The usual vacuum data and unit conversion

1.Division of the vacuum region	2.Length: The metric - English contrast table
3.Weight: The kilogram - pound - ounce contrast table	4.various vacuum meter and gauge pipe contrast table
5.Absolute temperature, Celsuis and Fahrenheit contrast table	6.Suction Capacity unit conversion table
7.Resistivity of various water (ohm)	8.Molecule average free distance under difference pressure of the air at 20 ℃
9.The usual pressure unit conversion table	10.Air molecule density under the different pressure
11.Main parameter of the vacuum grease	12.Conversion of power unit
13.Conversion of power unit	14.The brief charateristics of vacuum seal grease
15.Various rubber characteristics table	16.Conversion of the area unit
17.Conversition of the volume unit	18.Main parameter of 1# pump oil
19.Parameter of the diffussion vacuum pump oil made in china	20.Category and work scope of the vacuum pump
21.The saturated steam pressure under the various temperature	22.Some substance's melting poit, heat fuse, boiling poit, vaporization heat

1.Division of the vacuum region

vacuum region	pressure scope	
	Torr	Pa
low vacuum	760~10	101325~1333
middle vacuum	$10\sim10^{-3}$	$1333\sim1.33*10^{-1}$
high vacuum	$10^{-3}\sim10^{-8}$	$1.33*10^{-1}\sim10^{-6}$
ultrahigh vacuum	$10^{-8}\sim10^{-12}$	$10^{-6}\sim10^{-10}$
sky-high vacuum	$<10^{-12}$	$<10^{-10}$

2.Length: metric -english contrast table

unit	meter(m)	foot(ft)	inch(in)
meter(1m)	1	3.28	39.37
foot(1ft)	0.305	1	8.33
inch	0.0254	12	1

3.Weight: kilogram-pound-ounce contrast table

unit	kilogram(kg)	pound(Ib)	ounce(oz)
kilogram	1	2.2	35.27
pound	0.45	1	16
ounce	0.03	0.06	1

4.Various vacuum meter and guage pipe contrast table

vacuum meter name	resistance vacuum meter	heat-coupling vacuum meter	1.hot ka. ionization vacuum meter 2.pressure auto control instrument	cold ka.meeting control vacuum meter	middle vacuum meter	ultihigher vacuum meter
gauge pipe name	resistance gauge pipe	heat-coupling gauge pipe	ionization gauge pipe	cold ka. gauge pipe	middle vacuum gauge pimp	B-A gauge pipe
compasses pipe type	ZJ-52T	ZJ-51(DL-3) ZJ-53	ZJ-27(DL-9) ZJ-2(DL-2) ZJ-10(DL-5)	M014	DL-5 DL-8	ZJ-32 ZJ-32BC ZJ-12

5.Absolute temperature,Celsius,Fahrenheit contrast table

Temperature type	K(Absolute temperature)	^{o}C Celsuis)	^{o} F(Fahrenheit)
K(A)	1	^{o}C +273.15	5/9(^{o} F+459.67)
^{o}C (Celsuis)	K-273.15	1	5/9(^{o} F-32)
^{o} F(Fahrenheit)	9/5(K-459.67)	9/5(^{o}C +32)	1

6.Suction capacity unit conversion table

Unit	(m^3/s)	(L/s)	m^3/h	cft/min
(m^3/s)	1	1000	3600	2118.88
(L/s)	10^{-3}	1	3.6	2.119
(m^3/h)	$2.78*10^{-4}$	0.278	1	0.59
(cft/min)	$4.72*10^{-4}$	0.47	1.69	1

7.Resistivity of the various water(ohm)

water	seawater	low-grade tap water	high grade tap water	distilled water	hyperploid pure water
resistance rate	$10\sim10^{-2}$	10^{3}	$10^{4}\sim10^{5}$	10^{6}	$10^{7}\sim10^{8}$

8.Molecule average free distance at different pressure of the air at 20 ^{o}C

P(Torr)	1	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-9}
λ(cm)	$4.72*10^{-3}$	4.72	47.2	472	4720	$4.72*10^{6}$

9.The usual pressure unit conversion table

	Pa	Torr	μmHg	μbar	mbar	atm	am	inHg	lb/in^2
Pa	1	7.5×10^{-3}	7.5	10	10^{-2}	9.86923×10^{-6}	1.0197×10^{5}	2.953×10^{-4}	1.450×10^{-4}
Torr	133.32	1	10^{3}	1333.2	1.3332	1.31579×10^{-3}	1.3595×10^{-3}	3.937×10^{-2}	1.934×10^{-2}
μmHg	0.13332	10^{-3}	1	1.3332	1.3332×10^{-3}	1.31579×10^{-6}	1.3595×10^{-6}	3.937×10^{-5}	1.934×10^{-5}
μbar	10^{-1}	7.5×10^{-4}	7.5×10^{-1}	1	10^{-3}	9.86923×10^{-7}	1.0197×10^{-6}	2.953×10^{-5}	1.450×10^{-5}
mbar	10^{2}	7.5×10^{-1}	7.5×10^{2}	10^{3}	1	9.86923×10^{-4}	1.0197×10^{-3}	2.953×10^{-2}	1.450×10^{-2}
atm	101325	760	760×10^{3}	1013.25×10^{3}	1013.25	1	1.0333	29.921	14.696
am	98066.3	735.56	735.56×10^{3}	980663	980663×10^{-3}	0.967839	1	28.959	14.223
inHg	3386	25.4	25.4×10^{3}	3.386×10^{4}	33.86	3.342×10^{-2}	3.453×10^{-2}	1	4.912×10^{-1}
lb/in^2	6895	51.715	51.715×10^{3}	6.895×10^{4}	68.95	6.805×10^{-2}	7.031×10^{-2}	2.086	1

10.The air molecule indensity at different pressure

P(Torr)	1	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-9}
n_0(Entries/cm^3)	4×10^{16}	4×10^{13}	4×10^{12}	4×10^{11}	4×10^{10}	4×10^{7}

11.The main parameter of the vacuum grease

Name	Component	the saturated steam pressure at 20℃(Torr)	Max temperature permitted usage (℃)
2#	macromolecule carbon	3.1×10^{-8}	30
3#	oxid	10^{-9}	35
4#	Soap base oil	$10^{-7\sim10-8}$	130
7501	Silicon oil and silicon powder	10^{-6} 以下	-40~+200

12.Force unit conversion

Dyne(Dyn)	Newton(N)	Stan	kilogram force(kgf)
1	10^{-5}	10^{-8}	1.02×10^{-6}

13.Power unit conversion

Unit	PS	kW	W
Horse power(PS)	1	0.735	735
kilowatt(kW）	1.36	1	1000
watt(W)	1.36	0.001	1

14.The characteristics of the vacuum seal grease

Vacuum resin name	Vacuum seal resin		vacuum seal mud
	50＃	80＃	30＃
temperature	50℃	80℃	30℃
	10^{-7}~10^{-8}Torr	10^{-7}~10^{-8}Torr	5×10^{-4}Torr

15.Various rub's charateristics table

Rub category	natural rub	Butyl rubber	NBR	Fluororubber
Characteristic1	Fine performance of water-fast,acidproof, alkalescence-resistant	Pervasion rate is small	oil-proof nicer	23type strong acidproof
Characteristic2	higher suction capacity	Sublimation serverity	flexibility nicer	26 type infiltration rate is low,the degassing small
vacuum range	1×10^{-5}Torr	10^{-7}Torr	10^{-8}Torr	10^{-8}Torr
Temperature	-30~80℃	-30~150℃	-30~120℃	-20~200℃

16.Conversion of area unit

平方米(m^2)	平方厘米(cm^2)	平方毫米(mm^2)	平方市尺(sc^2)	平方英尺(ft^2)	平方英寸(in^2)
1	10000	1000000	9	10.7639	1550

17.Conversion of volume unit

立方米 (m3)	升 (L)	立方市尺 (sc3)	英加仑	美加仑(液体)	立方英尺 (ft3)	立方英寸 (inch2)	日升
1	1000	27	219.98	264.18	35.3147	0.06103	554.37

18.The parameter of the 1# pump oil

Project	movement sticky degree(centipoise)	flash point(℃)	saturated steam temperature at 20℃(托)	specific gravity(g/cm^3)	molecule weight(g)
KK-1	50℃时(47~57) 100℃时(8~11)	≥15	$\leq 4\times10^{-5}$	0.86	333

19.The brief parameter of the diffusing pump oil made in china

Brand number	1#	2#	3#	274 silicon oil	275 silicon oil
saturated steam temperature is not higher than (Torr)20℃	4×10^{-8}	2×10^{-8}	2×10^{-8}	2×10^{-8}	1.7×10^{-8}
movement sticky degree(centipoise)	45~60	55~65	68~80	38±3	165±20
freezing point is not high than(℃)	-15	-15	-15	-10	-14~-18
flash point isn't lower than(℃)	230	230	230	＞210	＞243
specific gravity(g/cm^2)				1.05~1.08	1.09±0.02

20.Category and work scope of the vacuum pump

vacuum pump	work scope (Torr)		vacuum pump	work scope (Torr)
Rotary vacuum pump	$760\sim5\times10^{-4}$		Reciprocating vacuum pump	$760\sim10^{-2}$
Rotary pistonvacuum pump	$760\sim5\times10^{-3}$		Adsorbentvacuum pump	$760\sim10^{-4}$
Oil supercharger vacuum pump	$10^{-1}\sim10^{-4}$		Sputter ion pump	$10^{-4}\sim10^{-10}$
Roots vacuum pump	$10^{-1}\sim10^{-4}$		Ti ionization vacuum pump	$10^{-3}\sim10^{-10}$
Oil diffusing vacuum pump	$10^{-3}\sim5\times10^{-7}$		Molecule vacuum pump	$10^{-3}\sim10^{-10}$
water ring vacuum pump	760~25		low temperature vacuum pump	$10^{-3}\sim10^{-10}$

21.The saturated steam temperature of the water

Temperature	Pressure			Temperature	pressure	
℃	Pa	Torr		℃	Pa	Torr
-13	225.4	1.691		-10	386.5	2.149
-7	361.9	2.715		-3	489.6	3.673
0	610.4	4.579		3	757.8	5.685
7	1001	7.513		10	1228	9.209
13	1497	11.23		17	1937	14.53
20	2337	17.54		23	2808	21.07
27	3564	26.74		30	4242	31.82
33	5029	37.73		37	6274	47.07
40	7378	55.32		43	8638	64.80
47	10610	79.60		50	12330	92.51
53	14290	107.2		57	17310	129.8
60	19910	149.4		63	22840	171.4
67	27320	205.0		73	35420	265.7
77	41870	314.1		83	53400	400.6
87	62480	468.7		93	78460	588.6
97	90920	682.1		100	101325	760.0
101	104980	787.6				

22.The melting point, heat of solution, boiling point and heat of vaporization of the substance

substance	melting point （℃）	heat of solution （Cal/g)	boiling point （℃）	heat of vaporization （Cal/g）
alcohol	-114	23.54	78	204
CS2	-112	45.3	46.25	84
ammonia	-77.7	81.3	-33	327
pine burl oil	-10	80	160	—
ice	0	80	100	539
naphthalene	80	33	218	50.5
iron	1100~1200	8	2450	93
CO	-200	46.68	-190	263
acetate	16.6	16.4	118.3	104
methyl alcohol	-97.1	20.95	64.7	94
aniline	-6.24	30.24	184.3	124
benzene	5.48	—	82.2	—
acetone	-96.5	—	56.1	—