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Gas turbines—Vocabulary

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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal of establishing a Japanese Industrial Standard from Japan Internal Combustion Engine Federation (JICEF)/Japanese Standards Association (JSA), with a draft being attached based on the provision of Article 12 Clause 1 of the Industrial Standardization Law. This Standard has been made based on **ISO 11086:1996** *Gas turbines—Vocabulary* for the purposes of making it easier to compare this Standard with International Standard; to prepare Japanese Industrial Standard conforming with International Standard; and to propose a draft of an International Standard which is based on Japanese Industrial Standard. Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

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In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

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Gas turbines—Vocabulary

Introduction This Japanese Industrial Standard has been prepared based on the first edition of **ISO 11086** *Gas turbines—Vocabulary* published in 1996 in such a manner that the corresponding parts (terms and definitions) in the corresponding International Standard are contained without modifying the technical contents and the items not specified in the corresponding International Standard complementarily are provided as a part of the Japanese Industrial Standard.

The portions sidelined or underlined with dots are the matters in which the contents of original International Standard have been modified. A list of modification with the explanations is given in annex 2 (informative).

1 Scope This Standard specifies essential terms used in gas turbines in general usage, i.e. industrial use, petroleum gas industry use, marine use, distributed energy system use, combined cycle and cogeneration system use, generation system use such as emergency use and so on, and gas turbine use in general such as machine driving use.

Remarks 1 The terms used in gas turbine in general, those are specified in **JIS B 0128:1995** for the detailed terms, shall reference the Standard.

2 The terms recognized as necessary other than the terms specified in corresponding International Standard are added.

3 The International Standard corresponding to this Standard is as follows.

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

ISO 11086:1996 *Gas turbines—Vocabulary* (MOD)

2 Normative references The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. If the indication of the year of coming into effect is given to these referred standards, only the edition of indicated year constitutes the provision of this Standard but the revision and amendment made thereafter are not applied. The normative references without the indication of the year of coming into effect apply only to the most recent edition (including amendments).

JIS B 0128:1995 *Thermal power plant—Gas turbine and auxiliary equipment—Vocabulary*

JIS B 8042-2 *Gas turbines—Procurement—Part 2: Standard reference conditions and ratings*

Remarks : **ISO 3977-2:1997** *Gas turbines—Procurement—Part 2: Standard reference conditions and ratings* is equivalent to the said standard.

JIS B 8042-3 *Gas turbines—Procurement—Part 3: Design requirements*

Remarks : **ISO 3977-3:2002** *Gas turbines—Procurement—Part 3: Design requirements* is equivalent to the said standard.

JIS B 8042-4 *Gas turbines—Procurement—Part 4: Fuels and environment*

Remarks : **ISO 3977-4:2002** *Gas turbines—Procurement—Part 4: Fuels and environment* is equivalent to the said standard.

JIS B 8042-9 *Gas turbines—Procurement—Part 9: Reliability, availability, maintainability and safety*

Remarks : **ISO 3977-9:1999** *Gas turbines—Procurement—Part 9: Reliability, availability, maintainability and safety* is equivalent to the said standard.

JIS B 8043-1 *Gas turbines—Exhaust gas emission—Part 1: Measurement and evaluation*

Remarks : **ISO 11042-1:1996** *Gas turbines—Exhaust gas emission—Part 1: Measurement and evaluation* is equivalent to the said standard.

JIS B 8044 *Gas turbines and gas turbine sets—Measurement of emitted airborne noise—Engineering/survey method*

Remarks : **ISO 10494:1993** *Gas turbines and gas turbine sets—Measurement of emitted airborne noise—Engineering/survey method* is equivalent to the said standard.

JIS W 0201 *Standard atmosphere*

Remarks : **ISO 2533:1975** *Standard atmosphere* and **ISO 2533:1975/ Addendum 1:1985** *Hypsometrical tables* is identical with the said standard.

JIS Z 8732 *Acoustics—Determination of sound power levels of noise sources using sound pressure—Precision methods for anechoic and hemi-anechoic rooms*

Remarks : **ISO/DIS 3745:2000** *Acoustics—Determination of sound power levels of noise sources—Precision methods for anechoic and semi-anechoic rooms* is identical with the said standard.

3 Classification of terms Classification of terms concerning to gas turbines is in the following articles.

- a) Gas turbine—general
- b) Gas turbine—efficiency
- c) Combined cycle and cogeneration system
- d) Auxiliaries and others

Remarks : Terms and definitions specified in clauses **6 to 10**, **11 to 15**, **16 to 20** and **21 to 25** in **ISO 11086:1996** shall be referenced corresponding to clauses **3 (2)**, **(3)**, **(4)** and **(10)** in **JIS B 0128:1995** respectively. Terms specified in other clauses in **ISO 11086:1996**, and not contained in this Standard shall be referenced to **JIS B 0128:1995** (see annex 1).

4 Terms and definitions The terms and definitions are as follows.

Words in common use are shown for reference.

- Remarks
- 1 In the column of terms, words placed in parentheses may be omitted unless such omission introduces any ambiguity.
 - 2 Illustrations of some terms are shown in annex for an explanation, and in those cases the numbers of annex and figure are shown in each definition column.
 - 3 English equivalents printed in boldface show the terms specified in corresponding International Standard.
 - 4 Numbers of term are assigned as for this standard, and they are not the same with the numbers of terms specified in corresponding International Standard. Comparison table of numbers are as shown in annex 1 (informative).

a) **Gas turbine—general**

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1001	ガスタービン	GASU TÂBIN	Rotating machine which converts thermal energy into mechanical work, consisting of a compressor(s), a thermal device(s) which heat(s) the working fluid, a turbine(s), a control system, and auxiliary equipment such as heat exchanger, if necessary. Used as a power plant of generation use, machine driving use, etc. Examples of gas turbine structural elements are shown in annex A figures 1 to 5.		gas turbine
1002	ガスタービンプラント	BASU TÂBIN PURANTO	Power plant which consists of gas turbine, driven machine and all essential equipment necessary for the production of power.		gas turbine power plant
1003	開放サイクル	KAIHÔ SAIKURU	Thermodynamic cycle in which the working fluid enters the gas turbine from the atmosphere and is discharged into the atmosphere.		open-cycle
1004	内燃ガスタービン	NAINEN GASU TÂBIN	Gas turbine in which fuel is directly injected into the combustion chamber and the combustion takes place within the working fluid.		internal combustion gas turbine
1005	単純サイクル	TANZYUN SAIKURU	Thermodynamic cycle consisting only of successive compression, combustion and expansion.		simple cycle
1006	再生サイクル	SAISEI SAIKURU	Thermodynamic cycle employing exhaust heat recovery, consisting of successive compression, regenerative heating, combustion, expansion and regenerative cooling (heat transfer from the exhaust to the compressor discharge fluid) of the working fluid.		regenerative cycle

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1007	中間冷却サイクル	TYŪKAN REIKYAKU SAIKURU	Thermodynamic cycle employing cooling of the working fluid between stages of successive compression.		intercooled cycle
1008	再熱サイクル	SAINETU SAIKURU	Thermodynamic cycle employing the addition of heat to the working fluid between stages of expansion.		reheat cycle
1009	一軸形ガスタービン	ITIZIKUGATA GASU TÂBIN	Gas turbine in which compressor and rotary shaft of turbine is mechanically connected and the power is delivered directly or through change gear (see annex A figures 1, 2 and 5).		single-shaft gas turbine
1010	多軸形ガスタービン	TAZIKUGATA GASU TÂBIN	Gas turbine in which two or more turbine elements rotate mechanically independently of each other, including free-turbine type and compound type (see annex A figures 3 and 4). In the case of two shafts, for example, is called two-shaft gas turbine.		multi-shaft gas turbine
1011	定置(式)ガスタービン	TEITI (SIKI) GASU TÂBIN	Gas turbine employed as a stationary energy source and not readily movable.		stationary gas turbine
1012	移動(式)ガスタービン	IDÔ (SIKI) GASU TÂBIN	Gas turbine employed as a stationary energy source but readily movable.		mobile gas turbine
1013	抽気ガスタービン	TYŪKI GASU TÂBIN	Gas turbine which has a main purpose to supply compressed air, extracted from the inter stage of compressor or the outlet of compressor, or high temperature gas, extracted from the inlet of gas turbine or the inter stage of turbine, to the outside (see annex A figure 5).		extraction gas turbine, bled gas turbine

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1014	ヘビーデューターイガスタービン	HEBÎ DYÛTEI GASU TÂBIN	Gas turbine which is designed for land use or for marine use, and is assumed to be operated for a long period and continuously at a rated load.	ZYÛKÔZÔGATA GASU TÂBIN, SANGYÔYÔ GASU TÂBIN	heavy-duty gas turbine
1015	航空駆用(形)ガスタービン	KÔKÛ TEN'YÔ (GATA) GASU TÂBIN	Gas turbine which is changed the design from aircraft use to land use or to marine use, or, using this as gas generator, and combining with power turbine, is changed to land use or to marine use.	KÔTENGATA GASU TÂBIN	aero-derivative gas turbine
1016	パッケージ形ガスタービン	PAKÊZIGATA GASU TÂBIN	Gas turbine in which gas turbine and principal auxiliaries are constructed into one body unit (package) at the manufacturer and shipped. Driven machine may be included.		package type gas turbine
1017	マイクロガスタービン	MAIKURO GASU TÂBIN	Very small gas turbine of output, generally, from several kW to 100 kW or so. There are many different cases from the former gas turbine from the viewpoint of construction, such as one-piece rotor, air bearing, one-piece driven machine and so on, and when taking to this point, this term is used. Ultraminiaturer gas turbine of more small output and several tens mm in diameter may be called ultra-micro gas turbine.		micro gas turbine
1018	船舶用ガスタービン	SENPAKUUYÔ GASU TÂBIN	Gas turbine which is used for marine driving power. Power generating gas turbine used for onboard power source may be included. Being used in the salty atmosphere of ocean air, countermeasures for marine use, such as anti-corrosion coating and so on, are mostly applied.		marine gas turbine

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1019	機械駆動用ガスタービン	KIKAI KUDÔYÔ GASU TABIN	Gas turbine which is used for driving driven machines such as compressor and pump other than generator. Generally it is used for the wide range of rotational speed, and multi-shaft gas turbine is generally applied.		mechanical drive gas turbine
1020	発電用ガスタービン	HATUDEN'YÔ GASU TABIN	Gas turbine which is used for driving generators. Generally it is used for a constant rotational speed, and single-shaft gas turbine is generally applied.		generator drive gas turbine, power generation gas turbine
1021	非常用ガスタービン	HIZYÔYÔ GASU TABIN	Gas turbine which is used for supplying disaster prevention electrical power or motive power at the time of emergency. There are for the use of electric power and of pump.		emergency gas turbine
1022	結合機関	KETUGÔ KIKAN	Gas turbine which is used for marine driving power, and especially for the wide power range, is combined the output power using gear equipment and so on with the engine other than the gas turbine, with the gas turbine of different output, or with plural gas turbines of the same output.		combined engine
1023	CODOG	SÎ-Ô-DÊ-Ô-ZÎ	Combined engine of gas turbine and diesel engine, and uses the diesel engine for low output driving and uses gas turbine for high output driving.		combined diesel engine or gas turbine
1024	CODAG	SÎ-Ô-DÊ-Ê-ZÎ	Combined engine of gas turbine and diesel engine, and uses the diesel engine for low output driving and uses gas turbine and diesel engine for high output driving.		combined diesel engine and gas turbine

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1025	COGOG	ŚÎ-Ô-ZÎ-Ô-ZÎ	Combined engine of high power gas turbine and low power gas turbine, and uses the low power gas turbine for low output driving and uses the high power gas turbine.		combined gas turbine or gas turbine
1026	COGAG	ŚÎ-Ô-ZÎ-Ê-ZÎ	Combined engine of high power gas turbine and low power gas turbine, and uses the low power gas turbine for low output driving and uses the high and the low power gas turbine. There is a case to combine plural of the same output gas turbines.		combined gas turbine and gas turbine
1027	タービン	TÂBIN	Component of a gas turbine, and rotary machine which produces mechanical power from the expansion of the working fluid.		turbine
1028	圧縮機	ASSYUKUKI	Component of a gas turbine, and rotary machine which increases pressure of the working fluid.		compressor
1029	燃焼器	NENSYÔKI	Component of a gas turbine, in which fuel reacts with the working fluid directly to raise its temperature. There is also a combustion chamber for reheat.		combustion chamber, combustor
1030	ガス発生器	GASU HASSEIKI	Assembly of gas turbine components that produces heated pressurized gas to a process or to a power turbine. It consists of one or more compressors, thermal device(s) associated with the working fluid, one or more compressor driving turbines, a control system, and essential auxiliary equipment.		gas generator

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1031	再生用熱交換器	SAISEIYÔ NETU KÔKANKI	Heat exchanger in which heat is transferred from one working fluid at the stage before entering into the combustion chamber. There are regenerator type and recuperator type.		regenerator, recuperator
1032	前置冷却器	ZENTI REIKYAKUKI	Heat-exchanger or evaporative cooler which reduces the temperature of the working fluid prior to its initial compression.		precooler
1033	中間冷却器	TYÛKAN REIKYAKUKI	Heat-exchanger or evaporative cooler that reduces the temperature of the working fluid between stages of compression.		intercooler
1034	出力タービン	SYUTURYOKU TÂBIN	Turbine which produces power output through an independent rotary shaft to drive load (see annex A figure 3).		power turbine
1035	圧縮機タービン	ASSYUKUKI TÂBIN	At the multi-shaft gas turbine, turbine which is used to drive a compressor.	GASU HASSEIKI TÂBIN	compressor turbine, gas generator turbine
1036	排熱回収装置	HAINETU KAISYÛ SÔTI	Equipment to recover the effective heat from the exhaust gas of gas turbine or holding heat of cooling water.		heat recovery facility
1037	回転方向	KAITEN HÔKÔ	Direction of rotation of the gas turbine's rotor when viewed in the direction of flow of the working fluid.		direction of rotation
1038	自立運転	ZIRITU UNTEN	Generally used as a term expressing one operating stage of starting cycle of gas turbine, and means the condition that the gas turbine can continue the acceleration without receiving any running torque from starting equipment.		self sustaining operation

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1039	冷却運転	REIKYAKU UNTEN	Operating mode of the gas turbine in which the hot parts of the gas turbine are allowed to cool more or less slowly to prevent thermal shock damage.		cooling down
1040	暖気運転	DANKI UNTEN	Operating mode of the gas turbine in which the hot temperature parts of the gas turbine will be prevented from sudden temperature raise to operate around the idling speed for a while after starting.		warming up
1041	起動曲線	KIDÔ KYOKUSEN	Diagram that presents the change of such as rotary speed, pressure, temperature and load along the stage of starting, speed-raising, load input and load raising of gas turbine.		starting characteristics diagram
1042	起動	KIDÔ	Act of getting the gas turbine and its driven equipment from the ready-to-start condition to the ready-to-load condition.		start
1043	通常起動	TÛZYÔ KIDÔ	Act of starting the gas turbine in the manner as recommended by the manufacturer for normal maintenance intervals.		normal start
1044	急速起動	KYÛSOKU KIDÔ	Act of starting the gas turbine in a possible optional fast mode that may have an adverse effect on maintenance and/or engine life.		fast start
1045	自立起動, ブラックスタート	ZIRITU KIDÔ, BURAKKU SUTÂTO	Act of starting the gas turbine using no external source of power.		black start
1046	強制冷却運転	KYÔSEI REIKYAKU UNTEN	Spin operation aiming to cool down of the high temperature parts of gas turbine.		forced cooling operation
1047	スピン運転, クランキング	SUPIN UNTEN, KURANKINGU	Gas turbine operation mode driven only by a starting equipment without fuel feeding.	MÔTARINGU	spin operation, cranking

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1048	ターニング	TĀNINGU	After the gas turbine is stopped, rotate the rotor slowly by the turning equipment, to prevent the strain of gas turbine and the driven equipment rotor, and/or to reduce the bending of the shaft before starting.	BARINGU	turning
1049	点火	TENKA	Act of energizing the igniters and so on to begin the burning of fuel.		ignition
1050	着火	TYAKKA	The condition that fuel starts burning by ignitor.		light-off
1051	起動時間	KIDŌ ZIKAN	Length of time for the gas turbine to go from the ready-to-start condition to the ready-to load condition. For some application like machine driving system, length of time to go to the beforehand decided minimum load and speed. Remarks: This time is determined in a large part by the driven equipment.		starting time
1052	コーストダウン	KÔSUTO DAUN	Condition between the fuel stop and gas turbine shaft complete stop after the gas turbine shut down.		coast down
1053	昇負荷時間	SYÔHUKA ZIKAN	Length of time for the gas turbine to go from the ready-to-load condition to full load.		loading time
1054	通常停止	TŪZYŌ TEISI	Gas turbine shut down by a prescribed operation.		normal shut down
1055	非常停止	HIZYŌ TEISI	Gas turbine immediate shut down by a manual or automatic operation to prevent or minimize the danger to human bodies or the danger of machines destroy.		emergency shut down

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1056	自動停止	ZIDÔ TEISI	Gas turbine shut down process operated by control equipment full automatically, operates starting by an operator's single operation.		automatic shut down
1057	手動停止	SYUDÔ TEISI	Gas turbine shut down process operated by operator's starting operation of each stages or controlling operations.		manual shut down
1058	ロードランバック	RÔDORAN BAKKU	Sudden load reduction from load operation to self sustaining operation or to idling operation, perceiving a specified trip signal (see JIS B 8042-9).		trip to idle
1059	コールドスタート	KÔRUDO SUTÂTO	Starting at the condition of metallic material of gas turbine being about room temperature.	REIKI KIDÔ, REITAI KIDÔ	cold start
1060	ホットスタート	HOTTO SUTÂTO	Starting at the condition of metallic material of gas turbine being high temperature such as just after the gas turbine shut down.	DANKI KIDÔ, ONTAI KIDÔ	hot start
1061	ハングアップ	HANGU APPU	A phenomenon for an aero-derivative gas turbine that the rotational speed at starting does not rise for reasons of such as gas temperature abnormal at starting and stall of compressor.		hung up
1062	ストール	SUTÔRU	A phenomenon of a compressor operation being unstable for reason of separation of an air flow from moving blade or stationary blade of compressor.		(compressor) stall
1063	アクティブストール 制御	AKUTIBU SUTÔRU SEIGYO	A control system of gas turbine stall phenomenon prevention actively that may happen to perceive the compressor of gas turbine getting near to the stall condition corresponding to the stall phenomenon happens to the compressor of gas turbine.		active stall control

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1064	(排気)バイパス制御	(HAIKI) BAIPASU SEIGYO	A control system of damper for by-pass chimney installed for achieving the gas turbine independent operation when a heat recovery facility and so on install exhaust gas side.		by-pass control
1065	オンコンディショニング メンテナンス	ON KONDISYON MENTENANSU	A generic term of maintenance work to plan or perform according the degree or tendency of damage making diagnoses the condition of specified parts, elements and assembly of gas turbine, by watching parameter during operation.		on condition maintenance
1066	二種燃料運搬	NISYU NENRYÔ UNTEN	An operation burning two kinds of fuel (combinations of liquid fuel, gaseous fuel and so on).		bi-fuel operation
1067	高温腐食	KÔON HUSYOKU	A phenomenon that erode metallic materials by formation of rather low melting point in the combustion chamber and accumulating on the surface of turbine blade, by vanadium, sodium or sulphur compound in fuel, or by salt in atmosphere.		hot corrosion
1068	エロージョン	ERÔZYON	Material abrasion by mechanical impact of solid particle in the working fluid.		erosion
1069	FOD	EHU-Ô-DÊ	Some parts' damage of gas turbine caused by passing of the materials other than the gas turbine.		foreign object damage
1070	SOD	ESU-Ô-DÊ	Some parts' damage of gas turbine caused by passing of a part of materials of the gas turbine itself.		self object damage

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1071	精密鑄造	SEIMITU TYŪZŌ	Casting process of no need of finishing process nor less allowance for machining using lost-wax process and so on, and is applied for high temperature part of gas turbine which is difficult to machining.		precision casting
1072	多結晶翼	TAKESSYŌ YOKU	Turbine blade having multicrystal grain, consisting of many directions of crystal.		equiaxial crystal bucket, conventional casting bucket
1073	一方向凝固翼	ITIHŌKŌ GYŌKO YOKU	Turbine blade having columnar grain solidified in one direction, and produced by precision casting.		directionally solidified bucket, columnar grain bucket
1074	単結晶翼	TANKESSYŌ YOKU	Turbine blade having no grain boundary and consists of one crystal, and produced by precision casting.		single crystal bucket
1075	複合材料	HUKUGŌ ZAIRYŌ	Composite material that is a complex of plural materials to make it possible to obtain some kinds of character such as higher specific strength and so on that can't be obtained by unity materials. There are fiber reinforced type and particle reinforced type made of long fiber and short fiber respectively. For gas turbine constructing parts, fiber reinforced materials made by long fiber are widely used.		composite material
1076	繊維強化プラスチック (複合材料)	SEN'I KYŌKA PURASUTIKKU (HUKUGŌ ZAIRYŌ)	Composite material that the basic material of plastics such as epoxy resin and polymer are reinforced with fiber of such as glass and carbon. It is used for the lower temperature part or relatively lower to medium temperature part of gas turbine. Material using glass fiber is called GFRP, and material using carbon fiber is called CFRP.	EHU-ĀRU-PĪ, PĪ-EMU-SĪ	fiber reinforced plastics, plastics matrix composite

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1077	繊維強化金属 (複合材料)	SEN'I KYÔKA KINZOKU (HUKUGÔ ZAIRYÔ)	Composite material that the basic metal of such as aluminium and titanium are reinforced with fiber of carbon and so on. It is used for the lower temperature part or medium to higher temperature part of gas turbine.	EHU-ÂRU-EMU, EMU-EMU-SÎ	fiber reinforced metal, metal matrix composite
1078	繊維強化セラミックス (複合材料)	SEN'I KYÔKA SERAMIKKU (HUKUGÔ ZAIRYÔ)	Composite material that ceramics as the basic metal are reinforced with such as metal and fiber of ceramics. It is used for the higher temperature part of gas turbine.	EHU-ÂRU-SÎ, SÎ-EMU-SÎ	fiber reinforced ceramics, ceramics matrix composite
1079	繊維強化超合金 (複合材料)	SEN'I KYÔKA TYÔGÔKIN (HUKUGÔ ZAIRYÔ)	Composite material that superalloy as the basic metal is reinforced with fiber of metal and so on. It is used for the extremely higher temperature part of gas turbine.	EHU-ÂRU-ESU, ESU-EMU-SÎ	fiber reinforced superalloy, superalloy matrix composite
1080	炭素繊維強化炭素 (複合材料)	TANSO SEN'I KYÔKA TANSO (HUKUGÔ ZAIRYÔ)	Composite material that the basic metal of carbon materials are reinforced with fiber of carbon. It is used for the extremely higher temperature part of gas turbine.	KÂBON/KÂBON HUKUGÔ ZAIRYÔ	carbon-carbon composite
1081	セラミックス	SERAMIKKUSU	Sintered materials at high temperature whose essential component is such as aluminium oxide (Al ₂ O ₃), silicon carbide (SiC) and silicon nitride (Si ₃ N ₄). It is used for the lower temperature part or higher temperature part of gas turbine.		ceramics
1082	焼結超合金	SYÔKETU TYÔGÔKIN	Sintered materials of powder of superalloy at high temperature. It is used for the higher temperature part of gas turbine.		powder metallurgy alloy
1083	金属間化合物	KINZOKUKAN KAGÔBUTU	Inter-metallic compound of such as aluminium and titanium. It is used for the medium or higher temperature part of gas turbine.		inter-metallic compound

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1084	拡散接合	KAKUSAN SETUGÔ	Bonding method of parts of titanium alloy and so on by metallic diffusion with heating in vacuum and pressing the bonding surface.		diffusion bonding
1085	摩擦接合, 摩擦溶接	MASATU SETUGÔ, MASATU YÔSETU	Bonding method of metallic parts by metal melting by frictional heat with pressing and causing friction.		friction bonding, friction welding
1086	電子ビーム溶接	DENSI BÎMU YÔSETU	Bonding method of bonding surface of metallic parts at the limited part by welding with heating by narrow and high-speed electron flow beam.		electron beam welding
1087	比強度	HIKYÔDO	Intensity such as tensile strength and yielding strength divided by density of material. It is used for an index to express enduring strength characteristic of materials used for the part of rotor construction of gas turbine.		specific strength
1088	遮熱コーティング	SYANETU KÔTEINGU	Coating performed on the surface of high temperature parts such as turbine and combustion chamber to reduce the metal temperature by its heat resistance.		thermal barrier coating
1089	空気冷却	KÛKI REIKYAKU	Cooling method of high temperature parts such as turbine and combustion chamber using air as medium.		air cooling
1090	蒸気冷却	ZYÔKI REIKYAKU	Cooling method of high temperature parts such as turbine and combustion chamber using steam as medium. In combined-cycle, generally, high temperature steam is guided to bottoming cycle after cooled to recover the exhausted heat.		steam cooling

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1091	クリアランスコントロール	KURIARANSU KONTORÔRU	Mechanical control system of clearance between the top of moving blade and stationary blade of turbine (tip clearance) by cooling or heating the stationary side. May be applied for compressor.		tip clearance control
1092	(乾式)低NO _x 燃焼器	(KANSIKI) TEI NOKKUSU NENSYÔKI	Combustion chamber whose burning temperature is restrained to low level to keep the emission of nitrogen oxides to low. There are such as premixed combustion, lean mixture combustion, two stage combustion and catalytic combustion.		lower emissions combustor , (dry) low NO _x combustor
1093	天然ガス	TEN'NEN GASU	Combustible gas produced from the earth naturally, whose main component is methane. It is used for the fuel of gas turbine and so on.		natural gas
1094	液化天然ガス	EKIKA TEN'NEN GASU	Natural gas liquefied at cryogenic temperature. It is used for the fuel of gas turbine after re-evaporation.		liquefied natural gas
1095	副生ガス	HUKUSEI GASU	Combustible gas obtained as by-products of petrochemistry process, the gas main components are such as hydrogen and methane, and is used for the fuel of gas turbine also.		by-product gas
1096	液化石油ガス	EKIKA SEKIYU GASU	Hydrocarbon gas, whose main components are propane or butane, liquefied by pressure or by cooling. Gas being at ordinary temperature and ordinary pressure, and easily liquefied by cooling and pressurized. It is used for the fuel of gas turbine as liquid as it is or as gas after re-evaporation.		liquefied petroleum gas
1097	バイオマス燃料	BAIOMASU NENRYÔ	Fuel obtained from biological resource such as raw garbage and small chip of wood.		biomass fuel, biofuel

No.	Term (Japanese character)	Reading	Definition	Informative	
				Words in common use	English equivalent
1098	消化ガス	SYÔKA GASU	Combustible gas, whose main component is methane, obtained from the fermentation of microscopic organism from sludge sewage. It may be used for the fuel of gas turbine and so on.		digestive gas
1099	温度パターンファクタ	ONDO PATÂN FAKUTA	The value of the difference between the maximum temperature of working fluid and the average temperature at the exit of combustion chamber divided by the temperature rise at combustion chamber.		temperature pattern factor
1100	ウオッベ指数	UOBBE SISÛ	The value of the calorific value of fuel divided by the root of specific weight to air of fuel. For the detail, see JIS B 8042-4. $WI = \frac{HC}{\sqrt{\rho_{gas}(P, T) / \rho_{air}(P_{ref}, T_{ref})}}$ where, WI : Wobbe index (kJ/m³) HC : heat output of fuel by combustion (kJ/m³) ρ_{gas} : density of fuel gas (kg/m³) ρ_{air} : density of air (kg/m³) P : pressure of fuel gas (kPa) P_{ref} : air pressure at the standard reference condition, 101.3 kPa T : temperature of fuel gas (°C) T_{ref} : temperature of air at the standard reference condition, 15 °C		Wobbe index