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Additional Considerations for Racing

This motorcycle has been manufactured for use in a reasonable and prudent manner and as a vehicle only. However, some may wish to subject this motorcycle to abnormal operation, such as would be experienced under racing conditions. KAWASAKI STRONGLY RECOMMENDS THAT ALL RIDERS RIDE SAFELY AND OBEY ALL LAWS AND REGULATIONS CONCERNING THEIR MOTORCYCLE AND ITS OPERATION.

Racing should be done under supervised conditions, and recognized sanctioning bodies should be contacted for further details. For those who desire to participate in competitive racing or related use, the following technical information may prove useful. However, please note the following important points.

- You are entirely responsible for the use of your motorcycle under abnormal conditions such as racing, and Kawasaki shall not be liable for any damages which might arise from such use.
- Kawasaki's Limited Motorcycle Warranty and Limited Emission Control Systems Warranty specifically exclude motorcycles which are used in competitive or related uses. Please read the warranty carefully.
- Motorcycle racing is a very sophisticated sport, subject to many variables. The following information is theoretical only, and Kawasaki shall not be liable for any damages which might arise from alterations utilizing this information.
- When the motorcycle is operated on public roads, it **must** be in its original state in order to ensure safety and compliance with applicable regulations.

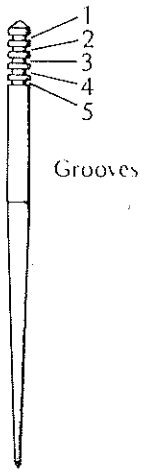
Carburetors:

Sometimes an alteration may be desirable for improved performance under special conditions when proper mixture is not obtained after the carburetors have been properly adjusted, and all parts cleaned and found to be functioning properly.

If the engine still exhibits symptoms of overly lean carburetion after all maintenance and adjustments are correctly performed, the main jet can be replaced with a smaller or larger one. A smaller numbered jet gives a leaner mixture and a larger numbered jet a richer mixture.

For the models other than the US model, a certain amount of adjustment can be made by changing the position of the needle. There are five grooves at the top of the needle. Changing the position of the clip to a groove closer to the bottom raises the needle, which makes the mixture richer at a given position of the throttle valve.

Jet Needle



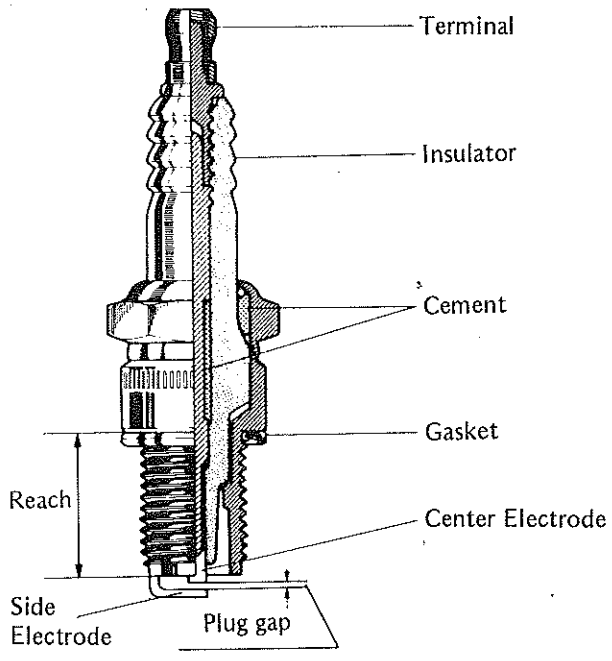
Spark Plug:

The spark plug ignites the fuel/air mixture in the combustion chamber. To do this effectively and at the proper time, the correct spark plug must be used, and the spark plug must be kept clean and adjusted.

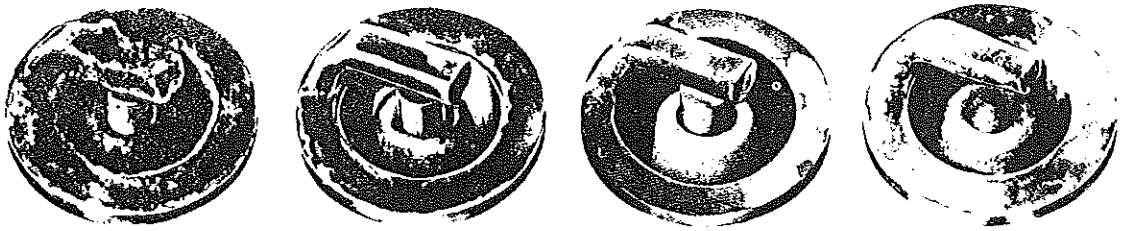
Test have shown the plug listed in the "General Specifications" section in the "General Information" chapter to be the best plug for general use.

Since spark plug requirements change with the ignition and carburetion adjustments and with riding conditions, whether or not a spark plug of a correct heat range is used should be determined by removing and inspecting the plug.

Spark Plug



Spark Plug Condition



Carbon Fouling | Oil Fouling | Normal Operation | Overheating

When a plug of the correct heat range is being used, the electrodes will stay hot enough to keep all the carbon burned off, but cool enough to keep from damaging the engine and the plug itself. This temperature is about 400 – 800°C (750 – 1,450°F) and can be judged by noting the condition and color of the ceramic insulator around the center electrode. If the ceramic is clean and of a light brown color, the plug is operating at the right temperature.

A spark plug for higher operating temperatures is used for racing. Such a plug is designed for better cooling efficiency so that it will not overheat and thus is often called a "colder" plug. If a spark plug with too high a heat range is used – that is, a "cold" plug that cools itself too well – the plug will stay too cool to burn off the carbon, and the carbon will collect on the electrodes and the ceramic insulator.

The carbon on the electrodes conducts electricity, and can short the center electrode to ground by either coating the ceramic insulator or bridging across the gap. Such a short will prevent an effective spark. Carbon build-up on the plug can also cause other troubles. It can heat up red-hot and cause preignition and knocking, which may eventually burn a hole in the top of the piston.

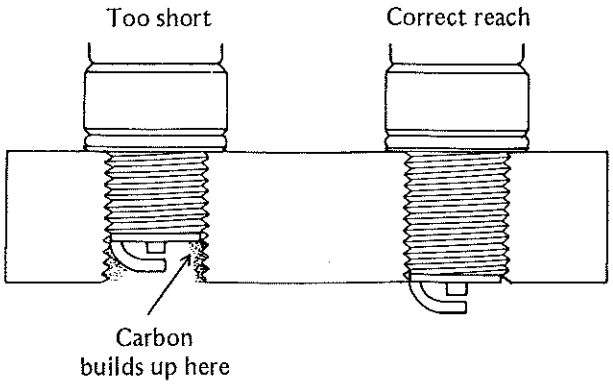
Spark Plug Inspection

- Remove the spark plug and inspect the ceramic insulator.
- ★Whether or not the right temperature plug is being used can be ascertained by noting the condition of the ceramic insulator around the electrode. A light brown color indicates the correct plug is being used. If the ceramic is black, it indicates that the plug is firing at too low a temperature, so the next hotter type (NGK B8ES) should be used instead. If the ceramic is white, the plug is operating at too high a temperature and it should be replaced with the next colder type.

CAUTION

- **If the spark plug is replaced with a type other than the standard plug, make certain the replacement plug has the same thread pitch and reach (length of threaded portion) and the same insulator type (regular type or projected type) as the standard plug.**
- **If the plug reach is too short, carbon will build up on the plug hole threads in the cylinder head, causing overheating and making it very difficult to insert the correct spark plug later.**
- **If the reach is too long, carbon will build up on the exposed spark plug threads causing overheating, preignition, and possibly burning a hole in the piston top. In addition, it may be impossible to remove the plug without damaging the cylinder head.**

Plug Reach



Standard Spark Plug Threads

Diameter	:	**14 mm**
Pitch	:	**1.25 mm**
Reach	:	**19.0 mm**

NOTE

- *The heat range of the spark plug functions like a thermostat for the engine. Using the wrong type of spark plug can make the engine run too hot (resulting in engine damage) or too cold (with poor performance, misfiring, and stalling). The standard plug has been selected to match the normal usage of this motorcycle in combined street and highway riding. Unusual riding conditions may require a different spark plug heat range. For racing, install the colder plug.*

Trouble shooting Guide

NOTE

○This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties. Electrical trouble-shooting is not covered here due to its complexity. For electrical problems, refer to the appropriate heading in Electrical System.

Engine Doesn't Start; Starting Difficulty

Engine won't turn over
- Cylinder, piston seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or crankcase bearing seizure
- Kickstarter return spring broken
- Kick ratchet gear not engaging

No fuel flow
- No fuel in tank
- Sticking of the valve in valve in the automatic fuel tap
- Fuel tap vacuum hose clogged
- Tank cap air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged

Engine flooded
- Float level too high
- Float valve worn or stuck open
- Starting technique faulty
- (When flooded, kick with the throttle fully open to allow more air to reach the engine)

No spark, spark weak
- Ignition switch not on
- Engine stop switch turned off
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- Ignition coil damaged
- Ignition coil register open
- CDI unit broken
- Pickup coil broken or maladjusted
- Flywheel magneto damaged
- Pulser rotor damaged
- Ignition or engine stop switch shorted
- Wiring shorted or open

Fuel/air mixture incorrect
- Throttle stop screw maladjusted
- Pilot jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Air cleaner duct loose
- Starter jet clogged

Compression low
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken, or sticking)
- Piston ring/land clearance excessive
- Cylinder head gasket or base gasket damaged
- Cylinder head not sufficiently tightened down
- Cylinder head warped
- Spark plug loose
- Crankshaft oil seal deteriorated or damaged
- Reed valve damaged
- Rotary valve cover oil seal deteriorated or damaged
- Rotary valve cover large O-ring deteriorated or damaged

Poor Running at Low Speed

Spark weak
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- Ignition coil damaged
- CDI unit broken pickup coil broken or maladjusted
- Flywheel magneto damaged
- Pulser rotor damaged

Fuel/air mixture incorrect
- Throttle stop screw maladjusted
- Carburetors not synchronizing
- Pilot jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Air cleaner duct loose
- Starter plunger stuck open
- Float level too high or too low
- Fuel tank air vent obstructed

Compression low
- Cylinder, piston worn
- Piston ring bad (worn, weak, broken or sticking)
- Piston ring/land clearance excessive
- Cylinder head gasket or base gasket damaged
- Cylinder head not sufficiently tightened down
- Cylinder head warped
- Spark plug loose
- Crankshaft oil seal deteriorated or damaged
- Reed valve damaged
- Rotary valve cover oil seal deteriorated or damaged
- Rotary valve cover large O-ring deteriorated or damaged

Poor Running No Power at High Speed

Firing incorrect
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- Ignition coil damaged
- Ignition timing malfunction
- Ignition coil register open
- CDI unit broken
- Pickup coil broken or maladjusted

Fuel/air mixture incorrect
- Main jet clogged or wrong size
- Jet needle or needle jet worn
- Jet needle clip in wrong position
- Float level too high or too low

Air jet or air passage clogged
Air cleaner clogged, poorly sealed, or missing
Starter plunger stuck open
Fuel to carburetor insufficient
Water or foreign matter in fuel
Fuel tank air vent obstructed
Fuel line clogged
Fuel tap clogged
Air cleaner duct loose

Compression low
Cylinder, piston worn
Piston ring bad (worn, weak, broken, or sticking)
Piston ring/land clearance excessive
Cylinder head gasket or base gasket damaged
Cylinder head not sufficiently tightened down
Cylinder head warped
Sprak plug loose
Crankshaft oil seal deteriorated or damaged
Reed valve damaged
Rotary valve cover oil seal deteriorated or damaged
Rotary valve cover large O-ring deteriorated or damaged

Oil and fuel/air mixture incorrect
Oil pump cable maladjusted
Throttle control cable maladjusted
Crankshaft oil seal deteriorated or damaged
Rotary valve cover oil seal deteriorated or damaged
Rotary valve cover large O-ring deteriorated or damaged
No oil in oil tank
Oil pump damaged
Oil line or check valve clogged
Air in oil pump or oil line

Engine rpm will not rise properly
Starter plunger stuck open
Float level too high or too low
Main jet clogged
Throttle valve does not fully open
Air cleaner clogged
Muffler clogged
Water or foreign matter in fuel
Cylinder exhaust port clogged
Brake dragging
Clutch slipping
Overheating
Transmission oil level too high
Transmission oil viscosity too high
Crankshaft bearing worn or damaged

Knocking
Ignition timing malfunction
Carbon built up in combustion chamber
Fuel poor quality or inccorect
Spark plug incorrect

Overheating

Firing incorrect
Spark plug dirty, damaged, or maladjusted
Ignition timing malfunction

Fuel/air mixture incorrect
Main jet clogged or wrong size
Float level too low
Air cleaner clogged
Air cleaner duct loose

Oil and fuel/air mixture incorrect
Throttle control cable maladjusted
No oil in oil tank
Oil pump damaged
Oil line or check valve clogged
Air in oil pump or oil line

Compression high
Carbon built up in combustion chamber

Engine load faulty
Clutch slipping
Transmission oil level too high
Brake dragging

Gauge incorrect
Water temperature gauge broken
Water temperature sensor broken

Coolant incorrect
Coolant leve too low
Coolant deteriorated

Cooling system component incorrect
Radiator clogged
Thermostat trouble
Radiator cap trouble
Water pump not rotating
Water pump impeller damaged

Over Cooling

Gauge incorrect
Water temperature gauge broken
Water temperature sensor broken

Cooling stystem component incorrect
Thermostat trouble

Fuel and Oil Consumption Excessive

Idle too fast
Throttle stop screw maladjusted
Throttle control cable catching or poorly adjusted

Fuel/air mixture too rich
Jet needle or needle jet worn
Starter plunger stuck open
Float level too high
Air cleaner clogged

Compression low
Cylinder, piston worn
Piston ring bad (worn, weak, broken, or sticking)
Piston ring/land clearance excessive
Cylinder head gasket or base gasket damaged
Cylinder head not sufficiently tightened down
Cylinder head warped
Spark plug loose
Crankshaft oil seal deteriorated or damaged
Reed valve damaged
Rotary valve cover oil seal deteriorated or damaged
Rotary vlave cover large O-ring deteriorated or damaged

Exhaust obstructed
Muffler clogged
Cylinder exhaust port clogged

Engine load faulty
Clutch slipping
Transmission oil level too high
Brake dragging

Clutch Operation Faulty

Clutch slipping
No clutch lever play
Friction plate worn or warped
Steel plate worn or warped
Clutch spring weak
Clutch cable maladjusted
Clutch inner cable catching
Clutch release mechanism trouble
Clutch hub or housing unevenly worn

Clutch not disengaging properly
Clutch lever play excessive
Clutch plate warped or too rough
Clutch spring tension uneven
Transmission oil deteriorated
Transmission oil viscosity too high
Clutch housing gear frozen on drive shaft
Clutch release mechanism trouble

Gear Shifting Faulty

Doesn't into gear; shift pedal doesn't return
Clutch not disengaging
Shift fork bent or seized
Shift return spring weak or broken
Shift lever broken
Shift return spring pin loose
Shift pawl spring broken
Set levers binding
External shift mechanism arm pawl worn

Jumps out of gear
Shift fork worn
Gear groove worn
Gear dogs, holes, and/or recesses worn
Shift drum groove worn
Shift drum set lever spring weak or broken
Shift fork guide pin or collar worn
Drive shaft, output shaft, and/or gear splines worn

Overshifts
Shift drum set lever spring weak or broken

Abnormal Engine Noise

Knocking
Ignition timing malfunction
Carbon built up in combustion chamber
Fuel poor quality or incorrect
Overheating
Spark plug incorrect

Piston slap
Cylinder/piston clearance excessive
Cylinder, piston worn
Connecting rod bent
Piston pin, piston pin hole worn

Other noise
Connecting rod small end clearance excessive
Connecting rod big end clearance excessive
Piston ring worn, broken, or stuck
Piston seizure or damaged
Cylinder head gasket leaking
Exhaust pipe leaking at cylinder connection
Crankshaft runout excessive
Engine mount loose
Crankshaft bearing worn

Abnormal Drive Train Noise

Clutch noise
Primary gear cam damper damaged
Clutch rubber damper deteriorated
Clutch housing/friction plate clearance excessive
Clutch housing gear/primary gear backlash excessive
Metal chip jammed in clutch housing gear teeth

Transmission noise
Crankcase bearing worn
Transmission gear worn or chipped
Metal chip jammed in gear teeth
Transmission oil insufficient or too thin
Kick ratchet gear not properly disengaging from kick gear
Kick idle gear worn or chipped

Drive chain noise
Chain worn
Rear and/or engine sprocket(s) worn
Chain lubrication insufficient
Rear wheel misaligned

Abnormal Frame Noise

Front fork noise
Oil insufficient or too thin
Spring weak or broken

Rear shock absorber noise
Shock absorber damaged

Disc brake noise
Pad installed incorrectly
Pad surface glazed
Disc warped
Caliper damaged
Cylinder damaged

Other noise
Bracket, nut, bolt, etc. not properly mounted or tightened

Exhaust Smoke

Excessive white smoke
Oil pump cable maladjusted
Throttle control cable maladjusted
Engine oil poor quality or incorrect
Crankshaft oil seal damaged
Rotary valve cover oil seal deteriorated or damaged

Rotary valve cover large O-ring deteriorated or damaged

Brownish smoke
Air cleaner clogged
Main jet too large or fallen off
Starter plunger stuck open
Float level too high

Handling and/or Stability Unsatisfactory

Handlebar hard to turn
Control cable routing incorrect
Wiring routing incorrect
Steering stem locknut too tight
Bearing roller damaged
Bearing race dented or worn
Steering stem lubrication inadequate
Steering stem bent
Tire air pressure too low

Handlebar shakes or excessively vibrates
Tire worn
Swing arm bushing or needle bearing damaged
Rim warped
Front, rear axle runout excessive
Wheel bearing worn
Handlebar clamp loose

Handlebar pulls to one side
Frame bent
Wheel misalignment
Swing arm bent or twisted
Swing arm pivot shaft runout excessive
Steering stem bent
Front fork leg bent
Right/left front fork oil level uneven

Shock absorption unsatisfactory
(Too hard)
Front fork oil excessive
Front fork oil viscosity too high
Front fork air pressure too high
Tire air pressure too high
Rear suspension maladjusted
(Too soft)
Front fork oil insufficient and/or leaking
Front fork oil viscosity too low
Front fork air pressure too low
Front fork, rear shock absorber spring(s) weak
Rear shock absorber oil leaking
Rear shock absorber gas leaking

Brake Doesn't Hold

Disc brake
Air in the brake line
Pad or disc worn
Brake fluid leak
Brake plunger of AVDS damaged
Disc warped
Contaminated pad
Brake fluid deteriorated
Primary cup or secondary cup damaged
Master cylinder scratched inside

Battery Discharged

Battery faulty (e.g., plates sulphated, shorted through sedimentation, electrolyte level too low)
Battery lead making poor contact
Regulator/rectifier damaged
Ignition switch damaged
Load excessive (e.g., bulb of excessive wattage)
Flywheel magneto damaged
Stator coil open or short
Wiring faulty

Battery Overcharged

Battery damaged
Regulator/rectifier trouble

General Lubrication

Lubrication

●Before lubricating each part, clean off any rusty spots with rust remover and wipe off any grease, oil, dirt, or grime.

●Lubricate the points listed below with indicated lubricant.

NOTE

○*Whenever the vehicle has been operated under wet or rainy conditions, or especially after using a high-pressure spray water, perform the general lubrication.*

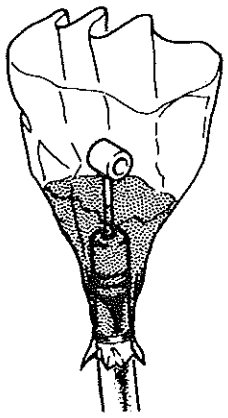
Pivots: Lubricate with Motor Oil.
- Side Stand
- Clutch Lever
- Brake Lever
- Brake Pedal Shaft
- Rear Brake Rod Joint
- Kick Pedal

Points: Lubricate with Grease.
- Throttle Inner Cable Lower End
- Oil Pump Inner Cable Lower End
- Speedometer Inner Cable*

*Grease the lower part of the inner cable sparingly.

Cables: Lubricate with Motor Oil.
- Choke Cable
- Throttle Control Cable
- Oil Pump Cable

Cable Lubrication



Nut, Bolt, and Fastener Tightness

Tighteness Inspeciton

●Check the tightness of the bolts and nuts listed here. Also, check to see that each cotter pin is in place and in good condition.

NOTE

○*For the engine fasteners, check the tightness of them when the engine is cold (at room temperature).*

○If there are loose fasteners, retorque them to the specified torque following the specified tightening sequence. Refer to the appropriate chapter for torque specifications. If torque specifications are not in the appropriate chapter, see the Standard Torque Table. First loosen each fastener by ½ turn, then tighten it.

★If cotter pins are damaged, replace them with new ones.

Nut, Bolt, and Fastener to be checked
- Wheels:
  - Front Axle Nut
  - Front Axle Clamp Bolts
  - Rear Axle Nut
  - Chain Adjuster Clamp Bolts
- Brakes:
  - Front Master Cylinder Clamp Bolts
  - Front Caliper Mounting Bolts
  - Rear Master Cylinder Mounting Bolt
  - Rear Caliper Holder Fixing Bolt
  - Rear Caliper Holder Collar Bolt
  - Brake Lever Pivot Nut
  - Brake Pedal Bolt
  - Brake Rod Joint Cotter Pin
- Suspension:
  - Front Fork Clamp Bolts
  - Front Fender Mounting Bolts and Nuts
  - Rear Shock Absorber Mounting Bolts
  - Swing Arm Pivot Shaft Nut
  - Uni-trak Link Nuts
  - Swing Arm Holder Mounting Bolts
- Steering
  - Stem Head Nut
  - Handlebar Holder Bolts
  - Handlebar Holder Clamp Bolts
- Engine:
  - Engine Mounting Bolts
  - Cylinder Head Bolts
  - Muffler Mounting Nuts
  - Muffler Mounting Bolts
  - Clutch Lever Pivot Nut
- Others:
  - Side Stand Bolt
  - Front Footpeg Mounting Bolts
  - Rear Frame Mounting Bolts
  - Footpeg Bracket Mounting Bolts

Standard Torque Table

This table relating tightening torque to thread diameter, lists the basic torque for bolts and nuts. Use this table for only the bolts and nuts which do not require a specific torque value. Refer to each chapter for reference to these features. All of the values are for use with dry solvent-cleaned threads.

General Fasteners

Threads dia. (mm)	Torque		
	N-m	kg-m	ft-lb
5	3.4 – 4.9	0.35 – 0.50	30 – 43 in-lb
6	5.9 – 7.8	0.60 – 0.80	52 – 69 in-lb
8	14 – 19	1.4 – 1.9	10.0 – 13.5
10	25 – 34	2.6 – 3.5	19.0 – 25
12	44 – 61	4.5 – 6.2	33 – 45
14	73 – 98	7.4 – 10.0	54 – 72
16	115 – 155	11.5 – 16.0	83 – 115
18	165 – 225	17.0 – 23	125 – 165
20	225 – 325	23 – 33	165 – 240

Unit Conversion Table

Prefixes for Units:

Prefix	Symbol	Power
mega	M	x 1,000,000
kilo	k	x 1,000
centi	c	x 0.01
milli	m	x 0.001
micro	μ	x 0.000001

Units of Mass:

kg	x	2.205	=	lb
g	x	0.03527	=	oz

Units of Volume:

L	x	0.2642	=	gal (US)
L	x	0.2200	=	gal (imp)
L	x	1.057	=	qt (US)
L	x	0.8799	=	qt (imp)
L	x	2.113	=	pint (US)
L	x	1.816	=	pint (imp)
mL	x	0.03381	=	oz (US)
mL	x	0.02816	=	oz (imp)
mL	x	0.06102	=	cu in

Units of Force:

N	x	0.1020	=	kg
N	x	0.2248	=	lb
kg	x	9.807	=	N
kg	x	2.205	=	lb

Units of Length:

km	x	0.6214	=	mile
m	x	3.281	=	ft
mm	x	0.03937	=	in

Units of Torque:

N-m	x	0.1020	=	kg-m
N-m	x	0.7376	=	ft-lb
N-m	x	8.851	=	in-lb
kg-m	x	9.807	=	N-m
kg-m	x	7.233	=	ft-lb
kg-m	x	86.80	=	in-lb

Units of Pressure:

kPa	x	0.01020	=	kg/cm^2
kPa	x	0.1450	=	psi
kPa	x	0.7501	=	cm Hg
kg/cm^2	x	98.07	=	kPa
kg/cm^2	x	14.22	=	psi
cm Hg	x	1.333	=	kPa

Units of Speed:

km/h	x	0.6214	=	mph

Units of Power:

kW	x	1.360	=	PS
kW	x	1.341	=	HP
PS	x	0.7355	=	kW
PS	x	0.9863	=	HP

Units of Temperature:

$$\frac{9\,(°C + 40)}{5} - 40 = °F \qquad \frac{5\,(°F + 40)}{9} - 40 = °C$$