

Certificate of Test

Client:	CapRite 13100 Wortham Center Dr. #333 Houston, Texas 77065	Date:	12 November 2024
Client Contact:	David Brown	SES Document No.:	2024_2674-CT-01_Rev1
PO Number:	1004	Project Manager:	Taylor Yeary, PE
		Date of Testing:	10/9-15/2024

Project/Test Description: CapRite contracted SES to perform a series of tests to determine thread protector fitment for installation and removal at various temperatures in addition to API Specification 5CT dimensional stability across different temperatures.

Test Sample Identification: Tenaris 5-1/2" 23lb-P110 ICY TORQ SFW Casing Thread Protectors: CAP001 – CAP003, CAP007
Tenaris 5-1/2" 20lb-P110 ICTSH W625 Casing Thread Protector: CAP004 – CAP006
(See Attachment 3 for CapRite drawing and material information.)

Test Equipment: Thermotron Environmental Chamber, Digital Caliper (SES-073),
O.D. Micrometer (SES-081), I.D. Micrometer (SES-158)

Procedure: Dimensional Stability testing was performed per API Specification 5CT, 11th Edition Annex F Section F.3. See Attachment 3 for Dimension Locations. Fitment testing followed CapRite's requests of checking fitment at ambient, 20°F, 0°F, -20°F, -50°F, and 150°F. Fit testing was performed by two handed installation and removal onto the appropriate casing pin, which were provided by CapRite.

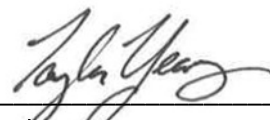
Results: Fitment and Dimensional Stability testing was successfully completed, see Attachment 1 for results summary and dimensional stability measurement log. No damage to casing pin threads was observed from the fitment testing.

Prepared by:



Cole Gatz
Project Engineer

Reviewed by:



Taylor Yeary, PE
Associate

This certificate and report referenced herein, if any, are intended for the exclusive use of CapRite. In performing this test, SES has relied on information provided by the Client and may not have independently verified such information. The results and any data provided by SES in any format ("Data") apply only to the sample(s) tested and shall not be considered indicative of the qualities of apparently identical or similar samples. The Data summarize results and contain findings only, and SES offers no recommendations, opinions, or conclusions. This certificate does not indicate successful or unsuccessful completion of a test or qualification program. SES disclaims all warranties, express or implied, and liability for the performance of the tested sample(s) and use of any Data.

Certificate of Test

List of Attachments:

Attachment 1: Fit Test and Dimensional Stability Summary Tables

Attachment 2: Chart of Temperature Cycling

Attachment 3: Sample Drawing and Material Datasheet

Attachment 4: Testing and Sample Photographs

Attachment 5: Calibration Certificates

Attachment 1: Fit Test and Dimensional Stability Summary Tables



STRESS
ENGINEERING
SERVICES INC.

SES PN: 2024_2674
Project Manager: T. Yeary
Testing Performed by: C. Gatz

CapRite Thread Protector Fitment Testing

Cap Size	Pipe Weight	Sample SN	Finger Cut Length (inches)	Fitment Mode	Temperature (°F) - Chronological Order								Notes		
					77	24	18	0	-19	-50	76	146		76	
5.5	23#	CAP001	1/8	Installation	Yes	Yes	Yes	Yes	N/A	N/A	N/A	Yes ¹	Yes ³	Tightest fitting cap of batch at all temps – halted fit testing after OF test per client request – Resumed at 150F 1. Req'd impact force to remove 2. Very easy on/off but plenty of grip on pipe 3. Tighter than other 23# caps at this temp	
				Removal	Yes	Yes	Yes	No ¹	N/A	N/A	N/A	Yes ²	Yes ³		
		CAP002	1/4	Installation	Yes	Yes	Yes	Yes ¹	Yes	Yes	Yes	Yes	Yes	Overall easier than CAP001 in all temps, harder than CAP003 for some, as expected from cut length 1. Significantly difficult 2. Req'd impact force to remove	
				Removal	Yes	Yes	Yes	Yes ¹	Yes	Yes ²	Yes	Yes	Yes		
		CAP003	1/2	Installation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1. Req'd impact force to remove	
				Removal	Yes	Yes	Yes	Yes	Yes ¹	Yes	Yes	Yes	Yes		
	20#	CAP007	5/8	Installation	N/A	N/A	N/A	N/A	N/A	Yes	Yes	Yes	Yes	Introduced to the sample set beginning at -20F fit test	
				Removal	N/A	N/A	N/A	N/A	Yes	Yes	Yes	Yes	Yes		
		CAP004	N/A	Installation	Yes	Yes	Yes	Yes	Yes	Yes	Yes ¹	Yes	Yes	1. 20# Caps slightly tighter than 23# caps at this temp	
				Removal	Yes	Yes	Yes	Yes	Yes	Yes	Yes ¹	Yes	Yes		
		CAP005	N/A	Installation	Yes	Yes	Yes	Yes	Yes	Yes	Yes ³	Yes	Yes	1. Req'd some wiggling to remove 2. 20# Caps slightly tighter than 23# caps at this temp	
				Removal	Yes	Yes	Yes	Yes ¹	Yes	Yes	Yes ²	Yes	Yes		
			CAP006	N/A	Installation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1. Req'd some wiggling to remove 2. 20# Caps slightly tighter than 23# caps at this temp
					Removal	Yes	Yes	Yes	Yes ¹	Yes	Yes	Yes	Yes	Yes	



**CapRite Thread Protector Dimensional Stability Testing
Measurement Log**

SES PN: 2024_2674

Project Manager: T. Yeary

Measurements By: C. Gatz

CAP001		23#	
Temperature (°F)	OD (inches)	ID (inches)	Length (inches)
77	6.073	5.53	10.676
-50	6.035	5.528	10.411
76	6.072	5.638	10.677
147	6.107	5.591	10.722
76	6.072	5.535	10.673

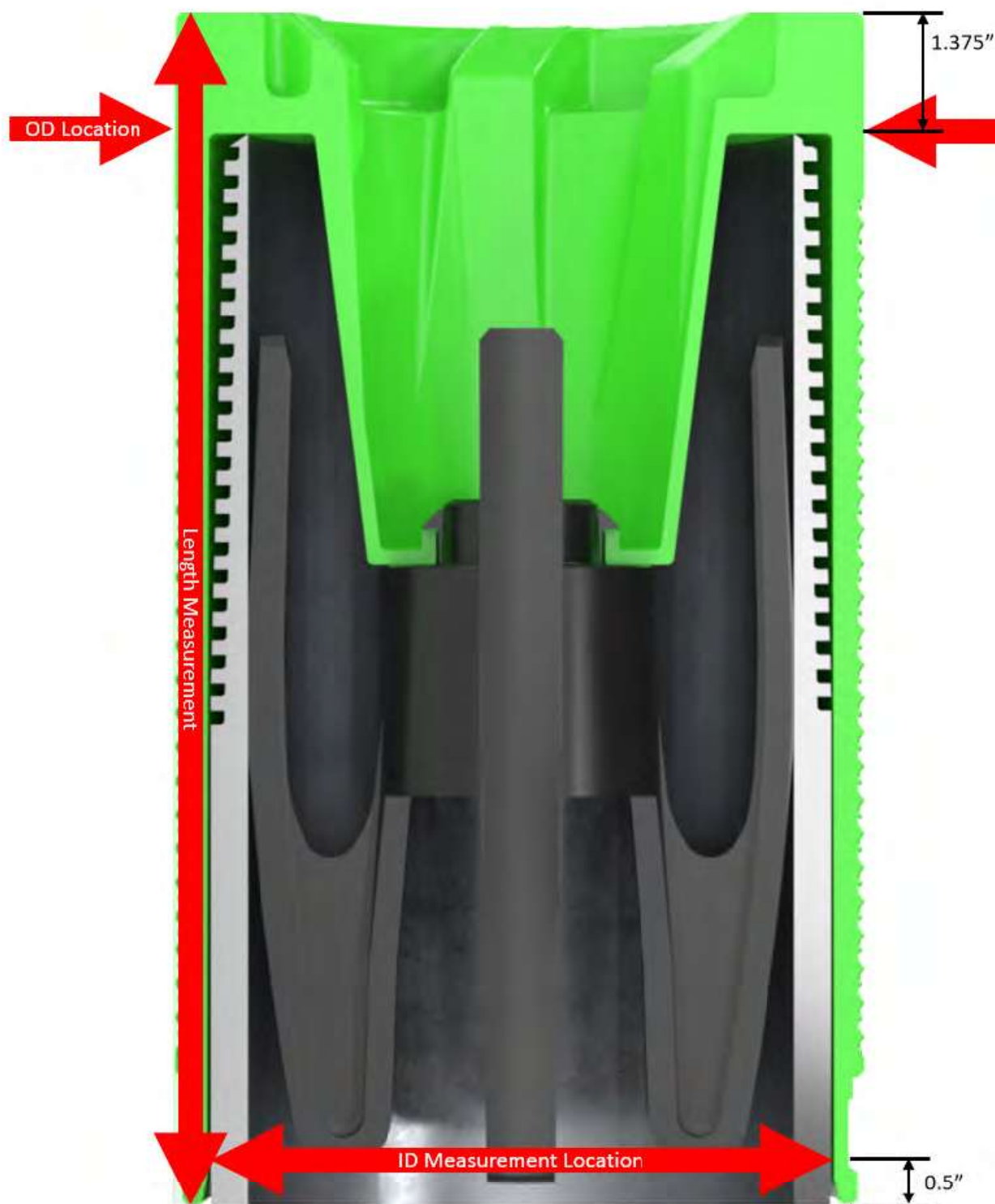
CAP002		23#	
Temperature (°F)	OD (inches)	ID (inches)	Length (inches)
77	6.039	5.698	10.695
-50	6.021	5.682	10.294
76	6.063	5.702	10.691
147	6.097	5.734	10.734
76	6.064	5.703	10.686

CAP003		23#	
Temperature (°F)	OD (inches)	ID (inches)	Length (inches)
77	6.07	5.683	10.685
-50	6.033	5.499	10.347
76	6.07	5.685	10.679
147	6.102	5.73	10.724
76	6.07	5.69	10.675

CAP004		20#	
Temperature (°F)	OD (inches)	ID (inches)	Length (inches)
77	6.068	5.69	10.682
-50	6.035	5.664	10.56
76	6.069	5.692	10.677
147	6.102	5.728	10.728
76	6.067	5.693	10.674

CAP005		20#	
Temperature (°F)	OD (inches)	ID (inches)	Length (inches)
77	6.066	5.681	10.678
-50	6.036	5.643	10.555
76	6.066	5.677	10.676
147	6.097	5.72	10.72
76	6.064	5.675	10.67

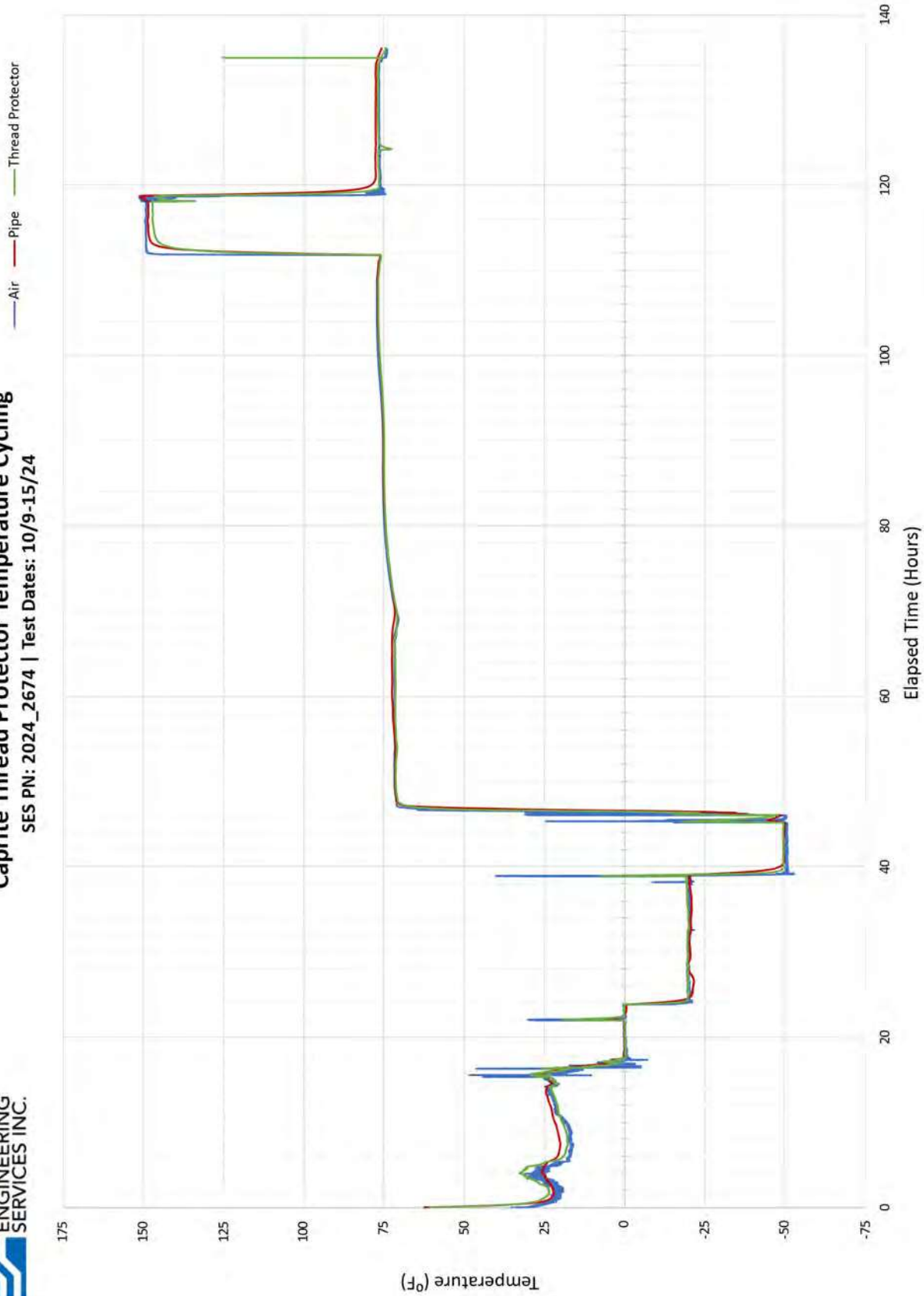
CAP006		20#	
Temperature (°F)	OD (inches)	ID (inches)	Length (inches)
77	6.079	5.665	10.682
-50	6.042	5.614	10.506
76	6.079	5.668	10.681
147	6.11	5.698	10.724
76	6.076	5.659	10.676

Dimensional Stability Test Measurement Locations

Attachment 2: Chart of Temperature Cycling



Caprite Thread Protector Temperature Cycling
SES PN: 2024_2674 | Test Dates: 10/9-15/24



Attachment 3: Sample Drawing and Material Datasheet



Polypropylene **TI4007G**

Sub-group
Impact Copolymer

Description
Extra high izod impact, superior low temperature drop impact

Applications
Suggested uses include profiles, tubing, squeeze bottles

Process
UL temperature index of 100°C

Control Properties:	ASTM Method	Units	Values
Nominal Melt Flow Rate (230°C/2.16kg)	D-1238	g/10 min	0.7

Typical Properties:	ASTM Method	Units	Values
Tensile Strength at Yield (2 in/min, 50 mm/min)	D-638	psi(MPa)	4,200(29)
Elongation at Yield (2 in/min, 50 mm/min)	D-638	%	12.5
Flexural Modulus (0.05 in/min, 1.3 mm/min, 1% secant)	D-790A	psi(MPa)	175,000(1,207)
Notched Izod Impact Strength at 23°C	D-256A		No Break
Instrumented Impact Strength at -29°C	D-3763	ft-lbs(J)	22(30)
Rockwell Hardness	D-785	R	78

Final Remarks

1. This resin meets the requirements for olefin polymers as defined in 21 CFR, section 177.1520 issued by the Food and Drug Administration. The additives present meet the applicable regulations.
2. This information reflects typical values obtained in our laboratories, but should not be considered as absolute or as warranted values. Only the properties and values mentioned on the Certificate of Quality are considered as guarantee of the product.
3. In some applications, Braskem has developed tailor-made resins to reach specific requirements.
4. In case of doubt regarding utilization, or for other applications, please contact Technical Service.
5. The values in this report can be modified without prior communication from Braskem.
6. Braskem polyolefin products do not have additives with heavy metals or organotin-based materials.

Revision Date:
6/20/2013

Attachment 4: Testing and Sample Photographs















Attachment 5: Calibration Certificates



PRECISION CALIBRATION & REPAIR
3130 Farrell Road
Houston, Texas 77073
Phone: 281-209-9000
Fax : 281-209-9955
www.precal.net

CERTIFICATE OF CALIBRATION

CERT NO. 2024-44990-08

DATE ISSUED : 08/25/24

CERTIFIED TO:
STRESS ENGINEERING
HOUSTON TX

PURCHASE ORDER: C1000335.004003
DATE RECEIVED: 08/07/24
METROLOGIST: GC

SERIAL NO.: SES-158
DESCRIPTION: I.D. MICROMETER SET (823)
SIZE: 4 - 40"
MANUFACTURER: STARRETT
CALIBRATION DATE: 08/20/24
FREQUENCY: 12 MONTHS
DUE DATE: 08/20/25
CALIBRATION SPECS: GGG-C-105C
AS FOUND: NO ADJUSTMENTS
AS LEFT: WITHIN TOLERANCE

NOMINAL	ACTUAL	TOLERANCE
.105 .210	.1050 .2100	+/- .0002
.515 .745	.5150 .7450	+/- .0002
.975	.9750	+/- .0002
4.000 5.000	4.0000 5.0001	+/- .001
6.000 8.000	6.0003 7.9999	+/- .001
11.000 14.000	10.9997 13.9999	+/- .001
16.000 17.000	15.9999 17.0000	+/- .001
18.000	17.9999	+/- .001

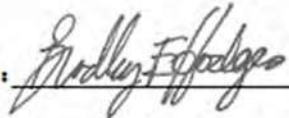
REMARKS:
NONE

MASTER SERIAL NO.:
809R - Cal Date: 11/24/23 Due Date: 11/24/24

NIST TEST NUMBERS FOR PRIMARY STANDARDS:
330795/330827

ALL CALIBRATIONS ARE PERFORMED IN ACCORDANCE:

- 1) WITH PCR'S ACCREDITED QUALITY SYSTEM QM-1 REV.4 01/02/2023.
- 2) ISO/IEC 17025:2017 AND ARE TRACEABLE TO NIST.
- 3) PERFORMED AT 68°F +/- 2°F AND <50% HUMIDITY. THESE RESULTS ARE RELATED ONLY TO THE INSTRUMENT(S) LISTED ON THIS CERTIFICATE.

QUALITY MANAGER: 

THIS CERTIFICATE SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF PCR.

Page 1 of 1 -



PRECISION CALIBRATION & REPAIR
3130 Farrell Road
Houston, Texas 77073
Phone: 281-209-9000
Fax : 281-209-9955
www.precal.net

CERTIFICATE OF CALIBRATION

CERT NO. 2024-45001-08

DATE ISSUED : 08/25/24

CERTIFIED TO:
STRESS ENGINEERING
HOUSTON TX

PURCHASE ORDER: C1000335.004003
DATE RECEIVED: 08/07/24
METROLOGIST: GC

SERIAL NO.: SES-081
DESCRIPTION: O.D. MICROMETER SET (224)
SIZE: 6 - 12"
MANUFACTURER: STARRETT
CALIBRATION DATE: 08/20/24
FREQUENCY: 12 MONTHS
DUE DATE: 08/20/25
CALIBRATION SPECS: GGG-C-105C
AS FOUND: NO ADJUSTMENTS
AS LEFT: WITHIN TOLERANCE

<u>NOMINAL</u>	<u>ACTUAL</u>	<u>TOLERANCE</u>
.105 .210	.1050 .2100	+/- .00025
.515 .745	.5150 .7450	+/- .00025
.975	.9750	+/- .00025
6-7	6.0001	+/- .00025
7-8	6.9999	+/- .00025
8-9	8.0000	+/- .00025
9-10	9.0000	+/- .0003
10-11	9.9999	+/- .0003
11-12	10.9999	+/- .0003

REMARKS:
NONE

MASTER SERIAL NO.:

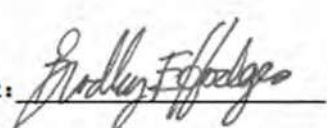
0804337 - Cal Date: 12/01/22 Due Date: 12/01/24, 850783 - Cal Date: 04/03/24 Due Date: 04/30/25

NIST TEST NUMBERS FOR PRIMARY STANDARDS:

683/291518-18, 685-O-0000049801-23

ALL CALIBRATIONS ARE PERFORMED IN ACCORDANCE:

- 1) WITH PCR'S ACCREDITED QUALITY SYSTEM QM-1 REV.4 01/02/2023.
- 2) ISO/IEC 17025:2017 AND ARE TRACEABLE TO NIST.
- 3) PERFORMED AT 68°F +/- 2°F AND <50% HUMIDITY. THESE RESULTS ARE RELATED ONLY TO THE INSTRUMENT(S) LISTED ON THIS CERTIFICATE.

QUALITY MANAGER: 

THIS CERTIFICATE SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF PCR.

Page 1 of 1 -



PRECISION CALIBRATION & REPAIR
3130 Farrell Road
Houston, Texas 77073
Phone: 281-209-9000
Fax : 281-209-9955
www.precal.net

CERTIFICATE OF CALIBRATION

CERT NO. 2024-40898-06
DATE ISSUED : 06/29/24

CERTIFIED TO:
STRESS ENGINEERING
HOUSTON TX

SERIAL NO.: SES-073
DESCRIPTION: DIGITAL CALIPER (CD-12C)
SIZE: 12"
MANUFACTURER: MITUTOYO
CALIBRATION DATE: 06/28/24
FREQUENCY: 12 MONTHS
DUE DATE: 06/28/25
CALIBRATION SPECS: MFG TOL
AS FOUND: NO ADJUSTMENTS
AS LEFT: WITHIN TOLERANCE

PURCHASE ORDER: C1000335.004003
DATE RECEIVED: 06/12/24
METROLOGIST: JV

NOMINAL	ACTUAL	TOLERANCE
ID@1" STEP@1"	1.0010 1.0000	+/- .001
DEPTH@1"	1.0000	+/- .001
OD @ .105	.1050	+/- .001
.515 .975	.5150 .9750	+/- .001
1" 2"	1.0000 2.0000	+/- .002
3" 4"	3.0000 4.0000	+/- .002
5" 6"	5.0000 6.0000	+/- .002
7" 8"	7.0000 8.0000	+/- .002
9" 10"	9.0000 10.0000	+/- .002
11" 12"	11.0000 12.0000	+/- .002

REMARKS:
NONE

MASTER SERIAL NO.:

0804337 - Cal Date: 12/01/22 Due Date: 12/01/24, 5561-R1 - Cal Date: 06/01/24 Due Date: 06/01/25, C12569 - Cal Date: 02/09/24 Due Date: 02/09/25

NIST TEST NUMBERS FOR PRIMARY STANDARDS:

683/291518-18, 683/289870-17, 685-O-0000000053-19, 685-O-0000034696-21, 685-O-0000049801-23

ALL CALIBRATIONS ARE PERFORMED IN ACCORDANCE:

- 1) WITH PCR'S ACCREDITED QUALITY SYSTEM QM-1 REV.4 01/02/2023.
- 2) ISO/IEC 17025:2017 AND ARE TRACEABLE TO NIST.
- 3) PERFORMED AT 68°F +/- 2°F AND <50% HUMIDITY. THESE RESULTS ARE RELATED ONLY TO THE INSTRUMENT(S) LISTED ON THIS CERTIFICATE.

QUALITY MANAGER: 

THIS CERTIFICATE SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF PCR.

Page 1 of 1 -