Design Verification

HumaClot Quattro

Contents

1. Introduction

This Verification Report contains performance data for the following HUMAN analyzer:

HumaClot Quattro, REF. 15660

The following HEMOSTAT Reagents were tested:

- HEMOSTAT Thromboplastin-SI (PT-SI)
- HEMOSTAT Activated Partial Thromboplastin Time (aPTT)
- HEMOSTAT Fibrinogen (FIB)
- HEMOSTAT Thrombin Time (TT)
- HEMOSTAT D-Dimer (DD)

For each HEMOSTAT Reagent, the following parameters were tested (if applicable):

- Limit of Detection (LOQ)
- Imprecision
- Calibration
- Interference
- Linearity
- Reference Interval
- Method Comparison

Please see below for a general evaluation of the Limit of Detection (LOQ) for coagulation screening tests..

2. Limit of Detection (LOQ)

2.1 Coagulation Screening Tests

Prothrombin Time, Activated Partial Thromboplastin Time, Fibrinogen, and Thrombin Time all quantify the time [s] from the activation of the coagulation cascade until the generation of fibrin. These assays do not determine a single analyte (*CLSI EP 17-A2 Detection Capability, Chapter 4.1, page 5)*, but rather assess a functional impairment of the coagulation as a whole, which makes them coagulation screening tests.

The LOQ is defined as max 3 standard deviations from the mean of the test results for a solution containing no analyte. To determine the lower limit of LOD, several measurements of a 'zero' standard (i.e. a standard that contains no analyte) are taken, and the standard deviation is calculated from the results. The area outside the 3 SD-range is then defined as 'noise', and is test-specific. A false positive result within this area would be extremely unlikely.The upper limit of the 3 SD-range corresponds to the lower limit of the LOQ.

However, for coagulation screening tests it is not possible to measure a solution containing no analyte. These tests are based on the photo-optical detection of the forming of a fibrin clot. Currently, there is no true 'zero', plasma-based standard commercially available, and the use of buffer instead of a 'zero' standard will not result in a fibrin clot. A lack of a fibrin clot prevents a manual or automated detection, and makes an analytical determination of the LOQ impossible.

Conclusion: The LOQ was not determined for the coagulation screening tests HEMOSTAT PT-SI, HEMOSTAT aPTT, HEMOSTAT FIB, HEMOSTAT TT, because it is not feasible to omit a single coagulation factor when performing a coagulation screening test. In addition, no 'zero' standard is commercially available for the determination of the lower LOQ limit.

2.2 IFU Review

The following IFUs for fibrinogen tests by well- established IVD manufacturers were reviewed. None of these IFUs state a detection limit, such as LOQ, for fibrinogen.

	Fibrinogen Test
Manufacturer	
Siemens	Dade Thrombin Reagent
Technoclone	Fibrinogen Reagent Kit

Hyphen BioMed	Fibriphen 2; Fibriphen 5
Labitec	LABITec Fib
Helena	Clauss Fibrinogen 100

Conclusion: In accordance with common practice, the LOQ for HEMOSTAT Fibrinogen (FIB) was not determined.

3. HEMOSTAT Thromboplastin-SI (PT-SI)

3.1 Imprecision

The imprecision (within-run and day-to-day run) of the HEMOSTAT Thromboplastin-SI (PT-SI) was calculated from eight determinations on five consutive days. Two level of BIO-RAD control sera were employed as samples.

Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E 3060010	V00.12b Feb 6 2017

Reagent	REF	LOT	Expiry Date
Hemostat Thromboplastin-SI	31003	16002	Feb.18

Sample	Manufacturer	REF	LOT	Expiry Date
Level 1	BIO-RAD	744	78421	May 18
Level 3		746	78423	May 18

Acceptance Criteria

	Within run	Day-Day Total
Level 1	CV<10%	CV<12%
Level 3	CV<10%	CV<12%

Results

Parameter	Ref	LOT	BIO-RAD Lyphochek Control	CV % within run					CV% Between-run	CV % Total
				Day 1	Day 2	Day 3	Day 4	Day 5		
PT-SI	31003	16002 Exp.: Feb.18	0.65	0.44	0.51	0.85	0.61	0.62	2.06	0.65
			4.17	1.66	1.82	2.48	1.61	2.32	6.10	4.17
			0.97	0.66	0.74	1.25	0.88	0.90	2.99	0.97
			4.84	1.75	2.02	2.77	1.75	2.65	6.78	4.84
			0.64	0.40	0.63	0.80	0.43	0.58	2.21	0.64
			4.25	1.69	1.87	2.51	1.64	2.37	6.22	4.25

Conclusion: The results meet the pre-defined acceptance criteria. The precision of the HEMOSTAT Thromboplastin-SI (PT-SI) is excellent.

3.2 Calibration

HEMOSTAT Thromboplastin-SI (PT-SI) was calibrated on the instrument with HEMOSTAT CALIBRATOR according to the dilution scheme for HEMOSTAT Thromboplastin-PT. Four manually prepared dilutions of the HEMOSTAT CALIBRATOR were measured in triplicate to determine the minimum and maximum deviation from the expected recovery.

Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E 2760007	V00.12b Feb 6 2017

Reagent	REF	LOT	Expiry Date
Hemostat Thromboplastin-SI	31003	16002	Feb.18
Hemostat Calibrator	35500	17011817	Aug.18

Acceptance Criteria

	%
Recovery	85-115

Results

Hemostat Calibrator	PT% AV	Min PT%	Max PT%	MW	Min Recovery	Max Recovery
PT-SI Quattro	93	95.2	96.4	95.6	102.4	103.7
	46.5	47.5	48.7	48.3	102.2	104.7
	23.25	23.5	24.8	24.2	100.0	105.5
	11.625	10.6	11	10.8	91.1	94.6

Conclusion: The results meet the pre-defined acceptance criteria. The recovery of the HEMOSTAT Thromboplastin-SI (PT-SI) is good.

3.3 Interference

Pooled normal human plasma was spiked with dilution series of potentially interfering substances, and the HEMOSTAT Thromboplastin-SI (PT-SI) test performed.

Substances tested:
Bilirubin (max 50mg/dl)
Hemoglobin (max 1000mg/dl)
Lipids (max 1000 mg/ml)
Triglycerides (max 3500 mg/ml)

Bilirubin
Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E 3060010	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Bilirubin	Sigma	B4126-1G	#SLBK2832V	n.a.
Plasma	University, Magdeburg	n.a.	#05520551	n.a.
Hemostat PT-SI	HUMAN	31002	16004	Sep.17

Acceptance Criteria

	%

Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Bilirubin mg/dl	s	%	s	%	s	%	s	%	%
0	0	14.7	100.0	14.3	100.0	14.3	100.0	14.7	100.0
5	5	14.4	98.0	14.3	100.0	14.2	99.3	14.6	99.3
10	10	14.4	98.0	14.2	99.3	14.3	100.0	14.5	98.6
15	15	14.4	98.0	14.5	101.4	14.5	101.4	14.5	98.6
20	20	14.4	98.0	14.4	100.7	14.6	102.1	14.7	100.0
25	25	14.3	97.3	14.5	101.4	14.6	102.1	14.8	100.7
30	30	14.5	98.6	14.6	102.1	14.7	102.8	14.7	100.0
35	35	14.3	97.3	15.0	104.9	14.9	104.2	15.1	102.7
40	40	14.8	100.7	14.8	103.5	15.0	104.9	15.4	104.8
45	45	14.4	98.0	15.1	105.6	15.3	107.0	14.7	100.0
50	50	14.4	98.0	15.2	106.3	19.1	133.6	10.7	72.8

Conclusion
Bilirubin did not interfere with the HEMOSTAT Thromboplastin-SI (PT-SI) at any concentration up to 50 mg/dl.

Hemoglobin
Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E 3060010	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Hemoglobin	HUMAN	10150	CTA005	Okt.17
Plasma	University, Magdeburg	n.a.	#5520551	n.a.
Hemostat PT-SI	HUMAN	31002	16004	Sep.17

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Hemoglobin mg/dl	s	%	s	%	s	%	s	%	%
0	15.3	100.0	15.3	100.0	15.2	100.0	15.4	100.0	100
25	15.1	98.7	15.2	99.3	15.3	100.7	15.4	100.0	100

Spike	Run1		Run2		Run3		Run4		Mean
Hemoglobin mg/dl	s	%	s	%	s	%	s	%	%
50	15.0	98.0	15.1	98.7	15.2	100.0	15.5	100.6	99
75	14.7	96.1	14.7	96.1	14.8	97.4	15.2	98.7	97
100	14.8	96.7	14.9	97.4	14.8	97.4	15.1	98.1	97
200	14.8	96.7	14.7	96.1	14.8	97.4	15.3	99.4	97
300	14.7	96.1	14.8	96.7	15.0	98.7	15.4	100.0	98
400	15.0	98.0	15.1	98.7	14.9	98.0	15.6	101.3	99
500	15.1	98.7	15.8	103.3	15.4	101.3	15.3	99.4	101
600	15.6	102.0	15.5	101.3	14.7	96.7	15.1	98.1	100
1000	41.8	273.2	15.5	101.3	15.7	103.3	16.4	106.5	146

Conclusion
Hemoglobin did not interfere with the HEMOSTAT Thromboplastin-SI (PT-SI) at any concentration up to 600 mg/dl.

Lipids
Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E 3060010	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Lipovenous 20%	Fresenius	n.a.	16IF1572	May17
Plasma	University, Magdeburg	n.a.	#05520551	n.a.
Hemostat PT-SI	HUMAN	31002	16004	Sep.17

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Lipids mg/dl	s	%	s	%	s	%	s	%	%
0	92.0	100.0	94.5	100.0	94.6	100.0	95.9	100.0	100
100	97.5	106.0	96.8	102.4	95.8	101.3	98.2	102.4	103
200	98.9	107.5	97.8	103.5	97.9	103.5	99.5	103.8	105
300	100.2	108.9	95.8	101.4	95.5	101.0	98.5	102.7	103
400	94.6	102.8	96.2	101.8	96.6	102.1	97.7	101.9	102
500	94.0	102.2	98.0	103.7	98.8	104.4	97.9	102.1	103
600	96.5	104.9	94.6	100.1	96.1	101.6	96.1	100.2	102
700	96.7	105.1	96.0	101.6	97.3	102.9	96.3	100.4	102
800	96.7	105.1	99.0	104.8	98.5	104.1	99.3	103.5	104

Spike	Run1		Run2		Run3		Run4		Mean
Lipids mg/dl	s	%	s	%	s	%	s	%	%
900	97.9	106.4	97.6	103.3	97.9	103.5	98.8	103.0	104
1000	96.5	104.9	97.4	103.1	96.3	101.8	98.3	102.5	103

Conclusion
Lipids did not interfere with the HEMOSTAT Thromboplastin-SI (PT-SI) at any concentration up to 1000mg/dl.

Triglycerides
Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E 3060010	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Triglycerides concentrated	Trina	A1974	08IA2713	n.a.
Plasma	University, Magdeburg	n.a.	#05520551	n.a.
Hemostat PT-SI	HUMAN	31002	16004	Sep.17

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Triglycerides mg/dl	s	%	s	%	s	%	s	%	%
0	72.6	100.0	73.5	100.0	71.9	100.0	72.1	100.0	100
250	70.5	97.1	73.6	100.1	72.2	100.4	72.6	100.7	100
350	70.5	97.1	68.9	93.7	70.4	97.9	69.3	96.1	96
450	71.1	97.9	71.1	96.7	71.4	99.3	71.0	98.5	98
550	70.7	97.4	71.5	97.3	71.6	99.6	71.9	99.7	98
650	68.5	94.4	68.6	93.3	72.1	100.3	72.1	100.0	97
750	69.2	95.3	68.7	93.5	66.5	92.5	66.4	92.1	93
1000	69.2	95.3	67.3	91.6	68.9	95.8	68.1	94.5	94
1500	65.2	89.8	68.1	92.7	65.1	90.5	67.6	93.8	92
2500	67.0	92.3	66.7	90.7	68.5	95.3	66.9	92.8	93
3500	68.0	93.7	71.1	96.7	66.3	92.2	62.3	86.4	92

Conclusion: Triglycerides did not interfere with the HEMOSTAT Thromboplastin-SI (PT-SI) at any concentration up to 3500 mg/dl.

3.4 ISI Value

The ISI Value was checked by determination of 4 TC AK Calibrant dilutions with known INR. The measurements were performed 4 times and then the ISI value was calculated via regression analysis.

Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E 3060010	V00.12b Feb 6 2017

Reagent	REF	LOT	Expiry Date
Hemostat Thromboplastin-SI	31003	16002	Feb.18
Hemostat Thromboplastin-SI	31002	16010	Feb.18
Controls	REF	LOT	Expiry Date
Hemostat CPN	35001	16003	02.2018
Hemostat CPA	35002	16004	02.2018
TC AK Kalibrants	5010004	OU401B01.07	Okt.18

Acceptance Criteria

	ISI
Hemostat PT-SI	<1.4

Results

Analyzer	ISI	
	LOT 16010	LOT 16002
HC Quattro	1.05	0.98

Conclusion: The results meet the pre-defined acceptance criteria. The ISI of the HEMOSTAT Thromboplastin-SI (PT-SI) was good.

3.5 Reference Range

The reference range for HEMOSTAT Thromboplastin-SI was established with a set of 25 plasma specimen.

Materials used

Analyzer	Serial
HumaClot Quattro	E 2760007

Reagent	Manufacturer	REF	LOT	Expiry Date
Hemostat PT-SI	Human	31003	16002	Feb. 18
NaCl	Human	CHE10187	HP_091	Aug. 17
Normal-Donor Set Plasma	CoaChrom Diagnostica	CCNS-10	ND32-031	Mai. 19
Hemostat Calibrator	Human	35500	13	Okt. 17
Hemostat Control Normal	Human	35002	17003	Feb. 19
Hemostat Control Abnormal	Human	35002	17002	Jan. 19

Acceptance Criteria

Control Plasma	Target Value [s]	Range [s]
Control Plasma Normal (CPN)	11.1	8.9-13.3
Control Plasma Abnormal (CPA)	19.6	15.7-23.5
Sample	Within CPN Range	Within CPN Range
Standard Deviation	<5	n.a.

Results

Sample	1. Run			2. Run			Mean		
	s	%	INR	s	%	INR	s	%	INR
F32323	15.3	81.9	1.15	14.9	85.4	1.12	15.1	83.7	1.14
F32328a	13.3	101.8	0.99	13.2	103.0	0.98	13.3	102.4	0.99
M32441	14.2	92.0	1.06	14.2	92.0	1.06	14.2	92.0	1.06
M32446	13.4	100.7	1.00	13.0	105.5	0.96	13.2	103.1	0.98
M32451	14.0	94.0	1.05	13.7	97.3	1.02	13.9	95.7	1.04
F32322	16.3	74.3	1.24	16.2	75.0	1.23	16.3	74.7	1.24
F32327	16.3	74.3	1.24	16.1	75.7	1.22	16.2	75.0	1.23
M32440	15.2	82.8	1.15	15.2	82.8	1.15	15.2	82.8	1.15
M32445	14.6	88.1	1.10	14.5	89.1	1.09	15.0	88.6	1.10
M32450	15.5	80.3	1.17	15.2	82.8	1.15	15.4	81.6	1.16
F32321	15.8	78.0	1.20	15.7	78.7	1.19	15.8	78.4	1.20
F32326	15.4	81.1	1.16	15.4	81.1	1.16	15.4	81.1	1.16
M32439	13.7	97.3	1.02	13.8	96.2	1.03	13.8	96.8	1.03
M32444	14.7	87.2	1.10	14.9	85.4	1.12	14.8	86.3	1.11
M32449	13.9	95.1	1.04	13.7	97.3	1.02	13.8	96.2	1.03
F32320	15.8	78.0	1.20	16.0	76.5	1.21	15.9	77.3	1.21
F32325	15.3	81.9	1.15	15.0	84.5	1.13	15.2	83.2	1.14
M32438	14.3	91.0	1.07	14.3	91.0	1.07	14.3	91.0	1.07
M32443	14.9	85.4	1.12	14.7	87.2	1.10	14.8	86.3	1.11
M32448	14.8	86.3	1.11	14.7	87.2	1.10	14.8	86.8	1.11
F32319	15.4	81.1	1.16	15.4	81.1	1.16	15.4	81.1	1.16
F32324	14.9	85.4	1.12	14.7	87.2	1.10	14.8	86.3	1.11
M32437a	13.3	101.8	0.99	13.3	101.8	0.99	13.3	101.8	1.0
M32442	12.7	109.4	0.94	12.7	109.4	0.94	12.7	109.4	0.9
M32447	13.7	97.3	1.02	13.6	98.4	1.01	13.7	97.9	1.02
Median	14.8	86.3	1.11	14.7	87.2	1.10	Median	14.8	86.3
95% Percentile	16.2	101.8	1.23	16.1	105	1.22	95.Perzentile	16.2	101.8
5% Percentile	13.3	75.0	0.99	13.0	75.9	0.96	5.Perzentile	13.3	75.0
Mean	14.7	88.3	1.10	14.6	89.3	1.09	Mittelwert	14.7	88.3
SD	0.99	9.4	0.08	1.0	9.64	0.08	SD	1.0	9.42

Conclusion: The results meet the pre-defined acceptance criteria. The reference range of the HEMOSTAT Thromboplastin-SI (PT-SI) was within CPN range.

3.6 Method Comparison

The HEMOSTAT Thromboplastin-SI (PT-SI) run on the HC Quattro was compared to a run on HumaCLOT Pro. The results were evaluated by a non-parametric regression model according to Passing & Bablok and Bland-Altman.

Acceptance Criteria

Passing&Bablok	
Slope	1±0.2
Intercept	± 15
Correlation coefficient R	>0.85
Bland Altman	
Mean %	<+15

Results

Descriptive Statistics

Method	HC Quattro	HC Pro	HC Quattro	HC Pro	HC Quattro	HC Pro
Test	PT-SI	PT-Si	PT-SI	PT-Si	PT-SI	PT-Si
Unit	s	s	%	%	INR	INR
N	70	70	74	74	74	74
Mean	21.94	21.24	41.39	48.55	1.96	1.83
SD	9.21	8.14	22.56	23.32	0.87	0.85
Median	19.23	18.88	34.10	45.78	1.66	1.61
Q1	15.16	14.91	22.98	27.15	1.32	1.17
Q3	25.94	25.60	59.24	66.55	2.45	2.23
Min	11.50	12.10	10.42	13.50	0.99	0.91
Max	58.35	51.50	96.42	104.90	4.87	4.75

Passing Bablok-Regression

	PT-SI s	PT-SI %	PT-SI INR
slope	1.1118	0.9241	1.0057
lower 95%-CL	1.0726	0.8531	0.9753
upper 95%-CL	1.1572	0.9938	1.0387
Intercept	-1.4461	-3.0474	0.1216
lower 95%-CL	-2.5296	-5.8100	0.0669
upper 95%-CL	-0.7059	-0.9397	0.1780
R^2=	0.9891	0.9721	0.9893

Bland-Altmann

	PT-SI Sonds		PT-SI %		PT-SI INR	
	Diff absolut	Diff absolut	Diff absolut	Diff %	Diff absolut	Diff %
Ø	0.71	2.48	-7.13	-16.08	0.14	8.91
1,96*SD	3.15	11.88	10.70	18.08	0.22	13.59

Conclusion: The results meet the pre-defined acceptance criteria. The performance of the HEMOSTAT Thromboplastin-SI (PT-SI) is equivalent on HumaCLOT Quattro and HumaCLOT Pro.

4. HEMOSTAT Activated Partial Thrombin Time (aPTT)

4.1 Imprecision

The imprecision (within-run and day-to-day run) of the HEMOSTAT Activated Partial Thromboplastin Time (aPTT) was calculated from eight determinations on five consutive days. Two level of BIO-RAD control sera were employed as samples.

Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E2760007	V00.12b Feb 6 2017

Reagent	REF	LOT	Expiry Date
Hemostat aPTT-EL	33012	16004	Okt.17

Sample	Manufacturer	REF	LOT	Expiry Date
Level 1	BIO-RAD	744	78421	May 18
Level 3		746	78423	May 18

Acceptance Criteria

	Within run	Day-Day Total
Level 1	CV<10%	CV<12%
Level 3	CV<10%	CV<12%

Results

Parameter	Ref	LOT	BIO-RAD Lyphochek Control	CV % within run					CV% Between-run	CV % Total
				Day 1	Day 2	Day 3	Day 4	Day 5		
aPTT-EL	33012	16004 / Exp. 1.10.17	Level 1	1.87	1.08	1.30	1.19	1.52	1.39	1.39
			Level 3	1.82	0.39	0.49	0.71	0.61	0.81	1.97

Conclusion: The results meet the pre-defined acceptance criteria. The precision of the HEMOSTAT Activated Partial Thromboplastin Time (aPTT) is excellent.

4.2 Interference

Pooled normal human plasma was spiked with dilution series of potentially interfering substances, and the HEMOSTAT aPTT test performed.

Substances tested:
Bilirubin (max 50mg/dl)
Hemoglobin (max 1000mg/dl)
Lipids (max 1000 mg/ml)
Triglycerides (max 3500 mg/ml)

Bilirubin
Materials used

Analzyer	Serial	Software Version
HumaClot Quattro	F 2460011	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Bilirubin	Sigma	B4126-1G	SLBK2832V	n.a.
Plasma	University, Magdeburg	n.a.	05520553	n.a.
Hemostat aPTT	HUMAN	33002	19001	Jul. 20

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Bilirubin mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	22.7	100.0	22.6	100.0	22.2	100.0	23.2	100.0	100.0
10	23.7	104.4	24.4	108.0	24.6	110.8	25.0	107.8	107.7
25	25.5	112.3	25.8	114.2	25.7	115.8	25.8	111.2	113.4
50	26.5	116.7	26.8	118.6	26.8	120.7	27.6	119.0	118.8
100	28.3	124.7	28.4	125.7	28.7	129.3	28.1	121.1	125.2
150	29.3	129.1	29.0	128.3	29.9	134.7	30.2	130.2	130.6
200	29.8	131.3	30.8	136.3	30.2	136.0	30.6	131.9	133.9
300	30.9	136.1	31.5	139.4	31.8	143.2	33.0	142.2	140.2
500	32.8	144.5	33.4	147.8	33.6	151.4	35.2	151.7	148.8
800	36.3	159.9	36.4	161.1	36.4	164.0	37.5	161.6	161.6
1000	38.3	168.7	38.4	169.9	37.7	169.8	38.3	165.1	168.4

Conclusion: Bilirubin did not interfere with the HEMOSTAT aPTT test at any concentration up to 10 mg/dl. Higher concentrations of bilirubin may interfere with the test.

Hemoglobin
Materials used

Analzyer	Serial	Software Version
HumaClot Quattro	F 2460011	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Hemoglobin	HUMAN	10150	CTA005	Okt.17
Plasma	University, Magdeburg	n.a.	5520553	n.a.

Reagents	Manufacturer	REF	LOT	Expiry Date
Hemostat aPTT	HUMAN	33002	19001	Jul. 20

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Hemoglobin mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	22.7	100.0	25.7	100.0	24.0	100.0	24.9	100.0	100
25	22.7	100.0	25.5	99.2	25.5	106.3	27.8	111.6	104
50	21.7	95.6	24.4	94.9	25.7	107.1	28.0	112.4	103
75	22.8	100.4	24.9	96.9	25.4	105.8	27.9	112.0	104
100	22.6	99.6	24.9	96.9	26.9	112.1	27.5	110.4	105
200	22.8	100.4	25.2	98.1	27.0	112.5	31.6	126.9	109
300	25.5	112.3	25.8	100.4	28.3	117.9	32.2	129.3	115
400	27.6	121.6	30.9	120.2	28.2	117.5	33.1	132.9	123
500	29.1	128.2	28.9	112.5	33.7	140.4	32.7	131.3	128
600	27.7	122.0	27.8	108.2	33.5	139.6	40.1	161.0	133
1000	31.3	137.9	29.5	114.8	31.6	131.7	42.5	170.7	139

Conclusion: Hemoglobin did not interfere with the HEMOSTAT aPTT test at any concentration up to 300 mg/dl. Higher concentrations of hemoglobin may interfere with the test.

Lipids
Materials used

Analzyer	Serial	Software Version
HumaClot Quattro	F 2460011	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Lipovenous 20%	Fresenius	n.a.	16IF1572	May17
Plasma	University, Magdeburg	n.a.	#05520553	n.a.
Hemostat aPTT	HUMAN	33002	19001	Jul. 20

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Lipids mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	22.0	100.0	21.9	100.0	22.9	100.0	22.5	100.0	100
100	20.9	95.0	20.8	95.0	21.6	94.3	22.9	101.8	97
200	22.8	103.6	21.1	96.3	21.7	94.8	22.7	100.9	99
300	21.9	99.5	21.7	99.1	21.7	94.8	22.5	100.0	98
400	21.6	98.2	21.8	99.5	22.8	99.6	21.9	97.3	99
500	21.6	98.2	21.8	99.5	22.1	96.5	21.0	93.3	97
600	22.5	102.3	22.4	102.3	22.1	96.5	23.6	104.9	101
700	22.7	103.2	22.4	102.3	22.6	98.7	23.1	102.7	102
800	23.1	105.0	22.8	104.1	23.2	101.3	23.1	102.7	103
900	23.8	108.2	23.1	105.5	23.3	101.7	24.9	110.7	107
1000	23.2	105.5	25.3	115.5	24.1	105.2	25.7	114.2	110

Conclusion: Lipids did not interfere with the HEMOSTAT aPTT test at any concentration up to 900 mg/dl. Higher concentrations of lipids may interfere with the test.

Triglycerides
Materials used

Analzyer	Serial	Software Version
HumaClot Quattro	F 2460011	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Triglycerides concentrated	Trina	A1974	08IA2713	n.a.
Plasma	University, Magdeburg	n.a.	#05520553	n.a.
Hemostat aPTT	HUMAN	33002	19001	Jul. 20

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Triglycerides mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	22.7	100.0	22.6	100.0	22.2	100.0	23.2	100.0	100.0
10	23.7	104.4	24.4	108.0	24.6	110.8	25.0	107.8	107.7
25	25.5	112.3	25.8	114.2	25.7	115.8	25.8	111.2	113.4
50	26.5	116.7	26.8	118.6	26.8	120.7	27.6	119.0	118.8

Spike	Run1		Run2		Run3		Run4		Mean
Triglycerides mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
100	28.3	124.7	28.4	125.7	28.7	129.3	28.1	121.1	125.2
150	29.3	129.1	29.0	128.3	29.9	134.7	30.2	130.2	130.6
200	29.8	131.3	30.8	136.3	30.2	136.0	30.6	131.9	133.9
300	30.9	136.1	31.5	139.4	31.8	143.2	33.0	142.2	140.2
500	32.8	144.5	33.4	147.8	33.6	151.4	35.2	151.7	148.8
800	36.3	159.9	36.4	161.1	36.4	164.0	37.5	161.6	161.6
1000	38.3	168.7	38.4	169.9	37.7	169.8	38.3	165.1	168.4

Conclusion: Triglycerides did not interfere with the HEMOSTAT FIBRINOGEN at any concentration up 1000 mg/dl.

4.3 Reference Range

The reference range for HEMOSTAT Activated Partial Thromboplastin Time (aPTT) was established with a set of 25 normal plasma specimen.

Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E2760007	V00.12b Feb 6 2017

Reagent	Manufacturer	REF	LOT	Expiry Date
Hemostat aPTT	Human	33012	17002	Sep. 18
Hemostat $CaCl_2$	Human	33022	23	Nov. 19
Hemostat CPN	Human	35001	17003	Feb. 19
Hemostat CPA	Human	35002	17002	Jan. 19
Normal Donor Set	Precision BioLogic	CCNS-10	ND32-031	Mai. 19

Acceptance Criteria

Control Plasma	Target Value [s]	Range [s]
Control Plasma Normal (CPN)	27.8	22.3-33.4
Control Plasma Abnormal (CPA)	40.9	32.7-19.0
Samples	Within CPN Range	Within CPN Range
Standard Deviation	<5	n.a.

Results

Sample	1.Run [s]	2. Run [s]	Mean [s]
F32323	27.1	27.3	27.2
F32328a	26.2	26.2	26.2
M32441	25.8	25.5	25.7
M32446	26.6	26.8	26.7

M32451	25.9	26.2	26.1
F32322	27.8	28.0	27.9
F32327	27.2	27.7	27.5
M32440	24.3	25.0	24.7
M32445	24.7	25.1	24.9
M32450	26.7	26.7	26.7
F32321	24.6	24.4	24.5
F32326	24.1	24.9	24.5
M32439	24.3	23.5	23.9
M32444	22.8	23.3	23.1
M32449	25.2	25.3	25.3
F32320	24.6	25.0	24.8
F32325	25.4	25.6	25.5
M32438	25.8	25.9	25.9
M32443	23.6	23.4	23.5
M32448	24.1	24.5	24.3
F32319	24.6	24.8	24.7
F32324	26.0	26.3	26.2
M32437a	27.5	26.6	27.1
M32442	26.6	27.0	26.8
M32447	27.3	27.6	27.5
Median	25.8	25.6	25.70
95% Percentile	27.5	27.68	27.57
5% Percentile	23.7	23.4	23.56
Mittelwert	25.6	25.7	25.63
SD	1.35	1.34	1.34

Conclusion: The results meet the pre-defined acceptance criteria. The reference range of the HEMOSTAT Activated Partial Thromboplastin Time (aPTT) was within CPN range.

4.4 Method Comparison

The HEMOSTAT Activated Partial Thromboplastin Time (aPTT) run on the HC Quattro was compared to a run on HumaCLOT Pro.The results were evaluated by a non-parametric regression model according to Passing & Bablok and Bland-Altman.

Analyzer	Serial	Software Version
HumaClot Quattro	E2760007	V00.12b Feb 6 2017
HumaClot Pro	H 07400305	V1.2 built 31.03.2017

Acceptance Criteria

Passing&Bablok	
Slope	1±0.2
Intercept	± 15
Correlation coefficient R	>0.85

Bland Altman	
Mean %	<+15

Results

Descriptive Statistics

Method	HC Quattro	HC Pro
Test	APTT	APTT
Unit	s	s
N	92	92
Mean	60.92	62.18
SD	31.09	29.61
Median	54.10	55.23
Q1	35.91	38.54
Q3	78.33	78.30
Min	22.05	24.05
Max	163.60	176.00

Passing Bablok-Regression

	APTT s
slope	0.9959
lower 95%-CL	0.9802
upper 95%-CL	1.0183
Intercept	-1.8185
lower 95%-CL	-2.9064
upper 95%-CL	-1.1069
R^2=	0.9872

Bland-Altmann

	APTT	
	Diff total	Diff %
	s	%
Ø	-1.27	-3.17
1.96*SD	9.93	10.91

Conclusion

The results meet the pre-defined acceptance criteria. The performance of the HEMOSTAT Activated Partial Thromboplastin Time (aPTT) is equivalent on HumaCLOT Quattro and HumaCLOT Pro.

5. HEMOSTAT Fibrinogen (FIB)

5.1 Imprecision

The imprecision (within-run and day-to-day run) of the HEMOSTAT Fibrinogen (FIB) was calculated from eight determinations on five consutive days. Three levels of BIO-RAD control sera were employed as samples.

Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E2760007	V00.12b Feb 6 2017

Reagent	REF	LOT	Expiry Date
Hemostat Fibrinogen	32002	16005	Okt.17

Sample	Manufacturer	REF	LOT	Expiry Date
Level 1	BIO-RAD	744	78421	May 18
Level 2		745	78422	May 18
Level 3		746	78423	May 18

Acceptance Criteria

	Within run	Day-Day Total
Level 1	CV<10%	CV<12%
Level 2	CV<10%	CV<12%
Level 3	CV<10%	CV<12%

Results

Parameter	REF	LOT	BIO-RAD Lyphochek Control	CV % within run					CV% Between-run	CV % Total
				Day 1	Day 2	Day 3	Day 4	Day 5		
Fibrinogen	32002	16005 Exp.: Okt.17	Level 1 (s)	2.4	2.3	3.6	3.9	2.9	3.0	3.0
			Level 2 (s)	4.8	3.1	4.7	4.4	3.4	4.1	4.0
			Level 3 (s)	7.3	5.1	8.1	6.7	8.4	7.1	7.2
			Level 1 (g/l)	2.3	2.1	3.4	3.7	2.7	2.8	2.8
			Level 2 (g/l)	5.7	3.7	5.5	5.1	4.1	4.8	4.7
			Level 3 (g/l)	9.3	6.6	10.0	8.5	10.4	9.0	9.0

Conclusion: The results meet the pre-defined acceptance criteria. The precision of HEMOSTAT Fibrinogen (FIB) is good.

5.2 Calibration

HEMOSTAT Fibrinogen (FIB) was calibrated with Hemostat CALIBRATOR according to the dilution scheme for HEMOSTAT Fibrinogen (FIB). Five manually prepared dilutions of the Hemostat Calibrator were measured in triplicates, to determine the minimal and maximal deviation from the expected recovery.

Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E2760007	V00.12b Feb 6 2017

Reagent	REF	LOT	Expiry Date
Hemostat Fibrinogen (FIB)	32002	16005	Okt.17
Hemostat Calibrator	35500	16010802	Okt.17

Acceptance Criteria

	%
Recovery	85-115

Results

	Fib g/l AV	Min Fib g/l	Max Fib g/l	MW	Min Recovery	Max Recovery
Fib Quattro	5.14	5.01	5.57	5.3	97.5	108.4
	3.42	3.30	3.35	3.33	96.6	97.9
	2.57	2.60	2.69	2.6	101.0	104.8
	1.72	1.56	1.64	1.6	90.6	101.1
	1.285	1.2	1.3	1.2	93.7	101.1

Conclusion: The results meet the pre-defined acceptance criteria. The recovery of the HEMOSTAT Fibrinogen (FIB) is good.

5.3 Interference

Pooled normal human plasma was spiked with dilution series of potentially interfering substances, and the HEMOSTAT Fibrinogen (FIB) test performed.

Substances tested:
Bilirubin (max 50mg/dl)
Hemoglobin (max 1000mg/dl)
Lipids (max 1000 mg/ml)
Triglycerides (max 3500 mg/ml)

Bilirubin
Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E2760007	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Bilirubin	Sigma	B4126-1G	SLBK2832V	n.a.
Plasma	University, Magdeburg	n.a.	05520553	n.a.
Hemostat Fibrinogen	HUMAN	32002	16005	Okt.17

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Bilirubin mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	2.76	100.0	2.76	100.0	2.74	100.0	2.77	100.0	100
5	2.87	104.0	2.85	103.3	2.84	103.6	2.81	101.4	103
10	2.73	98.9	2.73	98.9	2.70	98.5	2.72	98.2	99
15	2.83	102.5	2.76	100.0	2.78	101.5	2.81	101.4	101
20	2.77	100.4	2.81	101.8	2.73	99.6	2.78	100.4	101
25	2.85	103.3	2.78	100.7	2.76	100.7	2.74	98.9	101
30	2.78	100.7	2.78	100.7	2.76	100.7	2.74	98.9	100
35	2.74	99.3	2.80	101.4	2.77	101.1	2.73	98.6	100
40	2.67	96.7	2.64	95.7	2.65	96.7	2.68	96.8	96
45	2.76	100.0	2.77	100.4	2.74	100.0	2.70	97.5	99
50	2.70	97.8	2.80	101.4	2.81	102.6	2.78	100.4	101

Conclusion
Bilirubin did not interfere with the HEMOSTAT Fibrinogen (FIB) at any concentration up to 50 mg/dl.

Hemoglobin
Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E2760007	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Hemoglobin	HUMAN	10150	CTA005	Okt.17
Plasma	University, Magdeburg	n.a.	#05520553	n.a.
Hemostat Fibrinogen	HUMAN	32002	16005	Okt.17

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Hemoglobin mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%

Spike	Run1		Run2		Run3		Run4		Mean
Hemoglobin mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	2.80	100.0	2.76	100.0	2.76	100.0	2.76	100.0	100
25	2.72	97.1	2.68	97.1	2.72	98.6	2.67	96.7	97
50	2.72	97.1	2.70	97.8	2.67	96.7	2.84	102.9	99
75	2.87	102.5	2.85	103.3	2.83	102.5	2.78	100.7	102
100	2.78	99.3	2.77	100.4	2.78	100.7	2.73	98.9	100
200	2.74	97.9	2.74	99.3	2.72	98.6	2.74	99.3	99
300	2.87	102.5	2.88	104.3	2.83	102.5	2.78	100.7	103
400	2.76	98.6	2.73	98.9	2.80	101.4	2.74	99.3	100
500	2.80	100.0	2.72	98.6	2.78	100.7	2.72	98.6	99
600	2.72	97.1	2.73	98.9	2.70	97.8	2.72	98.6	98
1000	2.78	99.3	2.78	100.7	2.76	100.0	2.78	100.7	100

Conclusion
Hemoglobin did not interfere with the HEMOSTAT Fibrinogen (FIB) at any concentration up to 1000 mg/dl.

Lipids
Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E2760007	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Lipovenous	Fresenius	n.a.	16IF1572	May17
Plasma	University, Magdeburg	n.a.	#05520553	n.a.
Hemostat Fibrinogen	HUMAN	32002	16005	Okt.17

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Lipids mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	2.77	100.0	2.76	100.0	2.78	100.0	2.76	100.0	100
100	2.85	102.9	2.88	104.3	2.80	100.7	2.84	102.9	103
200	2.85	102.9	2.84	102.9	2.85	102.5	2.83	102.5	103
300	2.76	99.6	2.72	98.6	2.68	96.4	2.72	98.6	98
400	2.78	100.4	2.73	98.9	2.80	100.7	2.84	102.9	101
500	2.73	98.6	2.74	99.3	2.72	97.8	2.68	97.1	98
600	2.69	97.1	2.72	98.6	2.73	98.2	2.76	100.0	98

Spike	Run1		Run2		Run3		Run4		Mean
Lipids mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
700	2.83	102.2	2.80	101.4	2.85	102.5	2.80	101.4	102
800	2.74	98.9	2.68	97.1	2.73	98.2	2.74	99.3	98
900	3.04	109.7	3.35	121.4	2.98	107.2	2.87	104.0	**111**
1000	3.56	128.5	3.66	132.6	3.42	123.0	3.38	122.5	**127**

Conclusion
Lipids did not interfere with the HEMOSTAT Fibrinogen (FIB) at any concentration up to 800 mg/dl. Higher concentrations of lipids may interfere with the HEMOSTAT Fibrinogen (FIB) test.

Triglycerides
Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E2760007	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Triglycerides concentrated	Trina	A1974	08IA2713	n.a.
Plasma	University, Magdeburg	n.a.	#05520553	n.a.
Hemostat Fibrinogen	HUMAN	32002	16005	Okt.17

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Triglycerides mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	2.31	100.0	2.36	100.0	2.34	100.0	2.34	100.0	100
250	2.53	109.5	2.46	104.2	2.48	106.0	2.48	106.0	106
350	2.37	102.6	2.34	99.2	2.37	101.3	2.37	101.3	101
450	2.51	108.7	2.74	116.1	2.46	105.1	2.42	103.4	108
550	2.41	104.3	2.41	102.1	2.44	104.3	2.36	100.9	103
650	2.37	102.6	2.39	101.3	2.44	104.3	2.37	101.3	102
750	2.53	109.5	2.46	104.2	2.44	104.3	2.42	103.4	105
1000	2.48	107.4	2.48	105.1	2.46	105.1	2.41	103.0	105
1500	2.29	99.1	2.29	97.0	2.32	99.1	2.23	95.3	98
2500	2.31	100.0	2.29	97.0	2.28	97.4	2.26	96.6	98
3500	2.23	96.5	2.26	95.8	2.25	96.2	2.16	92.3	95

Conclusion
Triglycerides did not interfere with the HEMOSTAT Fibrinogen (FIB) at any concentration up to 3500 mg/dl.

5.4 Reference Range

The reference range for HEMOSTAT Fibrinogen (FIB) was established with a set of 25 plasma specimen .

Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E 3060010	V00.15b Jul 20 2017

Reagent	Manufacturer	REF	LOT	Expiry Date
Hemostat Fibrinogen	Human	32002	16005	Nov. 17
Normal-Donor Set Plasma	CoaChrom Diagnostica	CCNS-10	ND32-031	May. 19
Hemostat Kalibrator HC 2	Human	35500	13	Okt. 17
Hemostat CPN	Human	35001	17040408	Feb. 19
Hemostat CPN	Human	35002	17003	Feb. 19
Hemostat Control Abnormal	Human	35002	17002	Jan. 19
Hemostat Fibrinogen	Human	32002	16005	Nov. 17

Acceptance Criteria

Control Plasma	Target Value [g/l]	Range
Control Plasma Normal (CPN)	2.7	2.18-3.27
Control Plasma Abnormal (CPA)	1.47	1.18-1.77
Sample	Within CPN Range	Within CPN Range
Standard Deviation	<5	n.a.

Results

Sample	1.Run [s]		2. Run [s]		Mean [s]	
1. F32323	12.1	3.33	11.9	3.4	12.0	3.4
2. F32328a	12.4	3.3	12.0	3.4	12.2	3.3
3. M32441	12.1	3.3	12.6	3.2	12.4	3.3
4. M32446	11.1	3.6	11.4	3.5	11.3	3.6
5. M32451	11.7	3.5	11.7	3.5	11.7	3.5
6. F32322	9.5	4.2	9.6	4.2	9.6	4.2
7. F32327	12.7	3.2	12.7	3.2	12.7	3.2
8. M32440	13.6	3.0	13.6	3.0	13.6	3.0
9. M32445	12.6	3.2	12.7	3.2	12.7	3.2
10. M32450	14.0	2.9	13.9	2.9	14.0	2.9
11. F32321	12.8	3.1	12.6	3.2	12.7	3.2
12. F32326	13.3	3.0	13.8	2.9	13.6	3.0

13. M32439	11.7	3.5	11.8	3.4	11.8	3.4
14. M32444	14.8	2.7	14.9	2.7	14.9	2.7
15. M32449	14.1	2.8	14.2	2.8	14.2	2.8
16. F32320	13.1	3.1	13.0	3.1	13.1	3.1
17. F32325	11.6	3.5	11.6	3.5	11.6	3.5
18. M32438	12.0	3.4	12.0	3.4	12.0	3.4
19. M32443	14.3	2.8	14.5	2.8	14.4	2.8
20. M32448	13.1	3.1	13.2	3.0	13.2	3.1
21. F32319	12.0	3.4	12.1	3.3	12.1	3.3
22. F32324	15.4	2.6	15.8	2.5	15.6	2.6
23. M32437a	11.2	3.6	10.8	3.7	11.0	3.7
24. M32442	11.5	3.5	11.0	3.7	11.3	3.6
25. M32447	10.8	3.7	11.0	3.7	10.9	3.7
Median	12.4	3.3	12.6	3.2	12.5	3.2
95% Percentile	14.7	3.7	14.8	3.7	14.8	3.7
5% Percentile	10.9	2.7	10.8	2.7	10.8	2.7
Mean	12.5	3.2	12.6	3.2	12.6	3.2
SD	1.35	0.36	1.43	0.37	1.4	0.4

Conclusion

Conclusion: The results meet the pre-defined acceptance criteria. The reference range of the HEMOSTAT Fibrinogen (FIB) was within CPN range.

5.5 Method Comparison

The HEMOSTAT Fibrinogen (FIB) run on the HC Quattro was compared to a run on HumaCLOT Pro. The results were evaluated by a non-parametric regression model according to Passing & Bablok and Bland-Altman.

Acceptance Criteria

Passing&Bablok	
Slope	1±0.05
Intercept	± 10%
Correlation coefficient R	>0.98
Bland Altman	
Mean %	<10%

Results

Descriptive Statistics

Method	HC Quattro	HC Pro
Test	Fibrinogen	Fibrinogen
Unit	g/l	g/l
N	49	49
Mean	3,93	4,09
SD	1,57	1,63
Median	3,89	4,17

Method	HC Quattro	HC Pro
Test	Fibrinogen	Fibrinogen
Q1	2,94	2,85
Q3	4,60	5,03
Min	0,94	1,01
Max	8,22	8,13

Passing Bablok-Regression

	Fibrinogen g/l
slope	0,9244
lower 95%-CL	0,8571
upper 95%-CL	0,9747
Intercept	0,1408
lower 95%-CL	-0,0454
upper 95%-CL	0,3886
R^2=	0.9916

Bland-Altmann

	FIB	
	Diff absolut	Diff absolut
Ø	-0,16	-3,76
1.96*SD	0,42	11,35

Conclusion: The results meet the pre-defined acceptance criteria. The performance of the HEMOSTAT Fibrinogen (FIB) is equivalent on HumaCLOT Quattro and HumaCLOT Pro.

5.6 Linearity

Dilution series of 7,0 g/l to 1 g/l fibrinogen were prepared by mixing a fibrinogen high pool (SHP) with a low pool (imidazole buffer). The Hemostat FIB test was performed with these dilutions series, and the expected values compared with the test results.

Used Material

Name	Manufacturer	Ref	Lot	Expiry
Hemostat Fibrinogen	Human	32002	19003	30.11.2020
Fibrinogen Reference Plasma	Human	32002	0029	31.07.2020
SHP	Siemens	ORKL17	503263B	5.10.2019

Analyzer	SN-Nummer:	Human-Nr.:	Software:
HC Quattro	E 3060010	2519	V00.12b Feb 6 2017

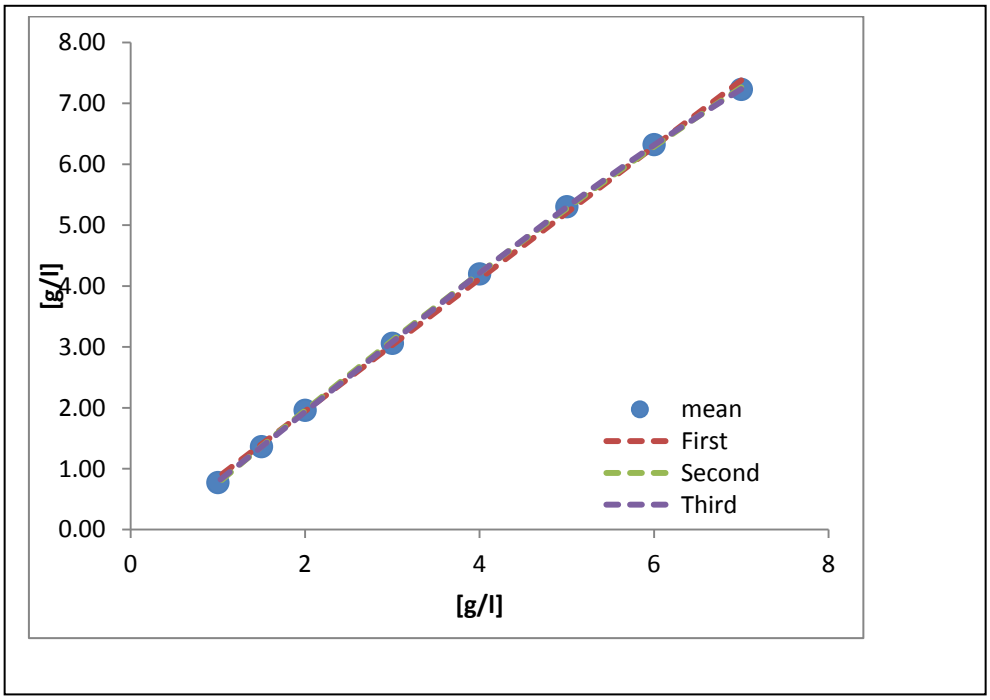
Acceptance Criteria

	Criteria
Non-linearity	Max 10%

Results

Criteria: non Linearity >10,00% Difference

Assigned value [g/l]	Mean	Predicted			Difference
	[g/l]	1st-order	2nd-order	3rd-order	3rd - 1st
7	7,23	7,38	7,26	7,24	-1,9
6	6,32	6,29	6,29	6,31	0,3
5	5,3	5,2	5,27	5,3	1,9
4	4,2	4,12	4,21	4,21	2,1
3	3,06	3,03	3,1	3,08	1,6
2	1,96	1,94	1,95	1,93	-0,5
1,5	1,36	1,4	1,36	1,36	-2,9
1	0,77	0,86	0,76	0,79	-9,1



The expected values and test results were similar (i.e. fulfilled acceptance criteria) within the range from 0.77 g/l to 7.23 g/l fibrinogen.

Conclusion: The Hemostat FIB test is linear from 0.77 g/l to 7.23 g/l fibrinogen.

6. HEMOSTAT Thrombin Time (TT)

6.1 Imprecision

The imprecision (within-run and day-to-day run) of the HEMOSTAT Thrombin Time (TT) was calculated from eight determinations on five consutive days. One leve of BIO-RAD control sera were employed as a sample.

Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E2760007	V00.12b Feb 6 2017

Reagent	REF	LOT	Expiry Date
Hemostat Thrombin Time	34002	16003	Dec.17

Sample	Manufacturer	REF	LOT	Expiry Date
Level 1 Lyphocheck	BIO-RAD	744	78421	May 18

Acceptance Criteria

	Within run	Day-Day Total
Level 1	CV<10%	CV<12%

Results

Parameter	REF	LOT	BIO-RAD Lyphochek Control	CV % within run					CV% Between-run	CV % Total
				Day 1	Day 2	Day 3	Day 4	Day 5		
TT	34002	16003	Level 1	1.06	0.69	0.62	1.33	0.77	0.89	1.08

Conclusion: The results meet the pre-defined acceptance criteria. The precision of the HEMOSTAT Thrombin Time (TT) is excellent.

6.2 Interference

Pooled normal human plasma was spiked with dilution series of potentially interfering substances, and the HEMOSTAT Thrombin Time test performed.

Substances tested:
Bilirubin (max 50mg/dl)
Hemoglobin (max 1000mg/dl)
Lipids (max 1000 mg/ml)
Triglycerides (max 3500 mg/ml)

Bilirubin
Materials used

Analzyer	Serial	Software Version
HumaClot Quattro	F 2460011	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Bilirubin	Sigma	B4126-1G	SLBK2832V	n.a.
Plasma	University, Magdeburg	n.a.	05520553	n.a.
Hemostat Thrombin Time	Human	34002	16003	Dec.17

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Bilirubin mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	16.0	100.0	18.0	100.0	15.7	100.0	15.6	100.0	100
5	15.6	97.5	15.8	87.8	15.8	100.6	15.7	100.6	97
10	16.1	100.6	15.9	88.3	15.8	100.6	15.8	101.3	98
15	16.4	102.5	16.1	89.4	16.1	102.5	16.0	102.6	99
20	16.2	101.3	16.1	89.4	16.0	101.9	16.0	102.6	99
25	16.3	101.9	16.8	93.3	16.0	101.9	16.4	105.1	101
30	16.9	105.6	16.9	93.9	15.0	95.5	17.5	112.2	102
35	17.7	110.6	18.1	100.6	17.8	113.4	18.0	115.4	110
40	17.8	111.3	15.8	87.8	18.9	120.4	20.1	128.8	112
45	18.6	116.3	19.1	106.1	18.6	118.5	18.0	115.4	114
50	15.8	98.8	17.5	97.2	20.1	128.0	16.8	107.7	108

Conclusion: Bilirubin did not interfere with the HEMOSTAT FIBRINOGEN at any concentration up to 35 mg/dl. Higher concentrations of bilirubin may interfere with the test.

Hemoglobin
Materials used

Analzyer	Serial	Software Version
HumaClot Quattro	F 2460011	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Hemoglobin	HUMAN	10150	CTA005	Okt.17
Plasma	University, Magdeburg	n.a.	#5520553	n.a.
Hemostat THROMBIN TIME	Human	34002	16003	Dec.17

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Hemoglobin mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	15	100.0	15.1	100.0	15.2	100.0	15.0	100.0	100
25	14.8	98.7	14.9	98.7	15.2	100.0	15.2	101.3	100
50	14.9	99.3	14.8	98.0	15.0	98.7	15.2	101.3	99
75	14.9	99.3	14.9	98.7	14.9	98.0	15.1	100.7	99
100	14.9	99.3	14.9	98.7	15.0	98.7	15.0	100.0	99
200	14.8	98.7	15.3	101.3	15.5	102.0	15.6	104.0	101
300	16.3	108.7	16.0	106.0	15.4	101.3	16.5	110.0	106
400	17.2	114.7	16.5	109.3	17.6	115.8	18.0	120.0	115
500	16.0	106.7	17.7	117.2	16.7	109.9	17.0	113.3	112
600	14.7	98.0	16.6	109.9	14.6	96.1	20.2	134.7	110
1000	22.3	148.7	15.9	105.3	17.5	115.1	15.8	105.3	119

Conclusion: Hemoglobin did not interfere with the HEMOSTAT Thrombin Time at any concentration up to 300 mg/dl. Higher concentrations of hemoglobin may interfere with the test.

Lipids
Materials used

Analzyer	Serial	Software Version
HumaClot Quattro	F 2460011	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Lipovenous 20%	Fresenius	n.a.	16IF1572	May17
Plasma	University, Magdeburg	n.a.	05520553	n.a.
Hemostat THROMBIN TIME	Human	34002	16003	Dec.17

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Lipids mg/dl	g/l		%		g/l		%		g/l
0	14.8	100.0	14.9	100.0	15.1	100.0	15.0	100.0	100
100	15.1	102.0	15.2	102.0	15.4	102.0	15.4	102.7	102
200	15.8	106.8	15.8	106.0	15.7	104.0	16.0	106.7	106
300	16.5	111.5	16.2	108.7	16.0	106.0	16.5	110.0	109
400	16.4	110.8	16.9	113.4	16.3	107.9	15.7	104.7	109
500	18.7	126.4	16.8	112.8	17.8	117.9	16.4	109.3	117
600	17.2	116.2	16.4	110.1	16.9	111.9	17.3	115.3	113
700	15.7	106.1	20.0	134.2	19.6	129.8	16.0	106.7	119
800	20.1	135.8	15.2	102.0	19.3	127.8	17.5	116.7	121
900	18.4	124.3	12.4	83.2	16.7	110.6	17.7	118.0	109
1000	36.0	243.2	19.1	128.2	18.7	123.8	22.2	148.0	161

Conclusion: Lipids did not interfere with the HEMOSTAT FIBRINOGEN at any concentration up to 400 mg/dl. Higher concentrations of lipids may interfere with the test.

Triglycerides
Materials used

Analzyer	Serial	Software Version
HumaClot Quattro	F 2460011	V00.12b Feb 6 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Triglycerides concentrated	Trina	A1974	08IA2713	n.a.
Plasma	University, Magdeburg	n.a.	#05520553	n.a.
Hemostat THROMBIN TIME	Human	34002	16003	Dec.17

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Triglycerides mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	16.1	100.0	16.0	100.0	16.0	100.0	16.2	100.0	100

Spike	Run1		Run2		Run3		Run4		Mean
Triglycerides mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
250	17.6	109.3	17.7	110.6	17.6	110.0	17.7	109.3	110
350	18.2	113.0	18.1	113.1	18.2	113.8	18.3	113.0	113
450	18.8	116.8	18.7	116.9	18.9	118.1	19.0	117.3	117
550	19.2	119.3	19.2	120.0	19.3	120.6	19.4	119.8	120
650	19.9	123.6	20.1	125.6	19.9	124.4	20.0	123.5	124
750	20.7	128.6	20.9	130.6	20.9	130.6	20.9	129.0	130
1000	22.4	139.1	22.6	141.3	22.6	141.3	22.8	140.7	141
1500	27.6	171.4	27.8	173.8	27.8	173.8	28.2	174.1	173
2500	71.2	442.2	63.1	394.4	45.9	286.9	88.7	547.5	418
3500	77.2	479.5	70.5	440.6	65.4	408.8	98.1	605.6	484

Conclusion: Triglycerides did not interfere with the HEMOSTAT FIBRINOGEN at any concentration up to 250 mg/dl.

6.3 Reference Range

The reference range for HEMOSTAT Thrombin Time (TT) was established with a set of 25 plasma specimen.

Materials used

Analyzer	Serial	Software Version
HumaClot Quattro	E2760007	V00.12b Feb 6 2017

Reagent	Manufacturer	REF	LOT	Expiry Date
Hemostat Thrombin Time	Human	34002	16003	Dez. 17
Normal-Donor Set Plasma	CoaChrom Diagnostica	CCNS-10	ND32-031	Mai. 19
Hemostat Kalibrator	Human	35500	13	Okt. 17
Hemostat Control Normal	Human	35002	17003	Feb. 19
Hemostat Control Abnormal	Human	35002	17002	Jan. 19
Hemostat Thrombin Time	Human	34002	16003	Dez. 17

Acceptance Criteria

Control Plasma	Target Value [s]	Range [s]
Control Plasma Normal (CPN)	21.4	17.1-256
Sample	Within CPN Range	Within CPN Range
Standard Deviation	<5	n.a.

Results

Sample	1.Run [s]	2.Run [s]	Mean [s]
1. F32323	13.2	13.3	13.3
2. F32328a	13.0	12.9	13.0

3. M32441	12.0	12.0	12.0
4. M32446	12.9	12.9	12.9
5. M32451	12.5	12.4	12.5
6. F32322	14.2	14.3	14.3
7. F32327	12.5	12.4	12.5
8. M32440	12.5	12.3	12.4
9. M32445	12.4	12.4	12.4
10. M32450	12.7	12.6	12.7
11. F32321	14.2	14.1	14.2
12. F32326	14.4	14.4	14.4
13. M32439	12.7	13.0	12.9
14. M32444	13.1	12.9	13.0
15. M32449	13.6	13.5	13.6
16. F32320	11.4	11.5	11.5
17. F32325	12.7	12.5	12.6
18. M32438	12.2	12.2	12.2
19. M32443	13.0	13.0	13.0
20. M32448	12.7	12.8	12.8
21. F32319	12.6	12.5	12.6
22. F32324	14.3	14.3	14.3
23. M32437a	12.1	12.2	12.2
24. M32442	13.3	12.9	13.1
25. M32447	12.3	12.3	12.3
Median	12.7	12.8	12.8
95% Percentile	14.3	14.3	14.3
5% Percentile	12.0	12.0	12.0
Mean	12.9	12.9	12.9
SD	0.76	0.76	0.8

Conclusion

The results meet the pre-defined acceptance criteria. The reference range of the HEMOSTAT Thrombin Time (TT) was within CPN range.

6.4 Method Comparison

The HEMOSTAT Thrombin Time (TT) run on the HC Quattro was compared to a run on HumaCLOT Pro. The results were evaluated by a non-parametric regression model according to Passing & Bablok and Bland Altman.

Acceptance Criteria

Passing&Bablok	
Slope	1±0.05
Intercept	± 10%
Correlations coefficient R	>0.98
Bland Altman	
Mean %	<10%

Descriptive Statistics

Method	HC Quattro	HC Pro
Test	TT	TT
Unit	S	s
N	90	90
Mean	19.87	20.30
SD	9.79	10.96
Median	17.18	17.10
Q1	14.78	14.83
Q3	21.79	22.34
Min	10.90	11.30
Max	72.90	85.45

Passing Bablok-Regression

	TT s
slope	0.9349
lower 95%-CL	0.8876
upper 95%-CL	0.9744
Intercept	0.9561
lower 95%-CL	0.2840
upper 95%-CL	1.8469
R^2=	0.9915

Bland-Altmann

	TT s	
	Diff absolut	Diff absolut
	s	%
Ø	-0.43	-0.94
1.96*SD	3.49	10.29

Conclusion

The results meet the pre-defined acceptance criteria. The performance of the HEMOSTAT Thrombin Time (TT) is equivalent on HumaCLOT Quattro and HumaCLOT Pro.

7. HEMOSTAT D-Dimer (DD)

7.1 Imprecision

The imprecision (within-run and day-to-day run) of the HEMOSTAT D-Dimer (DD) was calculated from eight determinations on five consutive days. A low level BIO-RAD control, a low level HEMOSTAT D-DIMER Control and a high level HEMOSTAT D-DIMER Control were employed as samples.

Materials used

Analyzer	Serial	Software Version
HumaClot Junior	G1560002	V00.12b Feb 6 2017

Reagent	REF	LOT	Expiry Date
Hemostat D-Dimer Buffer/Reagent	36002	5530036095/ 5530026095	Sep.17

Sample	Manufacturer	REF	LOT	Expiry Date
Hemostat D-DIMER CPL	BIO-RAD	36012	#01110355462	May 18
Hemostat D-DIMER CPH	HUMAN	36012	#01110365462	May 18
BioRad LC Level 1	HUMAN	744	78421	May 18

Acceptance Criteria

	Within run	Day-Day Total
Hemostat D-DIMER CPL	CV<10%	CV<12%
Hemostat D-DIMER CPH	CV<10%	CV<12%
BioRad LC Level 1	CV<10%	CV<12%

Results

Parameter	REF	LOT	Sample	CV % within run					CV% Between-run	CV % Total
				Day 1	Day 2	Day 3	Day 4	Day 5		
D-Dimer mE/min	C3002	#5530026095	BioRad LC Level 1	7.28	519	10.20	555	6.67	1.92	7.40
			CPL	4.55	2.73	3.57	4.07	2.24	0.94	3.44
			CPH	2.14	1.13	2.59	1.46	2.19	0.59	1.91
D-Dimer ng/ml	C3002	#5530026095	Level 1	582	3.07	7.82	564	4.48	1.65	587
			CPL	4.01	3.30	3.58	3.98	1.92	0.85	3.37
			CPH	1.84	1.06	2.13	1.42	2.03	0.45	1.68

Conclusion: The results meet the pre-defined acceptance criteria. The precision of the HEMOSTAT D-Dimer (DD) is excellent.

7.2 Interference

Pooled normal human plasma with added D-dimer spiking plasma was spiked with dilution series of potentially interfering substances, and the HEMOSTAT D-dimer test performed.

Substances tested:
Bilirubin (max 50mg/dl)
Hemoglobin (max 1000mg/dl)
Lipids (max 1000 mg/ml)
Triglycerides (max 3500 mg/ml)

Bilirubin

Materials used

Analzyer	Serial	Software Version
HumaClot Quattro	H2870047	V01.11b Aug 31 2019

Reagents	Manufacturer	REF	LOT	Expiry Date
Bilirubin	Sigma	B4126-1G	SLBK2832V	n.a.
Plasma	University, Magdeburg	n.a.	06784041	n.a.
D-Dimer Spiking Plasma 1:12	Nordic Biomarkers	n.a.	62196233	Jun.21
Hemostat D-dimer	Human	36002	17006A	Sep.19

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Bilirubin mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	1484	100.0	1545	100.0	1587	100.0	1561	100.0	100.0
1	1473	99.3	1510	97.7	1510	95.1	1594	102.1	98.6
2	1507	101.5	1533	99.2	1551	97.7	1546	99.0	99.4
5	1414	95.3	1417	91.7	1416	89.2	1442	92.4	92.1
10	1401	94.4	1414	91.5	1389	87.5	1399	89.6	90.8
15	1231	83.0	1227	79.4	1333	84.0	1420	91.0	84.3
20	1161	78.2	1155	74.8	1181	74.4	1148	73.5	75.2
25	1311	88.3	1045	67.6	1114	70.2	1135	72.7	74.7
35	928	62.5	958	62.0	963	60.7	1118	71.6	64.2
50	870	58.6	811	52.5	827	52.1	771	49.4	53.2

Conclusion: Bilirubin did not interfere with the HEMOSTAT D-dimer test at any concentration up to 50 mg/dl.

Hemoglobin

Materials used

Analzyer	Serial	Software Version
HumaClot Quattro	H2870047	V01.11b Aug 31 2019

Reagents	Manufacturer	REF	LOT	Expiry Date
Hemoglobin	HUMAN	HP_132A	CS_190905	Sep.21
Plasma	University, Magdeburg	n.a.	06784041	May18
D-Dimer Spiking Plasma 1:12	Nordic Biomarkers	n.a.	62196233	Jun.21
Hemostat D-dimer	Human	36002	17006A	Sep.19

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Hemoglobin mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	1099	100.0	1099	100.0	1208	100.0	1055	100.0	100.0
50	1142	103.9	1164	105.9	1033	85.5	1055	100.0	98.8
100	1099	100.0	1142	103.9	990	82.0	1033	97.9	95.9
200	881	80.2	1011	92.0	990	82.0	990	93.8	87.0
300	815	74.2	881	80.2	881	72.9	837	79.3	76.6
400	706	64.2	728	66.2	750	62.1	772	73.2	66.4
500	597	54.3	728	66.2	640	53.0	597	56.6	57.5
600	619	56.3	619	56.3	575	47.6	728	69.0	57.3
700	619	56.3	619	56.3	487	40.3	553	52.4	51.3
800	553	50.3	728	66.2	553	45.8	619	58.7	55.3
1000	640	58.2	597	54.3	509	42.1	793	75.2	57.5

Conclusion: Hemoglobin did not interfere with the HEMOSTAT Thrombin Time at any concentration up to 1000 mg/dl.

Lipids

Materials used

Analzyer	Serial	Software Version
HumaClot Quattro	H2870047	V01.11b Aug 31 2019

Reagents	Manufacturer	REF	LOT	Expiry Date
Lipovenous 20%	Fresenius	LCT-20	16LE7638	Apr.19
Plasma	University, Magdeburg	n.a.	06784041	May18
D-Dimer Spiking Plasma 1:12	Nordic Biomarkers	n.a.	62196233	Jun.21
Hemostat D-dimer	Human	36002	17006A	Sep.19

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Lipids mg/dl	g/l		%		g/l		%		g/l
0	509	100.0	509	100.0	531	100.0	466	100.0	100.0
20	553	108.6	422	82.9	466	87.8	531	113.9	98.3
40	378	74.3	575	113.0	422	79.5	466	100.0	91.7
60	422	82.9	422	82.9	400	75.3	466	100.0	85.3
80	400	78.6	422	82.9	378	71.2	466	100.0	83.2
100	335	65.8	400	78.6	422	79.5	357	76.6	75.1
120	248	48.7	335	65.8	248	46.7	313	67.2	57.1
140	313	61.5	248	48.7	313	58.9	313	67.2	59.1
160	227	44.6	313	61.5	205	38.6	270	57.9	50.7
180	292	57.4	205	40.3	205	38.6	183	39.3	43.9
200	140	27.5	161	31.6	161	30.3	205	44.0	33.4

Conclusion: Lipids did not interfere with the HEMOSTAT FIBRINOGEN at any concentration up to 200 mg/dl.

Triglycerides

Materials used

Analzyer	Serial	Software Version
HumaClot Quattro	G1560004, E3960010	V01.00 Aug 12 2017

Reagents	Manufacturer	REF	LOT	Expiry Date
Triglycerides concentrated	Trina	A1974	08IA2713	n.a.
Plasma	University, Magdeburg	n.a.	06784041	May18
D-Dimer Spiking Plasma 1:12	Nordic Biomarkers	n.a.	62196233	Jun.21
Hemostat D-dimer	Human	36002	17006A	Sep.19

Acceptance Criteria

	%
Standard Deviation to unspiked sample	+/- 10

Results

Spike	Run1		Run2		Run3		Run4		Mean
Triglycerides mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
0	1672	100.0	1603	100.0	1689	100.0	1683	100.0	100.0

Spike	Run1		Run2		Run3		Run4		Mean
Triglycerides mg/dl	g/l	%	g/l	%	g/l	%	g/l	%	%
50	1636	97.8	1591	99.3	1557	92.2	1635	97.1	96.6
100	1538	92.0	1562	97.4	1519	89.9	1628	96.7	94.0
200	1505	90.0	1471	91.8	1563	92.5	1530	90.9	91.3
300	1448	86.6	1500	93.6	1534	90.8	1462	86.9	89.5
400	1381	82.6	1428	89.1	1462	86.6	1492	88.7	86.7
500	1421	85.0	1425	88.9	1381	81.8	1412	83.9	84.9
600	1347	80.6	1376	85.8	1340	79.3	1318	78.3	81.0
700	1264	75.6	1307	81.5	1259	n.a.	1262	75.0	77.4
800	1201	71.8	1241	77.4	1244	73.7	1254	74.5	74.4
1000	967	57.8	1016	63.4	1165	69.0	1140	67.7	64.5

Conclusion: Triglycerides did not interfere with the HEMOSTAT D-Dimer test at any concentration up to 1000 mg/dl.

7.3 Method Comparison

The HEMOSTAT D-dimer (DD) run on the HC Quattro was compared to a run on HumaCLOT Pro. The results were evaluated by a non-parametric regression model according to Passing & Bablok and Bland-Altman.

Acceptance Criteria

Passing&Bablok	M
Slope	1±0.05
Intercept	± 10%
Correlations coefficient R	>0.98
Bland Altman	
Mean %	<10%

Descriptive Statistics

Method	HC Junior	HC Pro
Test	DD	DD
Unit	s	s
N	75	75
Mean	1003.15	1119.06
SD	849.10	937.43
Median	842.00	912.40
Q1	334.25	360.50
Q3	1290.50	1487.05
Min	94.83	154.10
Max	4266.0	4804.80

Passing Bablok-Regression

	DD
slope	0.8888
lower 95%-CL	0.8719
upper 95%-CL	0.9039
Intercept	-4.7192
lower 95%-CL	-15.7141
upper 95%-CL	6.0052
R^2=	0.9961

Bland-Altmann

	DD	
	Diff absolut	Diff %
Ø	-115.91	-10.77
1.96*SD	230.92	17.48

Conclusion: The results meet the pre-defined acceptance criteria. The performance of the HEMOSTAT D-Dimer (DD) is equivalent on HumaCLOT Quattro and HumaCLOT Pro.

7.4 Linearity

Dilution series of 3300 ng/ml to 100 ng/ml DDU were prepared by mixing a D-DIMER high pool (D-DIMER Calibrator) with a low pool (D-DIMER Diluent). The Hemostat DD test was performed with these dilutions series, and the expected values compared with the test results.

Used Material

Name	Manufacturer	REF	LOT	Expiry Date
Hemostat D-DIMER	Human	36002	19002	30.6.2020
Hemostat D-DIMER Calibrator for Calibration	Human	36002	18022710	28.2.2020
Hemostat D-DIMER Calibrator as High Pool	Human	36002	19002	30.6.2020
Hemostat D-DIMER Diluent	Human	36002	19002	30.6.2020

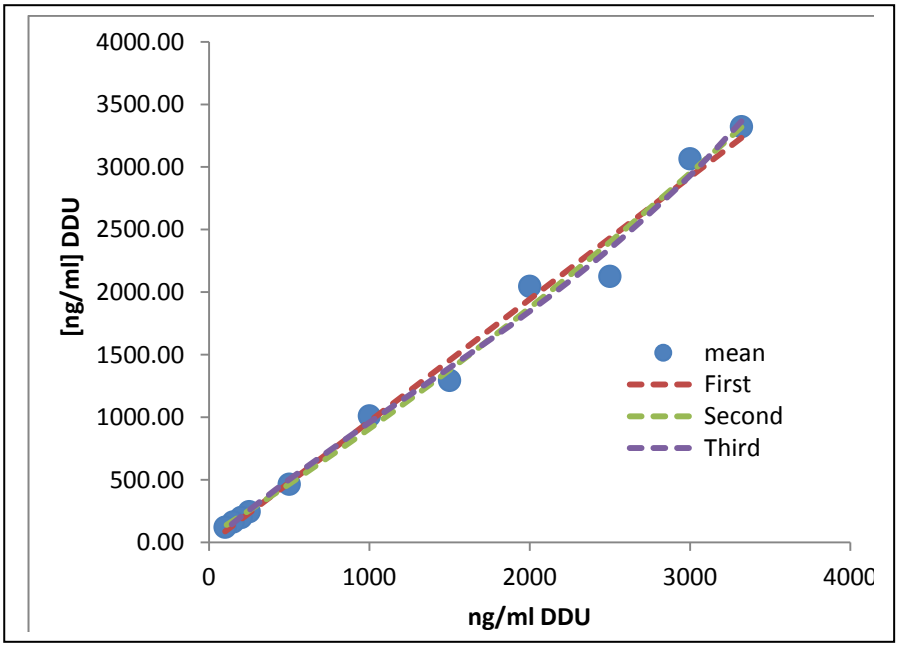
Analyzer	Serial	REF	Software
HC Quattro	E3060010	15660	V01.07b © Nov 15 2018

Acceptance Criteria

	Value
Non linearity	>15% Difference

Results

Assigned value ng/ml DDU	Mean	Predicted			Difference [%]
	[ng/ml] DDU	1st-order	2nd-order	3rd-order	3rd - 1st
3320,75	3322,67	3232,78	3318,28	3364,27	4
3000	3066,33	2919,5	2950,14	2930,71	0,4
2500	2126,67	2431,14	2398,67	2347,38	-3,9
2000	2047	1942,77	1874,49	1846,89	-4,7
1500	1295	1454,41	1377,61	1395,28	-4,6
1000	1011,33	966,05	908,04	958,58	-0,7
500	465,33	477,69	465,76	502,84	5,4
250	246	233,5	254,86	257,22	9,6
200	199,33	184,67	213,49	206,13	10,8
150	163,67	135,83	172,41	154,31	11,3
100	122	87	131,59	101,72	12,1



The expected values and test results were similar (i.e. fulfilled acceptance criteria) within the range from 122 ng/ml DDU to 3322,67 ng/ml DDU.

Conclusion: The Hemostat D-Dimer test is linear from 122 ng/ml DDU to 3322,67 ng/ml DDU.