# Technical Manual

# Bovine Haptoglobin (Hpt) ELISA Kit

- **Catalogue Code: BODL00067**
- **Sandwich ELISA Kit**
- **Research Use Only**

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# 1. Key Features and Sample Types

### Aliases:

HP,Hp2-Alpha,Alpha-2-Macroglobulin,Zonulin

### Detection method:

Sandwich

### Sample Type:

serum, plasma and other biological fluids.

### Reactivity:

Bovine

### Range:

156.25-10000ng/mL

### Sensitivity:

41.5ng/mL

### Storage:

2-8°C for 12 months

### Expiry:

See Kit Label

# 2. Storage & Expiry

Assay Genie ELISA Kits are shipped on ice packs. Please store this ELISA Kit at 4°C. Dateof expiration will be on the ELISA Box label.

- **Unopened Kits:** All the reagents should be kept according to labels on the vials. The TMB Substrate, Wash Buffer (30X concentrate) and the Stop Solution should be storedat 4°C upon receipt while the others should be at -20°C.

- **Opened Kits:** Once the kit is opened, the remaining reagents still need to be stored according to the above storage conditions. In addition, return the unused wells to the foil pouch containing the desiccant pack, and reseal along entire edge of zip-seal.

# 3. Description and Principle

The Assay Genie Sandwich ELISA kit is a highly sensitive assay for the quantitative measurement of a specific analyte in the following samples: serum, blood, plasma, cell culture supernatant and other related supernatants and tissues.

## How do our ELISA kits work?

The Assay Genie (enzyme-linked immunosorbent assays) assay kits are designed for the quantitative measurement of analytes in a wide variety of samples. As today's scientists demand premium quality, consistent data, Assay Genie have developed a range of sensitive, fast and reliable ELISA kit assays to meet and exceed those demands. Our assay kits use a quantitative sandwich ELISA technique and each kit comes with highly specific antibodies pre-coated onto a 96-well microtiter plate.

The microtiter plate provided in this kit has been pre-coated with an antibody specific to Hpt. Standards or samples are then added to the appropriate microtiter plate wells with abiotin-conjugated antibody preparation specific to Hpt. Next, Avidin conjugated to Horseradish Peroxidase (HRP) is added to each microplate well and incubated. After TMB substrate solution is added, only those wells that contain Hpt, biotin-conjugated antibody and enzyme-conjugated Avidin will exhibit a change in color. The enzyme-substrate reaction is terminated by the addition of sulphuric acid solution and the color change is measured spectrophotometrically at a wavelength of 450nm ± 10nm. The concentration of Hpt in the samples is then determined by comparing the O.D. of the samples to the standard curve.

## 4. Kit Contents

Each kit contains reagents for 96 assays including:

| No. | Component | 96-Well Kit | Storage |
|---|---|---|---|
| 1 | Pre-Coated ELISA Microplate | 1 | -20°C |
| 2 | Lyophilized Standard | 2 vials | -20°C |
| 3 | Diluent Buffer | 45 mL | -20°C |
| 4 | Detection Reagent A | 120 uL | -20°C |
| 5 | Detection Reagent B | 120 uL | -20°C |
| 6 | TMB Substrate | 9 mL | 2-8°C |
| 7 | Stop Solution | 6 mL | 2-8°C |
| 8 | Wash Buffer (30x) | 20 mL | 2-8°C |
| 9 | Plate Sealer | 2 pieces | |
| 10 | Manual | 1 | |

### Additional materials required:

1. Microplate reader with 450 ± 10nm filter.
2. Precision single or multi-channel pipettes and disposable tips.
3. Eppendorf Tubes for diluting samples.
4. Deionized or distilled water.
5. Absorbent paper for blotting the microtiter plate.
6. Container for Wash Solution.

## Precautions:

1. Do not perform a serial dilution directly in the wells.

2. Prepare standard within 15 minutes of performing the assay. Do not dissolve the reagents at 37˚C directly.

3. Detection Reagent A and B are sticky solutions, therefore slowly pipette them to reduce the volume errors.

4. Carefully reconstitute Standards or working Detection Reagent A and B according to the instruction, avoid foaming and mix gently until the crystals are completely dissolved. To minimize imprecision caused by pipetting, use small volumes and ensure that pipettors are calibrated. It is recommended to pipette more than 10μL at a time to ensure accuracy.

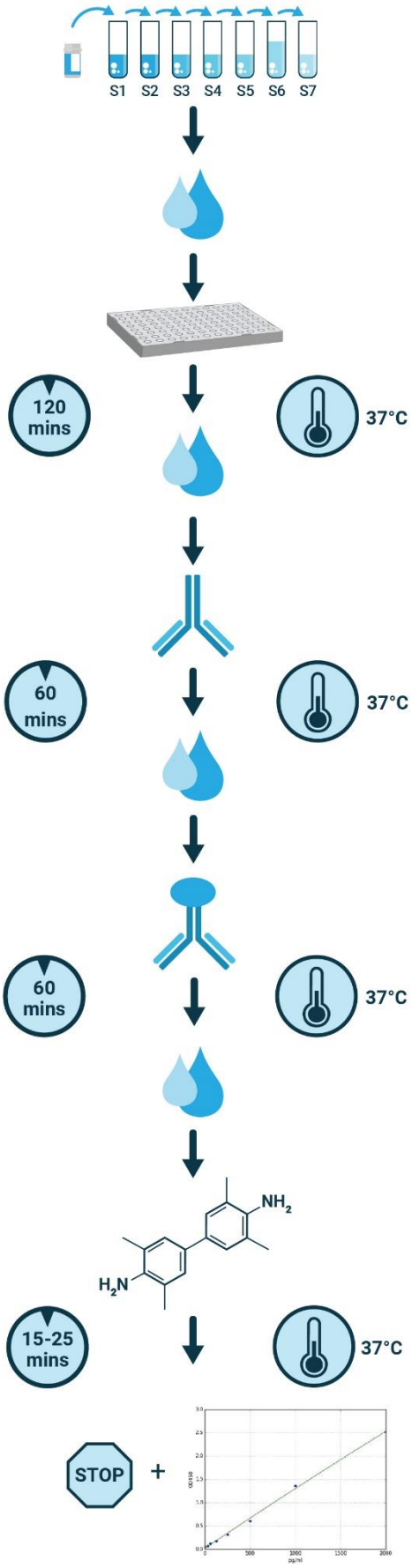
5. The reconstituted Standards, Detection Reagent A and Detection Reagent B can be used only once.

6. If crystals have formed in the Wash Solution concentrate (30×), warm to room temperature and mix gently until the crystals are completely dissolved.

7. Any contaminated water or container used during reagent preparation will influence the detection result.

8. The Stop Solution suggested for use with this kit is an acid solution. Wear eye, hand, face, and clothing protection when using this reagent.

## 5. Workflow Overview




Prepare plate standards and reagents

Add 100µl of samples, standards and controls

Aspirate

Add 100µl Detection Reagent A

Wash plate x3

Add 100µl Detection Reagent B

Wash plate x 5

Add 90µl TMB Substrate

Add 50µl STOP solution and readabsorbance @ 450nm

# 6. Sample Preparation

## General considerations:

1. Assay Genie is only responsible for the kit itself, not for the samples consumed during theassay. The user should calculate the possible amount of the samples used in the whole test. Please reserve sufficient samples in advance.
2. Please predict the concentration before assaying. If values for these are not within the range of the standard curve, users must determine the optimal sample dilutions for their particular experiments. Samples should be diluted by 0.01mol/L PBS (pH=7.0-7.2).
3. If the samples are not indicated in the manual, a preliminary experiment to determine thevalidity of the kit is necessary.
4. Tissue or cell extraction samples prepared using a chemical lysis buffer may cause unexpected ELISA results due to the impacts from certain chemicals.
5. Due to the possibility of mismatching between antigens from other origin and antibodies used in our kits (e.g., antibody targets conformational epitope rather than linear epitope), some native or recombinant proteins from other manufacturers may not be recognized byour products.
6. Samples from cell culture supernatant may not be detected by the kit due to influence from factors such as cell viability, cell number and/or sampling time.
7. Fresh samples that have not been stored for extended periods of time are recommended for the test. Otherwise, protein degradation and denaturalization may occur in those samples and give inaccurate or incorrect results.

## Sample Collection and Storage

**Tissue Homogenates:** The preparation of tissue homogenates will vary depending upon tissue type. For this assay, tissues should be rinsed in ice-cold PBS (0.01mol/L, pH 7.0-7.2) to remove excess blood thoroughly and weighed before homogenization. Mince the tissues tosmall pieces and homogenize them in 5-10 mL of PBS with a glass homogenizer on ice (MicroTissue Grinders also work). The resulting suspension should be sonicated with an ultrasonic cell disrupter or subjected to two freeze-thaw cycles to further break the cell membranes. Afterthat, the homogenates are centrifuged for 5 minutes at 5000×g. Remove the supernatant andassay immediately or aliquot and store at ≤-20°C.

**Cell lysates:** Cells must be lysed before assaying according to the following directions:

1. Adherent cells should be detached with trypsin and then collected by centrifugation (suspension cells can be collected by centrifugation directly).
2. Wash cells three times in cold PBS.
3. Resuspend cells in PBS (1×) and subject the cells to ultrasonication 4 times (or Freeze cells at ≤-20°C. Thaw cells with gentle mixing. Repeat the freeze/thaw cycle 3 times.).
4. Centrifuge at 1500×g for 10 minutes at 2-8°C to remove cellular debris.

**Cell culture supernatants and other biological fluids:** Centrifuge samples for 20 minutes at 1000×g. Remove particulates and assay immediately or store samples in aliquots at -20°C or -80°C. Avoid repeated freeze/thaw cycles.

### Notes

1. Samples to be used within 5 days may be stored at 4°C, otherwise samples must be stored at -20°C (≤1 month) or -80°C (≤2 months) to avoid loss of bioactivity and/or contamination.

2. Noticeable hemolysis will affect antibody-antigen reactions. Samples with any sign of hemolysis are not acceptable for this assay.

3. When performing the assay, bring samples to room temperature.

# 7. Standard and Reagent Preparation

## Sample Dilution Guidelines

Determine the concentration of the target protein in the test sample and then select the optimal dilution factor to ensure the target protein concentration falls within the optimal detection range of the kit. Dilute the samples with the dilution buffer provided with the kit. Several dilution tests may be required to achieve the optimal results. The test samples must be well mixed with thedilution buffer. Standard and sample dilution should be performed before starting the experiment.

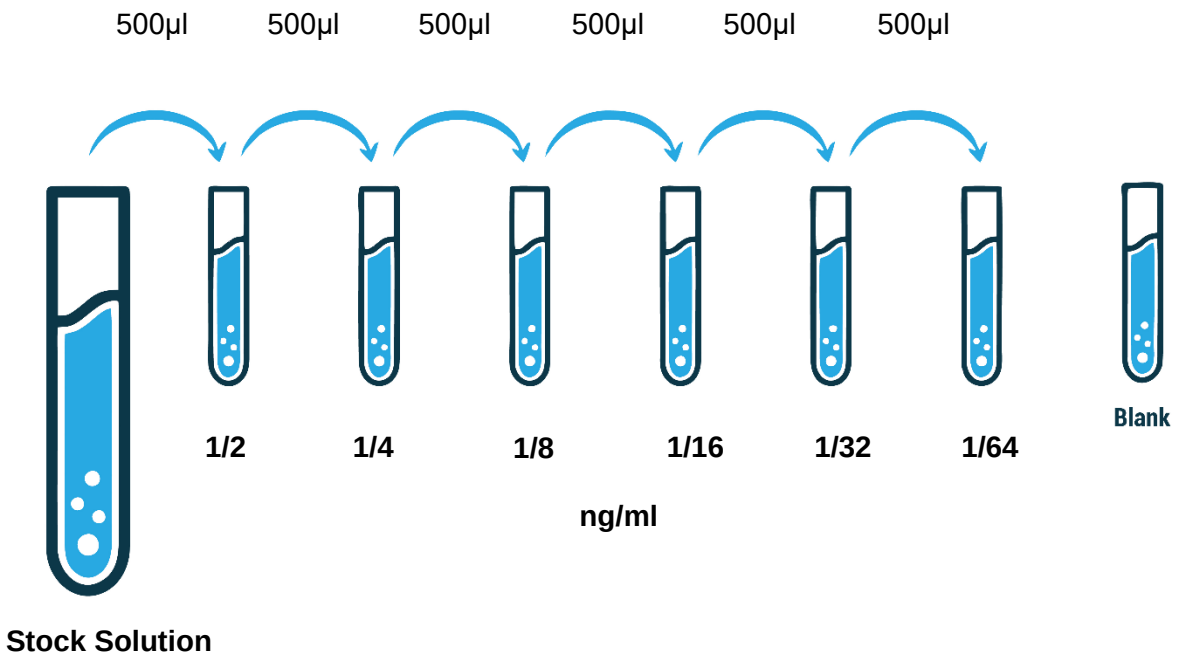
### 1. Reagent Preparation

Bring all kit components and samples to room temperature (18-25°C) before use.

### 2. Standard Dilution

Reconstitute the Standard with 1.0mL of Diluent Buffer, keep for 10 minutes at room temperature, shake gently (not to foam). The concentration of the standard in the stock solution is 10000ng/mL. Prepare 7 tubes containing 0.5mL Diluent Buffer and use the diluted standard to produce a double dilution series according to the picture shown below. Mix each tube thoroughly before the next transfer. Prepare a dilution series with 7 points; Label 7 Eppendorf tubes with 1/2, 1/4, 1/8, 1/16, 1/32, 1/64 and blank respectively and the last EP tube with Diluent Buffer is the blank 0ng/mL.

**DILUTION SERIES**



### 3. Detection Reagent A and Detection Reagent B

Briefly spin or centrifuge the stock Detection A and Detection B solutions before use. Dilute to the working concentrations with Diluent Buffer respectively (1:100).

### 4. Wash Buffer

Dilute 20mL of Wash Solution concentrate (30×) with 580mL of deionized or distilled water to prepare 600mL of Wash Solution (1×).

### 5. TMB Substrate

Aspirate the needed dosage of the solution with sterilized tips. Do not dump the residual solution back into the vial.

## 8. Assay Procedure

1. Determine wells for diluted standard, blank and sample. Prepare 7 wells for the standards, 1 well for blank. Add 100μL each of dilutions of standard (read Reagent Preparation), blank, and samples into the appropriate wells. Cover with the Plate sealer. Incubate for 2hours at 37˚C.
2. Remove the liquid from each well, do not wash.
3. Add 100μL of Detection Reagent A working solution to each well. Incubate for 1 hour at 37˚C after covering it with the Plate sealer.
4. Aspirate the solution and wash with 350μL of 1× Wash Solution to each well using a squirt bottle, multi-channel pipette, manifold dispenser or auto-washer, and let it sit for 1~2 minutes. Remove the remaining liquid from all wells completely by tapping the plate onto absorbent paper. Wash thoroughly 3 times. After the last wash, remove any remaining Wash Buffer by aspirating or decanting. Invert the plate and blot it against absorbent paper.
5. Add 100μL of Detection Reagent B working solution to each well. Incubate for 1 hour at 37˚C after covering it with the Plate sealer.
6. Repeat the aspiration/wash process for a total of 5 times as conducted in step 4.
7. Add 90μL of Substrate Solution to each well. Cover with a new Plate sealer. Incubate for 15-25 minutes at 37˚C (Do not exceed 30 minutes). Protect from light. The liquid will turn blue with the addition of the Substrate Solution.
8. Add 50μL of Stop Solution to each well. The liquid will turn yellow with the addition of the Stop solution. Mix the liquid by tapping the side of the plate. If the colour change does notappear uniform, gently tap the plate to ensure thorough mixing.
9. Remove any drops of water and fingerprints on the bottom of the plate and confirm there are no bubbles on the surface of the liquid. Run the microplate reader and take measurements at 450nm immediately.

## Notes

1. **Assay preparation:** Keep appropriate numbers of wells for each experiment and remove extra wells from microplate. Remaining wells should be resealed and stored at -20°C.

2. **Samples or reagents addition:** **Please use the freshly prepared Standard.** Carefully addsamples to wells and mix gently to avoid foaming. Do not touch the well walls. For each step in the procedure, total dispensing time for addition of reagents or samples to the assay plate should not exceed 10 minutes. This will ensure equal elapsed time for each pipetting step, without interruption. Duplication of all standards and specimens, although not required, is recommended. To avoid cross-contamination, change pipette tips betweenadditions of standards, samples, and reagents. In addition, use separated reservoirs for each reagent.
3. **Incubation:** To ensure accurate results, proper adhesion of plate sealers during incubation steps is necessary. Do not allow wells to sit uncovered for extended periods inbetween incubation steps. Once reagents are added to the well strips, DO NOT let the strips dry at any time during the assay. Incubation time and temperature must be controlled.
4. **Washing:** The wash procedure is critical. Complete removal of liquid at each step is essential for good performance. After the last wash, remove any remaining Wash Solution by aspirating or decanting, and remove any drops of water or fingerprints on the bottom of the plate. Insufficient washing will result in poor precision and false elevated absorbance reading.
5. **Controlling of reaction time:** Observe the change of color after adding TMB Substrate (e.g. observation once every 10 minutes), if the color is too deep, add Stop Solution in advance to avoid excessively strong reaction which will result in an inaccurate absorbance reading.
6. **TMB Substrate** is easily contaminated. Please protect it from light.
7. The environment humidity may have an effect on the results obtained from the kit. If the humidity in your facility is less than 60%, using a humidifier is recommended.

## 9. Data Analysis

Average the duplicate readings for each standard, control and sample, then subtract the average zero standard optical density. Construct a standard curve by plotting the mean O.D. and concentration for each standard and draw a best fit curve through the points on the graph or create a standard curve on log-log graph paper with Hpt concentration on the y-axis and absorbance on the x-axis. Using plotting software, (for instance, curve expert 1.30), is also recommended. If samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.

## 10. Typical Data & Standard Curve

### Standard Curve

In order to make the calculation easier, we plot the O.D. value of the standard (X-axis) against the known concentration of the standard (Y-axis), although concentration is the independent variable and O.D. value is the dependent variable. However, the O.D. values of the standard curve may vary according to the conditions of assay performance (e.g. operator, pipetting technique, washing technique or temperature effects), plotting the log of the data to establish a standard curve for each test is recommended. The typical standard curve below is provided for reference only.

### Detection Range

156.25-10000ng/mL. The standard curve concentrations used for the ELISA's were 10000ng/mL, 5000ng/mL, 2500ng/mL, 1250ng/mL, 625ng/mL, 312.5ng/mL, 156.25ng/mL and 0ng/mL.

(NO IMAGE)

### Sensitivity

The minimum detectable dose of Hpt is typically less than 41.5ng/mL. The sensitivity of this assay, or Lower Limit of Detection (LLD) was defined as the lowest protein concentration that could be differentiated from zero. It was determined by adding two standard deviations to the mean optical density value of twenty zero standard replicates and calculating the corresponding concentration.

## Specificity

This assay has high sensitivity and excellent specificity for detection of Hpt. No significant cross-reactivity or interference between Hpt and analogs was observed.

**Note:** Limited by current skills and knowledge, it is impossible to perform all possible cross-reactivity detection tests between Hpt and all analogs, therefore, cross reactivity may still exist.

## Precision

Intra-assay Precision (Precision within an assay): 3 samples with low, middle and high levelHpt were tested 20 times on one plate, respectively.

Inter-assay Precision (Precision between assays): 3 samples with low, middle and high level Hpt were tested on 3 different plates, 8 replicates in each plate.

- **CV (%) =** SD/mean X 100
- **Intra-Assay:** CV<10%
- **Inter-Assay:** CV<12%

## Stability

The stability of this ELISA Kit is determined by the loss rate of activity. The loss rate of this kitis less than 5% within the expiration date under appropriate storage conditions.

To minimize extra influence on the performance, operation procedures and lab conditions, especially room temperature, air humidity, incubator temperature should be strictly controlled. It is also strongly suggested that the whole assay is performed by the same operator from thebeginning to the end**.**

## Notes

1. Limited by the current conditions and scientific technology, it is impossible to conduct comprehensive identification and analysis tests on the raw materials provided by suppliers.As a result, it is possible there are some qualitative and/or technical risks.
2. The final experimental results will be closely related to the validity of the products, operation skills of the end users and the experimental environments. Please make sure that sufficient samples are available to obtain accurate results.
3. Kits from different batches may be a little different in detection range, sensitivity and color developing time. Please perform the experiment exactly according to the instruction manual included in your kit. Electronic ones on our website are for reference only.
4. Do not mix or substitute reagents from one kit lot to another. Use only the reagents supplied by manufacturer.
5. Protect all reagents from strong light during storage and incubation. All bottle caps of reagents should be closed tightly to prevent evaporation of liquids and contamination by microorganisms.
6. There may be a foggy substance in the wells when the plate is opened at the first time. It will not have any effect on the final assay results. Do not remove microtiter plate from thestorage bag until needed.
7. Incorrect procedures during reagent preparation and loading, as well as incorrect parameter setting for the plate reader may lead to incorrect results. A microplate plate reader with a bandwidth of 10nm or less and an optical density range of 0-3 O.D. or greater at 450 ± 10nm wavelength is acceptable for use in absorbance measurement. Please read the instruction carefully and adjust the instrument prior to the experiment.
8. Even the same experimenter may get different results from two separate experiments. In order to get better reproducible results, the operation of every step in the assay should becontrolled. Furthermore, a preliminary experiment before the general assay for each batchis recommended.
9. Each kit has undergone several rigorous quality control tests. However, results from end users might be inconsistent with our in-house data due to some unexpected transportation conditions or different lab equipment. Intra-assay variance among kits from different batches could arise from the above factors as well.
10. The standard in this kit, as well as the antigens used in antibody preparation are typically recombinant proteins. Differently expressed sequences, expression systems, and/or purification methods can be used in the preparation of recombinant proteins. There is also the possibility of differences in the screening technique of antibodies and antibody pairs inour kits. As a result, we cannot guarantee that our kit will be able to detect recombinant proteins produced by other companies. We do NOT recommend using Assay Genie ELISAkits for the detection of other recombinant proteins.
11. Validity period: 12 months.
12. The instruction manual also works with the 48T kit, all reagents in the 48T kit are reduced by half.

**Assay Genie 100% money-back guarantee!**

If you are not satisfied with the quality of our products and our technical team cannot resolveyour problem, we will give you 100% of your money back.

## Contact Details

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