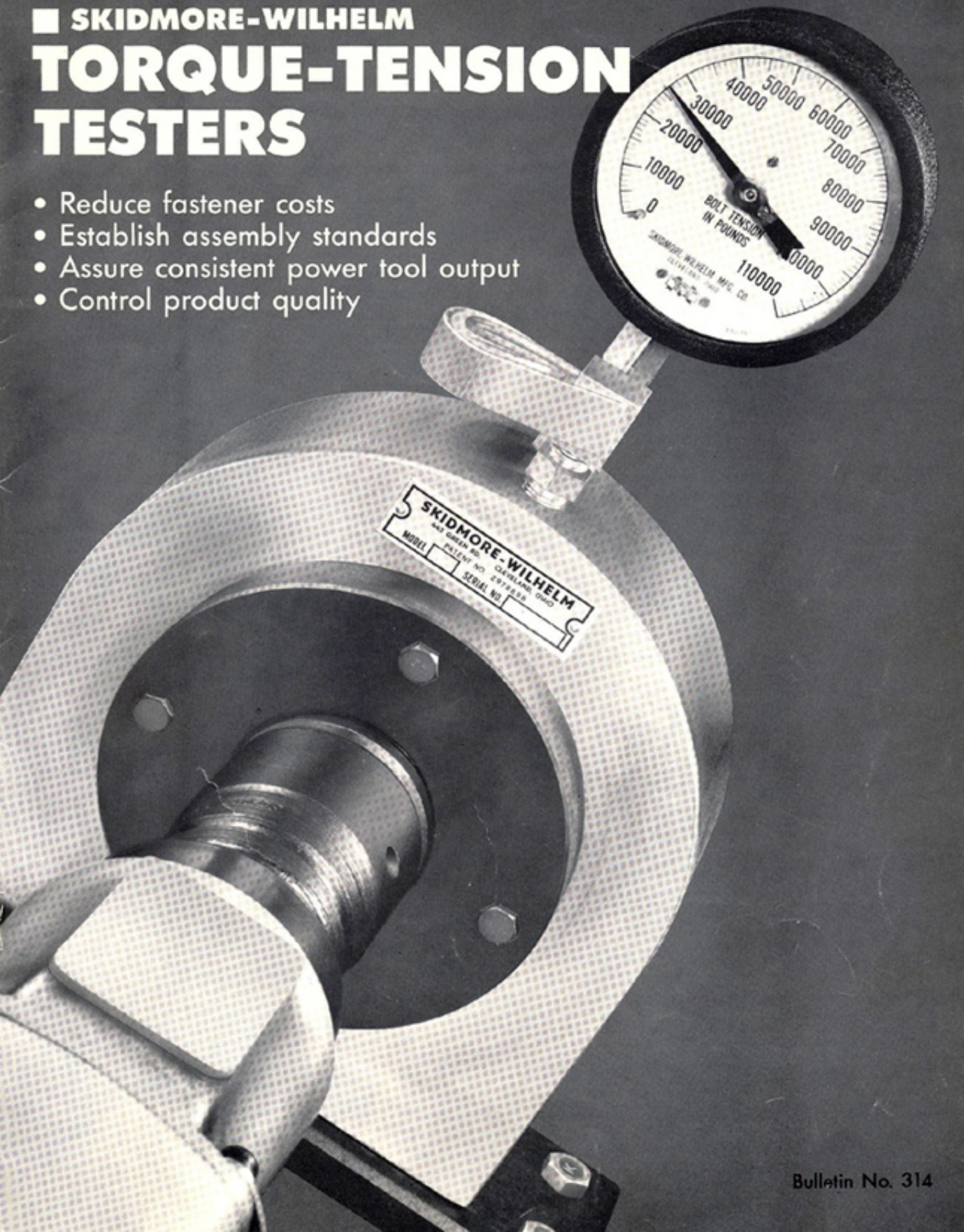
■ SKIDMORE-WILHELM

TORQUE-TENSION TESTERS

- Reduce fastener costs
- Establish assembly standards
- Assure consistent power tool output
- Control product quality

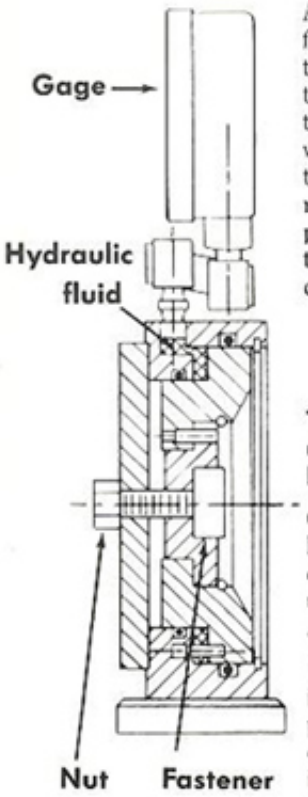


Bulletin No. 314

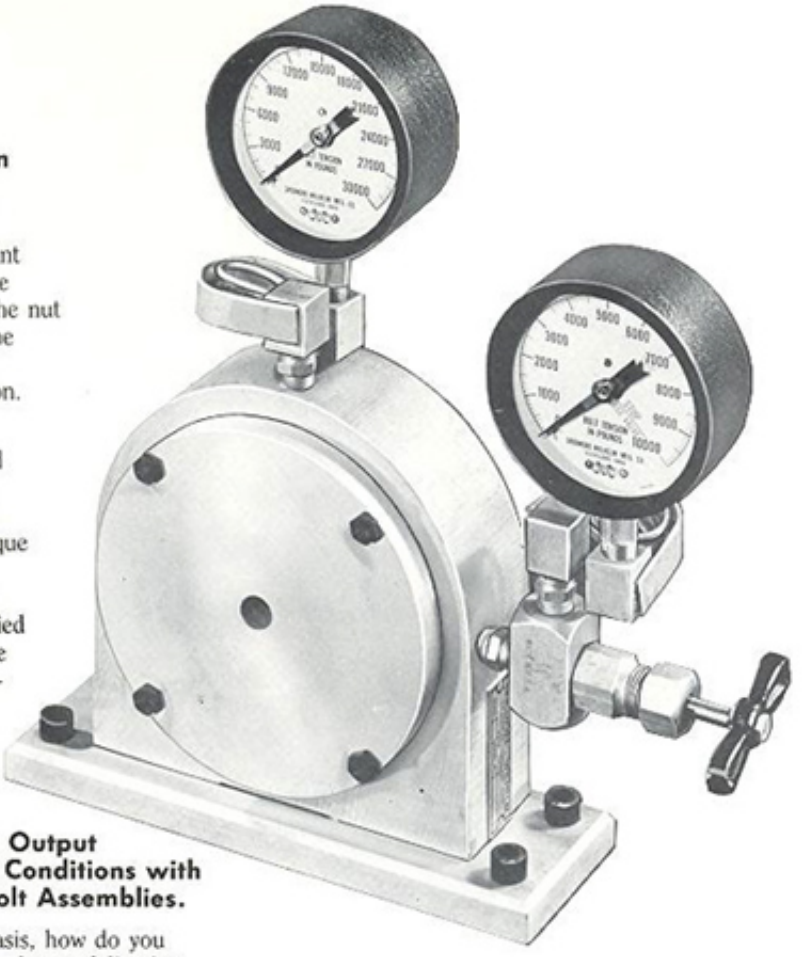
How Exactly Do You Use a Skidmore-Wilhelm Torque-Tension Tester?

Determine the exact torque-tension relationship to establish tightening standards for each application.

The tester lets you easily determine the joint torque-tension relationship. First, insert the fastener into the tester. Then, tightening the nut creates pressure, which is transmitted to the gage through hydraulic fluid. The gage is calibrated to read directly in pounds tension.



As you tighten the fastener with a hand torque wrench, the tester gage registers tension and the torque wrench registers torque. **Noting both readings at a specified point establishes the torque-tension standard for the joint.**



Test Power Tool Output under Standard Conditions with Precision Test Bolt Assemblies.

On a day-to-day basis, how do you know your power tools are delivering consistent tightening force each time you use them? Easy.

With a Skidmore-Wilhelm Torque-Tension Tester, you calibrate each tool individually and keep a record of its output performance. Then periodically — even every day — check the tool against its established norm. Any deviation in output signals the need for adjustment or maintenance *before it affects product quality.*

Consistent, accurate power tool output testing requires standard, repeatable test conditions. Most importantly, test conditions should simulate as closely as possible the way the tool is actually used on the job.

Production fasteners are poorly suited for test purposes and should not be used. They are subject to many variations, and physical changes from repeated tightening and retightening can adversely affect the torque-tension relationship.

To avoid such problems and guarantee standard power tool test conditions, Skidmore-Wilhelm makes special hardened alloy steel test bolt assemblies. First use the appropriate-sized assembly to establish a tool's performance norm. Then each time you retest the tool simply use the same test bolt assembly and compare the output.

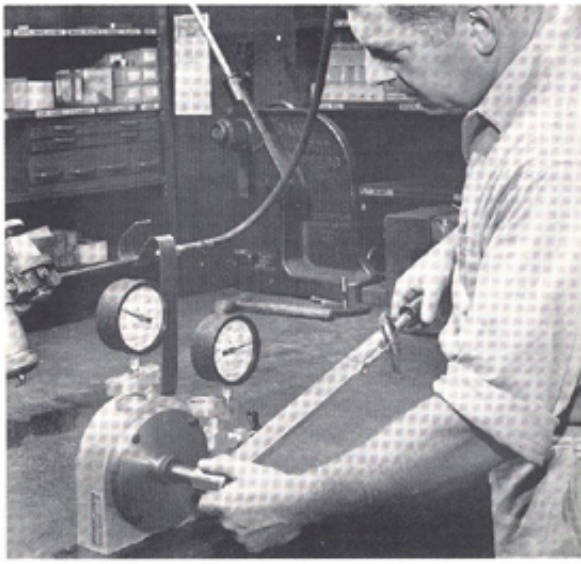
Test Bolt Assembly

TORQUE-TENSION TESTERS GIVE YOU MAXIMUM PRODUCT DEPENDABILITY AT THE LOWEST FASTENER AND ASSEMBLY COSTS.

Every fastener in an assembled product should meet two primary objectives: First it should be the right fastener. Then it must be properly tightened. A problem in either case can mean unnecessary material expense, assembly time, or early joint failure.

If your product sales depend upon fasteners consistently tightened to specifications — and upon controlling product component costs, assembly costs, and power tool repair costs — you need a Skidmore-Wilhelm Torque-Tension Tester.

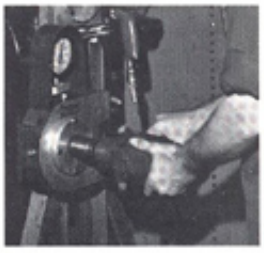
Skidmore-Wilhelm Torque-Tension Testers let you accurately choose the least expensive fasteners suited for your application — and then ensure that you tighten them to the required specifications every time.



Fastener Tension Is More Critical Than Torque.

Fastener problems occur when tightness is based upon torque alone. In fact, the actual clamping force that holds fastened parts together is tension, measured in pounds. Torque, produced by a hand torque wrench or a power tool, is the turning force that produces the tension in the fastener.

Because the clamping force is a direct result of the tightening force, there is a definite torque-tension relationship. But a fixed amount of torque may not always produce the same tension because of many important variables: material hardness, surface smoothness, washer and nut characteristics, thread condition, lubrication, plating or finish. *And, inconsistent output of power tools.* But if you control all these variables, you can establish an accurate torque-tension relationship that lets you consistently tighten fasteners to specifications every time.



Use Skidmore-Wilhelm Torque-Tension Testers to Choose the Right Fasteners and Consistently Tighten Them to Specifications.

Check fastener strength: During design, your Skidmore-Wilhelm Torque-Tension Tester lets you perform torque-to-yield tests and torque-to-failure tests to determine the right fastener: not simply the strongest fastener, but the least expensive fastener strong enough to secure the joint. You can spot check fastener quality at any time. And because you can place actual joint component samples in the tester, you can study how plating, types of washers, lubrication, and other joint variables affect the amount of torque needed to produce the required tension. *In this way the tester lets you establish accurate torque-tension tightening standards.*

Check power tool performance: Our testers let you determine the output of all kinds of power tools — pneumatic, electric, and hydraulic impact wrenches, and nutrunners. You can verify settings for adjustable output power tools, periodically check output against established norms, and ensure that assembly personnel are using power tools consistently.

Tool crib personnel or maintenance foremen: you can quickly verify the performance of new and rebuilt power tools as well as test whether older tools need maintenance. And because you test your power tools by actually using them in a tightening situation, you closely simulate the tool's on-the-job operating conditions. *Skidmore-Wilhelm Torque-Tension Testers ensure quality consistency and control.*

Skidmore-Wilhelm Makes a Full Range of Torque-Tension Testers.

For a complete Torque-Tension Tester setup, you need:

1. **A Skidmore-Wilhelm Torque-Tension Tester sized for your application**
2. **Adapter Sets sized to your fastener diameters**
3. **Test Bolt Assemblies sized to fit your power tools**

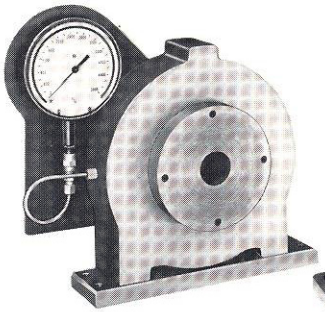
The following section describes these products in detail.

Torque-Tension Testers for Small, Mediun

Torque-Tension Tester models are designed according to fastener size and ty testing, the drive size of the power tool. Special test bolt assemblies for powe any model can be ordered with a dual-reading gage that indicates tension in

Large Applications

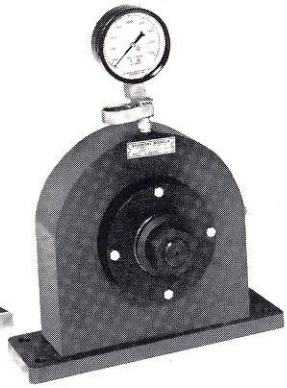
Model K



Fastener:
Bolts 1 1/4″ through 2 1/2″ (M32-M64)
Preload capacity:
225,000 lbs. maximum (100,000 kg)
Tool/size:
1″ to 2 1/2″ square drive
Test bolt assembly:
6 sizes available: 1 1/4″ - 2 1/2″

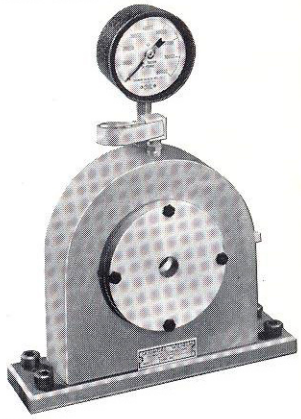
Medium Applications

Model H



Fastener:
High-strength bolts 1 1/8″ through 1 1/2″ (M30-M38)
Preload capacity:
170,000 lbs. maximum (80,000 kg)
Tool/size:
3/4″ to 1 3/4″ square drive
Test bolt assembly:
3 sizes available: 1″, 1 1/4″, 1 1/2″

Model RL



Fastener:
Bolts 5/8″ through 1 1/4″ (M16-M32)
Preload capacity:
100,000 lbs. maximum (50,000 kg)
Tool/size:
1/2″ through 1 1/2″ square drive
Test bolt assembly:
3 sizes available: 3/4″, 1″, 1 1/4″

, and Large Applications

e, maximum preload, and, for power tool output tool testing are available for all models. If desired, netric units as well as pounds.

Small Applications

Model J

Fastener:
Screws and bolts #10 through 9/16" (M5-M16)

Preload capacity:
30,000 lbs. maximum (13,500 kg)

Tool/size:
1/4" to 3/4" square drive

Test bolt assembly:
2 sizes available: 5/8", 7/8"

Model J features a separate low-range gage for easy reading over the tester's entire operating range.

Model S

Fastener:
Machine screws #6, #8, #10, and 1/4" (M3-M6)

Preload capacity:
5,000 lbs. maximum (2,260 kg)

Tool/size:
Power screwdrivers and small impact wrenches

Model S can be bench-mounted vertically or vise-mounted either vertically or horizontally. Accurate to within ±.5%. Ideal for testing small fasteners.

Adapter Sets

Each Skidmore-Wilhelm Torque-Tension Tester comes complete with plate and bushing adapters that allow you to test a variety of hex head bolts and cap screws. Self-tapping screws can also be tested. For shorter length bolts, tapped bushings are available.

Have an unusual head configuration? Skidmore-Wilhelm can make up special adapters. Need metric? Adapter sets are also available in metric equivalent sizes. See the accompanying chart to determine which adapter sets come standard with each tester model.

Tester Model	Standard Adapters Furnished For Use With The Following:
Model S	#6, #8, #10, & 1/4" fasteners
Model J	#10, 1/4", 5/16", 3/8", 7/16", 1/2", & 9/16" fasteners
Model RL	5/8", 3/4", 7/8", 1", 1 1/8", 1 1/4" fasteners
Model H	1 1/8" through 1 1/2"
Model K	1 1/4" through 2 1/2" fasteners

Test Bolt Assemblies

Choose test bolt assemblies from the accompanying table based on power tool square drive size, tester model, and hex socket size.

Tension-Tester Model	Bolt Assembly Part No.	Test Bolt Size	Power Tool Sq. Dr.	Hex Socket	Maximum "Norm"
S	S-105	5/16	1/4	3/8	5,000
J	J-110	5/8	1/4, 3/8, 1/2	9/16	15,000
J	J-114	7/8	5/8, 3/4	7/8	30,000
M, ML, RL	R-112	3/4	1/2, 5/8, 3/4	1 1/4	30,000
M, ML, RL	R-116	1	3/4, 1	1 5/8	70,000
M, ML, RL	R-120	1 1/4	1, 1 1/4, 1 1/2	2	110,000
H	H-116	1	3/4, 1	1 5/8	70,000
H	H-120	1 1/4	1, 1 1/4	2	110,000
H	H-124	1 1/2	1 1/4, 1 1/2, 1 3/4	2 3/8	170,000
K	K-120	1 1/4	1, 1 1/4	2	110,000
K	K-124	1 1/2	1 1/4, 1 1/2	2 3/8	170,000
K	K-128	1 3/4	1 1/2, 1 3/4	2 3/4	225,000
K	K-132	2	1 3/4, 2	3 1/8	225,000
K	K-136	2 1/4	2, 2 1/4	3 1/2	225,000
K	K-140	2 1/2	2 1/4, 2 1/2	3 7/8	225,000

Skidmore-Wilhelm Provides Other Fastener/Tool Testing Products and Services.

The complete Skidmore-Wilhelm product line covers a range of fastener and assembly tool testing products for both industrial and construction applications. Descriptive bulletins are available giving detailed information on most Skidmore-Wilhelm products.

Model M Bolt Tension Calibrator

Clamps directly to beam or column for on-site calibration of impact wrenches used to tighten high-strength bolts on structural steel. Also tests fastener strength. Accepts bolt diameters 1/2" to 1 1/4"; 100,000 lbs. maximum preload. Ideal for construction-site fastener testing. Ask for Bulletin 110.

Model MS Bolt Tension Calibrator

Same functions as Model M, but designed specifically for shorter-length construction bolts, including tension-control bolts, 1/2" to 1" in diameter. 90,000 lbs. capacity.

Model P 3/8" Bolt Tension Tester

For sales demonstrations showing comparative fastener strength. Easily clamps to a customer's desk or a bench. Ask for Bulletin 101.

Model W Torque Wrench Calibrator

For setting and checking beam, dial reading, or micrometer torque wrenches. Ask for Bulletin 210.

Model T Digital Torque Tester

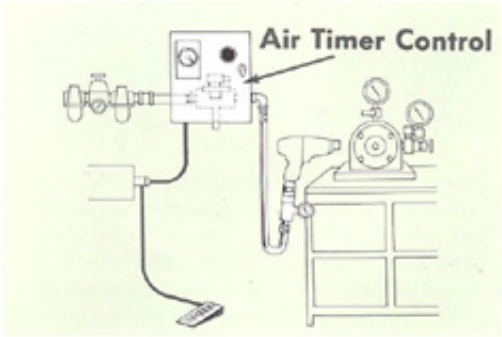
For checking performance of impact wrenches and hand torque wrenches. Patented electronic design gives direct digital readout of torque in foot-pounds or newton-meters. Ask for Bulletin 510.

Accessories

Model LR-100 Hydraulic Load Reliever

A hydraulic hand pump that attaches to a tester by means of a quick-disconnect fitting. Simulates service conditions by adding additional load to a bolt already preloaded in the tester. Also, by relieving the pressure on a bolt/lock nut assembly, the LR-100 allows measurement of the torque required to back off a prevailing torque lock nut — without loosening the nut.

Air Timer Control



Foot switch operated air timer control delivers air to power tool at a set pressure for a fixed time interval. Electric timer actuates a solenoid valve that shuts off air flow after a pre-set interval. Ensures that the true efficiency of the tool is the only test variable. Operates on either 110 or 220 volts; connects to existing 3/8" or 3/4" air lines.

Other Skidmore-Wilhelm product information bulletins:

Bulletin 112: **Model H Bolt Tension Calibrator**

Bulletin 118: **Test Bolt Assemblies**

Bulletin 124: **Model S Torque-Tension Calibrator**

Bulletin 360: **Model LC Forge Gage**

Handbook: **Torque-Tension Relationships**

Engineering Services

Need help in setting up a fastener/tool testing program? Call Skidmore-Wilhelm and talk to our engineering experts. We can help analyze your applications to determine fastener specifications, define test equipment needs, and establish an ongoing tool testing and maintenance record program.

How Leading Companies Use Skidmore-Wilhelm Torque-Tension Testers

EATON CORP.

Testers Check Fastener Quality and Evaluate Power Tool Performance

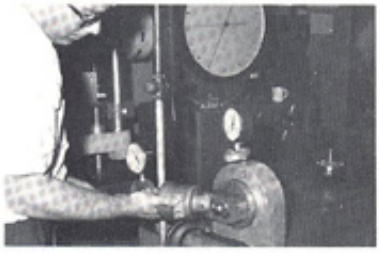
Selecting the proper power tool for the job is one of the ways Eaton uses Torque-Tension Testers. Careful analysis of test results has simplified power tool purchasing and reduced repair parts inventory. Periodic tool testing assures proper tightening during automobile and truck rear axle assembly. Incoming nut and cap screw combinations are also checked on the testers. Tensile strength as well as consistent torque to tension relationship are simultaneously verified..

A LEADING AUTOMOBILE MANUFACTURER

Torque-Tension Tester Key to Fastener Value Analysis Program

A complete program of torque-tension testing helps this leading automobile manufacturer achieve efficient fastening at the lowest possible cost.

The Torque-Tension Testers are used to evaluate the effects of different fastener designs, materials, platings, lubricants and other variables. While selecting fasteners, they also establish assembly standards. The Testers serve as inspection devices to assure consistent fastener quality and are also used to set and check power tool output. One low-cost, easy-to-use Torque-Tension Tester guarantees maximum overall fastener value from design through production.



HUCK MANUFACTURING CO.

Fastener Manufacturer Uses Tester for Product Development, Inspection, and Selling

Huckbolt High Tensile Fasteners are now being used as replacements for rivets or nuts and bolts in high-rise buildings, bridge construction and other structural work.

Tests of new designs, quality control of existing fastener types, and positive proof of their products' performance are all achieved with Torque-Tension Testers in a field where verified specifications, not promises, are essential to sales success.

SIOUX TOOLS, INC.

Testers Initiate a New, Realistic Concept of Gaging Power Tool Performance

Sioux Tools, Inc. has become the first power tool manufacturer to express the specifications of their tools in terms of tension rather than torque. Each of their power tools is rated by the pounds of tension it produces in five seconds on a Torque-Tension Tester equipped with a complete Skidmore-Wilhelm controlled power tool testing system which eliminates all variables except the performance of the power tool.

A total of 52 testers are now is use. Twelve serve as final inspection gages for new tools prior to shipment. Forty are located at local Sioux Tools Service Centers. Because of test standardization, any Sioux tool can be quickly checked for power output at the local centers. Sioux Tool's Service Manager states that the Torque-Tension Testers have saved a lot of time, effort, and money for his company and its customers.

Other Skidmore-Wilhelm customers:

American Bridge • Alcoa • Bechtel Power Corp. • The Boeing Co. • J.I. Case Co. • Caterpillar Tractor Co. • Chicago Pneumatic Tool • John Deere • Dresser Industries, Inc. • Duke Power Co. • E. I. duPont de Nemours & Co. • Ford Motor Co. • Freightliner Corp. • General Electric Co. • General Motors Corp. • Huck Mfg. Co. • Ingersol-Rand Co. • Lawson Products • Martin Marietta Corp. • Mobil Oil Corp. • Navistar • Rockwell International • Snap-On Tools Corp. • SPS Technologies • Standard Oil Co. • Stanley Hydraulic Tools • United Air Lines • Western Electric Co., Inc. • Westinghouse Electric Corp.

Skidmore-Wilhelm Is the Industry Leader in Torque-Tension Testing.

Over thirty years ago, Skidmore-Wilhelm developed the first Torque-Tension Tester, the Model M, to serve a specific need in the construction industry for testing high-strength bolts on structural steel. Other models followed to provide consistent fastener and power tool testing for industrial applications. Today, the full line of Skidmore-Wilhelm Torque-Tension Testers is used internationally.

From the first calibrator for consistent fastener and power tool testing to patented digital electronic technology, we at Skidmore-Wilhelm are proud of our role in improving product quality industry-wide, worldwide. You can rely upon *our* quality. And our service. In most cases, we can provide immediate stock delivery. Experience, quality, and service — your assurance when you choose Skidmore-Wilhelm.

SW

SKIDMORE-WILHELM MANUFACTURING CO.

Torque-Tension Tester Application Checklist

Primary use:

- ☐ Fastener Testing/Design
- ☐ Tool maintenance/Production

Type of testing:

- ☐ Fastener
  - Size _____
  - Preload _____
- ☐ Tool output
  - Drive size _____

Accessories:

- ☐ LR-100 Load Reliever
- ☐ Air Timer Control

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