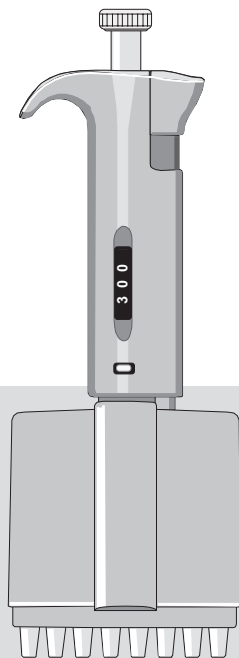


# ***Fisherbrand***<sup>®</sup> **Finnpipette**<sup>®</sup>

## INSTRUCTIONS FOR USE



2000 PARK LANE  
Pittsburgh PA 15275  
800-766-7000

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## PRODUCT DESCRIPTION

The **Fisherbrand**® Finnpipette Digital, Multichannel, Manual Pipetter operates on the air displacement principle and uses disposable polypropylene pipette tips. Five models cover a volume range from 0.5µl to 300µl.

### CONSTRUCTION

The tough polyamide and nylon pipetter handle stands up to volatile and aggressive liquids. Its low thermal conductivity means it won't absorb hand heat, which could compromise pipetter performance. The PVDF tip ejector shaft and PVDF/polypropylene tip cone provide extra corrosion resistance and are both autoclavable.

### DESIGN

Designed for safe, one-hand operation even when dispensing infectious liquids. The ribbed finger rest ensures a secure grip and correct pipetting angle, minimizing hand strain. The tip ejector is separate from the operating piston, so there's no danger of accidentally discharging tips. The large digital display is easy to read—even while holding the pipetter.

A shelf hanger is included for storing the pipetter. Pipetter hangs firmly from grippy finger rest on the shelf hanger. Self-adhesive stickers attach the hanger securely to shelves, counters, cabinets, and even existing pipetter stands.

### PACKAGE

The **Fisherbrand**® Finnpipette Digital is shipped in a specially designed package containing the following items:

- |   |                       |                            |
|---|-----------------------|----------------------------|
| 1. The <b>Fisherbrand</b> ® Finnpipette | 4. Finntip sample     | 7. Calibration certificate |
| 2. Service tool                         | 5. Tube of grease     | 8. Shelf hanger            |
| 3. Maintenance pliers                   | 6. Instruction manual | 9. Two stickers for hanger |

### COMPATIBLE PIPETTE TIPS

Fisherbrand General-purpose Redi-Tip\* Tips, Extended Length Tips, Stack-Rack Tips, and Environmental Reload Tips (101–1000µl).

Finntip Universal Tips (for volumes under 1µl).

Fisherbrand Standardization Tips (0–200µl).

Fisherbrand Redi-Tip Reference Tips (0–300µl).

Fisherbrand Redi-Tip Reference Tips (101–1000µl).

Fisherbrand Standardization Tips (200–1300µl).

Finntip 62 Tips and Finntip 63 Tips.

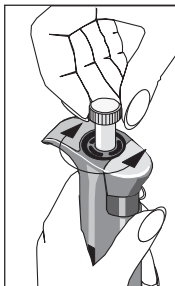
Fisherbrand Aerosol-barrier and Low-retention Tips

## PIPETTER OPERATION

### SETTING THE DELIVERY VOLUME

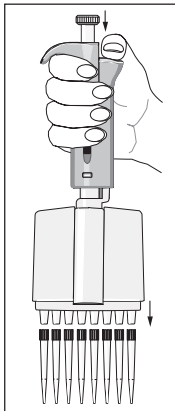
To set the delivery volume, turn the thumb knob counterclockwise to increase volume and clockwise to decrease volume. Make sure the thumb knob clicks into place for the desired volume and the digits are completely visible in the display window.

**Note:** Do not set volumes outside the pipetter's specified volume range. Forcing the thumb knob to turn outside the range may jam the mechanism and eventually damage the pipetter.



### TIP EJECTION

To avoid accidental tip ejection, the ejector button is separate from the thumb knob. It is molded into the handle directly beside the operating piston for comfort and ease of use. To release the tips, point the pipetter at a suitable waste receptacle and press the tip ejector with your thumb.



## PIPETTING TECHNIQUES

Make sure that the tips, pipette and solution are at the same temperature.

Make sure that the tips are firmly attached to the tip cone. Check for foreign particles in the tips. Hold the pipetter in an upright position while aspirating liquid. The gripper should rest on your index finger.

Push and release the push button slowly at all times, particularly when working with high viscosity liquids. Never allow the push button to snap back.

Before you begin your actual pipetting work, fill and empty the tips two to three times with the solution that you will be pipetting.

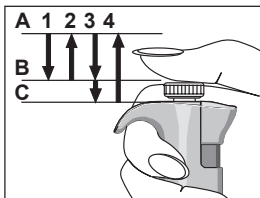
## PIPETTING TECHNIQUES, Contd.

### FORWARD TECHNIQUE

Fill a clean reagent reservoir with the liquid to be dispensed.

1. Depress the push button to the first stop.
2. Dip the tip under the surface of the liquid in the reservoir to a depth of about 1cm and slowly release the push button. Withdraw the tip from the liquid, touching it against the edge of the reservoir to remove excess liquid.
3. Deliver the liquid by gently depressing the push button to the first stop. After a delay of about one second, continue to depress the push button all the way to the second stop. This action will empty the tip.
4. Release the push button to the ready position. If necessary, change the tip and continue pipetting.

A = Ready position  
B = First stop  
C = Second stop

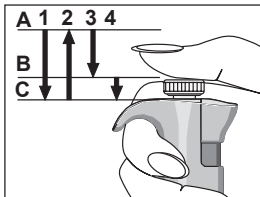


### REVERSE TECHNIQUE

The reverse technique is suitable for dispensing liquids that have a high viscosity or a tendency to foam easily. The technique is also recommended for dispensing very small volumes.

Fill a clean reagent reservoir with the liquid to be dispensed.

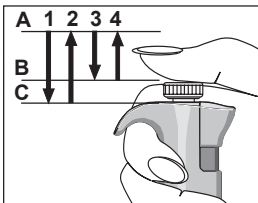
1. Depress the push button all the way to the second stop.
2. Dip the tip under the surface of the liquid in the reservoir to a depth of about 1cm, and slowly release the push button. This action will fill the tip. Withdraw the tip from the liquid, touching it against the edge of the reservoir to remove excess liquid.
3. Deliver the preset volume by gently depressing the push button to the first stop. Hold the push button at the first stop. Some liquid will remain in the tip, and this should not be included in the delivery.
4. The remaining liquid should either be discarded with the tip or pipetted back into the container.



## REPETITIVE TECHNIQUE

The repetitive technique offers a rapid and simple procedure for repeated delivery of the same volume. Fill a clean reagent reservoir with the liquid to be dispensed.

1. Depress the push button all the way to the second stop.
2. Dip the tip under the surface of the liquid in the reservoir to a depth of about 1cm, and slowly release the push button. This action will fill the tip. Withdraw the tip from the liquid, touching against the edge of the reservoir to remove excess liquid.
3. Deliver the preset volume by gently depressing the push button to the first stop. Hold the push button at the first stop. Some liquid will remain in the tip, and this should not be included in the delivery.
4. Continue pipetting by repeating steps 2 and 3.



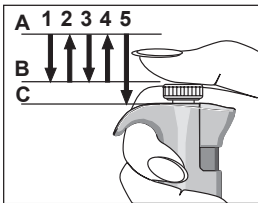
## PIPETTING WHOLE BLOOD

This technique is effective for certain specialized applications, such as deproteinization in blood glucose determination.

Use steps 1 and 2 of the forward technique to fill the tip with blood.

Wipe the tip carefully with a dry, clean tissue.

1. Immerse the tip into the reagent and depress the push button to the first stop, making sure the tip is well below the surface.
2. Release the push button slowly to the ready position. This will fill the tip. Keep the tip in the solution.
3. Depress the push button to the first stop and release slowly. Keep repeating this procedure until the interior wall of the tip is clear.
4. Finally, depress the push button all the way to the second stop to completely empty the tip.



## CALIBRATION

All Finnpiettes are factory calibrated and adjusted to give the volumes as specified when used with distilled or deionized water. Normally, the pipetters do not need adjustment, but they are constructed to permit recalibration and adjustment for liquids of different temperature and viscosity.

### DEVICE REQUIREMENTS AND TEST CONDITIONS

An analytical balance must be used to accurately weigh the test samples. The scale graduation value of the balance should be chosen according to the selected test volume of the pipetter:

Calibration Test Volume Range	Readable Scale Graduation
under 10 $\mu$ l	0.001mg
10–100 $\mu$ l	0.01mg
above 100 $\mu$ l	0.1mg

Test liquid: Distilled or deionized water, conforming to ISO 3696 requirements for “grade 3” water. Tests should be done in a draft-free room at a constant ( $\pm 0.5^{\circ}\text{C}$ ) temperature of water, pipetter and air between  $20^{\circ}\text{C}$  to  $25^{\circ}\text{C}$ .

The relative humidity must be above 55%. Especially with volumes under 50 $\mu$ l the air humidity should be as high as possible to reduce the effect of evaporation loss. Special accessories, such as the evaporation trap, are recommended.

### CHECKING THE CALIBRATION

The pipetter is checked with the maximum (nominal) volume and with the minimum volume (or 10% of maximum volume, whichever is higher.) For example, Finnpiette 0.5–10 $\mu$ l is tested at 10 $\mu$ l and 1 $\mu$ l.

A new tip is first pre-wetted three to five times and a series of ten pipettings is done with each volume. Each of the pipettings is dispensed into a tared weighing vessel on the analytical balance. Weight of each sample is noted for calculating calibration results. If the calculated results are within the limits given on Table 1 on the following page, the calibration of the pipetter is correct. A pipetter is always adjusted for delivery of the selected volume. Measuring volumes taken from the balance is not an acceptable procedure for calibrating the Fisherbrand Finnpiette.

## Procedure:

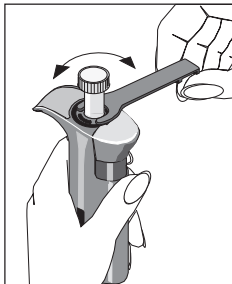
1. Do 10 pipettings with the min. volume.
2. Do 10 pipettings with the max. volume.
3. Calculate the accuracy (A) and precision (cv) of both series (See formulas below.)
4. Compare the results to the limits in Table 1 on the following page.

If the results are within the limits given, then the calibration of the pipetter is correct. Otherwise, the pipetter must be adjusted and checked again.

## ADJUSTMENT

Adjustment is done with the service tool.

1. Place the service tool into the openings of the calibration nut at the top of the handle.
2. Turn the service tool clockwise to increase, or counter clockwise to decrease the volume.
3. After adjustment check the calibration according to the instructions above.



## FORMULAS FOR CALCULATING RESULTS

### Conversion of mass to volume

$$V = (w + e) \times Z$$

V = volume ( $\mu$ l)

e = evaporation loss (mg)

w = weight (mg)

Z = conversion factor for mg/ $\mu$ l conversion

Evaporation loss can be significant with low volumes. To determine mass loss, dispense water to the weighing vessel, note the reading and start a stopwatch. See how much the reading decreases during 30 seconds (e.g., 6mg = 0.2mg/s)

Compare this to the pipetting time from taring to reading. Typical pipetting time might be 10 seconds with a mass loss of 2mg (10s x 0.2mg/s) in this example. If an evaporation trap or lid on the vessel is used the correction of evaporation is usually unnecessary.

The factor Z is for converting the weight of the water to volume at test temperature and pressure. A typical value is 1.0032 $\mu$ l/mg at 22°C and 95 kPa. See the conversion on page 16 of this manual for Z values at other temperatures and air pressures.



## Accuracy (systematic error)

Accuracy is the difference between the dispensed volume and the selected volume of a pipette.

$$A = \bar{V} - V_0 \quad A = \text{accuracy} \quad \bar{V} = \text{mean volume} \quad V_0 = \text{nominal volume}$$

Accuracy can be expressed as a relative value:  $A\% = 100\% \times A / V_0$

## Precision (random error)

Precision refers to the repeatability of the pipettings. It is expressed as standard deviation (s) or coefficient of variation (cv)

$$S = \sqrt{\frac{\sum_{i=1}^n (V_i - \bar{V})^2}{n-1}}$$

S = standard deviation

$\bar{V}$  = mean volume

n = number of measurements

v = variance

cv is the relative value of standard deviation:

$$cv = 100\% \times S / v$$

**TABLE 1**  
**ACCEPTABLE CALIBRATION RESULTS**

Test Volume Range	Max/Min Volumes (μl)	Accuracy μl	%	Precision Standard Deviation(μl)	Coefficient of Variation (%)
0,5-10μl /8ch	10	±0.24	±2.4	0.16	1.6
	1	±0.12	±12.0	0.08	8.0
5-50 μl/8ch	50	±0.75	±1.5	0.35	0.7
	5	±0.25	±5.0	0.10	2.0
50-300μl/8ch	300	±3.0	±1.0	0.9	0.3
	50	±2.3	±4.6	0.8	1.5
0.5-10μl/12ch	10	±0.24	±2.4	0.16	1.6
	1	±0.12	±12.0	0.08	8.0
5-50μl/12ch	50	±0.75	±1.5	0.35	0.7
	5	±0.25	±5.0	0.10	2.0
50-300μl/12ch	300	±3.0	±1.0	0.9	0.3
	50	±2.3	±4.6	0.8	1.5

## **CAUTION!**

*The Fisherbrand<sup>®</sup> Finnpiquette is designed to allow easy in-lab service. If you would prefer to have Fisher Scientific service your pipetter, make sure that it has been decontaminated before shipping.*

*Please note that the postal authorities in your country may prohibit or restrict the shipment of contaminated material by mail.*

## **TROUBLE SHOOTING**

The table below lists possible problems and their solutions.

<b>Defect</b>	<b>Possible reason</b>	<b>Solution</b>
Leakage	Tip incorrectly attached Foreign particles between tip and tip cone Foreign particles between the piston, the O-ring and the cylinder Insufficient amount of grease on cylinder and O-ring O-ring damaged	Attach firmly Clean tip cones attach new tips Clean and grease O-ring and cylinder.  Grease accordingly Change the O-ring
Inaccurate dispensing	Incorrect operation Tip incorrectly attached Calibration altered: caused by misuse, for example	Follow instructions carefully Attach firmly Recalibrate according to instructions
Inaccurate dispensing with certain liquids	Unsuitable calibration. High viscosity liquids may require recalibration.	Recalibrate with the liquids in question.

## MAINTENANCE

### SHORT-TERM CHECKING

The pipetter should be checked at the beginning of each day for dust and dirt on the outside surfaces. Particular attention should be paid to the tip cone. No other solvents except 70 % ethanol should be used to clean the pipetter.

**Note:** When the **Fisherbrand**® Finnpipette Digital Multichannel is not in use, make sure it is stored in an upright position. We recommend a Finnpipette stand for this purpose.

### LONG-TERM MAINTENANCE

If the pipetter is used daily, it should be checked every three months. The servicing procedure starts with the disassembly of the pipetter.

### DISASSEMBLING MULTICHANNEL PIPETTERS

1. Press down the tip ejector.
2. Insert the maintenance pliers under the tip ejector bar to release the tip ejector.
3. Remove the tip cone module by pressing it with the maintenance pliers
4. Press the spring and remove the locking pieces from the groove. Remove the spring and spring support
5. Place the maintenance key in the adapter groove and pull off the adapter.
6. Pull out the tip ejector adapter. Lift the upper end of the tip ejector bar slightly and push it back. Lift out the module spring.
7. Use a screwdriver to remove the screws in the module cover and lift off the cover.
8. Remove the piston bar and clean the pistons with a dry, napless cloth.
9. Clean the tip cones.
10. If needed, replace the seal by carefully releasing the cover ring from its snap joint with the screwdriver. Remove all the parts from the tip cone. Clean all the parts. Reassemble the tip cone.

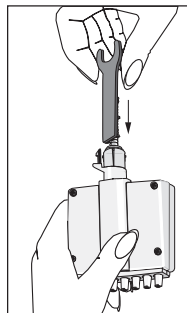
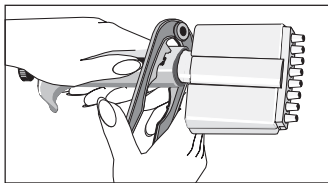
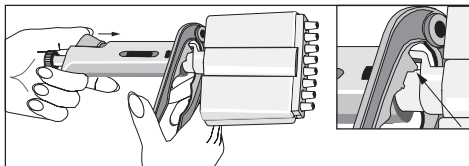
## ASSEMBLING MULTICHANNEL PIPETTERS\*

**5–50  $\mu$ l and 50–300  $\mu$ l:** Take one piston. Slide cover ring (32) (larger hole), spring (33), support ring (35), (o–ring (37) bigger 5–50 $\mu$ l) and o–ring (36) (smaller) onto the piston. Grease the o–ring with the lubricant provided in the pipette package. Slide all the parts into the tip cone and close the snap joint of the cover ring.

**0.5–10 $\mu$ l:** Take one piston. Slide cover ring (32) (larger hole), support (35), o–ring (36)(bigger), o–ring (37) (smaller) and o–ring support (38) onto the piston. Then slide spring (39), spring support (40) (sharp edges first) and o–ring (41) onto the o–ring support (38). Grease the o–rings with the lubricant provided in the pipetter package. Slide all the parts into the tip cone and close the snap joint of the cover ring.

11. Grease cleaned pistons with the lubricant provided in the pipetter package.
12. Install the piston bar with pistons and tip cones in the cover and close the cover with the four/six screws.
13. Place the tip ejector and module spring on the neck of the module. Press the spring below the tip ejector. Close the tip ejector with the tip ejector adapter.
14. Use the maintenance key to slide the adapter to wider groove in the module neck.
15. Slide the o–ring, spring support and spring onto the piston bar and lock with the locking pieces.
16. Attach the tip cone module to the handle and the tip ejector adapter to the tip ejector bar.

\* See the spare parts diagram on pages 10–12 for reference numbers given here in parentheses.

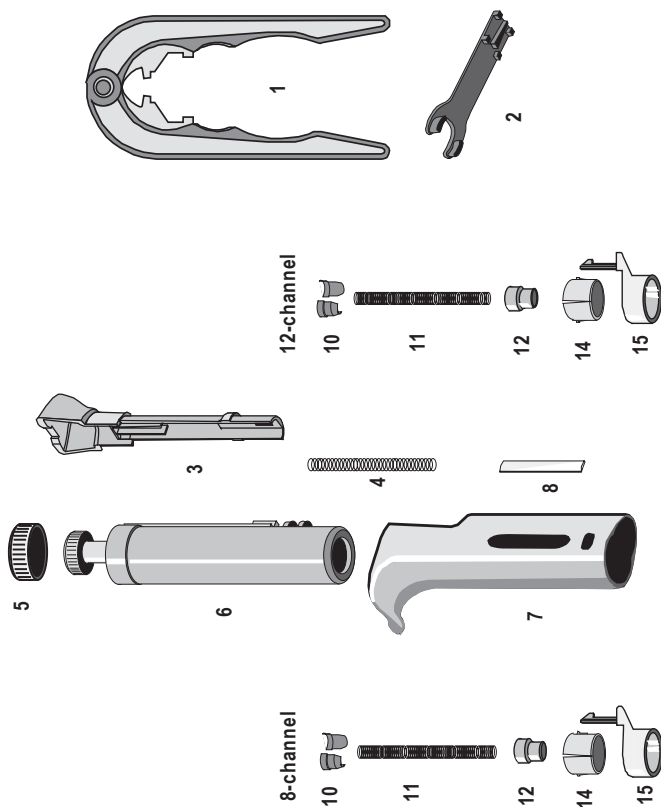


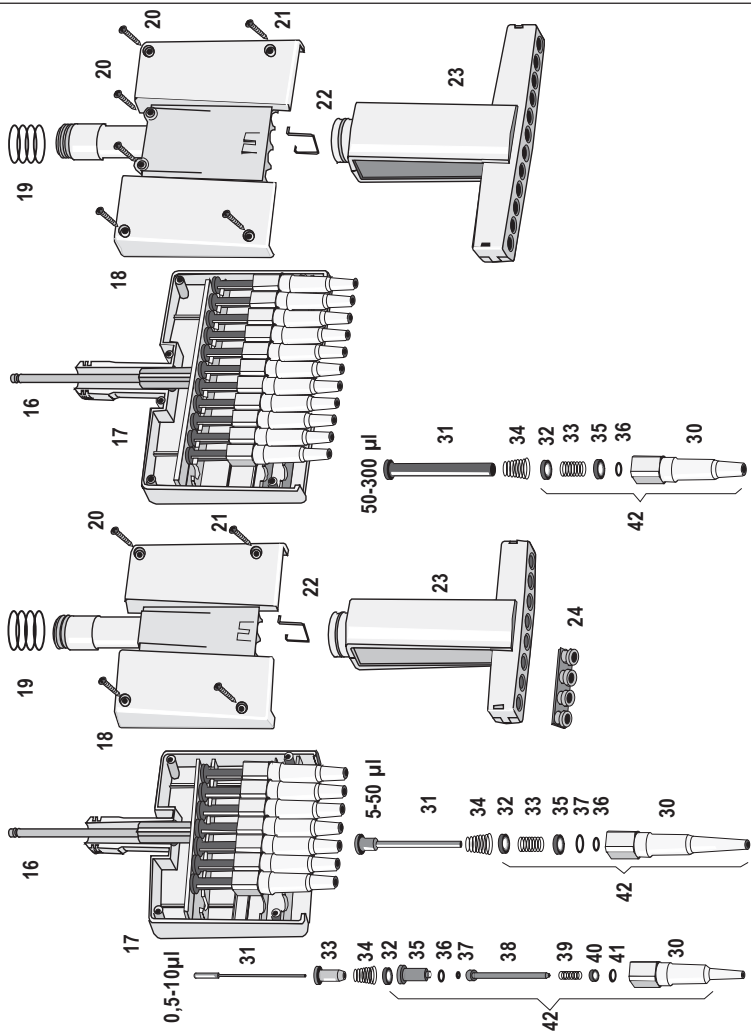
## SPARE PARTS

See figure 1 for spare parts and reference numbers

All	Module			Shelf hanger
1. 2900580	8-ch	0,5-50 µl	2207180	2206740
2. 10593720	8-ch	5-50 µl	2206750	
3. 10594540	8-ch	50-300 µl	2206760	
4. 1131820	12-ch	0,5-10 µl	2207190	
	12-ch	5-50 µl	2206770	
	12-ch	50-300 µl	2206780	
8-channel	12-channel	0,5-10 µl	5-50 µl	50-300 µl
10. 1058180	10. 1058180	5. 1057480	5. 1057490	5. 1057500
12. 10593260	12. 10593260	6. 2206650	6. 2206700	6. 2206710
13. 1030590	14. 10593750	7. 10594521	7. 10594527	7. 10594528
14. 10593750	15. 10593740	8. 1054015	8. 1054015	8. 1054014
15. 10593740	16. 2205980	11. 1131890	11. 1131890	11. 1130720
16. 2205970	17. 10594590	24. 10594760	30. 10589520	30. 10589160
17. 10594560	18. 10594580	30. 10593240	31. 2205950	31. 2205960
18. 10594550	19. 1131430	31. 2205860	32. 10589490	32. 10589490
19. 1131430	20. 0202041	32. 10589490	33. 1131400	33. 1131400
20. 0202041	21. 0202021	33. 10593510	34. 1131790	34. 1131790
21. 0202021	22. 1131930	34. 1131790	35. 10589500	35. 10589510
22. 1131930	23. 10594600	35. 10593280	36. 1030480	36. 1030140
23. 10594570		36. 1030380	37. 1030160	42. 2205270 1 pcs
		37. 1030060	42. 2208850 1 pcs	42. 2207080 8 pcs
		38. 10593290	42. 2209080 8 pcs	42. 2207090 12 pcs
		39. 1131900	42. 2209090 12 pcs	
		40. 10593360		
		41. 1030170		
		42. 2205870 1 pcs		
		42. 2207910 8 pcs		
		42. 2207920 12 pcs		

**Figure 1**





## CONVERSION TABLE

Value of the conversion factor Z ( $\mu\text{l}/\text{mg}$ ), as a function of temperature and pressure, for distilled water.

Temperature °C	Air pressure hPA (mbar)					
	800	853	907	960	1013	1067
15	1.0018	1.0018	1.0019	1.0019	1.0020	1.0020
15.5	1.0018	1.0018	1.0019	1.0020	1.0020	1.0021
16	1.0019	1.0020	1.0020	1.0021	1.0021	1.0022
16.5	1.0020	1.0020	1.0021	1.0022	1.0022	1.0023
17	1.0021	1.0021	1.0022	1.0022	1.0023	1.0023
17.5	1.0022	1.0022	1.0023	1.0023	1.0024	1.0024
18	1.0022	1.0023	1.0024	1.0024	1.0025	1.0025
18.5	1.0023	1.0024	1.0025	1.0025	1.0026	1.0026
19	1.0024	1.0025	1.0025	1.0026	1.0027	1.0027
19.5	1.0025	1.0026	1.0026	1.0027	1.0028	1.0028
20	1.0026	1.0027	1.0027	1.0028	1.0029	1.0029
20.5	1.0027	1.0028	1.0028	1.0029	1.0030	1.0030
21	1.0028	1.0029	1.0030	1.0030	1.0031	1.0031
21.5	1.0030	1.0030	1.0031	1.0031	1.0032	1.0032
22	1.0031	1.0031	1.0032	1.0032	1.0033	1.0033
22.5	1.0032	1.0032	1.0033	1.0033	1.0034	1.0035
23	1.0033	1.0033	1.0034	1.0035	1.0035	1.0036
23.5	1.0034	1.0035	1.0035	1.0036	1.0036	1.0037
24	1.0035	1.0036	1.0036	1.0037	1.0038	1.0038
24.5	1.0037	1.0037	1.0038	1.0038	1.0039	1.0039
25	1.0038	1.0038	1.0039	1.0039	1.0040	1.0041
25.5	1.0039	1.0040	1.0040	1.0041	1.0041	1.0042
26	1.0040	1.0041	1.0042	1.0042	1.0043	1.0043
26.5	1.0042	1.0042	1.0043	1.0043	1.0044	1.0045
27	1.0043	1.0044	1.0044	1.0045	1.0045	1.0046
27.5	1.0044	1.0045	1.0046	1.0046	1.0047	1.0047
28	1.0046	1.0046	1.0047	1.0048	1.0048	1.0049
28.5	1.0047	1.0048	1.0048	1.0049	1.0050	1.0050
29	1.0049	1.0049	1.0050	1.0050	1.0051	1.0052
29.5	1.0050	1.0051	1.0051	1.0052	1.0052	1.0053
30	1.0052	1.0052	1.0053	1.0053	1.0054	1.0055



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