

**Vehicle Research and Test Center  
ECE R16 Dynamic Testing  
THOR-50M**

**Prepared By:  
Transportation Research Center Inc.  
10820 State Route 347  
P. O. Box B-67  
East Liberty, OH 43319**



**Summary Report**

**June – July 2020**

**Prepared For  
Vehicle Research and Test Center  
P. O. Box 37  
East Liberty, OH 43319**

**SECTION 1**  
**PURPOSE AND SUMMARY FOR THOR-50M**

The purpose of the testing is: (1) To understand the correlation between static requirements in U.S. regulation and dynamic requirements in European regulation (ECE R16 test), (2) Collect injury metrics for ECE R16 manikin, Hybrid III 50th and THOR 50th ATDs, including chest and pelvis excursion

**SUMMARY**

A THOR-50M (serial number 015) was secured in the left rear occupant position (position 4 or P4) or in the right rear occupant position (position 6 or P6). The THOR-50M was instrumented with head, spine (upper, middle and lower), and pelvis triaxial accelerometers and angular velocities; upper/lower neck, thoracic spine, ASIS and Femur force and moment load cells; acetabulum force load cells; occipital condyle potentiometer; thorax IRTRACCs and two (2) string pots. During this test series the dummy was restrained with a 2019 Lexus ES (US or EU), 2018 Subaru Impreza (WGN) (US or EU) or 2019 Chevrolet Suburban (US or EU) 3-point seatbelt.

Section 2 contains the left rear occupant position side views of the dummy. Section 3 contains the right rear occupant position side views of the dummy. Section 4 contains the dummy certification information.

**SECTION 2**  
**LEFT REAR OCCUPANT POSITION TEST SUMMARY**

**TEST DUMMY INFORMATION**

|                     |                     |
|---------------------|---------------------|
| Description         | Position # 4        |
| ATD Type/Serial No. | THOR-50M/015        |
| Belt Types          | 2019 Lexus ES       |
| Regulation          | US, EU              |
| Positions           | Left Hand (LH) Rear |

**CAMERA POSITIONING FARO MEASUREMENTS**

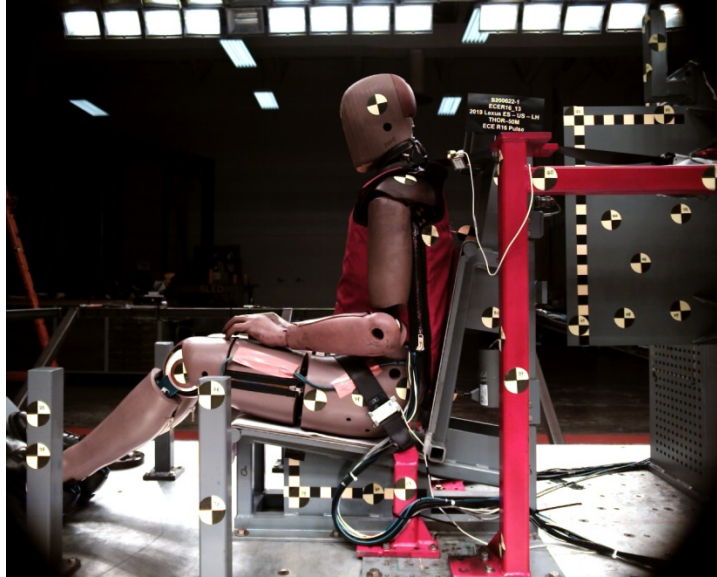
| Description     | Units | X       | Y        | Z       |
|-----------------|-------|---------|----------|---------|
| Origin          | mm    | 0.00    | 0.00     | 0.00    |
| N1 Front        | mm    | 1803.59 | -2.50    | -398.45 |
| N3 Left Oblique | mm    | 1295.83 | -1569.02 | -437.05 |
| N5 Left Side    | mm    | 102.59  | -1555.42 | -366.94 |

## DUMMY POSITIONING

BELT: 2019 Lexus ES – US – LH  
NHTSA Vehicle Database Number: v11258

TRC Test Number: S200622-1

VRTC Test Number: ECER16\_13



### DUMMY POSITIONING FARO MEASUREMENTS

| Description             | Units | X      | Y       | Z       |
|-------------------------|-------|--------|---------|---------|
| Top of Head             | mm    | 122.38 | -0.14   | -932.25 |
| Bridge of Nose          | mm    | 196.14 | 0.02    | -820.73 |
| Right Head CG           | mm    | 102.60 | 76.97   | -836.49 |
| Left Head CG            | mm    | 103.74 | -77.34  | -837.05 |
| Left Shoulder           | mm    | 41.90  | -208.69 | -626.07 |
| Left Shoulder Rib2      | mm    | 0.46   | -91.77  | -570.56 |
| Left Shoulder Rib3      | mm    | -5.51  | -101.33 | -539.81 |
| Right Shoulder          | mm    | 48.11  | 217.88  | -614.32 |
| Right Shoulder Rib2     | mm    | -0.42  | 93.85   | -569.67 |
| Right Shoulder Rib3     | mm    | -5.60  | 101.89  | -540.79 |
| Right H-Point on Skin   | mm    | 134.34 | 196.72  | -144.25 |
| Left H-Point on Skin    | mm    | 134.83 | -194.84 | -146.84 |
| Left Knee               | mm    | 553.56 | -156.64 | -186.21 |
| Right Knee              | mm    | 556.29 | 151.58  | -182.10 |
| Right Ankle             | mm    | 893.73 | 122.62  | 62.45   |
| Left Ankle              | mm    | 888.67 | -116.87 | 68.50   |
| Top of Shoulder Belt    | mm    | 163.08 | 0.93    | -554.94 |
| Bottom of Shoulder Belt | mm    | 175.48 | -0.96   | -474.47 |
| Top of Lap Belt         | mm    | 227.18 | -0.10   | -265.09 |
| Bottom of Lap Belt      | mm    | 234.87 | -0.19   | -219.33 |
| Belt spool out          | mm    | -57.38 | -210.11 | -681.09 |
| Shoulder belt spool out | mm    | 127.55 | -83.57  | -630.86 |
| 4 inch shoulder Belt    | mm    | 184.35 | 54.33   | -434.03 |

**DUMMY POSITIONING FARO MEASUREMENTS, CONTINUED**

|                                   |    |         |         |         |
|-----------------------------------|----|---------|---------|---------|
| Shoulder Belt Center              | mm | 176.17  | -2.76   | -514.02 |
| Lap Belt Center                   | mm | 232.27  | -2.37   | -239.55 |
| 4 inch Lap Belt                   | mm | 200.60  | -94.70  | -228.49 |
| String Pot Top                    | mm | -126.32 | -3.22   | -523.11 |
| String Pot Bottom                 | mm | -72.11  | -3.41   | -120.45 |
| Dummy Top String Pot              | mm | -18.42  | -146.04 | -505.12 |
| Dummy Bottom String Pot           | mm | 38.24   | -171.90 | -158.97 |
| Dummy Bottom String Pot Front     | mm | 242.95  | -199.60 | -133.04 |
| Dummy Top String Pot (R)          | mm | -16.36  | 132.42  | -504.98 |
| Dummy Bottom String Pot (R)       | mm | 35.48   | 170.30  | -156.21 |
| Dummy Bottom String Pot Front (R) | mm | 248.98  | 200.14  | -137.50 |
| Retractor Bolt 1                  | mm | -686.32 | -190.07 | -658.16 |
| Retractor Bolt 2                  | mm | -451.83 | -166.68 | -618.11 |
| Outboard Anchor Bolt              | mm | 31.94   | 131.20  | -11.73  |
| Inboard Anchor Bolt               | mm | 54.67   | -190.93 | -30.92  |
| Guide Loop Bolt 1                 | mm | -225.18 | -216.16 | -692.07 |
| Guide Loop Bolt 2                 | mm | -216.15 | -247.37 | -692.31 |

**DUMMY INJURY**

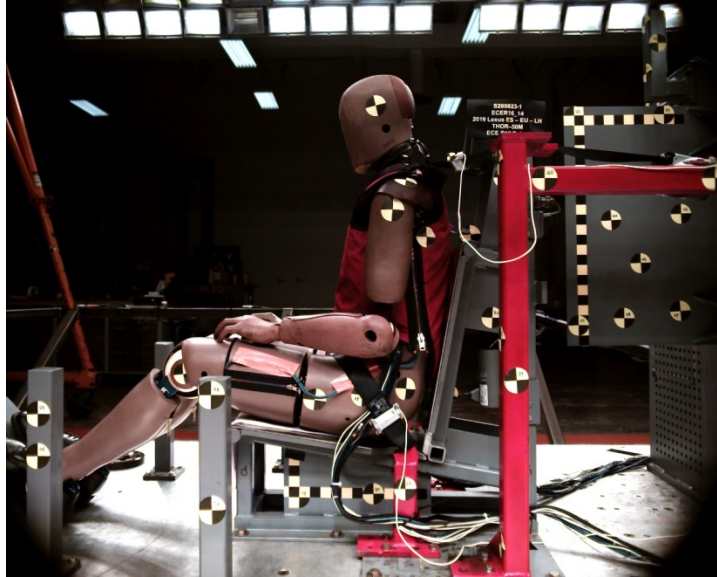
|                        |      |
|------------------------|------|
| HIC36 (36 ms)          | 271  |
| HIC15 (15 ms)          | 148  |
| BrIC                   | 0.69 |
| NIJ Max                | 0.48 |
| Torso String Pot (mm)  | 375  |
| Pelvis String Pot (mm) | 231  |

## DUMMY POSITIONING

BELT: 2019 Lexus ES – EU – LH  
NHTSA Vehicle Database Number: v11259

TRC Test Number: S200623-1

VRTC Test Number: ECER16\_14



### DUMMY POSITIONING FARO MEASUREMENTS

| Description             | Units | X      | Y       | Z       |
|-------------------------|-------|--------|---------|---------|
| Top of Head             | mm    | 124.14 | -0.20   | -928.93 |
| Bridge of Nose          | mm    | 198.74 | -0.39   | -818.72 |
| Right Head CG           | mm    | 104.13 | 76.29   | -833.93 |
| Left Head CG            | mm    | 106.57 | -77.53  | -833.78 |
| Left Shoulder           | mm    | 39.99  | -205.24 | -621.73 |
| Left Arm                | mm    | 70.98  | -243.24 | -553.24 |
| Left Shoulder Rib2      | mm    | 1.97   | -90.16  | -567.16 |
| Left Shoulder Rib3      | mm    | -4.10  | -99.51  | -536.13 |
| Right Shoulder          | mm    | 49.87  | 221.96  | -618.83 |
| Right Arm               | mm    | 83.47  | 252.17  | -546.79 |
| Right Shoulder Rib2     | mm    | 0.75   | 95.89   | -569.01 |
| Right Shoulder Rib3     | mm    | -4.65  | 103.96  | -539.78 |
| Right H-Point on Skin   | mm    | 134.04 | 199.98  | -142.40 |
| Left H-Point on Skin    | mm    | 136.23 | -192.31 | -147.28 |
| Left Knee               | mm    | 554.55 | -159.16 | -186.10 |
| Right Knee              | mm    | 555.46 | 155.60  | -182.69 |
| Right Ankle             | mm    | 888.74 | 120.54  | 68.84   |
| Right Ankle Top         | mm    | 899.93 | 75.40   | 53.57   |
| Left Ankle              | mm    | 890.32 | -123.09 | 64.62   |
| Left Ankle Top          | mm    | 901.34 | -87.33  | 49.24   |
| Top of Shoulder Belt    | mm    | 162.12 | -0.26   | -553.78 |
| Bottom of Shoulder Belt | mm    | 175.47 | 0.83    | -470.73 |
| Top of Lap Belt         | mm    | 225.54 | 0.71    | -266.52 |

**DUMMY POSITIONING FARO MEASUREMENTS, CONTINUED**

|                                   |    |         |         |         |
|-----------------------------------|----|---------|---------|---------|
| Bottom of Lap Belt                | mm | 231.99  | 0.18    | -220.58 |
| Belt spool out                    | mm | -55.94  | -204.34 | -675.36 |
| Shoulder belt spool out           | mm | 124.53  | -80.85  | -627.38 |
| 4 inch shoulder Belt              | mm | 189.86  | 54.73   | -430.87 |
| Shoulder Belt Center              | mm | 175.25  | -2.55   | -514.36 |
| Lap Belt Center                   | mm | 232.30  | 0.07    | -241.64 |
| 4 inch Lap Belt                   | mm | 200.75  | -91.30  | -231.44 |
| String Pot Top                    | mm | -133.10 | -3.20   | -524.68 |
| String Pot Bottom                 | mm | -74.06  | -2.76   | -120.48 |
| Dummy Top String Pot              | mm | -9.53   | -131.74 | -503.98 |
| Dummy Bottom String Pot           | mm | 39.56   | -168.88 | -157.30 |
| Dummy Bottom String Pot Front     | mm | 243.44  | -198.12 | -135.84 |
| Dummy Top String Pot (R)          | mm | -1.91   | 138.59  | -508.85 |
| Dummy Bottom String Pot (R)       | mm | 34.49   | 174.12  | -152.43 |
| Dummy Bottom String Pot Front (R) | mm | 248.04  | 203.68  | -138.68 |
| Retractor Bolt 1                  | mm | -686.32 | -189.97 | -658.05 |
| Retractor Bolt 2                  | mm | -451.70 | -166.57 | -618.15 |
| Outboard Anchor Bolt              | mm | 32.04   | 126.42  | -11.89  |
| Inboard Anchor Bolt               | mm | 55.71   | -191.00 | -30.64  |
| Guide Loop Bolt 1                 | mm | -225.59 | -216.66 | -691.54 |
| Guide Loop Bolt 2                 | mm | -216.19 | -247.60 | -691.95 |

**DUMMY INJURY**

|                        |      |
|------------------------|------|
| HIC36 (36 ms)          | 388  |
| HIC15 (15 ms)          | 259  |
| BrIC                   | 0.75 |
| NIJ Max                | 0.50 |
| Torso String Pot (mm)  | 356  |
| Pelvis String Pot (mm) | 243  |

**SECTION 3**  
**RIGHT REAR OCCUPANT POSITION TEST SUMMARY**

**TEST DUMMY INFORMATION**

|                     |  |
|---------------------|--|
| Description         | Position # 6                                       |
| ATD Type/Serial No. | THOR-50M/015                                       |
| Belt Types          | 2018 Subaru Impreza (WGN), 2019 Chevrolet Suburban |
| Regulation          | US, EU   |
| Positions           | Right Hand (RH) Rear                               |

**CAMERA POSITIONING FARO MEASUREMENTS**

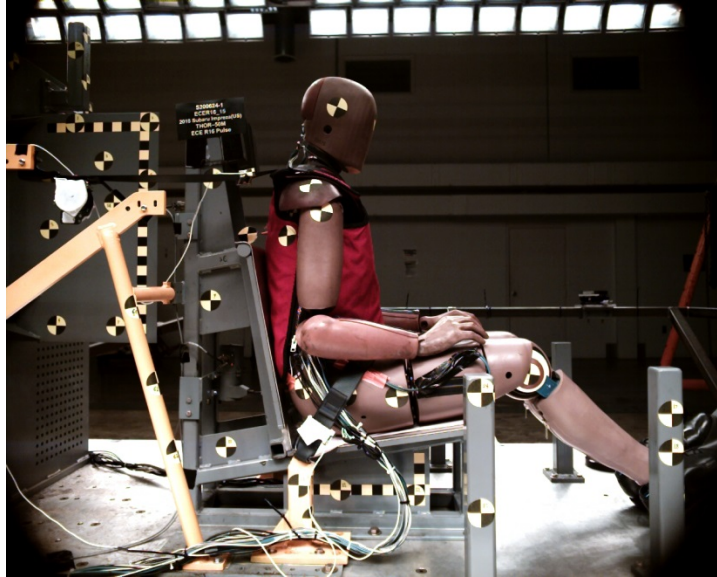
| Description      | Units | X       | Y       | Z       |
|------------------|-------|---------|---------|---------|
| Origin           | mm    | 0.00    | 0.00    | 0.00    |
| N1 Front         | mm    | 1803.72 | -2.95   | -398.48 |
| N3 Right Oblique | mm    | 1300.97 | 1577.87 | -433.74 |
| N5 Right Side    | mm    | 215.84  | 1565.62 | -361.02 |

## DUMMY POSITIONING

BELT: 2018 Subaru Impreza (WGN) – US – RH  
NHTSA Vehicle Database Number: v11260

TRC Test Number: S200624-1

VRTC Test Number: ECER16\_15



### DUMMY POSITIONING FARO MEASUREMENTS

| Description             | Units | X      | Y       | Z       |
|-------------------------|-------|--------|---------|---------|
| Top of Head             | mm    | 123.81 | -1.34   | -928.01 |
| Bridge of Nose          | mm    | 198.81 | -1.42   | -817.06 |
| Right Head CG           | mm    | 104.96 | 75.40   | -833.09 |
| Left Head CG            | mm    | 107.62 | -78.48  | -833.54 |
| Left Shoulder           | mm    | 45.01  | -208.86 | -613.86 |
| Left Arm                | mm    | 77.33  | -243.04 | -540.19 |
| Left Shoulder Rib2      | mm    | 2.41   | -92.69  | -566.68 |
| Left Shoulder Rib3      | mm    | -3.71  | -102.33 | -536.30 |
| Right Shoulder          | mm    | 56.93  | 221.53  | -609.28 |
| Right Arm               | mm    | 83.53  | 249.45  | -547.78 |
| Right Shoulder Rib2     | mm    | 1.04   | 93.26   | -566.99 |
| Right Shoulder Rib3     | mm    | -4.33  | 100.99  | -538.01 |
| Right H-Point on Skin   | mm    | 135.36 | 195.21  | -143.60 |
| Left H-Point on Skin    | mm    | 136.88 | -194.98 | -145.18 |
| Left Knee               | mm    | 556.43 | -153.34 | -189.61 |
| Right Knee              | mm    | 557.32 | 144.83  | -183.10 |
| Right Ankle Top         | mm    | 900.61 | 72.54   | 51.96   |
| Left Ankle              | mm    | 889.63 | -122.26 | 66.31   |
| Left Ankle Top          | mm    | 901.59 | -90.37  | 48.01   |
| Top of Shoulder Belt    | mm    | 158.02 | 0.63    | -577.86 |
| Bottom of Shoulder Belt | mm    | 175.98 | 0.02    | -499.65 |
| Top of Lap Belt         | mm    | 224.16 | 0.53    | -271.43 |
| Bottom of Lap Belt      | mm    | 233.03 | 0.01    | -223.66 |

**DUMMY POSITIONING FARO MEASUREMENTS, CONTINUED**

|                                   |    |         |         |         |
|-----------------------------------|----|---------|---------|---------|
| Belt spool out                    | mm | -73.91  | 218.72  | -643.66 |
| Shoulder belt spool out           | mm | 131.34  | 75.82   | -628.26 |
| 4 inch shoulder Belt              | mm | 180.25  | -60.26  | -457.59 |
| Shoulder Belt Center              | mm | 170.08  | 0.51    | -538.33 |
| Lap Belt Center                   | mm | 230.74  | 1.91    | -247.85 |
| 4 inch Lap Belt                   | mm | 199.24  | 97.71   | -232.74 |
| String Pot Top                    | mm | -131.49 | 0.63    | -526.63 |
| String Pot Bottom                 | mm | -71.52  | 1.34    | -121.02 |
| Dummy Top String Pot              | mm | -12.45  | -140.34 | -506.37 |
| Dummy Bottom String Pot           | mm | 40.29   | -170.84 | -156.34 |
| Dummy Bottom String Pot Front     | mm | 244.16  | -197.97 | -135.99 |
| Dummy Top String Pot (R)          | mm | -6.48   | 130.59  | -505.72 |
| Dummy Bottom String Pot (R)       | mm | 35.97   | 169.69  | -152.12 |
| Dummy Bottom String Pot Front (R) | mm | 248.74  | 198.99  | -140.60 |
| Retractor Bolt 1                  | mm | -533.63 | 321.28  | -642.69 |
| Retractor Bolt 2                  | mm | -279.49 | 301.26  | -544.34 |
| Outboard Anchor Bolt              | mm | -54.15  | -176.52 | -19.38  |
| Inboard Anchor Bolt               | mm | 49.97   | 229.99  | -15.22  |

**DUMMY INJURY**

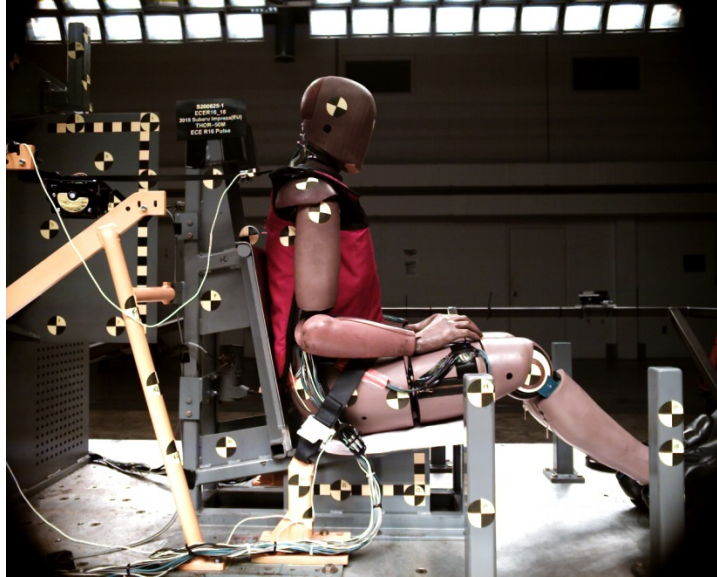
|                        |      |
|------------------------|------|
| HIC36 (36 ms)          | 738  |
| HIC15 (15 ms)          | 475  |
| BrIC                   | 0.99 |
| NIJ Max                | 0.80 |
| Torso String Pot (mm)  | 279  |
| Pelvis String Pot (mm) | 309  |

## DUMMY POSITIONING

BELT: 2018 Subaru Impreza (WGN) – EU – RH  
NHTSA Vehicle Database Number: v11261

TRC Test Number: S200625-1

VRTC Test Number: ECER16\_16



### DUMMY POSITIONING FARO MEASUREMENTS

| Description             | Units | X      | Y       | Z       |
|-------------------------|-------|--------|---------|---------|
| Top of Head             | mm    | 124.99 | -0.41   | -929.45 |
| Bridge of Nose          | mm    | 198.62 | 0.01    | -818.09 |
| Right Head CG           | mm    | 105.18 | 76.87   | -833.76 |
| Left Head CG            | mm    | 105.96 | -77.33  | -834.21 |
| Left Shoulder           | mm    | 37.25  | -206.16 | -617.43 |
| Left Arm                | mm    | 66.25  | -244.39 | -541.40 |
| Left Shoulder Rib2      | mm    | 1.49   | -91.27  | -567.89 |
| Left Shoulder Rib3      | mm    | -2.45  | -100.31 | -537.26 |
| Right Shoulder          | mm    | 49.94  | 224.88  | -614.95 |
| Right Arm               | mm    | 80.99  | 253.50  | -544.83 |
| Right Shoulder Rib2     | mm    | -0.08  | 94.82   | -567.90 |
| Right Shoulder Rib3     | mm    | -4.72  | 102.10  | -539.00 |
| Right H-Point on Skin   | mm    | 135.61 | 195.55  | -141.91 |
| Left H-Point on Skin    | mm    | 134.32 | -194.47 | -147.39 |
| Left Knee               | mm    | 554.00 | -159.96 | -183.37 |
| Right Knee              | mm    | 557.16 | 150.69  | -183.29 |
| Right Ankle Top         | mm    | 901.39 | 73.66   | 50.22   |
| Left Ankle              | mm    | 885.89 | -114.03 | 71.25   |
| Left Ankle Top          | mm    | 897.85 | -81.78  | 51.39   |
| Top of Shoulder Belt    | mm    | 154.21 | 0.85    | -577.03 |
| Bottom of Shoulder Belt | mm    | 176.30 | 0.40    | -498.30 |
| Top of Lap Belt         | mm    | 225.82 | -0.08   | -269.55 |
| Bottom of Lap Belt      | mm    | 234.53 | -0.56   | -221.10 |

**DUMMY POSITIONING FARO MEASUREMENTS, CONTINUED**

|                                   |    |         |         |         |
|-----------------------------------|----|---------|---------|---------|
| Belt spool out                    | mm | -71.88  | 216.67  | -641.11 |
| Shoulder belt spool out           | mm | 130.12  | 72.61   | -625.33 |
| 4 inch shoulder Belt              | mm | 180.45  | -59.41  | -457.97 |
| Shoulder Belt Center              | mm | 169.27  | 2.34    | -538.65 |
| Lap Belt Center                   | mm | 232.70  | -0.56   | -244.99 |
| 4 inch Lap Belt                   | mm | 202.03  | 93.58   | -230.49 |
| String Pot Top                    | mm | -128.40 | 3.81    | -522.70 |
| String Pot Bottom                 | mm | -77.37  | 3.91    | -119.61 |
| Dummy Top String Pot              | mm | -9.96   | -133.68 | -506.63 |
| Dummy Bottom String Pot           | mm | 37.39   | -170.75 | -158.93 |
| Dummy Bottom String Pot Front     | mm | 241.13  | -201.34 | -136.41 |
| Dummy Top String Pot (R)          | mm | -3.78   | 136.15  | -505.21 |
| Dummy Bottom String Pot (R)       | mm | 36.76   | 170.54  | -152.48 |
| Dummy Bottom String Pot Front (R) | mm | 249.90  | 198.50  | -136.20 |
| Retractor Bolt 1                  | mm | -532.68 | 321.08  | -642.79 |
| Retractor Bolt 2                  | mm | -277.94 | 303.13  | -543.81 |
| Outboard Anchor Bolt              | mm | -54.48  | -176.79 | -18.06  |
| Inboard Anchor Bolt               | mm | 50.84   | 229.33  | -12.54  |

**DUMMY INJURY**

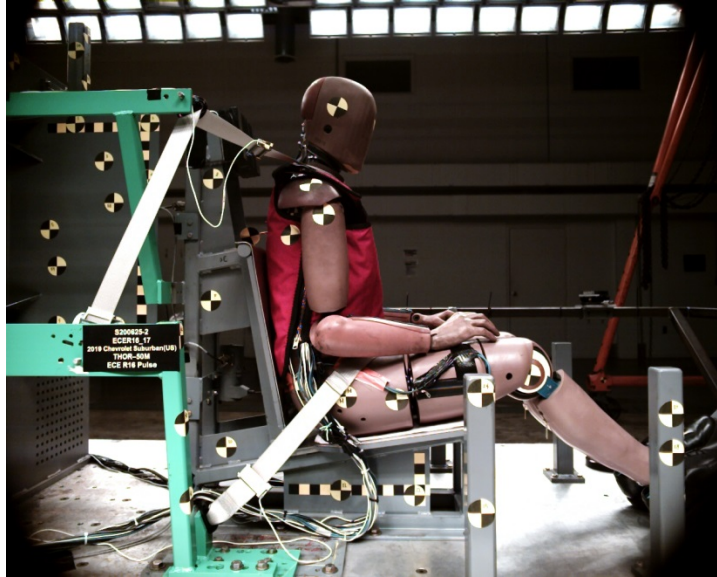
|                        |      |
|------------------------|------|
| HIC36 (36 ms)          | 318  |
| HIC15 (15 ms)          | 214  |
| BrIC                   | 0.61 |
| NIJ Max                | 0.41 |
| Torso String Pot (mm)  | 327  |
| Pelvis String Pot (mm) | 245  |

## DUMMY POSITIONING

BELT: 2019 Chevrolet Suburban – US – RH  
NHTSA Vehicle Database Number: v11262

TRC Test Number: S200625-2

VRTC Test Number: ECER16\_17



### DUMMY POSITIONING FARO MEASUREMENTS

| Description             | Units | X      | Y       | Z       |
|-------------------------|-------|--------|---------|---------|
| Top of Head             | mm    | 124.34 | -0.58   | -929.56 |
| Bridge of Nose          | mm    | 198.60 | -2.20   | -818.97 |
| Right Head CG           | mm    | 105.04 | 75.82   | -834.28 |
| Left Head CG            | mm    | 105.70 | -78.05  | -834.64 |
| Left Shoulder           | mm    | 28.30  | -209.05 | -621.72 |
| Left Arm                | mm    | 69.03  | -247.07 | -539.70 |
| Left Shoulder Rib2      | mm    | 0.73   | -92.98  | -568.82 |
| Left Shoulder Rib3      | mm    | -3.91  | -101.86 | -537.70 |
| Right Shoulder          | mm    | 57.01  | 219.11  | -612.76 |
| Right Arm               | mm    | 87.31  | 245.66  | -541.72 |
| Right Shoulder Rib2     | mm    | 1.33   | 92.94   | -567.72 |
| Right Shoulder Rib3     | mm    | -3.65  | 100.63  | -538.42 |
| Right H-Point on Skin   | mm    | 133.94 | 194.53  | -140.33 |
| Left H-Point on Skin    | mm    | 135.85 | -193.08 | -145.41 |
| Left Knee               | mm    | 554.19 | -160.50 | -185.14 |
| Right Knee              | mm    | 555.83 | 151.20  | -182.69 |
| Right Ankle Top         | mm    | 900.04 | 80.21   | 51.51   |
| Left Ankle              | mm    | 887.81 | -120.40 | 67.45   |
| Left Ankle Top          | mm    | 897.38 | -86.34  | 51.23   |
| Top of Shoulder Belt    | mm    | 154.51 | 0.19    | -576.05 |
| Bottom of Shoulder Belt | mm    | 176.04 | -0.04   | -491.48 |
| Top of Lap Belt         | mm    | 225.55 | -0.81   | -270.32 |
| Bottom of Lap Belt      | mm    | 232.49 | -0.73   | -221.55 |

**DUMMY POSITIONING FARO MEASUREMENTS, CONTINUED**

|                                   |    |         |         |         |
|-----------------------------------|----|---------|---------|---------|
| Belt spool out                    | mm | -37.54  | 209.81  | -700.97 |
| Shoulder belt spool out           | mm | 129.70  | 70.04   | -627.37 |
| 4 inch shoulder Belt              | mm | 181.05  | -56.89  | -447.15 |
| Shoulder Belt Center              | mm | 170.29  | -0.76   | -533.23 |
| Lap Belt Center                   | mm | 231.47  | -0.86   | -244.55 |
| 4 inch Lap Belt                   | mm | 202.74  | 93.32   | -232.73 |
| String Pot Top                    | mm | -126.08 | 1.55    | -519.77 |
| String Pot Bottom                 | mm | -70.08  | 2.21    | -119.23 |
| Dummy Top String Pot              | mm | -7.53   | -135.61 | -506.41 |
| Dummy Bottom String Pot           | mm | 39.70   | -171.93 | -160.69 |
| Dummy Bottom String Pot Front     | mm | 243.24  | -201.66 | -138.21 |
| Dummy Top String Pot (R)          | mm | -0.79   | 129.96  | -508.38 |
| Dummy Bottom String Pot (R)       | mm | 34.50   | 168.74  | -150.80 |
| Dummy Bottom String Pot Front (R) | mm | 248.32  | 198.60  | -134.19 |
| Retractor Bolt 1                  | mm | -375.02 | 385.18  | -239.16 |
| D-Ring                            | mm | -208.64 | 251.91  | -787.69 |
| Outboard Anchor Bolt              | mm | 2.00    | -204.99 | 10.32   |
| Inboard Anchor Bolt               | mm | -147.26 | 290.71  | 97.68   |

**DUMMY INJURY**

|                        |      |
|------------------------|------|
| HIC36 (36 ms)          | 757  |
| HIC15 (15 ms)          | 625  |
| BrIC                   | 1.01 |
| NIJ Max                | 0.86 |
| Torso String Pot (mm)  | 291  |
| Pelvis String Pot (mm) | 286  |

## DUMMY POSITIONING

BELT: 2019 Chevrolet Suburban – EU – RH  
NHTSA Vehicle Database Number: v11263

TRC Test Number: S200702-2

VRTC Test Number: ECER16\_18



### DUMMY POSITIONING FARO MEASUREMENTS

| Description             | Units | X      | Y       | Z       |
|-------------------------|-------|--------|---------|---------|
| Top of Head             | mm    | 125.36 | 1.20    | -930.61 |
| Bridge of Nose          | mm    | 198.57 | 0.66    | -818.63 |
| Right Head CG           | mm    | 106.35 | 78.82   | -835.53 |
| Left Head CG            | mm    | 106.46 | -74.80  | -834.95 |
| Left Shoulder           | mm    | 40.94  | -209.94 | -615.34 |
| Left Arm                | mm    | 66.20  | -239.70 | -537.79 |
| Left Shoulder Rib2      | mm    | -1.59  | -87.83  | -570.08 |
| Left Shoulder Rib3      | mm    | -5.51  | -96.90  | -539.43 |
| Right Shoulder          | mm    | 55.48  | 226.12  | -616.45 |
| Right Arm               | mm    | 91.67  | 252.42  | -541.09 |
| Right Shoulder Rib2     | mm    | 0.46   | 97.53   | -569.15 |
| Right Shoulder Rib3     | mm    | -3.81  | 105.12  | -540.07 |
| Right H-Point on Skin   | mm    | 134.82 | 198.73  | -140.62 |
| Left H-Point on Skin    | mm    | 133.37 | -190.25 | -145.47 |
| Left Knee               | mm    | 552.09 | -155.29 | -184.04 |
| Right Knee              | mm    | 556.74 | 153.42  | -184.95 |
| Right Ankle             | mm    | 887.67 | 128.57  | 68.80   |
| Right Ankle Top         | mm    | 899.65 | 83.84   | 52.42   |
| Left Ankle              | mm    | 888.53 | -122.72 | 66.05   |
| Left Ankle Top          | mm    | 900.76 | -89.98  | 48.65   |
| Top of Shoulder Belt    | mm    | 153.42 | -0.04   | -576.08 |
| Bottom of Shoulder Belt | mm    | 175.39 | -0.46   | -494.71 |
| Top of Lap Belt         | mm    | 226.04 | -0.16   | -269.24 |

**DUMMY POSITIONING FARO MEASUREMENTS, CONTINUED**

|                                   |    |         |         |         |
|-----------------------------------|----|---------|---------|---------|
| Bottom of Lap Belt                | mm | 233.06  | -0.19   | -222.87 |
| Belt spool out                    | mm | -36.25  | 210.31  | -702.80 |
| Shoulder belt spool out           | mm | 130.00  | 71.65   | -628.91 |
| 4 inch shoulder Belt              | mm | 181.67  | -57.59  | -451.21 |
| Shoulder Belt Center              | mm | 170.40  | 0.40    | -534.17 |
| Lap Belt Center                   | mm | 232.07  | 0.34    | -242.65 |
| 4 inch Lap Belt                   | mm | 204.63  | 95.57   | -235.20 |
| String Pot Top                    | mm | -139.86 | 3.52    | -521.51 |
| String Pot Bottom                 | mm | -82.05  | 2.96    | -122.54 |
| Dummy Top String Pot              | mm | -8.56   | -133.35 | -506.15 |
| Dummy Bottom String Pot           | mm | 35.82   | -169.54 | -161.66 |
| Dummy Bottom String Pot Front     | mm | 239.54  | -197.90 | -136.78 |
| Dummy Top String Pot (R)          | mm | -5.79   | 135.76  | -510.14 |
| Dummy Bottom String Pot (R)       | mm | 36.86   | 173.10  | -152.61 |
| Dummy Bottom String Pot Front (R) | mm | 249.31  | 201.28  | -134.43 |
| Retractor Bolt 1                  | mm | -375.48 | 385.87  | -238.13 |
| D-Ring                            | mm | -208.25 | 252.89  | -787.80 |
| Outboard Anchor Bolt              | mm | 2.61    | -205.04 | 11.51   |
| Inboard Anchor Bolt               | mm | -148.14 | 290.41  | 102.05  |

**DUMMY INJURY**

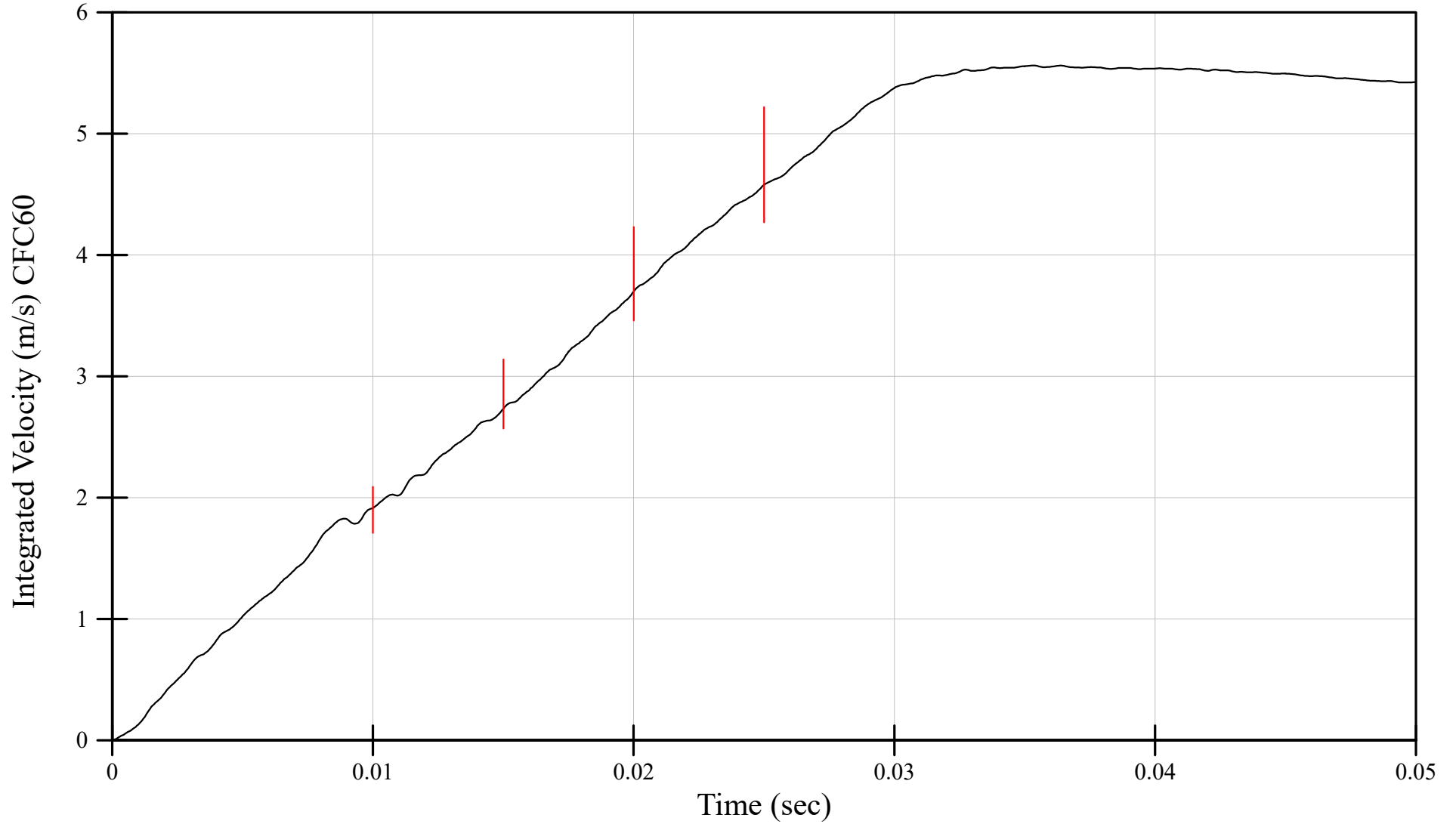
|                        |      |
|------------------------|------|
| HIC36 (36 ms)          | 704  |
| HIC15 (15 ms)          | 377  |
| BrIC                   | 0.99 |
| NIJ Max                | 0.81 |
| Torso String Pot (mm)  | 277  |
| Pelvis String Pot (mm) | 277  |

## SECTION 4

### DUMMY CALIBRATION DATA

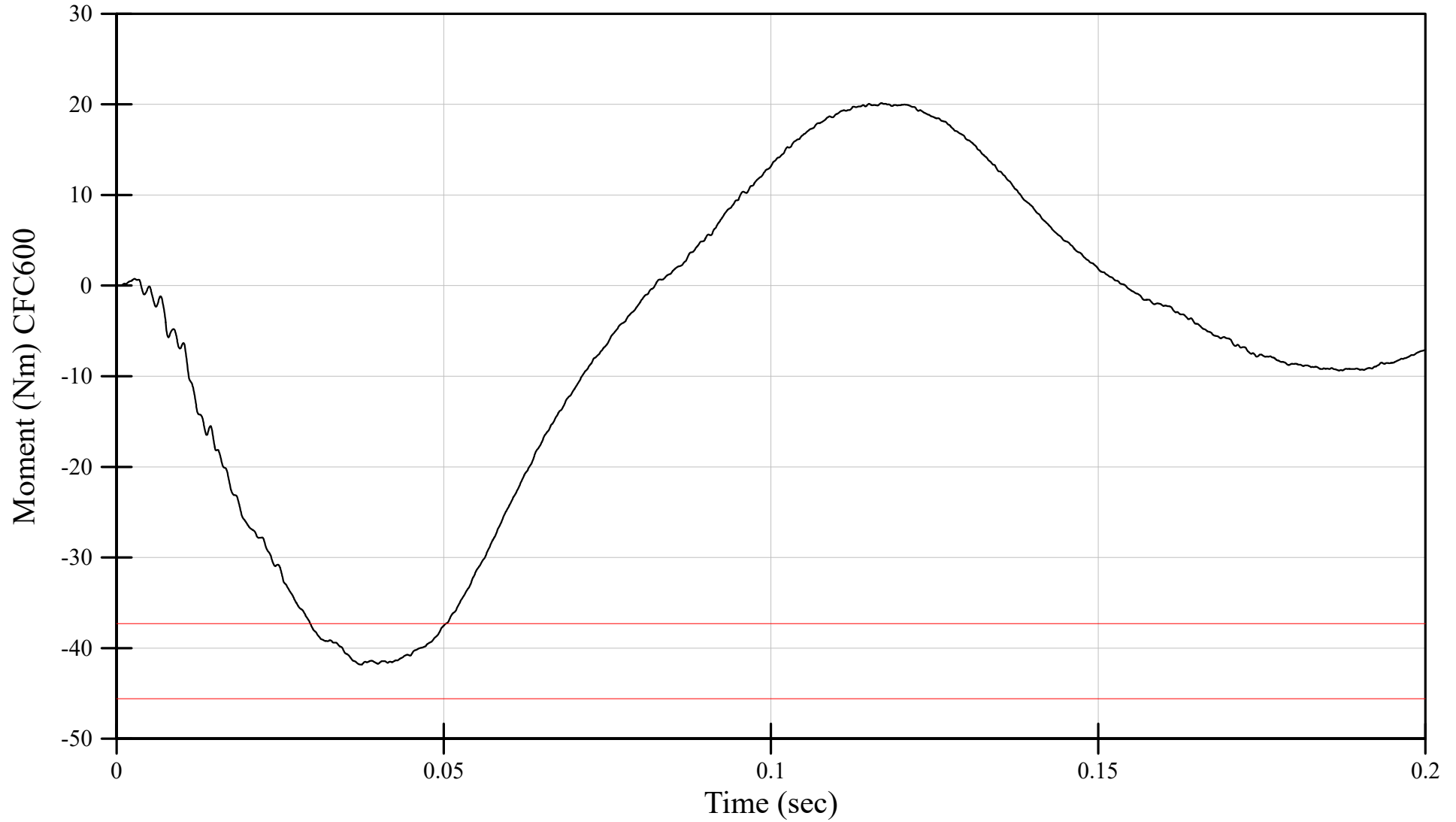
Test Temperature: 69.3 degrees  
Relative Humidity: 41.5%  
Test Velocity: 5.04 m/s

THOR Neck Right Torsion Qualification  
Probe Acceleration  
Serial Number: EB6005



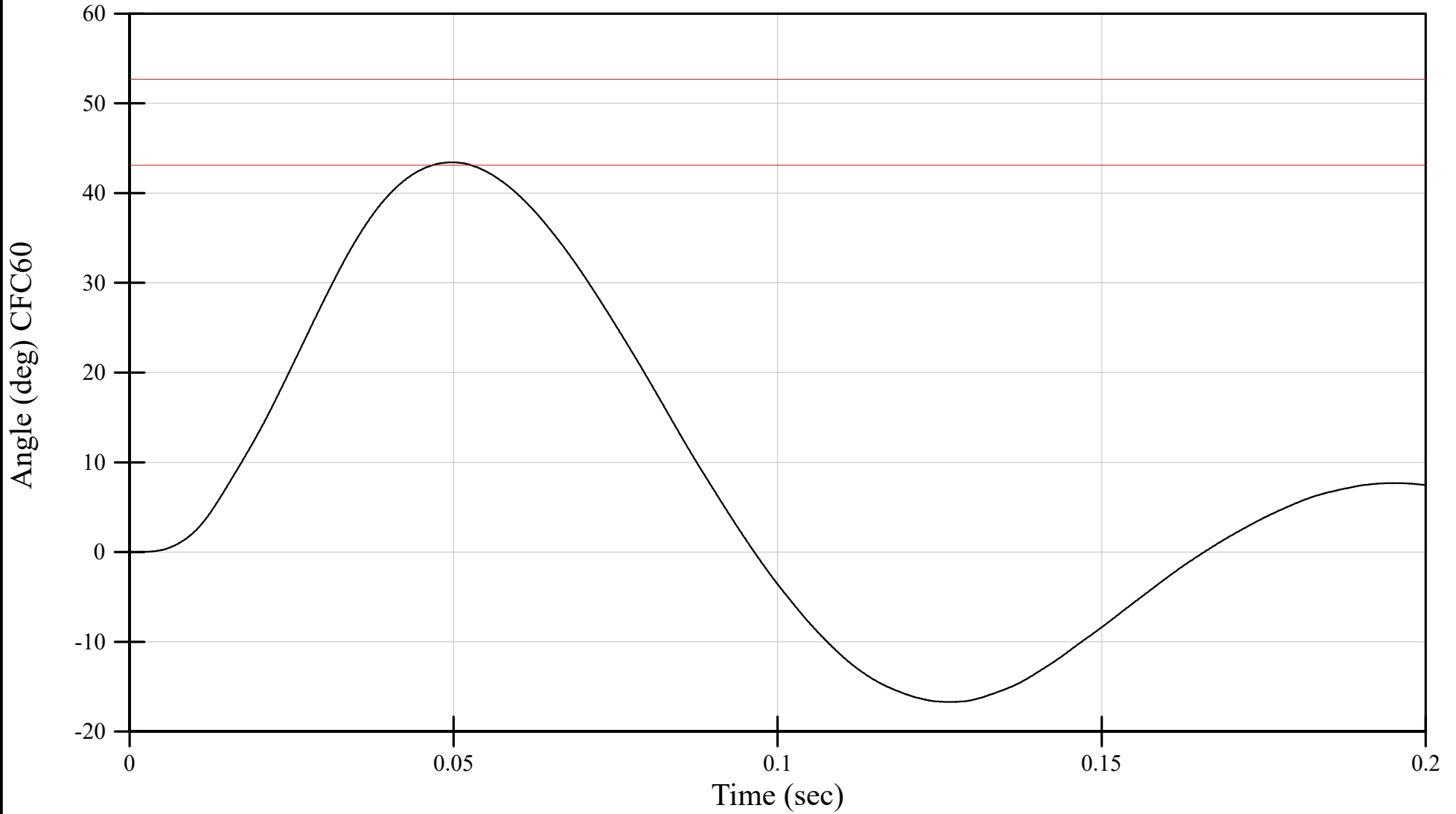
Test Temperature: 69.3 degrees  
Relative Humidity: 41.5%  
Test Velocity: 5.04 m/s

THOR Neck Right Torsion Qualification  
Z-Moment as Measured  
Serial Number: EB6005



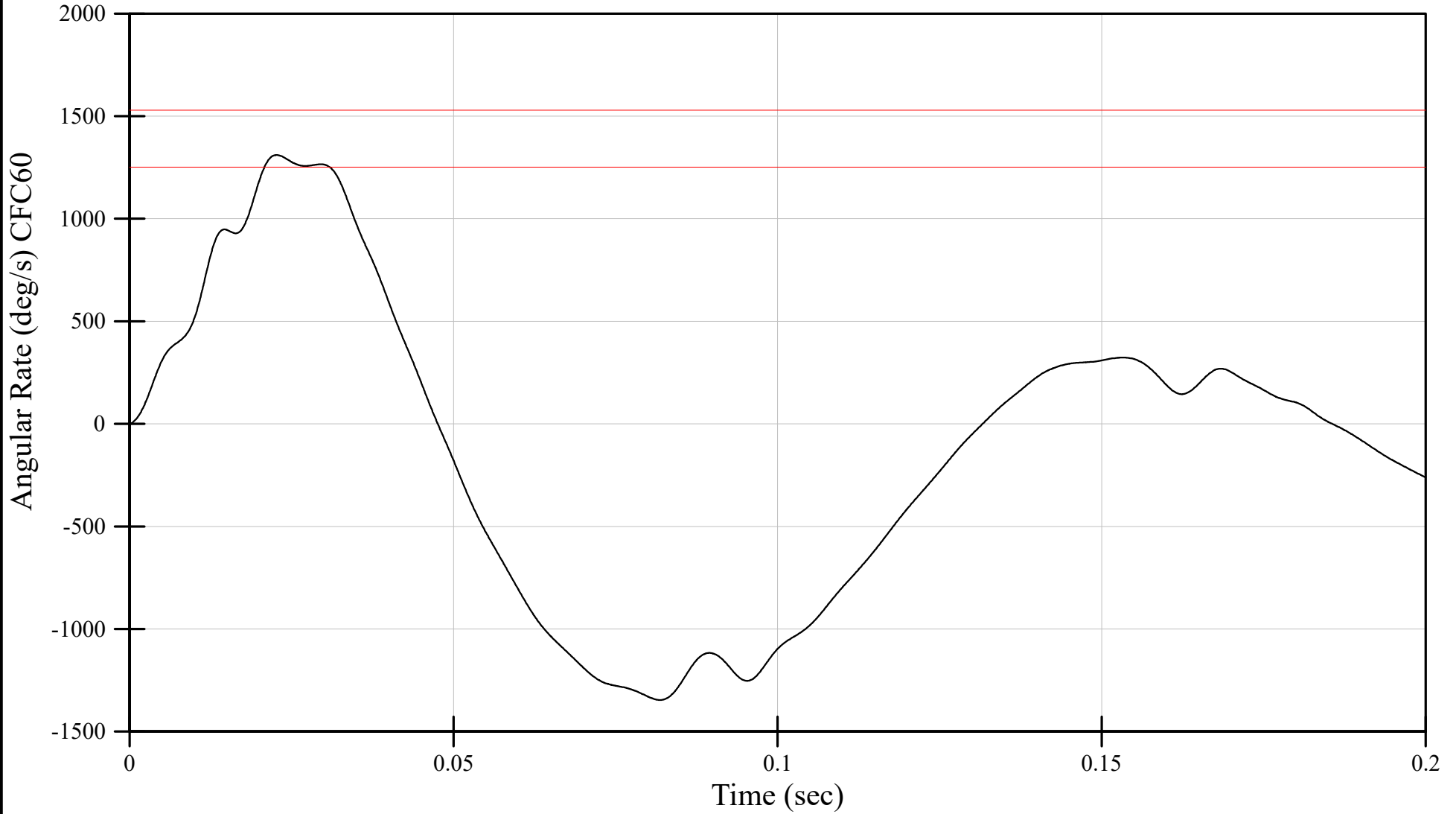
Test Temperature: 69.3 degrees  
Relative Humidity: 41.5%  
Test Velocity: 5.04 m/s

THOR Neck Right Torsion Qualification  
Neck Fixture Rotation  
Serial Number: EB6005



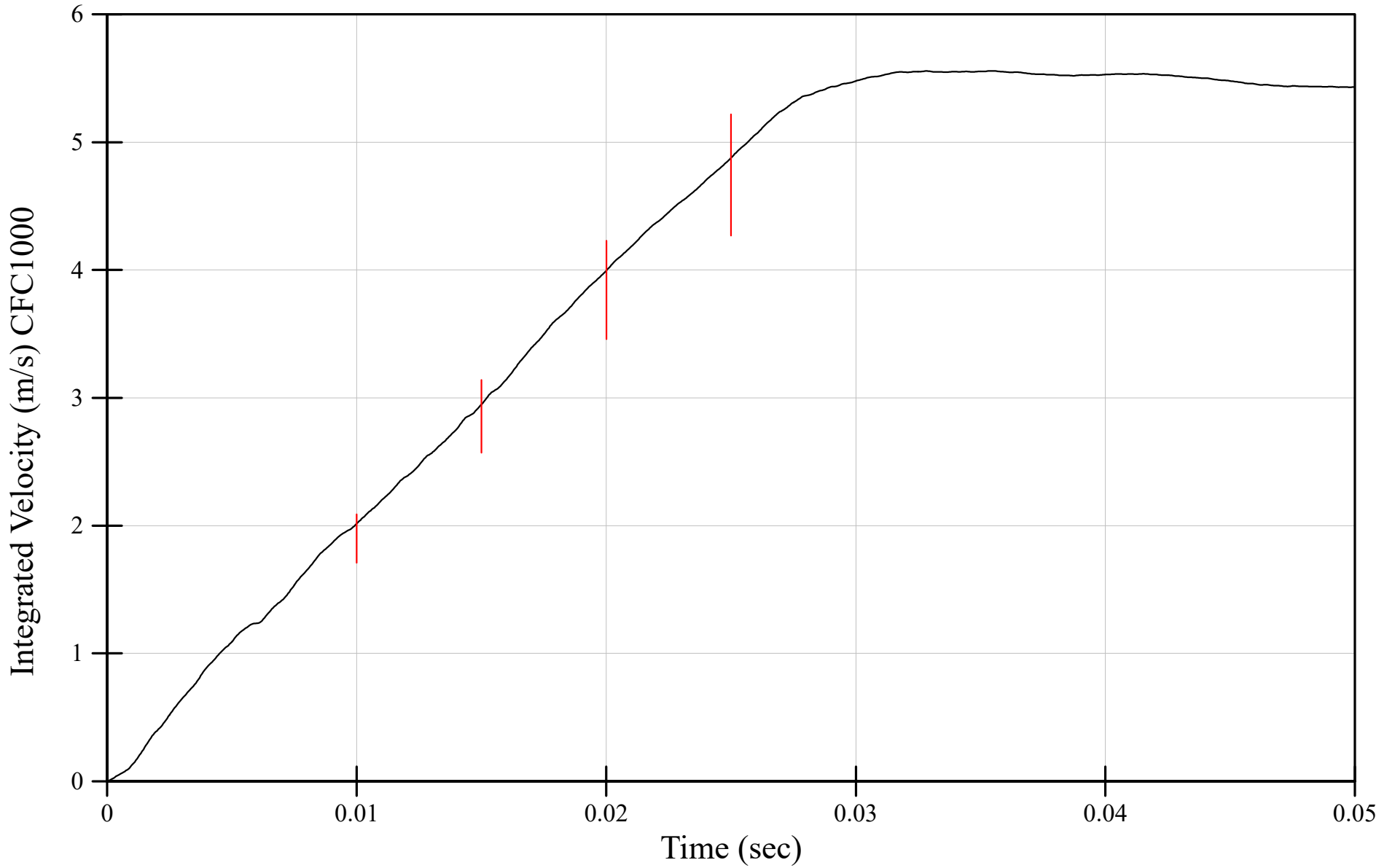
Test Temperature: 69.3 degrees  
Relative Humidity: 41.5%  
Test Velocity: 5.04 m/s

THOR Neck Right Torsion Qualification  
Peak Angular Rate  
Serial Number: EB6005



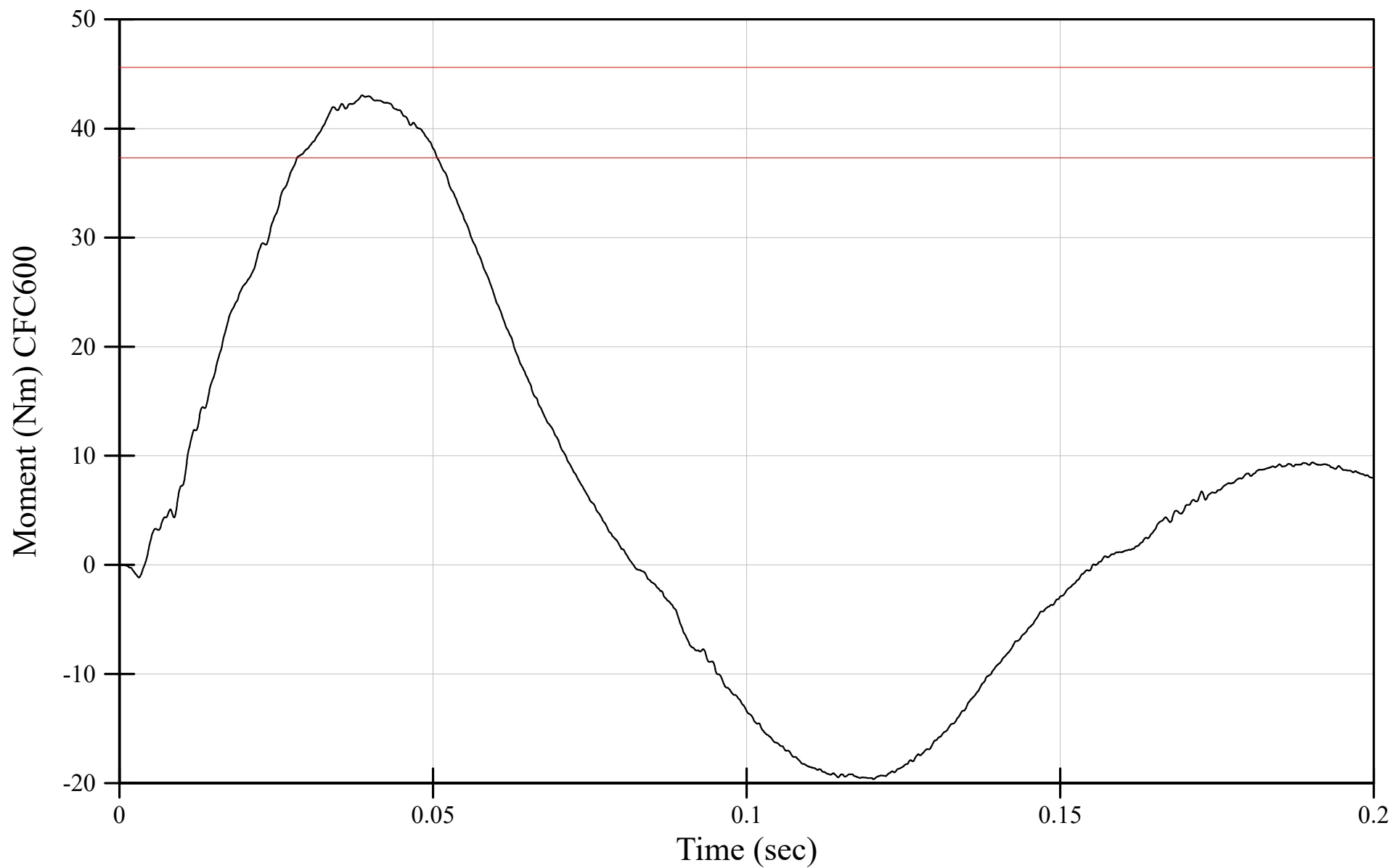
Test Temperature: 69.9 degrees  
Relative Humidity: 37.1%  
Test Velocity: 5.00 m/s

THOR Neck Left Torsion Qualification  
Pendulum Velocity  
Serial Number: EB6005



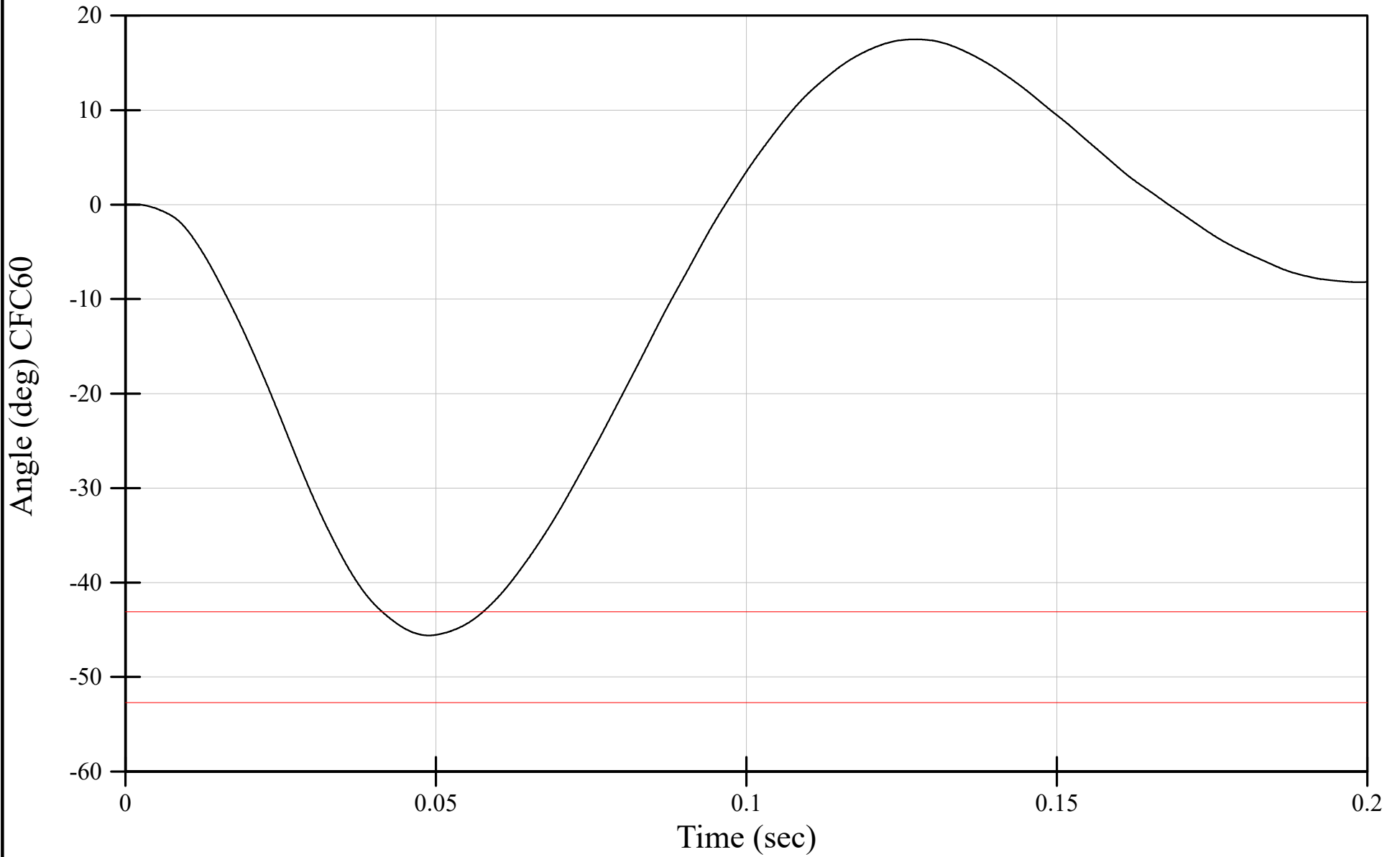
Test Temperature: 69.9 degrees  
Relative Humidity: 37.1%  
Test Velocity: 5.00 m/s

THOR Neck Left Torsion Qualification  
Z-Moment as Measured  
Serial Number: EB6005



Test Temperature: 69.9 degrees  
Relative Humidity: 37.1%  
Test Velocity: 5.00 m/s

THOR Neck Left Torsion Qualification  
Neck Fixture Rotation  
Serial Number: EB6005

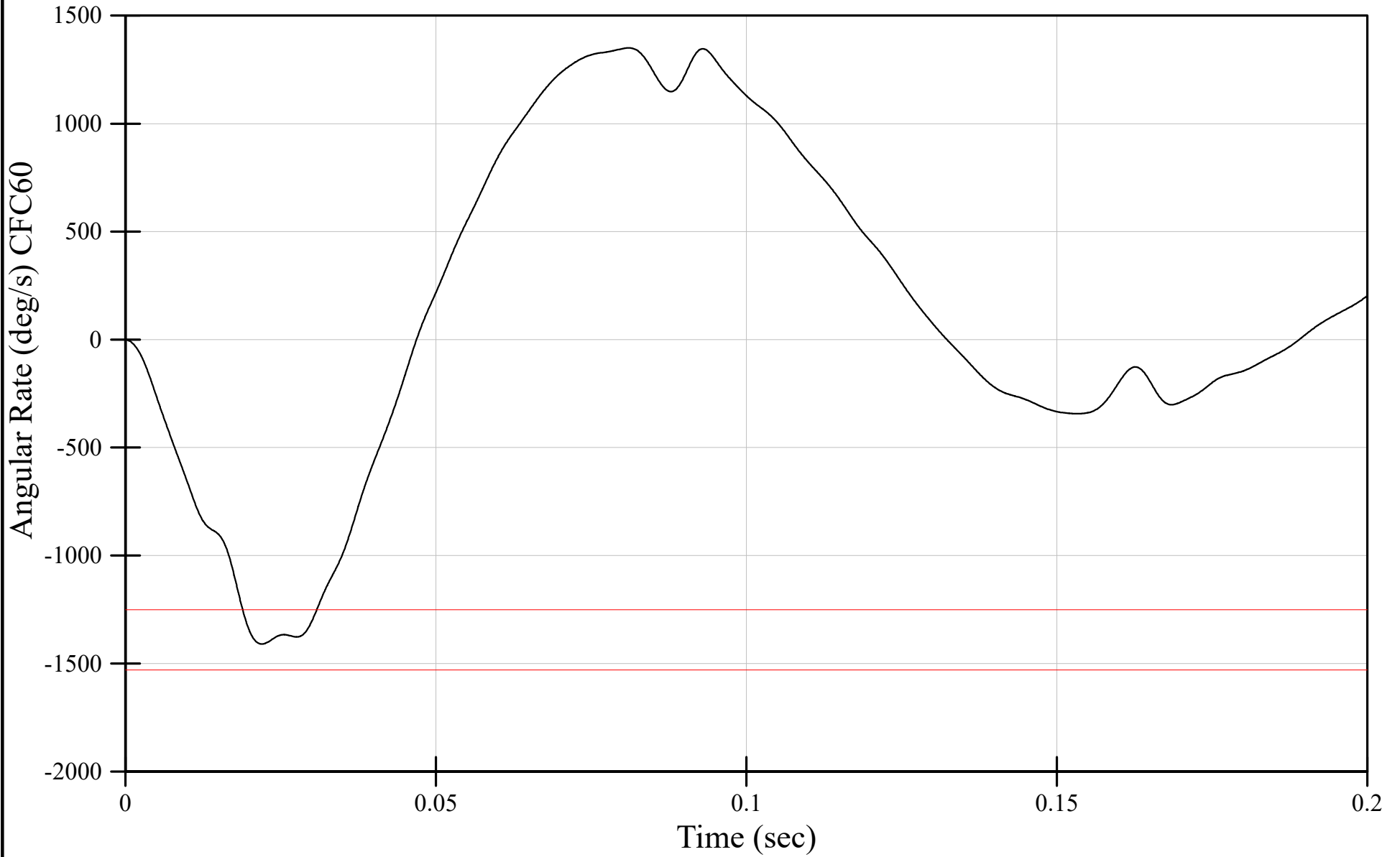


Test Temperature: 69.9 degrees  
Relative Humidity: 37.1%  
Test Velocity: 5.00 m/s

# THOR Neck Left Torsion Qualification

## Peak Angular Rate

Serial Number: EB6005

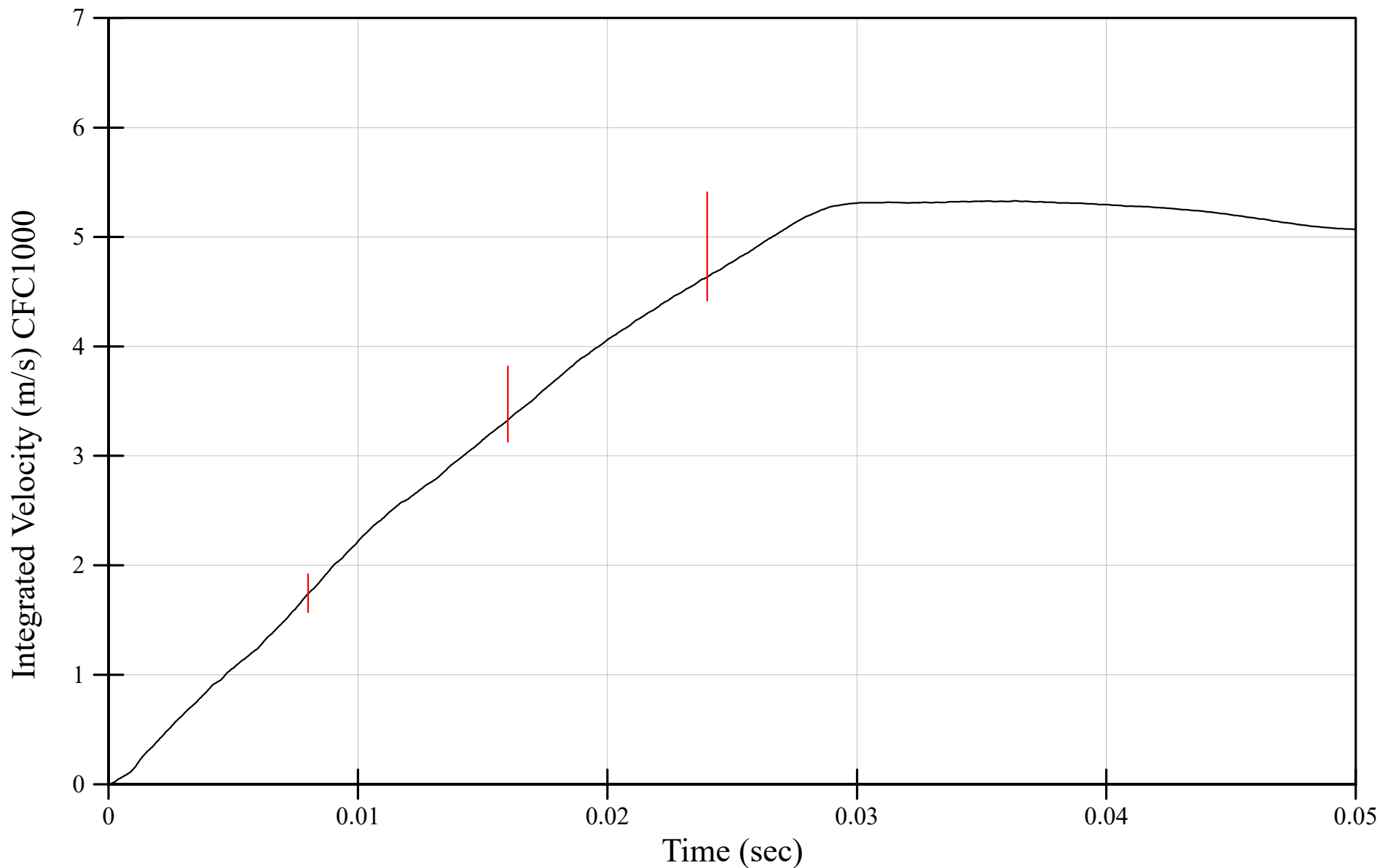


Test Temperature: 69.9 degrees  
Relative Humidity: 60.4%  
Test Velocity: 4.95 m/s

# THOR Neck Frontal Qualification

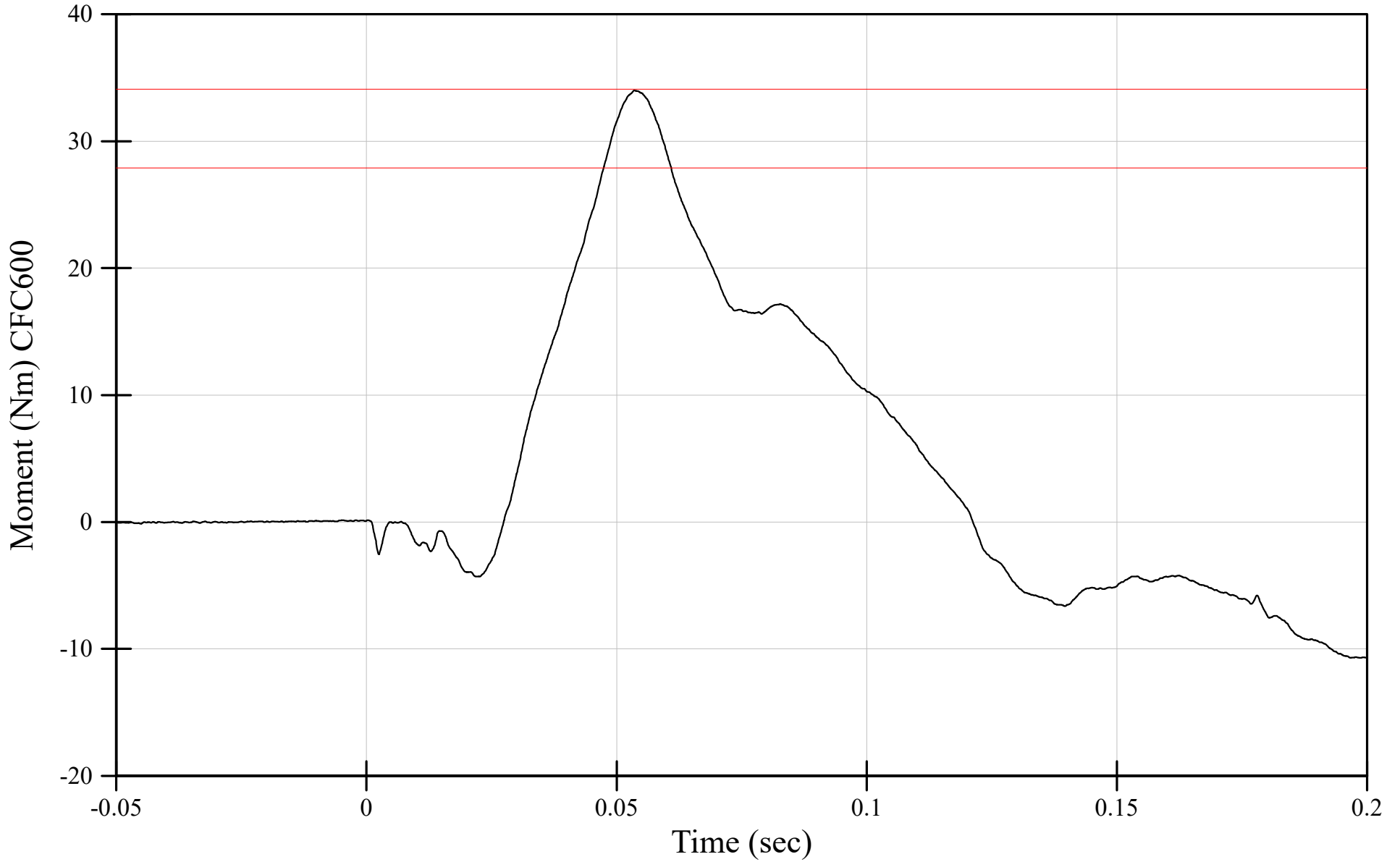
## Pendulum Velocity

Serial Number: EB6005



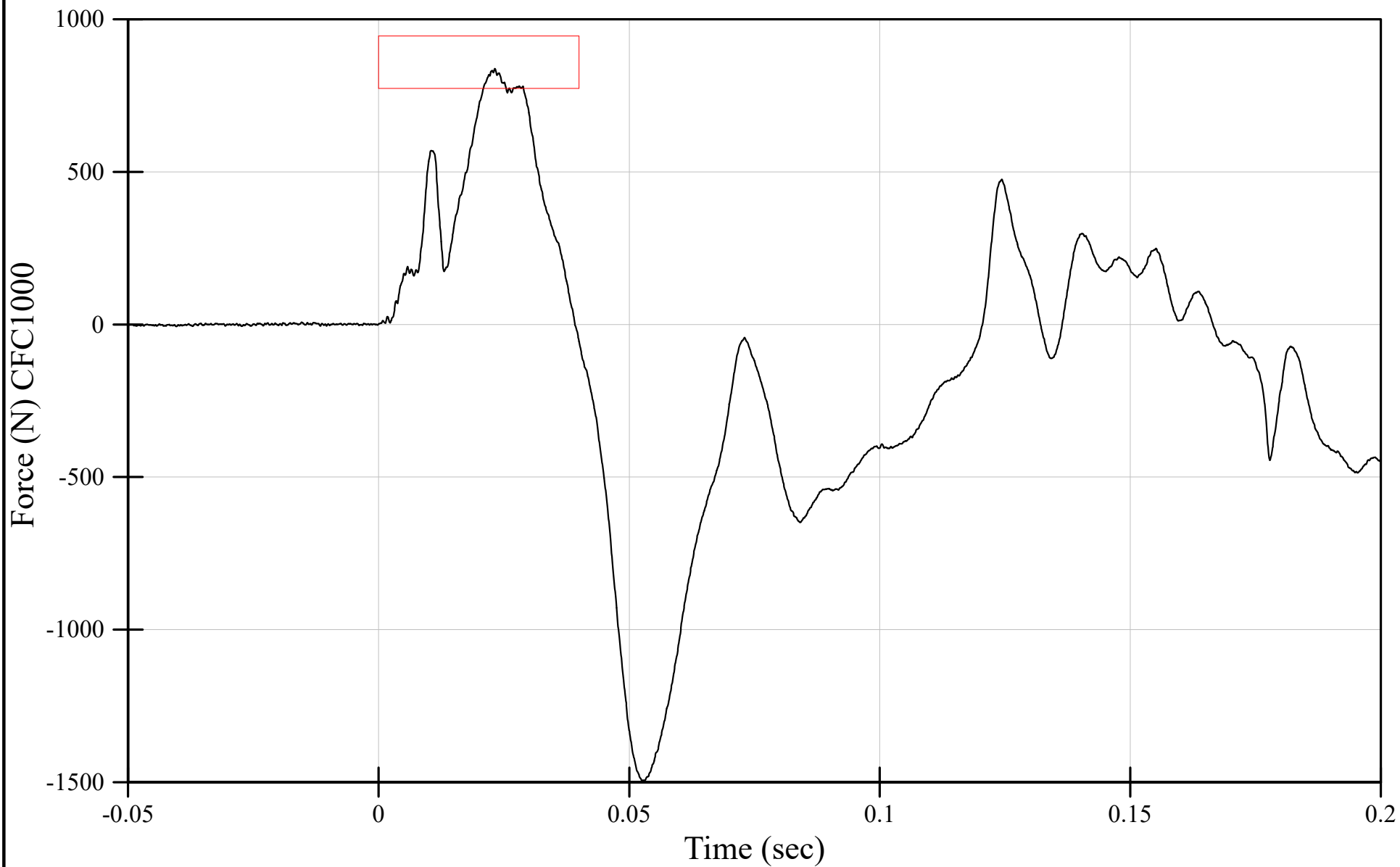
Test Temperature: 69.9 degrees  
Relative Humidity: 60.4%  
Test Velocity: 4.95 m/s

THOR Neck Frontal Qualification  
Y-Moment as Measured  
Serial Number: EB6005



Test Temperature: 69.9 degrees  
Relative Humidity: 60.4%  
Test Velocity: 4.95 m/s

THOR Neck Frontal Qualification  
Z-Force as Measured  
Serial Number: EB6005

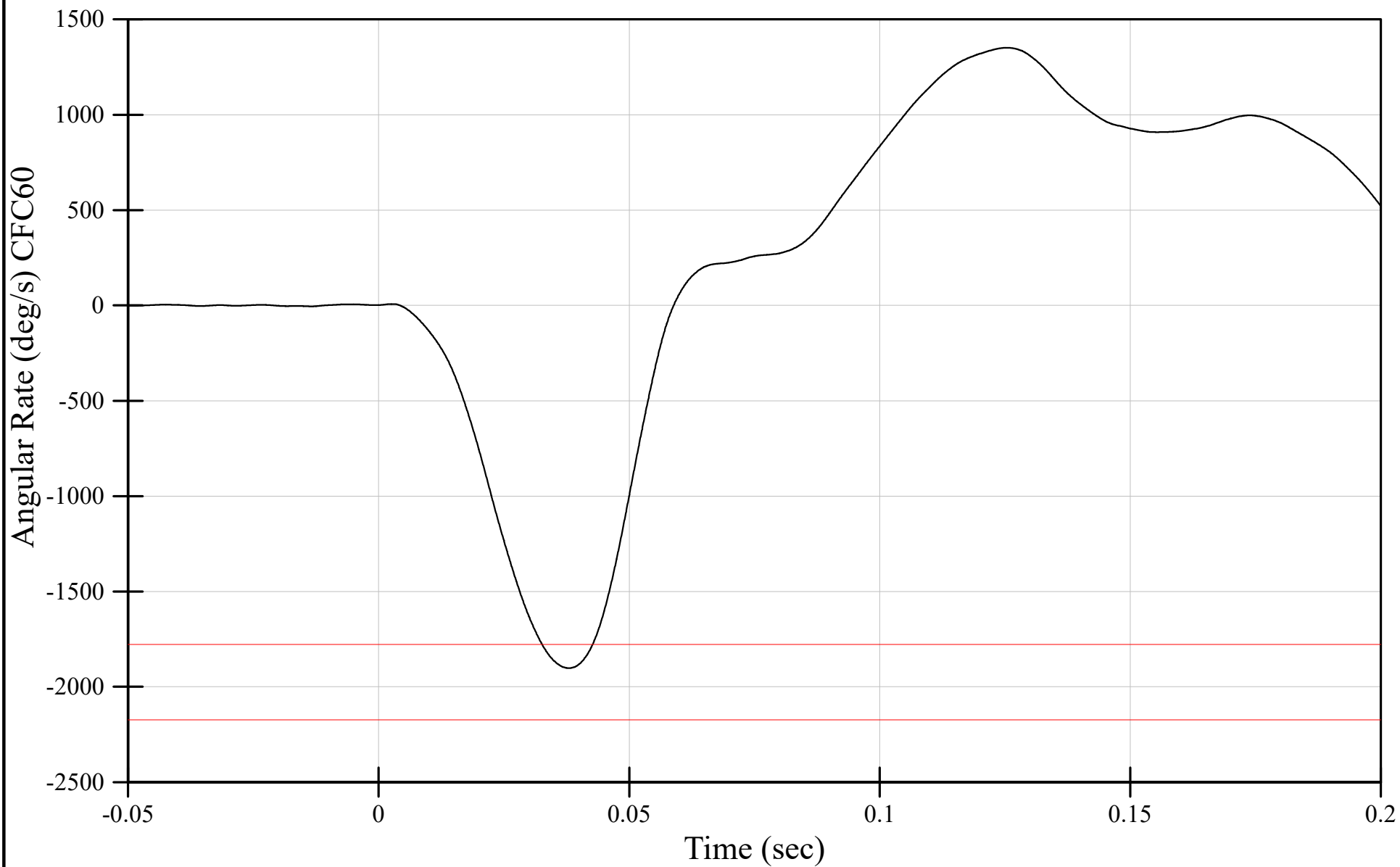


Test Temperature: 69.9 degrees  
Relative Humidity: 60.4%  
Test Velocity: 4.95 m/s

# THOR Neck Frontal Qualification

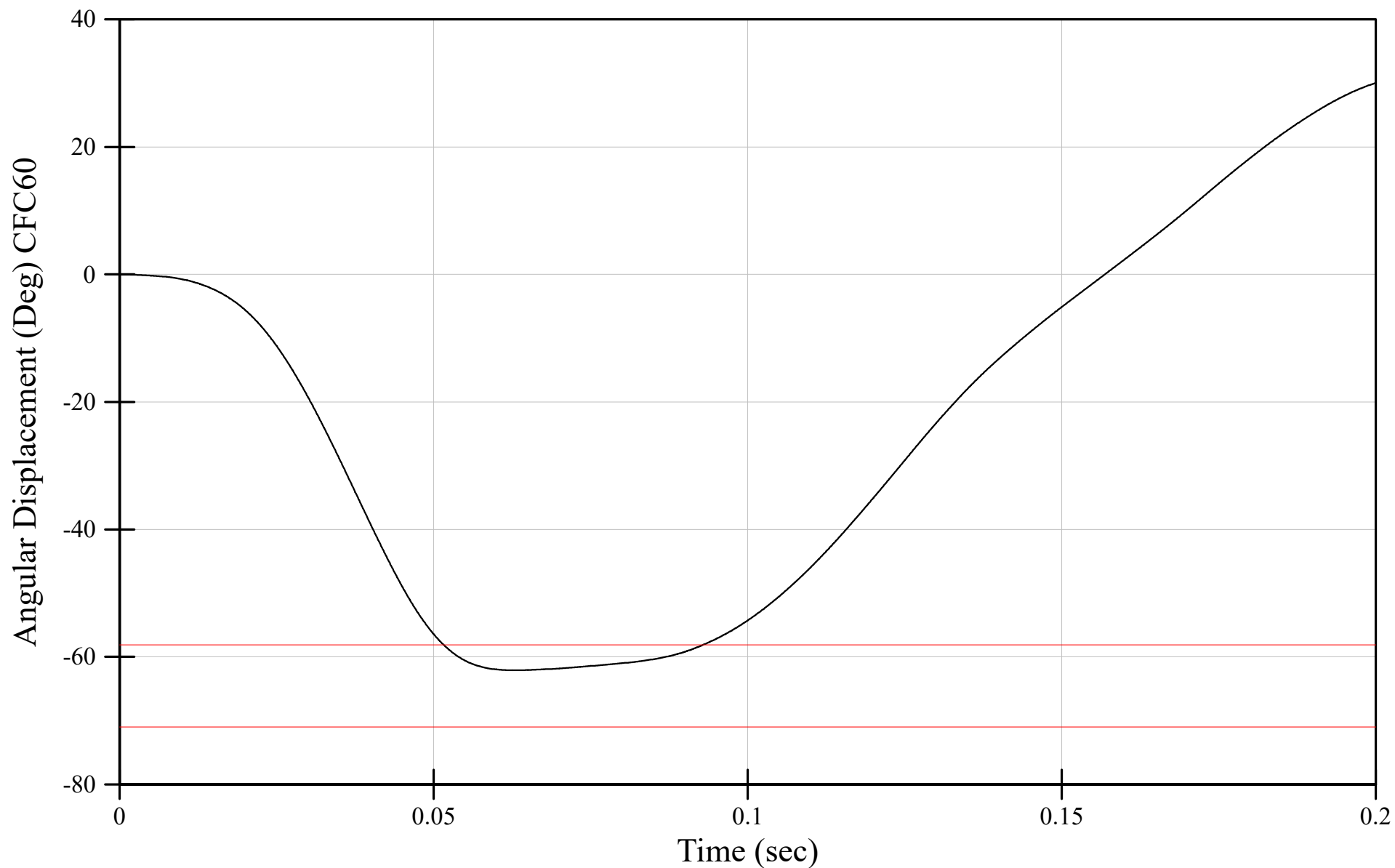
## Peak Angular Rate

Serial Number: EB6005



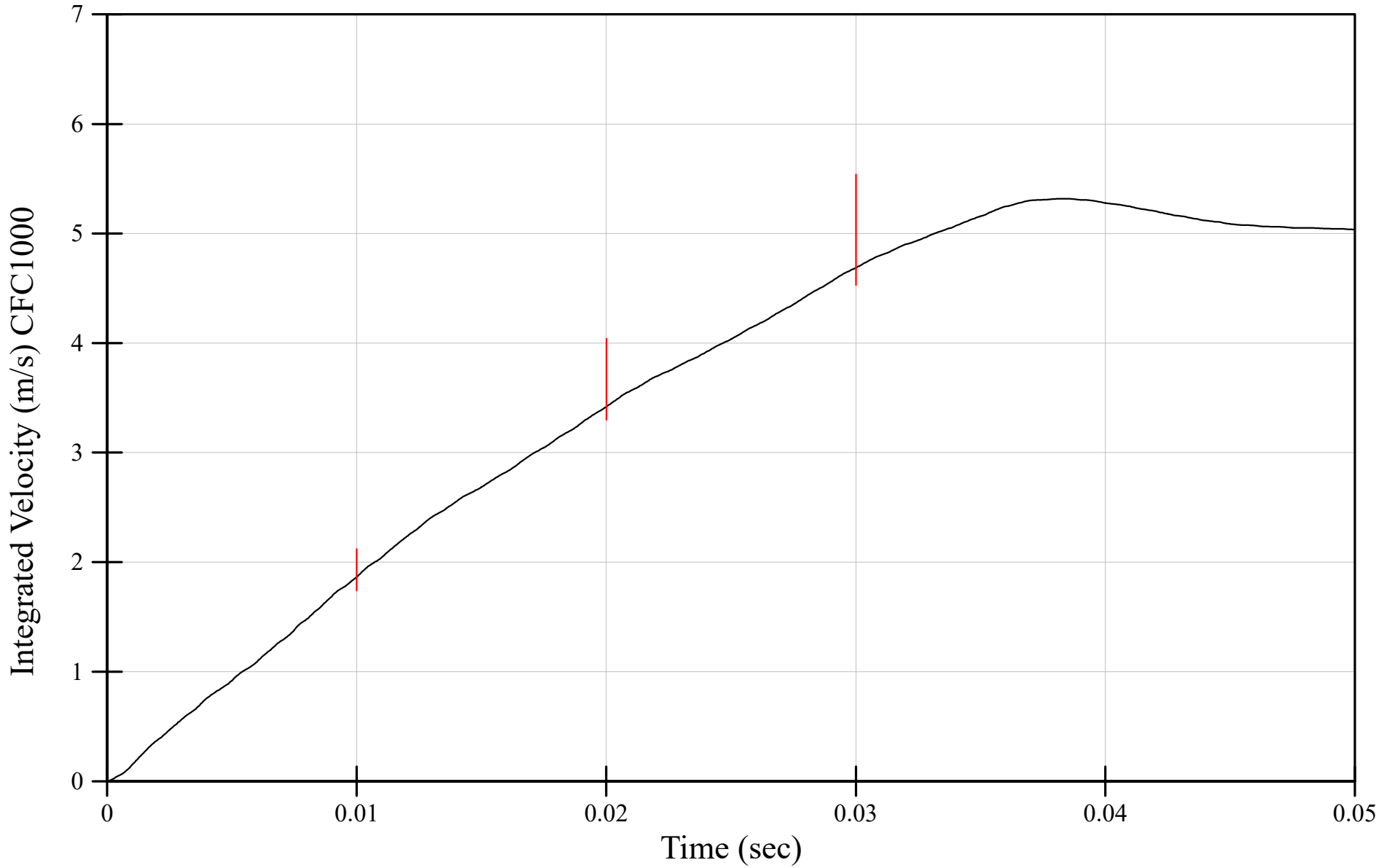
Test Temperature: 69.9 degrees  
Relative Humidity: 60.4%  
Test Velocity: 4.95 m/s

THOR Neck Frontal Qualification  
Neck Rotation  
Serial Number: EB6005



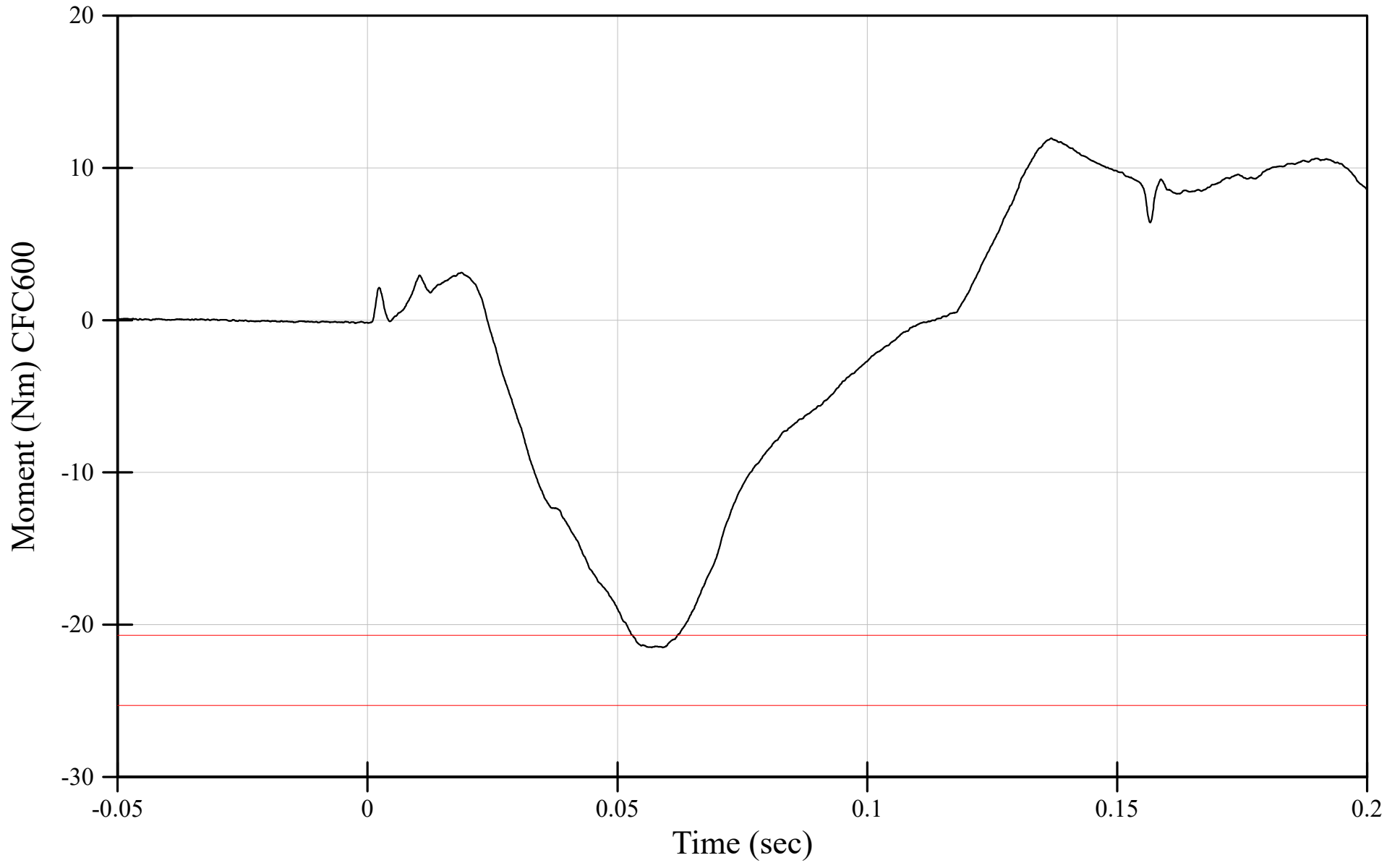
Test Temperature: 71.3 degrees  
Relative Humidity: 45.9%  
Test Velocity: 4.95 m/s

THOR Neck Extension Qualification  
Pendulum Velocity  
Serial Number: EB6005



Test Temperature: 71.3 degrees  
Relative Humidity: 45.9%  
Test Velocity: 4.95 m/s

THOR Neck Extension Qualification  
Y-Moment as Measured  
Serial Number: EB6005

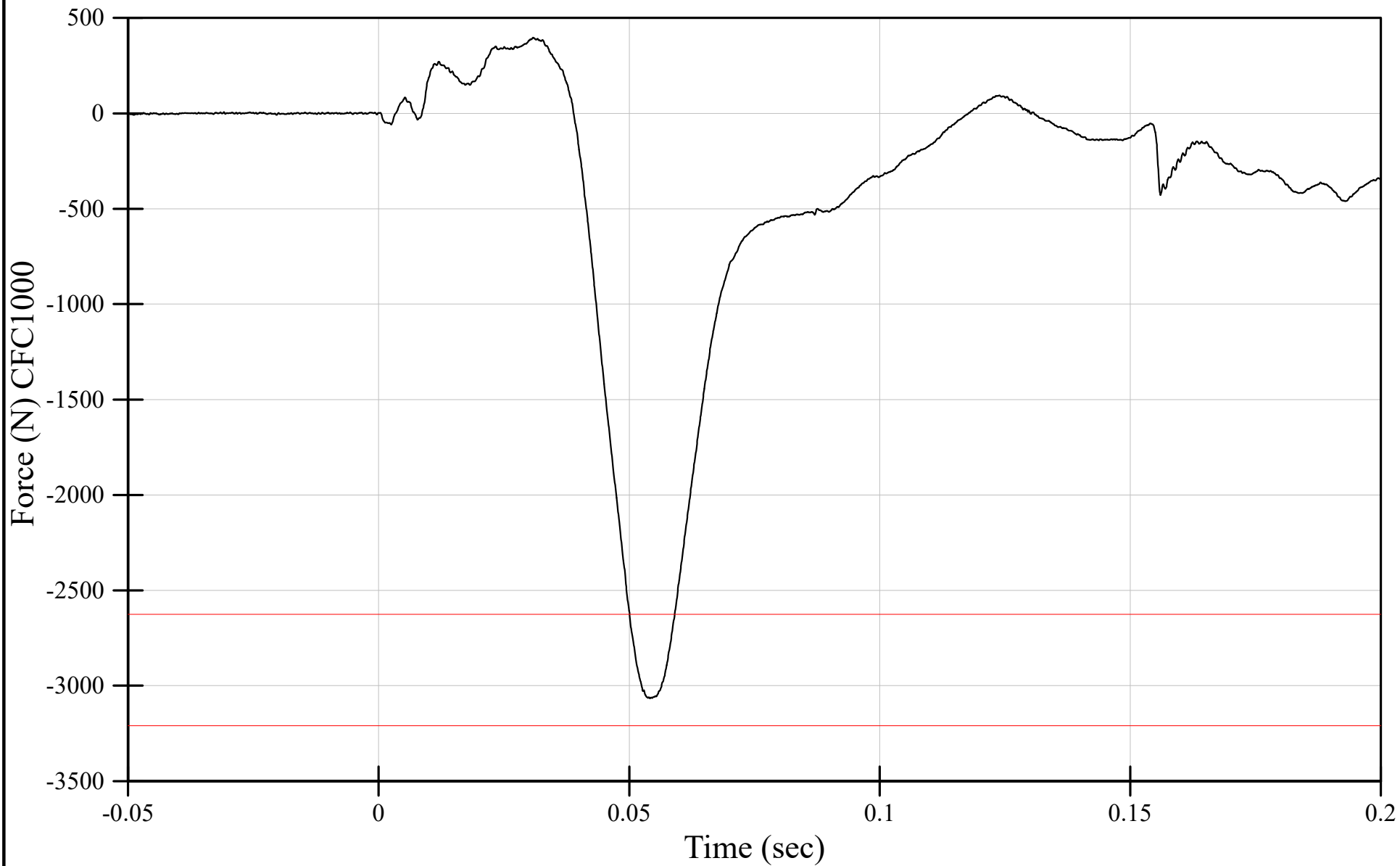


Test Temperature: 71.3 degrees  
Relative Humidity: 45.9%  
Test Velocity: 4.95 m/s

# THOR Neck Extension Qualification

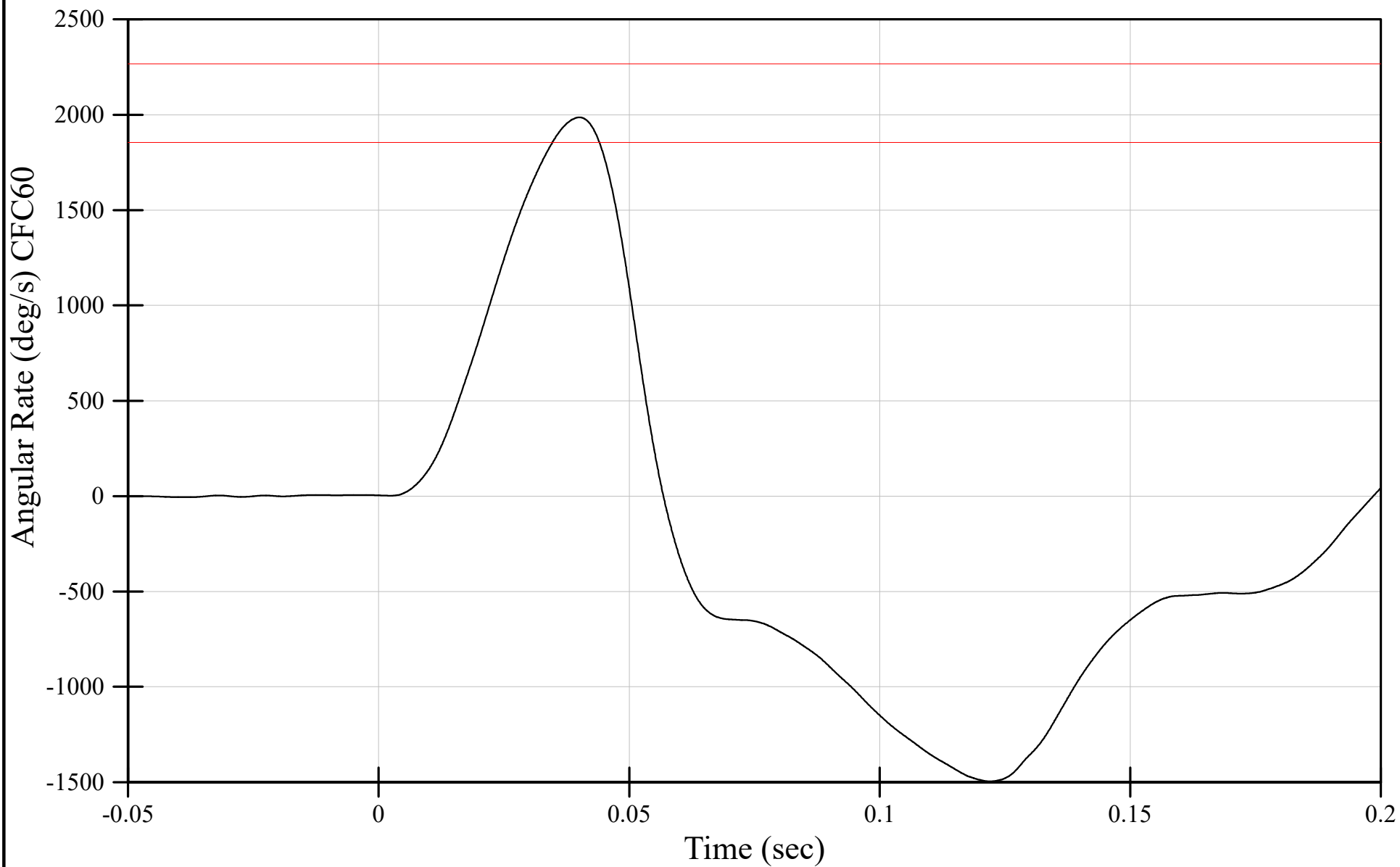
## Z-Force as Measured

Serial Number: EB6005



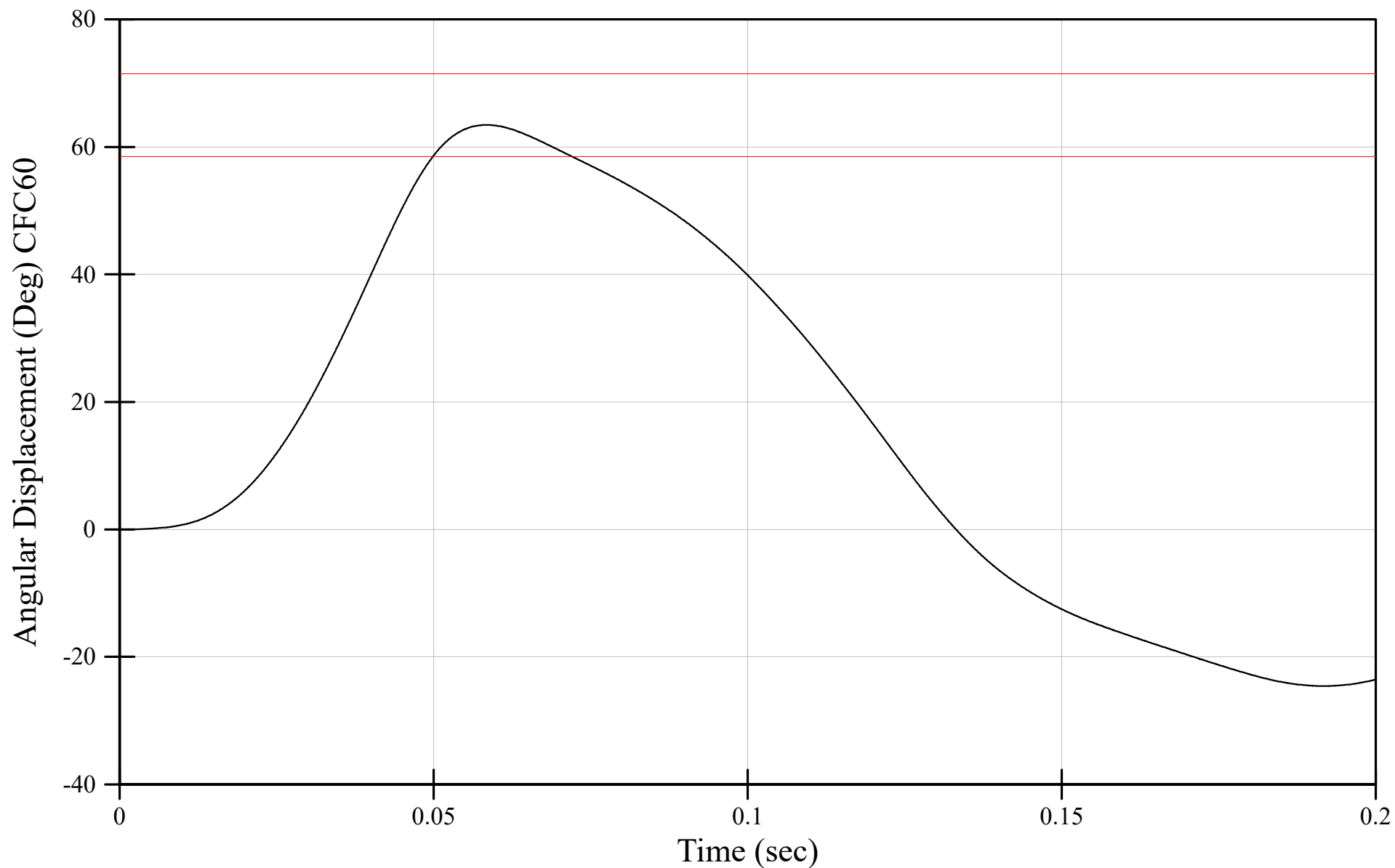
Test Temperature: 71.3 degrees  
Relative Humidity: 45.9%  
Test Velocity: 4.95 m/s

THOR Neck Extension Qualification  
Peak Head Angular Rate  
Serial Number: EB6005



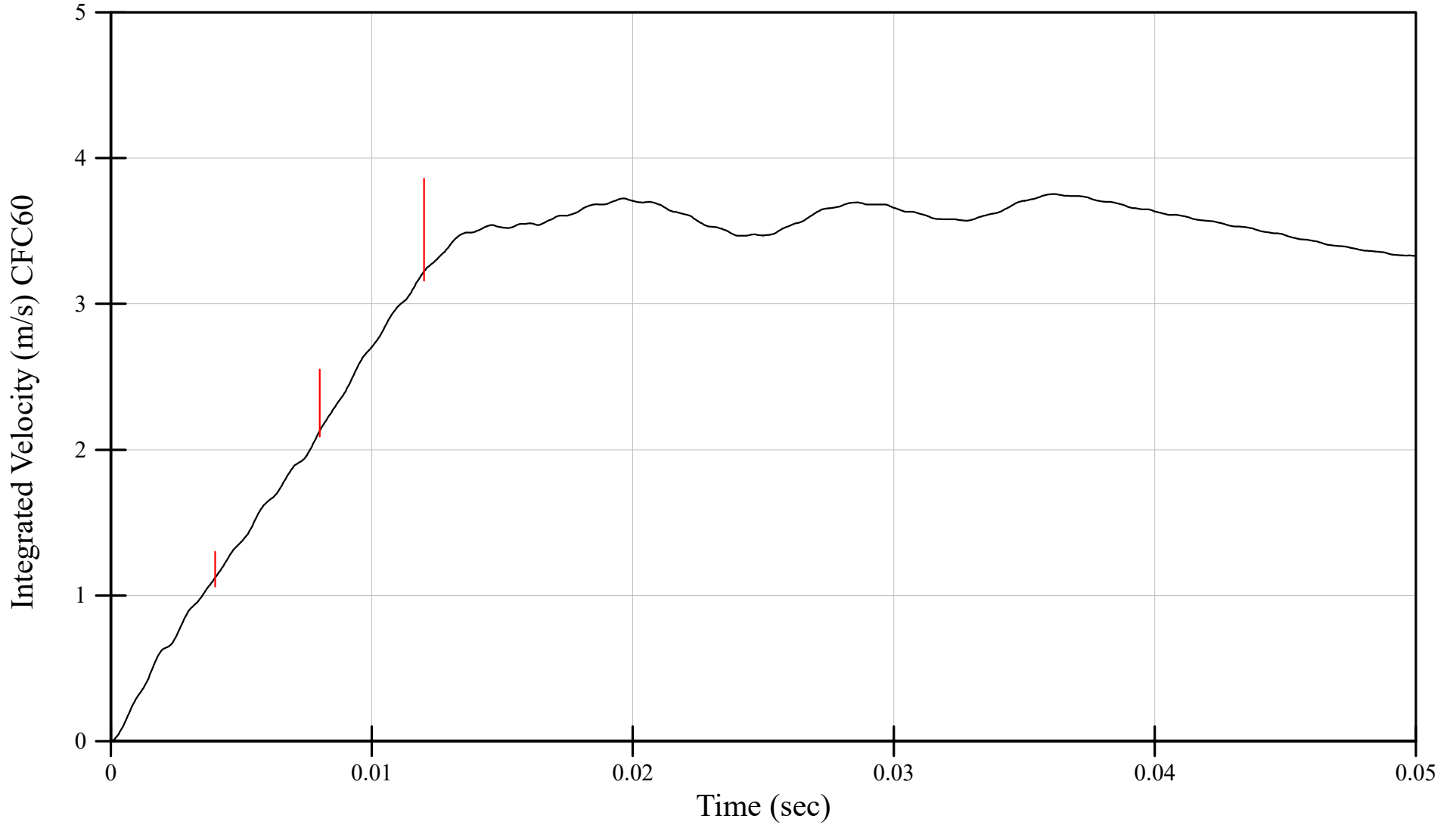
Test Temperature: 71.3 degrees  
Relative Humidity: 45.9%  
Test Velocity: 4.95 m/s

THOR Neck Extension Qualification  
Neck Rotation  
Serial Number: EB6005



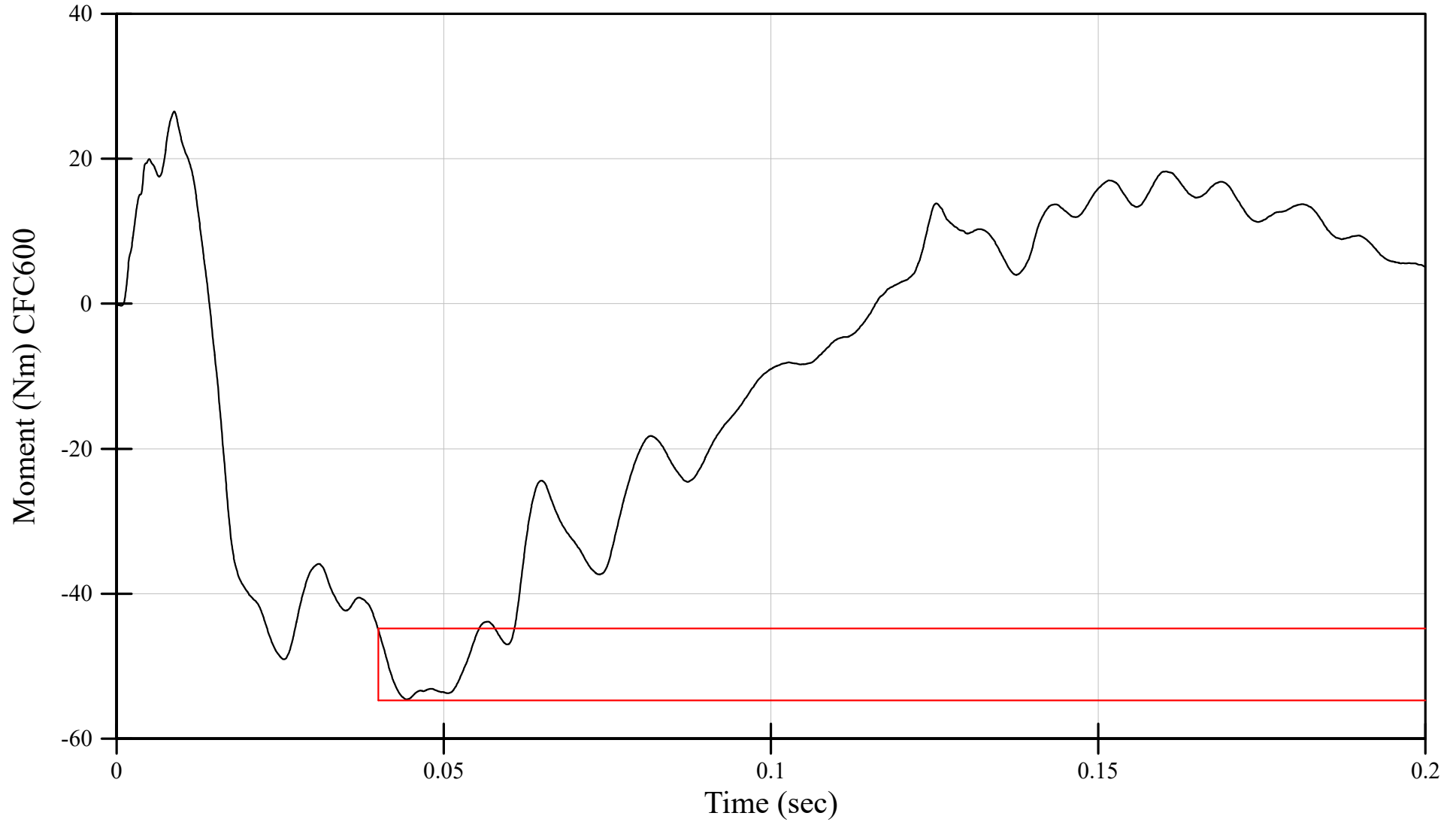
Test Temperature: 70.1 degrees  
Relative Humidity: 49.8%  
Test Velocity: 3.41122 m/s

THOR Neck Right Lateral Qualification  
Probe Acceleration  
Serial Number: EB6005



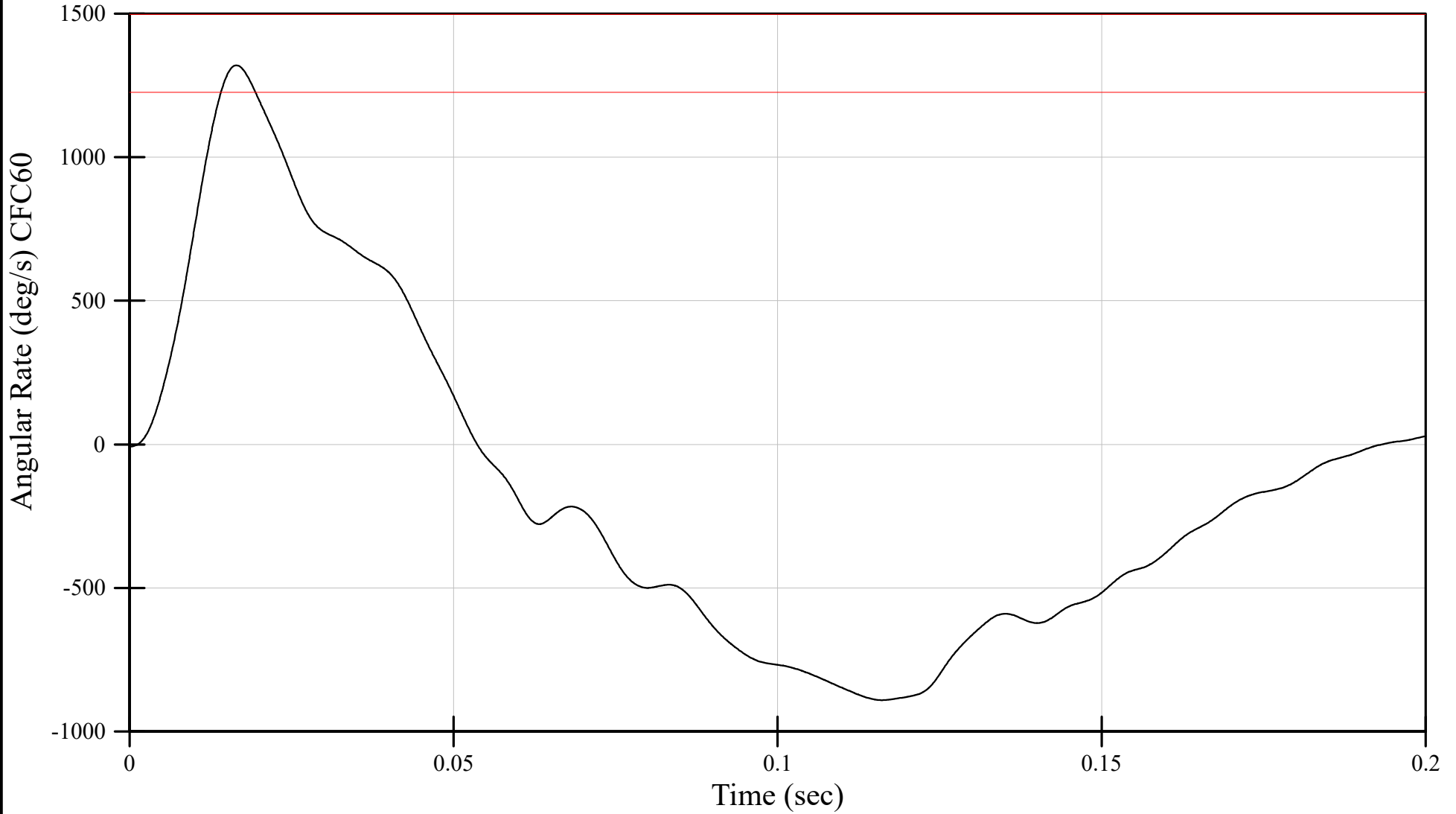
Test Temperature: 70.1 degrees  
Relative Humidity: 49.8%  
Test Velocity: 3.41122 m/s

THOR Neck Right Lateral Qualification  
X-Moment as Measured  
Serial Number: EB6005



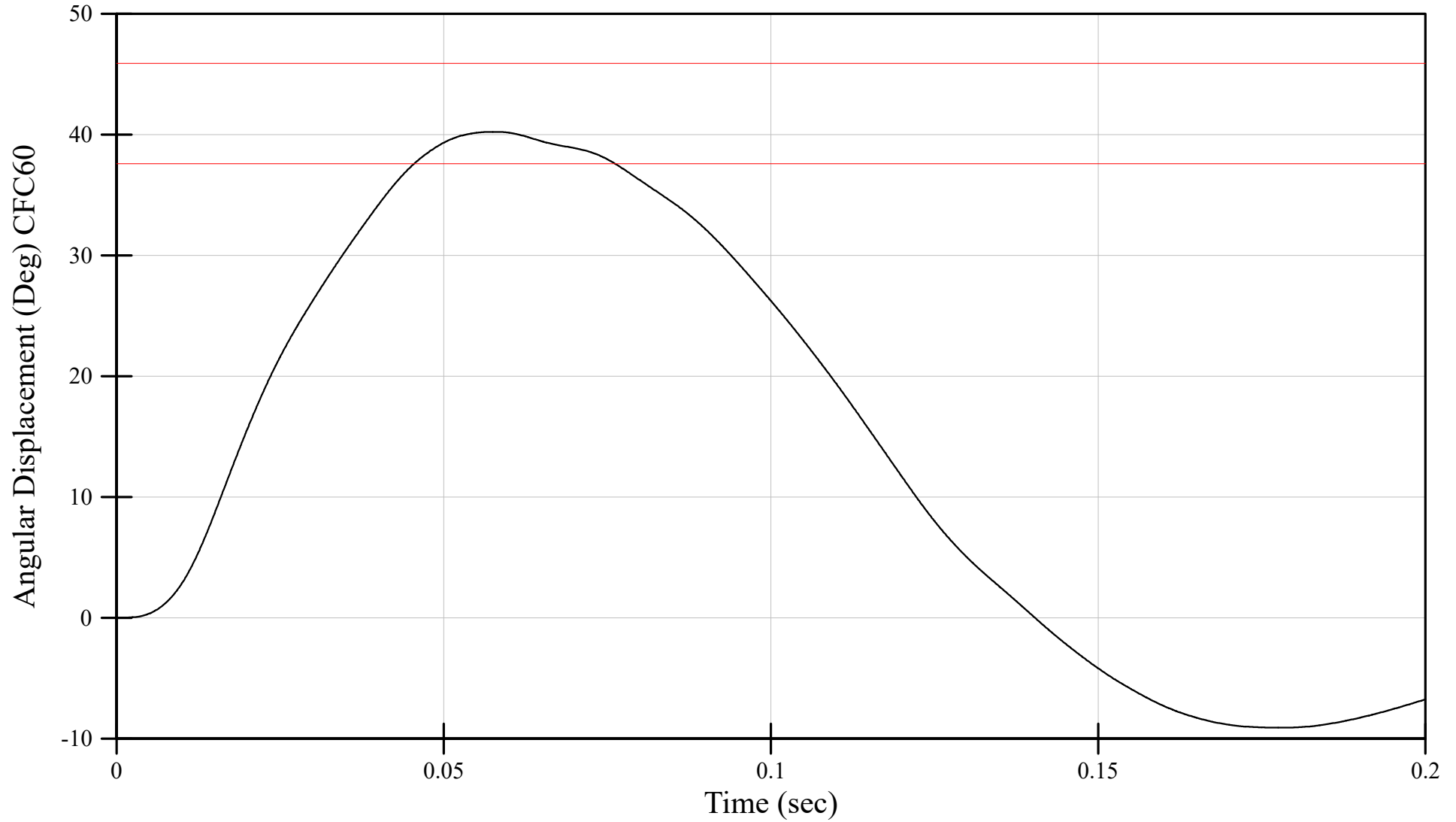
Test Temperature: 70.1 degrees  
Relative Humidity: 49.8%  
Test Velocity: 3.41122 m/s

THOR Neck Right Lateral Qualification  
Peak Angular Rate  
Serial Number: EB6005



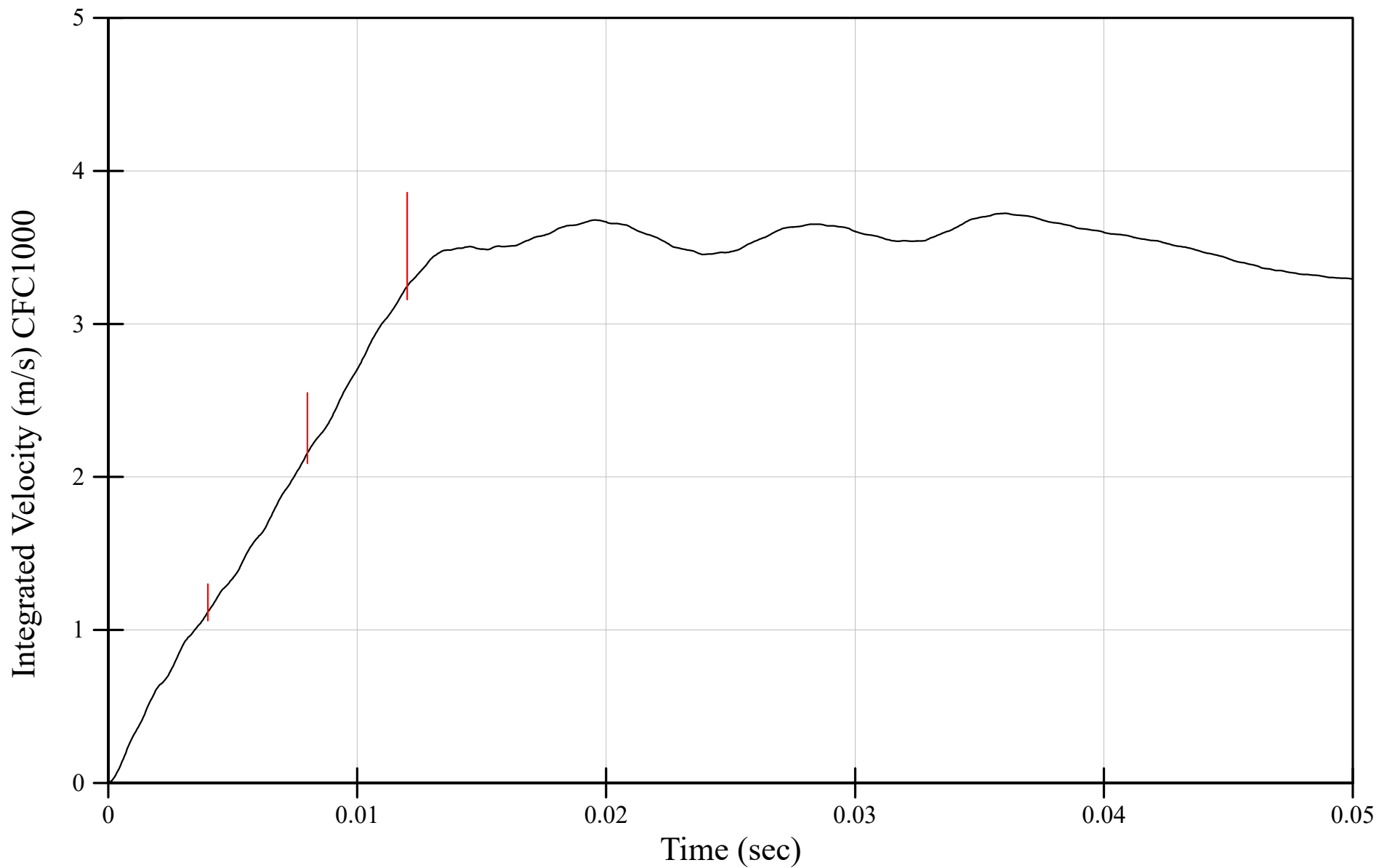
Test Temperature: 70.1 degrees  
Relative Humidity: 49.8%  
Test Velocity: 3.41122 m/s

THOR Neck Right Lateral Qualification  
Neck Rotation  
Serial Number: EB6005



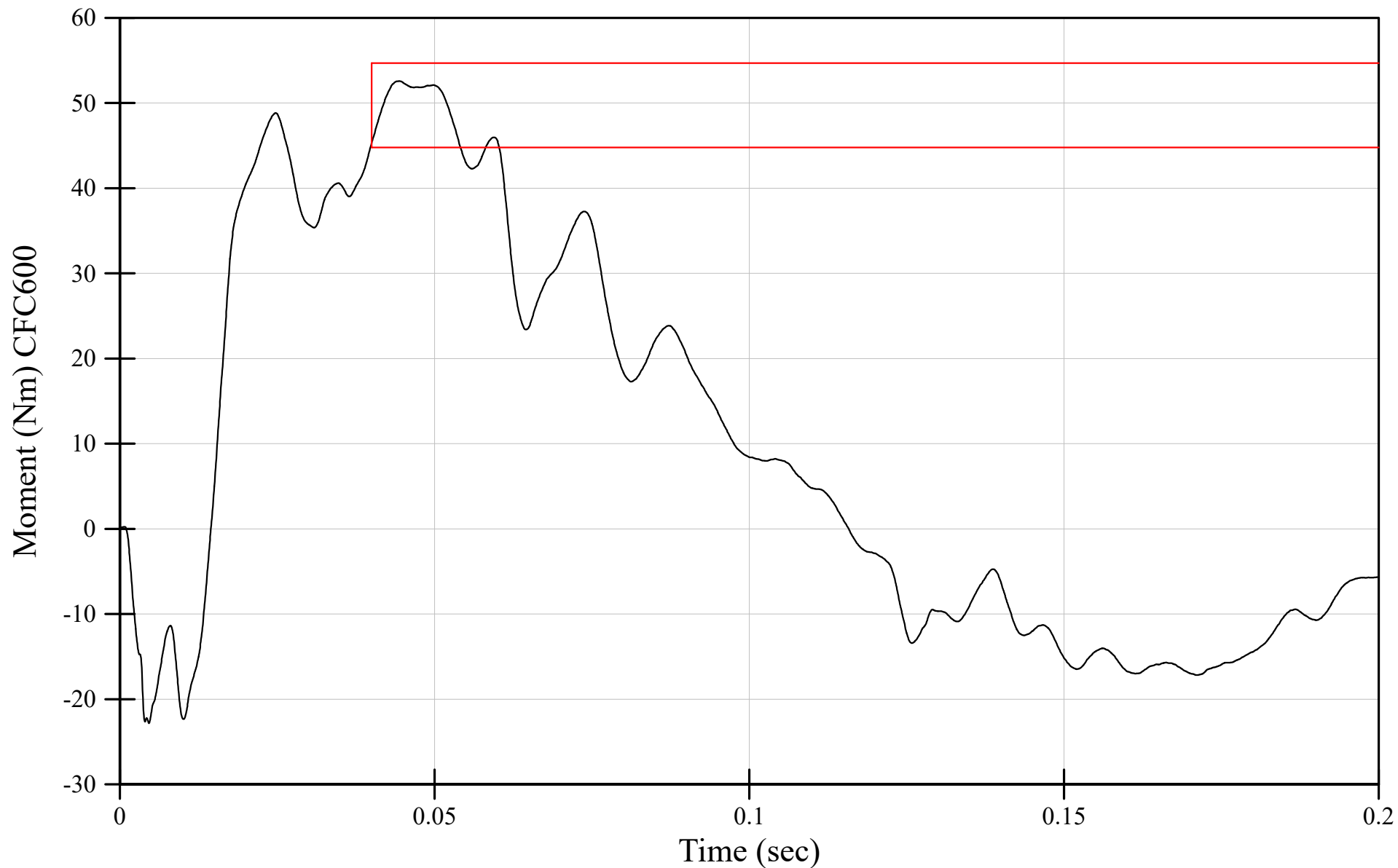
Test Temperature: 70.2 degrees  
Relative Humidity: 62%  
Test Velocity: 3.39 m/s

THOR Neck Left Lateral Qualification  
Pendulum Velocity  
Serial Number: EB6005



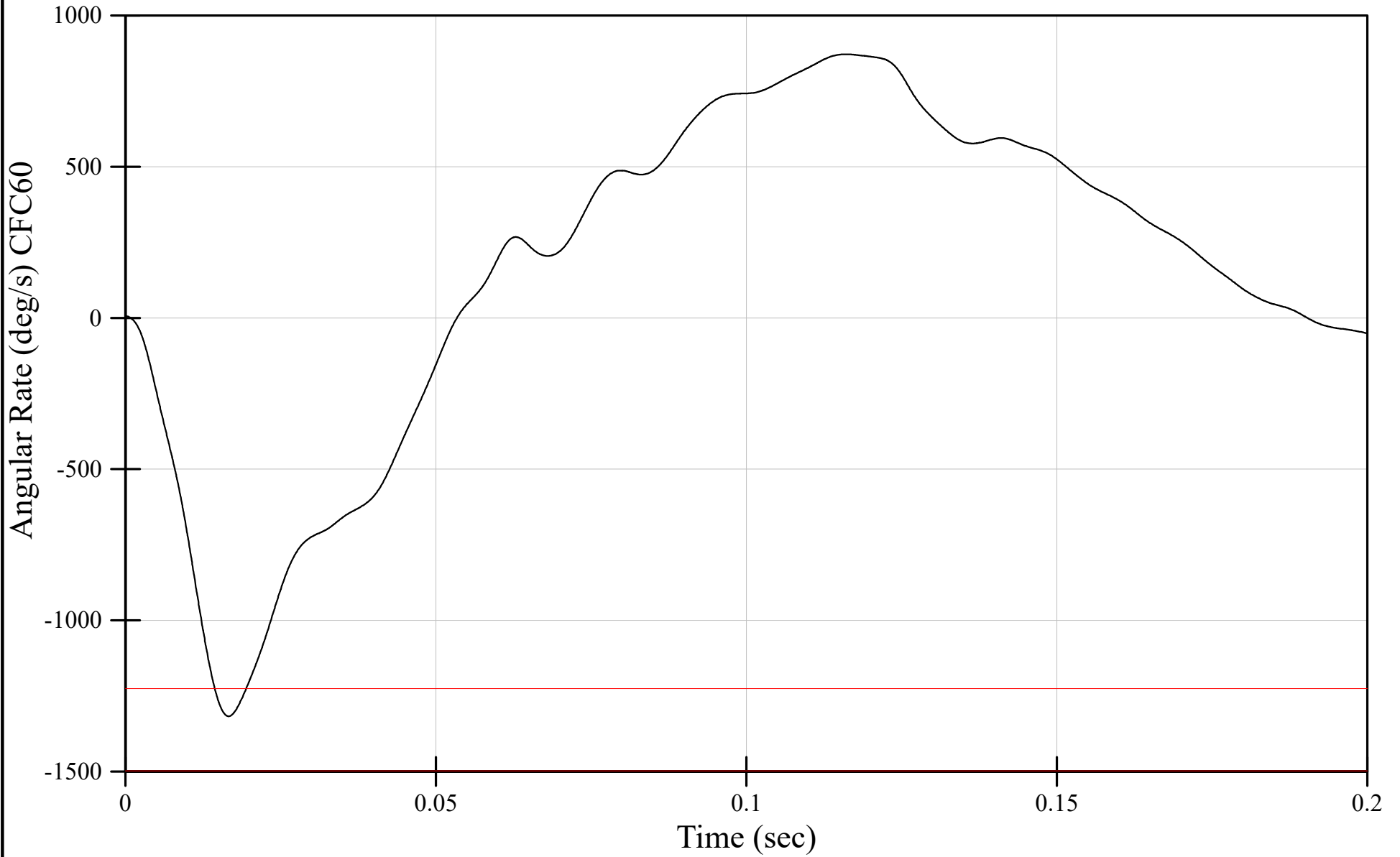
Test Temperature: 70.2 degrees  
Relative Humidity: 62%  
Test Velocity: 3.39 m/s

THOR Neck Left Lateral Qualification  
X-Moment as Measured  
Serial Number: EB6005



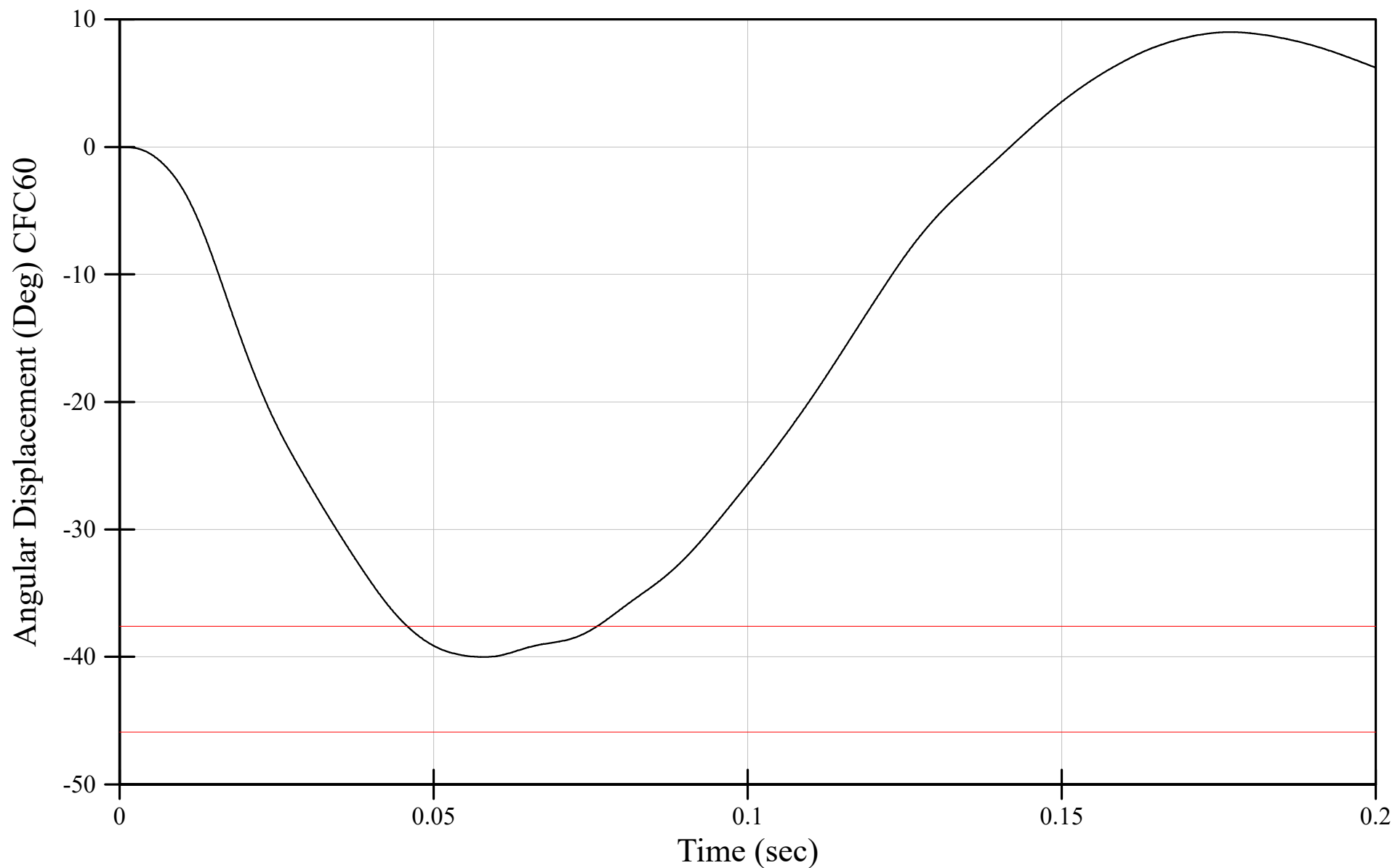
Test Temperature: 70.2 degrees  
Relative Humidity: 62%  
Test Velocity: 3.39 m/s

THOR Neck Left Lateral Qualification  
Peak Angular Rate  
Serial Number: EB6005



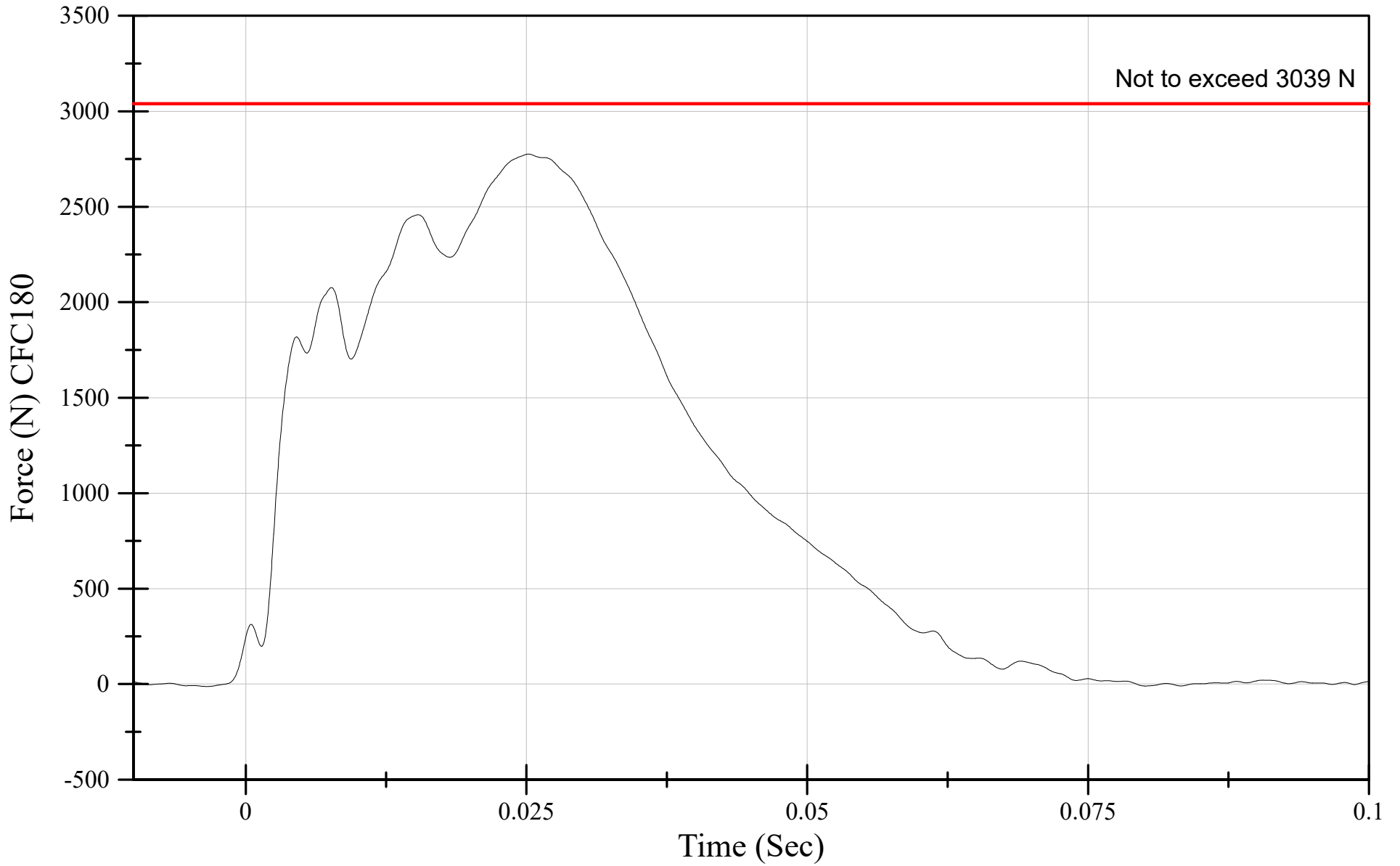
Test Temperature: 70.2 degrees  
Relative Humidity: 62%  
Test Velocity: 3.39 m/s

THOR Neck Left Lateral Qualification  
Neck Rotation  
Serial Number: EB6005



Test Temperature: 71.8 degrees  
Relative Humidity: 44.1%  
Test Velocity: 4.29 m/s

THOR Upper Thorax Qualification  
Probe Force  
Serial Number: 015

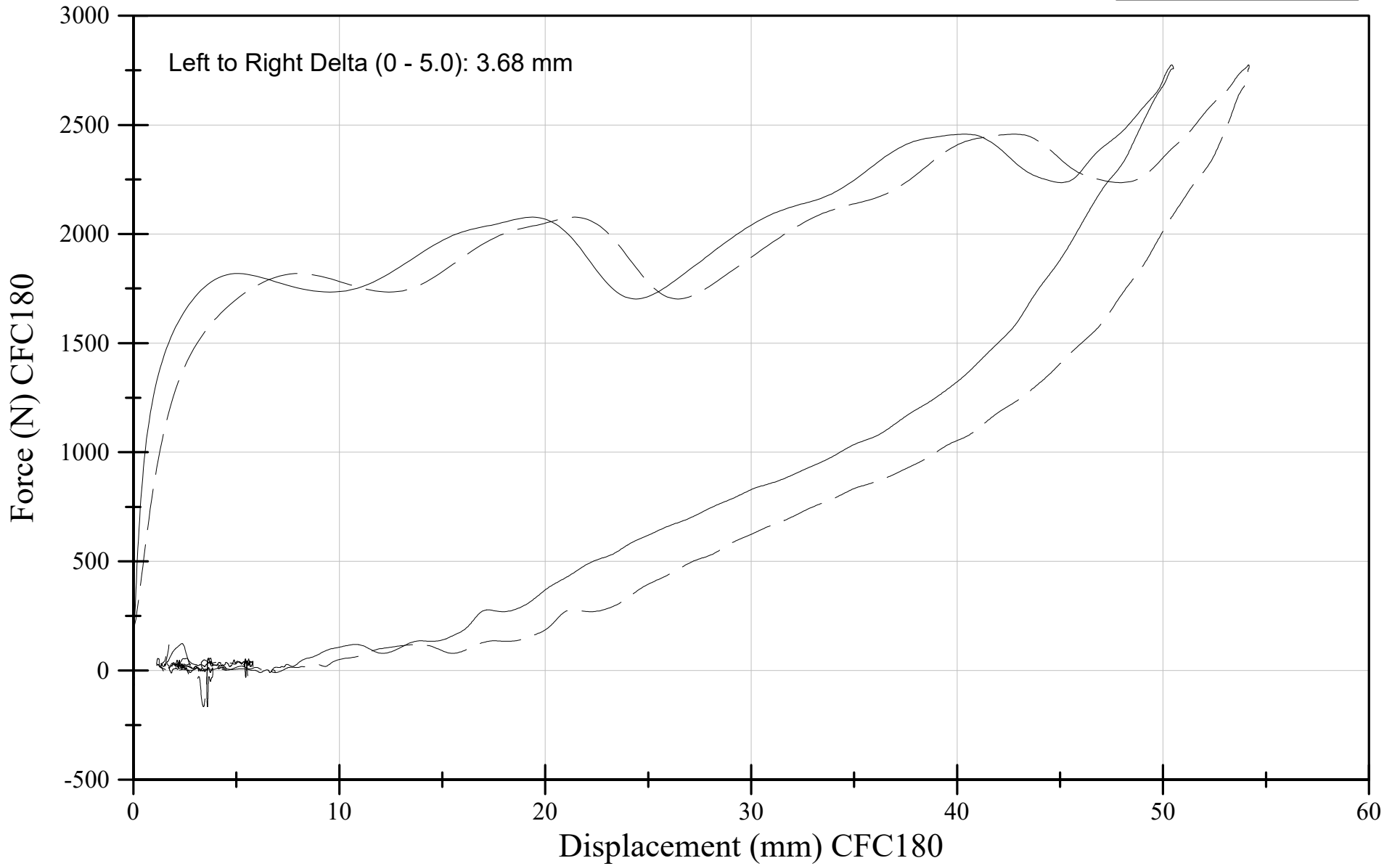


Not to exceed 3039 N

Test Temperature: 71.8 degrees  
Relative Humidity: 44.1%  
Test Velocity: 4.29 m/s

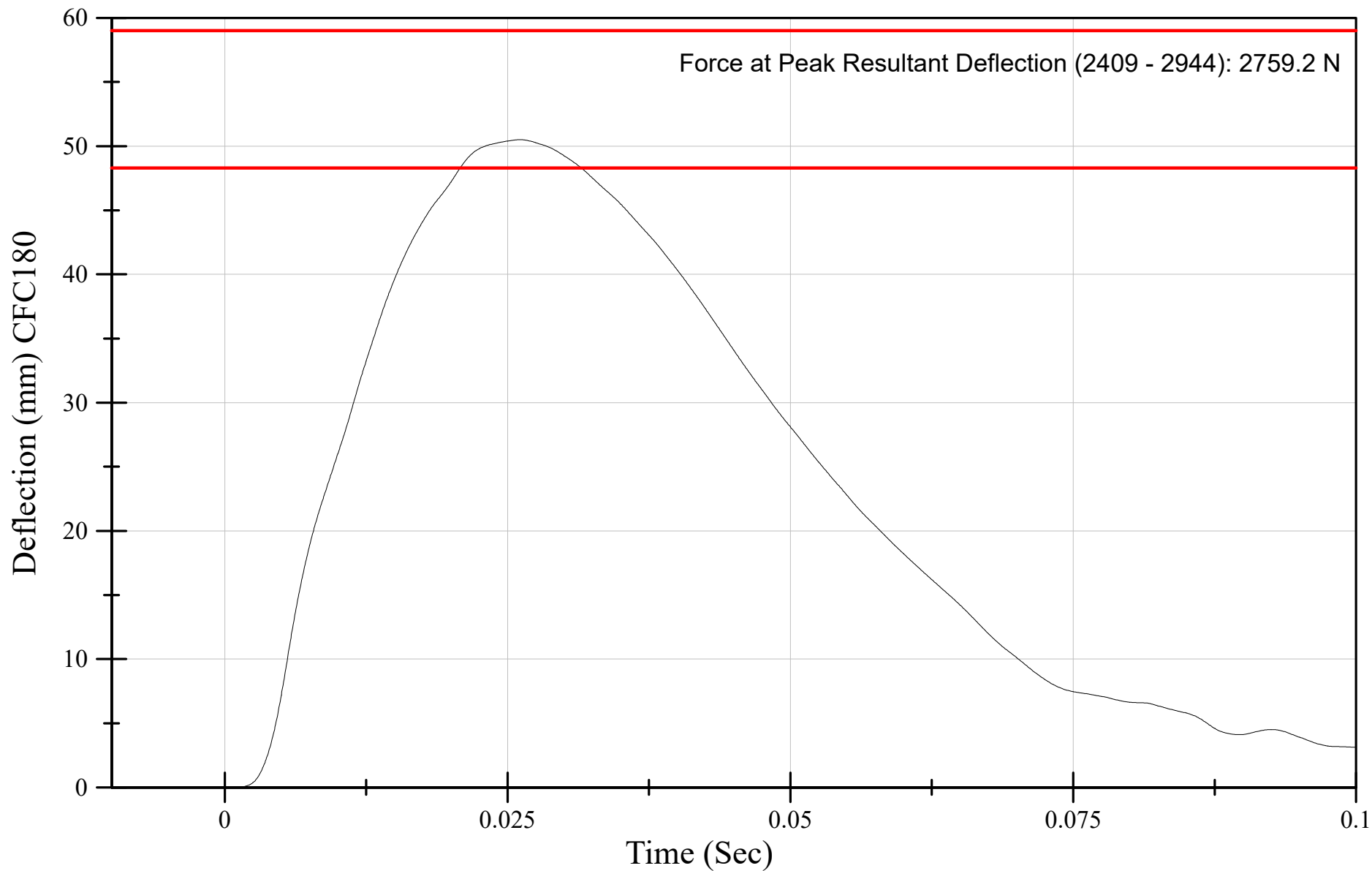
THOR Upper Thorax Qualification  
Probe Force vs Resultant Deflection  
Serial Number: 015

Upper Left  
Upper Right



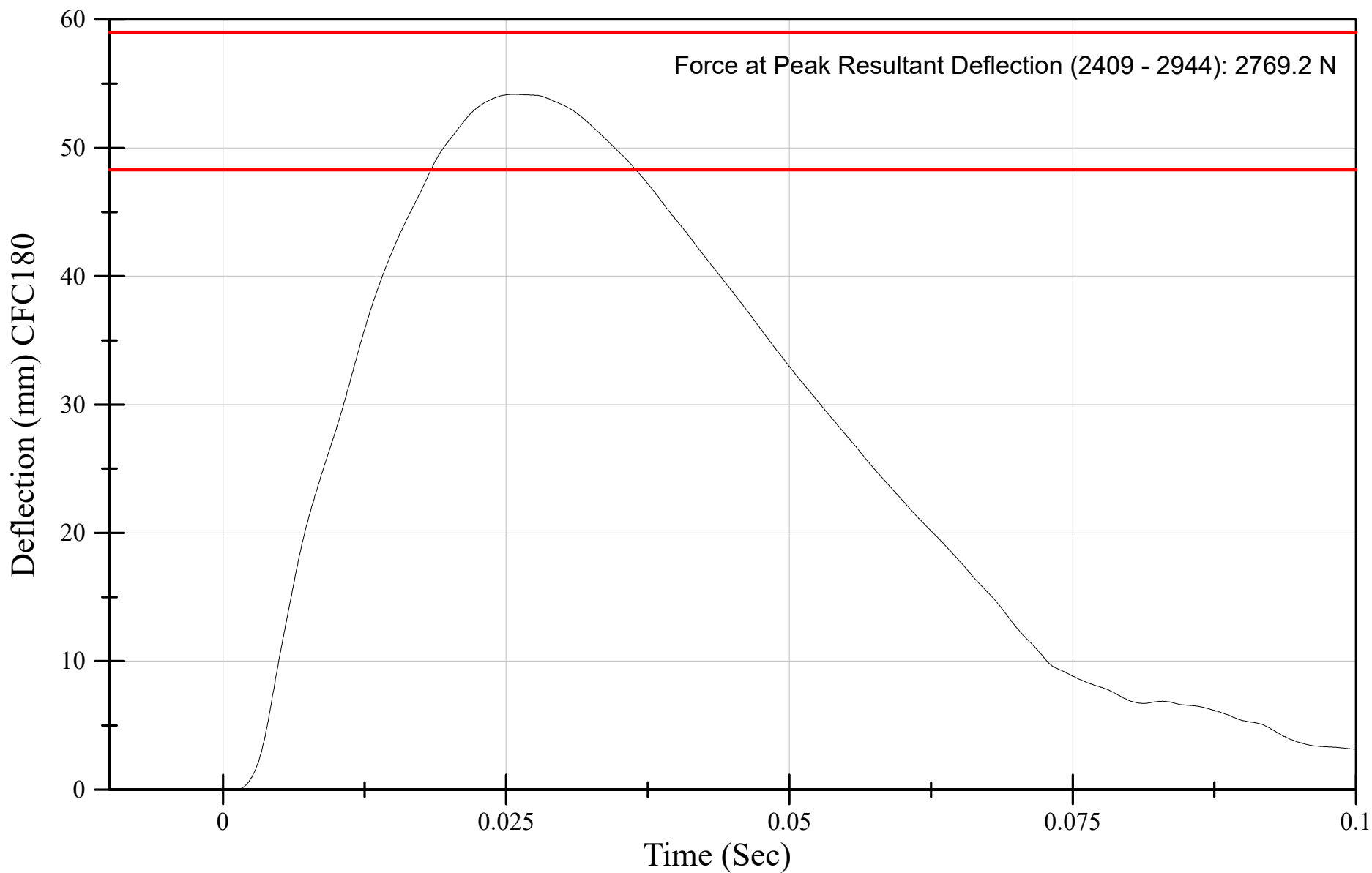
Test Temperature: 71.8 degrees  
Relative Humidity: 44.1%  
Test Velocity: 4.29 m/s

THOR Upper Thorax Qualification  
Left Resultant Deflection  
Serial Number: 015



Test Temperature: 71.8 degrees  
Relative Humidity: 44.1%  
Test Velocity: 4.29 m/s

THOR Upper Thorax Qualification  
Right Resultant Deflection  
Serial Number: 015

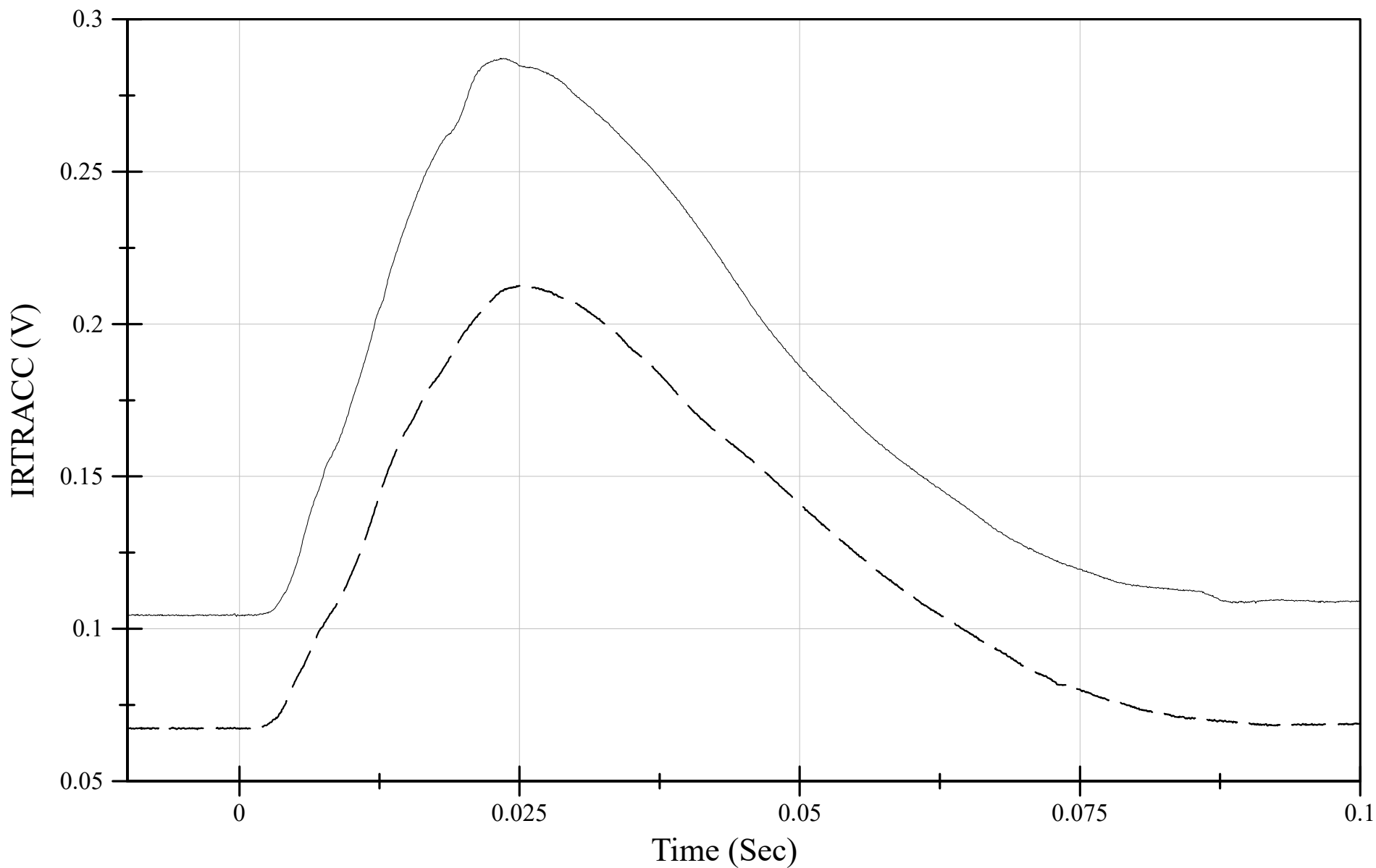
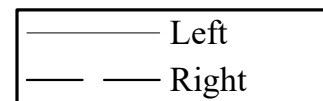


Test Temperature: 71.8 degrees  
Relative Humidity: 44.1%  
Test Velocity: 4.29 m/s

# THOR Upper Thorax Qualification

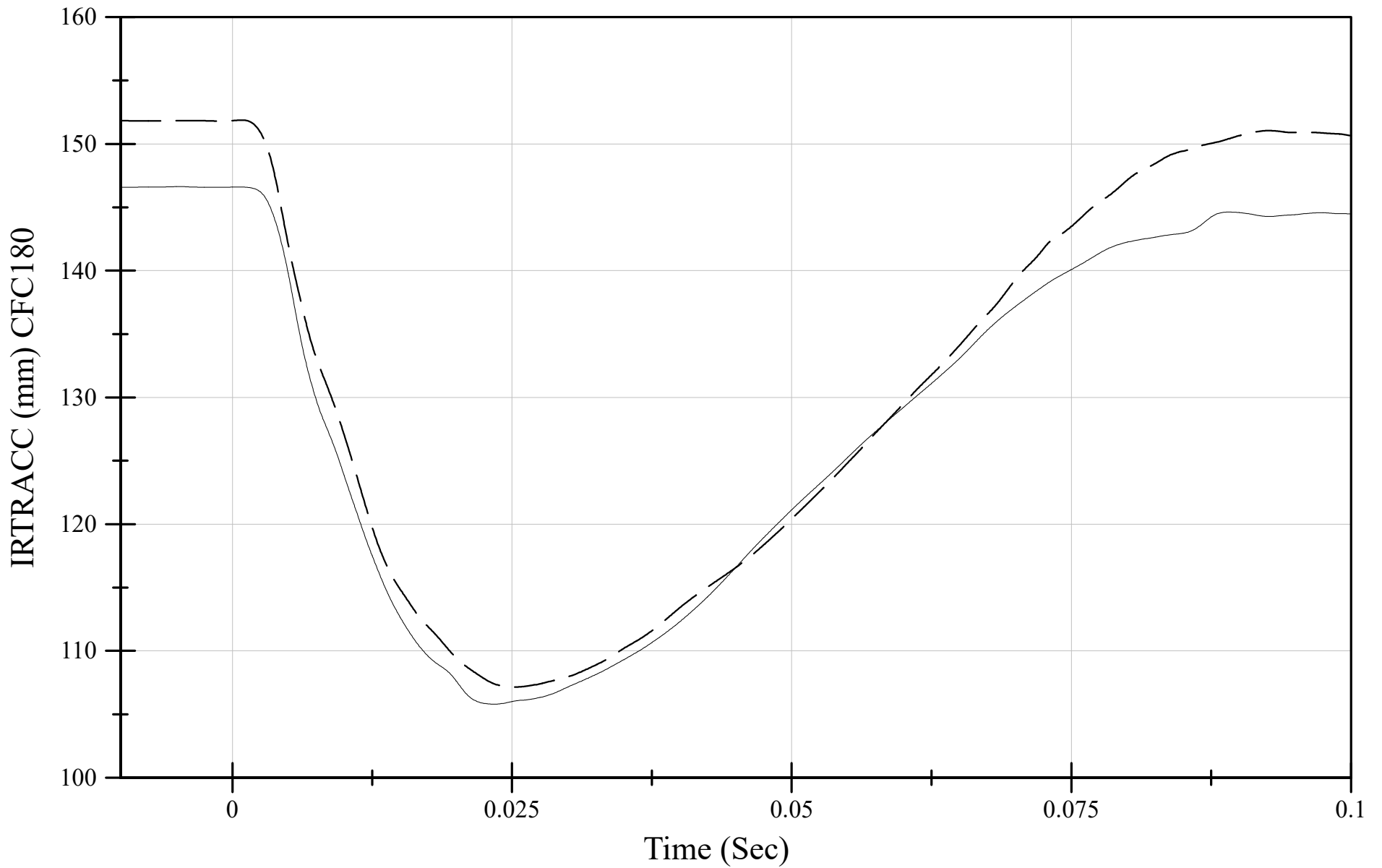
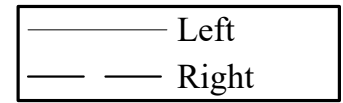
## IRTRACC Voltage

Serial Number: 015



Test Temperature: 71.8 degrees  
Relative Humidity: 44.1%  
Test Velocity: 4.29 m/s

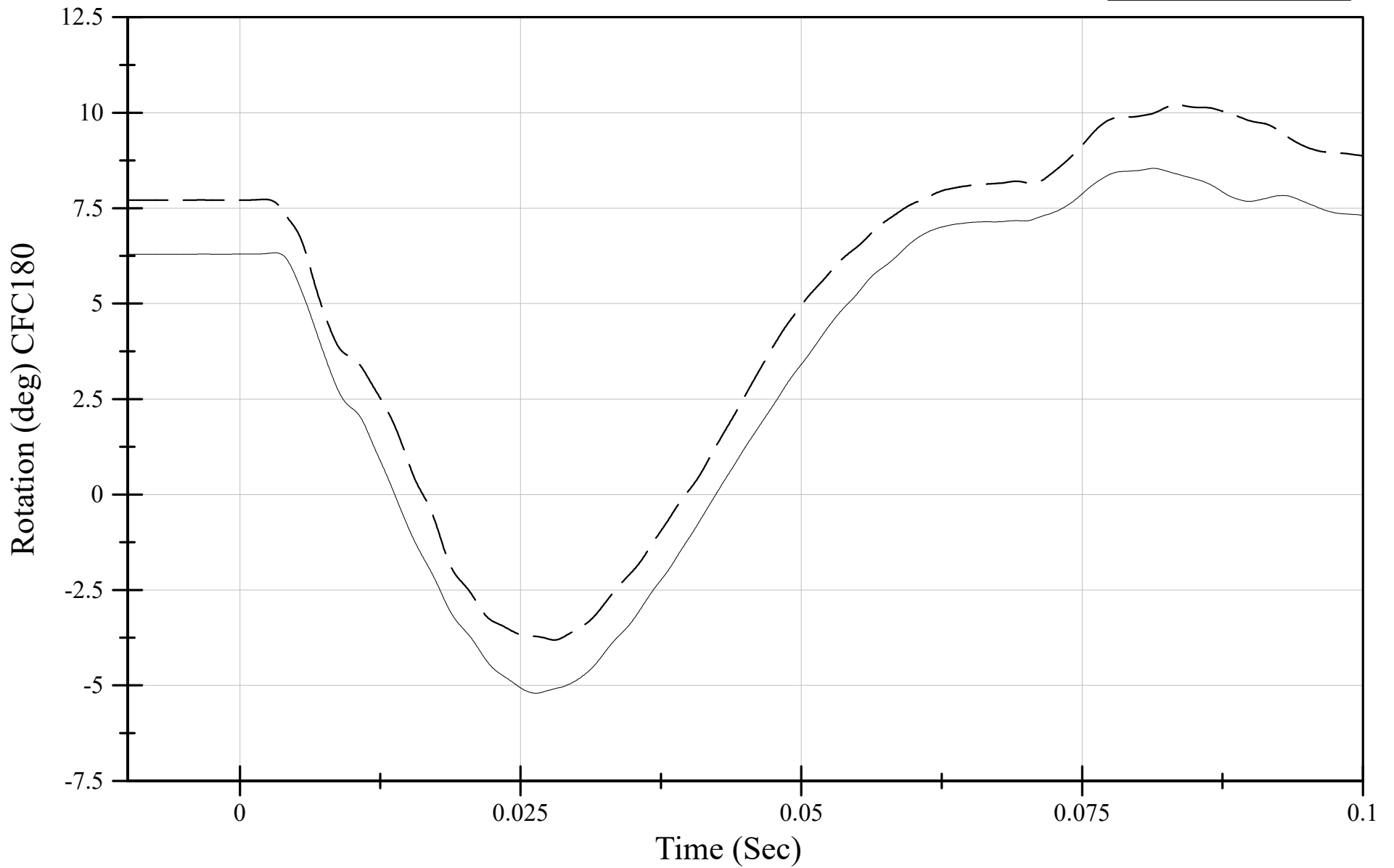
THOR Upper Thorax Qualification  
IRTRACC X-Deflection  
Serial Number: 015



Test Temperature: 71.8 degrees  
Relative Humidity: 44.1%  
Test Velocity: 4.29 m/s

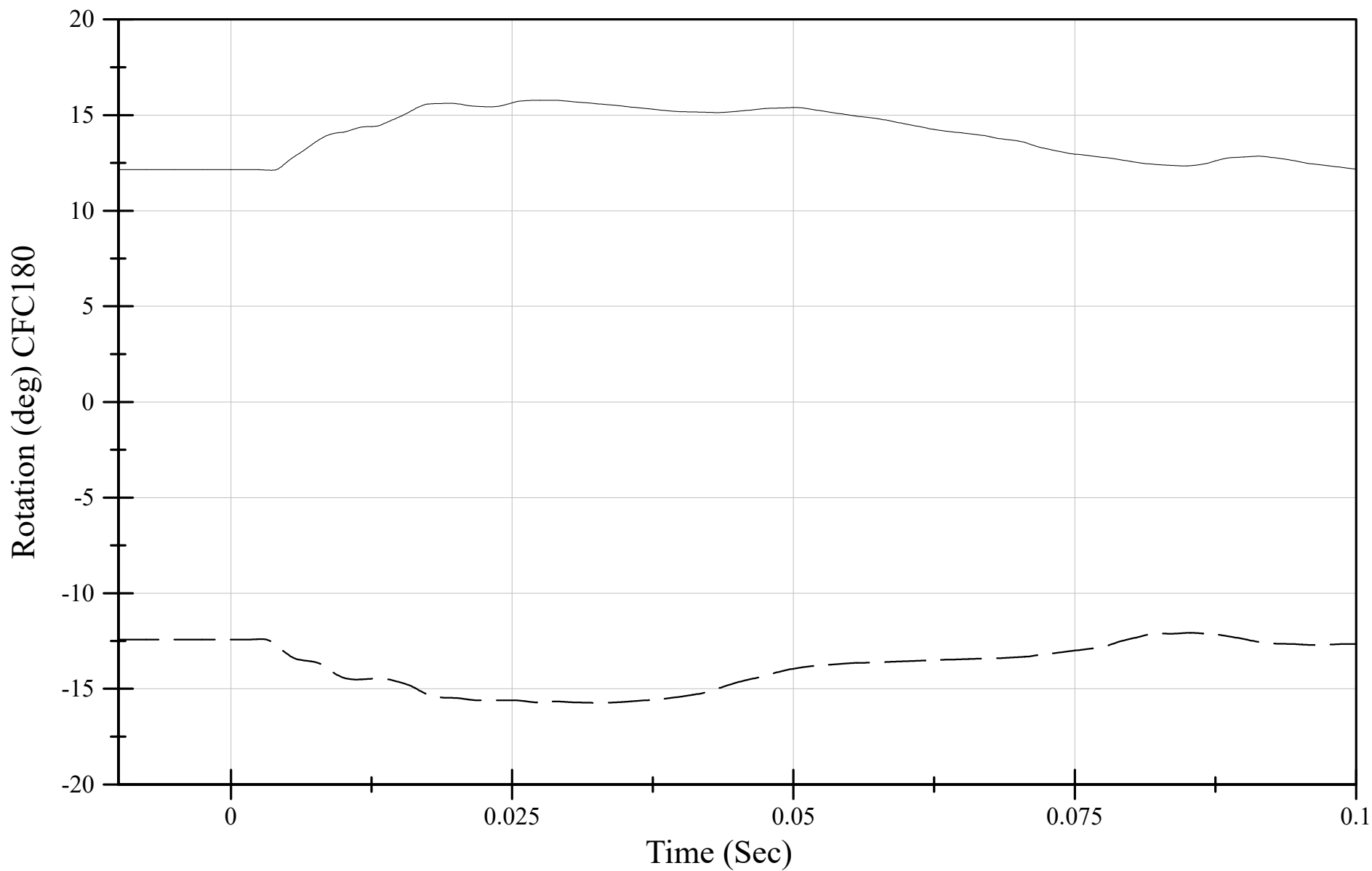
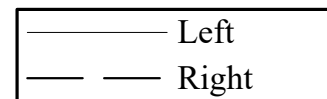
### THOR Upper Thorax Qualification

Y-Rotation + Offset  
Serial Number: 015



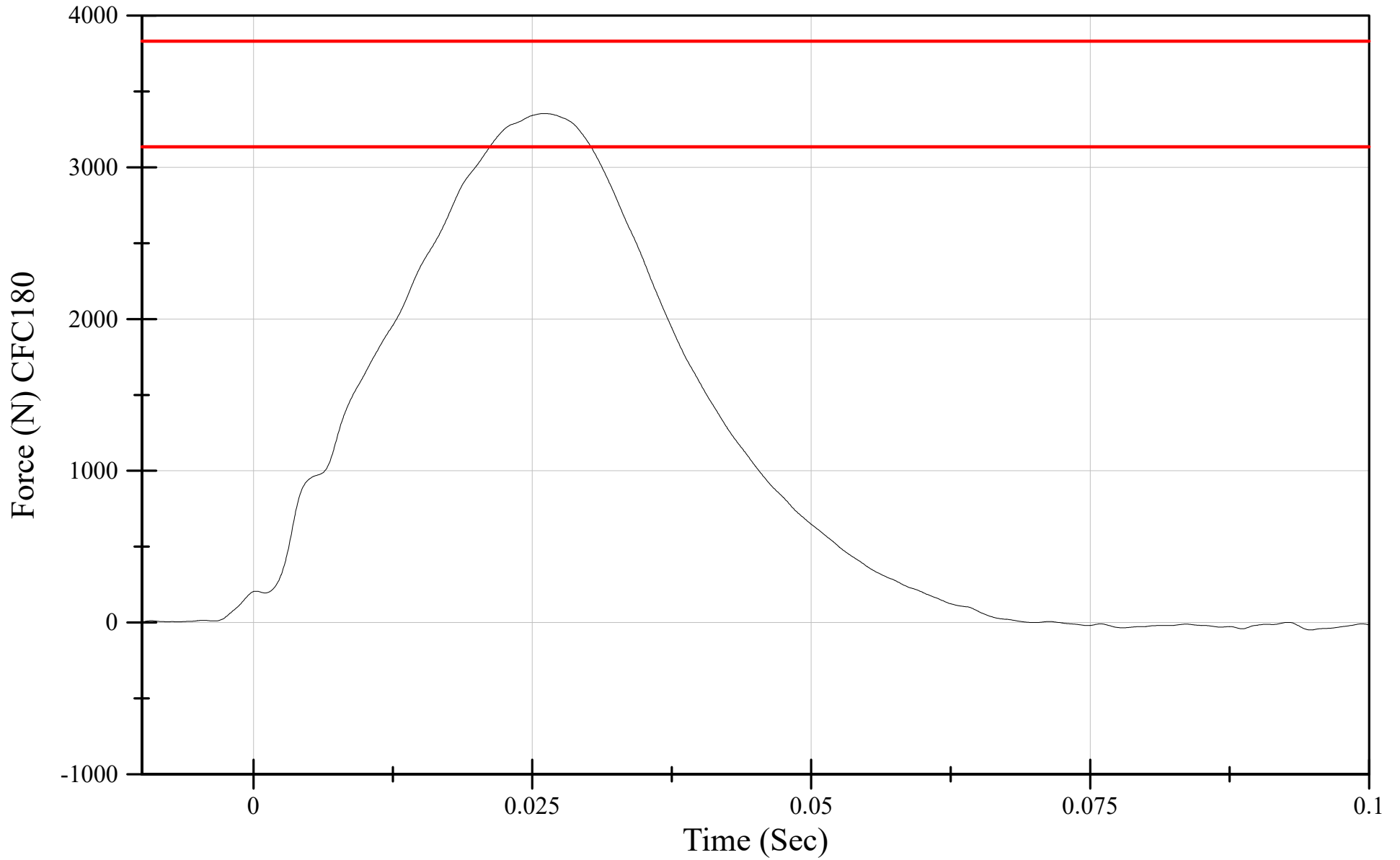
Test Temperature: 71.8 degrees  
Relative Humidity: 44.1%  
Test Velocity: 4.29 m/s

THOR Upper Thorax Qualification  
Z-Rotation + Offset  
Serial Number: 015



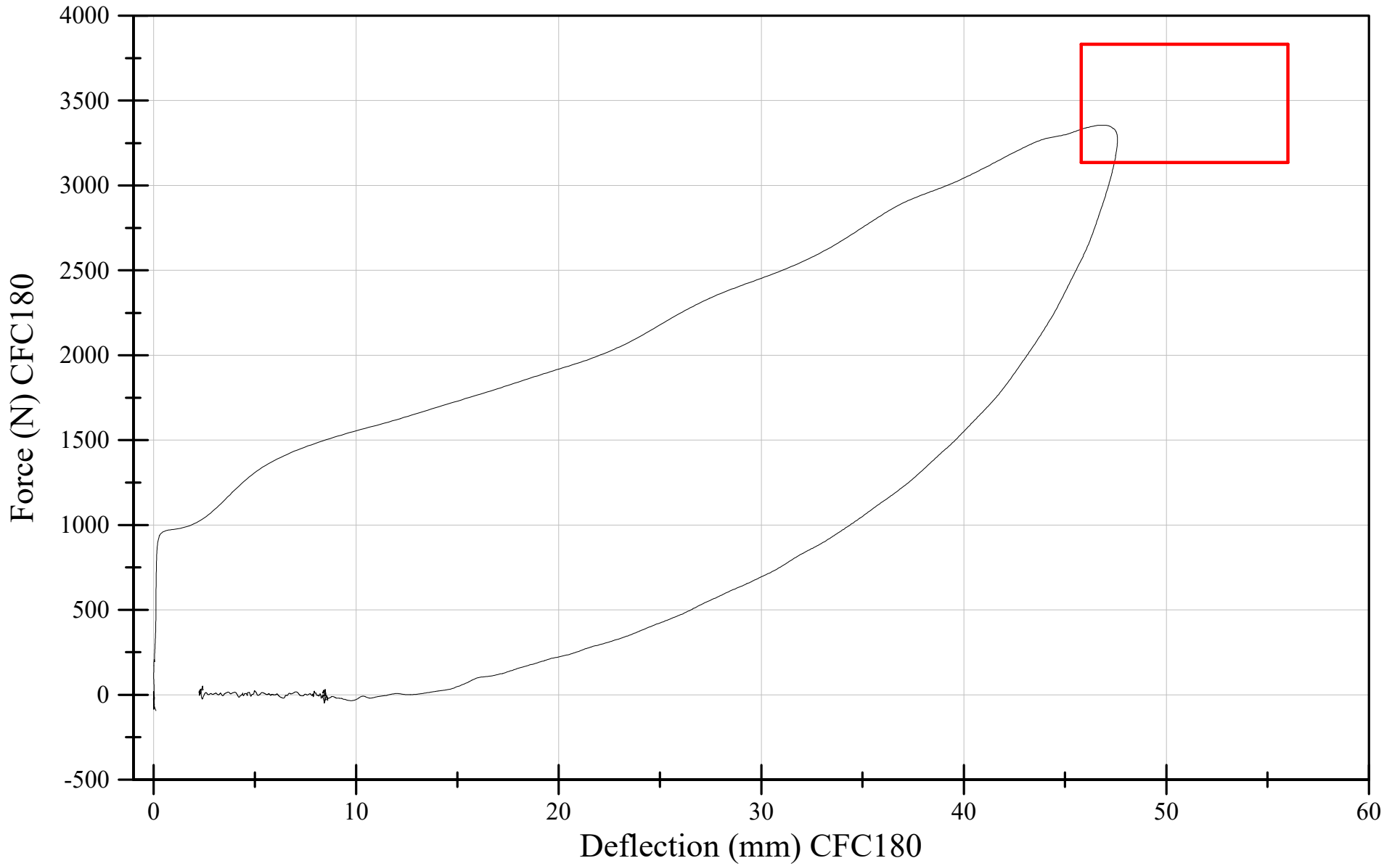
Test Temperature: 71.7 degrees  
Relative Humidity: 48.6%  
Test Velocity: 4.29 m/s

THOR Lower Right Thorax Qualification  
Probe Force  
Serial Number: 015



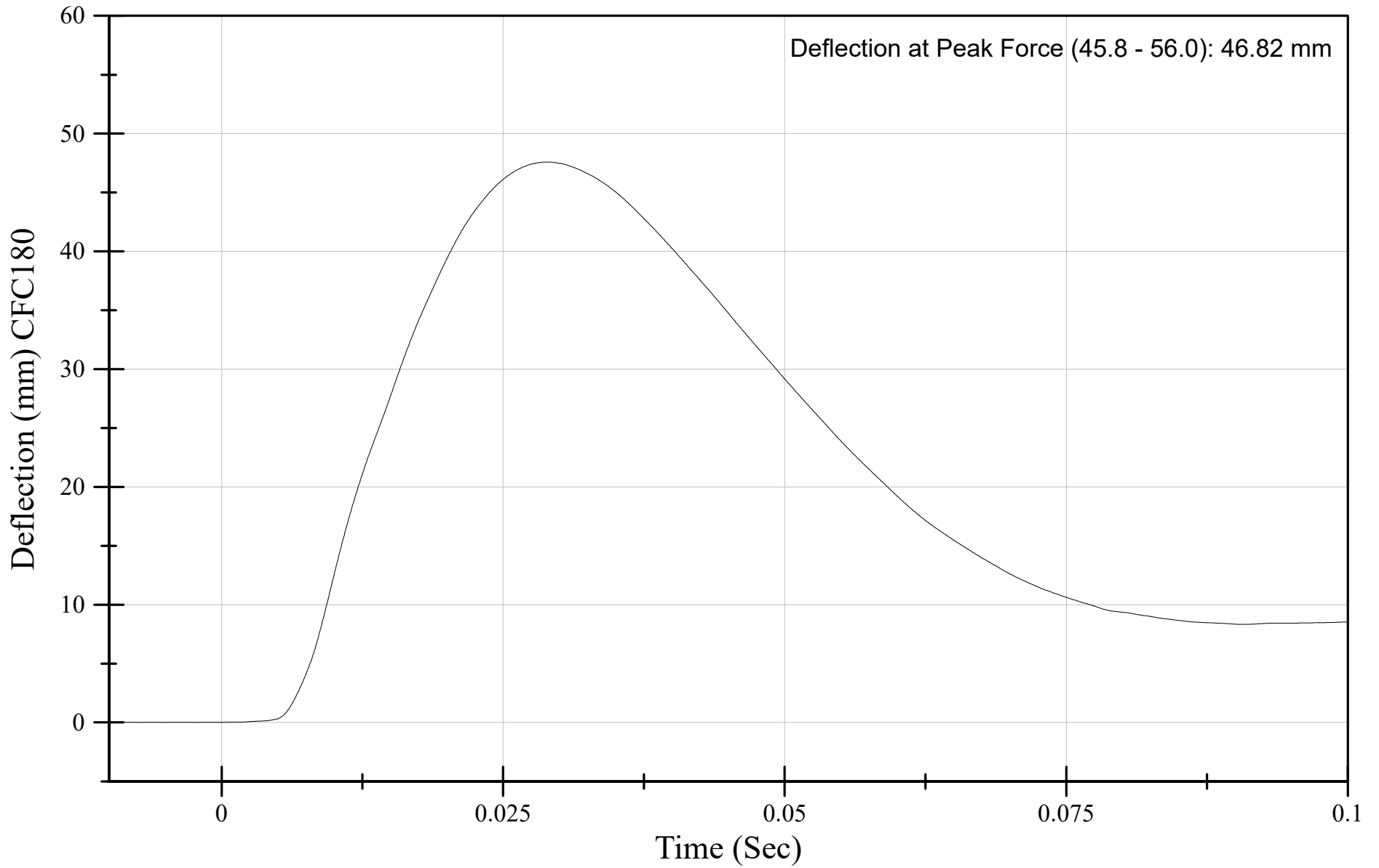
Test Temperature: 71.7 degrees  
Relative Humidity: 48.6%  
Test Velocity: 4.29 m/s

THOR Lower Right Thorax Qualification  
Probe Force vs Right Resultant Deflection  
Serial Number: 015



Test Temperature: 71.7 degrees  
Relative Humidity: 48.6%  
Test Velocity: 4.29 m/s

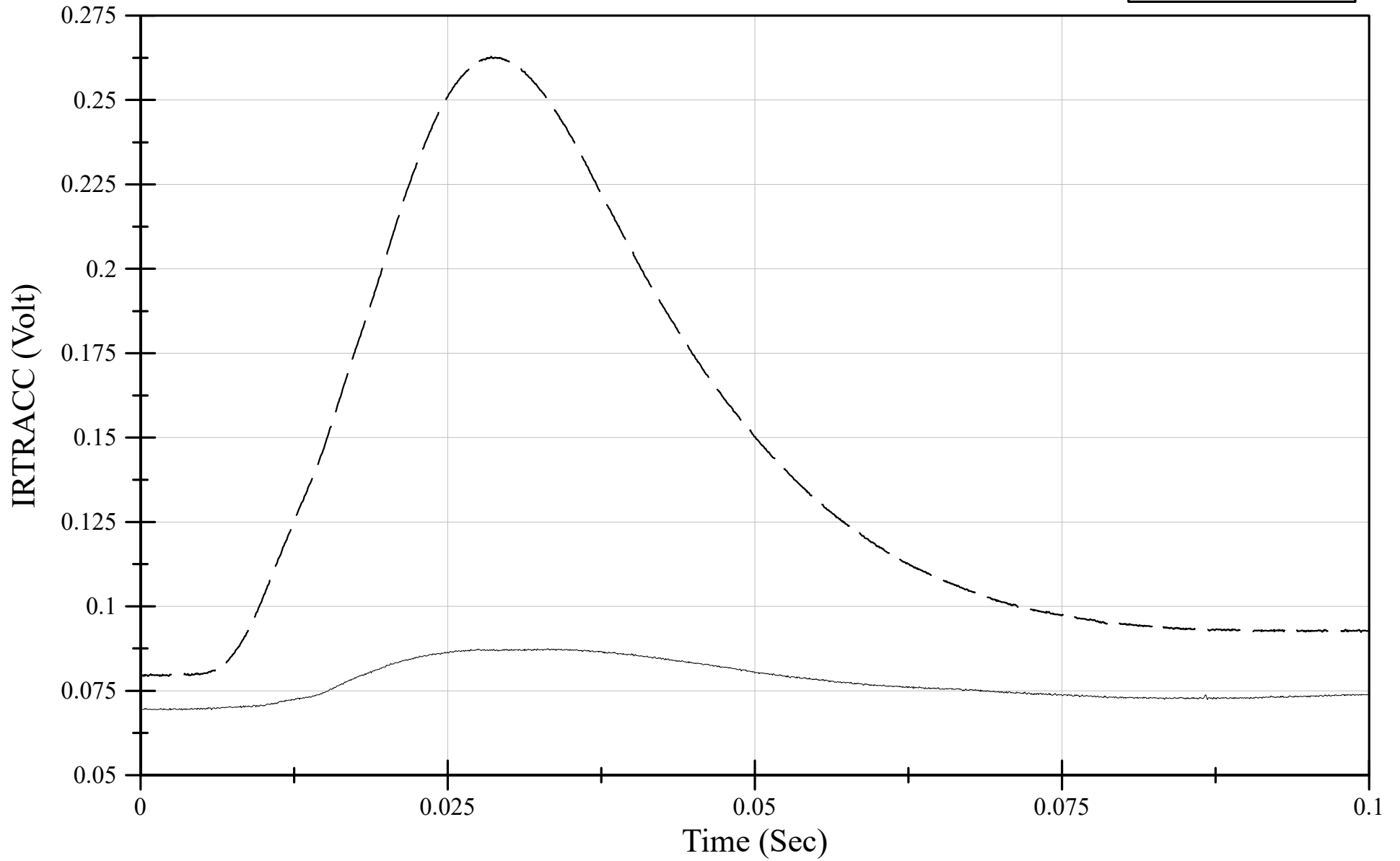
THOR Lower Right Thorax Qualification  
Right Resultant Deflection  
Serial Number: 015



Test Temperature: 71.7 degrees  
Relative Humidity: 48.6%  
Test Velocity: 4.29 m/s

### THOR Lower Right Thorax Qualification

INTRACC Voltage  
Serial Number: 015

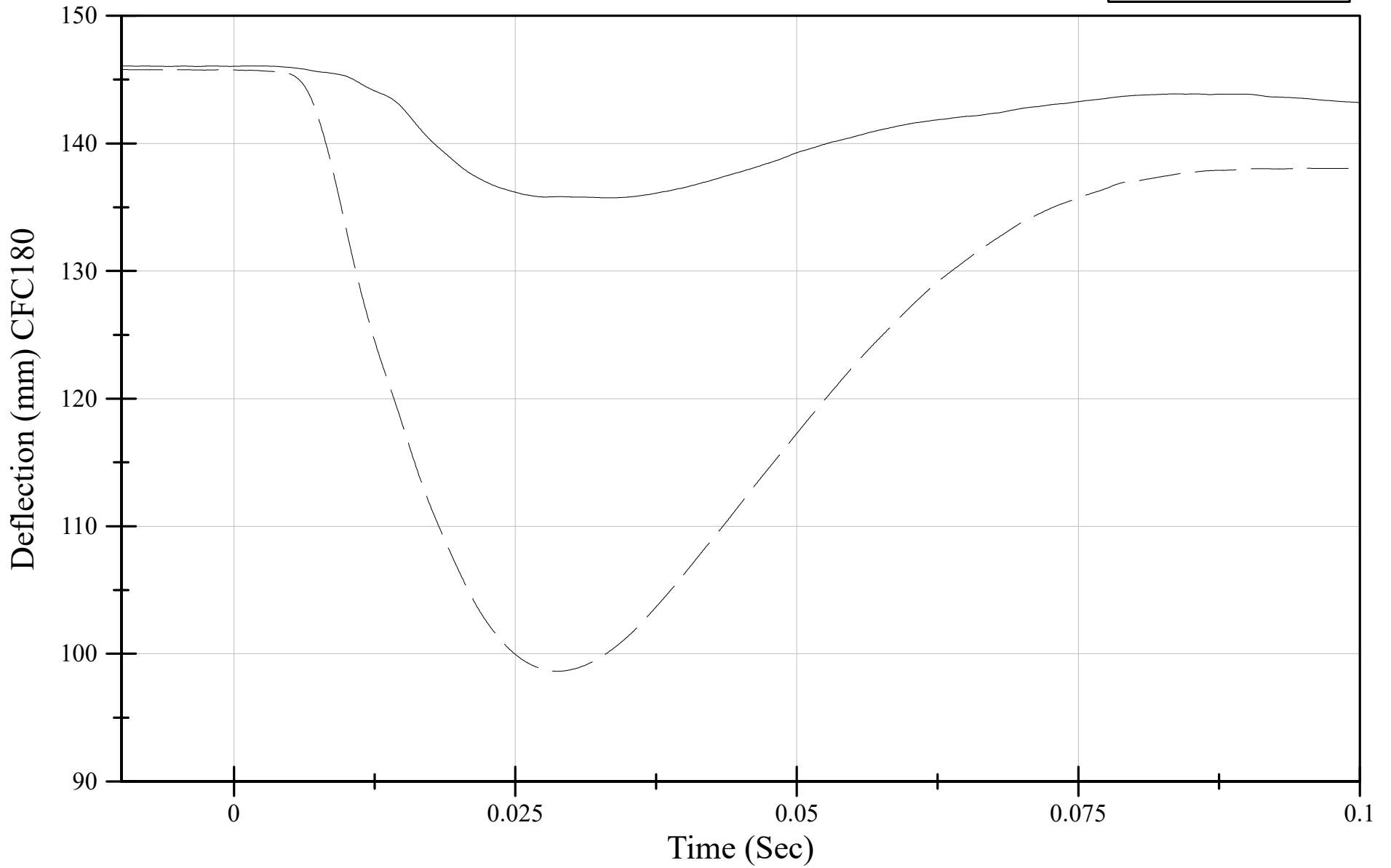


Test Temperature: 71.7 degrees  
Relative Humidity: 48.6%  
Test Velocity: 4.29 m/s

# THOR Lower Right Thorax Qualification

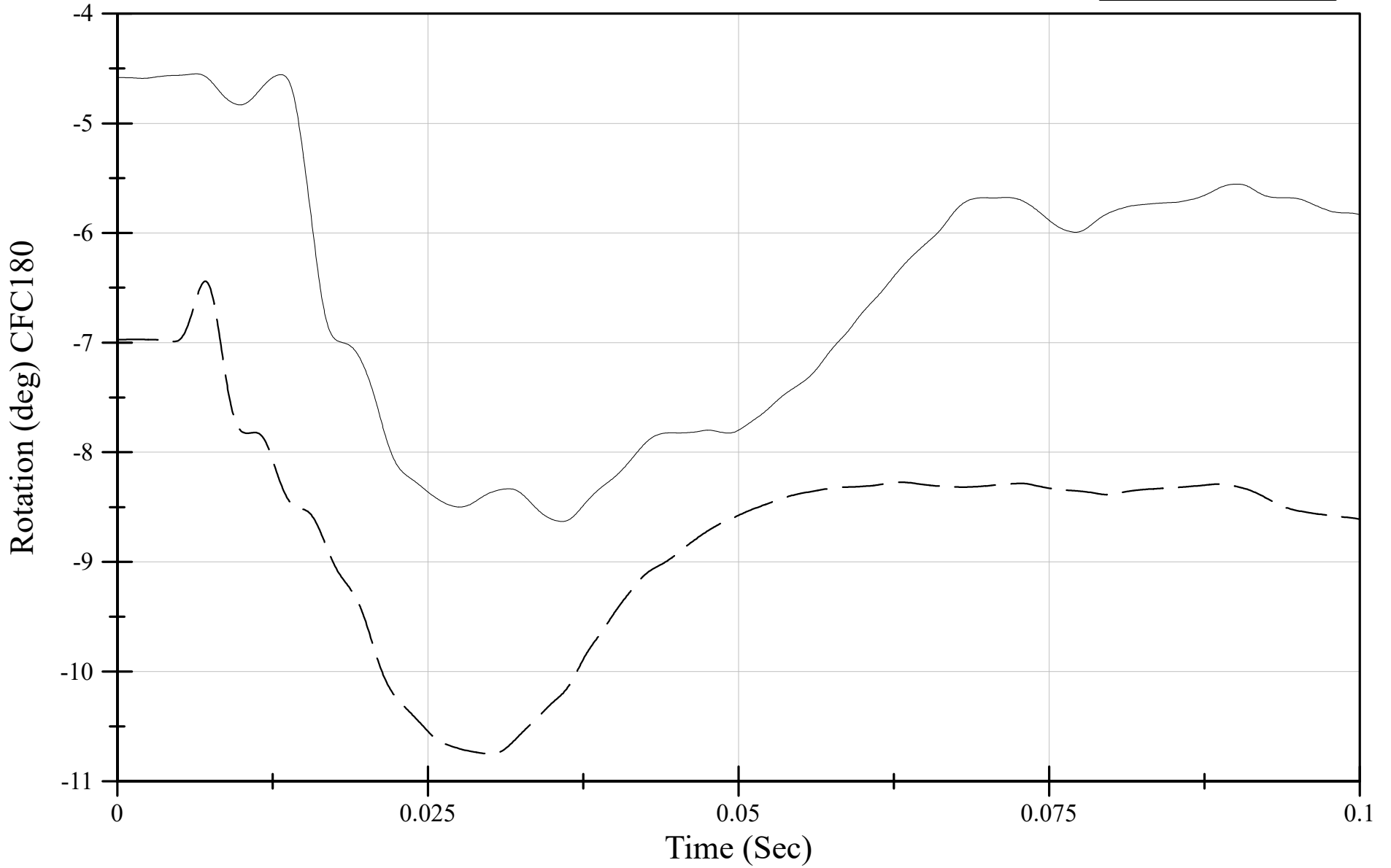
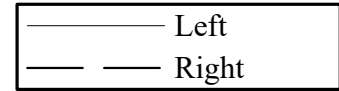
## X-Deflection

Serial Number: 015



Test Temperature: 71.7 degrees  
Relative Humidity: 48.6%  
Test Velocity: 4.29 m/s

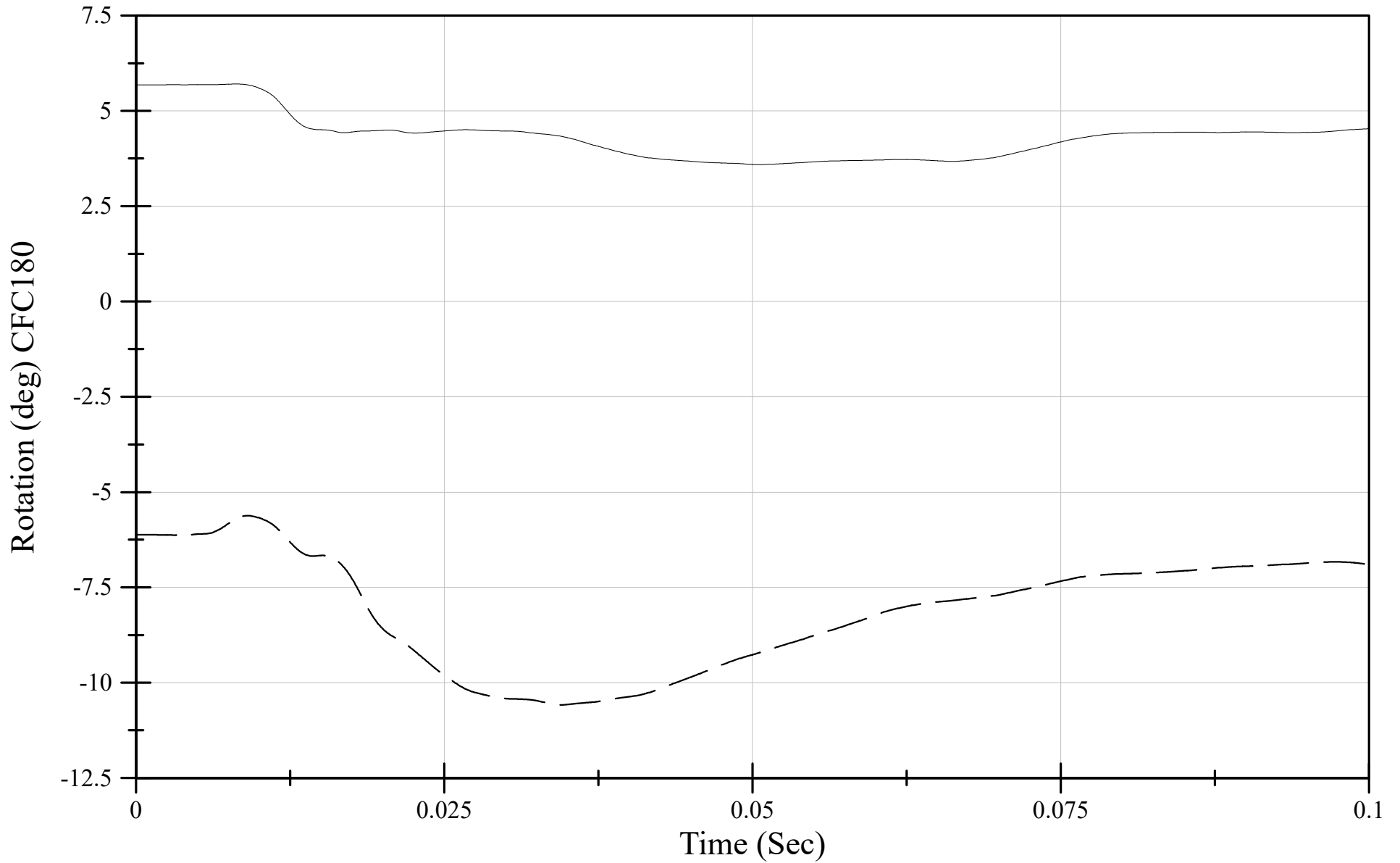
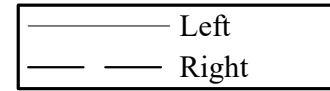
THOR Lower Right Thorax Qualification  
Y-Rotation + Offset  
Serial Number: 015



Test Temperature: 71.7 degrees  
Relative Humidity: 48.6%  
Test Velocity: 4.29 m/s

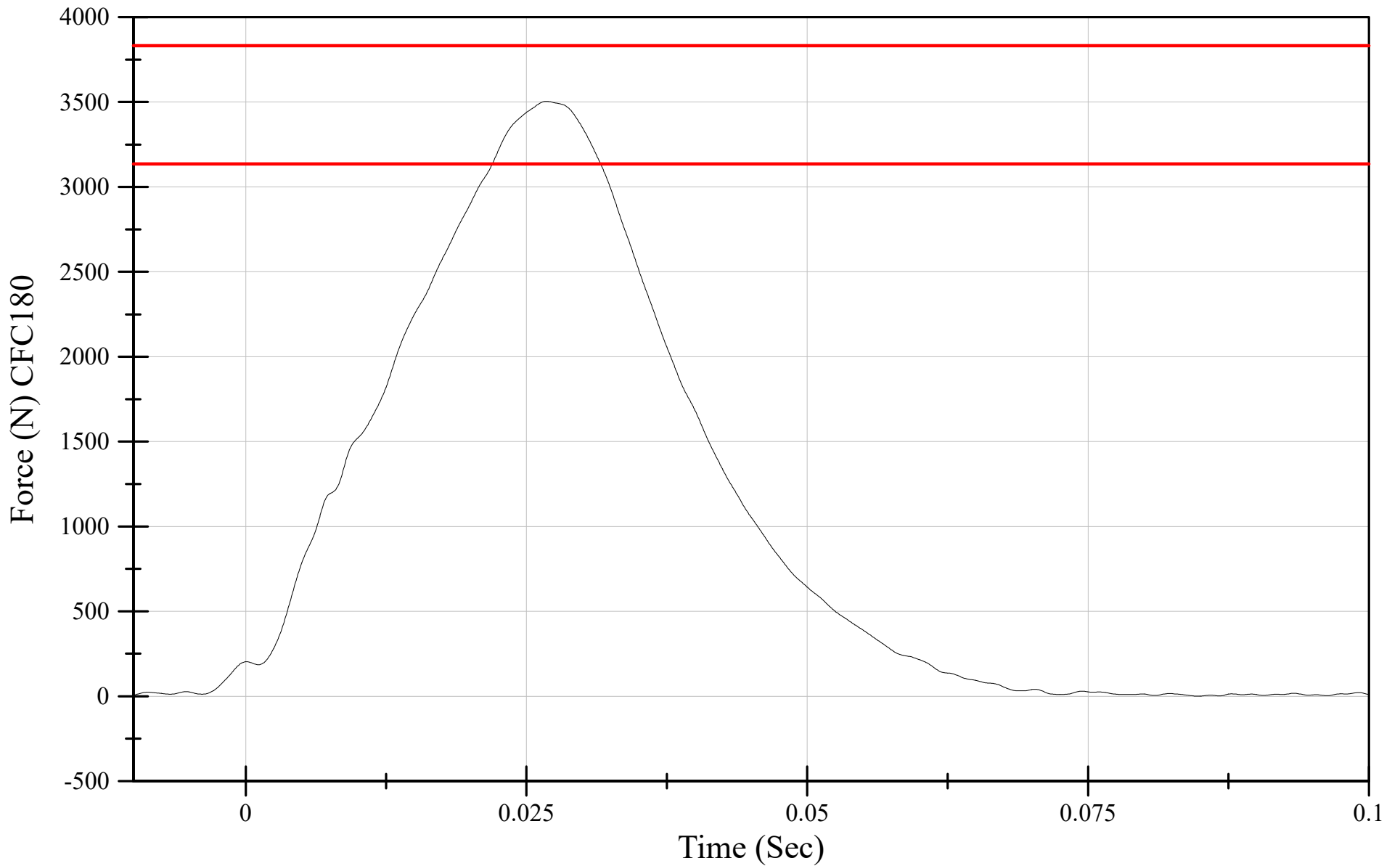
# THOR Lower Right Thorax Qualification

Z-Rotation + Offset  
Serial Number: 015



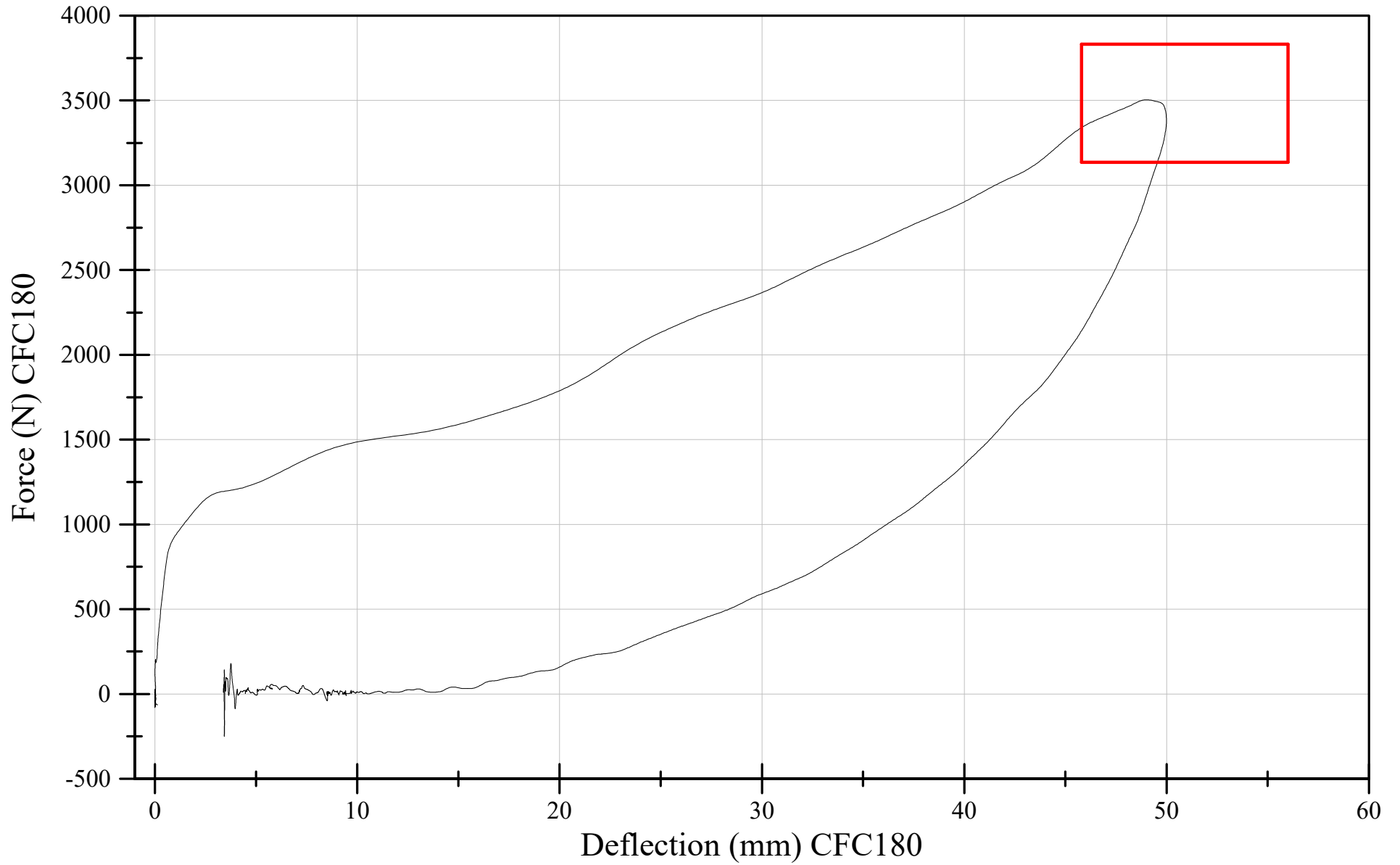
Test Temperature: 70 degrees  
Relative Humidity: 52.3%  
Test Velocity: 4.31 m/s

THOR Lower Left Thorax Qualification  
Probe Force  
Serial Number: 015



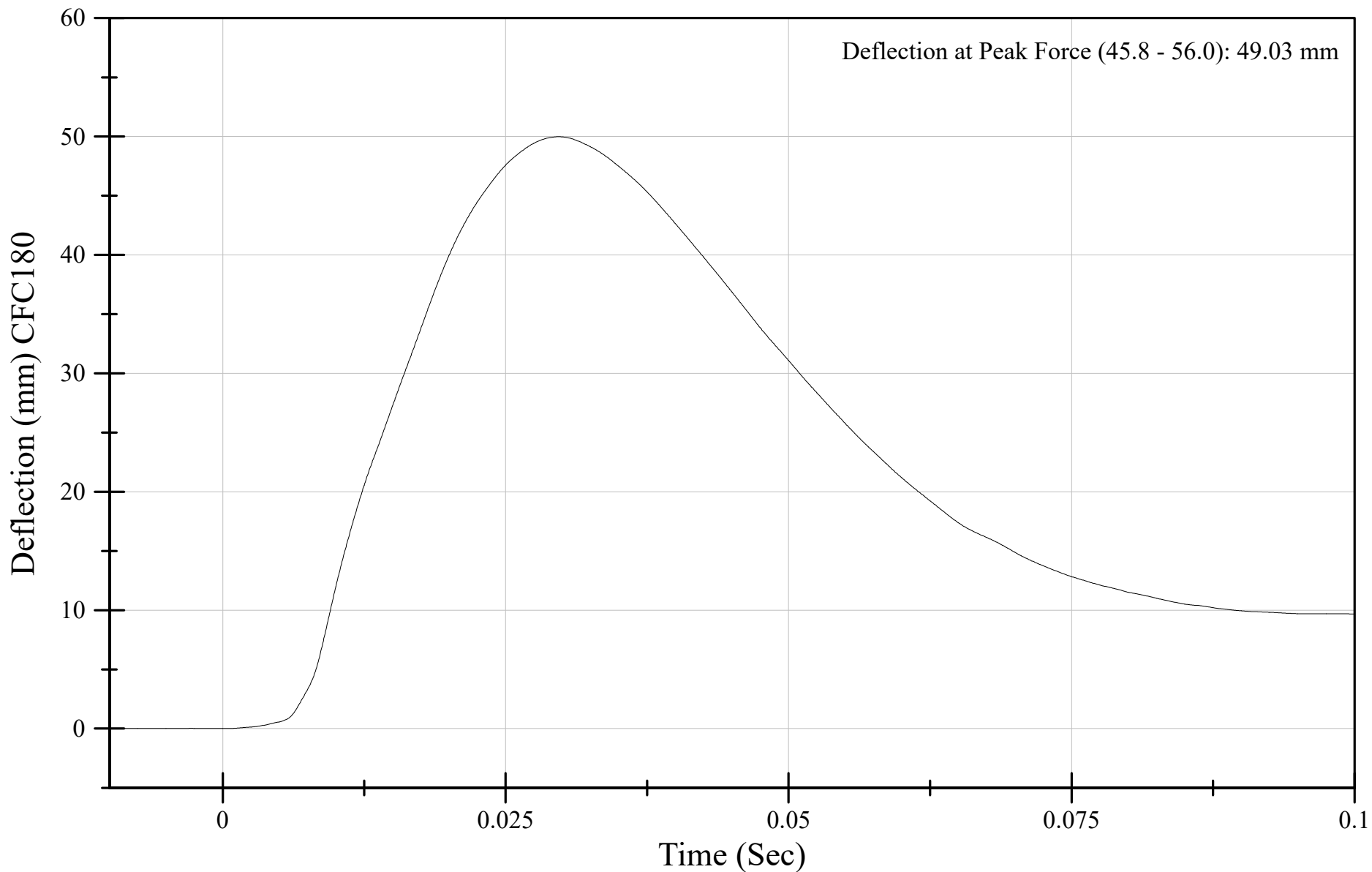
Test Temperature: 70 degrees  
Relative Humidity: 52.3%  
Test Velocity: 4.31 m/s

THOR Lower Left Thorax Qualification  
Probe Force vs Left Resultant Deflection  
Serial Number: 015



Test Temperature: 70 degrees  
Relative Humidity: 52.3%  
Test Velocity: 4.31 m/s

THOR Lower Left Thorax Qualification  
Left Resultant Deflection  
Serial Number: 015

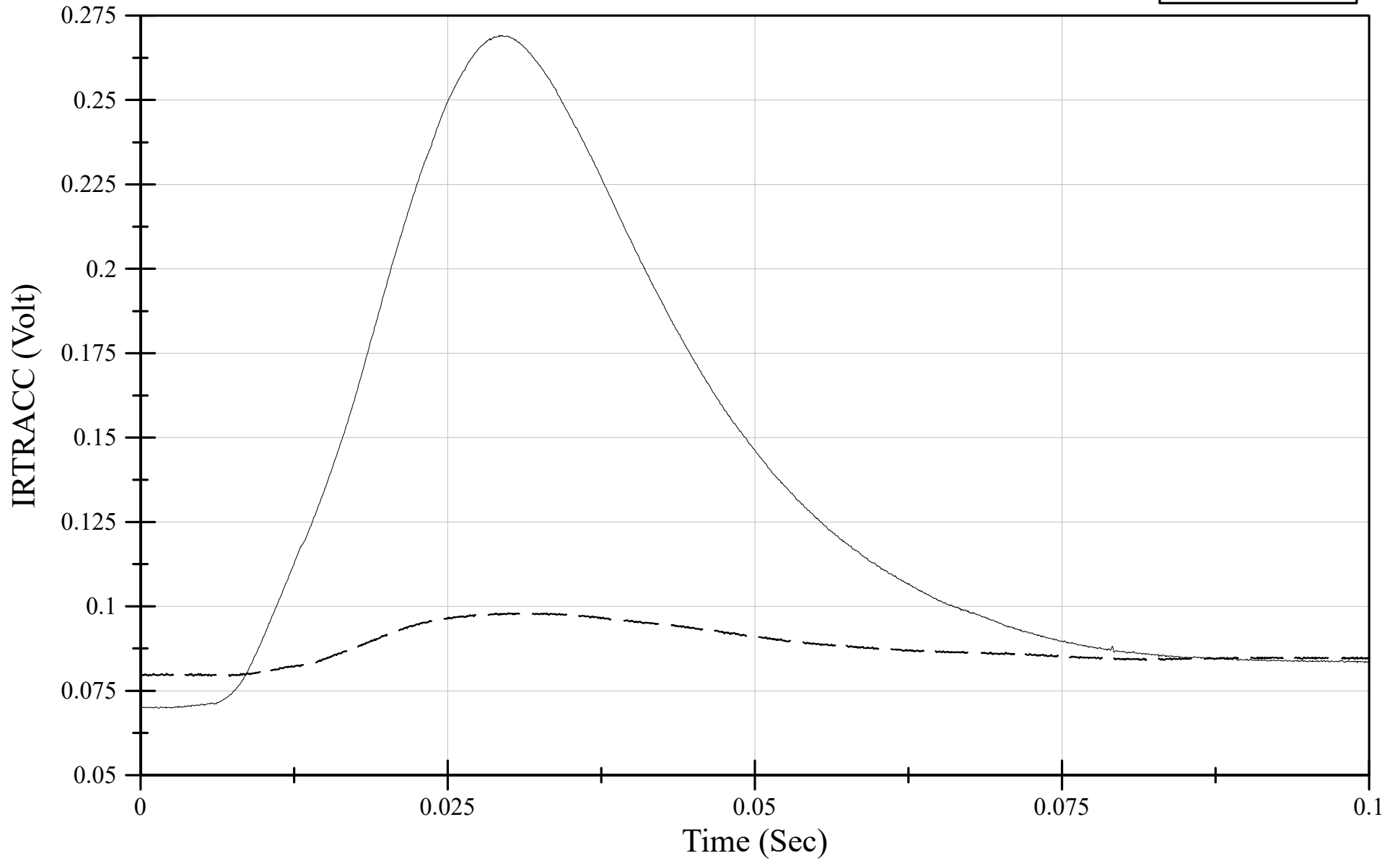


Deflection at Peak Force (45.8 - 56.0): 49.03 mm

Test Temperature: 70 degrees  
Relative Humidity: 52.3%  
Test Velocity: 4.31 m/s

# THOR Lower Left Thorax Qualification

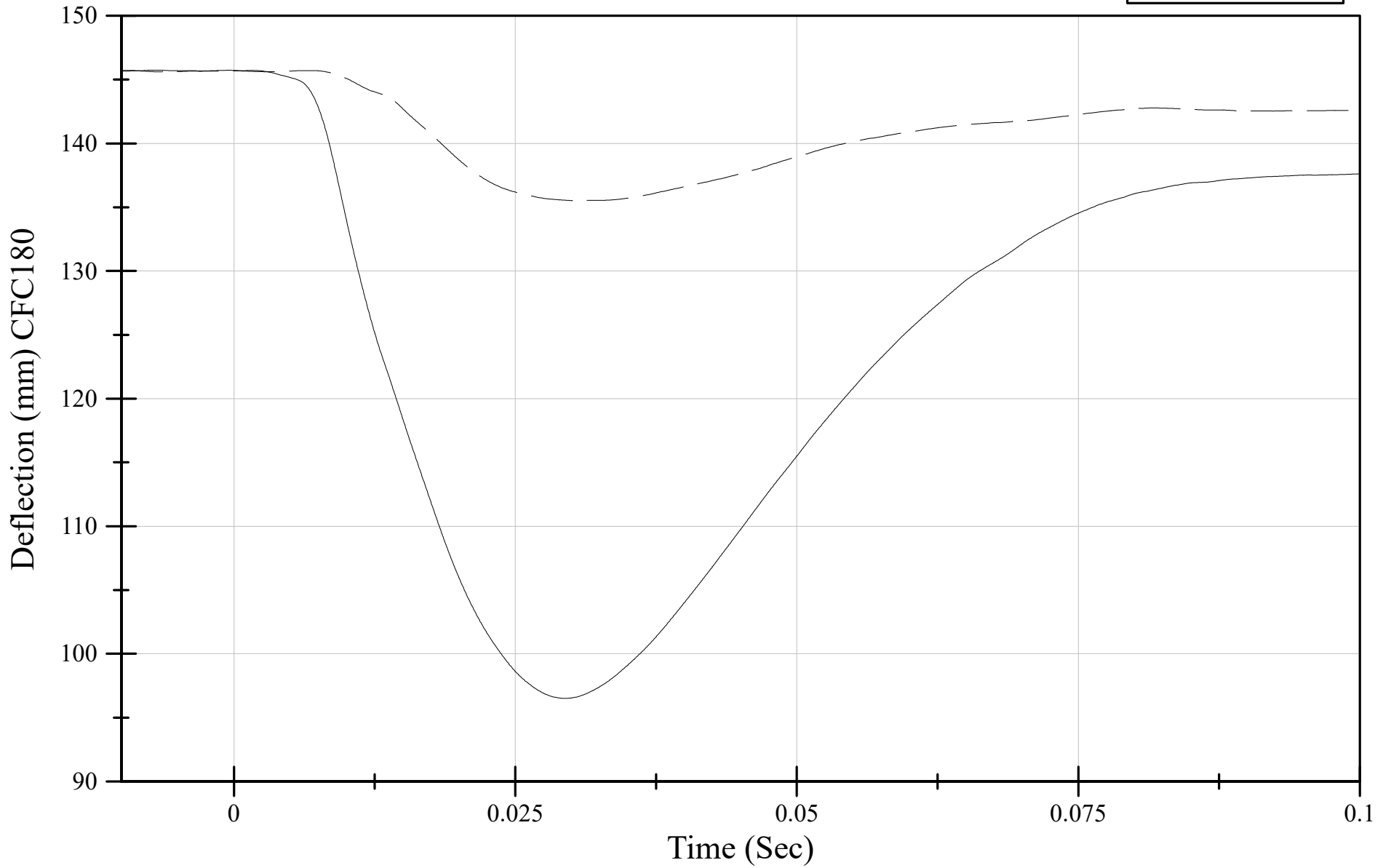
IRTRACC Voltage  
Serial Number: 015



Test Temperature: 70 degrees  
Relative Humidity: 52.3%  
Test Velocity: 4.31 m/s

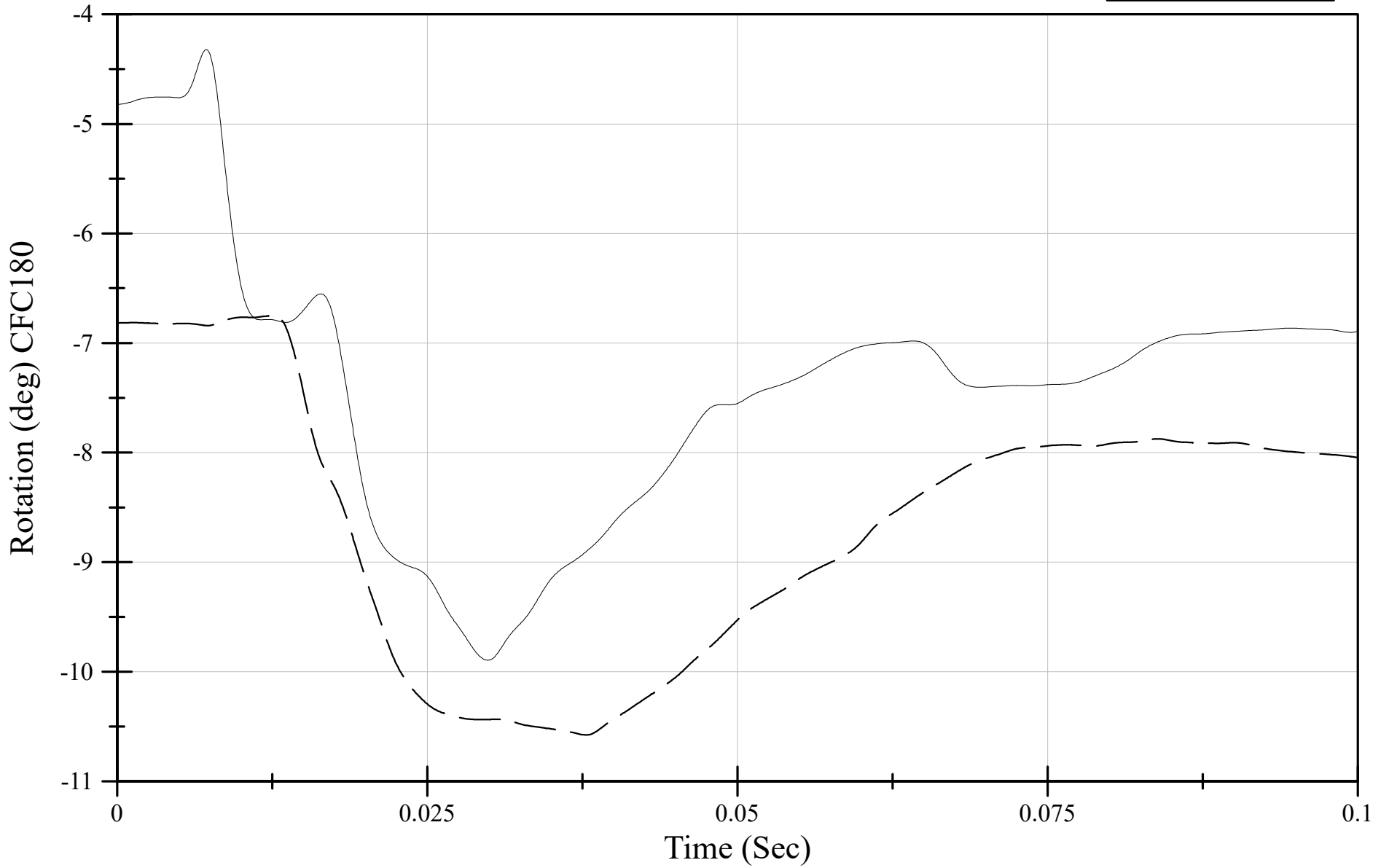
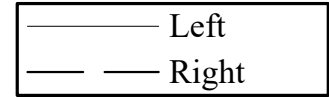
THOR Lower Left Thorax Qualification  
X-Deflection  
Serial Number: 015

Left  
Right



Test Temperature: 70 degrees  
Relative Humidity: 52.3%  
Test Velocity: 4.31 m/s

THOR Lower Left Thorax Qualification  
Y-Rotation + Offset  
Serial Number: 015



Test Temperature: 70 degrees  
Relative Humidity: 52.3%  
Test Velocity: 4.31 m/s

THOR Lower Left Thorax Qualification  
Z-Rotation + Offset  
Serial Number: 015

