DO-GOOD GAGE

by John Moyer
and Jeff Duguid

SCOPE AND INTRODUCTION

This manual is intended to briefly explain the concept of statistical process control (SPC), why the Do-Good gage was developed, and how to use the Do-Good gage. It is not intended to be a complete SPC program. Prior to implementing such a program, it is recommended that a good book on the subject be studied, such as Charbonneau and Webster's Industrial Quality Control (Prentice Hall), and a training program be instituted for operators who will be using SPC.

The Do-Good gage is the next generation in spring gaging as it provides the following features for the operator:

1. Provides a means of comparing measured spring free lengths with meter readings to verify accuracy.
2. Reduces adverse effects due to temperature drift and electrical noise.
3. Provides verification by printout that sort points are properly set and that the probe is the proper distance from the spring.
4. Provides a statistical pitch adjustment based on the spring free length as well as past performance. This reduces scrap and helps the coiler run a more normal distribution.
5. Prints out all data necessary for control charting, machine capability studies, and determining normality.

WHAT IS STATISTICAL PROCESS CONTROL

Statistics are tools used to make predictions about the quality level of a large group of parts when data is collected from a smaller sample. Consequently, Statistical Process Control is applying statistical measurements (mean, standard deviation, range, etc.) to a process to ensure a predictable quality level.

STATISTICAL PROCESS CONTROL REQUIREMENTS

Normal distribution

A normal distribution is represented by a bell shaped curve which has relatively few points or measures at the ends and an increasing number up to a maximum at the middle. If a line is drawn through the high point of the curve to the base line, the two parts formed will be similar in shape and very nearly equal in area. The normal distribution occurs often in nature and is used a lot in industrial statistics.

Standard deviation, the scatter or spread of separate measures around the middle, is a statistics tool that can be applied to a normal curve. If one standard deviation is measured off +/- from the mean under the curve, 68.26% of a random sample should fall within this area. If 100 springs were taken from a

During the production run, samples are taken at intervals as specified by your quality control department. The average of a five-piece sample and the range of the five-piece sample are plotted versus the control limits obtained in the machine capability study to determine if the process is remaining in control. Upper and lower control limits are derived from the statistics obtained in the machine capability study. Our sample X-bar and range charts use the average range to calculate the upper and lower control limits. This is probably the most common but certainly not the only accepted method.

Note: Most common machine capability study forms assume you are working with normal distributions. Consequently, if such forms are used to determine control limits, other tests (probability paper plot, chi square test, Geary's test, etc.) may be needed to determine if normality is a reasonable assumption.

Do-Good Gage

Statistical Process Control

The Do-Good 300-9X spring gage is designed with circuitry to measure lengths +/- from the mean free length of the springs as they are being coiled. The gage has three types of print-outs: machine capability studies, process control studies, and lists. See Exhibits #4, #5, & #6

When the machine capability study button (MCS) is pushed, the variation from the mean free length of 20-five piece samples or 100 springs is printed. From this data the following stats are calculated: mean, R-bar, UCLR, 3 sigma, UCLx and LCLx. In addition, a true 3 sigma calculated from the sum of the squares, X-bar and R charts, and a histogram will be printed. See Exhibit #4.

Test of Normality

A test for normality is automatically performed and the results are printed out. This test compares the average deviation with the standard deviation and if a particular relationship exists a statement indicating normality is printed. If a particular job doesn't always run a normal distribution, more than likely the control limits will still be valid because they are not calculated from ranges but from the total population 3 sigma.

Process Control

Control is probably not the best word to use here as Statistics do not control. People use the data to assist in controlling an operation. If the machine capability study shows a non-normal distribution, an out-of-control condition, or lack of capability, further investigation needs to be made in terms of wire quality, tooling, set-up, etc. to locate a specific cause. After corrective action, another machine capability study needs to be made for analysis.

X-bar and R charts may be produced automatically or with manual intervention. Limits developed during the machine capability study are automatically used on process control X-bar and R charts for continued sampling throughout the production run.

Set-up of Do-Good Gage

1. Connect the printer and the gage together with the cables provided.
2. Plug gage and printer into a 110 volt power line, preferably with an independent ground line.
3. Turn the printer on. The printer should be showing two green lights on its front panel. If not, refer to the printer manual. In most cases, if a red light comes on, it is usually due to a loose cover or paper outage. The gage does not need to have a printer to function.
4. Place the Mode switch in the set-up position. Position the Closure switch in the med. position to start. An adjustment later on may be necessary depending upon the scrap rate and machine cabability studies.
5. Position the probe as it is normally done.
6. Adjust the "zero" control. On an initial set-up, all four lights will be out when properly set-up. Since this is a sensitive adjustment, it may not be possible to get the bottom two lights (Cal) to go completely out. If this is the case, get the bottom two lights to flicker equally.
7. When performing the set-up, operators familiar with the Lion 300-9 spring gage must pay particular attention to two obvious differences between the Do-Good Gage and the standard Lion Gage. First, it is a push button set-up, and second, <u>there is no controller set-point as this function is performed by the gage</u>. Adjust the probe in .010" (or other value depending on meter scale) from the mean reading and press the "CAL +" button. For accurate statistics, the needle on the meter should read close to +.010" (or other value depending on the meter scale) when "CAL +" is pressed. A line is printed on the meter face to help determine what is or isn't close. If the meter reads too little move the probe in, reset the gage by turning it off for a few seconds, and then re-zero as specified in paragraph six. If the meter reads too much move the probe out. The gage must be reset by turning it off for a few seconds, and then re-zero as specified in paragraph six. Adjust the probe for the sort long setting and press the "SORT LONG" button. Repeat the process for the "SORT SHORT" and "CAL -" except press the appropriate buttons for these probe settings and do not check the meter reading before pressing the "CAL -" button. Move the probe back to zero and proceed to paragraph eight.

7A. If the free length variation exceeds the maximum swing of your meter scale, the gage must be set up using larger calibration points. Otherwise the statistics will not be accurate when free lengths peg the meter. To set-up the gage using a non-normal calibration, do the same as in paragraph seven except move the probe in and out twice the normal calibration length. You still want the meter to read your normal calibration length when pressing the "CAL +" button as before but you must remember this now represents twice the reading. The data gathered in this manner

14. With the machine running, run a machine capability study to determine if the process is normal, in control, and capable. If it is not, change the Closure switch to another setting such as slow or fast, based on whether it appears that the controller is adjusting too much or too little. Normally, the least amount of adjustment capable of centering the process and reacting to trends is the best. If a range is out, try reducing the correction or going to a slower switch position. If an X-Bar is out, try going to more correction or going to a faster switch position. Run another machine capability study. If there is still a problem with having a normal distribution or having an out-of-control situation etc., try different Closure switch and Correction pot settings with the set-up and operate switch in the manual mode. If a problem still exists, check for other causes such as machine problems, set-up problems, wire quality, etc. We have found in tests at our plant that if an X-bar is out-of-control, more pitch correction should be used (or a faster setting). If a range exceeds the upper limit, less pitch correction should be used (or a slower setting). In many cases the occurance of an out of control range indicates a special cause is at work.

    The setting of the controller switch and operation mode is listed out on the print-outs as A (automatic) or M (medium) controller speed. The number following this represents the pitch correction pot setting in manual and the internal pitch correction value in automatic.

CONTROL FUNCTIONS ON THE DO-GOOD GAGE

INTRO The following is a short description of the various controls on and in the gage, and what they do. It is intended to be a quick reference.

POWER The on/off power switch is located in the lower right corner of the front panel. It provides main power and a power on indicator.

MODE The mode switch has 3 positions. The set-up position is used when initializing the gage's internal sort points and calibration values. In set-up position some switches/controls take on different meanings. These are explained below. In the manual position, if the calibration points are OK, the gage will enter the manual mode. In this mode the gage performs all functions except automatic improvement of pitch correction based on past performance. It follows then that the auto position does automatically improve the pitch correction. In so doing the auto position causes the correction control to go dead by taking over it's job internally.

CLOSURE The closure or fast/med/slow switch is used to select a pitch correction multiplier in manual mode or a correction goal in automatic mode. The way in which it functions is complex, but simply stated it provides more/less correction in multiples of 2 in manual mode and in auto mode supplies a user input correction goal.

ZERO The zero control is a multi turn pot used only in set-up to adjust the meter to the 0 indication while measuring a set up spring. It should not be moved after it has been properly adjusted.

CAL + and MCS In set-up this switch is used to tell the gage when the length being measured is the + calibration length for the gage you have. If your gage is scaled for +/-.025" then this value would be +.010". When the Mode switch is not in the set-up position this switch starts a Machine Capability Study.

CAL - and STAT In set-up this switch is used to tell the gage when the length being measured is the - calibration length for the gage you have. If your gage is scaled for +/-.025" then this value would be -.010". When the Mode switch is not in the set-up position this switch starts or resumes taking statistical process data.

SORT LONG and ABORT In the set-up mode this switch programs the gage to start sorting the length currently being measured and longer. When not in set-up mode this button is used to abort a statistical data gathering function. It will abort a Machine Capability Study, stop taking automatically timed Stats for later resumption (if held down less than .7 sec.) or abort taking automatically timed Stats.

EXHIBIT 1

MOYER SPRING, ANGOLA IND. Date 20 FEB 8 PART # 12345

MACHINE CAPABILITY STUDY Machine #W11A Ran by MIKE

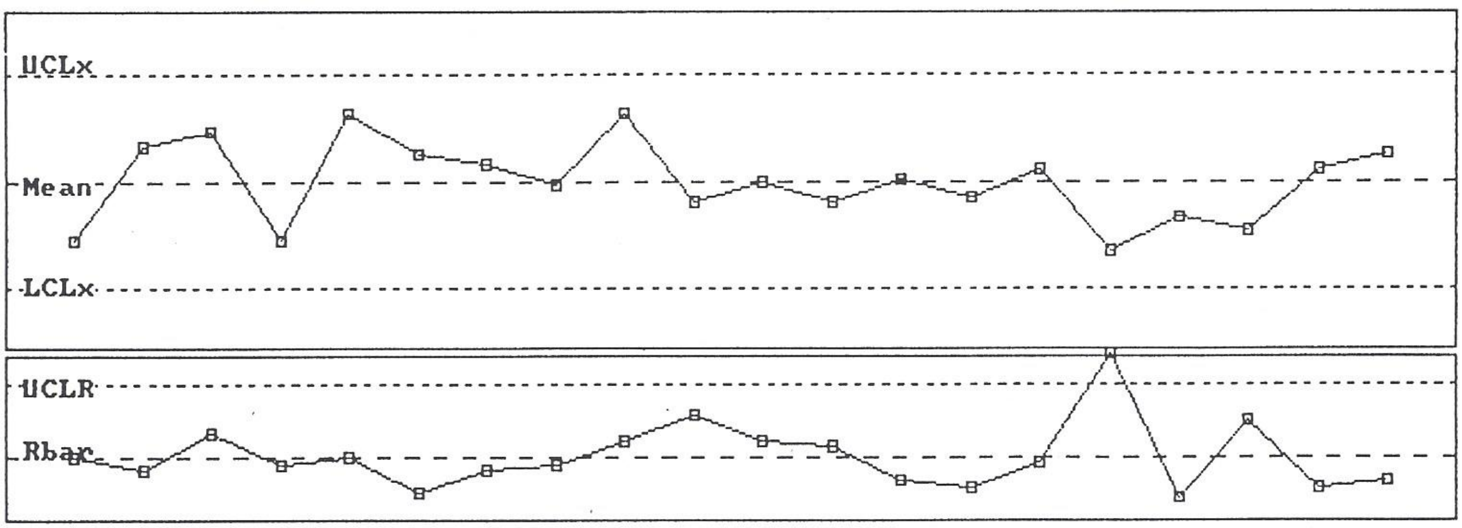
	Part 1	Part 2	Part 3	Part 4	Part 5	Xbar	RANGE
Sample 1	0.400	-0.250	-1.000	-1.800	-2.400	-1.0100	2.800
Sample 2	1.800	0.600	0.000	0.000	-0.400	0.4000	2.200
Sample 3	2.200	1.600	1.000	0.000	-1.600	0.6400	3.800
Sample 4	0.200	0.000	-1.400	-1.600	-2.200	-1.0000	2.400
Sample 5	2.400	1.000	0.800	0.800	-0.400	0.9200	2.800
Sample 6	1.000	0.600	0.000	0.000	-0.200	0.2800	1.200
Sample 7	1.000	0.600	0.200	0.200	-1.200	0.1600	2.200
Sample 8	1.000	0.800	0.000	-1.200	-1.400	-0.1600	2.400
Sample 9	2.600	1.600	0.800	0.400	-0.800	0.9200	3.400
Sample 10	2.200	0.200	0.000	-2.200	-2.400	-0.4400	4.600
Sample 11	1.800	0.400	0.000	-1.200	-1.600	-0.1200	3.400
Sample 12	0.800	0.000	-0.200	-0.400	-2.400	-0.4400	3.200
Sample 13	0.600	0.400	0.000	-0.200	-1.200	-0.0800	1.800
Sample 14	0.400	0.200	-0.400	-1.000	-1.000	-0.3600	1.400
Sample 15	1.600	0.800	-0.200	-0.800	-1.000	0.0800	2.600
Sample 16	2.800	-0.200	-0.200	-3.800	-4.400	-1.1600	7.200
Sample 17	-0.200	-0.200	-0.800	-1.000	-1.200	-0.6800	1.000
Sample 18	1.000	-0.400	-0.800	-0.800	-3.400	-0.8800	4.400
Sample 19	0.400	0.400	0.400	0.200	-1.000	0.0800	1.400
Sample 20	1.600	0.200	0.000	-0.200	-0.200	0.2800	1.800

3sig(R)= 3.6120 3sig= 3.8661 Z= -3.269

Upper Process Limit = 3.7376 Lower Process Limit = -3.9946

Xbar Limits Calculated Using Sample Ranges

UCLx= 1.4871 Mean= -0.1285 LCLx= -1.7441 UCLR= 5.908 Rbar= 2.795

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 2.812
     7  *******
 1.780
    16  ****************
 0.748
    42  ******************************************
-0.284
    21  *********************
-1.316
     8  ********
-2.348
     3  ***
-3.380
     3  ***
-4.412
```

EXHIBIT 1A

MOYER SPRING, ANGOLA IND. "C"alc "G"raph "P"rint "F"ile "O"ptions Q"uit

	Part 1	Part 2	Part 3	Part 4	Part 5	Xbar	RANGE
Sample 1	0.400	-0.250	-1.000	-1.800	-2.400	-1.010	2.800
Sample 2	1.800	0.600	0.000	0.000	-0.400	0.400	2.200
Sample 3	2.200	1.600	1.000	0.000	-1.600	0.640	3.800
Sample 4	0.200	0.000	-1.400	-1.600	-2.200	-1.000	2.400
Sample 5	2.400	1.000	0.800	0.800	-0.400	0.920	2.800
Sample 6	1.000	0.600	0.000	0.000	-0.200	0.280	1.200
Sample 7	1.000	0.600	0.200	0.200	-1.200	0.160	2.200
Sample 8	1.000	0.800	0.000	-1.200	-1.400	-0.160	2.400
Sample 9	2.600	1.600	0.800	0.400	-0.800	0.920	3.400
Sample 10	2.200	0.200	0.000	-2.200	-2.400	-0.440	4.600
Sample 11	1.800	0.400	0.000	-1.200	-1.600	-0.120	3.400
Sample 12	0.800	0.000	-0.200	-0.400	-2.400	-0.440	3.200
Sample 13	0.600	0.400	0.000	-0.200	-1.200	-0.080	1.800
Sample 14	0.400	0.200	-0.400	-1.000	-1.000	-0.360	1.400
Sample 15	1.600	0.800	-0.200	-0.800	-1.000	0.080	2.600
Sample 16	2.800	-0.200	-0.200	-3.800	-4.400	-1.160	7.200
Sample 17	-0.200	-0.200	-0.800	-1.000	-1.200	-0.680	1.000
Sample 18	1.000	-0.400	-0.800	-0.800	-3.400	-0.880	4.400
Sample 19	0.400	0.400	0.400	0.200	-1.000	0.080	1.400
Sample 20	1.600	0.200	0.000	-0.200	-0.200	0.280	1.800

Rbar= 2.800 3sig= 3.866 3sig(R)= 3.612 Z= -3.269
UCLx= 1.487 Mean= -0.128 LCLx= -1.744 UCLr= 5.908

SHORT STUDY / MOYER SPRING, ANGOLA IND. "C"alc "P"rint "O"ptions Q"uit

0.400	-0.250	-1.000	-1.800	-2.400
1.800	0.600	0.000	0.000	-0.400
2.200	1.600	1.000	0.000	-1.600
0.200	0.000	-1.400	-1.600	-2.200
2.400	1.000	0.800	0.800	-0.400
1.000	0.600	0.000	0.000	-0.200

Mean = 0.038 Median = 0.000 Sigma = 1.210 3 Sigma = 3.629
95% interval -0.413 <= Mean <= 0.490
Upper Process Limit = 3.667 Lower Process Limit = -3.591

```
 2.408
     4  * * * *
 1.445
     7  * * * * * * *
 0.482
    12  * * * * * * * * * * * *
-0.482
     2  * *
-1.445
     5  * * * * *
-2.408
```

EXHIBIT 2

MOYER SPRING, ANGOLA IND. Date 20 FEB 8 PART # 12345

X Bar & R Chart Machine #W11A Ran by MIKE

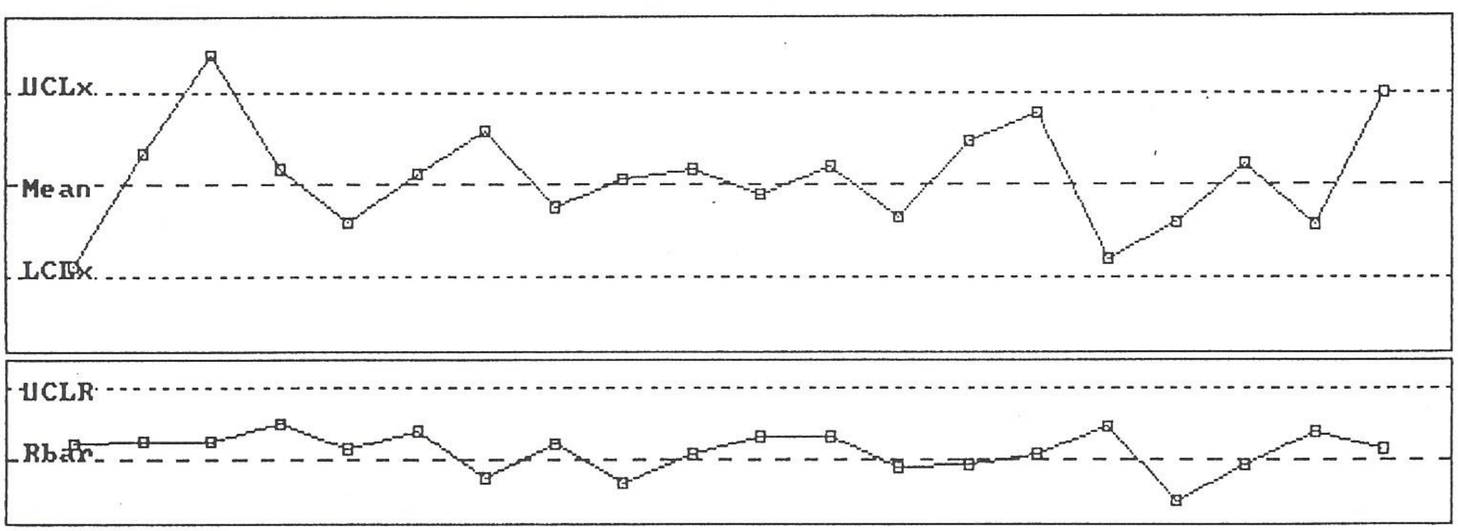
	Part 1	Part 2	Part 3	Part 4	Part 5	Xbar	RANGE
Sample 1	0.400	-0.200	-1.800	-2.600	-3.000	-1.4400	3.400
Sample 2	2.600	0.800	0.200	0.000	-1.000	0.5200	3.600
Sample 3	3.400	3.200	3.000	2.000	-0.200	2.2800	3.600
Sample 4	2.200	1.000	0.400	0.000	-2.200	0.2800	4.400
Sample 5	0.800	0.200	-0.800	-1.200	-2.400	-0.6800	3.200
Sample 6	2.800	0.400	-0.200	-1.000	-1.200	0.1600	4.000
Sample 7	1.600	1.600	1.200	0.800	-0.400	0.9600	2.000
Sample 8	0.200	0.800	0.000	-0.400	-2.600	-0.4000	3.400
Sample 9	0.600	0.200	0.800	-0.200	-1.000	0.0800	1.800
Sample 10	2.000	1.000	0.200	-0.800	-1.000	0.2800	3.000
Sample 11	1.600	0.600	-0.200	-0.800	-2.200	-0.2000	3.800
Sample 12	2.200	2.000	-0.200	-0.800	-1.600	0.3200	3.800
Sample 13	1.000	-0.400	-1.000	-1.200	-1.400	-0.6000	2.400
Sample 14	1.800	1.200	1.000	0.600	-0.800	0.7600	2.600
Sample 15	3.400	1.200	1.000	0.400	0.400	1.2800	3.000
Sample 16	0.800	-0.800	-1.600	-1.600	-3.400	-1.3200	4.200
Sample 17	-0.200	-0.400	-0.800	-0.800	-1.200	-0.6800	1.000
Sample 18	1.600	0.600	0.400	0.200	-1.000	0.3600	2.600
Sample 19	1.000	0.400	-0.200	-1.800	-3.000	-0.7200	4.000
Sample 20	3.000	2.600	2.000	0.600	-0.200	1.6000	3.200

3sig(R)= 4.0635 3sig= 4.4916 Z= -0.700

Upper Process Limit = 4.6336 Lower Process Limit = -4.3496

Xbar Limits Transfered From Prior Studies

UCLx= 1.6156 Mean= 0.0000 LCLx= -1.6156 UCLR= 5.908 Rbar= 2.795




```
 3.411
     8  ********
 2.437
    11  ***********
 1.462
    20  ********************
 0.487
    29  *****************************
-0.487
    19  *******************
-1.462
     8  ********
-2.437
     5  *****
-3.411
```

EXHIBIT 3

PART#______________ MACHINE#________________ DATE_____________ OP.__________
\ \ \ 2209-45
Unit of measure is .001 inch. Timers and counters are initialized.
(C)1985 Moyer Process & Control Co.,Inc. Gage will reject at 03.4 -03.4

EXHIBIT 4

MACHINE CAPABILITY STUDY

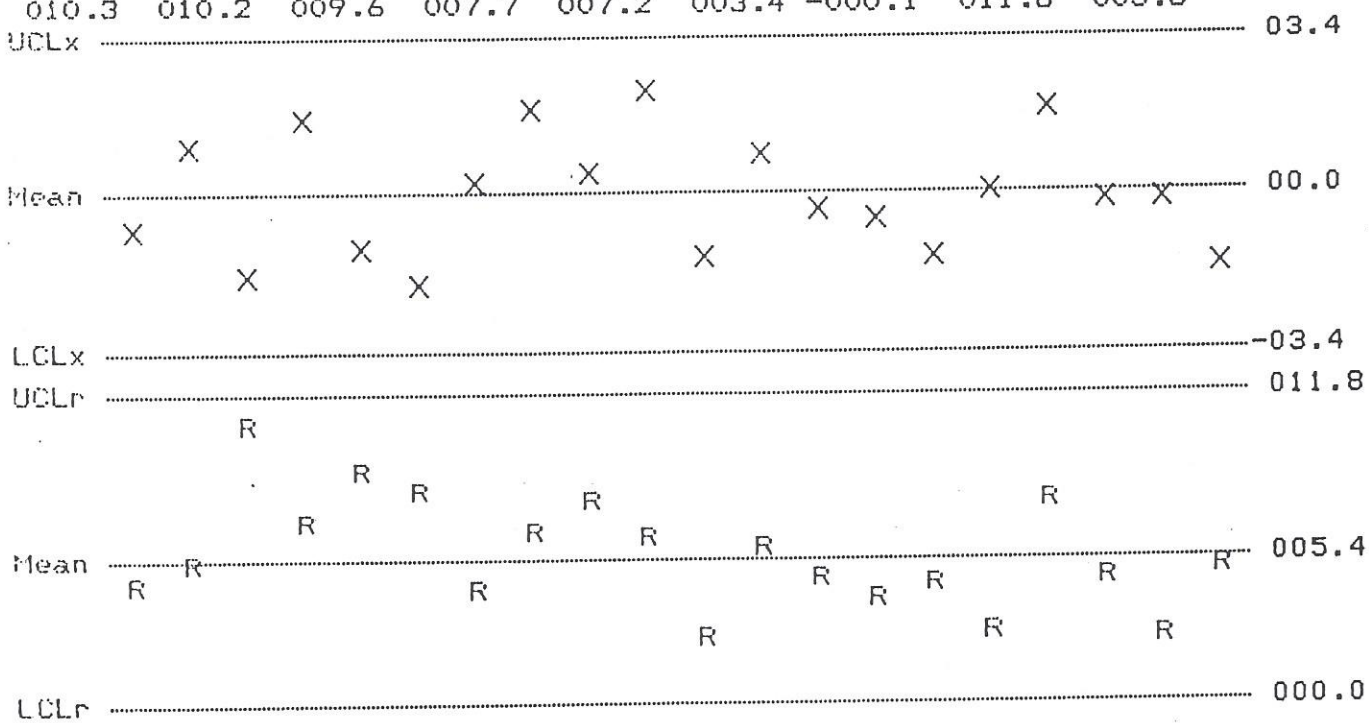
PART#__________ MACHINE#__________ DATE__________ OP.________

\ \ \ 2240-4

Time	Mode	Good	Bad	< Grouped data	unit=.001"			>	Xbar	Range
08:19:53	AM242	0037138	0000506	01.8	01.0	-02.0	-02.0	-02.6	-00.8	04.4
08:20:23	AM246	0037191	0000506	04.0	02.6	01.0	-01.0	-01.2	01.0	05.2
08:20:53	AM239	0037239	0000512	02.4	01.0	-00.8	-03.8	-08.2	-01.8	10.6
08:21:23	AM247	0037290	0000514	04.2	04.0	02.2	00.2	-02.6	01.6	06.8
08:21:53	AM251	0037340	0000518	02.8	01.0	-01.0	-03.2	-06.0	-01.2	08.8
08:22:23	AM242	0037391	0000520	01.8	01.8	-03.2	-04.4	-06.2	-02.0	08.0
08:22:53	AM238	0037444	0000520	01.6	01.4	01.4	-00.6	-02.6	00.2	04.2
08:23:23	AM226	0037497	0000521	05.2	02.4	01.4	01.4	-01.2	01.8	06.4
08:23:53	AM224	0037548	0000523	05.6	00.4	-00.4	-01.2	-02.0	00.4	07.6
08:24:23	AM220	0037596	0000529	06.2	03.4	01.0	00.4	00.0	02.2	06.2
08:24:53	AM220	0037646	0000532	00.4	-01.4	-01.8	-02.0	-02.0	-01.4	02.4
08:25:23	AM240	0037698	0000534	03.2	02.0	01.6	00.0	-02.6	00.8	05.8
08:25:53	AM238	0037751	0000534	02.8	-00.4	-01.4	-01.6	-01.8	-00.4	04.6
08:26:23	AM248	0037802	0000537	01.6	01.4	-01.8	-02.0	-02.2	-00.6	03.8
08:26:53	AM240	0037854	0000538	01.2	00.4	-02.6	-03.2	-03.2	-01.4	04.4
08:27:23	AM239	0037905	0000541	01.2	00.4	00.4	-00.6	-01.4	00.0	02.6
08:27:53	AM237	0037958	0000541	04.8	02.8	02.4	01.8	-02.8	01.8	07.6
08:28:23	AM248	0038011	0000541	02.0	01.0	01.0	-02.2	-02.6	-00.2	04.6
08:28:53	AM254	0038064	0000542	01.0	00.2	00.2	-00.8	-01.4	-00.2	02.4
08:29:23	AM255	0038117	0000542	01.0	-00.4	-01.0	-04.0	-04.0	-01.6	05.0

Normality test passed. Process centered. Control test passed.

5sd	4σ(v)	4σ(r)	3σ(v)	3σ(r)	UCLx(v)	mean	UCLr	Rbar
010.3	010.2	009.6	007.7	007.2	003.4	-000.1	011.8	005.6



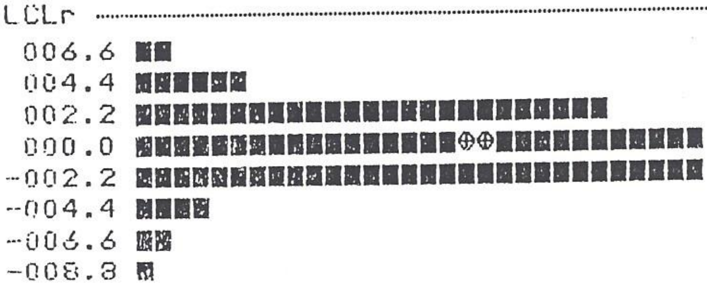


EXHIBIT 5

PROCESS SQC DATA

PART#____________ MACHINE#____________ DATE____________ OP.________

\ \ \ 2240-4

Time	Mode	Good	Bad	(Grouped data unit=.001")					Xbar	Range	(Grouped data unit=.001")					Xbar	Range
89:10:13	AM252	0038677	0000569	00.6	-00.6	-01.8	-02.0	-03.2	-01.4	03.8	00.6	-00.6	-01.8	-02.0	-03.2	-01.4	03.8
89:20:13	AM255	0039717	0000598	02.0	00.4	00.2	-01.6	-04.2	-00.6	06.2	02.0	00.4	00.2	-01.6	-04.2	-00.6	06.2
89:30:13	AM252	0040761	0000623	03.6	03.4	02.8	02.0	-00.6	02.2	04.2	03.6	03.4	02.8	02.0	-00.6	02.2	04.2
89:40:13	AM255	0041812	0000642	01.0	00.4	-01.4	-02.6	-02.8	-01.0	03.8	01.0	00.4	-01.4	-02.6	-02.8	-01.0	03.8
89:50:13	AM255	0042834	0000656	04.0	03.6	02.0	01.0	00.8	02.2	03.2	04.0	03.6	02.0	01.0	00.8	02.2	03.2
90:00:13	AM255	0043886	0000674	04.8	04.6	03.4	01.6	00.0	02.8	04.8	04.6	03.4	01.6	00.0	-02.0	01.6	06.6
90:10:13	AM253	0044934	0000695	-00.4	-00.6	-01.0	-02.4	-05.4	-02.0	05.0	00.6	-00.4	-00.6	-01.0	-02.4	-00.8	03.0
90:20:13	AM252	0045946	0000716	03.2	02.2	00.6	-00.6	-03.2	00.4	06.4	03.2	02.2	00.6	-00.6	-03.2	00.4	06.4
90:30:13	AM254	0046995	0000737	00.0	-01.2	-02.2	-04.2	-05.2	-02.6	05.2	00.0	-01.2	-02.0	-02.2	-04.2	-02.0	04.2
90:40:13	AM253	0047995	0000751	01.6	01.0	-00.8	-00.8	-02.2	-00.2	03.8	01.6	01.0	-00.8	-00.8	-02.2	-00.2	03.8
90:50:13	AM255	0049052	0000764	02.6	01.6	01.0	00.0	-03.4	00.4	06.0	02.6	01.6	01.0	00.0	-03.4	00.4	06.0
91:00:13	AM255	0050116	0000769	05.4	02.8	02.6	01.6	01.4	02.8	04.0	02.8	02.6	02.0	01.6	01.4	02.0	01.4
91:10:13	AM255	0051152	0000777	01.6	00.6	-00.2	-00.4	-01.4	00.0	03.0	01.6	00.6	-00.2	-00.4	-01.4	00.0	03.0
91:20:13	AM255	0052203	0000795	02.2	-00.4	-00.4	-00.6	-01.0	00.0	03.2	02.2	-00.4	-00.4	-00.6	-01.0	00.0	03.2
91:30:13	AM255	0053267	0000801	01.2	-00.6	-02.4	-04.0	-04.4	-02.0	05.6	01.2	-00.6	-02.4	-04.0	-04.4	-02.0	05.6
91:40:13	AM254	0054301	0000807	02.4	01.0	-00.4	-01.8	-02.0	-00.2	04.4	02.4	01.0	-00.4	-01.8	-02.0	-00.2	04.4
91:50:13	AM249	0055354	0000823	01.6	00.6	00.4	00.4	-02.4	00.2	04.0	01.6	00.6	00.4	00.4	-02.4	00.2	04.0
92:00:13	AM253	0056382	0000832	02.4	00.6	00.2	00.0	-02.0	00.2	04.4	02.4	00.6	00.2	00.0	-02.0	00.2	04.4
92:10:13	AM250	0057442	0000842	01.0	00.6	00.0	-00.2	-00.2	00.2	01.2	01.0	00.6	00.0	-00.2	-00.2	00.2	01.2
92:20:13	AM255	0058504	0000849	03.4	03.0	02.6	00.4	00.0	01.8	03.4	03.4	03.0	02.6	00.4	00.0	01.8	03.4

Process centered. Control test passed.

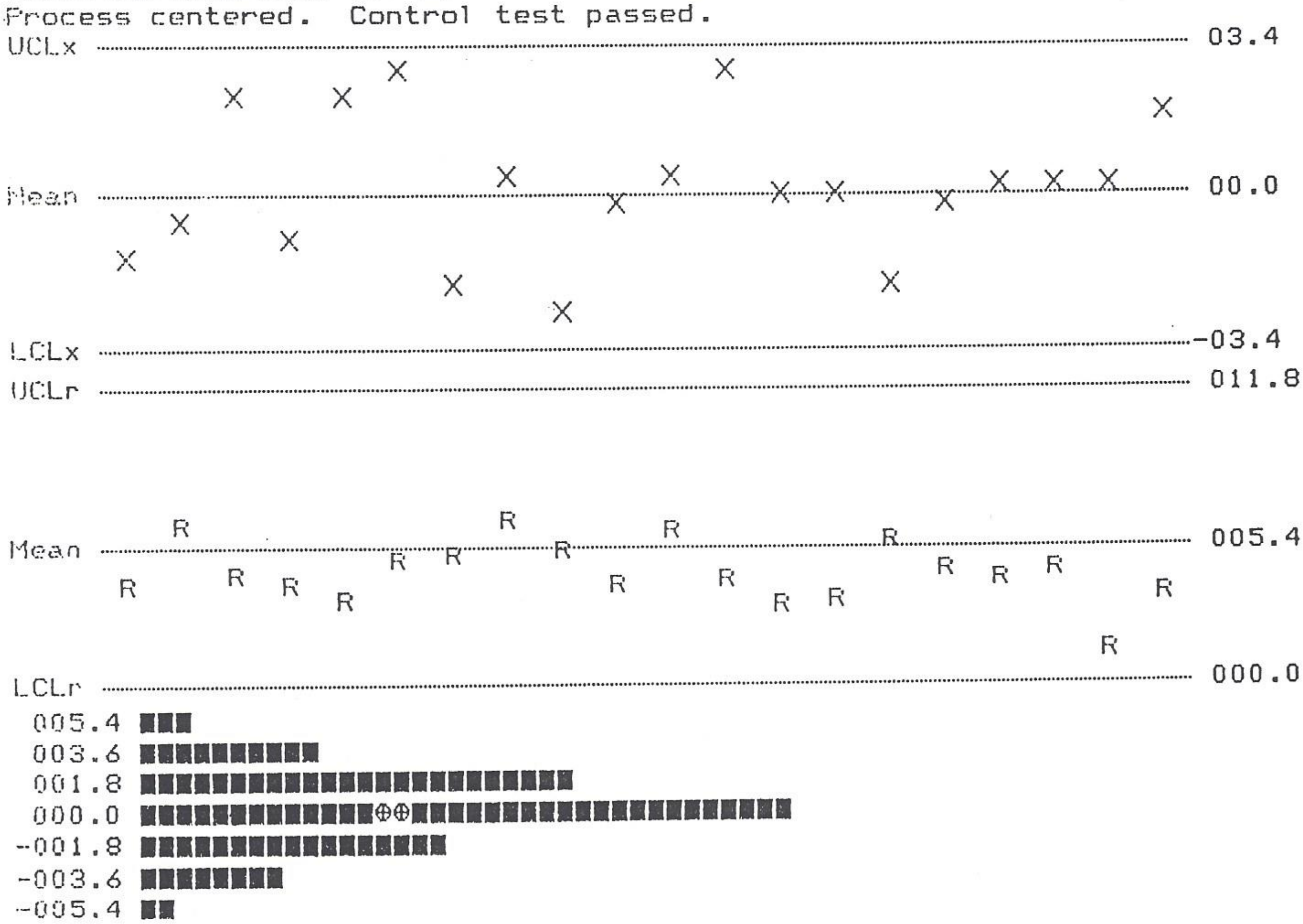


EXHIBIT 6

-00.4	01.2	11.6	-02.4	05.8	06.0	-01.6	-03.8	-08.4	03.8
00.0	04.4	01.6	03.8	02.0	01.0	-04.8	-09.0	-10.2	-06.0
-04.2	00.6	-01.4	01.6	-01.4	00.0	07.2	01.6	07.0	-01.0
04.2	00.0	03.2	05.6	03.8	-05.6	-02.8	-07.2	02.4	-02.2
03.2	00.4	-00.6	01.2	00.2	-05.8	-01.6	-01.0	03.6	-03.4
-05.0	02.8	00.2	-03.4	-05.4	-00.2	-06.8	-06.8	-00.4	05.6
08.0	09.8	-00.6	04.0	01.6	00.6	00.4	-07.2	-04.2	-08.0
-02.2	-05.2	-00.6	00.8	05.0	05.2	06.2	02.4	01.6	-01.4
-02.4	00.8	00.2	-06.8	-08.4	-00.6	-00.2	-00.4	-02.0	-00.6
01.2	-00.6	05.2	-01.6	06.6	06.8	06.0	03.6	03.6	-02.2
01.2	-00.6	01.6	-05.4	-05.6	00.2	03.2	02.0	09.8	01.0
02.6	-03.8	00.4	02.4	01.0	06.6	-06.8	-02.2	-04.2	-05.2