

CDS- Camshaft Design System Development documentation

Project: Demo report

Function: Inlet

File Name: acn

Department: Calc.

Name: Dieter Zuck

Company: CDS

Project Description:

Characteristics, development results:



Mon May 04 10:53:36 2020

CDS- Development Documentation



acn.PDF

Project files and informations:

10.000000 0 Sollhub_Ctrl_1.0_deg
24.000000 Länge Rampe Open
0.250000 Höhe Rampe Open
24.000000 Länge Rampe Close
0.250000 Höhe Rampe Close

Project files:

C:\CBuilder5\All_Users\acn.APA
C:\CBuilder5\All_Users\Demosh.Par
DEMO.FDA
STST.eng

Confidential

Mon May 04 10:53:36 2020

CDS- Development Documentation



acn.PDF

Saved files:

C:\CBuilder5\All_Users\acn.VAD
C:\CBuilder5\All_Users\acn.APA
C:\CBuilder5\All_Users\acn.ASC
C:\CBuilder5\All_Users\acn_Cam_Profile.MAT
C:\CBuilder5\All_Users\acn_Cam_Profile05.MAT
C:\CBuilder5\All_Users\acn_Cam_Profile025.MAT
Saved pictures: C:\CBuilder5\All_Users\acn_PIC
C:\CBuilder5\All_Users\acn_05.ASC
C:\CBuilder5\All_Users\acn_025.ASC
C:\CBuilder5\All_Users\acn_0125.ASC
C:\CBuilder5\All_Users\acn_05.VAD
C:\CBuilder5\All_Users\acn_025.VAD
C:\CBuilder5\All_Users\acn_0125.VAD
C:\CBuilder5\All_Users\acn_05.CAM
C:\CBuilder5\All_Users\acn_025.CAM
C:\CBuilder5\All_Users\acn_0125.CAM
C:\CBuilder5\All_Users\acn.MAR
C:\CBuilder5\All_Users\acn.MARG
C:\CBuilder5\All_Users\acn.LDS
C:\CBuilder5\All_Users\acn.LDG
C:\CBuilder5\All_Users\acn.CAM
C:\CBuilder5\All_Users\acn.CAD
C:\CBuilder5\All_Users\acn.HUB
C:\CBuilder5\All_Users\acn_SCP.su2
C:\CBuilder5\All_Users\acn.SSN
C:\CBuilder5\All_Users\acn.FCS

Status:

Acceleration curve is modified!

File extensions:

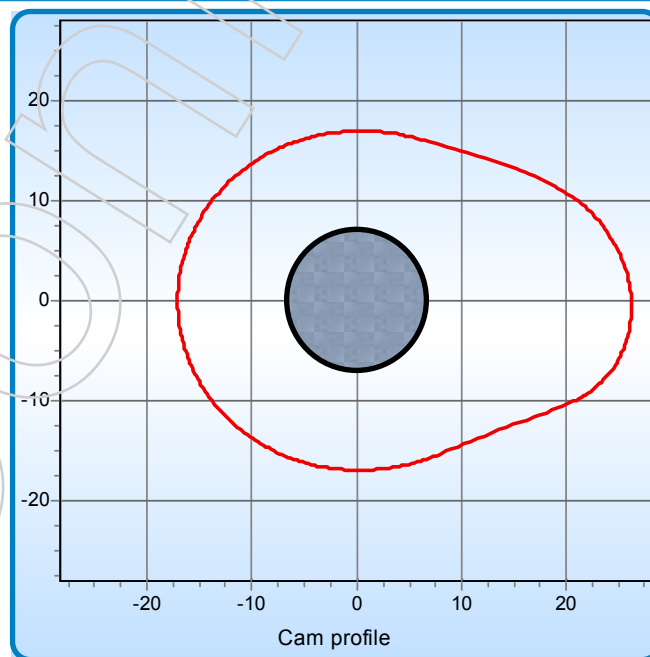
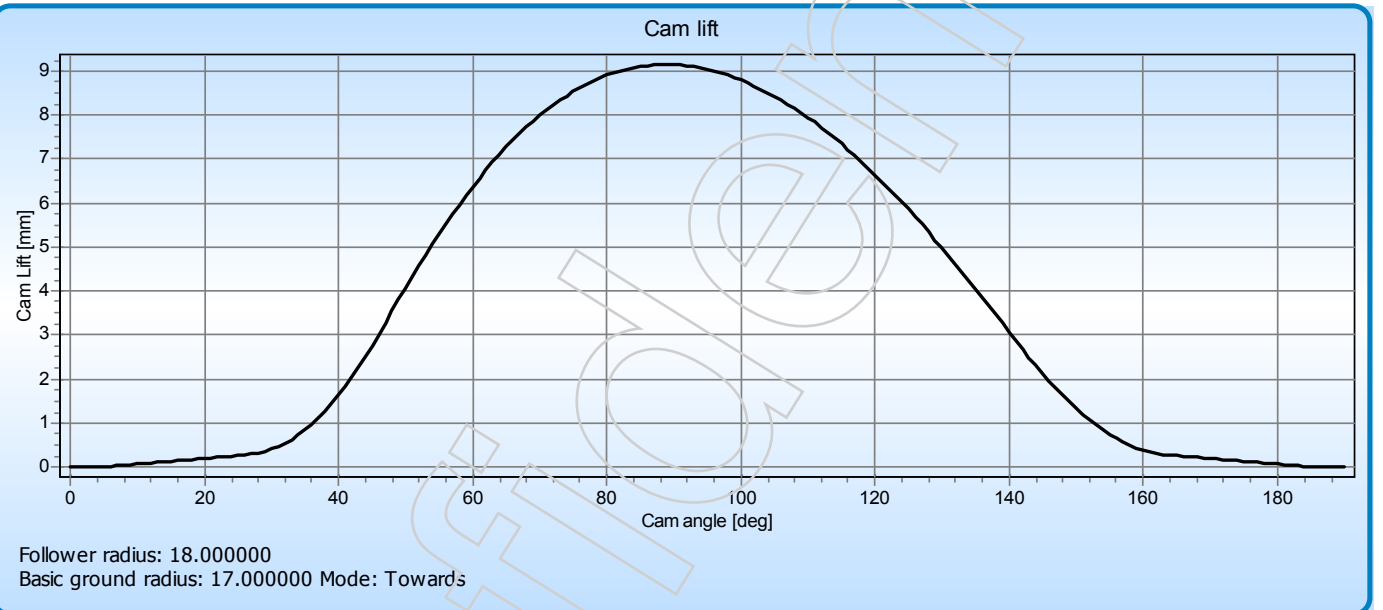
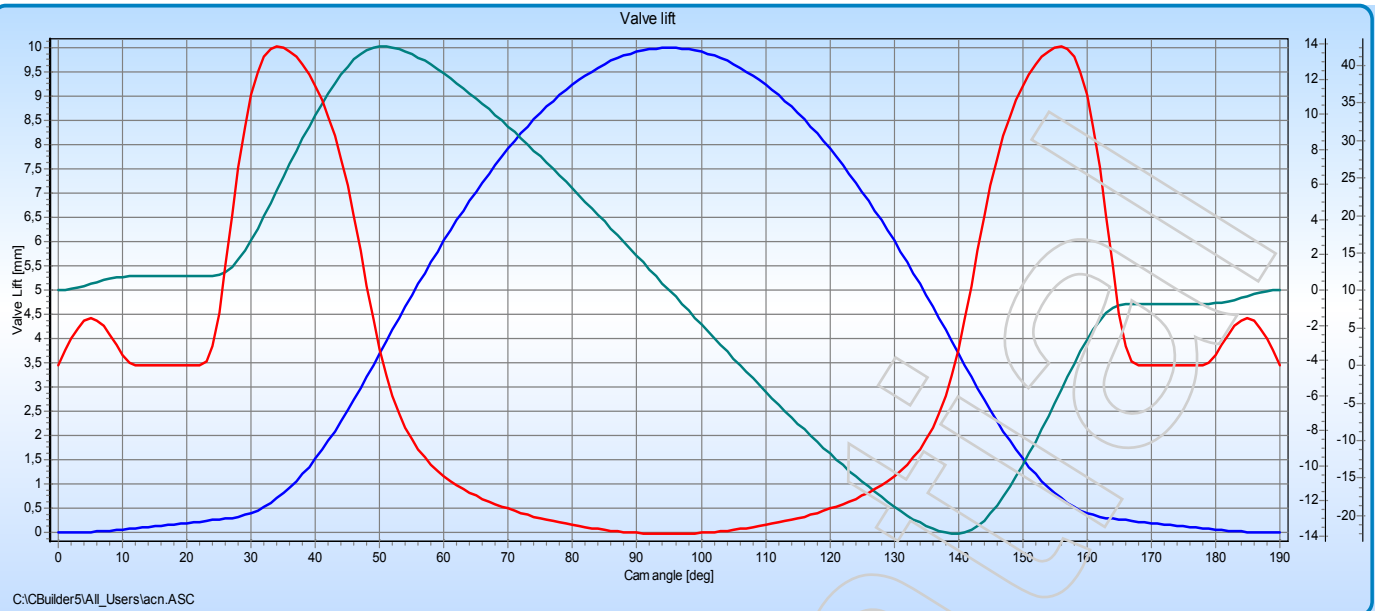
- *.APA -> Approximation data (Spline nodes)
 - *.ASC -> Valve lift data with steps: 1, 0.5, 0.25, 0.125 deg
 - *.VAD -> Valve lift analysis data
 - *.CAD -> Cam lift analysis data
 - *.CAM -> Cam grinding data with steps: 1, 0.5, 0.25, 0.125 deg
 - *.LDS -> LANDIS grinding data
 - *.LDG -> LANDIS grinding data (mirrored)
 - *.HUB -> Grinding data (without angle)
 - *.SSN -> Session file
 - *.MAR -> MAHR measurement data
 - *.MARG -> MAHR measurement data MIRRORED
 - *.PRO -> ADAMS cam profile
 - *.FCS -> Forces, Hertzian stresses, curvature radii
 - *_Cam_Profile.MAT -> RecDyn Cam Profile
 - *_SCP.su2 -> SIMPACK Cam Profile
 - *_KHI_F.DAT -> Flattappet: Angle Lift LengthPolar
- DoubleClick the file name to list the file!

Mon May 04 10:53:36 2020

CDS- Development Documentation



acn.PDF



Date and time: Mon May 04 10:53:07 2020

CDS- Development Documentation

CDS

Approximation file -> Spline nodes:

C:\CBuilder5\All_Users\acn.APA

10.00000000 0.00 0.00 0.00 0.00 24 0.250000 24 0.250000 2 2

0.000000 0.000000
4.967076 0.002968
10.571667 0.000000
10.982560 0.000000
23.305631 0.000000
24.369090 0.000000
28.817762 0.011598
35.409566 0.012495
44.985962 0.010600
50.152832 -0.002198
62.895040 -0.005543
95.000000 -0.007144
127.537109 -0.005671
144.145131 -0.002337
146.965363 0.010518
156.598958 0.018271
161.182231 0.011549
165.630900 0.000000
166.694366 0.000000
179.017436 0.000000
179.428324 0.000000
185.032918 0.002980
190.000000 0.000000

Mon May 04 10:53:36 2020

CDS- Development Documentation



acn.PDF

0	0.000000	69	7.751447	138	4.178030
1	0.000100	70	7.916841	139	3.936459
2	0.000794	71	8.076422	140	3.694452
3	0.002628	72	8.230100	141	3.453055
4	0.006032	73	8.377796	142	3.213503
5	0.011289	74	8.519431	143	2.977176
6	0.018512	75	8.654939	144	2.745517
7	0.027622	76	8.784245	145	2.519937
8	0.038380	77	8.907292	146	2.301725
9	0.050427	78	9.024018	147	2.091985
10	0.063314	79	9.134367	148	1.891638
11	0.076570	80	9.238283	149	1.701455
12	0.089899	81	9.335723	150	1.522088
13	0.103234	82	9.426641	151	1.354095
14	0.116568	83	9.510990	152	1.197950
15	0.129903	84	9.588736	153	1.054045
16	0.143238	85	9.659840	154	0.922699
17	0.156573	86	9.724270	155	0.804152
18	0.169908	87	9.781998	156	0.698554
19	0.183243	88	9.832996	157	0.605950
20	0.196578	89	9.877243	158	0.526243
21	0.209913	90	9.914716	159	0.459134
22	0.223248	91	9.945399	160	0.404055
23	0.236588	92	9.969280	161	0.360084
24	0.250000	93	9.986344	162	0.325900
25	0.263944	94	9.996586	163	0.299810
26	0.279861	95	10.000000	164	0.279861
27	0.299810	96	9.996586	165	0.263944
28	0.325900	97	9.986344	166	0.250000
29	0.360084	98	9.969280	167	0.236588
30	0.404055	99	9.945399	168	0.223248
31	0.459134	100	9.914716	169	0.209913
32	0.526243	101	9.877243	170	0.196578
33	0.605950	102	9.832996	171	0.183243
34	0.698554	103	9.781998	172	0.169908
35	0.804152	104	9.724270	173	0.156573
36	0.922699	105	9.659840	174	0.143238
37	1.054045	106	9.588736	175	0.129903
38	1.197950	107	9.510990	176	0.116568
39	1.354095	108	9.426641	177	0.103234
40	1.522088	109	9.335723	178	0.089899
41	1.701455	110	9.238283	179	0.076570
42	1.891638	111	9.134367	180	0.063314
43	2.091985	112	9.024018	181	0.050427
44	2.301725	113	8.907292	182	0.038380
45	2.519937	114	8.784245	183	0.027622
46	2.745517	115	8.654939	184	0.018512
47	2.977176	116	8.519431	185	0.011289
48	3.213503	117	8.377796	186	0.006032
49	3.453055	118	8.230100	187	0.002628
50	3.694452	119	8.076422	188	0.000794
51	3.936459	120	7.916841	189	0.000100
52	4.178030	121	7.751447	190	0.000000
53	4.418308	122	7.580327		
54	4.656599	123	7.403581		
55	4.892336	124	7.221312		
56	5.125049	125	7.033632		
57	5.354345	126	6.840659		
58	5.579890	127	6.642525		
59	5.801399	128	6.439367		
60	6.018621	129	6.231341		
61	6.231341	130	6.018621		
62	6.439367	131	5.801399		
63	6.642525	132	5.579890		
64	6.840659	133	5.354345		
65	7.033632	134	5.125049		
66	7.221312	135	4.892336		
67	7.403581	136	4.656599		
68	7.580327	137	4.418308		

Valve lift file: C:\CBuilder5\All_Users\acn.ASC

Mon May 04 10:53:36 2020

CDS- Development Documentation



acn.PDF

Basic ground radius: 17.000000 Mode: Towards

Follower radius: 18.000000

0.00	0.000000	67.00	7.587760	134.00	4.233587
1.00	0.000096	68.00	7.731918	135.00	4.041297
2.00	0.000767	69.00	7.868781	136.00	3.847537
3.00	0.002542	70.00	7.998386	137.00	3.652705
4.00	0.005839	71.00	8.120763	138.00	3.457290
5.00	0.010942	72.00	8.235959	139.00	3.261867
6.00	0.017964	73.00	8.344020	140.00	3.067117
7.00	0.026830	74.00	8.444995	141.00	2.873802
8.00	0.037310	75.00	8.538940	142.00	2.682740
9.00	0.049048	76.00	8.625921	143.00	2.494769
10.00	0.061598	77.00	8.705990	144.00	2.310707
11.00	0.074497	78.00	8.779216	145.00	2.131325
12.00	0.087458	79.00	8.845665	146.00	1.957326
13.00	0.100422	80.00	8.905405	147.00	1.789348
14.00	0.113385	81.00	8.958505	148.00	1.627990
15.00	0.126344	82.00	9.005040	149.00	1.473805
16.00	0.139303	83.00	9.045081	150.00	1.327326
17.00	0.152257	84.00	9.078702	151.00	1.189053
18.00	0.165212	85.00	9.105977	152.00	1.059464
19.00	0.178163	86.00	9.126984	153.00	0.939008
20.00	0.191112	87.00	9.141795	154.00	0.828104
21.00	0.204059	88.00	9.150491	155.00	0.727132
22.00	0.217005	89.00	9.153146	156.00	0.636415
23.00	0.229955	90.00	9.149839	157.00	0.556198
24.00	0.242999	91.00	9.140647	158.00	0.486605
25.00	0.256712	92.00	9.125648	159.00	0.427581
26.00	0.272663	93.00	9.104918	160.00	0.378810
27.00	0.292968	94.00	9.078534	161.00	0.339630
28.00	0.319791	95.00	9.046574	162.00	0.308975
29.00	0.355188	96.00	9.009113	163.00	0.285407
30.00	0.401006	97.00	8.966228	164.00	0.267194
31.00	0.458767	98.00	8.917998	165.00	0.252422
32.00	0.529627	99.00	8.864492	166.00	0.239242
33.00	0.614416	100.00	8.805789	167.00	0.226446
34.00	0.713706	101.00	8.741960	168.00	0.213697
35.00	0.827868	102.00	8.673080	169.00	0.200949
36.00	0.957112	103.00	8.599221	170.00	0.188199
37.00	1.101516	104.00	8.520455	171.00	0.175448
38.00	1.261024	105.00	8.436857	172.00	0.162693
39.00	1.435439	106.00	8.348495	173.00	0.149937
40.00	1.624415	107.00	8.255439	174.00	0.137180
41.00	1.827417	108.00	8.157759	175.00	0.124418
42.00	2.043696	109.00	8.055527	176.00	0.111657
43.00	2.272223	110.00	7.948812	177.00	0.098891
44.00	2.511600	111.00	7.837678	178.00	0.086125
45.00	2.759985	112.00	7.722201	179.00	0.073362
46.00	3.015154	113.00	7.602444	180.00	0.060673
47.00	3.274688	114.00	7.478479	181.00	0.048344
48.00	3.536222	115.00	7.350372	182.00	0.036820
49.00	3.797666	116.00	7.218195	183.00	0.026524
50.00	4.057318	117.00	7.082016	184.00	0.017795
51.00	4.313865	118.00	6.941905	185.00	0.010864
52.00	4.566299	119.00	6.797934	186.00	0.005811
53.00	4.813852	120.00	6.650173	187.00	0.002534
54.00	5.055929	121.00	6.498699	188.00	0.000765
55.00	5.292068	122.00	6.343586	189.00	0.000096
56.00	5.521916	123.00	6.184912	190.00	0.000000
57.00	5.745194	124.00	6.022763		
58.00	5.961690	125.00	5.857222		
59.00	6.171235	126.00	5.688382		
60.00	6.373707	127.00	5.516346		
61.00	6.569013	128.00	5.341224		
62.00	6.757082	129.00	5.163135		
63.00	6.937869	130.00	4.982213		
64.00	7.111342	131.00	4.798609		
65.00	7.277482	132.00	4.612499		
66.00	7.436285	133.00	4.424081		

Cam lift file: C:\CBuilder5\All_Users\acn.CAM

Mon May 04 10:53:36 2020

CDS- Development Documentation



acn.PDF

Geometry file: C:\CBuilder5\All_Users\Demosh.Par

Geometry finger follower

S

18.000000/* Radius follower */
 17.000000/* Cam ground radius */
 35.00/* Spring rate */
 320.00/* Basic spring force */
 98.000000/* Angle HVA */
 10.000000/* Width of follower */
 0.300000/* Querdehnzahl */
 1000/* Revolutions per minute 1 */
 8000/* Revolutions per minute 2 */
 235000.000000 210000.000000/* Elastizität Folger, Ventilkappe */
 231000.000000/* Elastizität Nocke */
 0.120000/* Ventilmasse (red.) */
 38.000000 0.000000/* Hebelradius Ventilseite Abstand ventilschaft - Center camshaft*/
 38.000000/* Hebelradius Nockenseite*/
 0.100000/* Friction coefficient */
 36.000000/* X- Koordinate Mitte NOWE */
 21.000000/* Y- Koordinate Mitte NOWE */
 90.00 8.0000/* Valve angle from horizontal, Ventilwinkeldifferenz nach Transformation */
 35.000000/* Angle between levers */
 1/* Modus: gezogen, gedrückt */
 12.000000 0.000000/* Radii Follower valve side */
 6.000000/* Diameter valve stem */
 0.115809/* X_Offset Valve Stem */
 6.200000/* Inertia moment */
 0/* Fixed, no fixed roller */
 1/* Mirror geometrie */
 0.0000/* Valve sub angle */
 25.00/* Required dist. inertia - spring force [%]*/
 0.0000/* Weigt of Lever [kg]*/
 45.1355/* Spring: Adjusted length [mm]*/
 90.0000/* Oel temperature [°C]*/
 1.0825/* X_Dist_Camshaft-Valveaxis*/
 36.3400/* Diam_Valve_Disk*/
 1.800000VALVE_COMPRESSION_STIFFNESS
 1.800000VALVE_COMPRESSION_DAMPING
 1.800000Lever_Valve_Mass
 1.800000Lever_Valve_IZZ
 1.800000Lever_Pivot_CM_X
 1.800000Lever_Pivot_CM_Y
 1.800000Lever_Pivot_Mass
 1.800000Lever_Pivot_IZZ
 1.800000Cam2Roller_Stiffness
 1.800000Cam2Roller_Damping
 1.800000VALVETOP_STIFFNESS
 1.800000VALVETOP_DAMPING
 1.800000Valve2Seat_Stiffness
 1.800000Valve2Seat_Damping
 1.800000Valve_Translational_Stiffness
 1.800000Valve_Translational_Damping
 1.800000Lever_Rotational_Stiffness
 1.800000Lever_Rotational_Damping
 10.000000Breite_Folger_Ventil
 1.800000CAM_STIFFNESS_EXPONENT
 1.800000CAM_DAMPING_INDENTATION_FACTOR
 1.800000VALVESEAT_STIFFNESS_EXPONENT
 1.800000VALVESEAT_DAMPING_INDENTATION_FACTOR
 0.002000Top_Retainer_Mass
 0.030000Mass_Valve
 1.800000VALVETOP_STIFFNESS_EXPONENT
 1.800000VALVETOP_DAMPING_INDENTATION_FACTOR
 1.800000INTERLEVER_STIFFNESS
 1.800000INTERLEVER_DAMPING
 1.79999995FREE_DAMPING
 1.800000BLOCK_DAMPING
 1.800000DAMPING_EXPONENT
 1.79999995FREE_DAMPING_I
 1.800000BLOCK_DAMPING_I
 1.800000DAMPING_EXPONENT_I
 1.800000Valve_Length
 1.800000SHAFT_MASS_PORTION
 1.800000PROTRUDING
 1.800000MASS_CAM_SIDE
 1.800000IZZ_CAM_SIDE
 1.800000MASS_VALVE_SIDE
 1.800000IZZ_VALVE_SIDE

Mon May 04 10:53:36 2020

CDS- Development Documentation



Spring file:
DEMO.FDA

DEMO1_ Spring data
D
0 350
7 595
13 900

Confidential

Mon May 04 10:53:36 2020

CDS- Development Documentation



acn.PDF

Follower shape file:
C:\CBuilder5\All_Users\Demo_VCF.CON

Kommentar
0.000000 0.000000
6.546613 1.212670
12.098300 3.058824
18.227045 0.452489
22.545023 -3.131222
26.124220 -6.965353
//
0.000000 0.000000
3.251151 0.635148
6.367736 1.139209
9.385003 1.336261
12.306384 1.131733
15.113344 0.497393
17.775230 -0.543665
20.259121 -1.932035
22.539680 -3.587013
24.609001 -5.421613
25.380781 -6.187580

Confidential

Mon May 04 10:53:36 2020

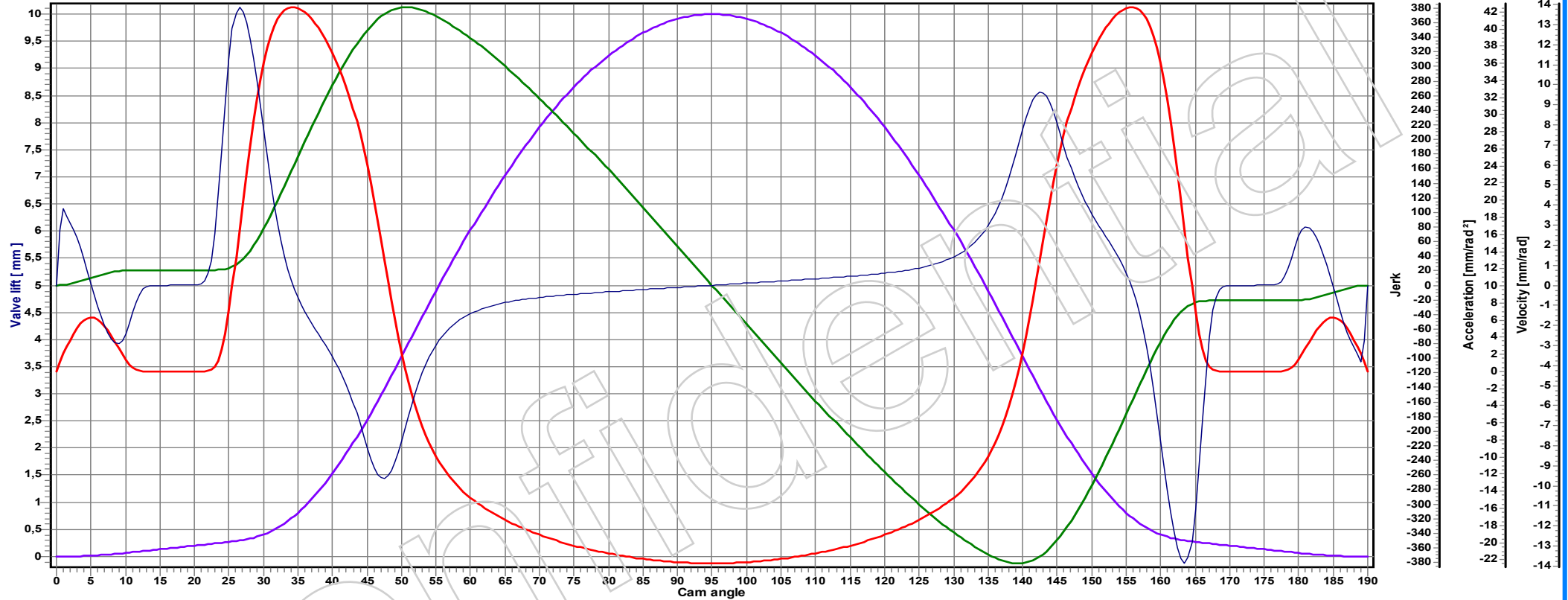
CDS- Development Documentation



acn.PDF

Valve lift ANALYSIS File name: C:\CBuilder5\All_Users\lacn.ASC

☒ Valve lift ☒ Velocity ☒ Acceleration ☒ Jerk



Vel. beg. ramp close: 4.6989 m/s RpM: 10000
Vel. end ramp open: 0.4103 m/s RpM: 10000

Jerk min.: -374.7087 mm/rad³
Jerk max.: 374.7087 mm/rad³
Acc. min.: -22.4144 mm/rad²
Acc. max2: 42.5408 mm/rad²
Acc. max1: 42.5408 mm/rad²
Vel. min.: -13.8535 mm/rad
Vel. max: 13.8535 mm/rad
Duration 1mm valve lift to max. valve lift: 58.41 deg
Max Lift: 10.0000 mm at 95.0000 deg
Length of Ramp Close: 24.00 deg
Length of Ramp Open: 24.00 deg

Area without ramps: 774.37 mm* deg
Area with ramps: 779.39 mm* deg
Width without ramps: 142.000 deg
Width of lift total: 190.000 deg
Width of lift 2.0 mm: 104.9153 deg
Width of lift 1.0 mm: 116.8229 deg
Width of lift 0.5 mm: 126.7821 deg
Height of Ramp Close: 0.2500 mm
Height of Ramp Open: 0.2500 mm

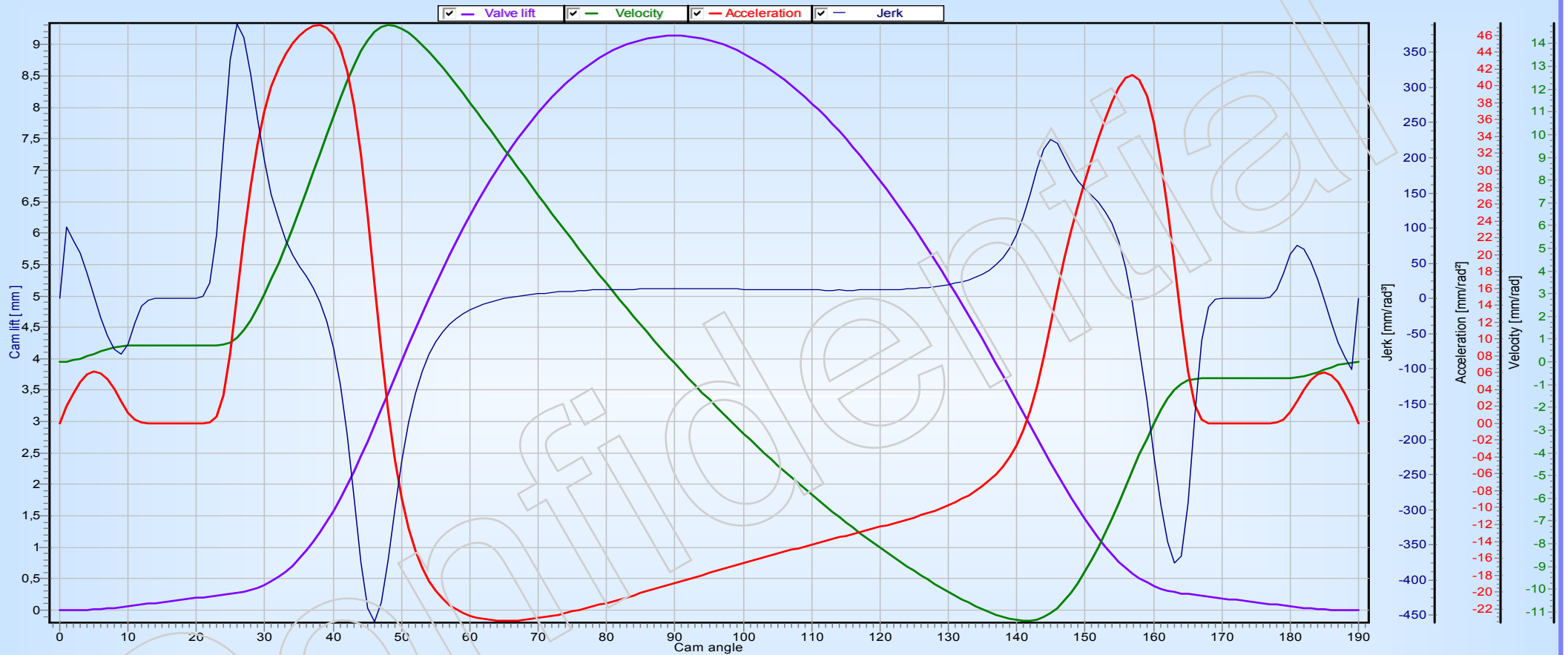
Date and time: Mon May 4 10:52:41 2020

CDS- Development Documentation

CDS

C:\CBuilder5\All_Users\lacn.APA

Cam lift ANALYSIS



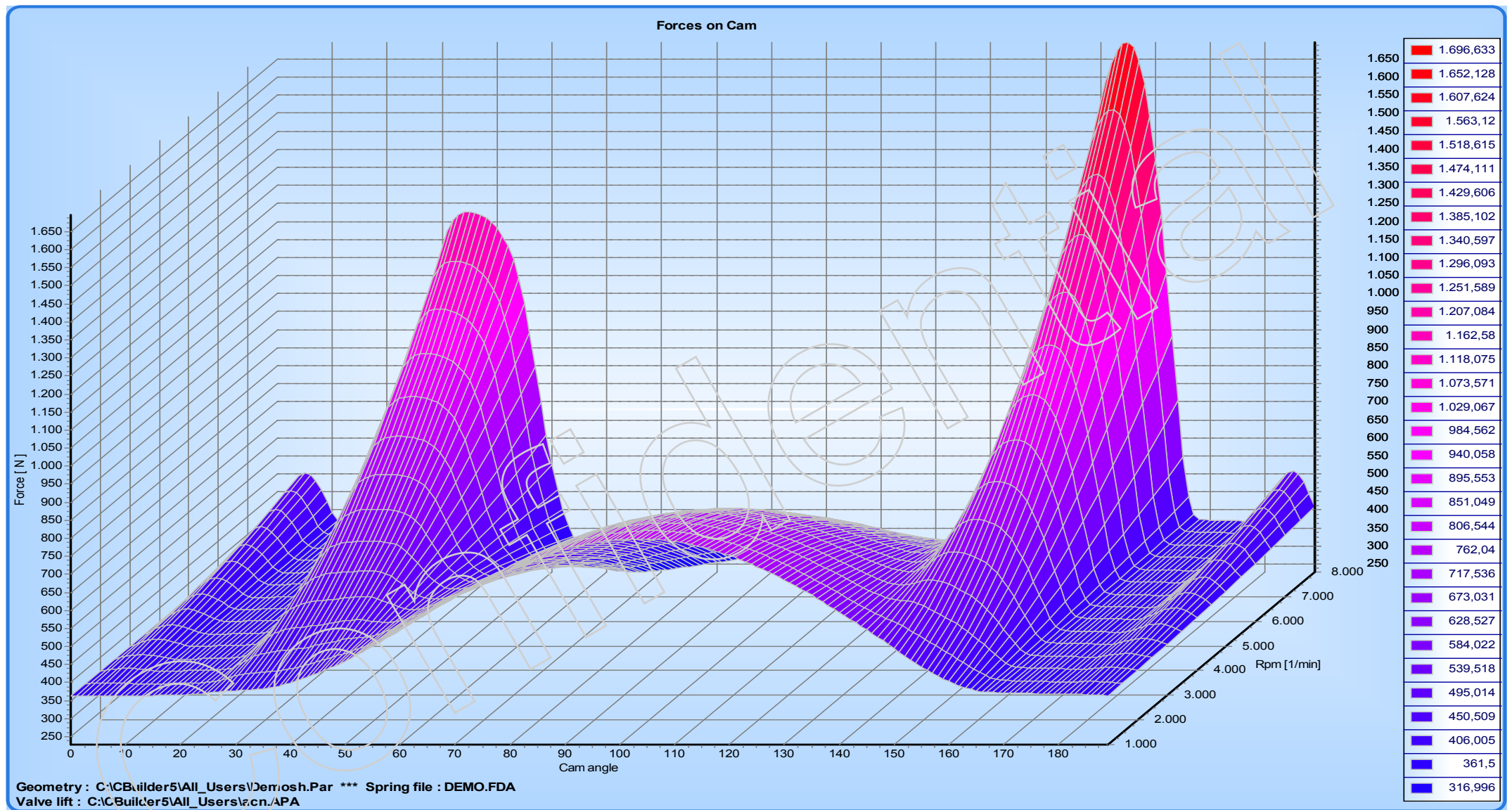
Max Lift: 9.1423 mm at 90.0000 deg
 Vel. max: 14.8233 mm/rad Width of lift 0.5 mm: 126.4690 deg
 Vel. min: -11.3556 mm/rad Width of lift 1.0 mm: 116.6857 deg
 Acc. max1: 47.2351 mm/rad² Width of lift 2.0 mm: 104.7974 deg
 Acc. max2: 41.3096 mm/rad² Width of lift total: 190.000 deg
 Acc. min: -23.4120 mm/rad² Width without ramps: 130.000 deg
 Jerk max.: 390.0862 mm/rad³ Area with ramps: 727.96 mm* deg
 Jerk min.: -159.1055 mm/rad³ Area without ramps: 727.96 mm* deg

Date and time: Mon May 04 10:52:11 2020

CDS- Development Documentation

N.CAM

CDS

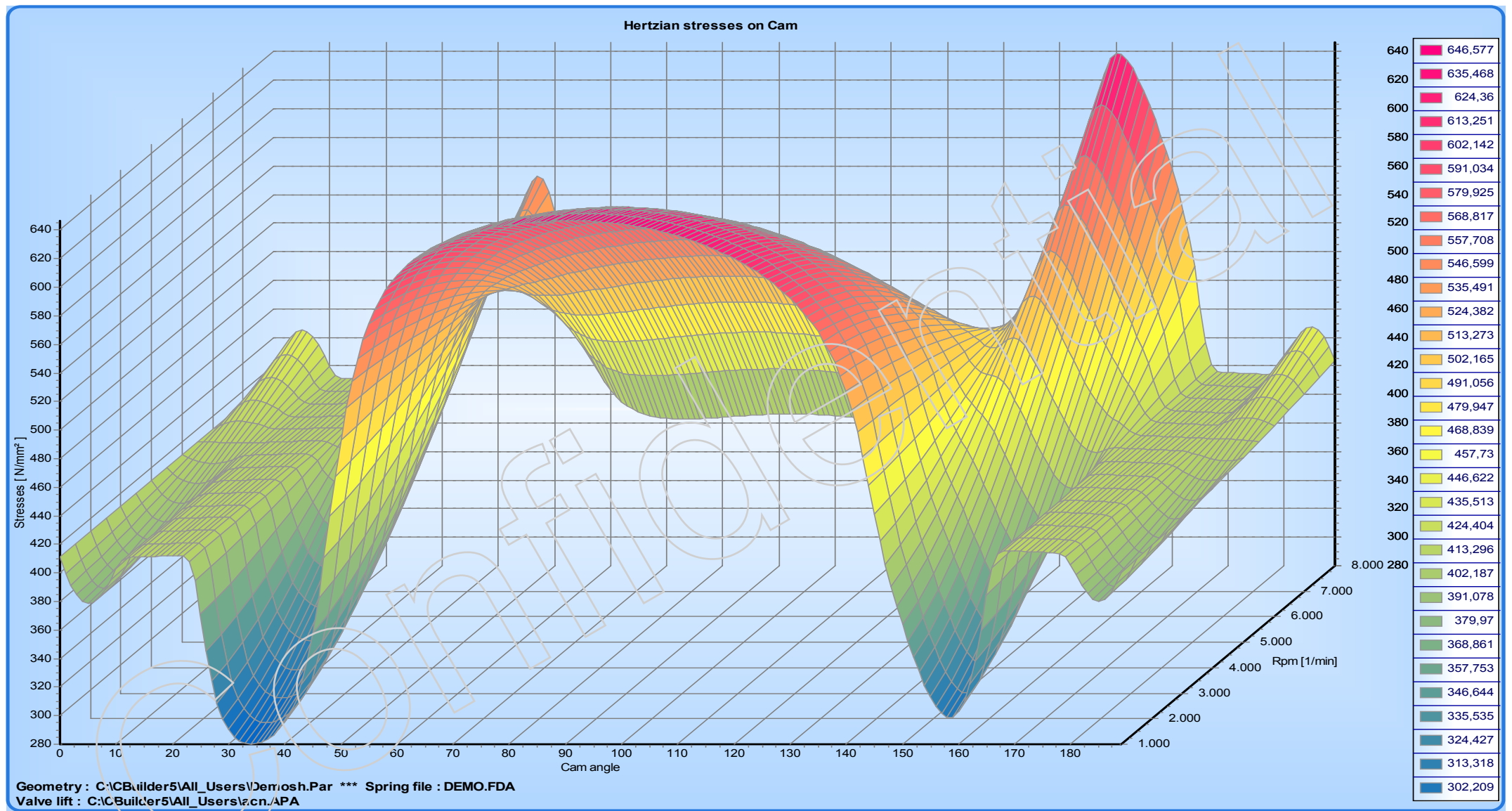


Date and time: Mon May 04 10:50:21 2020

CDS- Development Documentation

Date and time: Mon May 04 10:50:21 2020

CDS

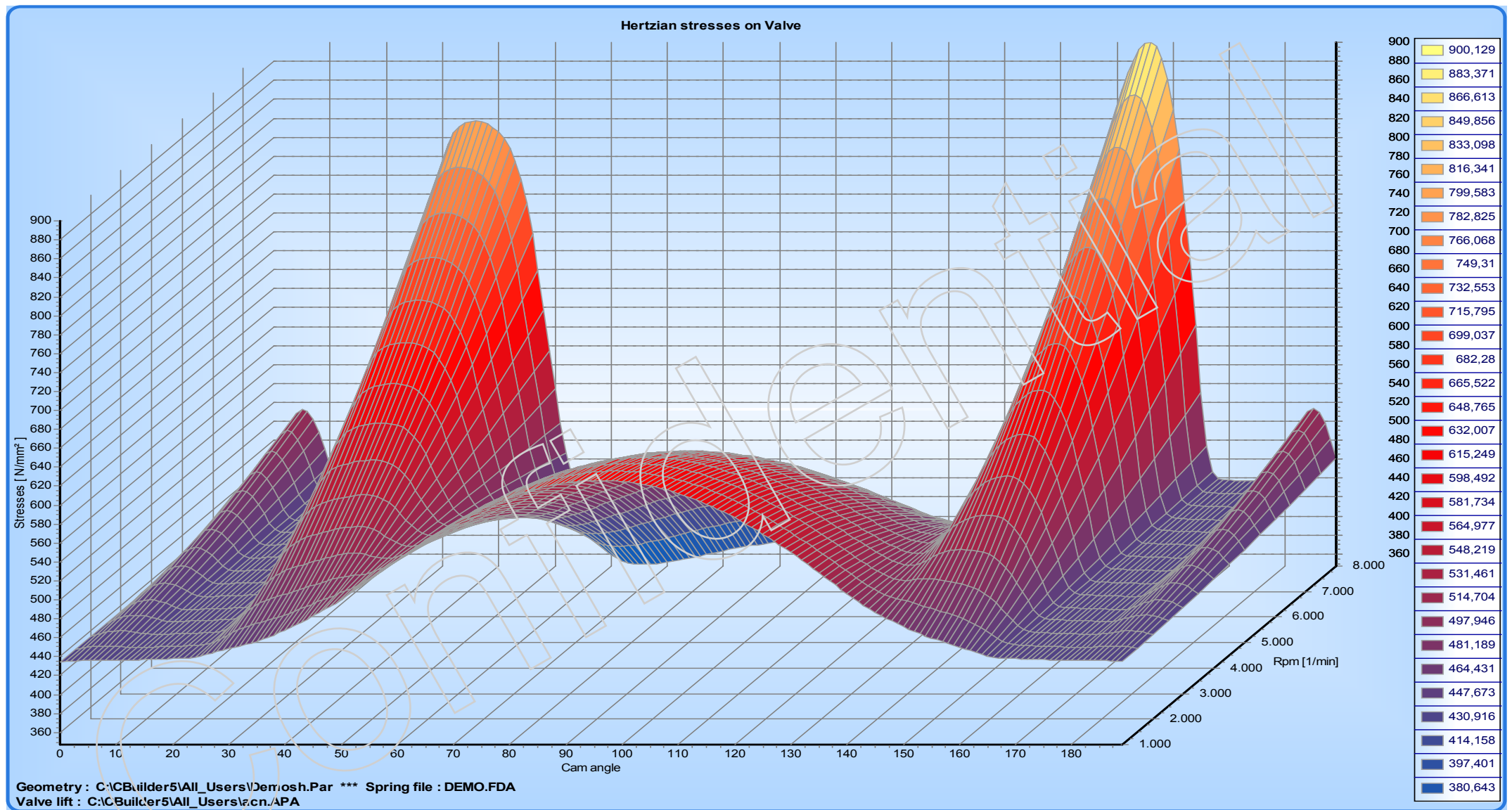


Date and time: Mon May 04 10:50:21 2020

CDS- Development Documentation

Date and time: Mon May 04 10:50:21 2020

CDS

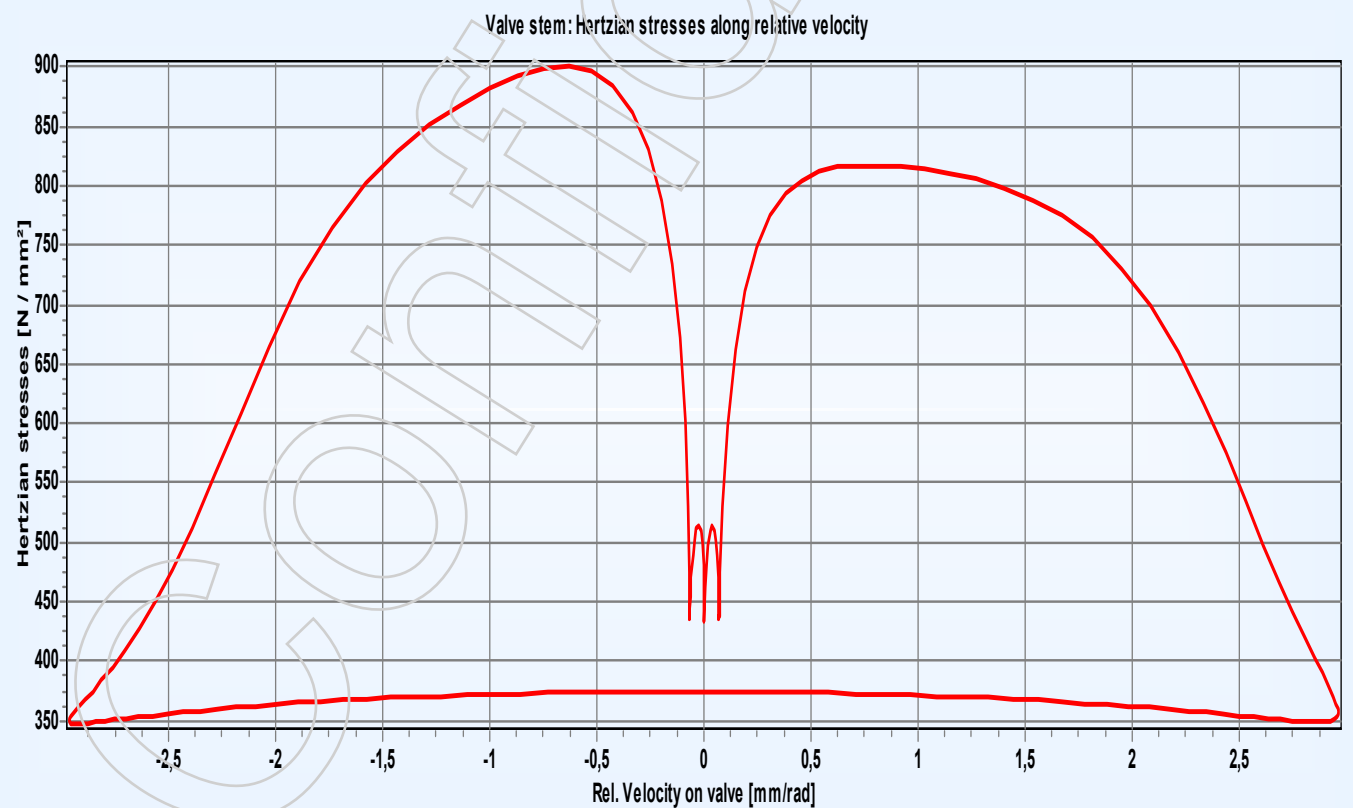
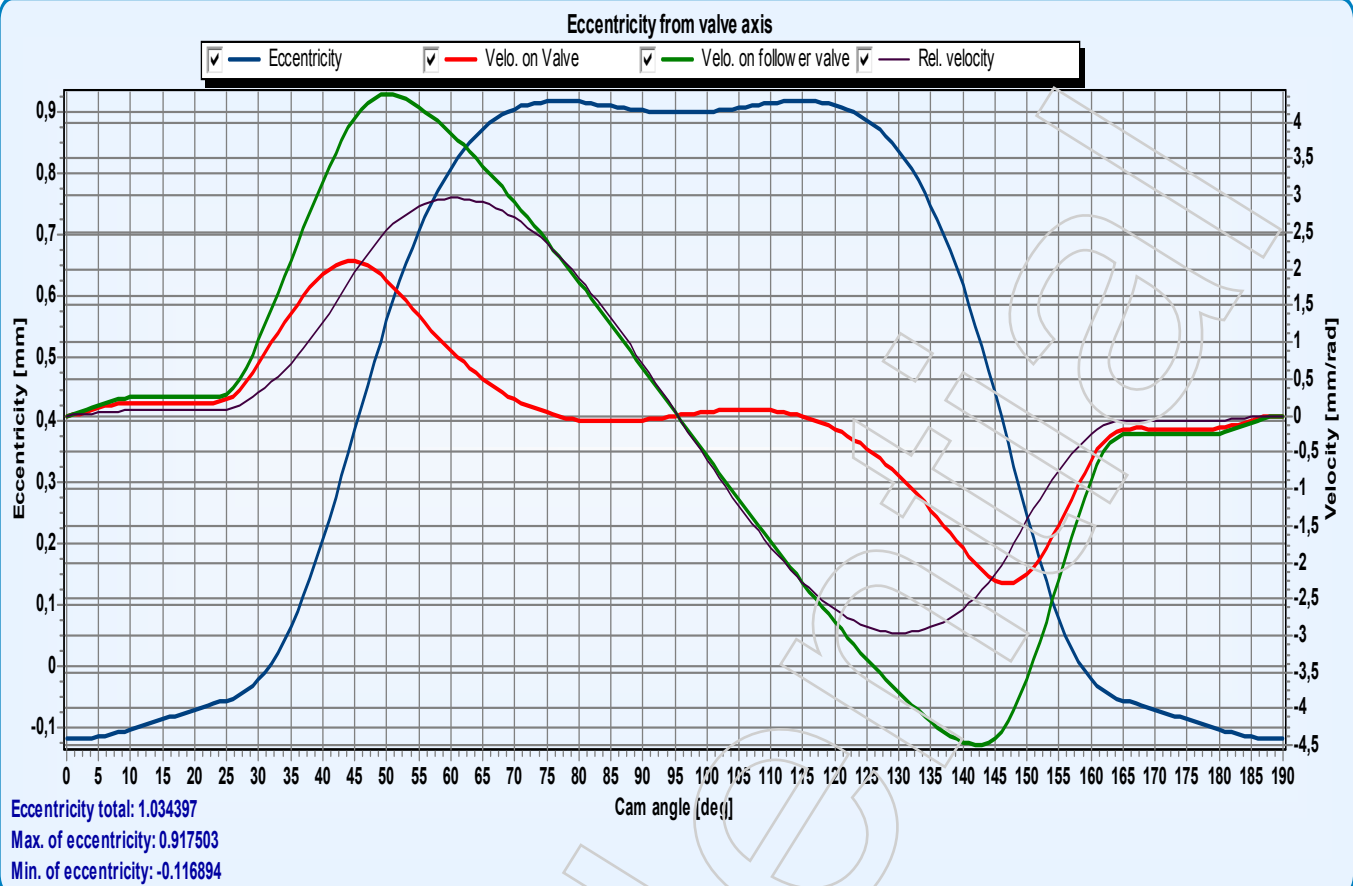


Date and time: Mon May 04 10:50:21 2020

CDS- Development Documentation

Date and time: Mon May 04 10:50:21 2020

CDS



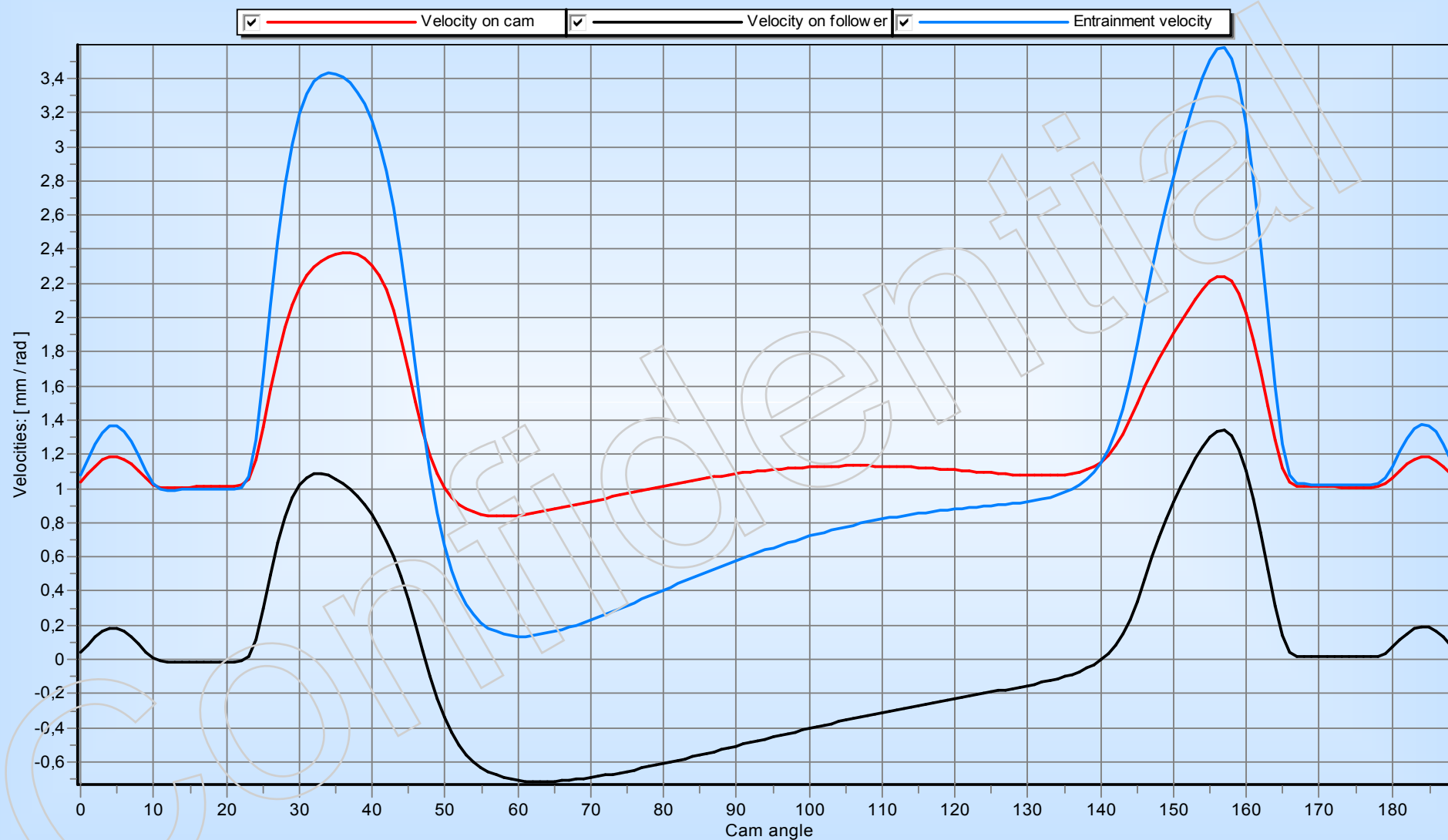
Date and time: Mon May 4 10:49:34 2020

CDS- Development Documentation

CDS

Valve lift file: C:\CBuilder5\All_Users\acn.ASC
Geometry file: C:\CBuilder5\All_Users\Demosh.Par

Entrainment velocity

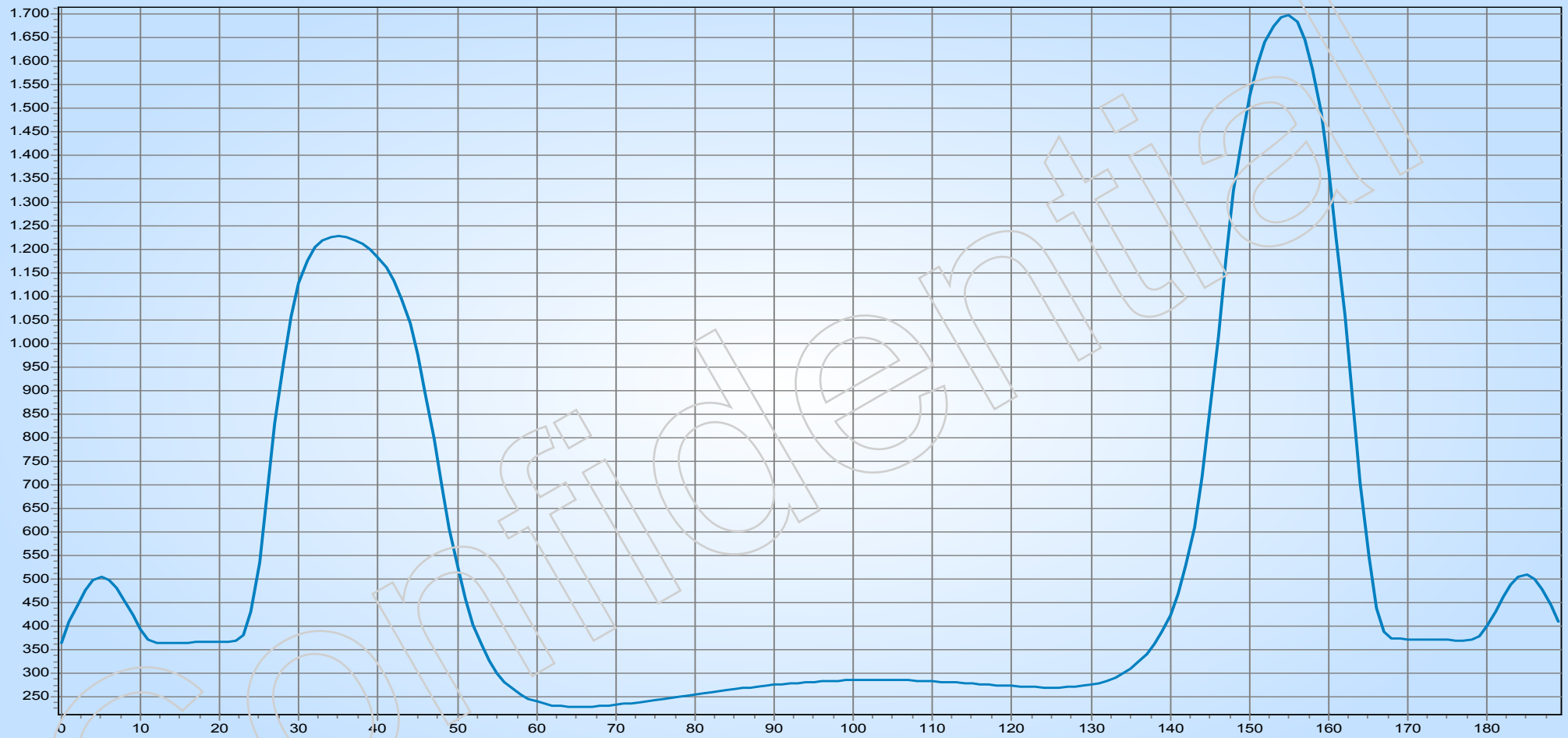


Date and time: Mon May 04 10:50:01 2020

CDS- Development Documentation

CDS

Forces on cam -> Selected RpM: 8000



Geometry : C:\CBuilder5\All_Users\Demosh.Par *** Spring file : DEMO.FDA
 Valve lift : C:\CBuilder5\All_Users\acn.APA

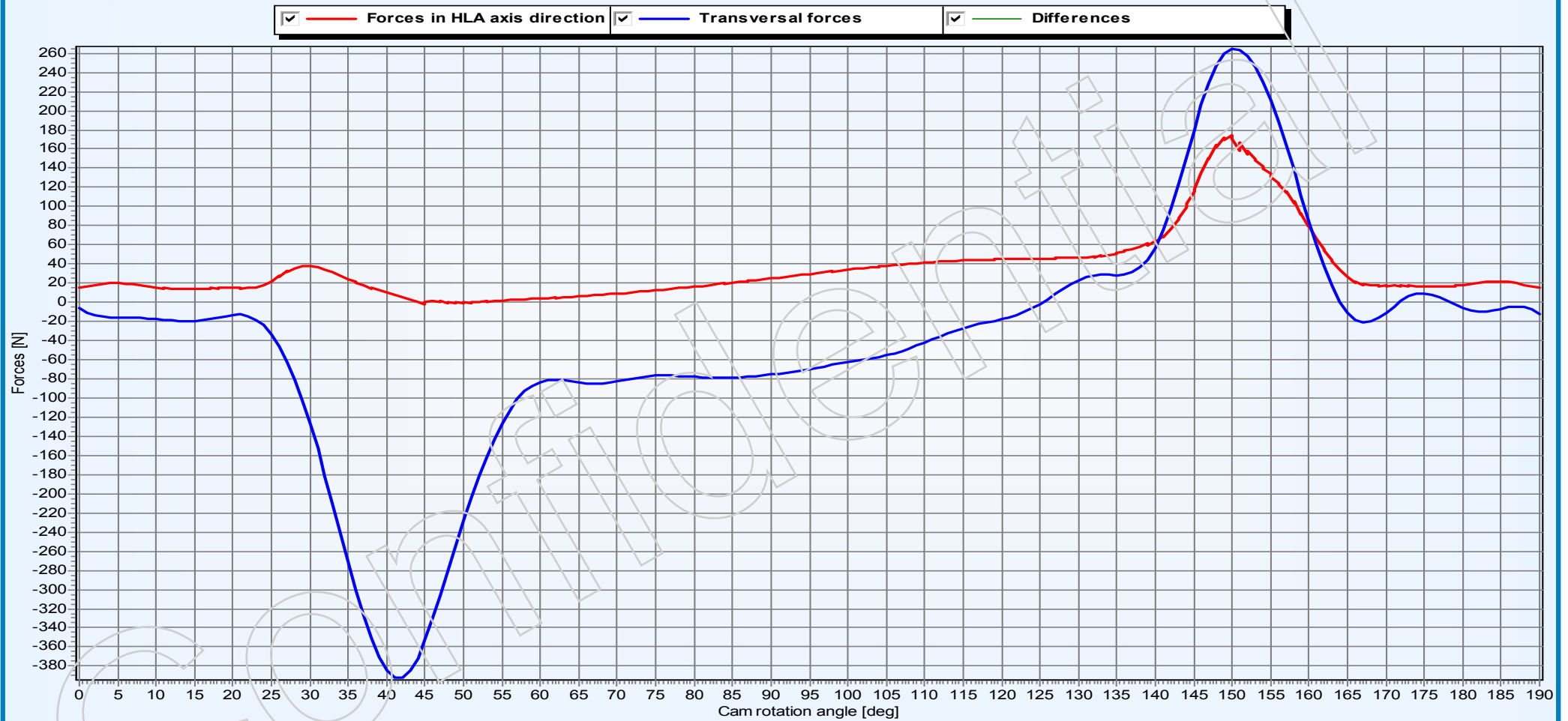
Date and time: Mon May 04 10:50:21 2020

CDS- Development Documentation



Forces on Pivot

Minimum of axial forces: 392.056919
Integral of forces in HLA- axis direction [N]: -7953.660156



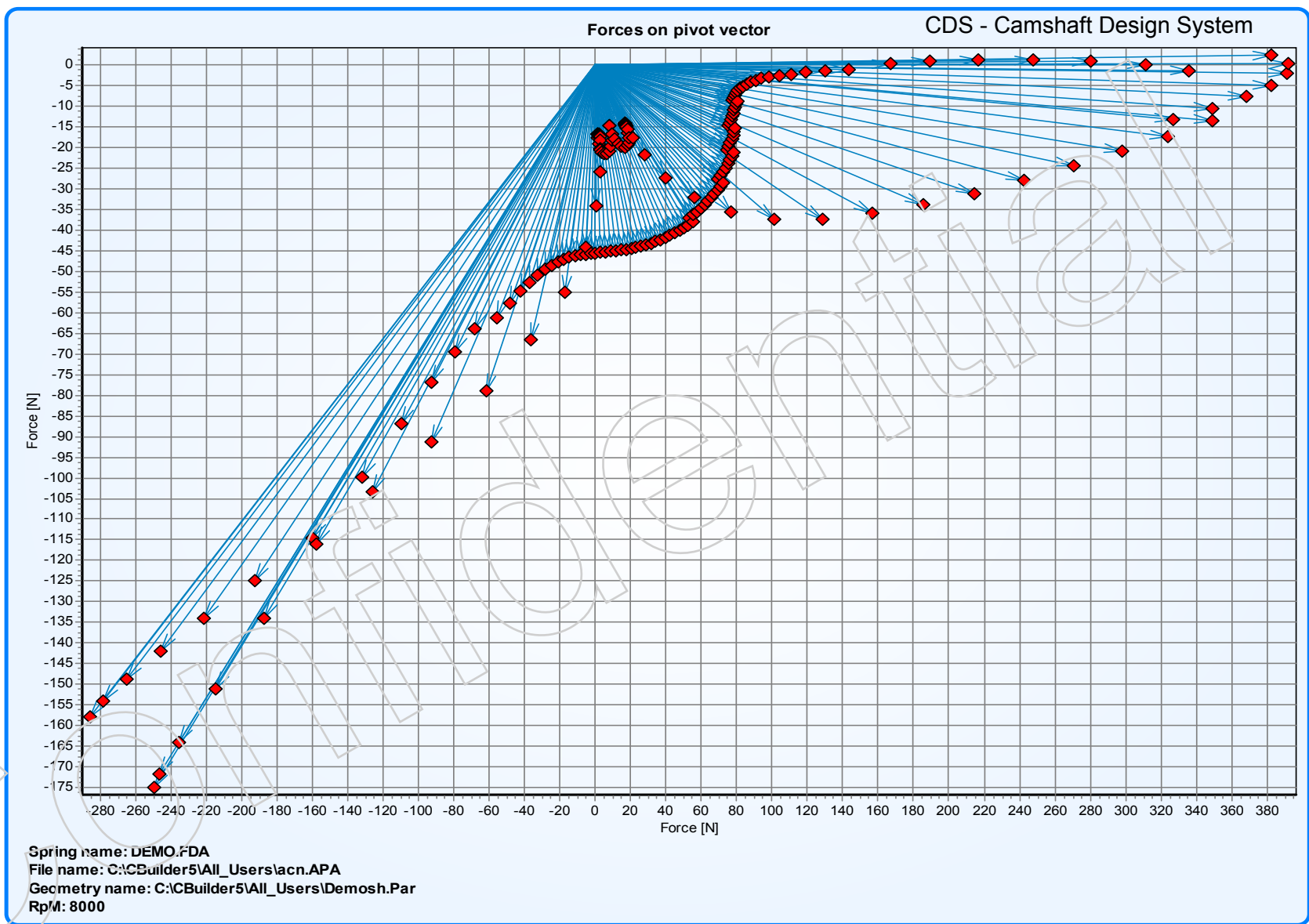
Spring name: DEMO.FDA
File name: C:\CBuilder5\All_Users\acn.APA
Geometry name: C:\CBuilder5\All_Users\Demosh.Par
Rpm: 8000

Date and time: Mon May 4 10:49:16 2020

CDS- Development Documentation

Finger follower valvetrain

CDS



Date and time: Mon May 4 10:49:16 2020

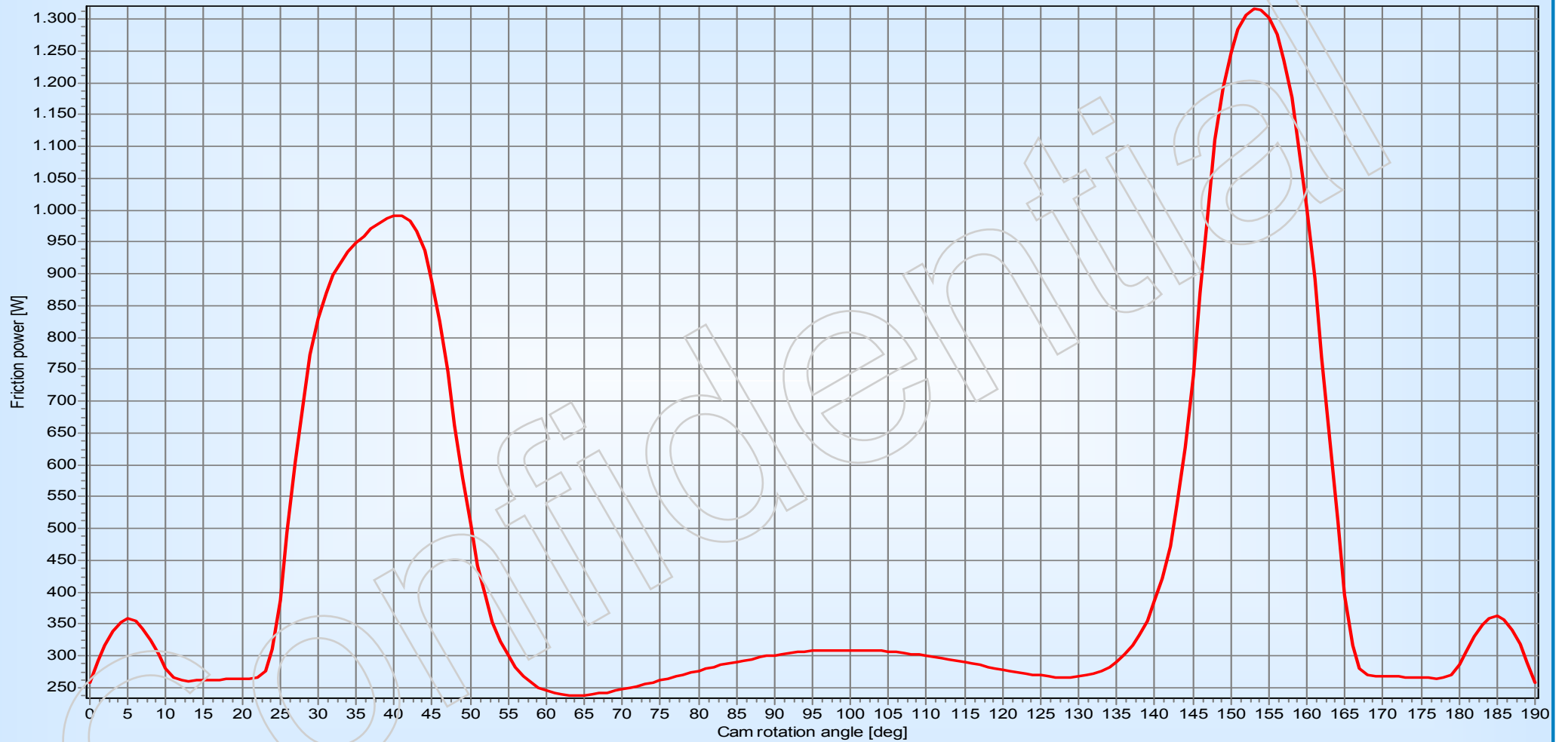
CDS- Development Documentation

Finger follower valvetrain

CDS

Friction power (finger follower)

Valve lift: C:\CBuilder5\All_Users\lacn.APA



Friction power: 0.4501 kW RpM: 8000
Friction coefficient: 0.1000

Date and time: Mon May 4 10:49:34 2020

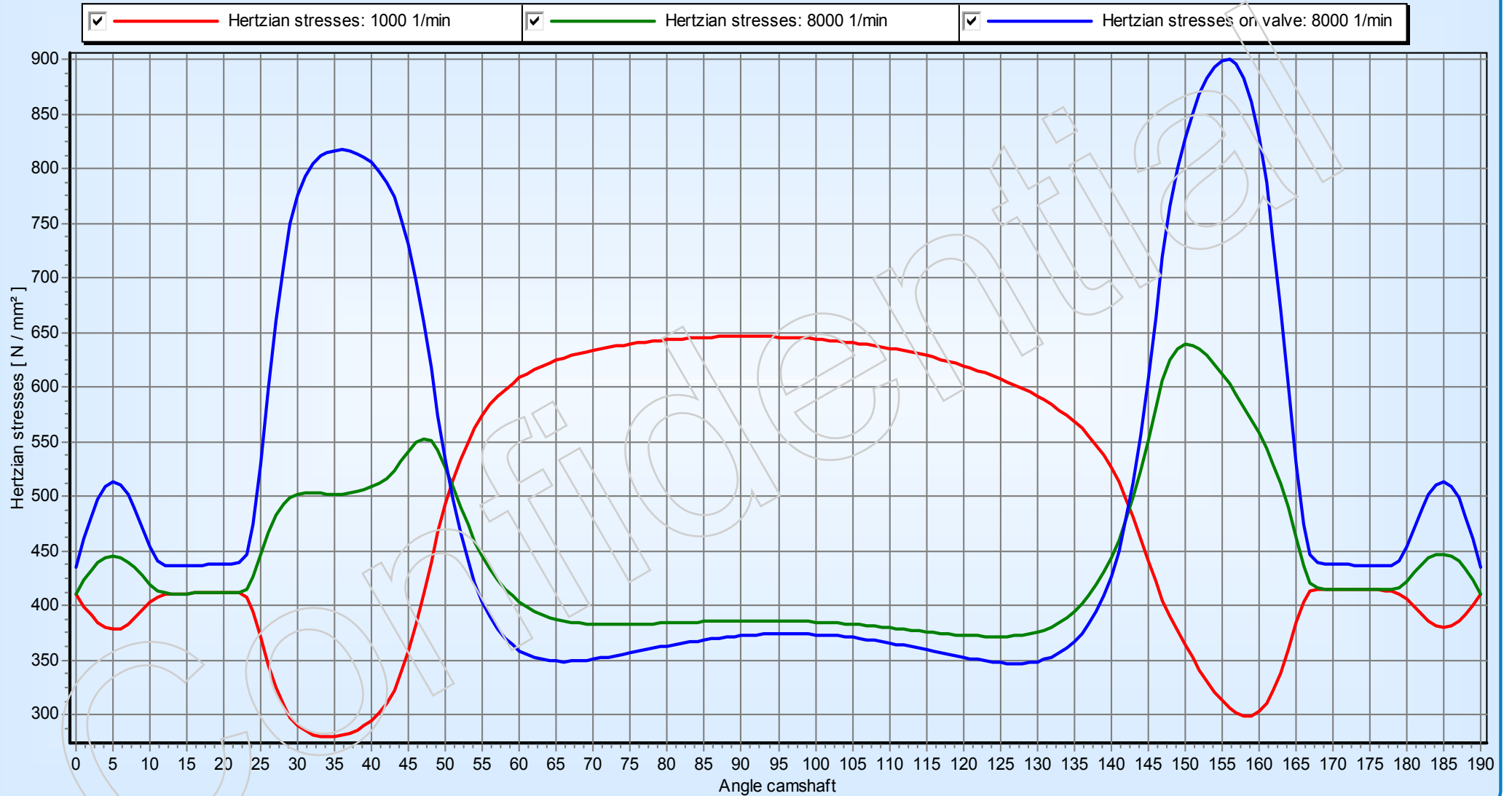
CDS- Development Documentation

Finger follower valvetrain



Hertzian stresses

CDS - Camshaft Design System



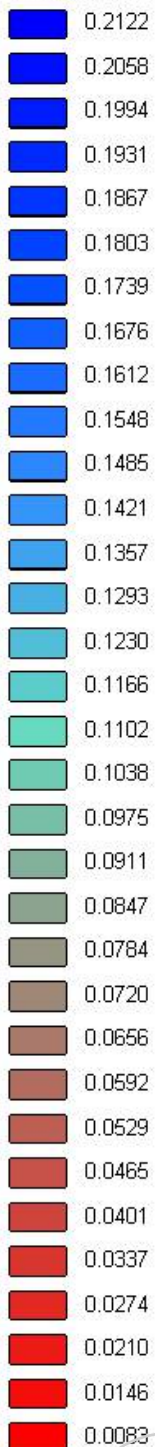
Date and time: Mon May 4 10:49:34 2020

CDS- Development Documentation

Finger follower valvetrain

CDS

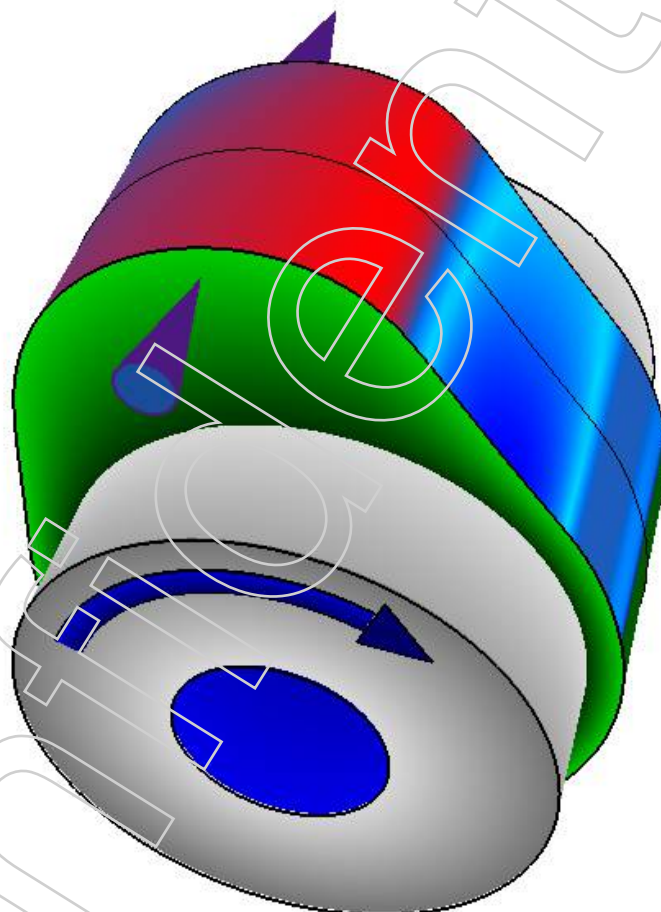
Distribution of oil film thickness on cam profile (dep. from RpM: 1000 to 8000 and oil temp.: 90)



DEMO.FDA

C:\CBuilder5\All_Users\Demosh.Par

C:\CBuilder5\All_Users\acn.APA



Mode: Towards!

Mon May 04 10:51:18 2020

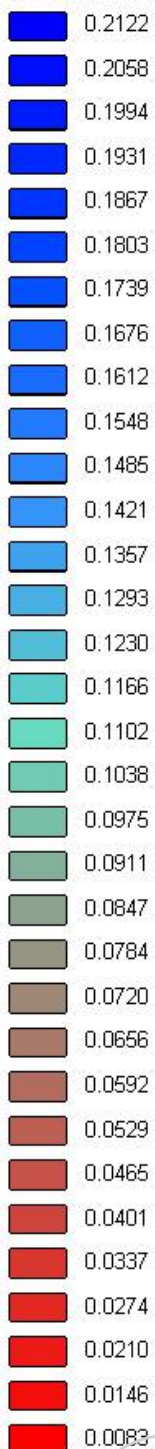
CDS- Development Documentation

CDS

C:\CBuilder5\All_Users\acn.APA

C:\CBuilder5\All_Users\Demosh.Par

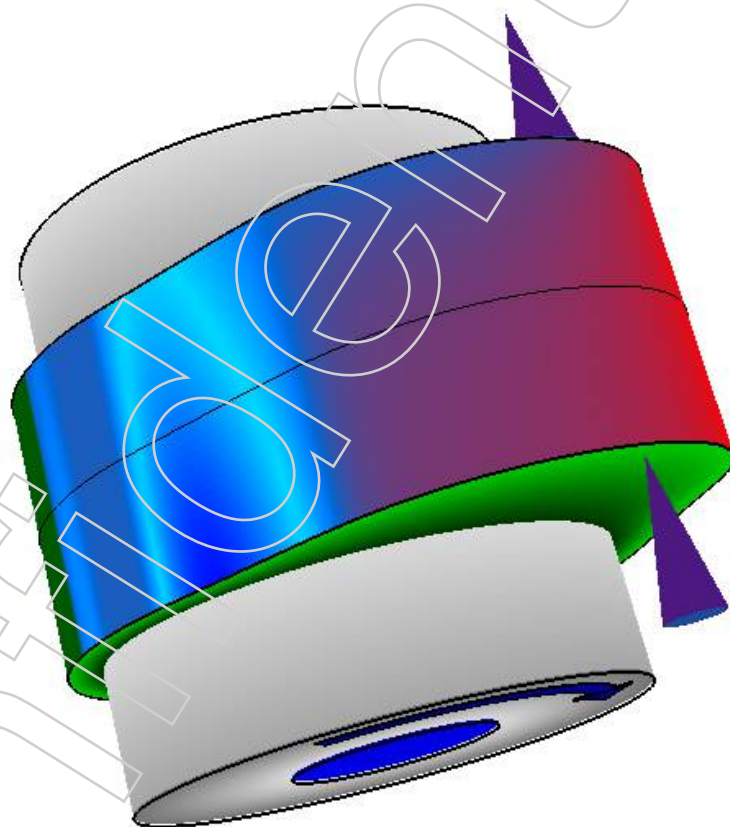
Distribution of oil film thickness on cam profile (dep. from Rpm: 1000 to 8000 and oil temp.: 90)



DEMO.FDA

C:\CBuilder5\All_Users\Demosh.Par

C:\CBuilder5\All_Users\acn.APA



Mode: Towards!

Mon May 04 10:51:21 2020

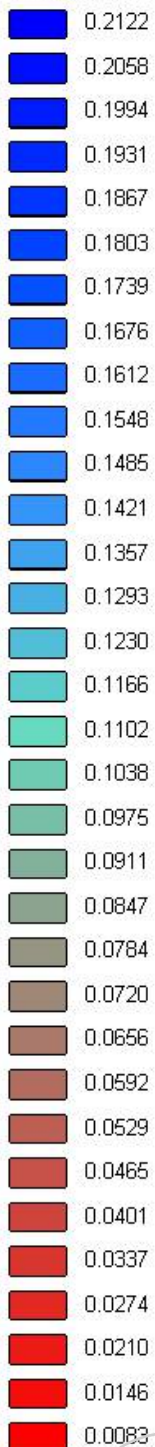
CDS- Development Documentation

CDS

C:\CBuilder5\All_Users\acn.APA

C:\CBuilder5\All_Users\Demosh.Par

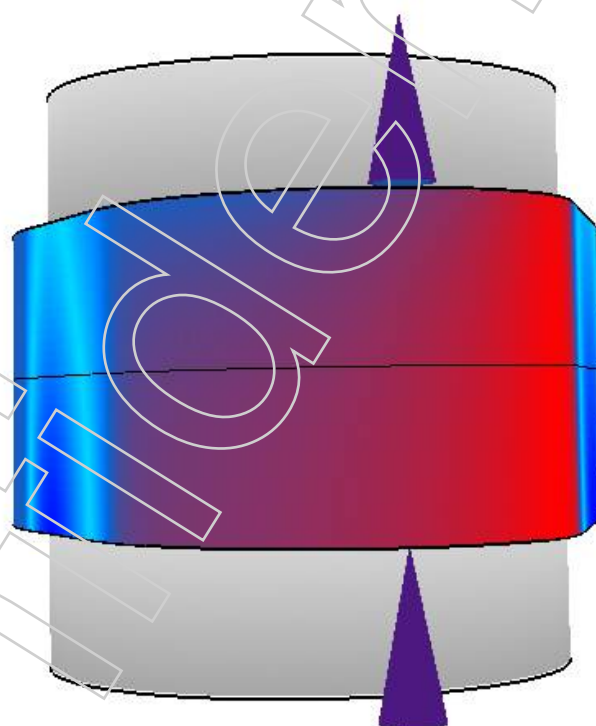
Distribution of oil film thickness on cam profile (dep. from RpM: 1000 to 8000 and oil temp.: 90)



DEMO.FDA

C:\CBuilder5\All_Users\Demosh.Par

C:\CBuilder5\All_Users\acn.APA



Mode: Towards!

Mon May 04 10:51:25 2020

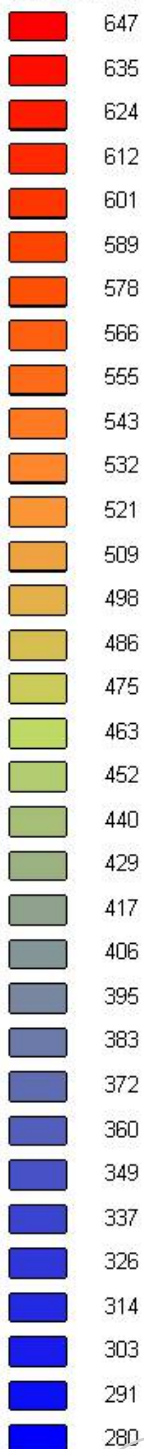
CDS- Development Documentation

CDS

C:\CBuilder5\All_Users\acn.APA

C:\CBuilder5\All_Users\Demosh.Par

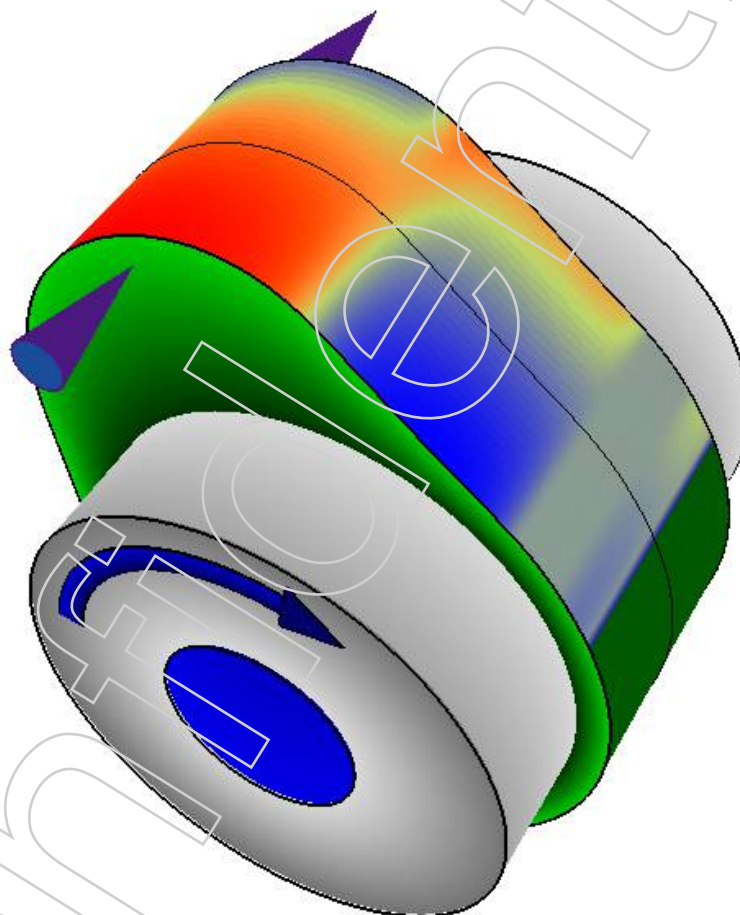
Distribution of Hertzian stresses on cam profile (dep. from Rpm: 1000 to 8000)



DEMO.FDA

C:\CBuilder5\All_Users\Demosh.Par

C:\CBuilder5\All_Users\acn.APA



Mode: Towards!

Mon May 04 10:51:02 2020

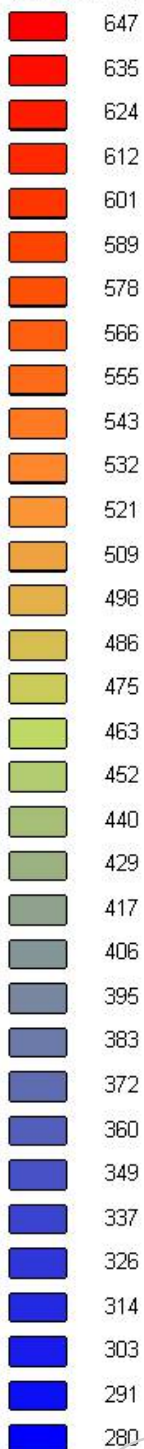
CDS- Development Documentation

CDS

C:\CBuilder5\All_Users\acn.APA

C:\CBuilder5\All_Users\Demosh.Par

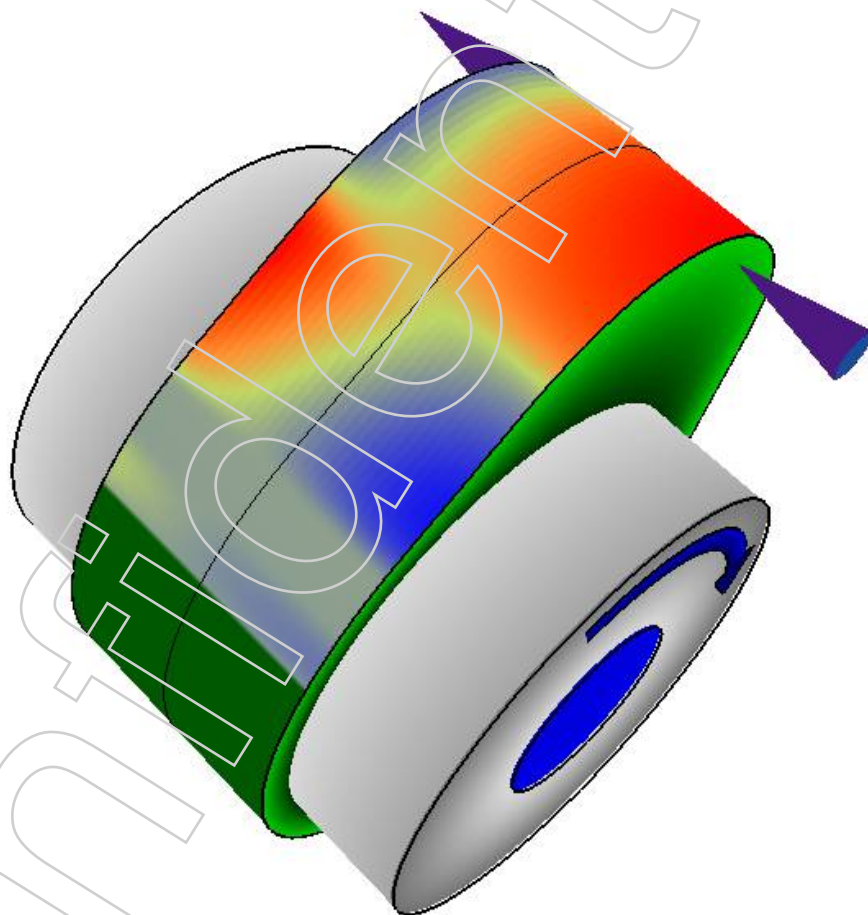
Distribution of Hertzian stresses on cam profile (dep. from Rpm: 1000 to 8000)



DEMO.FDA

C:\CBuilder5\All_Users\Demosh.Par

C:\CBuilder5\All_Users\acn.APA



Mode: Towards!

Mon May 04 10:51:05 2020

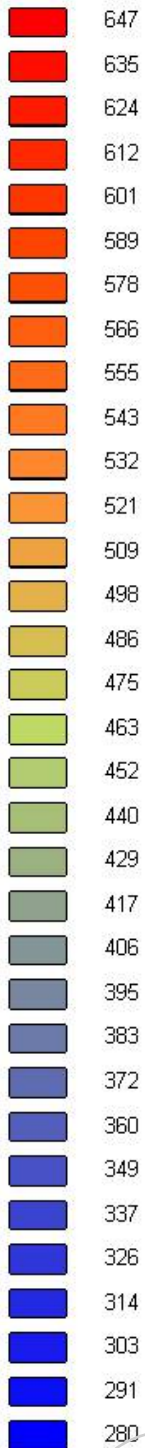
CDS- Development Documentation

CDS

C:\CBuilder5\All_Users\acn.APA

C:\CBuilder5\All_Users\Demosh.Par

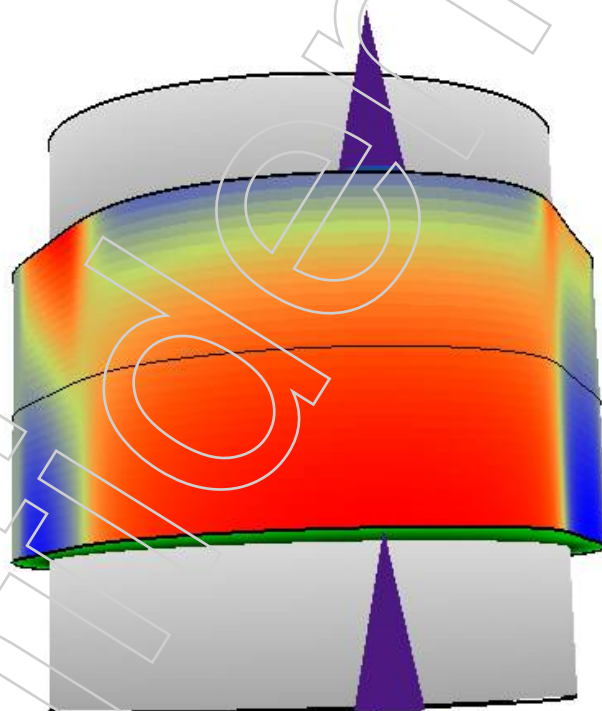
Distribution of Hertzian stresses on cam profile (dep. from Rpm: 1000 to 8000)



DEMO.FDA

C:\CBuilder5\All_Users\Demosh.Par

C:\CBuilder5\All_Users\acn.APA



Mode: Towards!

Mon May 04 10:51:08 2020

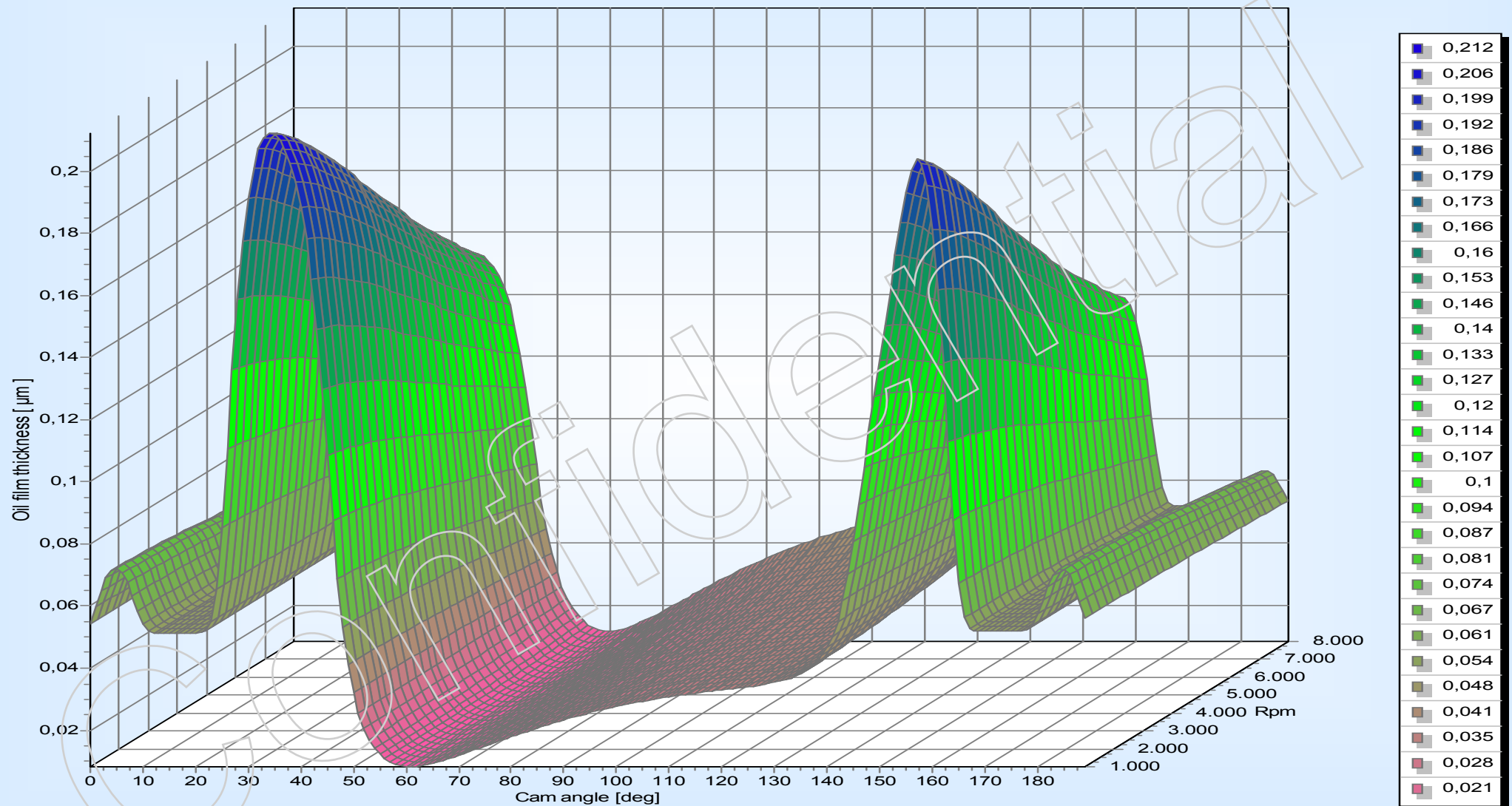
CDS- Development Documentation

CDS

C:\CBuilder5\All_Users\acn.APA

C:\CBuilder5\All_Users\Demosh.Par

Oil film thickness in rpm range

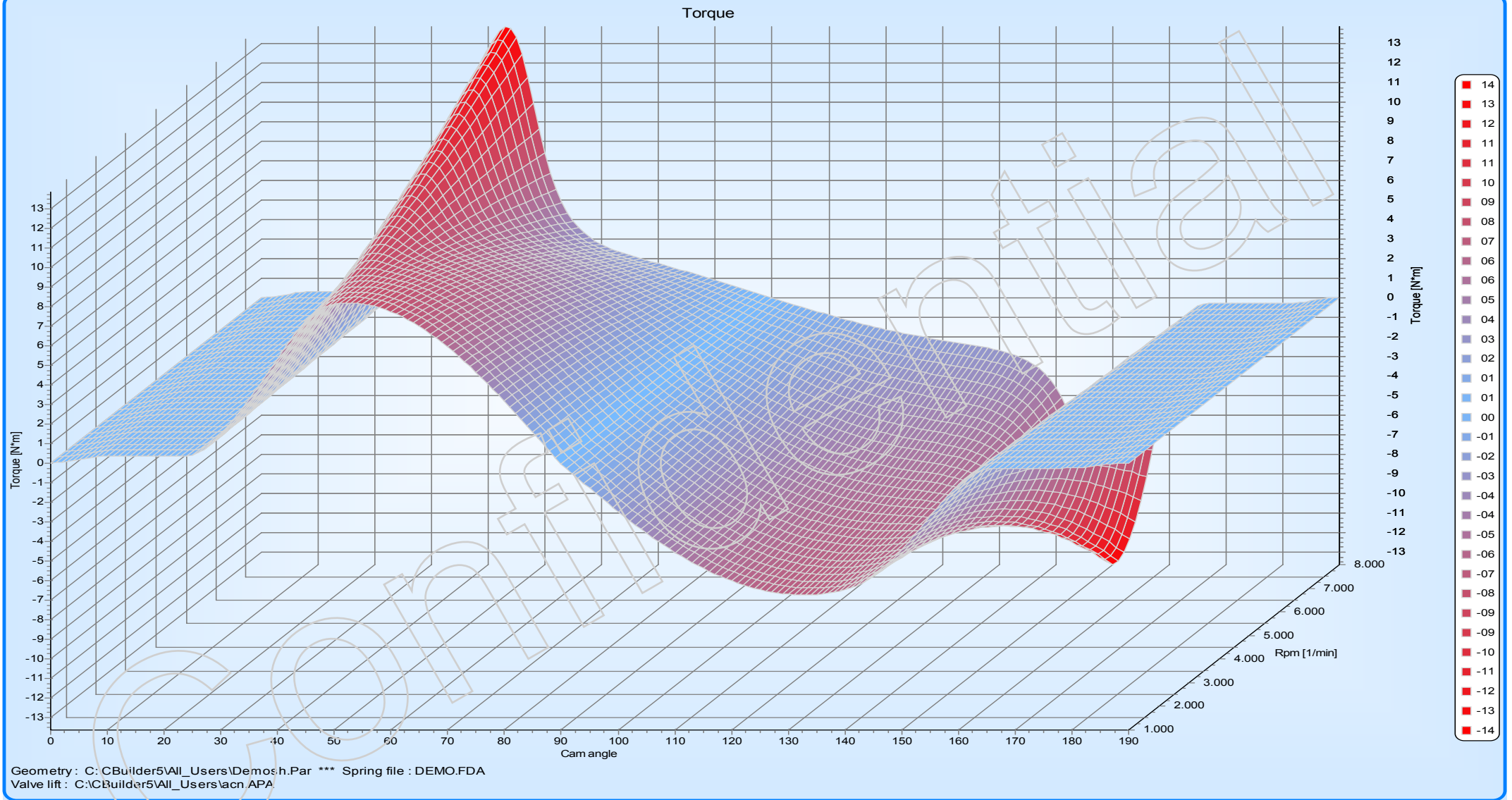


Date and time: Mon May 4 10:49:34 2020

CDS- Development Documentation

Finger follower valvetrain

CDS



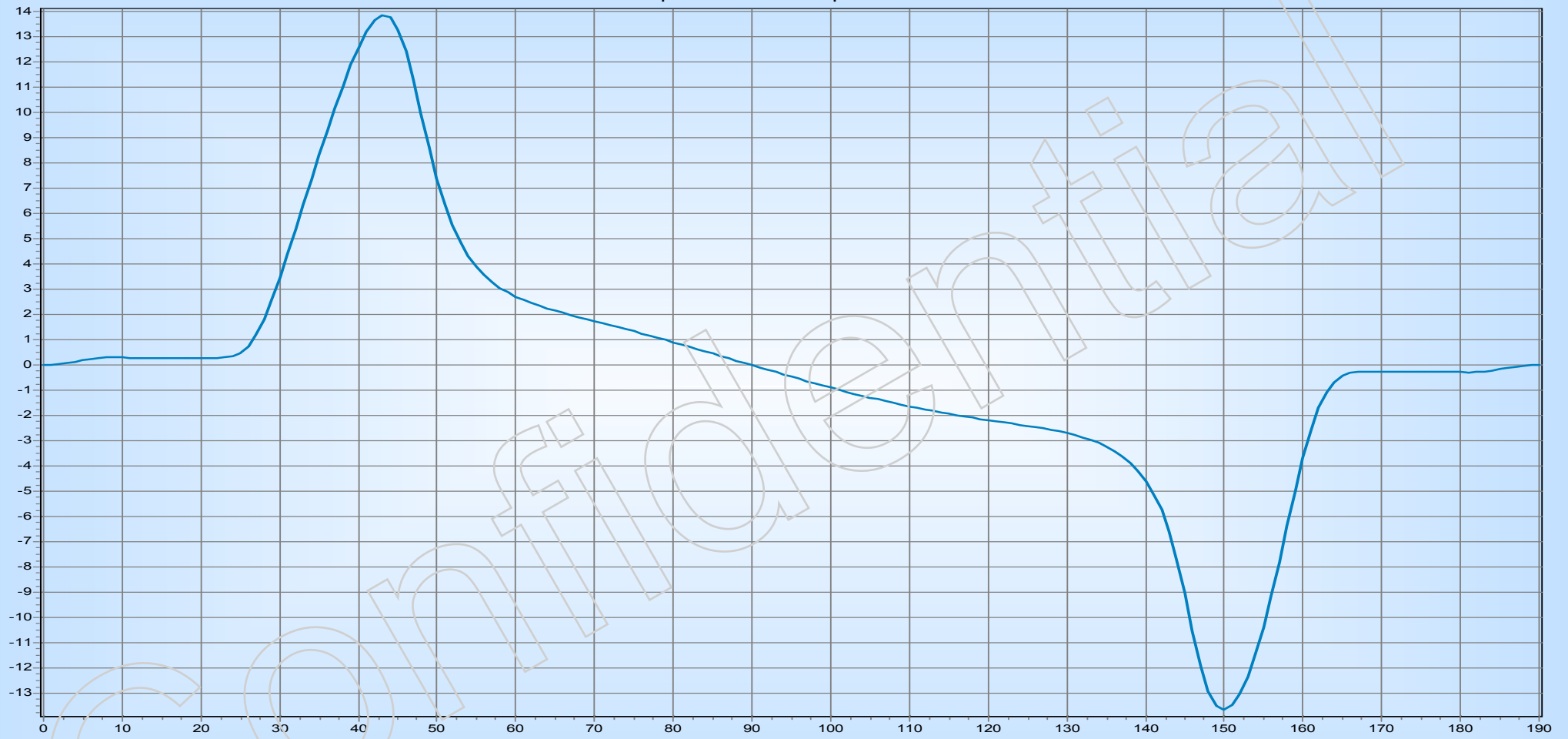
Date and time: Mon May 04 10:50:43 2020

CDS- Development Documentation

Torque_in_RpM_Range

CDS

Torque -> Selected RpM: 8000



Geometry : C:\CBuilder5\All_Users\Demo\Par *** Spring file : DEMO.FDA
Valve lift : C:\CBuilder5\All_Users\Demo\Valve.LIFT

Date and time: Mon May 04 10:50:43 2020

CDS- Development Documentation

Torque_Single_RpM

