

## Reagent for quantitative In-vitro-determination of haemoglobin in blood (SLS method)

**HB 342**

**Order No.** HB 342  
**Content:** 40 tests

**Method**  
 SLS method

**Sample material**  
 Capillary blood or EDTA blood  
 Use capillary blood immediately. Venous blood can be kept for up to 24 hours at +15°C to +25 °C.

**Reagent**  
 Contents / concentrations:  
 Reagent solution (pre-portioned in round cuvettes)  
 Sodium dodecyl sulfate (SLS) 2.08 mmol/L  
 Phosphate buffer 30 mmol/L, pH 7.3, Triton X-100 < 0.1%,  
 Non-ionic detergent

**Safety information**  
 If desired a safety data sheet will be provided.<sup>1)</sup>

**Storage and shelf life**  
 The reagent can be kept in a dark place at a temperature between +15°C and +25°C until the expiry date indicated on the packaging.

**Measurement conditions**  
 Measurement devices: Diaglobal Photometer  
 Dr. Lange Photometer  
 Meas. wavelengths: 546nm, 560nm  
 Temperature: Room temperature

**Measurement range**  
 1.0 - 25 g/dL (0.6 - 15.5 mmol/L)

### Working instructions

Pipette into round cuvette:	
	Analysis
Blood	10 µL
Wash out the capillary with reagent solution. Mix thoroughly. Measure after 30 seconds.	

**Diaglobal Photometer**

- Select the <HB SLS> test
- Set the photometer's zero point using a non-processed round cuvette (blank value)
- Insert analysis cuvette
- Read the result

**Dr. Lange Photometer**

- Select the <Hb> test
- Insert analysis cuvette
- Read the result

**Quality assurance**  
 For quality assurance we recommend our haemoglobin control **HEM QS**, haemolysate for accuracy and precision control for determination of haemoglobin in normal range.

### Reference values

	g/dL	mmol/L
Women	12 - 16	7.45 - 9.93
Men	14 - 18	8.69 - 11.2
Newborn	16 - 25	9.93 - 15.5
Babies	10 - 15	6.21 - 9.31
Toddlers	11 - 14	6.83 - 8.69
Children	12 - 16	7.45 - 9.93

**Tips**

- Store safely away from children.
- When extracting capillary blood, avoid pressing the finger pulp too hard because otherwise the blood to be extracted is thinned-out by tissue fluid.
- Due to the quick formation of the SLS methaemoglobin, readings can be already taken after 30 seconds.
- The colour is stable at room temperature for several hours.

### Summary<sup>2,3)</sup>

The red blood pigment, haemoglobin (abbreviated Hb) is a protein with iron content which is responsible for the transportation of oxygen in the bloodstream. It consists partly of globulin and the prosthetic haemolysis group. In addition to both major fractions (oxygenated haemoglobin and deoxygenated haemoglobin), further Hb derivatives with a changed haemolysis group (COHb, MetHb) or globulin contents which vary from the standard globulin share (HbA1, HbF) are in the blood.

Indications / diagnostic significance:

- Recognition of anaemia or hyperglobulia
- Follow-up and therapeutic controls for anaemia or hyperglobulia
- Monitoring risk groups for iron deficiency (pregnant women, toddlers, blood donors, haemodialysis patients, sportswomen)

Low HB counts which are not within the reference range are classified as belonging to the symptoms of anaemia and also occur after chronic loss of blood, insufficiently fulfilled additional iron requirements, iron use disorders, intoxication and an array of tumour diseases. Typical symptoms include tiredness and drop in performance.

**Measurement principle**  
 Amongst the various determination methods, the cyan methaemoglobin method has achieved the status of an international reference method<sup>4,5)</sup>. The SLS method<sup>6)</sup> is a further, reliable measurement process which offers several advantages against the established standard method (immediate availability of the measured value, use of a cyanide-free reagent which is stable against the action of light).

Through lysis of the erythrocyte membrane, haemoglobin and its physiologically effective derivatives are emitted and transformed to SLS methaemoglobin. The colour intensity of the SLS methaemoglobin is proportional to the haemoglobin concentration in the sample and is measured photometrically.

### Performance parameters

**Specificity / interferences**  
 The physiologically active Hb derivatives (COHb, MetHb etc.) are also registered upon determination. Highly lipaemic samples may disturb the test and falsify HB values which are too high.

**Inaccuracy**  
 The reproducibility was checked using human and control samples.

In series [n = 20]	Average [g/dL]	Standard deviation [g/dL]	VK [%]
Probe 1	6.50	0.08	1.3
Probe 2	12.2	0.13	1.1
Probe 3	15.9	0.17	1.1
From day to day [n = 20]	Average [g/dL]	Standard deviation [g/dL]	VK [%]
Probe 1	6.70	0.13	1.9
Probe 2	12.5	0.19	1.5
Probe 3	15.9	0.22	1.4

**Analytic sensitiveness**  
 Lower detection limit: 1.0 g/dL

**Comparison of methods**  
 Comparison of the Diaglobal test HB 342 (y) with a commercially available test (x) resulted in the following correlation according to the Passing/Bablok<sup>7)</sup> process:  
 $y = 1.020x - 0.272$   
 $r = 0.997$

n = 37  
 Concentration range: 5.8 - 28 g/dL

**Information on disposal**  
 Waste code number 180106:  
 Vials with reagent are considered hazardous waste. Do not allow reagent to reach surface water or sewage system. Dispose of in accordance with official regulations. Non-contaminated and completely empty packaging can be recycled.

**Bibliography**

1. <http://www.diaglobal.de/de/service/downloads/index.html>
2. Thomas L. Labor und Diagnose. 4.Aufl. Marburg: Die Medizinische Verlagsgesellschaft 1995: 597, 401
3. Rick W. Klinische Chemie und Mikroskopie. 6.Aufl. Berlin Heidelberg: Springer Verlag 1972: 115
4. Int. Committee for Standardisation in Haematology (ICSH), Brit. J. Haemat. 1967; 13:71
5. CCLS – Approved Standard H 15-A, 1984; Vol. 4 No.3 Reference procedure for the quantitative determination of hemoglobin in blood.
6. Oshiro I, Tanenaka T, Madea J. New method for hemoglobin determination by using lauryl sulfate (SLS). Clin Biochem 1982; 15:83
7. Passing H, Bablok W. A new biometric procedure for testing the equality of measurements from two different analytical methods. J Clin Chem Clin Biochem. 1983; 21:709-720