

DAEWOO BOLT

Dw (주) 대우볼트
 DAEWOO BOLT CO.,LTD.

What you want Where you want When you want



Dw DAEWOO BOLT CO.,LTD.

Dw (주) 대우볼트
 DAEWOO BOLT CO.,LTD.

Office / Factory

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본사/공장

충청남도 당진시 신평면 조비실길 16-8
 Tel. 041-363-0006 Fax. 041-363-4300 E-mail. sales@dwbolt.com

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SINCE 1987

품질 최우선 경영으로 고객여러분께 보답하겠습니다.

저희 (주)대우볼트는 1987년 창업 이래 토목, 건축, 교량, 플랜트공사 등에 소요되는 고장력 볼트류 및 도로, 항만, 철도 시설건설 등에 소요되는 용융아연도금 볼트류 및 기초공사용 앵카볼트류를 전문적으로 생산 납품해온 업계의 선두주자로 고객의 끊임 없는 성원과 애호에 힘입어 꾸준한 발전을 이룩하여 국내외에서 사업 가치를 인정받고 있으며, 전산업에 소요되는 특수 볼트, 너트류도 아울러 생산, 납품하고 있습니다.

앞으로도 저희 (주)대우볼트 전 임직원은 끊임없는 연구와 철저한 품질관리를 최고 품질의 제품을 공급하여 고객과 함께 성장하는 비즈니스 파트너가 되도록 최선을 다하겠습니다.

감사합니다.

대표이사 **강희준**

We will reward our customers with quality-oriented management.

Daewoo Bolt Co., Ltd., since its establishment in 1987, has been specializing in manufacturing and supplying of galvanized zinc plated bolt range for steel tower, guard rail and railway for electric train, anchor bolt range for various foundation construction works, H/T for construction, T/S bolt range and A325 range bolt for export, and is the foremost leader in the industry. Our business value has been recognized in both Korea and overseas market through accomplishment of continuous progress on the strength of ceaseless encouragement and devotion of our customers.

All the executive and staffs of Daewoo Bolt Co., Ltd. shall put our utmost efforts in becoming your business partner that grows along with our customers by supplying products with outstanding quality through continuous research and exhaustive quality control. Sincerely Yours.

Kang, Hee Joon, Representative Director

History

대우볼트가 밝아온 길

- 1987. 03** 대우볼트기업사 설립(서울 구로구 구로동 610-8)
Established Daewoo Bolt Company at Guro-Gu, Seoul
- 1994. 04** 시설확장 이전(경기도 김포군 검단면 불로리 594-1)-년간 6,000톤
앵카볼트 제조설비 신설-년간 1,000톤
Expanded and moved to Kimpo, Gyeonggi-Province, Korea (Annual production capacity : 6,000 Tons)
Built Anchor Bolts production line (Annual production capacity : 1,000 Tons)
- 1996. 04** 시설확장 이전 (인천광역시 서구 석남동 223-287)-년간 10,000톤
앵카볼트 및 ROD BAR제조설비 확충-년간 2,000톤
Expanded and moved to Seo-Gu, Incheon Metropolitan City, Korea (Annual production capacity : 10,000 Tons)
Expanded the production facilities of Anchor Bolts and Rod Bars (Annual production capacity : 2,000 Tons)
- 1997. 09** (주)대우볼트 법인 전환
Incorporated Daewoo Bolt Co., Ltd.
- 1998. 04** KS B 1002 육각볼트 표시 허가 인증 취득
Accredited for the marking license of KS B 1002 Hexagonal Head Bolts
- 1999. 06** 앵카볼트 및 양산볼트 제조설비 확충-년간 4,000톤
Expanded the production facilities of Anchor Bolts and Stud Bolts (Annual production capacity : 4,000 Tons)
- 2001. 03** 너트 제조설비 확충-년간 2,400톤
Expanded the production facilities of Nuts (Annual production capacity : 2,400 Tons)
- 2002. 06** KS B 1012 육각너트 표시허가 인증 취득
KS B 1016 기초볼트 표시허가 인증취득
KS B 1062 머리볼이스터드 표시허가 인증 취득
Accredited for the marking license of KS B 1012 Hexagonal Nuts
Accredited for the marking license of KS B 1016 Foundation (Anchor) Bolts
Accredited for the marking license of KS B 1062 Headed (Welding) Studs
- 2002. 07** KS A 9001/ISO 9001 인증 취득
Accredited for KS A 9001/ISO 9001
- 2004. 01** 당진공장 신축이전(당진군 신명면 조비길길 16-8번지 6,800평)
Built a new factory and moved the head office to Dangjin-City, Chungcheongnam-Province, Korea (Factory site area : 22,479 ㎡)
- 2004. 06** KS B 1010 마찰접합용고장력볼트 표시허가 인증취득
Accredited for the marking license of KS B 1010 Friction Grip Type High Strength Bolts
- 2004. 07** 파츠포머(580SS) 시설확충-년간 16,800톤
볼트, 너트, 앵카볼트 연간 총생산량 33,200톤
Expanded the production facilities of Parts Former (580SS) (Annual production capacity : 16,800 Tons)
Annual gross production capacity of Bolts, Nuts & Anchor Bolts (33,200 Tons)
- 2005. 12** 열처리 연속로 시설확충-년간 3,000톤
Expanded the continuous heat treatment furnace (Annual production capacity : 3,000 Tons)
- 2007. 01** 볼트포머(460SSL) 시설확충 - 연간 18,000톤
볼트, 너트, 앵카볼트 연간 총생산량 51,200톤
Expanded the production facilities of Bolts Former (460SSL) (Annual production capacity : 18,000 Tons)
Annual gross production capacity of Bolts, Nuts & Anchor Bolts (51,200 Tons)
- 2008. 05** 새 공장부지 설립(생산 C동 3,000평)
Built an additional factory complex "C" (Factory site area : 9,917㎡)
- 2011. 03** KS Q ISO 9001:2009 / ISO 9001:2008 인증 취득
Accredited for KS Q ISO 9001:2009 / ISO 9001:2008
- 2011. 12** 연속 열처리로 시설 확충-년간 10,000톤
볼트, 너트, 앵카볼트 연간 총 열처리량 13,000톤
Expanded the continuous heat treatment furnace (Annual production capacity : 10,000 Tons)
Annual gross production capacity of Heat Treatment for Bolts, Nuts & Anchor Bolts (13,000 Tons)
- 2012. 09** 볼트포머(Z424) 2대 시설 확충
Expanded the production facilities of Bolts Former (Z424 - 2 Units)
- 2013. 01** 볼트포머(BP460) & 너트포머 시설확충
볼트, 너트, 앵카볼트 연간 총생산량 58,200톤
Expanded the production facilities of Bolts Former (BP460) & Nut Former
Annual gross production capacity of Bolts, Nuts & Anchor Bolts (58,200 Tons)
- 2013. 04** KS B 1010 마찰 접합용 고장력 볼트 F13T급 표시 허가 인증 추가 획득
Accredited for the marking license of KS B 1010 F13T-grade friction grip type high strength bolts
- 2014. 10** Kecip 품질시스템 인증 획득
Accredited for quality system of Kecip
- 2014. 11** 기술연구소 설립
Establishment of Industrial Technology Research Institute
- 2015. 05** CE 인증 획득
CE CPR Certificate (Daewoo bolt. 070-048959)
- 2017. 08** 산선기 도입
Introduced the inch-scaled wire-drawing machine
- 2018. 03** KS Q ISO 9001:2009 / ISO 9001:2008 전환심사
Accredited for KS Q ISO 9001:2009 / ISO 9001:2008
- 2019. 08** JIS B1186 마찰접합 고장력 볼트 너트 와셔 세트 표시인증 획득
Accredited for the marking license of JIS B1186 Friction Grip Type High Strength Sets including Bolts, Nuts, and Washers.
- 2020. 02** 연속 열처리로 확충 - 연간 10,000 톤
Expanded the continuous heat treatment furnace (Annual production capacity: 10,000 Tons)
- 2020. 03** 산업발전 공로 대통령 표창장 수상
Awarded Presidential Prize for Achievement in Industrial Development
- 2020. 11** 볼트포머(BP550SS) 시설확충
Expanded the production facilities for Bolts Former. (BP550SS)
- 2021. 06** 원 웨이 파스너 특허 등록
Registered the One Way Fasteners patent
- 2022. 01** 대한민국 지식경영 대상 수상 경영부분(ESG 경영부분)
Awarded the Knowledge Management Grand Prize in Republic of Korea. (ESG Management field)
ISO 14001 및 ISO 45001 및 인증취득
Accredited for marking license of ISO 14001, ISO 45001
- 2022. 05** 전조설비 20대 시설 확충 - 전산스터드, 앵카볼트 연간 총 생산량: 15,000 톤
볼트, 너트, 앵카 볼트 연간 총 생산량: 88,200 톤
Expanded the production facilities of Rolling(20 Units)
(Annual gross production capacity for Stud Bolts, Anchor Bolts. : 15,000 Tons)
(Annual gross production capacity for Bolts, Nuts & Anchor Bolts : 88,200 Tons)



what you want
where you want
when you want

Vision & Philosophy

비전 & 경영이념

Management Philosophy



Vision

Global Top-tier Fastener Company

| 글로벌 Top-tier 화스너 전문기업

Slogan

Differential & World best!

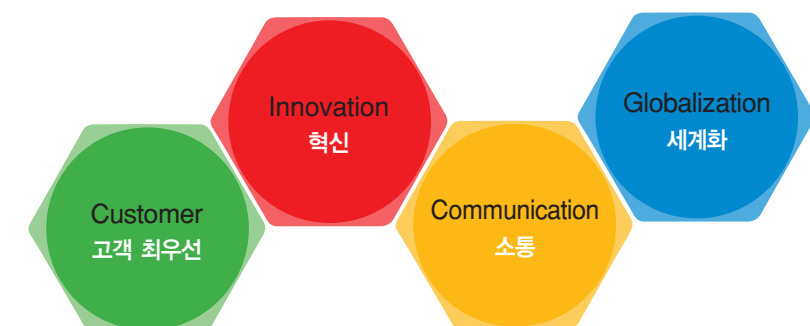
Goal 2025

1 매출 2,000억 / 당기 순이익 200억
200 billion KRW sales / 20 billion KRW net profit

2 해외 현지 법인 설립 강화
Overseas affiliated company Consolidation

3 ESG 경영
ESG management

Core Value





Production Facilities

생산설비

전 생산라인에 첨단 자동화시스템을 구축함으로써 균일한 품질의 제품을 대량 생산하고 있으며, 주문생산방식에 의해 다양한 규격의 제품을 생산하여 고객만족 극대화에 최선을 다하고 있습니다.

With the establishment of cutting-edge automated system on all production lines, we are making our best efforts for the maximization of customer satisfaction by manufacturing uniform-quality products on a mass production basis and various ranges of products on the basis of OEM.



01 볼트포머 Bolt Former

02 너트포머 Nut Former

03 열처리 장비 Heat Treatment Facility



Testing Facilities

검사설비

축력계, 투영기, 비커스 경도기, 금속현미경, 만능재료시험기 등
최첨단 장비로 엄정한 검사와 시험을 수행하여 최고품질의 제품을 생산, 납품합니다.

We are producing and supplying top-quality products based on very strict inspection & testing with the most advanced testing facilities like Axial force Tester, Projector, Vickers Hardness Tester, Metallographic Microscope, Universal Tester and so on.

Utility Model Registration 실용신안등록증

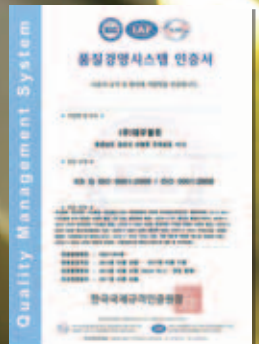


차량운전자의 야간주행시 도로상황의 식별을 용이하게하기 위한 가이드레일 및 중앙분리대용 볼트

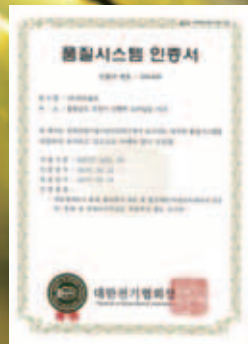


JIS B1186 마찰접합용 고정력 6각볼트, 6각너트, 평와셔의 세트 표시 허가인증

Quality Certificate 품질 인증서



KS Q ISO 9001:2009 / ISO 9001:2008 인증



DN-635 2014 KEPIC-MIN, SN



산업발전 공로 대통령 표창장



대한민국 지식경쟁 대상 수상 경영부분(ESG 경영부분)

Certificate 한국산업표준규격 인증서



KS B 1002 6각 볼트 표시 허가 인증



KS B 1010 마찰 접합용 고정력 6각 볼트, 6각 너트, 평와셔의 세트 표시 허가 인증



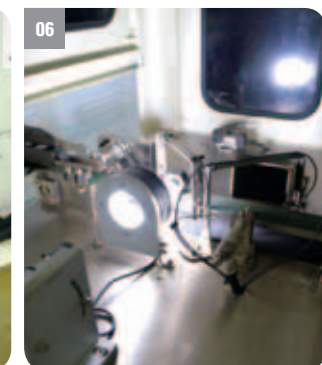
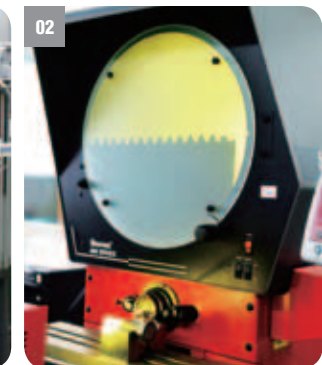
KS B 1062 머리높이 스탠드 표시 허가 인증



KS B 1016 기초 볼트 표시 허가 인증



KS B 1012 6각 너트 표시 허가 인증



- 01 볼트 토오크/ 축력 시험기
Torque tension machine
- 02 투영기
Projector
- 03 비커스 경도기
Vickers Hardness Tester
- 04 금속현미경
Metallographic Microscope
- 05 로크웰 경도기
Rockwell Hardness Tester
- 06 너트선별기
Nut Separator

Civil Engineering · Construction · Bridge · Plant

토목, 건축, 교량, 플랜트

작은 볼트 하나에도 정성을 다해 생산하여 최고의 품질로 고객님의게 다가가겠습니다.

For even small piece of bolt,
we will make our utmost and will approach to customers together with the highest quality.



Field of Business

Field of Business



▶ 토오크 셰어 볼트 세트
Torque shear Type Bolt Set
M16-M30
KS B 2819, JSS II 09,
ASTM F1852 available(optional)

▼ 마찰 접합용 육각 볼트 세트
Friction Grip Type Hexagonal Bolt Set
M12-M30
KS B 1010, JIS 1186
ISO 14399-3/14399-4 available(optional)



▼ 건축용 고장력 볼트
High Strength Bolt for Construction
M12-M36(inch. Size available)
A325/A325M, A490/A490M



▼ 앵커 볼트류
Anchor Bolts
All size available
KS B 1016, ASTM F1554
Chemical Anchor, Set-Anchor etc



▼ 머리볼이 스티드
Welding Studs
D13-D25(1/2"-1")
KS B 1062, ASTM A108



SOC Construction

SOC 건설

강풍에는 유연함으로, 비바람에는 내수성으로 갖은 자연의 악조건에서도 뛰어난 품질로 고객님께서 보내주시는 신뢰에 보답하겠습니다

We will repay customers for their trust in us with our outstanding quality under even all sorts of natural unfavorable conditions like strong wind or rainstorm.



▼ 송배전선로 / 통신 철탑용 용융아연도금볼트류

Electric Power Transmission & Distribution / Communication Steel Tower

M10~M64

KS, JIS, ASTM, ISO or other standards



▼ 전차선로용 볼트 / 금구류

Railway

M6~M42

KS, JIS, ASTM, ISO or other standards



▼ 도로공사 / 울타리 방음벽용 볼트

Road Construction / Sound Proof Wall

M6~M42

KS, JIS, ISO or other standards



Other Industries

그 외 산업용

다년간 축적된 기술력과 엄격한 검사를 통해 생산된 최고의 제품으로 고객님의 동반자가 되겠습니다.

We will become customer's partner with top-quality products manufactured on the basis of the accumulated technical skills and investigation for many years.



선박 내부용 볼트 Ship

M10-M24
KS, JIS, ISO and customized for client



기계부품 Machinery



중장비용(트랙볼트) Heavy Equipment (Track Bolt)

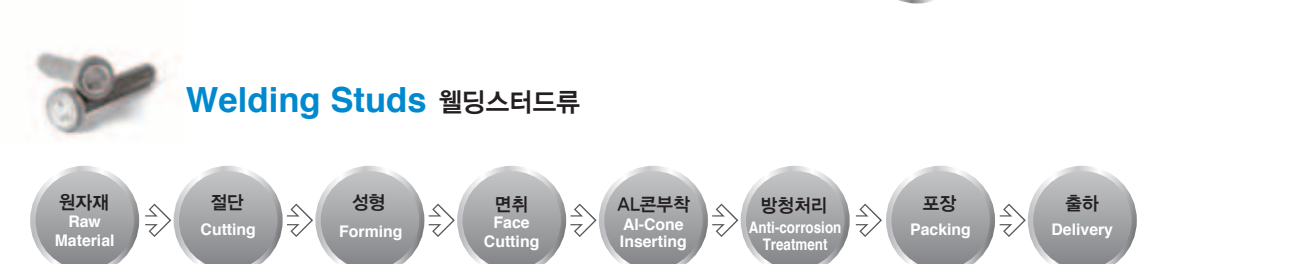
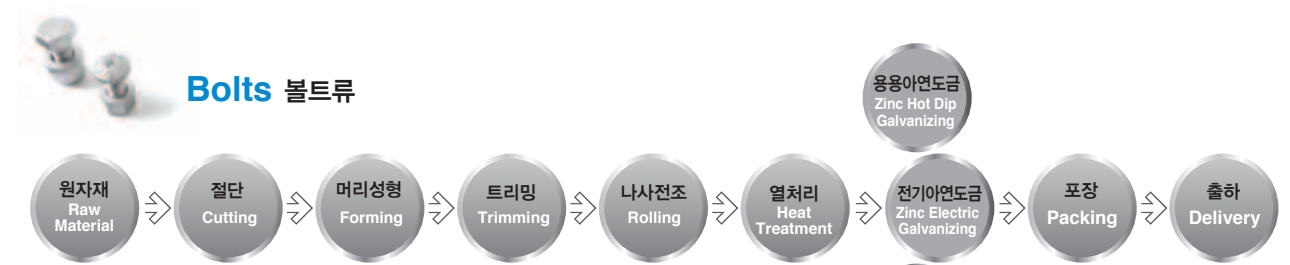


배관용(스터드 볼트) Pipe(Stud bolt)



Production Process

생산공정

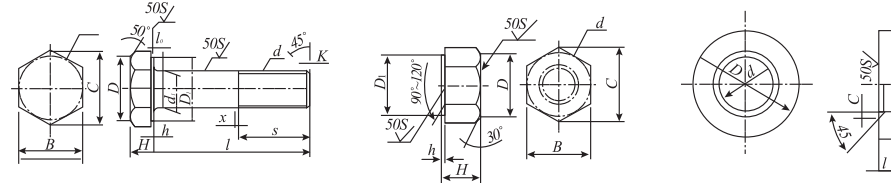


Technical Data

기술자료

마찰 접합용 고장력 육각 볼트 세트

Friction Grip Type High Strength Hex Bolt, Nut, Washer Set



Available Standard
ISO 14399-3, 14399-4
ISO, DIN, BSI, AS also available

Dimension(KS B 1010/JIS B 1186)

Unit : mm

Nominal size of thread d x P	Bolt									Nut					Washer						
	d1	H	B	C app.	D app.	D1 min.	r	h	S	H	B	C app.	D app.	D1 min.	h	d	D	t	c		
M12 x 1.75	12	8	22	25.4	20	20	0.8~1.6	0.4 ~ 0.8	25	12	22	25.4	20	20	0.4 ~ 0.8	13	26	3.2	1.5		
M16 x 2.0	16	10	27	31.2	25	25	1.2~2.0		30	16	27	31.2	25	25		0.4 ~ 0.8	17	32		4.5	2.0
M20 x 2.5	20	13	32	37.0	30	29			35	20	32	37.0	30	29			21	40		2.4	
M22 x 2.5	22	14	36	41.6	34	33	1.6~2.4		40	22	36	41.6	34	33		0.4 ~ 0.8	23	44	6.0		2.4
M24 x 3.0	24	15	41	47.3	39	38			45	24	41	47.3	39	38			25	48			
M27 x 3.0	27	17	46	53.1	44	43	50		27	46	53.1	44	43	28		56					
M30 x 3.5	30	19	50	57.7	48	47	55		30	50	57.7	48	47	31		60	8.0	2.8			

Mechanical Property(KS B 1010/JIS B 1186)

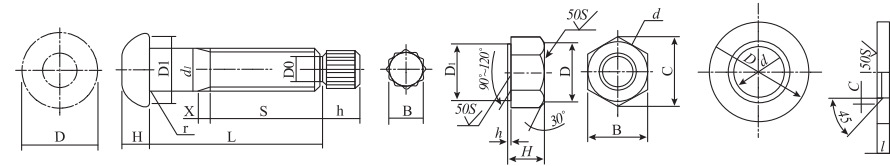
Class	Bolt											Nut			Washer		
	Yielding Strength	Tensile Strength	Elongation	Reduction ratio in area	Hardness	Minimum Tensile Load(KN)							Class	Hardness	Proof Load	Class	Hardness
						Size											
N/mm ²	N/mm ²	%	%	HRC	M12	M16	M20	M22	M24	M27	M30						
F8T	640 over	800 ~ 1,000	16 over	45 over	18~31	67	125	196	243	282	367	449	F8	HRB 85 ~ HRB 100	Same as minimum tensile load of bolt	F35	HRC 35 ~ HRC 45
F10T	900 over	1,000 ~ 1,200	14 over	40 over	27~38	84	157	245	303	353	459	561	F10	HRB 95 ~ HRC 35			
F13T *1	1,170 over	1,300 ~ 1,500	12 over	40 over	40~45	110	204	318	394	458	596	730	F13	HRC 30 ~ HRC 40			

*1 KS only



토오크 전단형 고장력 볼트 세트

Torque Shear Type High Strength Bolt, Nut, Washer Set



Available Standard
ASTM F 1852
ASTM F 2280

Dimension(KS B 2819/JSS II 09)

Nominal size of thread d x P	Bolt										Nut					Washer				
	d1	D1 min.	D min.	H	do	h app.	B	r	a-b max.	S	H	B	C	D	D1	h	d	D	t	c
M16 x 2.0	16	26	27	31.2	N.M	15	11.3	1.2~2.0	0.8	30	16	27	31.2	25	25	0.4 ~ 0.8	17	32	4.5	1.5
M20 x 2.5	20	33	34	37.0		18	14.1		0.9	35	20	32	37.0	30	29		21	40		
M22 x 2.5	22	37	38.5	41.6		19	15.4	1.1	40	22	36	41.6	34	33	23		44	2.0		
M24 x 3.0	24	41	43	47.3		20	16.8	1.2	45	24	41	47.3	39	38	25		48		2.4	
M27 x 3.0	27	47	49	53.1		22	19	1.6~2.4	1.3	50	27	46	53.1	44	43		28	56		
M30 x 3.5	30	53	55	57.7		24	21.1	2.0~2.8	1.5	55	30	50	57.7	48	47		31	60	8.0	2.8

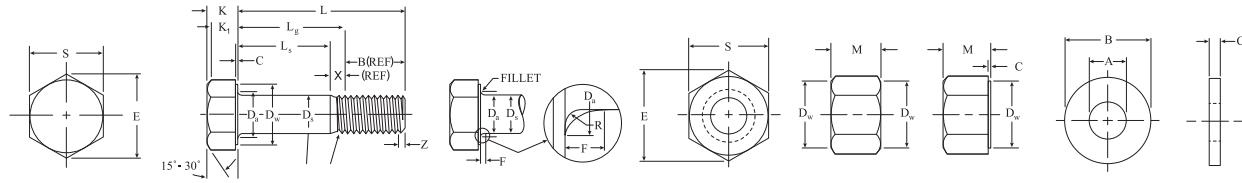


Mechanical Property(KS B 2819/JSS II 09)

Class	Bolt											Nut			Washer	
	Yielding Strength	Tensile Strength	Elongation	Reduction ratio in area	Hardness	Minimum Tensile Load(KN)						Class	Hardness	Proof Load	Class	Hardness
						Average Assembly Lot Tension(KN)										
						Size										
N/mm ²	N/mm ²	%	%	HRC	M16	M20	M22	M24	M27	M30						
S10T	900 over	1,000 ~ 1,200	14 over	40 over	27~38	156.7	244.8	303.4	352.5	458.8	561.3	F10	HRB 95 ~ HRC 35	Same as minimum tensile load of bolt	F35	HRC 35 ~ HRC 45
						106~139	165~217	205~268	238~312	310~406	379~496					
S13T *1	1,170 over	1,300 ~ 1,500	12 over	40 over	40~45	203.7	318.2	394.4	458.3	596.4	729.7	F13	HRC 30 ~ HRC 40	Same as minimum tensile load of bolt	F35	HRC 35 ~ HRC 45
						138~181	215~282	267~348	309~406	403~528	493~645					

*1. reference only

ASTM 건축용 육각볼트, 너트
Hex Bolt, Nut, Washer Set for Construction



Dimensions of Heavy Hex. Bolt(ANSI B18.2.3.7M)

Unit : mm

Nominal Bolt Dia & Thread Pitch	Body Diameter		Width Across Flats		Width Across Corners		Body Diameter		K1 Wrenching Height	Dw Washer Face Dia.	Runout of Bearing Surface FIM	C Washer Face Thickness		Da Fillet Transition	F Fillet Length	R Fillet Radius	B(Ref.) Thread Length		X(Ref.) Transition Thread Length
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.				Max.	Min.				Basic	Max.	
M12 x 1.75	12.00	11.73	21.00	20.67	24.25	23.35	7.76	7.24	5.2	19.6	0.39	0.6	0.3	13.7	3.0	0.6	30		8.8
M16 x 2.0	16.70	15.30	27.00	26.16	31.18	29.56	10.75	9.25	6.5	24.9	0.48	0.8	0.4	18.2	3.0	0.6	31	38	6.0
M20 x 2.5	20.84	19.16	34.00	33.00	29.26	37.29	13.40	11.60	8.1	31.4	0.59	0.8	0.4	22.4	4.0	0.8	36	43	7.5
M22 x 2.5	22.84	21.16	36.00	35.00	41.57	39.55	14.90	13.10	9.2	33.3	0.63	0.8	0.4	24.4	4.0	0.8	38	45	7.0
M24 x 3.0	24.84	23.16	41.00	40.00	47.34	45.20	15.90	14.10	9.9	38.0	0.70	0.8	0.4	26.4	4.0	1	41	48	9.0
M27 x 3.0	27.84	26.16	46.00	45.00	53.12	50.85	17.90	16.10	11.3	42.8	0.77	0.8	0.4	30.4	5.0	1.2	44	51	9.0
M30 x 3.5	30.84	29.16	50.00	49.00	57.74	55.37	19.75	17.65	12.4	46.5	0.85	0.8	0.4	33.4	6.0	1.2	49	56	10.5
M36 x 4.0	37.00	35.00	60.00	58.80	69.28	66.44	23.55	21.45	15.0	55.9	1.01	0.8	0.4	39.4	6.0	1.5	56	63	12.0

Dimensions of Heavy Hex. Nuts(ANSI B18.2.4.6M)

Unit : mm

Dimensions of Hardened Washers(ASTM F436M)

Nominal Nut Dia & Thread Pitch	S Width Across Flats		E Width Across Corners		M Thickness		Dw Bearing Face Dia.	C Washer Face Thickness		Runout of Bearing Surface FIM	Nominal Washer Size	A Inside Diameter		B Outside Diameter		C Thickness	
	Max.	Min.	Max.	Min.	Max.	Min.		Max.	Min.			Max.	Min.	Max.	Min.	Max.	Min.
M12 x 1.75	21.00	20.67	24.25	22.78	12.3	11.9	19.2	0.8	0.4	0.38	12	14.4	14.0	27.0	25.7	4.6	3.1
M16 x 2.0	27.00	26.16	31.18	29.56	17.1	16.4	24.9	0.8	0.4	0.47	16	18.4	18.0	34.0	32.4	4.6	3.1
M20 x 2.5	34.00	33.00	29.26	37.29	20.7	19.4	31.4	0.8	0.4	0.58	20	22.5	22.0	42.0	40.4	4.6	3.1
M22 x 2.5	36.00	35.00	41.57	39.55	23.6	22.3	33.3	0.8	0.4	0.63	22	24.5	24.0	44.0	42.4	4.6	3.1
M24 x 3.0	41.00	40.00	47.34	45.20	24.2	22.9	38.0	0.8	0.4	0.72	24	26.5	26.0	50.0	48.4	4.6	3.1
M27 x 3.0	46.00	45.00	53.12	50.85	27.6	26.3	42.8	0.8	0.4	0.80	27	30.5	30.0	56.0	54.1	4.6	3.1
M30 x 3.5	50.00	49.00	57.74	55.37	30.7	29.1	46.6	0.8	0.4	0.87	30	33.6	33.0	60.0	58.1	4.6	3.1
M36 x 4.0	60.00	58.80	69.28	66.44	36.6	35.0	55.9	0.8	0.4	1.05	36	39.6	39.0	72.0	70.1	4.6	3.1

Mechanical Property

Nominal Dia and Thread Pitch	Stress Area mm ²	ASTM A325M Bolt				ASTM A490M Bolt						ASTM A563M Nut						
		Proof Load		Tensile Strength min, KN	Hardness		Proof Load		Tensile Strength min, KN	Hardness		Proof Load, KN			Rockwell Hardness			
		Tensile Strength min, KN	Yield Strength Method KN		Brinell	Rockwell C	Length Measure, Method KN	Yield Strength Method KN		Brinell	Rockwell C	8S	10S	10S (over-tapped)	8S	10S	10S (over-tapped)	
M12 x 1.75	84.3	50.6	55.6	70.0			70.0	79.2	87.7	103.0			90.6	105	98.2			
M16 x 2.0	157	94.2	104	130	less than 2d	319	130	148	163	190	less than 2d	352	169	195	183			
M20 x 2.5	245	147	162	203	253	25	203	230	255	296	311	352	263	305	285			
M22 x 2.5	303	182	200	251	253	25	251	285	315	366	311	352	326	377	353	B89 ~ C38	C26 ~ C38	C26 ~ C38
M24 x 3.0	353	212	233	293			293	332	367	427			379	439	411			
M27 x 3.0	459	275	303	381			381	431	477	555	less than 3d	39	493	571	535			
M30 x 3.5	561	337	370	466	less than 3d	253	466	527	583	679	less than 3d	33	603	698	654			
M36 x 4.0	817	490	539	678	less than 3d	253	678	768	850	989	less than 3d	33	878	1,020	952			

고장력 볼트 체결 검사 계획서
Inspection & Test Plan for High Strength Bolts Assembly

번호 No.	검사분류 Classification	검사항목 Checking Point	적용규격 Applicable Standard	검사자구분 Inspector		검사장소 Inspecting Place	제출서류 Reporting Document
				시공사 Builder	발주자 Client		
1	공사현장 수입검사 Site receiving Inspection	외관, 종류, 등급, 호칭 로트번호 Appearance, Type, Class, Size, Lot No.	KS B 2819 KS B 1010	필수검사 Hold point	성적서검토 Review	현장 Site	볼트제작사 포장명세서 Fastner Maker's Packing List
		축력검사, 토크계수 Axial Force Test Torque coefficient	KS B 2819 KS B 1010	필수검사 Hold point	필수검사 Hold point	현장 Site	볼트제작사 시험성적서 Fastner Maker's Inspection & Test Certificate
2	체결전검사 Inspection before assembly	축력검사, 토크계수 체결기기작동 체결방법타당성 Axial Force Test Torque coefficient Assembling Tools Assembling Method	KS B 2819 KS B 1010 시공지침 Bolt assembly Manual	필수검사 Hold point	필수검사 Hold point	현장 Site	체결전 검사기록서 Before assembly inspection report
		가볼트사용여부 가볼트수량 철골수직도 Temporary bolt use Temporary bolt q'ty Steel skeleton drawing	KS B 1002 시공지침 Bolt assembly Manual	필수검사 Hold point	수시검사 Monitoring	현장 Site	
4	1차 체결 First assembly	규정토크 금매김(1차 체결후) 시공온도 Specified torque Making after 1st assembly Temperature at working time	시공지침 Bolt assembly Manual	필수검사 Hold point	수시검사 Monitoring	현장 Site	고장력볼트체결 시공품질점검표 High tension bolt assembly site quality check sheet
		규정토크 시공온도 Specified torque Temperature at working time	시공지침 Bolt assembly Manual	필수검사 Hold point	수시검사 Monitoring	현장 Site	
6	검사 Inspection	핀테일 파단 너트회전각 공회전여부 Pintail fracture Nut rotation angle Nut slippage	시공지침 Bolt assembly Manual	필수검사 Hold point	필수검사 Hold point	현장 Site	



일반 육각볼트, 너트
Hex. Bolt/Nut for General purpose



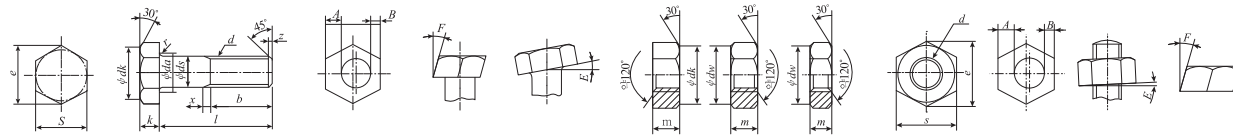
Dimension

Unit : mm

Nominal Size of Thread and Pitch(d x p)		Hex. Bolts(KS B1002)								Hex. Nuts(KS B 1012)									
coarse	fine	ds	k	s	e app.	r min.	da max.	A-B max.	E max.	F max.	m	m1	s	e app.	dw1 min.	A-B max.	E max.	F max.	
M6 x 1.00		6	4	10	11.5	0.25	6.8	0.3			5	3.6	10	11.5	9	0.3			
M8 x 1.25	M8 x 1.00	8	5.5	13	15	0.4	9.2	0.4			6.5	5	13	15	11.7	0.4			
M10 x 1.5	M10 x 1.25	10	7	17	19*6	0.4	11.2	0.5			8	6	17	19*6	15.8	0.5			
M12 x 1.75	M12 x 1.25	12	8	19	21.9	0.6	13.7	0.7			10	7	19	21.9	17.6	0.5			
M14 x 2.0	M14 x 1.5	14	9	22	25.4	0.6	15.7	0.7			11	8	22	25.4	20.4	0.7			
M16 x 2.0	M16 x 1.5	16	10	24	27.7	0.6	17.7	0.8			13	10	24	27.7	22.3	0.8			
M18 x 2.5	M18 x 1.5	18	12	27	31.2	0.6	20.2	0.9			15	11	27	31.2	25.6	0.8			
M20 x 2.5	M20 x 1.5	20	13	30	34.6	0.8	22.4	0.9			16	12	30	34.6	28.5	0.9			
M22 x 2.5	M22 x 1.5	22	14	32	37	0.8	24.4	1.1			18	13	32	37	30.4	0.9			
M24 x 3.0	M24 x 2.0	24	15	36	41.6	0.8	26.4	1.2	1* for Finish Semi-Finish	1* for Finish	19	14	36	41.6	34.2	1.1	1* for Finish Semi-Finish	1* for Finish	
M27 x 3.0	M27 x 2.0	27	17	41	47.3	1	30.4	1.3			22	16	41	47.3		1.3			
M30 x 3.5	M30 x 2.0	30	19	46	53.1	1	33.4	1.5	2* for Semi-Finish Regular	2* for Semi-Finish Regular	24	18	46	53.1		1.5	2* for Semi-Finish Regular	2* for Semi-Finish Regular	
M33 x 3.5	M33 x 2.0	33	21	50	57.7	1	36.4	1.6			26	20	50	57.7		1.6			
M36 x 4.0	M36 x 3.0	36	23	55	63.5	1	39.4	1.8			29	21	55	63.5		1.8			
M39 x 4.0	M39 x 3.0	39	25	60	69.3	1	42.4	2			31	23	60	69.3		2			
M42 x 4.5		42	26	65	75	1.2	45.6	2.1			34	25	65	75		2.1			
M45 x 4.5		45	28	70	80.8	1.2	48.6	0.3			36	27	70	80.8		2.3			
M48 x 5.0		48	30	75	86.5	1.6	52.6	2.4			38	29	75	86.5		2.4			
M52 x 5.0		52	33	80	92.4	1.6	56.6	2.6			42	31	80	92.4		2.6			
M56 x 5.5		56	35	85	98.1	2	63	2.8			45	34	85	98.1		2.8			
M60 x 5.5		60	38	90	104	2	67	3			48	36	90	104		2.9			
M64 x 6.0		64	40	95	110	2	71	3			51	38	95	110		3			
	M72 x 6.0	72	45	105	121	2	79	3.3			58	42	105	121		3.3			
	M80 x 6.0	80	50	115	133	2	87	3.5			64	48	115	133		3.5			

표시의 나사는 가급적 사용하지 않음.

표시의 치수는 ISO 규격과 다소 상이함.



Mechanical or physical property		4.6	4.8	5.6	5.8	6.8	8.8		9.8	10.9	12.9	
							d ≤ 16mm	d > 16mm				
Tensile strength(Mpa)	min.	400	420	500	520	600	800	830	900	1,040	1,220	
Lower yield strength(Mpa)	min.	240		300								
Stress at 0.2% nonproportional elongation(Mpa)	min.						640	660	720	940	1,100	
Stress at 0.0048d nonproportional elongation for full-size fasteners(Mpa)	min.		340		420	480						
Stress under proof load(Mpa)	nom.	225	310	280	380	440	580	600	650	830	970	
Proof load ratio		0.94	0.91	0.93	0.90	0.92	0.91	0.91	0.9	0.88	0.88	
Elongation after fracture for machined test pieces(%)		22		20			12	12	10	9	8	
Reduction of area after fracture for machined test pieces(%)							52		48	48	44	
Elongation after fracture for full size fasteners(%)												
Head soundness		No fracture										
Vickers hardness, HV F ≥ 98N	min.	120	130	155	160	190	250	255	290	320	385	
	max.	220				250	320	335	360	380	435	
Brinell hardness, HBW F= 30D*	min.	114	124	147	152	181	238	242	276	304	366	
	max.	209				238	304	318	342	361	414	
Rockwell hardness, HRB for 4.6~6.8, HRC for 8.8~12.9	min.	67	71	79	82	89	22	23	28	32	39	
	max.	95			99.5	32	34	37	39	44		
Surface hardness, HV 0.3	max.	h						h,390 h,435				
Height of non-decarburized thread zone, E, mm	min.							½H1		½H1		
Depth of complete decarburized in the thread, G, mm	max.	0.015										
Reduction of hardness after retempering, HV	max.	20										
Breaking torque, MB, N-m	min.	in accordance with ISO 898-7										
Impact strength, test at -20 °C, d ≥ 16mm, J	min.	27				27	27	27	27	27	m	
Surface integrity in accordance with ISO		ISO 6157-1										6157-3

머리붙이 스테드
Welding Stud

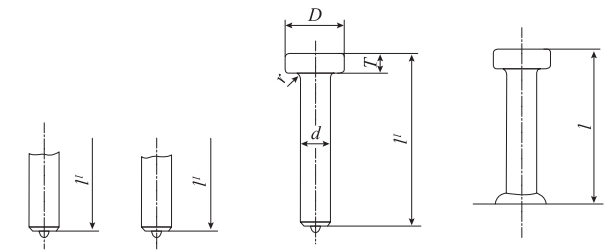


Dimension(KS B1062)

Unit : mm

Nominal size	Stud dia. d(mm)	Head dia. d(mm)	Thickness T min.(mm)	Fillet Radius r min.(mm)	Length l'(mm)	Final Length l(mm)	Weight (g)	Welding Amp x Time
13(½inch)	13±0.3	22±0.4	10	2	80	77	107	800 x 0.55
					100	97	128	
					120	117	149	
16(⅝inch)	16±0.3	29±0.4	10	2	80	76	162	1200 x 0.67
					100	96	194	
					120	116	226	
19(¾inch)	19±0.4	32±0.4	10	2	80	75	219	1500 x 0.84
					100	95	264	
					130	125	308	
22(⅞inch)	22±0.4	35±0.4	10	2	150	145	375	1700 x 1.00
					80	75	294	
					100	95	353	
25(1inch)	25±0.4	41±0.4	12	2	130	125	443	1900 x 1.40
					150	145	503	
					100	94	456	
					130	124	572	
					150	144	650	
					200	194	845	

Available Standard
ISO 13918
ANSI/AWS D1.1
JIS B 1198



Mechanical Property

Grade	0.2% offset or Yielding strength(N/mm²)	Tensile strength(N/mm²)	Elongation
HS1	235 over	400 ~ 550	20% over
HS2	350 over	500 ~ 650	17% over

Tensile load of welding section

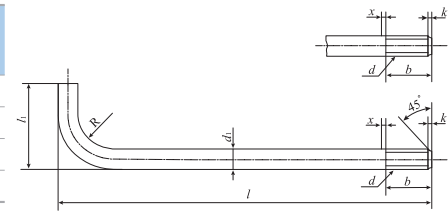
Nominal size		13	16	19	22	25	
Tensile load(KN)	HS1	min.	53.1	80.4	113	152	196
		max.	73.0	111	156	209	270
	HS2	min.	66.4	101	142	190	245
		max.	86.3	131	184	247	319
Area of Stud Section(mm²)		133	201	284	380	491	

기초 볼트
Anchor bolts

L type anchor bolts

Unit : mm

Nominal size of thread	d1		b		l1 appr.	R appr.	k appr.
	Basic	Toler.	Basic	Toler.			
M10 x 1.5	10	±0.4	25	+6.3, 0	40	20	1.5
M12 x 1.75	12		32		50	25	2
M16 x 2.0	16	±0.5	40	+8, 0	63	32	2
M20 x 2.5	20					40	2.5

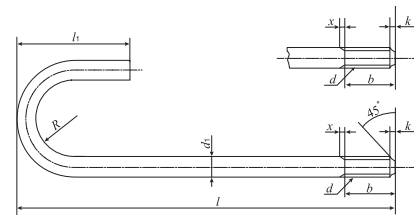


Available Standard
ASTM F 1554
Other international standards

J type anchor bolts

Unit : mm

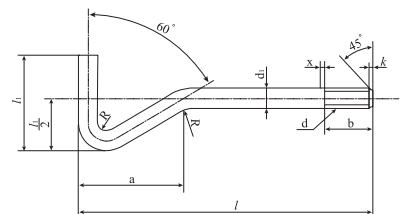
Nominal size of thread	d1		b		l1 appr.	R appr.	k appr.
	Basic	Toler.	Basic	Toler.			
M10 x 1.5	10	±0.4	25	+6.3, 0	45	20	1.5
M12 x 1.75	12		32		56	25	2
M16 x 2.0	16	±0.5	40	+8, 0	71	32	2
M20 x 2.5	20		50		90	40	2.5
M24 x 3.0	24	±0.6	63	+10, 0	112	50	3
M30 x 3.5	30		80		140	63	3.5
M36 x 4.0	36	±0.7	90	+12.5, 0	160	71	4
M42 x 4.5	42	±0.8	112		200	90	4.5
M48 x 5.0	48	±0.9	125		224	100	5



LA type anchor bolts

Unit : mm

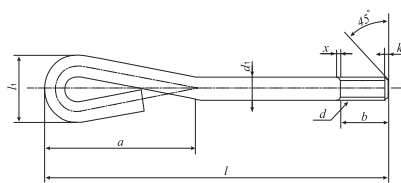
Nominal size of thread	d1		b		l1 appr.	a appr.	R appr.	k appr.
	Basic	Toler.	Basic	Toler.				
M8 x 1.25	8	±0.4	20	+6.3, 0	32	41	8	1.2
M10 x 1.5	10		30		40	51	10	1.5
M12 x 1.75	12	±0.5	35	+8, 0	50	64	12	2
M16 x 2.0	16		40		63	81	16	2
M20 x 2.5	20		50		80	102	20	2.5
M24 x 3.0	24	±0.6	80	+10, 0	100	127	24	3
M30 x 3.5	30		90		125	158	30	3.5
M36 x 4.0	36	±0.7	110	+12.5, 0	140	181	36	4
M42 x 4.5	42	±0.8	125		180	226	42	4.5
M48 x 5.0	48	±0.9	150		200	252	48	5



JA type anchor bolts

Unit : mm

Nominal size of thread	d1		b		l1 appr.	R appr.	k appr.
	Basic	Toler.	Basic	Toler.			
M10 x 1.5	10	±0.4	30	+6.3, 0	35	50	1.5
M12 x 1.75	12		35		40	65	2
M16 x 2.0	16	±0.5	40	+8, 0	55	85	2
M20 x 2.5	20		50		70	105	2.5
M24 x 3.0	24	±0.6	80	+10, 0	80	125	3
M30 x 3.5	30		90		100	155	3.5
M36 x 4.0	36	±0.7	110	+12.5, 0	120	190	4
M42 x 4.5	42	±0.8	125		140	220	4.5
M48 x 5.0	48	±0.89	150		160	250	5



Also we can manufacture all type anchor bolts such as Chemical Anchors, Set Anchor etc.























기타 특수 볼트류
Other Special Bolts







Hexagon bolt with collar		Nushroom head square neck bolt	
Hexagon bolt with flange		Cup head nib bolt	
Hexagon socket head cap screw		Nushroom head nib bolt	
Hexagon socket countersunk head cap screw		Cup oval neck bolt	
12 point flange screw		Cup square neck bolt	
T-head bolt (Hammer head bolt)		Flat countersunk square neck bot	
T-head bolt with square neck		Flat countersunk nib bot	
T-head bolt with double nib		Countersunk head screw with forged slot	

Eye bolt		Slotted headless screw with flat chamfered end	
Lifting bolt		Hexagon socket headless screw with flat chamfered end	
Stirrup bolt(U-bolt)		Hexagon socket headless screw with cone point	
Eyelet bolt		Slotted set screw with flat point	
Weld stud (Single end stud)		Slotted set screw with full dog point	
Stud bolt		Slotted set screw with cup point	
Stud		Slotted set screw with cone point	
Stud with undercut		Hexagon socket set screw with flat point	
Hexagon socket headless screw with full dog point		Hexagon socket set screw with full dog point	
Hexagon socket headless screw with full cup point		Hexagon socket set screw with cup point	
		Hexagon socket set screw with cone point	

PRODUCT IDENTIFICATION













BOLTS

FASTENER DESCRIPTION	STANDARD	PRODUCT IDENTIFICATION	PRODUCTION SIZE
High Strength Hex. Bolt for Friction Grip Joints of Structural Use	KS B 1010, JIS B 1186 Class F8T		M12-M30
	KS B 1010, JIS B 1186 Class F10T		
	KS B 1010 Class F13T		M20-M30
High Strength Torque Shear Bolt for Friction Grip Joints of Structural Use	KS B 2819, JSS II 09 S10T		M16-M30
	MAKER's		M20-M30
Bolts, Screws, Studs for General Purpose	ISO 898-1, KS B 0233 KS B 1002, JIS B 1180 Grade 4.6, 4.8, 5.6, 5.8, 6.8, 8.8, 9.8, 10.9, 12.9		M6 ~
Bolts, Screws for Steel Towers	ISO 898-1, KS B 0233 KS B 1002, JIS B 1180 Grade 4.8, 5.8, 6.8, 8.8, 9.8,		M12-M39 (M42-M56)
High Strength Bolt for Preloading	ISO 14399-3 System HR		M12-M36
	ISO 14399-4 System HV		
Carbon Steel Bolts, Studs and Threaded Rod 60,000PSI Tensile Strength	ASTM A307 Grade A		1/4"-20UNC ~4"-4UNC
	ASTM A307 Grade B		
	ASTM A307 Grade C		
Structural Bolts Steel Heat Treated 120/105 ksi Minimum Tensile Strength	ASTM A325 Type 1		1/2"-13UNC ~1.1/2-6UNC
	ASTM A325 Type 3		
Structural Bolts Steel Heat Treated 830 MPa Minimum Tensile Strength(Metric)	ASTM A325M Type 1		M12-M36
	ASTM A325M Type 3		
Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners	ASTM A354 Grade BC plain, zinc-coated		1/4"-20UNC ~4"-4UNC
	ASTM A354 Grade BD, 1/4"-2.5"		1/4"-20UNC ~2.5"-8UNC
	ASTM A354 Grade BD, 2.5" over		2.3/4"-4UNC ~4"-8UNC
Steel Transmission Tower Bolts, Zinc Coated and Bare	ASTM A394 Type 0		1/2"-13UNC ~1"-8UNC
	ASTM A394 Type 1		
	ASTM A394 Type 3		

FASTENER DESCRIPTION	STANDARD	PRODUCT IDENTIFICATION	PRODUCTION SIZE
Structural Bolts Alloy Steel Heat Treated 150 ksi Minimum Tensile Strength	ASTM A490 Type 1		1/2"-13UNC ~1.1/2-6UNC
	ASTM A490 Type 3		
High-Strength Steel Bolts, Classes 10.9 and 10.9.3 for Structural Steel Joints(Metric)	ASTM A490M Type 1		M12-M36
	ASTM A490M Type 3		
Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications	ASTM A193/A193M All Grades		ALL
Alloy-Steel and Stainless Steel Bolting for Low Temperature Service	ASTM A320/A320M All Grades		ALL



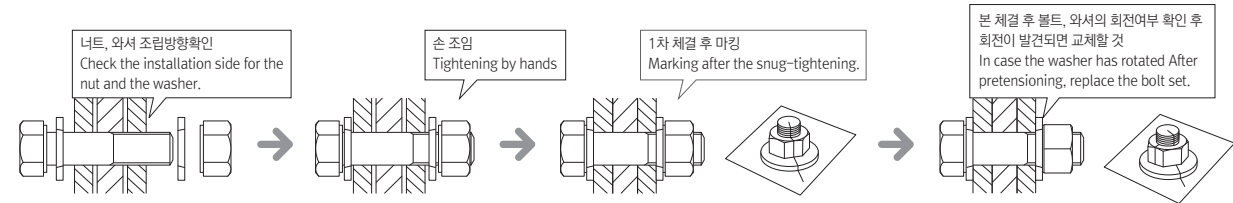
NUTS

FASTENER DESCRIPTION	STANDARD	PRODUCT IDENTIFICATION	PRODUCTION SIZE
Nuts for High Strength Hex. Bolt and Torque Shear Bolt for Friction Grip Joints of Structural Use	KS B 1010, JIS B 1186 Class F8		M12-M30
	KS B 1010, JIS B 1186 KS B 2819, JSS II 09 Class F10		
	KS B 1010 Class F13		M20-M30
Nuts for General Purpose	ISO 898-2, KS B 0234 KS B 1012, JIS B 1181 Grade 4,5,6,8,9,10,12		M6-M39 (M42-M100)
High Strength Bolt for Preloading	ISO 14399-3 System HR		M12-M36
	ISO 14399-4 System HV		
Carbon and Alloy Steel Nuts	ASTM A563 Grade O, A, B		1/4"-20UNC ~4"-4UNC
	ASTM A563 Grade C		
	ASTM A563 Grade C3		
	ASTM A563 Grade D, DH, DH3		
Carbon and Alloy Steel Nuts (Metric)	ASTM A563M Grade 5, 9, 10, 12 8S, 8S3, 10S, 10S3		M6-M100
Carbon and Alloy Steel Nuts for High Pressure or High Temperature Service or Both	ASTM A194/A194M Grade All		ALL

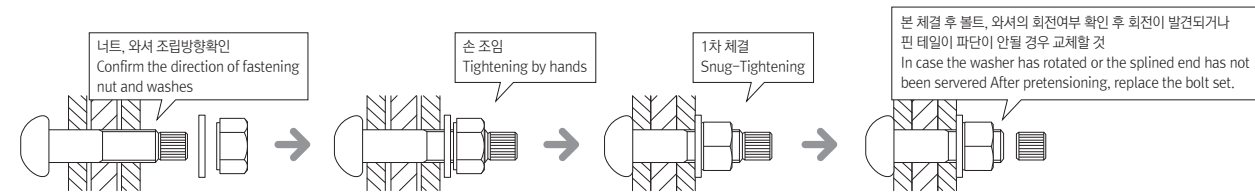
고장력 볼트 세트(F10T, S10T) 사용시 주의사항!
Installation of High Strength Bolts Set (F10T, S10T)

체결 시 유의사항 (Attention in Fastening)

A. 고장력(High Strength Bolt) 육각볼트(F10T)



B. 둥근머리 고장력(Torque Shear Bolt) 볼트(S10T)



- ▶ 1차 조임 전 부재간의 홀 센터가 일치가 된 상태에서 볼트를 홀에 삽입 하십시오.(볼트 강제 박음 시공을 절대 하지 마십시오)
(All boltholes shall be aligned to permit insertion of the bolts without undue damage to the threads before snug-tightening. (Do not hammer bolt head to insert the bolt in to the holes.))
- ▶ 1차 체결 후 눈 또는 비가 내릴 경우 1차 체결에 한하여 본 체결 (마지막 체결 필히 완료할 것)
(In case it rains or snows after the snug-tightening, pretensioning must be done with the Bolts which are snug-tightened.)
- ▶ 본 체결시 소켓의 마모상태를 확인하고 정확히 삽입 후 체결할 것. 마모 소켓 사용시 문제가 발생할 수 있음.(둥근머리 고장력볼트)
(Do fastening after exact adjusting and confirmation the condition of wear of inner socket. Use of bad socket may happen problem. (Torque Shear Bolt Sets))

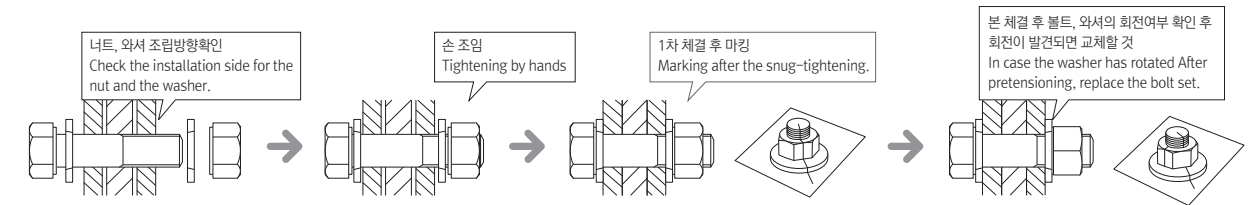
보관 시 유의사항 (Attention in Storage)

본 제품 표면 윤활조건을 변경시키는 비, 눈, 습기, 오물, 모래바람, 직사광선등과 직접 접촉되지 않도록 통풍이 잘되는 창고 및 유사한 위치에 보관, 관리할 것.
 (Please, Pay attention on following instruction Rain, Snow, Moisture, Foreign substance, Sand wind, direct sunlight can cause bad impact on bolt proper function. Product lubricating condition could be changed by the about cause. Keep the bolt in good ventilation warehouse or similar place.)



고장력 볼트 세트(F13T) 사용시 주의사항!
Installation of High Strength Bolts Set (F13T)

체결 시 유의사항 (Attention in Fastening)



- ▶ 1차 조임 전 부재간의 홀 센터가 일치가 된 상태에서 볼트를 홀에 삽입 하십시오.(볼트 강제 박음 시공을 절대 하지 마십시오)
(All boltholes shall be aligned to permit insertion of the bolts without undue damage to the threads before snug-tightening. (Do not hammer bolt head to insert the bolt in to the holes.))
- ▶ 1차 체결 후 눈 또는 비가 내릴 경우 1차 체결에 한하여 본 체결 (마지막 체결 필히 완료할 것)
(In case it rains or snows after the snug-tightening, pretensioning must be done with the Bolts which are snug-tightened.)
- ▶ 1차 체결 시의 공구는 제품에 충격이 적은 너트 런너를 사용하여 주십시오.
(Use Torque wrench or Impact wrench designed for snug tight only.)
- ▶ 본 체결시의 체결 토크는 규정된 값을 초과하지 않도록 시공해 주십시오. (체결 시 볼트 파단의 원인)
(When pretensioning, do not tighten the bolts excessively than the installation Torque. (It may cause a breakage of bolts))



보관 시 유의사항 (Attention in Storage)

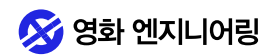
본 제품 표면 윤활조건을 변경시키는 비, 눈, 습기, 오물, 모래바람, 직사광선등과 직접 접촉되지 않도록 통풍이 잘되는 창고 및 유사한 위치에 보관, 관리할 것.
 (Please, Pay attention on following instruction Rain, Snow, Moisture, Foreign substance, Sand wind, direct sunlight can cause bad impact on bolt proper function. Product lubricating condition could be changed by the about cause. Keep the bolt in good ventilation warehouse or similar place.)

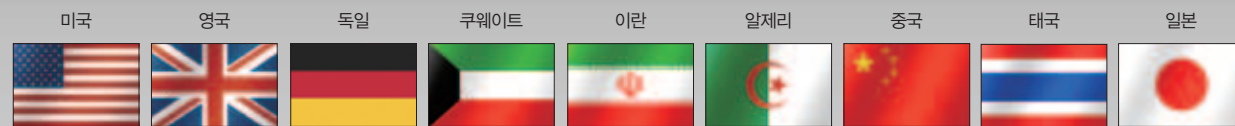




Major Customers in Korea

주요 고객사





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대우볼트 당진공장

고려화학

아산합덕 방면

당진군청

신평동공단지입구

당진지동차학원

서울

도암휴게소

명지아파트

당진TG

서해안고속도로

당진IC

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