Hastelloy Bolts & Nuts Specialty Company

HASMKOREA

Best of **Best**

최고를 지향하는 일등 기업으로 향합니다.

하스엠만의 독창적인 기술과 경험이 바탕이 되어 최고 그 이상의 제품으로 기대를 넘어 만족을 드립니다.

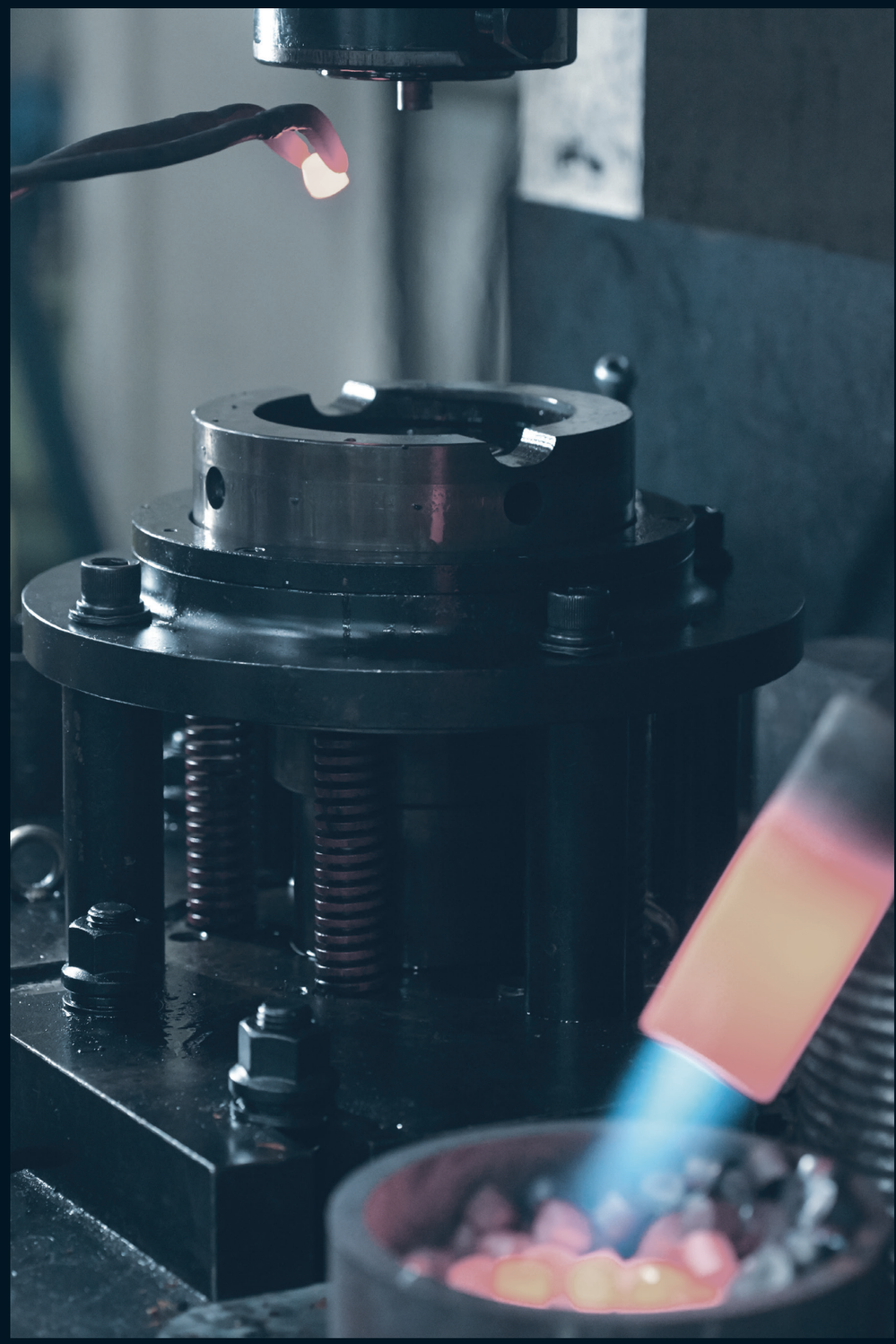
We seek to be the best in every area we are involved in.

Powered by our original technology and experiences, we exceed our customers' expectations with our best-in-class products.

HASMKOREA

TITANIUM
HASTELLOY
MONEL
INCONEL
INCOLOY
DUPLEX
MOLY
ZIRCONIUM
NICKEL

Endless
Strive for
Global Success.



“끝없는 도전, 세계로”라는 슬로건 아래
하스엠은 세계적인 흐름에 맞춰 현재 모습에 안주하지 않고
세계적인 기업으로의 꿈을 실현시키기 위해
지속적인 노력과 다양한 변화를 거듭하고 있습니다.

As represented by our slogan “Endless Strive for Global Success,” we are striving to keep abreast with the latest trends and challenge convention to grow into a globally renowned company.

무차입 경영을 실현하고자 최선의 노력을 기울이고 있습니다.

설립 이후 무차입 경영을 목표로 꾸준히 성장해 왔으며,
그 결과 금융기관 차입금 의존도는 매년 감소되는 성과를 거두고 있습니다.

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We have also made an all-out effort to become a zero-debt company.

We have taken rigorous steps to reach the goal of becoming a zero-debt company since our foundation, and our debt level has continued to decrease year after year.

2005.08 하스엠 주식회사 설립
HASM Co. established

2006.04 본사 설비증설 (Heading Mashine 3sets)
Installed additional facilities (three sets of heading machine) at the head office

Hastelloy Socket Bolt 국내 최초 단조 생산
Succeeded in the forging of hastelloy socket bolts for the first time in Korea

2007.03 ISO 9001 : 2001 품질 경영시스템 인증서 획득
Acquired ISO 9001 : 2001 Quality Management System certification

2008.06 서브원 업체 등록
Registered as a partner company of Serveone

2009.08 파주지사 개설
Opened the Paju branch

.10 구미지사 개설 및 구미공장 합병
Opened the Gumi branch and merged the Gumi production plant into the branch

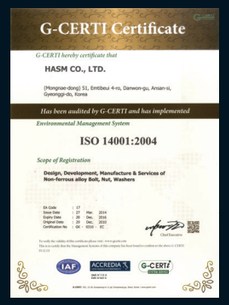
2010.12 ISO 14001 : 2004 환경 경영시스템 인증서 획득
Acquired ISO 14001: 2004 Environmental Management System certification

2011.03 본사 사옥 이전 및 가공, Plant 설비증설
Moved the head office to another location
Installed additional processing and plant facilities

2014.02 본사 시화 MTV단지 신축 입주 및 가공설비 증설
Newly built and moved into the Sihwa Multi-Techno Valley Complex and installed additional processing facilities

2015.04 두산중공업 업체등록
Registered as a partner company of Doosan Heavy Industries & Construction

.06 한국수자원공사 시화조력발전소 업체등록
Registered as a partner company of K-water's Sihwa-Lake Tidal Power Plant


G-CERTI Certificate

G-CERTI hereby certificate that

HASM CO., LTD.

(Wongnae-dong) 51, Entibeol 4-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Korea

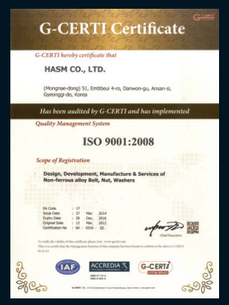
Has been audited by G-CERTI and has implemented

Environmental Management System

ISO 14001:2004

Scope of Registration

Design, Development, Manufacture & Services of Non-ferrous alloy Bolt, Nut, Washers


G-CERTI Certificate

G-CERTI hereby certificate that

HASM CO., LTD.

(Wongnae-dong) 51, Entibeol 4-ro, Danwon-gu, Ansan-si, Gyeonggi-do, Korea

Has been audited by G-CERTI and has implemented

Quality Management System

ISO 9001:2008

Scope of Registration

Design, Development, Manufacture & Services of Non-ferrous alloy Bolt, Nut, Washers

Production Facilities 생산 설비

Special Bolt Department I 특수볼트사업 1부

Special Bolt Department II 특수볼트사업 2부

Precision Processing Department 정밀가공 사업부

Product Warehouse 제품 창고

Product Quality Measurement Chamber 제품 계측 시험실

뿌린 만큼 거두는 세상의 이치에 발전 가능성은 무한합니다.

누구보다 한 발 앞선 기술 개발과 꾸준한 생산 설비 확대로 인해 최고 품질의 제품 생산으로 이어지고 있습니다.

We believe possibilities for growth are endless for those who try their best.

Our unyielding effort to remain at the forefront of technological innovation and steadily expand our production facilities is rewarded by the creation of quality products acclaimed to be the best in class.

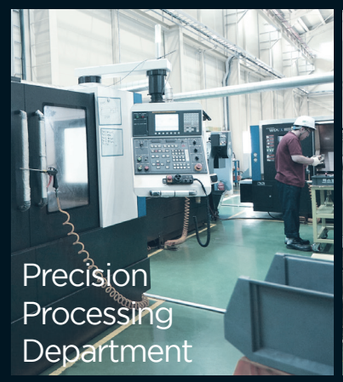
*** 슈퍼피셜 경도기**
(Rockwell Hardness Tester)

*** 유압식만능재료시험기**
(Universal Testing Machine-Hydraulic Type)

Production Facilities

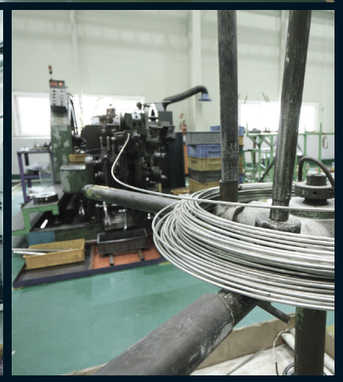
Special Bolt Department

Handheld XRF
(S1 Sorter-Bruker)



Precision Processing Department

Special Bolt Department



Product Warehouse

Our Products 취급 품목




특수비철금속을 이용해 볼트와 너트를 만드는 국내 유일의 회사입니다.

티타늄, 니켈합금, 지르코늄 등 특수 소재를 이용하여
각종 특수강 볼트, 너트 등을 제작 및 생산하고 있습니다.

We are the nation's only manufacturer of bolts and nuts made with special nonferrous metals.

We produce diverse types of bolts and nuts using special materials such as titanium, nickel alloys, and zirconium.

Titanium _ Bolt, Nut, Plan Washer, Spring Washer

티탄(Titan)으로도 불리우며, 고강도의 결정을 낼 수 있어 육각방형 결정에 삼단코팅하여 쓰이는 경우가 많다. 강화하지 않은 상태에서는 연성이 강한 특성상 철보다 약해지나, 처리 후에는 철에 비해 강도가 3배 정도 세어진다.

This is also called titan and is mainly used to triple-coat a hexagonal crystal to add to its high strength. It is more ductile than iron when not fortified, but its strength triples compared to iron after being treated.

Hastelloy _ C-276, C-22, G-30

내화학성이 강하고 가공성과 용접성이 좋아 화학공업용으로 널리 사용되는 합금강의 일종으로서 몰리브덴 약 28%, 철 약 5.5%가 포함되어 있는데 염산 등 비(非)산화성의 산(酸)에 끓는점까지 모든 농도에서 잘 견디며, 염화수소가스나 환원성용액에도 견딘다.

It is a type of alloy steel superior in chemical-resistance and is easy to process and weld, thus widely used across the chemical industry. It contains molybdenum (about 28 percent) and iron (about 5 percent), and corrosion is inhibited when exposed to hydrochloric acid and other non-oxidizing acids, including at their boiling points, as well as to hydrogen chloride gas and reducing agents.

Monel _ 400, K-500

니켈 60~70%와 구리 26~34%를 주성분으로 한 자연합금으로 니켈의 내식성을 개량한 것이고, 보통강보다 강인하며 내식성을 요하는 구조재료로 해수관련 플랜트, 선박부품 등에 쓰인다.

This alloy contains nickel (60-70 percent) and copper (26-34 percent) with improved corrosion-resistance. It is mainly used as a structural material for sea water-related facilities and ships as it is stronger than steel and superior in corrosion-resistance.

Inconel _ 600, 601, 617, 625, 718

니켈을 주체로 하여 15%의 크롬, 6~7%의 철, 2.5%의 티탄, 1% 이하의 알루미늄 · 망간 · 규소를 첨가한 내열합금이다.

This is a heat-resistant nickel-based alloy with chrome (15 percent), iron (6-7 percent), and titanium (2.5 percent), as well as aluminum, manganese, and silicon (each 1 percent or less).

Incoloy _ 800, 800HT, 825

고온에서 보통 정도의 강도와 산화나 탄화되지 않은 중 정도의 강도를 유지하는 철, 니켈, 크롬의 합금강이다.

This is an alloy steel of iron, nickel, and chrome, which maintains medium strength at high temperatures without being oxidized or carbonized.

Duplex _ 2205, 2507

오스테나이트(Austennite)의 페라이트(Ferrite) 성이 각각 50% 점유하는 이상(二相)조직을 갖는 강으로 304, 316 대비 강도 및 내식성이 높아 내해수용 고강도 부품에 많이 상용된다.

This is austenite-ferrite two-phased stainless steel. It boasts higher strength and corrosion-resistance than 304 and 316 stainless steel. It is often used for facilities that require high-strength sea water-resistant materials.

Moly _ 6%

광범위한 화학제에 대한 우수한 저항성을 가지며, 특히 소금기 있는 물, 해수 및 고염화물 환경에 적합하다.

It boasts superior resistance against diverse chemicals and is suitable to be applied to a saline environment including brackish water and sea water.

Zirconium

열중성자에 대한 흡수단면적이 금속재료 중에서 최소이고, 내식성이 매우 좋기 때문에 원자로의 재료로서 수요가 많다.

This is touted as the best among all metals in terms of the absorption cross section for thermal neurons. It is also superior in corrosion-resistance and is in high demand as a material for nuclear reactors.

Nickel _ 200, 201

은백색의 광택을 지닌 금속으로 철과 마찬가지로 단조 및 단접이 가능하고, 또한 전성 · 연성이 풍부하며, 연마가공도 가능하다.

This metal, with a silvery white luster, can be forged and forge-welded like iron. It is superior in malleability and ductility. It can also undergo the process of abrasive blasting.

STS _ 310S, 321, 317L, 904L

Titanium Alloys 티타늄 합금표

Common Name	UNS/W.Nr	Al	V	O_2	C	N	H	Fe	Ti	Other
Ti Gr 1	R50250 3.7025	-	-	max 0.18	max 0.1	max 0.03	max 0.015	max 0.2	rem	-
Ti Gr 2	R50400 3.7035	-	-	max 0.25	max 0.1	max 0.03	max 0.015	max 0.3	rem	-
Ti Gr 3	R50550 3.7055	-	-	max 0.35	max 0.1	max 0.05	max 0.015	max 0.3	rem	-
Ti Gr 4	R50700 3.7065	-	-	max 0.4	max 0.1	max 0.05	max 0.015	max 0.5	rem	-
Ti 6Al-4V Gr5	R56400 3.7164	5.5 -6.75	3.5 -4.5	max 0.2	max 0.1	max 0.05	max 0.015	max 0.4	rem	-
Ti 6AL-4V ELI	R56401	5.5 -6.5	3.5 -4.5	max 0.13	max 0.8	max 0.05	max 0.012	max 0.25	rem	
TI Gr 7	R52400 3.7235	-	-	max 0.25	max 0.1	max 0.03	max 0.015	max 0.3	rem	0.12 -0.25Pd
Ti Gr 11	R52250 3.7225	-	-	max 0.18	max 0.1	max 0.03	max 0.015	max 0.5	rem	0.12 -0.25Pd
Ti 3Al-2.5Sn Grade9	R56320	2.5 -3.5	2.0 -3.0	max 0.12	max 0.05	max 0.02	max 0.013	max 0.25	rem	-
Ti 6Al-6V-2Sn	R56620	5.5 nom	5.5 nom	-	-	-	-	-	rem	2.0 Sn
Ti 6Al-2Sn-4Zr-2Mo	R54620	6.0 nom	-	-	-	-	-	-	rem	2.0 Sn, 2.0 Mo, 4.0 Zr
Ti 6Al-2Sn-4Zr-6Mo	R56260	6.0 nom	-	-	-	-	-	-	rem	2.0 Sn, 6.0 Mo, 4.0 Zr
Ti 6Al-2Sn-2Zr-2Mo-2Cr-0.15Si	-	6.0	-	-	-	-	-	-	rem	2.0 Zr, 2.0 Mo, 2.0 Cr, 0.15 Si
Ti 10V-2Fe-3Al	R56410	2.6 -3.4	9.0 -11.0	max 0.13	max 0.05	max 0.05	max 0.015	1.6 -2.2	rem	0.005 Y
TI GR 12 TiCode-12	R53400 3.7105	-	-	max 0.25	max 0.08	max 0.03	max 0.015	max 0.3	rem	0.2 -0.4 Mo 0.6 -0.9 Ni
Ti 15V-3Al-3Cr-3Sn	R58153	2.5 -3.5	14 -16.0	max 0.13	max 0.05	max 0.05	max 0.015	max 0.25	rem	2.5 -3.5 Cr, 2.5 -3.5 Sn

Zirconium 지르코늄

Common Name	UNS/W.Nr	Zr + Hf	C	N	H	O	Fe+Cr	Nb
ZIRCA-DYNE®702 commercial purity zirconium	R60702	min 99.2	max 0.05	max 0.02	max 0.04	max 0.16	max 0.2	-
ZIRCDYNE®705	R60705	min 95.5	max 0.05	max 0.025	max 0.005	max 0.18	max 0.2	2.0 -3.0

Nickel Alloys 니켈 합금표

Common Name	UNS/W.Nr	Cr	Ni	Mo	Co	W	Si	Mn	Cu	N	C	Fe	Al	Ti	Cb	Other
HASTELLOY® G-30	N06030 2.4603	28.0 -31.5	rem	4.0 -6.0	max 5.0	1.5 -4.0	max 0.8	max 1.5	1.0 -2.4	-	max 0.03	13 -17.0	-	-	0.3 -1.50	0.04P 0.02S
HASTELLOY®G, NICROFER® 4520hMo	N06007 2.4618	21.0 -23.5	rem	5.5 -7.5	max 2.5	max 1.0	max 1.0	1.0 -2.0	1.5 -2.5	-	max 0.05	18 -21.0	-	-	1.75 -2.50	0.04P 0.03S
HASTELLOY®G-3 NICROFER® 4523hMo	N06985 2.419	21.0 -23.5	rem	6.0 -8.0	max 5.0	max 1.5	max 1.0	max 1.0	1.5 -2.5	-	max 0.015	18 -21.0	-	-	Cb+Ta 0.5 max	0.04P 0.03S
HASTELLOY® C-276 NICROFER® 5716hMoW	N10276 2.4819	14.5 -16.5	rem	15.0 -17.0	max 2.5	3.0 -4.5	max 0.08	max 1.0	-	-	max 0.02	4.0 -7.0	-	-	-	0.03P 0.03S 0.35V
HASTELLOY® C-22 NICROFER® 5621hMoW	N06022 2.4602	20.0 -22.5	rem	12.5 -14.5	max 2.5	2.5 -3.5	max 0.08	max 0.5	-	-	max 0.015	2.0 -6.0	-	-	-	0.02P 0.02S 0.35V
HASTELLOY®C-4 NICROFER® 6616hMO	N06455 2.4610	14.0 -18.0	rem	14.0 -17.0	max 2.0	-	max 0.08	max 0.1	-	-	max 0.015	max 3.0	-	max 0.7	-	0.04P 0.03S
HASTELLOY®B	N10001	max 1.0	rem	26.0 -33.0	max 2.5	-	max 1.0	max 1.0	-	-	max 0.12	max 6.0	-	-	-	0.04P 0.03S 0.6V
HASTELLOY®B-3 ®	N10675 2.4600	1.0 -3.0	min 65.0	27.0 -32.0	max 3.0	max 3.0	max 0.1	max 3.0	max 0.2	-	max 0.01	1.0 -3.0	max 0.5	max 0.2	max 0.2	0.03P 0.01S 0.2Ta 0.2V 0.1Zr
HASTELLOY®B-2 Nimofer 6928	N10665 2.4617	max 1.0	rem	26.0 -30.0	max 1.0	-	max 0.1	max 1.0	-	-	-	max 2.0	-	-	-	0.04P 0.03S
X HASTELLOY®X	N06002 2.4665	20.5 -23.0	rem	8.0 -10.0	0.5 -2.5	0.2 -1.0	max 1.0	max 1.0	-	-	0.05 -0.15	17.0 -20.0	-	-	-	0.04P 0.03S
625 INCONEL®625 icrofer 6020hMo	N06625 2.4856	20.0 -23.0	rem	8.0 -10.0	-	-	max 0.5	max 0.5	-	-	max 0.1	max 5.0	max 0.4	max 0.4	3.15 -4.15	0.015P 0.015S
INCONEL®690 NICROFER®6030	N06690 2.4642	27.0 -31.0	min 58.0	-	-	-	0.5 max	max 0.5	max 0.5	-	max 0.05	7.0 -11.0	-	-	-	0.015P
718 INCONEL®718	N07718 2.4668	17.0 -21.0	50.0 -55.0	2.8 -3.3	-	-	max 0.35	max 0.35	max 0.3	-	max 0.08	rem	0.2 -0.8	0.65 -1.15	4.75 -5.50	0.006B 0.015P 0.015S
INCONEL®725	N07725	19.0 -22.5	50.0 -59.0	7.0 -9.50	-	-	max 0.2	max 0.35	-	-	max 0.03	rem	max 0.35	1.00 -1.70	2.75 -4.00	0.015P 0.010S
INCONEL®X-750 NICROFER® 7016TiNb	N07750 2.4669	14.0 -17.0	min 70.0	-	-	-	max 0.5	max 1.0	max 0.5	-	max 0.08	5.0 -9.0	0.4 -1.0	2.25 -2.75	0.70 -1.20	0.01S
INCONEL®617 NICROFER® 5520 Co	N06617 2.4663	20.0 -24.0	min 44.5	8.0 -10.0	10.0 -15.0	-	max 1.0	max 1.0	max 0.5	-	0.05 -0.15	max 3.0	0.80 -1.50	max 0.6	-	0.006B 0.015S
INCONEL®693	N06693	27.0 -31.0	rem	-	-	-	max 0.5	max 1.0	max 0.5	-	max 0.15	2.5 -6.0	2.5 -4.0	max 1.0	0.5 -2.5	0.01S
601 NICROFER®6023 INCONEL®601	N06601 2.4851	21.0 -25.0	58.0 -63.0	-	-	-	max 0.5	max 1.0	max 1.0	-	max 0.1	rem	0.6 -1.2	-	-	0.015S
600 INCONEL®600 NICROFER®7216	N06600 2.4816	14.00 -17.00	min 720	-	-	-	max 0.5	max 1.0	max 0.5	-	max 0.15	6.00 -10.00	-	-	-	0.015S
825 NICROFER®4221	N08825 2.4858	19.5 -23.5	38 -46.0	2.5 -3.6	-	-	max 0.5	max 1.0	1.5 -3.0	-	max 0.05	rem	max 0.2	0.6 -1.2	-	0.03P 0.03S
INCOLOY®925	N09925	19.5 -23.5	38.0 -46.0	2.5 -3.6	-		max 0.5	max 1.0	1.5 -3.0		max 0.03	min 22.0	0.1 -0.5	1.9 -2.4	max 0.5	0.03S

Nickel Alloys 니켈 합금표

Common Name	UNS/W.Nr	Cr	Ni	Mo	Co	W	Si	Mn	Cu	N	C	Fe	Al	Ti	Cb	Other
800H	N08810	19.0 -23.0	30.0 -35.0	-	-	-	max 1.0	max 1.5	max 0.75	-	0.05 -0.10	rem	0.15 -0.60	0.15 -0.60	-	0.045P 0.015S
RA800AT,800HT®	N08811 N08810 1.4959,1.4876	19.0 -23.0	30.0 -35.0	-	-	-	max 1.0	max 1.5	max 0.75	-	0.06 -0.10	min 39.5	0.15 -0.60	0.15 -0.60	-	0.045P 0.015S (AL+Ti 0.85 -1.20)
MONEL®K-500	N05500 2.4375	-	63 -70.0	-	-	-	max 0.5	max 1.50	rem	-	max 0.25	max 2.00	2.30 -3.15	0.35 -0.85	-	0.01S
400 MONEL®400 NICORROS®	N04400 2.4360	-	63.0 -70.0	-	-	-	max 0.5	max 2.0	rem	-	max 0.3	max 2.50	-	-	-	0.024S
Alloy20 Carpenter NICROFER® 3620 Nb 20 CB-3®	N08020 2.4660	19.0 -21.0	32.0 -38.0	2.0 -3.0	-	-	max 1.0	max 2.0	3.0 -4.0	-	max 0.07	rem	-	-	8xC -1.0	0.045P 0.035S
NICROFER® 5923hMo,Alloy59	N06059 2.4605	22.0 -24.0	rem	15.0 -16.5	max 0.3	-	max 0.1	max 0.5	max 0.5	-	max 0.01	max 1.5	0.1 -0.4	-	-	0.015P 0.010S
200/Nickel 200 201/ Nickel 201	N02200 N02201	-	min 99.0	-	-	-	max 0.35	max 0.35	max 0.25	-	max 0.02	max 0.4	-	-	-	0.01S
317L	S31703	18.0 -20.0	11.0 -15.0	3.0 -4.0	-	-	max 1.0	max 2.0	-	-	max 0.03	rem	-	-	-	0.045P 0.03S
304L	S30403 1.4301 1.4307	18.0 -20.0	8.0 -12.0	-	-	-	max 1.0	max 2.0	-	-	max 0.03	rem	-	-	-	0.045P 0.03S
321	S32100 1.4541	17.0 -19.0	9.0 -12.0	-	-	-	max 1.0	max 2.0	-	-	max 0.08	rem	-		-	0.045P 0.03S
347	S34700 1.4550	17.0 -19.0	9.0 -13.0	-	-	-	max 1.0	max 2.0	-	-	max 0.08	rem	-	-	mic 10xC	0.045P 0.03S
316L	S31603 1.4401 1.4404	16.0 -18.0	10.0 -14.0	2.0 -3.0	-	-	max 1.0	max 2.0	-	-	max 0.03	rem	-	-	-	0.045P 0.03S
904L, 254SLX, Cronifer 1925LC 2RK65	N08904 1.4539	19.0 -23.0	23.0 -28.0	4.0 -5.0	-	-	max 1.0	max 2.0	1.0 -2.0	-	max 0.02	rem	-	-	-	0.045P 0.035S
317LM,317LX ™	S31725	18.0 -20.0	13.0 -17.0	4.0 -5.0	-	-	max 0.75	max 2.0	max 0.75	max 0.1	max 0.03	rem	-	-	-	0.045P 0.030S
17-14-4LN 317LXN ™	S31726	17.0 -20.0	13.5 -17.5	4.0 -5.0	-	-	max 0.75	max 2.0	max 0.75	0.1 -0.2	max 0.03	rem	-	-	-	0.045P 0.030S
410	S41000 1.4006	11.5 -13.5	-	-	-	-	max 1.0	max 1.0	-	-	max 0.15	rem	-	-	-	0.040P 0.030S
410S	S41008 1.4000	11.5 -13.5	max 0.6	-	-	-	max 1.0	max 1.0	-	-	max 0.08	rem	-	-	-	0.040P 0.030S
2205,AF22,F51 223FAL, Cronifer 2205LCN, DP-8	S31803 S32205 1.4462	21.0 -23.0	4.5 -6.5	2.5 -3.5	-	-	max 1.0	max 2.0	-	0.08 -0.20	max 0.03	rem	-	-	-	0.040P 0.020S
ZERON®100 S32760,F55	S32760 A911SA 1.4501	24.0 -26.0	6.0 -8.0	3.0 -4.0	-	0.5 -1.0	max 1.0	max 1.0	0.5 -1.0	0.2 -0.3	max 0.03	rem	-	-	-	0.030P 0.010S
2507, F53 S32750	S32750 1.4410	24.0 -26.0	6.0 -8.0	3.0 -5.0	-	-	max 0.8	max 1.2	-	0.24 -0.32	max 0.02	rem	-	-	-	0.035P 0.020S
25-6MO	N08926 1.4529	19.0 -21.0	24.0 -26.0	6.0 -7.0	-	-	max 0.5	max 2.0	0.5 -1.5	0.15 0.25	max 0.03	rem	-	-	-	0.030P 0.010S
AL-6XN®Alloy	N08367	20.0 -22.0	23.5 -25.5	6.0 -7.0	-	-	max 1.0	max 2.0	-	0.18 -0.25	max 0.03	rem	-	-	-	0.040P 0.010S
254SMO®	S31254	19.5 -20.5	17.5 -18.5	6.0 -6.5	-	-	max 0.8	max 1.0	0.5 -1.0	0.18 -0.25	max 0.02	rem	-	-	-	0.030P 0.010S

Comparison of Corrosion-Resistance 내식성 비교

A Guide to High-Temperature Characteristics

	Strength and Stability	Oxidation Resistance	Carburization Resistance	Sulfidation Resistance	Nitriding Resistance	Carbonitriding Resistance	Resistance to Molton Salts
INCONEL® Alloy 600	●	●	●	–	●	●	●
INCONEL® Alloy 601	●	●	●	◇	◇	◇	●
INCONEL® Alloy 601GC	●	●	●	◇	◇	◇	●
INCONEL® Alloy 617	●	●	●	●	●	●	●
INCONEL® Alloy 625	●	●	●	◇	●	●	●
INCONEL® Alloy 625CF	●	●	●	◇	●	●	●
INCONEL® Alloy 690	●	●	●	●	◇	◇	●
INCONEL® Alloy 718	●	●	●	◇	●	●	●
INCONEL® Alloy X-750	●	●	●	◇	●	●	●
INCONEL® Alloy X-751	●	●	●	◇	●	●	●
INCONEL® Alloy MA754	●	●	●	◇	●	●	●
INCONEL® Alloy MA758	●	●	●	●	●	●	●
INCONEL® Alloy HX	●	●	●	◇	●	◇	◇
INCOLOY® Alloy 330	◇	●	●	●	◇	◇	◇
INCOLOY® Alloy 800	●	●	●	●	◇	◇	◇
INCOLOY® Alloy 800H	●	●	●	●	◇	◇	◇
INCOLOY® Alloy 800HT	●	●	●	●	◇	◇	◇
INCOLOY® Alloy 803	●	●	●	●	–	–	◇
INCOLOY® Alloy 840	●	●	●	◇	◇	◇	◇
INCOLOY® Alloy 864	●	●	●	◇	◇	◇	◇
INCOLOY® Alloy MA956	●	●	●	●	●	●	◇
INCOLOY® Alloy A-286	●	●	◇	◇	◇	◇	◇
INCOLOY® Alloy DS	●	●	●	●	●	●	◇
NIMONIC® Alloy 75	●	●	●	◇	●	●	●
NIMONIC® Alloy 80A	●	●	●	◇	●	●	●
NIMONIC® Alloy 90	●	●	●	◇	●	●	●

● = Good to Excellent ◇ = Acceptable – = Not Suitable

A Guide to Aqueous Corrosion (All alloys listed are resistant to chloride cracking)

	Sulfuric-Acid	Hydrochloric-Acid	Hydrofluoric-Acid	Phosphoric-Acid	Nitric-Acid	Organic Acid	Alkalis and and Salts	Seawater
Nickel 200	◇	◇	●	◇	–	●	●	●
Nickel 201	◇	◇	●	◇	–	●	●	●
DURANICKEL® Alloy 301	◇	◇	●	◇	–	●	●	●
MONEL® Alloy 400	●	◇	●	●	–	●	●	●
MONEL® Alloy R-405	●	◇	●	●	–	●	●	●
MONEL® Alloy K-500	●	◇	●	●	–	●	●	●
INCONEL® Alloy 600	◇	–	◇	◇	–	●	●	◇
INCONEL® Alloy 22	●	●	●	●	●	●	●	●
INCONEL® Alloy 625	●	●	●	●	●	●	●	●
INCONEL® Alloy 625LCF	●	●	●	●	●	●	●	●
INCONEL® Alloy 686	●	●	●	●	◇	●	●	●
INCONEL® Alloy 690	◇	◇	●	●	●	●	●	◇
INCONEL® Alloy 718	◇	◇	◇	◇	◇	●	●	●
INCONEL® Alloy 725	●	●	●	●	●	●	●	●
INCONEL® Alloy C-276	●	●	●	●	◇	●	●	●
INCONEL® Alloy G-3	●	●	●	●	●	●	●	●
INCONEL® Alloy 050	●	●	●	●	●	●	●	●
INCOLOY® Alloy 800	◇	●	–	◇	●	●	◇	◇
INCOLOY® Alloy 825	●	●	●	●	●	●	●	●
INCOLOY® Alloy 864	◇	◇	◇	◇	●	●	●	●
INCOLOY® Alloy 925	●	●	●	●	●	●	●	●
INCOLOY® Alloy 020	●	●	●	●	●	●	●	●
INCOLOY® Alloy 25-6MO	●	●	◇	●	●	●	●	●
INCOLOY® Alloy 028	◇	●	◇	◇	◇	●	●	●

● = Good to Excellent ◇ = Acceptable – = Not Suitable

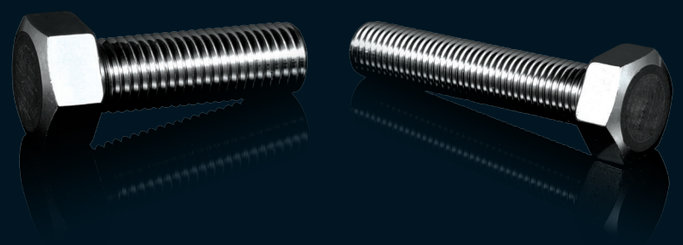
Unique **Article**

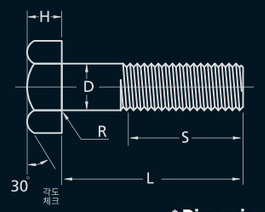
수입에 의존할 수밖에 없었던 특수 소재 볼트와 너트, 국내에서 유일하게 하스엠만이 믿을 수 있는 고품질의 제품을 만듭니다.

니켈합금, 티타늄, 지르코늄, 듀플렉스 외 각종 특수강 볼트, 너트 외(外), 하스텔로이(히터, 방전극), 반도체 장비 부품, 플랜트 부품 등을 제작, 생산하는 데에 지속적인 연구 개발에 힘쓰고 있으며,국내 최초 냉간압연방식의 하스텔로이 볼트를 생산하고 있습니다.

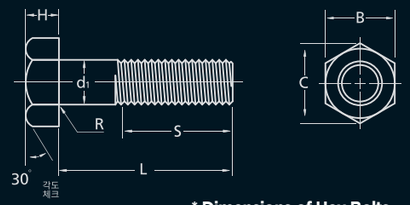
HASM is the nation's only reliable manufacturer of high-quality bolts and nuts made with special materials, which had to be imported in the past.

Our research and development is focused on producing bolts and nuts made with nickel alloys, titanium, zirconium, duplex stainless steel and other special materials as well as hastelloy heaters and discharge electrodes, semi-conductor equipment parts, and plant parts. We are also the nation's first manufacturer of cold-rolled hastelloy bolt.





* Dimensions of Heavy Hex Bolts



* Dimensions of Hex Bolts

Heavy Hex Bolts

ANSI B 18.2.1 *unit : inch

Nominal Size or Basic Product Dia		D	B			C							S	
		Body Dia	Width Across Flats			Width Across Corners		Height		Radius of Fillet			Thread Length For Bolt Lengths	
													6 in and Shorter	Over 6 in
		Max.	Basic	Max.	Min.	Max.	Min.	Basic	Max.	Min.	Max.	Min.	Basic	Basic
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	1.031	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	1.443	1.383	1/2	0.524	0.455	0.06	0.02	1.750	2.000
7/8	0.8750	0.895	1 7/16	1.438	1.394	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	1.876	1.796	43/64	0.700	0.591	0.09	0.03	2.250	2.500
1 1/8	1.1250	1.149	1 13/16	1.812	1.756	2.903	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	0.876	0.749	0.09	0.03	2.750	3.000
1 3/8	1.3750	1.404	2 3/16	2.188	2.119	2.526	2.416	29/32	0.940	0.810	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	3.035	1 5/32	1.196	1.054	0.12	0.04	3.750	4.000
2	2.0000	2.039	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
2 1/4	2.2500	2.305	3 1/2	3.500	3.388	4.041	3.862	1 1/2	1.548	1.327	0.19	0.06	4.750	5.000
2 1/2	2.5000	2.559	3 7/8	3.875	3.750	4.474	4.275	1 21/32	1.708	1.479	0.19	0.06	5.250	5.500
2 3/4	2.7500	2.827	4 1/4	4.250	4.112	4.907	4.688	1 13/16	1.869	1.632	0.19	0.06	5.750	6.000
3	3.0000	3.081	4 5/8	4.625	4.475	5.340	5.102	2	2.060	1.815	0.19	0.06	6.250	6.500

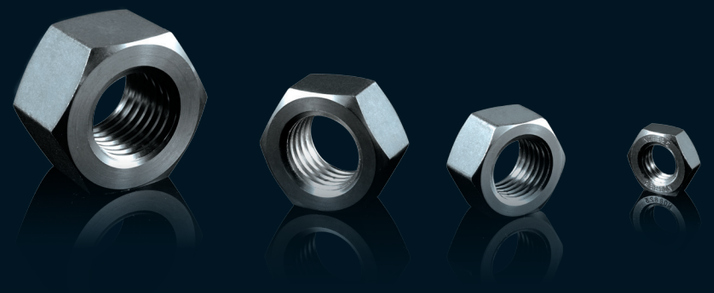
Hex Bolt

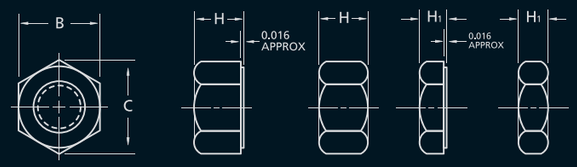
KS B 1002 : 2001 *unit : mm

Bolt Diameter		d1				H				B				C	R	S		
Pitch		Basic	Tolerance			Basic	Tolerance			Basic	Tolerance							
			Finish	Semi-Finish	Regular		Finish	Semi-Finish	Regular		Finish	Semi-Finish	Regular					
Coarse	Fine													App	Min	1≦ 125	125≦ 200	200≦ 400
M 6 x 1	-	6	0 -0.1	0 0.2	+0.6 -0.15	4	±0.15	±0.25	±0.6	10	0 -0.2	0 -0.6	0 -0.6	11.5	0.25	18	-	-
(M 7 x 1)	-	7	0 -0.15		+0.7 -0.2	5				11	0 -0.25	0 -0.7	0 -0.7	12.7	0.25	20	-	-
M 8 x 1.25	M 8 x 1	8				5.5				13				15	0.4	26	-	-
M10 x 1.5	M10 x 1.25	10				7	±0.2	±0.3	±0.8	17				19.6	0.4	26	-	-
M12 x 1.75	M12 x 1.25	12	0 -0.2	0 -0.25	+0.9 -0.2	8				19	0 -0.35	0 -0.8	0 -0.8	21.9	0.6	30	36	-
(M14 x 2)	(M14 x 1.5)	14				9				22				25.4	0.6	34	40	-
M16 x 2	M16 x 1.5	16				10				24				27.7	0.6	38	44	-
(M18 x 2.5)	(M18 x 1.5)	18				12		±0.35	±0.9	27				31.2	0.6	42	48	-
M20 x 2.5	M20 x 1.5	20				13				30				34.6	0.8	46	52	-
(M22 x 2.5)	(M22 x 1.5)	22		0 -0.35	+0.95 -0.35	14				32	0 -0.4	0 -1	0 -1	37	0.8	50	56	-
M24 x 3	M24 x 2	24				15				36				41.6	0.8	54	60	-
(M27 x 3)	(M27 x 2)	27				17				41				47.3	1	60	66	79
M30 x 3.5	M30 x 2	30				19				46				53.1	1	66	72	85
(M33 x 3.5)	(M33 x 2)	33	0 -0.25	0 -0.4	+1.2 -0.4	21	±0.25	±0.4	±0.1	50				57.7	1	72	78	91
M36 x 4	M36 x 3	36				23				55	0 -0.45	0 -1.2	0 -1.2	63.5	1	78	84	97
(M39 x 4)	(M39 x 3)	39				25				60				69.3	1	84	90	103
M42 x 4.5	-	42				26				65				75	1.2	90	96	109
(M45 x 4.5)	-	45				28				70				80.8	1.2	96	102	115
M48 x 5	-	48				30				75				86.5	1.6	102	108	121
(M52 x 5)	-	52	0 -0.3	0 -0.45	+1.2 -0.7	33	±0.3	±0.5	±1.5	80				92.4	1.6	-	116	129
M56 x 5.5	-	56				35				85	0 -0.55	0 -1.4	-	98.1	2	-	124	137
(M60 x 5.5)	-	60				38				90				104	2	-	132	145
M64 x 6	-	64			-	40			-	95				110	2	-	140	153
(M68 x 6)	-	68				43				100				115	2	-	148	161
-	M72 x 6	72				45				105				121	2	-	156	169
-	(M76 x 6)	76				48				110				127	2	-	164	177
-	M80 x 6	80				50				115				133	2	-	172	185

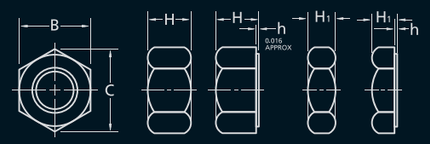
ANSI B 18.2.1 *unit : inch

Nominal Size or Basic Bolt Dia		d1	B			C		H		R			S	
		Body Dia	Width Across Flats			Width Across Corners		Height		Radius of Fillet			Thread Length For Bolt Lengths	
													6 in and Shorter	Over 6 in
		Max.	Basic	Max.	Min.	Max.	Min.	Basic	Max.	Min.	Max.	Min.	Basic	Basic
1/4	0.2500	0.260	7/16	0.438	0.425	0.505	0.484	11/64	0.188	0.150	0.03	0.01	0.750	1.000
5/16	0.3125	0.324	1/2	0.500	0.484	0.577	0.552	7/32	0.235	0.195	0.03	0.01	0.875	1.125
3/8	0.3750	0.388	9/16	0.562	0.544	0.650	0.620	1/4	0.268	0.226	0.03	0.01	1.000	1.250
7/16	0.4375	0.452	5/8	0.625	0.603	0.722	0.687	19/64	0.316	0.272	0.03	0.01	1.125	1.375
1/2	0.5000	0.515	3/4	0.750	0.725	0.866	0.826	11/32	0.364	0.302	0.03	0.01	1.250	1.500
5/8	0.6250	0.642	15/16	0.938	0.906	1.083	1.033	27/64	0.444	0.378	0.06	0.02	1.500	1.750
3/4	0.7500	0.768	1 1/8	1.125	1.088	1.299	1.240	1/2	0.524	0.455	0.06	0.02	1.750	2.000
7/8	0.8750	0.895	1 5/16	1.312	1.994	1.516	1.447	37/64	0.604	0.531	0.06	0.02	2.000	2.250
1	1.0000	1.022	1 1/2	1.500	1.450	1.732	1.653	43/64	0.700	0.591	0.09	0.03	2.250	2.500
1 1/8	1.1250	1.149	1 11/16	1.688	1.631	1.949	1.850	3/4	0.780	0.658	0.09	0.03	2.500	2.750
1 1/4	1.2500	1.277	1 7/8	1.875	1.812	2.165	2.066	27/32	0.876	0.749	0.09	0.03	2.750	3.000
1 3/8	1.3750	1.404	2 1/16	2.062	1.994	2.382	2.273	29/32	0.940	0.810	0.09	0.03	3.000	3.250
1 1/2	1.5000	1.531	2 1/4	2.250	2.175	2.598	2.480	1	1.036	0.902	0.09	0.03	3.250	3.500
1 3/4	1.7500	1.785	2 5/8	2.625	2.538	3.031	2.893	1 5/32	1.196	1.054	0.12	0.04	3.750	4.000
2	2.0000	2.039	3	3.000	2.900	3.464	3.306	1 11/32	1.388	1.175	0.12	0.04	4.250	4.500
2 1/4	2.2500	2.305	3 3/8	3.375	3.262	3.897	3.719	1 1/2	1.548	1.327	0.19	0.06	4.750	5.000
2 1/2	2.5000	2.559	3 3/4	3.750	3.625	4.330	4.133	1 21/32	1.708	1.479	0.19	0.06	5.250	5.500
2 3/4	2.7500	2.827	4 1/8	4.125	3.988	4.763	4.546	1 13/16	1.869	1.632	0.19	0.06	5.750	6.000
3	3.0000	3.081	4 1/2	4.500	4.330	5.196	4.959	2	2.060	1.815	0.19	0.06	6.250	6.500
3 1/4	3.2500	3.335	4 7/8	4.875	4.712	5.629	5.372	2 3/16	2.251	1.936	0.19	0.06	6.750	7.000
3 1/2	3.5000	3.589	5 1/4	5.250	5.075	6.062	5.786	2 5/16	2.380	2.057	0.19	0.06	7.250	7.500
3 3/4	4.7500	3.858	5 5/8	5.625	5.437	6.495	6.198	2 1/2	2.572	2.241	0.19	0.06	7.750	8.000
4	4.0000	4.111	6	6.000	5.800	6.928	6.612	2 11/16	2.764	2.424	0.19	0.06	8.250	8.500





* Dimensions of Heavy Hex Nuts and Heavy Hex Jam Nuts



* Dimensions of Hex Nut

Heavy Hex Nuts and Heavy Hex Jam Nuts

ANSI B 18.2.2 *unit : inch

Nominal Size or Basic Major Dia of Thread		B			C		H			H1			Heavy Hex Nuts Specified Proof Load		Heavy Hex Jam Nuts All Strength Levels
		Width Across Flats			Width Across Corners		Thickness Heavy Hex Nuts			Thickness Heavy Hex Jam Nuts			Up to 150,000 psi	150,000 psi and Grenter	
		Basic	Max.	Min.	Max.	Min.	Basic	Max.	Min.	Basic	Max.	Min.	Runout of Bearing Face FIR Max.		
1/4	0.2500	1/2	0.500	0.488	0.577	0.556	15/64	0.250	0.218	11/64	0.188	0.156	0.017	0.011	0.017
5/16	0.3125	9/16	0.562	0.546	0.650	0.622	19/64	0.314	0.280	13/64	0.220	0.186	0.020	0.012	0.020
3/8	0.3750	11/16	0.688	0.669	0.794	0.763	23/64	0.377	0.341	15/64	0.252	0.216	0.021	0.014	0.021
7/16	0.4375	3/4	0.750	0.728	0.866	0.830	27/64	0.441	0.403	17/64	0.285	0.247	0.022	0.015	0.022
1/2	0.5000	7/8	0.875	0.850	1.010	0.969	31/64	0.504	0.464	19/64	0.317	0.277	0.023	0.016	0.023
9/16	0.5625	15/16	0.938	0.909	1.083	1.037	35/64	0.568	0.526	21/64	0.349	0.307	0.024	0.017	0.024
5/8	0.6250	1 1/16	1.062	1.031	1.227	1.175	39/64	0.631	0.587	23/64	0.381	0.337	0.025	0.018	0.025
3/4	0.7500	1 1/4	1.250	1.212	1.443	1.382	47/64	0.758	0.710	27/64	0.446	0.398	0.027	0.020	0.027
7/8	0.8750	1 7/16	1.438	1.394	1.660	1.589	55/64	0.885	0.833	31/64	0.510	0.458	0.029	0.022	0.029
1	1.0000	1 5/8	1.625	1.575	1.876	1.796	63/64	1.012	0.956	35/64	0.575	0.519	0.031	0.024	0.031
1 1/8	1.1250	1 13/16	1.812	1.756	2.093	2.002	1 7/64	1.139	1.079	39/64	0.639	0.579	0.033	0.027	0.033
1 1/4	1.2500	2	2.000	1.938	2.309	2.209	1 7/32	1.251	1.187	23/32	0.751	0.687	0.035	0.030	0.035
1 3/8	1.3750	2 3/16	2.188	2.119	2.526	2.416	1 11/32	1.378	1.310	25/32	0.815	0.747	0.038	0.033	0.038
1 1/2	1.5000	2 3/8	2.375	2.300	2.742	2.622	1 15/32	1.505	1.433	27/32	0.880	0.808	0.041	0.036	0.041
1 5/8	1.6250	2 9/16	2.562	2.481	2.959	2.828	1 19/32	1.632	1.556	29/32	0.944	0.868	0.044	0.038	0.044
1 3/4	1.7500	2 3/4	2.750	2.662	3.175	3.035	1 23/32	1.759	1.679	31/32	1.009	0.929	0.048	0.041	0.048
1 7/8	1.8750	2 15/16	2.938	2.844	3.392	3.242	1 27/32	1.886	1.802	1 1/32	1.073	0.989	0.051	0.044	0.051
2	2.0000	3 1/8	3.125	3.025	3.608	3.449	1 31/32	2.013	1.925	1 3/32	1.138	1.050	0.055	0.047	0.055
2 1/4	2.2500	3 1/2	3.500	3.388	4.041	3.862	2 13/64	2.251	2.155	1 13/64	1.251	1.155	0.061	0.052	0.061
2 1/2	2.5000	3 7/8	3.875	3.750	4.474	4.275	2 29/64	2.505	2.401	1 29/64	1.505	1.401	0.068	0.058	0.068
2 3/4	2.7500	4 1/4	4.250	4.112	4.907	4.688	2 45/64	2.759	2.647	1 37/64	1.634	1.522	0.074	0.064	0.074
3	3.0000	4 5/8	4.625	4.475	5.340	5.120	2 61/64	3.013	2.893	1 45/64	1.763	1.643	0.081	0.070	0.081
3 1/4	3.2500	5	5.000	4.838	5.774	5.515	3 3/16	3.252	3.124	1 13/16	1.876	1.748	0.087	0.075	0.087
3 1/2	3.5000	5 3/8	5.375	5.200	6.207	5.928	3 7/16	3.506	3.370	1 15/16	2.006	1.870	0.094	0.081	0.094
3 3/4	4.7500	5 3/4	5.750	5.562	6.640	6.341	3 11/16	3.760	3.616	2 1/16	2.134	1.990	0.100	0.087	0.100
3	4.0000	6 1/8	6.125	5.925	7.073	6.755	3 15/16	4.014	3.862	2 3/16	2.264	2.112	0.107	0.093	0.107

Hex Nut

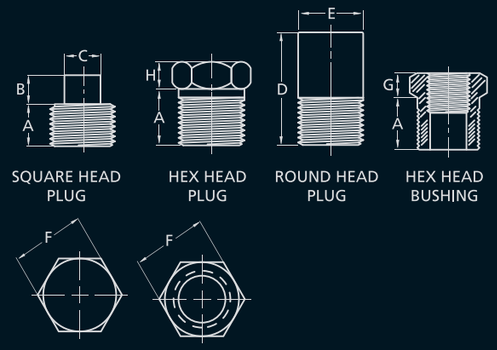
KS B 1002 : 2001 *unit : mm

Nominal Pitch		H				H1				B				C
			Tolerance				Tolerance				Tolerance			
		Basic	Finish	Semi-Finish	Regular	Basic	Finish	Semi-Finish	Regular	Basic	Finish	Semi-Finish	Regular	
Coarse	Fine													
M 6 x 1	-	5	0 -0.30	0 -0.48	±0.6	3.6	0 -0.3	0 -0.48	0 ±0.6	10	0 / -0.2	0 / -0.6	0 / -0.6	11.5
(M 7 x 1)	-	5.5				4.2				11				12.7
M 8 x 1.25	M 8 x 1	6.5	0 -0.36	0 -0.58	±0.8	5				13	0 -0.25	0 -0.7	0 -0.7	15
M10 x 1.5	M10 x 1.25	8				6				17				19.6
M12 x 1.75	M12 x 1.25	10				7	0 -0.36	0 -0.58	±0.8	19				21.9
(M14 x 2)	(M14 x 1.5)	11	0 -0.43	0 -0.70	±0.9	8				22	0 -0.35	0 -0.8	0 -0.8	25.4
M16 x 2	M16 x 1.5	13				10				24				27.7
(M18 x 2.5)	(M18 x 1.5)	15				11	0 -0.43	0 -0.70	±0.9	27				31.2
M20 x 2.5	M20 x 1.5	16				12				30				34.6
(M22 x 2.5)	(M22 x 1.5)	18				13				32				37
M24 x 3	M24 x 2	19	0 -0.52	0 -0.84	±1.0	14				36	0 -0.4	0 -1.0	0 -1.0	41.6
(M27 x 3)	(M27 x 2)	22				16				41				47.3
M30 x 3.5	M30 x 2	24				18				46				53.1
(M33 x 3.5)	(M33 x 2)	26				20	0 -0.52	0 -0.84	±1.0	50				57.7
M36 x 4	M36 x 3	29				21				55				63.5
(M39 x 4)	(M39 x 3)	31	0 -0.62	0 -1.0	±1.2	23				60	0 -0.45	0 -1.2	0 -1.2	69.3
M42 x 4.5	-	34				25				65				75
(M45 x 4.5)	-	36				27				70				80.8
M48 x 5	-	38				29				75				86.5
(M52 x 5)	-	42				31				80				92.4
M56 x 5.5	-	45				34				85				98.1
(M60 x 5.5)	-	48				36				90				104
M64 x 6	-	51	0 -0.74	0 -1.2	±1.5	38	0 -0.62	0 -1.0	±1.2	95	0 -0.55	0 -1.4	0 -1.4	110
(M68 x 6)	-	54				40				100				115
-	M72 x 6	58				42				105				121
-	(M76 x 6)	61				46				110				127
-	M80 x 6	64				48				115				133
-	(M85 x 6)	68				50				120				139
-	M90 x 6	72				54				130				150
-	(M95 x 6)	76				57				135				156
-	M100 x 6	80				60				145				167
-	(M105 x 6)	84	0 -0.87	0 -1.4	±1.8	63	0 -0.74	0 -1.2	±1.5	150	0 -0.65	0 -1.6	0 -1.6	173
-	M110 x 6	88				65				155				179
-	(M115 x 6)	92				69				165				191
-	(M120 x 6)	96				72				170				196
-	M125 x 6	100				76				180				208
-	(M130 x 6)	104				78				185	0 / -0.7	0 / -1.8	0 / -1.8	214

ANSI B 18.2.2

*unit : inch

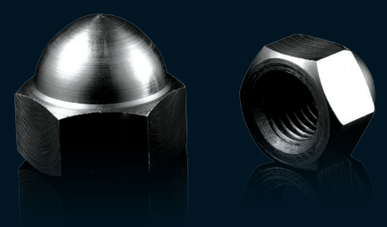
Nominal Size or Basic Major Dia of Thread		B			C		H			H1			Hex Nuts Specified Proof Load		Jam Nuts All Strength Levels
		Width Across Flats			Width Across Corners		Thickness Heavy Hex Nuts			Thickness Hex Jam Nuts			Up to 150,000 psi	150,000 psi and Grenter	
		Basic	Max.	Min.	Max.	Min.	Basic	Max.	Min.	Basic	Max.	Min.	Runout of Bearing Face FIR Max.		
1/4	0.2500	7/16	0.438	**0.428**	0.505	0.488	7/32	0.226	0.212	5/32	0.163	0.150	0.015	0.010	0.015
5/16	0.3125	1/2	0.500	**0.489**	0.577	0.557	17/64	0.273	0.258	3/16	0.195	0.180	0.016	0.011	0.016
3/8	0.3750	9/16	0.562	**0.551**	0.650	0.628	21/64	0.337	0.320	7/32	0.227	0.210	0.017	0.012	0.017
7/16	0.4375	11/16	0.688	**0.675**	0.794	0.768	3/8	0.385	0.365	1/4	0.260	0.240	0.018	0.013	0.018
1/2	0.5000	3/4	0.750	0.736	0.866	0.840	7/16	0.448	0.427	5/16	0.323	0.302	0.019	0.014	0.019
9/16	0.5625	7/8	0.875	0.861	1.010	0.982	31/64	0.496	0.473	5/16	0.324	0.301	0.020	0.015	0.020
5/8	0.6250	15/16	0.938	0.922	1.083	1.051	35/64	0.559	0.535	3/8	0.387	0.363	0.021	0.016	0.021
3/4	0.7500	1 1/8	1.125	1.088	1.299	1.240	41/64	0.665	0.617	27/64	0.446	0.398	0.023	0.018	0.023
7/8	0.8750	1 5/16	1.312	1.269	1.516	1.447	3/4	0.776	0.724	31/64	0.510	0.458	0.025	0.020	0.025
1	1.0000	1 1/2	1.500	1.450	1.732	1.653	55/64	0.887	0.831	35/64	0.575	0.519	0.027	0.022	0.027
1 1/8	1.1250	1 11/16	1.688	1.631	1.949	1.859	31/32	0.999	0.939	39/64	0.639	0.579	0.030	0.025	0.030
1 1/4	1.2500	1 7/8	1.875	1.812	2.165	2.066	1 1/16	1.094	1.030	23/32	0.751	0.687	0.033	0.028	0.033
1 3/8	1.3750	2 1/16	2.062	1.994	2.382	2.273	1 11/64	1.206	1.138	25/32	0.815	0.747	0.036	0.031	0.036
1 1/2	1.5000	2 1/4	2.250	2.175	2.598	2.480	1 9/32	1.317	1.245	**27/32**	0.880	0.808	0.039	0.034	0.039



Plug

ASME B 16.11-2009 *unit : mm

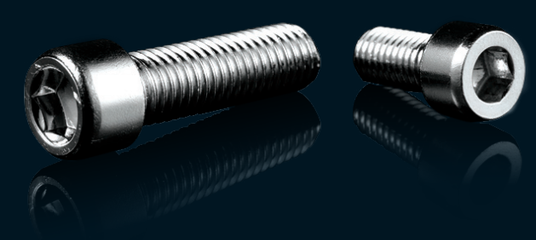
DN	Nom. Pipe Size	Length (Min.)	Squre Head Plug		Round Head Plug		Hex. Head Plug & Bushing		
			Height of Squre (Min.)	Width Flat (Min.)	Nominal Diameter of Head (Nom)	Length (Min.)	Width Flat (Min.)	Hex. Height (Min.) Bushing	Plug
		A	B	C	D	E	F	G	H
6	1/8"	10	6	7	10	35			6
8	1/4"	11	6	10	14	41	16	3	6
10	3/8"	13	8	11	18	41	18	4	8
15	1/2"	14	10	14	21	44	22	5	8
20	3/4"	16	11	16	27	44	27	6	10
25	1"	19	13	21	33	51	36	6	10
32	1-1/4"	21	14	24	43	51	46	7	14
40	1-1/2"	21	16	28	48	51	50	8	16
50	2"	22	18	32	60	64	65	9	18
65	2-1/2"	27	19	36	73	70	75	10	19
80	3"	28	21	41	89	70	90	10	21
100	4"	32	25	65	114	76	115	13	25

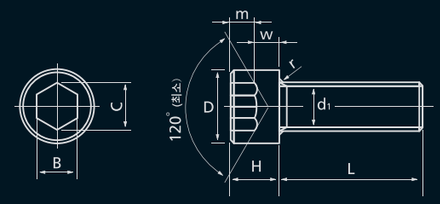


Cap Nut

*unit : mm

규격 (M)	H	h	B
M4	7.5	3.5	8
M5	7.5	4	8
M6	9.5	5	10
M8	12.5	6.5	12
M8	12.5	6.5	13
M10	15.5	8	14
M10	15.5	8	17
M12	18.5	10	19
M14	21	11	22
M16	24	13	24
M18	27	15	27
M20	29	16	30
M22	32.5	18	32
M24	35.5	19	38





Socket Bolt

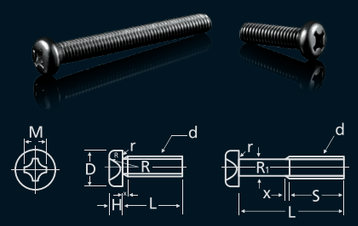
KS B 1003 : 2000 *unit : mm

	피치	d1		D		H		B		C	m	w	r
		기본	허용차	기본	허용차	기본	허용차	기본	허용차		최소	최소	최소
M3	0.5	3	-0.14	5.5	±0.18	3	-0.14	2.5	0.02 ~ 0.08	2.87	1.3	1.15	0.1
M4	0.7	4	-0.18	7	±0.22	4	-0.18	3		3.44	2	1.4	0.2
M5	0.8	5		8.5		5		4	0.02 ~ 0.095	4.58	2.5	1.9	0.2
M6	1	6		10		6	-0.3	5	0.02 ~ 0.14	5.72	3	2.3	0.25
M8	1.25	8	-0.22	13	±0.27	8	0 -0.36	6		6.86	4	3.3	0.4
M10	1.5	10		16		10		8	0.025 ~ 0.175	9.15	5	4	0.4
M12	1.75	12	-0.27	18		12	-0.43	10		11.43	6	4.8	0.6
M14	2	14		21	±0.33	14		12	0.032 ~ 0.212	13.72	7	5.8	0.6
M16	2	16		24		16		14		16	8	6.8	0.6
M18	2.5	18		27		18		14		16	9	7.7	0.6
M20	2.5	20	-0.33	30		20	-0.52	17	0.05 ~ 0.23	19.44	10	8.6	0.8
M22	2.5	22		33	±0.39	22		17		19.44	11	9.5	0.8
M24	3	24		36		24		19	0.065 ~ 0.275	21.73	12	10.4	0.8
M27	3	27		40		27		19		21.73	13.5	12.1	0.8
M30	3.5	30		45		30		22		25.15	15.5	13.1	1
M33	3.5	33		50		33		24		27.43	16.5	15	1
M36	4	36	-0.39	54	±0.46	36	-0.62	27		30.85	19	15.3	1
M42	4.5	42		63		42		32	0.08 ~ 0.33	36.57	21	19.2	1.2

Small Screw

KS B 1021 : 2012

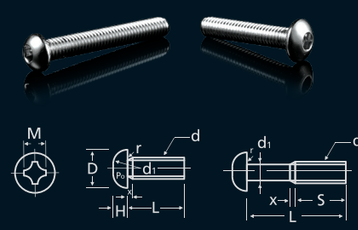
Pan Head Screw



*unit : mm

나사의 호칭 (d)	피치	십자 홈의 번호	D 기본 치수	D 허용차	H 기본 치수	H 허용차	R1 최소 약	R1 최대 약	M 최대	1형의 O 최대	1형의 O 최소	2형의 O(8) 최대	2형의 O(8) 최소	r 최대
M3	0.5	2	5.5	0 -0.5	2	±0.15	7	1.0	3.5	1.43	0.86	1.80	1.29	0.4
M3.5	0.6		6		2.3		8	1.1	3.8	1.73	1.15	2.10	1.58	0.4
M4	0.7		7		2.6		9	1.3	4.1	2.03	1.45	2.40	1.88	0.5
M4.5	0.75		8	0 -0.6	2.9		11	1.5	4.5	2.43	1.84	2.80	2.27	0.5
M5	0.8		9		3.3		12	1.6	4.8	2.73	2.14	3.10	2.56	0.6
M6	1	3	10.5	0 -0.7	3.9	±0.2	14	1.9	6.2	2.86	2.26	3.26	2.71	0.7
M8	1.25		14	0 -0.8	5.2		18	2.6	7.7	4.36	3.73	4.77	4.19	0.9

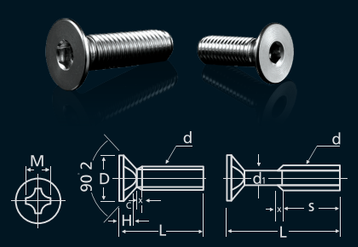
Round Head Screw



*unit : mm

나사의 호칭 (d)	피치	십자 홈의 번호	D 기본 치수	D 허용차	H 기본 치수	H 허용차	R1 최소 약	R1 최대 약	M 최대	1형의 O 최대	1형의 O 최소	2형의 O(8) 최대	2형의 O(8) 최소	r 최대
M3	0.5	2	5.5	0 -0.5	2	±0.15	7.3	1.8	3.4	1.33	0.76	1.70	1.19	0.4
M3.5	0.6		6		2.3		3.6	2	3.7	1.63	1.06	2.00	1.48	0.4
M4	0.7		7		2.6		4.2	2.3	4.0	1.93	1.34	2.30	1.78	0.5
M4.5	0.75		8	0 -0.6	3		4.8	2.7	4.4	2.33	1.74	2.70	2.17	0.5
M5	0.8		9		3.4		5.4	3	4.7	2.63	2.04	3.00	2.47	0.6
M6	1	3	10.5	0 -0.7	4	±0.2	6.3	3.5	6.1	2.76	2.16	3.16	2.62	0.7
M8	1.25		14	0 -0.8	5.4		8.4	4.6	7.6	4.26	3.63	4.67	4.09	0.9

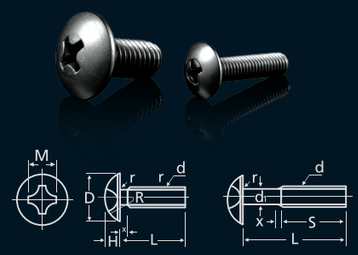
Flat Head Screw



*unit : mm

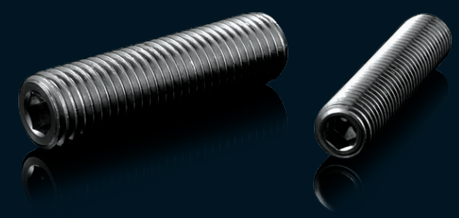
나사의 호칭 (d)	피치	십자 홈의 번호	D 기본 치수	D 허용차	H 기본 치수	H 허용차	C 약	M 최대	1형의 Q 최대	1형의 Q 최소	2형의 Q(8) 최대	2형의 Q(8) 최소
M3	0.5	2	6	0 -0.5	1.75	0 -0.3	0.25	3.5	1.43	0.91	1.80	1.34
M3.5	0.6		7		2		0.25	4.0	1.93	1.40	2.30	1.83
M4	0.7		8		2.3		0.3	4.4	2.33	1.79	2.70	2.22
M4.5	0.75		9	0 -0.6	2.55		0.3	4.8	2.73	2.19	3.10	2.61
M5	0.8		10		2.8		0.3	5.0	2.93	2.38	3.30	2.81
M6	1	3	12	0 -0.7	3.4	0 -0.4	0.4	6.6	3.26	2.70	3.66	3.16
M8	1.25		16	0 -0.8	4.4		0.4	8.3	4.96	4.36	5.37	4.82

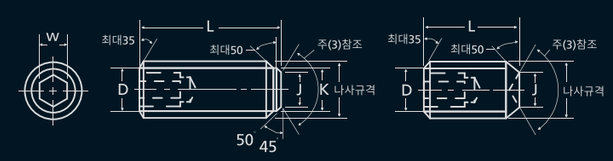
Truss Head Screw



*unit : mm

나사의 호칭 (d)	피치	십자 홈의 번호	D 기본 치수	D 허용차	H 기본 치수	H 허용차	C 약	M 최대	1형의 Q 최대	1형의 Q 최소	2형의 Q(8) 최대	2형의 Q(8) 최소	r 최대
M3	0.5	2	5.5	0 -0.5	6.9	±0.15	4.6	2.9	1.72	1.34	2.03	1.67	0.4
M3.5	0.6		6		8.1		5.4	3.9	1.83	1.30	2.20	1.73	0.4
M4	0.7		7		9.4		6.1	4.2	2.13	1.60	2.50	2.02	0.5
M4.5	0.75		8	0 -0.6	10.6		6.9	4.6	2.53	2.99	2.90	2.42	0.5
M5	0.8		9		11.8		7.7	4.9	2.83	2.29	3.20	2.71	0.6
M6	1	3	10.5	0 -0.7	14	±0.2	9.6	6.2	2.86	2.31	3.26	2.76	0.7
M8	1.25		14	0 -0.8	17.8		11.7	7.7	4.36	3.78	4.77	4.23	0.9

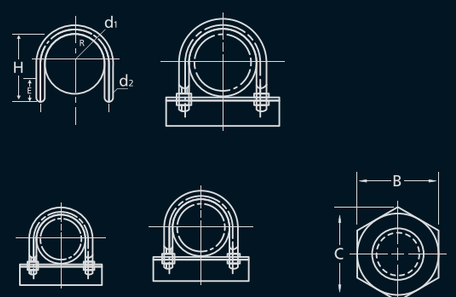




Socket Set Screws

KS B 1028 : 1990 *unit : mm

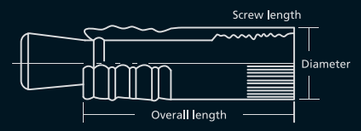
나사규격	피치	D (최대)	J(최대) 플래인컴포인트	J(최대) 톱니포인트	K (최대)	L(최소, 기준) 최소	L(최소, 기준) 최대	W (표준)	적용데이타 적정체결토크** N-m	적용데이타 적정체결토크** in-lbf	탭드릴
M3	0.50	2.10	1.50	1.40	2.06	2.8	3.2	1.5	0.60	5.00	2.50
M4 M5	0.70 0.80	2.75 3.70	2.5 3.5	2.1 2.4	2.74 3.48	3.7 4.7	4.3 5.3	2.0 2.5	2.00 2.50	18.00 35.00	3.30 4.20
M6 M8	1.00 1.25	4.35 6.00	4.0 5.5	3.3 5.0	4.14 5.62	5.7 7.7	6.3 8.3	3.0 4.0	7.00 17.00	62.00 150.00	5.00 6.75
M10 M12	1.50 1.75	7.40 8.60	7.0 8.5	6.0 8.0	7.12 8.58	9.7 11.6	10.3 12.4	5.0 6.0	34.00 60.00	300.00 530.00	8.50 10.25
M16 M20	2.00 2.50	12.35 16.00	12.0 15.0	10.0 14.0	11.86 14.83	15.6 19.6	16.4 20.4	8.0 10.0	150.00 300.00	1325.00 2650.00	14.00 17.50
M24	3.00	18.95	18.0	16.0	17.80	24.6	25.4	12.0	475.00	4200.00	21.00



U-Bolt

*unit : mm

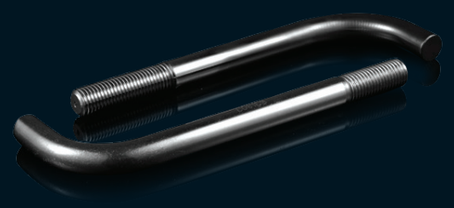
호칭경	파이프 강관 외경	유볼트 R	d1	d2	A H	A E	B H	B E	C H	C E
15	21.7	11	10	3/8			38	16	47	25
20	27.2	14	10	3/8			44	16	53	25
25	34.0	18	10	3/8			50	16	59	25
32	42.7	22	10	3/8			58	16	67	25
40	48.6	25	10	3/8			64	16	73	25
50	60.5	31	10	3/8			76	16	85	25
65	76.3	39	13	3/8			96	20	106	30
80	89.1	45	13	3/8			110	20	120	30
90	101.6	51	13	3/8			112	20	132	30
100	114.3	58	16	3/8	140	50				
125	139.8	71	16	2/1	166	50				
150	165.2	84	16	2/1	192	50				
175	190.7	97	16	2/1	218	50				
200	216.3	110	19	2/1	248	60				
225	241.8	122	19	5/8	274	60				
250	267.3	135	19	5/8	300	60				
300	318.5	161	25	1	359	75				
350	335.6	179	25	1	395	75				
400	406.4	205	25	1	445	75				
450	457.2	230	32	1 1/4	507	95				

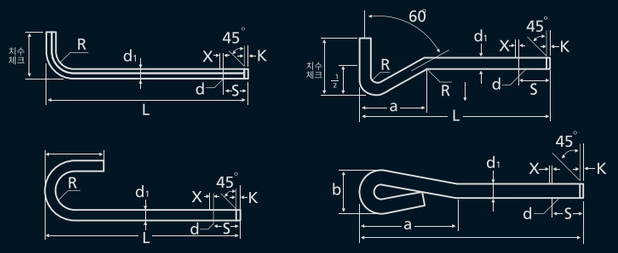


Set Anchor

*unit : mm

인치규격	규격	앙카길이	전장	드릴규격	드릴길이	
1/4"	6	30	50	10	33	20
5/16"	8	35	60 70	12	38	25 35
3/8"	10	40	70 100	14	44	40 50
1/2"	12	50	100 125 150	17	55	60 80 100
5/8"	16	60	100 125 150	21.5	65	50 80 100
3/4"	20	80	150 200 250	25	85	80 130 180
7/8"	22	100	200 250 300	28	110	120 170 220
1"	24	120	200 250 300	32	130	100 150 200

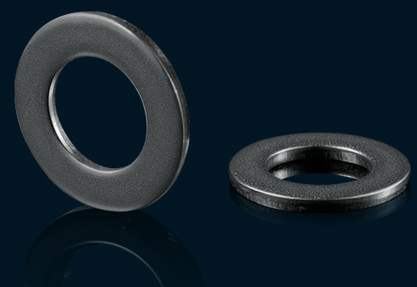


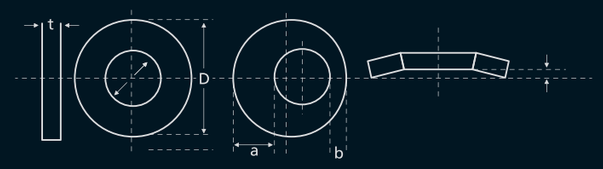


L - Anchor

KS B 1016 : 2010 *unit : mm

d	d1		S			L1 (약)		R (약)		a (약)		b (약)	K (약)
	기준치수	허용차	L.J	LA.JA	허용차	L.LA	J	L.J	LA	LA	JA	JA	
M8	8	±0.4		20	+6.3 0	32			8	41			1.2
10	10		25	30		40	45	20	10	51	50	35	1.5
12	12		32	35	+8 0	50	56	25	12	64	65	40	2
18	16	±0.5	40	40		63	71	32	16	81	85	55	2
20	20		50	50		80	90	40	20	102	105	70	2.5
24	24		63	80		100	112	50	24	127	125	80	3
30	30	±0.6	80	90	+10 0	125	140	63	30	158	155	100	3.5
36	36	±0.7	90	110		140	160	71	36	181	190	120	4
42	42	±0.8	112	125		180	200	90	42	226	220	140	4.5
48	48	±0.9	125	150	+12.5 0	200	244	100	48	252	250	160	5

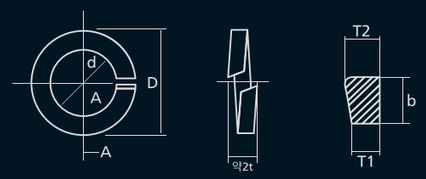




PLAIN WASHER

KS B 1326 : 2009 *unit : mm

호칭	내경		외경		치우침	두께	
	기준	허용	기준	허용	최대	기준	허용
6	6.6	+0.6	12.5	-0.7	0.86	1.6	±0.2
8	9		17			1.6	
10	11	+0.7	21	-0.8	1.04	2.0	±0.25
12	14		24			2.3	±0.3
14	16		28			3.2	±0.4
16	18		30			3.2	
18	20	+0.8	34	-1.0	1.24	3.2	
20	22		37			3.2	
22	24		39			3.2	
24	26		44			4.5	±0.5
27	30		50			4.5	
30	33	+1.0	56	-1.2	1.48	4.5	
33	36		60			6.0	±0.7
36	39		66			6.0	
39	42		72			6.0	
42	45		78			7.0	
45	48		85			7.0	
48	52	+1.2	92	-1.4	1.74	8.0	±1.0
52	56		98			8.0	
56	62		105			9.0	
60	66		110			9.0	
64	70		115			9.0	
68	74		120			10	
72	78		125	-1.6	2.0	10	
76	82	+1.4	135			10	
80	86		140			12	
85	91		145			12	
90	96		160			12	
95	101		165			12	
100	107		175			14	±1.4
105	112		180			14	
110	117		185	-1.8	2.3	14	
115	122	+1.6	200			14	
120	127		210			16	
125	132		220			16	
130	137		230			16	
140	147		240			18	±1.6
150	158		250			18	



Spring Washer

KS B 1324 : 2010 *unit : mm

호칭	안지름		단면 치수 (최소)		바깥지름 D (최대)		압축시험후 자유높이 (최대)		시험하중 kN
	기준차수	허용차	2호(bxt)	3호(bxt)	2호	3호	2호	3호	
2.0	2.1	+0.25	0.9x0.5	-	4.4	-	0.85	-	0.42
2.5	2.6		1.0x0.6	-	5.2	-	1.0	-	0.69
3.0	3.1	+0.30	1.1x0.7	-	5.9	-	1.2	-	1.03
(3.5)	3.6		1.2x0.8	-	6.6	-	1.35	-	1.37
4.0	4.1		1.4x1.0	-	7.6	-	1.7	-	1.77
(4.5)	4.6		1.5x1.2	-	8.3	-	2.0	-	2.26
5.0	5.1	+0.40	1.7x1.3	-	9.2	-	2.2	-	2.94
6.0	6.1		2.7x1.5	2.7x1.9	12.2	12.2	2.5	3.2	4.12
(7.0)	7.1		2.8x1.6	2.8x2.0	13.4	13.4	2.7	3.35	5.88
8.0	8.2	+0.50	3.2x2.0	3.3x2.5	15.4	15.6	3.35	4.2	7.45
10.0	10.2		3.7x2.5	3.9x3.0	18.4	18.8	4.2	5.0	11.8
12.0	12.2	+0.60	4.2x3.0	4.4x3.6	21.5	21.9	5.0	6.0	17.7
(14.0)	14.2		4.7x3.5	4.8x4.2	24.5	24.7	5.85	7.0	23.5
16.0	16.2		5.2x4.0	5.3x4.8	28.0	28.2	6.7	8.0	32.4
(18.0)	18.2	+0.80	5.7x4.6	5.9x5.4	31.0	31.4	7.7	9.0	39.2
20.0	20.2		6.1x5.1	6.4x6.0	33.8	34.4	8.5	10.0	49.0
(22.0)	22.5	+1.00	6.8x5.6	7.1x6.8	37.7	38.3	9.35	11.3	61.8
24.0	24.5		7.1x5.9	7.6x7.2	40.3	41.3	9.85	12.0	71.6
(27.0)	27.5	+1.20	7.9x6.8	8.6x8.3	45.3	46.7	11.3	13.8	93.2
30.0	30.5		8.7x7.5	-	49.9	-	12.5	-	118
(33.0)	33.5		9.5x8.2	-	54.7	-	13.7	-	147
36.0	36.5	-1.40	10.2x9.0	-	59.1	-	15.0	-	167
(39.0)	39.5		10.7x9.5	-	63.1	-	15.8	-	197

Highest **Value**

신용과 정직을 바탕으로 세계 최고의 경쟁력 있는 제품을 만들 것을 약속합니다.

항상 고객 최우선 주의라는 원칙 하에 깊은 탐구와 연구로 한 발 앞선 기술을 개발하여 고객의 믿음에 보답하는 경쟁력 있는 제품을 만들겠습니다.

We promise to create and deliver products of superior quality based on our integrity and trust of our customers.

We will reward our customers' trust in us by remaining committed to our "Customer First" strategy, focusing our resources on research and innovation to develop advanced technology, and delivering products of superior quality.

HASM Co., Ltd. 하스엠 주식회사

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