

Sourcing & Service

Japanese Automobile/Truck

Engine Valve/Guide/Seat



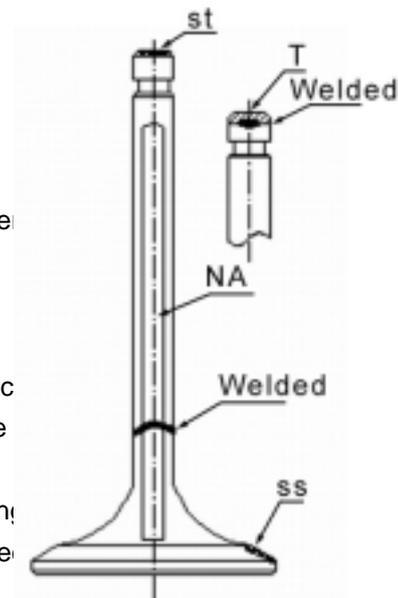
With more than thirty years experience in engine valve/guide/seat manufacturing, apply different kinds of materials/special treatments according to OE specifications. Mainly supply engine valve for passenger cars of , diesel engines trucks, buses & construction vehicles.

Main Materials for Engine Valve

- SCM** Chromium-Manganium-Molybdenum-steel(JIS SCM4) Alloy Steels applied to Inlet Valves
- H11** Silicon-Chromium(Silichrome 1) (JIS SUH 11) apply to Inlet Valve only
- H3** Silicon-Manganium-Molybdenum-steel(JIS SUH3) apply to Inlet Valves (may apply to Exhaust Valves of light engines)
- H36** High Chromium-Magane Austenitic steel (JIS SUH36)(Anti-Magnetic Steel 21-4N).Apply to Exhaust Valves of heavy duty engines.
- DIN** DIN 1.4718(Inlet),DIN 1.4882(Exhaust)

Special Treatment Symbols

- STL** **ss** Valve seat : Stellite No.6 or No.32(F)
st Tip:Stellite No.1
- T** Wafer welded valves Small wafer (normally in our A-class mate is welded at the valve tip
- Cr** Chromium plated valves stems
- Tuf** Soft nitrided valve Soft nitrided finish,in other words "Tufftride", or so called " Black Finish" in general,The significanc of these improvements resulting from soft nitrideing is of course an extneded valve life.
- NA** Sodium cooled valves demands are increasing for racing car en for several operating purposes and for long run under high speed Sodium affects lowering temperature at valve head.
- Bi-M** These are required for some types of engines,to economically provide a valve with the head resisntance to heat,corrosion and mechanical stresses and the stem with good wear resistance. the bi-metallic Valve has the head made from a high temperature and corrosion resistant steel, and the stem made from a steel (usually martensitic) with good mechanical properties at medium temperatures.This combination is highly recommended for Exhaust Valves.



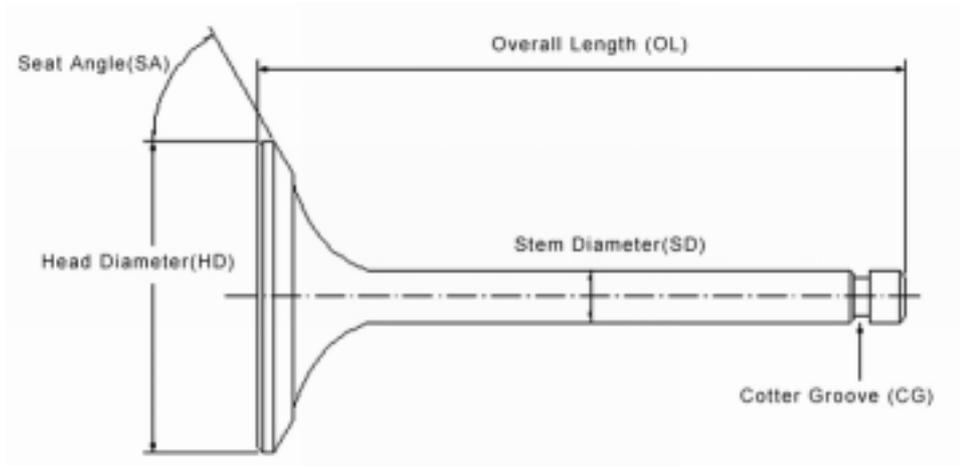
Chemical Components of Stellite

Stellite Code	Ni	C	Co	Cr	W	Fe	Melt.P(C)	HRC	Apply
STELLITE No.1	-	1.0	Balance	28.0	4.0	3.0Max	1.290	44	Seat
STELLITE No.6	-	2.5	Balance	30.0	12.0	3.0Max	1.265	54	Tip

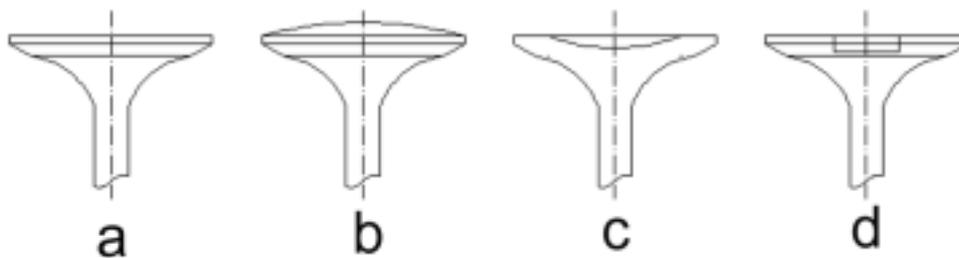
Chemical Analysis of Material

EIC Symbols	JIS	SAE	BS	C	Si	Mn	P	S	Ni	Cr	Mo	N	W	Approximate Equivalents		Apply
														TRW	EATON	
SCM	SCM4	4140	EN49	0.43	0.35	0.85	0.03	0.03	-	1.2	0.3	-	-			IN
	SNCM7	8645	AEN100D	0.40	0.40	0.65	0.03	0.035	0.9	0.75	0.2	-	-		I	IN
	SNCM8	4030	EN24	0.44	0.35	0.70	0.03	0.035	1.7	1.4	0.35	-	-	N		IN
H3	SUH3			0.45	2.50	0.60	0.03	0.03	0.6	12.0	1.3	-	-			IN & EX
H11	SUH11	HNV3	EN52	0.50	3.00	0.60	0.03	0.035	0.5	8.5	-	-	-			IN
H36	SUH36 (21-N4)	EV8	349S54	0.58	0.35	10.00	0.04	0.045	4.5	22.0	-	0.4	-	S	H	EX
			EN54	0.50	1.75	1.20	0.045	0.045	10.0	14.0	3.0	-	-	T	D	EX
	SUH4	ENV6	EN59	0.85	2.25	0.60	0.03	0.03	1.65	20.5	-	-	-	K	K	EX
DIN	1.4882	EV9		0.45	2.50	0.60	0.03	0.03	14.0	15.0	-	-	3.0			EX(Diesel)
DIN	1.4718			0.40	3.50	0.60	0.03	0.03	0.6	9.5						IN

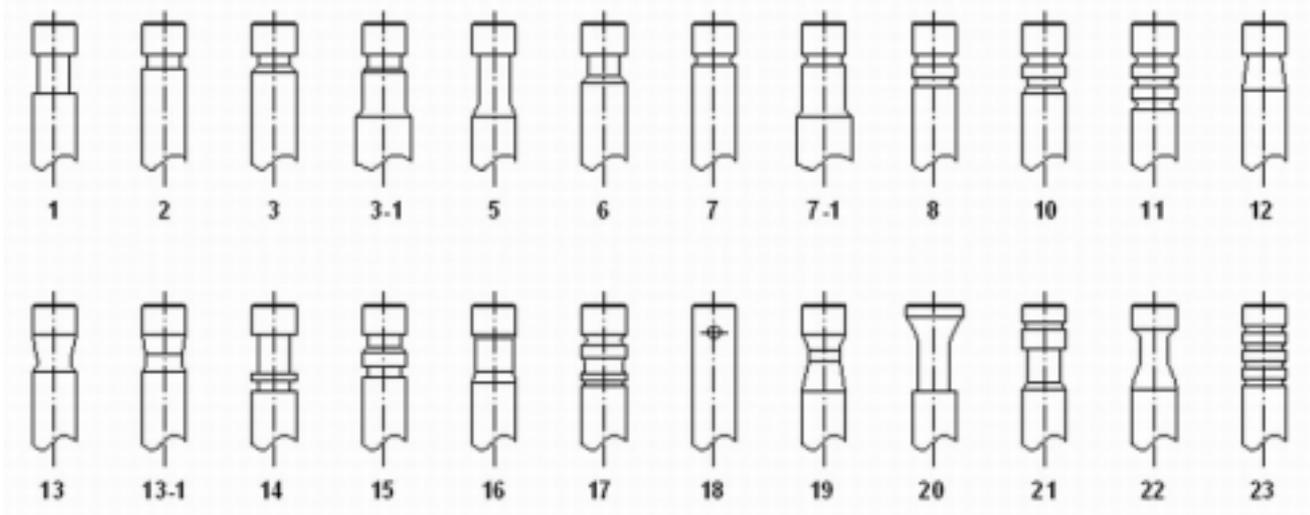
Nomenclature and symbols



Shape of Head (HS)



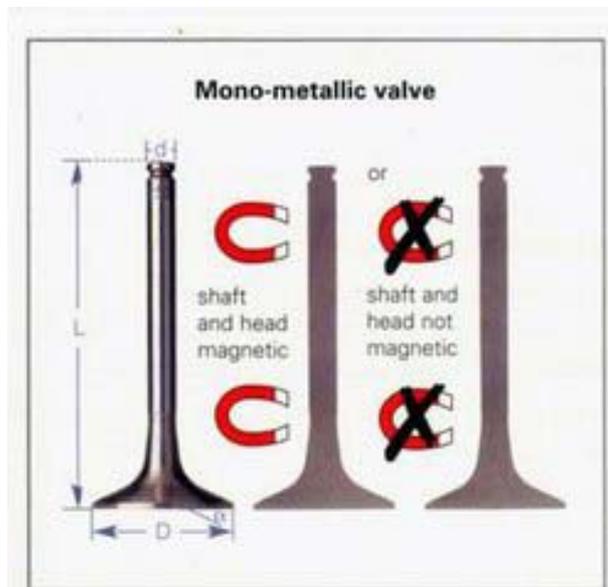
Shape of Cotter Groove (CG)



Design of Engine Valve

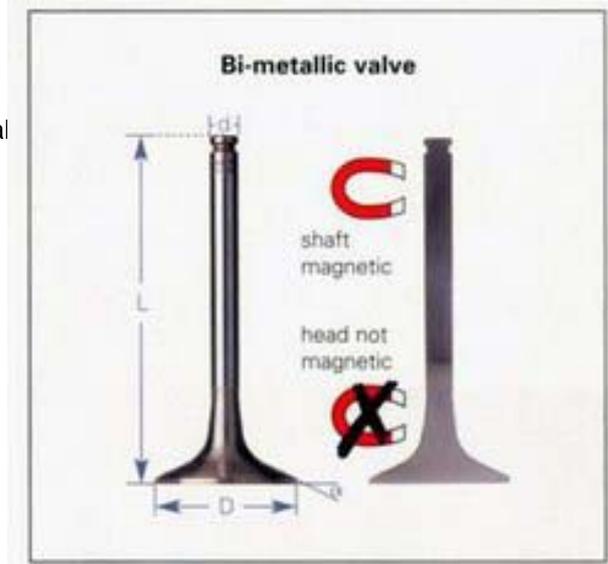
Mono-metallic valves

are produced efficiently in warm-extruded process or in an upsetting process.



Bi-metallic valves

make it possible to use the ideal combination of material both for the shaft and the end.



Function of Engine Valve

Valves are precision engine parts and they have to perform four important tasks in the operation of the engine:

- Block flow areas
- Controlling gas exchange
- Sealing the cylinder to the outside
- Dissipating the heat absorbed by the exhaust gases

Form combustion to the valve seat ring and to the valve guide.

At temperatures of up to 800°C, each valve opens and closes up to 70 times per second and during the life of the engine it is subjected to an average of 300 million changes of load.

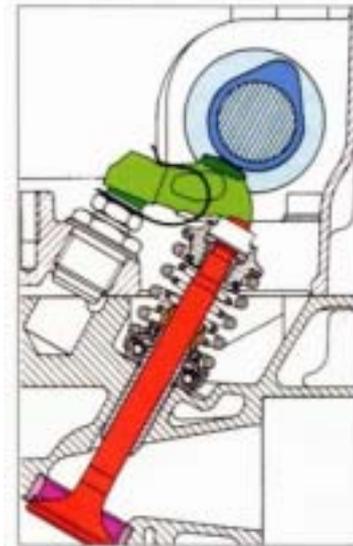
A distinction is generally made between inlet valves and exhaust valves.

Inlet valves

The valve-which are cooled by the circulation of unburnt gases-have to withstand high mechanical loads, especially upon contact with the valve seat.

Exhaust valves.

In addition to the great mechanical demands made on them, exhaust valves are subjected to high thermal stresses and chemical corrosion, Therefore, other materials and more complex production processes are used when they are manufactured.



Fitting Recommendations

Valves are some of the components in the engine that are subjected to the greatest thermal and mechanical stresses. Their working life-and thus the working life of the engine is strongly dependant on their being installed correct. Check the valves before installation to see if they have been damaged (for example, if they have been knocked etc.) Never install damaged or bent valves. Make sure that the valves are the right size for your engine.

VALVE GUIDE for the valve clearance

Valve stem diameter in mm	Inlet valve	Exhaust valve
6~7	10~40µm	25~55µm
8~9	20~50µm	35~65µm
10~12	40~70µm	55~85µm

Information and installation guidelines from the engine manufacturer must be observed in all cases. Before installing the valve, check the inner core of the valve spring head to see if it is worn or damaged, check also whether the valve spring power is still within the values prescribed by the engine manufacturer. Be sure to use new valve collets and valve shaft seals when installing the valve. The valve shaft must be lubricated sufficiently with clean engine oil before it is inserted.

EIC No.	Engine Code	Vehicle Model Chassis Type	No. of Cyl.	Year	IN EX	Dimensions						O.E. Part NO.
						HD	OL	SD	SA	HS	CG	

DAIHATSU

N01001	AB CB	CUORE,HLJET ATRAI, CHARADE1000	L45/55 40/60/65/66/70 G10/11 S75	2 3	79- 77-	IN	36	101.6	7	45°	C	7	13711-87701 13711-87702 13711-87705
E01001						EX	33	101.6	7	45°	C	7	13715-87701 13715-87702
N01014	CB	CHARADE		3		IN	30	107.2	6	45°	C	7	13711-87707
E01014						EX	26	107.2	6	45°	C	7	13715-87707
N01002	CL	CHARADE 1000D	G30, 101	3	83-	IN	36	104.9	7	45°	D	7	13711-87704
E01002						EX	32	105	7	45°	D	7	13715-87703
N01013	CL30	MIJET		3		IN	34	104.9	7	45°	D	7	13711-87706
E01013						EX	30	105.2	7	45°	D	7	13715-87705
N01007	DL	DELTA	V22 F75	4	85-	IN	42	127.6	9	45°	D	7	13711-87312 13711-87314
E01007						EX	35	127.6	9	45°	D	7	13715-87319 13715-87317 13715-87322
N01004	DG	DELTA 2500	D200/300 DV24/32	4	68-	IN	40	136.2	9	45°	C	7	13711-87304 13711-87305 5113-1641C
E01004						EX	33	136.2	9	45°	C	7	13715-87304 13715-87305 5113-1642C
N01005	DG	DELTA 2600	DV26/SV26	4	69-	IN	40	127.5	9	45°	C	3	13711-87306
E01005						EX	33	127.5	9	45°	C	3	13715-87307 13715-87309
N01006	DG DL	LIGHT BUS, TAFT DELTA,3000 D2000	F50/55/SV18/26/ 32/37/DV21/24/2 6/32/F60,V54	4	67- 73-	IN	40	127.6	9	45°	C	7	13711-87308
E01006						EX	33	127.7	9	45°	C	7	13715-87311
N01011	EF CL	PROTON KANSIL	EB	3		IN	34	111.1	7	45°	C	7	13711-87202
E01011						EX	28	110.4	7	45°	C	7	13715-87202
N01012	EF CL	KANSIL MALAYSIAN SPEC	FB10	3		IN	30	112.5	7	45°	D	7	13711-87201
E01012						EX	26	112.6	7	45°	D	7	13715-87201
N01008	FE	CONSORTE TAFT1000 COMPAG NO. BERLINA 1000	EP 30 F10/40	4	67-77	IN	32	95	7	45°	C	7	13711-87101 13711-87102 4023-1641
E01008						EX	29	95	7	45°	C	7	13715-87101 13715-87102 13715-87103 4023-1642
N01003	HC/S89	CHARADE 1300cc	G101	4	88-92	IN	30	112.6	6.6	45°	D	7	13711-87103
E01003						EX	26	114.5	6.6	45°	D	7	13715-87105
N01009	HC HD S89	CHARADE	G101	4	89-	IN	30	112.6	6.6	45°	D	7	13711-87103 13711-87104
E01009						EX	26	114.5	6.6	45°	D	7	13715-87105 13715-87106

EIC No.	Engine Code	Vehicle Model Chassis Type	No. of Cyl.	Year	IN EX	Dimensions						O.E. Part NO.
						HD	OL	SD	SA	HS	CG	

HINO

N02001	DK10 DK20	TRUCK ,BUS	KF, TC, ZM, HF,BG, RC	6	67-86 66-80	IN	57	175	12	45°	C	13	2310-1301-01 13711-1130B 13711-1130C
E02001						EX	51	175.5	12	45°	C	13	2311-1302-01 13715-1150C
N02002	DM100 DQ100	TRUCK;RANGER BUS;RAINBOW RANGER 4, 4. 5TON	RM, BM, HM, KM, KQ	6	63-86 72-83	IN	43.5	137.6	9	45°	D	13	2352-1301-00 2352-1301-01 13711-1170A
E02002						EX	36	137.6	9	45°	D	13	2352-1302-00 2352-1302-01 13715-1320A
N02003	DS50 DS60 DS140	TRUCK, BUS	RD35, ZC34, TC8000	6	57-61	IN	53	161	11	60°	D	13-1	2872-1305-01 13711-1310A
E02003						EX	45	161	11	45°	D	13-1	2872-1306-01 13715-1450A
N02004	DS70 DS90 DS80	TRUCK ,BUS	KC, TE, RD KC320/420, KE102, 202 TE120/220, BT51/61/220	6	60-88 62-68	IN	50	157	10	60°	D	13	2874-1301-01 13711-1320B
E02004						EX	45	157	10	45°	D	13	2874-1302-01 13715-1460B
N02005	DS56	TRUCK		6		IN	50	161.4	11	45°	D	13	13711-1340
E02005						EX							
N02006	EB100 EB200	TRUCK ,BUS	KB,RE KB380/TC30	6	67-77 67-79	IN	54	175	11.7	60°	D	13	2330-1301-12 2330-2301-20 13711-1140A 13711-1141
E02006						EX	48	175	11.7	45°	D	13	2330-1302-12 13715-1290A
N02007	EB300	TRUCK	KBI12, 303, 304	6	70-	IN	54	175.1	12	60°	C	8	13711-1030A
E02007						EX	48	175.1	12	45°	C	8	13715-1040A
N02008	EB300 EB400	TRUCK ,BUS	KB, BY, RE	6	71-86 77-88	IN	53	175.1	12	60°	C	7	13711-1090 13711-1091A
E02008						EX	47	174.8	12	45°	C	7	13715-1122A 13715-1500
N02009	EC100	TRUCK;RANGER BUS;RAINBOW	FD, K J, AM, RL KL3#/4#,AM 100/200	6	69-	IN	46.7	132.5	9	45°	C	7	2380-1301-10 13711-1180A
E02009						EX	37.7	132.5	9	45°	D	7	2380-1302-10 13715-1330A
N02010	ED100	TRUCK BUS	KF.ZM	6	71-75	IN	58	175	12	45°	D	13	13711-1240 2400-1301-24
E02010						EX	52	174.5	12	45°	D	13	13715-1380 2400-1302-04
N02011	ED100 (NEW)	TRUCK	KB, KS, KF, TC, WP ZC, ZG, ZH, ZM	6	71-77	IN	58	175	12	45°	D	8	2400-1320-00 13711-1250B
E02011						EX	52	174.5	12	45°	D	8	2400-1302-20 13715-1390B
N02012	EF100 EG100	TRUCK	KE702 KA, KF, TC, ZM	V8	71-	IN	54	170	12	45°	D	8	2390-1301-20 13711-1220A
E02012						EX	52	170	12	45°	D	8	2390-1302-21 13715-1370A
N02013	EF100 EF100T EG100 (NEW)	TRUCK BUS	KA, KF, TC, ZM RV	V8 V8	71-75 71- 71-78	IN	54	167.7	12	45°	D	7	13711-1110A 13711-1330A
E02013						EX	52	167.7	12	45°	D	7	13715-1140A

EIC No.	Engine Code	Vehicle Model Chassis Type	No. of Cyl.	Year	IN EX	Dimensions						O.E. Part NO.
						HD	OL	SD	SA	HS	CG	

HINO

N02014	EF100 EF300 EF350	TRUCK,BUS TRUCK,BUS TRUCK,BUS,	ZM,TC,RS,RV, KF,ZM,KS,RS, KF,TC,WP,ZM,	8 10	75 — 82	IN	56	169	12	60°	D	7	13711-1370A 13711-1401A 13711-1050A
E02014	EF500 EF700	TRUCK, TRUCK,	RV,ZM, SH,SS,			EX	52	170	12	45°	D	7	13715-1061B 13715-1060A
N02015	EF550 EF750 EK100 (New)	TRUCK, BUS	FH,KB,KF WD,ZC,FC, RC,	6 8	81-	IN	56.8	170	12	60°	D	7	13711-1012 13711-1380A 13711-1390A 13711-1420A 13711-1450A 13711-1451A
E02015						EX	53	170	12	45°	D	7	13715-1012 13715-1013A
N02016	EH100	TRUCK, RANGER,BUS,	KJ,KL,WB, RL,BX,AM	6	72-	IN	49.8	132.5	9	45°	C	7	2382-1301-00 13711-1200A
E02016		RAINBOW				EX	41.8	132.5	9	45°	C	7	2382-1302-00 13715-1350A
N02017	EH300 EH500	TRUCK, RANGER,BUS	KL,KU,KJ, RD,KR	6	74-80	IN	50.7	133.2	9	45°	C	7	2383-1301-10 13711-1100A 13711-1210A
E02017						EX	42.7	132.95	9	45°	D	7	2383-1302-10 13715-1130A 13715-1131 13715-1360A 13715-1100
N02018	EH700 H06C	TRUCK, RANGER,BUS, RAINBOW	FT,FD,GD,FF, KR,KG,RD, RR,RJ,LB	6	77- 83-86	IN	47.8 47.9	142 142.5	9 9	60° 60°	D D	7 7	13711-1081D 13711-1470 13711-1471
E02018						EX	41.3 42.5	142 142	9 9	45° 45°	D D	7 7	13715-1220A 13715-1520A 13715-1110 13715-1111C 13715-1081
N02019	EK100 EK200	TRUCK. BUS	FH,KB,KF,WD, ZC,FC, RC,	6	75- 80-90	IN	57	172	9	60°	D	8	13711-1011A
E02019						EX	53	172	9	45°	D	8	13715-1010 13715-1011A 13715-1000
N02020	EL100	TRUCK;RANGER	FG, LB, KK	6	78-	IN	50	144.5	10	60°	D	7	13711-1350B
E02020						EX	46.4	144.5	10	45°	D	7	13715-1070B
N02021	EM100	TRUCK BUS	FH, RV,	6	81-	IN	54 54	144.5 145	10	60°	D	7	13711-1410B 13711-1500
E02021		BLUERIBBON				EX	48	144	10	45°	D	7	13715-1240B
N02022	EP100	TRUCK	FN, FR, GN	6	81-	IN	50	144.9	10	60°	D	7	13711-1430A 13711-1431A 13711-1530A 13711-1541A
E02022						EX	46.4	145	10	45°	D	7	13715-1260A 13715-1580
N02023	ER100 ER200	BUS	RC	6	78-	IN	55	162.4	12	60°	D	7	13711-1360A 13711-1580A
E02023						EX	51	162.3	12	45°	D	7	13715-1470A
N02024	F20	TRUCK, FR		6		IN	49	159.7	10	60°	D	7	13711-1610 13711-1611
E02024						EX	47	159.5	10	45°	D	7	13715-1750

EIC No.	Engine Code	Vehicle Model Chassis Type	No. of Cyl.	Year	IN EX	Dimensions						O.E. Part NO.
						HD	OL	SD	SA	HS	CG	

HINO

N02025	H07C/D H06CT	TRUCK	RANGER	6		IN	47.9	134.5	9	60°	D	7	13711-1550
E02025						EX	41.3	134.2	9	45°	D	7	13715-1590
N02026	P09C(11)	TRUCK, FR		6		IN	41	155.5	8	60°	D	7	13711-1600B 13711-1590A 13711-1591A
E02026						EX	40	155.3	8	45°	D	7	13715-1620A
N02027	JO5C JO7C JO8C			6		IN	39	133	7	45°	D	7	13711-1631
E02027						EX	37	132.7	7	45°	D	7	13715-1732
N02028	W04D W06D	BUS;RAINBOW TRUCK RANGER	AC140 3M	4 6	83-	IN	45.5	123.1	9	60°	D	7	13711-1441 13711-1443 13711-78010 13711-1520 13711-1521
E02028						EX	40	123	9	45°	D	7	13715-1251 13715-1570 13715-78010



ENGIMAX INDUSTRIAL CORP.

#5, Lane 48, Tatung Road, Wufeng, Taichung, 41343 Taiwan R.O.C.

Tel: 886-4-2330-4735 Fax: 886-4-2330-7182

Email : john.mingyang@gmail.com

john.npic@gmail.com

<http://www.engimax.url.tw>