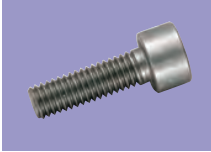
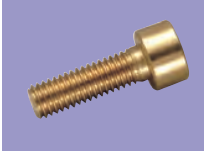
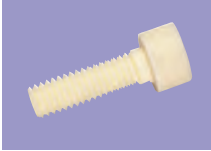








SPECIAL SCREWS

SOLUTIONS WITH SPECIAL SCREWS




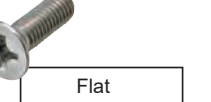



MATERIALS

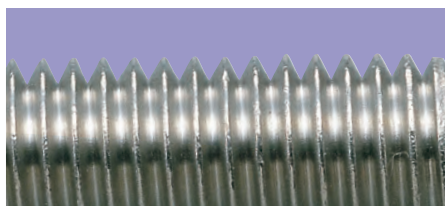
Special materials	
	
Pure titanium	Bronze
	
Ceramic	Molybdenum

Plastic	
	
VESPEL	PEEK
	
PC	Conductive PEEK

*Check further available materials

HEAD SHAPES

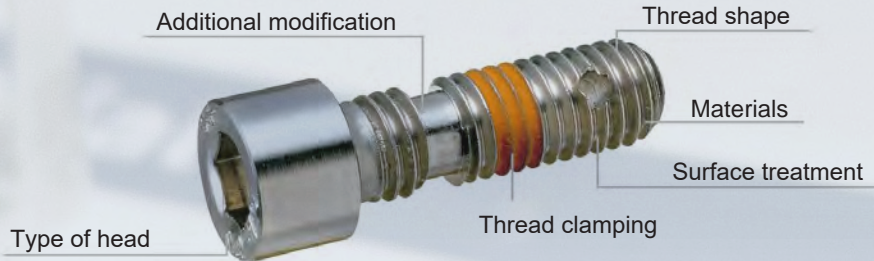
			
Socket Head Cap	Hexagon	Low Profile	Flat
			
Pan	Temper Resistant	Hexalobular Socket	



THREAD SHAPE

Type of thread: thick, slim, very slim, Unified and Whitworth

SPECIAL SCREWS



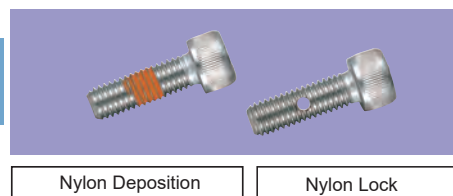
MADDITIONAL MODIFICATIONA

Screw length adjustment	Through hole processing	Necking	Screw tip processing	Head processing	Horizontal hollow processing
For required screw length	For ventilation devices	For fallout prevention	For positioning improvement	For large head diameter	For loosening prevention

SURFACE TREATMENT

Chromate	Super Black	Tuffride Treatment	Anodizing	Chemical Polishing	Electro-Polishing
Nickel Coating	Gold Plating	Silver Plating	Chrome Plating	Nickel Plating	Antibacterial Treatment
Gold Coating	Molybdenum Disulfide Coating	Teflon Coating	TiN Coating	Ferrosferric Oxid Coating	Painted-Baked Head Finish

VIBRATION RESITANCE



Nylon Deposition

Nylon Lock

SELECT A PRODUCT FROM CATEGORY

Vacuum Application Screws

Screws have gas ventilation holes for vacuum drawing of machines and have excellent corrosion resistance under vacuum environments.



→ P. 563*

Low Profile and Small Head Screws

Compact head screws. Suitable for reducing the size of applications.



→ P. 593*

High Performance Stainless Steel Screws

High performance stainless steel screws have excellent strength, heat resistance and corrosion resistance compared to standard stainless steel screws.



→ P. 621*

Titanium Screws

Screws made of titanium. They are lightweight, nonmagnetic and chemically resistant.



→ P. 663*

Special Material Screws

Screws made of special materials such as Inconel, Molybdenum and Hastelloy to provide excellent heat, chemical, corrosion resistance.



→ P. 645*

Chemical Resistance Screws

Screws with special materials, surface treatments and shapes for applications that require chemical resistance.



→ P. 663*

Special Surface Treatment Screws

Screws with surface treatment for seizing prevention and reflection resistance.



→ P. 671*

Miniature Screws

Small-diameter screws lower than M2.6 size for precision instruments.



→ P. 681*

* For further information check the GENERAL NBK 2017 CATALOGUE

Captive/full Thread Screws

Screws for falling out prevention and screws with full thread.



→ P. 689*

Functional Screws

Screws for fixing and locating clamping screws and ball plungers.



→ P. 701*

Inch Screws

Screws for equipment and facilities that use inch-screw specifications.



→ P. 708*

Tamper Resistance Screws

Screws which cannot be installed or removed easily with standard tools to prevent theft and tampering.



→ P. 713*

Hexalobular Socket Head Screws

Screws with strength socket heads. For repeating installations and removals.



→ P. 723*

Plugs

Screw plugs for oily hydraulic equipment and pneumatic devices.



→ P. 727*

Plastic Screws

Different types of plastic screws made from materials such as VESPEL, PEEK and PTFE (Teflon).



→ P. 733*

Washers and Vibration Resistant Treatment

Washers with abundant outside diameter and thickness variations and vibration resistant treatment parts.

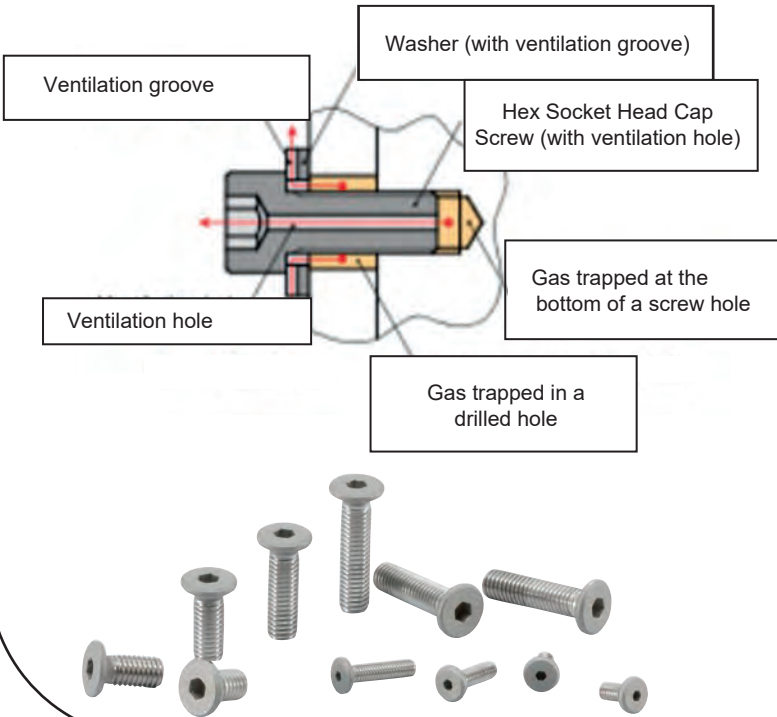


→ P. 780*

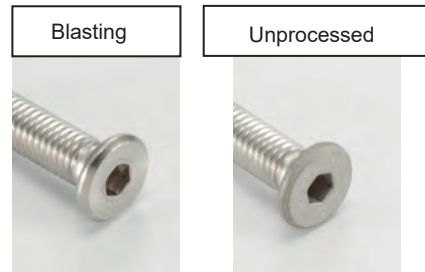
SELECTION FROM APPLICATION

VACUUM

Bolts with ventilation holes and washers with ventilation grooves support vacuuming equipment.



The surface of the screw head has been roughened with blasting to prevent the deposition from peeling off.



Aluminum alloy and ceramic cover caps prevent corrosion of bolts given by gas and plasma in the vacuum chamber.



LOW OUTGAS

Screws using material/surface treatment with low outgassing. Outgassing is extremely low even in vacuum environments.

VESPEL



Special Chemical Polish



CLEANROOM SPECIFICATIONS

Screws are cleaned and packed in cleanrooms.



Particle Measurement Tools

Specimen	SUS303 Ø19x20	
Test Method	Automatic Particle Measurement	Submerged Counter

Number of particles floating in ultra-pure water			
Particle Size	Ultrasonic Cleaning	IPA Cleaning	Unprocessed
≥0,3 μm	220.000	7.000.000	210.000.000
≥0,5	51.000	1.900.000	37.000.000
≥0,7	15.000	640.000	9.700.000
≥1,0	3.100	160.000	1.400.000
≥2,0	280	29.000	240.000


CHEMICAL RESISTANCE

Screws with excellent chemical resistance protect the thread and screw head from chemicals.



Hastelloy


Metal's chemical resistance

Material	Chemical Resistance
Hastelloy	High 
Titanium	
Inconel	
SUS316L (HiMo)	
SUS310S	



PTFE (teflon)

Resins' chemical resistance

Material	Chemical Resistance
PFTE (teflon)	High 
PVDF	
H- PVC	
PP	
PEEK	

PTFE (teflon) cover cap protects the screw head from chemicals.



Teflon coating with excellent chemical resistance.



HIGH STRENGTH

Screws made of high-strength titanium, stainless steel, resin and surface treatment. For applications that require strength in addition to the properties of the material and surface treatment.



Ti- 6al- 4V
(64 Titanium)

Titanium Screws	Tensile Strength (N/mm ²)
Ti- 6al- 4V (64 Titanium)	895 or higher
Ti- 15- 3- 3- 3 (β Titanium)	705- 945

Functional Stainless Steel Screws	Tensile Strength (N/mm ²)
SUS316L HiMo	800 · 1000

Special Surface Treatment Screws	Tensile Strength (N/mm ²)
Electroless Nickel Coating	1200

Plastic Screws	Tensile Strength (N/mm ²)
RENY	285

HEAT-RESISTANCE

Highly heat-resistant screws even for metal/ resin. Select according to the operating environment.



Molybdenum

Material	Tensile Strength (N/mm ²)			
	200°C	500°C	800°	1000°C
SUS316L	560	500	250	-
SUS310S	580	500	200	-
Inconel 600	560	530	200	70
Molybdenum	590	450	290	210
Carbon Steel	450	230	40	-
SUS304	500	420	160	-

Material	Continuous operating temperature (°C)
Ceramic	1500°C
VESPEL	288-350°C
PTFE (Teflon)	260°C

SELECTION FROM APPLICATION

FALLOUT/LOSS PREVENTION

Flat washer incorporated into the screw to prevent lost.

Magnetic detection type with a built-in magnetic flat washer, allowing magnetism detection.



Hex Socket Head Cap Screws with Captive Washer and Ventilation Hole



Hex Socket Head Cap Screws with Magnetic Captive Washer



Hex Socket Head Cap Screws

TIGHTENING HOLE DAMAGE PREVENTION

Hexalobular hole shape allows minimal damage from tools compared to hex hole or cross hole. It is ideal for repeated use at a high tightening torque.



Hexalobular Socket Head Cap Screws with Special Low Profile



Hexalobular Socket Pan Head Machine Screws



Hexalobular Socket Flat Head Machine Screws

VIBRATION RESISTANT

Screw components highly effective for prevention of screw loosening due to vibration of seating surface falling.



Ribbed Lock Washers



Hex Lock Nuts



Socket Button Head Cap Screws with Flange



High-intensity Washers

DECORATION

The mounting surface has been beautifully decorated with a distinctive colour and shape

Bezel Washers



Two Hole Pan Head Machine Screws



Gold Coating



Hexalobular Socket Head Cap Screws with Extreme Low Profile



ELECTRICAL INSULATION

Screws with excellent electrical insulating properties. For electrical and electronic equipment and the like requiring electrical insulating properties.



PTFE (teflon)



PEE

	Resistivity ($\times 10^{14} \Omega \cdot m$)
PTFE (teflon)	>100
PEEK	4,9
PC	4
Ceramic	>0,01
Iron	$10 \times 10^{-8} \Omega \cdot m$

LIGHTWEIGHT

For applications that require lighter weight such as automobiles, aircraft, aerospace equipment, medical equipment, robots, etc.



Aluminum		Titanium	
Metal Screws	Specific Gravity	Metal Screws	Specific Gravity
Aluminum	2,64	Ti- 6Al- 4V (64 Titanium)	4,43
Ti- 6Al- 4V (64 Titanium)	4,43	Pure Titanium	4,51
Pure Titanium	4,51	Ti- 15- 3- 3- 3 (β titanium)	4,8
Ti- 15- 3- 3- 3 (β titanium)	4,8	Iron	7,8
Iron	7,8		
Plastic Screws	Specific Gravity		
PC	1,2		
RENY	1,65		

SIMPLE OPERATION

Screws with washer incorporated. They do not require washers to be embedded, simplifying the assembly.



Hex Socket Head Cap Screws with Captive Washer (with ventilation hole)

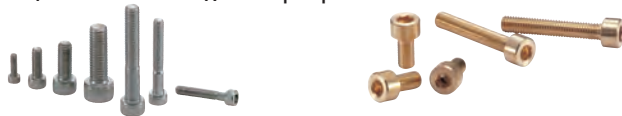
Hex Socket Head Cap Screws with Captive Washer

Simple Button Head Cap Screws with Flange



NON-MAGNETIC

Non-magnetic screws with low permeability. For FPD manufacturing equipment, semiconductor manufacturing equipment and electronic equipment require magnetic properties.



Pure Titanium

Phosphor Bronze

	Amplitude Permeability
Pure Titanium	1,0001
Ti - 6Al- 4V (64 titanium)	1,0002
Ti - 15- 3- 3- 3 (β titanium)	1,0002
Phosphor Bronze	1,0001
SUS316L	1,007
SUS316 HiMo	1,006

SPACE-SAVING

Screws with low head. Suitable for reducing the size of equipment and devices.



Hex Socket Head Cap Screws with Special Low Profile

Low Profile Screws	Small Head Screws
Hex Socket Head Cap Screws with Ventilation Hole with Low Profile	Hex Screws with Small Head
Hex Socket Head Cap Screws with Low Profile	Hex Screws with Small and Low Head
Hex Socket Head Cap with Special Low Profile	Hex Screws with Small and Low Special Head
Hexalobular Socket Head Cap Screws with Low Profile	Hex Screws with Small and Low Special Head
Hexalobular Socket Head Cap Screws with Special Low Profile	Head with Thin Cross-shaped Hole

SEIZING PREVENTION

Through special treatments, the required axial force can be obtained even at low tightening torque. As a result, it is effective in preventing galling and seizing even at high temperatures.

Silver Coating

Gold Coating

Low Temperature Black Chrome Treatment



Special Surface Treated Screws	Axial Force (kN)
Low temperature black chrome treatment	9.2
Teflon coating	8.7
Molybdenum disulfide coating	6.7
Fluorine coating	5
Gold coating	4.3
No surface treatment	2.3

ANTIREFLEXION

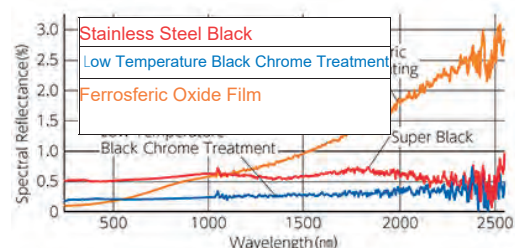
Low temperature black chrome treatment/ stainless steel black has a very low spectral reference, making it ideal for optical equipment that requires antireflection.



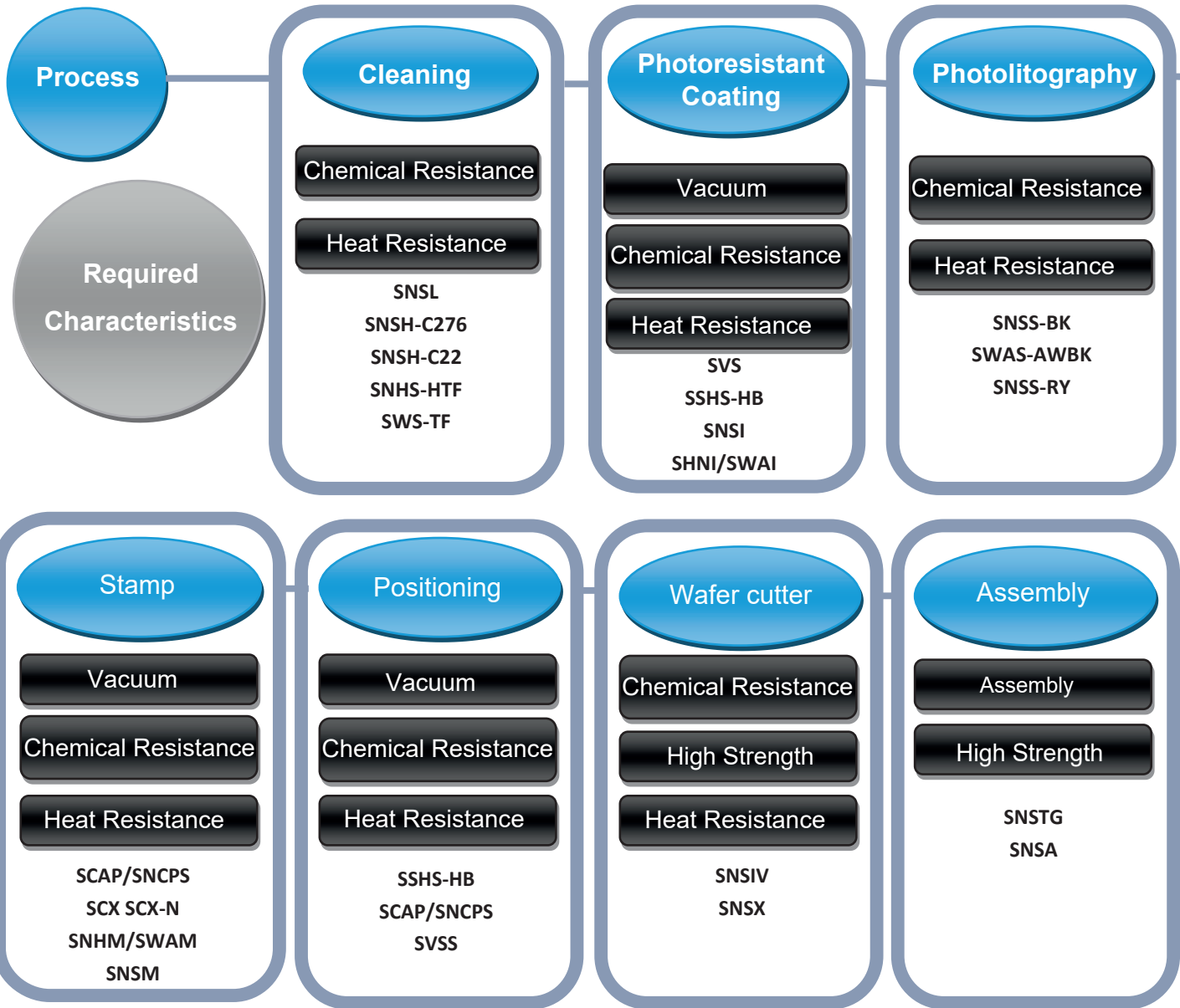
Hex Socket Head Cap Screw



Adjusting Washer



SEMICONDUCTOR EQUIPMENT SCREWS



SNSL



SNSH- C276



SNSH- C22



SNSH- HTF



SHNI/SWAI



SNSS- BK



SWAS- AWBK



SNSS- RY



SCX



SCX- N



SNSM



SHNM/SWAM



SNSIV



Ion implantation

Vacuum

Chemical Resistance

Non-magnetic

SVSL

SVST

SSHT

Cable assembly

Light

Heat resistance

SNSTG

SNSL

SLHL

SSHL

Referencie	Characteristics	Materials
SNSL	High-resistance stainless steel	SUS316L
SNSH- C276	Special material	Hastelloy C - 276 equiv.
SNSH- C22	Special material	Hastelloy C - 22 equiv.
SNHS- HTF	Teflon coated head	SUSXM7
SWS- TF	Teflon coating	SUS304
SVSS	With ventilation hole	SUSXM7
SSHS- HB	Socket head cap screws with special low profile and head shot blast	SUSXM7
SNSI	Special material	Inconel 600 equiv.
SHNI/SWAI	Special material	Inconel 600 equiv.
SNSS- BK	Super black hex socket head cap screws	SUSXM7
SWAS-AWBK	Black stainless steel	SUS304
SNSS- RY	Hex socket head cap screws with low temperature black chrome	SUSXM7
SVSL	With ventilation hole	SUS304
SVST	With ventilation hole	Titanium (TiB340C)
SSHT	Special low profile	Titanium (TiB435)
SCAP- SNCPS	Chemical resistance	PTFE/ SUSXM7
SCX/SCX- N	Chemical resistance	Cermic
SHNM/SWAM	Special material	Pure molybdenum
SNSM	Special material	Pure molybdenum
SSHS- HB	Special low profile	SUSXM7
SCAP/SNCPS	Chemical resistance	PFTE/ SUSXM7
SVSS	With ventilation hole	SUSXM7
SNSIV	Special material	Super invar
SNSX	High resistance stainless steel	SUS316L HiMo
SMSTG	High intensity titatium	Ti- 6al- 4V (64 Titanium)
SNSA	Special material	Aluminum (A5056)
SNSTG	High intnsity titatium	Ti- 6al- 4V (64 Titanium)
SNSL	High resistance stainless steel	SUS316L
SLHL	Low profile	SUS316L
SSHL	Special low profile	SUS316L

SWS- TF



SVSS



SSHS- HB



SNSI



SVSL



SVST



SSHT



SCAP/SNCPS

SCAP-CE SNCPS



SCAP-CE

SCAP-AL

SNSX



SNSTG



SNSA



SLHL



SSHL



SPECIAL SCREWS AND SOLUTIONS

