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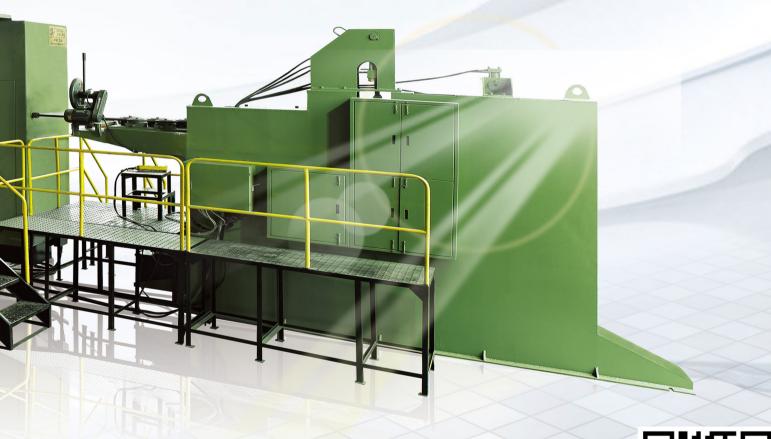








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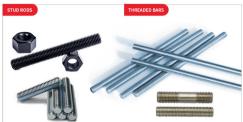
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Screw in Grade 12.9, 10.9 and 8.8 & SS screws, DIN912/ GB70 hexagon socket head cap screws, DIN931-933/ GB5782-5783 hexagon head screws, DIN7991 hexagon



socket countersunk head screws, ISO7380 hexagon

socket button head screws, ISO7379 hexagon socket head shoulder screws, DIN916-45H alloy steel hex socket head set screws.

Tel: +86-18923191655, +86-769-86004061

Fax: +86-769-86004061 Email: 429890629@gg.com

Website: www.chinafastenerinfo.net/vip/45453

P16

Guangdong STL Fastening System Co., Ltd.

Locking washers. DIN25201, DIN92550, S, VS, NFE2511, NFE-3L, 4L, SN60727, VSKD, VSK, etc.



Tel: +86-769-89083477 Fax: +86-769-89083476 Email: szjydwj@126.com

Website: www.chinafastenerinfo.net/vip/41282, www.dg-jyd.com

Foshan Nanhai Lishui Hexing Machinery Factory

Automatic cold heading machines, spring machines.

Tel: +86-757-85608889, +86-13902819732

Fax: +86-757-85602181 Email: hexing@fs-hexing.com

Website: www.chinafastenerinfo.net/vip/6016



Haining Sanlic Fastener Factory

Various non-standard fasteners, full range of nonstandard nuts.

Tel: +86-573-87537823 Fax: +86-573-87539603 Email: fbsy32@gmail.com

Website: www.chinafastenerinfo.net/vip/39897



P20

GuangDong GuoXing Hardware Co., Ltd.

Stainless steel self-drilling screws. Sizes range from #6-#16. Drill point size from L2-L5. Length up to 200mm. Variety of head types.



Tel: +86-751-3399899 Fax: +86-769-81776629 Email: galand@vip.sina.com

Website: www.chinafastenerinfo.net/vip/36527,

www.gd-gxwj.com

Haiyan Ausin Hardware Co., Ltd.

Self-drilling screws, self-tapping screws, drywall screws, chipboard screws, wood screws, washers, etc.



Tel: +86-573-86129299 Fax: +86-573-86120322 Email: sales@hyausin.com

Website: www.chinafastenerinfo.net/vip/41282, www.hyausin.com



Haiyan Fasteners Factory

Carriage bolts, hex head bolts, flange bolts, rivets, nonstandard fasteners, furniture fasteners.

Tel: +86-573-86513188, 86511248

Fax: +86-573-86511248

Email: hyxugx@126.com, yongjin@mail.jxptt.zj.cn

Website: www.chinafastenerinfo.net/vip/10051, www.hyff.com



Haiyan Lihe Hardware Products Co., Ltd.

DIN985/982, DIN6923, DIN980, DIN6926, DIN928/929, DIN439/DIN936, DIN1587, non-standard parts, etc.



Tel: +86-573-86058506 Fax: +86-573-86058509 Email: andhan2008@163.com

Website: www.chinafastenerinfo.net/vip/96650

D04

Haiyan Hongrun Fasteners Co., Ltd.

Grade 4.8, 8.8, 10.9 and 12.9 hexagonal flange bolts (including non-slip toothed flange screws, wheel hub screws and seat belt screws), high strength auto and motorcycle fasteners and other kinds of non-standard special items.



Tel: +86-573-86806666, +86-13506664650, 13506666092

Fax: +86-573-86866789 Email: xjw@wz-hr.com

Website: www.chinafastenerinfo.net/vip/20356, www.jxhyhr.com

Haiyan Yaozhibao Import and Export Co., Ltd.

Thousands of SKUs readily available from stock in threaded fasteners, such as nuts, bolts, screws and so



Tel: +86-573-86111237 Fax: +86-573-86022237 Email: bruce@hy-yzb.com Website: www.hy-yzb.com

Haiyan Huayu Automotive Components Co., Ltd.

M3-M30 nuts. GB52, GB6170 high-strength nuts, galvanized nuts, black nuts, flange nuts, weld nuts, brass nuts. We can also produce in accordance with standards of ISO, DIN, ANSI, BS, UNI and various shaped nuts.



Tel: +86-573-86815261 Fax: +86-573-86815262 Email: 402245023@gg.com

Website: www.chinafastenerinfo.net/vip/37468

Haiyan Yihui Hardware Technology Co., Ltd.

Hex bolts, carriage bolts, square head bolts, machine screws, hex flange surface screws, countersunk head bolts, roofing bolts, pins, hex nuts and threaded rods.



Tel: +86-573-86211556 Fax: +86-573-86287218 Email: 757304931@qq.com

Website: www.chinafastenerinfo.net/vip/49740, www.bolthome.com

Haiyan Lianyi Hardware Factory

All kinds of standard fasteners, non-standard bolts & nuts, hardware manufacturing and processing, fasteners for foreign trade.



for foreign trade.

Fax: +86-573-86513260 Email: hylywj@163.com

Website: www.chinafastenerinfo.net/vip/27653

Tel: +86-573-86513958, +86-13957323412

Handan Daoning Fastener Manufacturing Co., Ltd.

Bolts, screws, nuts, rods, studs, washers and many other hardware products, made of carbon steel, alloy and stainless steel, aluminum, brass or other special materials.



Tel: +86-18731035721 Email: heiyup@hotmail.com

Website: www.chinafastenerinfo.net/vip/98411, www.dao-ning.com



Hangzhou DingYuan Metal Washers Co., Ltd.

Spring washers and flat washers, stamping parts.

Tel: +86-571-83782296

Fax: +86-571-82875869

Email: admin@dyfasteners.com

Website: www.chinafastenerinfo.net/vip/23505, www.dyfasteners.com

Jiaxing Reegu Hardware Product Co., Ltd.

Rivet nuts with flat head, countersunk head, vertical stripes, hexagonal head, blind hole or other special kinds.

Tel: +86-577-86665360 Fax: +86-577-86665361 Email: 1692643651@qq.com

Website: www.chinafastenerinfo.net/vip/99588



Hangzhou Hangshen Energy-Saving Furnace Co., Ltd.

All kinds of heat treatment equipment research, development, design, production, manufacturing, sales and service.

Tel: +86-571-86173039 Fax: +86-571-86173039 Email: hsdl088@126.com

Website: www.chinafastenerinfo.net/vip/30983, www.hsdl088.com/en.html

Jiaxing Yida New Material Technology Co., Ltd.

Anchor bolts, U-bolts, eye bolts, non-standard stamping parts, 4.8, 8.8 threaded rods, stainless steel threaded rods, stainless steel U-bolts, stainless steel parts, etc.



Tel: +86-573-86196258, +86-13666743562

Fax: +86-573-86196258 Email: 850887057@qq.com

Website: www.chinafastenerinfo.net/vip/37393, www.ydfastener.cn

P17

HCH Hardware Co., Ltd.

All kinds of fasteners. Main products include standard bolts, nuts, screws, washers, pins and OEM parts.



Tel: +86-523-82208531 Fax: +86-523-86054516 Email: info@hchhardware.com Website: www.hchhardware.com

Jinan Star Fastener Co., Ltd.

Hexagon bolts, Hexagon flange bolts, carriage bolts, half-round head oval neck bolts, square-head bolts, T-bolts, U-bolts, anchor bolts, guide bolts, hexagon head wood screws, hexagon socket head cap screws, hexagon square nuts, various washers, etc.



Tel: +86-531-87881740 Fax: +86-531-87871032

Email: zhangguo@star-fastener.com

Website: www.chinafastenerinfo.net/vip/1123, www.starfastener.com

Jiangsu Chaoyue Stainless Steel Products Co., Ltd.

Studs, U bolts, chemical bolts, pin shafts, pipe fittings, metal stamping parts, embedded parts, precision non-standard parts.



Tel: +86-523-83980296 Fax: +86-523-83780273 Email: allen@chaoyue818.net

Website: www.chinafastenerinfo.net/vip/83270

Jinda Screw Machine (Dongguan) Co., Ltd.

Second-hand: 1D2B head punches; 2D3B, 3D3B, 3D5B, 3D6B, 4D3B rivet cold heading forming machines; Multistation bolt formers such as 2D2B, 3D3B, 4D4B, 5D5B, 6D6B; 5D5B, 6D6B multi-station nut formers; High speed thread rolling machines, tapping machines and thread rolling machines and so on.



Tel: +86-769-83124939, +86-1790497008

Fax: +86-769-83126949 Email: jindaluosi@163.com

Website: www.chinafastenerinfo.net/vip/75171, www.jd2003.cn



Jingjiang Datong Fastener Co., Ltd.

All kinds of fasteners: hex bolts, T-bolts & hex nuts, heavy nuts, carriage bolts, etc. Hot-dip galvanizing.

Tel: +86-523-84211001 Fax: +86-523-84211002 Email: njm31@163.com



Website: www.chinafastenerinfo.net/vip/44091, www.jsjjdatong.com

Leda Metal Co.

Washers (stoppers, snap rings, cushion rings), spring fasten articles, assembled screws and multi-functional screws, circlips, SEMS screws.



Tel: +86-769-87919756, +86-512-65015110

Fax: +86-769-87729835, +86-512-65016135

Email: rosa@ledametal.com, sales01@ledametal.cn

Website: www.chinafastenerinfo.net/vip/45168, www.ledametal.com

Jingjiang Hengfeng Rivet Manufacture Co., Ltd.

Various types of blind rivets, such as open end blind rivets, closed end blind rivets, multi-grip rivets, henglock rivets, tri-fold rivets, high strength blind rivets.



P13

Tel: +86-523-84553022 Fax: +86-523-84567222 Email: Jenny gian@hfrivet.com

Website: www.chinafastenerinfo.net/vip/28123, www.hfrivet.com

LeeSheng Hardware Screw Mould Factory

Assorted screws molds, like cold heading molds and multi-stroke special molds.



Tel: +86-769-87983456, 87320123, 87280123, 82003123, 87333456, 82138066

Fax: +86-769-82079088, 82036166 Email: lsmould168@126.com

Website: www.chinafastenerinfo.net/vip/38299, www.lscoy.com

Jinglefast Industrial Co., Ltd.

Hex bolts, hex cap screws, hex nuts, carriage bolts, hex lag screws, threaded rods, hex nuts with stamping products, flat washers and spring lock washers.



Tel: +86-574-89020185, +86-573-86197573

Fax: +86-574-89020180 Email: jg@jgfastener.com

Website: www.chinafastenerinfo.net/vip/49243, www.jgfastener.com

Nanjing Flybear Hardware Products Co., Ltd.

Fasteners, ISO9001:2008 and TS16949 certified.

Tel: +86-25-52758402

Fax: +86-25-52758408

Email: majinsuo@18luosi.com

Website: www.chinafastenerinfo.net/vip/57719, www.fbr99.com

Kunshan Zhonggu Precision Hardware Co., Ltd.

Stainless steel bolts, nuts, washers, etc.; high strength alloy steel products: socket head cap screws, hex bolts, set screws, shoulder screws; high-pressure bolts of American standard.



Tel: +86-512-57175387, 57826171, 57826172

Fax: +86-512-57175486 Email: kszg@chnhardware.com

Website: www.chinafastenerinfo.net/vip/39121, www.chnfastener.com

Ningbo Beilun Congfeng Machinery Co., Ltd.

Fastener machines.

Tel: +86-574-86907006, +86-13396685588, 15305844680



Fax: +86-574-86900620

Email: cf@nbcfjx.com, wwwcom1104@126.com, cf@nbcfjx.com Website: www.chinafastenerinfo.net/vip/24606, www.nbcfjx.com



Ningbo Chunli High Strength Fasteners Factory

All kinds of high strength bolts, standard components and non-standard holts



Tel: +86-574-86533332, +86-13777017677,

13486676666

Fax: +86-574-86532290 Email: 472164641@QQ.com

Website: www.chinafastenerinfo.net/vip/19671, www.chli.com.cn

Ningbo Linggi Hardware Industrial Co., Ltd.

Wheel nuts & bolts, eye bolts, flange nuts & bolts and various cutting & non-standard parts as per customers' drawings.



Tel: +86-15867328896, 13858221397

Fax: +86-574-88660602 Email: 70128336@qq.com

Website: www.chinafastenerinfo.net/vip/53316, http://ryjxpj.damuzzz.com

Ningbo Economic & Technical Development Zone Yonggang Fasteners Co., Ltd.

Pan head square neck carriage bolts in standards of DIN, BS, IFI, AS, hex bolts, guardrail bolts, flange bolts and other special bolts.



Tel: +86-574-88483298. 88352188 Fax: +86-574-88483288, 86232077

Email: nbyg@cnyonggang.com

Website: www.chinafastenerinfo.net/vip/1405, www.cnyonggang.com

Ningbo Taida Fastener Manufacture Co., Ltd.

Threaded rods, hex bolts, hex nuts, double-end stud bolts, stud bolts, heavy hex bolts, high strength hex bolts, high strength bolts, blind rivet nuts.



Tel: +86-574-89088921 Fax: +86-574-87261267

Email: luximex@tdfasteners.com

Website: www.chinafastenerinfo.net/vip/79986, www.nbtaida.com

Zhejiang Wanying Henghui Thread Technology Co., Ltd.

Design and manufacture customized high-precision, high-tensile, thread rolling dies.

Tel: +86-13282288850 Fax: +86-574-88657903 Email: sales@nbtools.net

Website: www.chinafastenerinfo.net/vip/75238,

www.cnwanying.com



Ningbo Tongna Machinery Technology Co., Ltd.

Wheel bolts, flange bolts, tire nuts, flange nuts, square nuts, hex nuts, welding nuts, nylon self-locking nuts, stamping



Tel: +86-574-65179890, +86-13586752625

Fax: +86-574-65175666 Email: 252357719@gg.com

Website: www.chinafastenerinfo.net/vip/1372, www.fhtongyong.com/en/about.asp

Ningbo Liheng Fastener Co., Ltd.

High strength bolts, nuts, high strength bolts with large hexagon head for steel structures, high strength double end studs, etc.



Tel: +86-310-6657366, 6668311, +86-13313207366,

13313209266

Fax: +86-310-6668311 Email: 13313207366@163.com

Website: www.chinafastenerinfo.net/vip/99854

Ningbo Xueyin Aluminum Industry Co., Ltd.

Aluminium alloy wire series, aluminium alloy bar series, aluminium welded wire seires, aluminium hollow tube series, special profiled series, etc.



Tel: +86-574-65179890, +86-13586752625

Fax: +86-574-65175666 Email: 252357719@gg.com

Website: www.chinafastenerinfo.net/vip/19726, www.chinaxueyin.com



Ningbo Yinzhou Zhenhua Stamping Co., Ltd.

DIN6797, DIN6798, DIN137, DIN9250, DIN6796, DIN7967, DIN432, NFE25-511, DIN2093, flange, cold stampings, stainless steel stampings, car accessories stampings, and progressive mold stampings, metal stampings, non-standard stampings.



Tel: +86-574-88400330 Fax: +86-574-88400068

Email: zhenhua@zjzhenhua.com

Website: www.chinafastenerinfo.net/vip/29142, www.zjzhenhua.com

Qifeng Precision Industry Sci-Tech Corp.

Manufacturer of railway fasteners, special fasteners, standard fasterners, aerospace fasteners, automotive fasteners, nuclear fasteners, stampings, welded hardware, turning parts.



Tel: +86-573-86851456 Fax: +86-573-86851478 Email: sales@qfjg.com.cn

Website: www.chinafastenerinfo.net/vip/5979, www.qfjg.com.cn

Ningbo Zhonghai Fastener Manufacturing Co., Ltd.

Threaded rods, external hex bolts, hex nuts.

Tel: +86-574-86531908, 86535895

Fax: +86-574-86531779

Email: zhjgj1234@163.com, 85483940@qq.com Website: www.chinafastenerinfo.net/vip/37410



Renqiu Zhenfang Cemented Carbide Mold Co., Ltd.

Cemented carbide molds.

Tel: +86-15031701966. +86-17732488848

Fax: +86-317-2671463 Email: 295398399@qq.com

Website: www.chinafastenerinfo.net/vip/92580



NYLOK®-China

NYLOK°, precote°, 3M°, LOCTITE°, NYCOTE°.

Tel: +86-512-50116888, 57700888, +86-15190138029

Fax: +86-512-57700988, 50119888

Email: tslg.ks@com.cn

Website: www.chinafastenerinfo.net/vip/15686, http://tslg.com.cn

Ruian City XinTai Fastener Co., Ltd.

All kinds of fasteners including washers, retaining rings and others fasteners, circlips for shafts, circlips for hole, wave washers, teeth washers, spring washers.



Tel: +86-577-65350012 Fax: +86-577-65366030 Email: xtjgj@126.com

Website: www.chinafastenerinfo.net/vip/3500, www.xtjgj.com

Oulai-Abletek Hardware Co., Ltd.

Self-drilling screws, tapping screws, drywall screws, chipboard screws, furniture screws and construction screws, etc.



Tel: +86-573-86862922, +86-13456211822

Fax: +86-571-88618836 Email: 1003473196@qq.com

Website: www.chinafastenerinfo.net/vip/52481, www.jxolwj.com

Ruian Huilida Metal Products Co., Ltd.

Washers, springs, snap rings and cotter pins.

Tel: +86-577-65261991, 65261997,

+86-13967792101

Email: valia@chinahuilida.com, info@chinahuilida.com

Website: www.chinafastenerinfo.net/vip/16959, www.chinahuilida.com





Ruian Jinfeng Standard Parts Manufacturing Co., Ltd.

Standard fasteners, stamping parts, motor parts, automotive fasteners, copper and copper alloy fasteners.



Tel: +86-577-66071227 Fax: +86-577-65278217 Email: asha188@163.com

Website: www.chinafastenerinfo.net/vip/24574, www.au8848.com

Ruian Yongjiu Standard Fastener Factory

Spring washers, wave spring washers, curved single coil spring lock washers, single coil spring lock washers heavy type, spring lock washers for washer assemblies, copper spring washers, stainless steel spring washers, flat washers, stamping, etc.



Tel: +86-577-65291777, +86-13758777818

Fax: +86-577-65268838 Email: info@yongjiuchina.com

Website: www.chinafastenerinfo.net/vip/43449, www.yongjiuchina.com

Rui'an Mingbo Stainless Steel Standard Parts Co., Ltd.

Stainless steel hex and hex socket bolts, flange/ hex Phillips screws, spring washers, cotter pins, threaded rods, high strength hex socket bolts with Grade 12.9, custom-made non-standard parts.



Tel: +86-577-65201535, 65216535, +86-13705781997

Fax: +86-577-65205178, 65921077 Email: 702125547@gg.com

Website: www.chinafastenerinfo.net/vip/52075

Ruian Zhirui Auto Parts Co., Ltd.

1. Washers: lock washers internal teeth, lock washers external teeth, knurling washers, disc springs, grounding gaskets, curved washers, wave washers, tab washers, etc.

2. Circlips: circlips for hole, circlips for shaft, E rings, etc.



Tel: +86-577-65326221, +86-13506579669

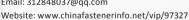
Fax: +86-577-65329297 Email: 38209839@qq.com

Website: www.chinafastenerinfo.net/vip/84002

Ruian People's Standard Parts Co., Ltd.

Circlips, washers, fasteners.

Tel: +86-577-65365502 Fax: +86-577-65381138 Email: 312848037@qq.com





Rui'an Zhufeng Standard Parts Co., Ltd.

1.GB fastening; 2.DIN fastening; 3.punching parts; 4.car punching parts; 5.insulated washers (plastic fastening).



Tel: +86-577-65365630 Fax: +86-577-65393630 Email: zf90000@126.com

Website: www.chinafastenerinfo.net/vip/18110, www.cn-washer.com

Rui'an Xinte Stamping Parts Co., Ltd.

Disc springs, wave washers, retaining rings E type, gaskets, bearing clamps, retaining rings for shaft, retaining rings for bores, automotive accessories.





SamChang Machinery Industrial

High speed screw thread rolling, high speed screw heading machines, high speed screw end cutting machines.



Tel: +86-595-86882839 Fax: +86-595-86899839 Email: paul@sam-chang.com

Website: www.chinafastenerinfo.net/vip/50437, www.sam-chang.com



SHANGHAI PRIME FASTENERS CO., LTD.

Shanghai Prime Fasteners Co., Ltd. is a state-owned enterprise and the largest professional fasteners manufacturer and exporter in China. The manufacturing base covers an area of 83,000 square meters, including bolt forming, heat treating, plating, packing and inspection center. It can provide over 50,000 sizes fasteners including DIN, ASTM and GB standard. The stock volume has exceeded 10,000 tons. Welcome to our company for discussing and visiting.



Tel: +86-21-63177707 Fax: +86-21-63178909 Email: export@sfiec.com Website: www.sfiec.com

Shanghai Aflon Metal Coating Co., Ltd.

Zinc flake Coating, Atotech, Magni surface treatment, metal processing.



Tel: +86-21-39198868 Fax: +86-21-39901858 Email: dacromet@vip.163.com

Website: www.chinafastenerinfo.net/vip/49444, www.aflon.com.cn

Shanghai Jiegu Metalwork Co., Ltd.

Various high quality GB, ANSI, JIS, DIN standard and nonstandard fasteners.



Website: www.chinafastenerinfo.net/vip/119, www.sh-jiegu.com

Shanghai Jingtuo Mould Manufacture Co., Ltd.

Cold-forging tungsten steel moulds, comprehensive moulds for cold-forging machines, tungsten steel plating rods, outside knives.



Tel: +86-13002127000 Fax: +86-21-69177346

Fmail: willen8457@163.com

Email: shjtmould2008@163.com

Website: www.chinafastenerinfo.net/vip/15345

Shanghai ChunLi Fastener Co., Ltd.

L type foundation bolts, T type bolts and nuts, standard fasteners, metro bolts, high strength bolts & nuts and washers, expressway guardrail bolts and nuts, concrete bifurcation pillow bolts, non-standard screws, hex socket cap bolts.



Tel: +86-310-5133686, 6894851, +86-13473017208,

18132207265

Fax: +86-310-6894851 Email: 825125170@qq.com

Website: www.chinafastenerinfo.net/vip/44826

Shanghai Kingpluse **Industry Co., Ltd.**

Bolts, nuts, wood screws, machine screws, selftapping screws, spring washers, flat washers, anchors, etc. according to DIN, ANSI, BS and JIS standards.





Tel: +86-21-57733852 Fax: +86-21-57736953

Email: sales@kp-industry.com

Website: www.chinafastenerinfo.net/vip/91270, www.kp-industry.com

Shanghai Jianfeng Hardware Products Co., Ltd.

Stainless steel standard and non-standard fasteners. Standards: metric fastener standards, IFI, BS. Materials: 201, 304, 302, 321, 316, 316L (materials of Shanghai Baosteel). We can also process non-standard fasteners to meet the demand of customers.



Tel: +86-21-61174091 Fax: +86-21-61174791 Email: jfluosi@163.com

Website: www.chinafastenerinfo.net/vip/33986, www.jfluosi.com

Shanghai Shangdian Washer Co., Ltd.

All types of washers, standard parts, flat washers, stamping parts, deformed punched pieces.



Tel: (factory) +86-21-57317386, 57317385; (office) +86-21-64802072

Fax: (factory) +86-21-57321201; (office) +86-21-64802072

Email: (factory) wyy@shwasher.com, (office) wendysun@shwasher.com Website: www.chinafastenerinfo.net/vip/9444, www.shwasher.com



Shanghai Welfast Enterprise Co., Ltd.

Bolts, nuts, washers, and threaded rods covering 4 series and 30 categories. Materials involve carbon steel, alloy steel, stainless steel, etc.



Tel: +86-21-62442081 Fax: +86-21-62447564 Email: sales@welfast.com

Website: www.chinafastenerinfo.net/vip/885, www.welfast.com

Shenzhen Shendingsheng Hardware Products Co., Ltd.

Rivets, male female screws, step screws, non-standard screws, turning parts.



Tel: +86-755-28179975, 28179976

Fax: +86-755-28179977 Email: ds@szdingsheng.com

Website: www.chinafastenerinfo.net/vip/51701, www.szshendingsheng.com

Shanghai Yi Er Lian Fastener Technology Co., Ltd.

Locking screws, anti-loose screws.

Tel: +86-13585977342 Fax: +86-21-58221227 Email: 2567762213@qq.com

Website: www.chinafastenerinfo.net/vip/80049



Sichuan Aoxin Fastener Manufacturing Co., Ltd.

High-strength fasteners, bolts, nuts and screws according to GB, DIN, JIS, BS, ANSI standards. Custom non-standard fasteners are also available.



Tel: +86-28-38862609 Fax: +86-28-38862609 Email: aoxin@scaoxin.com

Website: www.chinafastenerinfo.net/vip/4983, www.scaoxin.com

Shanghai Yueguan Hardware Co., Ltd.

Spring washers, saddle-shaped spring washers, square taper washers, retaining rings for shafts, retaining rings for bores, etc.



Tel: +86-21-33733488, +86-13671896397

Fax: +86-21-33732422

Email: yueguan.bill@foxmail.com

Website: www.chinafastenerinfo.net/vip/74050, www.yueguanwj.com

Sijin Intelligent Forming Machinery Co., Ltd.

Bolt formers, nut formers, part formers, 1-die 2-blow machines.

Tel: +86-574-88365336 Fax: +86-574-88352516



Website: www.chinafastenerinfo.net/vip/43714, www.machinesijin.com



P6, 7

Shenzhen Langgu Precision Hardware Co., Ltd.

Cold forged self-clinching nuts, spot welding studs, automatic lathe parts, CNC precision hardware, etc.



Tel: +86-755-27268196, +86-13692138358

Fax: +86-755-27268896 Email: sz langu@163.com

Website: www.chinafastenerinfo.net/vip/87880, www.szlangu.com

Sunta Hardware Co., Ltd.

Garage door fasteners, hex nuts, flange nuts, nylon lock nuts, domed cap nuts, spring nuts, washers, anchors, bolts, screws, special hardware, etc.



Tel: +86-21-58903118 Fax: +86-21-58956583 Email: sales@sunta.biz

Website: www.chinafastenerinfo.net/vip/11978, www.sunta.biz



Suzhou Ruihe Hardware Co., Ltd.

Stainless steel studs, nuts, hex bolts, hex socket bolts, eyebolts, various non-standard fasteners

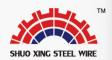


Tel: +86-512-67286697 Fax: +86-512-67286770 Email: szruihe@ruihe.cn

Website: www.chinafastenerinfo.net/vip/12098

Taicang Shuoxing Metal Products Co., Ltd.

Carbon steel spheroidizing annealing wire, alloy steel spheroidizing annealing wire, rivet wire, bright wire.



Tel: +86-512-53296187 Fax: +86-512-53296365 Email: suoxingwire@163.com

Website: www.chinafastenerinfo.net/vip/97065, www.sxsteelwire.com

Suzhou Shangyu Fastener Manufacturing Co., Ltd.

Stainless steel standard screws, chipboard screws, hexagonal screws, hexagonal cross washer face screws, T-bolts, carriage bolts and other special screws.



Tel: +86-15506202304, +61-420 403 488

Fax: +86-512-65838016

Email: 1033960527@qq.com, 2936123478@qq.com Website: www.chinafastenerinfo.net/vip/68519

Taiwan Huihung Industry Co., Ltd.

Screw heading machines, multi-task screw molding machines (two-die three-stroke, three-die three-stroke, four-die four-stroke), riveting machines, rivet machines and circular cutting type hollow riveting machines.



Tel: +86-512-65990795, 65990796, 65990797, +86-13255195012

Fax: +86-512-65990798 Email: szhh65990795@163.com

Website: www.chinafastenerinfo.net/vip/43741, www.hhlsjx.com

Suzhou TingJing Precision Hardware Co., Ltd.

Standard and non-standard nut, roller, fastener and multi-stage tungsten steel molds.

Tel: +86-512-65047603, 65045805, +86-18915557523

Fax: +86-512-65043023 Email: qin_liu5@163.com

Website: www.chinafastenerinfo.net/vip/20722,

http://szdjjm.iwopop.com



Tianjin Fine Hardware Co., Ltd.

ASTM A193 B7 B7M B8 B8M B16, ASTM A320 L7 L7M double-end bolts. ASTM nuts. Grade 5/8 hex screws. 0#-12# machine screws, alloy steel screws, stainless steel screws, electronic screws, alloy screws, etc.



Tel: +86-13821422700 Fax: +86-22-87913760 Email: tifine@163.com

Website: www.chinafastenerinfo.net/vip/6522, www.tjfine.com

Taicang Jincheng Hui Machinery Co., Ltd.

Imported tungsten steel screw punches, punch rivet tungsten steel welding rods. Hexagonal and a variety of shapes.



Tel: +86-512-53231618 Fax: +86-512-53231617 Email: taicangjch@126.com

Website: www.chinafastenerinfo.net/vip/67880

Uni-Protech Fasteners (Suzhou) Co., Ltd.

Precision turning parts, engine parts of lawn mower, parts for automotive industrial, stamping parts, prevailing torque lock nuts, special components with complexly shaped, slotted nuts, heavy



duty wheel nuts, wheel lug nuts, construction fasteners, etc.

Tel: +86-512-68361603

Fax: +86-512-68361606

Email: eva@mail.uni-protech.com.tw

Website: www.chinafastenerinfo.net/vip/110180, www.uni-protech.com.tw



Wenley Trading Co., Ltd.

GLEITMO dry solid film lubricants for fastener and automotive part industries. FUCHS specialty lubricants. Electroplating chemicals.



Tel: +886-423227553, +86-512-53597212

Fax: +86-512-53597211

Email: support@gleitmo-fuchs.com

Website: www.chinafastenerinfo.net/vip/4937, www.gleitmo-fuchs.com

Wenzhou Guangquan Standard Component Manufacturing Co., Ltd.

Carbon steel combined screws, SUS 304 stainless steel combined screws, high strength combined screws and GB 6560 triangular screw series.



Tel: +86-577-86522777 Fax: +86-577-86505188 Email: 2881376839@qq.com

Website: www.chinafastenerinfo.net/vip/42148

P20

Wenzhou Jinsheng Fastener Wenzhou Bangxin Fastener Co., Ltd.

Nylon insert lock nuts, BS lock nuts, hexagon nuts with flange, wing nuts, flange nuts, slotted nuts, acorn nuts, cap nuts, weld nuts and non-standard nuts.



Tel: +86-577-86352209 Fax: +86-577-86356103

Email: jsjgj@wzjinsheng.com, ally@wzjinsheng.com

Website: www.chinafastenerinfo.net/vip/14028, www.wzjinsheng.com

Co., Ltd.

Bolts, nuts, screws, pins, rivets and non-standard cold forged parts.



Tel: +86-577-86500898 Fax: +86-577-86500828 Email: sales@salesfastener.com

Website: www.chinafastenerinfo.net/vip/37547, www.bxjgj.com

Wenzhou Boyu Machine Co., Ltd.

Multi-station bearing type cold heading forming machines, multi-station extended copper sleeve type cold heading forming



machines and large-scale cold extrusion forming machines.

Tel: +86-15888276565, +86-577-86700881

Fax: +86-577-86700883

Email: zhanyu@wz-zhanyu.com

Website: www.chinafastenerinfo.net/vip/37485, www.wz-zhanyu.com

Wenzhou Kexingtong Fastener Co., Ltd.

Square nuts, hex flange bolts, wing nuts, non-standard screws, tapping screws, etc.



Tel: +86-577-86500901 Fax: +86-577-86565090 Email: 348380714@qq.com

Website: www.chinafastenerinfo.net/vip/86263

P1

Wenzhou City Ouhai Xianyan Gexin Standard Accessory Factory

Cross recess head screws, square head bolts, stud bolts, wave washers, E-rings, axle clamps, circlips for shaft, circlips for hole, rivets, all kinds of standard and nonstandard fasteners.



Tel: +86-577-85300777, +86-13806852107

Fax: +86-577-85315277 Email: xianvangexin@163.com

Website: www.chinafastenerinfo.net/vip/48985

Wuxi Anshida Hardware Co., Ltd.

Open end blind rivets, closed end blind rivets, multigrip type blind rivets, peel type blind rivets, grooved type blind rivets, hammer drive rivets, color-painted blind rivets, monobolt blind rivets, H-lock blind rivets, bulb type blind rivets, rivet insert nuts, rivet Studs.



Tel: +86-510-88762491 Fax: +86-510-88763742

Email: service@anshida.com

Website: www.chinafastenerinfo.net/vip/856, www.anshida.com



P12

Yixing City Jufeng Machinery Co., Ltd.

Screw molding machines, cold forged molding machines.

Tel: +86-510-87868816, +86-13806150656

Fax: +86-510-87868815

Email: jf@jf-machine.com, 121422822@qq.com

Website: www.chinafastenerinfo.net/vip/45143, www.jf-machine.com

Yuyao Yuxin Fastener Systems Co., Ltd.

Sleeve anchors, wedge anchors, drop in anchors, chemical anchors, hex coupling nuts, round couplings, spring toggles, grav-



ity toggles, shield anchors, tire wire anchors, nylon hammer drive anchors, nylon anchors, other anchors, sheet metal & stamping products.

Tel: +86-574-62938700, +86-13967852497

Fax: +86-574-62938308 Email: lisaliu@cosmosye.com

Website: www.chinafastenerinfo.net/vip/2484, www.cosmosye.com

Yongnian County Tianbang Fasteners Co., Ltd.

Bolts, nuts, flat washers, spring washers, thread rods, anchor bolts, self drilling screws, hex bolts.

Tel: +86-18803303309 Email: karryyan@hbtbls.com

Website: www.chinafastenerinfo.net/vip/45489,

www.hbtbls.com

Zhejiang Bullet Fastener Co., Ltd.

Nylon insert lock nuts, cap nuts, flange nuts, flange lock nuts, hex nuts, fittings according to DIN, ANSI, GB, JIS, BS and other non-standard fasteners.



Tel: +86-577-85859778 Fax: +86-577-85859779

Email: zjbullet@hotmail.com, zjbullet-billy@hotmail.com,

zjbullet-jason@hotmail.com

Website: www.chinafastenerinfo.net/vip/2009, www.bulletnut.com

D/12

FIANBANG

JFMACHINE

Yuyao No.2 Standard Fastener Factory

Eyebolts.

Tel: +86-15306621777, +86-574-62003860, 62003777

Fax: +86-574-62003980 Email: ruanlifei@biaoer.com

Website: www.chinafastenerinfo.net/vip/2261, www.biaoer.com

Zhejiang Chuangxin Standard Fasteners Factory

Bolts from M3 to M20, nuts from M4 to M24, pins, snap rings, etc.

Tel: +86-577-85220196, 85232611,

+86-13806803328 Fax: +86-577-85229598

Email: zjchuangxin@sina.com Website: www.chinafastenerinfo.net/vip/37498



P8

Yuyao Xintai Hardware Co., Ltd.

Established in 2005, we produce various anchors. ISO9001 certified. Factory area: 8000 square meters. Monthly capacity: 50 containers. We have 120 employees, including service team of 30 people. Annual sales amount: 15 million dollars. Our products are exported to Europe, America, Oceania, Southeast Asia. We have two branch offices now.



Tel: +86-17705846106, +86-18967826379

Fax: +86-574- 62020898, 62020910

Email: sales01@xtanchor.com, sales08@xtanchor.com

Website: www.chinafastenerinfo.net/vip/14295, www.xtanchor.com

Zhejiang Howls Auto Parts Co., Ltd.

Wheel nuts, long nuts, flange nuts, hex nuts, cap nuts, nylon insert lock nuts, welded nuts, etc.

Tel: +86-577-86001630, +86-13567784145

Fax: +86-577-86001620 Email: alex@wzhowl.com

Website: www.chinafastenerinfo.net/vip/113337,

www.wzhowl.com





Zhejiang Jiancai Machinery Co., Ltd.

Thread rolling machines, heading machines.

Tel: +86-573-84775599 Fax: +86-573-84775579 Email: 119559015@qq.com



Website: www.chinafastenerinfo.net/vip/4272,

www.jiancai.com.tw

Zhejiang Sanlin Metal Products Co., Ltd.

Brass, carbon steel, stainless steel nuts, bolts, washers and other special-shaped pieces.

Tel: +86-13868884825 Fax: +86-573-84806855 Email: sanlin@sanlincn.com

Website: www.chinafastenerinfo.net/vip/80522,

www.sanlinmetals.com



Zhejiang Kahuan Technology Co., Ltd.

Circlips, washers, springs, snap rings, etc.

Tel: +86-577-85229666

Fax: +86-577-85231999

Email: bingru.jiang@zjkhkj.com

Website: www.chinafastenerinfo.net/vip/268





Zhejiang Yeswin Machinery Co., Ltd.

5S/6S/6SL nut formers, 3S/4S/3SL/4SL bolt formers, nut tapping machines, standard & nonstandard nuts, socket wrenches, anchor bodies, and other special parts for automobiles or construction.



Tel: +86-573-84183777 Fax: +86-573-84184348 Email: sales@zjyeswin.com

Website: www.chinafastenerinfo.net/vip/1242, www.zjyeswin.com

Zhejiang Linhai Jinxin Car Fittings Co., Ltd.

Various kinds of bolts, screws, hex nuts, flange nuts, plain washers, spring washers, wood screws, thread rods and so on according to DIN, BS, ANSI/ ADSI, NFE, GB and ISO standards.



Tel: +86-576-85528228, +86-13958554092

Fax: +86-576-85528508

Email: jx88@msn.com, 2088@jinxincar.com

Website: www.chinafastenerinfo.net/vip/8336, www.jinxincar.com

Zhoushan City Hesheng Fasteners Co., Ltd.

Fasteners, fittings, nuts, bolts, other fasteners & fittings, rivet nuts, non-standard nuts, round nuts, bolts, lock rivet nuts, hex rivet nuts.



Tel: +86-580-8075230, +86-13705806507

Fax: +86-580-8075197

Email: hhb@hesheng-fastener.com

Website: www.chinafastenerinfo.net/vip/32530,

www.hesheng-fastener.com

Cover

Zhejiang Minmetals Huitong Import & Export Co., Ltd.

Hex nuts, square nuts, hex head bolts, carriage bolts, roofing screws, plain washers, spring washers, machine screws, self-tapping screws.



Tel: +86-571-85775785, 85775791

Fax: +86-571-85775610

Email: aschen@zjmtd.com, qzhou@zjmtd.com.cn

Website: www.chinafastenerinfo.net/vip/256, www.zjmtd.com.cn

Shandong Tengda Fasten Tech. Co., Ltd.

Bolts, nuts, screws, washers, threaded rods, tapping screws, rivets, wood screws, assembly parts, etc.

Tel: +86-632-5677909/5677972

Fax: +86-632-5677996

Email: oversea@tdfastener.com Website: www.tdfastener.com





P14

Zhejiang Jinmao Technology Co., Ltd.

Locknuts.

Repeatedly install and stay tight.

Contact Name: Xiaofeng WU Tel: +86-13801179931 Email: 2256799083@gg.com



Dongguan Raisesun Precision Hardware Co., Ltd.

We have been focusing on self-clinching and welding fasteners, and have built a full range stock for self-clinching nuts, standoffs, studs, pilots, etc. series.



Tel: +86-769-83691050 Fax: +86-769-83691051 Email: raisesunmetal@163.com Contact Name: Mr. Toney Website: www.rs-metal.co



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IMF Projects China's Economic Growth to Reach 5.2 pct in 2023

The International Monetary Fund (IMF) projected China's economy will grow by 5.2 percent in 2023, 0.8 percentage point higher than October 2022 forecast. "Growth in China is projected to rise to 5.2 percent in 2023, reflecting rapidly improving mobility," the IMF said in the newly released update to its World Economic Outlook report.

Global growth is projected to fall from an estimated 3.4 percent in 2022 to 2.9 percent in 2023, then rise to 3.1 percent in 2024, the IMF said, noting that the historical average growth rate between 2000 and 2019 is 3.8 percent.

The IMF said the rise in central bank rates to fight inflation and Russia-Ukraine conflict continue to weigh on economic activity. Global inflation is expected to fall from 8.8 percent in 2022 to 6.6 percent in 2023 and 4.3 percent in 2024, still above pre-pandemic (2017-2019) levels of about 3.5 percent, according to the update.

The IMF said the rapid spread of COVID-19 in China dampened growth in 2022, but the recent reopening has paved the way for a faster-than-expected recovery.

Yongnian Fastener Export Earnings Rise by 70.8% in 2022

As a renowned fastener production and distribution base in China, Yongnian has the reputation of "Fastener Capital of China". The fastener industry is one of the Top 10 characteristic industries in Hebei Province, and the annual production and sales of fasteners from Yongnian account for 55% of the national market share.

In recent years, Yongnian fastener companies have been deeply involved in overseas markets, and their products are exported to more than 110 countries and regions including the US, Japan, Egypt, Dubai, etc. By now, there are 476 fastener enterprises with independent export rights and over 50 export-oriented backbone enterprises in Yongnian. Moreover, there are 5 leading fastener enterprises who have established their overseas warehouses.

In 2022, Yongnian fastener export earnings grew by 70.8% year-on-year to about 158.6 million US dollars, bucking the trend of global slowdown. The annual output of fasteners in Yongnian reached 5.6 million tons in 2022, with output value of 38.5 billion yuan.

Since December 2022, Yongnian local government has started to arrange business delegations for Yongnian fastener companies to participate in exhibitions overseas. The exhibiting companies have received a large number of overseas orders through onsite participation or exhibition representative service. ◆

China's Auto Sector Maintains Sound Momentum in 2022, NEV Sales Soar



Chip shortages and rising costs of raw materials for power batteries, with sales of new energy vehicles (NEVs) almost doubling.

Auto sales rose 2.1 percent year on year to 26.86 million units in the world's largest automobile market in 2022, data from the China Association of Automobile Manufacturers showed.

In December alone, the country's auto sales totaled approximately 2.56 million units, down 8.4 percent from a year earlier but up 9.7 percent on a monthly basis, the data showed.

NEV market posted another stellar performance last year, driven by rising market demand and a sound policy environment.

China sold about 6.89 million NEVs in 2022, skyrocketing 93.4 percent year on year. NEV production soared 96.9 percent from a year earlier to about 7.06 million units.

Thanks to the NEV boom, the market share of NEVs in China's auto market reached 25.6 percent in 2022, up 12.1 percentage points from 2021.

China halved the purchase tax for eligible passenger vehicles last year, as part of a string of supportive measures to spur auto sales and underpin consumption.

Thanks to the policy stimulus and NEV boom, China's passenger car market logged a steady expansion in 2022. Sales of passenger cars stood at 23.56 million units last year, representing a year-on-year increase of 9.5 percent and exceeding 20 million units for an eighth consecutive year.

Exports also made a positive contribution to the growth of the auto market. China exported 3.11 million cars last year, logging a significant increase of 54.4 percent from a year earlier.

The volume extended China's auto exports boom in



2021, which surpassed the 2 million units for the first time and marked a big leap for the auto sector.

In the same period, exports of commercial vehicles climbed 44.9 percent from 2021 to 582,000 units, and exports of new-energy vehicles increased 1.2 times year on year to 679,000 units.

The association attributed the robust growth to factors such as the increasing competitiveness of Chinese auto companies and the overseas supply shortage.

In 2021, China's annual auto exports exceeded 2 million units for the first time, compared to about 1 million units in previous years, the data shows.

Looking forward, the association has expressed confidence in the prospects of China's auto market in 2023, given the recovery of the overall macroeconomy and relative policies to boost consumption and the vitality of market entities.

It is estimated that China's auto market will maintain its stable and sound growth momentum in 2023, and that it will post an increase of about 3 percent, according to the association. ◆

Metal Sectors Focus on Tech Innovation



ow-carbon efforts urged to accelerate productivity, high-quality development. China's iron and steel industry needs to step up efforts on technological innovation and low-carbon development to cope with challenges and realize high-quality growth, according to industry experts.

The remarks were made at an online forum on the development of China's iron and steel industry, which was held by several organizations including the Chinese Society for Metals and the China Metallurgical Industry Planning and Research Institute.

"The iron and steel industry is currently facing new challenges and must rely on scientific

and technological innovation to take an intensive growth pathway featuring an increase in total factor productivity to realize high-quality development," said Zhang Xiaogang, chairman of the CSM and former president of the International Organization for Standardization.

He said Chinese steelmakers need to enhance their operations and raise core competitiveness through strengthening cost control, and benchmarking to tap their potential and improve performance with precise goals.

Data from the National Bureau of Statistics showed the revenue of China's ferrous metal smelting and rolling processing industry in the first 10 months was 7.3 trillion yuan (\$1 trillion), down 9.7 percent from a year ago, while the industry's profits plummeted 92.7 percent year-on-year to 29.68 billion yuan during the period.

Experts said the plunge in profits is mainly attributable to the COVID-19 pandemic and the complexities of macroeconomic conditions, due to which enterprises are faced with sluggish demand, low product prices and high-level raw materials costs.

According to the China Iron and Steel Association, key iron and steel enterprises' purchase costs of coking coal increased more than 50 percent year-on-year during the first three quarters, while the costs of injection coal increased more than 40 percent on a yearly basis.

While the costs of importing iron ore in the first three quarters declined year-on-year, it was still higher compared with the costs in the same period in 2019 and 2020.

Amid soft demand and high-level prices of raw materials, crude steel output during the first 10 months declined 2.2 percent, the NBS statistics showed.

Diao Li, deputy head of the finance and assets department of the CISA, said prices of coal and coking coal had increased by the end of November, leading to more cost pressure on iron and steel enterprises.

According to Gan Yong, an academician at the Chinese Academy of Engineering, to address the multiple challenges it faces, China's iron and steel industry needs to focus on the key links of the industrial chain to propel high-quality development.

The industry needs to further phase out outdated capacity, strengthen the construction of smart systems to make good use of digital transformation and promote short-process steelmaking technologies like electric furnace steelmaking, Gan said, who is also honorary chairman of the CSM and former deputy head of the Chinese Academy of Engineering.

He also said the industry needs to advance energy conservation, carbon emission reduction and reform the technical innovation mechanism.

Fan Tiejun, president of the China Metallurgical Industry Planning and Research Institute, said safeguarding supplies of resources and ensuring product quality are the key to the healthy development of the industry.

The industry must adhere to a green, low-carbon and intelligent development pathway while striving for higher-level development comprehensively through technological innovation, mergers and acquisitions, resources and energy recycling, and application of a standard certification system, according to him.

He advised steelmakers to step up efforts to switch from blast furnaces to electric furnaces for steelmaking, strengthen research on and application of carbon capture, utilization and storage technologies, and make more breakthroughs in hydrogen metallurgy and other advanced low-carbon metallurgy technologies, to accelerate the decarbonization of the industry.

He also said enterprises should make better use of smart production and management technologies to reduce costs and improve efficiency.

As enhancing energy consumption efficiency remains a key task for the iron and steel industry to realize high-quality development,

the CISA has officially kicked off a three-year campaign in that regard.

He Wenbo, executive chairman of the association, said at the kickoff ceremony held recently in Zhanjiang, Guangdong province, that the association aims to facilitate 80 million to 100 million metric tons of steel capacity to reach benchmark standards on excellent energy consumption efficiency performance within 2023.

By 2024, steel capacity with excellent energy consumption efficiency is expected to expand to 150 million to 200 million tons. By 2025, the figure is expected to be 200 million to 300 million tons, he said. ◆

China's Shipbuilding Sector Continues to Top World Market



china's construction machinery manufacturers have been extremely busy starting this year, with these companies frequently facing a full workload in everything from production to sales, and seeing their schedules filled with orders from home and abroad, China Central Television reported.

The overseas orders from Europe, America, Latin America and Africa surged in the first half of this year, with excavator orders jumping 160 percent over the same period last year, said CCTV, citing a head of the international

logistics department at Sany Heavy Industry, a construction equipment manufacturer in Changsha of Hunan province.

In 2020, the Sany sold 98,705 excavators, accounting for 15 percent of the market share worldwide, and became the world's excavator sales champion for the first time.

Based on an absolute advantage in sales, the company has become the world's largest excavator manufacturer in the first half of this year, with sales figures surpassing the second company by 25,000 units, said Xiang Wenbo, president of Sany Heavy Industry.

Data from the China Construction Machinery Association showed that China's 26 excavator manufacturers sold a total of 223,833 excavators during January to June of this year, an increase of 31.1 percent year-on-year. Among the total sales, 193,700 excavators were sold domestically and 30,133 overseas, up 24.3 percent and 107 percent year-on-year, respectively.

Moreover, the sales of tower cranes have also been booming. At a smart plant of Zoomlion Heavy Industry Science and Technology, all the production lines have been in full capacity during the first six months, with a tower crane rolling off the production line every 18 minutes, said the CCTV.◆

China's Wind and Solar Power Stronger than Ever

installed capacity of newly added wind and solar power in China exceeded 120 million kilowatts last year, making the wind and solar power industry one of the most competitive ones in the country, National Energy Administration said during a press release in Beijing.

Accumulated wind and solar power installed capacity in China is expected to exceed 700 million kilowatts and the clean energies are also playing an important role in national energy security, it said.

According to the administration, wind and solar power accounts for 78 percent of the country's total newly added installed capacity last year. More than half of the country's newly added power generation capacity is from wind and solar, it said.

The average output of wind and solar power generation in most parts of the country last year accounted for around 15 percent of the average electricity load, with a maximum of 40 percent, it said.◆

China's Industrial Economy Sees Steady Growth in 2022



china's industrial economy posted overall steady growth in 2022.

The country's value-added industrial output of industrial firms with annual main business revenue of at least 20 million yuan (\$2.95 million) rose 3.6 percent year-on-year in 2022, the conference estimated.

The value-added industrial output of manufacturing climbed 3.1 percent year-on-year. Its share in GDP was expected to reach 28 percent, up 0.5 percentage points over 2021.

By the end of 2022, the country had over 70,000 specialized and sophisticated enterprises that produce new and unique

products, and more than 2.3 million 5G base stations had been built.

China's High-end Manufacturing Sector Sees Robust Growth

chinese high-end manufacturing companies gained strong momentum in recent years, with a higher market value and expanded footprints in overseas markets, a report said.

The number of A-share-listed high-end manufacturing companies reached 2,121 as of Dec 10, up 69.7 percent from 1,250 at the end of 2017, said the report released by the China Association for Public Companies.

The market value of the listed high-end manufacturing companies increased significantly during the 2017-2021 period. According to the report, these companies raked in 11.79 trillion yuan (\$1.69 trillion) in operating revenue in 2021, compared with 7.47 trillion yuan in 2017.



Thanks to years of overseas market expansion, the companies' revenue from overseas markets stood at 27.51 trillion yuan in 2021, up from 13.77 trillion yuan registered in 2017, the report showed.◆

China's Local Governments Send Delegations Overseas to Bring in Export Orders



ocal governments in China's exportoriented regions have stepped up support for business delegations, including chartering flights so they can fly them overseas to bring in more export orders and stabilize foreign trade, as the country relaxes its COVID control measures.

East China's Zhejiang Province launches a campaign to organize 1,000 group trips overseas, joined by about 10,000 foreign trade companies looking to win export orders.

On Dec. 3, east China's Zhejiang Province launched a campaign to organize 1,000 group trips overseas. The drive was joined by about 10,000 foreign trade companies looking to win export orders and expand their overseas markets.

One day later, a business delegation consisting of officials from provincial departments, including the Department of Commerce of Zhejiang Province, and business representatives left on a six-day trip to Europe.

"We hope to give more positive signs to the companies by taking the lead in arranging overseas business trips so they will be more confident and willing to take the initiative to go abroad and find more opportunities to compete and cooperate with their international counterparts," said Li Lin, secretary-general of the delegation.

Meanwhile, Jiaxing city in Zhejiang chartered a flight to Japan for a group of 96 representatives from 50 companies in Jiaxing as well as other cities in the province including Hangzhou, Ningbo and Huzhou on Dec. 4. The representatives attended the three-day Asia Fashion Fair (AFF), which kicked off in Tokyo on Dec. 7. This year, 60 enterprises from Jiaxing attended the AFF, compared to about 20 in previous years, according to the Jiaxing Municipal Bureau of Commerce.

Members of a business delegation from Jiaxing city, east China's Zhejiang Province, for the Asia Fashion Fair in Japan pose for a group photo.

Zhang Haofu, an official from the Jiaxing Municipal Bureau of Commerce, explained that the city would arrange for six business delegations to participate in exhibitions overseas, including three delegations to Japan, one to Germany and France, and one to the United Arab Emirates in December this year.

Ningbo city in Zhejiang has made similar arrangements. "Enterprises have a strong desire to expand their overseas markets," said Zhang Shuiqing, head of a business delegation from Ningbo. He added that the companies are hoping to expand cooperation, as there will be many exhibitions and market opportunities in Europe, the U.S., West Asia, and Southeast Asia in the near future.

Through its arrangements, Ningbo aims to secure new foreign trade orders worth \$10 billion, build 200,000 square meters of new overseas warehouses, and ensure that the actual use of foreign direct investment will reach \$4 billion before April 2023.

On Dec. 10, a group of more than 30 representatives from over 20 companies in Jinhua city, Zhejiang province, boarded

a plane for Indonesia. It was the first time a business delegation in Jinhua had travelled abroad in nearly three years, according to an official from the Jinhua municipal commerce bureau.

On Dec. 6, Nantong city in east China's Jiangsu Province organized a group of 105 people from 63 foreign trade companies to attend the AFF in Japan. This was the largest group organized by the city for an overseas exhibition since the outbreak of the COVID-19 epidemic.

Since November this year, the Nantong Bureau of Commerce has also arranged for enterprises to attend several other international exhibitions, including one in Germany and one in Australia.

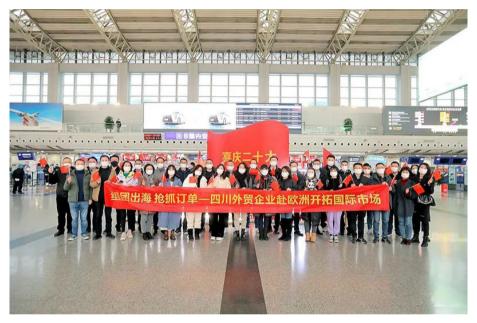
At the same time, southwest China's Sichuan Province has provided charter flights for delegations of foreign trade companies to visit France, Germany and Italy for trade events, according to the Sichuan Provincial Department of Commerce.

Members of a business delegation from southwest China's Sichuan Province, heading for Europe pose for a group photo at an airport.

Sichuan Provincial Department of Commerce has established a task force to provide more efficient services for enterprises, such as reducing passport processing times by half.

Sichuan rolled out 10 measures supporting companies in expanding their overseas markets in October this year. Over 100 enterprises in the province recently attended international exhibitions and secured orders worth over 1 billion yuan (\$143.8 million).

Sichuan Provincial Department of Commerce plans to arrange for companies to visit Thailand, Vietnam and other Regional



Comprehensive Economic Partnership member states next year to further explore the Southeast Asian market.

In November this year, the Guangzhou Municipal Commerce Bureau in south China's Guangdong Province sent over 100 representatives from about 40 foreign trade companies on chartered flights to exhibitions in the Southeast Asian region.

In the same month, a group of 43 representatives from 22 companies in Shenzhen city of Guangdong attended MEDICA, the world's largest trade fair for medical technology in Germany, on a chartered flight.

For delegations traveling overseas to secure orders, Shenzhen also provided subsidies for international charter flights, according to a guideline issued by the Commerce Bureau of Shenzhen Municipality on Oct. 31.◆

Taiwan Fastener Export Breaks USD 6 Billion Mark in 2022



In 2022 Taiwan's fastener export result was the third highest in history, with an annual export volume of 1, 665,300 tons, down 0.7 percent YoY, while the export value exceeded US\$6 billion for the first time, reaching US\$6.355 billion, or nearly NT\$200 billion, a record high.

Taiwan Industrial Fasteners Institute (TIFI) Chairman Tu-Chin Tsai said that the second half of 2022 was affected by the negative global steel economy, and although the number of orders received by manufacturers was more or less affected, resulting in a slightly lower export volume than the previous year, the export volume exceeded the US\$6 billion mark for the first time, mainly because the fastener industry gradually succeeded in transforming to the development of higher-value-added products, such as automotive screws, resulting in a higher average

unit price, and continued to work toward precision machining and smart manufacturing.

Recently, with the gradual improvement of the international steel economy, the market situation in Europe and the United States has improved, and Tu-Chin Tsai believes that it will be favorable for manufacturers to receive orders. The fastener industry is expected to recover in the second quarter of 2023, especially starting this May, export orders will obviously improve, so the outlook for the fastener export market in 2023 is positive.

TIFI also pointed out that the average export price of Taiwan fasteners in November 2022 rose to US\$3.98 per kilogram, a record high for a single month in history, but slipped to US\$3.94 per kilogram in December 2022, down 1 % from the previous month, but up 4.78 % from the same period in 2021, the second highest for a single month inhistory. ◆

Taiwan CSC Announces Q1 2023 Price Adjustments

Taiwan's China Steel Corp. has recently announced its latest steel product price adjustments for the first quarter of 2023.

The price of wire rod (including low carbon, medium-to-high carbon, cold forged, and low alloy) that is most relevant to fastener manufacturers will be reduced by NT\$1 ,500 (about US\$48.7) per metric ton.

However, the price of automotive material will be increased by NT\$500 (about US\$ 16.23) per metric ton. The average price adjustment for all steel products will be -0.83%. ◆



Chun Yu Expects Mild Rebound in Q2 and Recovery in 2nd Half of 2023



chun Yu said it is looking to end inventory adjustment in Q1 2023. Its corporate performance could stabilize in Q2 2023 and there could be a mild recovery.

There is a chance for Taiwanese fastener market to recover in the second half of 2023.

According to Chun Yu's analysis, its output in Taiwan peaked at 12,000 to 13,000 tons while the normal threshold is about 9,000 tons. It reached 8,000 tons from the end of Q3 to Q4 2022 and could return to 10,000 tons per month in 2023.

In terms of Mainland China, Chun Yu said the lockdown could soften in the future despite sporadic reoccurrence of COVID, that it couldn't go worse. In good times, outbound delivery can reach 6,000 to 8,000 tons. Currently it is 4,000 to 5,000 tons and could return to 6,000 tons in 2023.

Chun Yu has high hopes for Indonesia because the country is breaking records in GDP with a robust local demand. Indonesia is a material producing country and is less subject to inflation. Currently Chun Yu sells 2,000-2,500 tons of products per monththere.

Chun Yu holds positive outlook toward European market. Chun Yu is actively expanding its market share in the U.S. with steady increases. •

Japanese Nitto Seiko Rolls Out Uni-axis Auto Screw Fastening Device

Japanese Nitto Seiko rolls out Uni-axis auto screw fastening device.

"FM514VZ" and "FM514CZ" Uni-axis Auto Screw Fastening Device can be mounted on small vertical multi-joint robots. It weighs lighter and reduces carbon emission by 23%. The user can change fastening thrust and set fastening torque and speed.

The vacuum suction type FM514VZ model is suited for tight and deep places; the chuck-claw type FM514CZ model is suited for fastening flat surfaces. Screws are fed one by one from the feeder to the fastening unit through air pressure for automatic screw fastening tailored to each product.



SYNEGIC (Japan) Launches TriLead Crack-free Woodworking



The patent-pending TriLead screw, with a special bit shape newly developed by SYNEGIC, can cut wood and discharge wood chips to perfectly drill into MDF or particle boards without cracking the wood or creating burrs during the drilling process. There is no need to drill holes in the wood before use.

TriLead screw adopts chromate surface treatment, and can be used with hexagonal bits, suitable for wood with the thickness of 10-20mm, including shelves and other household furniture.

Japanese Fukui Byora Invests JPY 7.5 Billion in EV-related Field

n August 2022, Fukui Byora established a logistics center in Shiga Prefecture to provide just-in-time delivery to the Tokai and Kansai regions.

The company will capture the demand for EV parts, which is expected to expand significantly. The company will build a new plant located in Katayamazu in summer 2023 as a production base for EVs and high voltage battery parts. They will respond to new demand in the automotive field by utilizing its specialty in cold forging technology.



Japanese Vessel Rolls Out 25.4mm Impact Wrench



The Japanese have to replace large vehicle wheels with the ones for winter before the cold season arrives. The wheel nuts in use for a long time would be rusty from snow melting agent and hard to loosen up.

The huge demand for tire replacement in this period would put a lot of loads on impact wrenches. Plus, there are users that claimed impact wrenches are "too heavy, time-consuming due to low torque, easy to act up and costs much for repair."

Therefore, Vessel has rolled out "SP -390DX" 25.4mm Impact Wrench.

The product's anvil length shrinks from 8 to 6 inches to reduce torque loss during fastening. The anvil is hollow by design to reduce weight. The diameter of the air duct is increased, and the heat treatment to the air motor and rotor blade is optimized to improve torque via smooth rotation.

(Japan) Tange Products Rolls out High Grip Insert Nut

Tange Products recently rolls out High Grip Insert Nut. Insert nuts are used to fasten screws and bolts into resin products. The High Grip Insert Nut by Tange Products increases the area of contact with resin and therefore doesn't easily come off from resin.

A major feature is that the company makes the surface of High Grip Insert Nuts uneven only by means of stamping, which makes it easier to mass-produce High Grip Insert Nuts than machined insert nuts.

The Nut has 200% to 300% more pull-out strength and greatly improves rotational torque. It is made of

cod-rolled steel plates and it is toxin-free, cheap and can be used in the automotive and electrical engineering industries. Currently the company offers M4, M5 and M6 sizes and expects to sell 500 thousand pieces per month a year later.



Japanese KTC Develops Threaded Pipe Torque Wrench



eneral pipe wrenches rely on the operator to get a feel for them. The aging of the operator could lead to inconsistent quality or insufficient fastening. KTC (Kyoto Tool Co.) worked with Osaka Gas Network and successfully developed a torque wrench for threaded pipes which "clicks" on completion of fastening to ensure consistent operation.

Furthermore, the product is strong by design to hold through heavy rain and other severe weather. •

India's Export Tariffs Adjustment Could Impact China's Steel Products Export in 2023

Due to the weak external demand and lowered price advantage, the volume and price of China's steel exports have gone downwards since the second half of 2022; the rise in China's domestic steel prices and the appreciation of RMB in November 2022 continues to put pressure on steel exports in the short term.

China Iron and Steel Industry Association (CISA) said that the Indian government passed a bill on November 18, 2022 to abolish export tariffs on iron ore and certain steel products, and accordingly, Indian export resources will regain a share in the international market.

Although the short-term impact is limited, there could be a certain impact on China's steel exports in 2023.◆



Sundram Fasteners Q2 Net Slips 7% to 111.75 cr. on Spike in Input Costs



Sundram Fasteners Ltd., (SFL) standalone net profit for the second quarter contracted by 7% to 111.75 crore due to spike in raw material costs.

Revenue from operations rose by 14.6% to 1,218 crore. Domestic sales during the quarter were at 802 crore against 663 crore and export sales was 378 crore (363 crore).

Total expenditure shot up from 903 crore to 1,076 crore, of which cost of raw material accounted for 582 crore (486 crore).

The Board declared an interim dividend of 3.57 per share and an additional special dividend of 2 per share to commemorate the 60 th year of incorporation of SFL.

Further, the Board approved the scheme of amalgamation of Sunfast TVS Ltd., and TVS Engineering Ltd., with SFL and their respective shareholders. The amalgamation will facilitate operational synergies, efficient allocation of capital and provide a platform for integration of the defence and aerospace business of SFL, it said.◆

EU to Extend Carbon Tax to Fasteners in October 2023



After overnight negotiations, EU countries and European Parliament representatives reached an agreement on December 13, 2022, to impose a tax on CO2 emissions from imported steel and cement and other polluting goods, extending the scope of application from upstream products such as steel, aluminum and cement to downstream products such as screws and bolts.

The new mechanism is scheduled to be implemented on a trial basis from October 1, 2023.

The agreement, called the Carbon

Border Adjustment Mechanism (CBAM), is a new creation of the European Union in light of the global trend of carbon reduction, and was proposed by the Executive Committee in July 2021.

Since EU has set strict carbon reduction requirements for local industries with high carbon dioxide emissions, in order to prevent enterprises from increasing costs due to carbon reduction and end up with uncompetitive prices against imported products, CBAM was created, requiring purchase of carbon reduction certificates for foreign high carbon emission products entering the EU market.

Bossard Acquires PennEngineering's® Distribution Business in Canada

The Bossard Group is significantly expanding its market presence in Canada as a supplier of high-quality fastening solutions. It acquires the Canadian distribution business from the American company PennEngineering® in Danboro, Pennsylvania, USA, an innovative manufacturer of fastening solutions.

PENN Engineered Fasteners Corporation (PEF), based in Concord, Ontario, Canada, was founded in 1970 and acquired by PennEngineering® in 2017. The company supplies industrial segments such as automotive, energy, agriculture, and appliances with innovative fastening solutions, and generates annual sales of around USD 25 million with 30 employees.

Bossard and PennEngineering® maintain a successful, long-term collaboration which covers a total of 22 countries in North America, Europe and Asia. Bossard, with its global focus on creating value for its customers through engineering services and innovative logistic solutions, is convinced that it will be able to unlock additional growth in this strategic market located in the industrial epicenter of Canada.

European News

"With the acquisition of PEF we are in a great position to continue our profitable growth strategy in the context auf our Strategy 200. Building on our previous investments in Canada, adding PEF's capability, we will be able to expand our services in this key market. We are excited to welcome PEF employees to the Bossard family and look forward to further developing our business together in the Canadian market." said David Jones, CEO America, Bossard.

Both parties have agreed not to disclose the purchase price.

Bossard Shanghai Obtained AS9120B Aerospace Certificate

Bossard Shanghai has acquired a certificate AS9 120B Aerospace Quality Management Systems in China, which indicates that the company can offer aerospace clients certified fastener products and service.

"I am very pleased that Bossard has obtained the AS9120B certification, which fully proves that we have the ability to provide fasteners that meet the requirements of the aerospace industry. At the same time, I am also looking forward to Bossard's more than 190 years of experience in fastening technology that brings innovative breakthroughs in this field," said Simon Law, President of Bossard China.

The safety and quality of fasteners are of paramount importance to the aerospace industry. Since entering the Chinese market in 1999, Bossard has always maintained its focus on the aerospace industry. "With the AS9120B aerospace quality management system certificate, we will support China's aerospace industry by further expanding our fastener products and services such as: locking and anti-loosening fasteners, self-clinching



technology, riveting technology, self-tapping screws, fastener selection and testing services.◆

Bulten Closes Manufacturing Plant in the UK



In order to streamline the operation and improve profitability, Bulten has decided to close its manufacturing plant in Pembroke, UK. The closure means that 50 jobs are at risk of redundancy.

The closing-down process will begin with immediate effect, and the plan is to complete the process during the second quarter of 2023.

Total restructuring costs amount to approximately SEK 11 million, of which SEK 9 million are reserved for the current year. There will be additional investments totaling about SEK 12 million in connection with the closure. These primarily relate to

relocation of equipment and production to Bulten's other manufacturing plants, along with a few new recruitments.

"It is unfortunately difficult to achieve profitability with the mix of products made in Pembroke, and also volumes are relatively low. By moving the parts of production that have long-term potential to our other plants, we can achieve better efficiency and thereby higher profitability. This is in line with our strategy, which includes better utilization of our production network," says Anders Nyström, President and CEO of Bulten Group.

The operation in Pembroke became part of Bulten Group in 2020 with the acquisition of PSM International. Fifty people are currently employed at the plant, manufacturing and purchasing fasteners for different industrial segments. Bulten's other operations in the UK will not be affected by the closure of the Pembroke plant. ◆

TR Fastenings Opens New Facility in Hungary

TR Fastenings Hungary Kft, part of the Trifast plc Group, is celebrating the opening of its new purpose-built facility in Budapest, building on years of rising demand in the region.

Located in the southern suburb of Szigetszentmiklós, Budapest, TR Fastenings Hungary Kft is a fastener and Cat C supplier to international OEM's and their subcontractors not just in Hungary but in the seven countries that border them. The new 3,500 sq. metre modern facility has 9.5 metre eaves in the warehouse and is a high-capacity distribution facility that is ready to support TR's future European growth strategy.

TR Hungary was first established in 2000 and has grown considerably in that time,



quickly outgrowing two previous locations. Its rapid growth has been a real success story for TR and the region alike. It has come about through rising demand from large multinational household brands, many of which TR supplies to elsewhere in the world. Hungary has historically been a lower cost production region but with a highly skilled available workforce making it ideal for this kind of strategic investment. Hungary has a central location in Europe with seven countries on its border, which is perfect for distribution hubs.

The TR Hungary team is fully supported by the Group encompassing Sourcing, Technical and Design, Commercial, Financial, HR and Marketing support. •

Miguel Ángel López Borrego to Assume the Role of Interim CEO of NORMA Group



The Supervisory Board of NORMA Group SE has decided to appoint Miguel Ángel López Borrego to the position of Chief Executive Officer from January 1, 2023. He shall exercise the function until the position has been permanently filled, at the latest until December 31, 2023. The Supervisory Board continues its search for a permanent successor in the CEO role.

Günter Hauptmann, Chairman of the Supervisory Board of NORMA Group, comments: "We are extremely pleased to have tapped Miguel Ángel López Borrego to fill the CEO role during this transitional period, thus ensuring the continuity of the company's management. He is exceptionally well-positioned to leverage his deep insight into NORMA Group's business model and the challenges it currently faces, enabling him to guide the company through the current turbulent economic environment in an organized and competent manner."

Miguel Ángel López Borrego has been a member of the NORMA Group Supervisory Board since March 2021. As CEO of Siemens

S.A. in Madrid, he has been heading Siemens' Spanish operations since 2018. López Borrego can draw on many years of management experience in the automotive industry, in general industrial equipment and in the field of new energy. He was born in Germany in 1965 and holds Spanish citizenship.

During the transition phase pending a long-term appointment to the position of CEO, López Borrego will continue to implement ongoing improvement measures in the company together with his two fellow Management Board members, Dr. Friedrich Klein (COO) and Annette Stieve (CFO). In the meantime, his offices as member of the Supervisory Board shall be suspended.

"We will work together on the Management Board to stabilize profitability, compensate for inflation-driven cost increases and enhance plant productivity," says Miguel Ángel López Borrego. "With its diversified business model and strong order book, NORMA Group is in an excellent position to take advantage of growth opportunities even in challenging times."

NORMA Group's current CEO, Dr. Michael Schneider, will step down from the Management Board of NORMA Group at the end of 2022 by mutual agreement with the Supervisory Board. Dr. Michael Schneider and the Supervisory Board reached a mutual decision back in August not to extend Dr. Schneider's contract, which expires in mid-2023. The Supervisory Board's search for a long-term appointment to the position of CEO is proceeding according to plan.

Supervisory Board Chairman Günter Hauptmann would like to thank Dr. Michael Schneider on behalf of the entire Supervisory Board: "We regret Dr. Schneider's departure and thank him for the excellent cooperation. He has led NORMA Group in difficult times, initiated important digitalization measures and promoted the focus on the growth markets of electromobility and water management. We wish Dr. Schneider all the best for his personal and professional development."

Dr. Michael Schneider says: "My time at NORMA Group was characterized by upheaval in the industry environment and important internal strategic decisions. With the three strategic business units Water Management, Industry Applications together with Mobility and New Energy, NORMA Group is in an excellent position for future profitable growth. I would like to express my sincere thanks for the trusting cooperation with the Supervisory Board and on the Management Board."

IFI Announces New Standard for Steel Construction Industry

ndustrial Fasteners Institute (IFI) has announced the publication of a new IFI standard, IFI-171, thread dimensions for sizes 1-5/8 – 5-1/2 and 1-7/8 UNS for Assembly of Bolts, Studs and Nuts in the Steel Construction Industry.

The new standard specifies thread dimensions and tolerances for two sizes of coarse threads, 1-5/8 – 5-1/2 and 1-7/8—5, that are commonly used in the steel construction industry. The standard resolves



slight differences that commonly resulted from varied interpretations of ASME B1.1 (2019), which does not explicitly list sizes.

IFI standards are developed by industry experts that volunteer at the request of IFI members and industry stakeholders. Many of these experts are also engaged in the production of the IFI Book of Fastener Standards, a compilation of nearly 100 standards from ASTM, ASME, SAE and the IFI.

"I am very appreciative for the contribution of the task group members, beginning with Mike Friel from Haydon Bolts who identified the gap and pushed for a standard to be published," said Salim Brahimi, Director of Engineering and Technology for IFI. "I am also grateful for the expertise and guidance of Al Barrows, chair of ASME Committee B1 on Threads. His support was essential to validate the accuracy of the dimensions and to ensure we did the work correctly and in concert with ASME B1.1. This standard will be added the Online Book of Fastener Standards and to future publications of the hardcover Book of Fastener Standards."

IFI is the leading voice representing the interests of the North American manufacturers of mechanical fasteners and formed parts, as well as the key suppliers to the industry, fostering their working together to shape the future of the industry. IFI represents the industry to its suppliers, customers, the government, and the public-at-large to advance the competitiveness, products, and innovative technology of the Member Companies in a global marketplace. Learn more about IFI and its membership at indfast.org. •

US Cutting Tool Orders Up 6.7% in July

uly 2022 U.S. cutting tool consumption totaled \$173.2 million, according to the U.S. Cutting Tool Institute (USCTI) and AMT – The Association For Manufacturing Technology.

This total, as reported by companies participating in the Cutting Tool Market Report collaboration, was down 1.5% from June's \$175.9 million and up 6.7% when compared with the \$162.3 million reported for July 2021. With a year-to-date total of \$1.2 billion, 2022 is up 7.7% when compared to the same time period in 2021.

American News

These numbers and all data in this report are based on the totals reported by the companies participating in the CTMR program. The totals here represent the majority of the U.S. market for cutting tools.

"The July 2022 cutting tool results continue to show demand is still well off 2019 levels. 2022 dollar volume is still running about 15% lower than 2019, and when inflation is considered, total unit production is even lower," said Jarvis Cutting Tools President Costikyan Jarvis. "This data is supported by 2022 vehicle sales being around 13 million units versus 17 million units



in 2019 and the lower production in commercial aerospace. Expect to see improving cutting tool demand well into 2023. Improvement will be driven with increased aerospace production (Boeing reported that 737 production returned to 31-per month rates in June) and a reduction in automotive supply chain issues. Another good indicator is North America's premier manufacturing technology show, IMTS. The show returns this month, and attendee numbers and interest will be a good gauge for future demand."

"The slowdown in shipments seen in the second quarter of 2022 continued into July, although they remain well above last year's totals," said Mark Killion, director of U.S. industries at Oxford Economics. "This is in line with the deceleration recently seen in new orders and a moderating pace of activity in key client markets."

The Cutting Tool Market Report is jointly compiled by AMT and USCTI, two trade associations representing the development, production, and distribution of cutting tool technology and products. It provides a monthly statement on U.S. manufacturers' consumption of the primary consumable in the manufacturing process – the cutting tool. Analysis of cutting tool consumption is a leading indicator of both upturns and downturns in U.S. manufacturing activity, as it is a true measure of actual production levels.

Historical data for the Cutting Tool Market Report is available dating back to January 2012. This collaboration of AMT and USCTI is the first step in the two associations working together to promote and support U.S.-based manufacturers of cutting tool technology. ◆

BBI Relocates Its Montreal Facility and Doubles Its Toronto Warehouse

BI-Montreal has moved from a 90,000 sqft facility into a 154,000 sqft building and BBI-Toronto has doubled its warehouse space to 164,000 sqft facility enhancing just-in-time deliveries into Canada.

Brighton-Best is currently located in 31 locations in 6 countries and supplies over 7,000 distributors throughout the world.



Fastenal Sales Rose 16% in 2022



astenal posted another strong quarter to wrap up its 2022 fiscal year, but its latest quarterly sales increase moderated compared to earlier in the year.

The Minnesota fastener and industrial supply giant posted just shy of \$7 billion in overall sales in 2022, a 16% increase over 2021. Operating income and earnings before income taxes were both up more than 19% over that span, while net earnings rose 17.5%. Gross profit for the year climbed nearly 16%.

In the fourth quarter of 2022 alone, sales were

up 10.7% compared to the same period in 2021 — the company's sixth consecutive double-digit sales jump but its lowest increase of the year. The distributor's Q4 net earnings were up 6.2%, and gross profit rose 7.8%. The company's earnings per share of \$0.43 in the quarter slightly exceeded Wall Street projections.

Fastenal officials said the company saw higher unit sales in the latest quarter as strong demand in capital goods and commodities markets offset sluggish consumer goods and construction sectors. The company also said the positive impact of price inflation on sales numbers eased in the fourth quarter. Prices were stable in the latest three-month window, and the company said its moves to mitigate the impact of inflation in fasteners and transportation services boosted net sales by 350 to 380 basis points.

The company also warned that despite easing prices across many inputs, it could take "several quarters" before its costs reflect that trend due to its long supply chains.

Fastenal said it opened a total of 306 "onsite" locations during 2022 and closed 99, which it attributed to normal churn in its business. Its workforce increased by 1,520 in the past year. ◆

Würth Touts Record Revenue

astener and MRO distributor Würth Industry North America said Thursday that it set a new record for revenue growth through July.

The Indianapolis-based subsidiary of German distribution giant Würth Group said its revenue through last month was up 16.5% compared to the previous year, and that it is on pace to set a record for sales volume.

The company attributed the growth, in part, to the 2021



American News

completion of a multi-year strategy to divide into four divisions. Würth officials said the move streamlined and optimized its operations, products and procurement. Its MRO, safety and metalworking division, in particular, grew by 22.7%, while the industrial division grew by 14.5%.

"Even against the economic and market challenges we faced in the first half of 2022, we continue to see double-digit sales growth through our divisional structure," Würth North America CEO Dan Hill said in a statement.

The company said that it added 128 employees in the first seven months of the year, increasing its North American workforce by more than 5%. It is set to open what will be its largest facility in Virginia in coming weeks. ◆

MKS Instruments Announces Closing of Atotech Acquisition



MSS Instruments, Inc., a global provider of technologies that enable advanced processes and improve productivity, announced the completion of the previously announced acquisition of Atotech Limited for approximately US\$4.4 billion in cash and MKS common stock.

Atotech is a global leader in process chemicals, equipment, software and services for printed circuit boards, semiconductor IC packaging, and surface finishing.

"The acquisition of Atotech positions MKS to accelerate roadmaps for future generations of advanced electronics devices," said John T.C. Lee, President and CEO of MKS, "By combining leading capabilities in lasers, optics, motion and now process chemistry, MKS is set to be a leader in the next frontier for miniaturization and complexity: Optimizing the InterconnectSM, a significant enabling point of next-generation advanced electronics. Atotech's leadership in functional and decorative surface finishing will also extend MKS' product offering for industrial applications and grow our market reach. I could not be more excited to welcome the Atotech team to the MKS family."

Birmingham Fastener Announces Pacific Coast Bolt Acquisition

Birmingham Fastener is excited to announce the acquisition of Pacific Coast Bolt Corporation based in Santa Fe Springs, California. With over 80 years of combined fastener production, this acquisition strengthens Birmingham Fastener's manufacturing diversity and expands our U.S. footprint coast-to-coast with branches from New York to California. Most importantly, it allows us to add teammates to our world-class staff and will yield long-term benefits for our customers.



Pacific Coast Bolt manufactures and distributes a wide range of products to industries such as water, wastewater, chemical,

refining, and construction. With this partnership, Birmingham Fastener and its sister companies can expand product and service offerings to their customers.

Brad Tinney, President of Birmingham Fastener said of the acquisition, "This strategic initiative further complements Birmingham Fastener's made-in-America value proposition to our customers, as Pacific Coast Bolt brings a wealth of manufacturing equipment and overall fastener knowledge. We are excited to expand westward and honored to heighten the level of customer service for all our partners across America."

Field Fastener, Mid-State Bolt & Nut Merge



ield announced recently that it has merged with Mid-State Bolt & Nut Company, a full-line fastener distributor headquartered in Columbus, Ohio.

Terms of the deal were not disclosed.

Mid-State Bolt & Nut Company, founded in 1946, brings value to the OEM marketplace through creative and efficient supply chain solutions for fasteners and other direct materials.

This strategic partnership will enhance their combined position in North America

by expanding the products, services and geographical footprint in which they service customers. Both companies become stronger by being together, and more equipped to support current and prospective customers while providing technical services to drive short and long term cost savings.

"We've known Field and the Derry family for many years, and based on their culture, growth and future vision, we know that our team, customers and suppliers are in good hands by merging with Field", said Dave Broehm, president of Mid-State Bolt & Nut.

Broehm will step down as president but stay on in a consultant role to assist with the transition. Broehm's sons currently in the family business, Michael and Andrew, will be staying on with the company.

"What most impressed me was the quality of the people at Mid-State and their commitment to do whatever it takes to support the customer and one another. You can't teach this and it very much aligns with the culture of Field," said Field President Adam Derry. "We couldn't be more excited to welcome the Mid-State team and customer base into the Field family."

List of Global Fastener and Related Exhibitions in 2023

Compiled by China Fastener Info

March 2023

21-23 Fastener Fair Global

Organizer: Mack-Brooks Exhibitions

Messe Stuttgart, Germany www.fastenerfairglobal.com

April 2023

Manufacturing World Nagoya

Organizer: RX Japan

12-14

Portmesse Nagoya, Japan www.manufacturing-world.jp/nagoya

May 2023

3-5	Taiwan International Fastener Show Organizer: TAITRA	Kaohsiung Exhibition Center, Taiwan www.fastenertaiwan.com.tw
5-6	International Hardware Fair Italy Organizer: Koelnmesse srl	Fiera di Bergamo, Italy www.hardwarefair-italy.com
16-17	Fastener Fair USA Organizer: Reed Expo	Music City Center, TN, USA www.fastenerfairusa.com
24-26	INAFASTENER Organizer: GEM Indonesia	JIEXPO, Indonesia www.inafastener-exhibition.net
31- Jun 1	METALTECH Organizer: Informa Markets	MITEC Malaysia https://metaltech.com.my







June 2023

1-3	Fastener Fair India Organizer: RX Global	Bombay Exhibition Centre, India www.fastenerfairindia.com
6-8	+INDUSTRY Organizer: Bilbao Exhibition Center	Bilbao Exhibition Center, Spain https://plusindustry.bilbaoexhibitioncentre.com
7-10	WIN EURASIA Organizer: Hannover Fairs Turkey	Istanbul Expo Center, Turkey http://win-eurasia.com
21-23	Manufacturing World Japan Organizer: RX Japan	Tokyo Big Sight, Japan www.manufacturing-world.jp
21-24	Manufacturing Expo Organizer: RX Tradex	BITEC, Bangkok, Thailand www.manufacturing-expo.com

August 2023

9-11 **Vietnam Manufacturing Expo** I.C.E. Hanoi, Vietnam Www.vme-expo.com

The state of

September 2023

1-3 Hand Tools Fastener Expo Organizer: Hyve Group Bombay Exhibiton Center, India https://iihtexpo.com/Home

September 2023

7-9 **Fastener Fair Mexico** Organizer: RX Global

Expo Guadalajara, Mexico www.fastenerfairmexico.com

October 2023

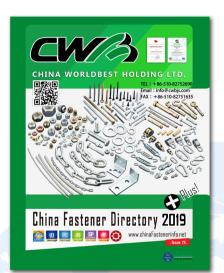
4-6	Manufacturing World Osaka Organizer: RX Japan	INTEX Osaka, Japan www.manufacturing-world.jp
4-6	METALEX Vietnam Organizer: RX Tradex	S.E.C.C, HCMC, Vietnam www.metalexvietnam.com
9-11	International Fastener Expo Organizer: Emerald X	Mandalay Bay, Las Vegas, USA https://fastenershows.com
18-20	Korea Metal Week Organizer: Korea Trade Fairs	KINTEX, South Korea www.korea-metal.com
25-27	Fastener Trade Show Suzhou Organizer: China Fastener Info	SIEC, Jiangsu, China www.fastenertradeshow.net

November 2023

7-10	Metal-Expo Organizer: Metal-Expo Co.,Ltd.	Expocentre Fairground, Russia www.metal-expo.ru
29- Dec 1	Manufacturing World Fukuoka Organizer: RX Japan	Marine Messe Fukuoka, Japan www.manufacturing-world.jp/ kyushu

^{*}Note: Show dates are subject to change. We suggest you doublecheck before your visit.

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Exhibit Profile



Mechanical Components Motion Technologies OEM, ODM, EMS



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Schedule

Held 4 times a year

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April 12-14, 2023

Portmesse Nagoya, Japan

TOKYO

June 21-23, 2023

Tokyo Big Sight, Japan

OSAKA

October 4-6, 2023 INTEX Osaka, Japan

FUKUOKA

November 29-December 1, 2023 Marine Messe Fukuoka, Japan

Exhibiting & Visiting Information www.manufacturing-world.jp/hub/en-gb.html

Organiser: **RX Japan Ltd.**



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China Fastener Info Returns to Overseas Fastener and Related Exhibitions

Manufacturing World Osaka 2022

The 25th Manufacturing World Osaka was grandly held on October 5-7, 2022 at INTEX Osaka, Japan. China Fastener Info attended the exhibition as media partner and distributed the latest *China Fastener Directory* onsite, aiming to help China fastener companies return to the Japanese market and introduce quality China fastener suppliers to international buyers.

As the largest manufacturing industry show in Western Japan, Manufacturing World Osaka is the perfect place to introduce solutions for R&D cycle shortening, productivity improvement, quality improvement, VA/VE, and cost reduction to industry professionals.

Manufacturing World Osaka 2022 consisted of 9 specialized shows, respectively: DMS, M-Tech, MEDIX, FacTex, AloTex, AM Japan, MTS, MDX, ODM/EMS. According to the statistics provided by organizer RX Japan, the 2022 edition had attracted 810 exhibitors and 27,162 visitors.

The main products/technologies exhibited were IT and digital transformation solutions, mechanical components, equipment, devices and measuring products used in the manufacturing industry. The main visitors to this exhibition were from the design, development, manufacturing, production engineering, purchasing and information systems departments of automotive, electrical, machinery and precision equipment manufacturers.

A large number of Chinese exhibitors recruited local representatives or interpreters to help display products onsite, while some companies insisted on sending their staff to the exhibition. Fastener exhibitors from China included Qifeng Precision, Gem-Year, Jin Shang, Zhejiang Ronnie Precision, etc.

The next edition of Manufacturing World Osaka will be held from October 4-6, 2023.





















METALEX VIETNAM 2022

China Fastener Info participated in METALEX VIETNAM 2022 held October 6-8, 2022 at SECC, Vietnam.

Exhibit profiles were: Metal Machine Tool, Sheet Metal Forming Machine, Precision Measuring and Testing, Machine Tool Accessory, Tools and Tooling, Grinding Wheel & Abrasive, Molds & Dies, Fluid Power, Power Transmission, Manufacturing and Process Automation, Wire, Tube, Fastener, Controller & Computer System, Welding, Semi-products and Raw Materials, and Miscellaneous.

We noticed that some well-known companies such as 3M, NSK, YAMAHA MOTOR, KEYENCE, HIWIN had their special-decorated booths.

Fastener related exhibitors included GEOMAT, SHIV SHAKTI ENGINEERING, DOERKEN COATINGS.

In addition to Vietnamese exhibitors, pavilions from Japan, Thailand, South Korea and India can be found onsite. Companies from Malaysia, China and Germany showcased themselves as individual exhibitors rather than regional pavilions.

The 2023 edition is scheduled to take place from October 4 to 6.







International Fastener Expo 2022



The International Fastener Expo 2022 (IFE 2022) took place at the Mandalay Bay Convention Center in Las Vegas from October 17 to 19, 2022. China Fastener Info participated in the expo as media partner.

Organized by Emerald Expositions, the International Fastener Expo (IFE) is the largest B2B expo for fasteners, tooling, and machinery in North America. Since 1981, the event has brought together the manufacturers and master distributors of fasteners, precision formed parts, fastener machinery & tooling and other related products and services with distributors and sales agents in the distribution chain, which is held annually in Las Vegas.

The 3-day show consisted of a variety of networking and educational

activities. Day 1 included Golf Tournament, Training Classes and Welcome Reception; while Day 2 and Day 3 featured Physical Exhibition, Sessions, as well as Hall of Fame and Young Fastener Professional Awards Ceremony.

According to the organizer, this year's show provided new features and proved that events are making a strong rebound! IFE 2022 saw outstanding attendance, gathering 3,500+ attendees representing 36 countries and regions from around the world for the three-day event.

The Expo Floor featured 450 total exhibitors including 30 new exhibitors making their debut at IFE this year. In addition to the US companies, international exhibitors from Chinese Mainland, Taiwan Province of China, India, South Korea, Turkey and other regions also took part in the event.

We noticed that China fastener exhibitors such as Jiashan Weiyue, Jiashan Ziheng, Jiaxing Chinafar, Jiashan XC, Shanghai Prince, Haiyan Dowson's, Haiyan Hongmao, Zhejiang Donghe, Haiyan Zhongda, etc. showcased their products and business advantages to the attendees.

In addition to distributing the publication *China Fastener Directory*, representative of China Fastener Info also promoted its B2B platform and social media to both exhibitors and visitors onsite.

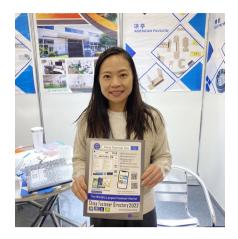
The next edition of IFE will be held October 9-11, 2023 at the same venue.





















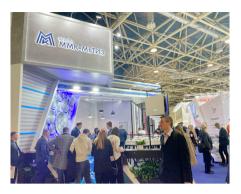
Metal-Expo 2022

Metal-Expo'2022, the 28th International Industrial Exhibition was held on November 8 - 11 at Expocentre Fairgrounds, Moscow, Russia. The industry forum brought together more than 400 steel industry producers from Russia, and 15 neighboring countries. More than 22k industry professionals visited the event among them constructors, heavy engineers, steel products end-users, professionals from fuel and energy complex, as well as transportation, logistics, steel trading etc.

China Fastener Info participated in the show as media partner at Stand No. 82D18 and distributed its publication *China Fastener Directory* onsite.













The four days of the event proved their high efficiency. Steel industry leaders held non-stop negotiations. The majority of the exhibitors highly appreciated professionalism of the visitors (among them leaders of steel, engineering, fuel and energy complex etc industries.) coming to meet face to face with steel products end-users. Many companies sent more than 100 delegates to the exhibition while more than 3k steel industry professionals were working at their stands during the exhibition in total.



The majority of the exhibitors are highly satisfied with the exhibition in terms of business development. More than 50 events were held in parallel with the exhibition and the number of the visitors grew a lot more as compared to the previous years.



Fastener related exhibitors included MMK-METIZ, Metprom-Ural PKF, Parallel, Tojfiliz, NLMK-Metiz, etc.



MMK Group presented the whole range of its products from hot-rolled and long products to steel sheets for the automotive industry, coated sheets and high durable MAGSTRONG products. TMK also presented the whole range of its products and solutions for the tubes and pipe industry. NLMK Group took the most of the four days of the event presenting their customers the latest solutions and product lines. NLMK and EVRAZ held separate meetings with their dealers. Among other products EVRAZ promoted their high-quality long and structural steel products for construction and railway industries.



wire India 2022



From 23 to 25 November 2022 the Bombay Convention & Exhibition Center in Mumbai again served as the meeting point for the leading regional trade fairs of the wire, cable and pipe & tube industries as well as the metallurgical, welding and cutting sectors. China Fastener Info attended the fair as media partner at Stand C37.



Four trade fairs with a total of 400 exhibitors from 21 countries presented current technologies, machinery, finished products, and solutions for their respective industry sectors over three trade fair days.



In addition to Indian companies, most European exhibitors came from the Benelux countries, Austria, Switzerland, Germany, Italy, the United Kingdom, Scandinavia, Turkey, France and Spain.

Overseas companies travelled from the USA, Canada, Thailand, Vietnam, Taiwan (China), South Korea, Singapore, South Africa and Chinese Mainland to India. In addition, the trade fairs featured national joint participations from Switzerland, Italy and Germany. The exhibits were complemented by a comprehensive conference program.







In 2024, the trade fair quartet will again be held at the Bombay Convention & Exhibition Center, this time from 27 to 29 November. ◆

Fastener Fair Global 2023:

Strong Exhibitor Line-up as the World's Leading Fastener and Fixing Exhibition Returns

Fastener Fair Global, the International Exhibition for the Fastener and Fixing Industry, returns from 21 – 23 March 2023 at Messe Stuttgart in Germany to bring the industry together face-to-face. At its 9th edition, Fastener Fair Global is the largest exhibition worldwide specifically dedicated to presenting and promoting fastener and fixing products and technologies.

In advance of the exhibition, there are already 780 exhibitors confirmed from some 40 countries across the world, with the strongest representation from German, Italian, Chinese, Turkish and Indian firms. Over 21,170 square metres of net exhibition space has already been booked, covering halls 1, 3, 5 and 7 at the Messe Stuttgart Exhibition Centre. Among those exhibiting at Fastener Fair Global are Alexander P A A L GmbH, Böllhoff GmbH, Carlo Salvi S.p.A., Eurobolt BV, F. REYHER Nchfg. GmbH & Co. KG, Fastbolt Schraubengroßhandels GmbH, INDEX Fixing Systems (Técnicas Expansivas S.L.), INOXMARE SRL, Lederer GmbH, MKT MetallKunststoff-Technik GmbH & Co. KG, Norm Civita San. ve Tic. A.S., Obel Civita San. ve Tic. A.S., PGB EUROPE NV, Pühl GmbH & Co. KG, SACMA LIMBIATE SPA, Schäfer



+ Peters GmbH, SPAX International GmbH & Co. KG, Tecfi Spa, TOBSTEEL GmbH, WASI GmbH and Würth.

"It is such a pleasure to welcome the fastener and fixing industry back to Stuttgart at Fastener Fair Global 2023. There has been so much happening within the industry in the last four years that we are looking forward to discovering at the show the most modern technologies the sector offers" says Liljana Goszdziewski, Portfolio Director for the European Fastener Fairs, commenting on behalf of Mack-Brooks Exhibitions, the organiser of the event. "Boasting strong participation from exhibiting companies, we can safely say that there is an eagerness for the sector to

return to the live exhibition as there is no real substitute for face-to-face networking to strengthen connections and enable new sales opportunities. Particularly with such a large and renowned exhibition within its industry such as Fastener Fair Global, which has such wideranging and international participation."

Very high level of exhibitor satisfaction with show experience

At the last edition, nine in ten exhibitors claimed to be satisfied with the show. This is reflected in the concrete business goals that were achieved through participation in the exhibition, as 85% of exhibitors



received positive business enquiries as a result of taking part in Fastener Fair Global. Furthermore, the exhibitor satisfaction was affected by the quality of the attendees at the show, with 95% of visitors having an influence on or personally making purchasing decisions.

The mix of visitors to the show represented the diversity of markets served by the fastener and fixing industry. Most visitors were either wholesalers, manufacturers or distributors, all playing a vital role in the supply chain. Visitors came from a wide range of professions, such as senior managers, buyers, engineers, R&D professionals and specialists who source and trade fasteners and fixings for various sectors, mainly automotive, construction, distribution, and mechanical engineering.

Exhibitor information and stand booking

Participants at Fastener Fair Global have a unique opportunity to meet face-to-face with other professionals in the industry from all over the world, see and ensure the quality of products first-hand, source and sell products and services, initiate and strengthen business relationships, and build trade networks.

Companies who wish to exhibit at Fastener Fair Global 2023 can contact the show team directly to discuss the best stand spaces available and receive a customised participation package.

Join the fastener and fixing industry's global gathering

Fastener Fair Global is the meeting place for leading international organisations in the fastener and fixing sector and an opportunity for exchanging competencies and views on current technological developments.

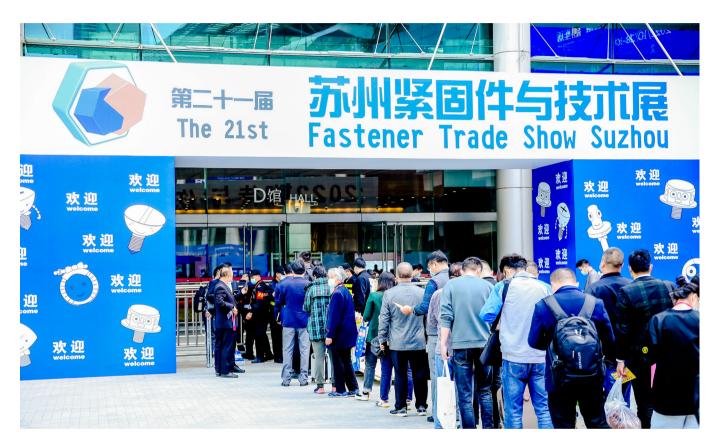
At its 9th edition, the exhibition represents an unmissable products and services showcase merged with various buying and networking opportunities for international suppliers, manufacturers and distributors of industrial fasteners and fixings, construction fixings, fastener manufacturing technology and related products and services.

Fastener Fair Global provides an excellent platform to establish new contacts and build successful business relationships with key industry players and professionals from various production and manufacturing sectors looking for fastening technologies.

Get your ticket now: www.fastenerfairglobal.com/en-gb/visit.html

Further information about the event is available on the show website: www.fastenerfairglobal.com +

The 22nd Fastener Trade Show Suzhou Rescheduled to October 2023



The 22nd Fastener Trade Show Suzhou, organized by China Fastener Info, has been rescheduled to 25-27 October 2023 at Suzhou International Expo Center (SIEC), Jiangsu Province, China.

As a grand festival for global fastener suppliers and buyers, the 2023 edition will occupy halls D1 and E1, with a total exhibition area of 12,000 square meters, featuring approximately 400 exhibiting companies. Some 12,000 buyers and visitors from China and the rest of the world are expected to come to the exhibition for annual procurement and negotiation.

The exhibit profile in 2023 will cover 6 product ranges throughout the entire fastener supply chain, including fasteners, tools, equipment, molds, surface treatment and raw materials.

Well-known China fastener and auxiliary companies, such as Meishan CRRC Fastening System, Zhejiang Huayuan Auto Technology, Aozhan Industrial, Jiashan Yongxin Fastener, Zhejiang Sanlin Hardware Products, Sijin Intelligent Forming Machinery, Zhejiang Yeswin Machinery, Zhejiang Wanying Henghui Thread Technology, etc. have confirmed their participation as exhibitors.

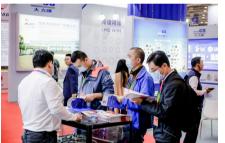
"Fastener Application Forum", including a series of insightful topics by leaders and experts from fastener application fields, will shed light on advanced technology applications, providing a unique opportunity for attendees to acquire knowledge and share information.

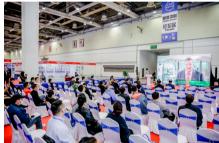












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Industrial fasteners market expected to hit \$131.56 bn by 2031

Source: Transparency Market Research



The value of the global industrial fasteners market was worth U.S. \$92.16 billion in 2021. Industry statistics estimate the market size to attain a valuation of \$131.56 billion in the next decade and by 2031, developing at a CAGR of 3.2%. This is according to a new report from market research consulting firm, Transparency Market Research.

Industrial fasteners refer to high-quality fasteners that can be used in applications ranging from maritime and automobile to construction. The terms industrial and permanent fasteners are interchangeably used here. These fasteners can withstand almost every weather and chemical element.

High-quality fasteners that are resistant to corrosion and other natural abrasions are a necessity in many industries. This creates lucrative opportunities for fastener manufacturers.

Companies in this market are focusing on novel materials, such as carbon-fiber and alloys, which ensure corrosion-resistant, lightweight, as well as superconducting fasteners. Manufacturers are also focusing on hybrid fasteners made using injection-moulded plastic materials and metals that are lighter, easy to install, and cost-effective.

The automotive segment held the major share of the global industrial fasteners market in 2021. However, the construction segment is expected to grow at the highest CAGR during the forecast period owing to the surge in construction activities around the world.

Construction industry driving the fastener market

An increase in demand for fasteners in the construction industry is a key factor driving the industrial fasteners market. Demand for steel fasteners is also rising for machine designs because it possesses a high degree of durability and greater, long-term resistance to corrosion.

It's recommended that manufacturers tap into incremental opportunities and design products as per the recent trends to broaden their revenue streams. They should also focus on miniature and design-driven steel fasteners, which play a vital role in small assemblies.

Automotive industry not far behind

As mentioned, the automotive segment held the major share of the global industrial fasteners market in 2021 and is still a top contender.

The global automotive industry is expected to grow significantly during the forecast period due to the increase in manufacture of automobiles.

Automakers are constantly developing drivetrains and more efficient engines to reduce fuel consumption. They're adopting emission-control technology to produce cleaner automobiles and relying on lighter-weight fastener to join parts.

So, the ongoing demand for automotive fasteners is likely to rise in the near future due to the growth in the automobile industry.

The demand

Demand for a different types of fasteners is rising. There's growth in new infrastructure developments, residential development, and diverse sectors such as renewables and telecommunications — which are also boosting the construction sector. In turn, this is augmenting the demand for bolt fasteners and other industrial fasteners. Furthermore, railroad and light-rail transportation systems for passengers and freight are developing at a rapid pace, globally. All of these sectors require industrial fasteners.

Demand for components used in the manufacture of railway infrastructure, including railroad fasteners, is expected to rise significantly in the near future. Demand for fasteners that are capable of sustaining railway equipment is high, due to the increase in number of passengers, faster transits, and long-distance journeys. Additionally, high-quality fasteners that are resistant to corrosion and other natural abrasions are required to meet the growing demand for railway tracks. These factors are expected to boost the industrial fasteners market during the forecast period.

The type

Based on product type, the industrial screws segment currently holds the major share of the global industrial fasteners market. The nuts and bolts segment is the one expected to grow at the highest CAGR, owing to increasing application in automotive and construction industries.

Additionally, an increase in the manufacture of medium commercial vehicles, light commercial vehicles, heavy earth moving equipment, textile machinery, machine tools, aircraft, and utility vehicles has propelled the usage

of fasteners in sub or main assembly parts. The market for bolts and nuts is fragmented. It is characterized by intense competition, with small and large players competing to maintain their respective position. High-tensile fasteners are primarily used in industrial, automotive, and engineering applications.

The players

The industrial fasteners market is fragmented, with the presence of many players. Competition is expected to intensify in the next few years due to the entry of several local players. Manufacturers in the industrial fasteners market are focusing on the material side along with new designs for superior grip.

Several companies are striving to meet the demands of customers as per the latest trends. They're introducing innovative products such as nano-laminated metallic-coated fasteners to prevent surface-type corrosion.

Key report findings

The need for parts used in the building of railroad infrastructure, such as railroad fasteners, is anticipated to increase dramatically in the near future. Due to the rise in long-distance trips, faster transit times, and passenger traffic, there is a considerable need for fasteners that can support railway equipment. In addition, to fulfill the rising demand for railway tracks, superior fasteners that are impervious to rust and other forms of natural abrasion are necessary. These factors are anticipated to drive the market for industrial fasteners during the forecast period.

The increasing production of vehicles is anticipated to cause the global automotive industry to expand considerably throughout the forecast period. In order to cut down on gasoline usage, automakers are always creating more fuel-efficient engines and drivetrains. In order to develop greener cars, they're implementing emission-control technologies. Due to the expansion of the automotive sector, the demand for automotive fasteners is thus anticipated to increase soon.

Depending on product type, the industrial screws category is likely to dominate the global market for industrial fasteners. Due to their expanding usage in the construction and automotive industries, nuts and bolts are anticipated to rise at the highest CAGR.

Oo

Automotive fastener market revenue to hit \$21.5 billion by 2028

Source: Global Market Insights



The automotive fastener market is set to reach U.S. \$21.5 billion by 2028, as reported in a research study by Global Market Insights Inc. The development of more versatile, universal fasteners is expected to boost the production statistics.

Automotive fasteners are playing a major role in terms of new and specific applications, including the electrification of vehicles and other unique technical requirements (such as lightweight features). Additionally, mechanical advancements, the reliability of fasteners, and enhancements in quality are boosting the market elements. The ease of replacing fastener from vehicles is also a consideration for manufacturers.

The growing demand for electric vehicles (EVs) is a factor favoring the automotive fastener market growth. Fasteners are not only needed in EVs but also in charging units, battery casings, and general infrastructural equipment. Requirements for lower emissions, along with the government support for carbon reduction via tax rebates and subsidies, have propelled players to provide more electric options, globally.

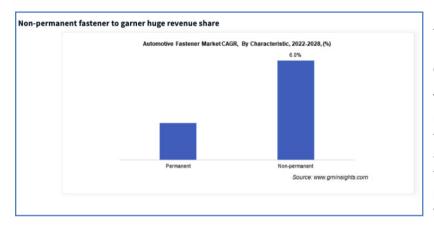
The light commercial vehicles segment is predicted to generate a revenue of about U.S. \$4 billion by 2028. New developments, a rise in e-commerce activities, and third-party logistics will augment the market for light commercial vehicles as they are highly suitable for last-mile deliveries.

The passenger car (PC) segment will hold more than 70% of the automotive fastener market revenue share by 2028. Passenger cars are the most common means of transportation. A rise in per capita income has favored the passenger car segment growth. Companies are rearranging their operations, recovering from the pandemic impact, and producing more cars, thereby incrementing greater use of automotive fastener. The aftermarket segment is expected to cross \$11.5 billion by 2028.

The aftermarket segment mainly includes manufacturers that supply fastener to automobiles after they have been manufactured by the OEMs. The end-users procure fastener as replacements or accessories for their vehicles.

Fastener types

Non-threaded automotive fastener will show the greatest positive growth. These fasteners help in distributing loads evenly onto the bearing surface and are found in different thicknesses, materials, and sizes, depending upon the requirement.



Non-threaded automotive fastener provides force distribution and vibration absorption. Besides this, non-threaded fastener reduces cost and save time.

The automotive fastener market size from non-permanent fastener segment is slated to witness 6% gains till 2028. Non-permanent automotive fastener, such as screws and bolts, find application in vehicles as they allow the parts to be disassembled and re-assembled when required.

These fasteners are mainly used for connecting two components, which can be removed, and the separated pieces come out without suffering any damage.

The OEMs

The automotive OEM segment is poised to reach \$9.5 billion by 2028, holding 45% of the market share. Consumers seeking to replace their damaged vehicle components purchase fastener from automotive OEMs to ensure that the replaced fastener are fully compatible with the vehicle and are manufactured — and with the same quality standards.

The industry is largely fragmented into several prominent and small manufacturers, including Kamax Group, Fontana, Agrati,

Sundram Fastener Limited, Shanghai Prime Machinery Company, SFS Group, Illinois Tool Works, Bulten AB, KOVA Fastener, Meidoh Co., Sterling Tools, Changshu City Standard Parts Factory, and Westfield Fastener.

Companies are shifting their preferences from standard to customized components that are expected to bolster customized fastener market revenue.





Global aerospace fasteners market to hit \$12.80 billion by 2030

Source: Fastener Engineering



Aslow rise in air traveling and surge in government expenditure on defense are driving the growth of the global aerospace fasteners market. According to a new report published by Allied Market Research, the global aerospace fasteners market was estimated at \$7.42 billion in 2020 and is expected to hit \$12.80 billion by 2030 — registering a CAGR of 5.5% from 2021 to 2030.

Materials

Aerospace fasteners are the components used to combine two or more objects in aircraft designing and manufacturing, including nuts and bolts made of titanium, nickel-based alloys, high-strength alloys, and other materials. The standards of aerospace fasteners materials, such as a high-operating temperature and resistance to corrosion are kept in mind to improve the fuel economy.

These fasteners are mostly used in military aircraft (fighter jets), ballistic missiles, defense, satellites, and other commercial purposes aircraft.

The alloy steel segment held the major share in 2020, garnering more than one-third of the global aerospace fasteners market, owing to installation of maximum

number of steel fasteners in aircrafts. The titanium segment, however, is projected to cite the fastest CAGR of 6.0% throughout the forecast period. This is due to its high tensile strength and capability to withstand extreme temperatures.

In terms of the product type, the nuts and bolts segment contributed to the lion's share in 2020, holding more than two-fifths of the global aerospace fasteners market. The same segment would also manifest the fastest CAGR of 5.2% from 2021 to 2030. This is attributed to their stability when used in assembly.

The market

Strict regulations on logistics and air travel services gave way to a steep decline in the production of new aircrafts as a direct result of COVID-19. This impacted the global aerospace fasteners market negatively, especially during the initial phase.

However, the market is projected to revive in the near future, as the global situation changes. As a result, rapid growth in global air travel owing to higher standards of living and a rise in tourism are expected to drive market growth. In addition, relief in the import duties in some countries for the manufacturers drives the growth of the aerospace fasteners market. Further, many countries are focused on strengthening defense system by including fighter jets, military helicopters, and other special aircrafts in their military air force.

By region, the market across Asia-Pacific, followed by North America, dominated in 2020, garnering more than one-third of the global aerospace fasteners market. The same region is also expected to cite the fastest CAGR of 5.9% throughout the forecast period. This is due to high air traffic in this region.

Key players

Bufab Group

Howmet Aerospace

Stanley Black & Decker Inc.

TFI Aerospace

B&B Specialities Inc.

Würth Group

The Boeing Company

TriMas Corporation

3D printing

3D printing technology for aircraft manufacturing is used for performing structural function in the aircraft. For instance, 3D printing is used for manufacturing components such as panels, ducts, wings, and other components. This technology is used for manufacturing lightweight components and reducing the number of components by printing two different adjacent parts into one single component.

To some extent, this is expected to reduce the demand for aerospace fasteners as there would be less assemblies. The aviation industry is always ready to adopt new technologies to reduce the overall weight of the aircraft.



Brazilian Fastener Exports and Imports in Q1 2022

Source: www.mdic.gov.br, Revista do Parafusos

uring the first three months in 2022, Q1, the Brazilian export hit US\$ 41,88 million, more than 9,5 thousand tons on volumes. Respectively were 34.8% and 22.2% superior to 2021, being US\$ 4.38 the FOB price/kg. With share 32% Argentina has been the principal export destination from fasteners "Made in Brazil", followed by 15% to USA, 13% to Paraguay, 5.9% to France and 4% sent to Germany.

On another hand, the imports achieved US\$ 253,23 million, with more than 55,5 thousand tons on volumes, respectively 11.7% and 9.8% above to 2021, with US\$ 4.56 the FOB price/kg.

China is the leader with share 32% from the total fasteners imported by Brazil, followed by 15% from USA, 8.7% from Japan, 8.6% from Germany, and 7.1% sent by Italy.◆





EU Fastener Trade Statistics during 2019-2021

Compiled by China Fastener Info

S 7318: Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers (including spring washers) and similar articles, of iron or steel.

Import Statistics (in descending order according to import value of 2021)

	2021		20	2020		2019	
Rank	Country/Region	Import Value (EURO)	Import Qty (kg)	Import Value (EURO)	Import Qty (kg)	Import Value (EURO)	Import Qty (kg)
1	Mainland China	1,683,956,377	784,576,218	1,124,835,021	643,167,567	1,167,648,479	627,259,520
2	Taiwan, China	1,304,355,058	432,198,353	1,012,100,026	373,177,188	1,174,902,177	432,616,375
3	United States	487,714,566	17,816,053	475,960,692	14,798,112	636,442,310	22,045,850
4	Switzerland	414,770,158	29,513,143	362,345,491	25,686,804	405,720,455	28,110,895
5	Turkey	363,786,356	116,337,983	250,113,831	78,892,141	284,024,250	89,081,146
6	United Kingdom	304,972,335	35,213,856	346,124,521	54,442,919	411,058,301	61,720,157
7	India	277,585,838	97,873,784	187,415,500	67,732,375	238,514,535	83,458,740
8	Vietnam	220,196,970	98,614,564	193,789,700	99,433,492	218,214,796	109,260,953
9	Japan	188,066,751	26,301,034	150,613,314	18,678,003	184,622,792	23,780,478
10	South Korea	178,787,877	37,168,367	145,461,539	30,802,224	168,691,182	38,775,122
11	Liechtenstein	92,731,145	13,568,324	89,922,253	12,641,672	86,521,652	12,056,289
12	Thailand	83,364,528	46,639,785	69,203,789	42,867,110	88,192,649	51,105,019
13	Malaysia	74,288,946	33,561,351	64,884,737	32,364,162	82,316,049	39,877,275
14	Bosnia and Herzegovina	49,280,909	17,666,089	32,678,741	12,814,082	39,473,824	15,746,964
15	Indonesia	41,557,107	9,755,776	32,465,622	8,435,854	30,486,852	7,810,349
16	Norway	29,220,793	8,848,093	29,749,115	8,909,694	37,905,995	12,090,596
17	Canada	27,000,102	2,395,235	19,695,165	1,741,210	24,128,067	1,677,486
18	Serbia	19,341,805	11,044,883	13,281,788	8,006,336	16,998,766	10,121,012
19	Philippines	15,799,703	4,183,987	13,157,136	3,708,572	18,583,792	5,092,856
20	Russia	15,622,196	6,650,687	11,419,547	4,172,095	15,739,581	6,524,501
	Worldwide	5,981,584,758	1,857,160,362	4,703,142,448	1,560,859,838	5,422,269,332	1,696,063,180



Export Statistics (in descending order according to export value of 2021)

		20	21	202	20	201	19
Rank	Country/Region	Export Value (EURO)	Export Qty (kg)	Export Value (EURO)	Export Qty (kg)	Export Value (EURO)	Export Qty (kg)
1	Mainland China	889,794,028	98,359,882	855,891,551	96,394,003	789,437,458	88,409,792
2	United States	849,788,452	98,227,046	734,817,503	79,211,033	868,351,123	87,191,514
3	United Kingdom	531,425,035	77,868,652	464,343,089	71,520,765	578,536,143	89,837,002
4	Switzerland	328,624,587	42,587,667	276,058,679	36,737,157	303,738,687	38,954,356
5	Russia	232,019,041	37,035,746	201,906,448	35,048,339	212,652,099	36,778,531
6	Mexico	230,641,613	33,643,951	192,134,268	27,688,209	231,938,423	31,815,507
7	Turkey	211,845,066	31,285,581	190,304,362	29,857,349	206,124,750	32,724,722
8	Brazil	182,893,944	30,015,583	146,512,480	22,576,026	171,592,789	28,190,483
9	India	146,114,474	19,812,347	99,628,133	13,304,756	129,333,696	17,858,655
10	Norway	125,086,113	19,192,337	122,525,091	21,430,499	137,559,116	24,662,528
11	Morocco	96,305,573	14,512,887	78,485,181	9,863,875	92,138,197	10,037,929
12	South Africa	67,754,529	10,127,245	54,261,741	8,631,463	76,058,384	13,401,391
13	South Korea	61,727,014	4,632,895	59,599,047	4,440,069	50,743,869	3,277,962
14	Liechtenstein	60,388,166	10,988,668	63,211,337	11,431,710	65,124,488	12,050,310
15	Australia	53,517,020	5,053,942	50,595,224	4,880,197	48,409,165	4,879,722
16	Japan	53,112,959	3,054,782	46,983,931	2,825,523	50,188,295	3,280,252
17	Canada	49,615,956	3,874,820	45,911,464	3,190,477	61,978,226	5,313,096
18	Ukraine	48,042,303	11,728,641	41,226,609	11,966,401	38,152,226	9,625,894
19	Serbia	44,657,079	7,949,187	33,949,277	6,439,015	32,936,662	6,242,090
20	Singapore	41,959,323	1,813,065	40,901,845	1,651,902	44,956,142	1,594,884
	Worldwide	4,892,057,103	633,088,031	4,318,421,302	569,554,015	4,806,739,985	625,244,563



Statistics of China Fastener Imports & Exports in 2022

Compiled by China Fastener Info

A ccording to the statistics of China Customs, China's fastener (iron or steel) imports saw a decrease of 12.89% year-on-year to USD 2.85 billion in 2022, with total import volume of 268,378 tons, down by 12.88% year-on-year.

China's top 3 fastener imports in 2022 were: Other screws and bolts, with tensile strength≥800MPa; nuts; other screws and bolts, with tensile strength<800MPa.

Import Statistics of China Fasteners (Iron or Steel) by Product in 2022

HS Code	HS Code Product		Import Quantity (kg)
73181100	Coach screws	1,999,698	215,767
73181200	Other wood screws	906,229	107,592
73181300	Screw hooks and screw rings	4,469,398	165,460
73181400	Self-tapping screws	109,121,224	14,980,776
73181510	Other screws and bolts, with tensile strength≥800MPa	920,628,384	134,617,738
73181590	Other screws and bolts, with tensile strength<800MPa	421,348,392	31,635,354
73181600	Nuts	545,888,881	44,655,885
73181900	Other threaded articles	89,896,112	4,288,920
73182100	Spring washers and other lock washers	64,142,118	2,061,415
73182200	Other washers	264,156,917	11,006,236
73182300	Rivets	62,427,963	3,970,473
73182400	Cotters and cotter pins	244,191,118	13,841,011
73182900	Other non-threaded articles	128,528,507	6,831,939
To	otal	2,857,704,941	268,378,566



In terms of export performance, on the contrary, China's fastener (iron or steel) exports rose by 20.42% to USD 11.17 billion in 2022, with total export volume of 3,918,028 tons, up 4.02% year-on-year.

China's top 3 fastener exports in 2022 were: Other screws and bolts, with tensile strength<800MPa; nuts; self-tapping screws.

Export Statistics of China Fasteners (Iron or Steel) by Product in 2022

HS Code	HS Code Product		Export Quantity (kg)
73181100	Coach screws	36,401,701	21,626,277
73181200	Other wood screws	193,285,650	94,941,575
73181300	Screw hooks and screw rings	42,135,017	14,273,525
73181400	Self-tapping screws	1,309,922,049	458,014,875
73181510	Other screws and bolts, with tensile strength≥800MPa	1,148,619,811	484,233,672
73181590	Other screws and bolts, with tensile strength<800MPa	3,719,294,783	1,248,091,482
73181600	Nuts	1,983,097,333	698,782,900
73181900	Other threaded articles	1,159,196,815	466,880,385
73182100	Spring washers and other lock washers	88,519,538	25,187,563
73182200	Other washers	760,093,858	242,152,506
73182300	Rivets	162,681,157	35,002,062
73182400	Cotters and cotter pins	329,967,298	71,764,383
73182900	Other non-threaded articles	245,644,436	57,076,911
To	otal	11,178,859,446	3,918,028,116



Fastener Trade Statistics of Japan in 2022

Compiled by China Fastener Info

Japan Fastener Imports by Product in 2022

HS Code	Product	Import Value (1,000 Yen)	Import Quantity (kg)
7318.11-000	Coach screws	319,654	1,074,977
7318.12-000	Other wood screws	8,876,930	20,017,444
7318.13-000	Screw hooks and screw rings	289,004	568,474
7318.14-000	Self-tapping screws	7,274,401	15,060,273
7318.15-110	Other screws and bolts, whether or not with their nuts or washers – of stainless steel	9,395,041	12,526,450
7318.15-190	Other screws and bolts, whether or not with their nuts or washers – Other	3,0302,552	96,629,751
7318.15-900	Other screws and bolts, whether or not with their nuts or washers – Screws	18,032,631	26,836,301
7318.16-100	Nuts – Of stainless steel	9,884,090	7,209,914
7318.16-900	Nuts – Other	19,463,951	30,819,033
7318.19-000	Other threaded articles	8,037,256	15,896,259
7318.21-000	Spring washers and other lock washers	2,482,317	5,082,015
7318.22-000	Other washers	6,806,316	9,825,828
7318.23-000	Rivets	1,036,407	1,399,831
7318.24-000	Cotters and cotter-pins	1,610,496	3,150,726
7318.29-000	7318.29-000 Other non-threaded articles		6,686,362
	Total	131,306,062	252,783,638



Japan Fastener Exports by Product in 2022

HS Code	Product	Export Value (1,000 Yen)	Export Quantity (kg)
7318.11-000	Coach screws	23,615	14,897
7318.12-000	Other wood screws	110,770	58,378
7318.13-000	Screw hooks and screw rings	10,569	978
7318.14-000	Self-tapping screws	12,158,426	10,534,018
7318.15-110	Other screws and bolts, whether or not with their nuts or washers – of stainless steel	6,069,643	2,066,879
7318.15-190	Other screws and bolts, whether or not with their nuts or washers – Other	139,079,859	175,133,812
7318.15-900	Other screws and bolts, whether or not with their nuts or washers – Screws	35,501,714	19,331,820
7318.16-100	Nuts – Of stainless steel	4,807,493	1,449,356
7318.16-900	Nuts – Other	76,945,306	75,691,643
7318.19-000	Other threaded articles	2,532,168	1,687,116
7318.21-000	Spring washers and other lock washers	3,640,847	1,772,345
7318.22-000	Other washers	29,205,161	17,688,507
7318.23-000	Rivets	4,924,011	2,977,126
7318.24-000	Cotters and cotter-pins	4,001,495	1,097,659
7318.29-000	7318.29-000 Other non-threaded articles		11,417,130
	Total	336,667,993	320,921,664



The Minor Diameter of ISO General Purpose Metric External Threads on Design Profile

Written by Li Xiaobin, CM of ISO/TC1

For the design profiles and their symbols see Clauses 6 and 4 of ISO/CD 68-1/2:2022.

In many cases the minor diameter d_3 of M external threads on design profile is not checked by the special minor diameter gauges. The formulae for the limits of sizes of minor diameter have not been given in ISO 965-1 since 1980. The tolerances of minor diameter T_{d3} are also replaced by the root contours, Clause 11 of ISO 965-1:2013.

Now some people think it is better to give the minor diameter limits and formulae of M external threads in ISO 965. In the follows I will give the detail explanation for the minor diameters and my next revision plan for ISO 965-1.

1. Basic minor diameter d_3

In order to design the M threading tools, and calculate the tensile strength of M external threads in ISO/TC2, the design profiles of external threads have been added, Figure 3 of ISO/CD 68-1/2:2022. The root truncation of external threads is *H*/6.

Basic minor diameter: $d_3 = d - 2 h_3 = d - 2 (17H/24) = d - 1.226 869 P$

For the values of basic minor diameter d_3 see Table 1 of ISO/DIS 724:2022.

2. Maximum minor diameter $d_{3 \text{ max}}$

The minor diameter limits of M external threads are decided by the minimum root radius $R_{1 \text{ min}}$, pitch diameter tolerance T_{d2} , upper limit deviation es and basic minor diameter on the basic profile d_1 . The maximum minor diameters $d_{3 \text{ max}}$ cannot be gotten by the basic minor diameter d_3 plus the upper limit deviation es, in the similar way to get the maximum major and pitch diameters. There is not the direct relation between the basic minor diameter and the minor diameter limits.

The below new M external thread root figure come from Figure 6b of ISO 965-1:2013 with the following three changes.

- 1) replace " R_{\min} " with " $R_{1\min}$ ", to keep the same symbol system with ISO/CD 68-1:2022;
- 2) add a size "y", the distance from the minor diameter of the thread GO ring gauge, ISO 1502, to the maximum minor diameter $d_{3 \text{ max}}$;

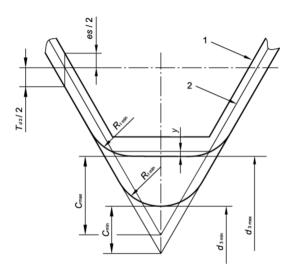
$$y = R_{1 \text{ min}} \{1 - \cos[\pi/3 - \arccos(1 - T_{d2}/(4R_{1 \text{ min}}))]\}$$

where y, $R_{1 \text{ min}}$ and T_{d2} are expressed in millimeters.

3) move the size low end of root maximum truncation C_{max} from the fundament triangle corner of minimum material flanks to the corner of maximum material flanks. The moving distance is $T_{\text{d2}}/2$. C_{max} size shall be taken in the fundament triangle of maximum material flanks. For the definition of truncation, see Clause 4.3 of ISO 5408:2009.

$$C_{\text{max}} = H/4 - y$$

For the H/4 values see Table 1 of ISO/CD 68-1/2:2022.



Key

- 1 basic profile
- 2 thread GO ring gauge profile (the fundament triangle of maximum material flanks)

Figure – M external thread root contour

Maximum minor diameter: $d_{3 \text{ max}} = d_1 + es - 2y$ where d_3 , d_1 , es and y are expressed in millimeters es is a negative number.

In order to let this maximum minor diameter be applicable to the most threaded products, in the maximum minor diameter formula $R_{1 \text{ min}} = 0.125P$. Similar to M thread rolling dies their thread crest arc has the same radius $R_{1 \text{ min}}$, too.

Chinese expert has concluded the maximum truncation positions for the 6g commercial external threads, their *d* and *P* combinations conforming to ISO 262:1998. See Table 1.

Table 1 – Maximum root truncation positions for the 6g commercial external threads

Minimum root radius R _{1 min}	Pitch	(H/4 - C _{max} ^a) / (H/4 - H/5) ^b	Remark
0.4250	Coarse	4% to 52% (average 31%)	The most C _{max} positions
0.125 <i>P</i>	Fine	19% to 44% (average 31%)	are in the upper half from the truncations H/4 to H/5

^a C_{max} is taken in the fundament triangle of maximum material flanks. $C_{\text{max}} = H/4 - y$.

b H = 0.866 025 404 P

Technology

The most C_{max} positions are highter than the middle of the truncations H/4 to H/5. They are much higher than the old maximum truncation position H/6 with the root radius 0.144P. The present C_{max} system increases M external thread maximum minor diameter and tensile strength a lot. This is the reason why the old root maximum truncation position H/6 was given up in 1980, when the second edition of ISO 965-1 was published.

Because the thread GO ring gauge can control the maximum minor diameter, the root round arc upper limit position, usually the maximum minor diameter is not listed in the table of limits of sizes.

3. Minimum minor diameter d_{3 min}

Root minimum truncation: $C_{min} = R_{1 min}$

Minimum minor diameter: $d_{3 \text{ min}} = d_1 + es - T_{d2} - H/2 + 2R_{1 \text{ min}}$

where d_3 , d_1 , H, R_1 , es and T_{d2} are expressed in millimeters

H = 0.866025404P

es is a negative number.

In order to let this minimum minor diameter be applicable to the most threaded products, in the minimum minor diameter formula $R_{1 \text{ min}} = 0.125P$.

Before 1980, the second edition of ISO 965-1, the old root minimum radius was 0.108*P*. The present large root minimum radius increases the fatigue strength of threaded products.

For the important threaded products their external thread minimum minor diameters can be required to be checked. This special requirement shall be given in the relevant product document.

BS 3643-1:2007 is the first national standard to show the formulae of M external thread minor diameter limits according to Clause 11 of ISO 965-1:2013. The minimum minor diameters of M external threads are listed in the two tables of BS 3643-2:2007.

As M external thread minimum minor diameters are not often checked, they shall be listed in an informative annex. Let product designer decide whether the minimum minor diameters are checked. Similarly, the formulae for the minor diameter limits shall be listed in an informative annex, too.

4. Minor diameter tolerances $T_{\rm d3}$

Present minor diameter tolerance: $T_{d3} = T_{d2} + 2(C_{max} - C_{min}) = T_{d2} + 2(C_{max} - 0.125P)$

Old minor diameter tolerance: $T_{d3} = T_{d2} + 2(R - R_{2 \text{min}}) = T_{d2} + 0.072P$

where $T_{\rm d3}$, $T_{\rm d2}$, $C_{\rm max}$ and P are expressed in millimeters

 $\underline{C}_{\min} = R_{1 \min} = 0.125P$ (present root radius)

R = H/6 = 0.144P; $R_{2 \text{ min}} = H/8 = 0.108P$ (old root radii)

For the ratio of the present to old minor diameter tolerances see Table 2

The present large minor diameter tolerance increases threading tool life, and makes threaded products easily.

The basic minor diameter d_3 positions are in the range of minor diameter tolerance zone. See Table 3.

Table 2 – The ratio of the present to old minor diameter tolerances for the 6g commercial external threads

Pitch	The ratio of the present to old minor diameter tolerances
Coarse	1.43 to 1.56 (average 1.53)
Fine	1.51 to 1.56 (average 1.54)

Table 3 – Basic minor diameter d₃ positions in minor diameter tolerance zone for the 6g commercial external threads

Minimum root radius R _{1 min}		$(C_{\text{max}}^{a} - H/6 + \text{es/2}^{b}) / (T_{\text{d2}}/2 + C_{\text{max}} - 0.125P)$	
0.4050	Coarse	24% to 46% (average 40%)	
0.125 <i>P</i>	Fine	37% to 45% (average 41%)	
^a C _{max} is taken	C_{max} is taken in the fundament triangle of maximum material flanks. $C_{\text{max}} = H/4 - y$.		
b es is a negati	es is a negative number.		

The average positions of the basic minor diameter d_3 are at the 40% to 41% of minor diameter tolerances T_{d3} . All d_3 positions are in the upper half of T_{d3} .

For the 6g commercial external threads the basic minor diameter position is not in the range of <u>old</u> minor diameter tolerance zone. It is over the top of <u>old</u> minor diameter tolerance zone by the distance |es|.

The present minor diameter system makes the ISO/TC2 calculation of tensile strength more reliable. The present average size of minor diameters is larger than the old system.

5. Summary

The present technical system of M external thread minor diameters has so many advantages. We have used this minor diameter system more than 40 years, and will insist on the present technical system.

The root minimum radius $R_{1 \text{ min}}$ is a very important parameter in the present minor diameter technical system. The root minimum radius 0.125P decides the maximum and minimum minor diameters, and their tolerances. We shall keep the symbol R_1 and $R_{1 \text{ min}}$ in ISO/CD 68-1:2022 and ISO 965-1:2013, respectively. Now 0.125P is recommended as the default value of the root minimum radius $R_{1 \text{ min}}$. "Unless specifically defined otherwise, the minimum radii R_1 should be 0,125P." has been added in Clause 6 of ISO/CD 68-1:2022 for the partial rounded root. If the symbol R_1 and $R_{1 \text{ min}}$ are deleted in ISO/CD 68-1:2022 and ISO 965-1:2013, respectively, we will go back to the old minor diameter system before 1980. It is not accepted at all.

I hope my above explanation is helpful for you to study the two new ISO/CD 68-1/2 drafts. ◆

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