

Progesterone ELISA

REF CAN-P-305	Rx ONLY	IVD
Effective Date: January 23, 2023		Version:USA-8.0

1. INTENDED PURPOSE & USE

For the quantitative measurement Progesterone in human serum by an ELISA (Enzyme-Linked Immunosorbent Assay).

This kit is intended for professional use only and is for laboratory use only. For *in vitro* diagnostic use only. Intended to be used manually but may be adaptable to open automated analyzers. The user is responsible for validating the performance of this kit with any automated analyzers.

2. LIMITATIONS RELATED TO INTENDED PURPOSE & USE

- This test is not intended to be used for screening purposes.
- This test is not intended for home testing or self-testing.
- The kit is calibrated for the determination of progesterone in human serum. The kit is not calibrated for the determination of progesterone in other specimens of human or animal origin.
- The results obtained with this kit shall never be used as the sole basis for a clinical diagnosis and for therapeutic decisions.
- Although common interfering substances have been evaluated with this test, other substances that have not been evaluated such as drugs and the occurrence of heterophilic antibodies in individuals regularly exposed to animals or animal products have the potential of causing interferences.

3. SUPPLEMENTAL INFORMATION

Progesterone is a C-21 female sex steroid hormone with a variety of physiological effects. In the follicular phase of the menstrual cycle, progesterone is produced in low levels. It increases to the LH peak and then sharply rises 3 to 4 days later to higher levels, remaining elevated through the 10th to 12th days after the LH peak. Then there is a sharp decline to the low levels of the follicular phase. It is responsible for the induction of the cyclic changes in the endometrium of the uterus allowing implantation and successful growth of the fertilized ovum and maintenance of pregnancy. Progesterone measurements are used in documenting ovulation and in the management of difficulties during the first trimester of pregnancy. Levels of progesterone may be useful in the evaluation of sterility due to luteal phase defects, prediction of impending abortion, and the diagnosis of ectopic pregnancy. Normal values of progesterone may be affected by drugs such as, oral contraceptives, super ovulatory drugs, estrogen replacement therapy medication, and GnRH analogues. The removal of ovarian function following surgical oophorectomy or chemotherapy may influence serum progesterone values.

4. PRINCIPLE OF THE TEST

The Progesterone ELISA is a competitive immunoassay. Competition occurs between progesterone present in calibrators, controls, specimen samples and an enzyme-labelled antigen (HRP conjugate) for a limited number of anti-progesterone antibody binding sites on the microplate wells. After a washing step that removes unbound materials, the TMB substrate (enzyme substrate) is added which reacts with HRP to form a blue-coloured product that is inversely proportional to the amount of progesterone present. Following an incubation, the enzymatic reaction is terminated by the addition of the stopping solution, converting the colour from blue to yellow. The absorbance is measured on a microplate reader at 450 nm. A set of calibrators is used to plot a calibrator curve from which the amount of progesterone in specimen samples and controls can be directly read.

5. PROCEDURAL CAUTIONS AND WARNINGS

- This kit is for use by trained laboratory personnel (professional use only). For laboratory *in vitro* use only.
- Practice good laboratory practices when handling kit reagents and specimens. This includes:
 - Do not pipette by mouth.
 - Do not smoke, drink, or eat in areas where specimens or kit reagents are handled.
 - Wear protective clothing and disposable gloves.
 - Wash hands thoroughly after performing the test.
 - Avoid contact with eyes; use safety glasses; in case of contact with eyes, flush eyes with water immediately and contact a doctor.
- Users should have a thorough understanding of this protocol for the successful use of this kit. Reliable performance will only be attained by strict and careful adherence to the instructions provided.
- Do not use the kit beyond the expiry date stated on the label.
- If the kit reagents are visibly damaged, do not use the test kit.
- Do not use kit components from different kit lots within a test and do not use any component beyond the expiration date printed on the label.
- All kit reagents and specimens must be brought to room temperature and mixed gently but thoroughly before use. Avoid repeated freezing and thawing of specimens.
- When the use of water is specified for dilution or reconstitution, use deionized or distilled water.
- Immediately after use, each individual component of the kit must be returned to the recommended storage temperature stated on the label.
- A calibrator curve must be established for every run.
- It is recommended to all customers to prepare their own control materials or serum pools which should be included in every run at a high and low level for assessing the reliability of results.
- The controls (included in kit) must be included in every run and their results must fall within the ranges stated in the quality control certificate; a failed control result might indicate improper procedural techniques or pipetting, incomplete washing, or improper reagent storage.
- When dispensing the substrate and stopping solutions, do not use pipettes in which these liquids will come into contact with any metal parts.
- The TMB Substrate is sensitive to light and should remain colourless if properly stored. Instability or contamination may be indicated by the development of a blue colour, in which case it should not be used.
- Do not use grossly hemolyzed, grossly lipemic, icteric or improperly stored serum.
- Samples or controls containing azide or thimerosal are not compatible with this kit, they may lead to false results.
- Samples values above the measuring range of the kit may be reported as >60 ng/mL. If further dilution and retesting is required, only calibrator A may be used to dilute serum samples. The use of any other reagent may lead to false results.
- Avoid microbial contamination of reagents.
- To prevent the contamination of reagents, use a new disposable pipette tip for dispensing each reagent, sample, calibrator, and control.
- To prevent the contamination of reagents, do not pour reagents back into the original containers.
- Kit reagents must be regarded as hazardous waste and disposed of according to local and/or national regulations.
- Consumables used with the kit that are potentially biohazardous (e.g., pipette tips, bottles or containers containing human materials) must be handled according to biosafety practices to minimize the risk of infection and disposed of according to local and/or national regulations relating to biohazardous waste.
- This kit contains 1 M sulfuric acid in the stopping solution component. Do not combine acid with waste material containing sodium azide or sodium hypochlorite.
- The use of safety glasses, and disposable plastic, is strongly recommended when manipulating biohazardous or bio-contaminated solutions.
- Proper calibration of the equipment used with the test, such as the pipettes and absorbance microplate reader, is required.
- If a microplate shaker is required for the assay procedure, the type

and speed of shaker required is stated in the REAGENTS AND EQUIPMENT NEEDED BUT NOT PROVIDED section. Both the type and speed of shaker used can influence the optical densities and test results. If a different type of shaker and/or speed is used, the user is responsible for validating the performance of the kit.

- Do not reuse the microplate wells, they are for SINGLE USE only.
- To avoid condensation within the microplate wells in humid environments, do not open the pouch containing the microplate until it has reached room temperature.
- When reading the microplate, the presence of bubbles in the wells will affect the optical densities (ODs). Carefully remove any bubbles before performing the reading step.

6. SAFETY CAUTIONS AND WARNINGS

6.1 BIOHAZARDS

The reagents should be considered a potential biohazard and handled with the same precautions applied to blood specimens. All human specimens should be considered a potential biohazard and handled as if capable of transmitting infections and in accordance with good laboratory practices.

The calibrators and controls provided with the kit contain processed human serum/plasma that has been tested by approved methods and found to be negative for the presence of HBsAg and antibodies to HCV, HIV 1/2 and HIV NAT. However, no test method can offer complete assurance that any viable pathogens are absent. Therefore, these components should be considered a potential biohazard and handled with the same precautions as applied to any blood specimen, following good laboratory practices.

6.2 CHEMICAL HAZARDS

Avoid direct contact with any of the kit reagents. Specifically avoid contact with the TMB Substrate (contains tetramethylbenzidine) and Stopping Solution (contains sulfuric acid). If contacted with any of these reagents, wash with plenty of water and refer to SDS for additional information.

7. SPECIMEN COLLECTION, STORAGE AND PRE-TREATMENT

7.1 Specimen Collection & Storage

Approximately 0.1 mL of serum is required per duplicate determination. Collect 4–5 mL of venous blood into an appropriately labelled tube and allow it to clot. Centrifuge at room temperature and carefully transfer the serum into a new storage tube or container. Serum samples may be stored at 2-8°C for up to 24 hours or at -10°C or lower if the analyses are to be done at a later date.

Consider all human specimens as possible biohazardous materials and take appropriate precautions when handling.

7.2 Specimen Pre-Treatment

Specimen pre-treatment is not required.

8. REAGENTS AND EQUIPMENT NEEDED BUT NOT PROVIDED

- Calibrated single-channel pipette to dispense 25 µL.
- Calibrated multi-channel pipettes to dispense 50 µL, 100 µL and 150 µL.
- Calibrated multi-channel pipettes to dispense 300 µL (if washing manually).
- Automatic microplate washer (recommended).
- Microplate shaker:
 - Orbital shaker (3 mm diameter) set to 600 rpm or
 - Reciprocating shaker (1.5" stroke length) set to 180 oscillations/minute.
- Disposable pipette tips.
- Distilled or deionized water.
- Calibrated absorbance microplate reader with a 450 nm filter and an upper OD limit of 3.0 or greater.

9. REAGENTS PROVIDED

- | MPL | Microplate |
|------------|--|
| Contents: | One anti-progesterone polyclonal antibody-coated 96-well (12x8) microplate in a resealable pouch with desiccant. |
| Format: | Ready to Use |
| Storage: | 2–8°C |
| Stability: | Unopened: Stable until the expiry date printed on the label. After Opening: Stable for four weeks. |
- | HRP | CONJ | CONC | HRP Conjugate Concentrate |
|--|---|--|------------------------------------|
| Contents: | One bottle containing Progesterone-Horse Radish Peroxidase (HRP) conjugate in a protein-based buffer with a non-mercury preservative. | | |
| Format: | Concentrated; Requires Preparation | | |
| Volume: | 0.4 mL/bottle | | |
| Storage: | 2–8°C | | |
| Stability: | Unopened: Stable until the expiry date printed on the label. After Opening: Stable for four weeks. | | |
| Preparation of HRP Conjugate Working Solution: | | <div>X101</div> | <div>Dilute 1:101 Before Use</div> |
| | | Dilute 1:101 in assay buffer before use (e.g., 20 µL of conjugate concentrate in 2 mL of assay buffer). If the whole plate is to be used dilute 120 µL of conjugate concentrate in 12 mL of assay buffer. Discard any that is left over. | |
- | CAL | A – F | Calibrator A – F |
|---|---|------------------|
| Six bottles of calibrator containing specified progesterone concentrations. Human serum-based buffer with a non-mercury preservative. Prepared by spiking buffer with defined quantities of progesterone. | | |
| Contents: | Listed below are approximate concentrations, please refer to vial labels for exact concentrations.
Concentrations: 0, 0.3, 1, 5, 20, 60 ng/mL. | |
| Format: | Ready to Use | |
| Volume: | Calibrator A: 2.0 mL/bottle
Calibrator B-F: 0.5 mL/bottle | |
| Storage: | 2–8°C | |
| Stability: | Unopened: Stable until the expiry date printed on the label. After Opening: Stable for four weeks. | |
- | CONTROL | 1 – 2 | Control 1 – 2 |
|------------|---|---------------|
| Contents: | Two bottles of control containing different progesterone concentrations. Human serum-based buffer with a non-mercury preservative. Prepared by spiking buffer with defined quantities of progesterone. Refer to the QC certificate for the target values and acceptable ranges. | |
| Format: | Ready to Use | |
| Volume: | 0.5 mL/bottle | |
| Storage: | 2–8°C | |
| Stability: | Unopened: Stable until the expiry date printed on the label. After Opening: Stable for four weeks. | |

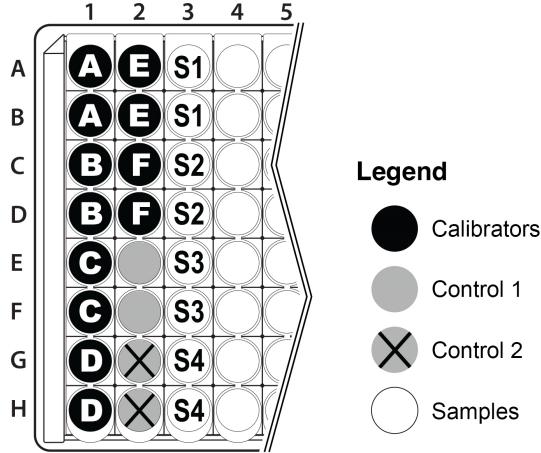
5.	ASY	BUFF	Assay Buffer
Contents:	One bottle containing a protein-based buffer with a non-mercury preservative.		
Format:	Ready to Use		
Volume:	15 mL/bottle		
Storage:	2–8°C		
Stability:	Unopened: Stable until the expiry date printed on the label. After Opening: Stable for four weeks.		

6.	TMB	SUB	TMB Substrate
Contents:	One bottle containing tetramethylbenzidine and hydrogen peroxide in a non-DMF or DMSO containing buffer.		
Format:	Ready to Use		
Volume:	16 mL/bottle		
Storage:	2–8°C		
Stability:	Unopened: Stable until the expiry date printed on the label. After Opening: Stable for four weeks.		

STOP	Stopping Solution		
Contents:	One bottle containing 1M sulfuric acid.		
Format:	Ready to Use		
Volume:	6 mL/bottle		
Storage:	2–8°C		
Stability:	Unopened: Stable until the expiry date printed on the label. After Opening: Stable for four weeks.		
Safety:	Refer to product SDS.		
			
Warning			

8.	WASH	BUFF	CONC	Wash Buffer Concentrate
Contents:	One bottle containing buffer with a non-ionic detergent and a non-mercury preservative.			
Format:	Concentrated; Requires Preparation			
Volume:	50 mL/bottle			
Storage:	2–8°C			
Stability:	Unopened: Stable until the expiry date printed on the label. After Opening: Stable for four weeks. Following Preparation: The wash buffer working solution is stable for 2 weeks following preparation, assuming Good Laboratory Practices are adhered to. To prevent microbial growth, prepare the wash buffer working solution in a clean container and store under refrigerated conditions (2-8°C) when not in use.			
Preparation of Wash Buffer Working Solution:	X10 Dilute 1:10 Before Use Dilute 1:10 in distilled or deionized water before use. If the whole microplate is to be used dilute 50 mL of the wash buffer concentrate in 450 mL of distilled or deionized water.			

10. RECOMMENDED ASSAY LAYOUT



11. ASSAY PROCEDURE

Specimen Pre-Treatment: None	
All kit components, controls and specimen samples must reach room temperature prior to use. Calibrators, controls, and specimen samples should be assayed in duplicate. Once the procedure has been started, all steps should be completed without interruption.	
1.	After all kit components have reached room temperature, mix gently by inversion.
2.	Prepare the HRP Conjugate Working Solution and Wash Buffer Working Solution (See section 9. <i>Reagents Provided</i> section, 2. <i>HRP Conjugate Concentrate</i> and 8. <i>Wash Buffer Concentrate</i>).
3.	Plan the microplate wells to be used for calibrators, controls, and samples. See section 10. <i>Recommended Assay Layout</i> . Remove the strips from the microplate frame that will not be used and place them in the bag with desiccant. Reseal the bag with the unused strips and return it to the refrigerator.
4.	Pipette 25 µL of each calibrator, control, and specimen sample into assigned wells.
5.	Pipette 100 µL of the HRP Conjugate Working Solution into each well (the use of a multi-channel pipette is recommended).
6.	Incubate the microplate on a microplate shaker** for 60 minutes at room temperature.
7.	Wash the microplate wells with an automatic microplate washer (preferred) or manually as stated below. <i>Automatic:</i> Using an automatic microplate washer, perform a 3-cycle wash using 300 µL/well of Wash Buffer Working Solution (3 x 300 µL). One cycle consists of aspirating all wells then filling each well with 300 µL of Wash Buffer Working Solution. After the final wash cycle, aspirate all wells and then tap the microplate firmly against absorbent paper to remove any residual liquid. <i>Manually:</i> For manual washing, perform a 3-cycle wash using 300 µL/well of Wash Buffer Working Solution (3 x 300 µL). One cycle consists of aspirating all wells by briskly emptying the contents of the wells over a waste container, then pipetting 300 µL of Wash Buffer Working Solution into each well using a multi-channel pipette. After the final wash cycle, aspirate all wells by briskly emptying the contents over a waste container and then tap the microplate firmly against absorbent paper to remove any residual liquid.
8.	Pipette 150 µL of TMB Substrate into each well (the use of a multi-channel pipette is recommended).
9.	Incubate the microplate on a microplate shaker** for 10-20 minutes at room temperature.
10.	Pipette 50 µL of Stopping Solution into each well (the use of a multi-channel pipette is recommended) in the same order and speed as was used for addition of the TMB Substrate. Gently tap the microplate frame to mix the contents of the wells.
11.	Measure the optical density (absorbance) in the microplate wells using an absorbance microplate reader set to 450 nm, within 20 minutes after addition of the Stopping Solution. ** See section 8. <i>Reagents And Equipment Needed But Not Provided</i> for microplate shaker options.

12. CALCULATIONS

- Calculate the mean optical density for each calibrator, control and specimen sample duplicate.
- Use a 4-parameter or 5-parameter curve fit with immunoassay software to generate a calibrator curve.
- The immunoassay software will calculate the concentrations of the controls and specimen samples using the mean optical density values and the calibrator curve.
- If a sample reads more than 60 ng/mL and needs to be diluted and retested, then dilute with calibrator A not more than 1:8. The result obtained must be multiplied by the dilution factor.

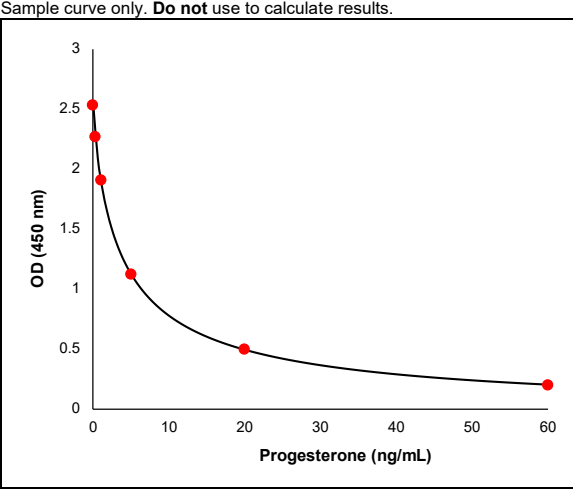
13. QUALITY CONTROL

- When assessing the validity of the test results, the following criteria should be evaluated:
- The calibrator with the highest concentration meets the % binding acceptable range as stated in the QC Certificate. % Binding = (OD of calibrator/OD of calibrator A) x 100.
 - The values obtained for the kit controls are within the acceptable ranges as stated in the QC certificate.
 - The results of any external controls that were used meet the acceptable ranges.

14. TYPICAL DATA

14.1 TYPICAL TABULATED DATA			
Sample data only. Do not use to calculate results.			
Calibrator	Mean OD (450 nm)	% Binding	Value (ng/mL)
A	2.538	100	0
B	2.274	90	0.3
C	1.909	75	1
D	1.124	44	5
E	0.502	20	20
F	0.200	8	60
Unknown	0.853	-	8.6

14.2 TYPICAL CALIBRATOR CURVE



15. PERFORMANCE CHARACTERISTICS

15.1 SENSITIVITY

The lower detection limit is calculated from the standard curve by determining the resulting concentration of the mean OD of Calibrator A (based on 10 replicate analyses) minus 2 SD. Therefore, the sensitivity of the DBC Progesterone ELISA kit is 0.1 ng/mL.

15.2 SPECIFICITY (CROSS-REACTIVITY)

The following compounds were tested for cross-reactivity with progesterone cross-reacting at 100%.

Compound	% Cross-Reactivity
Progesterone	100
11α-OH-Progesterone	100
Deoxycorticosterone	1.7
17-OH-Progesterone	0.4
5α-Androstane-3β, 17β-diol	0.3
Corticosterone	0.3
Pregnenolone	0.2

The following steroids were tested but cross-reacted at less than 0.1%: Cortisol, Cortisone, Danazol, DHEAS, Estradiol, 5β-Pregnan-3α, 17α, 21α-triol-20-one, 5β-Pregnan-3α, 17-diol-20-one, Pregnan-3α, 20α-diol and Testosterone.

15.3 PRECISION

Intra-Assay Precision

Two serum samples were assayed ten times each on the same calibrator curve. The results (in ng/mL) are tabulated below:

Sample	Mean	SD	CV %
1	1.89	0.20	10.6
2	14.24	1.45	10.2

Inter-Assay Precision

Two serum samples were assayed ten times over a period of four weeks. The results (in ng/mL) are tabulated below:

Sample	Mean	SD	CV %
1	2.63	0.33	12.6
2	10.15	1.04	10.2

15.4 LINEARITY

Two serum samples were diluted with calibrator A. The results (in ng/mL) are tabulated below.

Sample	Observed Result	Expected Result	Recovery %
1	10	-	-
1:2	5.3	5	106
1:4	2.16	2.5	86
1:8	1.38	1.25	110
1:16	0.59	0.63	95
2	20	-	-
1:2	10	9.1	91
1:4	5	4.2	84
1:8	2.5	2.0	81
1:16	1.25	1.1	88

15.5 RECOVERY

Spiked samples were prepared by adding defined amounts of progesterone to two serum samples. The results (in ng/mL) are tabulated below:

Sample	Observed Result	Expected Result	Recovery %
1 Unspiked	20	-	-
+ 5.0	13	12.5	104
+ 20.0	16	20	80
+ 60.0	31	40	78
2 Unspiked	45	-	-
+ 5.0	31	25	124
+ 20.0	35	32.5	108
+ 60.0	48	52.5	91

15.6 COMPARATIVE STUDIES

The DBC Progesterone ELISA kit (Kit A) was compared against a competitor's coated tube RIA kit (Kit B). The results (in ng/mL) are tabulated below.

Group	Kit A Mean	Kit B Mean
33 Samples	3.05	2.76

16. REFERENCE RANGES

As for all clinical assays each laboratory should collect data and establish their own range of expected normal values. ND = Not detectable

Group	Mean (ng/mL)	Absolute Range (ng/mL)
Males	0.53	ND – 1.35
Females	8.37	ND – 70.0
Postmenopausal Female	0.46	ND – 4.0

17. LITERATURE

- Grodsky G, et al., eds. Review of Physiological Chemistry, 17th edition. Los Altos, CA: Lange Medical Publications;1979:511.
- Abraham GE, et al. Simultaneous Radioimmunoassay of Plasma FSH, LH, Progesterone, 17-hydroxyprogesterone, and Estradiol-17 beta During the Menstrual Cycle. *J Clin Endocrinol Metab.* 1972;34(2):312–8.
- Ryan K, Greep R, Astwood E, eds. Handbook of Physiology, Vol. II. American Physiology Society, 1973:285.
- Israel R, et al. Single Luteal Phase Serum Progesterone Assay as an Indicator of Ovulation. *Am J Obstet Gynecol.* 1972;112(8):1043–6.
- Soules MR, et al. The Function of the Corpus Luteum of Pregnancy in Ovulatory Dysfunction and Luteal Phase Deficiency. *Fertil Steril.* 1981;36(1):31–6.
- Manganiello PD, et al. Serum Progesterone, 17 Alpha-Hydroxyprogesterone, Human Chorionic Gonadotropin, and Prolactin in Early Pregnancy and a Case of Spontaneous Abortion. *Fertil Steril.* 1981;36(1):55–60.
- Matthews CP, et al. Serum Progesterone Levels as an Aid in the Diagnosis of Ectopic Pregnancy. *Obstet Gynecol.* 1986; 68(3):390–4.
- Check JH, et al. Falsely Elevated Steroidal Assay Levels Related to Heterophile Antibodies Against Various Animal Species. *Gynecol Obstet Invest.* 1995; 40(2):139–40.

18. SYMBOLS GLOSSARY

Symbol	Definition	Symbol	Definition
	Catalogue number		Manufacturer
	Batch code		Date of manufacture
	In vitro diagnostic medical device		Biological risks
	Unique Device Identifier		Consult instructions for use
	Dilute 1:# Before Use		Prescription only: Device restricted to use by or on the order of a physician
	Quantity		Keep away from sunlight
	Use-by date		Authorized representative in the European Community/ European Union
	Do not re-use		Temperature limit
	Caution		Contains sufficient for <n> tests
	Lyophilized		For Research Use Only. Not for use in diagnostic procedures.
The definitions of symbols used for kit component names are described in the <i>Reagents Provided</i> section.			

19. CHANGE HISTORY

Previous Version:	IVD-8.0	New Version:	USA-8.0
Changes:	Change in version prefix from IVD to USA. Build: v1.3D		

20. GENERAL INFORMATION

	Diagnostics Biochem Canada (DBC) Inc. 384 Neptune Crescent London, Ontario, Canada N6M 1A1 Tel: (519) 681-8731 Fax: (519) 681-8734 e-mail: dbc@dbc-labs.com www.dbc-labs.com
--	---

Product Complaints

In the case of product complaints, the user shall submit in writing to the distributor or manufacturer a description of the complaint and provide accompanying data and/or information.

Warranty

DBC guarantees that the product is free of defects and will perform within the product specifications when the product is used prior to the expiration date, according to the intended purpose and use, and according to the instructions for use provided with the product. Any deviations from the intended purpose and use, instructions for use, modifications to kit components or use beyond the expiration date will invalidate any warranty claims.

Limitation of Liability

DBC liability in all circumstances whether in tort (including negligence) or at common law, and for any damage or loss, including but not limited to loss of profit and loss of sales, suffered whether direct, indirect, consequential, incidental or special is limited to the purchase price of the product(s) in question.