

FORENSIC BIOLOGY PROTOCOLS FOR FORENSIC STR ANALYSIS

Appendix for PowerPlex Fusion Stutter		
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Appendix for PowerPlex® Fusion Stutter

Table 1 Maximum allowable stutter ratios used by STRmix™ per stutter type modeled. A peak in stutter position will only be modeled by STRmix™ as stutter if its peak height ratio to the parent peak is below this threshold.

Stutter Type	Maximum Allowable Stutter Ratio
Back Stutter	0.3
Forward Stutter	0.2
Half Back Stutter	0.1
Double Back Stutter	0.1

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Stutter Information for the Fusion3500_Evidence2026 panel in GeneMarker® v3.0.0

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Table 2: Best explanatory variable(s) by stutter and location

	Back Stutter	Forward Stutter	Half-back Stutter	Double-back Stutter
D3S1358	Allele Regression	Locus Average	Locus Average	Locus Average
D1S1656	LUS Regression	Locus Average	Locus Average	Locus Average
D2S441	Allele Average/ LUS Regression/Locus Average	Locus Average	Locus Average	Locus Average
D10S1248	Allele Regression	Locus Average	Locus Average	Allele Regression
D13S317	Allele Regression	Locus Average	Locus Average	Locus Average
Penta E	Allele Regression	Locus Average	Locus Average	Locus Average
D16S539	Allele Regression	Locus Average	Locus Average	Locus Average
D18S51	Allele Regression	Locus Average	Locus Average	Allele Regression
D2S1338	Allele Average/ Allele Regression	Locus Average	Locus Average	Locus Average
CSF1PO	Allele Regression	Locus Average	Locus Average	Locus Average
Penta D	Allele Regression	Locus Average	None	None
TH01	LUS Regression	Locus Average	Locus Average	Locus Average
vWA	Allele Regression	Locus Average	Locus Average	Locus Average
D21S11	Allele Average/ Allele Regression	Locus Average	Locus Average	Locus Average
D7S820	Allele Regression	Locus Average	Locus Average	Locus Average
D5S818	Allele Regression	Locus Average	Locus Average	None
TPOX	Allele Regression	Locus Average	Locus Average	Locus Average
D8S1179	Allele Average/ Allele Regression	Locus Average	Locus Average	Locus Average
D12S391	Allele Average/ Allele Regression	Locus Average	Locus Average	Locus Average
D19S433	LUS Regression	Locus Average	None	Locus Average
FGA	Allele Regression	Locus Average	None	Locus Average
D22S1045	Allele Regression	Allele Regression	N/A	Locus Average

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Table 3: Stutter filter values by stutter type and location, including DYS391. *DBS filter values listed below are for reference - GeneMarker® v3.0.0 cannot apply these filters automatically.

Locus Specific Stutter Filters			
	DBS*	FS	HBS
D3S1358	1.17%	2.17%	0.47%
D1S1656	1.66%	1.80%	2.96%
D2S441	0.81%	1.81%	1.00%
D10S1248	Allele specific	0.86%	0.57%
D13S317	1.02%	1.97%	0.56%
Penta E	1.55%	1.36%	1.20%
D16S539	0.91%	1.89%	0.65%
D18S51	Allele specific	2.03%	1.03%
D2S1338	1.25%	2.74%	1.58%
CSF1PO	0.66%	1.73%	0.86%
Penta D	No filter	1.31%	No filter
TH01	0.91%	1.64%	1.18%
vWA	0.88%	1.82%	0.83%
D21S11	1.42%	2.40%	1.07%
D7S820	1.90%	2.45%	2.04%
D5S818	No filter (see artifact table)	1.99%	1.00%
TPOX	0.79%	1.59%	2.37%
DYS391	No filter BS: 7.85%	4.33%	No filter
D8S1179	1.03%	2.82%	1.08%
D12S391	3.59%	3.35%	1.90%
D19S433	1.02%	1.65%	No filter
FGA	1.66%	2.11%	No filter
D22S1045	1.37%	Allele specific	N/A

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Table 4: Allele-specific stutter filters used in GeneMarker® analysis at NYC OCME. DBS filter values listed below are for reference - GeneMarker® v3.0.0 cannot apply these filters automatically.

Allele Specific Stutter Filters – Blue

D3S1358		D1S1656		D2S441		D10S1248			D13S317		Penta E	
Allele	BS	Allele	BS	Allele	BS	Allele	BS	DBS	Allele	BS	Allele	BS
8	3.32%	8	5.17%	8	7.44%	8	3.46%	0.34%	5	0.87%	4	1.11%
9	4.12%	9	6.13%	9	7.44%	9	4.41%	0.46%	6	1.83%	5	1.49%
10	4.92%	10	6.61%	9.1	7.44%	10	5.36%	0.59%	7	2.79%	6	1.88%
11	5.72%	11	8.06%	10	5.94%	11	6.31%	0.72%	7.1	2.89%	7	2.26%
12	6.52%	12	8.54%	10.1	7.44%	12	7.26%	0.85%	8	3.75%	8	2.64%
13	7.32%	13	9.02%	11	7.59%	13	8.21%	0.97%	8.1	3.85%	9	3.02%
14	8.12%	13.3	8.06%	11.3	3.33%	14	9.16%	1.10%	9	4.71%	10	3.41%
14.3	8.36%	14	10.47%	12	8.13%	15	10.11%	1.23%	10	5.67%	11	3.79%
15	8.92%	14.3	6.13%	12.3	6.19%	16	11.05%	1.36%	11	6.63%	11.4	3.94%
15.1	9.00%	15	10.95%	13	7.90%	17	12.00%	1.48%	12	7.59%	12	4.17%
15.2	9.08%	15.3	7.58%	13.1	7.44%	18	12.95%	1.61%	12.3	7.88%	13	4.55%
15.3	9.16%	16	12.24%	13.3	7.44%	19	13.90%	1.74%	13	8.55%	14	4.94%
16	9.72%	16.2	12.23%	14	4.74%				13.3	8.84%	14.2	5.01%
16.2	9.88%	16.3	8.06%	14.3	7.65%				14	9.51%	15	5.32%
17	10.52%	17	12.88%	15	8.14%				15	10.48%	15.2	5.40%
17.1	10.60%	17.1	12.69%	16	8.63%				16	11.44%	16	5.70%
17.2	10.68%	17.3	9.02%	17	9.12%				17	12.40%	16.4	5.86%
18	11.32%	18	13.85%								17	6.09%
18.1	11.40%	18.3	9.99%								17.4	6.24%
18.2	11.48%	19	13.65%								18	6.47%
18.3	11.56%	19.3	10.95%								19	6.85%
19	12.12%	20.3	14.31%								20	7.23%
20	12.92%	21	14.67%								21	7.62%
20.1	13.00%										22	8.00%
21	13.73%										23	8.38%
											24	8.76%
											25	9.15%

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Allele Specific Stutter Filters – Green

D16S539		D18S51						D2S1338		CSF1PO		Penta D	
Allele	BS	Allele	BS	DBS	Allele	BS	DBS	Allele	BS	Allele	BS	Allele	BS
4	0.44%	7	2.70%	0.41%	16.3	9.85%	1.15%	10	5.25%	5	1.98%	2.2	0.00%
5	1.41%	8	3.47%	0.49%	17	10.39%	1.20%	11	5.69%	6	2.85%	3.2	0.23%
6	2.39%	9	4.24%	0.57%	17.2	10.55%	1.22%	12	6.13%	7	3.73%	5	0.73%
7	3.36%	9.2	4.39%	0.59%	17.3	10.62%	1.23%	13	6.57%	7.3	3.99%	6	1.02%
8	4.33%	10	5.01%	0.65%	18	11.16%	1.28%	14	7.01%	8	4.60%	6.4	1.13%
8.3	4.62%	10.2	5.16%	0.67%	18.1	11.24%	1.29%	15	7.45%	8.1	4.68%	7	1.30%
9	5.30%	11	5.78%	0.73%	18.2	11.31%	1.30%	16	7.16%	8.3	4.86%	7.4	1.41%
9.3	5.60%	11.2	5.93%	0.75%	19	11.93%	1.36%	17	7.19%	9	5.47%	8	1.58%
10	6.28%	12	6.55%	0.81%	19.2	12.08%	1.38%	18	8.24%	9.1	5.56%	8.2	1.64%
10.3	6.57%	12.2	6.70%	0.82%	20	12.70%	1.44%	18.3	8.90%	10	6.34%	9	1.86%
11	7.25%	12.3	6.78%	0.83%	20.2	12.85%	1.45%	19	9.56%	10.1	6.43%	9.2	1.92%
11.3	7.54%	13	7.31%	0.89%	21	13.47%	1.52%	19.3	9.34%	10.2	6.52%	9.4	1.98%
12	8.22%	13.1	7.39%	0.90%	21.1	13.54%	1.52%	20	10.82%	10.3	6.60%	10	2.15%
12.1	8.32%	13.2	7.47%	0.90%	21.2	13.62%	1.53%	21	12.62%	11	7.21%	11	2.43%
12.2	8.42%	13.3	7.55%	0.91%	22	14.24%	1.60%	22	9.09%	11.1	7.30%	11.1	2.46%
13	9.20%	14	8.08%	0.97%	22.2	14.39%	1.61%	22.2	10.62%	11.3	7.47%	11.2	2.49%
13.3	9.49%	14.2	8.24%	0.98%	23	15.01%	1.67%	23	9.88%	12	8.08%	12	2.71%
14	10.17%	15	8.85%	1.04%	23.2	15.16%	1.69%	23.2	11.06%	12.1	8.17%	12.1	2.74%
15	11.14%	15.2	9.01%	1.06%	24	15.78%	1.75%	23.3	11.10%	12.3	8.35%	12.2	2.77%
16	12.12%	15.3	9.08%	1.07%	24.2	15.93%	1.77%	24	10.97%	13	8.96%	13	2.99%
		16	9.62%	1.12%	25	16.54%	1.83%	24.2	11.50%	13.3	9.22%	13.4	3.11%
		16.1	9.70%	1.13%	26	17.31%	1.91%	25	11.80%	14	9.83%	14	3.28%
		16.2	9.78%	1.14%	27	18.08%	1.99%	26	12.29%	15	10.70%	14.1	3.30%
								27	12.73%	16	11.57%	14.4	3.39%
								28	13.17%			15	3.56%
								29	13.61%			16	3.84%
												17	4.12%
												18	4.41%

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Allele Specific Stutter Filters – Yellow

TH01		vWA		D21S11				D7S820		D5S818		TPOX	
Allele	BS	Allele	BS	Allele	BS	Allele	BS	Allele	BS	Allele	BS	Allele	BS
3	3.23%	10	1.52%	23.2	6.45%	31.1	10.05%	5	2.11%	5	2.30%	4	0.86%
4	1.70%	11	2.71%	23.3	6.50%	31.2	9.13%	5.2	2.29%	6	3.05%	5	1.40%
5	2.26%	12	3.90%	24	6.82%	31.3	10.15%	6	3.01%	7	3.80%	6	1.95%
5.3	3.42%	13	5.08%	24.2	6.91%	32	10.46%	6.3	3.29%	8	4.56%	7	2.50%
6	2.82%	14	6.27%	24.3	6.95%	32.1	10.51%	7	3.92%	9	5.31%	7.1	2.55%
6.1	3.49%	15	7.46%	25	7.27%	32.2	9.21%	7.1	4.01%	10	6.07%	7.3	2.66%
6.3	3.50%	15.2	7.70%	25.2	7.36%	32.3	10.60%	7.3	4.20%	10.1	6.14%	8	3.04%
7	3.38%	16	8.65%	25.3	7.41%	33	10.92%	8	4.83%	11	6.82%	9	3.59%
7.1	3.57%	16.1	8.77%	26	7.73%	33.1	10.97%	8.1	4.92%	11.1	6.89%	10	4.13%
7.3	3.58%	17	9.84%	26.2	7.82%	33.2	10.50%	8.2	5.01%	12	7.57%	10.1	4.19%
8	3.93%	18	11.03%	27	8.19%	33.3	11.06%	8.3	5.10%	12.1	7.65%	10.3	4.30%
8.3	2.26%	18.2	11.27%	27.1	8.23%	34	11.38%	9	5.74%	12.3	7.80%	11	4.68%
9	4.49%	18.3	11.39%	27.2	8.28%	34.1	11.42%	9.1	5.83%	13	8.33%	12	5.22%
9.1	3.73%	19	12.22%	28	7.71%	34.2	11.47%	9.2	5.92%	14	9.08%	13	5.77%
9.3	2.82%	20	13.41%	28.1	8.69%	34.3	11.51%	9.3	6.01%	15	9.83%	14	6.31%
10	5.05%	21	14.60%	28.2	8.73%	35	11.83%	10	6.65%	16	10.59%	15	6.86%
10.3	2.82%	22	15.79%	28.3	8.78%	35.1	11.88%	10.1	6.74%	17	11.34%	16	7.41%
11	5.61%	23	16.98%	29	9.16%	35.2	11.92%	10.3	6.92%	18	12.10%		
13.3	3.93%	24	18.17%	29.1	9.14%	36	12.29%	11	7.55%	19	12.85%		
		25	19.36%	29.2	9.19%	36.1	12.33%	11.1	7.65%				
				29.3	9.23%	36.2	12.38%	11.2	7.74%				
				30	9.90%	37	12.74%	11.3	7.83%				
				30.1	9.60%	37.2	12.83%	12	8.46%				
				30.2	8.28%	38	13.20%	12.1	8.55%				
				30.3	9.69%	38.2	13.29%	12.3	8.74%				
				31	10.01%	39	13.65%	13	9.37%				
								13.1	9.46%				
								14	10.28%				
								14.1	10.37%				
								15	11.19%				
								16	12.09%				

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Allele Specific Stutter Filters – Red

D8S1179		D12S391		D19S433		FGA				D22S1045		
Allele	BS	Allele	BS	Allele	BS	Allele	BS	Allele	BS	Allele	BS	FS
6	6.04%	13	5.08%	5.2	1.19%	12.2	2.40%	25.1	10.35%	6	0.00%	0.00%
7	6.43%	14	6.07%	6	1.84%	13	2.89%	25.2	10.41%	7	0.00%	0.67%
8	6.82%	15	5.53%	6.2	3.13%	14	3.51%	25.3	10.47%	8	1.04%	1.44%
9	7.22%	16	7.56%	7	2.65%	15	4.13%	26	10.90%	9	2.43%	2.22%
10	6.86%	17	10.09%	8	3.84%	16	4.74%	26.1	10.96%	10	3.82%	2.99%
11	8.00%	17.1	9.14%	8.2	3.62%	16.1	4.80%	26.2	11.02%	11	5.21%	3.77%
12	9.83%	17.3	6.58%	9	3.84%	16.2	4.87%	26.3	11.08%	12	6.60%	4.54%
12.3	8.51%	18	9.28%	9.2	4.43%	17	5.36%	27	11.52%	13	8.00%	5.32%
13	9.09%	18.1	10.13%	10	5.26%	17.2	5.48%	27.2	11.64%	14	9.39%	6.09%
13.2	8.86%	18.3	10.33%	10.2	5.25%	18	5.97%	27.3	11.70%	15	10.78%	6.87%
13.3	8.90%	19	11.20%	11	5.97%	18.2	6.10%	28	12.13%	16	12.17%	7.64%
14	8.08%	19.1	11.12%	11.1	5.26%	19	6.59%	28.2	12.25%	17	13.56%	8.42%
14.1	9.22%	19.3	11.32%	11.2	6.67%	19.1	6.65%	28.3	12.32%	18	14.95%	9.19%
15	8.82%	20	12.49%	12	6.67%	19.2	6.71%	29	12.75%	19	16.34%	9.97%
15.1	9.61%	20.1	12.11%	12.1	3.13%	19.3	6.77%	29.1	12.81%	20	17.73%	10.74%
15.3	9.69%	20.3	12.31%	12.2	7.38%	20	7.21%	29.2	12.87%			
16	9.70%	21	13.39%	13	7.38%	20.1	7.27%	30	13.36%			
17	10.36%	21.3	13.30%	13.1	7.60%	20.2	7.33%	30.2	13.49%			
18	10.75%	22	14.14%	13.2	8.09%	20.3	7.39%	31	13.98%			
19	11.14%	22.3	14.29%	14	8.09%	21	7.82%	31.2	14.10%			
20	11.53%	23	15.12%	14.1	8.41%	21.1	7.88%	32	14.59%			
		24	15.49%	14.2	8.80%	21.2	7.94%	32.2	14.72%			
		24.3	16.27%	14.3	8.57%	21.3	8.01%	33.2	15.33%			
		25	14.90%	15	8.80%	22	8.44%	34.2	15.95%			
		26	17.95%	15.2	9.51%	22.1	8.50%	41.2	20.26%			
		27	18.94%	16	9.51%	22.2	8.56%	42.2	20.88%			
				16.1	10.03%	22.3	8.62%	43.2	21.49%			
				16.2	10.22%	23	9.05%	44.2	22.11%			
				17	10.22%	23.1	9.11%	45.2	22.72%			
				17.2	10.57%	23.2	9.18%	46.2	23.34%			
				18	10.93%	23.3	9.24%	47.2	23.96%			
				18.1	11.65%	24	9.67%	48.2	24.57%			
				18.2	11.64%	24.1	9.73%	49.2	25.19%			
				19	12.38%	24.2	9.79%	50.2	25.80%			
				19.2	12.34%	24.3	9.85%	51.2	26.42%			
						25	10.28%					

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Stutter Information for the Fusion3500 panel in GeneMarker® v3.0.0

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Table 5: Locations without STRmix™ stutter modeling organized (a) by location and (b) by stutter type for STRmix™ and GeneMarker®. *There are no DBS filters in GeneMarker®. (X)-marked locations are NOT modeled by STRmix™. Note: All locations model back stutter and are not included in the tables.

(a) Stutter modeling by location

	D3S1358	D1S1656	D2S441	D10S1248	D13S317	Penta E
FS						
HBS						X
DBS*	X			X	X	X
	D16S539	D18S51	D2S1338	CSF1PO	Penta D	
FS				X	X	
HBS	X			X	X	
DBS*	X			X	X	
	TH01	vWA	D21S11	D7S820	D5S818	TPOX
FS	X					X
HBS		X	X		X	X
DBS*	X	X		X	X	X
	D8S1179	D12S391	D19S433	FGA	D22S1045	
FS						
HBS	X	X	X	X	X	
DBS*			X		X	

(b) Stutter modeling by stutter type

	FS	HBS	DBS*		FS	HBS	DBS*
D3S1358			X	TH01	X		X
D1S1656				vWA		X	X
D2S441				D21S11		X	
D10S1248			X	D7S820			X
D13S317			X	D5S818		X	X
Penta E		X	X	TPOX	X	X	X
D16S539		X	X	D8S1179		X	
D18S51				D12S391		X	
D2S1338				D19S433		X	X
CSF1PO	X	X	X	FGA		X	
Penta D	X	X	X	D22S1045		X	X

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Table 6: Methods for stutter modeling used by STRmix™ and GeneMarker® by location. For locations that use longest uninterrupted sequence (LUS) or Average, if value is not available, the allele regression line is then used. *There are no DBS filters in GeneMarker®.

Locus	Back Stutter	Forward Stutter	Half Back Stutter	Double Back Stutter*
D3S1358	Average	Average	Average	
D1S1656	LUS	Average	Allele Regression	Average
D2S441	Average	Average	Average	Average
D10S1248	Allele Regression	Average	Average	
D13S317	Allele Regression	Average	Average	
Penta E	Average	Average		
D16S539	Allele Regression	Average		
D18S51	Allele Regression	Average	Average	Average
D2S1338	Average	Average	Allele Regression	Allele Regression
CSF1PO	Allele Regression			
Penta D	Average			
TH01	LUS		Average	
vWA	Average	Average		
D21S11	Average	Average		Average
D7S820	Allele Regression	Average	Average	
D5S818	Allele Regression	Average		
TPOX	Average			
DYS391				
D8S1179	Average	Average		Average
D12S391	Allele Regression	Average		Allele Regression
D19S433	Average	Average		
FGA	Average	Average		Average
D22S1045	Allele Regression	Average		

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Table 7: Allele-specific stutter filters used in GeneMarker® analysis at NYC OCME. Values highlighted in blue show allele-specific averages. LUS assignments and values based on LUS calculations are highlighted in orange (D1S1656 and TH01).

D3S1358				D1S1656				D2S441				D10S1248				D13S317				Penta E				
Allele	BS	FS	HBS	Allele	LUS	BS	FS	HBS	Allele	BS	FS	HBS	Allele	BS	FS	HBS	Allele	BS	FS	HBS	Allele	BS	FS	HBS
8	3.15%	1.50%	2.34%	8	8	7.29%	6.12%	2.42%	8	8.01%	8.25%	2.25%	8	3.18%	3.68%	1.89%	5	1.47%	3.03%	3.34%	4	1.81%	7.13%	
9	3.94%	1.64%	2.37%	9	9	8.26%	6.09%	2.48%	9	7.95%	8.32%	2.43%	9	4.08%	3.84%	1.89%	6	2.20%	3.26%	3.40%	5	2.11%	1.00%	
10	4.74%	1.78%	2.41%	10	9.5	8.75%	6.06%	2.53%	9.1	3.58%	8.33%	2.44%	10	4.97%	4.00%	1.90%	7	2.94%	3.49%	3.45%	6	2.40%	7.17%	
11	5.54%	1.92%	2.44%	11	11	10.20%	12.44%	2.59%	10	5.99%	7.36%	0.77%	11	5.87%	4.17%	1.90%	7.1	3.02%	3.52%	3.46%	7	1.29%	7.18%	
12	6.33%	2.06%	2.47%	12	11.5	10.69%	3.91%	2.65%	10.1	7.89%	8.40%	2.62%	12	6.76%	7.02%	1.91%	8	3.68%	2.52%	3.15%	8	2.05%	7.20%	
13	7.13%	2.20%	2.50%	13	12	11.17%	8.86%	2.70%	11	8.02%	4.52%	1.21%	13	7.66%	2.69%	1.92%	8.1	3.76%	3.75%	3.51%	9	3.30%	7.22%	
14	7.57%	1.13%	2.54%	13.3	11	10.20%	5.96%	2.72%	11.3	1.97%	15.86%	2.83%	14	8.55%	5.87%	1.92%	9	4.42%	0.42%	2.96%	10	2.09%	1.76%	
14.3	8.17%	2.39%	2.55%	14	13.5	12.63%	5.24%	2.76%	12	11.11%	1.88%	2.95%	15	9.44%	4.00%	1.26%	10	5.16%	2.94%	3.04%	11	4.55%	7.25%	
15	8.48%	1.03%	1.82%	14.3	9	8.26%	5.93%	2.78%	12.3	7.78%	8.57%	3.00%	16	10.34%	6.25%	1.93%	11	5.90%	3.75%	3.51%	11.4	4.02%	7.26%	
15.1	8.80%	2.50%	2.57%	15	14	13.11%	2.75%	2.82%	13	4.17%	10.86%	3.12%	17	11.23%	0.91%	1.93%	12	6.64%	3.45%	3.86%	12	3.96%	5.47%	
15.2	8.88%	2.51%	2.57%	15.3	10.5	9.72%	7.00%	2.84%	13.1	7.73%	8.62%	3.14%	18	12.13%	5.30%	1.94%	12.3	6.86%	4.72%	3.75%	13	4.62%	7.28%	
15.3	8.96%	2.53%	2.58%	16	15.33	14.40%	3.57%	2.88%	13.3	7.72%	8.64%	3.18%	19	13.02%	5.46%	1.94%	13	7.37%	3.48%	3.81%	14	4.37%	0.96%	
16	10.06%	2.14%	4.48%	16.2		13.66%	5.88%	2.89%	14	7.00%	10.40%	6.49%					13.3	7.60%	4.95%	3.80%	14.2	4.85%	7.31%	
16.2	9.68%	2.66%	2.61%	16.3	11	10.20%	1.72%	2.89%	14.3	7.67%	8.71%	3.35%					14	8.11%	10.75%	4.22%	15	5.09%	1.02%	
17	10.31%	2.86%	3.36%	17	16	15.05%	2.00%	2.93%	15	4.92%	2.67%	3.47%					15	8.85%	2.00%	3.90%	15.2	5.15%	7.32%	
17.1	10.40%	2.78%	2.64%	17.1		14.09%	5.85%	2.94%	16	7.58%	8.84%	3.65%					16	9.59%	5.57%	3.95%	16	4.71%	7.34%	
17.2	10.48%	2.80%	2.64%	17.3	12	11.17%	6.63%	2.95%	17	7.53%	8.91%	3.82%					17	10.33%	5.80%	4.01%	16.4	5.51%	7.34%	
18	11.02%	3.46%	1.62%	18	17	16.02%	1.99%	2.99%													17	5.73%	1.14%	
18.1	11.19%	2.92%	2.67%	18.3	13	12.14%	1.94%	3.01%													17.4	5.80%	7.36%	
18.2	11.27%	2.94%	2.67%	19		15.00%	5.79%	3.05%													18	6.05%	27.09%	
18.3	11.35%	2.95%	2.67%	19.3	14	13.11%	1.18%	3.07%													19	5.94%	1.52%	
19	11.91%	3.05%	2.70%	20.3		15.63%	5.75%	3.12%													20	6.58%	7.40%	
20	12.71%	3.19%	2.73%	21		15.96%	5.73%	3.16%													21	8.09%	1.13%	
20.1	12.79%	3.21%	2.73%																		22	8.59%	7.44%	
21	13.51%	3.33%	2.76%																		23	7.34%	7.45%	
																					24	7.77%	7.47%	
																					25	8.07%	7.49%	

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Allele	BS	FS	HBS	Allele	BS	FS	HBS	Panel	BS	FS	HBS	Allele	BS	FS	HBS	Allele	BS	FS	HBS	Allele	BS	FS	HBS
4	2.54%	2.00%		7	4.05%	1.64%	1.55%	10	5.61%	10.21%	0.56%	5	2.40%			2.2	0.81%			18.1	11.95%	2.48%	1.18%
5	3.26%	2.15%		8	4.76%	1.72%	1.52%	11	6.09%	10.22%	0.66%	6	3.27%			3.2	1.05%			18.2	12.02%	2.48%	1.18%
6	3.98%	2.30%		9	5.48%	1.79%	1.49%	12	6.57%	10.23%	0.75%	7	4.14%			5	1.48%			19	12.59%	1.83%	0.68%
7	4.70%	2.45%		9.2	5.62%	1.81%	1.48%	13	7.04%	10.24%	0.85%	7.3	4.40%			6	1.71%			19.2	12.74%	2.56%	1.14%
8	5.42%	2.60%		10	6.19%	1.87%	1.45%	14	7.52%	10.25%	0.95%	8	5.00%			6.4	1.81%			20	13.30%	4.82%	1.11%
8.3	5.64%	2.64%		10.2	6.33%	1.88%	1.45%	15	8.00%	10.26%	1.05%	8.1	5.09%			7	1.95%			20.2	13.45%	2.63%	1.11%
9	6.15%	1.06%		11	6.90%	1.94%	1.42%	16	8.66%	0.73%	1.14%	8.3	5.27%			7.4	2.05%			21	14.02%	2.69%	1.08%
9.3	6.36%	2.79%		11.2	7.04%	1.96%	1.41%	17	7.30%	20.48%	1.24%	9	5.87%			8	2.65%			21.1	14.09%	2.70%	1.08%
10	6.87%	1.97%		12	7.61%	2.69%	2.30%	18	8.73%	10.29%	1.34%	9.1	5.96%			8.2	2.24%			21.2	14.16%	2.71%	1.07%
10.3	7.08%	2.94%		12.2	7.75%	2.03%	1.38%	18.3	9.57%	10.30%	1.37%	10	6.74%			9	1.45%			22	14.73%	3.84%	1.05%
11	7.59%	5.00%		12.3	7.82%	2.04%	1.37%	19	9.24%	2.80%	1.43%	10.1	6.83%			9.2	2.48%			22.2	14.87%	2.78%	1.04%
11.3	7.80%	3.09%		13	8.32%	1.61%	1.17%	19.3	10.04%	10.31%	1.46%	10.2	6.91%			9.4	2.52%			23	15.44%	2.84%	1.01%
12	8.31%	3.90%		13.1	8.39%	2.10%	1.35%	20	10.50%	11.77%	1.53%	10.3	7.00%			10	2.53%			23.2	15.58%	2.86%	1.01%
12.1	8.38%	3.21%		13.2	8.47%	2.11%	1.34%	21	11.58%	3.98%	1.63%	11	7.61%			11	2.32%			24	16.15%	2.92%	0.98%
12.2	8.45%	3.23%		13.3	8.54%	2.12%	1.34%	22	9.85%	4.80%	1.72%	11.1	7.69%			11.1	2.93%			24.2	16.29%	2.93%	0.97%
13	9.03%	2.87%		14	9.03%	1.29%	0.96%	22.2	11.42%	10.34%	1.74%	11.3	7.87%			11.2	2.95%			25	16.86%	2.99%	0.95%
13.3	9.24%	3.39%		14.2	9.18%	2.18%	1.31%	23	11.69%	2.12%	1.82%	12	8.47%			12	2.43%			26	17.57%	3.07%	0.91%
14	9.75%	1.99%		15	9.75%	1.43%	0.81%	23.2	11.90%	10.35%	1.84%	12.1	8.56%			12.1	3.17%			27	18.29%	3.14%	0.88%
15	10.47%	3.64%		15.2	9.89%	2.26%	1.28%	23.3	11.95%	10.35%	1.85%	12.3	8.73%			12.2	3.19%						
16	11.19%	3.79%		15.3	9.96%	2.27%	1.27%	24	13.02%	4.45%	1.92%	13	9.34%			13	2.70%						
				16	10.46%	1.53%	0.77%	24.2	12.38%	10.36%	1.94%	13.3	9.60%			13.4	3.47%						
				16.1	10.53%	2.33%	1.25%	25	13.30%	16.07%	2.01%	14	10.21%			14	4.26%						
				16.2	10.60%	2.33%	1.24%	26	16.31%	10.38%	2.11%	15	11.07%			14.1	3.64%						
				16.3	10.67%	2.34%	1.24%	27	13.71%	10.39%	2.21%	16	11.94%			14.4	3.71%						
				17	11.17%	1.92%	0.85%	28	14.18%	10.40%	2.31%					15	4.38%						
				17.2	11.31%	2.41%	1.21%	29	14.66%	10.41%	2.40%					16	4.09%						
				17.3	11.38%	2.42%	1.21%									17	4.33%						
				18	11.88%	3.34%	0.69%									18	4.57%						

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Allele	BS	FS	HBS	Allele	BS	FS	HBS	Allele	BS	FS	HBS	Allele	BS	FS	HBS	Allele	BS	FS	HBS	Allele	BS	FS	HBS
6	7.00%	2.87%		13	5.59%	3.40%		5.2	4.09%	16.66%		12.2	5.32%	4.79%		6	0.61%	9.37%		25	10.50%	7.63%	
7	7.50%	2.89%		14	6.74%	3.49%		6	4.68%	16.00%		13	5.69%	5.03%		7	2.08%	10.10%		25.1	11.24%	8.76%	
8	5.10%	2.91%		15	7.89%	3.58%		6.2	4.83%	15.83%		14	6.15%	5.34%		8	3.56%	10.83%		25.2	11.28%	8.79%	
9	8.51%	2.93%		16	9.05%	3.67%		7	5.43%	15.16%		15	6.60%	5.65%		9	5.03%	11.55%		25.3	11.33%	8.82%	
10	7.44%	2.15%		17	10.20%	2.00%		8	6.18%	14.33%		16	7.06%	5.96%		10	6.51%	12.28%		26	9.23%	9.03%	
11	11.98%	2.96%		17.1	10.32%	3.77%		8.2	6.33%	14.16%		16.1	7.11%	5.99%		11	7.98%	10.02%		26.1	11.69%	9.07%	
12	10.54%	4.18%		17.3	10.55%	3.79%		9	6.92%	13.49%		16.2	7.15%	6.02%		12	9.45%	16.28%		26.2	11.74%	9.10%	
12.3	10.16%	2.98%		18	11.35%	4.84%		9.2	7.07%	13.33%		17	7.52%	6.26%		13	10.93%	14.47%		26.3	11.79%	9.13%	
13	9.94%	3.32%		18.1	11.47%	3.86%		10	7.67%	12.66%		17.2	7.61%	6.33%		14	12.40%	7.11%		27	12.11%	9.34%	
13.2	10.61%	3.00%		18.3	11.70%	3.88%		10.2	7.82%	12.49%		18	7.98%	6.57%		15	13.88%	18.23%		27.2	12.20%	9.40%	
13.3	10.66%	3.00%		19	12.51%	3.94%		11	4.13%	11.82%		18.2	8.07%	6.63%		16	15.35%	15.12%		27.3	12.24%	9.43%	
14	10.56%	3.00%		19.1	12.62%	3.95%		11.1	8.49%	11.74%		19	6.62%	6.88%		17	16.82%	17.87%		28	12.57%	9.65%	
14.1	11.06%	3.02%		19.3	12.85%	3.97%		11.2	8.56%	11.66%		19.1	8.48%	6.91%		18	18.30%	18.12%		28.2	12.66%	9.71%	
15	10.44%	2.45%		20	13.66%	2.70%		12	10.62%	10.99%		19.2	8.53%	6.94%		19	19.77%	18.85%		28.3	12.70%	9.74%	
15.1	11.56%	3.03%		20.1	13.77%	4.04%		12.1	9.24%	10.91%		19.3	8.58%	6.97%		20	21.25%	19.58%		29	13.02%	9.96%	
15.3	11.66%	3.04%		20.3	14.00%	4.05%		12.2	9.31%	10.82%		20	8.05%	6.03%						29.1	13.07%	9.99%	
16	13.53%	2.81%		21	14.81%	1.38%		13	8.78%	23.50%		20.1	8.94%	7.22%						29.2	13.12%	10.02%	
17	12.47%	3.78%		21.3	15.16%	4.14%		13.1	9.98%	10.07%		20.2	7.70%	7.25%						30	13.48%	10.27%	
18	13.91%	1.35%		22	15.96%	2.66%		13.2	10.06%	9.99%		20.3	9.03%	7.28%						30.2	13.57%	10.33%	
19	13.51%	3.10%		22.3	16.31%	4.23%		14	9.47%	4.62%		21	8.87%	7.50%						31	13.94%	10.57%	
20	14.01%	3.12%		23	17.12%	1.70%		14.1	10.73%	9.24%		21.1	9.40%	7.53%						31.2	14.03%	10.64%	
				24	18.27%	10.35%		14.2	13.80%	6.21%		21.2	9.45%	7.56%						32	14.40%	10.88%	
				24.3	18.61%	4.41%		14.3	10.88%	9.07%		21.3	9.49%	7.59%						32.2	14.49%	10.94%	
				25	19.42%	4.47%		15	10.86%	1.85%		22	9.87%	3.11%						33.2	14.95%	11.25%	
				26	20.57%	4.56%		15.2	11.50%	3.96%		22.1	9.86%	7.83%						34.2	15.41%	11.56%	
				27	21.73%	4.65%		16	13.54%	3.94%		22.2	10.87%	7.87%						41.2	18.62%	13.71%	
								16.1	12.22%	7.57%		22.3	9.95%	7.90%						42.2	19.08%	14.02%	
								16.2	9.43%	3.15%		23	8.40%	7.26%						43.2	19.54%	14.33%	
								17	12.89%	6.82%		23.1	10.32%	8.14%						44.2	19.99%	14.64%	
								17.2	10.06%	6.65%		23.2	10.36%	8.17%						45.2	20.45%	14.95%	
								18	13.64%	5.98%		23.3	10.41%	8.20%						46.2	20.91%	15.25%	
								18.1	13.71%	5.90%		24	12.86%	6.65%						47.2	21.37%	15.56%	
								18.2	13.79%	5.82%		24.1	10.78%	8.45%						48.2	21.83%	15.87%	
								19	14.38%	5.15%		24.2	10.82%	8.48%						49.2	22.29%	16.18%	
								19.2	14.53%	4.98%		24.3	10.87%	8.51%						50.2	22.75%	16.48%	
																				51.2	23.21%	16.79%	

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References

- 1 Office of the Chief Medical Examiner- NYC PowerPlex® Fusion System Amplification Kit on the Applied Biosystems 3130xl Genetic Analyzer using GeneMarker® HID Analysis Software Validation Report (August 2016).
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- 3 NYC OCME Updating Stutter Parameters for Fusion 3500xL Data (April 2026).