

- /

(P-chart)

(450)

(30)

(Win QSB)

(p-chart)

(% 0.06) (2)

(% 0.47) (%0.53)

(1093)

Statistical Quality Control of Industrial Products at the General Company for Vegetable Oils

Abstract

This research includes the using of statistical to improve the quality of can plastics which is produced at the state company for Vegetable oils (Almaamon factory) by using the percentage defective control chart (p-chart) of a fixed sample. A sample of size (450) cans daily for (30) days was selected to determine the rejected product . Operations research with a (win QSB) package for (p-chart) was used to determine test quality level required for product specification to justify that the process that is statistically controlled.

The results show high degree of accuracy by using the program and the mathematical operations (primary and secondary) which used to draw the control limits charts and to reject the statistically uncontrolled samples . Moreover a final chart was drawn to be used in the factory .

The research shows improvement of the can product by percentage (0.06 %), product defects percentage was lowered from (0.53 % to 0.47 %) for the production process which becomes statistically controlled .Also it was found that it was within Iraqi specification (1093).

(D.H.Besterfield)

. [3]

(Frederick W.Taylor)

Scientific)

1911 (Maragement

. [4]

1924

(Walter A . Shewhart)

()

. [5]

(Inspection Sampling Techniques)

Acceptance)

(Sampling Plans

V.F.Dodge and H.G)

1944 (Roming

. [6]

Edward) 1950

(Deming

. [1]

(J.M.Juran 1999)

. [2]

Deming



. [7]

. [10]

(Armand Fiegenbaum)
(Total Quality Control)

. [8]

1961

:
(Xie and Goh. 1999) – 1 (Quality Control Circles)

1980 1970

. ()

Toquch)

Total)

design of Experiments DoE

] (Quality Management

Failure Mode and ()

. [6

(FMEA) Effects Analysis

1980

Statistical)

(Process Control

11]

1990

. [ISO

(Pankaj et al 2000)

– 2

9000

Soft ware

. [9 3]

(Software)

Excel , Access , Sql Server ,)

. (Oracle , Text files

[16] Design of experiments

()

. [12] (Web – Service)

(Qakland 2003) – 3

(Samipand Pandy 2010)

. [17]

. [14 13]

Chakraborti and Human) – 4

(2006

(P- Chart) (Parameter)

Random)

$f_{(P)}$ (Variable

. [18 6]

-1 P- Chart) $f_{(P)}$

(

. [15]

(Judi et al 2009) – 5

-2

)

-3

-4

)

Quality function

[20 19]

six sigma

deployment

(30) - -1

(100) .
(P) -)
(d) : (...
, m) -
 $P_i = \frac{d}{m}$ (\bar{x} - chart) -
(R - chart) -
) -
 P^- - (σ - chart

-2

$P^- = \frac{\sum_{i=1}^n P_i}{n}$, $P^- = CL$
: m ()
: n :
: d P -
(Central Line) : CL . - chart
: P_i -
30 - 1 : i . C - chart
- -
: . u- chart

3] (P-chart)

(Upper Control Limit)

[22 21

$$UCL (P^-) = P^- + 3 * \sqrt{\frac{P^- (1 - P^-)}{m}}$$

P

(Lower Control Limit)

$$LCL (P^-) = P^- - 3 * \sqrt{\frac{P^- (1 - P^-)}{m}}$$

:

) -
(

P_i

()

(3) (2)
(30) (p-chart)
(1
(450)

%100

-:

2010 / 10 / 3)

-1

) (2011 / 11 / 14 / *

.(3

[23] (1) 2

:

. (2) :

-

. (125) :

-

. (5 ±) :

-

. 450 =

-

)

)

/(:) -1

(2) (4

-2

()

-3

(Win QSB)

[25 24] P-chart

(Win QSB Package)

(1)



9)

. (10

<u>. (Win QSB)</u>			
	:		-
(1)	(8)	-1	
Quality)			
(8)	(Characteristics		
	(Attribute Data)		
	(4)		
	(30)	(450)	
	. (4)	OK	
			-
	(5)		
			-
(1)	-2	(6)	
. (% 0.53)			
(1)	-3	(Control Chart Setups)	-
		P – chart	(Mean for P)
(29)		. (7)	OK
	(10)	OK	-
%0.53	-1	(1)	P
. (1)	% 0.47	(8)	
	-2		
. (% 0.06)		(1)	-
(10)	-3		
(win QSB)			
	:		(29)

-3

-

-4

-

)

(

- 5

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-4

[26] (1093)

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(Win QSB)

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(3)

الملاحظات	انواع الفحوصات الفنية				المرفوض (d)	المقبول	حجم العينة	الوقت	تاريخها	رقم العينة
	المظهر	التشقق	النضوح	الوزن (غم)						
	-	-	-	8	8	442	450	9:30-8:30	2010/10/3	1
	-	-	1	4	5	445	450	9:30-8:30	2010/10/4	2
	-	-	-	2	2	448	450	9:30-8:30	2010/10/5	3
	-	-	1	2	3	447	450	9:30-8:30	2010/10/6	4
	-	-	-	-	-	450	450	11:30-10:30	2010/10/7	5
	-	-	-	-	-	450	450	12:30-11:30	2010/10/10	6
	-	-	1	1	2	432	450	9:30-8:30	2010/10/11	7
	-	-	1	2	3	447	450	9:30-8:30	2010/10/12	8
	-	-	-	2	2	448	450	9:30-8:30	2010/10/13	9
	-	-	1	2	3	447	450	9:30-8:30	2010/10/14	10
	-	-	1	-	1	449	450	9:30-8:30	2010/10/17	11
	-	-	-	-	-	450	450	10:30-9:30	2010/10/18	12
	-	-	-	-	-	450	450	11:30-10:30	2010/10/19	13
	-	-	-	-	-	450	450	12:30-11:30	2010/10/20	14
	-	-	-	2	2	448	450	9:30-8:30	2010/10/21	15
	-	-	-	4	4	556	450	9:30-8:30	2010/10/24	16
	-	-	1	1	2	448	450	9:30-8:30	2010/10/25	17
	-	-	-	-	-	450	450	9:30-8:30	2010/10/26	18
	-	-	-	1	1	449	450	9:30-8:30	2010/10/27	19
	-	-	1	2	3	447	450	9:30-8:30	2010/10/28	20
	-	-	1	4	5	445	450	9:30-8:30	2010/11/1	21
	-	-	1	3	4	446	450	9:30-8:30	2010/11/2	22
	-	-	-	-	-	450	450	1:30-12:30	2010/11/3	23
	-	-	-	4	4	446	450	9:30-8:30	2010/11/4	24
	-	-	1	2	3	447	450	9:30-8:30	2010/11/7	25
	-	-	-	4	4	446	450	9:30-8:30	2010/11/8	26
	-	-	-	4	4	446	450	9:30-8:30	2010/11/9	27
	-	-	1	3	4	446	450	9:30-8:30	2010/11/10	28
	-	-	-	-	-	450	450	12:30-11:30	2010/11/11	29
	-	-	-	3	3	447	450	9:30-8:30	2010/11/14	30



(2)

(3)

QCC Problem Specification [X]

Quality Characteristics

☐ Variable Data

☒ Attribute Data

Problem Title:

Number of Qty. Characteristics: **Size of Subgroups:**

Number of Subgroups: **Note: The above is the initial setup. You can modify it later.**

(4)



Subgroup	Date	Time	Size	الوزن	النضوج	التشقق	المظهر	Disabled	Cause	Action	Comment
1	3/10/2010	8.30:9.30	450	8	0	0	0				
2	4/10/2010	8.30:9.30	450	4	1	0	0				
3	5/10/2010	8.30:9.30	450	2	0	0	0				
4	6/10/2010	8.30:9.30	450	2	1	0	0				
5	7/10/2010	1.30:11.30	450	0	0	0	0				
6	0/10/2010	.30:12.30	450	0	0	0	0				
7	1/10/2010	8.30:9.30	450	1	1	0	0				
8	2/10/2010	8.30:9.30	450	2	1	0	0				
9	3/10/2010	8.30:9.30	450	2	0	0	0				
10	4/10/2010	8.30:9.30	450	2	1	0	0				
11	7/10/2010	8.30:9.30	450	0	1	0	0				
12	8/10/2010	1.30:10.30	450	0	0	0	0				
13	9/10/2010	1.30:11.30	450	0	0	0	0				
14	0/10/2010	.30:12.30	450	0	0	0	0				
15	1/10/2010	8.30:9.30	450	2	0	0	0				
16	4/10/2010	8.30:9.30	450	4	0	0	0				
17	5/10/2010	8.30:9.30	450	1	1	0	0				
18	6/10/2010	8.30:9.30	450	0	0	0	0				
19	7/10/2010	8.30:9.30	450	1	0	0	0				
20	8/10/2010	8.30:9.30	450	2	1	0	0				
21	1/11/2010	8.30:9.30	450	4	1	0	0				
22	2/11/2010	8.30:9.30	450	3	1	0	0				
23	3/11/2010	2.30:1.30	450	0	0	0	0				
24	4/11/210	8.30:9.30	450	4	0	0	0				
25	7/11/2010	8.30:9.30	450	2	1	0	0				
26	8/11/2010	8.30:9.30	450	4	0	0	0				
27	9/11/2010	8.30:9.30	450	4	0	0	0				
28	0/11/2010	8.30:9.30	450	3	1	0	0				
29	1/11/2010	.30:12.30	450	0	0	0	0				
30	4/11/2010	8.30:9.30	450	3	0	0	0				

(5)

Subgroup	Date	Time	Size	نسبة الوحدات	Disabled	Cause	Action	Comment
1	3/10/2010	00:16:22	450	0.0178				
2	4/10/2010	8.30:9.30	450	0.0111				
3	5/10/2010	8.30:9.30	450	0.0044				
4	6/10/2010	8.30:9.30	450	0.0067				
5	7/10/2010	1.30:11.30	450	0				
6	0/10/2010	.30:12.30	450	0				
7	1/10/2010	8.30:9.30	450	0.0044				
8	2/10/2010	8.30:9.30	450	0.0067				
9	3/10/2010	8.30:9.30	450	0.0044				
10	4/10/2010	8.30:9.30	450	0.0067				
11	7/10/2010	8.30:9.30	450	0.0022				
12	8/10/2010	1.30:10.30	450	0				
13	9/10/2010	1.30:11.30	450	0				
14	0/10/2010	.30:12.30	450	0				
15	1/10/2010	8.30:9.30	450	0.0044				
16	4/10/2010	8.30:9.30	450	0.0088				
17	5/10/2010	8.30:9.30	450	0.0044				
18	6/10/2010	8.30:9.30	450	0				
19	7/10/2010	8.30:9.30	450	0.0022				
20	8/10/2010	8.30:9.30	450	0.0067				
21	1/11/2010	8.30:9.30	450	0.0111				
22	2/11/2010	8.30:9.30	450	0.0088				
23	3/11/2010	2.30:1.30	450	0				
24	4/11/210	8.30:9.30	450	0.0088				
25	7/11/2010	8.30:9.30	450	0.0067				
26	8/11/2010	8.30:9.30	450	0.0088				
27	9/11/2010	8.30:9.30	450	0.0088				
28	0/11/2010	8.30:9.30	450	0.0088				
29	1/11/2010	.30:12.30	450	0				
30	4/11/2010	8.30:9.30	450	0.0067				

(6)

Control Chart Setups

Select a characteristic:
 نسبة الوحدات المعيبة

Select a control chart:
 P (Proportion)

UCL/LCL
☒ in sigmas
☐ in probability limits
☐ Preset values
 UCL: 3 σ
 LCL: -3 σ

Mean for P
☒ Average proportion
☐ Grand proportion
☐ Known value
 μ :

S.D (Sigma) for P
☒ From average proportion
☐ From grand proportion
☐ Known value
 σ :

Display Samples and Warnings
☒ All in one screen
☐ Multiple screens
 Points per screen:
☒ Show 2 sigma limits
☒ Show 1 sigma limits

OK Cancel Help

P – chart : (7)



P – chart : (8)

Subgroup	Date	Time	Size	نسبة الوحدات	Disabled	Cause	Action	Comment
1	4/10/2010	8.30:9.30	450	0.0111				
2	5/10/2010	8.30:9.30	450	0.0044				
3	6/10/2010	8.30:9.30	450	0.0067				
4	7/10/2010	1.30:11.30	450	0				
5	8/10/2010	1.30:12.30	450	0				
6	1/10/2010	8.30:9.30	450	0.0044				
7	2/10/2010	8.30:9.30	450	0.0067				
8	3/10/2010	8.30:9.30	450	0.0044				
9	4/10/2010	8.30:9.30	450	0.0067				
10	7/10/2010	8.30:9.30	450	0.0022				
11	8/10/2010	1.30:10.30	450	0				
12	9/10/2010	1.30:11.30	450	0				
13	10/10/2010	1.30:12.30	450	0				
14	11/10/2010	8.30:9.30	450	0.0044				
15	14/10/2010	8.30:9.30	450	0.0088				
16	15/10/2010	8.30:9.30	450	0.0044				
17	16/10/2010	8.30:9.30	450	0				
18	17/10/2010	8.30:9.30	450	0.0022				
19	18/10/2010	8.30:9.30	450	0.0067				
20	1/11/2010	8.30:9.30	450	0.0111				
21	2/11/2010	8.30:9.30	450	0.0088				
22	3/11/2010	2.30:1.30	450	0				
23	4/11/2010	8.30:9.30	450	0.0088				
24	7/11/2010	8.30:9.30	450	0.0067				
25	8/11/2010	8.30:9.30	450	0.0088				
26	9/11/2010	8.30:9.30	450	0.0088				
27	10/11/2010	8.30:9.30	450	0.0088				
28	1/11/2010	1.30:12.30	450	0				
29	4/11/2010	8.30:9.30	450	0.0067				

(1) : (9)



: (10)