



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

June 1, 2020

Group Chairmen's Factual Report – Attachment 6

PenAir Saab 2000 Performance Binder excerpt (unfactored landing distance)

OPERATIONAL FACTORS/HUMAN PERFORMANCE

DCA20MA002

LANDING DISTANCE CORRECTION FACTORS

The Landing Distance Correction Factors given below shows the increase/decrease in Demonstrated (unfactored) Landing Distance from various environmental conditions. The factor below shall be multiplied with the demonstrated landing distance to obtain the corrected demonstrated distance.

		FLAPS 20		FLAPS 35	
TAILWIND (Not applicable to very Low Friction Rwy)	- 5	kt	= 1.10	- 5	kt = 1.10
	-10	kt	= 1.21	-10	kt = 1.21
HEADWIND	+ 5	kt	= 0.98	+ 5	kt = 0.97
	+ 10	kt	= 0.96	+ 10	kt = 0.94
	+ 15	kt	= 0.94	+ 15	kt = 0.91
	+ 20	kt	= 0.92	+ 20	kt = 0.89
	+ 25	kt	= 0.9	+ 25	kt = 0.86
	+ 30	kt	= 0.88	+ 30	kt = 0.83
SLOPE	Downhill	-1	% = 1.04	-1	% = 1.03
	Downhill	-2	% = 1.08	-2	% = 1.06
	Uphill	+1	% = 0.98	+1	% = 0.98
	Uphill	+2	% = 0.96	+2	% = 0.96
WET RWY			= 1.15		= 1.15
WATER COVERED RWY	3 – 5	mm	= 1.60	3 – 5	mm = 1.57
	6 – 8	mm	= 1.55	6 – 8	mm = 1.52
	9 – 18	mm	= 1.48	9 – 18	mm = 1.48
SLUSH COVERED RWY	3 – 5	mm	= 1.59	3 – 5	mm = 1.57
	6 – 9	mm	= 1.54	6 – 9	mm = 1.52
	10 – 18	mm	= 1.46	10 – 18	mm = 1.47
WET SNOW COVERED RWY	6 – 9	mm	= 1.54	6 – 9	mm = 1.54
	10 – 19	mm	= 1.50	10 – 19	mm = 1.50
	20 – 26	mm	= 1.44	20 – 26	mm = 1.44
DRY SNOW COVERED RWY	5 – 14	mm	= 1.56	5 – 14	mm = 1.56
	15 – 30	mm	= 1.50	15 – 30	mm = 1.50
	31 – 45	mm	= 1.46	31 – 45	mm = 1.46
COMPACT SNOW COVERED RWY			= 1.35		= 1.33
VERY LOW FRICTION RWY			= 2.16		= 2.14

For combination of environmental conditions multiply applicable factors.

Example: Flaps 20
Tailwind 10 kt
Slope Downhill 2 %
Wet Rwy

Increase in Demonstrated Landing Distance: $1.21 \times 1.08 \times 1.15 = 1.50$

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UNFACTORED LANDING DISTANCE FLAPS 20

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NOTE: Never use V_{REF} and corresponding Landing Distance less than $V_{REF-MIN}$
 $V_{REF-MIN}$ is found on page Q2

GROSS WEIGHT lb	AIRPORT PRESSURE ALTITUDE = -1000 ft									
	DISTANCE -VREF					DISTANCE -VREF-ICE				
	VREF KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft	VREF -ICE KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft
33 000	109	2 807	2 067	1 896	1 739	126	3 428	2 580	2 384	2 202
35 000	112	2 926	2 162	1 987	1 822	130	3 584	2 706	2 504	2 315
37 000	115	3 039	2 253	2 072	1 903	134	3 734	2 827	2 618	2 423
39 000	118	3 146	2 339	2 155	1 981	137	3 878	2 945	2 729	2 528
41 000	121	3 251	2 425	2 235	2 057	140	4 021	3 062	2 838	2 633
43 000	123	3 356	2 510	2 315	2 133	143	4 163	3 178	2 949	2 738
45 000	126	3 460	2 594	2 395	2 208	146	4 304	3 293	3 060	2 841
47 000	128	3 564	2 679	2 474	2 283	149	4 446	3 409	3 169	2 945
49 000	131	3 666	2 762	2 552	2 359	152	4 587	3 525	3 276	3 048

GROSS WEIGHT lb	AIRPORT PRESSURE ALTITUDE = 0 ft									
	DISTANCE -VREF					DISTANCE -VREF-ICE				
	VREF KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft	VREF -ICE KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft
33 000	109	2 863	2 114	1 939	1 778	126	3 501	2 643	2 439	2 256
35 000	112	2 985	2 212	2 031	1 864	130	3 662	2 772	2 564	2 372
37 000	115	3 102	2 305	2 121	1 948	134	3 817	2 898	2 682	2 483
39 000	118	3 211	2 394	2 205	2 029	137	3 965	3 019	2 796	2 591
41 000	121	3 320	2 483	2 287	2 108	140	4 113	3 140	2 909	2 700
43 000	123	3 429	2 570	2 369	2 185	143	4 260	3 260	3 023	2 808
45 000	126	3 536	2 657	2 452	2 262	146	4 406	3 379	3 138	2 916
47 000	128	3 643	2 745	2 534	2 340	149	4 552	3 500	3 250	3 023
49 000	131	3 749	2 831	2 615	2 417	152	4 699	3 620	3 361	3 130

GROSS WEIGHT lb	AIRPORT PRESSURE ALTITUDE = 1000 ft									
	DISTANCE -VREF					DISTANCE -VREF-ICE				
	VREF KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft	VREF -ICE KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft
33 000	109	2 923	2 161	1 984	1 822	126	3 581	2 705	2 502	2 313
35 000	112	3 050	2 262	2 080	1 911	130	3 747	2 838	2 630	2 434
37 000	115	3 170	2 358	2 171	1 997	134	3 908	2 968	2 751	2 549
39 000	118	3 283	2 449	2 258	2 079	137	4 062	3 094	2 869	2 662
41 000	121	3 395	2 541	2 344	2 161	140	4 215	3 218	2 987	2 773
43 000	123	3 506	2 631	2 429	2 242	143	4 367	3 342	3 105	2 885
45 000	126	3 618	2 721	2 514	2 321	146	4 519	3 465	3 223	2 996
47 000	128	3 729	2 811	2 599	2 401	149	4 671	3 590	3 339	3 107
49 000	131	3 839	2 900	2 683	2 482	152	4 823	3 715	3 456	3 218

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UNFACTORED LANDING DISTANCE FLAPS 20

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GROSS WEIGHT lb	AIRPORT PRESSURE ALTITUDE = 2000 ft									
	DISTANCE -VREF					DISTANCE -VREF-ICE				
	VREF KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft	VREF -ICE KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft
33 000	109	2 984	2 207	2 030	1 866	126	3 662	2 767	2 564	2 370
35 000	112	3 115	2 311	2 128	1 959	130	3 831	2 904	2 695	2 495
37 000	115	3 238	2 410	2 222	2 046	134	3 998	3 038	2 821	2 615
39 000	118	3 356	2 504	2 312	2 130	137	4 158	3 168	2 943	2 732
41 000	121	3 470	2 598	2 401	2 215	140	4 316	3 296	3 065	2 846
43 000	123	3 584	2 692	2 488	2 298	143	4 474	3 424	3 187	2 961
45 000	126	3 700	2 784	2 576	2 380	146	4 631	3 552	3 308	3 077
47 000	128	3 815	2 876	2 664	2 463	149	4 789	3 681	3 428	3 192
49 000	131	3 929	2 969	2 751	2 547	152	4 947	3 811	3 550	3 306

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NOTE: Never use V_{REF} and corresponding Landing Distance less than $V_{REF-MIN}$
 $V_{REF-MIN}$ is found on page Q2

GROSS WEIGHT lb	AIRPORT PRESSURE ALTITUDE = -1000 ft									
	DISTANCE -VREF					DISTANCE -VREF-ICE				
	VREF KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft	VREF -ICE KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft
33 000	101	2 581	1 875	1 714	1 565	115	3 053	2 259	2 078	1 907
35 000	104	2 685	1 958	1 793	1 638	119	3 185	2 364	2 176	2 003
37 000	107	2 784	2 036	1 867	1 708	122	3 312	2 465	2 272	2 093
39 000	109	2 878	2 112	1 938	1 776	125	3 436	2 563	2 365	2 180
41 000	112	2 972	2 186	2 007	1 842	128	3 557	2 660	2 456	2 266
43 000	114	3 066	2 260	2 077	1 907	131	3 676	2 757	2 547	2 351
45 000	117	3 157	2 334	2 146	1 972	133	3 796	2 852	2 637	2 437
47 000	119	3 248	2 407	2 214	2 038	136	3 917	2 948	2 727	2 522
49 000	122	3 339	2 478	2 284	2 102	139	4 036	3 044	2 817	2 606

GROSS WEIGHT lb	AIRPORT PRESSURE ALTITUDE = 0 ft									
	DISTANCE -VREF					DISTANCE -VREF-ICE				
	VREF KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft	VREF -ICE KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft
33 000	101	2 630	1 916	1 752	1 601	115	3 115	2 310	2 125	1 952
35 000	104	2 737	2 001	1 832	1 676	119	3 252	2 419	2 226	2 050
37 000	107	2 839	2 082	1 908	1 747	122	3 384	2 524	2 325	2 143
39 000	109	2 936	2 160	1 980	1 817	125	3 510	2 625	2 421	2 233
41 000	112	3 033	2 236	2 053	1 885	128	3 635	2 725	2 514	2 322
43 000	114	3 130	2 313	2 126	1 952	131	3 758	2 825	2 608	2 410
45 000	117	3 224	2 390	2 196	2 019	133	3 882	2 924	2 702	2 497
47 000	119	3 317	2 464	2 265	2 086	136	4 007	3 023	2 794	2 586
49 000	122	3 412	2 538	2 337	2 152	139	4 131	3 123	2 887	2 673

GROSS WEIGHT lb	AIRPORT PRESSURE ALTITUDE = 1000 ft									
	DISTANCE -VREF					DISTANCE -VREF-ICE				
	VREF KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft	VREF -ICE KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft
33 000	101	2 684	1 957	1 791	1 637	115	3 184	2 362	2 176	2 001
35 000	104	2 794	2 044	1 873	1 715	119	3 325	2 474	2 280	2 100
37 000	107	2 899	2 128	1 952	1 789	122	3 460	2 582	2 383	2 197
39 000	109	3 000	2 208	2 028	1 860	125	3 590	2 686	2 481	2 290
41 000	112	3 100	2 286	2 102	1 931	128	3 720	2 790	2 578	2 381
43 000	114	3 199	2 365	2 177	2 001	131	3 849	2 893	2 676	2 473
45 000	117	3 296	2 445	2 250	2 070	133	3 977	2 995	2 772	2 564
47 000	119	3 394	2 522	2 322	2 139	136	4 105	3 099	2 868	2 656
49 000	122	3 491	2 598	2 395	2 207	139	4 234	3 201	2 965	2 746

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GROSS WEIGHT lb	AIRPORT PRESSURE ALTITUDE = 2000 ft									
	DISTANCE -VREF					DISTANCE -VREF-ICE				
	VREF KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft	VREF -ICE KIAS	15 kts TW ft	0 kts ft	15 kts HW ft	30 kts HW ft
33 000	101	2 738	1 998	1 831	1 673	115	3 252	2 413	2 227	2 050
35 000	104	2 851	2 087	1 914	1 754	119	3 398	2 530	2 334	2 151
37 000	107	2 959	2 174	1 997	1 831	122	3 536	2 640	2 441	2 252
39 000	109	3 064	2 256	2 076	1 904	125	3 671	2 748	2 541	2 347
41 000	112	3 167	2 336	2 152	1 978	128	3 805	2 855	2 642	2 441
43 000	114	3 268	2 418	2 228	2 050	131	3 939	2 961	2 743	2 536
45 000	117	3 369	2 500	2 304	2 122	133	4 071	3 066	2 843	2 631
47 000	119	3 470	2 579	2 378	2 192	136	4 203	3 174	2 942	2 725
49 000	122	3 571	2 657	2 453	2 261	139	4 337	3 280	3 042	2 819

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