

羊毛的初级加工

Early Stage Processing

完整的循环 – 数据的搜集与分析
Closing the Circle – data collection and analysis

托尼 塔克
Tony Turk

缩写解释

Acronyms

- **COF** – 地面干净整洁
COF – clean on floor
- **NV** – 精短毛价值
NV – Noil Value
- **POB** – 断裂部位
POB – Point of Break
- **FFD** – 新鲜纤维密度 – 梳毛机表面 **gms/m²**
FFD – fresh fibre density – gms/m² on carding surface
- **SDSR** – 道夫与锡林之间的速度比
SDSR- ratio of speed between doffer and swift

正确了解加工

Process Understanding

- **为什么正确了解加工如此重要？**
Why is understanding the process so important
- **为什么各种参数如此重要？**
What are the factors that are important
- **为什么必须搜集数据？**
What data should we collect
- **如何分析数据？**
How do we analyse data

地面整洁度与落毛率

COF 500 NV 250

CALC. T/N GMS 638										AV. OF FIGS BELOW				
91% 579 31.7 8.9 24 194 219										###				
TN1														
NO	TOP	NOIL	TOT	KG/HR	ROM%	NC	PC	TOT	+NC	+PC	GMS	ROM%	GMS	
											+ -	+ -	/M	
1	575	4	579	34.5	0.7	2	178	180	-23	-16	0	8.2	23	
2	570	9	579	34.2	1.6	4	180	184	-20	-14	0	7.3	23	
3	565	14	579	33.9	2.4	6	182	188	-18	-13	0	6.5	23	
4	560	19	579	33.6	3.3	8	183	192	-16	-11	0	5.6	23	
5	555	24	579	33.3	4.1	11	185	196	-14	-10	0	4.7	23	
6	550	29	579	33.0	5.0	13	186	200	-11	-8	0	3.9	23	
7	545	34	579	32.7	5.9	16	188	204	-9	-6	0	3.0	23	
8	540	39	579	32.4	6.7	18	190	208	-6	-5	0	2.2	23	
9	535	44	579	32.1	7.6	21	192	212	-4	-3	0	1.3	23	
10	530	49	579	31.8	8.5	23	194	217	-1	-1	0	0.4	23	
11	525	54	579	31.5	9.3	26	195	221	1	1	0	0.4	23	
12	520	59	579	31.2	10.2	28	197	226	4	3	0	1.3	23	
13	515	64	579	30.9	11.1	31	199	230	7	5	0	2.2	23	
14	510	69	579	30.6	11.9	34	201	235	9	7	0	3.0	23	
15	505	74	579	30.3	12.8	37	203	240	12	9	0	3.9	23	
16	500	79	579	30.0	13.6	40	205	245	15	11	0	4.7	23	
17	495	84	579	29.7	14.5	42	207	250	18	13	0	5.6	23	
18	490	89	579	29.4	15.4	45	209	255	21	15	0	6.5	23	
19	485	94	579	29.1	16.2	48	211	260	24	17	0	7.3	23	
20	480	99	579	28.8	17.1	52	214	265	27	19	0	8.2	23	

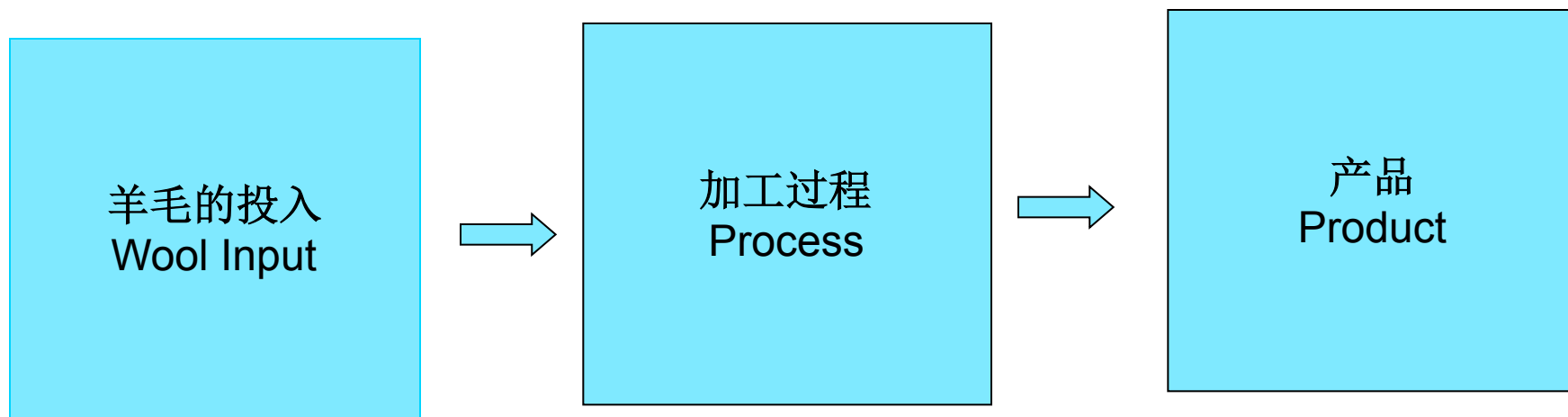
地面整洁度与落毛率

COF 700 NV 250

CALC. TN GMS 638										AV. OF FIGS BELOW				
91% 579 31.7 8.9 44 194 238										###				
TN 1														
NO	TOP	NO IL	TOT	KG/HR	ROM %	NC	PC	TOT	+NC	+PC	GMS	ROM %	GMS	
												+ -	+ -	M
1	575	4	579	34.5	0.7	3	178	182	-41	-16	0	8.2	23	
2	570	9	579	34.2	1.6	7	180	187	-37	-14	0	7.3	23	
3	565	14	579	33.9	2.4	11	182	193	-33	-13	0	6.5	23	
4	560	19	579	33.6	3.3	15	183	198	-29	-11	0	5.6	23	
5	555	24	579	33.3	4.1	19	185	204	-24	-10	0	4.7	23	
6	550	29	579	33.0	5.0	24	186	210	-20	-8	0	3.9	23	
7	545	34	579	32.7	5.9	28	188	216	-16	-6	0	3.0	23	
8	540	39	579	32.4	6.7	33	190	222	-11	-5	0	2.2	23	
9	535	44	579	32.1	7.6	37	192	229	-7	-3	0	1.3	23	
10	530	49	579	31.8	8.5	42	194	235	-2	-1	0	0.4	23	
11	525	54	579	31.5	9.3	46	195	242	2	1	0	0.4	23	
12	520	59	579	31.2	10.2	51	197	248	7	3	0	1.3	23	
13	515	64	579	30.9	11.1	56	199	255	12	5	0	2.2	23	
14	510	69	579	30.6	11.9	61	201	262	17	7	0	3.0	23	
15	505	74	579	30.3	12.8	66	203	269	22	9	0	3.9	23	
16	500	79	579	30.0	13.6	71	205	276	27	11	0	4.7	23	
17	495	84	579	29.7	14.5	76	207	284	32	13	0	5.6	23	
18	490	89	579	29.4	15.4	82	209	291	38	15	0	6.5	23	
19	485	94	579	29.1	16.2	87	211	299	43	17	0	7.3	23	
20	480	99	579	28.8	17.1	93	214	306	49	19	0	8.2	23	

加工图示

Process Map



原毛 – 重要的因素

Greasy Wool – Important factors

- | | |
|-----------|----------------------------------|
| ■ 细度 | Micron |
| ■ 毛丛长度 | Staple Length |
| ■ 毛丛强度 | Staple Strength |
| ■ 中部断裂 | POB |
| ■ 洗净率 | Yield – |
| ■ 草杂含量与种类 | Vegetable Matter and Type |

加工 - 洗毛过程

Processing - Scouring

- 开松 - 洗毛之前与洗毛之后
Opening - pre and post scour
- 温度
Temperature
- 搅动
Agitation
- 洗涤剂
Detergent
- 质量保证/控制
QA/QC

梳毛加工

Processing Carding

- 新鲜纤维密度 FFD
- 锡林与道夫的速比 SDSR
- 除草能力 Burr removal
- 回潮控制 Regain
- 和毛油的添加 Oil
- 质量保证/管理 QA/QC

数据分析举例

Example of Data for Analysis

COMPLETED_ DATE	Year	PRODN													
		PRED		BUYERS_		VEG		PRED	ACTUAL	ACTUAL	PRED	ACT	ACTL	PRED	FORMLA
		MICRON	Int Micron	LENGTH	Percent	YIELD	MICRON	LENGTH	YIELD	YIELD	RMNE	RMNE	LENGTH	Len Diff	
3/10/1995	1995	19.47	19	67.2	1.13	71.5	19.8	67.9	71.5	68.8	14.2	9.5	66	1.9	
23/10/1995	1995	19.42	19	67.1	0.65	73.9	19.8	66.2	73.9	68.3	7.8	8.5	67.4	-1.2	
12/1/1996	1996	19.38	19	67.2	0.65	75.8	19.7	70.4	75.8	71.1	9.8	8.5	67.1	3.3	
22/2/1996	1996	19.35	19	67.3	0.55	71.8	19.5	70.4	71.8	68.7	11.7	8.5	66.4	4	
24/5/1996	1996	19.22	19	67.1	0.7	71.5	19.5	69.1	71.5	67	13.1	8.5	66.1	3	
23/7/1996	1996	19.28	19	65	0.85	69.5	19.5	72.1	69.5	48.5	0	10	65.4	6.7	
2/9/1996	1996	19.24	19	67.7	0.52	73.1	19.5	64.2	73.1	69.1	14.4	8.5	64	0.2	
10/10/1996	1996	19.21	19	68.6	0.65	75.9	19.5	70.8	75.9	72.4	12	8.5	68.1	2.7	
6/11/1997	1997	19.3	19	70.4	0.69	74.3	19.9	70.6	74.3	70.7	8.3	8.5	69.7	0.9	
8/12/1997	1997	19.23	19	66.5	0.57	72.6	19.7	70	72.6	68.8	8.9	8.5	67	3	
29/5/1998	1998	19.28	19	66.9	1.13	74	19.6	68.6	74	72.1	13.5	9.5	64.9	3.7	
29/5/1998	1998	19.27	19	66.4	1.13	74.3	19.6	68.6	74.3	64	0	8.5	64.7	3.9	
28/10/1997	1997	19.23	19	65.9	1.43	70.9	19.6	68.2	70.9	68.8	8.5	9.5	65.9	2.3	
3/12/1997	1997	19.17	19	66.4	1.24	71.4	19.5	67.6	71.4	69.2	10.4	9.5	66.2	1.4	
23/12/1997	1997	19.3	19	64.9	1.3	69.8	19.7	63.4	69.8	67.8	9.7	9.5	65.1	-1.7	
12/1/1998	1998	19.26	19	64.4	1.3	68.3	19.7	63.4	68.3	66.6	11.2	9.5	64.5	-1.1	
20/2/1998	1998	19.26	19	66	0.95	73.4	19.5	68.4	73.4	71	8.7	8.5	66.8	1.6	
17/3/1998	1998	19.26	19	65.7	1.08	73.8	19.5	69.3	73.8	70.6	12.2	9.5	66.2	3.1	
15/4/1998	1998	19.3	19	69.8	0.72	76.2	19.4	69.4	76.2	72.6	7.7	8.5	66.8	2.6	
20/7/1998	1998	19.37	19	66.2	0.86	73.2	19.7	67	73.2	66.3	7.4	8.5	66.6	0.4	
24/9/1998	1998	19.29	19	63.5	2.04	67.5	19.8	64.7	67.5	65.3	11.5	10.5	63.8	0.9	
12/10/1998	1998	19.24	19	63.1	2.15	65.6	19.6	63.1	65.6	64.8	13.9	10.5	63.6	-0.5	
17/5/1994	1994	20.31	20	71	0.88	72.7	20.4	69.2	72.7	71.3	8.6	8	66.9	2.3	
12/12/1994	1994	19.84	20	70.4	0.49	72.9	20	63.2	72.9	55.8	0	8	68.3	-5.1	
14/2/1995	1995	20.32	20	70	0.46	75	20.2	70.3	75	72.9	6.7	8	68.2	2.1	
27/5/1995	1995	20.47	20	70	0.75	75.9	20.6	74.8	75.9	72.6	7.6	8	68.6	6.2	
5/6/1995	1995	20.45	20	70	0.55	77	20.7	72.6	77	73.9	7.4	8	69.2	3.4	
18/8/1995	1995	20.41	20	65.6	0.82	72.4	20.8	69.6	72.4	66	12	8	66.3	3.3	
21/8/1995	1995	19.54	20	68.2	1.09	74.1	19.8	71	74.1	69.4	10.2	9.5	68	3	
3/10/1995	1995	20.36	20	63.6	1.16	70.7	20.7	68.7	70.7	67.4	12.5	9.5	65.4	3.3	
6/10/1995	1995	20.4	20	68.6	0.45	74	20.5	68.5	74	69.1	5.7	8	68.1	0.4	
23/10/1995	1995	20.27	20	67.1	1.26	66	20.7	68.5	66	64.6	11.5	9	67.6	0.9	
16/1/1996	1996	19.99	20	69.5	0.81	73.9	20.2	74.8	73.9	74.5	12.5	8	69	5.8	
23/2/1996	1996	20.09	20	70.1	0.55	75.3	20.4	76	75.3	73.6	8.6	8	70.8	5.2	

纱线支数分析数据的举例

Example of Data for Analysis cont

Percent TST	Paid KG/H COMB	NPK Avg	POB Mid	Stap Len	Percent PCS	NEP AIM	VEG AIM
98	16.6	42	43	82	14	40	5
100	15	42	42	85	21	40	5
97	18.1	46	47	83	11	40	5
100	15.3	40	43	85	15	40	5
88	18.1	44	45	82	0	40	5
100	15.6	45	47	81	0	40	5
100	14.9	41	48	81	0	40	5
100	18.6	44	43	86	0	40	5
100	15.7	43	36	89	1	40	5
100	14.5	41	36	85	15	40	5
100	13.6	45	48	80	0	40	5
100	13.6	46	47	79	0	40	5
100	19.1	42	42	83	4	45	20
97	19.1	40	40	85	25	45	20
89	21.8	39	40	84	26	45	20
100	19	37	46	85	21	45	20
98	19.6	41	37	86	25	40	20
93	19.8	42	47	85	24	40	20
100	19.2	44	54	84	0	40	20
100	17.5	45	50	84	5	40	20
78	11.4	37	39	83	31	40	20
92	18.4	37	41	84	33	40	20
100	20.8	44	51	83	0	40	5
100	29.9	45	33	86	0	40	5
100	23	46	59	85	0	40	5
100	21.9	44	45	83	0	40	5
100	22.4	45	59	88	0	40	5
100	18.6	43	42	80	20	40	5
100	19.3	42	38	86	8	40	5
100	13.3	45	39	77	19	40	5
100	23.7	43	43	83	0	40	5
100	13.7	41	21	84	19	40	5
100	18.5	44	51	88	17	40	5
100	17.4	44	43	89	15	40	5

精梳喂入速率

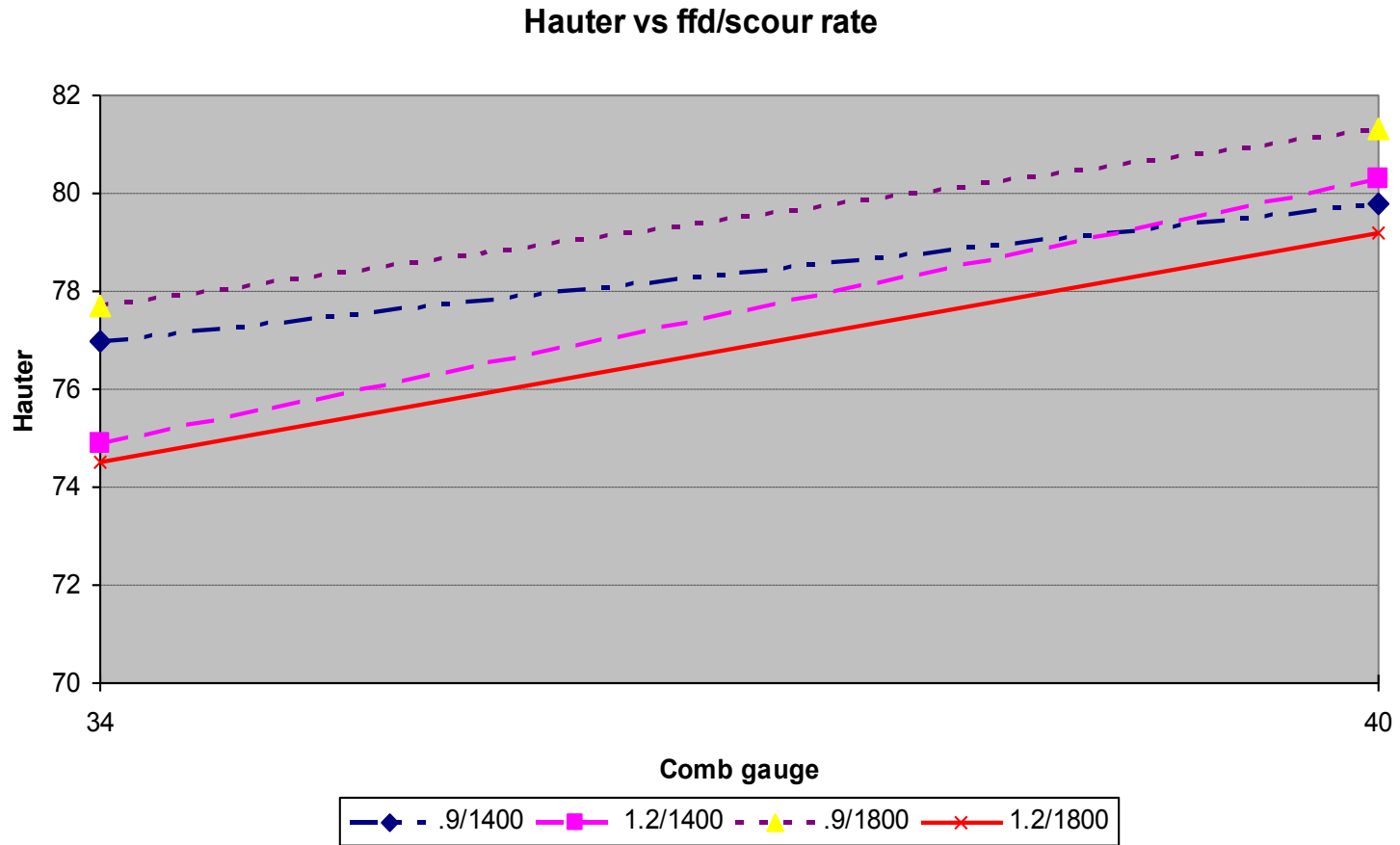
Combing Input Rates

		Combing Input Rates (feed/sliver weight))							
Veg Aim	Micron	Burr 1	1.5	2	3	4	5	6	7
15	<19.9	17/20							
	20-20.9	16/23							
	21-21.9	16/24							
	22-25	15/24							
	25+	14/30	14/30						
20	<19.9	16/22	17/21	17/21	17/21				
	20-22.9	16/23	17/24	17/23	17/23				
	23-24.9	14/24	14/24	14/23	14/23	14/23			
	25-27.9	14/25	14/25	14/25	14/25				
	28+	13/28	13/28	13/28	13/28				
30	<19.9	16/23	16/23	16/22	17/21				
	20-22.9	16/23	16/23	16/23	16/23				
	23-24.9	15/23	15/23	15/23	15/23	15/23	15/23		
	25-27.9	14/29	14/29	14/29	14/29	14/29	14/29	14/29	
	28+	14/30	14/30	14/30	14/30	14/30	14/30	14/30	
40	<19.9	16/24	16/24	16/24	17/23	17/22	17/20		
	20-20.9	15/24	15/24	15/24	17/23	17/22	17/20		
	21-21.9	15/25	15/25	15/25	15/25	15/25	16/25	16/25	
	22-23.9	14/26	14/26	14/26	14/26	14/26	14/22	14/22	
	24-25.9	14/26	14/26	14/26	14/26	14/26	14/26	14/26	14/26
	26+	13/29	13/29	13/29	13/29	13/29	13/29	13/29	13/29
45	<19.9	16/24	16/24	16/24	17/23	17/22	17/20		
	20-20.9	15/24	15/24	15/24	17/23	17/22	17/20		
	21-21.9	15/25	15/25	15/25	15/25	15/25	16/25	16/25	
	22-23.9	14/26	14/26	14/26	14/26	14/26	14/22	14/22	
	24-25	14/26	14/26	14/26	14/26	14/26	14/26	14/26	14/26
	25+	13/29	13/29	13/29	13/29	13/29	13/29	13/29	13/29

All comb loads are 20 ends
First Figure is Feed Cog
Second Figure is sliver weight.

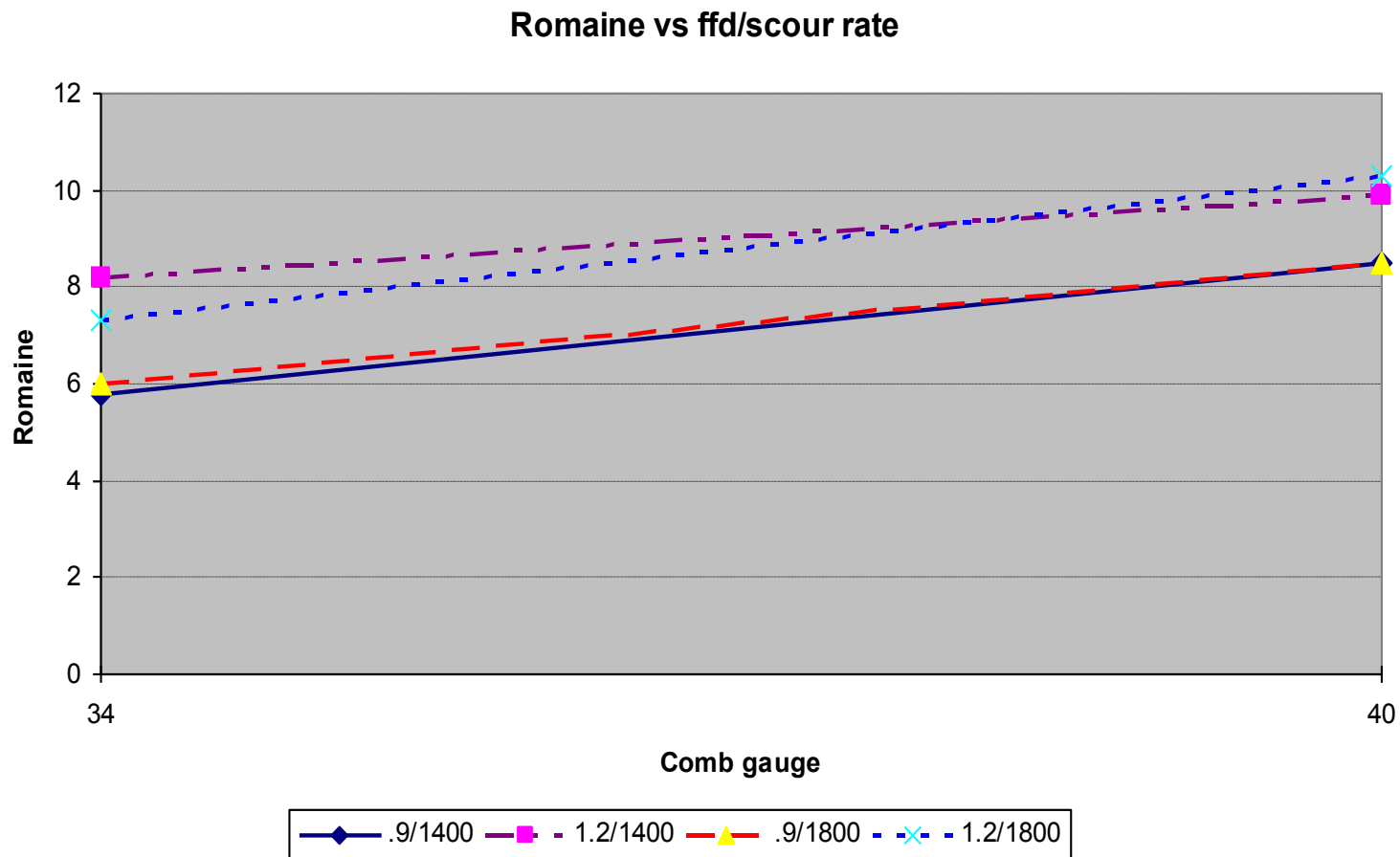
豪特与新鲜纤维密度/洗毛速率的对比

Hauter vs ffd/scour rate



落毛率与新鲜纤维密度/洗毛速率的对比

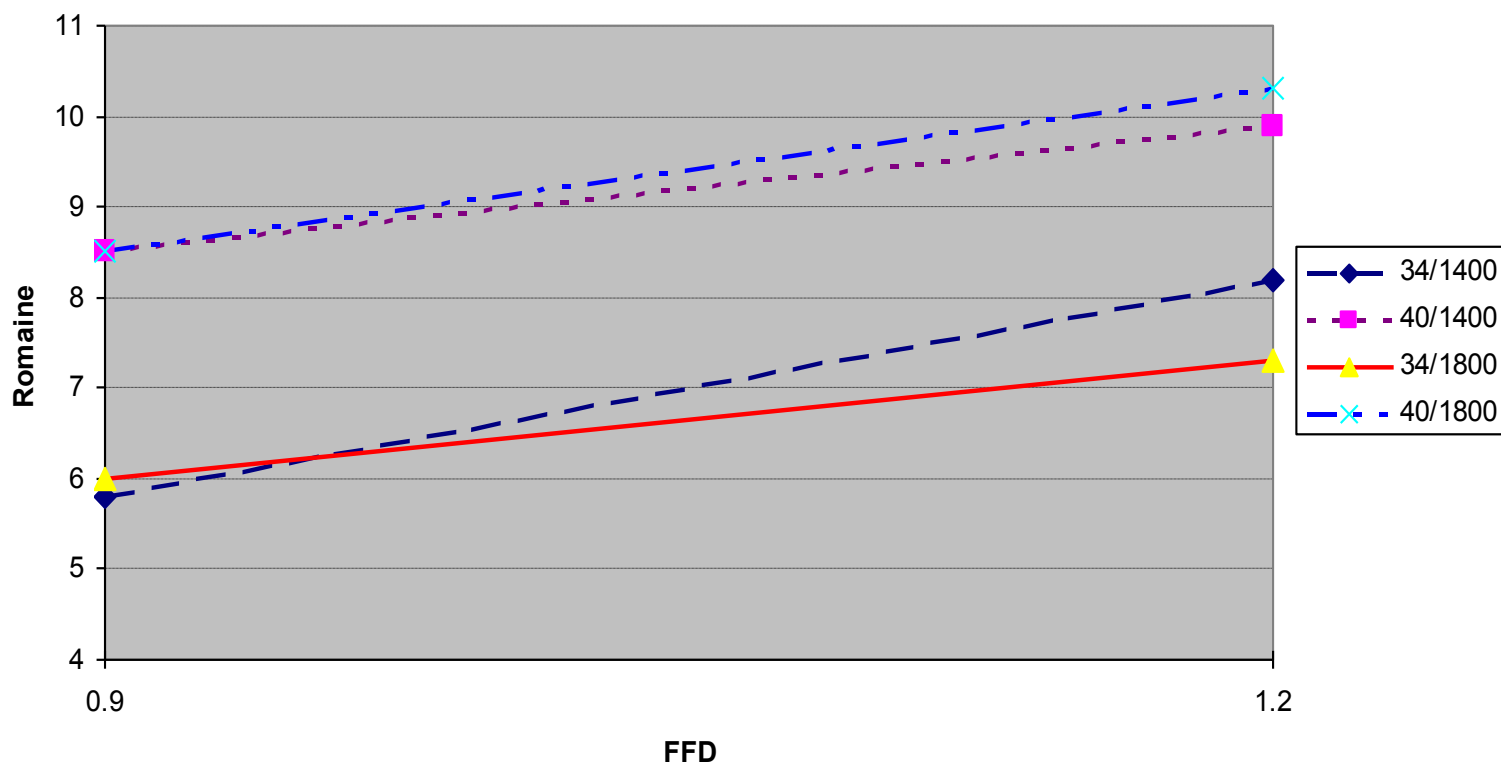
Romaine vs ffd/scour rate



落毛率与新鲜纤维密度/精梳隔距/洗毛速率的对比

Romaine vs ffd/comb gaug/scour rate

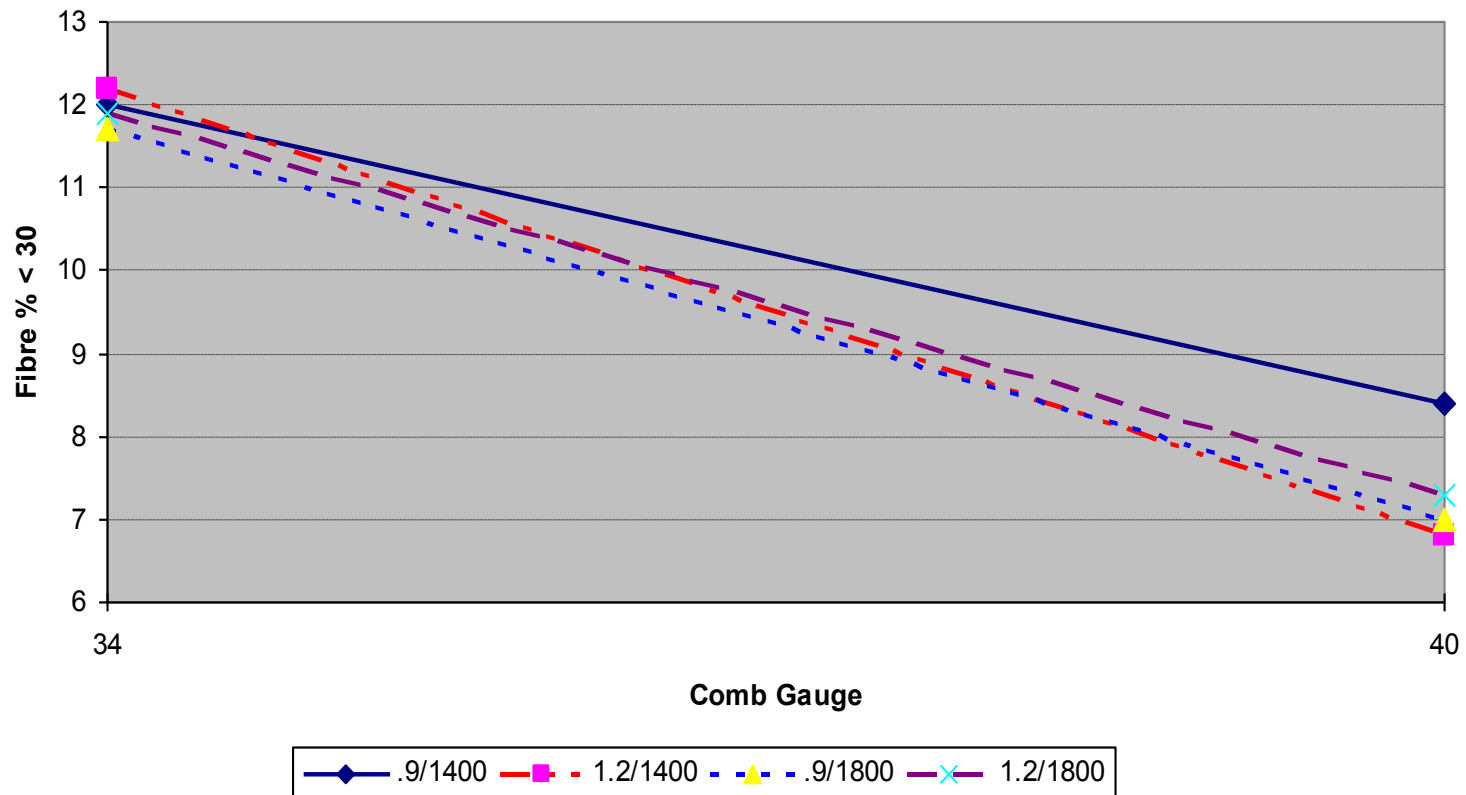
Romaine vs FFD/comb gauge/scour rate



精梳隔距与小于30%纤维的比较

Percentage fibre <30% vs comb gauge

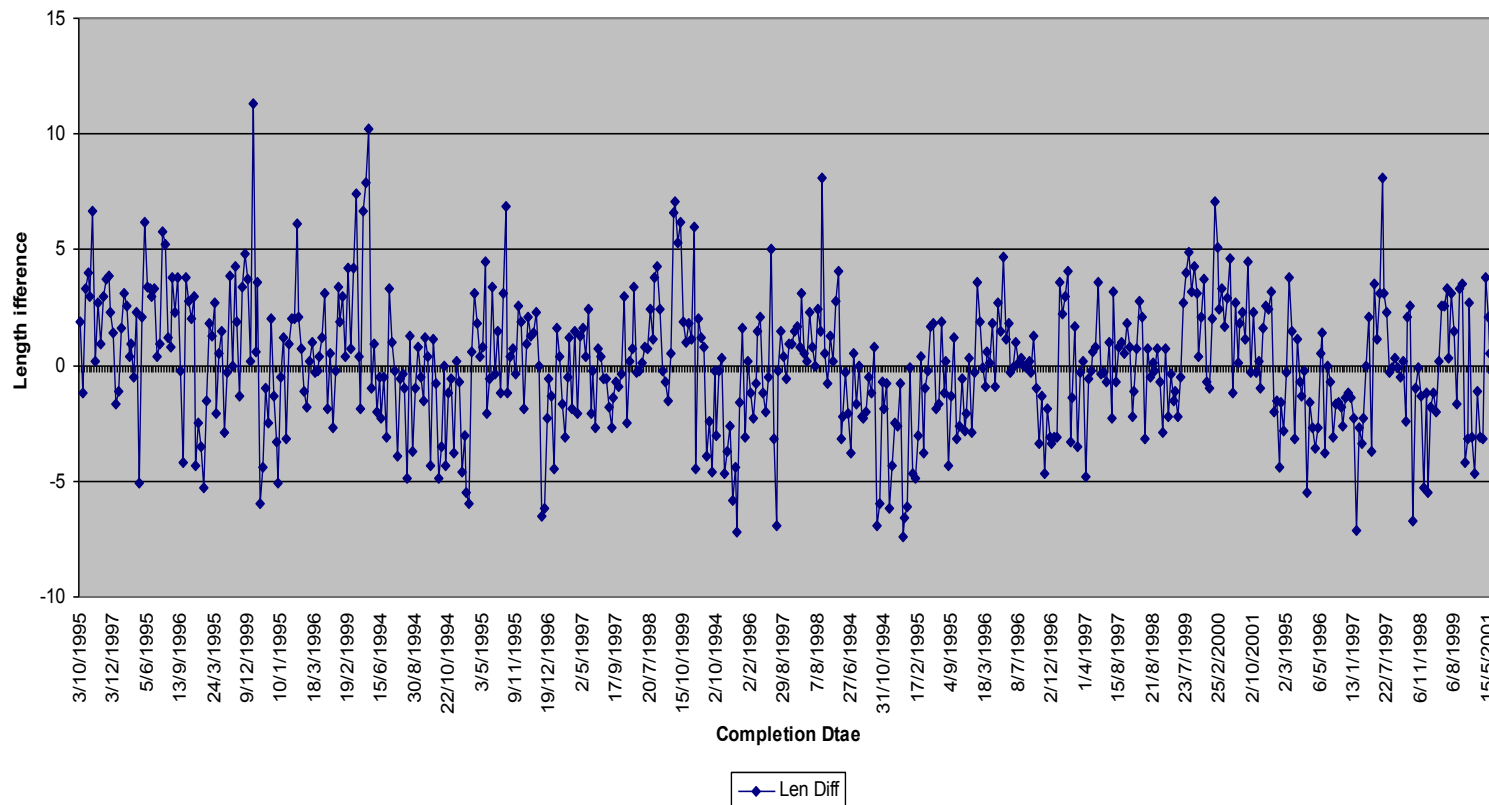
Percentage fibre <30% vs comb gauge



所有被检测羊毛的全部数据 1994 - 2001

All Data 100% tested wool 1994-2001

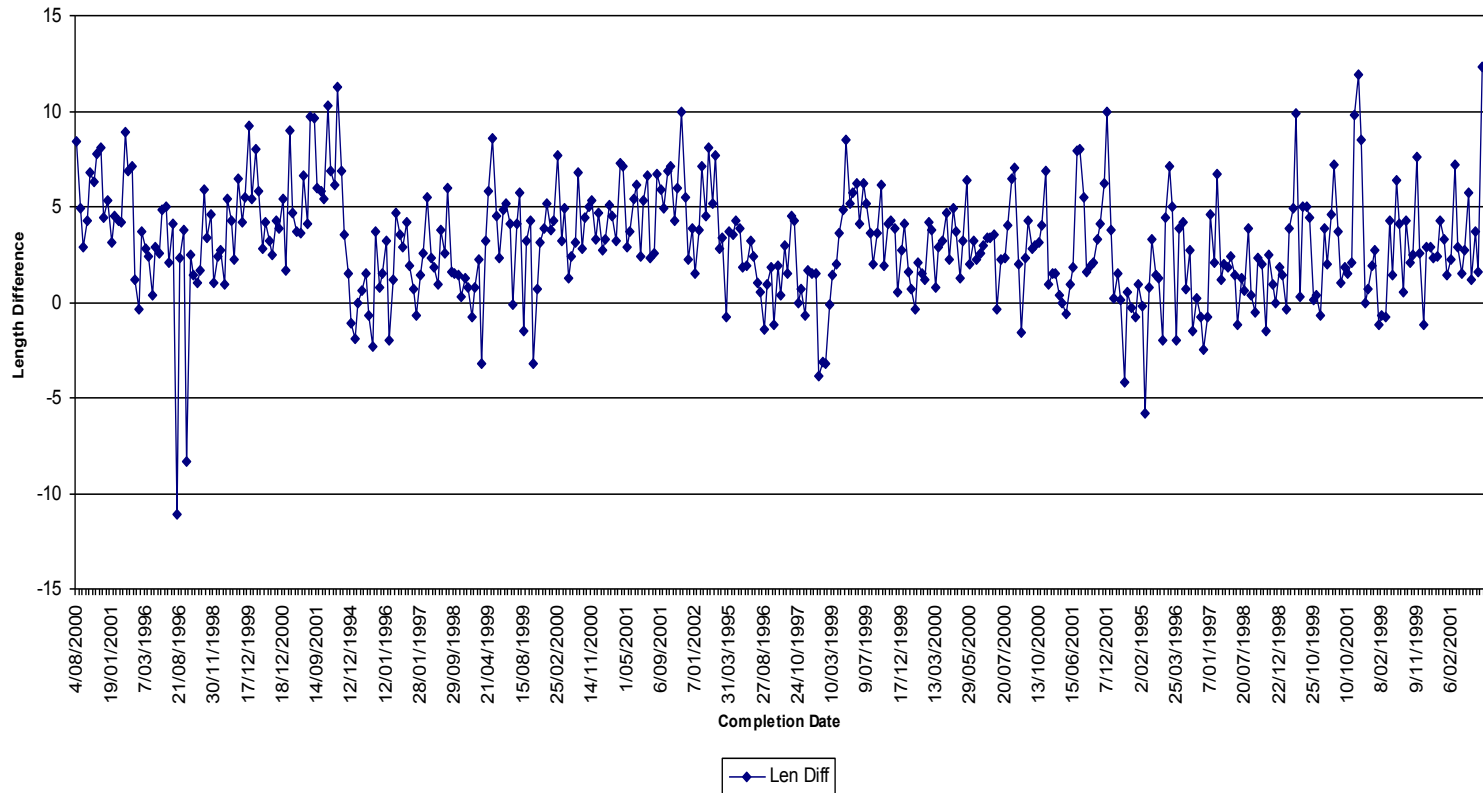
Actual length - TEAM H by Micron



一个质量组的数据 - 全部正身套毛

Data for One Quality Group - all fleece

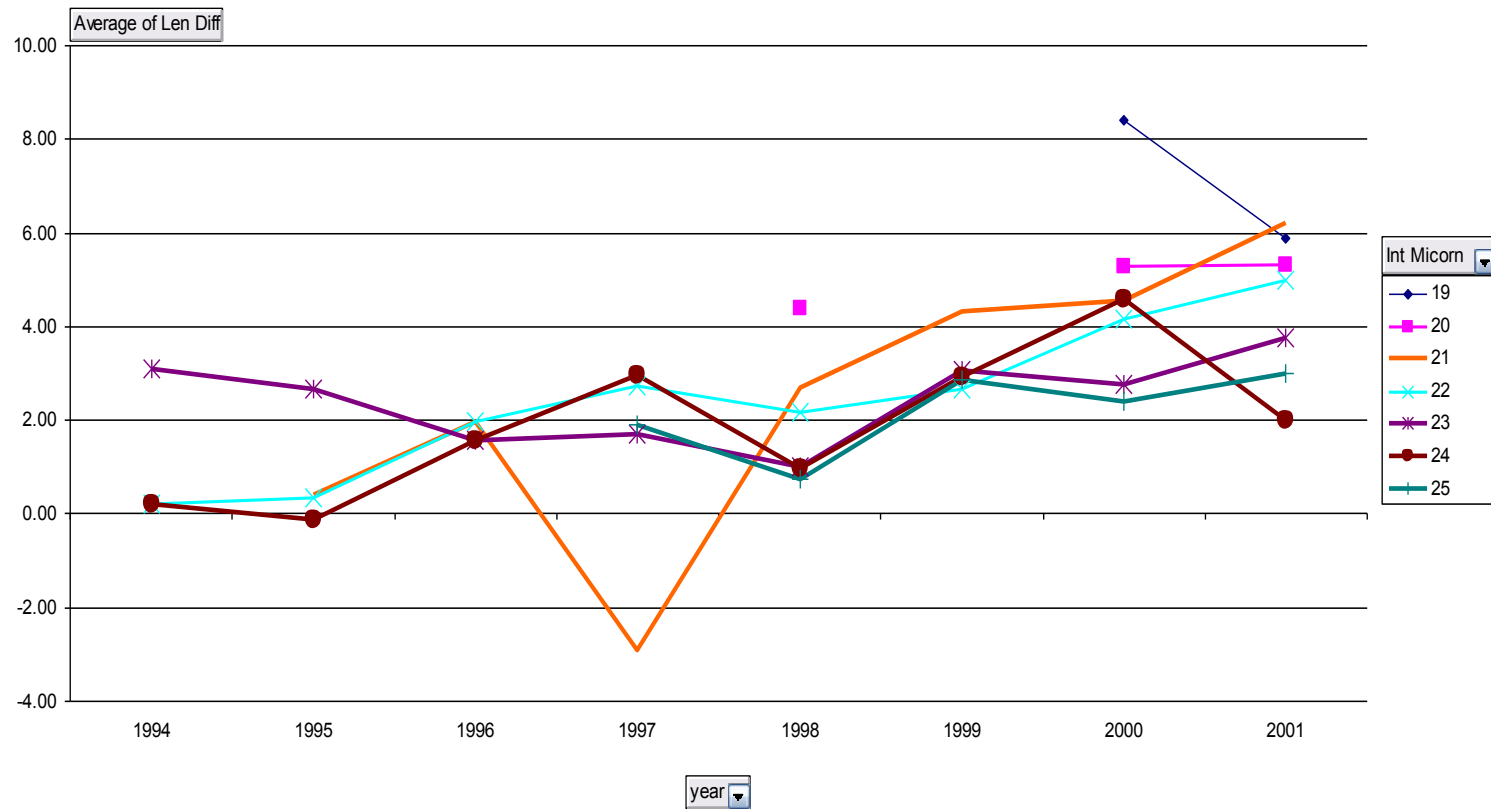
Length Difference 20_15



一个质量组的数据 - 全部正身套毛

Data for One Quality Group all fleece by Micron

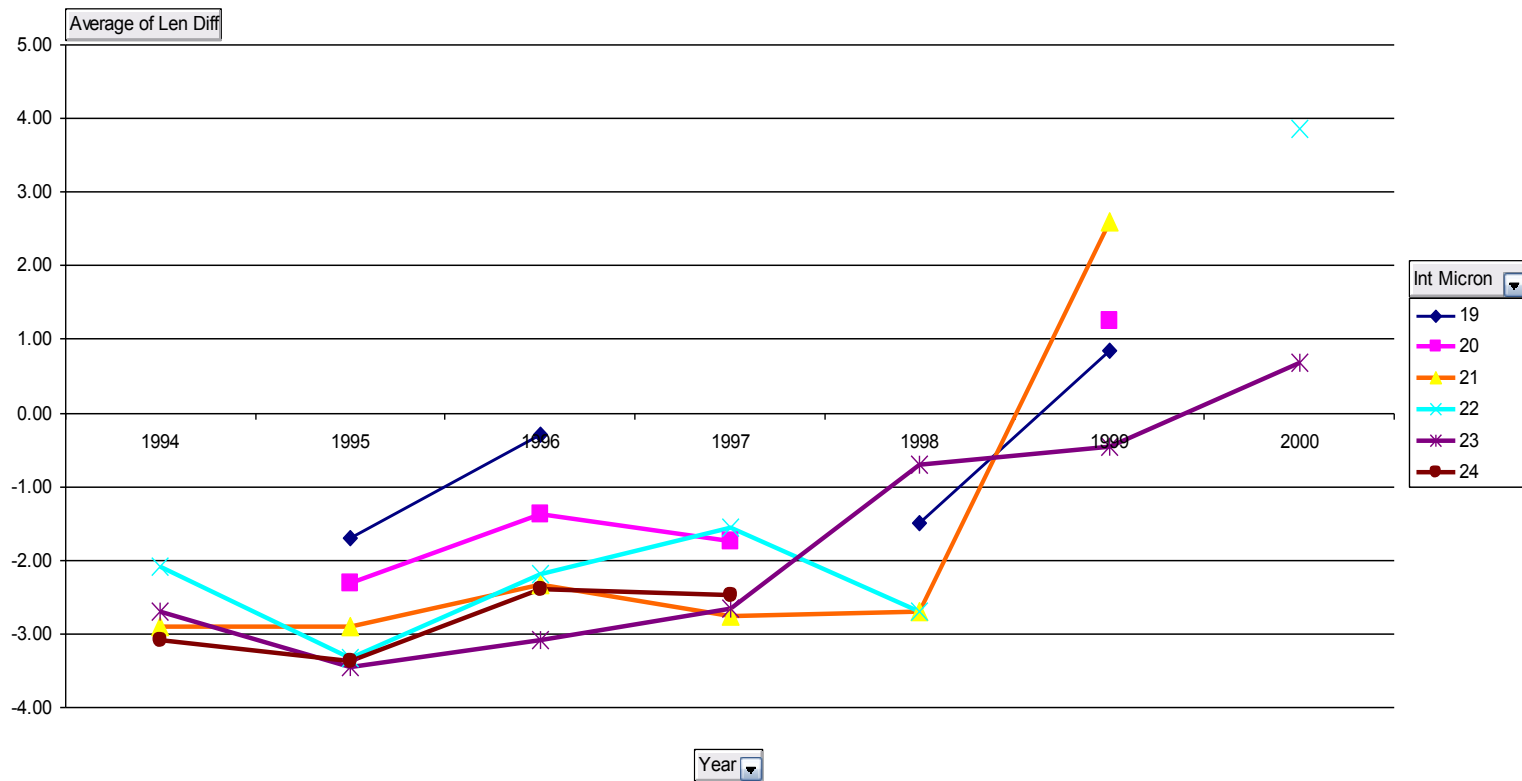
Drop Page Fields Here



一个质量组的数据30-40%边坎毛

Data for Quality Group 30-40% pieces

Drop Page Fields Here



精梳喂入速率

Combing Input Rates

Combing Input Rates (feed/sliver weight)

Veg Aim	Micron	Burr 1	1.5	2	3	4	5	6	7
15	<19.9	17/20							
	20-20.9	16/23							
	21-21.9	16/24							
	22-25	15/24							
	25+	14/30	14/30						
20	<19.9	16/22	17/21	17/21	17/21				
	20-22.9	16/23	17/24	17/23	17/23				
	23-24.9	14/24	14/24	14/23	14/23	14/23			
	25-27.9	14/25	14/25	14/25	14/25				
	28+	13/28	13/28	13/28	13/28				
30	<19.9	16/23	16/23	16/22	17/21				
	20-22.9	16/23	16/23	16/23	16/23				
	23-24.9	15/23	15/23	15/23	15/23	15/23	15/23		
	25-27.9	14/29	14/29	14/29	14/29	14/29	14/29	14/29	
	28+	14/30	14/30	14/30	14/30	14/30	14/30	14/30	
40	<19.9	16/24	16/24	16/24	17/23	17/22	17/20		
	20-20.9	15/24	15/24	15/24	17/23	17/22	17/20		
	21-21.9	15/25	15/25	15/25	15/25	15/25	16/25	16/25	
	22-23.9	14/26	14/26	14/26	14/26	14/26	14/22	14/22	14/22
	24-25.9	14/26	14/26	14/26	14/26	14/26	14/26	14/26	14/26
	26+	13/29	13/29	13/29	13/29	13/29	13/29	13/29	13/29
45	<19.9	16/24	16/24	16/24	17/23	17/22	17/20		
	20-20.9	15/24	15/24	15/24	17/23	17/22	17/20		
	21-21.9	15/25	15/25	15/25	15/25	15/25	16/25	16/25	16/25
	22-23.9	14/26	14/26	14/26	14/26	14/26	14/22	14/22	14/22
	24-25	14/26	14/26	14/26	14/26	14/26	14/26	14/26	14/26
	25+	13/29	13/29	13/29	13/29	13/29	13/29	13/29	13/29

All comb loads are 20 ends
First Figure is Feed Cog
Second Figure is sliver weight.