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**Glossary of terms used in
construction of pressure vessels**

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by High Pressure Institute of Japan (HPI)/ Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS B 0190**:1986 is replaced with this Standard.

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Glossary of terms used in construction of pressure vessels

1 Scope

This Japanese Industrial Standard specifies terms and definitions common to construction of pressure vessels.

2 Classification

The glossary of terms used in construction of pressure vessels shall be classified as follows.

- a) Design
- b) Member and shape
- c) Material
- d) Welding and working
- e) Test and inspection

3 Terms and definitions

The terms and definitions shall be as follows.

In addition, English equivalent is shown for reference.

a) **Design**

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
1101	計算厚さ	KEISAN ATUSA	required thickness according to the strength calculation formula of JISs concerning pressure vessels, but not including the corrosion allowance	calculated thickness
1102	最小制限厚さ	SAISYÔ SEIGEN ATUSA	minimum thickness specified in JISs concerning pressure vessels	minimum thickness
1103	呼び厚さ	YOBİ ATUSA	nominal dimension of thickness for plates, tubes, etc. Also called as “KOUSYÔ ATUSA”.	nominal thickness
1104	厚さ	ATUSA	collective term of nominal thickness or actual thickness	thickness
1105	腐れ代	KUSARE SIRO	predetermined thickness affordable for reduction on designing, in the case where the thickness reduction due to corrosion or wear is anticipated	corrosion allowance
1106	呼び径	YOBİ KEI	nominal dimension to express the size of tube, flange, valve, bolt, etc.	nominal diameter
1107	圧力	ATURYOKU	collective term of absolute and gauge pressures Unless otherwise specified, it is the gauge pressure.	(gauge) pressure
1108	設計圧力	SEKKEI ATURYOKU	pressure at the top of pressure vessel which is used for obtaining the calculated thickness and affordable for the maximum pressure at operation The design pressure used for designing the partition between two pressure chambers may be determined based on the pressure difference.	design pressure
1109	運転圧力	UNTEN ATURYOKU	pressure at the top of pressure vessel under the normal operating condition	operating pressure
1110	最高許容圧力	SAIKÔ KYOYÔ ATURYOKU	maximum pressure allowable at the top of pressure vessel on installed position at the defined temperature	maximum allowable working pressure

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
1111	耐圧試験圧力	TAIATU SIKEN ATURYOKU	pressure at the top of pressure vessel at the time of pressure resistance test	test pressure, hydrostatic test pressure
1112	水圧試験圧力	SUIATU SIKEN ATURYOKU	pressure at the top of pressure vessel at the time of water pressure test	hydrostatic test pressure
1113	気圧試験圧力	KIATU SIKEN ATURYOKU	pressure at the top of pressure vessel at the time of air pressure test	pneumatic test pressure
1114	設計温度	SEKKEI ONDO	temperature used when obtaining the calculated thickness combined with the design pressure The metal temperature of the pressure retaining parts at which the reference pressure for the design pressure is generated is made as the reference temperature, and the higher side temperature than this metal temperature is made as the design temperature.	design temperature
1115	最低設計金属温度	SAITEI SEKKEI KINZOKU ONDO	lower side temperature of metal temperature used when obtaining the calculated thickness combined with the design pressure The metal temperature of the pressure retaining parts at which the reference pressure for the design pressure is generated is made as the reference temperature, and the lower side temperature of this metal temperature is made as the minimum design metal temperature. Also this temperature is for the confirmation that the brittle fracture does not occur at this temperature or higher.	minimum design metal temperature
1116	最低許容金属温度	SAITEI KYOYÔ KINZOKU ONDO	minimum metal temperature at which brittle fracture does not occur under the defined load	minimum allowable metal temperature
1117	運転温度	UNTEN ONDO	metal temperature of the pressure retaining parts under the normal operating condition	operating temperature
1118	試験温度	SIKEN ONDO	metal temperature of the pressure retaining parts at the time of pressure test	test temperature, hydrostatic test temperature

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
1119	許容応力	KYOYÔ ÔRYOKU	limit of stress allowable in design which is specified in JISs concerning pressure vessel It differs according to the type of material, temperature, stress, etc.	allowable stress
1120	応力強さ	ÔRYOKU TUYOSA	equivalent intensity for the combined stress There are the maximum shear stress theory by Tresca and the distortion energy theory by von Mises, principally.	stress intensity
1121	許容応力強さ	KYOYÔ ÔRYOKU TUYOSA	limit of stress intensity allowable in design It differs according to the type of stress intensity.	stress intensity limit
1122	膜応力	MAKU ÔRYOKU	mean value of vertical stress at target cross section	membrane stress
1123	曲げ応力	MAGE ÔRYOKU	value on the end part of cross section of stress which varies equivalently and linearly from positive to negative (0 at the centre of plate thickness) at target cross section	bending stress
1124	支圧応力	SIATU ÔRYOKU	compressive stress generated on the contact surface when the member of construction receives the compression by contacting to other member	bearing stress
1125	垂直応力	SUITYOKU ÔRYOKU	stress generated normal to the target face Generally, the normal stress is not distributed uniformly in thickness direction of the element, but divided into the part where it is uniformly distributed to the whole and the part where it varies according to the position in thickness direction.	normal stress
1126	せん断応力	SENDAN ÔRYOKU	stress generated in tangential direction to the target face	shear stress
1127	流動応力	RYÛDÔ ÔRYOKU	stress used for the evaluation of plastic fracture due to the whole cross section yielding Generally, the mean value of yielding strength and tensile strength is used.	flow stress

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
1128	一次応力	ITIZI ÔRYOKU	stress generated to satisfy the law of equilibrium for the pressure or other mechanical load	primary stress
1129	一次一般膜応力	ITIZI IPPAN MAKU ÔRYOKU	membrane stress generated by pressure or other mechanical load, having no structural discontinuity	general primary membrane stress
1130	一次局部膜応力	ITIZI KYOKUBU MAKU ÔRYOKU	membrane stress generated by pressure or other mechanical load, having the property to generate excess strain when it is combined with other primary stress and discontinuity effect, or with either of them	local primary membrane stress
1131	一次曲げ応力	ITIZI MAGE ÔRYOKU	bending stress generated by pressure or other mechanical load, having no structural discontinuity	primary bending stress
1132	二次応力	NIZI ÔRYOKU	normal stress or shear stress generated by constraint of neighbouring part of construction or self constraint	secondary stress
1133	ピーク応力	PÎKU ÔRYOKU	increment of stress added to primary stress or secondary stress by stress concentration (notch effect) or local thermal stress	peak stress
1134	負荷応力	HUKA ÔRYOKU	stress generated by mechanical load such as pressure, gravity	load stress
1135	熱応力	NETU ÔRYOKU	stress generated due to constraint of free thermal expansion	thermal stress
1136	残留応力	ZANRYÛ ÔRYOKU	stress remaining in the object inside under the condition without external force or temperature grade The residual stress is generated by cold working or welding, or uneven heating/cooling during the heat treatment.	residual stress
1137	繰返し応力強さの振幅	KURIKAESI ÔRYOKU TUYOSA NO SINPUKU	half of maximum fluctuation range in stress intensity at the stress cycle	stress intensity amplitude
1138	応力サイクル	ÔRYOKU SAIKURU	cycle where stress starts from an initial value through maximum value and minimum value, and returns to the initial value (relative to the single operating cycle, two or more stress cycles may generate)	stress cycle

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
1139	運転サイクル	UNTEN SAIKURU	cycle in which the condition transfers from initial to new and returns to initial by operation The following three cycles are included in the operational cycle. Start-stop cycle Cycle where one extreme value is equal to atmospheric temperature and atmospheric pressure, or either of them, and other extreme values are under the normal operating condition. Normal operational cycle Cycle intermediate between start and stop which is required for vessel to accomplish the objective. Cycle of abnormal condition or emergency condition Occurrence of abnormal condition or emergency condition, and recovery from it to be considered in design.	operational cycle
1140	設計荷重	SEKKEI KAZYÛ	load used for construction calculation or stress analysis, which is the pressure including the design pressure and other mechanical load	design load
1141	試験荷重	SIKEN KAZYÛ	load acting at the time of pressure test, which is the pressure including the test pressure and other mechanical load	test load
1142	運転荷重	UNTEN KAZYÛ	load under the actual operating condition, which is the pressure and other mechanical load, and thermal (by normal and abnormal temperature distribution) load	operating load
1143	運転荷重条件	UNTEN KAZYÛ ZYÔKEN	working condition such as variation width of operating load, number of repetition, etc., which is used as the load condition in fatigue analysis	operating load condition
1144	応力解析	ÔRYOKU KAISEKI	calculation method of stress generated on each part of pressure vessel under a certain condition for the purpose of designing not based on the formulae	stress analysis

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
1145	疲労解析	HIRÔ KAISEKI	confirmation method of design soundness of vessel by analysis, which may be subjected to the fatigue collapse due to repetitive loading	fatigue analysis
1146	実験の解析	ZIKKEN TEKI KAISEKI	strength evaluation method for newly designed vessel by measuring the stress or obtaining the collapse load by applying anticipated load on actual device and model, when the application of stress analysis is difficult	experimental analysis
1147	簡易弾塑性解析	KAN'I DANSOSEI KAISEKI	calculation method of plastic strain on safety side by using the elastic analysis results when the application of plastic analysis is not practical	simplified elastic-plastic analysis
1148	塑性解析	SOSEI KAISEKI	analysis to obtain stress, strain, deformation, collapse load, etc. by considering the plastic property including the strain hardening of material	plastic analysis
1149	塑性関節	SOSEI KANSETU	idealized concept used in the limit analysis where the material is assumed to be the perfect plastic material, a certain area of cross section of member becomes yield condition by tensile or compression, and the member is capable of rotating freely against the outside force at this cross section	plastic hinge
1150	極限解析	KYOKUGEN KAISEKI	one of the plastic analysis which is the analysis to obtain the collapse load from the limit condition where the balance becomes unstable by assuming the plastic property of the material as the complete elastic plasticity without strain hardening	limit analysis
1151	疲労強度減少係数	HIRÔ KYÔDO GENSYÔ KEISÛ	value of fatigue strength of uniform material for specific repetitive number divided by that of notched material for the same repetitive number At the local constructional discontinuity part of the construction, this value becomes smaller than that of the case where there is no discontinuity due to the notch effect. Used in the fatigue analysis of construction discontinuity part.	fatigue strength reduction factor

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
1152	応力集中係数	ÔRYOKU SYÛTYÛ KEISÛ	maximum stress of local constructional discontinuity part of the construction divided by the nominal stress (stress at the part without structural discontinuity) Used as the multiplying factor to the calculated surrounding stress instead of the fatigue strength reduction factor when carrying out the fatigue analysis on the constructional discontinuity part.	stress concentration factor
1153	設計疲労曲線	SEKKEI HIRÔ KYOKUSEN	design curve for obtaining the allowable repetitive number from the stress intensity amplitude to calculate the fatigue life in design	design fatigue curve
1154	崩壊荷重	HÔKAI KAZYÛ	load by which the condition reaches such that deformation of construction increases adversely The collapse load obtained by the limit analysis method is the maximum load capable of retaining the construction composed of the perfect plastic material without strain hardening, and the deformation of construction increases unlimitedly due to this load. The collapse load is sometimes defined by designating the elastic deformation rate obtained by the plastic analysis method or the experimental analysis method.	collapse load
1155	熱応カラチエット	NETU ÔRYOKU RATYETTO	phenomenon in which progressive gradual increasing inelastic deformation or strain generated in the construction according to the thermal stress fluctuation	thermal stress ratcheting
1156	シェークダウン	SYÊKU DAUN	collective term of elastic and plastic shakedown Elastic shakedown is the phenomenon in which the construction finally shows the elastic behaviour after receiving several cycles of repetitive loading. The plastic shakedown is the phenomenon in which loop curve that stress-strain relation is closed is finally drawn after receiving several cycles of repetitive loading.	shakedown

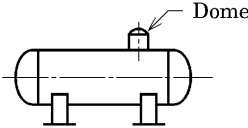
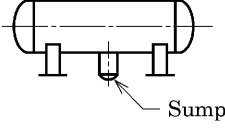
No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
1157	クリープ領域	KURÎPU RYÔIKI	temperature range where the allowable stress is determined according to the creep property of the material	creep range, creep regime
1158	安全係数	ANZEN KEISÛ	factor to provide the allowance at the time of design against the fluctuation of material and product, uncertainty of load and stress estimation, etc. On the construction of pressure vessel, this mostly means the factor to determine the allowable stress from the material strength. Also called as “ANZEN RITU”. Design factor may be used as the same meaning.	safety factor
1159	設計係数	SEKKEI KEISÛ	factor to provide the allowance at the time of design against the fluctuation of material and product, uncertainty of load and stress estimation, etc. On the construction of pressure vessel, this mostly means the factor to determine the allowable stress from the material strength. The safety factor may be used as the same meaning.	design factor
1160	構造上の不連続性	KÔZÔZYÔ NO HURENZOKUSEI	portion where shape of construction rapidly changes and causes the effect on the distribution of stress and strain	structural discontinuity
1161	長手継手	NAGATE TUGITE	(welded) joint in longitudinal direction of shell in cylindrical shell, etc.	longitudinal joint (of shell)
1162	周継手	SYÛ TUGITE	(welded) joint in circumference direction of shell in cylindrical shell, etc.	circumferential joint (of shell)
1163	溶接継手効率	YÔSETU TUGITE KÔRITU	factor to be multiplied when the strength of welded joint is obtained from the strength of parent material in weld joint design, which is the value of 1.00 or less determined by finish condition, existence of nondestructive inspection and its type	weld joint efficiency
1164	鑄造品品質係数	TYÛZÔHIN HINSITU KEISÛ	factor to be multiplied when the allowable stress of casting is obtained, which the value of 1.00 or less determined by finish condition, existence of nondestructive inspection and its type	casting quality factor

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
1165	致死の物質	TISITEKI BUSSITU	toxic gas or fluid which causes risk of life when extremely small amount of gas or liquid vapour thereof is sucked in individually or by mixture with air	lethal substance

b) Member and shape

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
2101	たて形容器	TATEGATA YÔKI	pressure vessel installed so that the centre axis of shell becomes vertical	vertical vessel
2102	横置容器	YOKOOKI YÔKI	pressure vessel installed so that the centre axis of shell becomes horizontal	horizontal vessel
2103	複合容器	HUKUGÔ YÔKI	pressure vessel which has two or more independent chambers	composited pressure vessel
2104	耐圧部	TAIATUBU	part subjected to the load according to the pressure among parts constituting the pressure vessel with keeping the pressure	pressure retaining parts
2105	非耐圧部	HITAIATUBU	construction part other than pressure retaining parts	nonpressure parts
2106	胴	DÔ	part of the pressure vessel constituting the main body of cylindrical shape, conical shape, spherical shape, etc. except the end part	shell
2107	円筒胴	ENTÔDÔ	shell of cylindrical shape	cylindrical shell
2108	円すい胴	ENSUIDÔ	shell of conical shape	conical shell
2109	球形胴	KYÛKEIDÔ	shell of spherical shape	spherical shell
2110	非円形胴	HIENTKEIDÔ	shell of noncircular shape in lateral cross section such as polygonal shape, ellipse shape	noncircular shell

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
2111	鏡板	KAGAMIITA	part of torispherical shape, etc. which constitutes the end part or intermediate partition of pressure vessel Also called as “KAGAMI”, simply.	head
2112	皿形鏡板	SARAGATA KAGAMIITA	head of torispherical shape in cross section	torispherical head
2113	半だ円体形鏡板	HAN DAENTAIKEI KAGAMIITA	head of ellipsoidal shape in cross section	ellipsoidal head
2114	全半球形鏡板	ZEN HANKYŪKEI KAGAMIITA	head of hemispherical shape in cross section	hemispherical head
2115	円すい形鏡板	ENSUIGATA KAGAMIITA	head of conical shape	conical head
2116	平鏡板	HIRA KAGAMIITA	head of flat-plate shape in whole part or most central part	flat head
2117	ふた板	HUTAITA	cover capable of mounting and dismounting for closure of opening for the purpose of retaining the pressure	cover plate
2118	(円すい胴の) 大径端部	(ENSUIDÔ NO) DAIKEI TANBU	end part of large diameter side of conical shell	large end (of conical section)
2119	(円すい胴の) 小径端部	(ENSUIDÔ NO) SYÔKEI TANBU	end part of small diameter side of conical shell	small end (of conical section)
2120	(鏡板の) 中高面	(KAGAMIITA NO) TYŪKÔMEN	surface of convex side of head	convex side (of head)
2121	(鏡板の) 中低面	(KAGAMIITA NO) TYŪTEIMEN	surface of concave side of head	concave side (of head)
2122	鏡板のフランジ部	KAGAMIITA NO HURANZIBU	cylindrical part at the end part of head	head flange, head skirt

No.	Term (Japanese character)	Reading	Definition	English equivalent (informative)
2123	タンジェントライン	TANZYENTO RAIN	line at beginning of bending in the construction of cylindrical shell which is connected to the head having roundness at corner or conical shell	tangent line
2124	ジャケット	ZYAKETTO	in dual structure vessel, the part covering the basic vessel	jacket
2125	ドーム	DÔMU	branch shell protruding to the upper part of vessel body in order to separate contents, etc. 	dome
2126	サンプ	SANPU	branch shell protruding to the lower part of vessel body in order to separate contents, etc. 	sump
2127	強め輪	TUYOMEWA	ring shape member to be attached to cylindrical shell, conical shell, etc. for reinforcing the stiffness	stiffening ring
2128	(胴の) 伸縮継手	(DÔ NO) SINSYUKU TUGITE	ring shape member having corrugated cross section and constituting a part of shell to be attached for making expansion and shrinkage easy, and for lessening thermal stress generated in shell	expansion joint (of shell)
2129	ライニング	RAININGU	inside liner or to apply the inside liner of metallic thin sheet, rubber, glass, etc. on inside surface of vessel	lining
2130	管板	KANBAN	sheet for attaching many tubes by welding, expanding, etc. in heat exchanger, etc. Also called as “KUDAITA”.	tubesheet
2131	管穴	KAN'ANA	holes for attaching tubes to tubesheet	tube hole