JIS B2220 5K & 16K Flange Dimensions — Marine Reference

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Dimension tables for JIS B2220 5K and 16K steel flanges DN15 to DN300: outside diameter, bolt circle, bolt holes and bolt sizes, with the identification logic that separates 5K, 10K and 16K on a ship built in Japan or Korea, the overlap traps where two ratings share an envelope but differ in drilling, and how JIS drilling maps against EN 1092-1 and ASME B16.5 when a replacement valve or spool has to mate with an existing line.

The short version

JIS B2220 is the Japanese steel-flange standard, and the nominal-pressure classes that matter on ships are 5K, 10K and 16K (kgf/cm² class, roughly 5, 10 and 16 bar duty families). Vessels built in Japan, Korea and much of China carry JIS-drilled flanges through most of their piping — which is why a European-sourced PN16 valve bolts up wrong on them.
5K is the light class (gravity and low-pressure service: vents, overflow, sounding, some sea-water and sanitary lines); 10K is the workhorse (covered in our JIS 10K dimensions chart); 16K appears on higher-pressure systems — boiler feed, steam, hydraulic-adjacent service and some fuel lines.
The overlap trap: at several sizes two ratings share outside diameter or bolt circle but differ in bolt count or hole diameter — 16K DN50 shares the 155/120 envelope of 10K DN50 but carries 8 bolts where 10K has 4. Measuring OD alone misidentifies the flange; always count holes and measure the bolt circle.
JIS, EN and ASME do not interchange. A JIS 10K DN80 (185/150/8×19) will not mate with PN16 DN80 (200/160/8×18) or ASME 3" Class 150. For mixed-standard ships the honest fixes are a drilled-both spectacle of a transition spool — our PN16 / Class 150 / JIS 10K comparison maps the three side by side.
Ordering: state the standard and class explicitly ("JIS B2220 16K DN100 slip-on, S25C or SS400"), not just "DN100 flange". Every table below gives the measurements a crew can take with a tape and a vernier to identify what is actually on the pipe.

1. JIS B2220 5K flange dimensions (DN15–DN300)

DN | NPS ref | Flange OD (mm) | Bolt circle PCD (mm) | Bolt holes | Hole ø (mm) | Bolt size |

15 | 1/2" | 80 | 60 | 4 | 12 | M10 |

20 | 3/4" | 85 | 65 | 4 | 12 | M10 |

25 | 1" | 95 | 75 | 4 | 12 | M10 |

32 | 1 1/4" | 115 | 90 | 4 | 15 | M12 |

40 | 1 1/2" | 120 | 95 | 4 | 15 | M12 |

50 | 2" | 130 | 105 | 4 | 15 | M12 |

65 | 2 1/2" | 155 | 130 | 4 | 15 | M12 |

80 | 3" | 180 | 145 | 4 | 19 | M16 |

100 | 4" | 200 | 165 | 8 | 19 | M16 |

125 | 5" | 235 | 200 | 8 | 19 | M16 |

150 | 6" | 265 | 230 | 8 | 19 | M16 |

200 | 8" | 320 | 280 | 8 | 23 | M20 |

250 | 10" | 385 | 345 | 12 | 23 | M20 |

300 | 12" | 430 | 390 | 12 | 23 | M20 |

5K flanges are thin and light by design — typical on air vents, sounding pipes, scupper and overflow lines, gravity drains and other systems where the pipe itself is the schedule-light grade. They are frequently plate flanges (JIS "plate" or slip-on hub patterns) in SS400 carbon steel; galvanized on deck service. Because the drilling is sparse (4 bolts up to DN80), warped 5K faces are common on old ships — a straight-edge check before ordering gaskets saves a leaking joint at sea. For critical joints confirm against the standard text or the ship's piping class; where a drawing conflicts with the pipe, the pipe wins.

2. JIS B2220 16K flange dimensions (DN15–DN300)

DN | NPS ref | Flange OD (mm) | Bolt circle PCD (mm) | Bolt holes | Hole ø (mm) | Bolt size |

15 | 1/2" | 95 | 67 | 4 | 15 | M12 |

20 | 3/4" | 100 | 75 | 4 | 15 | M12 |

25 | 1" | 125 | 90 | 4 | 19 | M16 |

32 | 1 1/4" | 135 | 100 | 4 | 19 | M16 |

40 | 1 1/2" | 140 | 105 | 4 | 19 | M16 |

50 | 2" | 155 | 120 | 8 | 19 | M16 |

65 | 2 1/2" | 175 | 140 | 8 | 19 | M16 |

80 | 3" | 200 | 160 | 8 | 23 | M20 |

100 | 4" | 225 | 185 | 8 | 23 | M20 |

125 | 5" | 270 | 225 | 8 | 25 | M22 |

150 | 6" | 305 | 260 | 12 | 25 | M22 |

200 | 8" | 350 | 305 | 12 | 25 | M22 |

250 | 10" | 430 | 380 | 12 | 27 | M24 |

300 | 12" | 480 | 430 | 16 | 27 | M24 |

16K flanges carry heavier hubs and thicker plates than 10K at the same DN, and from DN50 up the drilling is denser. Steam service, boiler feed, thermal-oil and some engine-room fuel and starting-air adjacent lines are the usual habitat. Where a 16K line needs gaskets, treat it as genuine pressure service: graphite or spiral-wound class materials selected on the pT logic in our Klingersil grade guide, not bargain fibre sheet.

3. Identification: measure, count, then name the flange

Measurement on the pipe | What it tells you | Trap it avoids |

Flange outside diameter (tape across the face) | First filter — narrows to 2–3 candidates across standards | OD alone cannot separate 16K DN50 from 10K DN50 (both 155 mm) |

Bolt circle PCD (centre of one hole to centre of the opposite hole) | The decisive number together with OD | PN16 DN80 and JIS 16K DN80 share OD 200, PCD 160 and 8 holes — only the hole diameter separates them (18 vs 23 mm) |

Number of bolt holes | Separates ratings sharing an envelope (10K DN50: 4 holes; 16K DN50: 8) | Counting from a photo of a dirty flange — wipe and count twice |

Bolt hole diameter (vernier in the hole) | Confirms the class and the stud size | A 19 mm hole takes M16; if M16 studs rattle in a 23 mm hole you are one class off |

Face type and raised-face diameter | JIS uses raised face as standard on 10K/16K; flat face common on 5K | Gasket pattern mismatch — see the flange face types guide |

Write the result as the standard writes it: "JIS B2220 10K DN100, slip-on, RF". With that line a supplier anywhere in the world quotes the right item the first time. With "4 inch flange, about 210 mm" nobody can.

4. JIS against EN 1092-1 and ASME B16.5 — the mixed-fleet reality

Fleets trade, charter and buy second-hand across build regions, so a Japanese-built hull ends up with European pumps on JIS lines or the reverse. Three working rules. First, never force-match: slotted holes, drawn-in bolts and half-engaged studs on a misdrilled pair are a flange failure waiting for a surveyor to find. Second, transition deliberately: a short spool drilled JIS one end and EN or ASME the other, or a plate flange re-drilled by a workshop against the correct template, documented in the piping records. Third, order to the pipe, not the catalogue default: when a valve for a JIS line is only stocked PN16, ask for the JIS-drilled variant or the spool — we quote both. The side-by-side drilling comparison for the three standards at matching sizes lives in our PN16 / Class 150 / JIS 10K reference; EN dimensions in the PN16, PN10, PN25 and PN40 charts; ASME in the Class 150 and Class 300 charts.

5. Materials, facings and the paperwork

JIS commodity flanges run SS400 (general structural carbon steel, the EN S235 class cousin), S25C forged where strength matters, SUS304/SUS316L for stainless lines. Marine procurement should state material grade and certificate level together: mill certificate EN 10204 3.1 is the normal ask for pressure lines; class survey items may need 3.2 witnessing. Gaskets follow the facing: full-face patterns on 5K flat faces, ring patterns inside the bolt circle on raised faces — dimensions per the tables above, materials per the gasket material selection guide. Stud length comes from flange thickness plus gasket plus nut stack; when in doubt send both flange thicknesses with the RFQ.

How buying works at cballast. We quote JIS-pattern flanges, matching gaskets and stud sets alongside the EN and ASME programme — one RFQ covers a mixed-standard ship. Accounts are vetted at onboarding; first order prepaid; established accounts move to credit terms with repeat discounts; public bodies and utilities are invoiced against purchase order from the first order. RFQs to sales@cballast.com.

Frequently asked questions

What is the difference between JIS 5K, 10K and 16K flanges?They are nominal-pressure classes of JIS B2220 (kgf/cm² families, roughly 5, 10 and 16 bar duty): 5K is light service (vents, drains, gravity lines), 10K the general shipboard standard, 16K the higher-pressure class for steam and boiler-adjacent systems. At the same DN they differ in flange OD, thickness, bolt circle and often bolt count — the tables above and the 10K chart give the numbers.

Will a JIS 10K flange bolt to a PN16 flange?As a rule, no. A handful of sizes come temptingly close, but hole counts, PCDs and hole diameters diverge across the range — JIS 10K DN80 is 185/150/8×19 against PN16 DN80 at 200/160/8×18. Use a transition spool or a correctly drilled counter-flange; never slot holes on a pressure joint.

How do I identify a JIS flange on board?Measure the flange OD and the bolt-circle diameter, count the holes, and measure one hole with a vernier. Those four numbers against the 5K/10K/16K tables identify the class without paperwork. The classic trap is 10K vs 16K at DN50 — same 155 mm OD and 120 mm PCD, but 4 holes against 8.

What does the K in JIS 10K mean?It is the nominal pressure class in the traditional kgf/cm² system — 10K ≈ 10 kgf/cm² ≈ 9.8 bar as a class family, not an exact working-pressure promise. Actual allowable pressure depends on material and temperature, exactly as PN and Class ratings do in the EN and ASME worlds.

What material are JIS marine flanges?Commodity carbon-steel lines run SS400 or S25C; stainless systems SUS304 or SUS316L (the JIS names for the 304/316L classes). State the grade and the certificate level (EN 10204 3.1 for pressure service) on the RFQ, and galvanizing where the line is weather deck service.

Where can I buy JIS standard flanges in Europe?cballast.com quotes JIS B2220 5K, 10K and 16K pattern flanges with matching gaskets and stud bolts, delivered against vessel schedules — alongside EN 1092-1 and ASME B16.5 so a mixed-standard ship needs one supplier, not three. Send the class, DN, type and material to sales@cballast.com.

References and related guides

Standards and sources referenced: JIS B2220 (steel pipe flanges); JIS G3101 (SS400), JIS G4051 (S25C); EN 1092-1; ASME B16.5; EN 10204 (inspection documents). Dimension tables compiled from the published standard; confirm safety-critical joints against the current edition.

JIS B2220 10K flange dimensions

PN16 vs Class 150 vs JIS 10K — side-by-side reference

PN16 flange dimensions — EN 1092-1

ASME B16.5 Class 150 flange dimensions

Flange face types — RF, FF, RTJ and surface finish

Flange bolt torque chart

BS 10 Table D/E/F flange dimensions

Questions on a drilling pattern, a transition spool or a material certificate: write to sales@cballast.com. We answer whether or not you buy from us.

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