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# SEVERE HAIL DETECTION USING VIL DENSITY AND ITS APPLICATION IN THE WESTERN STATES

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## I. Iintroduction

The use of VIL (Vertically Integrated Liquid) as a tool in severe weather prediction is not new. However, a variation on the use of VIL has led to a quantity called VIL density. VIL density has recently shown promise as a predictor of not only the possibility of hail, but also the possibility of severe hail (3/4 inch diameter or greater). The intent of this Technical Attachment is to give a brief overview of VIL and VIL density, along with its application to recent severe hail cases in the West. In section II, a brief overview of the theory behind the early attempts at forecasting hail (prior to the introduction of VIL density) will be presented. In section III, the transformation from VIL to VIL density will be addressed as well as the investigation of its use as a tool for forecasting severe hail in Oklahoma (Amburn and Wolf 1997). In section IV, the one-third and one thirtieth rules will be introduced. The application of VIL density theory in the West will be presented in section IV. Finally, some closing remarks concerning the use of VIL density will be made, including its relationship to incidences of heavy rain, damaging downburst winds and tornadoes.

## II. Hail Forecasting Prior to the Introduction of VIL Density

### a. Research on forecasting large hail prior to the introduction of VIL

The development of the Video Integrator and Processor, and the associated digital data opened the door for research involving digitized radar data. Lemon (1980) took full advantage of this data, and proposed a criterion for severe storm identification involving the detection of VIP 5 (approximately 51dBZ or more) at 8 km AGL (or approximately 26,000 ft) or higher. It was considered a good severe storm indicator for large hail.

Wagenmaker (1987) then studied the VIP 5 height as a function of several rawinsonde data-derived parameters, which included VIP 5 height verses 300 mb temperature, 500 mb height, 500 mb temperature, freezing level height, 300 mb height, and maximum echo top height. Although the prediction of hail occurrence was found to be very good, the correlation with hail 3/4 inch or greater was still an area where improvements could be made.

b. The introduction of VIL

The background on VIL began with Green and Clark (1972). They identified the relationship in the following equation:

$$M^* = 3.44 \times 10^{-6} \int Z^{4/7}\, dH$$

where;

$M^*$ = VIL (kg m$^{-2}$)

dH = The height difference in meters between radar beam centers of successive scans in a tilt sequence.

Z = The linearly averaged reflectivity between the two successive scans (mm$^{6}$ m$^{-3}$).

The integration is performed from the base of the storm to the top of the storm.

An alternate derivation of the VIL equation (OTB, 1993) is:

$$M = 3.44 \times 10^{-3} Z^{4/7}$$

where;

M = liquid water content (g m$^{-3}$)

Z = radar reflectivity (mm$^{6}$ m$^{-3}$)

We can obtain M* by converting this alternate form of the equation from g m$^{-3}$ to kg m$^{-3}$ and integrating as shown below.

$$M^* = 3.44 \times 10^{-3}\ (\mathrm{g\ m^{-3}}) \times (1\mathrm{kg}/10^{3}\mathrm{g}) I\, Z^{4/7}\, dH$$

or

$$M^* = 3.44 \times 10^{-6} \int Z^{4/7}\, dH$$

The WSR-88D hail algorithm calculates VIL. In order to calculate VIL, reflectivity values are first derived for each 4 km by 4 km grid box for each elevation angle within a 230 km radius of the radar, then vertically integrated. Reflectivities greater than 54 dBZ are not used in the calculations. The VIL values are output in units of mass per unit area (kg m$^{-2}$).

There are several limitations on the accuracy of VIL. The use of grid boxes can cause underestimates in fast moving storms or storms that are strongly tilted due to their vertical profile overlapping into more than one grid box. Underestimates occur for storms whose tops are incompletely scanned due to their close proximity to the radar. VIL is somewhat misnamed because much of the reflectivity may result from ice phase precipitation. Overestimates may occur for some storms beyond 200 km since the algorithm extrapolates liquid water estimates from the lowest azimuthal sweep below the beam down to the ground. (OTB, 1993). However in the central Plains, VIL has been found to be a good indicator of the presence of both small and large hail (Winston and Ruthi 1986). At this point, there was enough evidence for VIL to be used as a severe weather indicator.

Of widespread use during much of the 1990s is the "VIL of the day" approach. Once a critical value has been determined (a value for which severe hail has previously fallen that day), the value is then used as an effective severe hail indicator. Unfortunately, this value can vary drastically since it is based on the characteristics of the air mass, which can change very rapidly from day to day, or even from morning to afternoon.

## III. VIL Density and the Amburn and Wolf Study

### a. Cell density

Paxton and Shepherd (1993) continued the investigation of the relationship between echo tops and thunderstorm severity, but instead of the parameters used by Wagenmaker (1987), a quantity called "cell density" was used. Cell density is essentially the ratio between the maximum VIL and the echo top height.

### b. VIL density and Amburn and Wolf

Amburn and Wolf (1997); hereafter referred to as AW, investigated of a quantity called "VIL density". VIL density is defined as VIL (kg $m^{-2}$), multiplied by 1000 (g $kg^{-1}$), divided by the echo top height (m).

VIL density = VIL x 1000/ echo top

Both VIL and echo tops can be obtained from the WSR-88D, so VIL density can easily be calculated.

The advantage of VIL density verses VIL is in the fact that VIL density is a normalization of VIL via division by echo tops heights. Hence the variations in VIL density due to air mass type (for example, maritime polar versus maritime tropical) are much less than the variations in VIL.

The AW study consisted of a 9-month project from November 1994 through July 1995 under the radar umbrella of the KINX WSR-88D radar at Inola, Oklahoma, near Tulsa. A total of 221 thunderstorms were included in the study. The maximum VIL values and associated echo tops were used to calculate VIL densities.

Of the 221 cases investigated by AW, severe hail occurred during 185 of the cases. Non-severe hail occurred in 36 of the 221 cases. Two criteria were used in selecting cases. First, all thunderstorms that were known to have produced severe hail, as indicated from local storm report logs, were included in the study. Second, thunderstorms that did not produce severe hail were included only if they moved over a highly populated area when reports of hail observations could normally be expected (from around 0800 until around 2200 LT). This was done to ensure that the thunderstorms included as non-severe hail producers did not, in fact, produce severe-criteria hail. Thunderstorms that were not observed to produce severe hail, and that did not move over a highly populated area, were not included in the study. Also, thunderstorms with maximum VILs below 15 were not included in the study.

About 90% of the thunderstorms that produced severe hail occurred with VIL densities of 3.5 or greater. Less than 2% of the thunderstorms with VIL densities of 3.5 or greater were falsely identified as severe. Therefore a VIL density of 3.5 was considered by AW to be a "**reasonable threshold value for identification of severe hail**." Also a correlation between VIL density and hail size resulted from the study. For VIL densities less than 3, there were no reports of hail greater than 1 inch in diameter (Table 1). For VIL densities 3.0 - 3.9 most of the hail was 3/4 inch to 1 inch. For VIL densities 4.0 - 4.9, most of the hail was 3/4 inch to 1 3/4 inches. For VIL densities 4.9 or greater, most of the hail was 1 inch to 1 3/4 inches. For all hail (2 1/2 inches diameter) and larger, VIL densities were never below 4.75.

## IV. Application of the One-third and One-thirtieth Rules

### a. Determination of critical VIL values using simple calculations

An important point can be noticed from the data in Table 1 concerning VIL density values of 4.5 or greater. For VIL densities of 4.5 or greater ***all*** reports were severe. So based on the table, the 4.5 VIL density threshold can be used as a "***near 100% probability VIL density threshold for severe hail.***"

Since the VIL density values of 4.5 and 3.5 are critical values for the ***"near 100% probability VIL density threshold for severe hail"*** and ***"reasonable VIL density threshold for severe hail"*** respectively, we introduce the **"one-third"** and **"one-thirtieth"** rules for converting echo top values to critical VIL values that result in VIL density values very close to the "critical VIL density values".

These calculations are very useful since by inspecting the sounding and estimating expected echo tops for the forecast period, one can estimate the VIL values that would indicate severe hail. An approximate thunderstorm top height can be determined based on the most recent radiosonde and a "VIL of the forecast period" can be approximated. For instance, if the forecaster thinks that cloud tops will likely be around 30 thousand feet during the forecast period, then the forecaster can estimate a **"near 100% probability VIL threshold for severe hail,"** which would be VIL values in the lower 40s, and a **"reasonable VIL threshold for severe hail,"** which would be VIL values in the lower 30s, simply by using the following equations:

*The "One-third" rule*
***Echo top + (1/3 of the echo top) = approximately the "near 100% probability VIL threshold for severe hail" for that echo top value.***

*The "One-thirtieth" rule*
***Echo top + (1/30 of the echo top) = approximately the "reasonable VIL threshold for severe hail" for that echo top value.***

In other words, to perform the calculation to determine the ***"near 100% probability VIL threshold for severe hail"***, simply take the echo top height (in thousands of feet) and add ***one third*** of its value. The resulting value is approximately the critical VIL value that the VIL must meet or exceed in order to reach the ***"near 100% probability VIL density threshold for severe hail"*** value of 4.5 for that particular echo top. Likewise, to perform the calculation to determine the ***"reasonable VIL threshold for severe hail"***, simply take the echo top height (in thousands of feet) and add ***one-thirtieth*** of its value. The resulting value is approximately the critical VIL value that the VIL must meet or exceed in order to reach the ***"reasonable VIL density threshold for severe hail"*** value of 3.5 for that particular echo top.

Below is a quick derivation of the "one-third" and "one-thirtieth" rules.

$$\text{VIL density } (\mathrm{g\ m^{-3}}) = \text{VIL } (\mathrm{kg\ m^{-2}}) \times 1000\ (\mathrm{g\ kg^{-1}}) / \text{echo top } (\mathrm{m}) \qquad (4)$$

Since WSR-88D echo top heights are in feet, (4) is multiplied by 3.28 ft/m:

$$\text{VIL density } (\mathrm{g\ m^{-3}}) = [\text{VIL } (\mathrm{kg\ m^{-2}}) \times 1000\ (\mathrm{g\ kg^{-1}}) / \text{echo top (feet)}] \times 3.28 \qquad (5)$$

Simplifying, (5) becomes:

$$\text{VIL density } (\mathrm{g\ m^{-3}}) = [\text{VIL } (\mathrm{kg\ m^{-2}}) / \text{echo top (kft)}] \times 3.28 \qquad (6)$$

b. Examples

Assume forecast echo top height of 30 kft. According to the 1/3 rule, the ***"near 100% probability <u>VIL density</u> threshold for severe hail"*** is reached when the VIL exceeds 30 + 1/3 (30) or 40. This calculation can be tested by substituting a VIL value of 40 into equation (6):

**(40/30) x 3.28 = 4.37 which is approximately 4.5**

In words, for an echo top of 30 thousand feet, a VIL of 41 indicates a "near 100% probability for severe hail" since this results in a VIL density of approximately 4.5.

By testing other echo top heights we can confirm this relationship.

For an echo top height of 15 kft
15 + (**1/3** x 15) = 20, so VILs > 20 have a near 100% probability of being severe VILs
**(20/15) x 3.28 = 4.37**

For an echo top height of 24 kft
24 + (**1/3** x 24) = 32, so VILs > 32 have a near 100% probability of being severe VILs
**(32/24) x 3.28 = 4.37**

Notice that the calculated VIL densities are just shy of 4.5. This is the reasoning behind the wording "approximately equal to the ***near 100% probability <u>VIL density</u> threshold for severe hail***".

To verify the one-thirtieth rule, simply replace 1/3 with 1/30 in the above examples. For instance

For an echo top height of 39 kft
39 + (**1/30** x 39) = 40.3, VILs > 40 have at least a "reasonable probability" of being severe VILs
**(40/39) x 3.28 = 3.36**

## V. Application of VIL Density Theory in the West

### a. Preferred synoptic environment for hail in southern California

Large hail is not as frequent in the West as it is in the Midwest. In southern California, non-severe hail is far more frequent. Many reported hail events in southern California occur when 500 mb temperatures are approximately -22 or less, and when freezing levels fall below 6000 feet MSL (with such a low freezing level, even fairly weak, but sustained updrafts can produce hail). These conditions generally occur post-frontally, in the cold unstable air mass settling over the area, instead of with the cold front. This is very close to the type of scenario indicated by Hales (1985) in his discussion of tornadoes in the Los Angeles area. Hales found that the majority of tornadoes in the Los Angeles area occur well behind the cold front (Fig. 1). In order to supply the vertical motion necessary for widespread small hail with significant accumulations, along with isolated areas of larger hail, a vorticity center is usually needed. This situation can result in severe events *outside* of the more convection-prone areas over the mountains, over and downwind of the islands, and at the land breeze front. Other conditions associated with the more severe events are mentioned in Wofford (1994).

These conditions can occur during any season, except during the summer. During the summer monsoon season, the 500 mb temperatures and freezing levels are much higher, and most of the hail events occur in the mountains and deserts. The following case studies show the utility of VIL density in the West.

## b. Case studies

*The following case studies were recent Western Region Technical Attachments at the time of this writing. It is important to remember that the cases were selected because they were the only thunderstorm studies that included both echo top and VIL, the values necessary for computing VIL density. Other thunderstorms studies were not selected because they did not include both values.*

### 1. Severe thunderstorm in Fallbrook, California on 24 May 1996

On the morning of 24 May 1996, an upper-level low pressure system with strong 500 mb PVA moved over San Diego County (Garza and Atkin 1996). There was already a large upper-level low pressure system over Nevada, so the PVA occurred with a small trough of low pressure moving rapidly across southern California in post-frontal northwesterly flow. One inch diameter hail was reported with the storm over Fallbrook, in northwest San Diego County. The maximum VIL value of 43 kg $m^{-2}$ combined with an echo top of 26,000 feet MSL results in a VIL density of 4.42. This value is well above the reasonable threshold for identifying severe hail, and gives us a size range from 3/4 inch to 1 3/4 inches in diameter.

### 2. Severe thunderstorm in north central Oregon on 9 July 1995

On the morning of 9 July 1995, a supercell thunderstorm developed in the north central portion of Oregon, southwest of Redmond, Oregon (Tolleson 1996). As the storm went through Redmond, a spotter reported one-half inch diameter hail. At that time the echo top of 32,000 feet MSL (9751 meters) and a VIL of 30 kg $m^{-2}$ resulted in a VIL density of 3.1. This value is below the reasonable threshold value of 3.5 for identifying severe hail and is supported by the report of non-severe hail in Redmond. By the time the supercell reached Condon, the echo top reached 44,000 feet MSL (13,408 meters) and the VIL reached 67 kg $m^{-2}$, resulting in a VIL density of 5.0. This value is well above the reasonable threshold for identifying severe hail, and gives us a size range from 1 inch to 1 3/4 inches in diameter. Golf ball to baseball size hail occurred. Also a tornado was reported.

### 3. The Lemoore Naval Air Station severe hail event on 22 November 1996

On the afternoon of 22 November 1996 a supercell thunderstorm developed near Lemoore Naval Air Station, about 40 miles west of Fresno, California (Kruzdlo 1998). Echo tops were approximately 25,000 feet MSL (7618 meters) and VILs were between 30 and 40 kg $m^{-2}$. This resulted in a range of VIL densities between 3.93 and 5.25. These values are well above the reasonable threshold for severe hail, and gives a size range from 3/4 inch to 1 3/4 inches in diameter. The largest hail reported during this event was 2 1/2 inches in diameter. In addition, two tornadoes were reported.

### 4. The Las Vegas Nevada severe hail event on 23 August 1995

On the afternoon of 23 August 1995 a severe thunderstorm developed near Las Vegas, Nevada (Runk 1996). The echo top was approximately 43,000 feet MSL (13,103 meters) and the maximum VIL was 63 kg $m^{-2}$. This resulted in a VIL density of 4.8. This value is well above the reasonable threshold for identifying severe hail, and gives a size range from 3/4 inch to 1 3/4 inches in diameter. Hail up to one inch in diameter along with damaging downburst winds occurred with the storm.

## VI. Discussion

These few cases have shown that there is a promise concerning the use of VIL density to identify severe hail in the West, however more study (such as a project similar to the AW study) is necessary to fully establish the facts concerning the use of VIL density. If the results of future studies continue to show good skill for forecasting severe hail, then it might be a good idea to add VIL density to the suite of products available on the WSR-88D. Until such time, VIL density can be easily obtained from the VIL density tables included with this study (Tables 2 - 4), or the critical VIL values can be easily calculated using the one-third and one thirtieth rules. It is also recommended that forecasters evaluate the performance of VIL density as well as the hail detection algorithm. In this manner, insights into the accuracy of both methods can be achieved.

Operational forecasters in southern California have been successfully using VIL density to forecast severe hail. Forecasters have also been successful in forecasting strong winds. It seems as though the one-third and one-thirtieth rules for severe hail work well for severe convective winds, so by simply replacing “severe hail” with “severe convective winds” in the one-third and one-thirtieth rules, the rules may be used successfully for severe convective winds in southern California. Finally, VIL density has been successfully used for heavy rain situations. Therefore, future studies based on wind damage reports, tornado damage reports, and flooding reports will be the next steps in the investigation of VIL density. Although the focus of this Technical Attachment was on the use of mainly VIL density, the use of VIL density in combination with other parameters for predicting severe events will likely be included in these future studies.

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| | Ranges in VIL density | | | | | |
|---|---|---|---|---|---|---|
| Hail size | <3.0 | 3.0–3.4 | 3.5–3.9 | 4.0–4.4 | 4.5–4.9 | >4.9 |
| <19 mm (36) | 27 | 7 | 0 | 2 | 0 | 0 |
| 19–24 mm (117) | 6 | 10 | 32 | 44 | 18 | 7 |
| 25–45 mm (63) | 0 | 1 | 5 | 18 | 16 | 23 |
| >45 mm (5) | 0 | 0 | 0 | 0 | 1 | 4 |
| (Total number) | (33) | (18) | (37) | (64) | (35) | (34) |

Table 1. Hail sizes for given ranges of VIL density. Note that as the hail sizes increase, the minimum ranges for VIL density also increase. Values in parentheses represent the number of events in that category-range. (after Amburn and Wolf, 1997.)

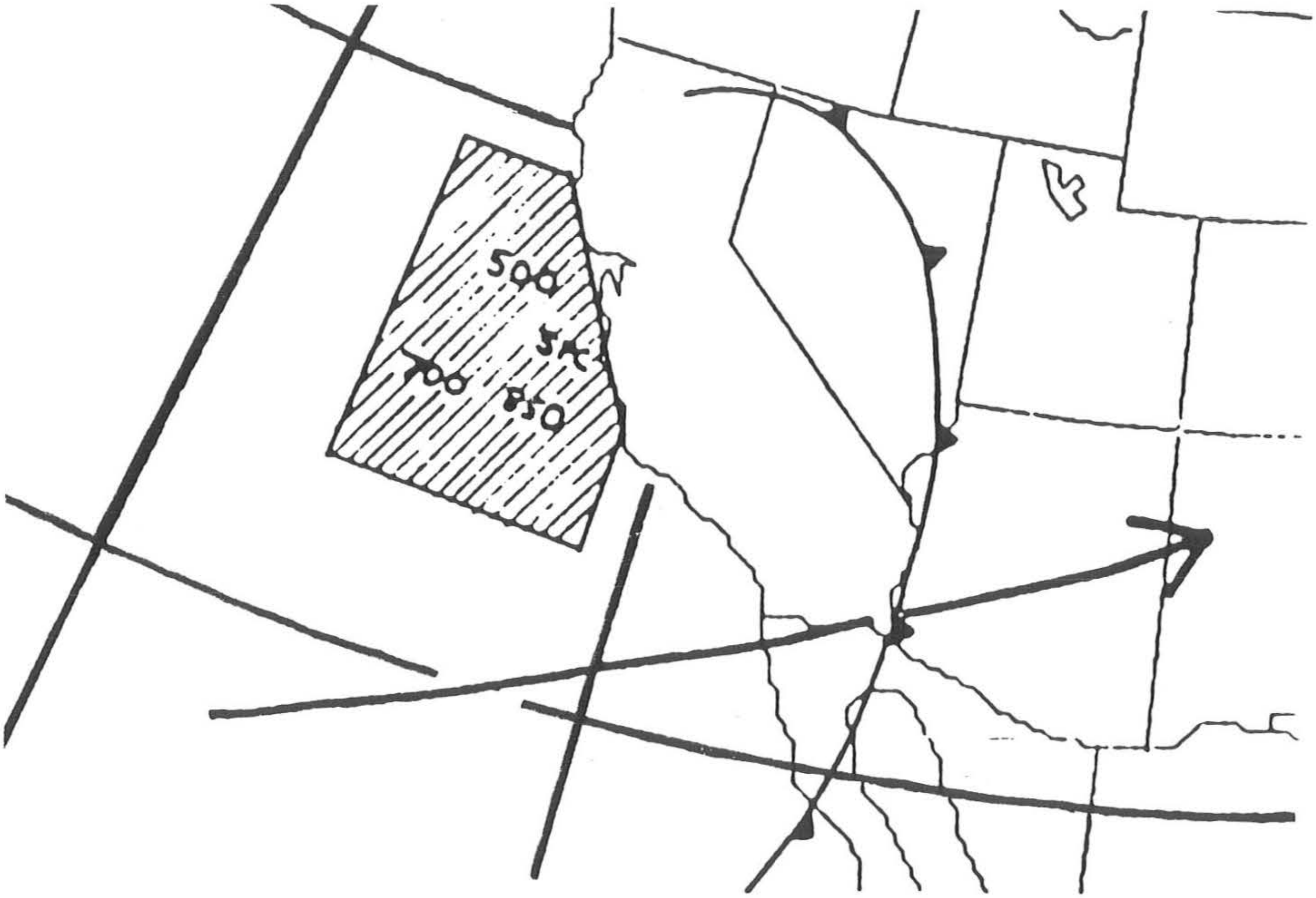

Fig. 1. Mean position of jet stream (arrow) and cold front at the time of tornado occurrences. The hatched area indicates the typical location of the low centers at the surface, 850, 700, and 500 mb. (after Hales, 1985.)

| VIL DENSITY VERSES HAIL SIZE | |
|---|---|
| VIL DENSITY | HAIL SIZE (DIAMETER) |
| Less than 3.0 g m$^{-3}$ | Mainly less than 3/4" |
| 3.0 g m$^{-3}$ - 3.4 g m$^{-3}$ | Mainly less than 3/4" to 1" |
| 3.5 g m$^{-3}$ - 3.9 g m$^{-3}$ | Mainly 3/4" to 1" |
| 4.0 g m$^{-3}$ - 4.4 g m$^{-3}$ | Mainly 3/4" to 1 3/4" |
| 4.5 g m$^{-3}$ - 4.9 g m$^{-3}$ | Mainly 3/4" to 1 3/4" |
| Greater than 4.9 g m$^{-3}$ | Mainly 1" to 1 3/4" |

Table 2. Values of VIL density verses hail size. The "reasonable threshold for severe hail" (3/4" or larger) is 3.5 g m$^{-3}$. The "near 100% probability threshold for severe hail" (3/4" or larger) is 4.5 g m$^{-3}$.

# VIL DENSITY

| VIL kg m$^{-2}$ | ECHO TOP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | VIL kg m$^{-2}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | |
| 1 | 3.3 | 1.6 | 0.5 | 0.8 | 0.7 | 0.5 | 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 1 |
| 2 | 6.6 | 3.3 | 1.9 | 1.6 | 1.3 | 1.1 | 0.9 | 0.8 | 0.7 | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 2 |
| 3 | 9.8 | 4.9 | 3.3 | 2.5 | 2 | 1.6 | 1.4 | 1.2 | 1.1 | 1 | 0.9 | 0.8 | 0.8 | 0.7 | 0.7 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 3 |
| 4 | 13 | 6.6 | 4.6 | 3.3 | 2.6 | 2.2 | 1.9 | 1.6 | 1.5 | 1.3 | 1.2 | 1.1 | 1 | 0.9 | 0.9 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 4 |
| 5 | 16 | 8.2 | 6 | 4.1 | 3.3 | 2.7 | 2.3 | 2.1 | 1.8 | 1.6 | 1.5 | 1.4 | 1.3 | 1.2 | 1.1 | 1 | 1 | 0.9 | 0.9 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 5 |
| 6 | 20 | 9.8 | 7.4 | 4.9 | 3.9 | 3.3 | 2.8 | 2.5 | 2.2 | 2 | 1.8 | 1.6 | 1.5 | 1.4 | 1.3 | 1.2 | 1.2 | 1.1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 6 |
| 7 | 23 | 11 | 8.7 | 5.7 | 4.6 | 3.8 | 3.3 | 2.9 | 2.6 | 2.3 | 2.1 | 1.9 | 1.8 | 1.6 | 1.5 | 1.4 | 1.4 | 1.3 | 1.2 | 1.1 | 1.1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 7 |
| 8 | 26 | 13 | 10 | 6.6 | 5.3 | 4.4 | 3.8 | 3.3 | 2.9 | 2.6 | 2.4 | 2.2 | 2 | 1.9 | 1.7 | 1.6 | 1.5 | 1.5 | 1.4 | 1.3 | 1.3 | 1.2 | 1.1 | 1.1 | 1.1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 8 |
| 9 | 30 | 15 | 11 | 7.4 | 5.9 | 4.9 | 4.2 | 3.7 | 3.3 | 3 | 2.7 | 2.5 | 2.3 | 2.1 | 2 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 9 |
| 10 | 33 | 16 | 13 | 8.2 | 6.6 | 5.5 | 4.7 | 4.1 | 3.6 | 3.3 | 3 | 2.7 | 2.5 | 2.3 | 2.2 | 2.1 | 1.9 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 10 |
| 11 | 36 | 18 | 14 | 9 | 7.2 | 6 | 5.2 | 4.5 | 4 | 3.6 | 3.3 | 3 | 2.8 | 2.6 | 2.4 | 2.3 | 2.1 | 2 | 1.9 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 11 |
| 12 | 39 | 20 | 16 | 9.8 | 7.9 | 6.6 | 5.6 | 4.9 | 4.4 | 3.9 | 3.6 | 3.3 | 3 | 2.8 | 2.6 | 2.5 | 2.3 | 2.2 | 2.1 | 2 | 1.9 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 12 |
| 13 | 43 | 21 | 17 | 11 | 8.5 | 7.1 | 6.1 | 5.3 | 4.7 | 4.3 | 3.9 | 3.6 | 3.3 | 3 | 2.8 | 2.7 | 2.5 | 2.4 | 2.2 | 2.1 | 2 | 1.9 | 1.9 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 13 |
| 14 | 46 | 23 | 18 | 11 | 9.2 | 7.7 | 6.6 | 5.7 | 5.1 | 4.6 | 4.2 | 3.8 | 3.5 | 3.3 | 3.1 | 2.9 | 2.7 | 2.6 | 2.4 | 2.3 | 2.2 | 2.1 | 2 | 1.9 | 1.8 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.1 | 14 |
| 15 | 49 | 25 | 20 | 12 | 9.8 | 8.2 | 7 | 6.2 | 5.5 | 4.9 | 4.5 | 4.1 | 3.8 | 3.5 | 3.3 | 3.1 | 2.9 | 2.7 | 2.6 | 2.5 | 2.3 | 2.2 | 2.1 | 2.1 | 2 | 1.9 | 1.8 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.2 | 15 |
| 16 | 52 | 26 | 21 | 13 | 11 | 8.8 | 7.5 | 6.6 | 5.8 | 5.2 | 4.8 | 4.4 | 4 | 3.8 | 3.5 | 3.3 | 3.1 | 2.9 | 2.8 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.1 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 16 |
| 17 | 56 | 28 | 22 | 14 | 11 | 9.3 | 8 | 7 | 6.2 | 5.6 | 5.1 | 4.6 | 4.3 | 4 | 3.7 | 3.5 | 3.3 | 3.1 | 2.9 | 2.8 | 2.7 | 2.5 | 2.4 | 2.3 | 2.2 | 2.1 | 2.1 | 2 | 1.9 | 1.9 | 1.8 | 1.7 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 17 |
| 18 | 59 | 30 | 24 | 15 | 12 | 9.9 | 8.4 | 7.4 | 6.6 | 5.9 | 5.4 | 4.9 | 4.5 | 4.2 | 3.9 | 3.7 | 3.5 | 3.3 | 3.1 | 3 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.1 | 2 | 2 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 18 |
| 19 | 62 | 31 | 25 | 16 | 12 | 10 | 8.9 | 7.8 | 6.9 | 6.2 | 5.7 | 5.2 | 4.8 | 4.5 | 4.2 | 3.9 | 3.7 | 3.5 | 3.3 | 3.1 | 3 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 19 |
| 20 | 66 | 33 | 27 | 16 | 13 | 11 | 9.4 | 8.2 | 7.3 | 6.6 | 6 | 5.5 | 5 | 4.7 | 4.4 | 4.1 | 3.9 | 3.6 | 3.5 | 3.3 | 3.1 | 3 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 | 1.6 | 20 |
| 21 | 69 | 34 | 28 | 17 | 14 | 12 | 9.9 | 8.6 | 7.7 | 6.9 | 6.3 | 5.7 | 5.3 | 4.9 | 4.6 | 4.3 | 4.1 | 3.8 | 3.6 | 3.4 | 3.3 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 21 |
| 22 | 72 | 36 | 29 | 18 | 14 | 12 | 10 | 9 | 8 | 7.2 | 6.6 | 6 | 5.6 | 5.2 | 4.8 | 4.5 | 4.2 | 4 | 3.8 | 3.6 | 3.4 | 3.3 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 22 |
| 23 | 75 | 38 | 31 | 19 | 15 | 13 | 11 | 9.4 | 8.4 | 7.5 | 6.9 | 6.3 | 5.8 | 5.4 | 5 | 4.7 | 4.4 | 4.2 | 4 | 3.8 | 3.6 | 3.4 | 3.3 | 3.2 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2 | 2 | 1.9 | 1.9 | 23 |
| 24 | 79 | 39 | 32 | 20 | 16 | 13 | 11 | 9.8 | 8.7 | 7.9 | 7.2 | 6.6 | 6.1 | 5.6 | 5.2 | 4.9 | 4.6 | 4.4 | 4.1 | 3.9 | 3.8 | 3.6 | 3.4 | 3.3 | 3.2 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.5 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2 | 2 | 24 |
| 25 | 82 | 41 | 33 | 21 | 16 | 14 | 12 | 10 | 9.1 | 8.2 | 7.5 | 6.8 | 6.3 | 5.9 | 5.5 | 5.1 | 4.8 | 4.6 | 4.3 | 4.1 | 3.9 | 3.7 | 3.6 | 3.4 | 3.3 | 3.2 | 3 | 2.9 | 2.8 | 2.7 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 25 |
| 26 | 85 | 43 | 35 | 21 | 17 | 14 | 12 | 11 | 9.5 | 8.5 | 7.8 | 7.1 | 6.6 | 6.1 | 5.7 | 5.3 | 5 | 4.7 | 4.5 | 4.3 | 4.1 | 3.9 | 3.7 | 3.6 | 3.4 | 3.3 | 3.2 | 3.1 | 2.9 | 2.8 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.1 | 26 |
| 27 | 89 | 44 | 36 | 22 | 18 | 15 | 13 | 11 | 9.8 | 8.9 | 8.1 | 7.4 | 6.8 | 6.3 | 5.9 | 5.5 | 5.2 | 4.9 | 4.7 | 4.4 | 4.2 | 4 | 3.8 | 3.7 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 27 |
| 28 | 92 | 46 | 37 | 23 | 18 | 15 | 13 | 11 | 10 | 9.2 | 8.4 | 7.7 | 7.1 | 6.6 | 6.1 | 5.7 | 5.4 | 5.1 | 4.8 | 4.6 | 4.4 | 4.2 | 4 | 3.8 | 3.7 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 28 |
| 29 | 95 | 48 | 39 | 24 | 19 | 16 | 14 | 12 | 11 | 9.5 | 8.7 | 7.9 | 7.3 | 6.8 | 6.3 | 5.9 | 5.6 | 5.3 | 5 | 4.8 | 4.5 | 4.3 | 4.1 | 4 | 3.8 | 3.7 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.6 | 2.5 | 2.4 | 2.4 | 29 |
| 30 | 98 | 49 | 40 | 25 | 20 | 16 | 14 | 12 | 11 | 9.8 | 9 | 8.2 | 7.6 | 7 | 6.6 | 6.2 | 5.8 | 5.5 | 5.2 | 4.9 | 4.7 | 4.5 | 4.3 | 4.1 | 3.9 | 3.8 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.7 | 2.6 | 2.5 | 2.5 | 30 |
| 31 | 102 | 51 | 42 | 25 | 20 | 17 | 15 | 13 | 11 | 10 | 9.3 | 8.5 | 7.8 | 7.3 | 6.8 | 6.4 | 6 | 5.7 | 5.3 | 5.1 | 4.9 | 4.6 | 4.4 | 4.2 | 4.1 | 3.9 | 3.8 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.7 | 2.6 | 2.5 | 31 |
| 32 | 105 | 52 | 43 | 26 | 21 | 18 | 15 | 13 | 12 | 10 | 9.6 | 8.8 | 8.1 | 7.5 | 7 | 6.6 | 6.2 | 5.8 | 5.5 | 5.2 | 5 | 4.8 | 4.6 | 4.4 | 4.2 | 4 | 3.9 | 3.8 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.8 | 2.8 | 2.7 | 2.6 | 32 |
| 33 | 108 | 54 | 44 | 27 | 22 | 18 | 15 | 14 | 12 | 11 | 9.9 | 9 | 8.3 | 7.7 | 7.2 | 6.8 | 6.4 | 6 | 5.7 | 5.4 | 5.2 | 4.9 | 4.7 | 4.5 | 4.3 | 4.2 | 4 | 3.9 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.9 | 2.8 | 2.7 | 33 |
| 34 | 111 | 56 | 46 | 28 | 22 | 19 | 16 | 14 | 12 | 11 | 10 | 9.3 | 8.6 | 8 | 7.4 | 7 | 6.6 | 6.2 | 5.9 | 5.6 | 5.3 | 5.1 | 4.8 | 4.7 | 4.5 | 4.3 | 4.1 | 4 | 3.8 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 3 | 2.9 | 2.8 | 34 |
| 35 | 115 | 57 | 47 | 29 | 23 | 19 | 16 | 14 | 13 | 11 | 10 | 9.6 | 8.8 | 8.2 | 7.6 | 7.2 | 6.8 | 6.4 | 6 | 5.7 | 5.5 | 5.2 | 5 | 4.8 | 4.6 | 4.4 | 4.3 | 4.1 | 4 | 3.8 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.9 | 35 |
| 36 | 118 | 59 | 48 | 30 | 24 | 20 | 17 | 15 | 13 | 12 | 11 | 9.8 | 9.1 | 8.4 | 7.9 | 7.4 | 6.9 | 6.6 | 6.2 | 5.9 | 5.6 | 5.4 | 5.1 | 4.9 | 4.7 | 4.6 | 4.4 | 4.2 | 4.1 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 3 | 36 |
| 37 | 121 | 61 | 50 | 30 | 24 | 20 | 17 | 15 | 13 | 12 | 11 | 10 | 9.3 | 8.7 | 8.1 | 7.6 | 7.1 | 6.8 | 6.4 | 6.1 | 5.8 | 5.5 | 5.3 | 5.1 | 4.9 | 4.7 | 4.5 | 4.3 | 4.2 | 4.1 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 37 |
| 38 | 125 | 62 | 51 | 31 | 25 | 21 | 18 | 16 | 14 | 12 | 11 | 10 | 9.6 | 8.9 | 8.3 | 7.8 | 7.3 | 6.9 | 6.6 | 6.2 | 5.9 | 5.7 | 5.4 | 5.2 | 5 | 4.8 | 4.6 | 4.5 | 4.3 | 4.2 | 4 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 38 |
| 39 | 128 | 64 | 52 | 32 | 26 | 21 | 18 | 16 | 14 | 13 | 12 | 11 | 9.8 | 9.1 | 8.5 | 8 | 7.5 | 7.1 | 6.7 | 6.4 | 6.1 | 5.8 | 5.6 | 5.3 | 5.1 | 4.9 | 4.7 | 4.6 | 4.4 | 4.3 | 4.1 | 4 | 3.9 | 3.8 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.2 | 39 |
| 40 | 131 | 66 | 54 | 33 | 26 | 22 | 19 | 16 | 15 | 13 | 12 | 11 | 10 | 9.4 | 8.7 | 8.2 | 7.7 | 7.3 | 6.9 | 6.6 | 6.3 | 6 | 5.7 | 5.5 | 5.3 | 5.1 | 4.9 | 4.7 | 4.5 | 4.4 | 4.2 | 4.1 | 4 | 3.9 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 40 |
| 41 | 134 | 67 | 55 | 34 | 27 | 22 | 19 | 17 | 15 | 13 | 12 | 11 | 10 | 9.6 | 9 | 8.4 | 7.9 | 7.5 | 7.1 | 6.7 | 6.4 | 6.1 | 5.8 | 5.6 | 5.4 | 5.2 | 5 | 4.8 | 4.6 | 4.5 | 4.3 | 4.2 | 4.1 | 4 | 3.8 | 3.7 | 3.6 | 3.6 | 3.4 | 3.4 | 41 |
| 42 | 138 | 69 | 57 | 34 | 28 | 23 | 20 | 17 | 15 | 14 | 13 | 11 | 11 | 9.8 | 9.2 | 8.6 | 8.1 | 7.7 | 7.2 | 6.9 | 6.6 | 6.3 | 6 | 5.8 | 5.5 | 5.3 | 5.1 | 4.9 | 4.8 | 4.6 | 4.5 | 4.3 | 4.2 | 4.1 | 3.9 | 3.8 | 3.7 | 3.7 | 3.5 | 3.4 | 42 |
| 43 | 141 | 71 | 58 | 35 | 28 | 24 | 20 | 18 | 16 | 14 | 13 | 12 | 11 | 10 | 9.4 | 8.8 | 8.3 | 7.8 | 7.4 | 7.1 | 6.7 | 6.4 | 6.1 | 5.9 | 5.7 | 5.4 | 5.2 | 5.1 | 4.9 | 4.7 | 4.6 | 4.4 | 4.3 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 43 |
| 44 | 144 | 72 | 59 | 36 | 29 | 24 | 21 | 18 | 16 | 14 | 13 | 12 | 11 | 10 | 9.6 | 9 | 8.5 | 8 | 7.6 | 7.2 | 6.9 | 6.6 | 6.3 | 6 | 5.8 | 5.6 | 5.3 | 5.2 | 5 | 4.8 | 4.7 | 4.5 | 4.4 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 3.6 | 44 |
| 45 | 148 | 74 | 61 | 37 | 30 | 25 | 21 | 18 | 16 | 15 | 13 | 12 | 11 | 11 | 9.8 | 9.2 | 8.7 | 8.2 | 7.8 | 7.4 | 7 | 6.7 | 6.4 | 6.2 | 5.9 | 5.7 | 5.5 | 5.3 | 5.1 | 4.9 | 4.8 | 4.6 | 4.5 | 4.3 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 45 |
| 46 | 151 | 75 | 62 | 38 | 30 | 25 | 22 | 19 | 17 | 15 | 14 | 13 | 12 | 11 | 10 | 9.4 | 8.9 | 8.4 | 7.9 | 7.5 | 7.2 | 6.9 | 6.6 | 6.3 | 6 | 5.8 | 5.6 | 5.4 | 5.2 | 5 | 4.9 | 4.7 | 4.6 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 46 |
| 47 | 154 | 77 | 63 | 39 | 31 | 26 | 22 | 19 | 17 | 15 | 14 | 13 | 12 | 11 | 10 | 9.6 | 9.1 | 8.6 | 8.1 | 7.7 | 7.4 | 7 | 6.7 | 6.4 | 6.2 | 5.9 | 5.7 | 5.5 | 5.3 | 5.1 | 5 | 4.8 | 4.7 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 3.9 | 3.9 | 47 |
| 48 | 157 | 79 | 65 | 39 | 32 | 26 | 23 | 20 | 17 | 16 | 14 | 13 | 12 | 11 | 10 | 9.8 | 9.3 | 8.8 | 8.3 | 7.9 | 7.5 | 7.2 | 6.8 | 6.6 | 6.3 | 6.1 | 5.8 | 5.6 | 5.4 | 5.3 | 5.1 | 4.9 | 4.8 | 4.6 | 4.5 | 4.4 | 4.2 | 4.2 | 4 | 3.9 | 48 |
| 49 | 161 | 80 | 66 | 40 | 32 | 27 | 23 | 20 | 18 | 16 | 15 | 13 | 12 | 11 | 11 | 10 | 9.5 | 8.9 | 8.5 | 8 | 7.7 | 7.3 | 7 | 6.7 | 6.4 | 6.2 | 6 | 5.8 | 5.5 | 5.4 | 5.2 | 5 | 4.9 | 4.7 | 4.6 | 4.5 | 4.3 | 4.3 | 4.1 | 4 | 49 |
| 50 | 164 | 82 | 68 | 41 | 33 | 27 | 23 | 21 | 18 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9.7 | 9.1 | 8.6 | 8.2 | 7.8 | 7.5 | 7.1 | 6.8 | 6.6 | 6.3 | 6.1 | 5.9 | 5.7 | 5.5 | 5.3 | 5.1 | 5 | 4.8 | 4.7 | 4.6 | 4.4 | 4.3 | 4.2 | 4.1 | 50 |
| 51 | 167 | 84 | 69 | 42 | 33 | 28 | 24 | 21 | 19 | 17 | 15 | 14 | 13 | 12 | 11 | 10 | 9.8 | 9.3 | 8.8 | 8.4 | 8 | 7.6 | 7.3 | 7 | 6.7 | 6.5 | 6.2 | 6 | 5.8 | 5.6 | 5.4 | 5.2 | 5.1 | 4.9 | 4.8 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 51 |
| 52 | 171 | 85 | 70 | 43 | 34 | 29 | 24 | 21 | 19 | 17 | 16 | 14 | 13 | 12 | 11 | 11 | 10 | 9.5 | 9 | 8.5 | 8.1 | 7.7 | 7.4 | 7.1 | 6.8 | 6.6 | 6.3 | 6.1 | 5.9 | 5.7 | 5.5 | 5.3 | 5.2 | 5 | 4.9 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 52 |
| 53 | 174 | 87 | 72 | 43 | 35 | 29 | 25 | 22 | 19 | 17 | 16 | 14 | 13 | 12 | 12 | 11 | 10 | 9.7 | 9.1 | 8.7 | 8.3 | 7.9 | 7.6 | 7.3 | 7 | 6.7 | 6.4 | 6.2 | 6 | 5.8 | 5.6 | 5.4 | 5.3 | 5.1 | 5 | 4.8 | 4.7 | 4.6 | 4.5 | 4.3 | 53 |
| 54 | 177 | 89 | 73 | 44 | 35 | 30 | 25 | 22 | 20 | 18 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9.9 | 9.3 | 8.9 | 8.5 | 8 | 7.7 | 7.4 | 7.1 | 6.8 | 6.6 | 6.3 | 6.1 | 5.9 | 5.7 | 5.5 | 5.4 | 5.2 | 5 | 4.9 | 4.8 | 4.7 | 4.5 | 4.4 | 54 |
| 55 | 180 | 90 | 74 | 45 | 36 | 30 | 26 | 23 | 20 | 18 | 16 | 15 | 14 | 13 | 12 | 11 | 11 | 10 | 9.5 | 9 | 8.6 | 8.2 | 7.8 | 7.5 | 7.2 | 7 | 6.7 | 6.5 | 6.2 | 6 | 5.8 | 5.6 | 5.5 | 5.3 | 5.1 | 5 | 4.9 | 4.8 | 4.6 | 4.5 | 55 |
| 56 | 184 | 92 | 76 | 46 | 37 | 31 | 26 | 23 | 20 | 18 | 17 | 15 | 14 | 13 | 12 | 11 | 11 | 10 | 9.7 | 9.2 | 8.8 | 8.3 | 8 | 7.7 | 7.4 | 7.1 | 6.8 | 6.6 | 6.3 | 6.1 | 5.9 | 5.7 | 5.6 | 5.4 | 5.2 | 5.1 | 5 | 4.9 | 4.7 | 4.6 | 56 |
| 57 | 187 | 94 | 77 | 47 | 37 | 31 | 27 | 23 | 21 | 19 | 17 | 16 | 14 | 13 | 12 | 12 | 11 | 10 | 9.8 | 9.3 | 8.9 | 8.5 | 8.1 | 7.8 | 7.5 | 7.2 | 6.9 | 6.7 | 6.5 | 6.2 | 6 | 5.8 | 5.7 | 5.5 | 5.3 | 5.2 | 5 | 5 | 4.8 | 4.7 | 57 |
| 58 | 190 | 95 | 78 | 48 | 38 | 32 | 27 | 24 | 21 | 19 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 11 | 10 | 9.5 | 9.1 | 8.6 | 8.3 | 7.9 | 7.6 | 7.3 | 7 | 6.8 | 6.6 | 6.4 | 6.1 | 5.9 | 5.8 | 5.6 | 5.4 | 5.3 | 5.1 | 5 | 4.9 | 4.8 | 58 |
| 59 | 193 | 97 | 80 | 48 | 39 | 32 | 28 | 24 | 22 | 19 | 18 | 16 | 15 | 14 | 13 | 12 | 11 | 11 | 10 | 9.7 | 9.2 | 8.8 | 8.4 | 8.1 | 7.8 | 7.5 | 7.2 | 6.9 | 6.7 | 6.5 | 6.3 | 6 | 5.9 | 5.7 | 5.5 | 5.4 | 5.2 | 5.1 | 5 | 4.8 | 59 |
| 60 | 197 | 98 | 81 | 49 | 39 | 33 | 28 | 25 | 22 | 20 | 18 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 10 | 9.8 | 9.4 | 8.9 | 8.5 | 8.2 | 7.9 | 7.6 | 7.3 | 7 | 6.8 | 6.6 | 6.4 | 6.2 | 6 | 5.8 | 5.6 | 5.5 | 5.3 | 5.2 | 5 | 4.9 | 60 |
| 61 | 200 | 100 | 83 | 50 | 40 | 33 | 29 | 25 | 22 | 20 | 18 | 17 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 10 | 9.5 | 9.1 | 8.7 | 8.4 | 8 | 7.7 | 7.4 | 7.2 | 6.9 | 6.7 | 6.5 | 6.3 | 6.1 | 5.9 | 5.7 | 5.6 | 5.4 | 5.3 | 5.1 | 5 | 61 |
| 62 | 203 | 102 | 84 | 51 | 41 | 34 | 29 | 25 | 23 | 20 | 19 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 11 | 10 | 9.7 | 9.2 | 8.8 | 8.5 | 8.2 | 7.8 | 7.5 | 7.3 | 7 | 6.8 | 6.6 | 6.4 | 6.2 | 6 | 5.8 | 5.6 | 5.5 | 5.4 | 5.2 | 5.1 | 62 |
| 63 | 207 | 103 | 85 | 52 | 41 | 35 | 30 | 26 | 23 | 21 | 19 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 11 | 10 | 9.9 | 9.4 | 9 | 8.6 | 8.3 | 8 | 7.7 | 7.4 | 7.1 | 6.9 | 6.7 | 6.5 | 6.3 | 6.1 | 5.9 | 5.7 | 5.6 | 5.5 | 5.3 | 5.2 | 63 |
| 64 | 210 | 105 | 87 | 53 | 42 | 35 | 30 | 26 | 23 | 21 | 19 | 18 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 10 | 10 | 9.5 | 9.1 | 8.8 | 8.4 | 8.1 | 7.8 | 7.5 | 7.2 | 7 | 6.8 | 6.6 | 6.4 | 6.2 | 6 | 5.8 | 5.7 | 5.6 | 5.4 | 5.2 | 64 |
| 65 | 213 | 107 | 88 | 53 | 43 | 36 | 31 | 27 | 24 | 21 | 19 | 18 | 16 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 10 | 9.7 | 9.3 | 8.9 | 8.5 | 8.2 | 7.9 | 7.6 | 7.4 | 7.1 | 6.9 | 6.7 | 6.5 | 6.3 | 6.1 | 5.9 | 5.8 | 5.7 | 5.5 | 5.3 | 65 |
| 66 | 216 | 108 | 89 | 54 | 43 | 36 | 31 | 27 | 24 | 22 | 20 | 18 | 17 | 15 | 14 | 14 | 13 | 12 | 11 | 11 | 10 | 9.8 | 9.4 | 9 | 8.7 | 8.3 | 8 | 7.8 | 7.5 | 7.2 | 7 | 6.8 | 6.6 | 6.4 | 6.2 | 6 | 5.8 | 5.7 | 5.5 | 5.4 | 66 |
| 67 | 220 | 110 | 91 | 55 | 44 | 37 | 31 | 27 | 24 | 22 | 20 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 10 | 10 | 9.5 | 9.2 | 8.8 | 8.5 | 8.1 | 7.9 | 7.6 | 7.3 | 7.1 | 6.9 | 6.7 | 6.5 | 6.3 | 6.1 | 5.9 | 5.8 | 5.6 | 5.5 | 67 |
| 68 | 223 | 112 | 92 | 56 | 45 | 37 | 32 | 28 | 25 | 22 | 20 | 19 | 17 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 9.7 | 9.3 | 8.9 | 8.6 | 8.3 | 8 | 7.7 | 7.4 | 7.2 | 7 | 6.8 | 6.6 | 6.4 | 6.2 | 6 | 5.9 | 5.7 | 5.6 | 68 |
| 69 | 226 | 113 | 94 | 57 | 45 | 38 | 32 | 28 | 25 | 23 | 21 | 19 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 10 | 9.8 | 9.5 | 9.1 | 8.7 | 8.4 | 8.1 | 7.8 | 7.6 | 7.3 | 7.1 | 6.9 | 6.7 | 6.5 | 6.3 | 6.1 | 6 | 5.8 | 5.7 | 69 |
| 70 | 230 | 115 | 95 | 57 | 46 | 38 | 33 | 29 | 26 | 23 | 21 | 19 | 18 | 16 | 15 | 14 | 14 | 13 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.2 | 8.9 | 8.5 | 8.2 | 7.9 | 7.7 | 7.4 | 7.2 | 7 | 6.8 | 6.5 | 6.4 | 6.2 | 6.1 | 5.9 | 5.7 | 70 |
| 71 | 233 | 116 | 96 | 58 | 47 | 39 | 33 | 29 | 26 | 23 | 21 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 9.7 | 9.3 | 9 | 8.6 | 8.3 | 8 | 7.8 | 7.5 | 7.3 | 7.1 | 6.9 | 6.6 | 6.5 | 6.3 | 6.2 | 6 | 5.8 | 71 |
| 72 | 236 | 118 | 98 | 59 | 47 | 39 | 34 | 30 | 26 | 24 | 21 | 20 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 9.9 | 9.5 | 9.1 | 8.7 | 8.5 | 8.1 | 7.9 | 7.6 | 7.4 | 7.2 | 6.9 | 6.7 | 6.6 | 6.4 | 6.3 | 6 | 5.9 | 72 |
| 73 | 239 | 120 | 99 | 60 | 48 | 40 | 34 | 30 | 27 | 24 | 22 | 20 | 18 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.2 | 8.9 | 8.6 | 8.3 | 8 | 7.7 | 7.5 | 7.3 | 7 | 6.8 | 6.6 | 6.5 | 6.4 | 6.1 | 6 | 73 |
| 74 | 243 | 121 | 100 | 61 | 49 | 41 | 35 | 30 | 27 | 24 | 22 | 20 | 19 | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 9.7 | 9.4 | 9 | 8.7 | 8.4 | 8.1 | 7.8 | 7.6 | 7.4 | 7.1 | 6.9 | 6.7 | 6.5 | 6.4 | 6.2 | 6.1 | 74 |
| 75 | 246 | 123 | 102 | 62 | 49 | 41 | 35 | 31 | 27 | 25 | 22 | 21 | 19 | 18 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 9.9 | 9.5 | 9.1 | 8.8 | 8.5 | 8.2 | 8 | 7.7 | 7.5 | 7.2 | 7 | 6.8 | 6.6 | 6.5 | 6.3 | 6.2 | 75 |
| 76 | 249 | 125 | 103 | 62 | 50 | 42 | 36 | 31 | 28 | 25 | 23 | 21 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.2 | 8.9 | 8.6 | 8.3 | 8.1 | 7.8 | 7.6 | 7.3 | 7.1 | 6.9 | 6.7 | 6.6 | 6.4 | 6.2 | 76 |
| 77 | 252 | 126 | 104 | 63 | 51 | 42 | 36 | 32 | 28 | 25 | 23 | 21 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 11 | 10 | 9.7 | 9.4 | 9 | 8.7 | 8.4 | 8.2 | 7.9 | 7.7 | 7.4 | 7.2 | 7 | 6.8 | 6.7 | 6.5 | 6.3 | 77 |
| 78 | 256 | 128 | 106 | 64 | 51 | 43 | 37 | 32 | 28 | 26 | 23 | 21 | 20 | 18 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 9.9 | 9.5 | 9.2 | 8.8 | 8.5 | 8.3 | 8 | 7.8 | 7.5 | 7.3 | 7.1 | 6.9 | 6.8 | 6.6 | 6.4 | 78 |
| 79 | 259 | 130 | 107 | 65 | 52 | 43 | 37 | 32 | 29 | 26 | 24 | 22 | 20 | 19 | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.3 | 8.9 | 8.7 | 8.4 | 8.1 | 7.9 | 7.6 | 7.4 | 7.2 | 7 | 6.9 | 6.6 | 6.5 | 79 |
| 80 | 262 | 131 | 109 | 66 | 53 | 44 | 38 | 33 | 29 | 26 | 24 | 22 | 20 | 19 | 17 | 16 | 15 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 11 | 10 | 9.7 | 9.4 | 9.1 | 8.8 | 8.5 | 8.2 | 8 | 7.7 | 7.5 | 7.3 | 7.1 | 7 | 6.7 | 6.6 | 80 |
| 81 | 266 | 133 | 110 | 66 | 53 | 44 | 38 | 33 | 30 | 27 | 24 | 22 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 9.8 | 9.5 | 9.2 | 8.9 | 8.6 | 8.3 | 8.1 | 7.8 | 7.6 | 7.4 | 7.2 | 7 | 6.8 | 6.6 | 81 |
| 82 | 269 | 135 | 111 | 67 | 54 | 45 | 38 | 34 | 30 | 27 | 24 | 22 | 21 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.3 | 9 | 8.7 | 8.4 | 8.2 | 7.9 | 7.7 | 7.5 | 7.3 | 7.1 | 6.9 | 6.7 | 82 |
| 83 | 272 | 136 | 113 | 68 | 54 | 46 | 39 | 34 | 30 | 27 | 25 | 23 | 21 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.8 | 9.4 | 9.1 | 8.8 | 8.5 | 8.3 | 8 | 7.8 | 7.6 | 7.3 | 7.2 | 7 | 6.8 | 83 |
| 84 | 275 | 138 | 114 | 69 | 55 | 46 | 39 | 34 | 31 | 28 | 25 | 23 | 21 | 20 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 9.9 | 9.5 | 9.2 | 8.9 | 8.6 | 8.4 | 8.1 | 7.9 | 7.6 | 7.4 | 7.3 | 7.1 | 6.9 | 84 |
| 85 | 279 | 139 | 115 | 70 | 56 | 47 | 40 | 35 | 31 | 28 | 25 | 23 | 21 | 20 | 19 | 17 | 16 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.3 | 9 | 8.7 | 8.5 | 8.2 | 7.9 | 7.7 | 7.5 | 7.4 | 7.1 | 7 | 85 |
| 86 | 282 | 141 | 117 | 71 | 56 | 47 | 40 | 35 | 31 | 28 | 26 | 24 | 22 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.7 | 9.4 | 9.1 | 8.8 | 8.6 | 8.3 | 8 | 7.8 | 7.6 | 7.5 | 7.2 | 7.1 | 86 |
| 87 | 285 | 143 | 118 | 71 | 57 | 48 | 41 | 36 | 32 | 29 | 26 | 24 | 22 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 9.8 | 9.5 | 9.2 | 8.9 | 8.7 | 8.4 | 8.1 | 7.9 | 7.7 | 7.6 | 7.3 | 7.1 | 87 |
| 88 | 289 | 144 | 119 | 72 | 58 | 48 | 41 | 36 | 32 | 29 | 26 | 24 | 22 | 21 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.3 | 9 | 8.8 | 8.5 | 8.2 | 8 | 7.8 | 7.7 | 7.4 | 7.2 | 88 |
| 89 | 292 | 146 | 121 | 73 | 58 | 49 | 42 | 36 | 32 | 29 | 27 | 24 | 22 | 21 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.7 | 9.4 | 9.1 | 8.9 | 8.6 | 8.3 | 8.1 | 7.9 | 7.7 | 7.5 | 7.3 | 89 |
| 90 | 295 | 148 | 122 | 74 | 59 | 49 | 42 | 37 | 33 | 30 | 27 | 25 | 23 | 21 | 20 | 18 | 17 | 16 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 9.9 | 9.5 | 9.2 | 9 | 8.7 | 8.4 | 8.2 | 8 | 7.8 | 7.6 | 7.4 | 90 |
| 91 | 298 | 149 | 124 | 75 | 60 | 50 | 43 | 37 | 33 | 30 | 27 | 25 | 23 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.3 | 9.1 | 8.8 | 8.5 | 8.3 | 8.1 | 7.9 | 7.6 | 7.5 | 91 |
| 92 | 302 | 151 | 125 | 75 | 60 | 50 | 43 | 38 | 34 | 30 | 27 | 25 | 23 | 22 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.8 | 9.4 | 9.2 | 8.9 | 8.6 | 8.4 | 8.1 | 8 | 7.7 | 7.5 | 92 |
| 93 | 305 | 153 | 126 | 76 | 61 | 51 | 44 | 38 | 34 | 31 | 28 | 25 | 23 | 22 | 20 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 9.9 | 9.5 | 9.3 | 9 | 8.7 | 8.5 | 8.2 | 8.1 | 7.8 | 7.6 | 93 |
| 94 | 308 | 154 | 128 | 77 | 62 | 52 | 44 | 39 | 34 | 31 | 28 | 26 | 24 | 22 | 21 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 10 | 9.6 | 9.4 | 9.1 | 8.8 | 8.6 | 8.3 | 8.2 | 7.9 | 7.7 | 94 |
| 95 | 312 | 156 | 129 | 78 | 62 | 52 | 45 | 39 | 35 | 31 | 28 | 26 | 24 | 22 | 21 | 19 | 18 | 17 | 16 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 12 | 11 | 11 | 10 | 10 | 9.7 | 9.5 | 9.2 | 8.9 | 8.6 | 8.4 | 8.3 | 8 | 7.8 | 95 |
| 96 | 315 | 157 | 130 | 79 | 63 | 53 | 45 | 39 | 35 | 31 | 29 | 26 | 24 | 23 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 9.8 | 9.6 | 9.3 | 9 | 8.7 | 8.5 | 8.4 | 8.1 | 7.9 | 96 |
| 97 | 318 | 159 | 132 | 80 | 64 | 53 | 46 | 40 | 35 | 32 | 29 | 27 | 24 | 23 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 9.9 | 9.7 | 9.4 | 9.1 | 8.8 | 8.6 | 8.4 | 8.1 | 8 | 97 |
| 98 | 321 | 161 | 133 | 80 | 64 | 54 | 46 | 40 | 36 | 32 | 29 | 27 | 25 | 23 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 13 | 13 | 12 | 12 | 12 | 11 | 11 | 10 | 10 | 9.8 | 9.5 | 9.2 | 8.9 | 8.7 | 8.5 | 8.2 | 8 | 98 |
| 99 | 325 | 162 | 135 | 81 | 65 | 54 | 46 | 41 | 36 | 32 | 30 | 27 | 25 | 23 | 22 | 20 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.9 | 9.6 | 9.3 | 9 | 8.8 | 8.6 | 8.3 | 8.1 | 99 |
| 100 | 328 | 164 | 136 | 82 | 66 | 55 | 47 | 41 | 36 | 33 | 30 | 27 | 25 | 23 | 22 | 21 | 19 | 18 | 17 | 16 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 9.9 | 9.7 | 9.4 | 9.1 | 8.9 | 8.7 | 8.4 | 8.2 | 100 |

Table 3a. VIL density table for VIL values between 1 kg m$^{-2}$ and 100 kg m$^{-2}$, and echo tops from 1000 feet to 40000 feet.

# VIL DENSITY

| VIL $kg\,m^{-2}$ | ECHO TOP KFT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | VIL $kg\,m^{-2}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | |
| 1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1 |
| 2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 2 |
| 3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 3 |
| 4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 4 |
| 5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 5 |
| 6 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 6 |
| 7 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 7 |
| 8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 8 |
| 9 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 9 |
| 10 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 10 |
| 11 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 11 |
| 12 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 12 |
| 13 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 13 |
| 14 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 14 |
| 15 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 15 |
| 16 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 16 |
| 17 | 1.4 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 17 |
| 18 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 18 |
| 19 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 19 |
| 20 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 20 |
| 21 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 21 |
| 22 | 1.8 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 22 |
| 23 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 23 |
| 24 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 24 |
| 25 | 2 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 25 |
| 26 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 26 |
| 27 | 2.2 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 27 |
| 28 | 2.2 | 2.2 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 28 |
| 29 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 29 |
| 30 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 30 |
| 31 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 31 |
| 32 | 2.6 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 32 |
| 33 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 33 |
| 34 | 2.7 | 2.7 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 34 |
| 35 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 35 |
| 36 | 2.9 | 2.8 | 2.8 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 36 |
| 37 | 3 | 2.9 | 2.8 | 2.8 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 37 |
| 38 | 3 | 3 | 2.9 | 2.8 | 2.8 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 38 |
| 39 | 3.1 | 3 | 3 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 39 |
| 40 | 3.2 | 3.1 | 3.1 | 3 | 2.9 | 2.9 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 40 |
| 41 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 41 |
| 42 | 3.4 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 42 |
| 43 | 3.4 | 3.4 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 43 |
| 44 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 44 |
| 45 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 45 |
| 46 | 3.7 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3 | 3 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 46 |
| 47 | 3.8 | 3.7 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 2 | 1.9 | 47 |
| 48 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 2 | 48 |
| 49 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2 | 2 | 49 |
| 50 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 50 |
| 51 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 51 |
| 52 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 52 |
| 53 | 4.2 | 4.1 | 4.1 | 3.9 | 3.9 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.1 | 3.1 | 3.1 | 3 | 2.9 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 53 |
| 54 | 4.3 | 4.2 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 54 |
| 55 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 55 |
| 56 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 56 |
| 57 | 4.6 | 4.4 | 4.4 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 57 |
| 58 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 58 |
| 59 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 2.4 | 59 |
| 60 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 60 |
| 61 | 4.9 | 4.8 | 4.7 | 4.5 | 4.5 | 4.4 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 61 |
| 62 | 5 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 62 |
| 63 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 63 |
| 64 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.4 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 64 |
| 65 | 5.2 | 5.1 | 5 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 65 |
| 66 | 5.3 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 66 |
| 67 | 5.4 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.1 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 67 |
| 68 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.7 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.1 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.9 | 2.8 | 2.8 | 68 |
| 69 | 5.5 | 5.4 | 5.3 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.9 | 2.8 | 69 |
| 70 | 5.6 | 5.5 | 5.4 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.9 | 70 |
| 71 | 5.7 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 4.9 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 71 |
| 72 | 5.8 | 5.6 | 5.5 | 5.4 | 5.3 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 3 | 72 |
| 73 | 5.8 | 5.7 | 5.6 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 73 |
| 74 | 5.9 | 5.8 | 5.7 | 5.5 | 5.4 | 5.3 | 5.1 | 5.1 | 5 | 4.8 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 74 |
| 75 | 6 | 5.9 | 5.7 | 5.6 | 5.5 | 5.4 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.4 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 | 3.1 | 3.1 | 75 |
| 76 | 6.1 | 5.9 | 5.8 | 5.7 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 | 3.1 | 76 |
| 77 | 6.2 | 6 | 5.9 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 | 77 |
| 78 | 6.2 | 6.1 | 6 | 5.8 | 5.7 | 5.6 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 78 |
| 79 | 6.3 | 6.2 | 6 | 5.9 | 5.8 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 79 |
| 80 | 6.4 | 6.2 | 6.1 | 6 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.2 | 5.1 | 5 | 5 | 4.9 | 4.7 | 4.7 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 80 |
| 81 | 6.5 | 6.3 | 6.2 | 6 | 5.9 | 5.8 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 81 |
| 82 | 6.6 | 6.4 | 6.3 | 6.1 | 6 | 5.9 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.4 | 3.4 | 82 |
| 83 | 6.6 | 6.5 | 6.3 | 6.2 | 6.1 | 5.9 | 5.8 | 5.7 | 5.6 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 83 |
| 84 | 6.7 | 6.6 | 6.4 | 6.3 | 6.1 | 6 | 5.8 | 5.8 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.8 | 4.7 | 4.6 | 4.6 | 4.4 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 84 |
| 85 | 6.8 | 6.6 | 6.5 | 6.3 | 6.2 | 6.1 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5 | 5 | 4.9 | 4.8 | 4.7 | 4.7 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 85 |
| 86 | 6.9 | 6.7 | 6.6 | 6.4 | 6.3 | 6.1 | 6 | 5.9 | 5.8 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 5 | 4.9 | 4.8 | 4.7 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.2 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 86 |
| 87 | 7 | 6.8 | 6.7 | 6.5 | 6.4 | 6.2 | 6 | 6 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.1 | 5.1 | 5 | 4.9 | 4.8 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 87 |
| 88 | 7 | 6.9 | 6.7 | 6.6 | 6.4 | 6.3 | 6.1 | 6 | 5.9 | 5.8 | 5.7 | 5.6 | 5.4 | 5.3 | 5.2 | 5.2 | 5.1 | 5 | 4.9 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 88 |
| 89 | 7.1 | 6.9 | 6.8 | 6.6 | 6.5 | 6.4 | 6.2 | 6.1 | 6 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 | 89 |
| 90 | 7.2 | 7 | 6.9 | 6.7 | 6.6 | 6.4 | 6.3 | 6.2 | 6 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.3 | 5.3 | 5.2 | 5.1 | 5 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 90 |
| 91 | 7.3 | 7.1 | 7 | 6.8 | 6.6 | 6.5 | 6.3 | 6.2 | 6.1 | 6 | 5.9 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 91 |
| 92 | 7.4 | 7.2 | 7 | 6.9 | 6.7 | 6.6 | 6.4 | 6.3 | 6.2 | 6 | 5.9 | 5.8 | 5.7 | 5.6 | 5.4 | 5.4 | 5.3 | 5.2 | 5.1 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 92 |
| 93 | 7.4 | 7.3 | 7.1 | 6.9 | 6.8 | 6.6 | 6.5 | 6.4 | 6.2 | 6.1 | 6 | 5.9 | 5.8 | 5.7 | 5.5 | 5.4 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 93 |
| 94 | 7.5 | 7.3 | 7.2 | 7 | 6.9 | 6.7 | 6.5 | 6.4 | 6.3 | 6.2 | 6 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.9 | 94 |
| 95 | 7.6 | 7.4 | 7.3 | 7.1 | 6.9 | 6.8 | 6.6 | 6.5 | 6.4 | 6.2 | 6.1 | 6 | 5.9 | 5.8 | 5.6 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.2 | 5 | 4.9 | 4.9 | 4.8 | 4.7 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.9 | 95 |
| 96 | 7.7 | 7.5 | 7.3 | 7.2 | 7 | 6.9 | 6.7 | 6.6 | 6.4 | 6.3 | 6.2 | 6.1 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 96 |
| 97 | 7.8 | 7.6 | 7.4 | 7.2 | 7.1 | 6.9 | 6.7 | 6.6 | 6.5 | 6.4 | 6.2 | 6.1 | 6 | 5.9 | 5.7 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.3 | 5.1 | 5.1 | 5 | 4.9 | 4.8 | 4.8 | 4.7 | 4.5 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 4 | 4 | 97 |
| 98 | 7.8 | 7.6 | 7.5 | 7.3 | 7.2 | 7 | 6.8 | 6.7 | 6.6 | 6.4 | 6.3 | 6.2 | 6.1 | 6 | 5.8 | 5.7 | 5.6 | 5.5 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 4 | 98 |
| 99 | 7.9 | 7.7 | 7.6 | 7.4 | 7.2 | 7.1 | 6.9 | 6.8 | 6.6 | 6.5 | 6.4 | 6.2 | 6.1 | 6 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.5 | 5.4 | 5.2 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.8 | 4.6 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 99 |
| 100 | 8 | 7.8 | 7.6 | 7.5 | 7.3 | 7.1 | 7 | 6.8 | 6.7 | 6.6 | 6.4 | 6.3 | 6.2 | 6.1 | 5.9 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.3 | 4.2 | 4.2 | 4.1 | 100 |

Table 3b. VIL density table for VIL values between 1 kg $m^{-2}$ and 100 kg $m^{-2}$, and echo tops from 41000 feet to 80000 feet.

# VIL DENSITY

| VIL | ECHO TOP IN FEET | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5000 | 7000 | 9000 | 11000 | 13000 | 15000 | 17000 | 19000 | 21000 | 23000 | 25000 | 27000 | 29000 | 31000 | 33000 | 35000 | 37000 | 39000 | 41000 | 43000 | 45000 |
| 2 | 1.31 | 0.94 | 0.73 | 0.60 | 0.50 | 0.44 | 0.39 | 0.35 | 0.31 | 0.29 | 0.26 | 0.24 | 0.23 | 0.21 | 0.20 | 0.19 | 0.18 | 0.17 | 0.16 | 0.15 | 0.15 |
| 4 | 2.62 | 1.87 | 1.46 | 1.19 | 1.01 | 0.87 | 0.77 | 0.69 | 0.62 | 0.57 | 0.52 | 0.49 | 0.45 | 0.42 | 0.40 | 0.37 | 0.35 | 0.34 | 0.32 | 0.31 | 0.29 |
| 6 | 3.94 | 2.81 | 2.19 | 1.79 | 1.51 | 1.31 | 1.16 | 1.04 | 0.94 | 0.86 | 0.79 | 0.73 | 0.68 | 0.63 | 0.60 | 0.56 | 0.53 | 0.50 | 0.48 | 0.46 | 0.44 |
| 8 | 5.25 | 3.75 | 2.92 | 2.39 | 2.02 | 1.75 | 1.54 | 1.38 | 1.25 | 1.14 | 1.05 | 0.97 | 0.90 | 0.85 | 0.80 | 0.75 | 0.71 | 0.67 | 0.64 | 0.61 | 0.58 |
| 10 | 6.56 | 4.69 | 3.64 | 2.98 | 2.52 | 2.19 | 1.93 | 1.73 | 1.56 | 1.43 | 1.31 | 1.21 | 1.13 | 1.06 | 0.99 | 0.94 | 0.89 | 0.84 | 0.80 | 0.76 | 0.73 |
| 12 | 7.87 | 5.62 | 4.37 | 3.58 | 3.03 | 2.62 | 2.32 | 2.07 | 1.87 | 1.71 | 1.57 | 1.46 | 1.36 | 1.27 | 1.19 | 1.12 | 1.06 | 1.01 | 0.96 | 0.92 | 0.87 |
| 14 | 9.18 | 6.56 | 5.10 | 4.17 | 3.53 | 3.06 | 2.70 | 2.42 | 2.19 | 2.00 | 1.84 | 1.70 | 1.58 | 1.48 | 1.39 | 1.31 | 1.24 | 1.18 | 1.12 | 1.07 | 1.02 |
| 16 | 10.50 | 7.50 | 5.83 | 4.77 | 4.04 | 3.50 | 3.09 | 2.76 | 2.50 | 2.28 | 2.10 | 1.94 | 1.81 | 1.69 | 1.59 | 1.50 | 1.42 | 1.35 | 1.28 | 1.22 | 1.17 |
| 18 | 11.81 | 8.43 | 6.56 | 5.37 | 4.54 | 3.94 | 3.47 | 3.11 | 2.81 | 2.57 | 2.36 | 2.19 | 2.04 | 1.90 | 1.79 | 1.69 | 1.60 | 1.51 | 1.44 | 1.37 | 1.31 |
| 20 | 13.12 | 9.37 | 7.29 | 5.96 | 5.05 | 4.37 | 3.86 | 3.45 | 3.12 | 2.85 | 2.62 | 2.43 | 2.26 | 2.12 | 1.99 | 1.87 | 1.77 | 1.68 | 1.60 | 1.53 | 1.46 |
| 22 | 14.43 | 10.31 | 8.02 | 6.56 | 5.55 | 4.81 | 4.24 | 3.80 | 3.44 | 3.14 | 2.89 | 2.67 | 2.49 | 2.33 | 2.19 | 2.06 | 1.95 | 1.85 | 1.76 | 1.68 | 1.60 |
| 24 | 15.74 | 11.25 | 8.75 | 7.16 | 6.06 | 5.25 | 4.63 | 4.14 | 3.75 | 3.42 | 3.15 | 2.92 | 2.71 | 2.54 | 2.39 | 2.25 | 2.13 | 2.02 | 1.92 | 1.83 | 1.75 |
| 26 | 17.06 | 12.18 | 9.48 | 7.75 | 6.56 | 5.69 | 5.02 | 4.49 | 4.06 | 3.71 | 3.41 | 3.16 | 2.94 | 2.75 | 2.58 | 2.44 | 2.30 | 2.19 | 2.08 | 1.98 | 1.90 |
| 28 | 18.37 | 13.12 | 10.20 | 8.35 | 7.06 | 6.12 | 5.40 | 4.83 | 4.37 | 3.99 | 3.67 | 3.40 | 3.17 | 2.96 | 2.78 | 2.62 | 2.48 | 2.35 | 2.24 | 2.14 | 2.04 |
| 30 | 19.68 | 14.06 | 10.93 | 8.95 | 7.57 | 6.56 | 5.79 | 5.18 | 4.69 | 4.28 | 3.94 | 3.64 | 3.39 | 3.17 | 2.98 | 2.81 | 2.66 | 2.52 | 2.40 | 2.29 | 2.19 |
| 32 | 20.99 | 14.99 | 11.66 | 9.54 | 8.07 | 7.00 | 6.17 | 5.52 | 5.00 | 4.56 | 4.20 | 3.89 | 3.62 | 3.39 | 3.18 | 3.00 | 2.84 | 2.69 | 2.56 | 2.44 | 2.33 |
| 34 | 22.30 | 15.93 | 12.39 | 10.14 | 8.58 | 7.43 | 6.56 | 5.87 | 5.31 | 4.85 | 4.46 | 4.13 | 3.85 | 3.60 | 3.38 | 3.19 | 3.01 | 2.86 | 2.72 | 2.59 | 2.48 |
| 36 | 23.62 | 16.87 | 13.12 | 10.73 | 9.08 | 7.87 | 6.95 | 6.21 | 5.62 | 5.13 | 4.72 | 4.37 | 4.07 | 3.81 | 3.58 | 3.37 | 3.19 | 3.03 | 2.88 | 2.75 | 2.62 |
| 38 | 24.93 | 17.81 | 13.85 | 11.33 | 9.59 | 8.31 | 7.33 | 6.56 | 5.94 | 5.42 | 4.99 | 4.62 | 4.30 | 4.02 | 3.78 | 3.56 | 3.37 | 3.20 | 3.04 | 2.90 | 2.77 |
| 40 | 26.24 | 18.74 | 14.58 | 11.93 | 10.09 | 8.75 | 7.72 | 6.91 | 6.25 | 5.70 | 5.25 | 4.86 | 4.52 | 4.23 | 3.98 | 3.75 | 3.55 | 3.36 | 3.20 | 3.05 | 2.92 |
| 42 | 27.55 | 19.68 | 15.31 | 12.52 | 10.60 | 9.18 | 8.10 | 7.25 | 6.56 | 5.99 | 5.51 | 5.10 | 4.75 | 4.44 | 4.17 | 3.94 | 3.72 | 3.53 | 3.36 | 3.20 | 3.06 |
| 44 | 28.86 | 20.62 | 16.04 | 13.12 | 11.10 | 9.62 | 8.49 | 7.60 | 6.87 | 6.27 | 5.77 | 5.35 | 4.98 | 4.66 | 4.37 | 4.12 | 3.90 | 3.70 | 3.52 | 3.36 | 3.21 |
| 46 | 30.18 | 21.55 | 16.76 | 13.72 | 11.61 | 10.06 | 8.88 | 7.94 | 7.18 | 6.56 | 6.04 | 5.59 | 5.20 | 4.87 | 4.57 | 4.31 | 4.08 | 3.87 | 3.68 | 3.51 | 3.35 |
| 48 | 31.49 | 22.49 | 17.49 | 14.31 | 12.11 | 10.50 | 9.26 | 8.29 | 7.50 | 6.85 | 6.30 | 5.83 | 5.43 | 5.08 | 4.77 | 4.50 | 4.26 | 4.04 | 3.84 | 3.66 | 3.50 |
| 50 | 32.80 | 23.43 | 18.22 | 14.91 | 12.62 | 10.93 | 9.65 | 8.63 | 7.81 | 7.13 | 6.56 | 6.07 | 5.66 | 5.29 | 4.97 | 4.69 | 4.43 | 4.21 | 4.00 | 3.81 | 3.64 |

Table 4. VIL density table for VIL values between 2 kg $m^{-2}$ and 50 kg $m^{-2}$, and echo tops from 5000 feet to 45000 feet.

| | Ranges in VIL density | | | | | |
|---|---|---|---|---|---|---|
| Hail size | <3.0 | 3.0–3.4 | 3.5–3.9 | 4.0–4.4 | 4.5–4.9 | >4.9 |
| <19 mm (36) | 27 | 7 | 0 | 2 | 0 | 0 |
| 19–24 mm (117) | 6 | 10 | 32 | 44 | 18 | 7 |
| 25–45 mm (63) | 0 | 1 | 5 | 18 | 16 | 23 |
| >45 mm (5) | 0 | 0 | 0 | 0 | 1 | 4 |
| (Total number) | (33) | (18) | (37) | (64) | (35) | (34) |

Table 1. Hail sizes for given ranges of VIL density. Note that as the hail sizes increase, the minimum ranges for VIL density also increase. Values in parentheses represent the number of events in that category-range. (after Amburn and Wolf, 1997.)

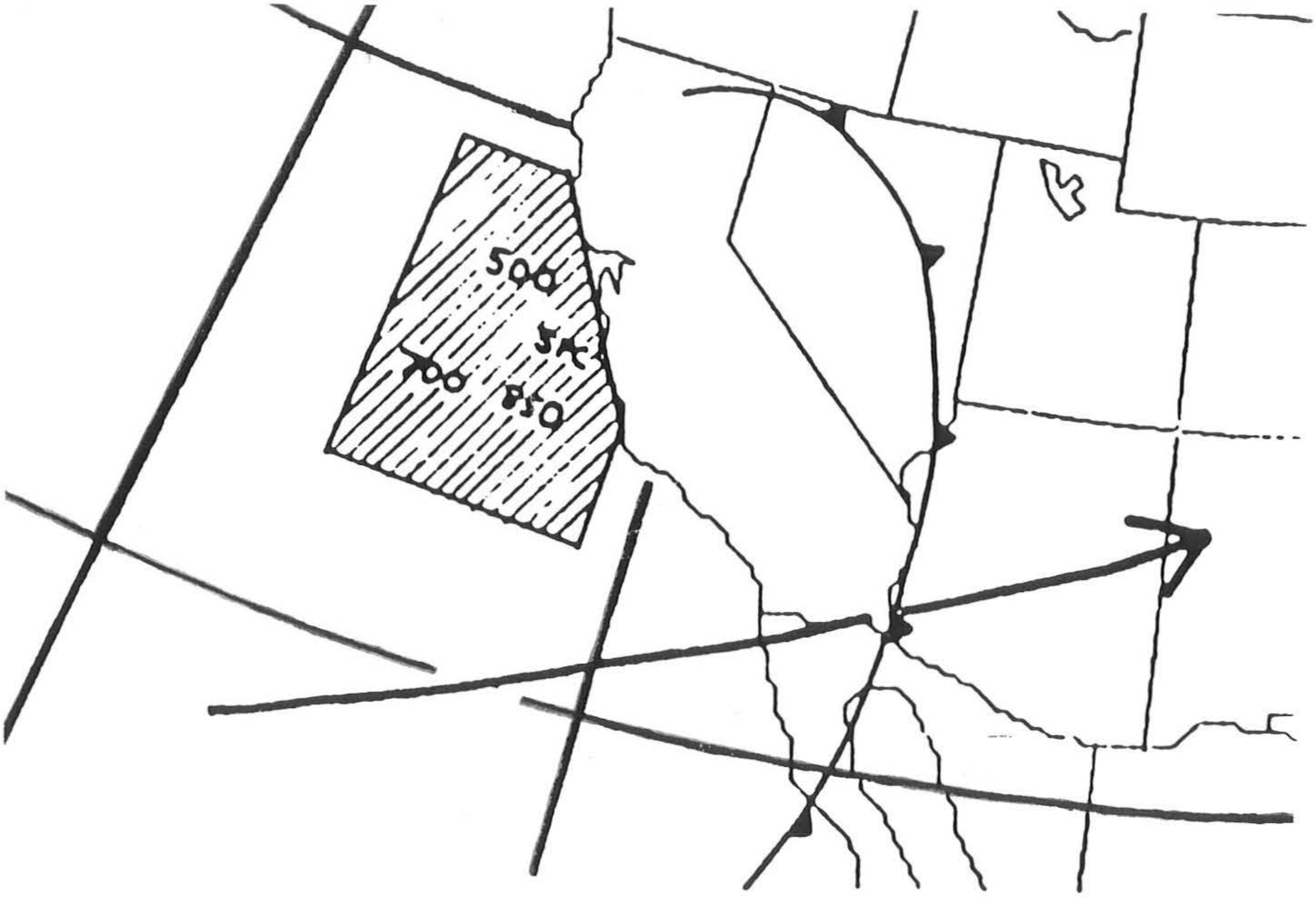

Fig. 1. Mean position of jet stream (arrow) and cold front at the time of tornado occurrences. The hatched area indicates the typical location of the low centers at the surface, 850, 700, and 500 mb. (after Hales, 1985.)

| VIL DENSITY VERSES HAIL SIZE | |
|---|---|
| VIL DENSITY | HAIL SIZE (DIAMETER) |
| Less than 3.0 g $m^{-3}$ | Mainly less than 3/4" |
| 3.0 g $m^{-3}$ - 3.4 g $m^{-3}$ | Mainly less than 3/4" to 1" |
| 3.5 g $m^{-3}$ - 3.9 g $m^{-3}$ | Mainly 3/4" to 1" |
| 4.0 g $m^{-3}$ - 4.4 g $m^{-3}$ | Mainly 3/4" to 1 3/4" |
| 4.5 g $m^{-3}$ - 4.9 g $m^{-3}$ | Mainly 3/4" to 1 3/4" |
| Greater than 4.9 g $m^{-3}$ | Mainly 1" to 1 3/4" |

Table 2. Values of VIL density verses hail size. The "reasonable threshold for severe hail" (3/4" or larger) is 3.5 g $m^{-3}$. The "near 100% probability threshold for severe hail" (3/4" or larger) is 4.5 g $m^{-3}$.

# VIL DENSITY

| VIL $kg\ m^{2}$ | ECHO TOP kft | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | VIL $kg\ m^{-2}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | |
| 1 | 3.3 | 1.6 | 0.5 | 0.8 | 0.7 | 0.5 | 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 1 |
| 2 | 6.6 | 3.3 | 1.9 | 1.6 | 1.3 | 1.1 | 0.9 | 0.8 | 0.7 | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 2 |
| 3 | 9.8 | 4.9 | 3.3 | 2.5 | 2 | 1.6 | 1.4 | 1.2 | 1.1 | 1 | 0.9 | 0.8 | 0.8 | 0.7 | 0.7 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 3 |
| 4 | 13 | 6.6 | 4.6 | 3.3 | 2.6 | 2.2 | 1.9 | 1.6 | 1.5 | 1.3 | 1.2 | 1.1 | 1 | 0.9 | 0.9 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 4 |
| 5 | 16 | 8.2 | 6 | 4.1 | 3.3 | 2.7 | 2.3 | 2.1 | 1.8 | 1.6 | 1.5 | 1.4 | 1.3 | 1.2 | 1.1 | 1 | 1 | 0.9 | 0.9 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 5 |
| 6 | 20 | 9.8 | 7.4 | 4.9 | 3.9 | 3.3 | 2.8 | 2.5 | 2.2 | 2 | 1.8 | 1.6 | 1.5 | 1.4 | 1.3 | 1.2 | 1.2 | 1.1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 6 |
| 7 | 23 | 11 | 8.7 | 5.7 | 4.6 | 3.8 | 3.3 | 2.9 | 2.6 | 2.3 | 2.1 | 1.9 | 1.8 | 1.6 | 1.5 | 1.4 | 1.4 | 1.3 | 1.2 | 1.1 | 1.1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 7 |
| 8 | 26 | 13 | 10 | 6.6 | 5.3 | 4.4 | 3.8 | 3.3 | 2.9 | 2.6 | 2.4 | 2.2 | 2 | 1.9 | 1.7 | 1.6 | 1.5 | 1.5 | 1.4 | 1.3 | 1.3 | 1.2 | 1.1 | 1.1 | 1.1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 8 |
| 9 | 30 | 15 | 11 | 7.4 | 5.9 | 4.9 | 4.2 | 3.7 | 3.3 | 3 | 2.7 | 2.5 | 2.3 | 2.1 | 2 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 9 |
| 10 | 33 | 16 | 13 | 8.2 | 6.6 | 5.5 | 4.7 | 4.1 | 3.6 | 3.3 | 3 | 2.7 | 2.5 | 2.3 | 2.2 | 2.1 | 1.9 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 10 |
| 11 | 36 | 18 | 14 | 9 | 7.2 | 6 | 5.2 | 4.5 | 4 | 3.6 | 3.3 | 3 | 2.8 | 2.6 | 2.4 | 2.3 | 2.1 | 2 | 1.9 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 11 |
| 12 | 39 | 20 | 16 | 9.8 | 7.9 | 6.6 | 5.6 | 4.9 | 4.4 | 3.9 | 3.6 | 3.3 | 3 | 2.8 | 2.6 | 2.5 | 2.3 | 2.2 | 2.1 | 2 | 1.9 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 12 |
| 13 | 43 | 21 | 17 | 11 | 8.5 | 7.1 | 6.1 | 5.3 | 4.7 | 4.3 | 3.9 | 3.6 | 3.3 | 3 | 2.8 | 2.7 | 2.5 | 2.4 | 2.2 | 2.1 | 2 | 1.9 | 1.9 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 13 |
| 14 | 46 | 23 | 18 | 11 | 9.2 | 7.7 | 6.6 | 5.7 | 5.1 | 4.6 | 4.2 | 3.8 | 3.5 | 3.3 | 3.1 | 2.9 | 2.7 | 2.6 | 2.4 | 2.3 | 2.2 | 2.1 | 2 | 1.9 | 1.8 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.1 | 14 |
| 15 | 49 | 25 | 20 | 12 | 9.8 | 8.2 | 7 | 6.2 | 5.5 | 4.9 | 4.5 | 4.1 | 3.8 | 3.5 | 3.3 | 3.1 | 2.9 | 2.7 | 2.6 | 2.5 | 2.3 | 2.2 | 2.1 | 2.1 | 2 | 1.9 | 1.8 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.2 | 15 |
| 16 | 52 | 26 | 21 | 13 | 11 | 8.8 | 7.5 | 6.6 | 5.8 | 5.2 | 4.8 | 4.4 | 4 | 3.8 | 3.5 | 3.3 | 3.1 | 2.9 | 2.8 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.1 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 16 |
| 17 | 56 | 28 | 22 | 14 | 11 | 9.3 | 8 | 7 | 6.2 | 5.6 | 5.1 | 4.6 | 4.3 | 4 | 3.7 | 3.5 | 3.3 | 3.1 | 2.9 | 2.8 | 2.7 | 2.5 | 2.4 | 2.3 | 2.2 | 2.1 | 2.1 | 2 | 1.9 | 1.9 | 1.8 | 1.7 | 1.7 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 17 |
| 18 | 59 | 30 | 24 | 15 | 12 | 9.9 | 8.4 | 7.4 | 6.6 | 5.9 | 5.4 | 4.9 | 4.5 | 4.2 | 3.9 | 3.7 | 3.5 | 3.3 | 3.1 | 3 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.1 | 2 | 2 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 18 |
| 19 | 62 | 31 | 25 | 16 | 12 | 10 | 8.9 | 7.8 | 6.9 | 6.2 | 5.7 | 5.2 | 4.8 | 4.5 | 4.2 | 3.9 | 3.7 | 3.5 | 3.3 | 3.1 | 3 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 19 |
| 20 | 66 | 33 | 27 | 16 | 13 | 11 | 9.4 | 8.2 | 7.3 | 6.6 | 6 | 5.5 | 5 | 4.7 | 4.4 | 4.1 | 3.9 | 3.6 | 3.5 | 3.3 | 3.1 | 3 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 | 1.6 | 20 |
| 21 | 69 | 34 | 28 | 17 | 14 | 12 | 9.9 | 8.6 | 7.7 | 6.9 | 6.3 | 5.7 | 5.3 | 4.9 | 4.6 | 4.3 | 4.1 | 3.8 | 3.6 | 3.4 | 3.3 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 21 |
| 22 | 72 | 36 | 29 | 18 | 14 | 12 | 10 | 9 | 8 | 7.2 | 6.6 | 6 | 5.6 | 5.2 | 4.8 | 4.5 | 4.2 | 4 | 3.8 | 3.6 | 3.4 | 3.3 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.1 | 2.1 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 22 |
| 23 | 75 | 38 | 31 | 19 | 15 | 13 | 11 | 9.4 | 8.4 | 7.5 | 6.9 | 6.3 | 5.8 | 5.4 | 5 | 4.7 | 4.4 | 4.2 | 4 | 3.8 | 3.6 | 3.4 | 3.3 | 3.2 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2 | 2 | 1.9 | 1.9 | 23 |
| 24 | 79 | 39 | 32 | 20 | 16 | 13 | 11 | 9.8 | 8.7 | 7.9 | 7.2 | 6.6 | 6.1 | 5.6 | 5.2 | 4.9 | 4.6 | 4.4 | 4.1 | 3.9 | 3.8 | 3.6 | 3.4 | 3.3 | 3.2 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.5 | 2.4 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2 | 2 | 24 |
| 25 | 82 | 41 | 33 | 21 | 16 | 14 | 12 | 10 | 9.1 | 8.2 | 7.5 | 6.8 | 6.3 | 5.9 | 5.5 | 5.1 | 4.8 | 4.6 | 4.3 | 4.1 | 3.9 | 3.7 | 3.6 | 3.4 | 3.3 | 3.2 | 3 | 2.9 | 2.8 | 2.7 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 25 |
| 26 | 85 | 43 | 35 | 21 | 17 | 14 | 12 | 11 | 9.5 | 8.5 | 7.8 | 7.1 | 6.6 | 6.1 | 5.7 | 5.3 | 5 | 4.7 | 4.5 | 4.3 | 4.1 | 3.9 | 3.7 | 3.6 | 3.4 | 3.3 | 3.2 | 3.1 | 2.9 | 2.8 | 2.8 | 2.7 | 2.6 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.1 | 26 |
| 27 | 89 | 44 | 36 | 22 | 18 | 15 | 13 | 11 | 9.8 | 8.9 | 8.1 | 7.4 | 6.8 | 6.3 | 5.9 | 5.5 | 5.2 | 4.9 | 4.7 | 4.4 | 4.2 | 4 | 3.8 | 3.7 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.5 | 2.4 | 2.3 | 2.3 | 2.2 | 27 |
| 28 | 92 | 46 | 37 | 23 | 18 | 15 | 13 | 11 | 10 | 9.2 | 8.4 | 7.7 | 7.1 | 6.6 | 6.1 | 5.7 | 5.4 | 5.1 | 4.8 | 4.6 | 4.4 | 4.2 | 4 | 3.8 | 3.7 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 28 |
| 29 | 95 | 48 | 39 | 24 | 19 | 16 | 14 | 12 | 11 | 9.5 | 8.7 | 7.9 | 7.3 | 6.8 | 6.3 | 5.9 | 5.6 | 5.3 | 5 | 4.8 | 4.5 | 4.3 | 4.1 | 4 | 3.8 | 3.7 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.6 | 2.6 | 2.5 | 2.4 | 2.4 | 29 |
| 30 | 98 | 49 | 40 | 25 | 20 | 16 | 14 | 12 | 11 | 9.8 | 9 | 8.2 | 7.6 | 7 | 6.6 | 6.2 | 5.8 | 5.5 | 5.2 | 4.9 | 4.7 | 4.5 | 4.3 | 4.1 | 3.9 | 3.8 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.7 | 2.6 | 2.5 | 2.5 | 30 |
| 31 | 102 | 51 | 42 | 25 | 20 | 17 | 15 | 13 | 11 | 10 | 9.3 | 8.5 | 7.8 | 7.3 | 6.8 | 6.4 | 6 | 5.7 | 5.3 | 5.1 | 4.9 | 4.6 | 4.4 | 4.2 | 4.1 | 3.9 | 3.8 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.8 | 2.7 | 2.7 | 2.6 | 2.5 | 31 |
| 32 | 105 | 52 | 43 | 26 | 21 | 18 | 15 | 13 | 12 | 10 | 9.6 | 8.8 | 8.1 | 7.5 | 7 | 6.6 | 6.2 | 5.8 | 5.5 | 5.2 | 5 | 4.8 | 4.6 | 4.4 | 4.2 | 4 | 3.9 | 3.8 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.8 | 2.8 | 2.7 | 2.6 | 32 |
| 33 | 108 | 54 | 44 | 27 | 22 | 18 | 15 | 14 | 12 | 11 | 9.9 | 9 | 8.3 | 7.7 | 7.2 | 6.8 | 6.4 | 6 | 5.7 | 5.4 | 5.2 | 4.9 | 4.7 | 4.5 | 4.3 | 4.2 | 4 | 3.9 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.9 | 2.8 | 2.7 | 33 |
| 34 | 111 | 56 | 46 | 28 | 22 | 19 | 16 | 14 | 12 | 11 | 10 | 9.3 | 8.6 | 8 | 7.4 | 7 | 6.6 | 6.2 | 5.9 | 5.6 | 5.3 | 5.1 | 4.8 | 4.7 | 4.5 | 4.3 | 4.1 | 4 | 3.8 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 3 | 2.9 | 2.8 | 34 |
| 35 | 115 | 57 | 47 | 29 | 23 | 19 | 16 | 14 | 13 | 11 | 10 | 9.6 | 8.8 | 8.2 | 7.6 | 7.2 | 6.8 | 6.4 | 6 | 5.7 | 5.5 | 5.2 | 5 | 4.8 | 4.6 | 4.4 | 4.3 | 4.1 | 4 | 3.8 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 2.9 | 2.9 | 35 |
| 36 | 118 | 59 | 48 | 30 | 24 | 20 | 17 | 15 | 13 | 12 | 11 | 9.8 | 9.1 | 8.4 | 7.9 | 7.4 | 6.9 | 6.6 | 6.2 | 5.9 | 5.6 | 5.4 | 5.1 | 4.9 | 4.7 | 4.6 | 4.4 | 4.2 | 4.1 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 3 | 36 |
| 37 | 121 | 61 | 50 | 30 | 24 | 20 | 17 | 15 | 13 | 12 | 11 | 10 | 9.3 | 8.7 | 8.1 | 7.6 | 7.1 | 6.8 | 6.4 | 6.1 | 5.8 | 5.5 | 5.3 | 5.1 | 4.9 | 4.7 | 4.5 | 4.3 | 4.2 | 4.1 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 3 | 37 |
| 38 | 125 | 62 | 51 | 31 | 25 | 21 | 18 | 16 | 14 | 12 | 11 | 10 | 9.6 | 8.9 | 8.3 | 7.8 | 7.3 | 6.9 | 6.6 | 6.2 | 5.9 | 5.7 | 5.4 | 5.2 | 5 | 4.8 | 4.6 | 4.5 | 4.3 | 4.2 | 4 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.2 | 3.1 | 38 |
| 39 | 128 | 64 | 52 | 32 | 26 | 21 | 18 | 16 | 14 | 13 | 12 | 11 | 9.8 | 9.1 | 8.5 | 8 | 7.5 | 7.1 | 6.7 | 6.4 | 6.1 | 5.8 | 5.6 | 5.3 | 5.1 | 4.9 | 4.7 | 4.6 | 4.4 | 4.3 | 4.1 | 4 | 3.9 | 3.8 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.2 | 39 |
| 40 | 131 | 66 | 54 | 33 | 26 | 22 | 19 | 16 | 15 | 13 | 12 | 11 | 10 | 9.4 | 8.7 | 8.2 | 7.7 | 7.3 | 6.9 | 6.6 | 6.3 | 6 | 5.7 | 5.5 | 5.3 | 5.1 | 4.9 | 4.7 | 4.5 | 4.4 | 4.2 | 4.1 | 4 | 3.9 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 40 |
| 41 | 134 | 67 | 55 | 34 | 27 | 22 | 19 | 17 | 15 | 13 | 12 | 11 | 10 | 9.6 | 9 | 8.4 | 7.9 | 7.5 | 7.1 | 6.7 | 6.4 | 6.1 | 5.8 | 5.6 | 5.4 | 5.2 | 5 | 4.8 | 4.6 | 4.5 | 4.3 | 4.2 | 4.1 | 4 | 3.8 | 3.7 | 3.6 | 3.6 | 3.4 | 3.4 | 41 |
| 42 | 138 | 69 | 57 | 34 | 28 | 23 | 20 | 17 | 15 | 14 | 13 | 11 | 11 | 9.8 | 9.2 | 8.6 | 8.1 | 7.7 | 7.2 | 6.9 | 6.6 | 6.3 | 6 | 5.8 | 5.5 | 5.3 | 5.1 | 4.9 | 4.8 | 4.6 | 4.5 | 4.3 | 4.2 | 4.1 | 3.9 | 3.8 | 3.7 | 3.7 | 3.5 | 3.4 | 42 |
| 43 | 141 | 71 | 58 | 35 | 28 | 24 | 20 | 18 | 16 | 14 | 13 | 12 | 11 | 10 | 9.4 | 8.8 | 8.3 | 7.8 | 7.4 | 7.1 | 6.7 | 6.4 | 6.1 | 5.9 | 5.7 | 5.4 | 5.2 | 5.1 | 4.9 | 4.7 | 4.6 | 4.4 | 4.3 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 43 |
| 44 | 144 | 72 | 59 | 36 | 29 | 24 | 21 | 18 | 16 | 14 | 13 | 12 | 11 | 10 | 9.6 | 9 | 8.5 | 8 | 7.6 | 7.2 | 6.9 | 6.6 | 6.3 | 6 | 5.8 | 5.6 | 5.3 | 5.2 | 5 | 4.8 | 4.7 | 4.5 | 4.4 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 3.6 | 44 |
| 45 | 148 | 74 | 61 | 37 | 30 | 25 | 21 | 18 | 16 | 15 | 13 | 12 | 11 | 11 | 9.8 | 9.2 | 8.7 | 8.2 | 7.8 | 7.4 | 7 | 6.7 | 6.4 | 6.2 | 5.9 | 5.7 | 5.5 | 5.3 | 5.1 | 4.9 | 4.8 | 4.6 | 4.5 | 4.3 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 45 |
| 46 | 151 | 76 | 62 | 38 | 30 | 25 | 22 | 19 | 17 | 15 | 14 | 13 | 12 | 11 | 10 | 9.4 | 8.9 | 8.4 | 7.9 | 7.5 | 7.2 | 6.9 | 6.6 | 6.3 | 6 | 5.8 | 5.6 | 5.4 | 5.2 | 5 | 4.9 | 4.7 | 4.6 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 46 |
| 47 | 154 | 77 | 63 | 39 | 31 | 26 | 22 | 19 | 17 | 15 | 14 | 13 | 12 | 11 | 10 | 9.6 | 9.1 | 8.6 | 8.1 | 7.7 | 7.4 | 7 | 6.7 | 6.4 | 6.2 | 5.9 | 5.7 | 5.5 | 5.3 | 5.1 | 5 | 4.8 | 4.7 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 3.9 | 3.9 | 47 |
| 48 | 157 | 79 | 65 | 39 | 32 | 26 | 23 | 20 | 17 | 16 | 14 | 13 | 12 | 11 | 10 | 9.8 | 9.3 | 8.8 | 8.3 | 7.9 | 7.5 | 7.2 | 6.8 | 6.6 | 6.3 | 6.1 | 5.8 | 5.6 | 5.4 | 5.3 | 5.1 | 4.9 | 4.8 | 4.6 | 4.5 | 4.4 | 4.2 | 4.2 | 4 | 3.9 | 48 |
| 49 | 161 | 80 | 66 | 40 | 32 | 27 | 23 | 20 | 18 | 16 | 15 | 13 | 12 | 11 | 11 | 10 | 9.5 | 8.9 | 8.5 | 8 | 7.7 | 7.3 | 7 | 6.7 | 6.4 | 6.2 | 6 | 5.8 | 5.5 | 5.4 | 5.2 | 5 | 4.9 | 4.7 | 4.6 | 4.5 | 4.3 | 4.3 | 4.1 | 4 | 49 |
| 50 | 164 | 82 | 68 | 41 | 33 | 27 | 23 | 21 | 18 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9.7 | 9.1 | 8.6 | 8.2 | 7.8 | 7.5 | 7.1 | 6.8 | 6.6 | 6.3 | 6.1 | 5.9 | 5.7 | 5.5 | 5.3 | 5.1 | 5 | 4.8 | 4.7 | 4.6 | 4.4 | 4.3 | 4.2 | 4.1 | 50 |
| 51 | 167 | 84 | 69 | 42 | 33 | 28 | 24 | 21 | 19 | 17 | 15 | 14 | 13 | 12 | 11 | 10 | 9.8 | 9.3 | 8.8 | 8.4 | 8 | 7.6 | 7.3 | 7 | 6.7 | 6.5 | 6.2 | 6 | 5.8 | 5.6 | 5.4 | 5.2 | 5.1 | 4.9 | 4.8 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 51 |
| 52 | 171 | 85 | 70 | 43 | 34 | 29 | 24 | 21 | 19 | 17 | 16 | 14 | 13 | 12 | 11 | 11 | 10 | 9.5 | 9 | 8.5 | 8.1 | 7.7 | 7.4 | 7.1 | 6.8 | 6.6 | 6.3 | 6.1 | 5.9 | 5.7 | 5.5 | 5.3 | 5.2 | 5 | 4.9 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 52 |
| 53 | 174 | 87 | 72 | 43 | 35 | 29 | 25 | 22 | 19 | 17 | 16 | 14 | 13 | 12 | 12 | 11 | 10 | 9.7 | 9.1 | 8.7 | 8.3 | 7.9 | 7.6 | 7.3 | 7 | 6.7 | 6.4 | 6.2 | 6 | 5.8 | 5.6 | 5.4 | 5.3 | 5.1 | 5 | 4.8 | 4.7 | 4.6 | 4.5 | 4.3 | 53 |
| 54 | 177 | 89 | 73 | 44 | 35 | 30 | 25 | 22 | 20 | 18 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9.9 | 9.3 | 8.9 | 8.5 | 8 | 7.7 | 7.4 | 7.1 | 6.8 | 6.6 | 6.3 | 6.1 | 5.9 | 5.7 | 5.5 | 5.4 | 5.2 | 5 | 4.9 | 4.8 | 4.7 | 4.5 | 4.4 | 54 |
| 55 | 180 | 90 | 74 | 45 | 36 | 30 | 26 | 23 | 20 | 18 | 16 | 15 | 14 | 13 | 12 | 11 | 11 | 10 | 9.5 | 9 | 8.6 | 8.2 | 7.8 | 7.5 | 7.2 | 7 | 6.7 | 6.5 | 6.2 | 6 | 5.8 | 5.6 | 5.5 | 5.3 | 5.1 | 5 | 4.9 | 4.8 | 4.6 | 4.5 | 55 |
| 56 | 184 | 92 | 76 | 46 | 37 | 31 | 26 | 23 | 20 | 18 | 17 | 15 | 14 | 13 | 12 | 11 | 11 | 10 | 9.7 | 9.2 | 8.8 | 8.3 | 8 | 7.7 | 7.4 | 7.1 | 6.8 | 6.6 | 6.3 | 6.1 | 5.9 | 5.7 | 5.6 | 5.4 | 5.2 | 5.1 | 5 | 4.9 | 4.7 | 4.6 | 56 |
| 57 | 187 | 94 | 77 | 47 | 37 | 31 | 27 | 23 | 21 | 19 | 17 | 16 | 14 | 13 | 12 | 12 | 11 | 10 | 9.8 | 9.3 | 8.9 | 8.5 | 8.1 | 7.8 | 7.5 | 7.2 | 6.9 | 6.7 | 6.5 | 6.2 | 6 | 5.8 | 5.7 | 5.5 | 5.3 | 5.2 | 5 | 5 | 4.8 | 4.7 | 57 |
| 58 | 190 | 95 | 78 | 48 | 38 | 32 | 27 | 24 | 21 | 19 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 11 | 10 | 9.5 | 9.1 | 8.6 | 8.3 | 7.9 | 7.6 | 7.3 | 7 | 6.8 | 6.6 | 6.4 | 6.1 | 5.9 | 5.8 | 5.6 | 5.4 | 5.3 | 5.1 | 5 | 4.9 | 4.8 | 58 |
| 59 | 193 | 97 | 80 | 48 | 39 | 32 | 28 | 24 | 22 | 19 | 18 | 16 | 15 | 14 | 13 | 12 | 11 | 11 | 10 | 9.7 | 9.2 | 8.8 | 8.4 | 8.1 | 7.8 | 7.5 | 7.2 | 6.9 | 6.7 | 6.5 | 6.3 | 6 | 5.9 | 5.7 | 5.5 | 5.4 | 5.2 | 5.1 | 5 | 4.8 | 59 |
| 60 | 197 | 98 | 81 | 49 | 39 | 33 | 28 | 25 | 22 | 20 | 18 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 10 | 9.8 | 9.4 | 8.9 | 8.5 | 8.2 | 7.9 | 7.6 | 7.3 | 7 | 6.8 | 6.6 | 6.4 | 6.2 | 6 | 5.8 | 5.6 | 5.5 | 5.3 | 5.2 | 5 | 4.9 | 60 |
| 61 | 200 | 100 | 83 | 50 | 40 | 33 | 29 | 25 | 22 | 20 | 18 | 17 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 10 | 9.5 | 9.1 | 8.7 | 8.4 | 8 | 7.7 | 7.4 | 7.2 | 6.9 | 6.7 | 6.5 | 6.3 | 6.1 | 5.9 | 5.7 | 5.6 | 5.4 | 5.3 | 5.1 | 5 | 61 |
| 62 | 203 | 102 | 84 | 51 | 41 | 34 | 29 | 25 | 23 | 20 | 19 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 11 | 10 | 9.7 | 9.2 | 8.8 | 8.5 | 8.2 | 7.8 | 7.5 | 7.3 | 7 | 6.8 | 6.6 | 6.4 | 6.2 | 6 | 5.8 | 5.6 | 5.5 | 5.4 | 5.2 | 5.1 | 62 |
| 63 | 207 | 103 | 85 | 52 | 41 | 35 | 30 | 26 | 23 | 21 | 19 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 11 | 10 | 9.9 | 9.4 | 9 | 8.6 | 8.3 | 8 | 7.7 | 7.4 | 7.1 | 6.9 | 6.7 | 6.5 | 6.3 | 6.1 | 5.9 | 5.7 | 5.6 | 5.5 | 5.3 | 5.2 | 63 |
| 64 | 210 | 105 | 87 | 53 | 42 | 35 | 30 | 26 | 23 | 21 | 19 | 18 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 10 | 10 | 9.5 | 9.1 | 8.8 | 8.4 | 8.1 | 7.8 | 7.5 | 7.2 | 7 | 6.8 | 6.6 | 6.4 | 6.2 | 6 | 5.8 | 5.7 | 5.6 | 5.4 | 5.2 | 64 |
| 65 | 213 | 107 | 88 | 53 | 43 | 36 | 31 | 27 | 24 | 21 | 19 | 18 | 16 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 10 | 9.7 | 9.3 | 8.9 | 8.5 | 8.2 | 7.9 | 7.6 | 7.4 | 7.1 | 6.9 | 6.7 | 6.5 | 6.3 | 6.1 | 5.9 | 5.8 | 5.7 | 5.5 | 5.3 | 65 |
| 66 | 216 | 108 | 89 | 54 | 43 | 36 | 31 | 27 | 24 | 22 | 20 | 18 | 17 | 15 | 14 | 14 | 13 | 12 | 11 | 11 | 10 | 9.8 | 9.4 | 9 | 8.7 | 8.3 | 8 | 7.8 | 7.5 | 7.2 | 7 | 6.8 | 6.6 | 6.4 | 6.2 | 6 | 5.8 | 5.7 | 5.5 | 5.4 | 66 |
| 67 | 220 | 110 | 91 | 55 | 44 | 37 | 31 | 27 | 24 | 22 | 20 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 10 | 10 | 9.5 | 9.2 | 8.8 | 8.5 | 8.1 | 7.9 | 7.6 | 7.3 | 7.1 | 6.9 | 6.7 | 6.5 | 6.3 | 6.1 | 5.9 | 5.8 | 5.6 | 5.5 | 67 |
| 68 | 223 | 112 | 92 | 56 | 45 | 37 | 32 | 28 | 25 | 22 | 20 | 19 | 17 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 9.7 | 9.3 | 8.9 | 8.6 | 8.3 | 8 | 7.7 | 7.4 | 7.2 | 7 | 6.8 | 6.6 | 6.4 | 6.2 | 6 | 5.9 | 5.7 | 5.6 | 68 |
| 69 | 226 | 113 | 94 | 57 | 45 | 38 | 32 | 28 | 25 | 23 | 21 | 19 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 10 | 9.8 | 9.5 | 9.1 | 8.7 | 8.4 | 8.1 | 7.8 | 7.6 | 7.3 | 7.1 | 6.9 | 6.7 | 6.5 | 6.3 | 6.1 | 6 | 5.8 | 5.7 | 69 |
| 70 | 230 | 115 | 95 | 57 | 46 | 38 | 33 | 29 | 26 | 23 | 21 | 19 | 18 | 16 | 15 | 14 | 14 | 13 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.2 | 8.9 | 8.5 | 8.2 | 7.9 | 7.7 | 7.4 | 7.2 | 7 | 6.8 | 6.5 | 6.4 | 6.2 | 6.1 | 5.9 | 5.7 | 70 |
| 71 | 233 | 116 | 96 | 58 | 47 | 39 | 33 | 29 | 26 | 23 | 21 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 9.7 | 9.3 | 9 | 8.6 | 8.3 | 8 | 7.8 | 7.5 | 7.3 | 7.1 | 6.9 | 6.6 | 6.5 | 6.3 | 6.2 | 6 | 5.8 | 71 |
| 72 | 236 | 118 | 98 | 59 | 47 | 39 | 34 | 30 | 26 | 24 | 21 | 20 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 9.9 | 9.5 | 9.1 | 8.7 | 8.5 | 8.1 | 7.9 | 7.6 | 7.4 | 7.2 | 6.9 | 6.7 | 6.6 | 6.4 | 6.3 | 6 | 5.9 | 72 |
| 73 | 239 | 120 | 99 | 60 | 48 | 40 | 34 | 30 | 27 | 24 | 22 | 20 | 18 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.2 | 8.9 | 8.6 | 8.3 | 8 | 7.7 | 7.5 | 7.3 | 7 | 6.8 | 6.6 | 6.5 | 6.4 | 6.1 | 6 | 73 |
| 74 | 243 | 121 | 100 | 61 | 49 | 41 | 35 | 30 | 27 | 24 | 22 | 20 | 19 | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 9.7 | 9.4 | 9 | 8.7 | 8.4 | 8.1 | 7.8 | 7.6 | 7.4 | 7.1 | 6.9 | 6.7 | 6.5 | 6.4 | 6.2 | 6.1 | 74 |
| 75 | 246 | 123 | 102 | 62 | 49 | 41 | 35 | 31 | 27 | 25 | 22 | 21 | 19 | 18 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 9.9 | 9.5 | 9.1 | 8.8 | 8.5 | 8.2 | 8 | 7.7 | 7.5 | 7.2 | 7 | 6.8 | 6.6 | 6.5 | 6.3 | 6.2 | 75 |
| 76 | 249 | 125 | 103 | 62 | 50 | 42 | 36 | 31 | 28 | 25 | 23 | 21 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.2 | 8.9 | 8.6 | 8.3 | 8.1 | 7.8 | 7.6 | 7.3 | 7.1 | 6.9 | 6.7 | 6.6 | 6.4 | 6.2 | 76 |
| 77 | 252 | 126 | 104 | 63 | 51 | 42 | 36 | 32 | 28 | 25 | 23 | 21 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 11 | 10 | 9.7 | 9.4 | 9 | 8.7 | 8.4 | 8.2 | 7.9 | 7.7 | 7.4 | 7.2 | 7 | 6.8 | 6.7 | 6.5 | 6.3 | 77 |
| 78 | 256 | 128 | 106 | 64 | 51 | 43 | 37 | 32 | 28 | 26 | 23 | 21 | 20 | 18 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 9.9 | 9.5 | 9.2 | 8.8 | 8.5 | 8.3 | 8 | 7.8 | 7.5 | 7.3 | 7.1 | 6.9 | 6.8 | 6.6 | 6.4 | 78 |
| 79 | 259 | 130 | 107 | 65 | 52 | 43 | 37 | 32 | 29 | 26 | 24 | 22 | 20 | 19 | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.3 | 8.9 | 8.7 | 8.4 | 8.1 | 7.9 | 7.6 | 7.4 | 7.2 | 7 | 6.9 | 6.6 | 6.5 | 79 |
| 80 | 262 | 131 | 109 | 66 | 53 | 44 | 38 | 33 | 29 | 26 | 24 | 22 | 20 | 19 | 17 | 16 | 15 | 15 | 14 | 13 | 13 | 12 | 11 | 11 | 11 | 10 | 9.7 | 9.4 | 9.1 | 8.8 | 8.5 | 8.2 | 8 | 7.7 | 7.5 | 7.3 | 7.1 | 7 | 6.7 | 6.6 | 80 |
| 81 | 266 | 133 | 110 | 66 | 53 | 44 | 38 | 33 | 30 | 27 | 24 | 22 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 9.8 | 9.5 | 9.2 | 8.9 | 8.6 | 8.3 | 8.1 | 7.8 | 7.6 | 7.4 | 7.2 | 7 | 6.8 | 6.6 | 81 |
| 82 | 269 | 135 | 111 | 67 | 54 | 45 | 38 | 34 | 30 | 27 | 24 | 22 | 21 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.3 | 9 | 8.7 | 8.4 | 8.2 | 7.9 | 7.7 | 7.5 | 7.3 | 7.1 | 6.9 | 6.7 | 82 |
| 83 | 272 | 136 | 113 | 68 | 54 | 46 | 39 | 34 | 30 | 27 | 25 | 23 | 21 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.8 | 9.4 | 9.1 | 8.8 | 8.5 | 8.3 | 8 | 7.8 | 7.6 | 7.3 | 7.2 | 7 | 6.8 | 83 |
| 84 | 275 | 138 | 114 | 69 | 55 | 46 | 39 | 34 | 31 | 28 | 25 | 23 | 21 | 20 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 9.9 | 9.5 | 9.2 | 8.9 | 8.6 | 8.4 | 8.1 | 7.9 | 7.6 | 7.4 | 7.3 | 7.1 | 6.9 | 84 |
| 85 | 279 | 139 | 115 | 70 | 56 | 47 | 40 | 35 | 31 | 28 | 25 | 23 | 21 | 20 | 19 | 17 | 16 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.3 | 9 | 8.7 | 8.5 | 8.2 | 7.9 | 7.7 | 7.5 | 7.4 | 7.1 | 7 | 85 |
| 86 | 282 | 141 | 117 | 71 | 56 | 47 | 40 | 35 | 31 | 28 | 26 | 24 | 22 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.7 | 9.4 | 9.1 | 8.8 | 8.6 | 8.3 | 8 | 7.8 | 7.6 | 7.5 | 7.2 | 7.1 | 86 |
| 87 | 285 | 143 | 118 | 71 | 57 | 48 | 41 | 36 | 32 | 29 | 26 | 24 | 22 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 9.8 | 9.5 | 9.2 | 8.9 | 8.7 | 8.4 | 8.1 | 7.9 | 7.7 | 7.6 | 7.3 | 7.1 | 87 |
| 88 | 289 | 144 | 119 | 72 | 58 | 48 | 41 | 36 | 32 | 29 | 26 | 24 | 22 | 21 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.3 | 9 | 8.8 | 8.5 | 8.2 | 8 | 7.8 | 7.7 | 7.4 | 7.2 | 88 |
| 89 | 292 | 146 | 121 | 73 | 58 | 49 | 42 | 36 | 32 | 29 | 27 | 24 | 22 | 21 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.7 | 9.4 | 9.1 | 8.9 | 8.6 | 8.3 | 8.1 | 7.9 | 7.7 | 7.5 | 7.3 | 89 |
| 90 | 295 | 148 | 122 | 74 | 59 | 49 | 42 | 37 | 33 | 30 | 27 | 25 | 23 | 21 | 20 | 18 | 17 | 16 | 16 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 9.9 | 9.5 | 9.2 | 9 | 8.7 | 8.4 | 8.2 | 8 | 7.8 | 7.6 | 7.4 | 90 |
| 91 | 298 | 149 | 124 | 75 | 60 | 50 | 43 | 37 | 33 | 30 | 27 | 25 | 23 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 12 | 11 | 11 | 10 | 10 | 9.6 | 9.3 | 9.1 | 8.8 | 8.5 | 8.3 | 8.1 | 7.9 | 7.6 | 7.5 | 91 |
| 92 | 302 | 151 | 125 | 75 | 60 | 50 | 43 | 38 | 34 | 30 | 27 | 25 | 23 | 22 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.8 | 9.4 | 9.2 | 8.9 | 8.6 | 8.4 | 8.1 | 8 | 7.7 | 7.5 | 92 |
| 93 | 305 | 153 | 126 | 76 | 61 | 51 | 44 | 38 | 34 | 31 | 28 | 25 | 23 | 22 | 20 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 9.9 | 9.5 | 9.3 | 9 | 8.7 | 8.5 | 8.2 | 8.1 | 7.8 | 7.6 | 93 |
| 94 | 308 | 154 | 128 | 77 | 62 | 52 | 44 | 39 | 34 | 31 | 28 | 26 | 24 | 22 | 21 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 10 | 9.6 | 9.4 | 9.1 | 8.8 | 8.6 | 8.3 | 8.2 | 7.9 | 7.7 | 94 |
| 95 | 312 | 156 | 129 | 78 | 62 | 52 | 45 | 39 | 35 | 31 | 28 | 26 | 24 | 22 | 21 | 19 | 18 | 17 | 16 | 16 | 15 | 14 | 14 | 13 | 12 | 12 | 12 | 11 | 11 | 10 | 10 | 9.7 | 9.5 | 9.2 | 8.9 | 8.6 | 8.4 | 8.3 | 8 | 7.8 | 95 |
| 96 | 315 | 157 | 130 | 79 | 63 | 53 | 45 | 39 | 35 | 31 | 29 | 26 | 24 | 23 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 9.8 | 9.6 | 9.3 | 9 | 8.7 | 8.5 | 8.4 | 8.1 | 7.9 | 96 |
| 97 | 318 | 159 | 132 | 80 | 64 | 53 | 46 | 40 | 35 | 32 | 29 | 27 | 24 | 23 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 9.9 | 9.7 | 9.4 | 9.1 | 8.8 | 8.6 | 8.4 | 8.1 | 8 | 97 |
| 98 | 321 | 161 | 133 | 80 | 64 | 54 | 46 | 40 | 36 | 32 | 29 | 27 | 25 | 23 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 13 | 13 | 12 | 12 | 12 | 11 | 11 | 10 | 10 | 9.8 | 9.5 | 9.2 | 8.9 | 8.7 | 8.5 | 8.2 | 8 | 98 |
| 99 | 325 | 162 | 135 | 81 | 65 | 54 | 46 | 41 | 36 | 32 | 30 | 27 | 25 | 23 | 22 | 20 | 19 | 18 | 17 | 16 | 15 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 10 | 10 | 9.9 | 9.6 | 9.3 | 9 | 8.8 | 8.6 | 8.3 | 8.1 | 99 |
| 100 | 328 | 164 | 136 | 82 | 66 | 55 | 47 | 41 | 36 | 33 | 30 | 27 | 25 | 23 | 22 | 21 | 19 | 18 | 17 | 16 | 16 | 15 | 14 | 14 | 13 | 13 | 12 | 12 | 11 | 11 | 11 | 10 | 9.9 | 9.7 | 9.4 | 9.1 | 8.9 | 8.7 | 8.4 | 8.2 | 100 |

Table 3a. VIL density table for VIL values between 1 kg $m^{-2}$ and 100 kg $m^{-2}$, and echo tops from 1000 feet to 40000 feet.

# VIL DENSITY

| VIL kg m$^{-2}$ | ECHO TOP KFT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | VIL kg m$^{-2}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | |
| 1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1 |
| 2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 2 |
| 3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 3 |
| 4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 4 |
| 5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 5 |
| 6 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 6 |
| 7 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 7 |
| 8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 8 |
| 9 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 9 |
| 10 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 10 |
| 11 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 11 |
| 12 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 12 |
| 13 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 13 |
| 14 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 14 |
| 15 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 15 |
| 16 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 16 |
| 17 | 1.4 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 17 |
| 18 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 18 |
| 19 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 19 |
| 20 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 20 |
| 21 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 21 |
| 22 | 1.8 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 22 |
| 23 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.9 | 23 |
| 24 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 1 | 1 | 1 | 24 |
| 25 | 2 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1 | 1 | 25 |
| 26 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 26 |
| 27 | 2.2 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 27 |
| 28 | 2.2 | 2.2 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 28 |
| 29 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 29 |
| 30 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 30 |
| 31 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 31 |
| 32 | 2.6 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 32 |
| 33 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 33 |
| 34 | 2.7 | 2.7 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 34 |
| 35 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.4 | 35 |
| 36 | 2.9 | 2.8 | 2.8 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 36 |
| 37 | 3 | 2.9 | 2.8 | 2.8 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | 37 |
| 38 | 3 | 3 | 2.9 | 2.8 | 2.8 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 38 |
| 39 | 3.1 | 3 | 3 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 39 |
| 40 | 3.2 | 3.1 | 3.1 | 3 | 2.9 | 2.9 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 40 |
| 41 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 41 |
| 42 | 3.4 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.7 | 42 |
| 43 | 3.4 | 3.4 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 43 |
| 44 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 44 |
| 45 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 1.9 | 1.8 | 45 |
| 46 | 3.7 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3 | 3 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 2 | 1.9 | 1.9 | 1.9 | 46 |
| 47 | 3.8 | 3.7 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 2 | 1.9 | 47 |
| 48 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2 | 2 | 2 | 2 | 48 |
| 49 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2 | 2 | 49 |
| 50 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 50 |
| 51 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 51 |
| 52 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 52 |
| 53 | 4.2 | 4.1 | 4.1 | 3.9 | 3.9 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.1 | 3.1 | 3.1 | 3 | 2.9 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 53 |
| 54 | 4.3 | 4.2 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 54 |
| 55 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 55 |
| 56 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 56 |
| 57 | 4.6 | 4.4 | 4.4 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 2.3 | 57 |
| 58 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.4 | 58 |
| 59 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 2.5 | 2.4 | 59 |
| 60 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.3 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 2.5 | 60 |
| 61 | 4.9 | 4.8 | 4.7 | 4.5 | 4.5 | 4.4 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 | 61 |
| 62 | 5 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 2.6 | 2.5 | 62 |
| 63 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 2.6 | 63 |
| 64 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.4 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 2.6 | 64 |
| 65 | 5.2 | 5.1 | 5 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 2.7 | 65 |
| 66 | 5.3 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.8 | 2.8 | 2.8 | 2.7 | 2.7 | 66 |
| 67 | 5.4 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.1 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 67 |
| 68 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.7 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.1 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.9 | 2.8 | 2.8 | 68 |
| 69 | 5.5 | 5.4 | 5.3 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.9 | 2.8 | 69 |
| 70 | 5.6 | 5.5 | 5.4 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 2.9 | 70 |
| 71 | 5.7 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 4.9 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.1 | 3.1 | 3.1 | 3 | 3 | 2.9 | 2.9 | 71 |
| 72 | 5.8 | 5.6 | 5.5 | 5.4 | 5.3 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 3 | 72 |
| 73 | 5.8 | 5.7 | 5.6 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 3 | 73 |
| 74 | 5.9 | 5.8 | 5.7 | 5.5 | 5.4 | 5.3 | 5.1 | 5.1 | 5 | 4.8 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 | 3.1 | 3.1 | 3 | 74 |
| 75 | 6 | 5.9 | 5.7 | 5.6 | 5.5 | 5.4 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.4 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 | 3.1 | 3.1 | 75 |
| 76 | 6.1 | 5.9 | 5.8 | 5.7 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 | 3.1 | 76 |
| 77 | 6.2 | 6 | 5.9 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 3.2 | 77 |
| 78 | 6.2 | 6.1 | 6 | 5.8 | 5.7 | 5.6 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 3.2 | 78 |
| 79 | 6.3 | 6.2 | 6 | 5.9 | 5.8 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 3.2 | 79 |
| 80 | 6.4 | 6.2 | 6.1 | 6 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.2 | 5.1 | 5 | 5 | 4.9 | 4.7 | 4.7 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 3.3 | 80 |
| 81 | 6.5 | 6.3 | 6.2 | 6 | 5.9 | 5.8 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.4 | 3.4 | 3.3 | 81 |
| 82 | 6.6 | 6.4 | 6.3 | 6.1 | 6 | 5.9 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.4 | 3.4 | 82 |
| 83 | 6.6 | 6.5 | 6.3 | 6.2 | 6.1 | 5.9 | 5.8 | 5.7 | 5.6 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.4 | 83 |
| 84 | 6.7 | 6.6 | 6.4 | 6.3 | 6.1 | 6 | 5.8 | 5.8 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.8 | 4.7 | 4.6 | 4.6 | 4.4 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 84 |
| 85 | 6.8 | 6.6 | 6.5 | 6.3 | 6.2 | 6.1 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5 | 5 | 4.9 | 4.8 | 4.7 | 4.7 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 85 |
| 86 | 6.9 | 6.7 | 6.6 | 6.4 | 6.3 | 6.1 | 6 | 5.9 | 5.8 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 5 | 4.9 | 4.8 | 4.7 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.2 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 86 |
| 87 | 7 | 6.8 | 6.7 | 6.5 | 6.4 | 6.2 | 6 | 6 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.1 | 5.1 | 5 | 4.9 | 4.8 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 87 |
| 88 | 7 | 6.9 | 6.7 | 6.6 | 6.4 | 6.3 | 6.1 | 6 | 5.9 | 5.8 | 5.7 | 5.6 | 5.4 | 5.3 | 5.2 | 5.2 | 5.1 | 5 | 4.9 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 88 |
| 89 | 7.1 | 6.9 | 6.8 | 6.6 | 6.5 | 6.4 | 6.2 | 6.1 | 6 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 3.7 | 89 |
| 90 | 7.2 | 7 | 6.9 | 6.7 | 6.6 | 6.4 | 6.3 | 6.2 | 6 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.3 | 5.3 | 5.2 | 5.1 | 5 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 3.7 | 90 |
| 91 | 7.3 | 7.1 | 7 | 6.8 | 6.6 | 6.5 | 6.3 | 6.2 | 6.1 | 6 | 5.9 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 3.7 | 91 |
| 92 | 7.4 | 7.2 | 7 | 6.9 | 6.7 | 6.6 | 6.4 | 6.3 | 6.2 | 6 | 5.9 | 5.8 | 5.7 | 5.6 | 5.4 | 5.4 | 5.3 | 5.2 | 5.1 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 3.8 | 92 |
| 93 | 7.4 | 7.3 | 7.1 | 6.9 | 6.8 | 6.6 | 6.5 | 6.4 | 6.2 | 6.1 | 6 | 5.9 | 5.8 | 5.7 | 5.5 | 5.4 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.9 | 3.8 | 93 |
| 94 | 7.5 | 7.3 | 7.2 | 7 | 6.9 | 6.7 | 6.5 | 6.4 | 6.3 | 6.2 | 6 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.7 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 3.9 | 94 |
| 95 | 7.6 | 7.4 | 7.3 | 7.1 | 6.9 | 6.8 | 6.6 | 6.5 | 6.4 | 6.2 | 6.1 | 6 | 5.9 | 5.8 | 5.6 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.2 | 5 | 4.9 | 4.9 | 4.8 | 4.7 | 4.7 | 4.6 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.2 | 4.1 | 4 | 4 | 3.9 | 3.9 | 95 |
| 96 | 7.7 | 7.5 | 7.3 | 7.2 | 7 | 6.9 | 6.7 | 6.6 | 6.4 | 6.3 | 6.2 | 6.1 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.8 | 4.7 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.3 | 4.2 | 4.1 | 4.1 | 4 | 4 | 3.9 | 96 |
| 97 | 7.8 | 7.6 | 7.4 | 7.2 | 7.1 | 6.9 | 6.7 | 6.6 | 6.5 | 6.4 | 6.2 | 6.1 | 6 | 5.9 | 5.7 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.3 | 5.1 | 5.1 | 5 | 4.9 | 4.8 | 4.8 | 4.7 | 4.5 | 4.5 | 4.4 | 4.4 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 4 | 4 | 97 |
| 98 | 7.8 | 7.6 | 7.5 | 7.3 | 7.2 | 7 | 6.8 | 6.7 | 6.6 | 6.4 | 6.3 | 6.2 | 6.1 | 6 | 5.8 | 5.7 | 5.6 | 5.5 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 4.9 | 4.9 | 4.8 | 4.7 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 4 | 98 |
| 99 | 7.9 | 7.7 | 7.6 | 7.4 | 7.2 | 7.1 | 6.9 | 6.8 | 6.6 | 6.5 | 6.4 | 6.2 | 6.1 | 6 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.5 | 5.4 | 5.2 | 5.2 | 5.1 | 5 | 4.9 | 4.8 | 4.8 | 4.6 | 4.6 | 4.5 | 4.5 | 4.4 | 4.3 | 4.3 | 4.2 | 4.2 | 4.1 | 4.1 | 99 |
| 100 | 8 | 7.8 | 7.6 | 7.5 | 7.3 | 7.1 | 7 | 6.8 | 6.7 | 6.6 | 6.4 | 6.3 | 6.2 | 6.1 | 5.9 | 5.9 | 5.8 | 5.7 | 5.6 | 5.5 | 5.4 | 5.3 | 5.2 | 5.1 | 5 | 5 | 4.9 | 4.8 | 4.7 | 4.6 | 4.6 | 4.5 | 4.4 | 4.4 | 4.3 | 4.3 | 4.2 | 4.2 | 4.1 | 100 |

Table 3b. VIL density table for VIL values between 1 kg m$^{-2}$ and 100 kg m$^{-2}$, and echo tops from 41000 feet to 80000 feet.

# VIL DENSITY

| VIL | ECHO TOP IN FEET | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5000 | 7000 | 9000 | 11000 | 13000 | 15000 | 17000 | 19000 | 21000 | 23000 | 25000 | 27000 | 29000 | 31000 | 33000 | 35000 | 37000 | 39000 | 41000 | 43000 | 45000 |
| 2 | 1.31 | 0.94 | 0.73 | 0.60 | 0.50 | 0.44 | 0.39 | 0.35 | 0.31 | 0.29 | 0.26 | 0.24 | 0.23 | 0.21 | 0.20 | 0.19 | 0.18 | 0.17 | 0.16 | 0.15 | 0.15 |
| 4 | 2.62 | 1.87 | 1.46 | 1.19 | 1.01 | 0.87 | 0.77 | 0.69 | 0.62 | 0.57 | 0.52 | 0.49 | 0.45 | 0.42 | 0.40 | 0.37 | 0.35 | 0.34 | 0.32 | 0.31 | 0.29 |
| 6 | 3.94 | 2.81 | 2.19 | 1.79 | 1.51 | 1.31 | 1.16 | 1.04 | 0.94 | 0.86 | 0.79 | 0.73 | 0.68 | 0.63 | 0.60 | 0.56 | 0.53 | 0.50 | 0.48 | 0.46 | 0.44 |
| 8 | 5.25 | 3.75 | 2.92 | 2.39 | 2.02 | 1.75 | 1.54 | 1.38 | 1.25 | 1.14 | 1.05 | 0.97 | 0.90 | 0.85 | 0.80 | 0.75 | 0.71 | 0.67 | 0.64 | 0.61 | 0.58 |
| 10 | 6.56 | 4.69 | 3.64 | 2.98 | 2.52 | 2.19 | 1.93 | 1.73 | 1.56 | 1.43 | 1.31 | 1.21 | 1.13 | 1.06 | 0.99 | 0.94 | 0.89 | 0.84 | 0.80 | 0.76 | 0.73 |
| 12 | 7.87 | 5.62 | 4.37 | 3.58 | 3.03 | 2.62 | 2.32 | 2.07 | 1.87 | 1.71 | 1.57 | 1.46 | 1.36 | 1.27 | 1.19 | 1.12 | 1.06 | 1.01 | 0.96 | 0.92 | 0.87 |
| 14 | 9.18 | 6.56 | 5.10 | 4.17 | 3.53 | 3.06 | 2.70 | 2.42 | 2.19 | 2.00 | 1.84 | 1.70 | 1.58 | 1.48 | 1.39 | 1.31 | 1.24 | 1.18 | 1.12 | 1.07 | 1.02 |
| 16 | 10.50 | 7.50 | 5.83 | 4.77 | 4.04 | 3.50 | 3.09 | 2.76 | 2.50 | 2.28 | 2.10 | 1.94 | 1.81 | 1.69 | 1.59 | 1.50 | 1.42 | 1.35 | 1.28 | 1.22 | 1.17 |
| 18 | 11.81 | 8.43 | 6.56 | 5.37 | 4.54 | 3.94 | 3.47 | 3.11 | 2.81 | 2.57 | 2.36 | 2.19 | 2.04 | 1.90 | 1.79 | 1.69 | 1.60 | 1.51 | 1.44 | 1.37 | 1.31 |
| 20 | 13.12 | 9.37 | 7.29 | 5.96 | 5.05 | 4.37 | 3.86 | 3.45 | 3.12 | 2.85 | 2.62 | 2.43 | 2.26 | 2.12 | 1.99 | 1.87 | 1.77 | 1.68 | 1.60 | 1.53 | 1.46 |
| 22 | 14.43 | 10.31 | 8.02 | 6.56 | 5.55 | 4.81 | 4.24 | 3.80 | 3.44 | 3.14 | 2.89 | 2.67 | 2.49 | 2.33 | 2.19 | 2.06 | 1.95 | 1.85 | 1.76 | 1.68 | 1.60 |
| 24 | 15.74 | 11.25 | 8.75 | 7.16 | 6.06 | 5.25 | 4.63 | 4.14 | 3.75 | 3.42 | 3.15 | 2.92 | 2.71 | 2.54 | 2.39 | 2.25 | 2.13 | 2.02 | 1.92 | 1.83 | 1.75 |
| 26 | 17.06 | 12.18 | 9.48 | 7.75 | 6.56 | 5.69 | 5.02 | 4.49 | 4.06 | 3.71 | 3.41 | 3.16 | 2.94 | 2.75 | 2.58 | 2.44 | 2.30 | 2.19 | 2.08 | 1.98 | 1.90 |
| 28 | 18.37 | 13.12 | 10.20 | 8.35 | 7.06 | 6.12 | 5.40 | 4.83 | 4.37 | 3.99 | 3.67 | 3.40 | 3.17 | 2.96 | 2.78 | 2.62 | 2.48 | 2.35 | 2.24 | 2.14 | 2.04 |
| 30 | 19.68 | 14.06 | 10.93 | 8.95 | 7.57 | 6.56 | 5.79 | 5.18 | 4.69 | 4.28 | 3.94 | 3.64 | 3.39 | 3.17 | 2.98 | 2.81 | 2.66 | 2.52 | 2.40 | 2.29 | 2.19 |
| 32 | 20.99 | 14.99 | 11.66 | 9.54 | 8.07 | 7.00 | 6.17 | 5.52 | 5.00 | 4.56 | 4.20 | 3.89 | 3.62 | 3.39 | 3.18 | 3.00 | 2.84 | 2.69 | 2.56 | 2.44 | 2.33 |
| 34 | 22.30 | 15.93 | 12.39 | 10.14 | 8.58 | 7.43 | 6.56 | 5.87 | 5.31 | 4.85 | 4.46 | 4.13 | 3.85 | 3.60 | 3.38 | 3.19 | 3.01 | 2.86 | 2.72 | 2.59 | 2.48 |
| 36 | 23.62 | 16.87 | 13.12 | 10.73 | 9.08 | 7.87 | 6.95 | 6.21 | 5.62 | 5.13 | 4.72 | 4.37 | 4.07 | 3.81 | 3.58 | 3.37 | 3.19 | 3.03 | 2.88 | 2.75 | 2.62 |
| 38 | 24.93 | 17.81 | 13.85 | 11.33 | 9.59 | 8.31 | 7.33 | 6.56 | 5.94 | 5.42 | 4.99 | 4.62 | 4.30 | 4.02 | 3.78 | 3.56 | 3.37 | 3.20 | 3.04 | 2.90 | 2.77 |
| 40 | 26.24 | 18.74 | 14.58 | 11.93 | 10.09 | 8.75 | 7.72 | 6.91 | 6.25 | 5.70 | 5.25 | 4.86 | 4.52 | 4.23 | 3.98 | 3.75 | 3.55 | 3.36 | 3.20 | 3.05 | 2.92 |
| 42 | 27.55 | 19.68 | 15.31 | 12.52 | 10.60 | 9.18 | 8.10 | 7.25 | 6.56 | 5.99 | 5.51 | 5.10 | 4.75 | 4.44 | 4.17 | 3.94 | 3.72 | 3.53 | 3.36 | 3.20 | 3.06 |
| 44 | 28.86 | 20.62 | 16.04 | 13.12 | 11.10 | 9.62 | 8.49 | 7.60 | 6.87 | 6.27 | 5.77 | 5.35 | 4.98 | 4.66 | 4.37 | 4.12 | 3.90 | 3.70 | 3.52 | 3.36 | 3.21 |
| 46 | 30.18 | 21.55 | 16.76 | 13.72 | 11.61 | 10.06 | 8.88 | 7.94 | 7.18 | 6.56 | 6.04 | 5.59 | 5.20 | 4.87 | 4.57 | 4.31 | 4.08 | 3.87 | 3.68 | 3.51 | 3.35 |
| 48 | 31.49 | 22.49 | 17.49 | 14.31 | 12.11 | 10.50 | 9.26 | 8.29 | 7.50 | 6.85 | 6.30 | 5.83 | 5.43 | 5.08 | 4.77 | 4.50 | 4.26 | 4.04 | 3.84 | 3.66 | 3.50 |
| 50 | 32.80 | 23.43 | 18.22 | 14.91 | 12.62 | 10.93 | 9.65 | 8.63 | 7.81 | 7.13 | 6.56 | 6.07 | 5.66 | 5.29 | 4.97 | 4.69 | 4.43 | 4.21 | 4.00 | 3.81 | 3.64 |

Table 4. VIL density table for VIL values between 2 kg $m^{-2}$ and 50 kg $m^{-2}$, and echo tops from 5000 feet to 45000 feet.