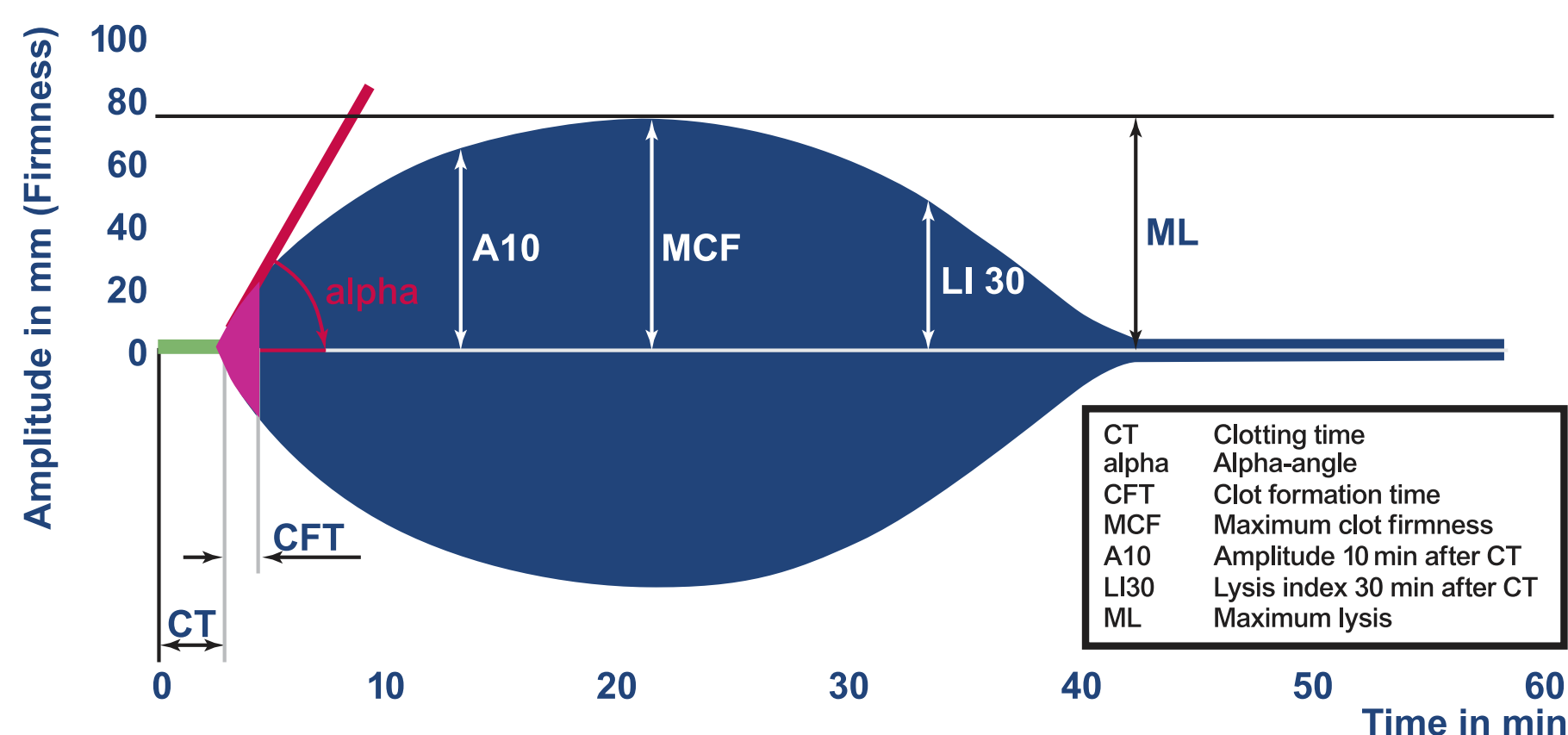




ROTEM® Thromboelastometry System

A Basic Guide to Assays and Clinical Interpretation

ROTEM® Parameters



U.S. Reference Ranges¹

	CT	CFT	a angle	A10 ²⁻⁵	A20	MCF
INTEM	122-208	45-110	70-81	40-60	51-72	51-72
EXTEM	43-82	48-127	65-80	40-60	50-70	52-70
FIBTEM						7-24
HEPTEM	Compare to INTEM					
APTEM	Compare to EXTEM					

Assays

INTEM – Intrinsic Pathway activation (F II, V, VIII, IX, X, XI, XII, Heparin)

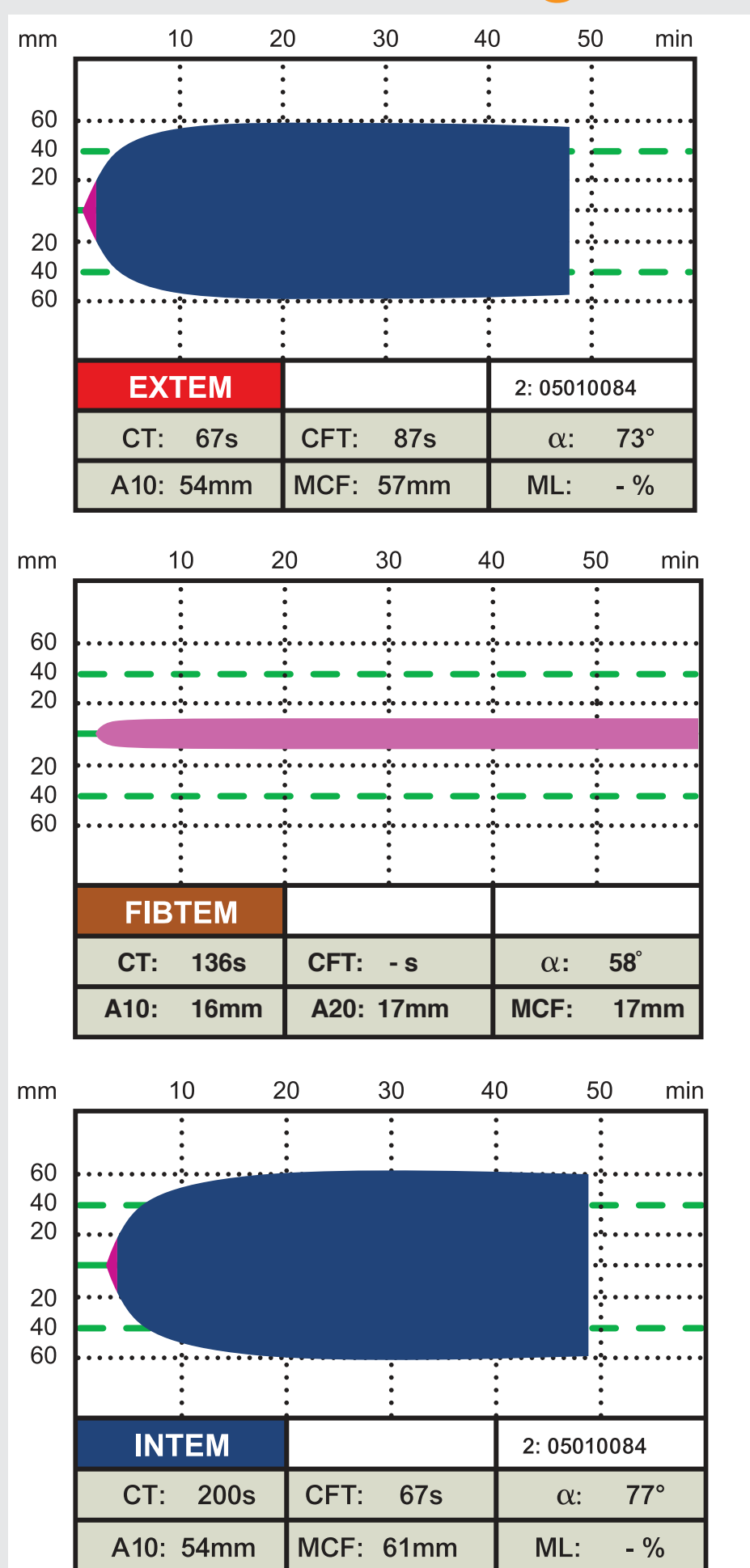
EXTEM – Extrinsic Pathway activation (F II, V, VII, X)

FIBTEM – Fibrin activity/contribution to clot firmness (extrinsic activation, platelet neutralization)

HEPTEM – Confirms heparin effect (intrinsic activation, heparin neutralization)

APTEM – Confirmation of hyperfibrinolysis (extrinsic activation with antifibrinolytic agent)

Normal TEMograms



ROTEM® Results in Clinically Significant Bleeding

Consider the effects on ROTEM® parameters: (CT, A10 (MCF) and ML):

CT_{IN} Prolonged
Suggests Heparin influence or intrinsic pathway factor deficiency

CT_{EX} Prolonged
Suggests extrinsic pathway factor deficiency

A10_{IN,EX} Reduced
Suggests inadequate clot firmness as a result of decreased platelets, fibrinogen and/or FXIII

MCF_{IN,EX} Reduced
Suggests inadequate clot firmness as a result of decreased platelets, fibrinogen and/or FXIII

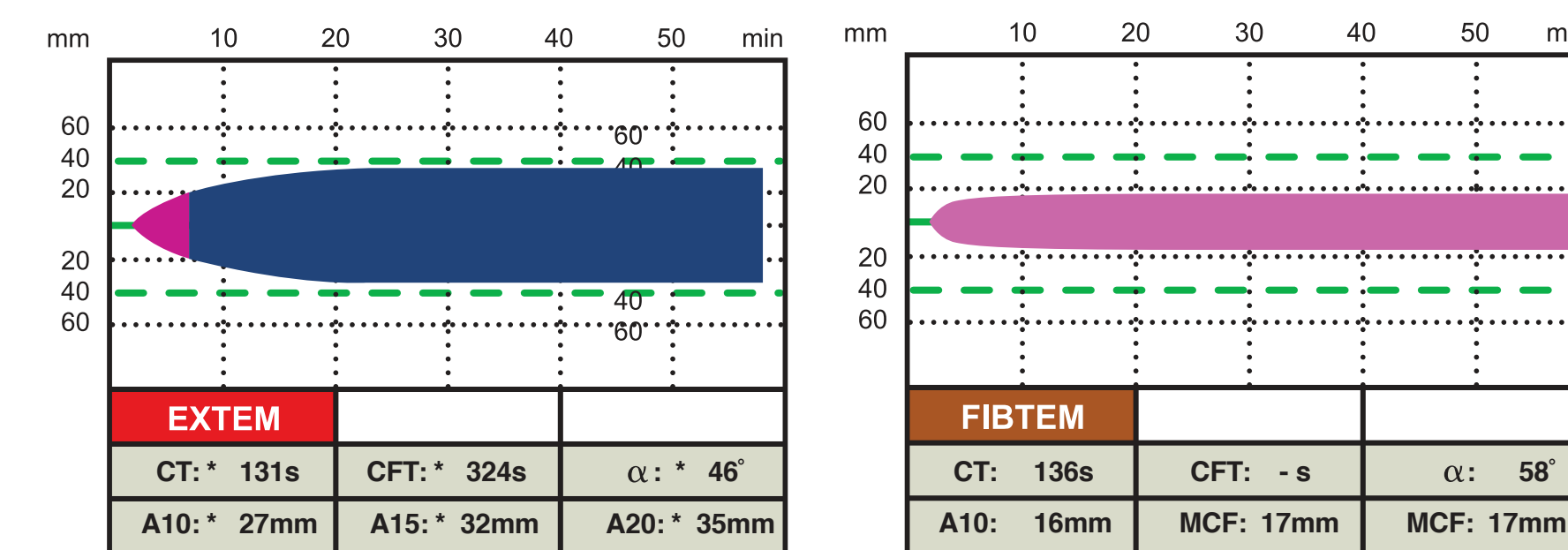
MCF_{FIB} Reduced
Suggests inadequate fibrin contribution to clot firmness

ML_{IN,EX,FIB} >15%
Suggests hyperfibrinolysis

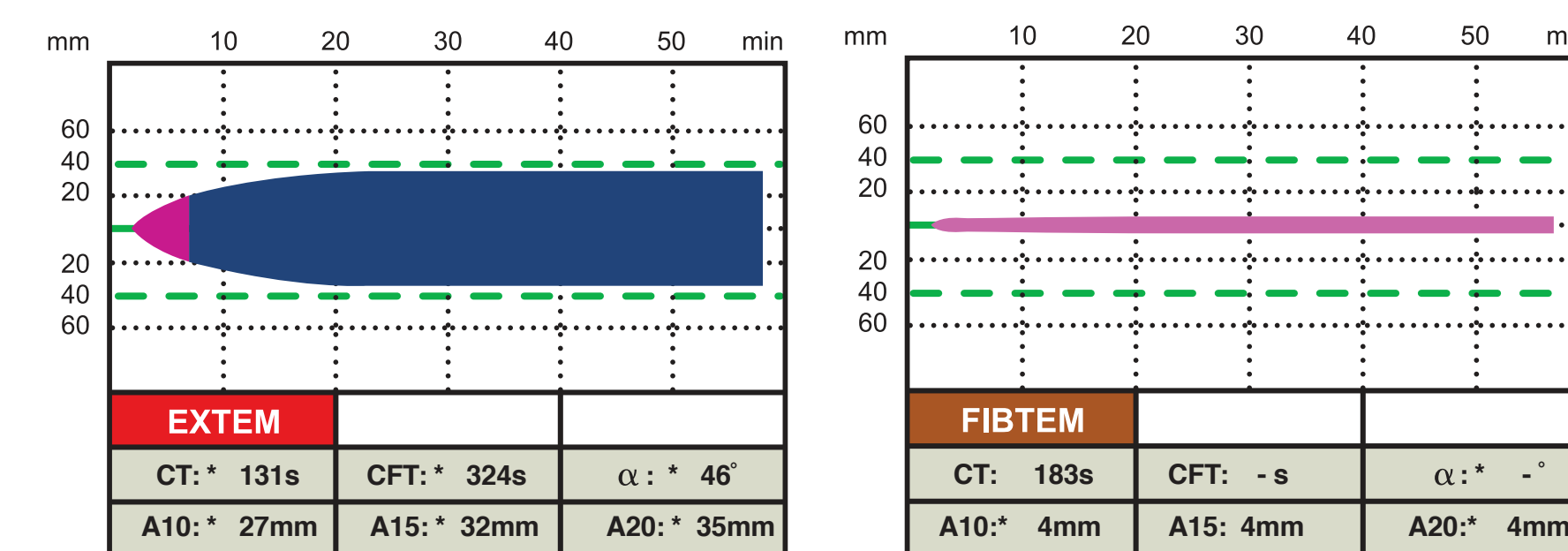
Clinical Interpretation of ROTEM® Parameters²⁻⁵

EXTEM-INTEM			EXTEM-INTEM			FIBTEM		
Parameter	Value (sec)	Comment	Parameter	Value (mm)	Comment	Parameter	Value (mm)	Comment
EXTEM CT	> 82 sec	Consider FFP if clinical bleeding	MCF A10	> 70 mm > 60 mm	Hypercoagulability; may be associated with increased risk of thromboembolic event	MCF A10	> 24 mm > 20 mm	Enhanced fibrin polymerization may compensate for low platelet count
			MCF A10	50-70 mm 40-60 mm	Normal values	MCF A10	10-24 mm 9-20 mm	Normal values
			MCF A10	45-49 mm 35-39 mm	Borderline values; may be associated with increased bleeding	MCF A10	7-9 mm 6-8 mm	Borderline values; may be associated with increased bleeding; consider cryoprecipitate if clinical bleeding
INTEM CT	> 208 sec	1. Run HEPTEM if patient may have received any heparin 2. Consider protamine if HEPTEM CT is normal 3. Consider FFP if HEPTEM CT is also prolonged and if clinical bleeding	MCF A10	40-44 mm 30-34 mm	Increased bleeding risk	MCF A10	5-6 mm 4-5 mm	Increased bleeding risk; consider cryoprecipitate if clinical bleeding
			MCF A10	< 40 mm < 30 mm	High bleeding risk	MCF A10	< 5 mm < 4 mm	High bleeding risk; consider cryoprecipitate

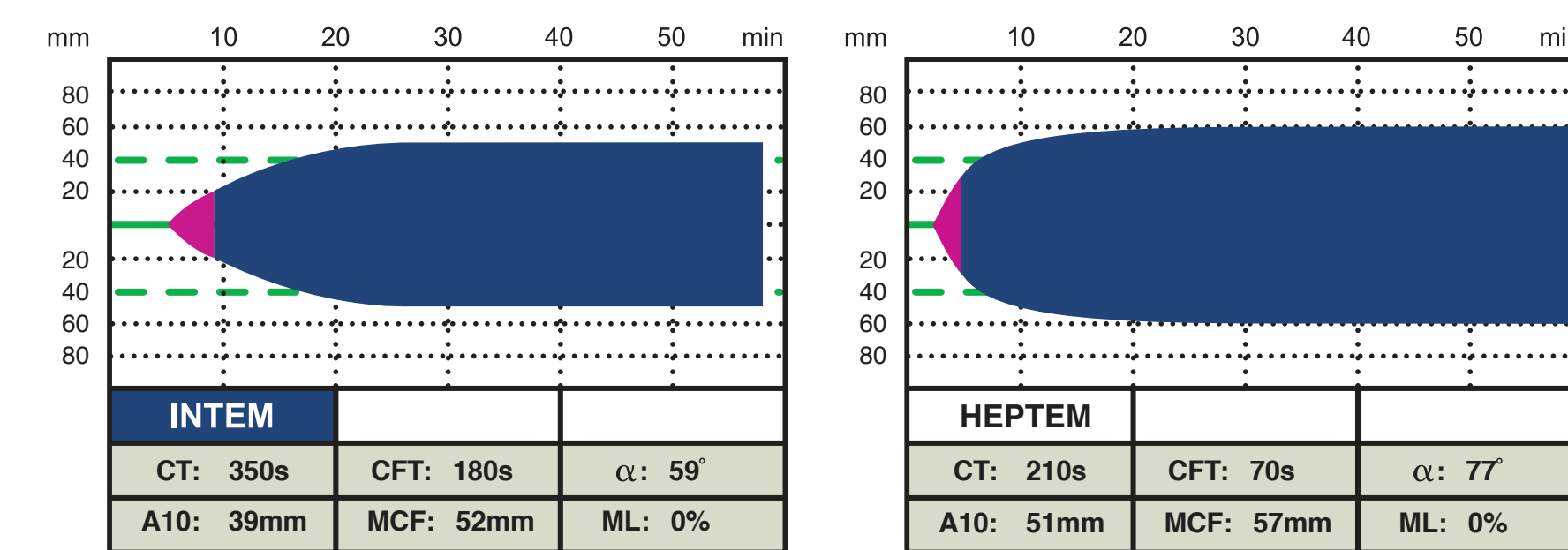
Abnormal TEMograms (Demonstrating Coagulopathies)



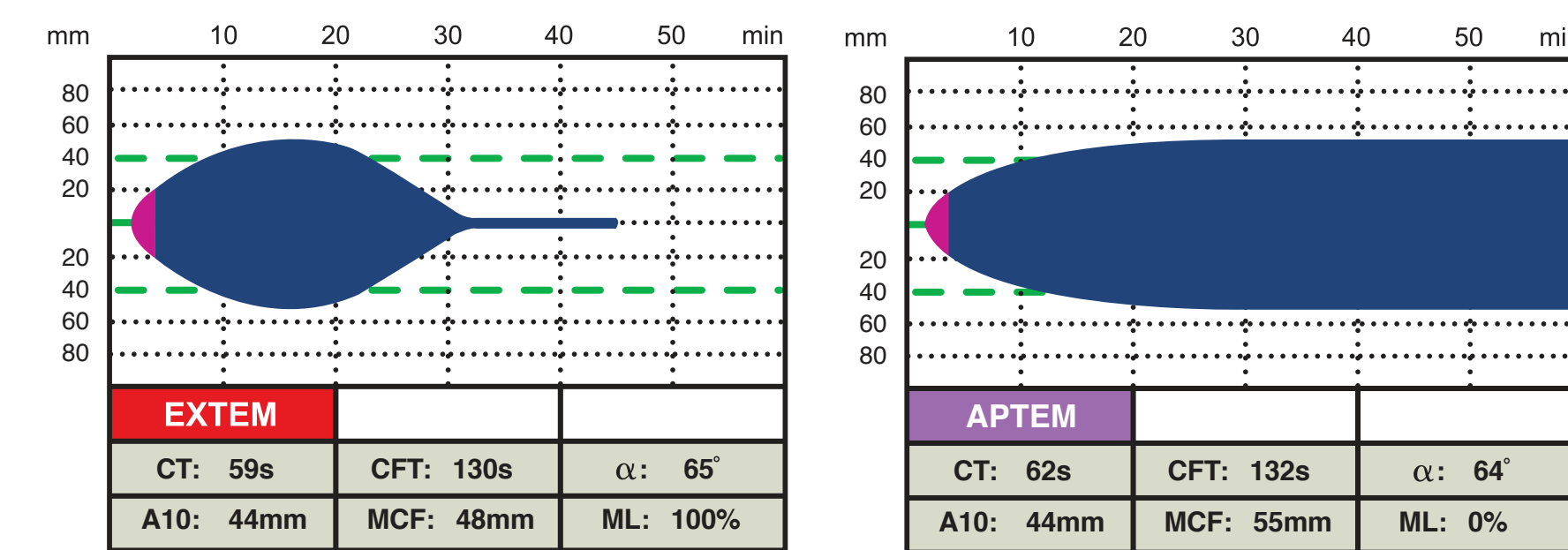
Suggests Low Platelets



Suggests Low Fibrinogen



Suggests Heparin Influence



Suggests Hyperfibrinolysis

Disclaimer: This Interpretation guide is intended for use by qualified and trained ROTEM® users to assist in the safe interpretation of the results of the ROTEM® delta Thromboelastometry System. Results from the ROTEM® delta should not be the sole basis for a patient diagnosis; ROTEM® delta results should be considered along with a clinical assessment of the patient's condition and other coagulation laboratory tests.

Interpretation Table Disclaimer: This table is based on clinical practice. However, other clinicians may have different recommendations and interpretations. TEM Systems, Inc encourages each institution to develop their own tables, algorithms and interpretation procedures.

REFERENCES: 1 - ROTEM® delta reference ranges (adult values listed in the above table) have been determined in 3 US clinical centers on reference group samples with no signs of impaired coagulation. These values are for orientation only. They are not binding and may vary from lab to lab. Please note that reference ranges for coagulation parameters depend on the reference population, the blood sampling technique and other pre-analytical factors. It is recommended to confirm the ranges with a hospital specific reference group.
2 - Dirkmann D et al. Early thromboelastometric variables reliably predict maximum clot firmness in patients undergoing cardiac surgery: a step towards earlier decision making. Acta Anaesthesiol Scand. 2012 Dec 14. doi: 10.1111/aas.12040.

3 - Görlinger K et al. Fast interpretation of thromboelastometry in non-cardiac surgery: reliability in patients with hypo-, normo-, and hypercoagulability. Br J Anaesth. 2013;110:222-30.
4 - Lier H et al. Thromboelastometry guided therapy of severe bleeding. Essener Runde algorithm. Hamostasologie. 2013;33:51-61.
5 - Schöchl H et al. Early and individualized goal-directed therapy for trauma-induced coagulopathy. Scand J Trauma Resusc Emerg Med. 2012;20:15.

