HYTORC VIETNAM-

CALIBRATION SERVICE

HYT /RC

The World's Most Trusted Industrial Bolting Systems

+84 2836 208 305 - hytorcvina.com





of industrial

bolting



support







100



patents



John Junkers founded the company

HYTORC HEADQUATERS Address: 333 RT 17 N. Mahwah, New Jersey, USA

HTTP://HYTORCVINA.COM/



QUALITY STANDARDS

HYTORC reaches for the highest levels of quality in every area of our business. From product development to customer service we strive to raise quality expectations in our industry.

Quality People

Employees and representatives of HYTORC embody the highest quality standards in every aspect of their work. From providing quick and helpful information to developing the latest safety improvements; our team is comprised of the highest quality people with equally high quality standards.

✤ Quality Service

We aim to provide the highest level of service to all HYTORC users. Our goal is to prevent downtime at your job by providing preventative maintenance, on-site service and fast turn around when repairs are necessary.

Quality Products

Every product that carries the HYTORC name is a result of countless hours of quality inspections and testing throughout all phases of design, R&D, production, and assembly. When you receive your HYTORC equipment you can be sure that you have a system to rely on.

Quality Solutions

HYTORC offers custom solutions for troublesome bolting jobs. Whether the goal is to increase safety, reduce job time, ensure joint integrity, or all of the above; HYTORC ensures the highest level of quality throughout the process - From knowledgeable on-site representatives to communication throughout the design process, you can rest assured that your project is in the best hands.





HYTORC STANDARD:



Quality Assurance ISO 9001:2015

The Lloyd's Register Group is one of the world leaders in assessing business processes and products to internationally recognized standards.

The Lloyd's Register Group provides independent assurance to companies operating high-risk, capital-intensive assets in the energy and transportation sectors, to enhance the safety of life, property and the environment.

ISO 9001:2015 Certification



Nuclear Power Co. Ltd.

HYTORC is now an approved registered supplier to Korea Hydro & Nuclear Co.

Certificate of Registration



ISO 17025:2017 covers calibration performed using standard methods, non-standard methods, and laboratorydeveloped methods.

ISO 17025:2017 is applicable to all organizations performing tests and/or calibrations. These include, for example, first-, second- and third-party laboratories, and laboratories where testing and/or calibration forms part of inspection and product certification.

PJLA Certification



Group

TÜV Rheinland Group is a globally recognized testing, inspection and certification organization offering the highest quality services for a wide range of industries worldwide.

AD 2000 Merkblatt W 0 Certificate Annex to Certificate No.: 01 202 USA/Q-11 2032



The CE Mark on a product or machine identifies it as complying with all the of safety requirements established by the European Union.

The CE Mark identifies a product as complying with the health and safety requirements spelled out in European legislation (Directives) and is mandatory for equipment operating in the European Union (EU).

Declaration of Conformity Declaration of Conformity - Lithium Gun Declaration of Conformity - Lion Gun



ISO 9001:2015

ISO 9001:2015 Certificate of Registration HTYORC South East Asia Pte. Ltd.

Certificate of Registration

Mitsubishi Hitachi

Power Systems

HYTORC is now an approved registered supplier to Mitsubishi Heavy Industries.

Certificate of Registration



Standard

Confirmation on quality assurance according to nuclear standard KTA 1401.

KTA 1401 Certificate



AUTHORIZED LETTER:



HYTORC, Division UNEX Corporation 333 Route 17N, Mahwah, NJ 07430, USA Tel: (201) 512-9500 Fax: (201) 512-9615 Email: info@hytorc.com

TO WHOM IT MAY CONCERN

This is to certify that we at HYTORC, an ISO 9001 certified USA manufacturer of high quality tools for professional use, do hereby confirm:

HYTORC VIET NAM COMPANY LIMITED

Add: D01, Tan Thuan Rd, Tan Thuan EPZ, Tan Thuan Dong Ward, Dist 7, HCMC

Tel/Fax: +028 36 208305/07

Website: https://hytorc.com/hytorc-locations

is our authorized branch company in VIETNAM, and only they can market and sell HYTORC tools in VIETNAM, as well as give HYTORC's global after-sales & service to customer.

Thank you,

Tom Evans

Customer Support Manager HYTORC USA

HYTORC 333 Route 17 North Mahwah, NJ 07430





SERVICES:

Repair & Calibration



For improved productivity, inventory management and operator safety, HYTORC mobile service technicians provide repairs, calibrations and training at your location.

Equipment Rental



From individual tools to customized bolting systems, HYTORC has the largest stock of rental equipment in the industry, available worldwide.

Flange Calculator



The calculator recommends the best torque values and bolt loads for your job as well the recommended bolting pattern based on the bolting system you are using and the number of tools on the job.

HY-Care



Improve your productivity with HY-Care, the preventative maintenance solution for industrial bolting systems.

Custom Engineering



With 50 years of experience dedicated to industrial bolting, we have solved almost every bolting challenge imaginable. Let our engineering team show you the possibilities.

Training



For improved productivity and incident reduction, HYTORC leads the industry in safety and operational training initiatives.

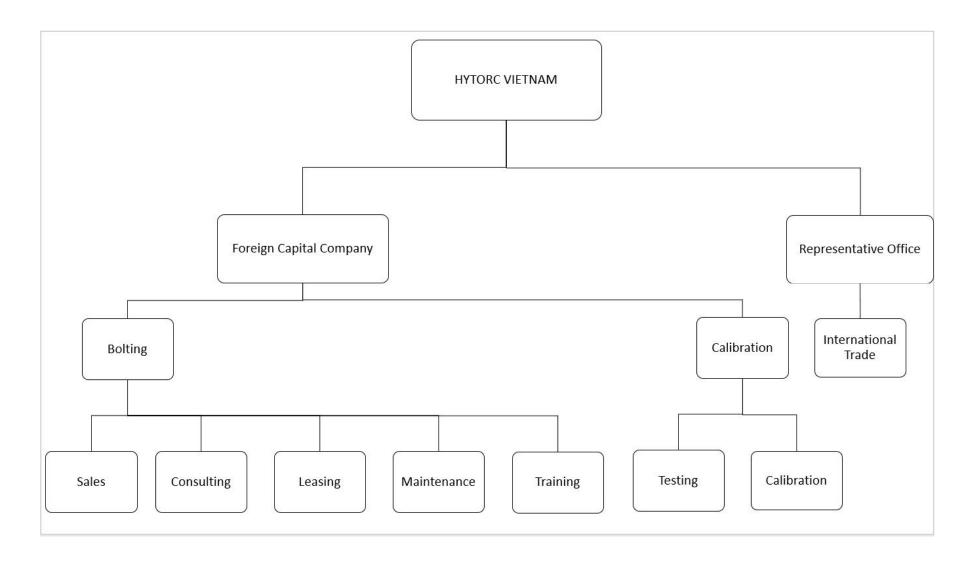
Bolting Software



HYTORC Flange Calculator, HYTORC Flange Manager and the HYTORC App







ASME

The American Society of Mechanical Engineers

THIS CERTIFICATE IS AWARDED TO Lai Mingyuan

FOR SUCCESSFUL COMPLETION OF ASME Bolting Specialist Qualification Program

THROUGH

HYTØRC'

August 23, 2018

Castabile D.C

HYTORC ENGINEERS QUALIFIED:

Lai Ming Yuan **ASME Bolting Specialist General Manager**

Tran Nhat Truong **ASME Bolting Specialist** Sales Manager

Cao Thanh Lap **ASME Bolting Specialist Customer Service** Manager





anin Cealed



HYTORC WAREHOUSE & TOOLS:





REGISTRATION CERTIFICATE

TỔNG CỤC TIÊU CHUẢN ĐO LƯỜNG CHÁT LƯƠNG

BÔ KHOA HỌC VÀ CÔNG NGHỆ CONG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM Độc lập - Tự do - Hạnh phúc

Số 3834 /TĐC-ĐL

Hà Nội, ngày 21-tháng 12 năm 2021

GIẢY CHỨNG NHÀN ĐĂNG KÝ CUNG CẤP DICH VỤ KIỂM ĐINH, HIỆU CHUẨN, THỨ NGHIỆM PHƯƠNG TIÊN ĐO, CHUẨN ĐO LƯỜNG

Căn cứ Luật Đo lường ngày 11 tháng 11 năm 2011;

Căn cử Nghị định số 105/2016/ND-CP ngày 01 tháng 7 năm 2016 của Chính phủ quy định về điều kiện hoạt động của tổ chức kiểm định, hiệu chuẩn, thứ nghiệm phương tiên đo, chuẩn đo lường;

Căn cứ Nghi định số 154/2018/NĐ-CP ngày 09 tháng 11 năm 2018 của Chính phủ sửa đổi, bổ sung, bãi bỏ một số quy định về điều kiện đầu tư, kinh doanh trong lĩnh vực quản lý nhà nước của Bộ Khoa học và Công nghệ và một số quy định về kiểm tra chuyên ngành;

Căn cứ Quyết định số 08/2019/OĐ-TTg ngày 15 tháng 02 năm 2019 của Thủ tướng Chính phủ Quy định chức năng, nhiệm vụ, quyền hạn và cơ cấu tổ chức của Tổng cục Tiêu chuẩn Đo lưởng Chất lượng trực thuộc Bộ Khoa học và Công nghệ;

Xét để nghị của Vụ trưởng Vụ Đo lưởng.

Tổng cục Tiêu chuẩn Đo lường Chất lượng chứng nhận:

1. Tên tổ chức: Công ty TNHH một thành viên Thương mại Hytorc Việt Nam.

Địa chỉ tru sở chính: Lô D01, đường Tân Thuận, Khu chế xuất Tân Thuận, phường Tân Thuận Đông, Quận 7, Thành phố Hồ Chí Minh.

Diên thoai: 028. 36208305/028. 36208306 Fax: 028. 36208307

Email: info@hytorcvina.com

Đã đăng ký cung cấp dịch vụ kiểm định, hiệu chuẩn, thử nghiệm phương tiện đo, chuẩn đo lường đối với lĩnh vực hoạt động ghi trong Phụ lục kẻm theo Giấy chứng nhân này.

Địa điểm hoạt động: Tại trụ sở chính của Công ty TNHH một thành viên Thương mai Hytorc Việt Nam và tại hiện trường.

2. Số đăng ký: ĐK 539.

3. Giấy chứng nhận đăng ký được cấp: Lần đầu./. 3

Noi nhân:

- Công ty TNHH MTV TM Hytore Việt Nam; - Chi cue TCDLCL TP. Hồ Chí Minh; - Law: VT. DL.

KT. TÔNG CUC TRƯỞNG PHÓ TỔNG CỤC TRƯỜNG





Phụ lục LINH VỤC HOẠT ĐỘNG CUNG CẤP DỊCH VỤ KIỆM ĐỊNH, HIEU CHUÁN, THỨ NGHIỆM PHƯƠNG TIỆN ĐO, CHUẨN ĐO LƯỜNG CUA CÔNG TX TNHH MỘT THÀNH VIÊN THƯƠNG MẠI HYTORC VIÊT NAM

(Ban hành kèm theo Giấy chứng nhận số 3834 /TĐC-ĐL ngày 27 tháng 12 năm 2021 của Tổng cục trưởng Tổng cục Tiêu chuẩn Đo lường Chất lượng)

TT	Tên phương tiện đo, chuẩn đo lường	Phạm vi đo	Cấp/độ chính xác	Tên dịch vụ	Ghi chú
1	Phương tiện đo moment lực	(0 + 27 116) Nm [(0 + 20 000) lbf.ft]	±3%	Hiệu chuẩn	
	iúc	[(0 + 20 000) [01.11]	9		

ISO/IEC 17025:2017 CERTIFICATION

VĂN PHÒNG CÔNG NHÀN CHÁT LƯƠNG

BỘ KHOA HỌC VÀ CÔNG NGHỆ CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM Độc lập - Tự do - Hạnh phúc

Số: 846 /OĐ-VPCNCL

Hà Nội, ngày 11 tháng 05 năm 2023.

OUYÉT ÐINH

Về việc công nhận phòng thí nghiệm

GIÁM ĐÓC VĂN PHÒNG CÔNG NHÀN CHẤT LƯỢNG

- Căn cứ Luật Tiêu chuẩn và Qui chuẩn kỹ thuật ngày 30 tháng 6 năm 2006;
- Căn cử Quyết định số 2058/QĐ-BKHCN ngày 23 tháng 07 năm 2018 về việc han hành Điều lê Tổ chức và Hoạt động Văn phỏng Công nhận Chất lượng:
- Theo để nghị của Đoàn Chuyên gia đánh giả và Ban thẩm xét.

OUYÉT ÐINH

Điều 1: Công nhận Phòng thí nghiệm:

PHÒNG KIẾM ĐỊNH HIỆU CHUẨN ĐO LƯỜNG HYTORC CÔNG TY TNHH MTV THƯƠNG MẠI HYTORC VIỆT NAM Thuộc

phù hợp theo ISO/IEC 17025:2017 với danh mục các phép hiệu chuẩn kèm theo Quyết định này.

- Điều 2: Phòng thí nghiệm mang số hiệu: VILAS 1494
- Điều 3: Phòng thí nghiệm được công nhận ở Điều 1 phải tuân thủ đầy đủ các yêu cầu về công nhân theo quy đinh hiện hành.
- Điều 4: Quyết định này có hiệu lực 3 năm kế từ ngày ký và Phòng thí nghiệm sẽ chịu sự giám sát định kỳ mỗi năm một lần.

Noi nhân:

- Đơn vị có tên tại Điều 1;
- HS đánh giả;
- Luu VT.





CHỨNG CHỈ CÔNG NHÂN Certificate of Accreditation

Phòng thí nghiêm:

PHÒNG KIỆM ĐỊNH HIỆU CHUẢN ĐO LƯỜNG HYTORC CÔNG TY TNHH MTV THƯƠNG MẠI HYTORC VIỆT NAM

Laboratory:

HYTORC MEASUREMENT DEPARTMENT HYTORC VIETNAM COMPANY LIMITED

Địa điểm PTN/ Lab location:

Lô D01, đường Tân Thuận, khu chế xuất Tân Thuận, phường Tân Thuận Đông, Quận 7, TP HCM

đã được đánh giá và phù hợp các yêu cầu của has been assessed and found to conform with the requirements of

ISO/IEC 17025:2017

Lĩnh vực công nhận Field of Accreditation **ĐO LƯỜNG - HIỆU CHUẨN** Measurement - Calibration Mā số Accreditation No

VILAS 1494

GIÁM ĐỐC VĂN PHÒNG CÔNG NHÂN CHẤT LƯƠNG (Director of Bureau of Accreditation)

VAN PHON CONG NHÀN

Nghy/ Date of Issue: 11/05/2023 (Annex of decision: 846/QD-VPCNCL date 11/05/2025) AN THI THU HA Hiệu lực công nhân/ Period of validation: up to 11/05/2026 Hiệu lực lần đầu/ Beginning of accreditation: 11/05/2023

TRÀN THI THU HÀ HYT /RC

CALIBRATION SERVICE:

- Hydraulic Torque Wrench Calibration Services at Hytorc Vietnam officice
- For improved productivity, inventory management and operator safety, HYTORC mobile service technicians provide repairs, test and training at your location.

AKO SYSTEM:





AKO System – Pressure Transducer & Digital Indicator Certification

		CERTIFICATE O	OF CALIBRA	TION			CUSTON
	"The Standard by Wh	pecialties	D/IEC 17025 Accredite P: (860) 298-97 F: (860) 683-41 www.akotorque.c	65 26	Fild Calibration Accreditation No. 796	89	
CUSTOMER: HYTOR	C VIETNAM COM	1PANY LIMITED		CERTIFICATION	NO. 500938		
	N THUAN RD, T						
	UAN DONG WA						
001.7				AS RECEIVED: Out of	Tolerance		
				AS LEFT: In Toler			
OUR LAB NO. 125490		YOUR REFERENCE NO. CAKO22001		CAL. DATE 07/25/22	DUE DATE Determined by Cus	tomor	
PART NUMBER:	SERIAL NUMB		DESCRIPTION:	07/25/22	PHYSICAL CONDITION		
TSD10KPT	245267	ER.	Pressure Tra	ansducer	Used - Good		
TSD6500-2	21230		Digital Indic		Used - Good		
Uncerta	WI-103, Rev. B	f Reading from 10% to	100% of capa		HUMIDITY: 52 %	52 C	
PROCEDURE(S): A.K.O.	WI-103, Rev. B	f Reading from 10% to DESCRIPTION Dead Weight Pressur				6	
PROCEDURE(S): A.K.O. STANDARDS USED FOR CA MODEL T-155-1/C Calibration tolerand This calibration was	WI-103, Rev. B UBRATION: 5/N 101921 :e ratio is 4:1 or ; performed in a	DESCRIPTION Dead Weight Pressur greater. ccordance with ISO/IE0	re Tester (C 17025:2017(CALIBRATION DATE 06/03/21 (E), ANSI/ISO/ASQ (RATION LOCATION: In La DUE DATE 08/03/22 Q10012-2003(E),	5 1 <u>b</u>	
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USTOMER: HYTORC VIETNAM COMPANY LIMITED D01, TAN THUAN RD, TAN THUAN EPZ TAN THUAN DONG WARD DIST. 7, HCMC VIETNAM CERTIFICATION NO. 500938

CAL. DATE: 07/25/22 DUE DATE: Determined by Customer

	STANDARD	As Found	As Left	
1	1 000 psi	995 ₃	999	
2	2 000 psi	1 995 3	1 999	
3	3 000 psi	2 996 ₂	2 999	
4	4 000 psi	3 994 ₃	3 999	
5	5 000 psi	4 993 3	4 999	
6	6 000 psi	5 993 ₂	5 998	
7	7 000 psi	6 992 ₂	6 998	
8	8 000 psi	7 990 ₃	7 998	
9	9 000 psi	8 990 z	8 998	
0	10 000 psi	9 989 ₂	9 998	

Although this reading is within limits, compliance could not be determined when including the K=2, 95% confidence interval.

This reading is out of tolerance.

The reported expanded uncertainty is based on the combined standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Page 2 of 2

HTTP://HYTORCVINA.COM/



SALE01SVN@HYTORCVINA.COM

AKO System – Torque Transducer & Digital Indicator Certification

CERTIFICATE OF CALIBRATION ISO/IEC 17025:2017 Accredited Torque Specialties P: (860) 298-9765 he Standard by Which Torque is Calibrated F: (860) 683-4126 50 Baker Hollow Rd., Windsor, CT 06095 www.akotorgue.com CUSTOMER: HYTORC VIETNAM COMPANY LIMITED CERTIFICATION NO. 500557 D01. TAN THUAN RD. TAN THUAN EPZ TAN THUAN DONG WARD DIST. 7, HCMC VIETNAM AS RECEIVED: In Tolerance AS LEFT: In Tolerance OUR LAB NO YOUR REFERENCE NO. CAL. DATE DUE DATE 125490 CAKO22001 07/25/22 Determined by Customer PART NUMBER SERIAL NUMBER: DESCRIPTION PHYSICAL CONDITION: TSD20011 7924 **Torque Transducer** Used - Good TSD6500-2 21230 **Digital Indicator** Used - Good Capacity: 20 000 lbf-ft System Accuracy: 0.1% of Reading ±2 lbf-ft from 10% to 100% of capacity ±2 lbf·ft below 10% of Capacity TEMPERATURE: 73 °F Uncertainty: 0.023% of Reading from 10% to 100% of capacity HUMIDITY: 50 % CALIBRATION LOCATION: In Lab 0.029% of Reading below 10% of capacity PROCEDURE(S): A.K.O. WI-101, Rev. C STANDARDS USED FOR CALIBRATION: CALIBRATION DATE MODEL DUE DATE S/N DESCRIPTION TSD20052 1954 **Calibration Arm** 10/26/20 10/26/22 1SL/P1-50 Class F Weight Set 08/10/20 08/10/22 SQU-50 Class F Weight Set 09/01/20 09/01/22 Calibration tolerance ratio is 4:1 or greater. This calibration was performed in accordance with ISO/IEC 17025:2017(E), ANSI/ISO/ASQ Q10012-2003(E), ANSI/NCSL Z540.1-1994 (R2002), and ANSI/NCSL Z540.3-2006 (R2013) with standards traceable to the International System of Units (SI) through the National Insitute of Standards and Technology (NIST). THE RESULTS ABOVE RELATE ONLY TO THE ITEM(S) CALIBRATED. THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT WRITTEN APPRO A.K.O., INC. TORQUE SPECIALTIES THE ABOVE PARTS HAVE BEEN CAREFULLY CALIBRATED IN ACCORDANCE WITH THE ABOVE METHODS. THIS CALIBRATION IS LIMITED TO DEFECTS DISCLOSED FROM ABOVE METHOD ONLY. OUR LIABILITY NOT TO EXCEED COST OF RE-INSPECTION OR RE-CALIBRATION AUTHORIZED BY: Juliannes Juliann G. Wiezalis Calibration Lab Manager ISSUE DATE: 07/25/22 Page 1 of 2 KO/CERT/12/21

CUSTOMER: HYTORC VIETNAM COMPANY LIMITED D01. TAN THUAN RD. TAN THUAN EPZ TAN THUAN DONG WARD DIST. 7, HCMC VIETNAM

TSD20011 S/N:7924 Torque Transducer

CERTIFICATION NO. 500557

TSD6500-2 S/N:21230 Digital Indicator

CAL. DATE: 07/25/22 DUE DATE: Determined by Customer

STANDARD	As Found CW	As Found CCW	As Left CW	As Left CCW
200 lbf-ft	200	200	200	200
400 lbf-ft	400	400	400	400
600 lbf-ft	600	600	600	600
800 lbf-ft	800	800	800	800
1 000 lbf.ft	1 000	1 000	1 000	1 000

4	800 lbf-ft	800	800	800	800
5	1 000 lbf-ft	1 000	1 000	1 000	1 000
6	1 200 lbf·ft	1 200	1 200	1 200	1 200
7	1 400 lbf-ft	1 400	1 400	1 400	1 400
8	1 600 lbf-ft	1 600	1 600	1 600	1 600
9	1 800 lbf-ft	1 800	1 800	1 800	1 800
10	2 000 lbf-ft	2 000	1 998	2 000	1 998
11	4 000 lbf-ft	4 000	3 998	4 000	3 998
12	6 000 lbf-ft	6 002	5 998	6 002	5 998
13	8 000 lbf·ft	8 002	7 998	8 002	7 998
14	10 000 lbf-ft	10 004	9 996	10 004	9 996
15	12 000 lbf-ft	12 006	11 996	12 006	11 996
16	14 000 lbf-ft	14 006	13 996	14 006	13 996
17	16 000 lbf-ft	16 006	15 994	16 006	15 994
18	18 000 lbf-ft	18 008	17 994	18 008	17 994
19	20 000 lbf·ft	20 012	19 992	20 012	19 992

Procedure and using the appropriate TSD Torque Transducer Calibration Systems, we guarantee you will achieve for each Torque Transducer a repeated accuracy of 0.1% of Reading ± one LSD from 10% to 100% of the transducer range. The accuracy below 10% of the transducer range is ± one LSD

The reported expanded uncertainty is based on the combined standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

TECHNICIAN: 51M, 51C

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CALIBRATION PROCEDURE-USING APPROPRIATE A.K.O CALIBRATION

TSD HT1002 HYD WRENCH PROCEDURE

PROCEDURE FOR TESTING AND CALIBRATING A HYDRAULIC TORQUE WRENCH USING A.K.O. Inc. TSD PRECISION TORQUE STANDARDS.

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1. PRELIMINARY INSTRUCTIONS

This Procedure is meant to provide a step by step guide to test a Hydraulic Torque Wrench and should be read in its entirety before executing any steps. For the purpose of this procedure, it is assumed that A.K.O. Inc. Torque Specialties Division Torque and Pressure standards are used. There are three major components needed. <u>One</u>, an A.K.O. Inc. <u>Torque Standard</u> such as a TSD 10035-HT, TSD 20035-HT, TSD 40055-HT, <u>Two</u>, a regulated hydraulic supply capable of producing 10,000 PSI with a TSD 10KPT <u>Pressure Standard</u>. <u>Three</u>, a Controller/Computer with the Hydraulic version of <u>Torq-Cal 2000</u> software.

1.1 IMPORTANT SAFETY NOTES

Prior to the Test & Calibration operation, ensure that the UUT (Unit Under Test) is correctly lubricated with all parts, and safety latches, locks, connections and fittings are all in good operating order. For best results always test the UUT with the PISTON fully retracted.

Always make sure Adapters and Drives are securely installed, and the hydraulic connections securely connected, with NO LEAKAGE. Verify that all hydraulic hoses are operating correctly and be sure not to kink them. Clean and dry all oil spills. Keep Calibration System clean and free of oil.

It is very important that the Swivel Connector Assembly on the UUT (the swivel block that the hydraulic hoses from the pump connect to) is directed UPWARDS to clear any obstructions from the Calibration Stand components. If the Swivel Assembly is drooping down, it may interfere with the Stand's structure causing it to break off. If the Swivel Assembly is damaged or ruptured it may result in catastrophic damage to the wrench and a substantial oil discharge.

When using a "Motorized Hydraulic Pressure System" make sure the Pressure Regulator is in the MINIMUM pressure setting prior to turning the Hydraulic Power Supply ON. With the A.K.O. Inc. TSD10K-RHYD the MINIMUM setting is when there is NO resistance while turning the Pressure Regulator. It will DAMAGE the Regulator if the handle is turned all the way CCW and tightened. Also it is very important that the pump be turned OFF when a load is not being supplied. Leaving the pump ON or in the NEUTRAL position will cause the oil inside the pump to cycle continuously and as a result heat the oil until it is too hot and will trip the Thermal Switch on the pump and possibly DAMAGE the pump.

Always make sure that ALL Calibration Equipment is within the Capacity of the UUT. This includes Torque Standard, Pressure Standard, and any adapters used in the test.

HYDRAULIC TORQUE WRENCH CALIBRATION PROCEDURE USING APPROPRIATE A.K.O. CALIBRATION EQUIPMENT

PROCEDURE NUMBER: HT 1002 Rev. B

DATE: 6/22/2011 RESPECTFULLY SUBMITTED BY: Juliann S. a

NOTICE

While every precaution has been taken in the preparation of this procedure, Torque Specialties Div. A. K. O. Inc. assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the equipment or information contained herein.

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CALIBRATION PROCEDURE-USING APPROPRIATE A.K.O CALIBRATION

PROCEDURE FOR TESTING AND CALIBRATING A HYDRAULIC TORQUE WRENCH USING A.K.O. Inc. TSD PRECISION TORQUE STANDARDS.

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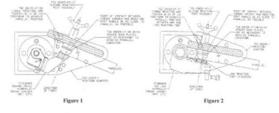
2. MECHANICAL & HYDRAULIC SETUP

2.1 INSTALL ADAPTERS

Before Installing the UUT onto the TSD Torque Standard identify the size of the drive on the UUT as well as the type and Capacity. Select the correct adapter(s) for the Capacity and size of the drive of the UUT and install it onto the Torque Standard.

2.2 INSTALL THE WRENCH

Install the wrench into the adapter and ratchet the wrench towards the post until the UUT Reaction Foot is PARALLEL with the TSD Reaction Arm assembly. It is imperative that the UUT Reaction Foot be parallel with the TSD 20035-HT-20 Reaction Arm assembly(see shaded areas in figures 1 and 2). Keep in mind there are three Reaction Arm adjustments to properly set the appropriate geometry for the "Unit Under Test". To adjust the Arm use the T Allen Wrench to remove the 1"-8 Boll in the torque transducer end of the arm. Position the arm to one of the three positions to bring the torque wrench reaction foot as close to parallel with the TSD 20035-20 as possible while leaving enough space in between for the TSD 20035-13 Reaction Post. Re-install the 1"-8 Bolt into the Arm and tighten to 100 Lb.Ft. Torque. Bring the TSD 20035-13 Reaction Post to the center of the torque wrench reaction foot so that it is positioned in between the UUT foot and the Reaction Arm. If needed install the appropriate Shim Plates in between the Post and the Arm to create a Parallel condition. Tighten the post to the arm.



2.3 POSITION THE RATCHET

Once the PARALLEL condition has been satisfied, take into consideration the position of the ratchet. Always test the UUT with the ratchet position in the beginning of the stroke. The ratchet position can be adjusted by removing the UUT from the test Stand and rotating it 90 degrees CW, Re-install the UUT onto the Stand and ratchet the wrench towards the post. Repeat this step until the ratchet position is in the beginning of the stroke. If positioned correctly there should be $\frac{34}{7}$ or less of play between the UUT foot and TSD 20035-13 Reaction Post.

PROCEDURE FOR TESTING AND CALIBRATING A HYDRAULIC TORQUE WRENCH USING A.K.O. Inc. TSD PRECISION TORQUE STANDARDS.

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2. MECHANICAL & HYDRAULIC SETUP (continued)

2.4 CONNECT THE HOSES

Now that the UUT is set up in the Torque Standard with the correct ratchet position and parallel condition, connect the hydraulic hoses from the Hydraulic Power Supply to the UUT. Connect the "SUPPLY" Hydraulic Hose from the Pump to the "A" (ADVANCE) fitting on the UUT. Connect the "RETURN" Hydraulic Hose to the "R" (RETURN) fitting. Never reverse these connections. Ensure the Quick Disconnect fittings are fully made-up and TIGHT. Position the Swivel Connection Assembly pointed UPWARD to keep hoses clear of the PINCH POINT.

2.5 ZERO THE INDICATOR

Assuming that both the Torque Standard and Pressure Standard are properly connected to the Indicator, turn on the Indicator. Observing the dual display, ensure that the Pressure Standard is selected as the TOP Display and the Torque Standard is selected as the BOTTOM Display. Press the "ZERO" button on the touchpad on the front of the indicator. Select each of the displays individually and verify that both are reading "0".

3. COMPUTER SETUP

The TSD 3000, which is the Computer Assembly mounted on the top of the Hydraulic Power Supply, is loaded with TORQ-CAL 2000 Hydraulic Torque Wrench Software and configured by A.K.O. Inc. prior to shipping. It is assumed that the two RS232 cables are connected to both the indicator and computer in there appropriate ports and operational.

3.1 OPEN TORQ-CAL 2000

Now that the Mechanical and Hydraulic setup is complete turn the Computer ON. Open the HYDRAULIC version of <u>Torq-Cal 2000</u> using the shortcut on the Desktop. The program will default to the Main Test Activity Screen.

3.2 LOAD THE TEMPLATE FOR UUT

Locate the Template Window in the bottom right hand corner of the Main Test Activity Screen. This window contains templates that have already been created. If the Template associated with the UUT already exists Double-click on it and proceed to SECTION 3.4, otherwise continue to SECTION 3.3.



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3. COMPUTER SETUP (continued)

3.3 CREATE A TEMPLATE

A Hydraulic Torque Wrench (UUT) that does not have a template in the TORQ-CAL 2000 Software will need to have a template created for it. Templates are stored in the Template Window on the Main Test Activity Screen. To create a new template simply Right Mouse Click in the Template Window. The ADD, DELETE, EDIT window will appear. Click on ADD and the CREATE OR EDIT TEMPLATE Window will open.

Start from the top left and enter the Model Number, or Make and Model of the UUT in the TEMPLATE NAME dialogue box. Enter the same information into the MODEL NUMBER dialogue box. Almost all Hydraulic Wrenches have a capacity of 10,000 PSI. Therefore, in the WRENCH CAPACITY dialogue box enter "10000" without any commas or units specified. Do NOT enter anything in the RATIO dialogue box.

Now locate the SECONDARY READING Window. Click on the downward arrow under TRANSDUCER to reveal the drop down menu and select "TSD 20011". Select the radio button labeled TORQUE, select the radio button labeled METER 2, and select the radio button labeled "LB-FL" as the STANDARD. In the PRIMARY READING Window click on the downward arrow under TRANSDUCER to reveal the drop down menu and select "TSD 10011". Select the radio button labeled PRESSURE, select the radio button labeled METER 1, and select the radio button labeled PSI as the STANDARD.

In the TOOL TYPE Window select the radio button labeled HYDRAULIC. Now click in the open window below the ADD button. This is the input window for the SETTINGS which refers to the test point settings. Enter "1500" in this window as this is the first pressure setting to be tested. Click the ADD button and observe how the value has transferred under SETTINGS. Continue to add all the desired test points which are typically 1500 and every thousand from 2000 – 10000 for a total of ten Settings. (NOTE: It is important to click the ADD button when entering SETTINGS with the mouse and NOT to use the "enter" button on the keyboard as this will exit the CREATE TEAMPLATE Window without saving.) Click the SAVE button and then the OK button. Now the new template will be in the list in the TEMPLATE Window. Double Click on the newly made Template to load the test.

3.4 ENTER CUSTOMER DATA

The CUTOMER DATA Window opens when a template is selected. All of these fields can be edited to provide information about the UUT. This information is specific to the wrench and is used when generating a certification. All of the fields, except for the NEXT CAL DATE field, can be edited by clicking in the PROCEDURE FOR TESTING AND CALIBRATING A HYDRAULIC TORQUE WRENCH USING A.K.O. Inc. TSD PRECISION TORQUE STANDARDS.

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3. COMPUTER SETUP (continued)

3.4 ENTER CUSTOMER DATA (continued)

dialogue box below each item and entering in the corresponding data. To set the NEXT CAL DATE elick on the SET DATE button to the right. The DATEFORM Window opens. Use the Calendar to highlight the day the UUT is due for calibration and elick the OK button. The ONLY field that MUST be filled out to continue is the TOOL ID/SN field. Once all the relevant fields are filled elick the DONE button. The window will close and return to the MAIN TEST ACTIVITY screen.

3.5 ENTER OPERATOR ID AND START TEST

If the COMPUTER SETUP has been followed correctly the TOOL ID/SN dialogue box should be filled in with the Serial Number of the UUT. Also the graph under TEST ACTIVITY should have populated with the SETTINGS of the template selected earlier.

Enter the name or ID of the operator in the dialogue box below OPERATOR ID. This is a required entry.

4. TEST THE UUT

The TSD Calibration Equipment and the UUT are now set up and ready to begin the test. The next step will be to EXERCISE the wrench to its Capacity prior to taking readings to achieve the most accurate results.

4.1 EXERCISE THE UUT

Up to this point the TSD 10K-RHYD Regulated Hydraulic Power Supply should have been OFF. Make sure the Directional Pressure Lever is in the NUETRAL position, all hoses are properly connected, and the Pressure Regulator is at its lowest setting. Turn the Pump ON by flicking the jog switch up on the pump control box. Press the Green START button on the control box to energize the pump. The oil is now cycling through the pump. The UUT is now ready to be pressurized.

Pull the Directional Pressure Lever CCW to put the Lever in the ADVANCE position. Hydraulic Oil is now flowing through the wrench. Observe the UUT to ensure it is functioning properly. Observe the Indicator to ensure both of the displays are reading. Slowly turn the Regulator CW to increase the Pressure being supplied to the UUT. Turn the Regulator CW until the Top display is reading 10000 PSI and hold for 3 to 10 seconds. Turn the Regulator CUW to back-off the Pressure until there is no more resistance and the Regulator turns freely. Do not



CALIBRATION PROCEDURE-USING APPROPRIATE A.K.O CALIBRATION

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4. TEST THE UUT (continued)

4.1 EXERCISE THE UUT (continued)

tighten Regulator. Push the Directional Pressure Lever CW into the NUETRAL position, wait 2 to 3 seconds, push the Lever into the RETRACT position, wait 2 to 3 seconds for the piston in the wrench to retract, pull the Lever back into the NUETRAL position. Make sure the Torque display on the Indicator returns to 0, and that the Pressure display is less than 300 PSI. Press the Red STOP button on the pump control box. The Pressure Display should return to 0 and the pump should be off. The UUT is now "exercised".

4.2 TAKE READINGS

Click the START TEST button in the Torq-Cal 2000 software on the Main Test Activity Screen. The MANUAL CONTROL window will open and the software is ready to begin the test. Press the Green START button on the control box to energize the pump. Pull the Directional Pressure Lever CCW to put the Lever in the ADVANCE position. Observe the Indicator to ensure both of the displays are reading. Slowly turn the Regulator CW to increase the Pressure being supplied to the UUT. Turn the Regulator CW until the Top (Pressure) display is reading identical to the First Test Setting which is typically 1500 PSI. Once the Setting is reached, observe the Torq-Cal 2000 software to ensure the Pressure and Torque reading were captured in the graph under TEST ACTIVITY. Continue to increase the pressure until the next Setting is reached and make sure the readings were captured. If the Setting was NOT captured, the software will not collect any more data until the field for that Setting is filled. Stop increasing the pressure and back it off below the Setting. Increase the pressure slower to capture the data, Repeat if necessary. Increase the pressure to each Setting until all of the Data has been captured and the Capacity of the UUT has been reached. The TEST COMPLETE Window opens. Turn the Regulator CCW to back-off the Pressure until there is no more resistance and the Regulator turns freely. Push the Directional Pressure Lever CW into the NUETRAL position, wait 2 to 3 seconds, push the Lever into the RETRACT position, wait 2 to 3 seconds for the piston in the wrench to retract, pull the Lever CCW back into the NUETRAL position. Make sure the Torque display on the Indicator returns to 0, and that the Pressure display is less than 300 PSI. Press the Red STOP button on the pump control box. The Pressure Display should return to 0 and the pump should be off. Click the OK button in the TEST COMPLETE Window.

4.3 SAVE THE TEST

It is important to SAVE the test before generating a certification. To save select FILE from the Toolbar in the top left corner of the Torq-Cal 2000 Software. The drop down menu will appear. Select SAVE. The SAVE AS Window will open. Input the file name as the SN of the UUT which is the default. Click SAVE. Torq-Cal 2000 saves files using basic Windows convention. PROCEDURE FOR TESTING AND CALIBRATING A HYDRAULIC TORQUE WRENCH USING A.K.O. Inc. TSD PRECISION TORQUE STANDARDS.

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5. CREATE A CERTIFICATION

To Create a Certification Form click on the RESULTS button on the MAIN TEST ACTIVITY Screen. The OPEN Window will open. Select "HyTorcStd.xls" file. This will open a Microsoft EXCEL sheet. All of the data that was entered into the CUSTOMER DATA Window earlier will populate into the Certification. Select appropriate TAB from the bottom of the Excel sheet and fill in information specific to the UUT. Select Print to print out the Certification.

The Test is now complete and the UUT can be removed from the test stand. All Calibration Equipment should be cleaned stored and can be turned OFF if desired. NEVER leave the pump ON or RUNNING. Make sure to turn the switch on the Pump Control Box OFF. Check that the Data from the Certification is within the wrench or UUT's tolerance. If it is out of tolerance the UUT should be Greased and well Lubricated and Test Procedure repeated until the UUT is in tolerance.

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CERTIFICATE FORM

HYT	RC®	PHÒNG KIẾM ĐINH HI	CH HỮU HẠN MTV TM HYTORC VIỆT NAM ỆU CHUẨN ĐO LƯÔNG HYTORC (ĐK 539) Thuận, KCX Tân Thuận, P. Tân Thuận Đông, Quận 7, HCM 80 Số Fax: (Jo28) 36 208 30 (2023) (302 80) Email: info@hytorcvina.com		HY	F / R C [®] Since 1988	CÔNG TY TRÁCH NHIỆM PHÒNG KIẾM ĐỊNH HIỆU Địa chỉ / Add: Ló Đơi, Đ. Tân Th Điện thoại / Tếi: (028) 36 208 305 Web : www.hytorcvina.com Em	uận, KCX Tân Thuận, P. Số Fax : (028) 36 208 1	Tân Thuận Đông, Quận 7, HCM 307
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<i>Torque</i> Khách hàng:					1500				
Customer					2000 3000				
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