DESIGN OF A SYSTEMATIC MONITORING PLAN FOR CATI SURVEYS

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1. Introduction

The Census Bureau began research about 1980 into the use of computer assisted telephone interviewing (CATI) to conduct telephone interviews for its demographic surveys. With CATI, the survey questionnaire is programmed into a computer and the interviewer conducts interviews from a computer terminal. Questions are read from the screen to the respondents over the phone and responses are keyed directly into the terminal by the interviewer. This centralized, computer-based system provides the opportunity for monitoring interviews. This paper describes a monitoring system that has been designed for the use of CATI for Census Bureau surveys.

In recent years, CATI research at the Census Bureau has focused on applications to warm contact cases (i.e., sample households that have already received a personal visit (PV) interview).** Warm contact interviews arise in the Current Population Survey (CPS), National Crime Survey (NCS), and other Census Bureau surveys where sample households receive an initial PV interview and then are retained in the sample for several more interviews. Due primarily to cost considerations, most of the interviews following the initial PV interview with a household are conducted by telephone for these surveys. Currently, these telephone interviews are conducted from interviewers' homes. Alternatively, the Census Bureau is considering conducting these interviews from centralized CATI facilities.

In 1985 the Census Bureau established a telephone facility in Hagerstown, MD (about 100 miles from Bureau headquarters) for the purpose of conducting extensive research into the use of CATI. Tests for several demographic surveys, including CPS and NCS, are currently being conducted at this facility, referred to as the Hagerstown Telephone Center (HTC). A detailed discussion of the development of CATI at the Census Bureau is given by Nicholls (1983). An overview of the development and status of CATI is provided by Groves and Nicholls (1986).

The experiments at the HTC have consisted primarily of operational feasibility tests and comparisons between the CATI experimental sample and the control sample (i.e., the sample treated with the current procedures). Both samples involve a mixture of PV and telephone interview cases. The PV portions of the two treatment samples are designed to be equivalent. Therefore, any differences between the two treatments should be attributable to the difference between CATI and telephone interviewing from interviewers' homes. A report on the evaluation of CATI for use in the CPS is provided by the U.S. Bureau of the Census (1988) and for use in the NCS by Hubble and Wilder (1988).

One of the major advantages of CATI over the current procedure is the far greater control over the telephone interviews that can be exercised from a centralized CATI facility. In particular, it is possible to monitor CATI interviews, where this option is not realistically available with telephone interviewing from the interviewers' homes.

Research into monitoring methods for CATI has been underway at the Census Bureau for a couple of years. The major emphasis has been in the area of designing and testing a monitoring form. Also, there has been considerable study regarding the sampling aspects of systematic monitoring -- the procedure for regularly monitoring a portion of each interviewer's work.

Although a systematic monitoring procedure has not yet been put into place for the Bureau's CATI experimental surveys being conducted at the HTC, one has been designed and some limited testing has been conducted. This document describes the design of this monitoring system.

2. Basic approach to systematic monitoring for CATI

At this time, the primary purpose of systematic monitoring for CATI is to provide immediate information on the quality of interviewing. This information would be used in discussions with interviewers. However, no procedure for deriving formal ratings of interviewers based on monitoring results has been suggested, due primarily to the variability among monitors.

As a general check on interviewer performance, it seems appropriate to use probability sampling in selecting cases for monitoring and to use a constant selection rate across shifts and interviewers. Specifically, the system has been designed to monitor a random 5% of each interviewer's cases, using time segments. There may be some modest advantages to other methods that allow differing sampling rates, however, these would complicate the selection procedure and would probably be perceived as unfair by the interviewers. In addition to routine systematic monitoring, special purpose monitoring may be used to monitor specific interviewers who had difficulty during training or experienced interviewers who are having repeated problems.

The choice of a monitoring rate of 5% has to be somewhat arbitrary since at this time there are no specific measurements being generated from monitoring sessions that could provide a precision criterion. Rates of 2.5%, 5% and 10% have all been considered by Census Bureau staff. Based primarily on cost considerations, a rate of 2.5% was initially proposed. However, a small, informal survey of some survey organizations revealed that, although telephone monitoring rates vary substantially, there may be an industry standard emerging for Federal surveys of 10%. This rate seemed to apply to surveys that did not include any

reinterviewing. Since the Bureau plans to do reinterviews for CATI applications, as well as monitoring, it was decided that 5% would be a reasonable monitoring rate with which to begin.

The choice of time segments, rather than cases, as sampling units for monitoring is dictated by the basic operation of a CATI facility. First, the number of cases per interviewer is not fixed, making it difficult to determine how many cases per interviewer should be monitored to achieve a 5% rate. Also, it is generally difficult and time consuming to find the beginning of a case. Futhermore, there is a considerable variety of interviewer work schedules possible at the HTC which would make it difficult to schedule monitoring if interviewer cases were used as sampling units. The use of time segments for monitoring sessions allows for a 5% rate to be achieved and for relatively easy scheduling of monitoring sessions.

The amount of monitoring scheduled for a shift is based on the anticipated number of interviewers for the shift. The appropriate number of monitoring time segments for the shift are selected randomly from the shift's time slots. The interviewers working the shift are assigned randomly to the selected monitoring sessions, hour by hour, except that controls have been established to increase the selection probabilities of those interviewers who have been monitored fewer times per hour worked than others.

The specific features of the CATI monitoring design are given in the remaining sections. These include (a) the length of monitoring time segments, (b) the selection of monitoring segments for a shift, (c) the assignment of interviewers to monitoring sessions, and (d) the assignment of staff to conduct the monitoring sessions.

3. Definition of monitoring time segments

Monitoring time segments of various lengths have been considered. Initially, segments of 15 and 20-minutes were proposed. Based on some trial monitoring sessions, longer segments are now being recommended because of the increased likelihood that a monitoring session will contain an entire interview. Therefore, it has been decided to use either 25- or 50-minute monitoring sessions: 25-minute sessions for regular CPS and 50-minute sessions for CPS interviews with supplements and for NCS interviews.

Hourly time slots have been defined for each of these two monitoring segment lengths -- one for a single 50-minute segment and the other for two 25-minute segments. The two schemes are:

(1) One 50-minute time segment:
Session: 10-60 minutes past the hour.

(2) Two 25-minute segments with a scheduled 5 minute break between them:
Session 1: 5-30 minutes past the hour.
Session 2: 35-60 minutes past the hour.

There may be additional experimentation with lengths of monitoring sessions for various surveys. This experimentation may lead to the use of monitoring segments of different lengths.

4. Determination of the number of monitoring segments to assign for a given shift

The number of monitoring segments assigned for a given shift will be based on the length of the shift, the target monitoring rate of 5% and the anticipated number of interviewers working the shift. At the HTC, both five hour and six hour shifts are used. On weekdays, five hour shifts are used as follows: 9:00am-2:00pm, 12:00pm-5:00pm, 2:00pm-7:00pm, 5:00pm-10:00pm and 7:00pm-12:00am. On weekends, six hour shifts are used as follows: 12:00pm-6:00pm, 6:00pm-12:00am. The target number of monitor minutes for each shift is 5% of the anticipated total number of interviewer minutes for the shift. The actual number of assigned monitoring segments for a shift is the number which best approximates the target number of monitoring minutes. For example, if, for a 5-hour shift, 18 interviewers are anticipated to work, then the number of interviewer minutes expected to be worked is 5400, (i.e., 18 x 60 x 5) and the target monitoring time is 270 minutes (5% of 5400). For a 50-minute monitoring segment, the multiple of 50 closest to this target is 250 minutes or 5 sessions of monitoring during the shift. This gives an effective monitoring rate of .046. However, for a 25-minute monitoring segment the number best approximating the target is 275 minutes or 11 sessions of monitoring during the shift. The effective monitoring rate in this case is .051, which is closer to the target of .05 than would be achieved with the five 50-minute sessions. The number of 50-minute monitoring segments assigned for five and six hour shifts is specified in Table 3.1.

In some cases in a five hour shift with 50-minute monitoring segments, the target monitoring time falls exactly between two multiples of 50. For example, when the projected number of interviewers, K, is 15, the target monitoring time of 225 minutes is a 25 minute difference from both 200 minutes (i.e., .044 monitoring rate) and 250 minutes (i.e., .056 monitoring rate). For those values of K with a target monitoring time equidistant from two multiples of 50, the choice of the lower or higher multiple alternates, starting with the lower multiple. The first time this happens is at K=15; thus, for the target monitoring time of 225 minutes the assigned monitoring time will be 200 minutes. The next lowest value of K for which this occurs is K=25. The target monitoring time for this case is 375 minutes. The assigned monitoring time is the higher multiple -- 400 minutes (.053 monitoring rate). This procedure of alternating between the lower and higher rates continues through K=55.

When monitoring segments are 25 minutes, the assigned monitoring time is the multiple of 25 closest to the target monitoring time. This is true for all K>2. When K=2, 50 minutes of monitoring will be assigned instead of 25 minutes, even though 25 minutes is closer to the target number of 30 minutes, in order to provide a minimum monitoring workload of 50 minutes for

a shift. The number of 25-minute monitoring segments assigned for five and six hour shifts is specified in Table 3.2.

5. Assignment of monitoring segments to time slots

Once the number of monitoring segments (m) assigned to a shift is obtained from Table 3.1 or 3.2, segments are assigned to time slots. (The assignment of interviewers to monitoring time slots, described in the next section, will be done hour by hour, rather than for an entire shift.) The method of assignment of segments to time slots varies somewhat between the 25- and 50-minute time segments.

5.1. Monitoring assignments for 50-minute sgments

The assignment of interviewers for monitoring sessions depends on the shift length. Let h denote the length (in hours) of a shift. The shift length being used at the HTC is either 5 or 6. An h hour shift has h 50-minute time slots to which monitoring can be assigned. These time slots are numbered 1 to h.

The number of monitoring segments to be assigned, m, can be expressed as follows:

$$m = q\,(h) + r \qquad (4.1)$$
where $q \geq 0,\ 0 \leq r \leq h-1.$

Hence, the number of monitoring segments to be assigned can be expressed as an integral multiple of h plus a remainder that is less than h. Initially, each time slot is assigned q monitoring sessions. If r=0, (i.e., m is an exact multiple of h), no other assignments are required. However, if $r \neq 0$, the remaining r segments are randomly assigned to the h possible time slots. After this assignment, each time slot will finally have either q or q+1 monitoring sessions assigned to it.

For example, if in a five hour shift during a CPS-supplement month, the anticipated number of interviewers for that shift is 23, then the number of monitoring sessions assigned is 7 according to Table 3.1. The number of assigned sessions can be expressed as:

$$7 = 1(5) + 2.$$

Here q = 1 and r = 2; therefore each time slot is initially assigned one segment and the remaining two segments are randomly assigned to two of the five time slots. Hence, two time slots will be assigned two monitoring sessions and the other three slots will be assigned one session.

5.2. Monitoring assignments for 25-minute monitoring

The method used to assign segments to time slots for 25-minute monitoring segments is based on the method used for 50-minute monitoring segments. The number of 25-minute monitoring segments for an h hour shift is 2h: two time slots for each hour. These time slots are numbered from 1 to 2h.

The number of monitoring segments, m, can be expressed as follows:

$$m = q\,(2h) + r \qquad (4.2)$$
where $q \geq 0,\ 0 \leq r \leq 2h-1.$

The number of monitoring segments to be assigned can be expressed as an integral multiple of 2h plus a remainder (if one exists) that is less than 2h. Thus, each time slot is initially assigned q monitoring sessions. If r=0, no other assignments are required. However, if $r \neq 0$, the remaining r segments are randomly assigned to the 2h time slots. After this assignment, each time slot will ultimately have either q or q + 1 monitoring sessions assigned to it.

6. Assignment of interviewers to monitoring sessions

Once the monitoring time slots in a shift are assigned a specific number of monitoring sessions as described in the previous section, interviewers are assigned to monitoring sessions on an hourly basis. Assignments are made hourly, rather than for an entire shift, because interviewer work schedules often vary from strict shift definitions. Hourly assignments allow for this type of flexibility in work schedules. (It is assumed, however, that interviewers generally begin and end work at the beginning of an hour.)

Prior to the assignment of interviewers to monitoring sessions, the K interviewers working a specific hour are listed in order, based on the priority-to-be-monitored index, I, defined as follows:

$$I = \frac{\text{No. of time segments monitored}}{\text{No. of hours worked} + 1}$$

This index is based on the rate at which interviewers have already been monitored. Interviewers with the lower index values have the highest priority. Thus the interviewers are listed in ascending order by priority index. Any ties are randomly ordered. The "1" in the denominator ensures that division by zero does not occur when an interviewer has not worked any hours in the month. Also, if two interviewers have the same ratio of number of segments monitored to number of hours worked, the "1" lowers the index more for the interviewer that has worked less (hence, giving him/her a higher priority for monitoring). For example, an interviewer monitored once out of five hours of work would have a lower index than one who has been monitored twice out of ten hours of work.

To be able to derive the index for each interviewer, accurate records of which interviewers worked and were monitored each hour of each day must be kept for the month. Ideally, the index would be updated each hour. However, it may be feasible to update the index only once per shift or per day.

Let n equal the total number of monitoring sessions assigned to the time slot(s) (either one or two depending on the length of the monitoring sessions) contained in a specific hour. The n interviewers to be monitored are

the first n listed on the priority-to-be-monitored list. Interviewers are assigned to specific sessions in the order listed.

This procedure of assigning interviewers to monitoring sessions is not significantly altered by the fact that interviewer shifts overlap. The methods described earlier of determining the number of monitoring sessions for a shift and the assignment of sessions to time slots are unchanged (i.e., are carried out without regard to overlapping shifts). Then for any hour contained in two overlapping shifts, the procedure of assigning interviewers to monitoring sessions is a combined one. Specifically, the assigned number of monitoring sessions for any time slot is totaled for the two shifts. Also, in assigning interviewers to monitoring sessions a combined list of interviewers from the two shifts is used.

For example, let shift 1 refer to the 5-hour shift from 2 to 7 and shift 2 refer to the 5-hour shift from 5 to 10. If 5 interviewers are anticipated to work during shift 1 and 6 interviewers are anticipated for shift 2 during a regular CPS interview month, then three 25-minute monitoring segments will be assigned for shift 1 and four 25-minute monitoring segments will be assigned for shift 2. Suppose that the three randomly selected time slots for shift 1 are 3:05-3:30, 4:35-5:00 and 5:35-6:00. Also, suppose that for shift 2 the four randomly selected time slots are 5:35-6:00, 6:05-6:30, 7:35-8:00 and 9:05-9:30. When assigning interviewers to be monitored from 5:00 to 6:00, two will be selected from the combined list of eleven interviewers for the two monitoring sessions to be conducted starting at 5:35. (The combined list of interviewers could contain less than eleven persons if any interviewers work both shifts.) Also, when assigning interviewers to be monitored from 6:00 to 7:00, one will be selected from the combined list of eleven interviewers for the monitoring session starting at 6:05.

7. Assignment of supervisors to monitoring sessions

Based on discussions with project staff, it appears that shift supervisors will do the monitoring. It is anticipated that the number of shift supervisors present for each hour will be large enough to provide the number of monitors necessary to conduct the designated monitoring sessions (i.e., at least one more supervisor than the number of monitors needed during the hour).

There are several ways that supervisors can be assigned to monitoring sessions. It may be that a small number of supervisors are assigned to monitoring for the entire shift, or monitoring workloads may be more evenly shared among supervisors. Perhaps some experimentation with alternatives may be carried out prior to the time that CATI will be used for live CPS cases (scheduled Jan. '89).

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** Research into "cold contact" telephone interviewing (i.e., interviewing households over the telephone for their first interview in the survey) was conducted for the National Health Interview Survey and for the National Crime Survey. Reports of these studies are provided by Biemer and Chapman (1985) and by Alexander, et. al. (1986).

*** This paper reports the general results of research undertaken by Census Bureau staff. The views expressed are attributable to the authors and do not necessarily reflect those of the Census Bureau.

Table 3.1. 50-minute monitoring segments for 5(6) hour shifts

Projected number of interviewers for a shift	No. of interviewer minutes for 5(6) hr shift	Target monitoring time for the shift	Assigned monitoring time for the shift	No. of monitoring segments for the shift	Projected monitoring rate for the shift
1	300 (360)	15 (18)	0 (0)	0 (0)	0 (0)
2	600 (720)	30 (36)	50 (50)	1 (1)	.083 (.069)
3	900 (1080)	45 (54)	50 (50)	1 (1)	.056 (.046)
4	1200 (1440)	60 (72)	50 (50)	1 (1)	.042 (.035)
5	1500 (1800)	75 (90)	100 (100)	2 (2)	.067 (.056)
6	1800 (2160)	90 (108)	100 (100)	2 (2)	.056 (.046)
7	2100 (2520)	105 (126)	100 (150)	2 (3)	.048 (.060)
8	2400 (2880)	120 (144)	100 (150)	2 (3)	.042 (.052)
9	2700 (3240)	135 (162)	150 (150)	3 (3)	.056 (.046)
10	3000 (3600)	150 (180)	150 (200)	3 (4)	.050 (.056)
11	3300 (3960)	165 (198)	150 (200)	3 (4)	.045 (.051)
12	3600 (4320)	180 (216)	200 (200)	4 (4)	.056 (.046)
13	3900 (4680)	195 (234)	200 (250)	4 (5)	.051 (.053)
14	4200 (5040)	210 (252)	200 (250)	4 (5)	.048 (.050)
15	4500 (5400)	225 (270)	200 (250)	4 (5)	.044 (.046)
16	4800 (5760)	240 (288)	250 (300)	5 (6)	.052 (.052)
17	5100 (6120)	255 (306)	250 (300)	5 (6)	.049 (.049)
18	5400 (6480)	270 (324)	250 (300)	5 (6)	.046 (.046)
19	5700 (6840)	285 (342)	300 (350)	6 (7)	.053 (.051)
20	6000 (7200)	300 (360)	300 (350)	6 (7)	.050 (.049)
21	6300 (7560)	315 (378)	300 (400)	6 (8)	.048 (.053)
22	6600 (7920)	330 (396)	350 (400)	7 (8)	.053 (.051)
23	6900 (8280)	345 (414)	350 (400)	7 (8)	.051 (.048)
24	7200 (8640)	360 (432)	350 (450)	7 (9)	.049 (.052)
25	7500 (9000)	375 (450)	400 (450)	8 (9)	.053 (.050)
26	7800 (9360)	390 (468)	400 (450)	8 (9)	.051 (.048)
27	8100 (9720)	405 (486)	400 (500)	8 (10)	.049 (.051)
28	8400 (10080)	420 (504)	400 (500)	8 (10)	.048 (.050)
29	8700 (10440)	435 (522)	450 (500)	9 (10)	.052 (.048)
30	9000 (10800)	450 (540)	450 (550)	9 (11)	.050 (.051)
31	9300 (11160)	465 (558)	450 (550)	9 (11)	.048 (.049)
32	9600 (11520)	480 (576)	500 (600)	10 (12)	.052 (.052)
33	9900 (11880)	495 (594)	500 (600)	10 (12)	.051 (.051)
34	10200 (12240)	510 (612)	500 (600)	10 (12)	.049 (.049)
35	10500 (12600)	525 (630)	500 (650)	10 (13)	.048 (.052)
36	10800 (12960)	540 (648)	550 (650)	11 (13)	.051 (.050)
37	11100 (13320)	555 (666)	550 (650)	11 (13)	.050 (.049)
38	11400 (13680)	570 (684)	550 (700)	11 (14)	.048 (.051)
39	11700 (14040)	585 (702)	600 (700)	12 (14)	.051 (.050)
40	12000 (14400)	600 (720)	600 (700)	12 (14)	.050 (.049)
41	12300 (14760)	615 (738)	600 (750)	12 (15)	.049 (.051)
42	12600 (15120)	630 (756)	650 (750)	13 (15)	.052 (.050)
43	12900 (15480)	645 (774)	650 (750)	13 (15)	.050 (.048)
44	13200 (15840)	660 (792)	650 (800)	13 (16)	.049 (.051)
45	13500 (16200)	675 (810)	700 (800)	14 (16)	.048 (.049)
46	13800 (16560)	690 (828)	700 (850)	14 (17)	.051 (.051)
47	14100 (16920)	705 (846)	700 (850)	14 (17)	.050 (.050)
48	14400 (17280)	720 (864)	700 (850)	14 (17)	.049 (.049)
49	14700 (17640)	735 (882)	750 (900)	15 (18)	.051 (.051)
50	15000 (18000)	750 (900)	750 (900)	15 (18)	.050 (.050)
51	15300 (18360)	765 (918)	750 (900)	15 (18)	.049 (.049)
52	15600 (18720)	780 (936)	800 (950)	16 (19)	.051 (.051)
53	15900 (19080)	795 (954)	800 (950)	16 (19)	.050 (.050)
54	16200 (19440)	810 (972)	800 (950)	16 (19)	.049 (.049)
55	16500 (19800)	825 (990)	800 (1000)	16 (20)	.052 (.051)
56	16800 (20160)	840 (1008)	850 (1000)	17 (20)	.051 (.050)
57	17100 (20520)	855 (1026)	850 (1050)	17 (21)	.050 (.051)
58	17400 (20880)	870 (1044)	850 (1050)	17 (21)	.049 (.050)
59	17700 (21240)	885 (1062)	900 (1050)	18 (21)	.051 (.049)
60	18000 (21600)	900 (1080)	900 (1100)	18 (22)	.050 (.051)

Table 3.2. 25-minute monitoring segments for 5(6) hour shifts

Projected number of interviewers for a shift	No. of interview minutes for 5(6) hr. shift	Target monitoring time for the shift	Assigned monitoring time for the shift	No. of monitoring segments for the shift	Projected monitoring rate for the shift
1	300 (360)	15 (18)	0 (0)	0 (0)	0 (0)
2	600 (720)	30 (36)	50 (50)	2 (2)	.083 (.069)
3	900 (1080)	45 (54)	50 (50)	2 (2)	.056 (.046)
4	1200 (1440)	60 (72)	50 (75)	2 (3)	.042 (.052)
5	1500 (1800)	75 (90)	75 (100)	3 (4)	.050 (.056)
6	1800 (2160)	90 (108)	100 (100)	4 (4)	.056 (.046)
7	2100 (2520)	105 (126)	100 (125)	4 (5)	.048 (.050)
8	2400 (2880)	120 (144)	125 (150)	5 (6)	.052 (.052)
9	2700 (3240)	135 (162)	125 (150)	5 (6)	.046 (.046)
10	3000 (3600)	150 (180)	150 (175)	6 (7)	.050 (.049)
11	3300 (3960)	165 (198)	175 (200)	6 (8)	.053 (.051)
13	3900 (4680)	195 (234)	200 (225)	8 (9)	.051 (.048)
14	4200 (5040)	210 (252)	200 (250)	8 (10)	.048 (.050)
15	4500 (5400)	225 (270)	225 (275)	9 (11)	.050 (.051)
16	4800 (5760)	240 (288)	250 (300)	10 (12)	.052 (.052)
17	5100 (6120)	255 (306)	250 (300)	10 (12)	.049 (.049)
18	5400 (6480)	270 (324)	275 (325)	11 (13)	.051 (.050)
19	5700 (6840)	285 (342)	275 (350)	11 (14)	.048 (.051)
20	6000 (7200)	300 (360)	300 (350)	12 (14)	.050 (.049)
21	6300 (7560)	315 (378)	325 (375)	13 (15)	.052 (.050)
22	6600 (7920)	330 (396)	325 (400)	13 (16)	.049 (.051)
23	6900 (8280)	345 (414)	350 (425)	14 (17)	.051 (.051)
24	7200 (8640)	360 (432)	350 (425)	14 (17)	.049 (.049)
25	7500 (9000)	375 (450)	375 (450)	15 (18)	.050 (.050)
26	7800 (9360)	390 (468)	400 (475)	16 (19)	.051 (.051)
27	8100 (9720)	405 (486)	400 (475)	16 (19)	.049 (.049)
28	8400 (10080)	420 (504)	425 (500)	17 (20)	.051 (.050)
29	8700 (10440)	435 (522)	425 (525)	17 (21)	.049 (.050)
30	9000 (10800)	450 (540)	450 (550)	18 (22)	.050 (.051)
31	9300 (11160)	465 (558)	475 (550)	19 (22)	.051 (.049)
32	9600 (11520)	480 (576)	475 (575)	19 (23)	.049 (.050)
33	9900 (11880)	495 (594)	500 (600)	20 (24)	.048 (.051)
34	10200 (12240)	510 (612)	500 (600)	20 (24)	.049 (.049)
35	10500 (12600)	525 (630)	525 (625)	21 (25)	.050 (.050)
36	10800 (12960)	540 (648)	550 (650)	22 (26)	.051 (.050)
37	11100 (13320)	555 (666)	550 (675)	22 (27)	.050 (.051)
38	11400 (14680)	570 (684)	575 (675)	23 (27)	.050 (.049)
39	11700 (14040)	585 (702)	575 (700)	23 (28)	.049 (.050)
40	12000 (14400)	600 (720)	600 (725)	24 (29)	.050 (.050)
41	12300 (14760)	615 (738)	625 (750)	25 (30)	.051 (.051)
42	12600 (15120)	630 (756)	625 (750)	25 (30)	.050 (.050)
43	12900 (15480)	645 (774)	650 (775)	26 (31)	.050 (.050)
44	13200 (15840)	660 (792)	650 (800)	26 (32)	.049 (.051)
45	13500 (16200)	675 (810)	675 (800)	27 (32)	.050 (.049)
46	13800 (16560)	690 (828)	700 (825)	28 (33)	.051 (.050)
47	14100 (16920)	705 (846)	700 (850)	28 (34)	.500 (.050)
48	14400 (17280)	720 (864)	725 (875)	29 (35)	.050 (.051)
49	14700 (17640)	735 (882)	725 (875)	29 (35)	.049 (.050)
50	15000 (18000)	750 (900)	750 (900)	30 (36)	.050 (.050)
51	15300 (18360)	765 (918)	775 (925)	31 (37)	.050 (.050)
52	15600 (18720)	780 (936)	775 (925)	31 (37)	.050 (.049)
53	15900 (19080)	795 (954)	800 (950)	32 (38)	.050 (.050)
54	16200 (19440)	810 (972)	800 (975)	32 (39)	.049 (.050)
55	16500 (19800)	825 (990)	825 (1000)	33 (40)	.050 (.051)
56	16800 (20160)	840 (1008)	850 (1000)	34 (40)	.050 (.050)
57	17100 (20520)	855 (1026)	850 (1025)	34 (41)	.050 (.050)
58	17400 (20880)	870 (1044)	875 (1050)	35 (42)	.050 (.050)
59	17700 (21240)	885 (1062)	875 (1050)	35 (42)	.049 (.049)
60	18000 (21600)	900 (1080)	900 (1075)	36 (43)	.050 (.050)