Dielectric®

Antenna Model: **TUM-LP-C3-1/3M-1**

Proposal Number:	**C-71938-**
Date:	**19-Aug-22**
Customer:	**SBG**
Location:	**Sapphire Valley, NC**

Electrical Specifications

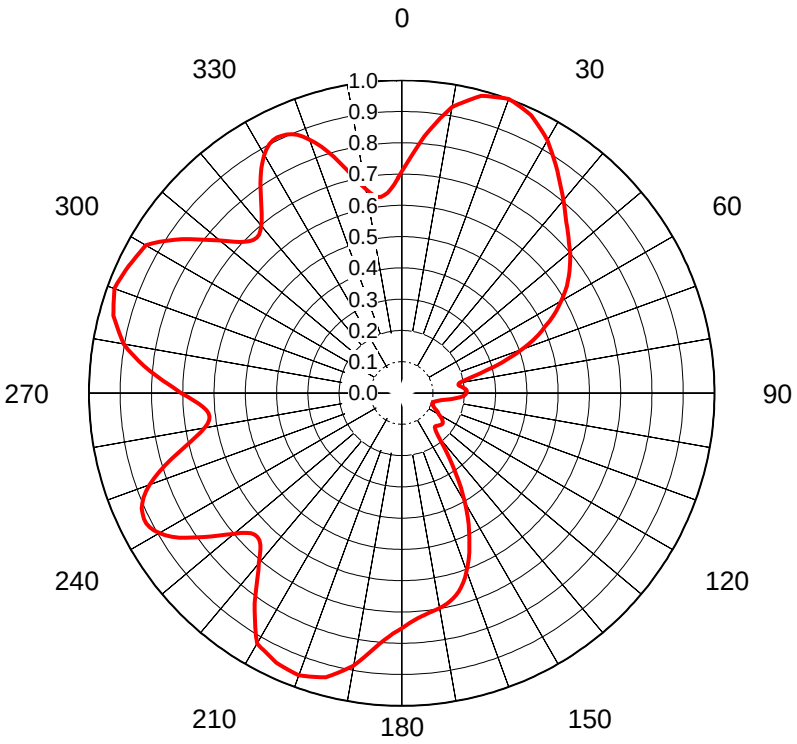
Polarization:	**Elliptical**		
Azimuth Pattern:	**Directional**		
Antenna Input:	**1-5/8"**	**50 Ohm**	**EIA/DCA**
VSWR:	Channel	**1.15 : 1**	
Bandwidth:			
Rated Input Power:	**5 kW**	**(6.99 dBk)**	**Maximum Average Power**

Mechanical Specifications

Mounting:	**Side Mounted**			
Environmental Protection:	**Panel Cover**			
Height:	**3.2 ft (1m)**			
Weight:	**150 lb (0.1t)**	Excludes Mounts		
Effective Projected Area:	**14.9 ft² (1.4m²)**	**TIA-222-G**	Basic Wind Speed:	**90 m/h (144.8 km/h)**

Channel Specifications

Call	CH	Freq	Hpol ERP	Vpol ERP	TPO	Peak Main Lobe Hpol Gain	Peak Main Lobe Vpol Gain	Peak at Horizontal Hpol Gain	Peak at Horizontal Vpol Gain
W34EP	21	515 MHz	5.00 kW (6.99 dBk)	1.25 kW (0.97 dBk)	1.95 kW (2.91 dBk)	3.33 (5.22dB)	0.83 -(0.80dB)	3.33 (5.22dB)	0.83 -(0.80dB)

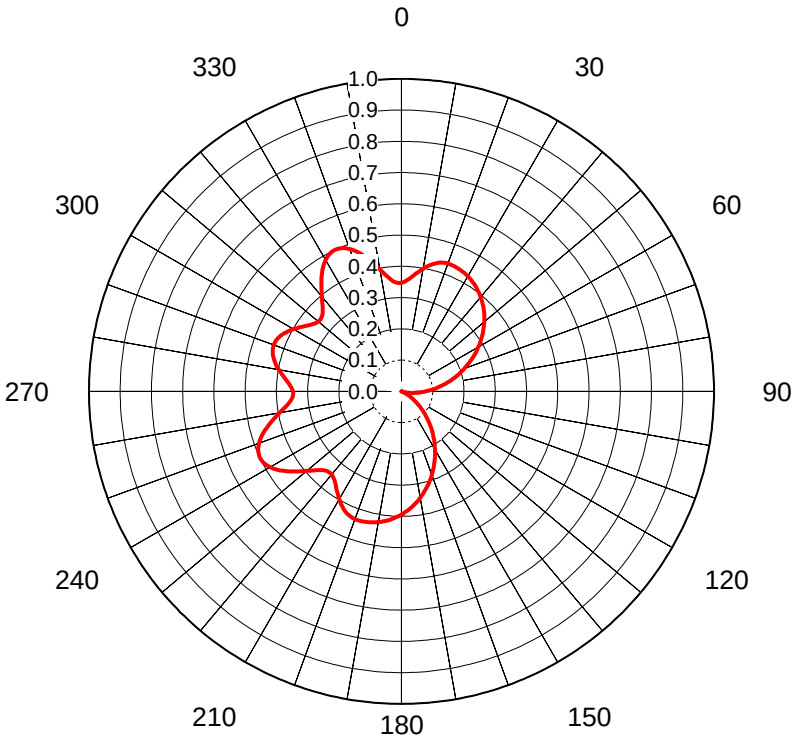


AZIMUTH PATTERN
Horizontal Polarization

In Free Space

Proposal No.	**C-71938-**
Date	**19-Aug-22**
Call Letters	**W34EP**
Channel	**21**
Frequency	**515 MHz**
Antenna Type	**TUM-LP-C3-1/3M-1**
Gain	**1.97 (2.95dB)**
	Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.709	36	0.854	72	0.362	108	0.104	144	0.261	180	0.753	216	0.794	252	0.815	288	0.968	324	0.765
1	0.729	37	0.841	73	0.336	109	0.103	145	0.283	181	0.760	217	0.771	253	0.791	289	0.973	325	0.785
2	0.750	38	0.828	74	0.309	110	0.102	146	0.308	182	0.769	218	0.748	254	0.766	290	0.977	326	0.807
3	0.774	39	0.816	75	0.282	111	0.105	147	0.333	183	0.780	219	0.728	255	0.740	291	0.974	327	0.828
4	0.798	40	0.805	76	0.257	112	0.108	148	0.358	184	0.791	220	0.711	256	0.716	292	0.972	328	0.847
5	0.823	41	0.792	77	0.234	113	0.111	149	0.381	185	0.804	221	0.691	257	0.693	293	0.969	329	0.864
6	0.845	42	0.780	78	0.214	114	0.114	150	0.403	186	0.819	222	0.675	258	0.672	294	0.966	330	0.878
7	0.866	43	0.769	79	0.198	115	0.116	151	0.427	187	0.835	223	0.663	259	0.654	295	0.962	331	0.891
8	0.887	44	0.758	80	0.187	116	0.122	152	0.450	188	0.851	224	0.655	260	0.640	296	0.958	332	0.901
9	0.908	45	0.748	81	0.183	117	0.127	153	0.472	189	0.868	225	0.652	261	0.628	297	0.955	333	0.907
10	0.929	46	0.738	82	0.183	118	0.131	154	0.492	190	0.886	226	0.652	262	0.621	298	0.951	334	0.909
11	0.940	47	0.729	83	0.186	119	0.134	155	0.511	191	0.897	227	0.658	263	0.619	299	0.948	335	0.908
12	0.951	48	0.720	84	0.191	120	0.137	156	0.533	192	0.908	228	0.668	264	0.621	300	0.945	336	0.905
13	0.962	49	0.711	85	0.197	121	0.143	157	0.553	193	0.919	229	0.682	265	0.627	301	0.929	337	0.899
14	0.973	50	0.703	86	0.202	122	0.149	158	0.573	194	0.930	230	0.700	266	0.637	302	0.912	338	0.890
15	0.984	51	0.693	87	0.206	123	0.154	159	0.590	195	0.941	231	0.719	267	0.650	303	0.894	339	0.878
16	0.987	52	0.684	88	0.208	124	0.157	160	0.607	196	0.945	232	0.739	268	0.666	304	0.876	340	0.862
17	0.991	53	0.673	89	0.209	125	0.160	161	0.623	197	0.949	233	0.761	269	0.685	305	0.858	341	0.846
18	0.994	54	0.663	90	0.207	126	0.162	162	0.637	198	0.953	234	0.784	270	0.705	306	0.837	342	0.827
19	0.997	55	0.652	91	0.205	127	0.163	163	0.650	199	0.957	235	0.806	271	0.724	307	0.816	343	0.807
20	1.000	56	0.641	92	0.201	128	0.163	164	0.660	200	0.961	236	0.828	272	0.744	308	0.796	344	0.785
21	0.997	57	0.630	93	0.195	129	0.161	165	0.669	201	0.959	237	0.849	273	0.765	309	0.777	345	0.762
22	0.993	58	0.617	94	0.187	130	0.159	166	0.677	202	0.957	238	0.867	274	0.786	310	0.760	346	0.739
23	0.989	59	0.604	95	0.178	131	0.158	167	0.684	203	0.955	239	0.882	275	0.808	311	0.740	347	0.717
24	0.984	60	0.589	96	0.169	132	0.156	168	0.690	204	0.953	240	0.894	276	0.828	312	0.723	348	0.697
25	0.979	61	0.575	97	0.159	133	0.154	169	0.694	205	0.951	241	0.906	277	0.848	313	0.708	349	0.678
26	0.970	62	0.560	98	0.149	134	0.152	170	0.698	206	0.945	242	0.913	278	0.867	314	0.696	350	0.663
27	0.961	63	0.543	99	0.139	135	0.151	171	0.702	207	0.940	243	0.917	279	0.885	315	0.687	351	0.648
28	0.952	64	0.526	100	0.128	136	0.152	172	0.705	208	0.935	244	0.917	280	0.902	316	0.681	352	0.637
29	0.942	65	0.507	101	0.124	137	0.156	173	0.709	209	0.930	245	0.914	281	0.912	317	0.679	353	0.632
30	0.933	66	0.491	102	0.120	138	0.163	174	0.713	210	0.925	246	0.910	282	0.923	318	0.682	354	0.631
31	0.919	67	0.473	103	0.115	139	0.172	175	0.717	211	0.905	247	0.901	283	0.933	319	0.688	355	0.635
32	0.906	68	0.454	104	0.111	140	0.183	176	0.722	212	0.884	248	0.890	284	0.944	320	0.699	356	0.642
33	0.893	69	0.433	105	0.107	141	0.200	177	0.729	213	0.862	249	0.875	285	0.954	321	0.712	357	0.653
34	0.880	70	0.410	106	0.106	142	0.219	178	0.736	214	0.841	250	0.857	286	0.959	322	0.728	358	0.668
35	0.867	71	0.387	107	0.105	143	0.240	179	0.744	215	0.819	251	0.837	287	0.964	323	0.746	359	0.687



AZIMUTH PATTERN
Vertical Polarization

In Free Space

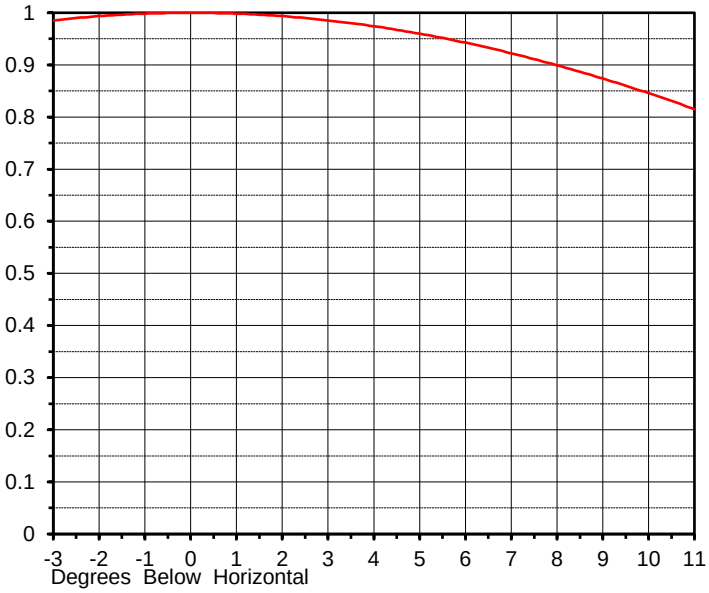
Proposal No.	**C-71938-**
Date	**19-Aug-22**
Call Letters	**W34EP**
Channel	**21**
Frequency	**515 MHz**
Antenna Type	**TUM-LP-C3-1/3M-1**
Gain	**2.01 (3.04dB)**
	Calculated

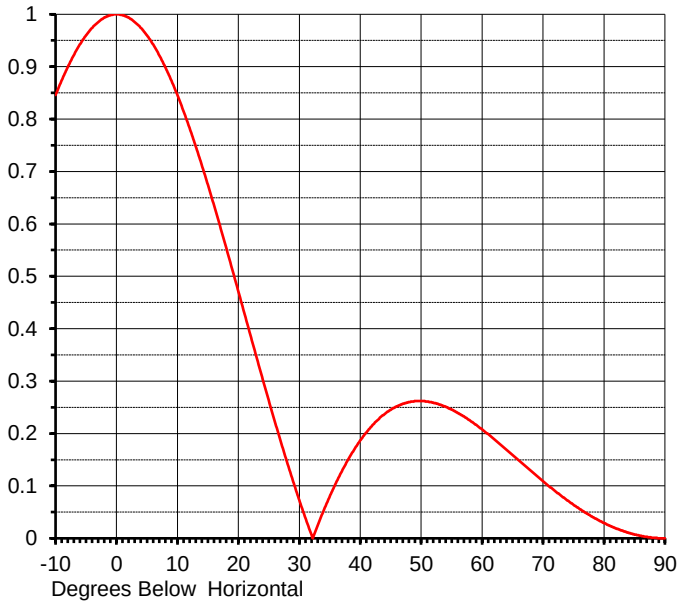
Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.347	36	0.409	72	0.200	108	0.002	144	0.172	180	0.394	216	0.361	252	0.472	288	0.433	324	0.436
1	0.349	37	0.405	73	0.193	109	0.001	145	0.179	181	0.398	217	0.356	253	0.464	289	0.435	325	0.446
2	0.352	38	0.402	74	0.186	110	0.000	146	0.186	182	0.402	218	0.352	254	0.455	290	0.435	326	0.455
3	0.356	39	0.398	75	0.179	111	0.001	147	0.193	183	0.405	219	0.349	255	0.446	291	0.435	327	0.464
4	0.361	40	0.394	76	0.172	112	0.002	148	0.200	184	0.409	220	0.347	256	0.436	292	0.433	328	0.472
5	0.367	41	0.390	77	0.165	113	0.004	149	0.207	185	0.412	221	0.347	257	0.426	293	0.431	329	0.479
6	0.373	42	0.386	78	0.158	114	0.006	150	0.215	186	0.415	222	0.347	258	0.416	294	0.428	330	0.485
7	0.379	43	0.381	79	0.151	115	0.009	151	0.222	187	0.418	223	0.349	259	0.406	295	0.424	331	0.490
8	0.386	44	0.377	80	0.144	116	0.012	152	0.229	188	0.420	224	0.352	260	0.396	296	0.420	332	0.495
9	0.392	45	0.372	81	0.137	117	0.015	153	0.236	189	0.423	225	0.357	261	0.386	297	0.415	333	0.498
10	0.398	46	0.367	82	0.130	118	0.019	154	0.243	190	0.425	226	0.363	262	0.378	298	0.410	334	0.499
11	0.404	47	0.362	83	0.123	119	0.022	155	0.250	191	0.427	227	0.370	263	0.370	299	0.404	335	0.500
12	0.410	48	0.357	84	0.116	120	0.026	156	0.257	192	0.429	228	0.378	264	0.363	300	0.398	336	0.499
13	0.415	49	0.351	85	0.110	121	0.031	157	0.264	193	0.430	229	0.386	265	0.357	301	0.392	337	0.498
14	0.420	50	0.346	86	0.103	122	0.035	158	0.271	194	0.431	230	0.396	266	0.352	302	0.386	338	0.495
15	0.424	51	0.340	87	0.097	123	0.040	159	0.277	195	0.433	231	0.406	267	0.349	303	0.379	339	0.490
16	0.428	52	0.334	88	0.090	124	0.045	160	0.284	196	0.434	232	0.416	268	0.347	304	0.373	340	0.485
17	0.431	53	0.328	89	0.084	125	0.050	161	0.291	197	0.434	233	0.426	269	0.347	305	0.367	341	0.479
18	0.433	54	0.322	90	0.078	126	0.055	162	0.297	198	0.435	234	0.436	270	0.347	306	0.361	342	0.472
19	0.435	55	0.316	91	0.072	127	0.061	163	0.304	199	0.435	235	0.446	271	0.349	307	0.356	343	0.464
20	0.435	56	0.310	92	0.066	128	0.066	164	0.310	200	0.435	236	0.455	272	0.352	308	0.352	344	0.455
21	0.435	57	0.304	93	0.061	129	0.072	165	0.316	201	0.435	237	0.464	273	0.356	309	0.349	345	0.446
22	0.435	58	0.297	94	0.055	130	0.078	166	0.322	202	0.433	238	0.472	274	0.361	310	0.347	346	0.436
23	0.434	59	0.291	95	0.050	131	0.084	167	0.328	203	0.431	239	0.479	275	0.367	311	0.347	347	0.426
24	0.434	60	0.284	96	0.045	132	0.090	168	0.334	204	0.428	240	0.485	276	0.373	312	0.347	348	0.416
25	0.433	61	0.277	97	0.040	133	0.097	169	0.340	205	0.424	241	0.490	277	0.379	313	0.349	349	0.406
26	0.431	62	0.271	98	0.035	134	0.103	170	0.346	206	0.420	242	0.495	278	0.386	314	0.352	350	0.396
27	0.430	63	0.264	99	0.031	135	0.110	171	0.351	207	0.415	243	0.498	279	0.392	315	0.357	351	0.386
28	0.429	64	0.257	100	0.026	136	0.116	172	0.357	208	0.410	244	0.499	280	0.398	316	0.363	352	0.378
29	0.427	65	0.250	101	0.022	137	0.123	173	0.362	209	0.404	245	0.500	281	0.404	317	0.370	353	0.370
30	0.425	66	0.243	102	0.019	138	0.130	174	0.367	210	0.398	246	0.499	282	0.410	318	0.378	354	0.363
31	0.423	67	0.236	103	0.015	139	0.137	175	0.372	211	0.392	247	0.498	283	0.415	319	0.386	355	0.357
32	0.420	68	0.229	104	0.012	140	0.144	176	0.377	212	0.386	248	0.495	284	0.420	320	0.396	356	0.352
33	0.418	69	0.222	105	0.009	141	0.151	177	0.381	213	0.379	249	0.490	285	0.424	321	0.406	357	0.349
34	0.415	70	0.215	106	0.006	142	0.158	178	0.386	214	0.373	250	0.485	286	0.428	322	0.416	358	0.347
35	0.412	71	0.207	107	0.004	143	0.165	179	0.390	215	0.367	251	0.479	287	0.431	323	0.426	359	0.347

ELEVATION PATTERN

Proposal No.	**C-71938-**
Date	**19-Aug-22**
Call Letters	**W34EP**
Channel	**21**
Frequency	**515 MHz**
Antenna Type	**TUM-LP-C3-1/3M-1**

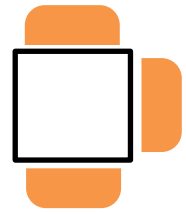
RMS Directivity at Main Lobe	**2.1 (3.22 dB)**	Beam Tilt	**0.00 deg**
RMS Directivity at Horizontal	**2.1 (3.22 dB)**	Pattern Number	**01U021000**
Calculated			

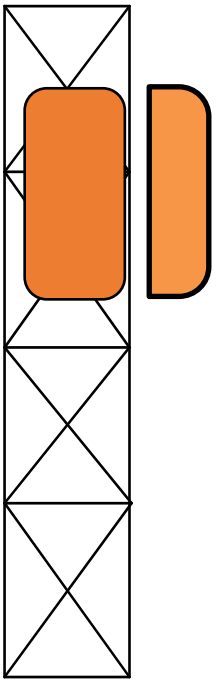




Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.846	10.0	0.846	30.0	0.073	50.0	0.262	70.0	0.109
-9.0	0.874	11.0	0.815	31.0	0.039	51.0	0.261	71.0	0.099
-8.0	0.899	12.0	0.783	32.0	0.007	52.0	0.259	72.0	0.090
-7.0	0.922	13.0	0.748	33.0	0.024	53.0	0.255	73.0	0.081
-6.0	0.943	14.0	0.712	34.0	0.053	54.0	0.251	74.0	0.072
-5.0	0.960	15.0	0.675	35.0	0.080	55.0	0.246	75.0	0.064
-4.0	0.974	16.0	0.636	36.0	0.105	56.0	0.239	76.0	0.056
-3.0	0.985	17.0	0.596	37.0	0.128	57.0	0.233	77.0	0.049
-2.0	0.994	18.0	0.555	38.0	0.150	58.0	0.225	78.0	0.042
-1.0	0.998	19.0	0.513	39.0	0.169	59.0	0.217	79.0	0.035
0.0	1.000	20.0	0.471	40.0	0.187	60.0	0.208	80.0	0.029
1.0	0.998	21.0	0.429	41.0	0.202	61.0	0.199	81.0	0.024
2.0	0.994	22.0	0.387	42.0	0.216	62.0	0.189	82.0	0.019
3.0	0.985	23.0	0.345	43.0	0.227	63.0	0.179	83.0	0.015
4.0	0.974	24.0	0.303	44.0	0.237	64.0	0.169	84.0	0.011
5.0	0.960	25.0	0.263	45.0	0.245	65.0	0.159	85.0	0.007
6.0	0.943	26.0	0.222	46.0	0.252	66.0	0.149	86.0	0.005
7.0	0.922	27.0	0.183	47.0	0.257	67.0	0.139	87.0	0.003
8.0	0.899	28.0	0.145	48.0	0.260	68.0	0.129	88.0	0.001
9.0	0.874	29.0	0.108	49.0	0.262	69.0	0.119	89.0	0.000
								90.0	0.000

MECHANICAL SPECIFICATIONS





Proposal No.	**C-71938-**
Date	**19-Aug-22**
Call Letters	**W34EP**
Channel	**21**
Frequency	**515 MHz**
Antenna Type	**TUM-LP-C3-1/3M-1**

Preliminary Specifications

Side Mounted

With ice TIA-222-G

Height AGL(z)	195 ft (59.4 m)
Basic Wind Speed	90 m/h (144.8 km/h)
Structure Class	III
Exposure Category	C
Topography Category	1
Design Ice	0.5 in t_{iz} = 1.20 in
Wind Speed w/Ice	40 m/h (64.4 km/h)

Mechanical Specifications		**without ice**	**with ice**	
Height	H2	3.2 ft (1m)		
Height of Center of Radiation	H3	1.6 ft (0.5m)		
Effective Projected Area	$(EPA)_A$	14.9 ft² (1.4m²)	21.4 ft² (2m²)	Mounts Excluded
Weight	W	150 lb (0.1t)	275 lb (0.1t)	Mounts Excluded

Antenna designed in accordance with AISC specifications for design of structural steel as prescribed by TIA-222-G

Prepared by: CAB **Date:** 19-Aug-22 **ME:** **EE:**

0

Summary

Proposal No.	**C-71938-**
Date	**19-Aug-22**
Call Letters	**W34EP**
Channel	**21**
Frequency	**515 MHz**
Antenna Type	**TUM-LP-C3-1/3M-1**

Antenna

	Hpol		Vpol	
ERP:	**5.00 kW**	**(6.99 dBk)**	**1.25 kW**	**(0.97 dBk)**
Peak Gain*	3.33	(5.22 dB)	0.83	-(0.80 dB)

Antenna Input Power

1.50 kW **(1.77 dBk)**

Transmission Line

Type:	**Flexline Air**	Attenuation:	**(1.14 dB)**
Size:	**1-5/8"**	Efficiency:	**76.9%**
Impedance:	**50 Ohm**		
Length:	**235 ft**	**71.6 m**	

Transmitter Output

1.95 kW **(2.91 dBk)**

Transmitter filter losses not included

* Directivity and Gain are with respect to half wave dipole. The gain includes feed system losses