

**Flex-GTR Pendulum type and Inverse type  
Dynamic Certification Test Data**

## **(1) Pendulum Type Certification Test Data**













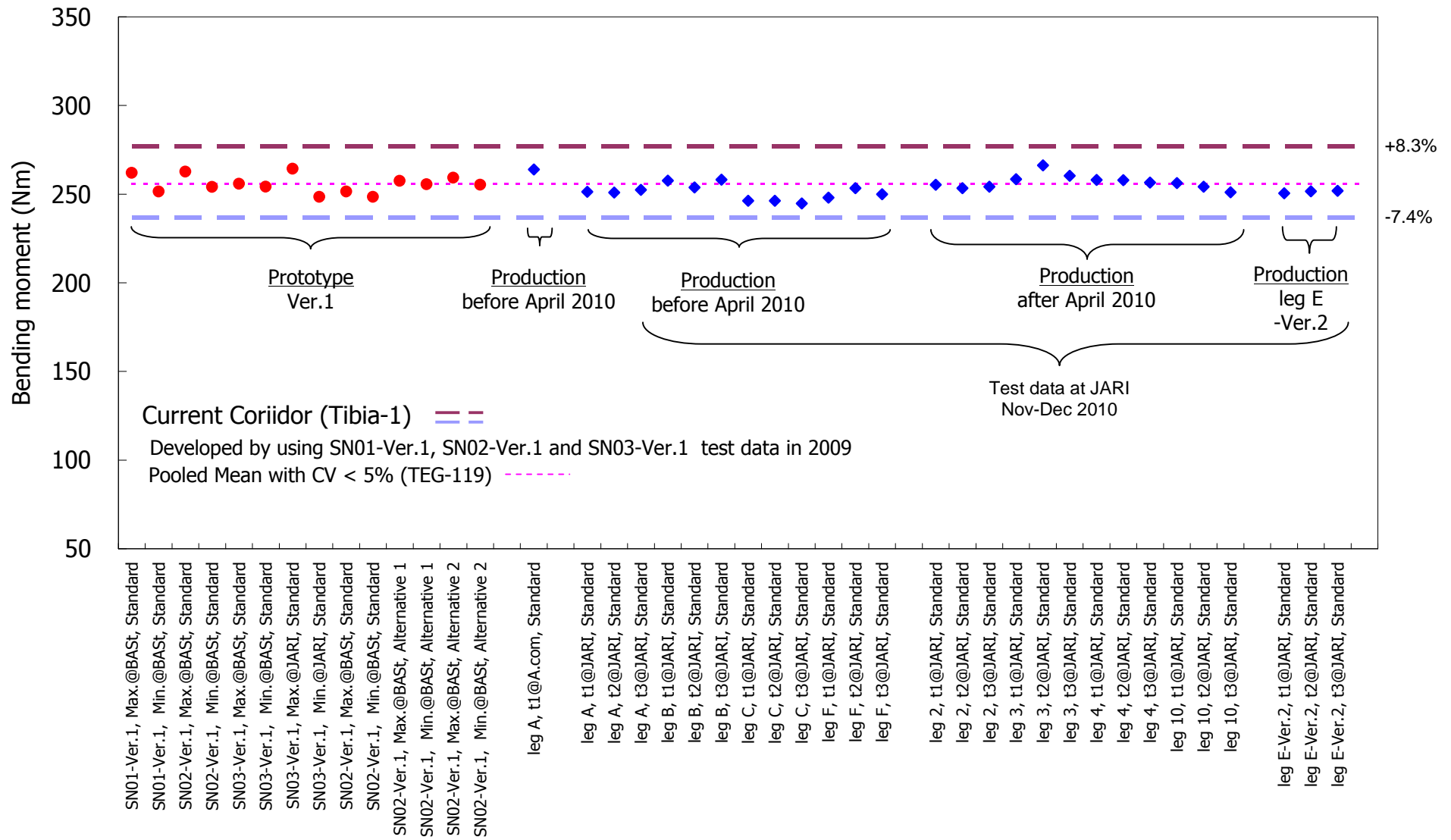




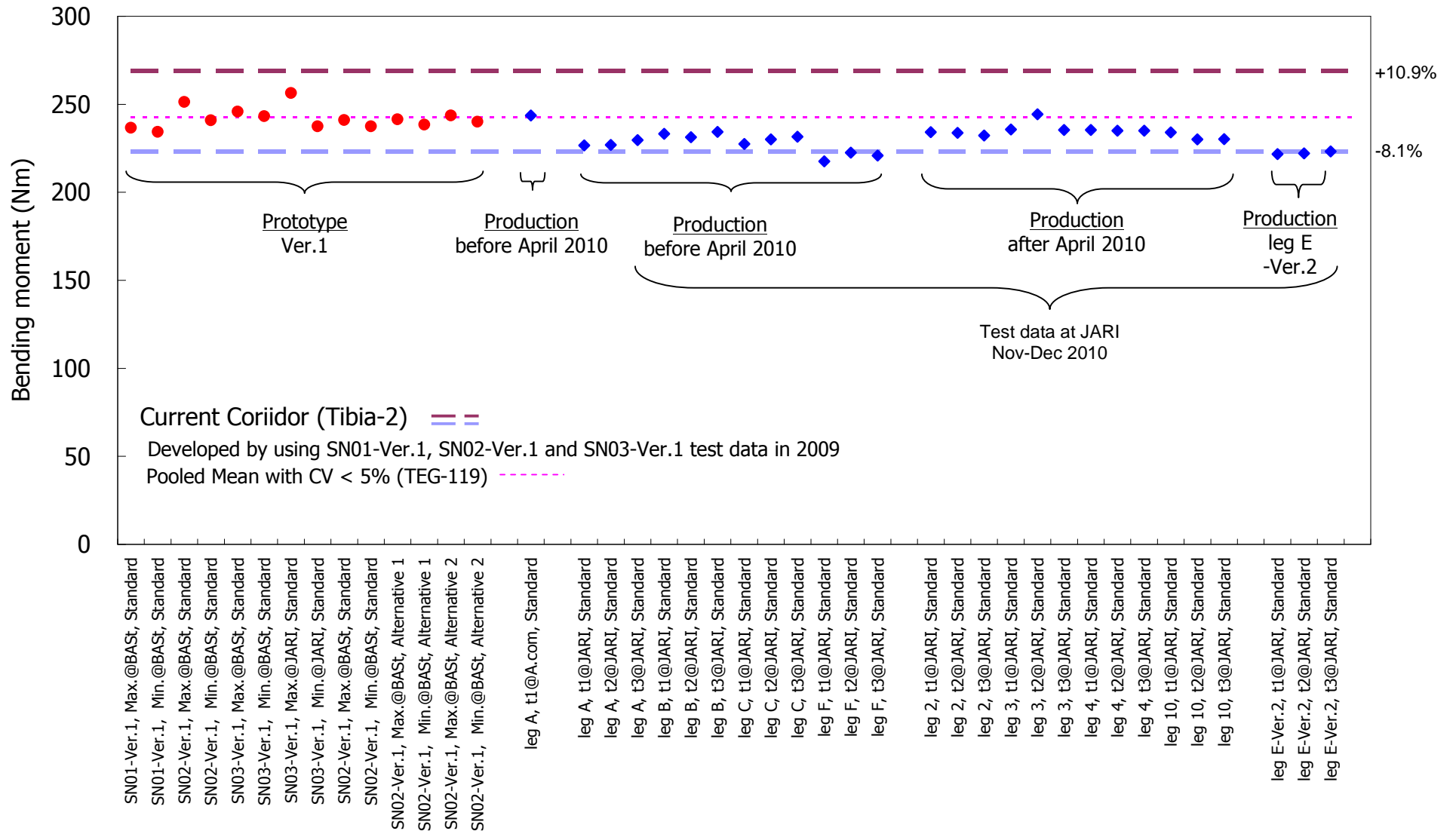
## **(2) Inverse Type Certification Test Data**

# Inverse Type

## Current Corridor (Tibia-1) and Test data

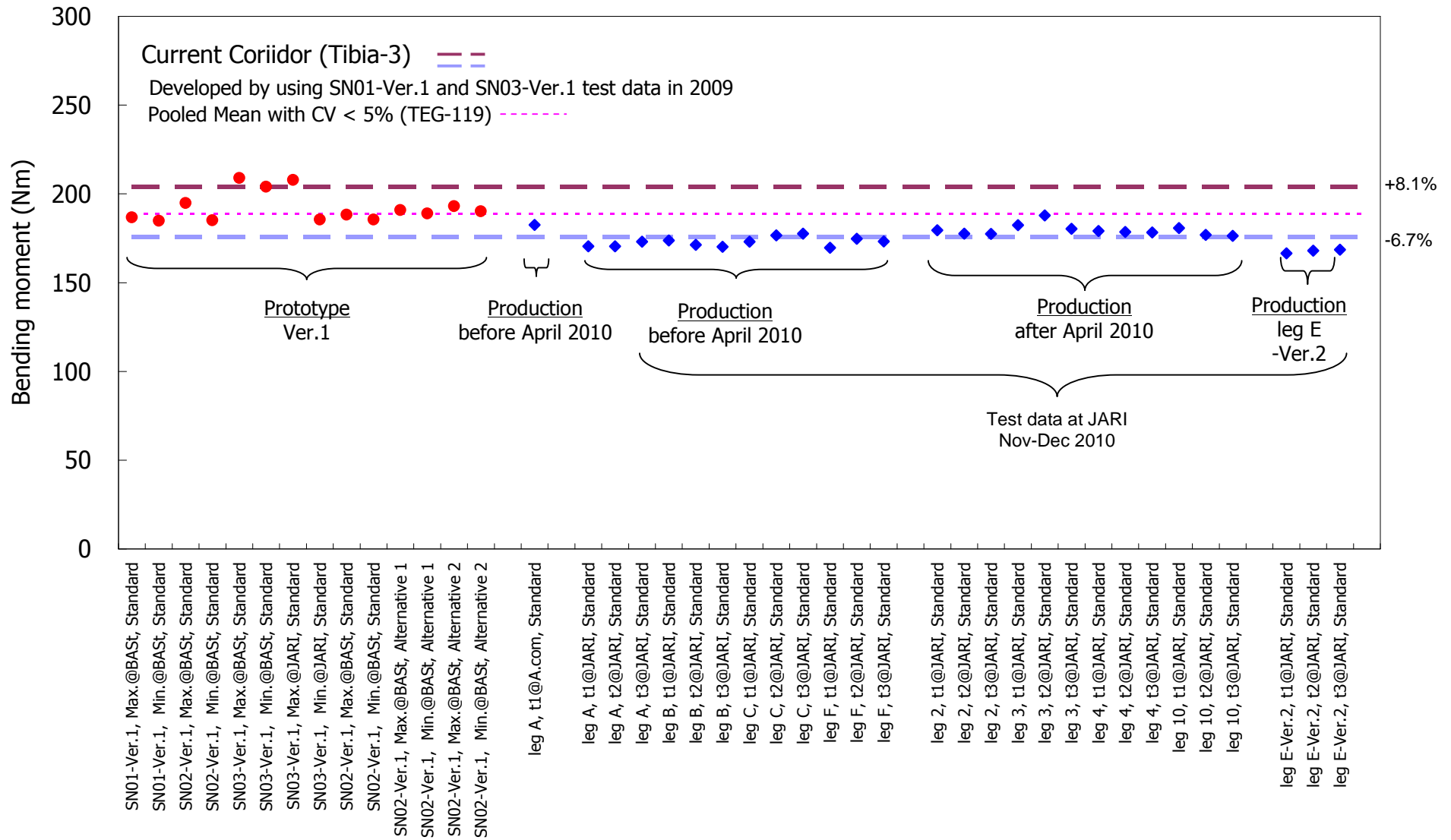


# Inverse Type Current Corridor (Tibia-2) and Test Data

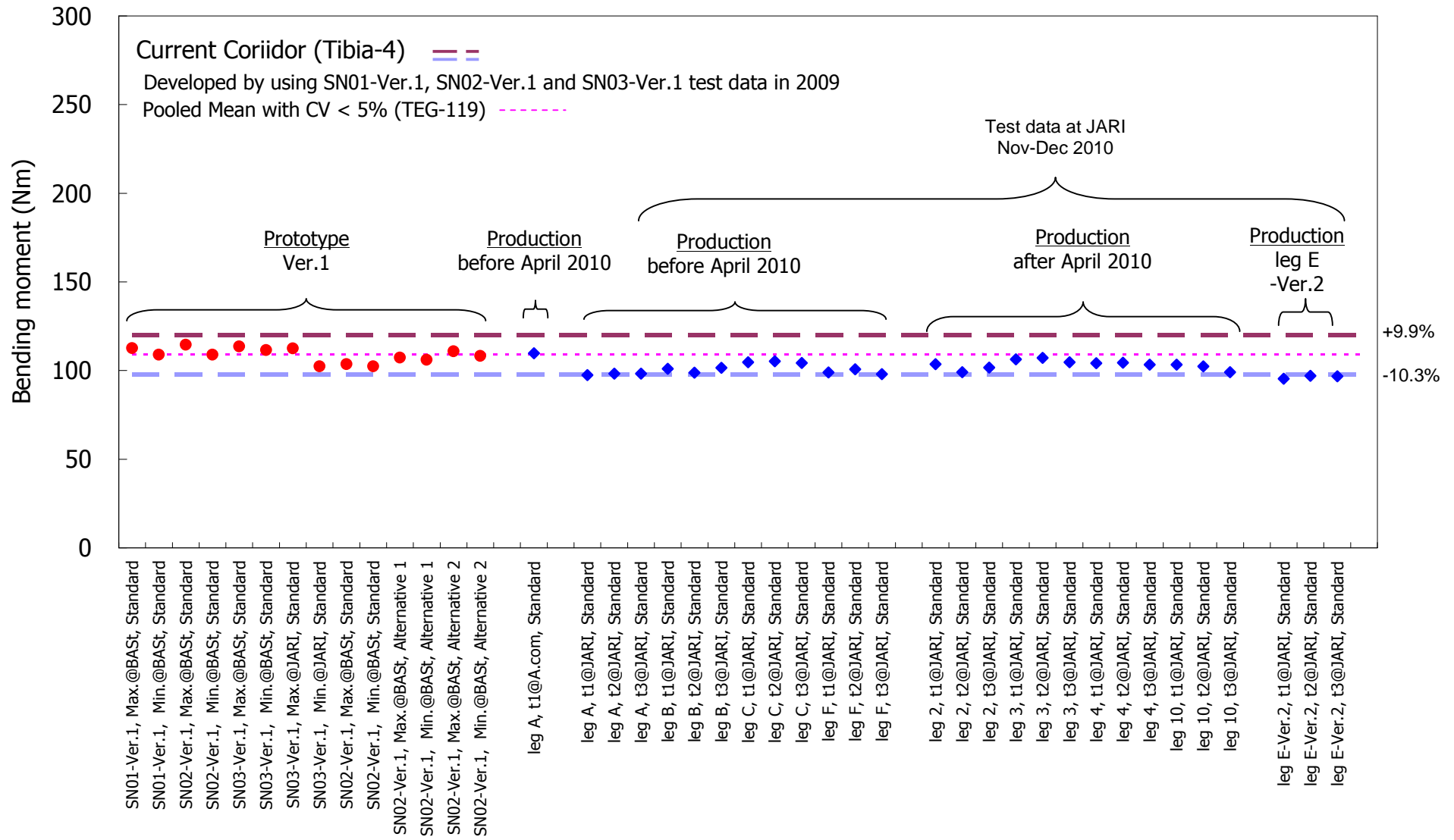


# Inverse Type

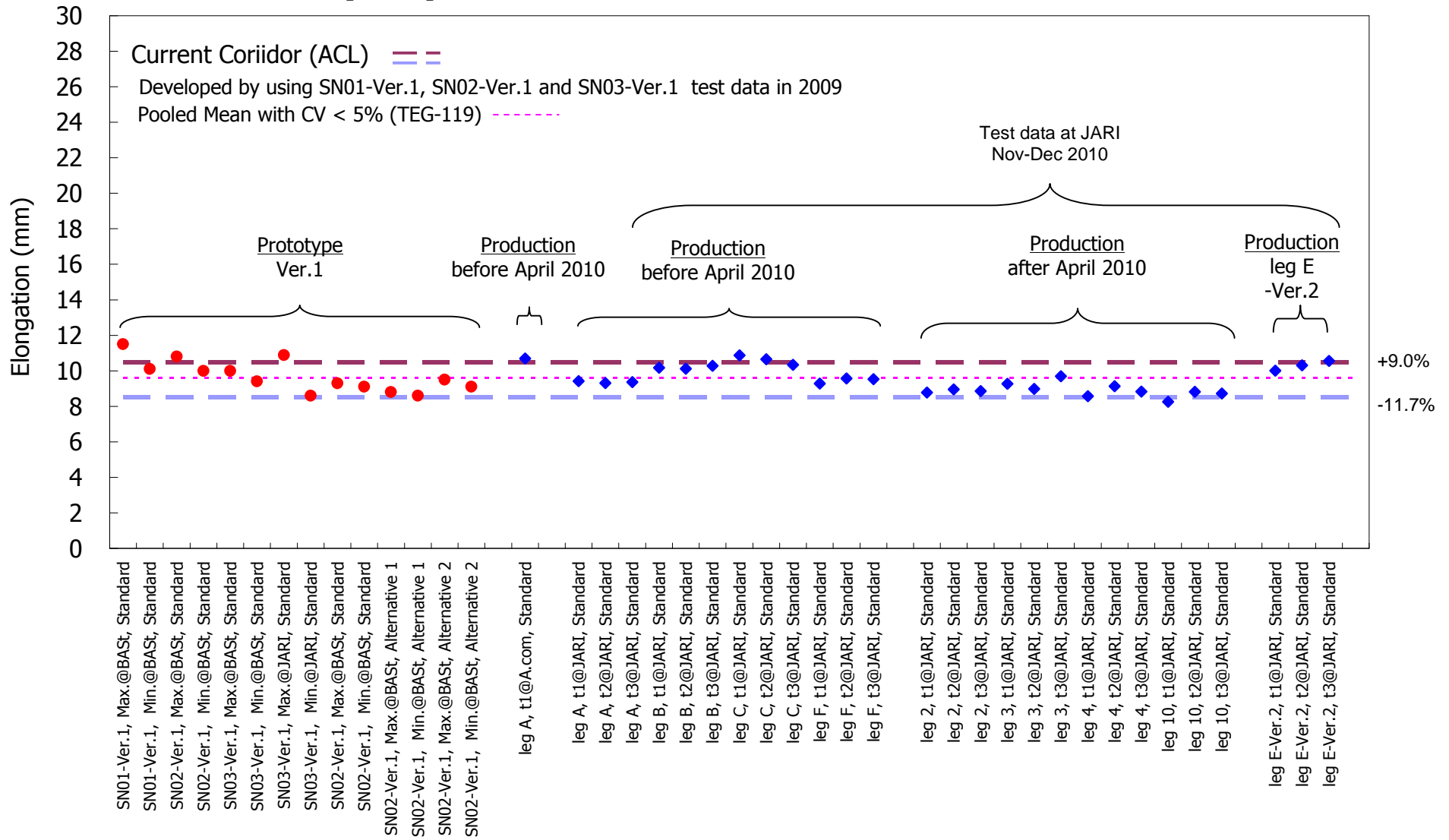
## Current Corridor (Tibia-3) and Test Data



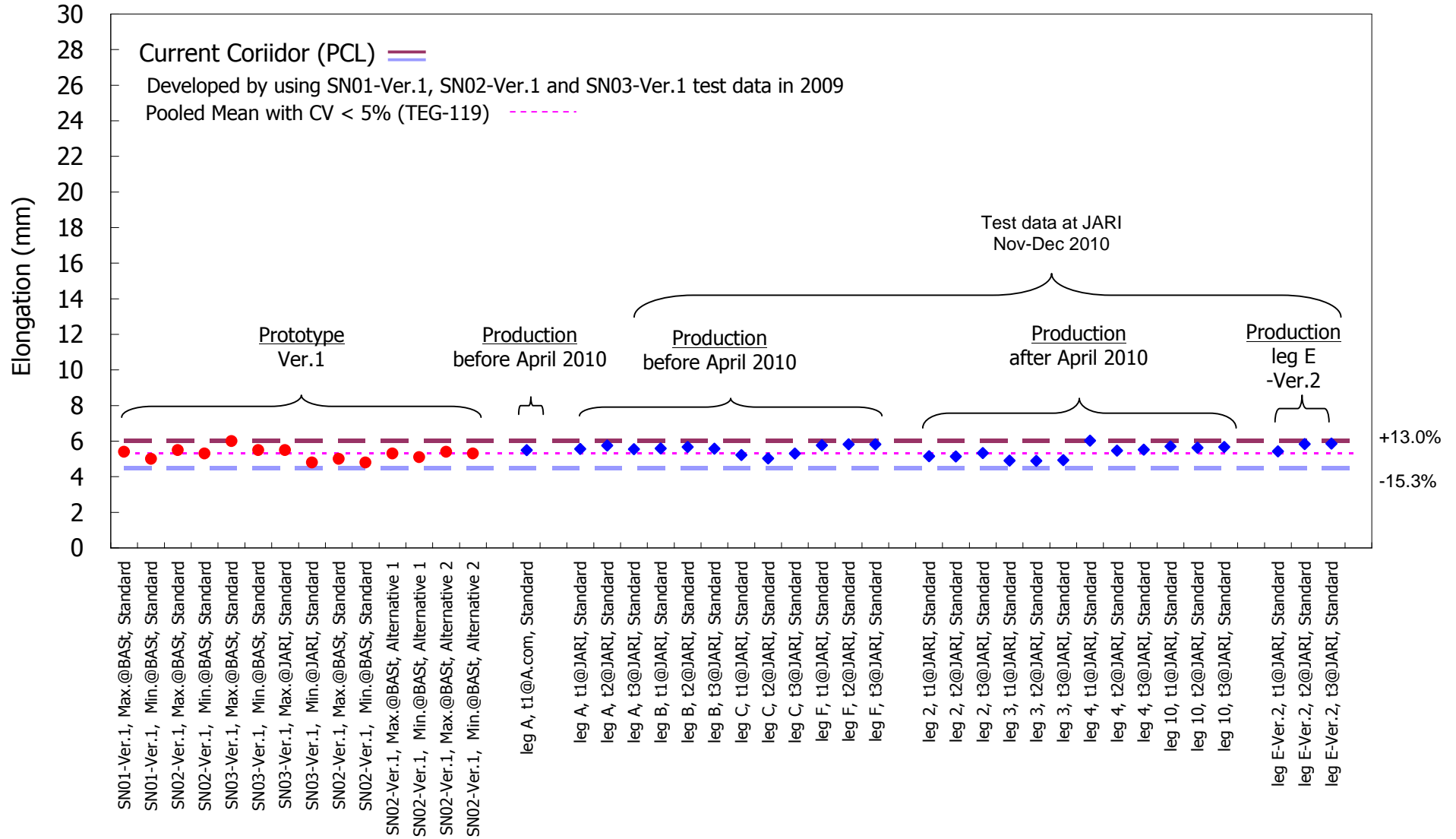
# Inverse Type Current Corridor (Tibia-4) and Test Data



# Inverse Type Current Corridor (ACL) and Test Data

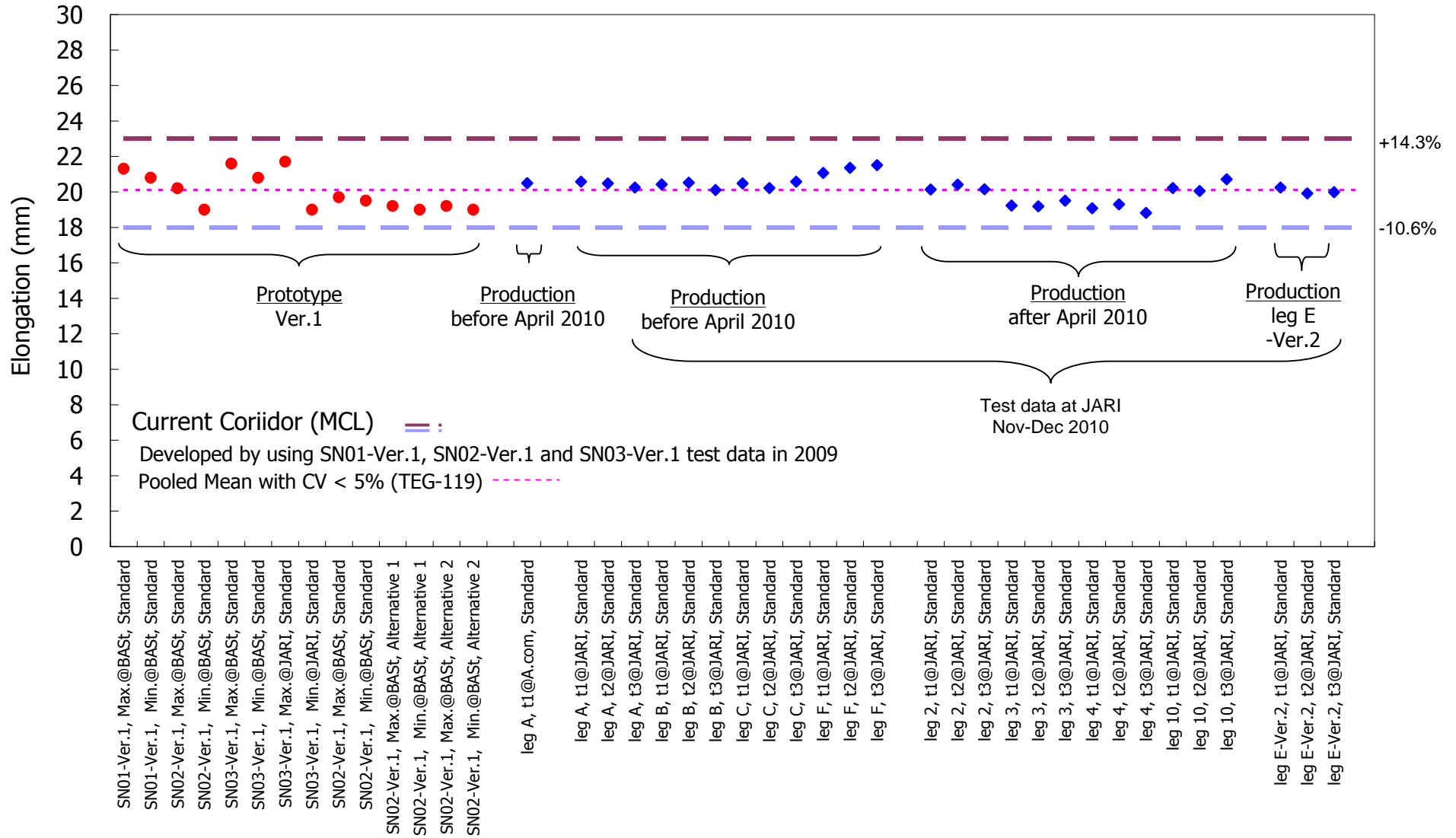


# Inverse Type Current Corridor (PCL) and Test Data





# Inverse Type Current Corridor (MCL) and Test Data



# Appendix (1): Flex-GTR ID and Specifications

## Flex-GTR ID and Specifications

1 Dec. 2010

			Femur			Tibia			Produced	
			Bone core	Glue	Sensitivity	Bone core	Glue	Sensitivity	Month and Year	
Flex-GTR-prototype	SN01	Ver.1	BASE	BASE	325Nm	BASE	BASE	325Nm	Nov. 2008	
		Ver.2	BASE	BASE	325Nm	NEW	BASE	325Nm	Nov. 2009	
	SN02	Ver.1	BASE	BASE	325Nm	BASE	BASE	325Nm	Nov. 2008	
		SN03	Ver.1	BASE	BASE	325Nm	BASE	BASE	325Nm	Nov. 2008
			Ver.2	BASE	BASE	325Nm	NEW	BASE	325Nm	Sep. 2009
	Ver.3	NEW	NEW	400Nm	NEW	BASE	325Nm	Jul. 2010		
Flex-GTR-production	leg A		NEW	BASE	325Nm	NEW	BASE	325Nm	Before Apr. 2010	
	leg B		NEW	BASE	325Nm	NEW	BASE	325Nm	Before Apr. 2010	
	leg C		NEW	BASE	325Nm	NEW	BASE	325Nm	Before Apr. 2010	
	leg D		NEW	BASE	325Nm	NEW	BASE	325Nm	Before Apr. 2010	
	leg E	Ver.1		NEW	BASE	325Nm	NEW	BASE	325Nm	Before Apr. 2010
		Ver.2		NEW	BASE	325Nm	NEW	NEW	400Nm	Nov. 2010
	leg F		NEW	BASE	325Nm	NEW	BASE	325Nm	Before Apr. 2010	
	leg 1		NEW	NEW	400Nm	NEW	NEW	400Nm	After Apr. 2010	
	leg 2		NEW	NEW	400Nm	NEW	NEW	400Nm	After Apr. 2010	
	leg 3		NEW	NEW	400Nm	NEW	NEW	400Nm	After Apr. 2010	
	leg 4		NEW	NEW	400Nm	NEW	NEW	400Nm	After Apr. 2010	
	leg 6		NEW	NEW	400Nm	NEW	NEW	400Nm	After Apr. 2010	
	leg 7		NEW	NEW	400Nm	NEW	NEW	400Nm	After Apr. 2010	
	leg 8		NEW	NEW	400Nm	NEW	NEW	400Nm	After Apr. 2010	
	leg 9		NEW	NEW	400Nm	NEW	NEW	400Nm	After Apr. 2010	
	leg 10		NEW	NEW	400Nm	NEW	NEW	400Nm	After Apr. 2010	

## Appendix (2): Comparison Dummy Corridor Widths

# Comparison dummy corridors

Dummy	Reg/ Ref	lower	upper	average	width	
TRL PLI tibia acceleration	EC No 631/2010	120	250	185	-35%	35%
TRL PLI bending angle	EC No 631/2010	6.2	8.2	7.2	-14%	14%
TRL PLI shearing displacement	EC No 631/2010	3.5	6	4.75	-26%	26%
TRL upper leg Peak bending moment	EC No 631/2010	190	250	220	-14%	14%
HIII chest 3.0m/s	SAE J2779	21.5	26.5	24	-10%	10%
HIII chest 6.7m/s	CFR 572	63.5	72.6	68.1	-7%	7%
HIII Knee slider low speed	SAE J2876	9.33	12.67	11.0	-15%	15%
HIII Knee slider	CFR 572	1.26	1.72	1.49	-15%	15%
HIII Knee slider	CFR 572	2.27	3.10	2.69	-15%	15%
WorldSID shoulder 4.3m/s [mm]	ISO15830	35	45	40.0	-13%	13%
WorldSID shoulder 4.3m/s [kN]	ISO15830	2.6	3.3	2.95	-12%	12%
WorldSID chest no arm 4.3m/s [mm]	ISO15830	33	43	38.0	-13%	13%
WorldSID chest no arm 4.3m/s [mm]	ISO15830	35	43	39.0	-10%	10%
WorldSID chest no arm 4.3m/s [mm]	ISO15830	32	40	36.0	-11%	11%
WorldSID chest no arm 4.3m/s [kN]	ISO15830	3.2	3.8	3.50	-9%	9%
WorldSID chest w.arm 6.7m/s [mm]	ISO15830	35	47	41.0	-15%	15%
WorldSID chest w.arm 6.7m/s [mm]	ISO15830	46	56	51.0	-10%	10%
WorldSID chest w.arm 6.7m/s [mm]	ISO15830	39	46	42.5	-8%	8%
WorldSID chest w.arm 6.7m/s [kN]	ISO15830	4.9	5.8	5.35	-8%	8%
WorldSID pelvis 6.7m/s [G]	ISO15830	41	51	46.0	-11%	11%
WorldSID pelvis 6.7m/s [kN]	ISO15830	6.3	7.8	7.05	-11%	11%

**TRL PLI**  
Avg. +/- 25%

**Hybrid III**  
Avg. +/- 12%

**WorldSID**  
Avg. +/- 11%

## Comparison with Flex PLI Current Corridor Width

		Corridor Width	
<b>TRL PLI</b>	Tibia acceleration	+/-	35 %
	Bending angle	+/-	14 %
	Shearing displacement	+/-	26 %
<b>Avg.</b>		<b>+/-</b>	<b>25 %</b>
<b>TRL Upper Leg</b>	Bending moment	+/-	<b>14 %</b>
<b>Hybrid III</b>	Chest 3.0 m/s	+/-	10 %
	Chest 6.0 m/s	+/-	7 %
	Knee slider low speed	+/-	15 %
	Knee slider	+/-	15 %
	Knee slider	+/-	15 %
<b>Avg.</b>		<b>+/-</b>	<b>12 %</b>
<b>WorldSID</b>	Shoulder 4.3 m/s [mm]	+/-	13 %
	Shoulder 4.3 m/s [kN]	+/-	12 %
	Chest no arm 4.3 m/s [mm]	+/-	13 %
	Chest no arm 4.3 m/s [mm]	+/-	10 %
	Chest no arm 4.3 m/s [mm]	+/-	11 %
	Chest no arm 4.3 m/s [kN]	+/-	9 %
	Chest w.arm 6.7 m/s [mm]	+/-	15 %
	Chest w.arm 6.7 m/s [mm]	+/-	10 %
	Chest w.arm 6.7 m/s [mm]	+/-	8 %
	Chest w.arm 6.7 m/s [kN]	+/-	8 %
	Pelvis 6.7 m/s [G]	+/-	11 %
	Pelvis 6.7 m/s [kN]	+/-	11 %
	<b>Avg.</b>		<b>+/-</b>

Pendulum Type	Current Corridor Width				
<b>Flex PLI</b>	Tiba-1	+	7.4 %	-	7.3 %
	Tiba-2	+	6.9 %	-	6.2 %
	Tiba-3	+	9.3 %	-	7.9 %
	Tiba-4	+	7.9 %	-	6.9 %
	ACL	+	9.9 %	-	9.0 %
	PCL	+	14.0 %	-	14.5 %
	MCL	+	7.0 %	-	6.4 %
	<b>Avg.</b>		<b>+</b>	<b>8.9 %</b>	<b>-</b>
Inverse Type	Current Corridor Width				
<b>Flex PLI</b>	Tiba-1	+	8.3 %	-	7.4 %
	Tiba-2	+	10.9 %	-	8.1 %
	Tiba-3	+	8.1 %	-	6.7 %
	Tiba-4	+	9.9 %	-	10.3 %
	ACL	+	9.0 %	-	11.7 %
	PCL	+	13.0 %	-	15.3 %
	MCL	+	14.3 %	-	10.6 %
<b>Avg.</b>		<b>+</b>	<b>10.5 %</b>	<b>-</b>	<b>10.0 %</b>