BONDHUS Timesaving GorillaProof Tools

Protanium® HIGH TORQUE STEEL

Protanium® High Torque Steel is much more than "just steel" and much more than a "name". It is a specification, a process and a commitment to producing a level of tool performance unmatched by any competitor.

Protanium® high torque steel is not an 8650 grade steel, it is not a form of S2 and it is not a chrome-vanadium or chrome-moly type steel. It is custom mixed to a formula that is the result of many years of research and continuous development effort.

Bondhus works extensively with its' steel suppliers to ensure meticulous quality control, testing and documentation standards are adhered to. Conformance to Bondhus' specification means qualified technicians perform constant inspection, testing and evaluation steps to make sure the "no compromises" quality policy is always enforced. Over 60 separate tests guarantee that every tool manufactured is 100% within spec.

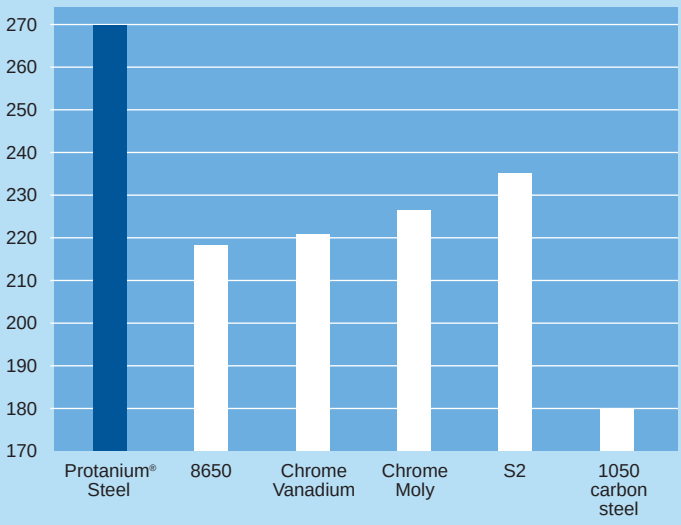
Customized heat treating processes are key to bringing out the superior strength properties of Protanium® high torque steel. Anyone with a piece of steel and a torch can perform some level of heat treating. Attaining results that push beyond industry accepted limits of performance requires equipment, skill, and years of research and development that Bondhus alone has committed itself to.

Hex stock must be smooth and free of pits, burrs, and other imperfections. Bondhus demands 100% compliance from mills that supply steel.

Sharp edges are critical to the tool fitting properly in a fastener. Rounded corners are not accepted. They will cause slippage and failure. Bondhus maintains the toughest standards in the industry.

Grain size is monitored before and after heat treating. A small grain size helps assure conformance to strength and hardness standards.

4mm Tools — Average Stock Torque (in-lb)



Custom mixed steel and precise control of the heat treating process are two keys to producing the strongest hex and star tools in the world.

Average Torque (in-lb)

Hardness Rockwell C	Tensile Strength PSI	5/64" & 2mm	1/8"	5/32" & 4mm	1/4"	5/16" & 8mm	
61	360000	**34**	**141**	**273**	1125	2187	
59	340000	**32**	**133**	**258**	**1063**	**2065**	
57	320000	**30**	**125**	**243**	**1000**	**1944**	**Protanium® Steel**
55	300000	28	117	228	**938**	**1822**	
53	280000	27	109	213	875	1701	
51	260000	25	102	197	813	1579	8650 Steel
49	240000	23	94	182	750	1458	
46	220000	21	86	167	688	1336	
43	200000	19	78	152	625	1215	Carbon
40	180000	17	70	137	563	1093	Steel
37	160000	15	63	121	500	972	

Note
If hardness and good ductility are maintained, then the higher the tensile strength, the stronger the tool.

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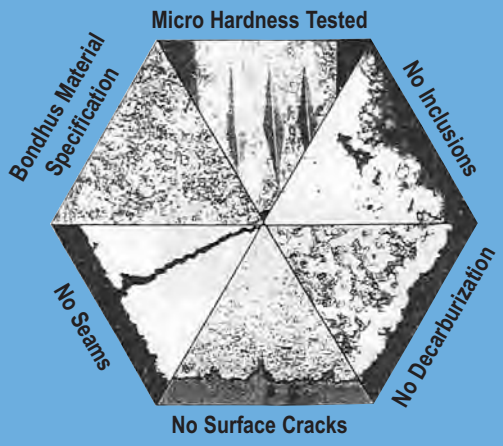

Cracks, decarburization, seams, surface discontinuities, undisolved carbides, and inclusions are not unusual in common grades of steel. These conditions cause poor ductility and premature tool breakage. The Protanium® steel specification, however, does not allow for these conditions to exist.

Hardness and Ductility
Protanium® Steel is considerably harder than the steel produced by most Bondhus competitors. When competitors do have hardness values approaching that of Protanium® steel, they do so by sacrificing ductility.

Ductility is important to monitor, since as the hardness increases, so does brittleness and the potential for shattering. Every batch of Protanium® steel is tested by applying torque in a standard break test.

The Bondhus standard assures in excess of 99% of all breaks will actually break clean and straight. Most competitors cannot even hit 50% clean breaks. Tools that shatter are a hazard to both the user and equipment in the vicinity.

Hardness testing is performed during and after the heat treating process to accurately measure and constantly monitor hardness values.

Bondhus strives for consistent hardness throughout, not just on the surface. Micro hardness testing is performed beneath a microscope on polished cross sections encased in epoxy. Too much hardness causes brittleness; not enough causes premature wear.

Torsional tensile strength is monitored for every batch of steel. An ongoing effort is made to improve strength and reduce or eliminate shattering. The heat treating process is adjusted for every batch of steel to obtain maximum ductility and hardness.

Extensive lab testing has *proven* that Bondhus tools consistently generate up to 20% more torque than any other manufacturer in the industry. Independent lab testing results are available within the **Tech Library section at www.bondhus.com.**

Inferior Tools are Expensive

Time *is* money, and the real cost of using an inferior tool is realized when something goes wrong. As anyone who works with mechanical devices knows, bad things occasionally happen. It's not a question of "if", but rather "when".

Stripped screw heads are one of those bad things that happen. A stripped screw head can no longer be removed with a hex tool. If it's in a difficult to reach location, where a clamping device cannot grip it, the task becomes particularly problematic.

The cost of a high quality hex tool is negligible compared to the cost of removing a broken or stripped screw. Will the removal take a few hours? An entire day? What is the real cost of an inexpensive, poorly performing hex tool?

Bondhus quality hex tools are made from Protanium® high torque steel and have sharper corners to generate maximum holding and turning forces within the screw to virtually eliminate stripped screw heads.

Professional hex tools deliver a level of performance not attainable by consumer grade tools. In addition, safety is a factor that can impact the "actual" cost of ownership. As a result, knowledgeable buyers and professionals alike recognize the serious dangers of inferior tools that shatter instead of breaking clean.

The purpose of a high quality tool is to provide a faster, easier, and less costly means of performing a task. Bondhus strives to provide not just "good" tools, but the finest tools available anywhere. Customer satisfaction is what we strive for.

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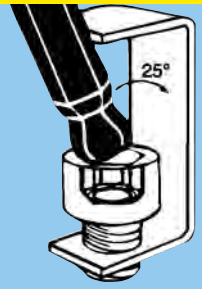
Why a Bondhus Ball End Tool?

A ball end tip is a tremendous time saver. It allows a tool to be inserted into a screw head quickly, even from an angle or when working in the blind.

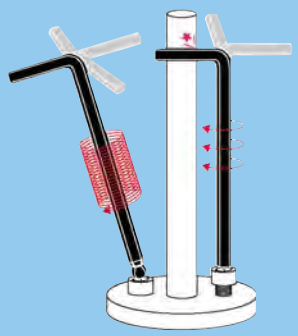
The concept by which the ball end tip slides into a screw head is known as funnel insertion. The side of the ball end directs or funnels the tool into the screw head, and precise machining ensures an exact fit between tool and screw head.

Bondhus is not a "me too" manufacturer of ball end tools; Bondhus invented the hex ball end and for almost forty years has been continually improving on this invention. Bondhus ball end tools sell better than the competition because they work better and last longer than competitor tools. It's that simple. Bondhus ball end tools significantly reduce the amount of time it takes to complete a task.



Angle entry to 25°
- Works in hard to reach areas
- Faster insertion and removal
- Precisely machined tip "funnels" itself into screw head

Ergonomic design
- Allow natural hand and wrist rotation
- Turns a full 360° in location
- Reduces user fatigue



Efficient design
- Works even in blind locations or near obstructions
- Eliminates need to continuously remove, reposition, and reinsert tool
- Engages to full depth
- Reduces 'stripping' problems

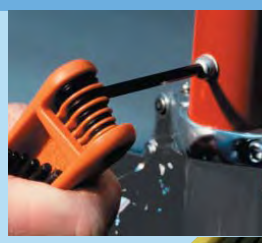
Bondhex™ Cases

Thirty years ago, Bondhus introduced the first molded case for organizing hex keys.

- **Color coded for easy identification:**
  Inch (yellow)
  Metric (red)
  Star (green)
- **Convenient storage holds tools firmly in place**

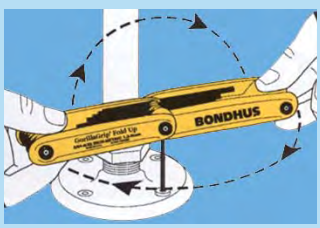
- Organizes hex tools in a compact manner
- Sorts and prevents loose or lost hex keys
- A slight twist of the wrist releases tools from their locked position

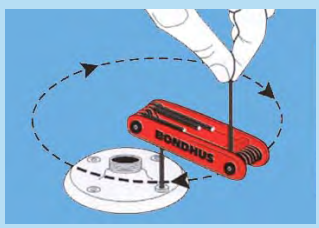
GorillaGrip® Folding Tools



Bondhus developed the molded handle that revolutionized the concept of fold up tools.
- Handle fits comfortably in a users hand
- Does not conduct heat or cold
- 40% stronger than comparable steel handles
- Time saving blade selection
  - Special flutes separate tools
  - Flutes allow quick selection of one blade at a time
  - Eliminates annoyance of having to constantly unstack blades to make a selection
- Eight different tips available

- Color coded handles for easy identification: Inch (yellow), Metric (red), Star (green).
- Turn & flip feature eliminates constant repositioning of tool when working near obstructions
- 90° stop feature converts the GorillaGrip® folding tool into a time saving speed wrench





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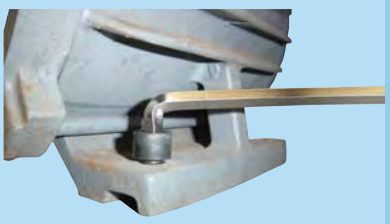
Stubby tools

Bondhus was the first U.S. manufacturer to introduce a complete line of short arm hex key tools for applications where a standard hex key cannot reach.

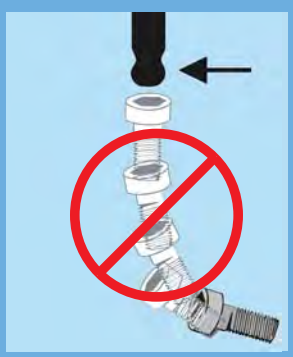
- Reach into low clearance areas and turn a screw
- No need to ever cut down and file a standard wrench again as a makeshift solution
- Tighter short arm radius than a standard hex key
- Short arm has hex tip, and long arm has a ball end tip for maximum time savings



ProHold® Tip Screw Holding Technology

Bondhus is the developer and exclusive manufacturer of patented ProHold® tip tools — the best screw holding technology available.

- Holds screws tight on the tool every time
- Available for both hex and star tools
- Bondhus is the only manufacturer making screw holding tools in sizes as small as .050" and 1.27mm
- Smooth tool rotation is preserved
- Does not reduce the strength of the tool or cause damage to the screw head
- Non-magnetic
- Never drop a screw again
- Available in a full range of Hex and Star sizes: .050" to 3/8", 1.27mm to 10mm, and T9 to T60



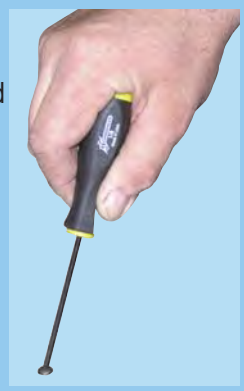
Handles Designed for Productivity

Ergonomically Shaped T-handles

Bondhus is the only U.S. manufacturer to design and build T-handles that fit the shape of a users hand.

- Mass of the full metal handle generates a flywheel effect for rapid insertion or removal of screws
- Tough coating resists damage and cushions grip
- Handle does not attract or hold dirt — excellent cleanup qualities
- Slight curve eliminates painful problem of handles digging into hands
- Handle welded directly to blade - eliminates loosening and wobbling of blade due to wear
- Focuses effort on turning a screw, instead of finding a comfortable grip on the handle
- Color coded for easy identification: Inch (yellow), Metric (red), Star (green)

ComfortGrip Screwdriver Handles



Bondhus was the first U.S. hex tool manufacturer to introduce cushioned grip style screwdriver handles for hex and star tools.

- Handles proportioned to blade size to prevent blade breakage
- Soft, cushioned handle with positive, non-slip surface
- Good grip even with wet or oily hands
- Reduces fatigue to accomplish more — with less effort
- Anti-roll on inclined or vibrating surfaces
- Color coded for easy identification: Inch (yellow), Metric (red), Star (green)

Star wing and flag handles

These are real time savers for special star and star plus applications.

- Can be gripped in many different ways
- The green handle top allows for rapid fingertip spinning of tool
- Handles generate needed torque to seat or break loose a screw — even the very delicate screws found in electronics applications

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ProGuard™ DRY SURFACE TECHNOLOGY DST

ProGuard™ dry surface protection is yet another Bondhus exclusive. It is the most effective solution in the industry for protecting tools from rust and corrosion.

Most hex tool manufacturers cut corners by providing inadequate protection against corrosion. Tool manufacturers deal with the problem of rust and corrosion by providing a range of solutions:

- Plating provides a degree of protection, but it eventually nicks, flakes or wears off, and allows water to seep in.
- Black oxide finishes provide only limited protection. Almost with the first use, the finish begins to wear off and allow water to penetrate through to the tool.
- Coating a tool with oil is nearly no protection at all. Almost immediately, it is vulnerable to rust and corrosion.

ProGuard™ dry surface finish is a radically different solution that offers vastly superior protection. It starts with caustic cleaning to remove all oxides and impurities on the surface. A proprietary electrolytic process is then used to grow a very tight and small grained crystal structure on the surface of the tool. In addition, a fast drying oil is used to provide yet a second line of protection. The resulting finish creates a surface that is very difficult for moisture and contaminants to penetrate.

Results of comparative Salt Spray performance testing, conducted by an independent lab, provide dramatic proof that the Bondhus ProGuard™ corrosion protection is up to five times more effective than any other solution available. Independent lab testing results are available within the **Tech Library section at www.bondhus.com.**

Actual corrosion after 10 hours exposure to salt spray

Consistency Of Machining:

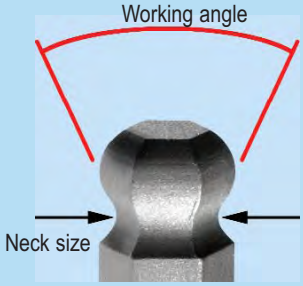
Every manufacturer advertises the "quality" of their tools. Independent laboratory testing, however, reveals results that are not always consistent with those claims.

A tools' effectiveness is directly proportional to how well it fits into a fastener. Bondhus manufactures tools to the tightest tolerances in the tool industry. Every tool is designed for the absolute optimal fit in a fastener. Tighter tolerances mean the best possible fit between tool and fastener will always be achieved.

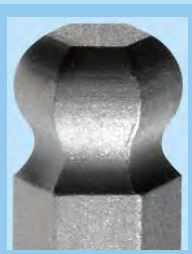
The Bondhus specification demands stock that is free of defects created in the drawing process, sharp and clean corners, precise machining and a tightly sealed surface to prevent damage from corrosion.

A poorly machined ball end tip does not fit properly into a screw head. It risks stripping the screw head and may not produce a smooth rotating action, further hampering tool use.

Machining a ball end on a small tool is very difficult to accomplish. Compare the precision of a Bondhus .050" ball end and the tool of a typical competitor. (See photo at bottom of page.) Bondhus means precision.



Strength and working angle are two of the primary characteristics by which ball end tips are rated. Increasing neck size produces a corresponding increase in strength, but does so at the expense of allowable working angle. Conversely, a smaller neck size increases working angle, but decreases strength.



Bondhus Precision

Competitor poorly machined

.050" Ball end Comparison

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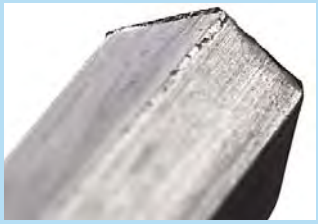
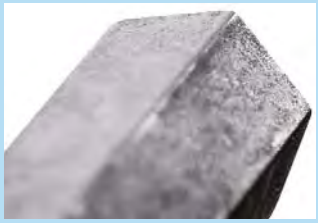
No Burrs: The clearance between a hex key and the screw into which it is inserted is typically .0005" or less on each side of the key, and even a small burr can interfere with or prevent insertion. If the socket of a screw head is on the small side of its tolerance, and the hex key is on the large side, any amount of burr will prevent proper insertion.



The imprecise nature of the competition's cutting method known as 'precision cutting' creates burrs that interfere with inserting the tool into a screw head.

Chamfering: Insertion of a straight hex or star tip into a screw head is much easier when all burrs are eliminated by chamfering the tip of the tool. Bondhus employs several styles of chamfers, using each style where it is most effective. The type of chamfer used is not critical. The point is to ensure that burrs are removed from all hex and star keys as shown by the Bondhus tool below.



Bondhus ball end tips are unique. They are capable of achieving superior torque while retaining a working angle of up to 25º because of the superior torque and ductility characteristics of Protanium® steel. No other competitor can match this performance with common grades of steel.

Every Bondhus tool is subject to its own set of specifications. Bondhus is meticulous about quality control — no deviation from the spec, no seconds, no exceptions. Period.

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At Bondhus, we believe in the quality of our tools and the warranty they carry is your proof. Not all warranties are created equal, and the tool industry is no exception. Reading the fine print often makes telling statements about the manufacturer's confidence in their own product.

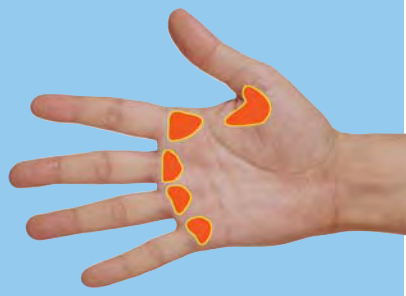
Bondhus tools are designed by toolmakers to work hard, save time, and to last. Only Bondhus offers an unconditional lifetime warranty.

All Bondhus products are guaranteed for life. If you are not happy with a Bondhus® tool — for any reason — simply return it. A replacement will be shipped right out at no cost — no hassles, no questions asked!

Ergonomic Handle Designs

Good handle design doesn't just happen; it's the outcome of experience and design refinement performed by dedicated people who care about the tool user. Bondhus handles are designed by people who know, understand, and use tools for a living.

- **Tool user strength** is a major consideration in handle design because handles need to accommodate a range of hand strengths. Bondhus designs its handles to accommodate a wide range of user hand sizes and strengths.
- **Ergonomic designs** ensure all handles fit comfortably in the users hands. As a result, tool users experience less fatigue and the pain associated with aggressive or prolonged tool use. Non slip surfaces ensure good grip, even in wet or oily conditions.



- **Bondhus handles**, fitted with ball end blades, are designed and sized to match the torque capacity of each blade tip.
- **Blade torque** is accurately established for every blade and is consistently maintained in the manufacturing process. Variations in torque yield unpredictable results when the blade is coupled with a handle. Tool users can be confident that Bondhus handles will not over torque the blade, and result in damage to the tool.

Bondhus handles are well designed, are a joy to use, and greatly enhance a tool user's efficiency in performing a task. In addition, Bondhus handles are designed to protect both their blades and the fasteners they drive from wear and breakage.