

#### RECESS SCREWS GAGING



Ing. John B. Graef
Source: Wrentham Tool Group

# THE SPEAKER





- John B. Graef (65), Mechanical Engineer, graduated at Catholic University of Rio Grande do Sul (PUC-RS), Porto Alegre-Brazil and MBA by Maua Institute of Technology, with specialization in Marketing Strategy at Getulio Vargas Foundation (FGV-Sao Paulo School of Economics) both in Sao Paulo-Brazil.
- Fasteners Manufacturing Specialist, with over 35 years of experience in fasteners and cold forming parts production, engineering, sales & marketing and international trading of fastener machinery, tooling and cold forming technology.
- For 15 years working as Plant Manager and General Manager of Brazilian fastener companies and since 1995 founder and CEO of SouthWind International, a Brazilian technical trading company specialized in supplying machinery and tooling for the fastener industry in Brazil and South America, currently representing 15 companies, machines and tools manufacturers from more than 10 countries, and since 2015 Managing Director of SouthWind Int'l USA, specialized in supplying cold forming tools for North American fasteners producers.

# INTRODUCTION



With the continuous increasing of the quality requirements for screws used in the automotive and aerospace industries, the gaging and controls during manufacturing is becoming more and more critical every day in the fasteners industry.

This presentation's objective is to present an overview of the most popular screw gages and how important is the use of appropriate gage for each application on the screws manufacturing process, mainly for the characteristics and control items where it is not possible the measuring with conventional instruments, like screws drive recesses, drive fit, head height, shank straightening and concentricity and so on.

It will be also shown the several calibration and traceability requirements to be performed though Accredited Labs, for the gages and instruments used either in screws production or quality inspection.



# The Evolution of the Fastener Industry The Recess Drive System



- 1930- J.P. Thompson invents a "Cruciform Recess" which screw manufacturers showed no interest. The invention languished until he met Henry F. Phillips who liked and bought the patent rights this was 1933
- 1931 Cleveland Ohio the Industrial Fasteners Institute was begun (IFI)
- 1933 The American Screw Company turned down the Phillips recess
- 1934 The new President of the American Screw Company Eugene Clark told his HEAD MEN that he would put on pension all who insisted that it could not be done
- 1936 H. Phillips made some modifications to the original design and patented them and started marketing it to the automotive industry
- 1937 General Motors adopts the Phillips screw for its Cadillac assembly lines
- 1940 85% of U.S. screw manufacturers had become licensed to produce the Phillips Screw
- Henry F. Phillips Born 1890, Retired 1945 and dies 1958
- 2019 Since 1940 there have been numerous recess drives invented -
- The Phillips design still holds a significant position in the industry which is testament to a great invention



#### Standard and Non-Proprietary Drive Recesses



- PHILLIPS® -Type 1
- Type 1A (generic Pozidriv ®)
- Struck-Slot
- Square-Socket Type-3
- Hexagon Socket
- Combination Drives
- Type 31 (Generic Quadrex®)
- Frearson Type 2
- Hexlobe® (generic Torx® )
- Hexlobe® Plus



#### Licensed Recesses - Proprietary

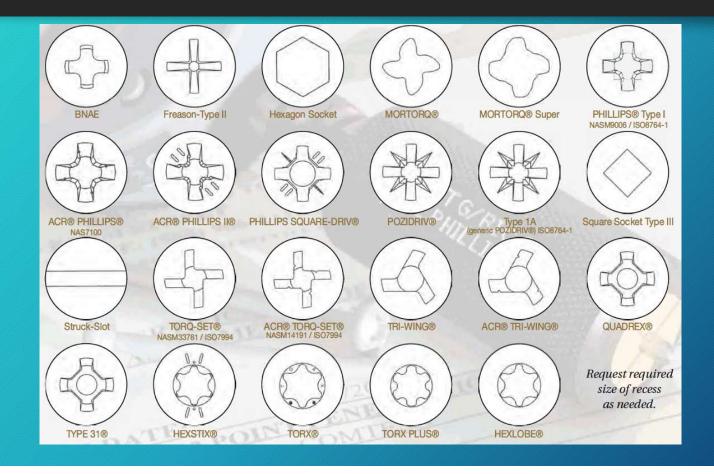


- Torx ® Internal and External
- TORX PLUS ® Internal and External
- TORX PLUS ® AUTOSERT ®
- TORX ® TAMPER-RESISTENT
- TORQ-SET ® & ACR ® Style
- TRI-WING ®
- MORTORQ ®
- MORTORQ ® SUPER ®
- HEXSTIX ®
- PHILLIPS SQUARE DRIV ®
- POZIDRIV ®
- ACR® Phillips II ®
- QUADREX ®
- ACR ® (all versions)
- TTAP ®
- Clear Driv ®



### Overview of most popular recess drives







#### Penetration Gages







#### Plug and Fit (Go-No Go) Gages







#### Plug / Fit Gages

These gages are used to check driver recess fit & wobble tolerance in the screw.

All sizes are available.

Individual gage components are available upon request.

All Wrentham Tool Group gaging is supplied with certification.



#### **Drivers Ring Gages**







#### Test Blocks Gages







#### **Test Block Gages**

Test blocks are used by the manufacturers of driver bits when measuring the torque exerted on driver bits during inspection procedures.

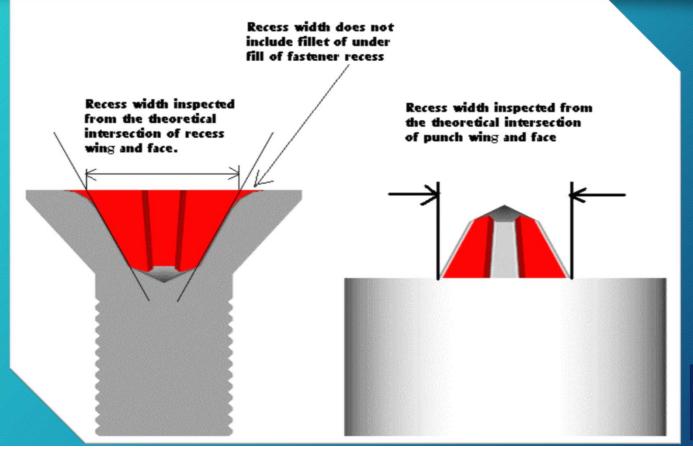
All sizes are available.

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#### Recess Width Inspection

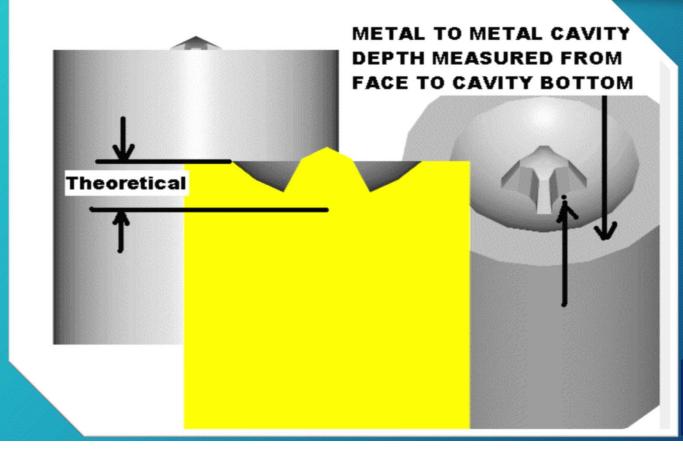






#### Punch Head Cavity Depth Measurement

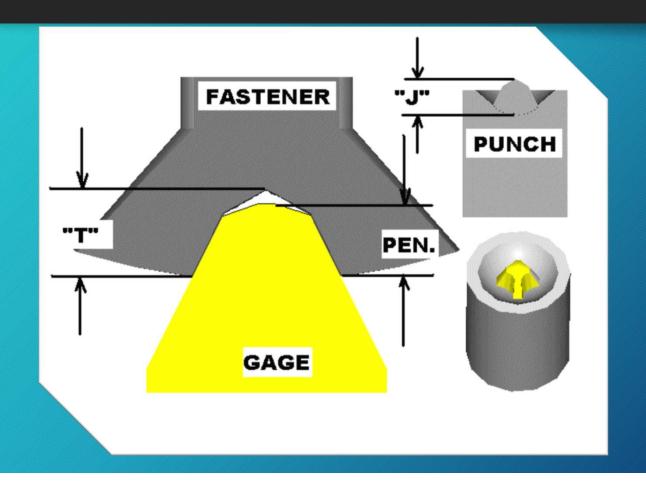






#### Measuring "J", "T" and Penetration on Pan Head Recess







#### Other Types of Fasteners Gages





Micro Screws Penetration Gage



Head Height Gage



Concentricity Gage



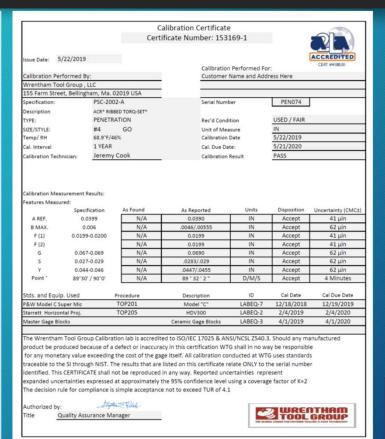
Wooble Gage



#### Gages Calibration Certificate



			tificate Number: 153007-9				ACCREDITED	
Wrentham Tool Gro		Calibration Performed Bv:				or: dress here		
	Wrentham Tool Group , LLC			customer na	nie and ad	dress here		
133 Tarrir Screet, De		12019 LISA	-					
Specification:	ISO 106		WTP#16963	Serial Number		2019-735		
Specification: Description	HEXLOBE® FINAL		W15#10303	Serial Number		2019-735		
TYPE:	GO / NO GO		PLUG GAGE	Rec'd Conditio	_	NEW		
SIZE:	HL25		PLUG GAGE	Unit of Measure		MM		
Temp/ RH GO	69.3°F/38%			Calibration Dat		5/23/2019		
Temp/ RH NO GO	69.2°F/42%			Calibration Date - NOGO		5/24/2019		
	09.2 F/	12/0				3/24/2019		
Cal. Interval		Cook			Cal. Due Date:		PASS	
Calibration Technician Features Measured:		Calif	bration Measurer					
	Specification	As Found	As Rep		Units	Disposition	Uncertainty(CMC±	
	4.451/4.465	N/A	4.4		MM	Accept	41 µm	
A	-	N/A	4.4		MM	Accept	41 µm	
A		N/A	4.4		MM	Accept	41 µm	
	0.371/0.378	N/A	Acce		MM		N/A	
	3.170/3.185	N/A N/A	3.1		MM	Accept	48 μm 48 μm	
8		N/A N/A	3.1		MM	Accept	48 μm 48 μm	
-	0.907/0.932	N/A	Acce		MM	Accept	46 μm N/A	
NOT GO	0.907/0.932	N/A	ACCI	ept	IVIIVI		N/A	
	4.560/4.566	N/A	4.5	63	MM	Accept	41 µm	
A	4.300/4.300	N/A	4.5		MM	Accept	41 µm	
A		N/A	4.5		MM	Accept	41 µm	
A Radius	0.429/0.436	N/A	Acce		MM	/ посерт	N/A	
B MAX.	2.868	N/A	2.8		MM	Accept	48 µm	
B MAX.		N/A	2.85	52	MM	Accept	48 µm	
B MAX.	*	N/A	2.8	51	MM	Accept	48 µm	
B Radius	0.637/0.647	N/A	Acce	ept	MM		N/A	
Stds. and Equip. Used Proce		rocedure	Description		ID	Cal Date	Cal Due Date	
P&W Model C Super Mic		TOP201 Mode		I "C"	LABEQ-7	12/19/2018	12/19/2019	
Mahr Federal /Amp.		TOP 202	Model 7		LABEQ-8	10/12/2018	10/12/2019	
Master Gage Blocks The Wrentham Tool			Ceramic Ga		LABEQ-3	4/1/2019	4/1/2020	



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## Accredited Lab Certification





#### Accredited Laboratory

A2LA has accredited

#### WRENTHAM TOOL GROUP, LLC

Bellingham, MA

for technical competence in the field of

#### Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This laboratory also meets the requirements of ANSI/NCSLI Z540.3-2006 and R205 – Specific Requirements: Calibration Laboratory Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 31st day of May 2019.

Vice President, Accreditation Services For the Accreditation Council Certificate Number 4180.01 Valid to April 30, 2021

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.



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