

Table : Balance quality grades for various groups of representative rigid rotors (From ISO 1940/1)

Balance Quality Grade	Product of the Relationship $v = 2\pi n/60 \cdot r$ (1) (2) mm/s	Rotor Types - General Examples
G 4 000	4 000	Crankshaft/drives <sup>(3)</sup> of rigidly mounted slow marine diesel engines with uneven number of cylinders <sup>(4)</sup>
G 1 600	1 600	Crankshaft/drives of rigidly mounted large two-cycle engines
G 630	630	Crankshaft/drives of rigidly mounted large four-cycle engines Crankshaft/drives of elastically mounted marine diesel engines
G 250	250	Crankshaft/drives of rigidly mounted fast four-cylinder diesel engines <sup>(4)</sup>
G 100	100	Crankshaft/drives of fast diesel engines with six or more cylinders <sup>(4)</sup> Complete engines (gasoline or diesel) for cars, trucks and locomotives <sup>(5)</sup>
G 40	40	Car wheels, wheel rims, wheel sets, drive shafts Crankshaft/drives of elastically mounted fast four-cycle engines with six or more cylinders <sup>(4)</sup> Crankshaft/drives of engines of cars, trucks and locomotives
G 16	16	Drive shafts (propeller shafts, cardan shafts) with special requirements Parts of crushing machines Parts of agricultural machinery Individual components of engines (gasoline or diesel) for cars, trucks and locomotives Crankshaft/drives of engines with six or more cylinders under special requirements
G 6.3	6.3	Parts of process plant machines Marine main turbine gears (merchant service) Centrifuge drums Paper machinery rolls; print rolls Fans Assembled aircraft gas turbine rotors Flywheels Pump impellers Machine-tool and general machinery parts Medium and large electric armatures (of electric motors having at least 80 mm shaft height) without special requirements Small electric armatures, often mass produced, in vibration insensitive applications and/or with vibration-isolating mountings Individual components of engines under special requirements
G 2.5	2.5	Gas and steam turbines, including marine main turbines (merchant service) Rigid turbo-generator rotors Computer memory drums and discs Turbo-compressors Machine-tool drives Medium and large electric armatures with special requirements Small electric armatures not qualifying for one or both of the conditions specified for small electric armatures of balance quality grade G 6.3 Turbine-driven pumps
G 1	1	Tape recorder and phonograph (gramophone) drives Grinding-machine drives Small electric armatures with special requirements
G 0.4	0.4	Spindles, discs and armatures of precision grinders Gyroscopes

1)  $v = 2\pi n/60 \cdot r$  n/10, if n is measured in revolutions per minute and v in radians per second.

2) For allocating the permissible residual unbalance to correction planes, refer to "Allocation of Uper to correction planes."

3) A crankshaft/drive is an assembly which includes a crankshaft, flywheel, clutch, pulley, vibration damper, rotating portion of connecting rod, etc.

4) For the purposes of this part of ISO 1940/1, slow diesel engines are those with a piston velocity of less than 9 m/s; fast diesel engines are those with a piston velocity of greater than 9 m/s.

5) In complete engines, the rotor mass comprises the sum of all masses belonging to the crankshaft/drive described in note 3 above.