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भारतीय मानक मसौदा

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(पहला पुनरीक्षण)

Draft Indian Standard

**GLOSSARY OF AERONAUTICAL AND ASTRONAUTICAL TERMS
PART 8 POWER PLANT**

(First Revision)

ICS 49.020

**Air and Space Vehicles Sectional
Committee, TED 14**

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FOREWORD

This Indian Standard is one of the series of Indian Standards on glossary of terms pertaining to aeronautical and astronautical fields. The other Indian Standards published in this series are:

IS 7879 (Part 1) : 1975 Under Revision (Doc No. 20706)	Glossary Of Aeronautical And Astronautical Terms Part 1 General
IS 7879 (Part 2) : 1975 Under Revision (Doc No. 20708)	Glossary Of Aeronautical and Astronautical Terms Part 2 Motion of Aircraft
IS 7879 (Part 3) : 1975 Under Revision (Doc No. 20757)	Glossary of Aeronautical and Astronautical Terms Part 3 Structure
IS 7879 (Part 4) : 1980 Under Revision (Doc No. 20759)	Glossary of Aeronautical and Astronautical Terms Part 4 Aerodynamics
IS 7879 (Part 5) : 1982 Under Revision (Doc No. 20760)	Glossary of Aeronautical and Astronautical Terms Part 5 Aerodynes (Heavier - Than - Air - Aircraft)

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IS 7879 (Part 8): 2023

IS 7879 (Part 6) : 1978 Under Revision (Doc No. 20763)	Glossary of Aeronautical and Astronautical Terms Part 6 Space Terms
IS 7879 (Part 7) : 1984 Under Revision (Doc No. 21135)	Glossary of Aeronautical and Astronautical Terms Part 7 Air Traffic and Ground Services
IS 10041 : 1981 Under Revision (Doc No. 20768)	A Glossary of Terms — Airlines technical operations

The present standard provides standard definition of technical terms relating to power plant including gas turbines.

Each term has been assigned a 4-digit number. The first one (or two) digit, in the thousandth place, represents the part number. This part number with the following digit in the hundredth place represents the section. The last two digits represents the position of the definition within a section, thus, the term 8215 is the 15th definition of Section 82 which is Part 8.

This standard was first published in 1987. The present revision has been taken up with a view to incorporating the modifications found necessary as a result of experience gained on the use of this standard. Also, in this revision, the standard has been brought into the latest style and format of Indian Standard, and references to Indian Standards, wherever applicable have been updated.

The following International Standards available on the subject have been referred by the technical committee in the course of preparation of this standard:

- a) BS 185 'Aeronautical and Astronautical Terms'.

The composition of the Committee responsible for the formulation of this standard is given at Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of test or analysis, shall be rounded off in accordance with IS 2: 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Draft Indian Standard

GLOSSARY OF AERONAUTICAL AND ASTRONAUTICAL TERMS
PART 8 POWER PLANT

1 SCOPE

This Part Covers terms and definitions relating to power plant for aerospace applications. Terms relating to gas turbines and jet propulsion are covered in separate sections.

SECTION 81 MAIN CLASSES OF POWER PLANT

No.	Term	Definition
8101	Composite engine	A combination of two engines of basically different thermodynamic cycles, such as a piston-turbine engine combination. Not to be confused with the general engineering term 'compound engine'
8102	Gas-turbine engine	An engine in which the working fluid is heated by internal combustion and expanded through a turbine.
8103	Jet engine	Any engine that ejects a jet or streams of gas or fluid, obtaining all or most of its thrust by reaction to the engine.
8104	Lift engine	An engine used primarily to provide lifting force on a VTOL or STOL aircraft.
8105	Piston engine	An engine in which the working fluid is expanded in a cylinder against a reciprocating piston.
8106	Ramjet engine AEROTHERMODYNAMIC DUCT (ATHODYD)	An engine producing a jet by burning fuel in air which has been compressed, by forward speed alone, in an appropriately shaped duct and expanded in a nozzle.
8107	Rocket ramjet	A ramjet engine having a rocket attached to it, usually mounted concentrically within the ramjet duct, the rocket being used to bring the vehicle up to the necessary operating speed for the ramjet.
8108	Rocket motor	A device for producing thrust by the ejection of matter, usually in gaseous form, the thrust being generated from propellant carried in the system.
8109	Vectored thrust engine	An engine in which the direction of thrust can be continuously varied.
8110	Aero-engine AIRCRAFT ENGINE	An engine used to provide the main propulsive or lifting power for an aircraft.

SECTION 82 TYPES OF PISTON ENGINE

No.	Term	Definition
8201	Arrow engine	An engine with three rows of cylinders forming, in end view, a broad arrow.
8202	Axial engine	An engine with the axes of its cylinders arranged parallel to the driving shaft.
8203	Compression ignition engine	An engine in which ignition of the working fluid in the cylinder is produced by the heat of compression alone.
8204	H-engine	An engine with its cylinders forming, in end view, the letter 'H'.
8205	In-line engine	An engine with its cylinders arranged in bank(s) from front to rear.
8206	Inverted engine	An engine with its cylinders below the crankshaft (<i>see</i> 8215).
8207	Opposed cylinder engine	An engine with its cylinders arranged opposite each other in the same plane, their connecting rods working on the same crankshaft.
8208	Opposed-piston engine	An engine with two pistons acting in opposition in the same cylinder.
8209	Radial engine	An engine with a row, or rows, of cylinders spaced radially round a common crankshaft, the cylinders being stationary and the crankshaft revolving.
8210	Multi-row radial engine	A radial engine with two or more rows of cylinders.
8211	Rotary engine	An engine with its cylinders equally spaced round a common crankshaft, the crankshaft being stationary and the cylinders revolving.
8212	Supercharged engine	An engine in which the charge pressure in the induction system may be creased, by mechanical means, above that produced by normal aspiration.
8213	Super compression engine	An unsupercharged engine of high compression ratio, which is designed not to be run at full throttle except at or above some predetermined altitude.
8214	V-engine	An engine with its cylinders forming, in end view, the letter 'V'.
8215	Vertical engine	An engine with its cylinders vertically above the crankshaft (<i>see</i> 8206).
8216	X-engine	An engine with its cylinders forming, in end view, the letter 'X'.

Engine Components

Location of Parts

The following are the standard adjectives for the location of parts, the engine being assumed in normal running position with the observer looking along it towards the output shaft end:

Left	Centre	Right
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Front	Middle	Rear
Top	Centre	Bottom

8217	Flame trap (INDUCTION FLAME DAMPER)	A device fitted in the induction system to prevent the passage of flame in the event of a 'backfire' or 'blow-back'.
8218	Junk ring (SEAL RING/GASKET)	A ring for maintaining a gas-tight seal between the cylinder head and the bore of sleeve valve
8219	Maneton piston connecting rods	The detachable short end of a crankshaft in a rotary or radial engine.
8220	Connecting rod assembly	The complete assembly of one or more connecting rods working on one crankpin.
8221	Forked Assembly	An assembly of connecting rods in which one carries the big end bearing and the remainder encircle and oscillate upon a surface formed on the master rod or big-end bearing concentric with the letter.
8222	Master and Articulated Assembly	An assembly of connecting rods in which one carries the big end bearing and the remainder encircle and oscillate upon a surface formed on the master rod or big-end bearing concentric with the letter
8223	Side-By-side Assembly	An assembly of connecting rods in which a number of similar plain connecting rods are arranged successively side-by-side with narrow big-ends usually carrying roller bearings.
8224	Slipper-Type Assembly	An assembly of connecting rods in which each rod has a slipper held in place by flanges, riding on the outer surface of the big-end bearing, or in an annular groove.
8225	Piston Rings Gas Ring (COMPRESSION RING)	A spring ring for maintaining a gas-tight seal between the (COMPRESSION RING) piston and cylinder wall.
8226	Obturator Ring	A gas ring L-shaped in cross section.
8227	Scraper Ring (OIL RING)	Scraper ring A spring ring for removing superfluous oil from the cylinder (OIL RING) wall.
8228	Wrist-Pin (KNUCKLE PIN LINK PIN)	The pin which attaches an articulated connecting rod to the (KNUCKLE PIN LINK PIN) master rod.
CARBURATION		
8229	Accelerator Pump	A mechanism which temporarily enriches the mixture with the opening of the throttle.
8230	Boost Control	A device which so regulates the manifold pressure that a predetermined value is not exceeded.
8231	Variable-Datum Boost Control	A boost control in which the controlled manifold pressure varies progressively with the position of the hand throttle lever.
8232	Boost Control Override	A device to override the boost control so that a pressure higher than the normal controlled pressure can be obtained.

8233	Boost Pressure	The pressure in the induction system at a point standardized for each type of engine, expressed as an amount above or below the standard sea-level atmospheric pressure (See Manifold pressure)
8234	Bulk-Injection Carburetor (PRESSURE INJECTION CARBURETTOR)	A carburetor, which injects the fuel under pressure into the air stream at some point before it is distributed to the cylinders.
8235	Bulk-Injection Pump	A fuel metering pump which carries out the same functions as a bulk injection carburetor.
8236	Direct-Injection Pump	A fuel metering pump which injects the fuel direct into the individual engine cylinders.
8237	Float-Type Carburetor	A carburetor in which the head of the fuel supplied to the jet is controlled by a float and needle valve.
8238	Fuel Trimmer	A mechanism which adjusts the fuel to air ratio for a given throttle setting under different ambient conditions.
8239	Induction Manifold	A branched pipe for distributing the air or air fuel mixture to a number of cylinders.
8240	Intercooler (AFTERCOOLER)	A component installed on the delivery side of a supercharger or compressor to cool either the compressed air or the air fuel mixture. (It is normally driven by engine or by a turbine.)
8241	Mixture Control	A device embodied in the fuel metering system for adjusting the mixture strength.
8242	Automatic Mixture Control	A device for varying, in accordance with changes in air density, the quantity of fuel delivered.
8243	Power Boost	A device or system for increasing temporarily the power of an engine above its normal maximum continuous rating.
8244	Slow-running cut-off (FUEL CUT-OFF)	A device for cutting off the supply of metered fuel.
8245	Water-Injection	The injection of water, usually mixed with an anti-freeze agent such as methanol, into an engine to suppress detonation.
SUPERCHARGERS		
8246	Supercharger	A compressor used to increase the density of the air or mixture supplied to an engine. Normally driven either by the engine or by an exhaust turbine
8247	Axial-Flow Super Charger	A supercharger in which the air or mixture is compressed by an axial flow compressor.
8248	Centrifugal Supercharger	A supercharger in which the air or mixture is compressed by a centrifugal compressor.
8249	Multi Speed Supercharger	A gear driven supercharger in which alternative gear ratios may be engaged.
8250	Multi-Stage Supercharger	A supercharger having two or more stages of compression in series.

8251	Positive-displacement Supercharger	A supercharger in which volumes of air or mixture are isolated and compressed.
8252	Roots Supercharger	A supercharger in which compression is effected by the relative motion of two meshing rotors in a fixed case.
8253	Vane Supercharger	A supercharger in which compression is effected by the motion of vanes carried in a rotor eccentrically located in a fixed case.
Exhaust System		
8254	Exhaust Manifold	A pipe or chamber into which exhaust gases are led from a number of cylinders.
8255	Collector ring (COLLECTOR) Exhaust pipes	An exhaust manifold in the form of a ring, used in radial engines.
8256	Branch Pipe	A short pipe which conveys exhaust gases from a cylinder to an exhaust manifold.
8257	Ejector Pipe	A pipe so disposed or shaped as to produce appreciable forward thrust.
8258	Stub Pipe	A short pipe which discharges the exhaust gases directly from a cylinder directly to atmosphere in the absence of a manifold.
8259	Tail Pipe	A short pipe which discharges the exhaust gases directly from a cylinder directly to atmosphere in the absence of a manifold.
8260	Flame Damper	A device to prevent visual detection of an aircraft by its exhaust flame.
8261	Glare Shield	A device to prevent the pilot's night vision from being impaired by exhaust flames or flow.
8262	Glow Screen	A device for obscuring the glow from hot metal.
8263	Heating Muff	A chamber, surrounding an exhaust pipe or manifold, to provide hot air.
8264	Intensifier Tube	A tube inserted in an exhausted manifold for the purpose of heating air passing through the tube and conveying it to a carburetor for de-icing or anti-icing.
8265	Booster Coil	An induction coil providing a spark to facilitate starting
8266	Impulse Starter	A mechanical device which gives a series of impulses to the magneto to facilitate starting.
8267	Isolating Spark Gap	A spark gap in the H. T. booster lead to prevent feed-back from the magneto.
8268	Screened Ignition	An ignition system in which all components are surrounded by an earthed metallic screen to prevent radio interference therefrom
COOLING SYSTEM		

8269	Ducted Cooling Engine Coolant Radiators	A system in which cooling air is constrained to flow in a duct or ducts to or from the power plant.
8270	Annular radiators Annual radiator	A radiator shaped to fit within a circular cowling and through which the cooling air flows axially.
8271	Ducted Radiator	A radiator installed in a duct.
8272	Honeycomb Radiator	A radiator consisting of a block of tubes between which the coolant circulates.
8273	Leading-Edge Radiator	A surface radiator which forms part of the leading edge of a wing.
8274	Mixed Matrix Radiator	A radiator compounded with an oil cooler so that alternate tubes are used for coolant and oil.
8275	Nose Radiator	A radiator fitted at the front of a fuselage or nacelle.
8276	Ring Radiator	A radiator of circular form through which the cooling air flows radially.
8277	Secondary Surface Radiator	A radiator with the cooling increased by fins.
8278	Series Radiator	A ducted radiator mounted in front of an oil cooler.
8279	Surface Radiator	A radiator in which some part of the surface of the aircraft is adapted for cooling
8280	Under-Wing Radiator	A radiator fitted below a wing
8281	Wing Radiator	A radiator located in a wing.
8282	Evaporative Cooling	A cooling system which utilizes the latent heat of evaporation by allowing the coolant to boil and, after condensation, to return to the cylinder jackets.
8283	Gills (COWLING GILLS)	A set of movable flaps at the rear of a cowling to control the flow of cooling air.

SECTION 83 LUBRICATION, FUEL SYSTEM AND STARTERS

No.	Term	Definition
8301	Lubricating oil coolers Air-intake oil cooler	A cooler incorporated in an air intake.
8302	Ducted Oil Cooler	A cooler installed in a duct.
8303	Mixed-Matrix Cooler Oil	A cooler compounded with a radiator so that alternate tubes are used for coolant and oil.
8304	Multi-Element Cooler Oil	A cooler composed of a number of cooling units.

No.	Term	Definition
8305	Series Oil Cooler	A ducted cooler mounted behind a radiator.
8306	Surface Oil Cooler	A cooler in which some part of the surface of the aircraft is adapting for cooling.
8307	Tank Oil Cooler	A cooler and oil tank combined.
8308	Oil Control Valve	An automatic valve to regulate the performance of an oil cooler, e. g., by-pass, viscosity, thermostatic or anti-surge valve.
8309	Oil Dilution System	A system by which the oil can be diluted to assist cold starting.
8310	Food Pipes	Pipes leading oil from the oil tank to the engine or accessory.
8311	Scavenge Pipe	Pipes leading oil from the oil tank to the engine or accessory.
8312	Tank Vent Pipe	A pipe leading from the air-space in an oil tank to the atmospheric or engine casing.
8313	Pumps Pressure Pump	A pump which supplies oil under pressure to the engine or accessory.
8314	Scavenge Pump	A pump which withdraws used oil from the engine or accessory and returns it to the oil tank.
FUEL SYSTEM		
8315	Avcat	An aviation turbine fuel of the kerosene type with a high flashpoint.
8316	Avgas	An aviation gasoline.
8317	Avtag	An aviation turbine wide cut gasoline.
8318	Avtur	An aviation turbine fuel of the kerosene type.
NOTE — The addition of a figure after the term Avcat or Avtur gives an indication of the maximum freezing point, e.g. Avcat/40 is an Avcat which has a freezing point not higher than -40° C.		
8319	Booster Pump	A fuel pump used to maintain positive pressure in a feed pipe.
8320	Float Mechanism	A float operated mechanism for control of a valve located in a fuel system.
8321	Fluid Level Indicator	A device which gives a remote indication of the level of the fuel in a tank of an aircraft.
8322	Fuel-Jettison Gear Fuel Tanks	Gear for the rapid discharge of fuel in emergency.
8323	Auxiliary Tank	A removable tank in which an additional supply of fuel can be carried.
8324	Drop Tank	An external tank designed to drop in flight when empty.
8325	Gravity Tank	A tank from which the fuel is supply to the engine(s) by gravity alone.

No.	Term	Definition
8326	Integral Tank	Part of the structure of the aircraft adapted to form a tank.
8327	Jettisonable Tank	A tank which can be jettisoned in emergency.
8328	Semi-Integral Tank	A detachable tank which forms part of the aircraft structure when in place.
8329	Inverted Flight Switch	A mechanically operated switch breaks the circuit to a fuel-no-air valve or similar component to interrupt fuel flow from tank to engine during inverted flight.
8330	Recuperator	A vessel in which fuel is stored so as to meet negative acceleration conditions, the fuel being fed into the engine by application of air pressure
8331	Sloshing	Movement to and fro of liquid in its tank, which may adversely affect stability and control of a flying vehicle.
VALVES		
8332	Double Shut-Off Valve	A valve incorporating two separate and independently controlled shut-off devices so that if one fails to operate the other shuts off the flow.
8333	Fuel-No-Air Valve	A device which ensure that, when an engine receives fuel from a pressurized tank, fuel only is admitted to the fuel inlet of the engine regardless of the attitude of the aircraft air or other gases used for pressurizing being excluded.
8334	Jettison Valve	A valve which permits the discharge of fuel overboard in emergency
8335	Pressure Maintaining Valve	A valve which maintains a particular pressure in part of the valve system for some special purpose.
8336	Transfer Valve	A valve which enables fuel to be transferred from one tank to another, particularly during flight. Usually so arranged that, when the fuel in a tank falls below a predetermined level, the valve opens and admits fuel from another tank.
8337	Unidirectional Restrictor Valve	A valve which permits free flow in one direction but restricts flow in the reverse direction.
AIR INTAKES AND GUARDS AIR IN TAKES		
8338	Centre-Body Intake	An air intake whose air duct is formed between an outer skin and inner member known as the centre body, which may be axially movable.
8339	External Compression	An air intake for supersonic operation in which the greater part of the compression occurs in one or more shocks at and upstream of the intake lip.
8340	Internal Compression Intake	An air intake for supersonic operation in which the greater part of the compression occurs in one or more shocks within the intake.

No.	Term	Definition
8341	Multi-Shock Intake	An air intake for supersonic operation in which compression occurs in a number of shocks.
8342	Non-Ramming Intake	An air intake in which the effect of forward speed on intake air pressure is neutralized.
8343	Ramming Intake	An air intake directed forward to increase the intake air pressure.
8344	Single Shock Intake	An air intake for supersonic operation in which compression occurs in only one shock.
8345	Variable Geometry Intake	An air intake whose area or shape can be varied in flight.
8346	Wedge Intake	A variable geometry intake, usually of rectangular form, whose area and shape are defined by the position of one or more variable ramps.
8347	Air Take Casing	A casing through which the air is admitted to the engine.
FILTERS		
8348	Air filter (AIR CLEANER)	An assembly of filter elements in the air intake.
8349	Filter Element	A replaceable component for removing entrained particles from a fluid stream.
8350	Dry-Type Filter Element	A filter element in an air filter, in which the filtration is effected by a dry matrix.
8351	Wet-Type Filter Element	A filter element in an air filter, in which the filtration is effected by a liquid film.
8352	Momentum Separation	The removal of entrained particles from the air stream by utilizing their momentum.
GUARDS		
8353	Ice Guard	A screen fitted to an intake to provide a surface for the adhesion of ice and so prevent its serious accretion in the air intake system.
8354	Gapless-Type Ice Guard	An ice guard fitted in the intake mouth, used in conjunction with an automatic alternative air Inlet.
8355	Gapped-Type Ice Guard	An ice guard mounted forward of the air intake entry to provide a gap which does not ice up.
8356	Intake Air Heater	A device for raising the temperature of the intake air entering the engine.
8357	Plenum Chamber	A chamber, usually fed from a ramming intake, supplying air to the engine or for other purposes.
ENGINE STARTERS		

No.	Term	Definition
8358	Cartridge Starter	A device in which the gases generated in a cartridge are used to rotate an engine for starting. The cartridge may contain an explosive charge, compressed gas or volatile liquid to rotate the compressor for starting the engine.
8359	Combustion Starter	A device in which the hot gases from the combustion of fuel are used to rotate an engine for starting, either directly or by coupling on to a shaft.
8360	Compressed Air Starter (PNEUMATIC STARTER)	A device for starting an engine by utilizing the expansive energy of compressed air stored in the cylinders or otherwise.
8361	Electric Starter	An electric motor used to rotate an engine for starting.
8362	Ground Starter	Any device, not carried in an aircraft, for starting an aero engine.
8363	Hand Starter	A device, embodied in an aero-engine or attached thereto, for rotating the engine by hand, otherwise than by the propeller, for starting.
8364	Inertia Starter	A device by which energy is stored in a small high speed flywheel and, for starting, transmitted to an engine through a slipping clutch, the flywheel being energized either by hand or otherwise.
8365	Internal-COMBUSTION STARTER	An internal combustion engine used to start the main engine.
8366	Turbo-Starter (GASTURBINE STARTER GTS)	A starter incorporating a small turbine energized by compressed air or other gas, with or without combustion.
General Terminology		
8367	Accessory Gearbox	An engine driven gearbox for driving accessories.
8368	Auxiliary Power Unit APU	An independent engine and ancillary equipment to provide power for auxiliary services.
8369	Bootstrap	Applied to a self-sustaining process which needs to be started in operation by outside power or propellant.
8370	Consumption	The total quantity of fuel or oil consumed per hour.
8371	Specific Consumption	<ul style="list-style-type: none"> a) Of engines driving propellers: The quantity by weight of fuel or oil consumed per horsepower per hour; and b) Of jet reaction engines: The weight of propellant or fuel consumed per kilogram (Newton) of thrust per hour.

No.	Term	Definition
8372	Cooling Film Cooling	Evaporative cooling of the inner wall of a combustion chamber or other surface by a coolant injected adjacent to the surface.
8373	Regenerative Cooling	The process of cooling by the circulation of fuel or oxidant, enabling some heat, otherwise wasted, to be recovered.
8374	Sweat Cooling (TRANSPIRATION COOLING)	Evaporative cooling in which the cooling liquid passes through a porous wall and is thereby distributed evenly over the surface to be cooled.
8375	Cowl Flap	A shutter in an aircraft cowl, used to regulate the flow of cooling air around the engine.
8376	Cowling	A cover surrounding the whole or part of a power unit when installed in an aircraft.
8377	Non-Pressure Cowling (SEALED COWLING)	A cowling designed to prevent entry of surrounding air into the engine nacelle.
8378	Pressure Cowling (UNSEALED COWLING)	A cowling in which the pressure of the air is increased, either by ram effect or by a fan.
8379	Engine Rating	A statement of the specified minimum output (horsepower or thrust) under prescribed Conditions and for a prescribed period.
8380	Contingency Rating	A special rating for power or thrust usable in emergency for particular classes of aircraft or conditions of flight and duration.
8381	Intermediate Rating (MAXIMUM RATING, RATING WITH REHEAT)	A special rating for power or thrust usable in emergency for particular classes of aircraft or conditions of flight and duration.
8382	Normal Continuous Rating	This is the highest rating of the engine which may be used for a prescribed period of time in each flight. This rating can include the use of reheat or bypass heat.
8383	Maximum Continuous Rating	The highest rating of the engine which may be used during periods of unrestricted duration, but use of this rating may be detrimental to the authorised life of the engine.
8384	Maximum Lift Rating	The maximum thrust that may be raised by a vectored thrust engine for a prescribed time during vertical or short takeoff or landing.
8385	Maximum Thrust Engine	The maximum thrust for a prescribed time in a vectored thrust engine which can be used at times other than during vertical take-off or landing.
8386	Flame Front	The boundary of a burning zone in a combustible mixture.
8387	Flame Holder (FLAME STABILIZER)	A device inserted in a moving fuel-air mixture, designed to stabilize a flame.

No.	Term	Definition
8388	Height Power Factor	The ratio of the power or thrust developed at a specified altitude to that which would be developed at standard sea level. It applies to maximum power or thrust conditions at full throttle.
8389	Paired Engines	Two completely independent engines mounted close together.
8390	Power unit	An engine or assembly of two or more engines, as fitted into an aircraft, complete with all components and accessories.
8391	Coupled-engine power unit	A power unit containing engines coupled together to drive a common shaft.
8392	Double-engine power unit	A power unit containing two engines driving co-axial propellers.
8393	Right-hand (or clockwise) accessories	An accessory rotating clockwise to an observer facing the accessories driven end, to mate with an anti-clockwise drive.
8394	Right-hand (or clockwise) drive	A drive rotating clockwise to an observer facing the driving end.
8395	Weights dry weight	The weight of an engine without liquid, but including all accessories essential to its running and any drives incorporated in it for non-essential accessories.
8396	Weight per horsepower	The dry weight of an engine divided by its maximum permissible Horsepower.
8397	Weight per bound thrust	The dry weight of an engine divided by the maximum permissible thrust under standard sea level conditions.

SECTION 84 GAS TURBINES AND JET PROPULSION
(Location of Parts)

The following are the standard adjectives for the location of parts, the engine being assumed in normal running position with the observer looking along it towards the intake:

Left	Centre	Right
Front	Middle	Rear
Top	Centre	Bottom

TYPES OF GAS TURBINE AND TURBINE COMPONENTS

8401	Afterburner	A combustion chamber in which additional fuel is injected into the hot exhaust gases of turbine type engine, reheating them and developing increased thrust.
Gas Turbines		
8402	Axial-flow turbine	A turbine through which the general direction of flow is axial.
8403	Compressor turbine	The turbine which drives the compressor as distinct from that which drives an output shaft.
8404	Impulse turbine	A turbine in which the whole of the pressure drop or working fluid expansion occurs in the fixed nozzle or blade passages.
8405	Inward-flow turbine	A turbine in which the general direction of flow is radially inwards with axial outlet, and the pressure drop in the working fluid is caused largely by the action of centrifugal force during passage through the rotating member
8406	Radial-flow turbine	A turbine which functions by the action of the working fluid on rows of rotating blades in conjunction with nozzles, or rows of fixed blades, the general direction of flow being radial.
8407	Reaction turbine	A turbine in which the whole or part of the pressure drop or working fluid expansion occurs in the moving blade passage.
8408	Interheater	A combustion-chamber unit situated between the turbine stages, to provide additional power.
8409	Main rotor	The complete assembly of the rotating parts of the compressor and turbine.
8410	Nozzle guide ring	A ring of stationary guide-vanes, which accelerate the gas and direct it onto a row of rotating turbine blades.
8411	Turbine disc	The rotating member of which the blades of an axial-flow turbine are carried.
8412	Turbine entry duct	A duct leading the products of combustion to the turbine.
8413	Turbine rotary shroud Turbine Tip Shroud	A complete or segmented band mounted on the tip of the rotor blade, sometimes formed by lips projecting tangentially from the blade tips.
8414	Turbine static shroud Turbine Shroud Ring	A ring used to prevent the escape of gas past the tips of the blades in an axial flow turbine.
8415	Turbine wheel	A ring used to prevent the escape of gas past the tips of the blades in an axial flow turbine.
Compressor System		
8416	Axial flow compressor	A compressor in which the air is compressed by its passage axially past rows of blades alternately rotating and either fixed or contra rotating.

8417	Centrifugal compressor	A compressor in which the compression is initiated by the passage of the air radially outwards through an impeller and into a diffuser.
8418	Mixed-flow compressor	A rotary compressor through which the acceleration of fluid is partly radially and partly axial.
8419	Single-entry compressor	A rotary compressor through which the acceleration of fluid is partly radially and partly axial.
8420	Double-entry compressor	A compressor in which air is admit to both sides of the impeller, or to both ends of the rotating member.
8421	Compressor bleed	A passage through which compressed air is duct away from the compressor to perform an auxiliary service.
8422	Compressor blow off	An arrangement to discharge air from any stage of a compressor to prevent the compressor stalling when operating away from its design conditions, e.g. during acceleration.
8423	Compressor casing	A casing enclosing the impeller or rotating member.
8424	Compressor diffuser	A ring of fixed vanes, or one or more expansion passages, situated in the compressor delivery to assist in the conversion of the kinetic energy of the air into pressure energy.
8425	Compressor drum	A cylinder, or series of connected discs, upon which the rotating blades of an axial-flow compressor are mounted,
8426	Compressor stage	A compressor, or part of a compressor, consisting of one row of rotating and one row of fixed blades in an axial-flow machine or one impeller and its associated diffuser in a centrifugal machine.
8427	Compressor stall	A condition in a rotary air compressor in which some of the blades or vanes of some stages meet the air flow at such an angle that the flow is distributed which may lead to break down or discontinuity of flow and unsatisfactory operation of a gas turbine engine.
8428	Impeller	The rotating member of a centrifugal compressor, carrying suitably shaped vanes.
8429	Impeller inter cooler	A heat exchanger installed in between the stages of compressor to cool the compressed air.
8430	Vanes Refrigerant injection	The injection of a refrigerant (for example, water, an alcohol or mixtures thereof) into the working fluid before, during or after compression to enhance the performance of the engine.
8431	Vanes inlet guide- vanes AIR-INTAKE GUIDEVANES	Radial or circumferential vanes fitted in the air intake.
8432	Rotating guide vanes	Curved extensions of the impeller vanes projecting into, or adjacent-to the throat of the air intake casing.

8433	Toroidal guide vane	A flared annular guide-vane in an air-intake casing to guide the incoming air evenly over the entire area of the impeller intake.
Fuel Supply and Combustion Systems		
8434	Barometric fuel control Aerometric Pressure Control	A device which, with changes in atmospheric pressure, regulates the flow in the fuel manifold, by varying the delivery of a fuel pump.
8435	Barostatic relief valve Barostat	A device, which with changes in atmospheric pressure, regulates the pressure supplied, and thereby the flow in the fuel manifold, by means of spill through a relief valve.
8436	Burner	A device for injecting a spray Of fuel Into the combustion Chamber. This may be fixed or variable orifice type. In American practice, the term may include the whole combustion chamber.
8437	Duplex burner	A burner with alternative fuel entries and a single exit orifice.
8438	Simplex burner	A burner with a single fuel entry and a single exit orifice.
8439	Spill burner	A burner in which a portion of the entering fuel is recirculated instead of passing into the combustion chamber.
8440	By pass heat	Combustion in the by-pass air of a by-pass or ducted-fan turbine engine to provide additional thrust.
8441	Characteristic chamber length	The length of a straight tube of constant cross-sectional length area equal to that of the throat of the given chamber, the enclosed volume of the tube being equal to that contained within the combustion chamber of the given rocket engine between the injection face and the throat.
8442	Combustion chamber	A chamber in which combustion occurs. This may be a simple chamber or contain one or more flame tubes.
8443	Flame tube	A tube within a combustion chamber, in which combustion occurs.
8444	Flame out	Unintentional cessation of combustion in a jet or gas turbine engine.
8445	Fuel accumulator	A device for storing fuel, during a portion of the starting cycle, in order to augment the flow momentarily when a predetermined fuel pressure has been reached,
8446	Fuel control unit	A device for controlling the fuel supply to an engine in accordance with pilot demand, ambient conditions and engine limitations.
8447	Fuel manifold (Fuel Fedded manifold)	A main pipe with a series of branch pipes distributing fuel to the burners.
Fuel Feeder Manifold		
8448	Fuel pressure switch	A device which ensures that full current is not applied to the electric starter motor until fuel pressure has reached a predetermined figure.

8449	Igniter plug	An electric discharge plug for igniting the fuel when starting the turbine.
8450	Torch igniter	A combined igniter plug and fuel atomizer for initiating combustion when starting the turbine.
8451	Interconnector	A pipe connecting adjacent combustion chambers or flame tubes.
8452	Minimum pressure valve	A device which prevents the burner fuel pressure from falling below a predetermined value.
Idling Control Valve		
8453	Primary holes	Holes through which a portion of the airflow is passed into a flame tube for the early stage of combustion.
8454	Secondary holes	Holes through which air is passed into a flame tube downstream of the primary holes to stabilize the flame and to complete combustion.
8455	Holes tertiary	Holes through which air is passed into a flame tube downstream of the secondary holes to dilute the hot gas and so to reduce its temperature.
8456	Reheat AFTERBURNING	Combustion after the last turbine stage to provide additional thrust.
8457	Return flow system	A combustion system in which the entering air and the emerging gas flow in opposite directions.
8458	Straight flow system	A combustion system in which the entering air passing into the flame tube or combustion chamber.
8459	Swirl-vane	A vane used to impart a swirling motion to the air passing into the flame tube or combustion chamber.
Exhaust System		
8460	Eyelids CLAMSHELL SHUTTERS	Two hinged shutters, suggesting eyelids in appearance and action; used to control the flow of the exhaust gases in a jet propulsion engine.
8461	Exhaust cone	An assembly which leads the exhaust gases from the annular turbine discharge to the jet pipe. It usually consists of two main parts, an inner and an outer cone, mounted concentrically with the turbine wheel.
8462	Exhaust stator-blades	An assembly of stator-blades situated behind the turbine discharge to remove residual whirl from the exhaust gases.
8463	Insulation plate	An assembly of stator-blades situated behind the turbine discharge to remove residual whirl from the exhaust gases.
8464	Jet pipe	A pipe which leads the exhaust gases from the exhaust cone to the propelling nozzle on turbojets.
8465	Jet silencer	A device incorporated with the propelling nozzle to reduce the noise from the jet.
8466	Serrated nozzle	A jet silence consisting of a nozzle whose exit area is in the form of radially disposed slots.
8467	Propelling nozzle	The nozzle attached to the rear end of the jet pipe or to the exhaust cone or to the by-pass duct to increase the velocity of discharged gases.

8468	Convergent nozzle	A propelling nozzle whose cross-sectional area diminishes progressively towards its exit.
8469	Convergent Divergent Nozzle	A propelling nozzle whose cross-sectional area diminishes nozzle to a throat of minimum area and increases again towards the exit.
CONDI-NOZZLE		
8470	Centre-body nozzle PLUG NOZZLE BULLET NOZZLE	A propelling nozzle in which gas passes between an outer skin and an inner body, usually arranged in such a way as to create a convergent-divergent passage. The centre-body may be fixed or axially moveable.
8471	Ejector shroud	A shroud arranged around the exit of a propelling nozzle to produce an induced flow of air.
8472	External expansion nozzle	A propelling nozzle in which the supersonic expansion occurs wholly or partially downstream of the walls of the nozzle.
8473	Internal expansion nozzle	A propelling nozzle, generating supersonic velocity in which the expansion occurs completely within the wall of the nozzle.
8474	Two-stream nozzle	A propelling nozzle into which a second gas stream is introduced either at the start of or during the supersonic expansion.
8475	Variable-area propelling nozzle	A propelling nozzle in which the flow area can be varied to nozzle Thrust reverser obtain optimum engine operating conditions.
8476	Thrust reverser	A controllable device mounted at or on the propelling nozzle to reverse the jet thrust.
8477	Thrust spoiler	A controllable device mounted at or on the propelling nozzle to reduce the jet thrust.
MISCELLANEOUS TERMS		
8478	By-pass ratio	In a by-pass or ducted-fan turbine engine, the ratio of the by-pass airflow to the high pressure or combustion airflow.
8479	Diffuser buzz	An oscillatory shock motion and airflow associated with the shock system ahead of the inlet; very rapid pressure pulsations are produced, which can affect the behavior of engines.

8480	Engine speed	The revolutions per minute of the main or other specified rotor assembly.
8481	Gas generator	<ul style="list-style-type: none"> a) A gas turbine engine which supplies a flow of hot gas under pressure for use elsewhere; and b) The high-pressure compressor, combustion chamber and turbine of a by-pass or ducted fan engine.
8482	Gag turbine engines bypass turbine engine	A gas turbine engine in which a proportion of intake air is diverted from the compressor into a duct such that it by-passes the combustion and turbine sections and is reintroduced into the jet stream.
8483	Compound turbine engine	A gas turbine engine in which the compression of the intake air is performed in stages in a number of mechanically separate compressors each of which is driven by a separate turbine.
8484	Two-shaft engine (Two spool Engine)	A two-stage compound turbine engine.
8485	Contra-flow turbine	A gas turbine engine in which the turbine and compressor blades are integral or adjacent, and the working fluid flows in opposite directions through the respective passages of the two sets of blades.
8486	Ducted-fan turbine (ENGINE TURBO-FAN)	A gas turbine engine in which a portion of the net energy is used to drive a ducted fan. 'It may be front or rear fan and the by-pass airflow may either be mixed with the high pressure or combustion airflow or be discharged directly from the fan.
8487	Free turbine engine	A gas turbine engine in which the turbine driving the output shaft is not coupled to a compressor rotor.
8488	Single shaft engine	A gas turbine engine in which the output shaft is coupled to a compressor rotor.
8489	Turbojet (JET TURBINE ENGINE)	A gas turbine engine in which the net energy available is utilized by the air or hot gas solely in the form of a jet issuing through a propelling nozzle.
8490	Turboprop engine (PROPELLER TURBINE ENGINE)	A gas turbine engine in which a proportion of the net energy is used to drive a propeller.

8491	Turboshaft engine	A gas turbine engine in which a proportion of the net energy is used to drive a main output shaft other than driving a propeller or ducted fan.
8492	Powered lift	Lift derived from the downward displacement of air by a jet engine or power-driven rotor.
8493	Jet lift	Lift for the purpose of V/ST OL derived from the lift engine or vectored thrust engines.
8494	Lift fan	A fan on VTOL aircraft, installed with its axis substantially vertical, solely to provide lift.
8495	Pulse jet engine intermittent jet engine	An engine producing a pulsating jet by burning fuel in air in such a way that the compression due to forward speed is augmented by the pressure waves within the unit, the pulsation being produced by intermittent closing of the intake or by other means.
8496	Rotating stall	A form of blade stall in which the stall condition moves around the blade row.
	Thrust	
8497	Net (standard) thrust	The force in the direction of motion deducted from the resolved components of the normal pressures on the inside of the pre-entry stream tube and on the internal surface of the duct.
8498	Dry thrust	The net thrust obtained from a gas turbine engine without using after burning (reheat).
8499	Gross (standard) thrust	The force which occurs in a gas turbine engine by the reaction to the momentum of exhaust gases at the exit place of the propelling nozzle inclusive of the pressure thrust.
8500	Static thrust	In a jet propulsion engines, the net thrust available with no translational motion under prescribed conditions.
8501	Vectored thrust	Net thrust obtained in the specified direction of jet nozzle(s) of gas turbine engine through which compressed air and or the exhaust gas is flowing.
8502	Specific thrust	Thrust developed by engine per unit mass flow of air inducted into the engine.
8503	Reheat thrust	Augmented thrust of an engine obtained by the introduction and burning of fuel between the engine turbine and the jet pipe propelling nozzle utilising the unburnt oxygen in the exhaust gas.
8504	Ground idling thrust	Net thrust available at ground idling speed under prescribed conditions.

ANNEX B

(Foreword)

COMMITTEE COMPOSITION

AIR AND SPACE VEHICLES SECTIONAL COMMITTEE SECTIONAL COMMITTEE, TED 14

<i>Organization</i>	<i>Representative(s)</i>
IN Personal Capacity	SHRI DILIP B BHATT (<i>Chairman</i>)
Adani Aerospace and Defence Limited, Bengaluru	SHRI SAMPATHKUMARAN S T
Aeronautical Development Agency, Bengaluru	SHRI D K P SINHA SHRI RAMMOHAN V KAKI (<i>Alternate</i>)
Aeronautical Development Establishment, Bengaluru	SHRI A VAMSIKRISHNA SHRI RANJITH T (<i>Alternate</i>)
Air India, New Delhi	SHRI MATHEW PANICKER
Airports Authority of India, New Delhi	SHRI D DILIP KUMAR
Bharat Dynamics Limited, Hyderabad	SHRI J K MISHRA SHRI KV SUBBA REDDY (<i>Alternate</i>)
CSIR - National Aerospace Laboratories, Bengaluru	SHRI VEERA SESA KUMAR SHRI S RAVISHANKAR (<i>Alternate</i>) DR. SAPTHAGIRI G (<i>Alternate</i>)
Centre for Military Air worthiness and Certification, Bengaluru	SHRI P JAYAPAL SHRI R KAMALAKANNAN (<i>Alternate</i>)
Defence Research and Development Organization, Research Centre Imarat, Hyderabad	DR. S KARUNANIDHI SHRI SSSBS SUBBA RAO (<i>Alternate</i>)
Department of Defence Production, Ministry of Defence, New Delhi	SHRI ARINDAM CHAUDHARY
Directorate General of Aeronautical Quality Assurance, Ministry of Defence, New Delhi	SHRI SANJAY KUMAR SHARMA SHRI MUKESH CHAND MEENA (<i>Alternate</i>)
Directorate General of Civil Aviation, New Delhi	SHRI BHARAT LAL SHRI VEERENDRA KUMAR KABIR (<i>Alternate</i>) SHRI ASEEM KUMAR
Directorate of Naval Air Material, Ministry of Defence	SHRI D D DARKE SHRI R RAJESH (<i>Alternate</i>)
GAIL (India) Limited, New Delhi	SHRI KAUSHIK DAS

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<i>Organization</i>	<i>Representative(s)</i>
Gas Turbine Research Establishment, Bengaluru	SHRI G DEVEANANDA SHRI D NAGARAJU (<i>Alternate</i>)
Godrej Aerospace, Mumbai	SHRI AMOL BANSI THORAT
HQ Maintenance Command, Indian Air Force	SHRI F J D'SOUJA SHRI V. K. GOEL (<i>Alternate</i>)
Hindustan Aeronautics Limited, Bengaluru	SHRI PRATAP PANDA SHRI SUSHIL KUMAR (<i>Alternate</i>)
Indian Institute of Science, Bengaluru	DR. SATISH L. DR. L. UMANAND (<i>Alternate</i>) DR. SUBBA REDDY B (<i>Alternate</i>)
Indian Institute of Technology Madras, Chennai	PROF. HARISHANKAR RAMCHANDRAN
Indian National Space Promotion and Authorisation Centre (IN-SPACE), Ahmedabad	SHRI PARAGJYOTI GARG
Indian Space Research Organization - U R Rao Satellite Centre, Bengaluru	SHRI RAGHAVENDRA KULKARNI SHRI RAYAN KUTTY P P (<i>Alternate</i>)
Indian Space Research Organization - Vikram Sarabhai Space Centre, Thiruvananthapuram	SHRI P. RAMKUMAR SHRI JAYAKUMAR M SHRI GOVIND (<i>Alternate</i>)
Indian Space Research Organization, Bengaluru	DR. A K ANIL KUMAR SHRI MANISH SAXENA (<i>Alternate</i>)
Larsen and Toubro Limited, Mumbai	SHRI LAXMESH B.H. SHRI JAMBUNATHAN G (<i>Alternate</i>)
Society of Indian Aerospace Technologies and Industries, Bengaluru	SHRI FRANCIS XAVIER
Sundram Fasteners Limited, Chennai	SHRI ATUL KUMAR AGRAWAL
In personal capacity	SHRI MANOHAR SIDANA
In personal capacity	SHRI S C SHRIMALI
BIS Directorate General	SHRI P.V. SRIKANTH, SCIENTIST 'D' & HEAD (TED) [REPRESENTING DIRECTOR GENERAL (EX-OFFICIO)]

MEMBER SECRETARY
MR. SHIVAM AGGARWAL
SCIENTIST C / DEPUTY DIRECTOR
(TRANSPORT ENGINEERING DEPARTMENT)