ARCHITECT

LIPASE

This package insert contains information to run the Lipase assay on the ARCHITECT *c* Systems.

Read Highlighted Changes: Revised February 2017.

Package insert instructions must be carefully followed. Reliability of assay results cannot be guaranteed if there are any deviations from the instructions in this package insert.

Customer Service: Contact your local representative or find country-specific contact information on www.abbottdiagnostics.com.

Key to Symbols

CONTAINS: AZIDE	Contains sodium azide. Contact with acids liberates very toxic gas.	R2	Reagent 2
EC REP	Authorized Representative in the European Community	REF	Catalog number/List number
ECO HAZARD	Ecological hazard	SN	Serial number
FOR USE WITH	Identifies products to be used together		Consult instructions for use
INFORMATION FOR USA ONLY	Information needed for United States of America only		Manufacturer
IVD	*In Vitro* Diagnostic Medical Device		Sufficient for
LOT	Batch code/Lot number		Temperature limitation
PRODUCT OF JAPAN	Product of Japan		Use by/Expiration date
R1	Reagent 1		Caution
R1A	Reagent 1A		

Abbott

NAME

LIPASE

INTENDED USE

The Lipase assay is used for the quantitation of lipase in human serum or plasma.

SUMMARY AND EXPLANATION OF TEST

Pancreatic lipase in serum and plasma is closely associated with pancreatic diseases. The activity of this enzyme has been measured as an important marker for diagnosing pancreatic diseases and the associated monitoring of therapeutic effects. Pancreatic lipase test kits currently available include a turbidimetric method using triglyceride as substrate and a colorimetric method using synthetic substrates. These methods, however: 1) lack precision near the normal level; 2) exhibit poor reproducibility; and 3) are affected by other enzymes such as esterases.

The enzymatic color rate assay uses a clear substrate solution of 1,2-diglyceride, which is a 'natural' substrate. The assay is highly sensitive and specific for pancreatic lipase, using colipase and deoxycholate as activators.

PRINCIPLES OF PROCEDURE

Lipase acts on a natural substrate, 1,2-diglyceride, to liberate 2-monoglyceride. This is hydrolyzed by monoglyceride lipase into glycerol and free fatty acid. Glycerol kinase acts on glycerol to form glycerol-3-phosphate which is in turn acted on by glycerol-3-phosphate oxidase to generate hydrogen peroxide. Peroxidase converts the hydrogen peroxide, 4-aminoantipyrine, and *N*-ethyl-*N*-(2-hydroxy-3-sulfopropyl)-m-toluidine (TOOS) into a quinone dye. The rate of formation of the dye, measured as an increase in absorbance at 548 nm, is proportional to the lipase concentration in the sample.

Methodology: Quinone Dye

REAGENTS

Reagent Kit

REF 7D80-31 Lipase is supplied as a two-reagent kit which contains:

R1 5 x 29 mL

R1A 5 x 30 mL
Contains human serum albumin.

R2 5 x 14 mL

Estimated tests per kit: 778

Calculation is based on the minimum reagent fill volume per kit.

Reactive Ingredients		Concentration
R1	Cholic acid	5.34 mmol/L
R1A	1,2-Diglyceride	1.1 mmol/L
	Monoglyceride lipase	0.88 U/mL
	Glycerol kinase	< 1.34 U/mL
	Glycerol-3-phosphate oxidase	< 40.0 U/mL
	Peroxidase	< 1.34 U/mL
	Colipase	< 40.0 U/mL
	TOOS	0.068%
	ATP	0.66 mmol/L
R2	Deoxycholic acid	36.0 mmol/L
	4-Aminoantipyrine	0.12%

Inactive Ingredients: R1 and R2 contain sodium azide (0.05%) as a preservative.

REAGENT HANDLING AND STORAGE

Reagent Handling

Remove air bubbles, if present in the reagent cartridge, with a new applicator stick. Alternatively, allow the reagent to sit at the appropriate storage temperature to allow the bubbles to dissipate. To minimize volume depletion, do not use a transfer pipette to remove the bubbles.

CAUTION: Reagent bubbles may interfere with proper detection of reagent level in the cartridge, causing insufficient reagent aspiration which could impact results.

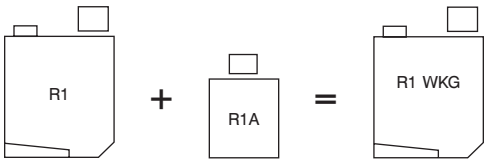
Reagent Storage

Unopened reagents are stable until the expiration date when stored at 2 to 8°C.

Reagent stability is 11 days if the reagent is uncapped and onboard.

Instructions for Use

1. Prepare the Working Reagent by adding the contents of the large Lipase R1 to the smaller Lipase R1A.



Working Reagent 1

2. Replace the R1A reagent stopper and mix by gentle inversion to achieve complete dissolution.
3. Return the prepared Working Reagent to the R1 cartridge and mix again by gentle inversion.
   Remove air bubbles, if present in the reagent cartridge, with a new applicator stick.
4. Place the R1 cartridge in Reagent Supply Center 1.
5. Place the R2 cartridge in Reagent Supply Center 2.

Indications of Deterioration

Instability or deterioration should be suspected if there are precipitates, visible signs of leakage, extreme turbidity, microbial growth, if calibration does not meet the appropriate package insert and/or **ARCHITECT System Operations Manual** criteria, or if controls do not meet the appropriate criteria.

WARNINGS AND PRECAUTIONS

Precautions for Users

- IVD
- For *In Vitro* Diagnostic Use.
- Do not use components beyond the expiration date.
- Do not mix materials from different kit lot numbers.
- Do not mix reagents prepared at different times.
- Do not reuse the reagent containers, bottles, caps, or plugs due to the risk of contamination and the potential to compromise reagent performance.
- ⚠ **CAUTION:** This product contains human-sourced and/or potentially infectious components. Refer to the REAGENTS section of this package insert. No known test method can offer complete assurance that products derived from human sources or inactivated microorganisms will not transmit infection. Therefore, all human-sourced materials should be considered potentially infectious. It is recommended that these reagents and human specimens be handled in accordance with the OSHA Standard on Bloodborne Pathogens.[1] Biosafety Level 2[2] or other appropriate biosafety practices[3,4] should be used for materials that contain or are suspected of containing infectious agents.
  The human albumin used in R1A is nonreactive for HBsAg, HIV-1 RNA or HIV-1Ag, anti-HCV, and anti-HIV-1/HIV-2.
- The following warnings and precautions apply to R1A:
  H412 Harmful to aquatic life with long lasting effects.

  Prevention

  P273 Avoid release to the environment.

  P501 Dispose of contents/container in accordance with local regulations.

- The following warnings and precautions apply to R1 and R2:
  Contains sodium azide.
  EUH032 Contact with acids liberates very toxic gas.
  P501 Dispose of contents/container in accordance with local regulations.
- Safety Data Sheets are available at www.abbottdiagnostics.com or contact your local representative.
- For a detailed discussion of safety precautions during system operation, refer to the **ARCHITECT System Operations Manual,** *Section 8*.

SPECIMEN COLLECTION AND HANDLING

Suitable Specimens

Serum and plasma are acceptable specimens.

- **Serum:** Use serum collected by standard venipuncture techniques into glass or plastic tubes with or without gel barriers. Ensure complete clot formation has taken place prior to centrifugation. Centrifuge according to tube manufacturer's instructions to ensure proper separation of serum from blood cells.

  Some specimens, especially those from patients receiving anticoagulant or thrombolytic therapy, may take longer to complete their clotting processes. Fibrin clots may subsequently form in these sera and the clots could cause erroneous test results.
- **Plasma:** Use plasma collected by standard venipuncture techniques into glass or plastic tubes. Acceptable anticoagulants are lithium heparin (with or without gel barrier) and sodium heparin. Ensure centrifugation is adequate to remove platelets. Centrifuge according to tube manufacturer's instructions to ensure proper separation of plasma from blood cells.

For total sample volume requirements, refer to the ASSAY PARAMETERS section of this package insert and *Section 5* of the **ARCHITECT System Operations Manual**.

Specimen Storage

Serum and Plasma

Temperature	Maximum Storage	Bibliographic Reference
20 to 25°C	7 days	5
2 to 8°C	7 days	5, 6
-20°C	1 year	5

Guder et al.[5] suggest storage of frozen specimens at -20°C for no longer than the time interval cited above. However, limitations of laboratory equipment make it necessary in practice for clinical laboratories to establish a range around -20°C for specimen storage. This temperature range may be established from either the freezer manufacturer's specifications or your laboratory standard operating procedure(s) for specimen storage.

NOTE: Stored specimens must be inspected for particulates. If present, mix and centrifuge the specimen to remove particulates prior to testing.

PROCEDURE

Materials Provided

REF 7D80-31 Lipase Reagent Kit

Materials Required but not Provided

- REF 3E16-02 Lipase Calibrator
- Control Material
- Saline (0.85% to 0.90% NaCl) for specimens that require dilution
- REF 2J94-20 Detergent B

Assay Procedure

For a detailed description of how to run an assay, refer to *Section 5* of the **ARCHITECT System Operations Manual**.

Specimen Dilution Procedures

The ARCHITECT *c* Systems have an automatic dilution feature; refer to *Section 2* of the **ARCHITECT System Operations Manual** for additional information.

Serum and Plasma: Specimens with lipase values exceeding 1,200 U/L are flagged and may be diluted by following either the Automated Dilution Protocol or the Manual Dilution Procedure.

Automated Dilution Protocol

If using the Automated Dilution Protocol, the system performs a dilution of the specimen and automatically corrects the enzyme activity value by multiplying the result by the appropriate dilution factor. To set up the automatic dilution feature, refer to *Section 2* of the **ARCHITECT System Operations Manual** for additional information.

Manual Dilution Procedure

Manual dilutions should be performed as follows:

- Use saline (0.85% to 0.90% NaCl) to dilute the sample.
- The operator must enter the dilution factor in the patient or control order screen. The system uses this dilution factor to automatically correct the enzyme activity value by multiplying the result by the entered factor.
- If the operator does not enter the dilution factor, the result must be multiplied by the appropriate dilution factor before reporting the result.

NOTE: If a diluted sample result is flagged indicating it is less than the linear low limit, do not report the result. Rerun using an appropriate dilution.

For detailed information on ordering dilutions, refer to *Section 5* of the **ARCHITECT System Operations Manual**.

CALIBRATION

Calibration is stable for approximately 11 days (264 hours) and is required with each change in reagent lot number. Verify calibration with at least two levels of controls according to the established quality control requirements for your laboratory. If control results fall outside acceptable ranges, recalibration may be necessary.

For a detailed description of how to calibrate an assay, refer to *Section 6* of the **ARCHITECT System Operations Manual**.

For information on calibrator standardization, refer to the Lipase Calibrator package insert.

QUALITY CONTROL

The following is the recommendation of Abbott Laboratories for quality control. As appropriate, refer to your laboratory standard operating procedure(s) and/or quality assurance plan for additional quality control requirements and potential corrective actions.

- Two levels of controls (normal and abnormal) are to be run every 24 hours.
- If more frequent control monitoring is required, follow the established quality control procedures for your laboratory.
- If quality control results do not meet the acceptance criteria defined by your laboratory, patient values may be suspect. Follow the established quality control procedures for your laboratory. Recalibration may be necessary.
- Review quality control results and acceptance criteria following a change of reagent or calibrator lot.

RESULTS

Refer to *Appendix C* of the **ARCHITECT System Operations Manual** for information on results calculations.

Representative performance data are given in the EXPECTED VALUES and SPECIFIC PERFORMANCE CHARACTERISTICS sections of this package insert. Results obtained in individual laboratories may vary.

LIMITATIONS OF THE PROCEDURE

ARCHITECT c Systems are designed to mitigate reagent carryover, and testing is performed during assay development to determine needed SmartWash settings. However, system conditions may occur that allow Lipase contamination from other lipase-containing reagents. Lipase is found in Clinical Chemistry Cholesterol 7D62, Triglyceride 7D74, Direct LDL 1E31, Ultra HDL 3K33, and Lactic Acid 9P18 reagents.

To minimize the potential for Lipase contamination:

1. Always complete the cuvette wash cycle in its entirety. If necessary, Pause (do not stop) the system to ensure the cuvette wash occurs as scheduled.
2. Ensure instrument maintenance activities are complete.
3. Verify all SmartWash parameters are configured correctly.
4. Perform reagent carryover testing for non-Abbott assays before implementing them in the laboratory. Refer to Reagent carryover evaluation in the Architect c System Assay Applications Guide. For additional information, refer to Reagent carryover corrective action procedures in *Section 10* of the **ARCHITECT System Operations Manual.**

Should elevated or erratic Lipase results continue to occur, you may choose to configure the following SmartWash settings on the ARCHITECT c 4000 and c 8000 instruments (refer to *Section 2*, in the A**RCHITECT System Operations Manual**):

Add the following SmartWash for all assays:

COMPONENT	REAGENT/ASSAY	WASH	Volume	Replicates
Cuvette	**Chol**	**10% Detergent B**	**345**	

Configure the following SmartWash settings for Lipase:

COMPONENT	REAGENT/ASSAY	WASH	Volume	Replicates
Cuvette	**UHDL**	**10% Detergent B**	**345**	
Cuvette	**DLDL**	**10% Detergent B**	**345**	
Cuvette	**LactA**	**10% Detergent B**	**345**	

On the ARCHITECT c 16000 instrument, line-separate the Lipase reagent from the Cholesterol, Triglyceride, Direct LDL, Ultra HDL, and Lactic Acid reagents.

- N-Acetyl-4-benzoquinone Imine (NAPQI), a metabolite of Acetaminophen at very high levels may lead to falsely low results.
- N-Acetyl-L-Cysteine at therapeutically achieved levels may lead to falsely low results.

Refer to the SPECIMEN COLLECTION AND HANDLING and SPECIFIC PERFORMANCE CHARACTERISTICS sections of this package insert.

Detergent B solution must be onboard the system.

EXPECTED VALUES

Reference Range

Serum[7]

	Range (U/L)
Adult	8 to 78

A study was conducted using 133 serum samples from volunteers. Data were analyzed as described by Clinical and Laboratory Standards Institute (CLSI) protocol NCCLS C28-A.[8] From this study, 95% of all specimens fell within 8 to 78 U/L, with samples ranging from 7 to 90 U/L.

It is recommended that each laboratory determine its own reference range based upon its particular locale and population characteristics.

SPECIFIC PERFORMANCE CHARACTERISTICS

Linearity

Lipase is linear up to 1,200 U/L. Linearity was verified using CLSI protocol NCCLS EP6-P.[9]

Limit of Detection (LOD)

The LOD for Lipase is 1.6 U/L. The LOD is the mean concentration of an analyte-free sample + 2 SD, where SD = the pooled, within-run standard deviation of the analyte-free sample.

Limit of Quantitation (LOQ)

The LOQ for Lipase is 3.1 U/L. The LOQ is the analyte concentration at which the CV = 20%.

Interfering Substances

Interference studies were conducted using CLSI protocol NCCLS EP7-P.[10] Interference effects were assessed by Dose Response and Paired Difference methods, at the medical decision level of the analyte.

Interfering Substance	Interferent Concentration		N	Target (U/L)	Observed (% of Target)
Bilirubin	15 mg/dL	(257 µmol/L)	4	212.3	94.7
	30 mg/dL	(513 µmol/L)	4	212.3	86.4
Hemoglobin	1,000 mg/dL	(10.0 g/L)	4	215.7	103.1
	2,000 mg/dL	(20.0 g/L)	4	215.7	99.1
Intralipid	750 mg/dL	(7.5 g/L)	4	198.1	94.1
	1,000 mg/dL	(10.0 g/L)	4	198.1	93.9

Bilirubin solutions at the above concentrations were prepared by addition of a bilirubin stock to human serum pools. Hemoglobin solutions at the above concentrations were prepared by addition of hemolysate to human serum pools. Intralipid solutions at the above concentrations were prepared by addition of Intralipid to human serum pools.

Interferences from medications or endogenous substances may affect results.[11]

The following drugs and metabolites were tested for interference at the concentrations indicated using an acceptance criteria of ± 10% from the target value.

Interfering Substance	Interferent Concentration		N	Target (U/L)	Observed (% of Target)
Acetaminophen	200 mg/L	(1324.5 µmol/L)	3	33.6	100.5
Dipyrone	100 mg/L	(300.3 µmol/L)	3	33.5	97.3
N-Acetyl-L-Cysteine	800 mg/L	(4908.0 µmol/L)	3	70.6	46.5
NAPQI*	20 mg/L	(134.2 µmol/L)	3	30.9	87.5

*NAPQI (N-Acetyl-4-benzoquinone Imine) metabolite of Acetaminophen

Precision

The imprecision of the Lipase assay is ≤ 7.5% Total CV. Representative data from studies using CLSI protocol NCCLS EP5-T2[12] are summarized below.

Control		Level 1	Level 2
N		80	80
Mean (U/L)		42.7	78.6
Within Run	SD	0.31	1.43
	%CV	0.7	1.8
Between Run	SD	1.13	1.88
	%CV	2.6	2.4
Between Day	SD	0.91	2.62
	%CV	2.1	3.3
Total	SD	1.48	3.53
	%CV	3.5	4.5

Method Comparison

Correlation studies were performed using CLSI protocol NCCLS EP9-A.[13]

Serum results from the Lipase assay on the AEROSET System were compared with those from a commercially available enzymatic methodology.

Serum results from the Lipase assay on an ARCHITECT *c* System were compared with the Lipase assay on the AEROSET System.

	AEROSET vs. Comparative Method	ARCHITECT vs. AEROSET
N	74	80
Y - Intercept	-1.458	2.891
Correlation Coefficient	1.000	0.997
Slope	0.936	1.032
Range (U/L)*	10.3 to 619.1	3.10 to 1,146.80

*AEROSET

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ARCHITECT

Lipase Serum/Plasma—Conventional and SI Units

Configure assay parameters — General

● General O Calibration O SmartWash O Results O Interpretation

Assay: **Lip** Type: **Photometric** Version: †
Number: **1029**
Run controls for onboard reagents by: Lot

● Reaction definition O Reagent / Sample O Validity checks

Reaction mode: **Rate up**

	Primary	Secondary		Read times
Wavelength:	**548**	/ **660**	Main:	**22 – 33**
Last required read:	**33**		Flex:	___–___
Absorbance range:	___–___		Color Correction:	___–___
Sample blank type:	**None**			

O Reaction definition ● Reagent / Sample O Validity checks

				R1	R2
Reagent:	**LIP00**		Reagent volume:	**156**	**52**
Diluent:	**Saline**		Water volume:	___	___
Diluent dispense mode:	**Type 0**		Dispense mode:	**Type 0**	**Type 0**

Dilution name	Sample	Diluted sample	Diluent	Water		Dilution factor	Default dilution
STANDARD :	**4.0**	___	___	___	=	**1:1.00**	●
_____ :	___	___	___	___	=		O
_____ :	___	___	___	___	=		O

O Reaction definition O Reagent / Sample ● Validity checks

Reaction check: **End Subtraction**

	A	B
Read Time:	**33 – 33**	**31 – 31**
Calculation limits:	**0.0001 – 9.9999**	

Rate linearity %: ___

Configure assay parameters — Calibration

O General ● Calibration O SmartWash O Results O Interpretation

Assay: **Lip** Calibration method: **Linear**

● Calibrators O Volumes O Intervals O Validity checks

Calibrator set:		Calibrator level:	Concentration:
Lipase	Blank:	**Water**	**0**
	Cal 1:	**Lipase1**	‡

Replicates: **3** [Range 1 – 3]

O Calibrators ● Volumes O Intervals O Validity checks

Calibrator: **Lipase**

Calibrator level	Sample	Diluted sample	Diluent	Water
Blank: **Water**	**4.0**	___	___	___
Cal 1: **Lipase1**	**4.0**	___	___	___

O Calibrators O Volumes ● Intervals O Validity checks

Calibration intervals:
Full interval: **264** (hours)
Calibration type:
Adjust type: **None**

O Calibrators O Volumes O Intervals ● Validity checks

Blank absorbance range: _____ – _____
Span: **Blank** – **Blank**
Span absorbance range: _____ – _____
Expected cal factor: **0.00**
Expected cal factor tolerance %: **0**

Configure assay parameters — SmartWash

O General O Calibration ● SmartWash O Results O Interpretation

Assay: **Lip**

COMPONENT	REAGENT / ASSAY	WASH		Volume	Replicates
R1	**ACETM**	**0.5%**	**AcidWash**	**345**	**1****
R1	**LIP00**	**10%**	**Detergent B**	**345**	**2**
R1	**All**	**10%**	**Detergent B**	**345**	**2**
R2	**LIP00**	**10%**	**Detergent B**	**345**	**2**
R2	**All**	**10%**	**Detergent B**	**345**	**2**
Cuvette	**Trig**	**10%**	**Detergent B**	**345**	
Cuvette	**Chol**	**10%**	**Detergent B**	**345**	
Sample Probe		**0.5%**	**AcidWash**		

****Reagent Probe SmartWashes must be configured in order listed.

Configure assay parameters — Results

O General O Calibration O SmartWash ● Results O Interpretation

Assay: **Lip** Assay number: **1029**
Dilution default range: Result units: **U/L**
Low-Linearity: **4**††
High-Linearity: **1200**
Gender and age specific ranges:

GENDER	AGE (UNITS)	NORMAL	EXTREME
Either	**0 – 130 (Y)**	**8 – 78**	

Configure result units

Assay: **Lip**
Version: †
Result units: **U/L**
Decimal places: **0** [Range 0 – 4]
Correlation factor: **1.0000**
Intercept: **0.0000**

† Due to differences in instrument systems and unit configurations, version numbers may vary.

‡ Refer to the concentration specified on calibrator labeling or value sheet. These values are defined on the Configure calibrator set screen.

†† The linear low value (Low-Linearity) is LOQ rounded up to the number of decimal places defined in the decimal places parameter field.