

Better Than NEEDS



# SUPPLIER CERTIFICATE



엠케이폴렉스(주)

**MK POLLEX**



## CONTENTS

**History of Screws**

BC 3C	Archimedes invented spiral water screw for the first time 1400 Knight's armor in the Middle Ages Used for clocks, guns, precision machines etc.
AC18C	The industrial Revolution increased usefulness and necessity of screws 1860 Screws became standardized by Henry Maudsley.
AC19C	Many screws made of various materials and standards have been developed.

### 1. Company Introduction

- 2. 1-1. Certification and patent status
- 1-2. History
- 1-3. Equipment Production & Inspection
- 1-4. Product Inspection Certificate

### 2. Application & End user

- 2-1. Application
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- 2-3. Delivery Performance (Since 2016)

### 3. Research & Development

- 3-1. Medical Products - Titanium COLD FORGING
- 3-2. Anti-loosening solution
- 3-3. Domed bolt

### 4. Process Flow Chart

### 5. Description & Specification

### 6. Production Introduction

- 6-1. Catalogue Of Main product

### 7. Greeting



# 1-1. Company Introduction



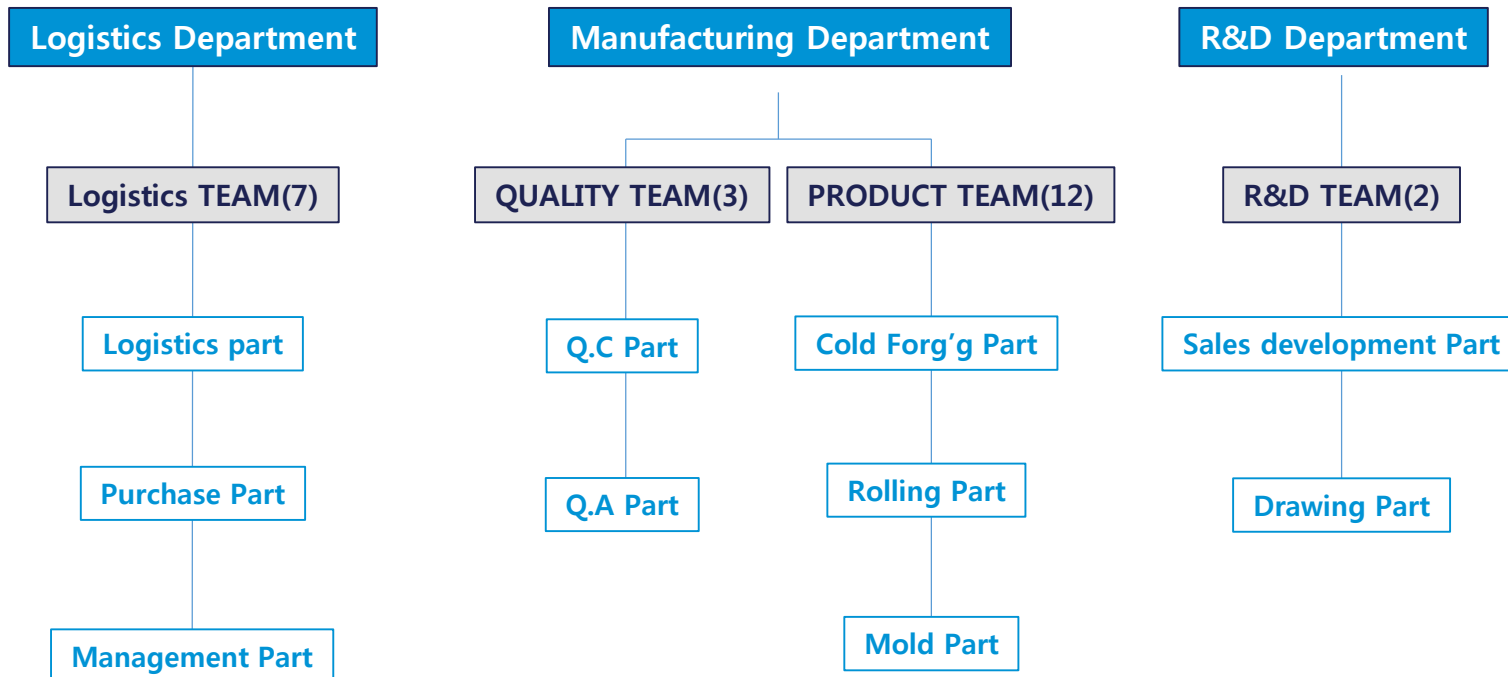
## i . General Information



<b>Company Name</b>	MK POLLEX CO.,LTD.	<b>establishment date</b>	April 22, 2003
<b>Address</b>	#831-22 Jugok-ri, Ujeong-eup, Hwaseong-City,Gyeonggi-do Korea		
<b>Phone Number</b>	82-31-351-6450	<b>Fax Number</b>	82-31-351-6474
<b>Home page</b>	www.plx.co.kr	<b>E-mail</b>	master@plx.co.kr sales@plx.co.kr
<b>Business conditions</b>	Manufacture	<b>Items</b>	Bolt, Cold Forged part, Trade



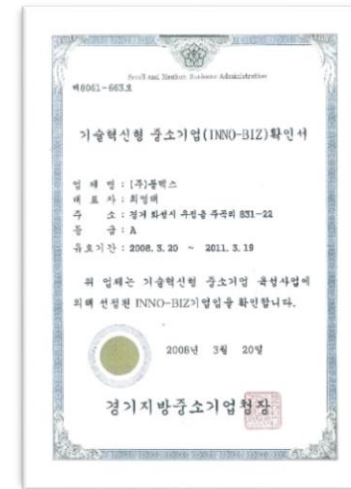
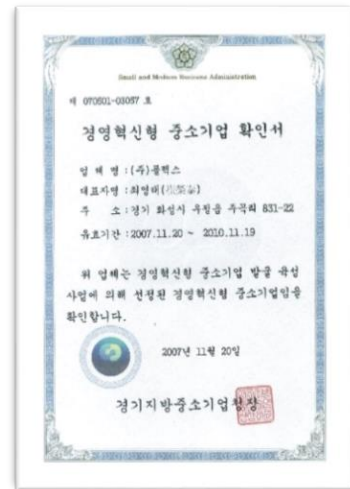
## Organization chart





# 1-2-1. Company Introduction

## Certification and patent status





## 1-2-2. Company Introduction



# The American Society of Mechanical Engineers CERTIFICATE



The American Society of Mechanical Engineers

— Founded 1880 —

THIS CERTIFICATE IS AWARDED TO

*Young Tae Choi* 최영태

FOR SUCCESSFUL COMPLETION OF

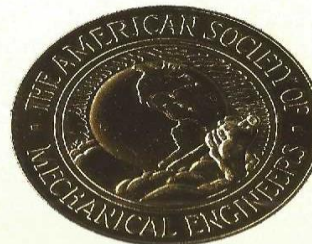
**Bolted Joint Assembly Principles Per PCC-1-2013**

October 11-12, 2018

Seoul, Korea

16 Hours

Thomas Costabile P.E.  
Executive Director



Arin Ceglia  
Director, Learning & Development





### ii. History of POLLEX

- 2003.04 Established Pollex - Professional manufacturer of socket bolts
- 2005.05 Volvo Construction Equipment Korea Co., Ltd. - Six-Point Screw Development
- 2005.10 Valve Actuator Parts Development - Stainless Socket Bolt
- 2005.11 Mando Co., Ltd. Business registration/transaction - Delivery of consumable bolts
- 2006.12 Developed and mass-produced socket bolts for heavy equipment (for BREAKER)
- 2006.12 **Construction of Hwaseong Plant**
- 2007.05 Export of ODD optical disk drive parts - Philippines SEPHIL / SAMSUNG ELCTORONICAL CO., LTD
- 2008.09 Manufacturing method of jack terminal for connecting electronic devices - Patent registration
- 2009.11 Gyeyang Electric Co., Ltd. China - **Development of grinder (100 / 125MM) parts**



### ii. History of POLLEX

- 2009.10** Entry into the steel tower business
  - Registered as a qualified company for supply of steel towers of KEPCO
- 2011.03** Mass production of nickel surface-treated socket bolts for FA companies
- 2011.11** Japan HITACHI, SONY parts development - Set screw / M2\*2.2
- 2013.09** Development of fastening elements for traffic-related new technology sound barrier
  - Anti-loosening bolt
- 2014.01** Sales of ASTM standard products for heat exchanger / pressure vessel
  - ASTM A193, A194, A307, A325, A490, A563, F436, F155
- 2014.05** Japan NISSAN SCREW Supply Agreement and Product Development / Mass Production Collaboration
- 2015.06** Delivery of Daewoo E & C - Jordan Nuclear Power Construction Storage POOL DOOR Plate
- 2016.03** Mass-production of fasteners for assembly of Samsung Semiconductor / Hynix/LG Display vendors





### ii. History of POLLEX

- 2016.07** Selection of partners for Korea Hydro & Nuclear Power Plant [ATOM mentoring project](#)
- 2016.12** Registration and delivery of iMarket Korea MRO company
- 2017.01** Name changed to company name MK POLEX CO., LTD.
- 2017.03** [Development of two-sided washers \(anti-particle equipment particles\)](#)
- 2017.06** Start of trading ICD with FineTec, a manufacturer of semiconductor process equipment and inspection equipment
- 2018.01** Development of Cold-Formed Components for Nipple Water Supply System
- 2018.05** Patent registration for washers to prevent loosening
- 2018.09** [Development of one-way security screws \(anti-disaster and anti-open\)](#)
- 2018.10** Exhibition of M- TECH Osaka, Japan (KEYENCE, IKEDA METAL COMPANY Registration ongoing)



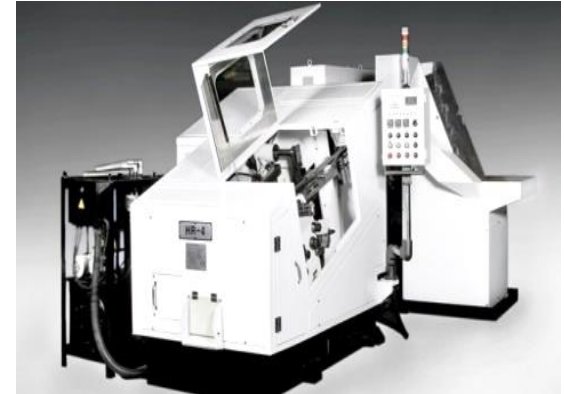
# 1-4-1. PRODUCTION EQUIPMENT



1.FORGING MACHINE  
FORMER



FORGING MACHINE  
HEADER



3. ROLLING MACHINE



4. CNC MACHINE



5. HEAT TREATMENT FURNACE  
OUT SOURCING



6. SURFACE TREATMENT  
EQUIPMENT  
OUT SOURCING



# 1-4-2-1. EQUIPMENT LIST

## COLD FORGING MACHINE (FORMER, HEADER)

NO	MACHINE	MANUFACTURE	MODEL	DIA	TYPE	SPECIFICATION			OUTPUT (KW)	DATE OF PUR	LOCATION
						RPM	P/HOUR	LENTH			
1	FORMER	GERMANY	BF4	M16	4D-4P	60	3,600	150	22	2007	F1
2	HEADER	TAEJIN	HS1-3	M12	1D-3B	30	1,800	180	15	2007	F1
3	HEADER	HAHSHIN	HS2-3	M8	2D-3B	80	4,800	120	11	2005	F1
4	HEADER	HAHSHIN	HS2-3	M6	2D-3B	90	5,400	80	3	2012	F1
5	HEADER	HAHSHIN	HS2-3	M4	2D-3B	90	5,400	50	2.2	2002	F1
6	HEADER	TAEJIN	HS1-3	M6	1D-3B	60	3,600	80	3	2005	F1
7	HEADER	TAEJIN	HS1-3	M4	1D-3B	70	4,200	50	2.2	2005	F1
8	FORMER	TAEJIN	BF4	M6	4D-4P	120	7,200	50	7.5	2008	F2
9	FORMER	TAEJIN	BF4	M8	4D-4P	120	7,200	60	7.5	2008	F2
10	FORMER	TAEJIN	BF4	M10	4D-4P	120	7,200	80	7.5	2008	F2
11	FORMER	TAEJIN	BF4	M12	4D-4P	120	7,200	60	7.5	2008	F2
12	FORMER	JYOTO	NF4	M2	4D-4P	120	7,200	10	2	2008	F2
13	FORMER	TAEJIN	NF4	M6	4D-4P	120	7,200	25	7.5	2012	F2
14	FORMER	TAEHWA	BF3	M4	3D-3P	120	7,200	40	7.5	2005	F1
15	FORMER	SAGAMURA	NF3	M6	3D-3P	120	7,200	20	7.5	2005	F1
16	HEADER	DAEWOO	HS13	M3	1D-3B	80	4,800	20	1.5	2012	F1
17	FORMER	JYOTO	NF5	M10	5D-5P	120	7,200	45	15	2012	F1
18	HEADER	HANSHIN	HS1-2	M3	1D-2B	120	7,200	30	1.5	2005	F2
19	HEADER	HWASUNG	HS1-3	M8	1D-3B	50	3,000	120	7.5	2012	F2
20	HEADER	HWASUNG	HS1-3	M6	1D-3B	60	3,600	80	3	2012	F2



# 1-4-2-2. EQUIPMENT LIST

## THREADING (ROLLING)

NO	MACHINE	MANUFACTURE	MODEL	DIA	TYPE	SPECIFICATION			OUTPUT	DATE OF PUR	LOCATION
						RPM	P/HOUR	LENTH	(KW)		
1	ROLLING MACHINE	JINSAN	RF6	M6	F	80	4,800	65	3.7	2005	B
2	ROLLING MACHINE	HEESUNG	RFE6	M6	F	150	9,000	45	5.5	2014	B
3	ROLLING MACHINE	HEESUNG	RF6	M6	F	80	4,800	75	5.5	2012	B
4	ROLLING MACHINE	NISSEI	RF12	M12	F	60	3,600	102	11	2008	B
5	ROLLING MACHINE	JINSAN	RF2	M2.5	F	160	9,600	25	0.75	2005	B
6	ROLLING MACHINE	JINSAN	RF2	M2.5	F	160	9,600	25	0.75	2012	B
7	ROLLING MACHINE	TAEJIN	RF3	M3	F	120	7,200	32	1.5	2005	B
8	ROLLING MACHINE	TAEJIN	RF3	M3	F	120	7,200	32	1.5	2005	B
9	ROLLING MACHINE	BOSUNG	RF4	M4	F	100	6,000	52	1.5	2007	B
10	ROLLING MACHINE	HEESUNG	RR2	M8	2R	60	3,600	50	5.5	2008	B
11	ROLLING MACHINE	DAITO	RF6	M6	F	80	4,800	52	3.7	2012	B
12	ROLLING MACHINE	HEESUNG	RFE8	M8	F	120	7,200	60	7.5	2014	B
13	ROLLING MACHINE	JINSAN	RF3	M3	F	120	7,200	32	0.75	2005	2F



# 1-4-2-3. EQUIPMENT LIST

## PLATE ROLL'G MACHINE

NO	MACHINE	MANUFACTURE	MODEL	DIA	TYPE	SPECCIFICATION			OUTPUT (KW)	DATE OF PUR R	LOCATION
						RPM	P/HOUR	LENGTH			
1	PLATE ROLL' G MACHINE	TAEJIN	TL2	M2-3	Φ 1.72	120	7,200	12	0.75	2005	2F
2	PLATE ROLL' G MACHINE	TAEJIN	TL3	M2-3	Φ 1.72	120	7,200	12	0.75	2006	2F
3	PLATE ROLL' G MACHINE	TAEJIN	TL4	M2-4	Φ 1.72	120	7,200	12	0.75	2005	2F
4	PLATE ROLL' G MACHINE	TAEJIN	TL4	M2-4	Φ 1.72	120	7,200	12	0.75	2005	2F
5	PLATE ROLL' G MACHINE	TAEJIN	TL4	M4-5	Φ 1.72	120	7,200	12	0.75	2006	2F
6	PLATE ROLL' G MACHINE	TAEJIN	TL5	M4-5	Φ 1.72	120	7,200	12	0.75	2007	2F
7	PLATE ROLL' G MACHINE	TAEJIN	TL5	M3-5	Φ 2.60	120	7,200	12	0.75	2007	2F
8	PLATE ROLL' G MACHINE	TAEJIN	TL5	M3-5	Φ 2.60	120	7,200	12	0.75	2005	2F
9	PLATE ROLL' G MACHINE	TAEJIN	TL8	M5-8	Φ 4.60	120	7,200	12	0.75	2007	2F
10	PLATE ROLL' G MACHINE	TAEJIN	TL8	M5-8	Φ 4.60	120	7,200	12	0.75	2006	2F



# 1-4-3. EQUIPMENT LIST

## ROLLING MACHINE (SEMS)

NO	MACHINE	MANUFACTURE	MODEL	DIA	TYPE	SPECIFICATION			OUTPUT	DATE OF PUR	LOCATION
						RPM	P/HOUR	LENGTH	(KW)		
1	SEM'S ROLLING MACHINE	JINAP	CH8	M8	수직	60	3,600	45	0.75	2009	B
2	SEM'S ROLLING MACHINE	JINAP	CH6	M6	수직	80	4,800	45	0.75	2009	B
3	SEM'S ROLLING MACHINE	JINBU	CF5	M5	수평	80	4,800	45	0.75	2009	B
4	SEM'S ROLLING MACHINE	JINBU	CF4	M4	수평	80	4,800	45	0.75	2009	B
5	SEM'S ROLLING MACHINE	JINBU	CF3	M3	수평	80	4,800	45	0.75	2009	B
1	SEM'S ROLLING MACHINE	YUJIN	RF8	M8	F	80	4,800	45	7.5	2009	B
2	SEM'S ROLLING MACHINE	YUJIN	RF6	M6	F	100	6,000	52	3.7	2009	B
3	SEM'S ROLLING MACHINE	YUJIN	RF6	M6	F	100	6,000	52	3.7	2009	B
4	SEM'S ROLLING MACHINE	YUJIN	RF6	M6	F	120	7,200	52	3.7	2009	B
5	SEM'S ROLLING MACHINE	DAEHAN	RF3	M3	F	120	7,200	27	0.75	2009	B



# 1-4. INSPECTION EQUIPMENT



1. ROCKWELL  
HARDNESS TESTER



2. UNIVERSAL TESTING  
MACHINE



3. METAL MICROSCOPE



4. PLATING  
THICKNESS TESTER



5. VERNIER CALIPERS



6. MICROMETER



7. RING GAUGE



8. SALT SPRAY  
TESTING MACHINE



# 1-5. PRODUCTION INSPECTION CERTIFICATE



## Test report of The Official Test Facilities

BEYOND ASIAN HUB, TOWARD GLOBAL WORLD

**KTR**  
KOREA TESTING & RESEARCH INSTITUTE

### TEST REPORT

우 13810 경기도 과천시 교육원로 98(중양동) TEL (032)5709-700 FAX (032)575-5613  
 성적서번호: TAK-2018-077337 접수 일자: 2018년 05월 14일  
 대표 자: 최진재팀 시험완료일자: 2018년 05월 25일  
 업체 명: 영케이폴렉스(주)  
 주소: 경기 화성시 우정읍 매바위로 76  
 시료 명: 금속시험(SUS 신차리 유두렌지)

#### 시험결과

시험항목	단위	시료구분	결과치	시험방법
중성염수분무시험(12 h, 적독발생유무)	-	n1	이상없음	KS D 9502 : 2009
중성염수분무시험(12 h, 적독발생유무)	-	n2	이상없음	KS D 9502 : 2009

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2018년 05월 25일

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BEYOND ASIAN HUB, TOWARD GLOBAL WORLD

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중성염수분무시험(6 h, 적독발생유무)	-	n2	이상없음	KS D 9502 : 2009(*)

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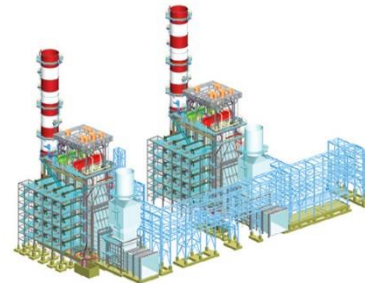




## 2-1. COMPANY INTRODUCTION

### Major Customers & Final user

H.R.S.G (Heat Recovery Steam Generator)  
ENGINEERING - BASIC & DETAIL  
MANUFACTURING  
TEST & COMMISSIONING CONSTRUCTION  
SUPERVISION  
TRAINING & EDUCATION





## Major Customers - Final user





## APPLICATION-PART 1

### 01 Chemical Equipment Products



### 02 Energy Plant Products



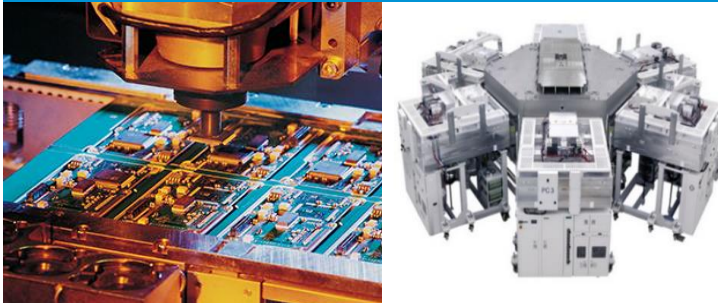
H.R.S.G (Heat Recovery Steam Generator)  
ENGINEERING - BASIC & DETAIL  
MANUFACTURING  
TEST & COMMISSIONING CONSTRUCTION





## APPLICATION-PART 2

SEMICONDUCTOR EQUIPMENT INDUSTRY



AUTOMOTIVE INDUSTRY



MEDICAL INDUSTRY



SOLAR POWER GENERATION INDUSTRY



OPTICS & HOME APPLIANCES



ROBOT INDUSTRY





## 2-3-1. Delivery Performance(Since 2016)

NO	PROJECT NAME or COMPANY	DELIVERY PERIOD	DELIVERY PERFORMANCE	CUSTOMER	DESCRIPTION
1	Seoul Combined Cycle Power-MAIN STACK	2015.09~2016.03	\$137,570	FINE INNOVATION Corporation	H/T BOLT SETS
2	ROJANA SPP3 PROJECT	2015.12~2016.06	\$96,475	DKME Corporation	ASTM A325
3	Pocheon CHP Boiler	2016.03~2016.10	\$147,310	FINE INNOVATION Corporation	ASTM A325
4	BHI-//ALGERIA NAAMA CAPP	2016.04~2016.10	\$105,436	DKME Corporation	ASTM A307 Gr.A
5	WEST DAMIETTA PROJECT	2016.06~2016.09	\$46,382	DKME Corporation	ASTM A325
6	DKME UPON PROJECT	2016.06~2016.10	\$128,293	DKME Corporation	ASTM A490
7	KARBALA PROJECT	2016.06~2016.10	\$6,494	FINE INNOVATION Corporation	F10T, S10T
8	VPI-V17498 TVA Allen PROJECT	2016.10~2016.12	\$7,885	DKME Corporation	ASTM A325
9	SAMSUNG ELECTRO-MACHANICS	2016.01~2016.12	\$296,846	ANI CO., LTD	SOCKET BOLT
10	SEMES CO., LTD	2016.01~2016.12	\$304,082	ANI CO., LTD	SOCKET BOLT
11	SAMSUNG ELECTRONICS CO., LTD	2016.01~2016.12	\$111,317	HANYANG ENG (TAEBONG)	SOCKET BOLT
12	KEYANG ELECTRIC	2016.01~2016.12	\$51,948	KEYANG ELECTRIC	SOCKET BOLT
13	SAMSUNG ELECTRO-MACHANICS	2016.03~2016.12	\$22,263	CHEONGWOO PRECISION	SOCKET BOLT
14	TOPTEC INC	2016.03~2016.12	\$72,356	CM TECH21 Corporation	SOCKET BOLT
15	SAMSUNG ELECTRO-MACHANICS	2016.03~2016.12	\$46,070	HANGANG PRECISION	SOCKET BOLT



## 2-3-2. Delivery Performance(Since 2016)

NO	PROJECT NAME & COMPANY	DELIVERY PERIOD	DELIVERY PERFORMANCE	CUSTOMER	DESCRIPTION
16	SK HYNICS CO., LTD	2016.03~2016.12	\$37,100	ICD Corporation	SOCKET BOLT
17	SAMSUNG SDI VN	2017.01~2017.08	\$240,200	ANI CO., LTD	SOCKET BOLT
18	TOPTEC INC VN	2017.01~2017.04	\$163,200	CM TECH21 Corporation	SOCKET BOLT
19	BHI-//ALGERIA NAAMA CCPP	2017.01~2017.13	\$183,000	SYSCO CO., LTD	ASTM & H/T BOLT SET
20	CEMES CO., LTD	2017.01~2017.15	\$63,080	FINE TECH Corporation	SOCKET BOLT
21	SAMSUNG ELECTRONICS CO., LTD	2017.01~2017.16	\$296,800	ANI CO., LTD	SOCKET BOLT
22	MYANMAR(REFINERY FACILITY)	2017.02~2017.07	\$66,790	TTS CORPORATION	SOCKET BOLT
23	SAMSUNG SDI VN	2017.03~2017.07	\$340,260	ANI CO., LTD	SOCKET BOLT
24	SAMSUNG SDI VN	2017.04~2017.08	\$140,200	ANI CO., LTD	SOCKET BOLT
25	SAMSUNG ELECTRONICS CO., LTD	2017.06~2017.07	\$40,260	ANI CO., LTD	SOCKET BOLT
26	TOPTEC INC	2017.05~2017.12	\$163,210	FINE TECH Corporation	SOCKET BOLT
27	SAMSUNG ELECTRO-MACHANICS	2017.06~2017.06	\$43,600	CHEONGWOO PRECISION	SOCKET BOLT
20	LG DISPLAY CO., LTD	2017.07~2017.10	\$63,080	ODI CO., LTD	SOCKET BOLT
21	SAMSUNG SDI CO.LTD	2017.08~2018.02	\$296,846	ANI CO., LTD	SOCKET BOLT
22	MYANMAR(REFINERY FACILITY)	2018.01~2018.02	\$66,790	TTS CORPORATION	H/T BOLT SETS
21	LG DISPLAY CO., LTD	2018.02~2017.06	\$296,846	ODI CO., LTD	SOCKET BOLT



## 2-3-3. Delivery Performance by Product

### Plant industry parts - I ASTM A325/A325M - Heavy hexagon bolts

**Iron & Steel plant**



**Iron structure building**



**Power plant**



**Chemical plant**



## 2-3-4. Delivery Performance by Product

### Plant industry parts - II

ASTM A490/A490M - Heavy hexagon bolt set & stud bolt set

**Iron & Steel plant**



**Power plant**



**Offshore plant**



**Chemical plant**





## 2-3-5. Delivery Performance by Product

### Plant industry parts - III ASTM A307 - Hexagon bolts

**Nuclear power plant**



**Power plant**



**Iron & Steel plant**



**Chemical plant**



## 2-3-6. Delivery Performance by Product

### Plant industry parts - IV KS B 2819 - T/S bolts

Steel structure bridge



Iron structure building



Nuclear power plant



Chemical plant



## 2-3-7. Delivery Performance by Product

### Plant industry parts - V KS B 1010 - H/T bolt set

**Steel structure bridge**



**Iron structure building**



**Nuclear power plant**



**Chemical plant**



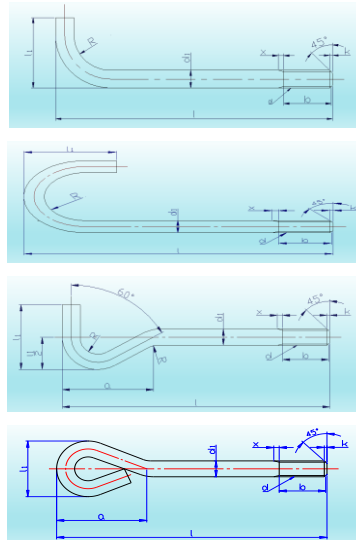
## 2-3-8. Delivery Performance by Product

### Plant industry parts - VI KS B 1016 – FOUNDATION BOLT

Chemical plant



Power plant



Iron structure building



Nuclear power plant



## 2-3-9. Delivery Performance by Product

### Plant industry parts - VII KS B 1062 - Headed weld'g stud

Steel structure bridge



Iron structure building



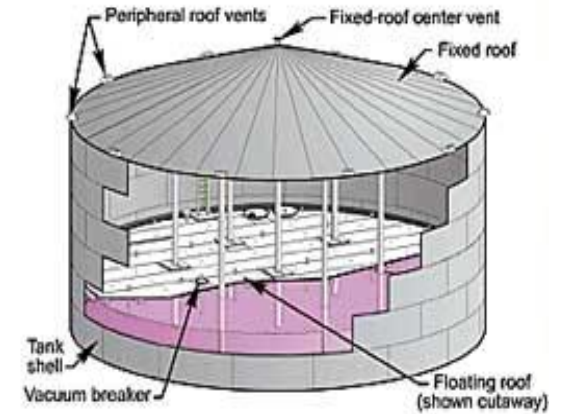
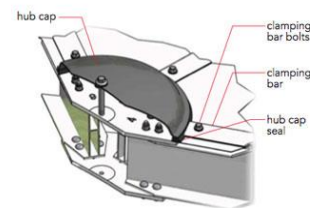
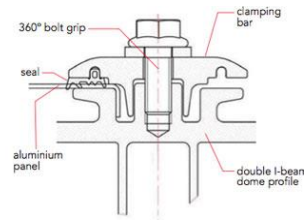
Power plant



Nuclear power plant

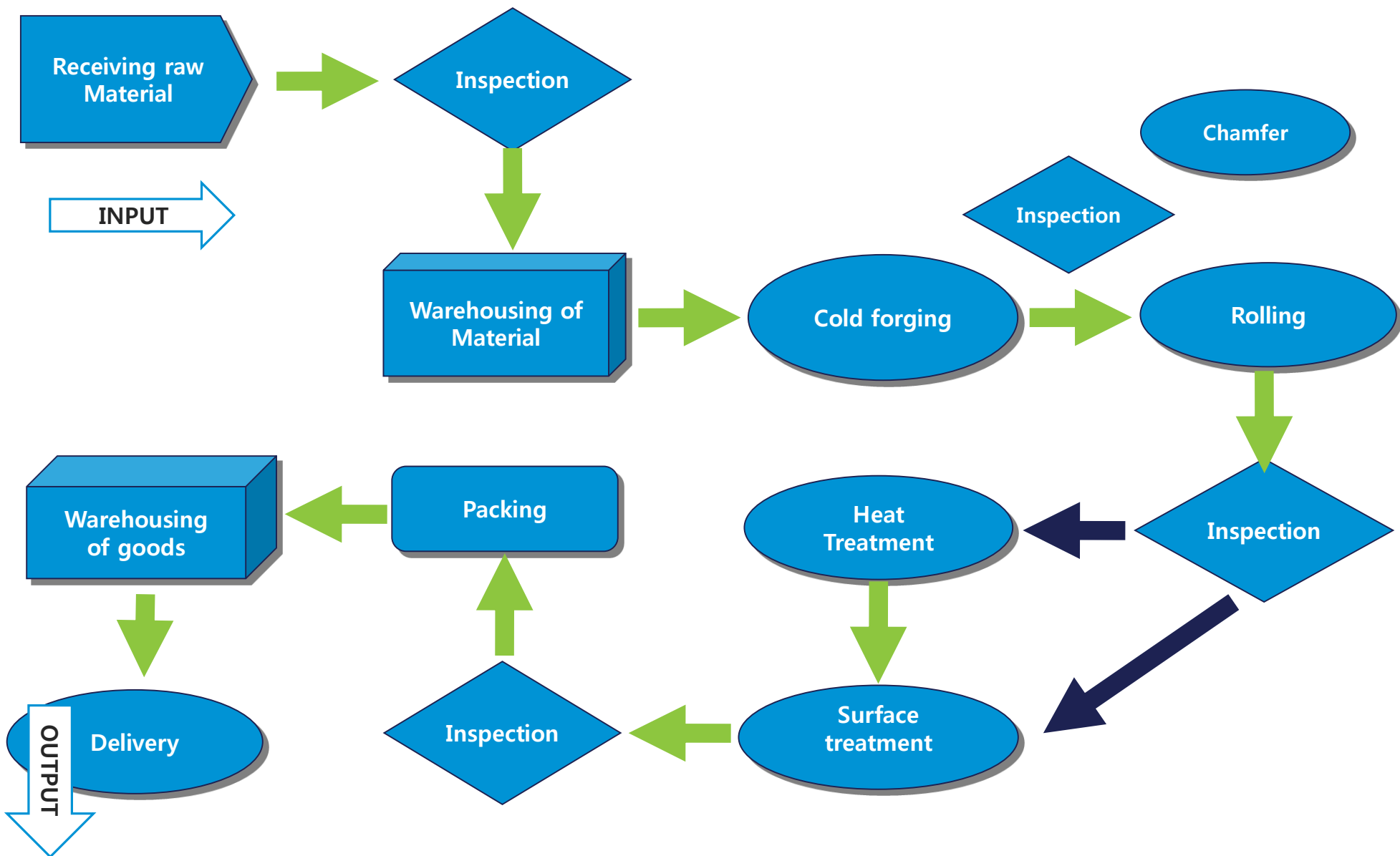


## Plant industry parts - VIII Waterproof bolt set





### 3. PROCESS FLOW CHART- Cold forging parts





# 4. DESCRIPTION & SPECIFICATION

Description	Specification		
Hex Bolt Heavy Hex Bolt	4.6, 6.8, 8.8, 10.9, 12.9	GOST R ISO 898-1, KS B 0233	GOST 7798, KS B 1002
	4T, 5T, 6T, 7T	JIS B 1051	JIS B 1180
	A, B	ASTM A307	ANSI/ASME B 18.2.1
	B7, B7M, B8, B8M, B16	ASTM A193	
High Strength Hex Bolt	1, 2, 3	ASTM A325, ASTM A490	ANSI/ASME B 18.2.1
Stud Bolt	B5, B6, B7, B7M,	ASTM A193, ASTM A320	ANSI/ASME B 16.5
	L7, B8, B8M, B16		
	4.8, 8.8, 10.9, 4T	GOST R ISO 898-1, KS B 0233, JIS B 1051	KS B 1037, JIS B 1173
Foundation Bolt(Anchor Bolt)	Type J, JA, L, LA,	GOST 24379.1, KS B1016, JIS B1178	
U-Bolt	Type A, B, C	KS V3032, JIS F3022	
Hex Nut Heavy Hex Nut High Strength Hex Nut	4, 5, 6, 8, 10, 12	GOST R ISO 898-2, KS B0234	KS B1012
	4T, 5T, 6T, 8T, 10T, 12T	GOST R 52645, JIS B1052	JIS B1181
	F8, F10	KS B 1010, JIS B 1186	
	A, B, C, 8S, 10S	ASTM A563/563M	ANSI/ASME B 18.2.
	2H, 2HM, 4, 6, 8, 8M	ASTM A194	
Plain Washer	F35	KS B 1010, JIS B 1186	
	TYPE1, TYPE3	GOST R 52646, ASTM F436	
Heavy Square Nut	A, B, C, 8S, 10S	ASTM A563/563M	ANSI/ASME B 18.2.2
Socket Head Cap Screw	8.8, 10.9, 12.9	GOST R ISO 898-1, KS B 0233, JIS B 1051	KS B 1003, JIS B 1176
		ASTM A574	ANSI/ASME B 18.3
Hex Cap Screw Heavy Hex Screw	4.6, 6.8, 8.8, 10.9, 12.9,	GOST R ISO 898-1, KS B 0233, JIS B 1051	GOST 7798, KS B 1002, JIS B 1180
	4T, 5T, 6T, 7T		
	BC, BD	ASTM A354	ANSI/ASME B 18, 2.1
	TYPE 1, 2	ASTM A449	
Heavy Hex Structural Bolt	F8T, F10T, F12T	KS B 1010, JIS B 1186	
Square Bolt	4.6, 4.8, 4T	GOST R ISO 898-1, KS B 0233, JIS B 1051	KS B 1004, JIS B 1182
Heavy Square Bolt	A, B	ASTM A307	ANSI/ASME B 18.2.1

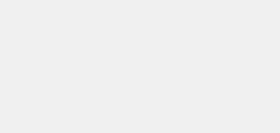
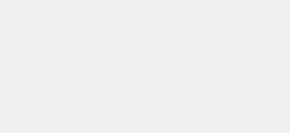
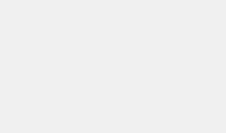
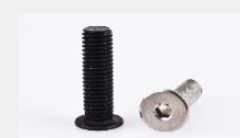




# 5. INTRODUCTION OF PRODUCT

Alloy Steel	Grade	Surface Treatment	Stainless Steel	Grade	Surface Treatment
	12.9T/ 109T/ 8.8T	Black Zinc / Ni		304(A-70) 316L(A2-80)	Wash'G / Black

1. Hexagon Socket Head Cap Screws
2. Hexagon Low Head Cap Screws
3. Hexagon Socket Ultra Low Head Cap Screws
4. Hexagon Socket Button Head Cap Screws
5. Hexagon Socket Countersunk Head Cap Screw
6. Hexagon Socket Set Screws - Type( Cup/Flat/Cone/Dog)
7. Hexagon Washer Assemblies Socket/Sems Screws
8. 6 Lobe Button Head Cap Screws
9. Torx Socket Head Cap Screws
10. Torx Socket Button Head Cap Screws
11. Torx Socket Countersunk Head Cap Screws
12. Pin Torx Socket Button Head Cap Screws
13. Pin Torx Socket Countersunk Head Cap Screws
14. Socket Head Cap Screws with Hole
15. Hexagon Socket Tapered Pipe Plugs
16. Hexagon Socket Drt-seal Tapered Pipe Plugs
17. Square Head Tapered Pipe Plugs -Carbon steel
18. Profile Accesery Nut –Spong/Spring/Ball/ T
19. Machine screw / Tapping screw/ Taptite screw
- 20.Cold Forggng Product
- 21.Hexagon bolt / Nut

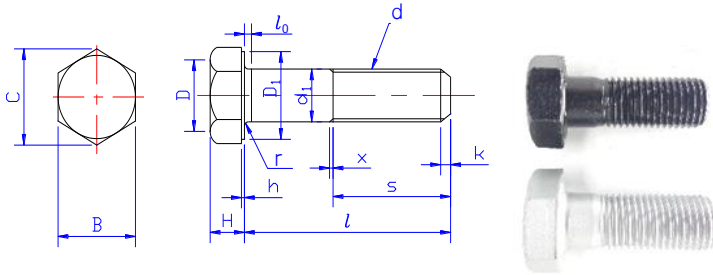




# 6-1. INTRODUCTION OF PRODUCT

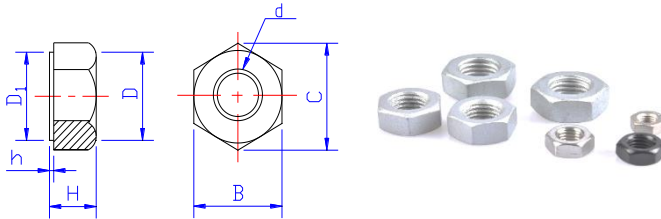
## HIGH STRENGTH BOLT, NUT, WASHER

Unit : mm



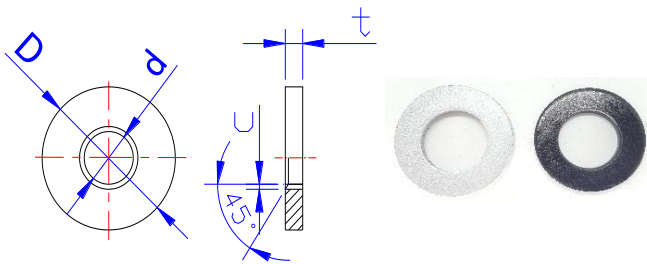
Nominal Diameter (d)	d1		H		B		C	D	D1	r	K	a - b	E	F	h	s	
	Basic	Tolerance	Basic	Tolerance	Basic	Tolerance	App.	App.	min.		App.	max.	max.	max.		Basic	Tolerance
M 12	12	+0.7	8	±0.8	22	0	25.4	20	20	0.8~1.6	2	0.7	1°	2°	0.4~0.8	25	+5
M 16	16	-0.2	10		27	-0.8	31.2	25	25			30				0	
M 20	20	+0.8 -0.4	13	±0.9	32	0 -1	37	30	29	1.2~2.0	2.5	0.9	1°	2°	0.4~0.8	35	+6 0
M 22	22		14		36		41.6	34	33			40					
M 24	24		15		41		47.3	39	38	45							
M 27	27		17		46		53.1	44	43	50							
M 30	30		19		±1.0		50	57.7	48	47	55						

Unit : mm



Nominal Diameter (d)	d1	H		B		C	D	D <sub>1</sub>	a-b	E	F	h
		Basic	Tolerance	Basic	Tolerance	App.	App.	min.	max.	max.	max.	
M 12	12	12	±0.35	22	0	25.4	20	20	0.7	1°	2°	0.4~0.8
M 16	16	16		27	-0.8	31.2	25	25	0.8			
M 20	20	20	±0.4	32	0 -1	37	30	29	0.9			
M 22	22	22		36		41.6	34	33	1.1			
M 24	24	24		41		47.3	39	38	1.2			
M 27	27	27		46		53.1	44	43	1.3			
M 30	30	30		50		57.7	48	47	1.5			

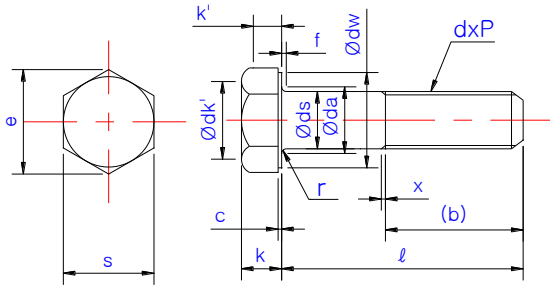
Unit : mm



Nominal Size	d		D		t		c or r
	Basic	Tolerance	Basic	Tolerance	Basic	Tolerance	
12	13	+0.7 / 0	26	0 / -0.8	3.2	±0.4	1.5
16	17		32	0 / -1	4.5	±0.5	
20	21	40					
22	23	+0.8 / 0	44		6	±0.7	
24	25		48				
27	28		56	0 / -1.2	8		
30	31	+1.0 / 0	60			2.8	



# 6-2. INTRODUCTION OF PRODUCT



**HEX BOLT**



KS B 1002 / JIS B 1180

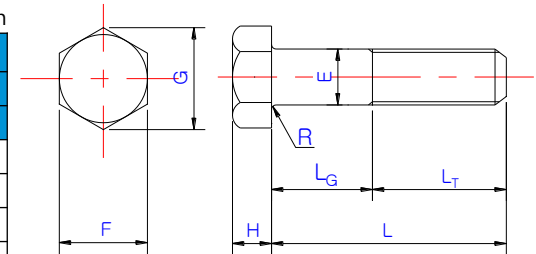
Diameter (d)	Pitch		d <sub>s</sub>		k		s		e	d <sub>k</sub> <sup>1</sup>	r	d <sub>a</sub>	z
	Coarse	Fine	Basic	Tolerance	Basic	Tolerance	Basic	Tolerance	App.	App.	min	max	App.
M 12	1.75	1.25	12	0 - 0.25	8	±0.3	19	0 - 0.8	21.9	18	0.6	13.7	2
(M 14)	2	1.5	14		9		22		25.4	21	0.6	15.7	2
M 16	2	1.5	16		10		24		27.7	23	0.6	17.7	2
(M 18)	2.5	1.5	18		12		27		31.2	26	0.6	20.2	2.5
M 20	2.5	1.5	20	0 - 0.35	13	±0.35	30	0 - 1.3	34.6	29	0.6	22.4	2.5
(M 22)	2.5	1.5	22		14		32		37	31	0.6	24.4	2.5
M 24	3	2	24		15		36		41.6	34	0.6	26.4	3
(M 27)	3	2	27		17		41		47.3	39	1	30.4	3
M 30	3.5	2	30	0 - 0.4	19	±0.4	46	0 - 1.2	53.1	44	1	33.4	3.5
(M 33)	3.5	2	33		21		50		57.7	48	1	36.4	3.5
M 36	4	3	36		23		55		63.5	53	1	39.4	4
(M 39)	4	3	39		25		60		69.3	57	1	42.4	4
M 42	4.5	—	42	0 - 0.4	26	±0.4	65	0 - 1.2	75	62	1.2	45.6	4.5
(M 45)	4.5	—	45		28		70		80.8	67	1.2	48.6	4.5
M 48	5	—	48		30		75		86.5	72	1.6	52.6	5

Unit : mm

ANSI/ASME B 18.2.1

Nominal Size or Basic Product Dia		E		F		G		H			R		L <sub>T</sub>	
		Max	Basic	Max	Min	Max	Min	Basic	Max	Min	Max	Min	6" ≥ L	6" < L
1/2	0.5000	0.515	7/8	0.875	0.850	1.010	0.969	11/32	0.364	0.302	0.03	0.01	1.250	1.500
5/8	0.6250	0.642	1-1/16	1.062	1.001	1.227	1.175	27/64	0.444	0.378	0.06	0.02	1.500	1.750
3/4	0.7500	0.768	1-1/4	1.250	1.212	1.440	1.383	1/2	0.524	0.455	0.06	0.02	1.750	2.000
7/8	0.8750	0.895	1-3/16	1.438	1.384	1.660	1.589	37/64	0.604	0.531	0.06	0.02	2.000	2.250
1	1.0000	1.022	1-5/8	1.625	1.575	1.875	1.796	43/64	0.700	0.591	0.09	0.03	2.250	2.500
1-1/8	1.0250	1.145	1-13/16	1.812	1.758	2.093	2.002	3/4	0.780	0.658	0.09	0.03	2.500	2.750
1-1/4	1.2500	1.277	2	2.000	1.938	2.309	2.209	27/32	0.875	0.749	0.09	0.03	2.750	3.000
1-3/8	1.3750	1.484	2-3/16	2.188	2.119	2.525	2.416	29/32	0.940	0.81	0.09	0.03	3.000	3.250
1-1/2	1.5000	1.531	2-3/8	2.375	2.300	2.742	2.622	1	1.036	0.902	0.09	0.03	3.250	3.500
1-3/4	1.7500	1.785	2-3/4	2.750	2.662	3.175	3.065	1-5/32	1.196	1.054	0.12	0.04	3.750	4.000
2	2.0000	2.000	3-1/8	3.125	3.025	3.608	3.449	1-11/32	1.388	1.175	0.12	0.04	4.250	4.500

Unit : inch



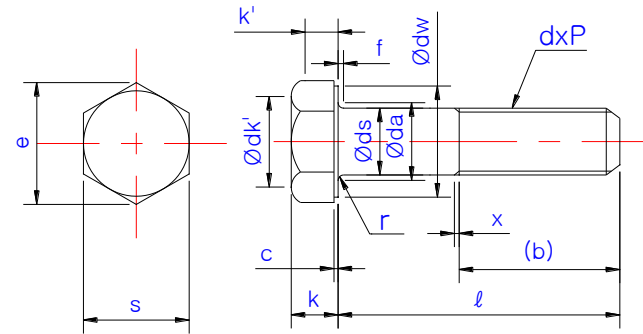
**HEAVY HEX BOLT**





# 6-3. INTRODUCTION OF PRODUCT

## HEXAGON HEAD BOLT

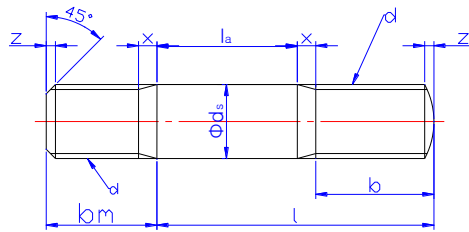


Unit : mm

Diameter (d)	Pitch		d <sub>s</sub>		k		s		e	d <sub>k</sub> <sup>1</sup>	r	d <sub>a</sub>	z
	Coarse	Fine	Basic	Tolerance	Basic	Tolerance	Basic	Tolerance	App	App	min	max	App
M 12	1.75	1.25	12	0 0.25	8	±0.3	19	0 - 0.8	21.9	18	0.6	13.7	2
(M 14)	2	1.5	14		9		22		25.4	21	0.6	15.7	2
M 16	2	1.5	16		10		24		27.7	23	0.6	17.7	2
(M 18)	2.5	1.5	18		12		27		31.2	26	0.6	20.2	2.5
M 20	2.5	1.5	20	0 0.35	13	±0.35	30	0 - 1.3	34.6	29	0.6	22.4	2.5
(M 22)	2.5	1.5	22		14		32		37	31	0.6	24.4	2.5
M 24	3	2	24		15		36		41.6	34	0.6	26.4	3
(M 27)	3	2	27		17		41		47.3	39	1	30.4	3
M 30	3.5	2	30	0 - 0.4	19	±0.4	46	0 - 1.2	53.1	44	1	33.4	3.5
(M 33)	3.5	2	33		21		50		57.7	48	1	36.4	3.5
M 36	4	3	36		23		55		63.5	53	1	39.4	4
(M 39)	4	3	39		25		60		69.3	57	1	42.4	4
M 42	4.5	—	42		26		65		75	62	1.2	45.6	4.5
(M 45)	4.5	—	45		28		70		80.8	67	1.2	48.6	4.5
M 48	5	—	48		30		75		86.5	72	1.6	52.6	5



# 6-4. INTRODUCTION OF PRODUCT



## STUD BOLT



KS B 1037

Unit : mm

Diameter(d)		M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20	
P	Coarse	0.7	0.8	1	1.25	1.5	1.75	2	2	2.5	2.5	
	Fine	-	-	-	-	1.25	1.25	1.5	1.5	1.5	1.5	
ds	Basic	4	5	6	8	10	12	14	16	18	20	
	Tolerance	0/-0.12			0/-0.15		0/-0.18			0/-0.21		
b	Basic	10	12	14	18	20	22	25	28	30	32	
	Tolerance	+1.1/0	+1.4/0	+1.5/0	+1.9/0	+2.2/0	+2.6/0	+3/0	+3/0	+3/0	+5/0	
bm	TYPE1	Basic	-	-	-	-	12	15	18	20	22	25
		Tolerance	-	-	-	-	+1.1/0			+1.3/0		
	TYPE2	Basic	6	7	8	11	15	18	21	24	27	30
		Tolerance	+0.75/0	+0.9/0		+1.1/0			+1.3/0			+1.6/0
	TYPE3	Basic	8	10	12	16	20	24	28	32	36	40
		Tolerance	+0.9/0		+1.1/0		+1.3/0			+1.6/0		
z( App.)		0.8	0.8	1	1.2	1.5	2	2	2	2.5	2.5	

ANSI C-85

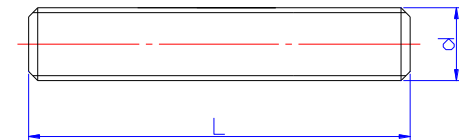
Unit : inch

Length \ Diameter	Tolerance on Length - inch	
	L ≤ 6 inch	L > 6 inch
over 5/16" to 3/4"	±0.06	±0.12
over 3/4" to 1-1/4"	±0.12	±0.19
over 1-1/4"	±0.25	±0.25

ANSI C-86

Unit : mm

Length \ Diameter	Tolerance on Stud Length
to M12	±1.5
over M12 to M18	±3.1
over M18	±6.3

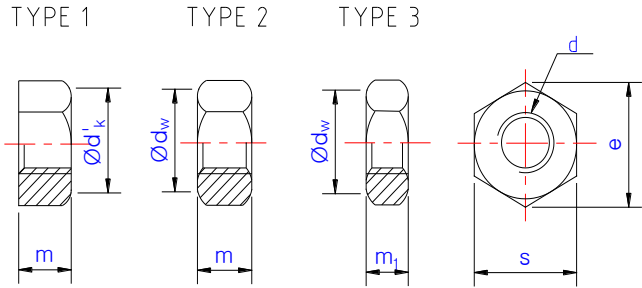


## FULLY THREADED STUD BOLT





# 6-5. INTRODUCTION OF PRODUCT



**HEX NUT**



KS B 1012 / JIS B 1181

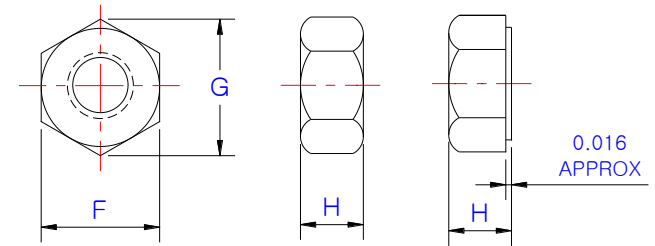
Unit : mm

Diameter (d)	m		m <sub>1</sub>		s		e	d <sub>k</sub> <sup>1</sup> & d <sub>w</sub>
	Basic	Tolerance	Basic	Tolerance	Basic	Tolerance	App.	App.
M 12	10	±0.8	7	±0.8	19	0 - 0.8	21.9	18
(M 14)	11	±0.9	8		22		25.4	21
M 16	13		10		24		27.7	23
(M 18)	15		11	27	31.2	26		
M 20	16	±1.0	12	±0.9	30	0 - 1.0	34.6	29
(M 22)	18		13		32		37	31
M 24	19		14		36		41.6	34
(M 27)	22	±1.0	16	±1.0	41	0 - 1.2	47.3	39
M 30	24		18		46		53.1	44
(M 33)	26		20		50		57.7	48
M 36	29	±1.2	21	±1.0	55	0 - 1.2	63.5	53
(M 39)	31		23		60		69.3	57
M 42	34		25		65		75	62
(M 45)	36	±1.2	27	±1.0	70	0 - 1.2	80.8	67
M 48	38		29		75		86.5	72

ANSI / ASME B 18.2.2

Unit : inch

Nominal Size	F		G		H	
	Max	Min	Max	Min	Max	Min
1/2	0.875	0.850	1.010	0.969	0.504	0.464
9/16	0.938	0.909	1.083	1.037	0.568	0.526
5/8	1.062	1.031	1.227	1.175	0.631	0.587
3/4	1.250	1.212	1.443	1.382	0.758	0.710
7/8	1.438	1.394	1.660	1.589	0.885	0.833
1	1.625	1.575	1.876	1.796	1.012	0.956
1 1/8	1.812	1.756	2.093	2.002	1.139	1.079
1 1/4	2.000	1.938	2.309	2.209	1.251	1.187
1 3/8	2.188	2.119	2.526	2.416	1.378	1.310
1 1/2	2.375	2.300	2.742	2.622	1.505	1.433
1 5/8	2.562	2.481	2.959	2.828	1.632	1.556
1 3/4	2.750	2.662	3.175	3.035	1.759	1.679
1 7/8	2.938	2.844	3.392	3.242	1.886	1.802
2	3.125	3.025	3.608	3.449	2.013	1.925



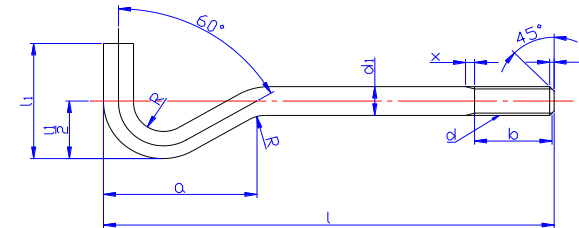
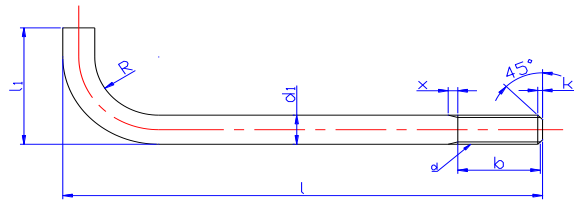
**HEAVY HEX NUT**





# 6-6. INTRODUCTION OF PRODUCT

## FOUNDATION BOLTS (ANCHOR BOLTS) – KS B 1016 , JIS B 1178



KS B 1016 : L-TYPE

Unit : mm

Nominal Diameter(d)	d <sub>1</sub>		b		l <sub>1</sub> App.	R App.	k App.
	Basic	Tolerance	Basic	Tolerance			
M10	10	±0.4	25	+6.3 / 0	40	20	1.5
M12	12		32	+8 / 0	50	25	2
M16	16	40	63		32	2	
M20	20	50	80		40	2.5	

KS B 1016 : LA-TYPE

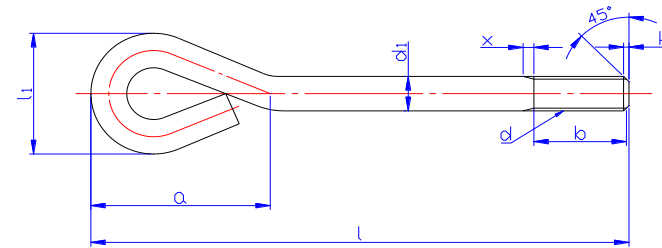
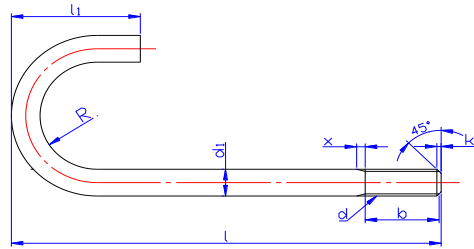
Unit : mm

Nominal Diameter(d)	d <sub>1</sub>		b		L <sub>1</sub> App.	a App.	R App.	K App.
	Basic	Tolerance	Basic	Tolerance				
M8	8	±0.4	20	+6.3 / 0	32	41	8	1.2
M10	10		30	+8 / 0	40	51	10	1.5
M12	12		35		50	64	12	2
M16	16	±0.5	40	+10 / 0	63	81	16	2
M20	20		50		80	102	20	2.5
M24	24	80	100		127	24	3	
M30	30	±0.6	90		125	158	30	3.5
M36	36	±0.7	110	140	181	36	4	
M42	42	±0.8	125	180	226	42	4.5	
M48	48	±0.9	150	+12.5 / 0	200	252	48	5



# 6-7. INTRODUCTION OF PRODUCT

## FOUNDATION BOLTS (ANCHOR BOLTS) – KS B 1016 , JIS B 1178



KS B 1016 : J-TYPE

Unit : mm

Nominal Diameter(d)	d <sub>1</sub>		b		l <sub>1</sub> App.	R App.	K App.
	Basic	Tolerance	Basic	Tolerance			
M10	10	±0.4	25	+6.3 / 0	45	20	1.5
M12	12		32		56	25	2
M16	16	±0.5	40	+8 / 0	71	32	2
M20	20		50		90	40	2.5
M24	24		63		112	50	3
M30	30	±0.6	80	+10 / 0	140	63	3.5
M36	36	±0.7	90		160	71	4
M42	42	±0.8	112		200	90	4.5
M48	48	±0.9	125	+12.5 / 0	224	100	5

KS B 1016 : JA-TYPE

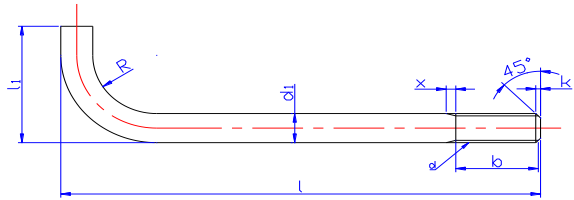
Unit : mm

Nominal Diameter(d)	D <sub>1</sub>		b		l <sub>1</sub> App.	a App.	K App.
	Basic	Tolerance	Basic	Tolerance			
M10	10	±0.4	30	+6.3 / 0	35	50	1.5
M12	12		35		40	65	2
M16	16	±0.5	40	+8 / 0	55	85	2
M20	20		50		70	105	2.5
M24	24		80		80	125	3
M30	30	±0.6	90	+10 / 0	100	155	3.5
M36	36	±0.7	110		120	190	4
M42	42	±0.8	125		140	220	4.5
M48	48	±0.9	150	+12.5 / 0	160	250	5





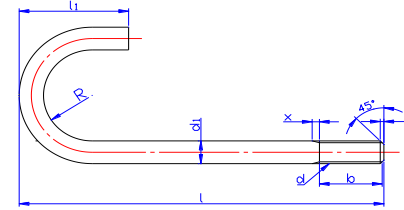
## FOUNDATION BOLTS (ANCHOR BOLTS) – KS B 1016 , JIS B 1178



KS B 1016 : L-TYPE

Unit : mm

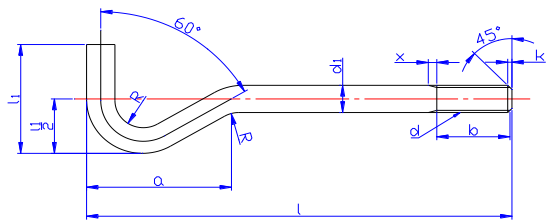
Nominal Diameter(d)	d <sub>1</sub>		b		l <sub>1</sub>	R	k
	Basic	Tolerance	Basic	Tolerance	App.	App.	App.
M10	10	±0.4	25	+6.3 / 0	40	20	1.5
M12	12		32		50	25	2
M16	16	±0.5	40	+8 / 0	63	32	2
M20	20		50		80	40	2.5



KS B 1016 : J-TYPE

Unit : mm

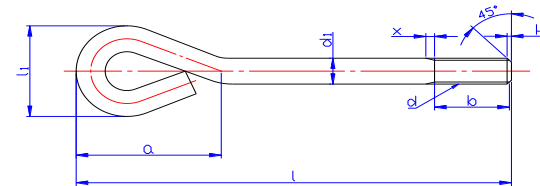
Nominal Diameter(d)	d <sub>1</sub>		b		l <sub>1</sub>	R	K
	Basic	Tolerance	Basic	Tolerance	App.	App.	App.
M10	10	±0.4	25	+6.3 / 0	45	20	1.5
M12	12		32		56	25	2
M16	16	±0.5	40	+8 / 0	71	32	2
M20	20		50		90	40	2.5
M24	24	±0.6	63	+10 / 0	112	50	3
M30	30		80		140	63	3.5
M36	36	±0.7	90	+10 / 0	160	71	4
M42	42	±0.8	112		200	90	4.5
M48	48	±0.9	125	+12.5 / 0	224	100	5



KS B 1016 : LA-TYPE

Unit : mm

Nominal Diameter(d)	d <sub>1</sub>		b		l <sub>1</sub>	a	R	K
	Basic	Tolerance e	Basic	Tolerance e	App.	App.	App.	App.
M8	8	±0.4	20	+6.3 / 0	32	41	8	1.2
M10	10		30		40	51	10	1.5
M12	12		35		50	64	12	2
M16	16	±0.5	40	+8 / 0	63	81	16	2
M20	20		50		80	102	20	2.5
M24	24	±0.6	80	+10 / 0	100	127	24	3
M30	30		90		125	158	30	3.5
M36	36	±0.7	110	+10 / 0	140	181	36	4
M42	42	±0.8	125		180	226	42	4.5
M48	48	±0.9	150	+12.5 / 0	200	252	48	5



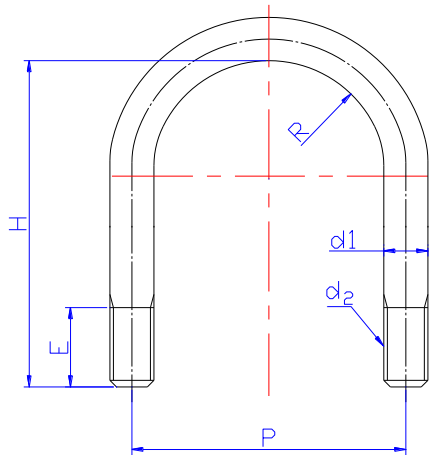
KS B 1016 : JA-TYPE

Unit : mm

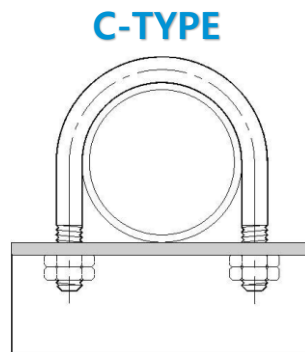
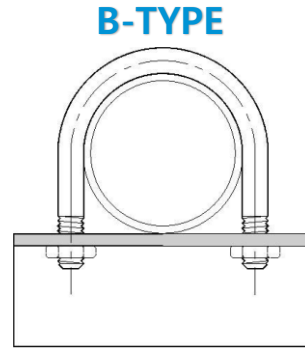
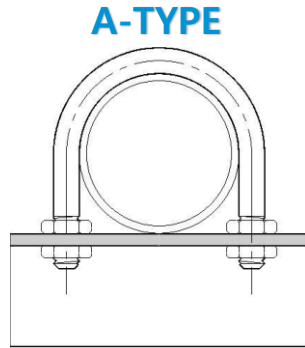
Nominal Diameter(d)	D <sub>1</sub>		b		l <sub>1</sub>	a	K
	Basic	Tolerance	Basic	Tolerance	App.	App.	App.
M10	10	±0.4	30	+6.3 / 0	35	50	1.5
M12	12		35		40	65	2
M16	16	±0.5	40	+8 / 0	55	85	2
M20	20		50		70	105	2.5
M24	24	±0.6	80	+10 / 0	80	125	3
M30	30		90		100	155	3.5
M36	36	±0.7	110	+10 / 0	120	190	4
M42	42	±0.8	125		140	220	4.5
M48	48	±0.9	150	+12.5 / 0	160	250	5



# 6-9. INTRODUCTION OF PRODUCT



**U - BOLT**



KS V 3032, JIS F3022

Unit : mm

Nominal Size	Outer diameter of Pipe	p	R	d1	d2	A-TYPE		B-TYPE		C-TYPE	
						H	E	H	E	H	E
15	21.7	34	12	10	M10	-	-	39	20	47	30
20	27.2	40	15	10	M10	-	-	45	20	53	30
25	34.0	46	18	10	M10	-	-	52	20	60	30
32	42.7	56	23	10	M10	-	-	60	20	68	30
40	48.6	62	26	10	M10	-	-	66	20	74	30
50	60.5	74	32	10	M10	-	-	78	20	86	30
65	76.3	92	40	12	M12	-	-	98	25	108	35
80	89.1	104	46	12	M12	-	-	110	25	120	35
90	101.6	116	52	12	M12	-	-	123	25	133	35
100	114.3	134	59	16	M16	141	50	-	-	-	-
125	139.8	160	72	16	M16	167	50	-	-	-	-
150	165.2	186	85	16	M16	192	50	-	-	-	-
175	190.7	212	98	16	M16	218	50	-	-	-	-
200	216.3	242	111	20	M20	249	60	-	-	-	-
225	241.8	268	124	20	M20	274	60	-	-	-	-
250	267.4	294	137	20	M20	300	60	-	-	-	-
300	318.5	350	163	24	M24	357	70	-	-	-	-
350	355.6	386	181	24	M24	394	70	-	-	-	-
400	406.4	438	207	24	M24	444	70	-	-	-	-
450	457.2	496	233	30	M30	505	85	-	-	-	-
500	508.0	548	259	30	M30	556	85	-	-	-	-
550	558.8	598	284	30	M30	606	85	-	-	-	-
600	609.6	656	310	36	M36	663	100	-	-	-	-
650	660.4	706	335	36	M36	713	100	-	-	-	-
700	711.2	758	361	36	M36	764	100	-	-	-	-
750	762.0	810	387	36	M36	818	100	-	-	-	-
800	812.8	868	413	42	M42	875	115	-	-	-	-
850	863.6	920	439	42	M42	926	115	-	-	-	-
900	914.4	970	464	42	M42	977	115	-	-	-	-



## 8. GREETING



Thank you very much  
for spending time with us.

**POLLEX CO., LTD.**

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