What are hand tools ?　　什么是手工具?

*Defination ~　A hand tool is a device for performing work on a material or a physical systems using **ONLY** hands.*

定义 ~　手工具是只能用手在物料或者物理系统上工作的装置.

HAND

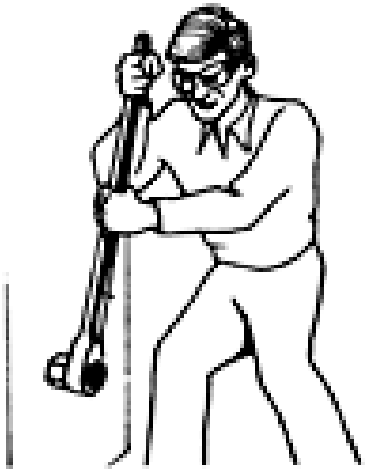
+

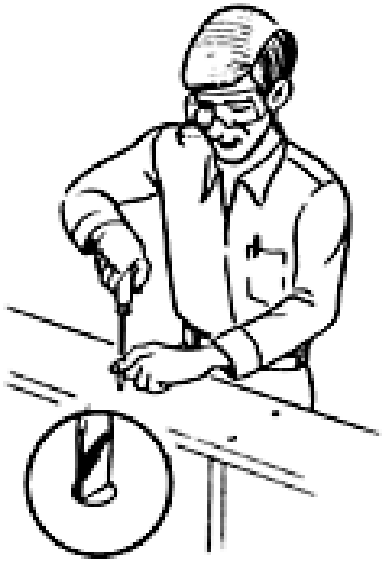
TOOLS

= *Hand tools*

SAFETY RECOMMEDATIONS 安全建议

Proper Usage and care.. 合理使用和维护..





Tool Trolleys 工具车

Don't pull behind you.
Nothing balanced on top.

一次只能拉一个抽屉

Only one drawer at a time.

不要放在身后拉，不能在顶部放置易倾倒物品

NEVER use a toolbox for an anvil or a similar purpose.

永远不要把盒子做为砧板或者其他类似用途.

NEVER use a toolbox as a ladder.

永远不要把盒子做为梯子使用

Wrenches and Sockets扳手与套筒

Always pull the wrench towards you.

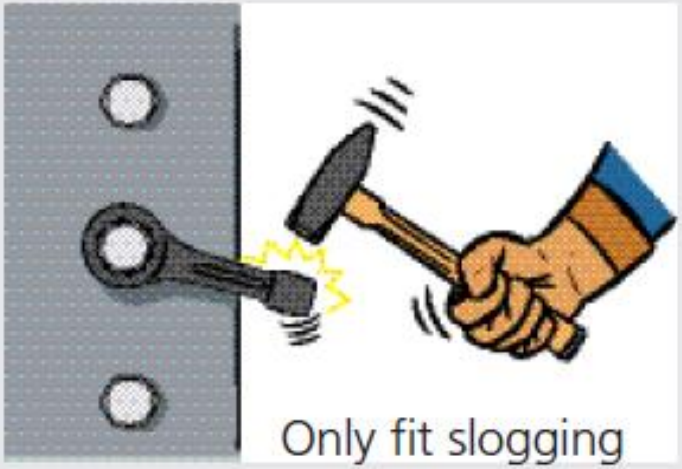
正对自己拉扳手

No metric tools on inch sizes.

公制扳手用在英制螺栓

Don't exceed tool capacity or use oversize extensions.

不能超范围或者加延长杆使用



Only fit slogging wrenches.仅限于敲击扳手

Can You Use Non-Impact Sockets With an Air Ratchet?

你能在气动扳手上使用非冲击套筒吗？

Air ratchets are most commonly used in industries including heavy equipment maintenance, and manufacturing or assembly. They can be used in a manner similar to regular ratchets and are ideal for tightening or loosening fasteners.

气动扳手最常用的行业包括重型设备维护,制造或组装。使用方式类似于常规扳手、是理想的收紧或放松紧固件。

The amount of torque created by the use of compressed air allows air ratchets to break stubborn nuts and bolts free.

它的扭矩是由压缩空气产生来使扳手拧松顽固的螺栓螺母

To withstand the torque created by air ratchets, impact sockets are made of high-tensile metals, allowing the sockets to absorb the shock created by impact tools.

为了承受由气动棘轮扳手产生的扭矩，冲击套筒是由高强度金属制成,使套筒能够吸收冲击工具所带来的震动

Warning警告

Although non-impact sockets might fit onto air/impact ratchets, they are dangerous to use that way. Non-impact sockets are fabricated from brittle metals that could fracture or shatter, with the pieces becoming projectiles, under the torque created by air ratchets.

尽管非冲击套筒可以装到气动扳手上，但那样会非常危险。非冲击套筒是由较脆的金属制成在冲击工具的大扭矩下使用容易破碎和飞溅

Static vs. Impact Torque静态与动态扭矩

An impact wrench uses a series of internal hammers to beat on a bolt head to loosen it, as opposed to the steady (static) torque of a wrench.

冲击扳手用一连串的内部锤子打击螺栓头使之放松的方式,与棘轮扳手的稳定(静态)的扭矩截然不同

Heating Effects加热/高温影响

The rapid hammering of an impact wrench creates heat, which can lead to failure when using standard chrome sockets.

冲击扳手的快速锤击会产生热量，会导致标准铬合金套筒的失效。

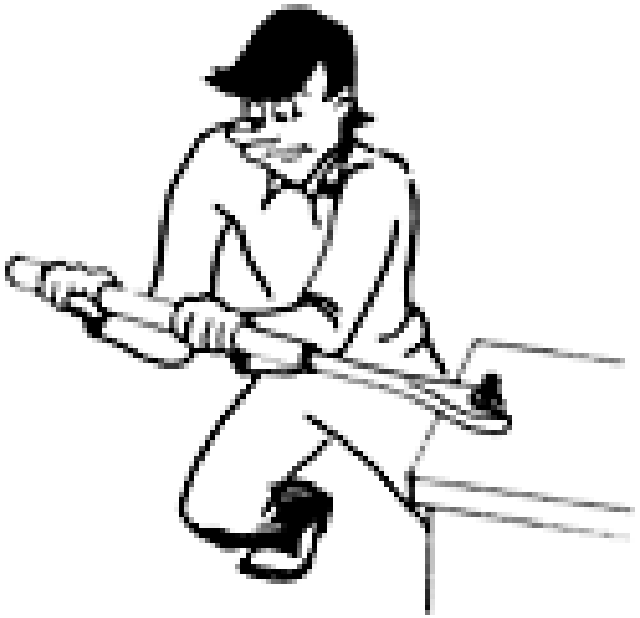
Stress Cracking应力断裂

The constant force of repeated impacts can cause microscopic imperfections in your socket's metal to expand into full-blown stress risers. Impact sockets are thick enough to prevent this.

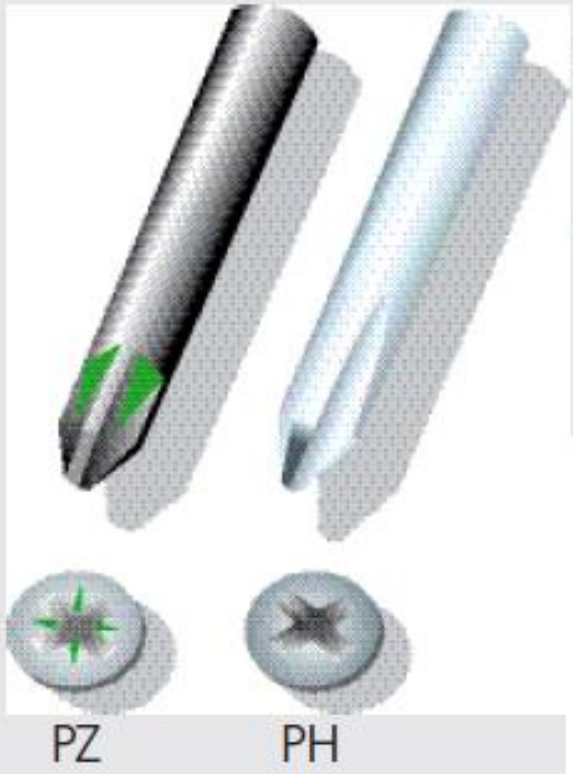
持续的恒定的打击会使套筒金属的内部产生细微裂痕而扩大成全面的应力破坏。冲击套筒的厚度可以防止这种现象。

DO NOT hammer or abuse the wrenches/spanners.
不能锤击或者滥用扳手

NEVER use leverage extension on wrench
永远不要在扳手上使用延长杆



Screwdrivers螺丝批

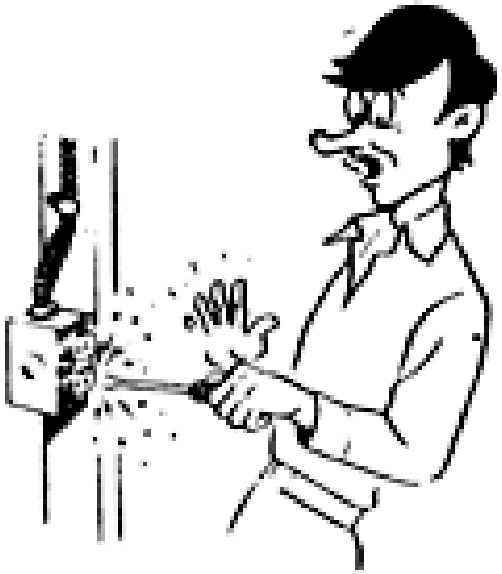


Select the correct pattern :

- Black blades PZ : Pozidriv®.
- Chrome blades PH : Phillips®.

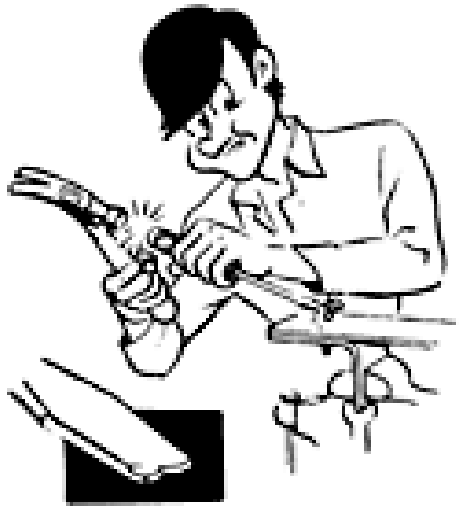
选择合适的模式

- *黑色刀面 ：米字孔*
- *铬合金刀面：十字孔*



Never use a screwdriver as a chisel or lever.

永远不要把螺丝批做凿子或撬杆使用



Pliers钳子

Always use a 1000V insulated tool when working with live components.

当操作有电物体时一定要使用1000V的绝缘工具

Never modify the shape of a tool

永远不要自行修改工具的形状

DO NOT use plier for hammering.

不要用钳子来锤击.

DO NOT hammer on pliers to cut bolts or wires.

不要用锤子敲击钳子来切断螺栓或者电线.

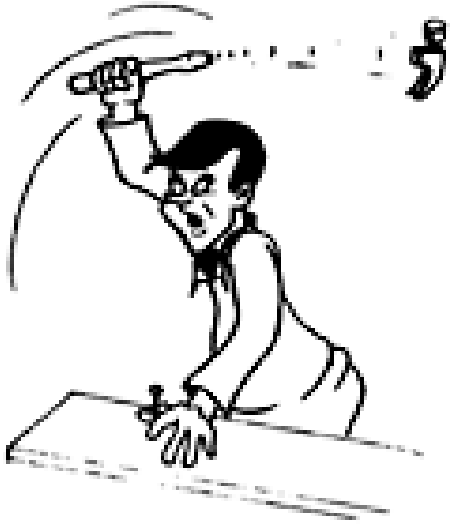
Hammers & Striking Tools 锤子及敲击工具

Select tools with a guard.

使用工具要用防护装置

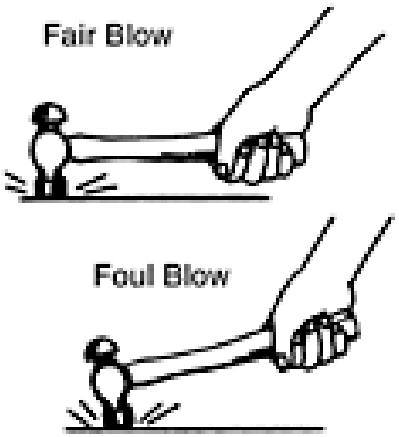
Never use tools with ill-fitting or damaged handles

不能使用手柄不合适或者已经损坏的的工具



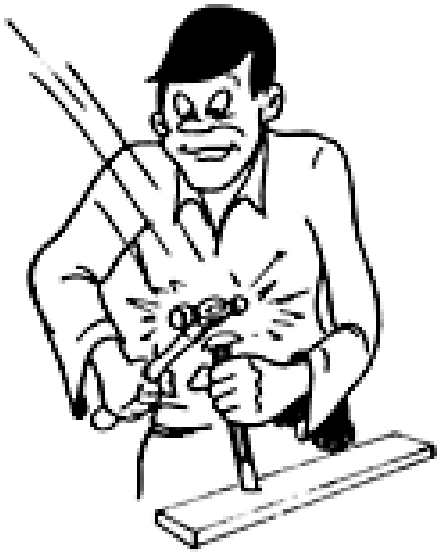
Never “hard on hard”.
Check tool condition before use.

永远不要“硬碰硬”。使用之前需要检查工具状态。



Always struck squarely with the hammer striking face PARALLEL with the surface being struck.

锤击时，永远使锤子的表面与被锤击的表面保持平行



Never strike with the side or cheek of the hammer.

永远不要用锤子的边缘或侧面打击

BASIC FUNDAMENTAL
基 本 原 理

Threaded Fastener Technology and Application Processes
Torque Wrenches
Calibration Procedures
螺纹紧固件技术及应用过程
扭力扳手
校准流程

What is TORQUE?什么是扭矩？

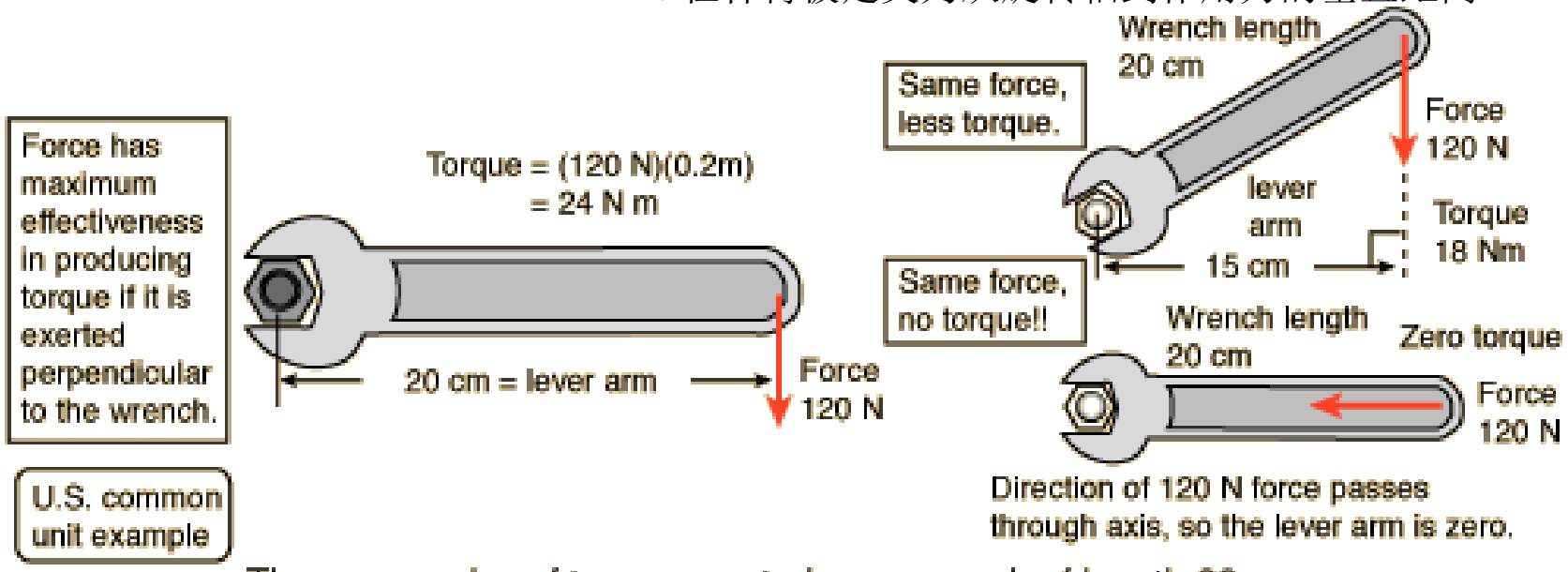
A torque is an influence which tends to change the rotational motion of an object. One way to quantify a torque is

扭矩是旋转运动对物体的影响, 扭矩量化：

Torque = Force applied x lever arm

扭矩=应力x杠杆长度

The lever arm is defined as the perpendicular distance from the axis of rotation to the line of action of the force. 杠杆臂被定义为从旋转轴到作用力的垂直距离



Three examples of torque exerted on a wrench of length 20 cm.

What is the *purpose* of a controlled connection?

控制连接的目的是什么?

How is a Torque Value determined?

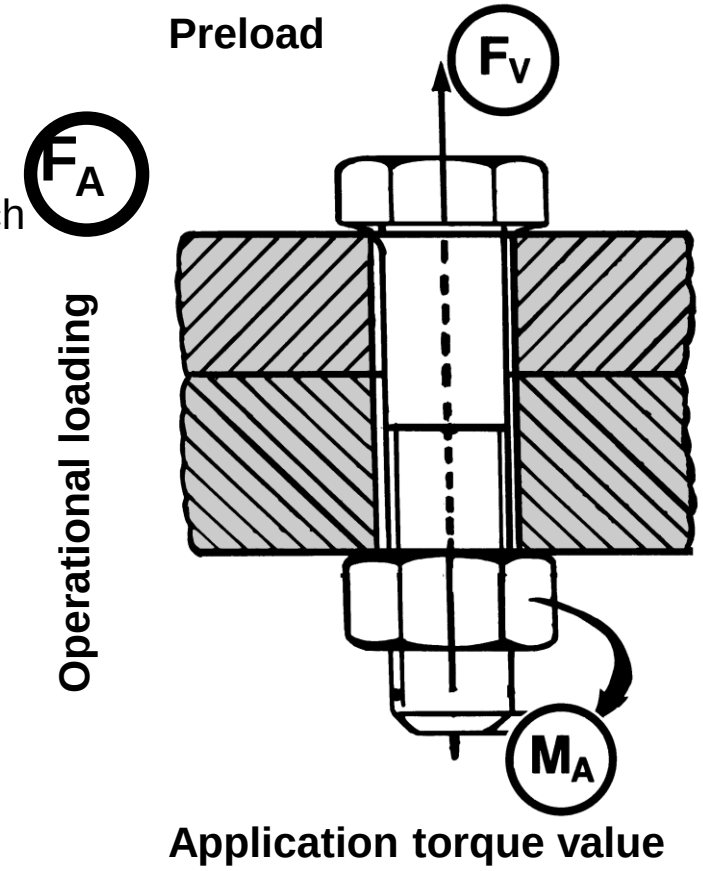
扭矩值是怎样被确定的

The connection (joint) is made up of different pieces which are to attached and held together. The device (fastener) which holds the pieces together must be designed to be stronger than the total of all loads incurred (including all *operational* and *environmental* factors).

连接处(接头)是由不同的部分连接在一起。连接的设备(紧固件) 必须比所有可能出现的总负载更坚固(包括操作和环境因素)。

The fastener is dimensioned and preloaded so that all forces acting to separate the connection are overcome.

螺栓被预加载,以便于克服所有导致连接分开的力。



What happens when a threaded fastener is tightened?

螺栓拧紧后会发生什么?

„The terminology of tightening“拧紧的专业术语

Preload 预紧

Elasticity zone弹性区域

Yield point屈服点

Elongation延展率

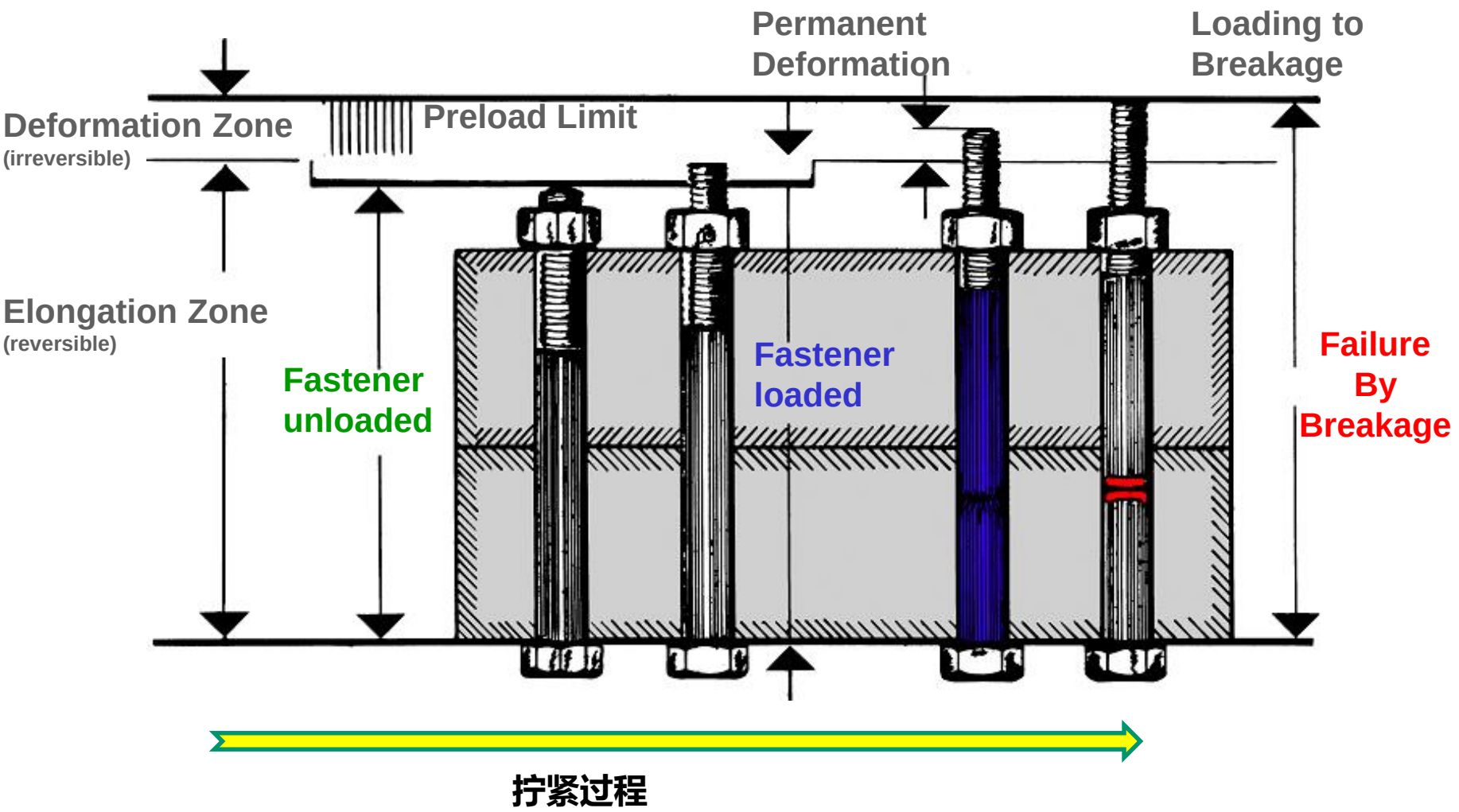
Locking load锁定负荷

Torque value扭矩值

Deformation形变

What happens when a threaded fastener is tightened?

螺栓拧紧后会发生什么?



What happens when a threaded fastener is tightened?

螺栓拧紧后会发生什么?

Preload (Re)预紧

The force required to secure a connection without loading it
加载前需要一个安全连接所需的力

Yield Point (Rp 0,2)屈服点

The force *to* which a non proportional stretch/strain occurs (limitation based on elasticity)
出现非比例延伸/应变的力 (弹性极限)

Elongation (distortion)延伸率

Elongation is the result of strain stretching the fastener when tightened however when the strain is removed (loosened) the fastener returns to it‘s original state.
延伸率是指螺栓拉伸撤销应力后螺栓能够回到它的原始状态

What happens when a threaded fastener is tightened?

螺栓拧紧后会发生什么?

Locking Load锁定载荷

The point in loading at which a fastener connection can no longer release itself.
螺栓连接的加载点不再能释放自己（即工件被连接固定住）

Torque Value扭矩值

The sum of all energies required to secure the fastener.
this includes: preloading, thread friction, friction from radial movement of the fastener head, washers, nuts or the fastener itself.
所有的能量的总和需要确保螺栓的安全：
这包括:预紧,螺纹摩擦,紧固件头部摩擦的径向运动，垫圈，螺母或螺栓本身。

Deformation形变

The stretch which remains after the fastener is loosened
当螺栓被松开后，延长变形依然保持（不再恢复）

Product Characteristics of a Torque Wrench

扭力工具的产品特征

What should such a device be able to do?

这样的设备应该能做什么?

Acquire and indicate torque values
获得和显示扭矩值
Control and verify torque values
控制和核实扭矩值
Measure a range of values
测量一定范围内的数值
Consistently be able to duplicate a torque value
持续复制扭矩值
Be robust and dependable
耐用而且可靠
Adaptable in nature (ie. Changeable insert tools)
兼容性高（例如，可变换接头）

Do's & Don't of Torque Wrench usages.

扭力扳手的使用禁忌.

ALWAYS REMEMBER – Torque Wrenches are **PRECISION MEASURING INSTRUMENTS / DEVICES** just like micrometers, calipers, etc.

永远记住-扭力扳手是精密的测量仪器/设备，就像千分尺，卡尺等一样

Before using a Torque Wrench, kindly read the instruction manual completely.

在使用扭力扳手前，敬请仔细阅读产品手册

When using always pull, **DO NOT PUSH**, to apply torque and adjust your stance to prevent a fall.

使用工具时，永远用拉而不是推并且要调整距离防止摔落

A "Cheater Bar / Pipe" should **NEVER** be used on a torque wrench to apply excess leverage.

永远不能把加长杆用在扭力扳手上来获取额外的扭力

Do's & Don’t of Torque Wrench usages.

扭力扳手的使用禁忌.

Do not use with sockets or fasteners showing wear or cracks.
不能使用明显磨损或者开裂的套筒或者螺栓

Always grasp handle firmly in the center of the grip.
保持握住手柄的中间部位

Approach final torque slowly and evenly.
接近最终扭矩时需缓慢均匀用力

Stop pulling wrench immediately when target torque is reached.
当目标扭矩值到达时立刻停止拉动扳手

Never use a torque wrench to break fasteners loose.
永远不能使用扭矩扳手反向松动螺栓

Do's & Don't of Torque Wrench usages.

扭力扳手的使用禁忌.

Wrenches should be re-calibrated if dropped. Should never be used in excess of its capacity.

扭力扳手如果掉落需要重新校验，永远不要超出其范围使用

Should be cleaned and stored properly as torque wrenches will last longer if reasonable care is taken.

扭力扳手需要清洁和合适的环境保存，合理的维护会使扳手持续更长的有效期

Always unwind handle to the lowest setting after each use.

需要每次用完后回到最低值（达威力的机械结构扭力扳手除外）

Do not attempt to lubricate the internal torque mechanism.

不要试图润滑内部的扭力机械装置

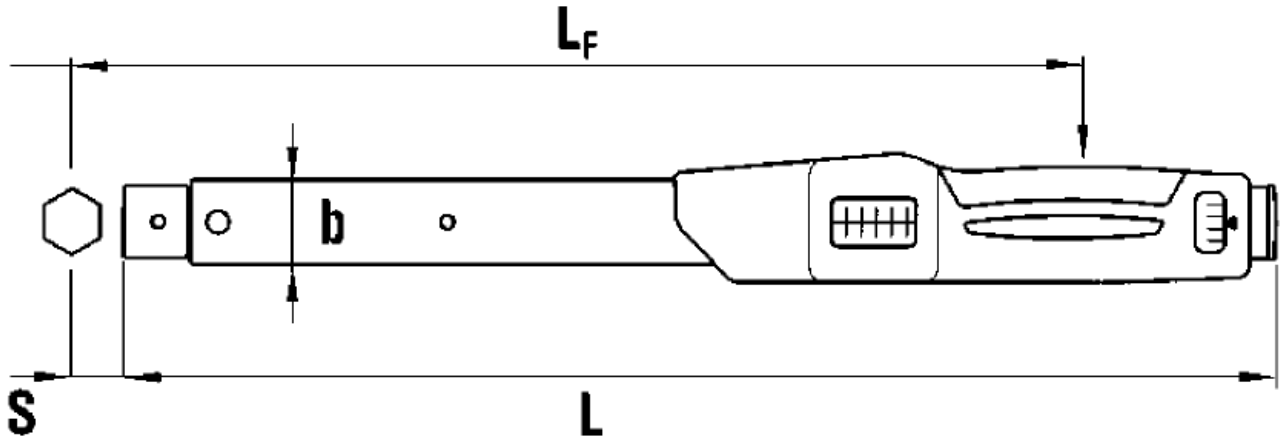
The wrench should be sent to a qualified calibration lab once **every year or every 5000 cycles for RE-CALIBRATION.**

扳手每年或者每5000次都需要被送到有资质的校验实验室重新校验

Torque Facts – Uses Of Adaptors

使用转接头

Formula for Calculating Addition of an Adapter to a Torque Wrench 计算连接转接头后的公式



Formula: $\dfrac{\text{Desired Torque} \times L_F}{L_F + S}$ **= NEW REQUIRED TORQUE SETTING**

Example: 250 Nm Dial Wrench using a 50mm long crowfoot adapter

L_F = Effective Length: 430mm
Desired Torque = 250Nm
Length of Adapter = 50mm

$$\frac{250\text{Nm} \times 430\text{mm}}{430\text{mm} + 50\text{mm}} = 223.95\text{Nm}$$

Pull Wrench to 224Nm

The right choice of tools for every application

工具的正确选择

Load detecting and evaluating wrenches
负载检测及评估扳手

Angle measurement discs
角度测量盘（配合机械扳手）

Indicating type wrenches
指针式扳手

„click“ trigger type wrenches卡塔响类型扳手

The right choice of tools for every application

工具的正确选择

Types of Torque wrenches扳手类型

Balanced
Torque wrenches
平衡扭矩扳手

„click“ type
Mechanical trigger torque wrenches
卡塔响机械触发扭矩扳手

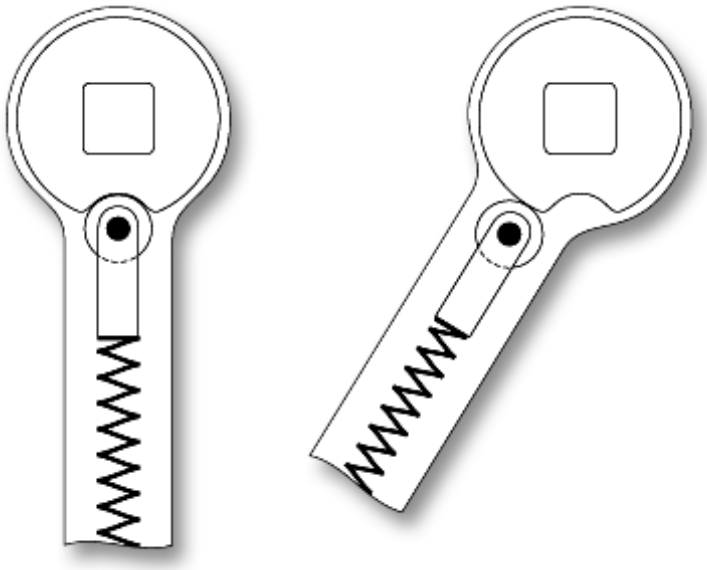
Unbalanced
Torque wrenches
非平衡扳手（单手操作）

Indicating
Mechanical torque wrenches
指针显示机械扳手

Do all torque wrench work the same way?

所有的扭力扳手是一样的工作原理吗？

The most important switching mechanisms
on signalling torque wrenches 最重要的机械信号切换装置



System A

Quasi-friction clutch/Slip Clutch
摩擦离合

Is used in a modified form for torque screwdrivers (small torque levels).
用在扭矩螺丝刀（小扭矩）

Drawback:弊端

Abrupt interruption of force, dangerous at higher torque levels.
大扭矩情况下的扭矩突然中断存在危险性

Benefit:优点

At smaller torque levels, virtually impossible to overload.
在小扭矩的应用上，几乎不可能过载

Do all torque wrench work the same way?

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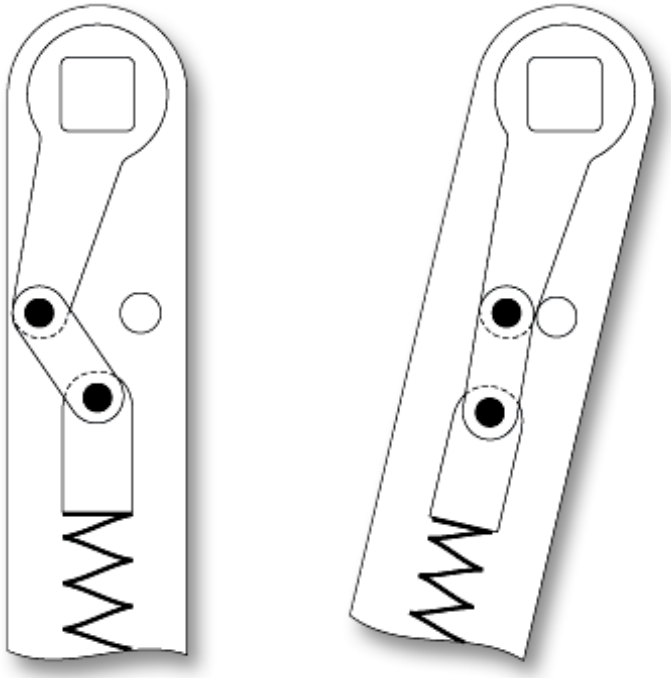

System B

Knuckle joint (common)铰链连接

Used by

Norbar, Gedore, Belzer, Tonichi, Cleco, Richmont, Dresser, Sturtevant and Walter.

Drawback:弊端

Many opportunities for friction,
trigger points change due to changes in friction.
摩擦过多，由于过多的摩擦导致触发点改变

Benefit: 优点

Acceptable signal.信号清晰

Do all torque wrench work the same way?

所有的扭力扳手是一样的工作原理吗？

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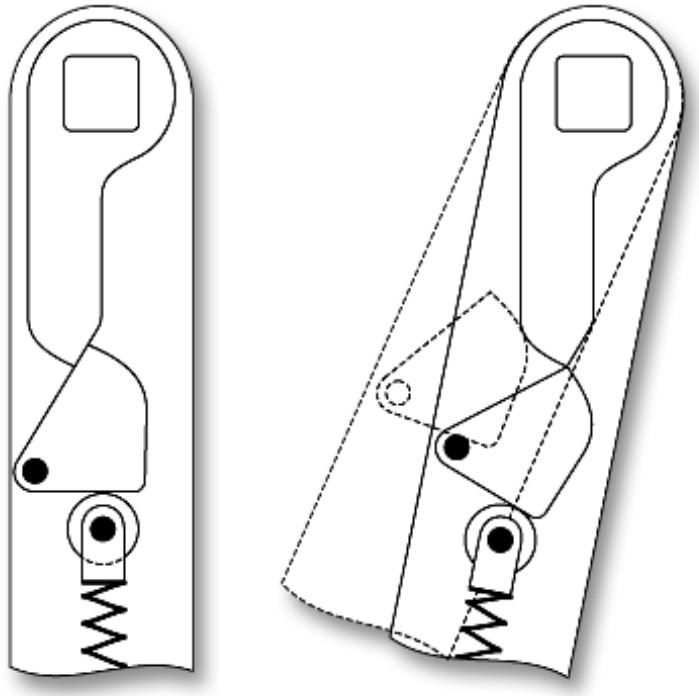


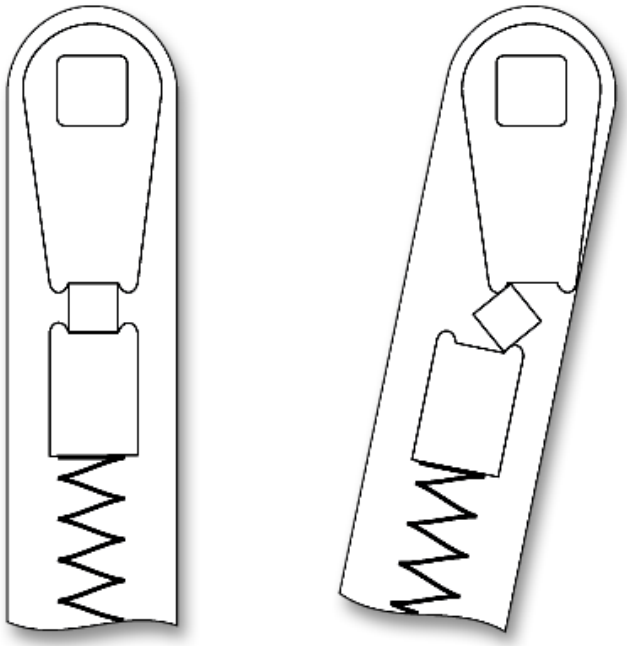
System C

Trigger cams扳机凸轮
Used by
Rahsol,
and, in a modified form, by STAHLWILLE.
由达威力做改进
Drawback:弊端
Wear on the triggering cams.
扳机凸轮缓慢耗损
STW:达威力
Very high-grade material (required), 高端材料
precision machining.精度加工
Vibratory grinding / running-in
of the triggering mechanism.触发机构的震动研磨

Do all torque wrench work the same way?

所有的扭力扳手是一样的工作原理吗？

The most important switching mechanisms
on signalling torque wrenches 最重要的机械信号切换装置



System D

Tilt blocks倾斜方块
Used by
Hazet, Wera, and VBW.

Drawback:弊端
At lower levels of torque,
signal is hardly audible and non-tactile.
低扭矩时，很难听到或感受到信号

Benefit:优点
Clockwise – anticlockwise operation, low wear.
正反转运行，低损耗

What is the different about STAHLWILLE torque wrench

达威力扭矩扳手的不同之处在哪里？

The legendary 730 “classic” series

传奇般的730经典系列

The new & improved 730N series

最新改良版的730N系列

No More Coil Springs
不再有螺旋弹簧

therefore no bothersome memory effect or changes in accuracy deviation over time!
因此没有讨厌的记忆影响（应力）或者精度改变等问题

Revolutionary highly accurate switching mechanism
革命性的高精度的机械机构

One Wrench for Unlimited applications

一把扳手无限量的应用-转换接头的变化

Why **own** and **calibrate** more wrenches than you actually need?

有了转换接头又何必拥有那么多实际上并不需要的扳手呢

Finally a Plug & Play device

...that actually WORKS!!

Quick Adjustment Selection

快速调整的选择

Pull & Turn

拉&转

Rapid and easy way to adjust

快速轻松调整

Push to lock

按即锁住

Ergonomic Design Handle

人机工程学设计的手柄

Easy to read color defined double scale

容易辨认的不同颜色的双刻度标示

“Micrometer” scale fo fine adjustment

千分尺刻度微调

Impact, dirt & chemical resistant 2 component handle，

两部分组成的手柄防尘防冲击防化学腐蚀

It feels as good as it looks too!!

手柄感觉和看以来一样完美！

Easy To Calibrate方便调整

Adjustable without disassembly (calibration techs love this!!)

无需拆解的调整（校验员喜欢这个！）

Service and repair a range of wrenches with just a hand-full of low cost parts!

服务和维修一系列的扳手仅需要一小撮低价值的配件而已。

Other Advantages of STAHLWILLE Torque wrench series
达威力扳手的其他优点

Modified trigger cam utilizing a torsion beam

Readily identifiable trigger signal both physically and acoustically
改进的触发凸轮利用了扭力杆，容易从身体和听觉上感受到触发信号

Lightening fast adjustment

Saves time and money, user friendly.
减轻快速调整装置，节省时间和金钱

The set torque value is “locked” in place固定力矩值可以被锁定

Minimizing the chance of the setting being accidently altered
减少设定值被意外的改变的几率

Double trigger signal - it can be felt and heard双触发的信号-能够被感受到和听到

Assures the user is aware that the set value has been reached
确保使用者能够意识到已经达到设定值

Adjustable without disassembly无拆卸的调整

Saves time & money if adjustments are needed, speeds up the calibration process
节省时间和成本的调整，加速了校验过程

Long time accuracy长时间保持精度

Saves time and money at calibration periods, no memory effect ensures an accurate wrench between calibration intervals
在校验期间省时省成本，没有记忆影响确保在使用期间的扳手精度

Other Advantages of STAHLWILLE Torque wrench series

达威力扳手的其他优点

Diverse variety of insert tools are available in the Standardprogramm

Saves expense on special tools when appropriate tooling is available as standard

适用于标准工具各种不同的转换插头：在特殊工具上节省成本并且能够像标准工具一样使用

Sunken insert tool release button凹陷的转换接头的快换开关

Protects against inadvertent insert tool separation

保护不经意的触碰 使接头掉落

Slim design enables use in tight locations纤细的设计使之在紧凑的空间使用

Reduces the number of „special“ tools needed减少特殊工具的使用

Every wrench has its own unique ID number and certification certificate

Every wrench is readily identifiable and traceable

每把扳手有自己单独的身份号码和证明

每把扳手都很容易区分和跟踪

High Quality Standards

高品质的标准

Every wrench comes with a factory calibration certificate compliant to **DIN EN ISO 6789** and traceable to the National Standards Laboratory

每把扳手出厂都是带符合DIN EN ISO 6789和可追溯到国家标准实验室校准证书

Certified “out of the box” deviation accuracy of +/- 3% (730N) at any setting!!

经认证的的任何设置下“开箱”偏差精度+ / - 3%(730 n)! !

CERTIFICATE

DQS GmbH
Deutsche Gesellschaft zur Zertifizierung von Managementsystemen

hereby certifies that the company

STAHLWILLE Company-Group

Eduard Wille GmbH & Co. KG
Lindenallee 27
D-42349 Wuppertal
Germany

R. Jung GmbH & Co. KG
Pappelstraße
D-56269 Dierdorf
Germany

Eduard Wille GmbH & Co. KG
Lange Straße 40-56
D-42857 Remscheid
Germany

SWM Werkzeugfabrik GmbH & Co. KG
Stiller Berg
D-98587 Steinbach-Hallenberg
Germany

for the scope

Manufacture of tools

has implemented and maintains a

Quality Management System.

An audit, documented in a report, has verified that this quality management system fulfills the requirements of the following standard:

DIN EN ISO 9001 : 2000
December 2000 edition

This certificate is valid until 2006-06-11

Certificate Registration No.: 000018 QM

Frankfurt am Main, Berlin 2003-06-12

Dr.-Ing. K. Petrick

Dipl.-Ing. S. Heinloth

MANAGING DIRECTORS

DQS is member of IQNet THE INTERNATIONAL CERTIFICATION NETWORK

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Deutscher Akkreditierungs Rat DAR TGA-ZM-02-90-00 TGA-ZM-02-90-60

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IQNet®

THE INTERNATIONAL CERTIFICATION NETWORK

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IQNet and
DQS GmbH Deutsche Gesellschaft zur Zertifizierung von Managementsystemen

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Dr. Fabio Roversi
President of IQNet

S. Heinloth
Dr. K. Petrick
Managing Directors of DQS GmbH

IQNet Partners*:

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91979639

Stahlwille products are genuinely manufactured in its own factories all located in side Germany, with the highest known standards and quality.

以高标准和高品质著称Stahlwille产品是真正的由位于德国的自己的工厂加工制造,。

Definition of Products Warranties产品质保的定义

Most of the Stahlwille Tools in the program carries a Life Time Warranty provided that all the products should and must be used in accordance to its design and purposes.

大多数Stahlwille工具都有使用期限内的质量保证,所有的产品应用都必须根据其设计和使用目的。

Products that are made from Plastic, Rubber, Glass, Wood and Fibers materials are not warrantable.

由塑料、橡胶、玻璃、木材和纤维材料制成的产品是不做质保的

Tools that requires ‘External Power’ sources such as Electricity, Pneumatic and Hydraulic are also not warrantable.

需要外部动力的工具,如电、气动和液压等也不做质保的。（例如手电）

Modification, Illegal extensions and Not Logical usages of Stahlwille Tools are not warrantable.

修改，不合理加长及不合理使用工具同样不在质保范围内

Tools that are of wears and tears such as Screwdriver Bits, Drill Bits, Hacksaw Blades and Cutting knives and Blades are not warrantable.

工具的磨损比如螺丝批头，钻头，锯片，切割刀，刀片都不在质保范围内

THANK YOU
KHAAWP KHOON KHRAP
VIELEN DANK
TERIMA KASIH
MERCI
GRAZIE
Cảm ơn bạn
谢谢
شكرا
감사합니다
ありがとう
Спасибо
धन्यवाद