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CONCRETE N-TYPE HAMMER



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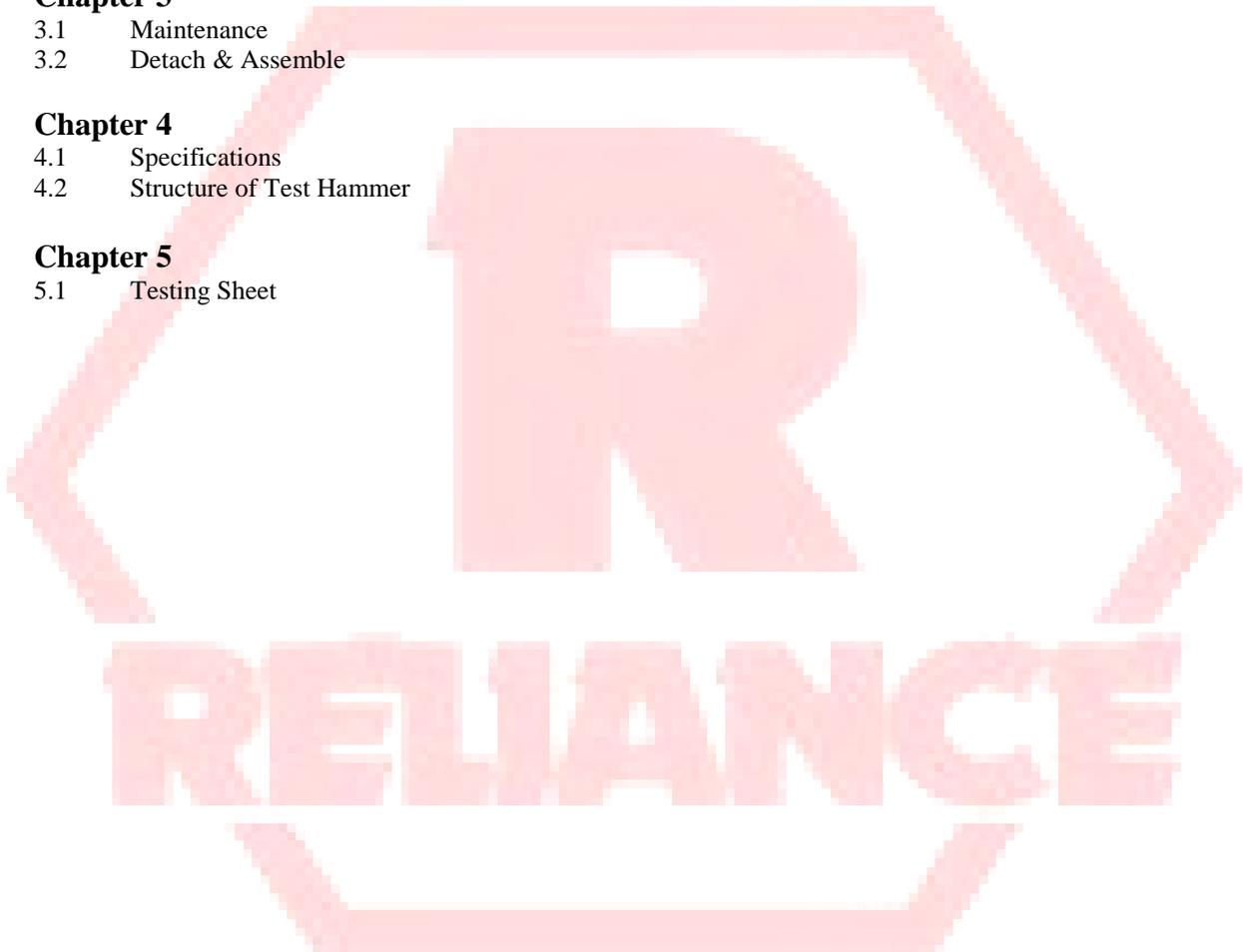
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CHAPTER 1

1.1 HOW TO OPERATE

During testing keep test hammer perpendicular to test surface.

OPERATION PROCEDURES:

1. Generally, the test hammer is locked during storage; unlock hammer before a test. Take out test hammer, keeping the rebound pole perpendicular to a surface (any hard surface). Pushing test hammer down slowly, the hammer will unlock and the button will bound out, stop pushing and move hammer up slowly away from the surface, the rebound pole will reach out and at the same time the rebound hammer will be hooked on compression spring, now it's ready for a test.
2. Aim at test point, keep perpendicular, push slowly, rebound pole will be pushed into the test hammer at the same time the compressing spring will compress, keep pushing till rebound hammer unhooks (there will be a "rebound ball" noise). After impact with rebound pole will be rebounded and the pointer will stop at the highest on the gauge. Note that before you record the rebound value DO NOT loses your hand or the pointer will ZERO SET automatically by the push from the compression spring.

NB:

If it is difficult to see the reading under the conditions specified in Step 2, lock hammer by **PRESSING THE BUTTON ONLY AFTER IMPACT** and remove the device to a convenient place in order to read the gauge. Unlock it by following Step1 after reading for another test.

3. Continue test at other test points.
4. End of testing push the rebound pole back into the test hammer just like above test procedure. After the rebound hammer impact, press the button and the test hammer will be locked. Clean and put back in protective casing.

1.2 REMARKS

1. When performing tests on non vertical surfaces and hence not holding the instrument horizontally it is essential to take into account the factor of gravity acting upon the impact shock and the carbonation depth is another factor that need be taken into account, a precise conversion sheet has been provided.
2. Please note that careful operation is helpful for accuracy and keep the instrument from fall, water, collision and other damage.
3. Test must be performed on smooth and uniform surfaces obtained from castings. Avoid uneven and porous surfaces, lumps of gravel and joints in the concrete. Tests on thin sections or zones less than 10cm will require particular care in the interpretation of the results because of the distortion due to the elasticity of the section. If possible the back of the section should be held stiff by some means.
4. It is advisable to take more than 12 readings in order to obtain a reliable average value R_m . Interval between each test points should be 2 or 3 cm.

NB:

The compressive strength Mpa against the R_m (average rebound values) please refer to Compression Strength.

CHAPTER 2

2.1 Calibrate Test Hammer

Every instrument needs calibration, verification or adjustment after long time use. According to the standard regulation the hammer can be verified through a SANAS Calibrated Steel Anvil. The Calibration Steel Anvil for the test hammer hardness must be of HRC 58-62.

Calibration is simple but important and indispensable.

Calibration circumstance: dry and room temperature between 5-35C.

NOTE

The hammer itself cannot be SANAS Calibrated only verified through the Steel Anvil that must be SANAS Calibrated for hardness in order to pass. The Steel Anvil can be purchased from Reliance for convenient and regular verification on site.

PROCEDURE

Calibrating the test hammer will be just like a test but use of the steel anvil. Test hammer on steel anvil and inspect the rebound value. A test hammer can get a value of $RM=80\pm 2$. Calibration values differ according to different test hammers.



2.2 RECTIFICATION OF TEST HAMMER

The device does not require special maintenance. Avoid dust collect in the rebound pole and penetrate inside the device. AVOID dirt, oil or dust to accumulate on the surface of the hammer or rebound pole it may cause errors

in the rebound impact, always keep the hammer clean and stored properly. In order to keep reliability and good accuracy of the hammer you should verify the hammer regularly and periodically. After the test hammer was operated or every 2000 times or when in doubt verify the accuracy of test by using the Calibrated Steel Anvil.

1. Testing the max static friction between pointer slider and shaft in the instrument it should fall in the scope of 0.5 – 0.8N. Or adjust the slider until it meets requirements.
2. Check the effective work length of the tension spring to see if it is 61.5mm usually by adjusting the spring to suitable length.
3. Check the stroke distance of the hammer the spring will stretch up to 75mm. The spring must be stretched to its limits. It is difficult to check the length in the test hammer, however, it can indirectly checked by the following method:
 - a) Taking out the machine core hook the strike hammer on the hook, hanging up, pulling the tension spring by spring base till the strike side of rebound pole appears. Measuring the distance between the two strike sides, if the length is in scope of 76.1mm – 75.7mm its correct.
4. At the end of rectification you will need to calibrate the test hammer on the Calibrate Steel Anvil the test value should be $RM=80\pm 2$. Generally before above procedures clean the machine core with petrol or alcohol. The center pole should be wiped with little watch oil.

CHAPTER 3

3.1 MAINTENANCE

In order to keep good accuracy you should be careful in operation and storage. Daily maintenance is strongly recommended for regular use.

1. Store clean hammer in suitcase after each test.
2. Do not play with the hammer for fun
3. Clean the machine core after long period of use or after used in unclean, dusty areas. Use petrol or alcohol and wipe watch oil on the center pole at the end, calibrate it on the steel anvil. During large number of tests you should keep regular maintenance.

3.2 DETACH & ASSEMBLE

Placing test hammer against a hard place push end cover till the button is loose, stop and let rebound pole reach out of the device slowly. Screw off end cover and take out the compression spring, screw off the cover cap and detach the semicircular clasp. Keep the device upright with the rebound pole downwards, move the core component to tail, hold the hook and unhook the rebound hammer taking out the core component. It must be unhooked first when you take it out or put it back. Detach the core component, rebound pole will leave the centre rod. In general the three components are:

- Rebound Hammer
- Tension Spring
- Spring Base.

Screw pointer pole by opening the end of the instrument the pointer pole will separate from a front fixer keep screwing till pointer pole separates from the slider. Above are detach procedures, assembling procedures are the opposite of above.

CHAPTER 4

4.1 SPECIFICATIONS

Measuring Ranges	: 10-60mPa
Impact Energy	: 2.207 +/- 0.1J (0.225Kgf.m)
Length of Spring Stretch	: 75 +/-0.3mm
The Static Friction of Pointer Slider	:0.65N – 0.15N
Radius of Spherical Tip	: 25mm +/- 1mm
Weight	: 1kg

4.2 STRUCTURE OF TEST HAMMER

1. Test surface
2. Rebound pole
3. Dust felt ring
4. Semicircular clasp
5. Tension spring
6. Body B
7. Fixer 1
8. Scale
9. Pointer axis
10. Center rod
11. Shrapnel
12. Pointer slider
13. Guide flange
14. Hook spring
15. Fixer 2
16. End cover
17. Compression spring
18. Tighten nut
19. Adjust bolt
20. Hook
21. Master lock
22. Position lock hook
23. Button nut
24. Button block
25. Button spring
26. Shell
27. Rebound hammer (impact hammer)
28. Spring circle
29. buffer spring
30. Spring block
31. Cover cap

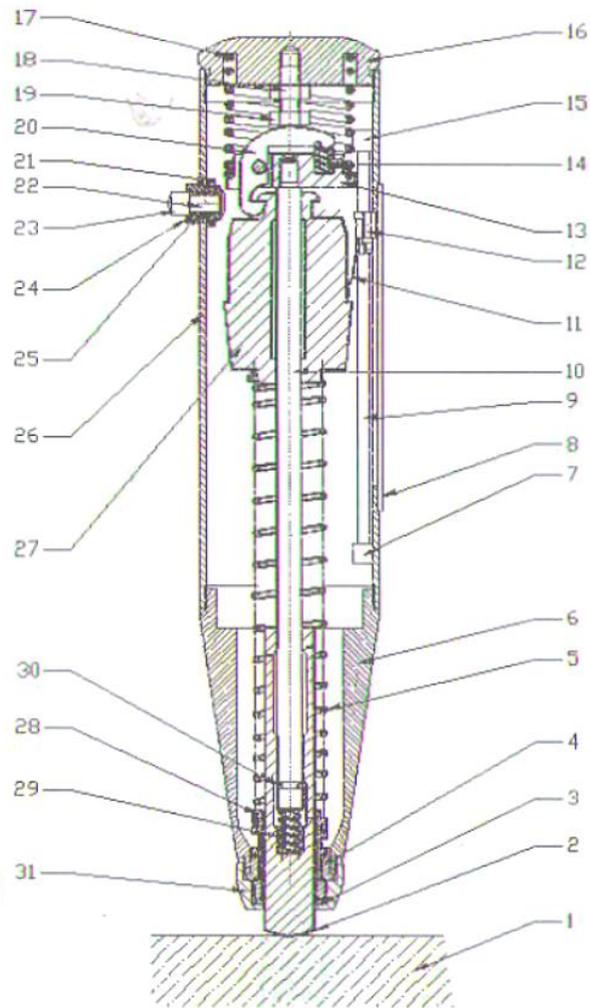


Figure 1 Structure of Test Hammer



Figure 2 Gauge

CHAPTER 5

5.1 TESTING SHEETS

SEVEN COMPRESSIVE STRENGTH (Mpa)/Rm

COMPRESSIVE STRENGTH (Mpa)													
Rm	CARBONATION DEPTH (mm)												
	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	>6
20	10.3	10.1	-	-	-	-	-	-	-	-	-	-	-
20.2	10.5	10.3	10	-	-	-	-	-	-	-	-	-	-
20.4	10.7	10.5	10.2	-	-	-	-	-	-	-	-	-	-
20.6	11	10.8	10.4	10.1	-	-	-	-	-	-	-	-	-
20.8	11.2	11	10.6	10.3	-	-	-	-	-	-	-	-	-
21	11.4	11.2	10.8	10.5	10	-	-	-	-	-	-	-	-
21.2	11.6	11.4	11	10.7	10.2	-	-	-	-	-	-	-	-
21.4	11.8	11.6	11.2	10.9	10.4	10	-	-	-	-	-	-	-
21.6	12	11.8	11.4	11	10.6	10.2	-	-	-	-	-	-	-
21.8	12.3	12.1	11.7	11.3	10.8	10.5	10.1	-	-	-	-	-	-
22	12.5	12.2	11.9	11.5	11	10.6	10.2	-	-	-	-	-	-
22.2	12.7	12.4	12.1	11.7	11.2	10.8	10.4	10	-	-	-	-	-
22.4	13	12.7	12.4	12	11.4	11	10.7	10.3	10	-	-	-	-
22.6	13.2	12.9	12.5	12.1	11.6	11.2	10.8	10.4	10.2	-	-	-	-
22.8	13.4	13.1	12.7	12.3	11	11.4	11	10.6	10.3	-	-	-	-
23	13.7	13.4	13	12.6	12.1	11.6	11.2	10.8	10.5	10.1	-	-	-
23.2	13.9	13.6	13.2	12.8	12.2	11.8	11.4	11	10.7	10.3	10	-	-
23.4	14.1	13.8	13.4	13	12.4	12	11.6	11.2	10.9	10.4	10.2	-	-
23.6	14.4	14.1	13.7	13.2	12.7	12.2	11.8	11.4	11.1	10.7	10.4	10.1	-
23.8	14.6	14.3	13.9	13.4	12.8	12.4	12	11.5	11.2	10.8	10.5	10.2	-
24	14.9	14.6	14.2	13.7	13.1	12.7	12.2	11.8	11.5	11	10.7	10.4	10.1
24.2	15.1	14.8	14.3	13.9	13.3	12.8	12.4	11.9	11.6	11.2	10.9	10.6	10.3
24.4	15.4	15.1	14.6	14.2	13.6	13.1	12.6	12.2	11.9	11.4	11.1	10.8	10.4
24.6	15.6	15.3	14.8	14.4	13.7	13.3	12.8	12.3	12	11.5	11.2	10.9	10.6
24.8	15.9	15.6	15.1	14.6	14	13.5	13	12.6	12.2	11.8	11.4	11.1	10.7
25	16.2	15.9	15.4	14.9	14.3	13.8	13.3	12.8	12.5	12	11.7	11.3	10.9

25.2	16.4	16.1	15.6	15.1	14.4	13.9	13.4	13	12.6	12.1	11.8	11.5	11
25.4	16.7	16.4	15.9	15.4	14.7	14.2	13.7	13.2	12.9	12.4	12	11.7	11.2
25.6	16.9	16.9	16.1	15.7	14.9	14.4	13.9	13.4	13	12.5	12.2	11.8	11.3
25.8	17.2	16.9	16.3	15.8	15.1	14.6	14.1	13.6	13.2	12.7	12.4	12	11.5
26	17.5	17.2	16.6	16.1	15.4	14.9	14.4	13.8	13.5	13	12.6	12.2	11.6
26.2	17.8	17.4	16.9	16.4	15.7	15.1	14.6	14	13.7	13.2	12.8	12.4	11.8
26.4	18	17.6	17.1	16.6	15.8	15.3	14.8	14.2	13.9	13.3	13	12.6	12
26.6	18.3	17.9	17.4	16.8	16.1	15.6	15	14.4	14.1	13.5	13.2	12.8	12.1
26.8	18.6	18.2	17.7	17.1	16.4	15.8	15.3	14.6	14.3	13.8	13.4	12.9	12.3
27	18.9	18.5	18	17.4	16.6	16.1	15.5	14.8	14.6	14	13.6	13.1	12.4
27.2	19.1	18.7	18.1	17.6	16.8	16.2	15.7	15	14.7	14.1	13.8	13.3	12.6
27.4	19.4	19	18.4	17.8	17	16.4	15.9	15.2	14.9	14.3	14	13.4	12.7
27.6	19.7	19.3	18.7	18	17.2	16.6	16.1	15.4	15.1	14.5	14.1	13.6	12.9
27.8	20	19.6	19	18.2	17.4	16.8	16.3	15.6	15.3	14.7	14.2	13.7	13
28	20.3	19.7	19.2	18.4	17.6	17	16.5	15.8	15.4	14.8	14.4	13.9	13.2
28.2	20.6	20	19.5	18.6	17.8	17.2	16.7	16	15.6	15	14.6	14	13.3
28.4	20.9	20.3	19.7	18.8	18	17.4	16.9	16.2	15.8	15.2	14.8	14.2	13.5
28.6	21.2	20.6	20	19.1	18.2	17.6	17.1	16.4	16	15.4	15	14.3	13.6
28.8	21.5	20.9	20.2	19.4	18.5	17.8	17.3	16.6	16.2	15.6	15.2	14.5	13.8
29	21.8	21.1	20.5	19.6	18.7	18.1	17.5	16.8	16.4	15.8	15.4	14.6	13.9
29.2	22.1	21.4	20.8	19.9	19	18.3	17.7	17	16.6	16	15.6	14.8	14.1
29.4	22.4	21.7	21.1	20.2	19.3	18.6	17.9	17.2	16.8	16.2	15.8	15	14.2
29.6	22.7	22	21.3	20.4	19.5	18.8	18.2	17.5	17	16.4	16	15.1	14.4
29.8	23	22.3	21.6	20.7	19.8	19.1	18.4	17.7	17.2	16.6	16.2	15.3	14.5
30	23.3	22.6	21.9	21	20	19.3	18.6	17.9	17.4	16.8	16.4	15.4	14.7
30.2	23.6	22.9	22.2	21.2	20.3	19.6	18.9	18.2	17.6	17	16.6	15.6	14.9
30.4	23.9	23.2	22.5	21.5	20.6	19.8	19.1	18.4	17.8	17.2	16.8	15.8	15.1
30.6	24.3	23.6	22.8	21.9	20.9	20.2	19.4	18.7	18	17.5	17	16	15.2
30.8	24.6	23.9	23.1	22.1	21.2	20.4	19.7	18.9	18.2	17.7	17.2	16.2	15.4
31	24.9	24.2	23.4	22.4	21.4	20.7	19.9	19.2	18.4	17.9	17.4	16.4	15.5
31.2	25.2	24.4	23.7	22.7	21.7	20.9	20.2	19.4	18.6	18.1	17.6	16.6	15.7
31.4	25.6	24.8	24.1	23	22	21.2	20.5	19.7	18.9	18.4	17.8	16.9	15.8
31.6	25.9	25.1	24.3	23.3	22.3	21.5	20.7	19.9	19.2	18.6	18	17.1	16
31.8	26.2	25.4	24.6	23.6	22.5	21.7	21	20.2	19.4	18.9	18.2	17.3	16.2
32	26.5	25.7	24.9	23.9	22.8	22	21.2	20.4	19.6	19.1	18.4	17.5	16.4
32.2	26.9	26.1	25.3	24.2	23.1	22.3	21.5	20.7	19.9	19.4	18.6	17.7	16.6
32.4	27.2	26.4	25.6	24.5	23.4	22.6	21.8	20.9	20.1	19.6	18.8	17.9	16.8
32.6	27.6	26.8	25.9	24.8	23.7	22.9	22.1	21.3	20.4	19.9	19	18.1	17
32.8	27.9	27.1	26.2	25.1	24	23.2	22.3	21.5	20.6	20.1	19.2	18.3	17.2
33	28.2	27.4	26.5	25.4	24.3	23.4	22.6	21.7	20.9	20.3	19.4	18.5	17.4
33.2	28.6	27.7	26.8	25.7	24.6	23.7	22.9	22	21.2	20.5	19.6	18.7	17.6
33.4	28.9	28	27.1	26	24.9	24	23.1	22.3	21.4	20.7	19.8	18.9	17.8
33.6	29.3	28.4	27.4	26.4	25.2	24.2	23.3	22.6	21.7	20.9	20	19.1	18
33.8	29.6	28.7	27.7	26.6	25.4	24.4	23.5	22.8	21.9	21.1	20.2	19.3	18.2
34	30	29.1	28	26.8	25.6	24.6	23.7	23	22.1	21.3	20.4	19.5	18.3
34.2	30.3	29.4	28.3	27	25.8	24.8	23.9	23.2	22.3	21.5	20.6	19.7	18.4
34.4	30.7	29.8	28.6	27.2	26	25	24.1	23.4	22.5	21.7	20.8	19.8	18.6
34.6	31.1	30.2	28.9	27.4	26.2	25.2	24.3	23.6	22.7	21.9	21	20	18.8
34.8	31.4	30.5	29.2	27.6	26.4	25.4	24.5	23.8	22.9	22.1	21.2	20.2	19

35	31.8	30.8	29.6	28	26.7	25.8	24.8	24	23.2	22.3	21.4	20.4	19.2
35.2	32.1	31.1	29.9	28.2	27	26	25	24.2	23.4	22.5	21.6	20.6	19.4
35.4	32.5	31.5	30.2	28.6	27.3	26.3	25.4	24.4	23.7	22.8	21.8	20.8	19.6
35.6	32.9	31.9	30.6	29	27.6	26.6	25.7	24.7	24	23	22	21	19.8
35.8	33.3	23.3	31	29.3	28	27	26	25	24.3	23.3	22.2	21.2	20
36	33.6	32.6	31.2	29.6	28.2	27.2	26.2	25.2	24.5	23.5	22.4	21.4	20.2
36.2	34	33	31.6	29.9	28.6	27.5	26.5	25.5	24.8	23.8	22.6	21.6	20.4
36.4	34.4	33.4	32	30.3	28.9	27.9	26.8	25.8	25.1	21.1	22.8	21.8	20.6
36.6	34.8	33.8	32.4	30.6	29.2	28.2	27.1	26.1	25.4	24.4	23	22	20.9
36.8	35.2	34.1	32.7	31	29.6	28.5	27.5	26.4	25.7	24.6	23.2	22.2	21.1
37	35.5	34.4	33	31.2	29.8	28.8	27.7	26.6	25.9	24.8	23.4	22.4	21.3
37.2	35.9	34.8	33.4	31.6	30.2	29.1	28	26.9	26.2	25.1	23.7	22.6	21.5
37.4	36.3	35.2	33.8	31.9	30.5	29.4	28.3	27.2	26.5	25.4	24	22.9	21.8
37.6	36.7	35.6	34.1	32.3	30.8	29.7	28.6	27.5	26.8	25.7	24.2	23.1	22
37.8	37.1	36	34.5	32.6	31.2	30	28.9	27.8	27.1	26	24.5	23.4	22.3
38	37.5	36.4	34.9	33	31.5	30.3	29.2	28.1	27.4	26.2	24.8	23.6	22.5
38.2	37.9	36.8	35.2	33.4	31.8	30.6	29.5	28.4	27.7	26.5	25	23.9	22.7
38.4	38.3	37.2	35.6	33.7	32.1	30.9	29.8	28.7	28	26.8	25.3	24.1	23
38.6	38.7	37.5	36	34.1	32.4	31.2	30.1	29	28.3	27	25.5	24.4	23.2
38.8	39.1	37.9	36.4	34.4	32.7	31.5	30.4	29.3	28.5	27.2	25.8	24.6	23.5
39	39.5	38.2	36.7	34.7	33	31.8	30.6	29.6	28.8	27.4	26	24.8	23.7
39.2	39.9	38.5	37	35	33.3	32.1	30.8	29.8	29	27.6	26.2	25	24
39.4	40.3	38.8	37.3	35.3	33.6	32.4	31	30	29.2	27.8	26.4	25.2	24.2
39.6	40.7	39.1	37.6	35.6	33.9	32.7	31.2	30.2	29.4	28	26.6	25.4	24.4
39.8	41.2	39.6	38	35.9	34.2	33	31.4	30.5	29.7	28.2	26.8	25.6	24.7
40	41.6	39.9	38.3	36.2	34.5	33.3	31.7	30.8	30	28.4	27	25.8	25
40.2	42	40.3	39.6	36.5	34.8	33.6	32	31.1	30.2	28.6	27.3	26	25.2
40.4	42.4	40.7	39	36.9	35.1	33.9	32.3	31.4	30.5	28.8	27.6	26.2	25.4
40.6	42.8	41.1	39.4	37.2	35.4	34.2	32.6	31.7	30.8	29.1	27.8	26.5	25.7
40.8	43.3	41.6	39.8	37.7	35.7	34.5	32.9	32	31.2	29.4	28.1	26.8	26
41	43.7	42	40.2	38	36	34.8	33.2	32.3	31.5	29.7	28.4	27.1	26.2
41.2	44.1	42.3	40.6	38.4	36.3	35.1	33.5	32.6	31.8	30	28.7	27.3	26.5
41.4	44.5	42.7	40.9	37.7	36.6	35.4	33.8	32.9	32	30.3	28.9	27.6	26.7
41.6	45	43.2	41.1	39.2	36.9	35.7	34.2	33.3	32.4	30.6	29.2	27.9	27
41.8	45.4	43.6	41.8	39.5	37.2	36	34.5	33.6	32.7	30.9	29.5	28.1	27.2
42	45.9	44.1	42.2	39.9	37.6	36.3	34.9	34	33	31.2	29.8	28.5	27.5
42.2	46.3	44.4	42.6	40.3	38	36.6	35.2	34.3	33.3	31.5	30.1	28.7	28.7
42.4	46.7	44.8	43	40.6	38.3	36.9	35.5	34.6	33.6	31.8	30.4	29	28
42.6	47.2	45.3	43.4	41.1	38.7	37.3	35.9	34.9	34	32.1	30.7	29.3	28.3
42.8	47.6	45.7	43.8	41.4	39	37.6	36.2	35.2	34.3	32.4	30.9	29.5	28.6
43	48.1	46.2	44.2	41.8	39.4	38	36.6	35.6	34.6	32.7	31.3	29.8	28.9
43.2	48.5	46.6	44.6	42.2	39.8	38.3	36.9	35.9	34.9	33	31.5	30.1	29.1
43.4	49	47	45.1	42.6	40.2	38.7	37.2	36.3	35.3	33.3	31.8	30.4	29.4
43.6	49.4	47.4	45.4	43	40.5	39	37.5	36.6	35.6	33.6	32.1	30.6	29.6
43.8	49.9	47.9	45.9	43.4	40.9	39.4	37.9	36.9	35.9	33.9	32.4	30.9	29.9
44	50.4	48.4	46.4	43.8	41.3	39.8	38.3	37.3	36.3	34.3	32.8	31.2	30.2
44.2	50.8	48.8	46.7	44.2	41.7	40.1	38.6	37.6	36.6	34.5	33	31.5	30.5
44.4	51.3	49.2	47.2	44.6	42.1	40.5	39	38	36.9	34.9	33.3	31.8	30.8
44.6	51.7	49.6	47.6	45	42.4	40.8	39.3	38.3	37.2	35.2	33.6	32.1	31

44.8	52.2	50.1	48	45.4	42.8	41.2	39.7	38.6	37.6	35.5	33.9	32.4	31.3
45	52.7	50.6	48.5	45.8	43.2	41.6	40.1	39	37.9	35.8	34.3	32.7	31.6
45.2	53.2	51.1	48.9	46.3	43.6	42	40.4	39.4	38.3	36.2	34.6	33	31.9
45.4	53.6	51.5	49.4	46.6	44	42.3	40.7	39.7	38.6	36.4	34.8	33.2	32.2
45.6	54.1	51.9	49.8	47.1	44.4	42.7	41.1	40	39	36.8	35.2	33.5	32.5
45.8	54.6	52.4	50.2	47.5	44.8	43.1	41.5	40.4	39.3	37.1	35.5	33.9	32.8
46	55	52.8	50.6	47.9	45.2	43.5	41.9	40.8	39.7	38.5	35.8	34.2	33.1
46.2	55.5	53.3	51.1	48.3	45.5	43.8	42.2	41.1	40	37.7	36.1	34.4	33.3
46.4	56	53.8	51.5	48.7	45.9	44.2	42.6	41.4	40.3	38.1	36.4	34.7	33.6
46.6	56.5	54.2	52	49.2	46.3	44.6	42.9	41.8	40.7	38.4	36.7	35	33.9
46.8	57	54.7	52.4	49.6	46.7	45	43.3	42.2	41	38.8	37	35.3	34.2
47	57.5	55.2	52.9	50	47.2	45.2	43.7	42.6	41.4	39.1	37.4	35.6	34.5
47.2	58	55.7	53.4	50.5	47.6	45.8	44.1	42.9	41.8	39.4	37.7	36	34.8
47.4	58.5	56.2	53.8	50.9	48	46.2	44.5	43.3	42.1	39.8	38	36.3	35.1
47.6	59	56.6	54.3	51.3	48.4	46.6	44.8	43.7	42.5	40.1	38.4	36.6	35.4
47.8	59.5	57.1	54.7	51.8	48.8	47	45.2	44	42.8	40.5	38.7	36.9	35.7
48	60	57.6	55.2	52.2	49.2	47.4	45.6	44.4	43.2	40.8	39	37.2	36
48.2		58	55.7	52.6	49.6	47.8	46	44.8	43.6	41.1	39.3	37.5	36.3
48.4		58.6	56.1	53.1	50	48.2	46.4	45.1	43.9	41.5	39.6	37.8	36.6
48.6		59	56.6	53.5	50.4	48.6	46.7	45.5	44.3	41.8	40	38.1	36.9
48.8		59.5	57.1	54	50.9	49	47.1	45.9	44.6	42.2	40.3	38.4	37.2
49		60	57.5	54.4	51.3	49.4	47.5	46.2	45	42.5	40.6	38.8	37.5
49.2			58	54.8	51.7	49.8	47.9	46.6	45.4	42.8	41	39.1	37.8
49.4			58.5	55.3	52.1	50.2	48.3	47.1	45.8	43.2	41.3	39.4	38.2
49.6			58.9	55.7	52.5	50.6	48.7	47.4	46.2	43.6	41.7	39.7	38.5
49.8			59.4	56.2	53	51	49.1	47.8	46.5	43.9	42	40.1	38.8
50			59.9	56.7	53.4	51.4	49.5	48.2	46.9	44.3	42.3	40.4	39.1
50.2				57.1	53.8	51.9	49.9	48.5	47.2	44.6	42.6	40.7	39.4
50.4				57.6	54.3	52.3	50.3	49	47.7	45	43	41	39.7
50.6				58	54.7	52.7	50.7	49.4	48	45.4	43.4	41.4	40
50.8				58.5	55.1	53.1	51.1	49.8	48.4	45.7	43.7	41.7	40.3
51				59	55.6	53.5	51.5	50.1	48.8	46.1	44.1	42	40.7
51.2				59.4	56	54	51.9	50.5	49.2	46.4	44.4	42.3	41
51.4				59.9	56.4	54.4	52.3	50.9	49.6	46.8	44.7	42.7	41.3
51.6					56.9	54.8	52.7	51.3	50	47.2	45.1	43	41.6
51.8					57.3	55.2	53.1	51.7	50.3	47.5	45.4	43.3	41.8
52					57.8	55.7	53.6	52.1	50.7	47.9	45.8	43.7	42.3
52.2					58.2	56.1	54	52.5	51.1	48.3	46.2	44	42.6
52.4					58.7	56.5	54.4	53	51.5	48.7	46.5	44.4	43
52.6					59.1	57	54.8	53.4	51.9	49	46.9	44.7	43.3
52.8					59.6	57.4	55.2	53.8	52.3	49.4	47.3	45.1	43.6
53					60	57.8	55.6	54.2	52.7	49.8	47.6	45.4	43.9
53.2						58.3	56.1	54.6	53.1	50.2	48	45.8	44.3
53.4						58.7	56.5	55	53.5	50.5	48.3	46.1	44.6
53.6						59.2	56.9	55.4	53.9	50.9	48.7	46.4	44.9
53.8						59.6	57.3	55.8	54.3	51.3	49	46.8	45.3
54							57.8	56.3	54.7	51.7	49.4	47.1	45.6
54.2							58.2	56.7	55.1	52.1	49.8	47.5	46
54.4							58.6	57.1	55.6	52.5	50.2	47.9	46.3

54.6						59.1	57.5	56	52.9	50.5	48.2	46.6
54.8						59.5	57.9	56.4	53.2	50.9	48.5	47
55						59.9	58.4	56.8	53.6	51.3	48.9	47.3
55.2							58.8	57.2	54	51.6	49.3	47.7
55.4							59.2	57.6	54.4	52	49.6	48
55.6							59.7	58	54.8	52.4	50	48.4
55.8								58.5	55.2	52.8	50.3	48.7
56								58.9	55.6	53.2	50.7	49.1
56.2								59.3	56	53.5	51.1	49.4
56.4								59.7	56.4	53.9	51.4	49.8
56.6									56.8	54.3	51.8	50.1
56.8									57.2	54.7	52.2	50.5
57									57.6	55.1	52.5	50.8
57.2									58	55.5	52.9	51.2
57.4									58.4	55.9	53.3	51.6
57.6									58.9	56.3	53.7	51.9
57.8									59.3	56.7	54	52.3
58									59.7	57	54.4	52.7
58.2										57.4	54.8	53
58.4										57.8	55.2	53.4
58.6										58.2	55.6	53.8
58.8										58.6	55.9	54.1
59										59	56.3	54.5
59.2										59.4	56.7	54.9
59.4										59.8	57.1	55.2
59.6											57.5	55.6
59.8											57.9	56
60											58.3	56.4

