} \\ \hline \end{array}$ | ZOETGEA OEAQ | $\begin{aligned} & \text { ZOOETGT } \\ & \text { GEAQ } \end{aligned}$ |
| 20 | Z O A Q | $\mathrm{Z} O \text { A O A }$ | ZOAKA | $\mathrm{ZONOA}$ | $\begin{array}{ll} \mathrm{ZO} \\ \mathrm{~T} \text { Q N O E } \end{array}$ | $\begin{aligned} & \text { ZOOETGEA } \\ & \text { OEA Q } \end{aligned}$ | $\begin{aligned} & \text { ZOAETGT} \\ & \text { G EAQ A T } \end{aligned}$ |
| 21 | Z G E Q | Z G EKEQ | Z G T O E Q | $\mathrm{Z}_{\mathrm{Q}}^{\mathrm{Z}} \mathrm{~T} \text { TKGE}$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{G} \text { T O G T }$ | $\begin{aligned} & \mathrm{Z} \text { G E K G T K } \\ & \mathrm{Q} \end{aligned}$ | $\begin{aligned} & Z \\ & Z \\ & O \\ & O \end{aligned}$ |
| 22 | Z G E Q | Z G E K E Q | Z G T O E Q | $\mathrm{Z}_{\mathrm{Q}} \mathrm{G} \text { T K G E }$ | $\mathrm{Z}_{\mathrm{Q}}^{\mathrm{Z}} \mathrm{G} \text { T O G T }$ | $\begin{aligned} & \text { Z Z G E K G T K } \\ & \hline \text { E } \end{aligned}$ | $\begin{aligned} & Z G T O G T \\ & O G E Q \end{aligned}$ |
| 23 | Z G Q | Z E K G Q | Z E K E Q | $\begin{aligned} & \mathrm{ZOTOE} \\ & \mathrm{KGGQ} \end{aligned}$ | $\begin{aligned} & \mathrm{ZO} \mathrm{O}_{\mathrm{G}} \mathrm{O} \text { T } \\ & \mathrm{G} \mathrm{Q} \end{aligned}$ | $\begin{aligned} & Z_{G} O T K T \end{aligned}$ | $\begin{aligned} & \mathrm{Z} E N P N P \\ & E \\ & \hline \end{aligned}$ |
| 24 | Z E IQ | Z E I G Q | Z O A P E G | $\begin{aligned} & \mathrm{ZOTP} \\ & \mathrm{G} \mathrm{Q}^{\mathrm{T}} \mathrm{P} \end{aligned}$ | $\begin{aligned} & \text { Z O A PAP } \\ & E G Q \end{aligned}$ | $\begin{aligned} & \text { Z O T P A P } \\ & \text { E G Q } \end{aligned}$ |  |
| 25 | Z HEEYQ | $\begin{array}{ll} \mathrm{Z} & \mathrm{H} A \mathrm{P} \\ \mathrm{Y} \\ \hline \end{array}$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{HTOU}$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{H} \text { T P K }$ | $\begin{aligned} & \mathrm{Z} \\ & \mathrm{~K} \underset{\mathrm{Q}}{ } \mathrm{~T} \text { U A P } \end{aligned}$ | $\begin{aligned} & \text { Z H T P H T } \\ & \text { U K Q } \end{aligned}$ |  |
| 26 | Z E H K Q | ZOEVGQ | $\mathrm{Z}_{\mathrm{Q}}^{\mathrm{Z}} \mathrm{OAPK}$ | $\begin{array}{ll} \mathrm{Z} & \mathrm{O} \text { E V E V } \\ \mathrm{K} \end{array}$ | $\begin{aligned} & \mathrm{Z} O \text { O P A P } \\ & K \\ & \mathrm{Q} \end{aligned}$ | $\begin{array}{lll} \hline Z O T P V E \\ V & K \end{array}$ | $\begin{aligned} & \mathrm{Z} \\ & \mathrm{~K} \\ & \mathrm{O} \\ & \mathrm{Q} \end{aligned}$ |
| 27 | Z E H K Q | $\begin{aligned} & \mathrm{Z} V \mathrm{~V} H \\ & \mathrm{~K} \mathrm{Q}_{\mathrm{Q}} \end{aligned}$ | Z V E P G Q | $\begin{array}{ll} \hline Z \mathrm{~V} \text { E P E H } \\ \mathrm{K} \end{array}$ | $\begin{array}{ll} \hline Z \quad V E P E P \\ K & Q \end{array}$ | $\begin{array}{llll} \text { Z V E T M U } \\ \text { E P K } Q \end{array}$ |  |
| 28 | Z V G V G Q | $\begin{aligned} & \mathrm{Z} V \mathrm{O} \text { P } \\ & \mathrm{G} \text { Q } \end{aligned}$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{~V} \text { E P G }$ | $\begin{aligned} & \mathrm{Z} V \underset{\mathrm{G}}{\mathrm{~V}} \mathrm{E} \text { U E U } \end{aligned}$ | Z V E U E P | $\begin{aligned} & \text { Z VEPVE } \\ & \text { PG Q } \end{aligned}$ | $\mathrm{Z}_{\mathrm{K}}^{\mathrm{ZV}} \mathrm{Q} \text { P P T M }$ |
| 29 | Z V G H K Q | Z V O P G Q | $\mathrm{z}_{\mathrm{K}}^{\mathrm{V}} \mathrm{Q} \text { O PGH}$ | Z V E U E U | $\begin{aligned} & \mathrm{Z} \\ & \mathrm{G} \text { V O P P O } \end{aligned}$ | $\begin{array}{llllll} \hline Z & V & E & U & V & O \\ P & O & H & G & Q \end{array}$ | $\begin{aligned} & \text { ZVOP PVOP } \\ & \text { E U K Q } \end{aligned}$ |
| 30 | z V OUG Q | Z V O P G Q | $\begin{aligned} & \mathrm{Z} V \mathrm{O} \text { U G H } \\ & \mathrm{G} \mathrm{Q}^{2} \end{aligned}$ | $\begin{aligned} & \mathrm{Z} V \mathrm{~V} \text { G P G H } \\ & \mathrm{G} \end{aligned}$ | $\begin{aligned} & \mathrm{ZVVGUOE} \\ & M \mathrm{G} Q \end{aligned}$ | Z V E M E M | $\begin{aligned} & Z V E M P \\ & G P G Q \end{aligned}$ |
| 31 | $\mathrm{Z}_{\mathrm{Q}}^{\mathrm{Z}} \mathrm{~K} \text { G H}$ | $Z_{Q} \text { G H G H }$ | Z K G U G H | z K G U O M | Z K G U H E M | Z K E M E M Q |  |
| 32 | Z H O V Q | Z H K U Q | Z M K U Q | $\underset{Q}{Z} H \text { G UGUU }$ | $\underset{Q}{Z} H \text { G M UK U }$ | $\begin{aligned} & \mathrm{Z} H \mathrm{H} G \mathrm{MG} \\ & \mathrm{M} \end{aligned}$ |  |
| 33 | Z H O V Q | Z H K U Q | Z M K U Q | Z H G U G U | Z H G M UK U | $\begin{aligned} & \mathrm{Z} \\ & \mathrm{M} \text { Q G M G } \end{aligned}$ |  |
| 34 | $\underset{Q}{Z I K H}$ | $\mathrm{Z}_{\mathrm{Q}} \mathrm{I} G \mathrm{~A}$ | Z I K U K H | $\begin{aligned} & \mathrm{Z} I K \mathrm{~K} V \mathrm{~V} \\ & \mathrm{~A} \end{aligned}$ | $\underset{Q}{Z} \text { I G A U G A }$ | Z I G N G A | $\begin{aligned} & \text { Z IG M V E } \\ & N_{Q} \end{aligned}$ |
| 35 | Z V I U K Q | ZVIHIGA <br> K Q | $\begin{array}{\|l\|l\|} \hline Z \mathrm{~V} \text { I U V G A } \\ \mathrm{K} Q \end{array}$ | $\begin{aligned} & \mathrm{Z} V \mathrm{I} G \mathrm{AG} \\ & A 囚 Q \end{aligned}$ | $\begin{aligned} & \mathrm{Z} V \text { I G N G A } \\ & \mathrm{K} Q \end{aligned}$ | $\begin{array}{\|l\|l\|} \hline Z \mathrm{~V} \text { I G N G N } \\ \hline \mathrm{K} Q \end{array}$ |  |

NAVIGATION MARKS AND OBSTRUCTIONS
The Navigation Marks in and around Howth Sound shall be left as follows-
South Rowan: to be passed to the West and South Rowan Rocks:
to be passed to the East and South
Any part of Ireland's Eye capable of being touched by a boat while racing is designated as an obstruction to sea room.
Competitors are reminded of a trawler wreck in Howth Sound, south of the Carrgran Rocks on Ireland's Eye, which is submerged at most stages of the tide.
Boats racing in the vicinity of Baldoyle Spit shall sail North and East of the Spit Mark (S).


Racing Marks 2010 (Approximate)

|  | Name | Shape | Colour | Deg | Min | Deg | Min |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A | Apex | Conical | Black | 53 | 26.76 | 06 | 03.26 |
| C | Cush | Conical | Black | 53 | 24.50 | 06 | 05.44 |
| D | Dunbo | Conical | Yellow | 53 | 24.73 | 06 | 03.85 |
| E | Apex | Conical | Black | 53 | 26.00 | 06 | 02.20 |
| G | Garbi | Conical | Black | 53 | 25.00 | 06 | 02.32 |
| H | Hub | Conical | Black | 53 | 25.71 | 06 | 04.43 |
| I | Island | Conical | Black | 53 | 24.70 | 06 | 04.36 |
| J | Thulla | Conical | Black | 53 | 23.80 | 06 | 03.40 |
| K | Stack | Conical | Black | 53 | 24.60 | 06 | 03.11 |
| M | Malahide | Conical | Black | 53 | 27.23 | 06 | 05.59 |
| N | North | Conical | Black | 53 | 27.99 | 06 | 03.40 |
| O | Osprey | Conical | Orange | 53 | 25.41 | 06 | 03.52 |
| P | Portmarnock | Conical | Black | 53 | 25.89 | 06 | 06.30 |
| Q | Roway Rocks | IALA | Greem | 53 | 23.88 | 06 | 03.22 |
| R | South Roway | IALA | Greem | 53 | 23.78 | 06 | 03.88 |
| S | Spit | Conical | Black | 53 | 24.35 | 06 | 04.48 |
| T | Talbot | Conical | Black | 53 | 27.31 | 06 | 01.30 |
| U | Ulysses | Conical | Orange | 53 | 26.22 | 06 | 04.97 |
| V | Viceroy | Conical | Orange | 53 | 25.12 | 06 | 04.78 |
| W | West | Conical | Black | 53 | 24.96 | 06 | 06.07 |
| Z | ZEPHYR | Inflatable Black | Approx Upwind of Start Line |  |  |  |  |

## COURSE SELECTION

1). Courses will be designated by three numeral boards.
2). The first two boards will indicate the beat. ie $07=070^{\circ}$
3). The third board indicates the column number across the top of the page.

Therefore Course 073 is the third course in from the left on line 07.

| TIDES | HW | HT. | LW |
| :--- | :---: | :---: | :---: |
| Sunday, September 19th | 09.57 | 3.3 m | 15.43 |
| Sunday, September 26th | 13.50 | 3.9 m | 07.23 |
| Sunday, October 3rd | 08.08 | 3.3 m | 13.55 |
| Sunday, October 10th | 13.51 | 4.3 m | 07.16 |
| Satuday, October 16th | 13.51 | 3.0 m | 13.01 |

2010 Race Marks - Relative Bearings Table - Magnetic (Approx)

|  | A | B | C | D | E | G | H | 1 | J | K | M | N | 0 | P | Q | 5 | T | U | V | w |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A |  | $186^{\circ}$ | $216^{\circ}$ | $196^{\circ}$ | $146{ }^{\circ}$ | $168^{\circ}$ | $220{ }^{\circ}$ | 207* | $188^{\circ}$ | 184* | 295 ${ }^{\circ}$ | 002 ${ }^{\circ}$ | 1920 | 250 ${ }^{\circ}$ | 185 ${ }^{\circ}$ | 203 ${ }^{\circ}$ | 071 ${ }^{\circ}$ | $248{ }^{\circ}$ | $215^{\circ}$ | 229 ${ }^{\circ}$ |
| B | 006 ${ }^{\circ}$ |  | $319^{\circ}$ | $352^{\circ}$ | 019 ${ }^{\circ}$ | 024 ${ }^{\circ}$ | $350{ }^{\circ}$ | $336{ }^{\circ}$ | $357^{\circ}$ | 010 ${ }^{\circ}$ | 347* | 005 ${ }^{\circ}$ | 002 ${ }^{\circ}$ | $331{ }^{\circ}$ | 010 ${ }^{\circ}$ | $331{ }^{\circ}$ | 022* | $347^{\circ}$ | $340^{\circ}$ | $321{ }^{\circ}$ |
| C | 036 ${ }^{\circ}$ | $139^{\circ}$ |  | 084 ${ }^{\circ}$ | 058 ${ }^{\circ}$ | $081{ }^{\circ}$ | 032 ${ }^{\circ}$ | 077 ${ }^{\circ}$ | $126^{\circ}$ | 092 ${ }^{\circ}$ | $004{ }^{\circ}$ | 025 ${ }^{\circ}$ | 058 ${ }^{\circ}$ | $346{ }^{\circ}$ | $121{ }^{\circ}$ | $111^{\circ}$ | 047* | 015 ${ }^{\circ}$ | 038 ${ }^{\circ}$ | $327{ }^{\circ}$ |
| D | $016{ }^{\circ}$ | $172^{\circ}$ | 264 ${ }^{\circ}$ |  | $043{ }^{\circ}$ | 078 ${ }^{\circ}$ | $347^{\circ}$ | 272 ${ }^{\circ}$ | $170^{\circ}$ | $110^{\circ}$ | $344{ }^{\circ}$ | $011{ }^{\circ}$ | $023{ }^{\circ}$ | $315^{\circ}$ | $161^{\circ}$ | $233{ }^{\circ}$ | 036 ${ }^{\circ}$ | $342^{\circ}$ | $312^{\circ}$ | 287 ${ }^{\circ}$ |
| E | $326{ }^{\circ}$ | $199^{\circ}$ | 238 ${ }^{\circ}$ | $223{ }^{\circ}$ |  | $190^{\circ}$ | 264 ${ }^{\circ}$ | $233^{\circ}$ | $204{ }^{\circ}$ | $207^{\circ}$ | $307^{\circ}$ | $346{ }^{\circ}$ | $238{ }^{\circ}$ | $273^{\circ}$ | 202 ${ }^{\circ}$ | $225{ }^{\circ}$ | 028 ${ }^{\circ}$ | $284{ }^{\circ}$ | 246 ${ }^{\circ}$ | 252 ${ }^{\circ}$ |
| G | $348{ }^{\circ}$ | 204 ${ }^{\circ}$ | $261{ }^{\circ}$ | 258 ${ }^{\circ}$ | 010 ${ }^{\circ}$ |  | $305^{\circ}$ | $263^{\circ}$ | $214^{\circ}$ | $236{ }^{\circ}$ | $325^{\circ}$ | $354{ }^{\circ}$ | $306{ }^{\circ}$ | $297^{\circ}$ | $211^{\circ}$ | $249{ }^{\circ}$ | $021{ }^{\circ}$ | $314^{\circ}$ | $281{ }^{\circ}$ | $275^{\circ}$ |
| H | 040 ${ }^{\circ}$ | $170^{\circ}$ | 212 ${ }^{\circ}$ | $167^{\circ}$ | 084 ${ }^{\circ}$ | $125^{\circ}$ |  | $191^{\circ}$ | $168^{\circ}$ | $151^{\circ}$ | $342^{\circ}$ | $021{ }^{\circ}$ | $125^{\circ}$ | $285{ }^{\circ}$ | $164^{\circ}$ | $187^{\circ}$ | 055 ${ }^{\circ}$ | $334{ }^{\circ}$ | 205 ${ }^{\circ}$ | $238{ }^{\circ}$ |
| 1 | 027 ${ }^{\circ}$ | $156{ }^{\circ}$ | $257^{\circ}$ | 092 ${ }^{\circ}$ | 053 ${ }^{\circ}$ | 083 ${ }^{\circ}$ | $011^{\circ}$ |  | $148^{\circ}$ | $101^{\circ}$ | $353^{\circ}$ | 018 ${ }^{\circ}$ | 048 ${ }^{\circ}$ | $326{ }^{\circ}$ | $140^{\circ}$ | $177^{\circ}$ | 043 ${ }^{\circ}$ | $357^{\circ}$ | $350{ }^{\circ}$ | $293{ }^{\circ}$ |
| J | 008 ${ }^{\circ}$ | $177^{\circ}$ | $306{ }^{\circ}$ | $350^{\circ}$ | $024{ }^{\circ}$ | 034 ${ }^{\circ}$ | $348{ }^{\circ}$ | $328{ }^{\circ}$ |  | 018 ${ }^{\circ}$ | $345{ }^{\circ}$ | 006 ${ }^{\circ}$ | 004 ${ }^{\circ}$ | $326{ }^{\circ}$ | 062 ${ }^{\circ}$ | $317^{\circ}$ | 026 ${ }^{\circ}$ | $345{ }^{\circ}$ | $334{ }^{\circ}$ | $312^{\circ}$ |
| K | $004{ }^{\circ}$ | $190^{\circ}$ | $272^{\circ}$ | 290 ${ }^{\circ}$ | 027 ${ }^{\circ}$ | 056 ${ }^{\circ}$ | $331{ }^{\circ}$ | $281{ }^{\circ}$ | $198^{\circ}$ |  | $337^{\circ}$ | 003 ${ }^{\circ}$ | $350^{\circ}$ | $310^{\circ}$ | $190^{\circ}$ | 259 ${ }^{\circ}$ | 028 ${ }^{\circ}$ | $332^{\circ}$ | $304{ }^{\circ}$ | 288 ${ }^{\circ}$ |
| M | $115^{\circ}$ | $167^{\circ}$ | $184^{\circ}$ | $164^{\circ}$ | $127^{\circ}$ | $145^{\circ}$ | $162^{\circ}$ | $173^{\circ}$ | $165^{\circ}$ | $157^{\circ}$ |  | 066 ${ }^{\circ}$ | $152^{\circ}$ | 204 ${ }^{\circ}$ | $163^{\circ}$ | $173^{\circ}$ | 094 ${ }^{\circ}$ | $166^{\circ}$ | $173^{\circ}$ | $193^{\circ}$ |
| N | $182^{\circ}$ | $185^{\circ}$ | 205 ${ }^{\circ}$ | $191^{\circ}$ | $166^{\circ}$ | $174{ }^{\circ}$ | $201{ }^{\circ}$ | $198{ }^{\circ}$ | $186^{\circ}$ | $183{ }^{\circ}$ | 246 ${ }^{\circ}$ |  | $187^{\circ}$ | 225 ${ }^{\circ}$ | $184^{\circ}$ | $196{ }^{\circ}$ | $125^{\circ}$ | 214* | 202 ${ }^{\circ}$ | 214* |
| 0 | 012 ${ }^{\circ}$ | $182^{\circ}$ | $238{ }^{\circ}$ | $203{ }^{\circ}$ | 058 ${ }^{\circ}$ | $126^{\circ}$ | $305{ }^{\circ}$ | $228{ }^{\circ}$ | $184^{\circ}$ | $170^{\circ}$ | $332^{\circ}$ | $007{ }^{\circ}$ |  | 2920 | $180^{\circ}$ | 215 ${ }^{\circ}$ | 040 ${ }^{\circ}$ | $319^{\circ}$ | 256 ${ }^{\circ}$ | 260 ${ }^{\circ}$ |
| P | 070 ${ }^{\circ}$ | $151^{\circ}$ | $166{ }^{\circ}$ | $135{ }^{\circ}$ | 093 ${ }^{\circ}$ | $117^{\circ}$ | $105^{\circ}$ | $146{ }^{\circ}$ | $146{ }^{\circ}$ | $130{ }^{\circ}$ | 024 ${ }^{\circ}$ | $045{ }^{\circ}$ | $112^{\circ}$ |  | $143^{\circ}$ | $151^{\circ}$ | $071{ }^{\circ}$ | 073 ${ }^{\circ}$ | $136{ }^{\circ}$ | $178^{\circ}$ |
| Q | 005 ${ }^{\circ}$ | $190^{\circ}$ | $301{ }^{\circ}$ | $341^{\circ}$ | 022 ${ }^{\circ}$ | $031{ }^{\circ}$ | $344{ }^{\circ}$ | $320{ }^{\circ}$ | 2420 ${ }^{\circ}$ | 010 ${ }^{\circ}$ | $343^{\circ}$ | $004{ }^{\circ}$ | $360^{\circ}$ | $323{ }^{\circ}$ |  | $308{ }^{\circ}$ | 024 ${ }^{\circ}$ | $342^{\circ}$ | $329{ }^{\circ}$ | $308{ }^{\circ}$ |
| 5 | 023 ${ }^{\circ}$ | $151^{\circ}$ | 291 ${ }^{\circ}$ | $053{ }^{\circ}$ | 045 ${ }^{\circ}$ | 069 ${ }^{\circ}$ | $007{ }^{\circ}$ | $357^{\circ}$ | $137^{\circ}$ | 079 ${ }^{\circ}$ | $353{ }^{\circ}$ | 016 ${ }^{\circ}$ | $035{ }^{\circ}$ | $331{ }^{\circ}$ | $128^{\circ}$ |  | 039 ${ }^{\circ}$ | $357^{\circ}$ | $353{ }^{\circ}$ | $309{ }^{\circ}$ |
| T | 251 ${ }^{\circ}$ | 202 ${ }^{\circ}$ | $227^{\circ}$ | $216^{\circ}$ | 208 ${ }^{\circ}$ | $201{ }^{\circ}$ | $235^{\circ}$ | $223{ }^{\circ}$ | 206 ${ }^{\circ}$ | 208 ${ }^{\circ}$ | $274{ }^{\circ}$ | $305{ }^{\circ}$ | $220{ }^{\circ}$ | $251^{\circ}$ | $204{ }^{\circ}$ | 219 ${ }^{\circ}$ |  | $249{ }^{\circ}$ | $229{ }^{\circ}$ | $236{ }^{\circ}$ |
| U | 068 ${ }^{\circ}$ | $167^{\circ}$ | $195^{\circ}$ | $162^{\circ}$ | $104^{\circ}$ | $134^{\circ}$ | $154{ }^{\circ}$ | $177^{\circ}$ | $165^{\circ}$ | $152^{\circ}$ | $346{ }^{\circ}$ | $034{ }^{\circ}$ | $139{ }^{\circ}$ | 253 ${ }^{\circ}$ | $162^{\circ}$ | $177^{\circ}$ | 069 ${ }^{\circ}$ |  | $180^{\circ}$ | 213 ${ }^{\circ}$ |
| V | 035 ${ }^{\circ}$ | $160^{\circ}$ | 218 ${ }^{\circ}$ | 132 ${ }^{\circ}$ | 066 ${ }^{\circ}$ | $101^{\circ}$ | 025 ${ }^{\circ}$ | $170^{\circ}$ | $154{ }^{\circ}$ | $124^{\circ}$ | $353^{\circ}$ | 022 ${ }^{\circ}$ | 076 ${ }^{\circ}$ | $316^{\circ}$ | $149{ }^{\circ}$ | $173^{\circ}$ | 049 ${ }^{\circ}$ | 000 ${ }^{\circ}$ |  | 264 ${ }^{\circ}$ |
| w | 049 ${ }^{\circ}$ | $141^{\circ}$ | $147^{\circ}$ | $107^{\circ}$ | 072 ${ }^{\circ}$ | 095 ${ }^{\circ}$ | 058 ${ }^{\circ}$ | $113^{\circ}$ | $132^{\circ}$ | $108^{\circ}$ | $013^{\circ}$ | 034 ${ }^{\circ}$ | 080 ${ }^{\circ}$ | $358{ }^{\circ}$ | $128^{\circ}$ | $129^{\circ}$ | 056 ${ }^{\circ}$ | 033 ${ }^{\circ}$ | 084 ${ }^{\circ}$ |  |

