Apex Tool Group - Aerospace

- Apex Tool Group Overview
- Why ATG?
- ATG Complete Solution Portfolio
- Appendices

TOOL impex
CZECH REPUBLIC s.r.o.

July 2014

Apex Tool Group Overview

A leading global manufacturer of professional hand and power tools, industrial assembly solutions and services

- Revenues of $1.5 billion in 2012 with over 8,500 associates
- Manufacturing in 27 locations in the Americas, Europe, Asia, Australia

Diversified sales profile and strong relationships with global OEM's, industrial distributors, and retail customers

- Commercial operations in over 120 countries

Strong end-user focused product development culture delivering relevant innovation

- Over 200 engineering and R&D associates globally
- Design centers in Germany, France, US, and China

Globally managed with the Apex Business System (ABS)

- Enables us to provide innovative solutions with outstanding operational excellence and consistent earnings growth

Owned by Bain Capital since February 2013

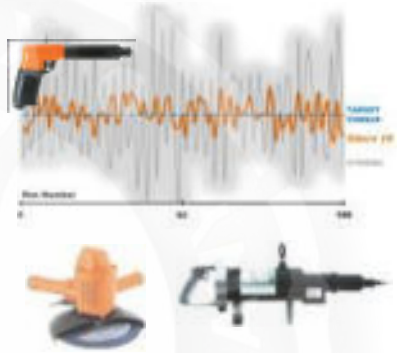
Company Vision and Mission

Our Vision	**The focused leader in Assembly and Repair Tools delivering smart productivity and smarter results.**
Our Mission	**To be the first choice for industrial and professional customers by delivering outstanding innovation, productivity solutions and exceptional service around the globe**

Our Values

Goal Is To Be The Global Leader Of Smart Productivity Solutions

Industry Focused Solutions

	Motor Vehicle	Aerospace	General Industry	Electronics
Products				
Customers	DAIMLER, BMW, Audi, GM, CHRYSLER, VW, CHERY, FAW	BOEING, BOMBARDIER, AIRBUS, AEROLIA, EMBRAER, COMAC, SPIRIT AEROSYSTEMS	GENERAL DYNAMICS Electric Boat, LUFKIN, GE Energy, Exxon, Hertz Equipment Rental, Howmet Castings, ALCOA, Hamilton Sundstrand	Newark, Farnell, ACE Hardware, RadioShack, Digi-Key, RS, The Home Depot, TECHNI-TOOL, Lowe's, amazon.com

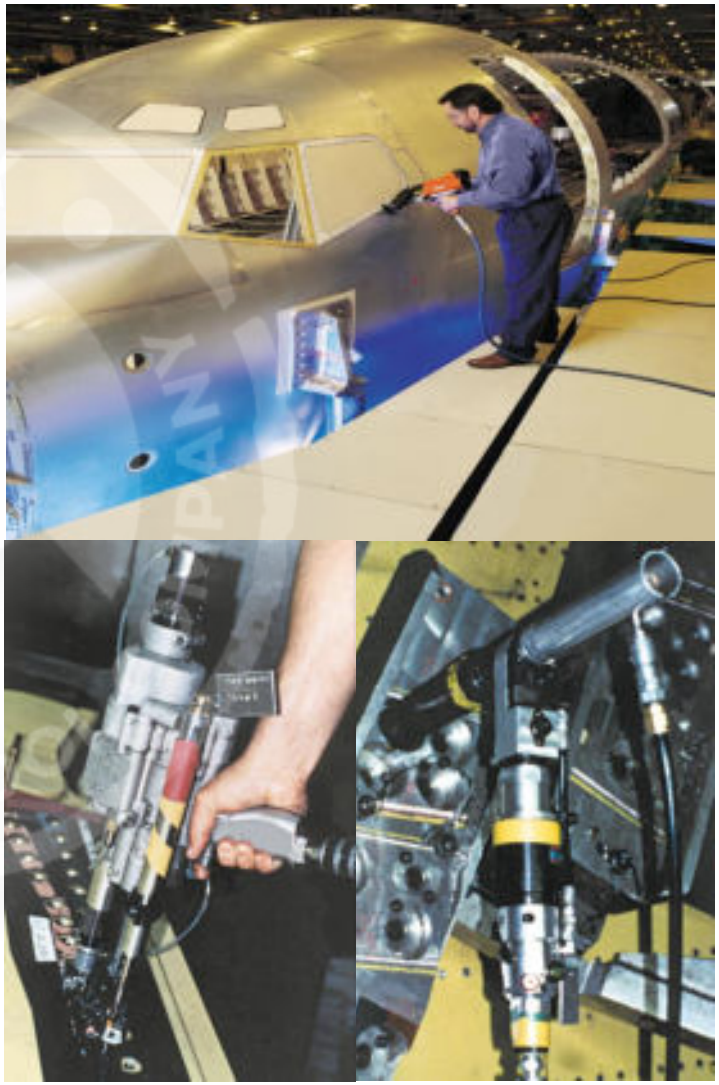
Power Tools
(~$325 Million)

Electronic Tools
(~$125 Million)

Broad Portfolio Of Solutions Delivering "Smart Productivity, Smarter Results™"

60+ Years in Aerospace

For decades, Aerospace production facilities all over the world have depended on Recoules, Quackenbush, Cleco, Dotco, and Apex products to deliver powerful, reliable, safe, efficient, and user-friendly performance. These products have been designed to bring exceptional value with durability, ergonomics, ease of integration and increased aero build rates in mind.



Recoules Quackenbush — Advanced drilling equipment, Cutters, and Microstop cages

Cleco — Pneumatic and Electric Fastening Tools and Systems

APEX — Tough, long lasting bits and sockets

DOTCO — Precision Material Removal air tools

Creating Durable Products For Years That Last For Years.

60+ Years of Aerospace

1947	Quackenbush Established
1949	The first flight of the prototype DeHavilland Comet, the first commercial jet aircraft.
1950	Dotco Established
1957	Boeing 707-120
1963	Boeing 727-100
1967	Boeing 737-100
1969	First human lunar landing. "one small step for man - one giant leap for mankind."
1969	EmbraerEmpresa Brasileira de Aeronautica SA, Embraer Formed
1969	Boeing 747-100
1970	Airbus Industrie GIE formed
1970	Recoules Established
1972	Airbus A330 First Flight
1983	STS-6, the first flight of the Space Shuttle Challenger.
1987	Airbus A320 First Flight
1989	The first flight of the B-2 "Spirit" bomber,
1989	EmbraerBegan developing the EMB 145 (currently named ERJ 145), 50-passenger aircraft
1989	Short Brothers is acquired by Bombardier
1991	Bombardier First flight of CRJ, a stretch of its Challenger executive jet.
1991	Airbus A330/340 LR First Flight
1992	Bombardier CRJ200 enters service
1994	Boeing 777-200
1994	Airbus A300-600 Super Transporter First Flight
1997	Airbus A330-200 makes its first flight.
2003	Bombardier Maiden flight of Global 5000
2005	Airbus A380 First Flight
2006	LockheedMaiden flight of the F-35 Joint Strike Fighter
2009	BoeingThe Boeing 787 Dreamliner makes its first flight.
2010	Apex Tool Group Established
2013	Airbus A350 Completes Maiden Flight.
2013	Bombardier Maiden flight of CSeries commercial aircraft

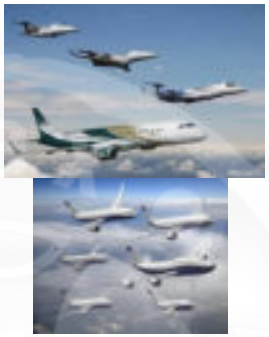
Supporting Aerospace Since The Dawn Of Commercial Jets

Where we Participate

Aircraft

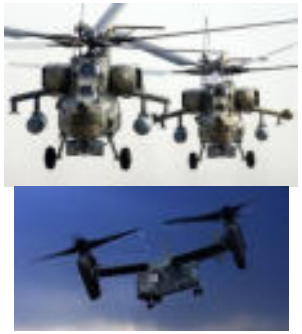
Commercial

Regional



Business

Military



Rotocraft

Space

Defense

APEX TOOL GROUP

Aerospace Customers

Global Provider For Global Customers

Global R&D Foundation

New Product Development	Continuous Improvement	Engineer to Order / Custom order	Research & Technology

Best Product & Technology to Market

NPD Stage Gate Process

- DMEDI Process
- Project prioritization process
- Technology Funnel Process

Resources

- 50+ engineers
- 5 chief engineers
- Avg 20yrs/employee
- Technology Partners
- External consulting
- Global Sourcing
- Internal Manufacturing

Design Strengths

- Gear Designs
- Pneumatic motors
- Electrical/Electronics
- Software
- Internal lab testing
- Virtual Validation

Business Systems

- Policy deployment
- Core Values
- Kaizen / Lean
- Cost reductions
- Product Roadmaps
- Strategic Initiatives

Product Differentiation

- Technology
  - Create / Embed latest technology
- Performance & Capability
  - Optimized designs
  - Breadth of product offerings
- Ergonomics
  - Best power density
  - Operator comfort
- Quality & Serviceability
  - Modularity
  - High durability
- Total Customer Value
  - Total cost of ownership

Testing & Validation

- Accelerated testing (HALT/HASS)
  - Faster response to quality issues
  - Reduced time in development
  - Competitor Testing

- Full Tool Testing
  - Run to failure

- Field Testing
  - Pilot testing

- Certifications
  - Customer / CE etc.

Broad Operations Footprint

Global Design And Operating Locations Able To Serve Customers Regionally

Why ATG?

ATG Aerospace Solutions

- **Complete Solution Portfolio**
  - ADE and Cutters with Tightening and Material Removal solution portfolio
  - Turn Key Solutions provider, application expertise, solution development, project management
  - Global service network, after-sales service, maintenance and reconditioning capabilities

- **Solutions that reduce Total Cost of Ownership**
  - **Productivity** e.g. Cycle time, process time, repair time, set up time, calibration time,
  - **Durability** e.g. Saving on repair parts (less parts, less costly parts), more years of use
  - **Ergonomics** e.g. More up time, less worker fatigue
  - **Quality** e.g. Less defects
  - **Acquisition Cost** e.g. Livewire system architecture of multiple tools per controller

- **History and Experience**
  - ADE proven and qualified on multiple major programs
  - Enables implementation of known solutions in less time
  - Technical experts with industry process knowledge to get “right first time” solution
  - Tightening Solutions proven in MVI can be applied to Aerospace

Aerospace Complete Solution Portfolio

Aerospace Solution Portfolio

Products

Advanced Drilling

- Positive Feed

- Self Colleting

- Specialty

Specialty Cutters

- Drilling

- Countersinking (Manual)

- Drill and Countersink

- Reamers

- Back Spot Face

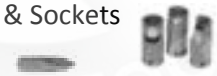
Tightening

- DC Electric Fastening

- Pneumatic Fastening

- Riveting

- Bits & Sockets



Material Removal

- Hand Drills & Microstop Cages

- Rivet Shavers

- Grinders

- Sanders

Universal Joints

- Universal Joints

APEX

Custom Solution/Service

Brands

Recoules Quackenbush

Recoules

Cleco

APEX

Recoules

DOTCO

Recoules Quackenbush

Cleco

DOTCO

Largest Portfolio In The Industry

Advanced Drilling and Cutter Solutions

Products

Specialty

CD Drill

Nut Plate Drill

Back Spotfacer

Compact Power Feed

Self Colleting

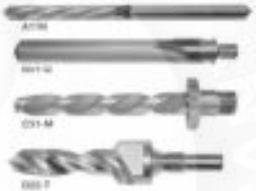
Template Foot

Concentric Collet

Twist Lock

C Foot

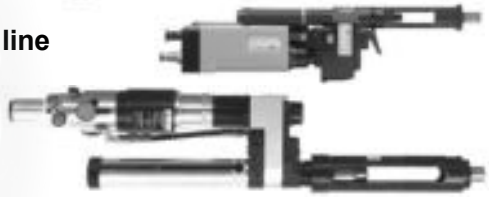
Cutters



Positive Feed

Right Angle

Inline



New Technology

A1

Chip Fragmentation – Mitis ™

Adaptive 2 Speed

Complete Solutions For Hole Production

Tightening Solutions

	Pneumatic	Corded Electric	Wireless	Automation
Products	Specialty Heads Pulse tools Stall and shut Off Current control Torque control Livewire I Wrench Tool presence Fixtured multiple Automated systems			
Applications	Frangible Fasteners/Eddie Bolts	Non Frangible Fasteners		




Industry Leading Tightening Technology

Material Removal Solutions

Products

Drilling and Countersinking

Cutter

Microstop Cage

Pistol Drill

Angle Drills

Inline Drills

Deburring/Grinding

Pencil Grinders

Inline Grinders

Angle Grinders

Sanding/Surface Preparation

Belt Sander

Angle Sander/Polisher

Random/Orbital Sanders

Inline Sander/Buffer

Applications

Durable Proven Products

Turn Key Solutions Provider

Equipment

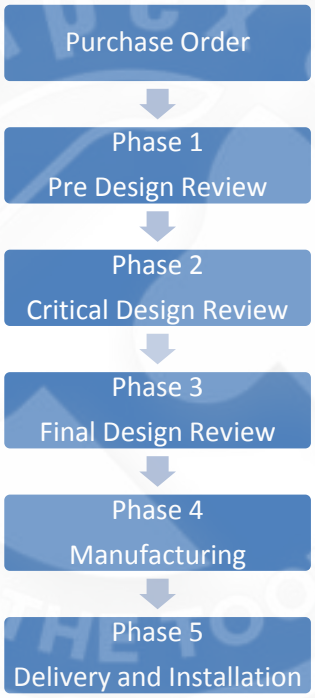
Custom Drill and Countersink solution that took a 3 step process down to one step with vacuum, error proofing and enhanced ergonomics

Custom 10 Spindle wheel multiple solution with advanced tightening strategies, error proofing and data collection for optimum quality

Multi Spindle Robot end effector solution with advanced tightening strategies, error proofing and data collection, reconfigurable for optimum productivity

Support

- Application and proposal support
- Project management and process



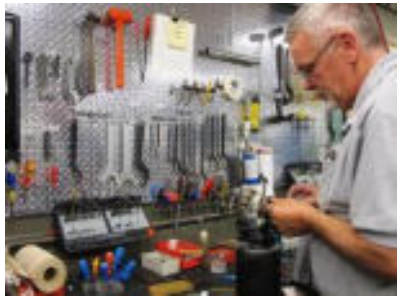
- Mechanical & controls engineering
- Installation support
- Field service support
- Training

Solutions

- Lower Cost of Ownership
  - Productivity
  - Durability
  - Ergonomics
  - Quality
- Process Improvements
- Error Proofing
- Data Management
- Advanced Tightening Strategies

Customized Solutions To Meet Your Needs

Global Service Network



IN-HOUSE REPAIR NETWORK

USA:	Norwalk, California
	Redmond, Washington
	Houston, Texas
	Auburn Hills, Michigan
	York, Pennsylvania
	Lexington, South Carolina
CANADA:	Missassauga, Ontario
MEXICO:	Queretaro, Mexico
BRAZIL:	Sorocaba, Brazil
CHINA:	Shanghai, China
INDIA:	Pune, India
ENGLAND:	Staffordshire, UK
FRANCE:	Ozoir, France
GERMANY:	Westhausen, Germany
HUNGARY:	Győr, Hungary

With a full range of tools for every production and maintenance operation, we are your ultimate productivity solutions partner. Our global service network can provide the level of professional repair and maintenance required to keep you up and running. No matter what your current tool repair capabilities are, we can maintain and manage your entire fleet of tools, even those built by other brands. You can rely on our in-house service centers and global distributor-based service network to deliver world-class support.

Appendix 1

- ADE and Cutters Product

ADE Positive Feed – Portfolio

Positive Feed Portfolio

Base Tools

15QRHD

9X2

15QR, QB, QI
158QR,QB,QI

230QR,QB

Attachments

Twist Lock

Concentric Collet

Template Foot

Adaptive

Accessories

Lubricators

Electronic Counter

Handles

Mitis ™ Internal &External

Cutters

Features/Benefits

- Full range of positive feed up to 1” in Ti 1 3/8” in Al
- Inline and right angle to suit application
- Wide range of speeds and feeds
- Variable speed options on some models
- Up to 2.3hp/1600lbs of thrust
- Extensive range of attachments
- Accessories to suit your needs
  - MQL lubricators
  - Counter for cutter and service life
  - External Mitis ™ compatible
- Adaptive option
- Custom design engineering to specific needs

ADE Positive Feed – 15QRHD

Head Duty 15QRHD Gear Head

Base Tools

15QRHD

158-15QRHD

158-15QRHDA

Attachments

Twist Lock

Concentric Collet

Adaptive

Accessories

Lubricators

Electronic Counter

Handles

Mitis ™ External

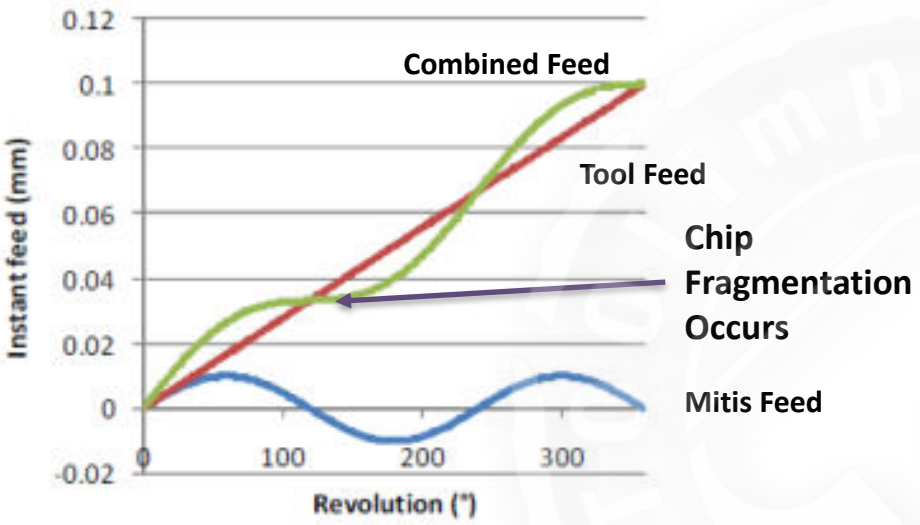
Cutter

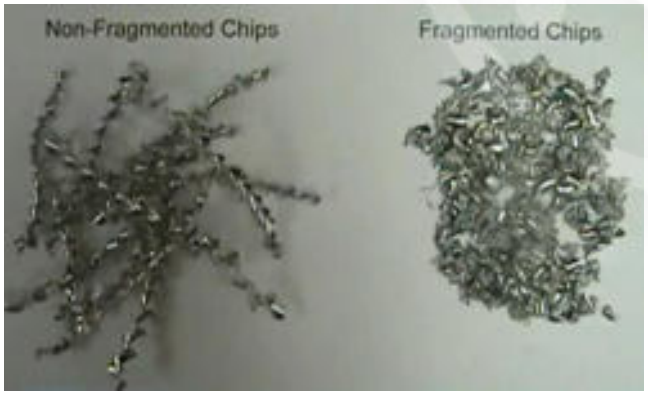
Features/Benefits

- New design heavy duty gear head
  - Increased torque capability x 2
  - Improved durability
  - Greater hole capacity
- Interchangeable with existing 15 head
  - Less investment to upgrade existing tools
- 1.6hp with extended speed range
  - Greater range of applications possible
- Extensive range of attachments and accessories
- External Mitis ™ compatible
- Adaptive Option

ADE Positive Feed – Mitis ™

Mitis – External or Internal Feed Oscillation





Features/Benefits

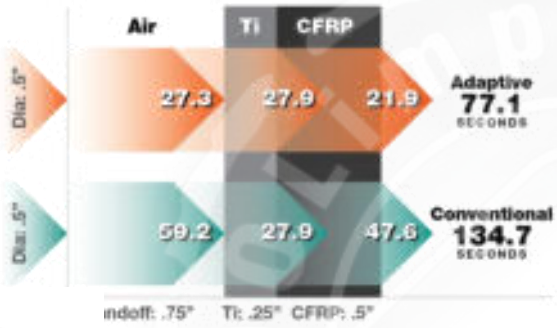
- Greatly improves vacuuming of chips
  - Less FOD
  - Less clean up time
  - More efficient cutting
- Reduces risk of marking surfaces due to long chips
- Less torque spikes due to chip packing
- Predictable cutter life from consistent process
- Potential to extend cutter life
- Reduces heat build up in the cutter
- Minimizes need for lubrication
- External can be added to any positive feed
- Internal available on 9X2

ADE Positive Feed – Pneumatic Adaptive

Positive Feed Adaptive

Programmable 2 Speed Drilling System

Ideal for
- CFRP/Ti
- Ti/CFRP
- Ti/CFRP/Ti
- Al/CFRP/Ti
- Ti/Al



DMP
(Drill Manager Pneumatic)

Adaptive Drill

Increased Productivity and more…

Features/Benefits

- Automatic high speed/low speed in material
- Reduced cycle time
- More holes per cutter
- Stops system after preset cutter count
  - Virtually eliminates use of a worn cutter
- Check tool performance on start up
  - Reduces chance of using a worn tool
- Optimizes Coolant Usage
  - Programmable for material
  - Shut of on exit
- Stores cycle and maintenance life on the tool
- On board air tool lubrication
  - Optimal tool performance
- Can be retrofitted to existing tools

ADE Specialty – 10QNPD

10QNPD Nut Plate Drill

- Capacity .1285” Drill/ .250” Countersink*
- .6”/15mm Feed Stroke, 7/16”/11mm Clamp Stroke
- Power 0.7hp/0.5kW
- Weight 5lbs/2.3Kg*
- RPM 600/6000
- Minimum Countersink Depth Accuracy of +/-.001”
- Countersink Depth adjustable in .001” increments
- Variable spacing available from .3”/7.6mm to 1.0”/25.4mm
- M Mini Spindle Option for closer centers (0.219/5.6mm)” min)
- Pressure foot options to suit Nut plate Centers

Features/Benefits

- Higher power - drill/countersink Faster
- More durable - less maintenance
- Flexible (re)configurations – Multiple applications possible with single base tool
- Electronic counter
  - For cutter life – reduces chance of using worn cutter/bad hole
  - Allows implementation of preventive maintenance – reduces chance of tool failure, less down time, less overall repair costs

Appendix 2

- Tightening Product Presentations

Tightening - 19 Series

19 Series Screwdrivers and Nutrunners

Features/Benefits

- World-class ergonomics and comfort
- Industry-leading accuracy and precision
- 5-year clutch warranty
- Designed and tested to over 1 million cycles
- Available in over 100 variations, including custom-built configurations
- Perfect for all fastening applications, from mass production to quality-critical assembly

Tightening - Global Controller

mPRO400 Global Controller

Livewire ™

Corded 18/48/67

I Wrench

Multiples

Intelligent Spindle

Features/Benefits

- Common to all ATG electric tools
- Flexible product configurations
  - Corded and cordless
  - Fixtured and hand held
- Modular system builds
  - Up to 32 tools
- Key communication protocols
- Data management options
- Full serviceability
- Global product support
- Universal connectivity for ultimate flexibility
- Auto sensing voltage

A Global Solution

Tightening - Livewire ™

Livewire ™

mPRO400
Global Controller

Livewire ™

Features/Benefits

- Leader in wireless
- Serviceable angle heads
- Engineered solutions
- Proven equipment
- Lower cost of ownership
- Multiple wireless options
- 16 Tools, 1 Controller – servo & controller on-board Tool
- Eliminate cables and cable management
- Increase operator efficiency and productivity
- Reduce in-system damage costs
- Multiple power supply options
  - Lithium-ion battery packs (26v or 44v)
  - Tethered Power Module (48v)
  - Auto Sensing

Manage Up to 16 Cordless Tools with 1 Controller

Tightening - Corded Tools

Electric Corded 18/48

mPRO400
Global Controller

Features/Benefits

- Over 50 years of experience
- One controller for all tools
- Serviceable angle heads
- Serviceable motors
- Proven equipment
- Lower cost of ownership
- Inline, pistol, and angle offering
- 2 – 230 Nm torque range
- Brushless motor technology
- Resolver speed / angle control
- Reaction transducer
- Ergonomic comfort handles
- High visibility status LED’s

Proven Range Of Durable Corded Electric Tightening Tools

Tightening - I Wrench

Automatic Head Recognition Feature

Programmable Correctional Tq/Angle Factor for Special Head Attachments

Color Touch Screen Navigation

- Tq. & Angle Data
- VIN used
- Application/ P-Set Selected
- Event status update

Software

- Customer Protocols
- Production Server
- Data Base

WLAN 2.4 & 5Ghz

Plant Network

Operate via -

- mPro400 GC
- PC / HMI w/ mProRemote software

Integrated Bar Code Scanner

Cleco LIVEWIRE

- **Measurement of Angle of Rotation Independent from Temperature**
- **Rechargeable Li-Ion battery**
- **Operator Guidance through vibration notification**

Tightening - Intelligent Spindle

- Torque Range : 2 – 2800 NM
  - Compact on-board intelligence
    - Modular Construction – Ultimate Versatility

    - High Productivity
      - World class durability (MTBF 3 Mil cycles @80%)
      - World class accuracy (Cmk >1.67 @ +/- 5%)
        - Dual torque transducers
          - Angle Encoder
            - Resolver

- Over 25,000 nutrunners installed
- European Homologation Compliance
- Complete product portfolio
- Proven lower cost of ownership

Appendix 3

- Material Removal Product

Material Removal - Hand Drills

Pistol Grip

- Most common style of air drill
- Use when drilling axis is horizontal or the work piece is below the operator
- Chuck sizes usually vary between 1/4” to 1/2” (6.4 to 12mm)
- Options include governor, reverse switch, auxiliary handle, etc.

Angle

- Uses short drill bits to access tight or cramped spaces
- Popular in aerospace and confined area drilling
- Comes in a variety of configurations to optimize accessibility

Inline

- Drilling vertical holes along the sight line of the operator
- Can be great for drilling in cramped and awkward spaces where the inline configuration is required
- Least popular version of handheld drills

Material Removal - Microstop Cages & Cutters

Manual Drill and Countersinking

Cutters MicroStop Cage Manual drill

Features/Benefits

- Quality
  - Centering cone of the cutter for perfect concentricity
  - Ball pivoting spindle to ensure alignment
- Durability
  - Microstop depth secured by steel locknut
  - Hardened and ground chrome-nickel steel spindle
- Accuracy
  - Micro depth adjustment
  - Multiple base options to ensure maximum stability when drilling/countersinking
- Productivity
  - Optional integral vacuum for chip extraction reducing clean up

Industry Leading Quality and Durability

Material Removal - Die Grinders

High Speed Turbine

- Characterized by high-speed turbine motor
- Typically 0.04-0.08 Kw
- Some are governed
- Mostly front exhaust
- Do not lubricate!
- 1/8” Collet or 3mm Collet

Pencil

- Rotary vane motor
- Mostly non-governed
- Front and rear exhaust
- 1/8” collet

Angle

- Rotary vane motor
- 0.15-0.75 Kw
- 1/4” collet
- Geared angle head and non-geared available
- Many combinations of speeds, governing options, speed regulation, and housing material

Inline

- All rotary vane motor driven
- Typically range from 0.15 – 0.75 Kw
- 1/4” Collet
- Numerous variations and combinations of lengths, speeds, governing options, speed regulation, and housing material

Material Removal - Sanders, Buffers, Polishers

Angle/Vertical Sanders

- Uses sanding discs (PSA, Hook and Loop, etc.), flap wheels, polishing pad or bonnet
- Used with backing pad and/or intermediate soft/medium pad
- Can be angle , handle, or pistol grip

Orbital & Random Orbital Sanders

- Typically use sanding discs or sand paper (PSA or Hook and Loop),
- Popular orbit patterns are 3/16” or 3/32” (2 or 4 mm)
- May feature central vacuum
- One or two-handed grip

Inline / Straight Sander

- Uses the edge rather than the face of the flap or bristle wheel
- Consumables are abrasives on an attachment shank

Belt Sanders

- Uses belt-shaped abrasives which comes in a variety of lengths and widths to suit the application
- Ideal for deburring and finishing in tight areas or where sanding has to conform to a contour

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