

HI 84429

## Titration Acids Mini Titrator and pH Meter for the Dairy Industry

Perform a Complete Analysis with One Compact Meter!



HI 84429 is a low cost, easy to use, automatic titrator and pH meter that reflects HANNA's years of experience as a manufacturer of analytical instruments. HI 84429 performs automatic analysis with all the necessary calculations through a clear and simple interface.

This advanced automatic titrator and pH meter has a powerful and effective built-in algorithm to analyze the shape of the pH electrode response and determines the reaction completion. By pressing the START key, the instrument automatically conducts an endpoint titration and the result is immediately displayed. The HI 84429 has a simple and reliable peristaltic pump to ensure accuracy in dosing and repeatability in measurement.

The HI 84429 comes with a pre-programmed analysis method designed for total titratable acidity measurements on milk. The determination of total acids in dairy products is made according to a neutralization reaction; that is the reaction between the acids found in dairy products and a base. This type of reaction forms the basis of titration methods of analyzing acids. Titratable acidity is measured on a degassed sample at the endpoint of 8.30 pH. The results are expressed in °SH, °Thm °D or % l.a.

### Acidity Measurement and Its Significance in the Dairy Industry

There are two fundamentally different conventions for expressing acidity in dairy products: titratable acidity and pH. The pH is a measurement of hydrogen ion concentration while titratable acidity is the neutralizing capacity by a base.

Acidity affects taste, thus this parameter is tested to determine the quality of the milk product. As milk acidity increases over time, measuring this parameter is also a means of monitoring storage conditions. Acidity is determined by an endpoint titration using sodium hydroxide (a base) and is defined as the consumption of base necessary to shift the pH value from 6.6 (corresponding to fresh milk) to a pre-determined basic pH value. While pH 7.0 is the actual point of neutralization, phenolphthalein is commonly employed as a color indicator to determine the endpoint of reaction and with it, color change occurs at pH 8.3. Titratable acidity is expressed as one of a variety of units, the use of which reflects the titration method and strength of base employed during titration.

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°SH – Soxlet Henkel degrees: obtained by titrating 100 mL of milk with 0.25N NaOH, using phenolphthalein as the indicator. This method is common in Central Europe.

°Th – Thorner degrees: obtained by titrating 100 mL of milk thinned with 2 parts distilled water, with 0.1 N NaOH, using phenolphthalein as an indicator. Method is used mostly in Sweden and the CIS.

°D – Dornic degrees: obtained by titrating 100 mL of milk thinned with two parts distilled water, with 0.9N NaOH, using phenolphthalein as an indicator. Used mostly in the Netherlands and France.

% l.a. – percent lactic acid: obtained as °D divided by 100. Frequently used in the UK, USA, Canada, Australia and New Zealand.

Note: Taking into account the concentration of sodium hydroxide, the results expressed in one value can be easily converted into any other unit value by consulting the chart at right.

The HI 84429 Mini Titrator eliminates the subjective endpoint color change detection determined by the human eye, and instead

employs the sensitivity and accuracy of a pH sensor. The titration method is a potentiometric endpoint determination using a pre-determined pH value.

Acidity of dairy products can be expressed in any of the units described earlier by simply selecting the desired unit. After performing a pump calibration with the supplied standard, you can then make titrations, expressed in the desired unit, using the same titrant. This eliminates the inconvenience of changing tubes, purging the titrant for tube cleaning and being sure that you have the right titrant concentration – saving time and titrant. The quantity of sample needed is much smaller in comparison to a traditional method, where 100 mL of product is used.

	°SH	°Th	°D	% l.a.
NaOH Concentration (N)	0.25	0.1	0.111	0.111
	1	2.5	2.25	0.0225
	0.4	1	0.9	0.009
	4/9	10/9	1	0.01

SPECIFICATIONS		HI 84429
Titrator	Titratable Acidity Low Range	0.0 to 15.0 °SH; 0 to 40 °Th; 0 to 35 °D; 0.00 to 0.35 % l.a.
	Titratable Acidity LR Resolution	0.1 °SH; 1 °Th; 1 °D; 0.01% l.a.
	Titratable Acidity High Range	10 to 75 °SH; 20 to 200 °Th; 20 to 175 °D; 0.0 to 2.0 % l.a.
	Titratable Acidity HR Resolution	0.5 °SH; 1 °Th; 1 °D; 0.1% l.a.
	Accuracy (@25°C/77°F)	5% of reading
	Titration Method	acid-base titration
	Principle	endpoint titration, 8.30 pH
	Pump Debit	0.5 mL/min
	Stirring Speed	800 rpm
	Logging Data	up to 50 samples
pH Meter	Range	-2.0 to 16.0 pH / -2.00 to 16.00 pH
	Resolution	0.1 pH / 0.01 pH
	Accuracy (@25°C/77°F)	±0.01 pH
	Calibration	one, two or three point calibration (pH 4.01, 6.00, 8.30)
	Temperature Compensation	manual or automatic from -20 to 120°C (-4 to 248°F)
	Logging Data	up to 50 samples
Temperature	Range	-20.0 to 120.0°C (-4.0 to 248.0°F)
	Resolution	0.1°C
	Accuracy (@25°C/77°F)	±0.4°C without probe error
Electrodes	FC 260B pH electrode with 1 m (3.3') cable (included), HI 5315 reference probe with 1 m (3.3') cable (included)	
Temperature Probe	HI 7662-M stainless steel temperature probe with 1 m (3.3') cable (included)	
Environment	0 to 50°C (32 to 122°F); RH max 95% non-condensing	
Power Supply	12 VDC adapter (included)	
Dimensions	208 x 214 x 163 mm (8.2 x 8.4 x 6.4") (with beaker)	
Weight	2200 g (77 oz.)	

## ORDERING INFORMATION

HI 84429-01 (115V) and HI 84429-02 (230V) are supplied with FC 260B pH electrode, HI 5315 Reference electrode, HI 7072 Filling solution (30 mL), HI 7662-M temperature probe, HI 84429-50 titrant (100 mL), HI 84429-55 Standard (500 mL), HI 700640 cleaning solution for milk deposits (20 mL, 2), pH 4.01 buffer solution (230 mL), pH 6.00 buffer solution (230 mL), pH 8.30 buffer solution (230 mL, 50 mL beakers (2), 20 mL beakers (2), tube set with cap, stir bars (2 small, 2 large), power cord, 1 mL syringe, capillary dropper pipette and Instruction manual.

## SOLUTIONS

HI 84429-50 Titrant solution, 100 mL  
 HI 84429-55 Pump calibration standard, 500 mL  
 HI 84429-65 pH 4.01 buffer solution, 230 mL (6)  
 HI 84429-70 pH 6.00 buffer solution, 230 mL (6)  
 HI 84429-60 pH 8.30 buffer solution, 230 mL (6)  
 HI 84429-20 Reagent set starter kit (20 tests)  
 HI 70640L Cleaning solution for remaining milk deposits, 500 mL  
 HI 70641L Cleaning and disinfecting for dairy products, 500 mL  
 HI 70642L Cleaning solution for remaining cheese deposits, 500 mL  
 HI 7072 Reference electrode filling solution (4)

## ACCESSORIES

HI 70483T Tube set with cap for titrant bottle and tip  
 HI 731316 Stir bar 12 x 5 mm (5)  
 HI 731319 Stir bar 25 x 7 mm (10)  
 HI 740036P 50 mL plastic beaker (10)  
 HI 740037P 20 mL plastic beaker (10)  
 HI 740143 Syringe 1 mL (6)  
 HI 740144 Pipette tip 1 mL (6)