

# GRISPE

**Guidelines and Recommendations for Integrating Specific Profiled steel sheets in the Eurocodes (GRISPE)**

## Test report

### Annex

**30.04.2015  
(Rev. 02)**

**Deliverable D 3.3**

**Guidelines and Recommendations for Integrating Specific Profiled Steels sheets in the Eurocodes  
(GRISPE)**

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## **1 Annex A: Object of testing**

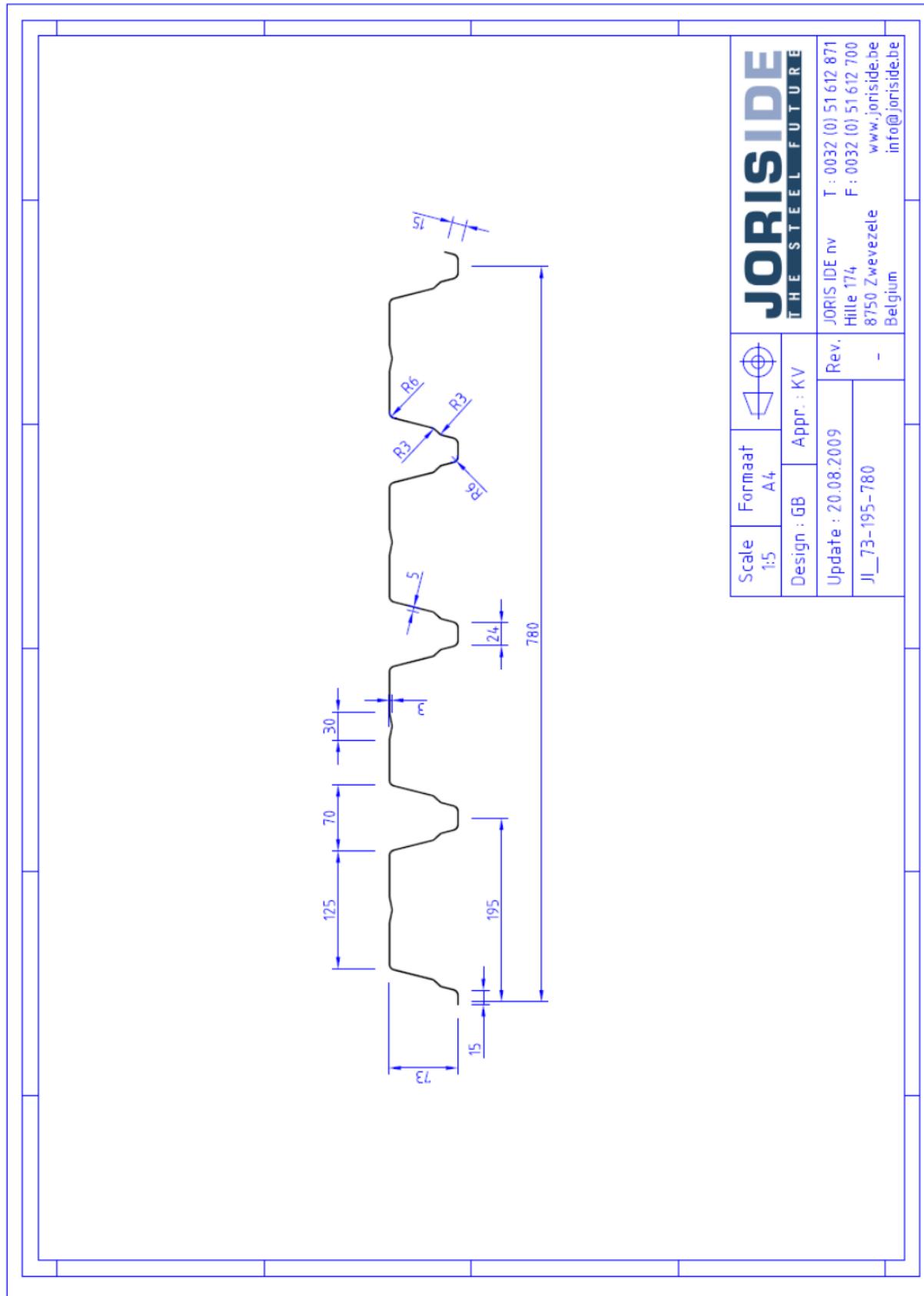


Figure A.1: Cross-section of PML 73

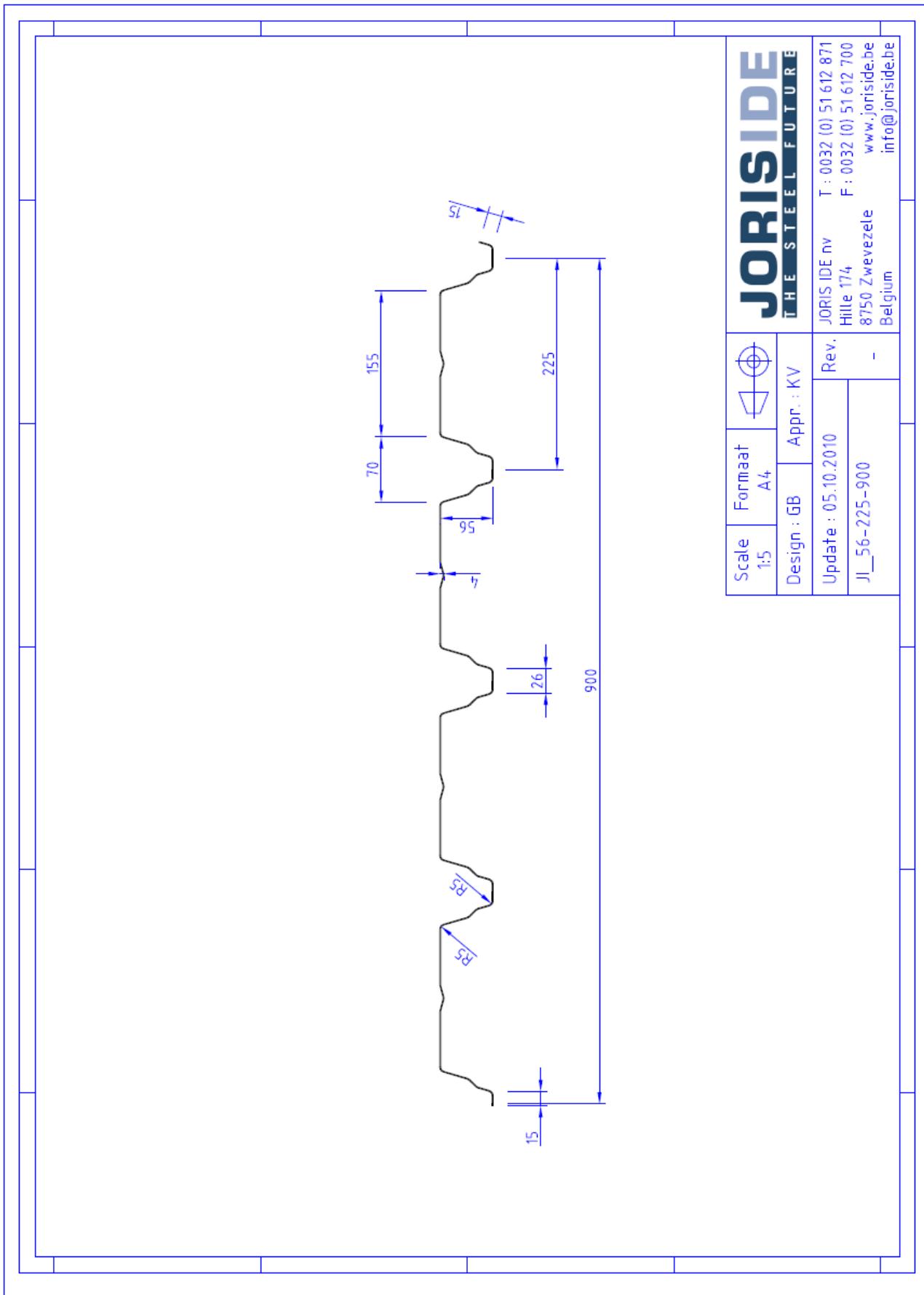


Figure A.2: Cross-section of PML 56

## 2 Annex B: Single span positive bending tests

### Tests set-up:

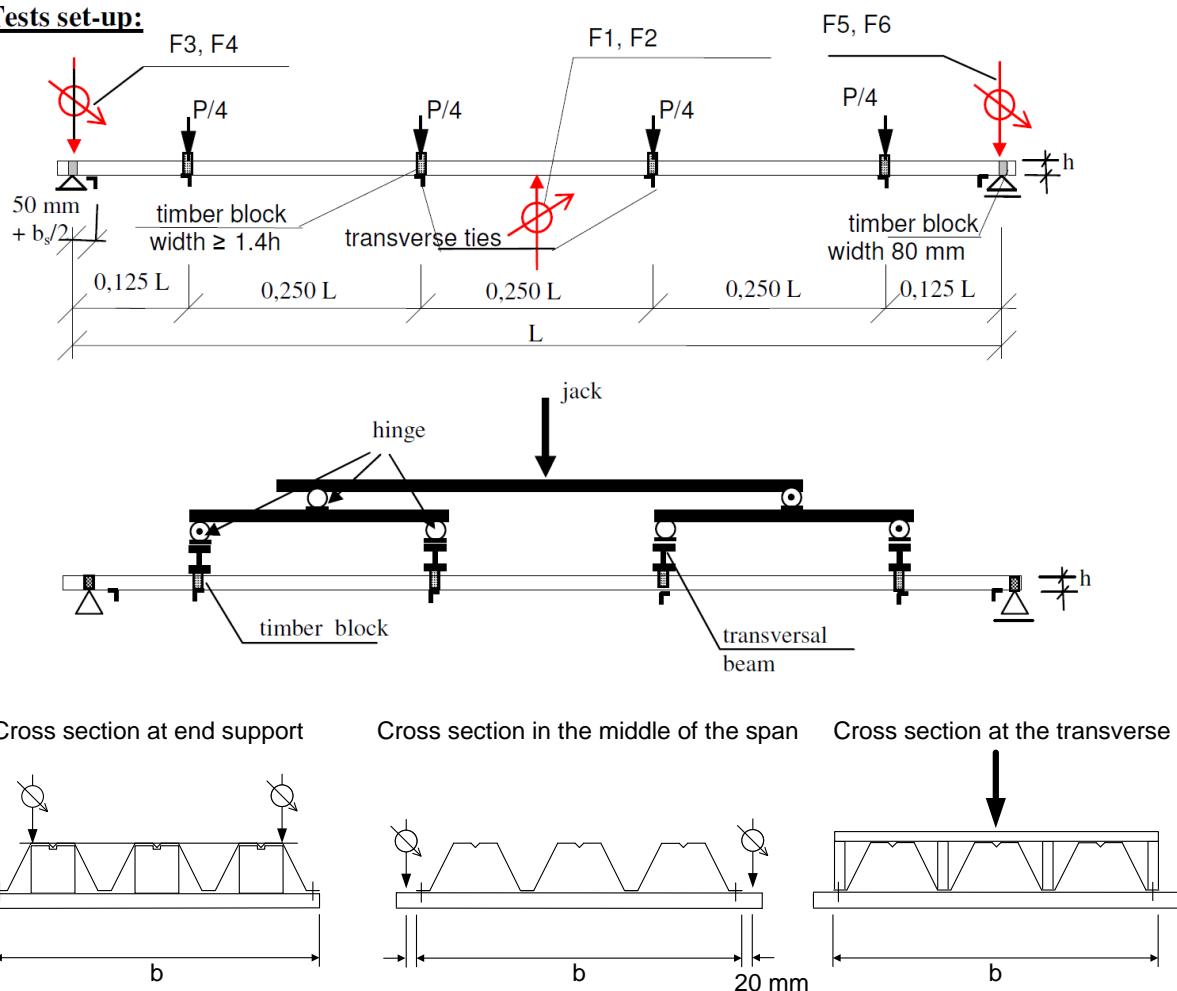


Figure B.1: Schematic test setup



Figure B.2: Test setup (exemplary for PF-4-075-1)

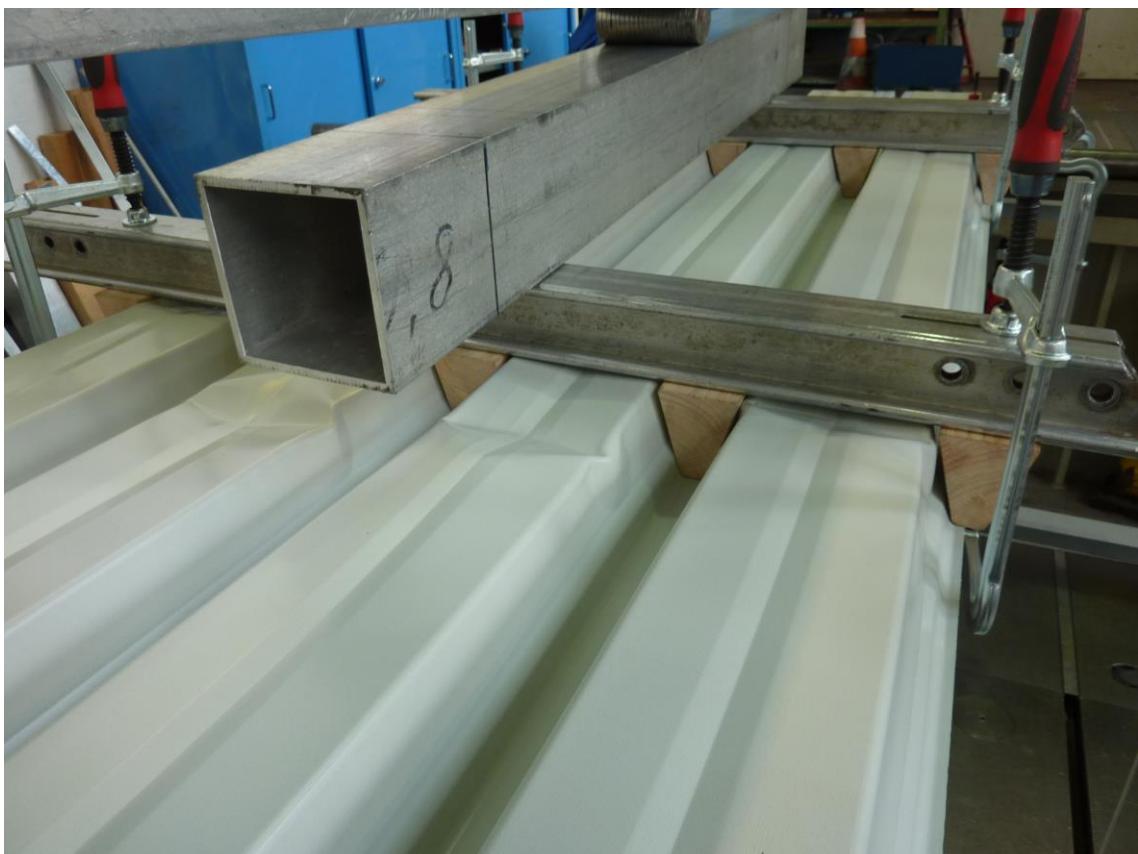


Figure B.3: Failure mode (exemplary for PF-4-075-2)



Figure B.4: Failure mode (exemplary for PF-4f-100-1)

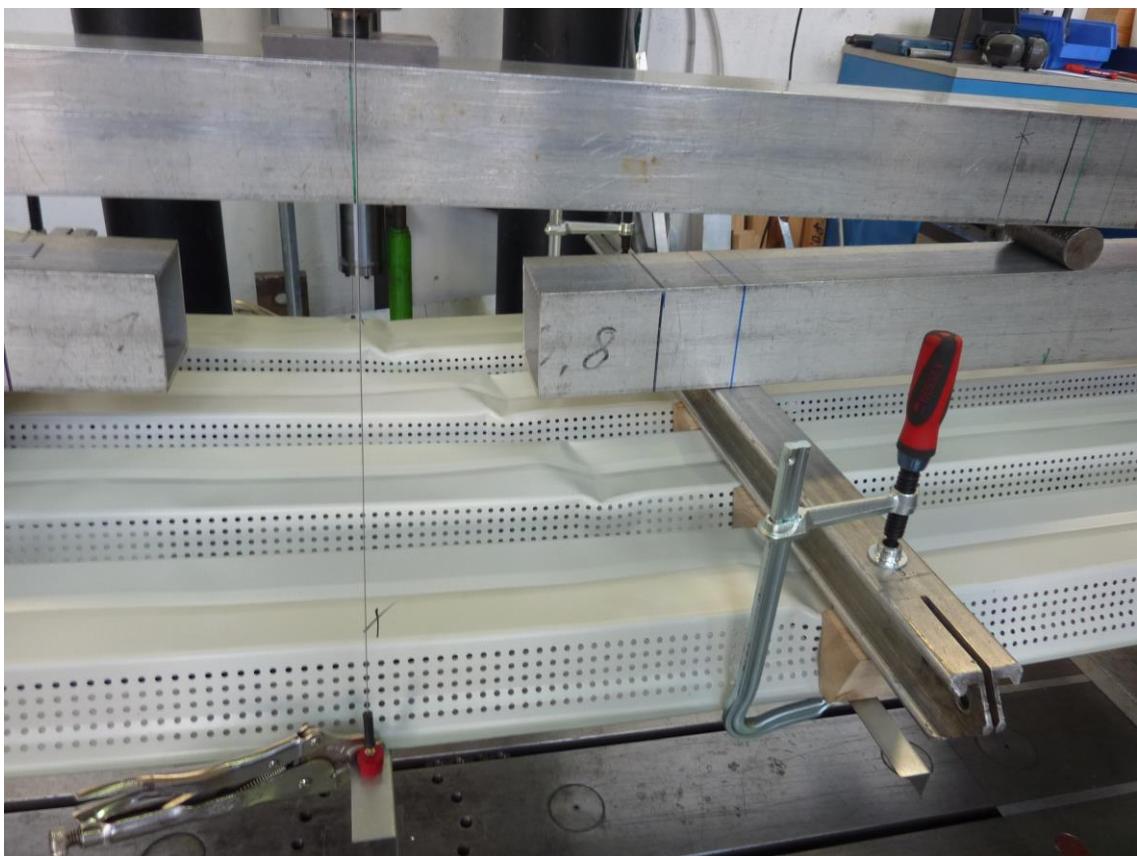


Figure B.5: Failure mode (exemplary for PF-4w-075-1)

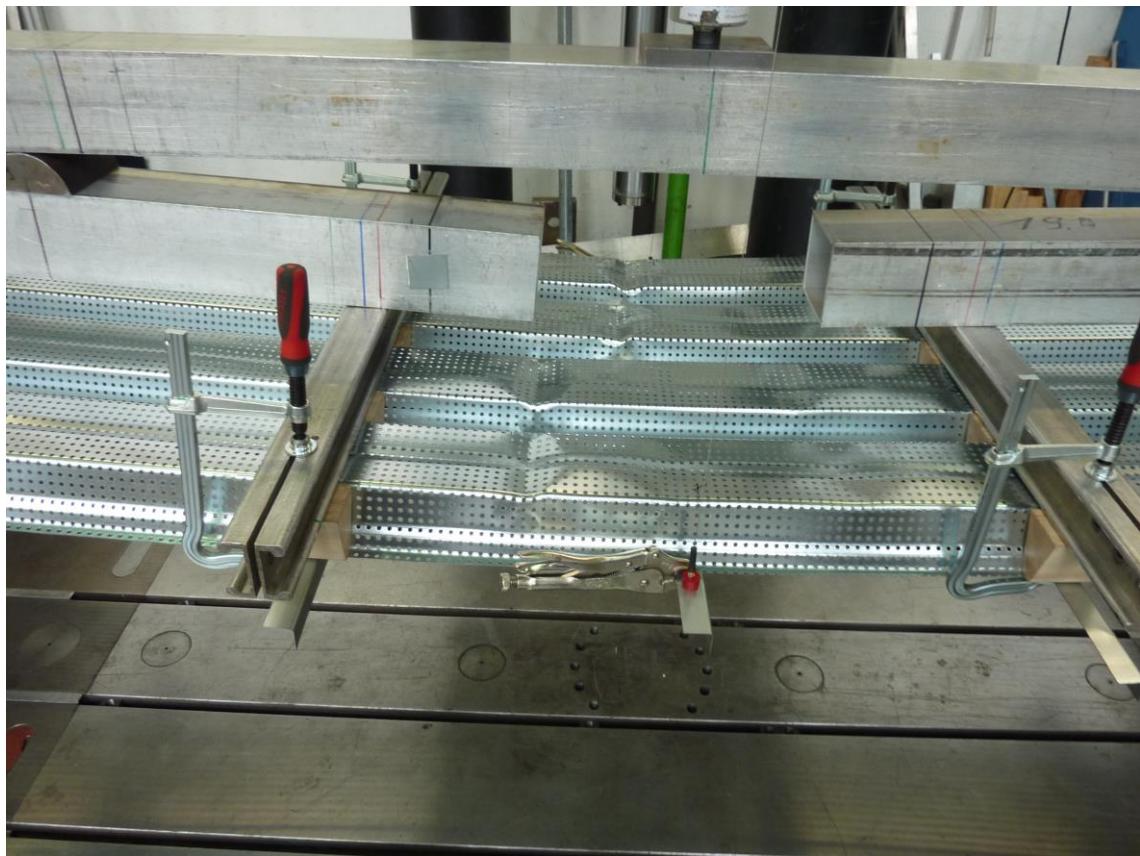


Figure B.6: Failure mode (exemplary for PF-4t-100-2)



Figure B.7: Failure mode (exemplary for PF-4Hs1-075-1)

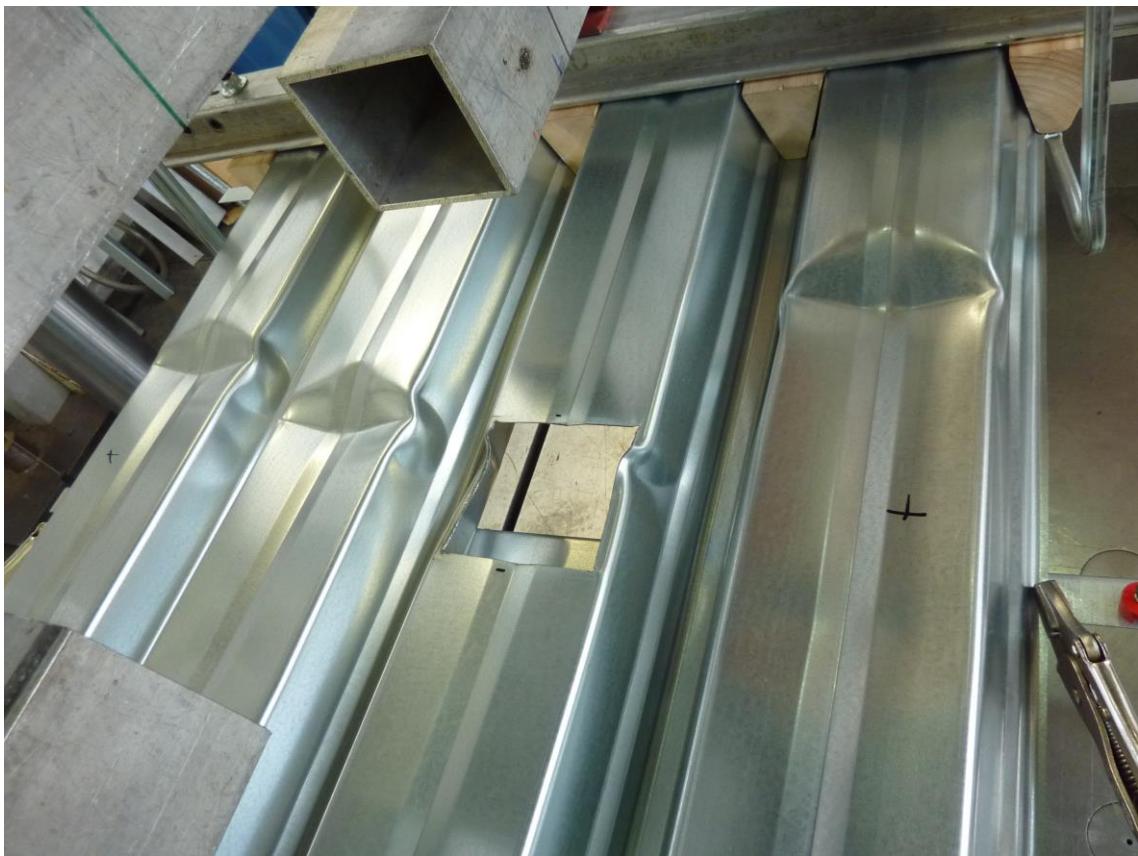


Figure B.8: Failure mode (exemplary for PF-4Hs2-075-2)

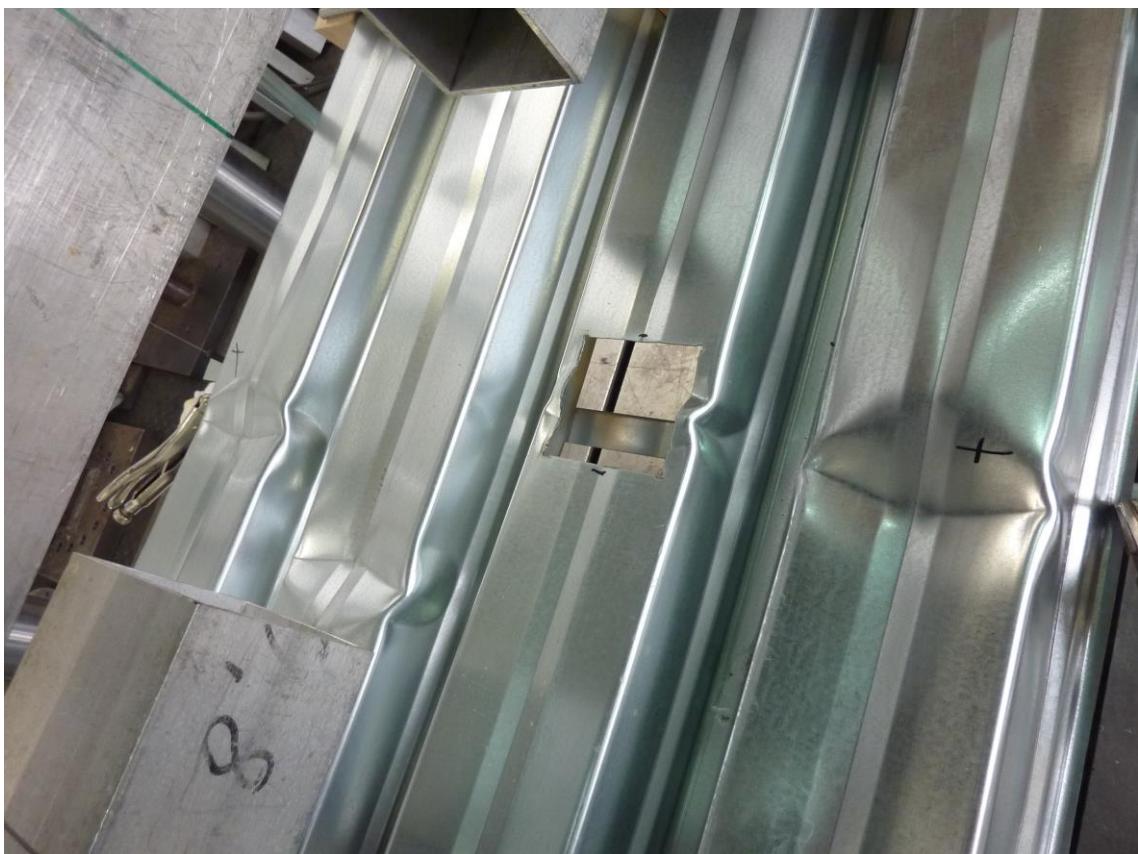


Figure B.9: Failure mode (exemplary for PF-4Hs3-075-1)

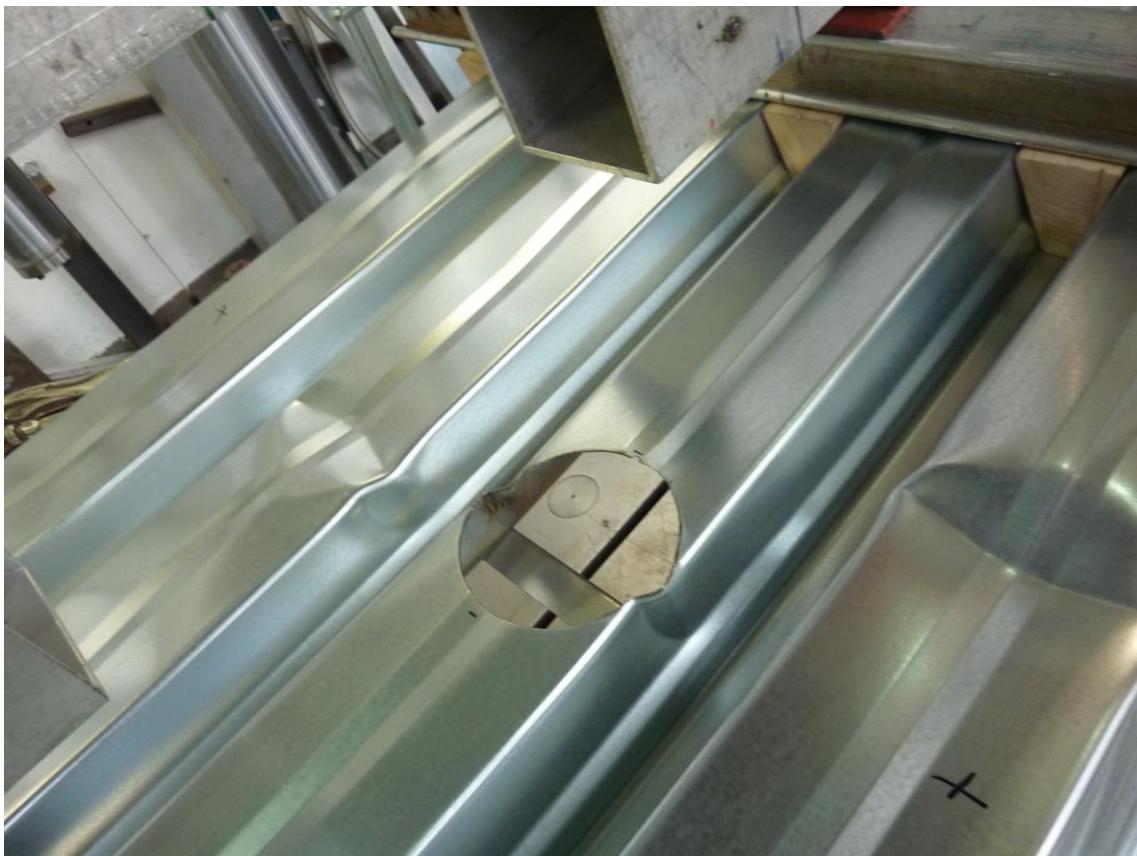


Figure B.10: Failure mode (exemplary for PF-4Hc1-075-2)

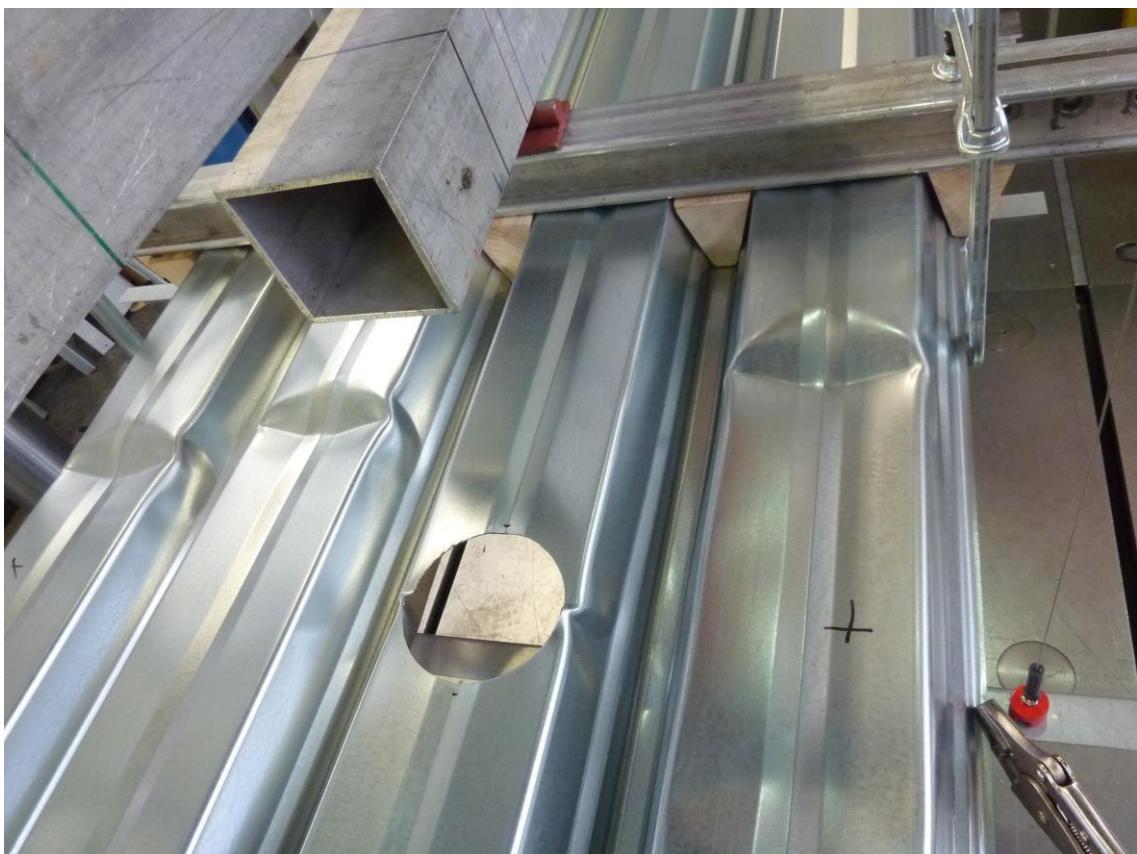


Figure B.11: Failure mode (exemplary for PF-4Hc2-075-2)

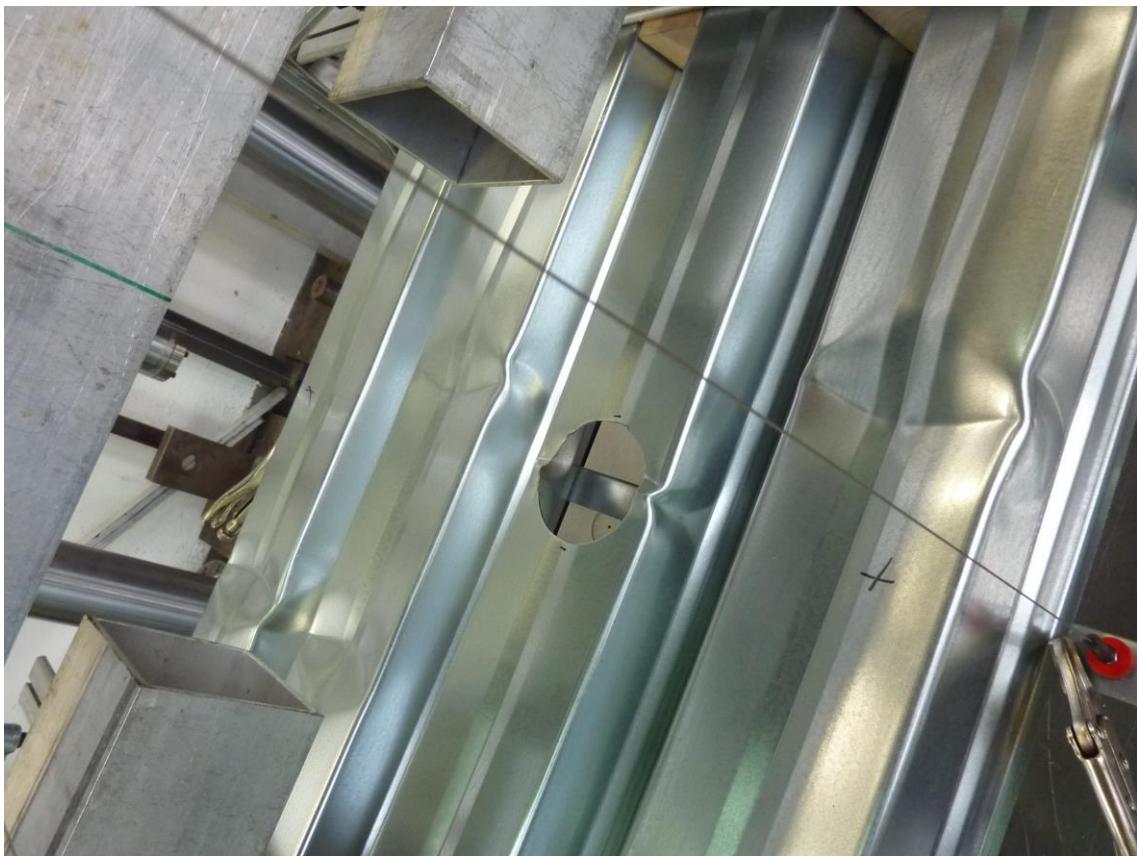
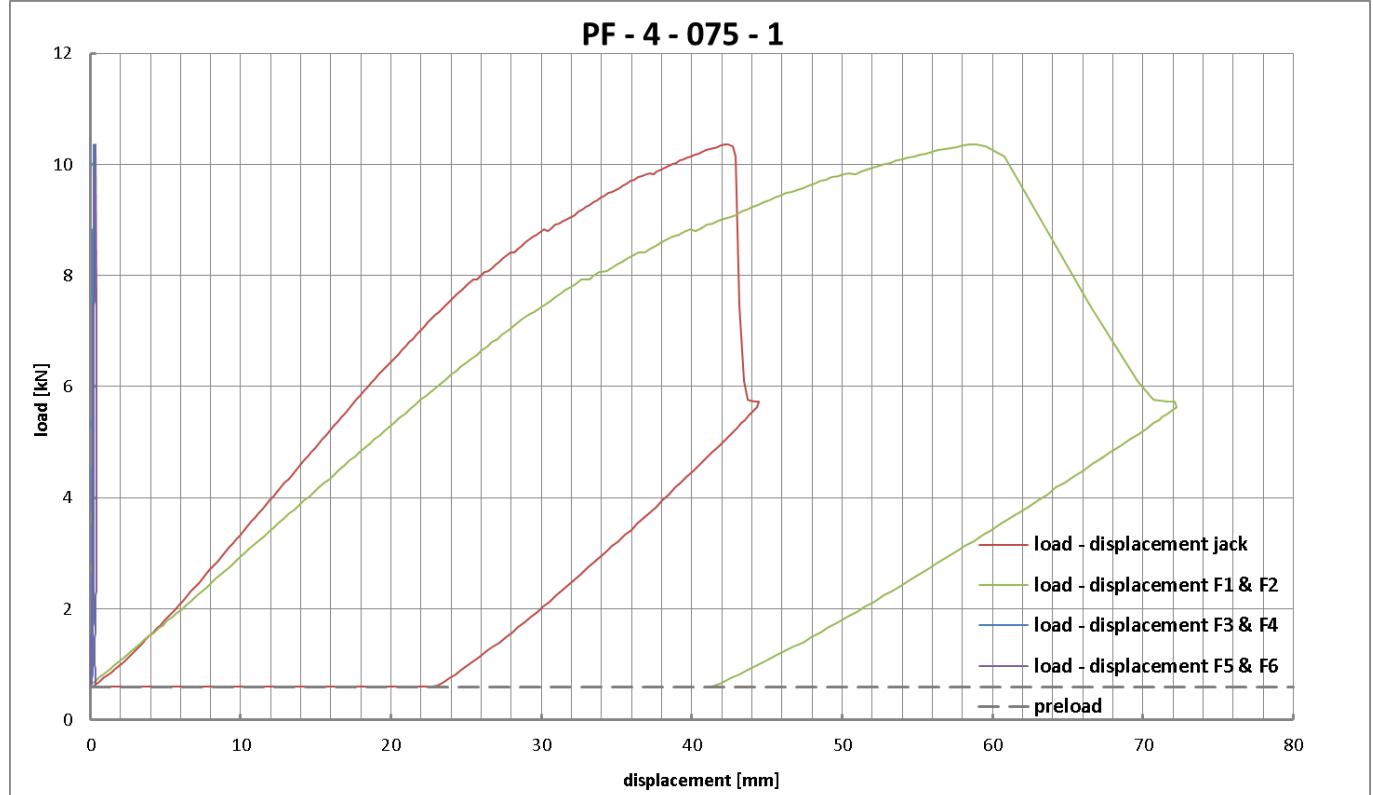
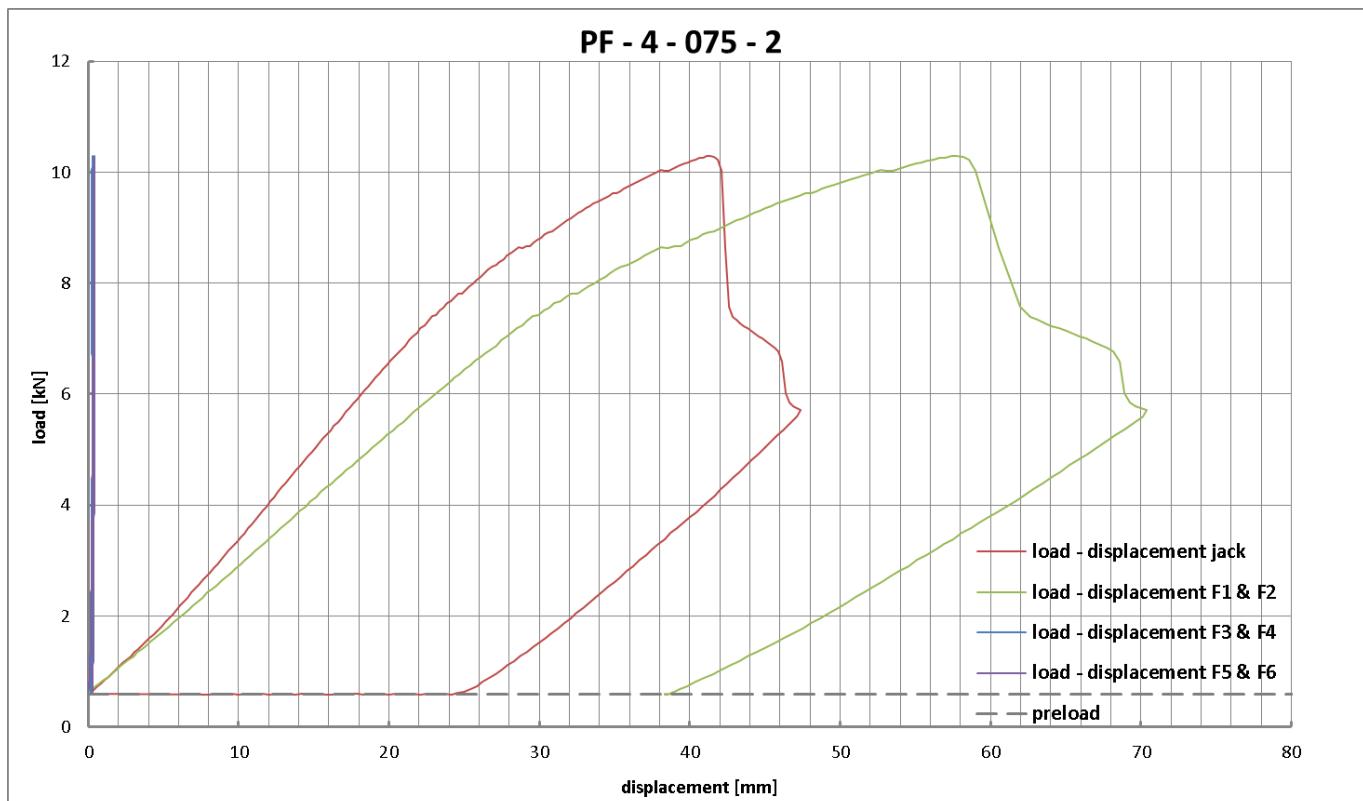
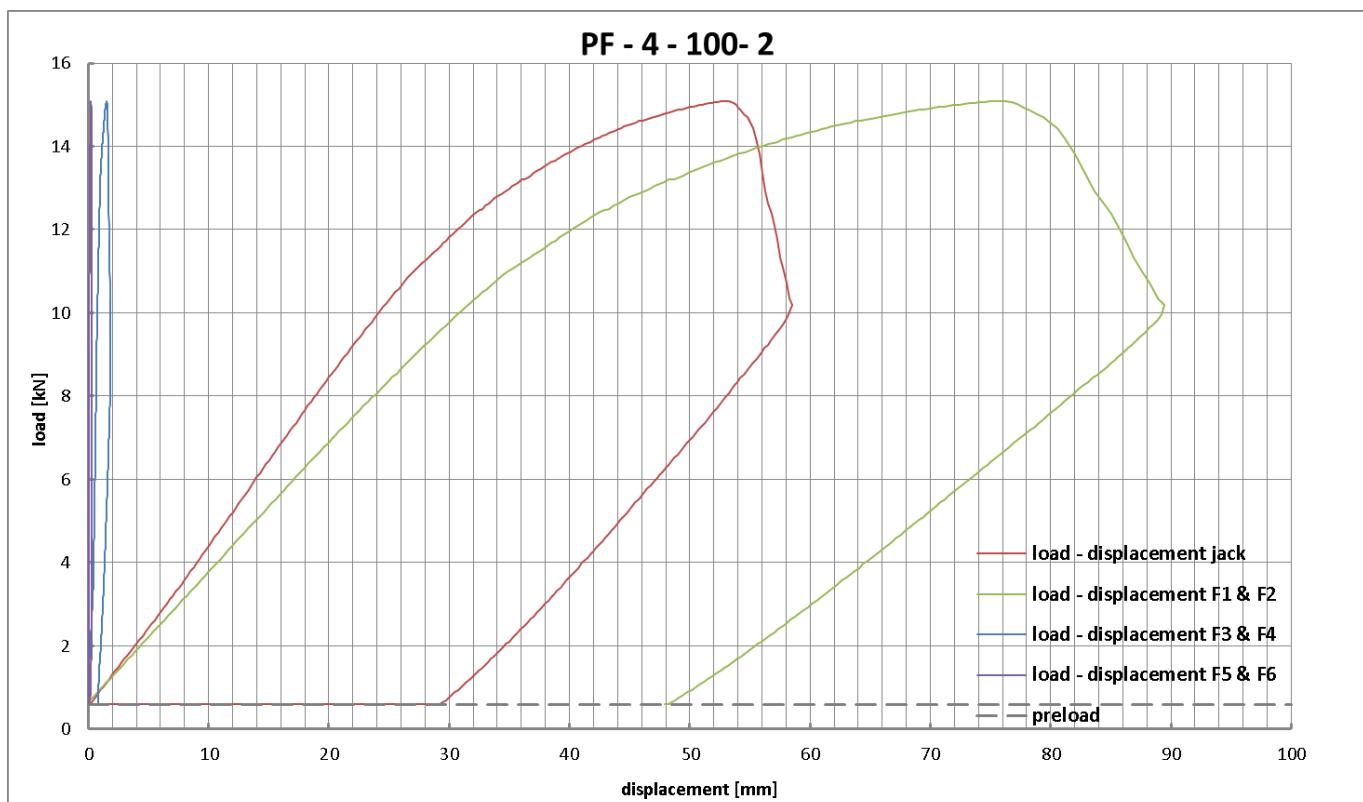
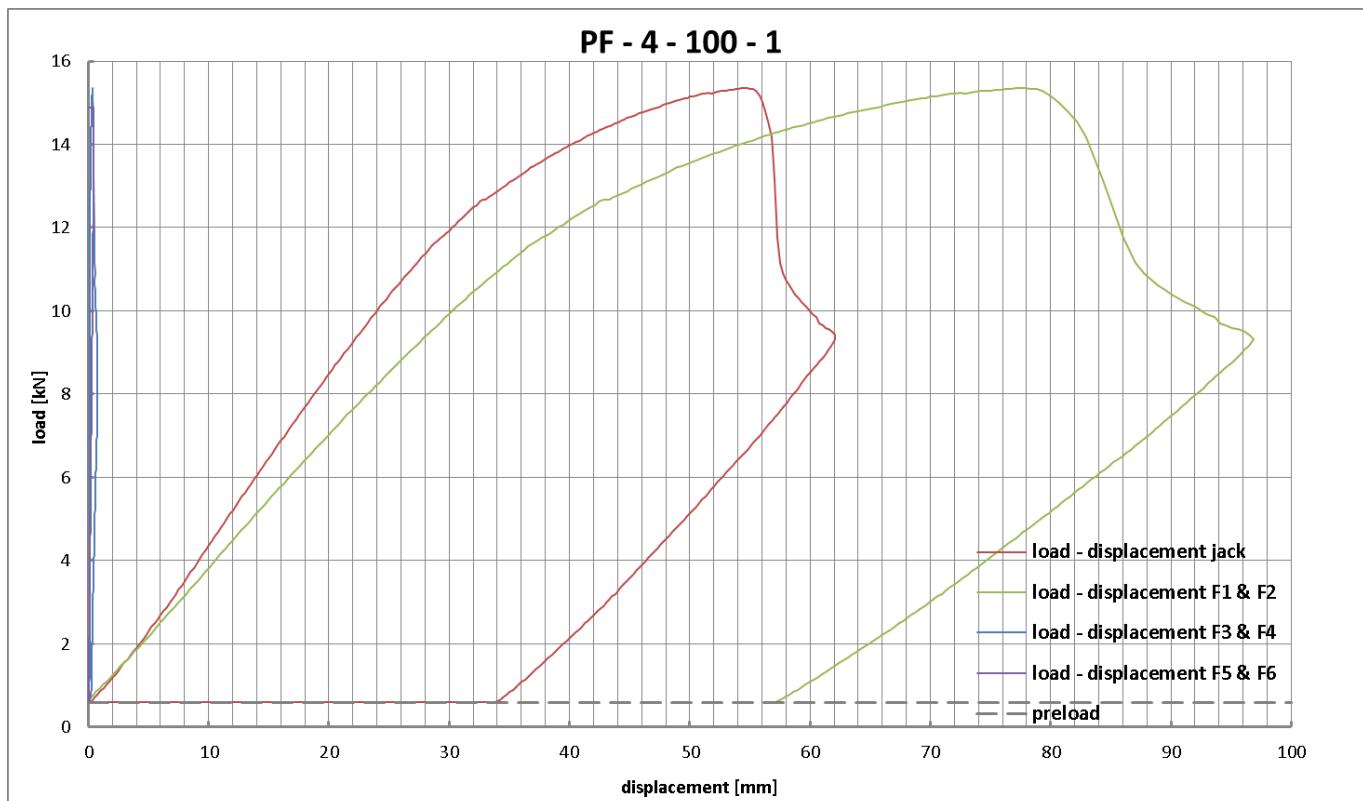


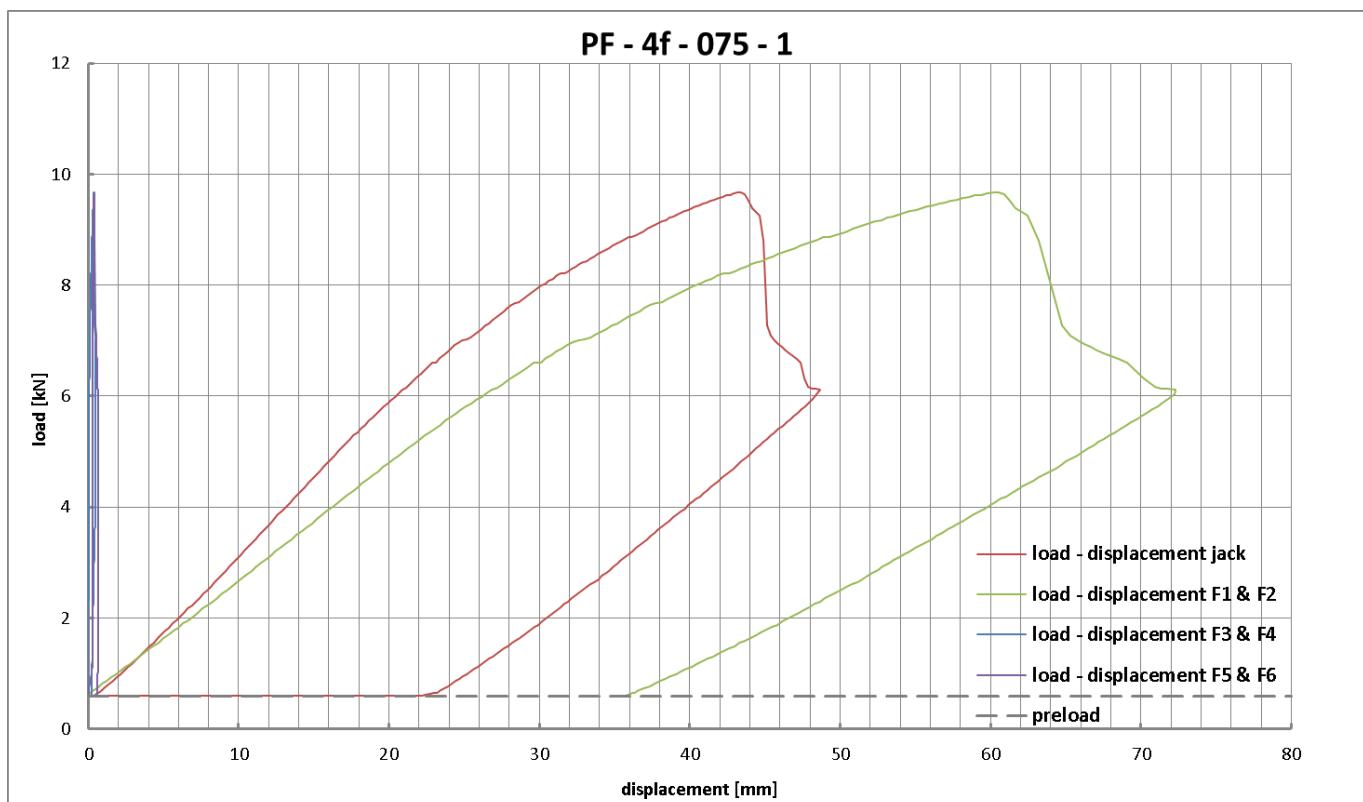
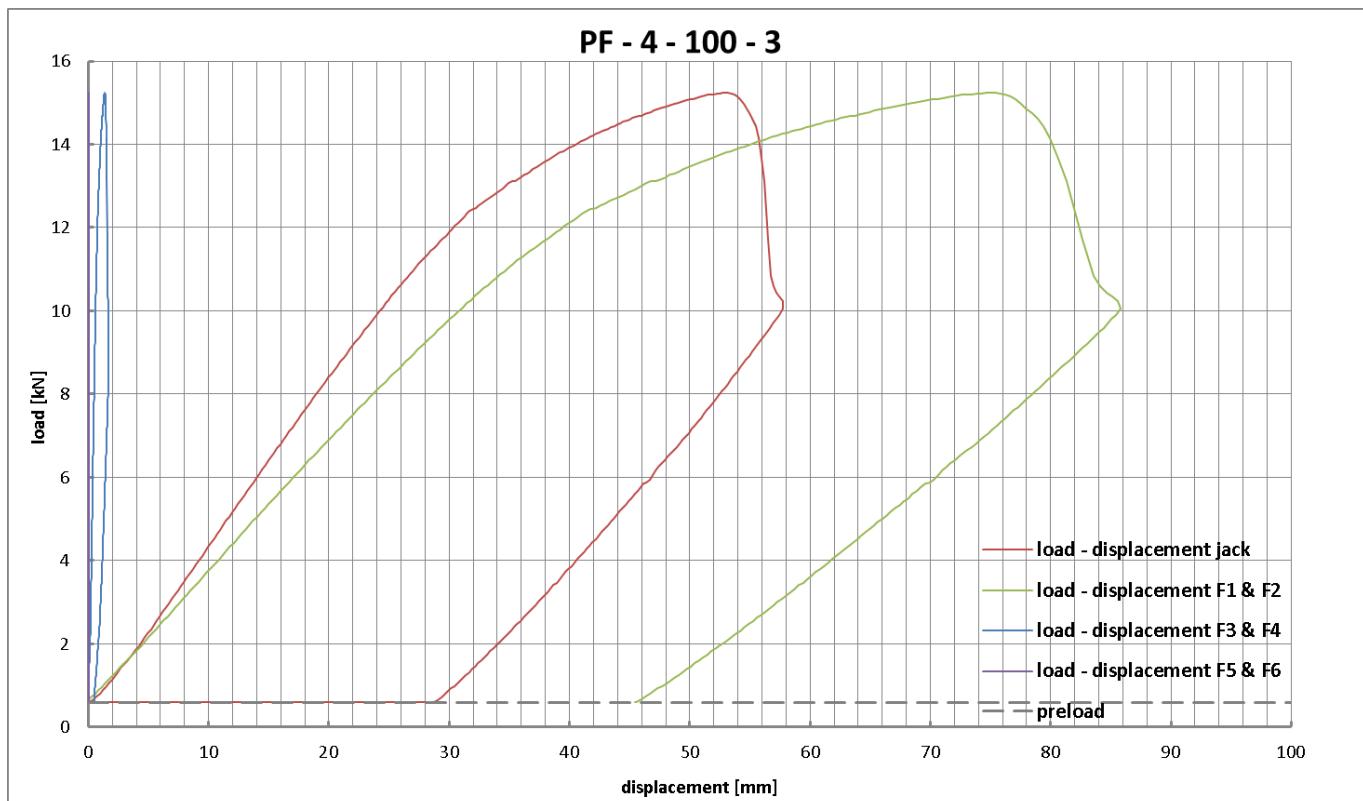
Figure B.12: Failure mode (exemplary for PF-4Hc3-075-1)

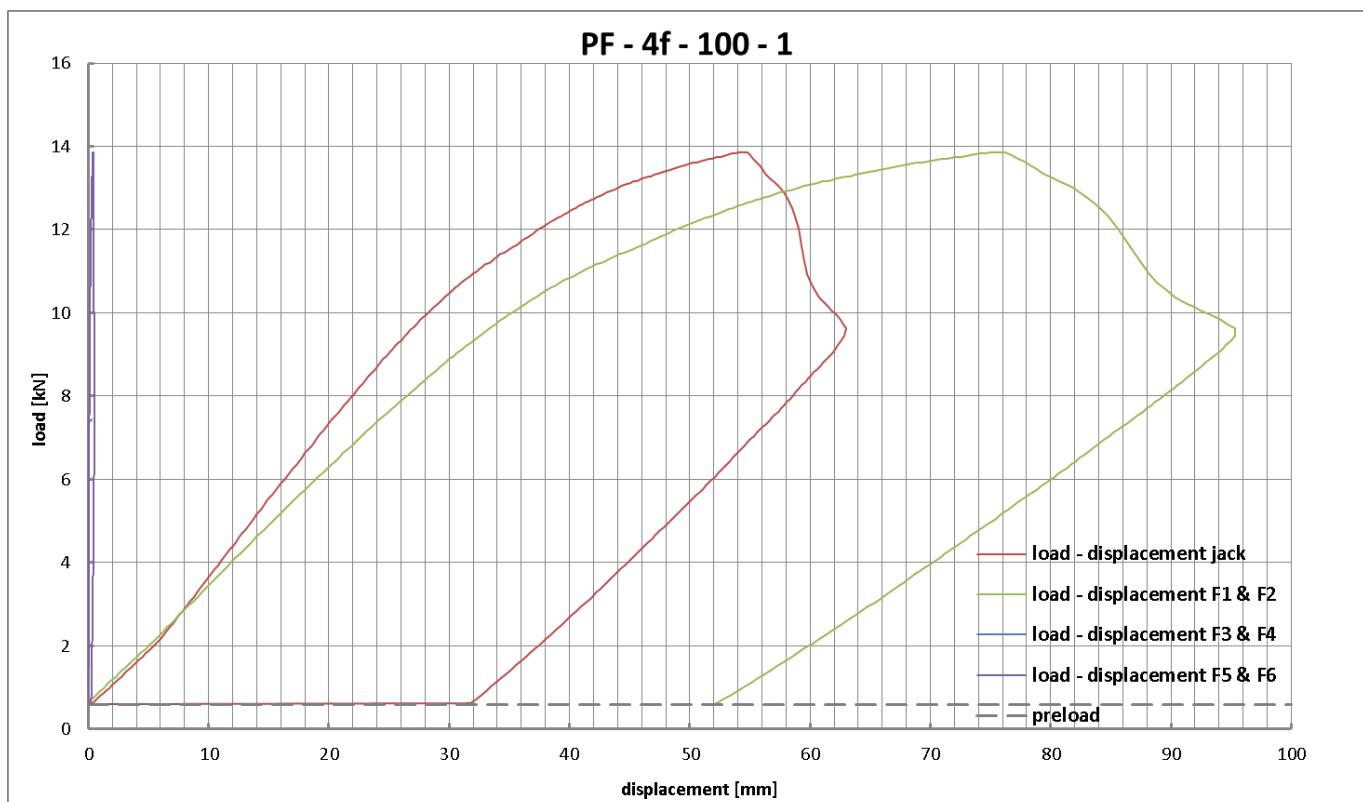
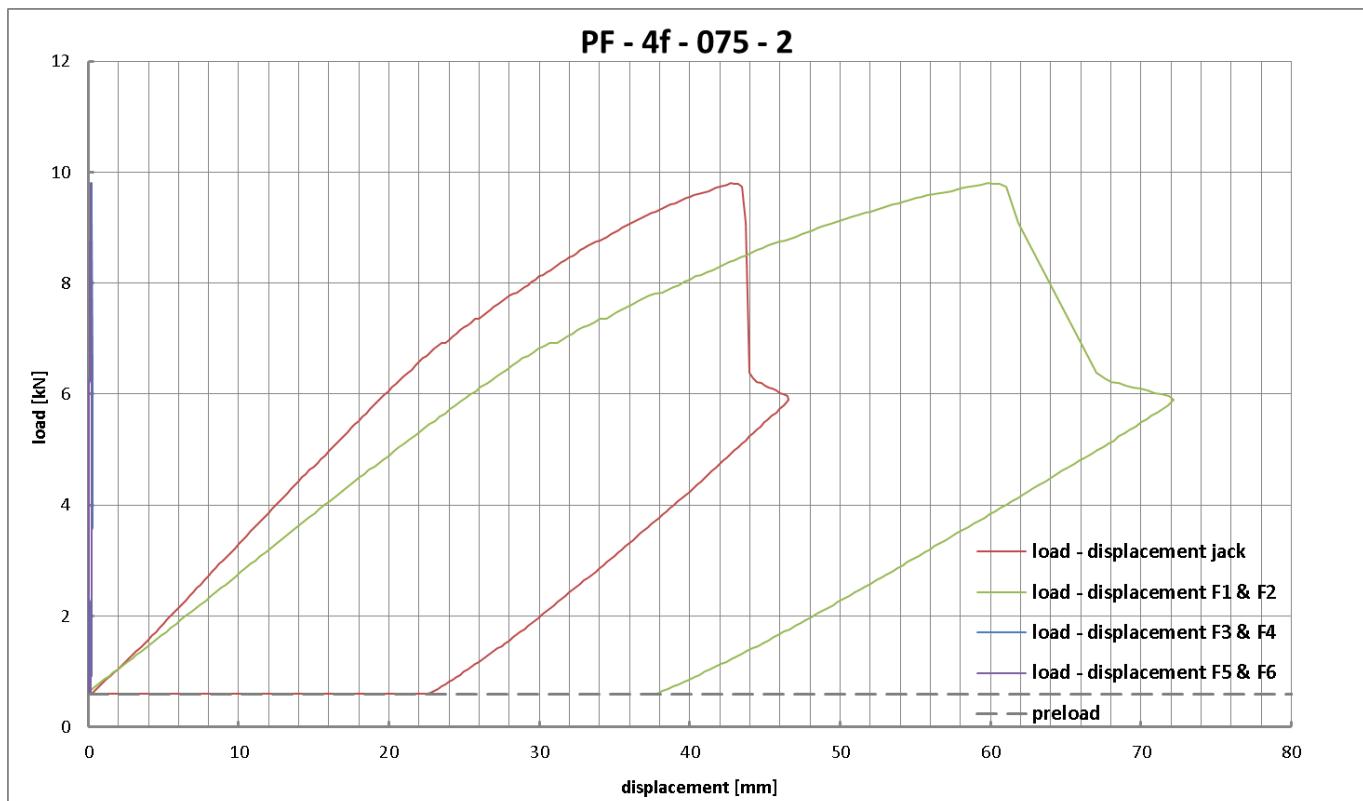
Load-deflection curves (with and without square perforation):

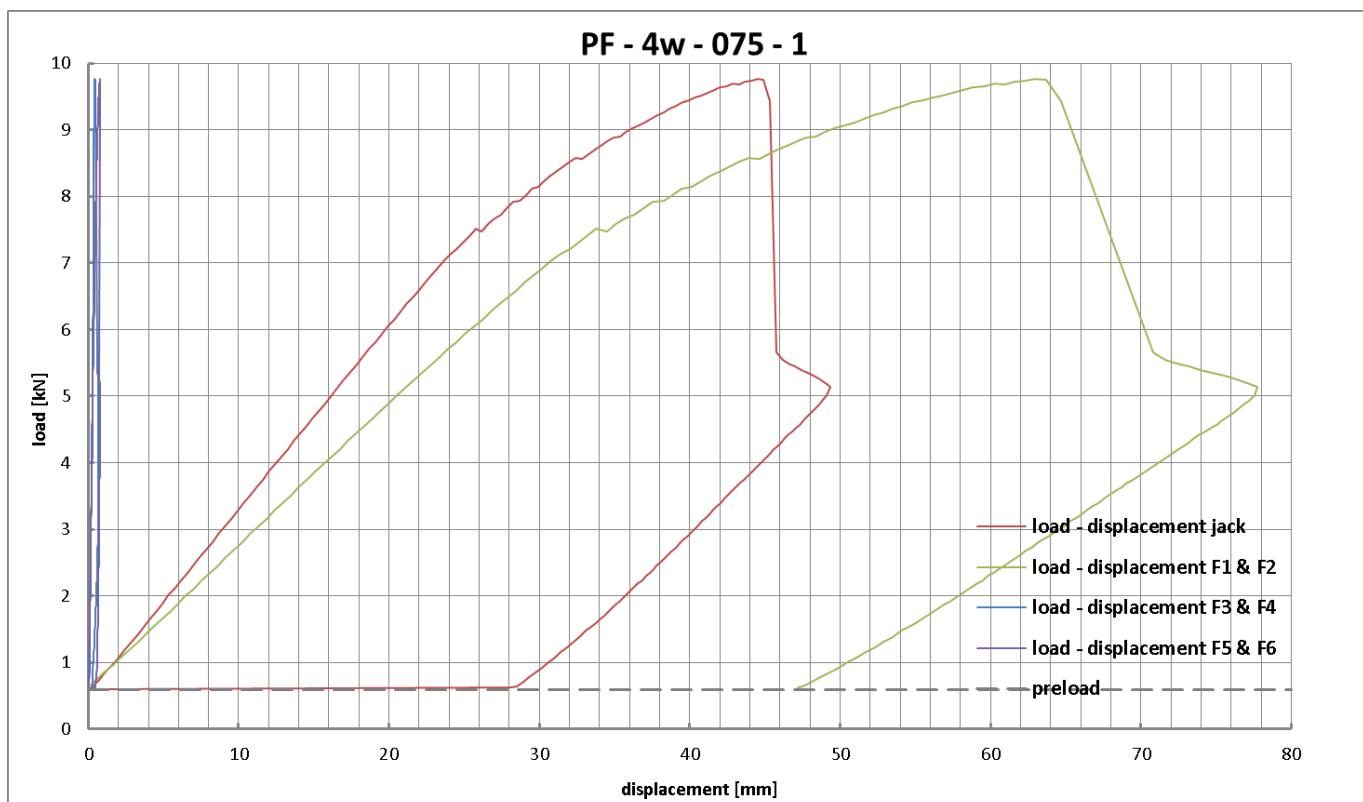
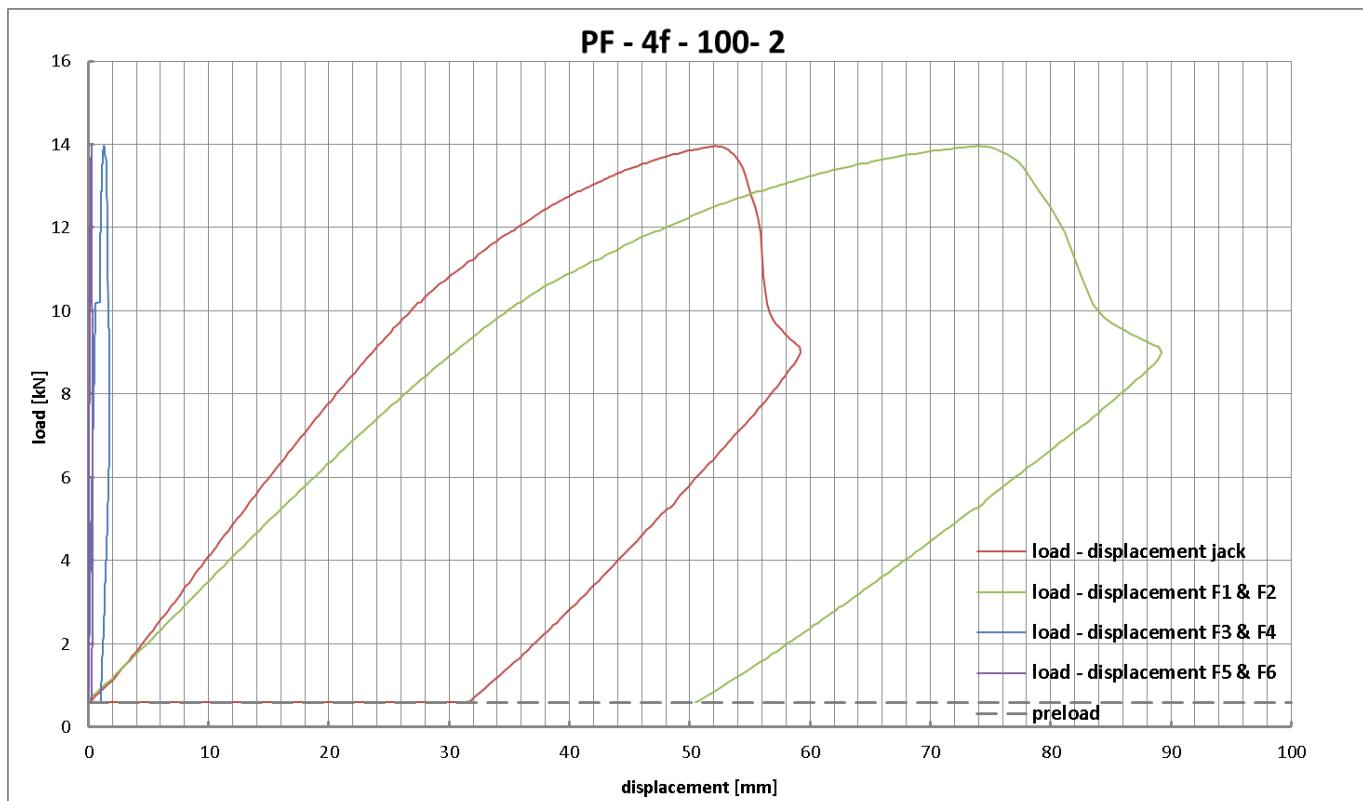


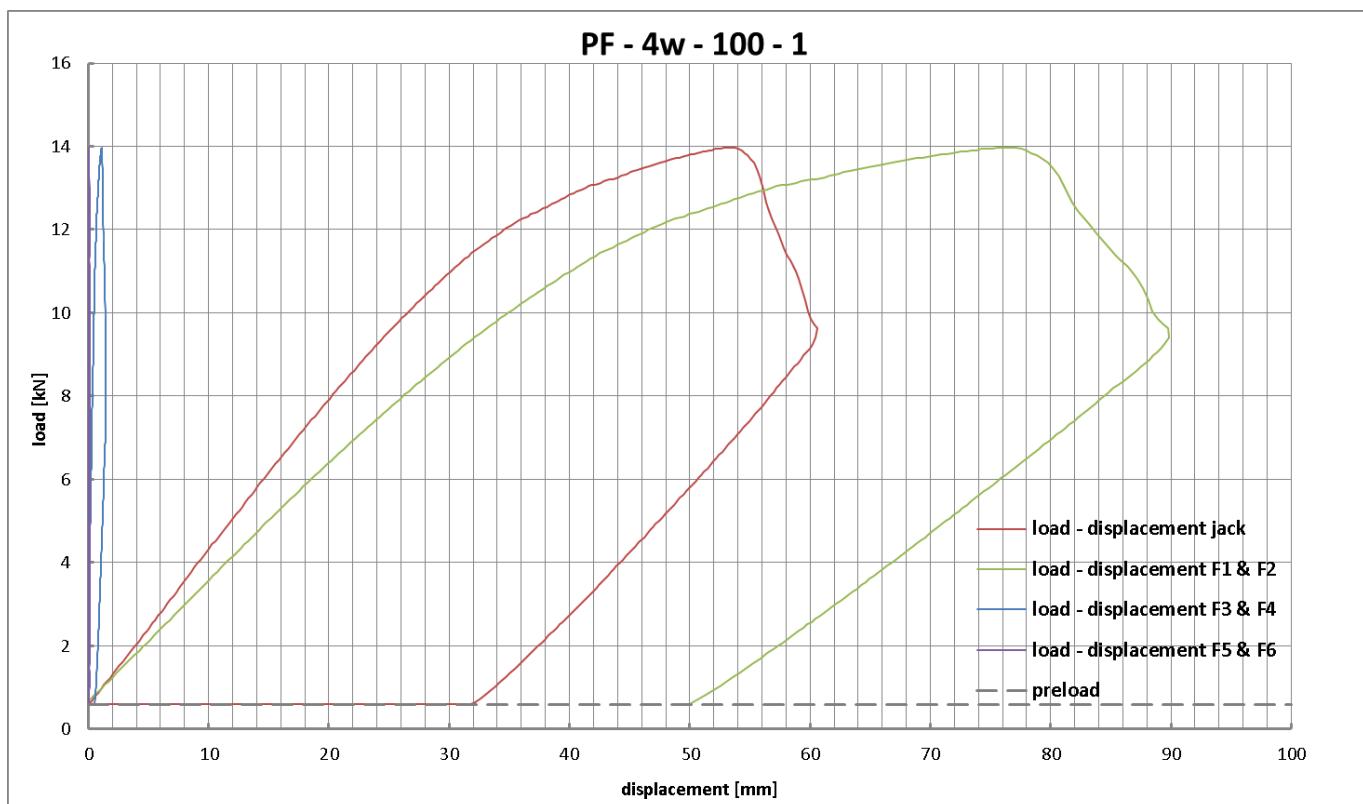
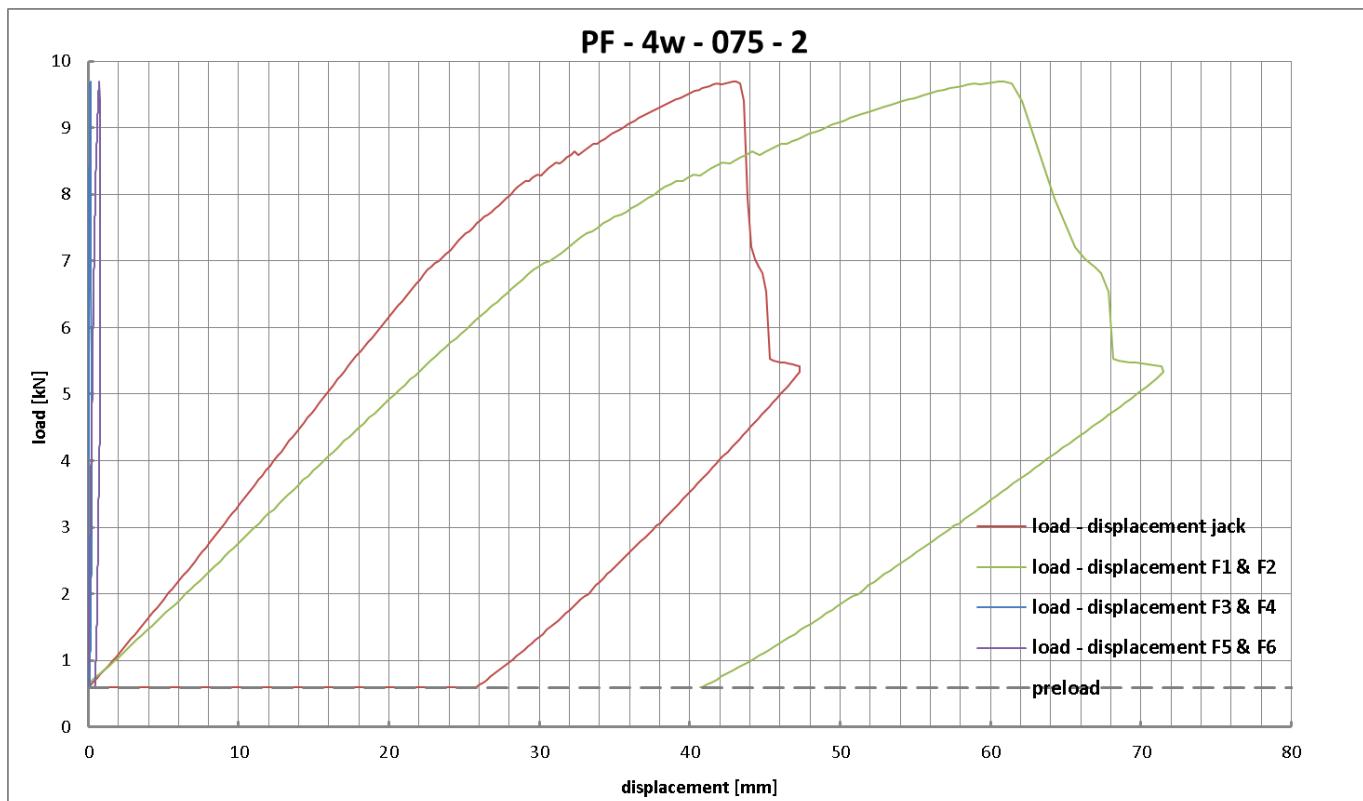


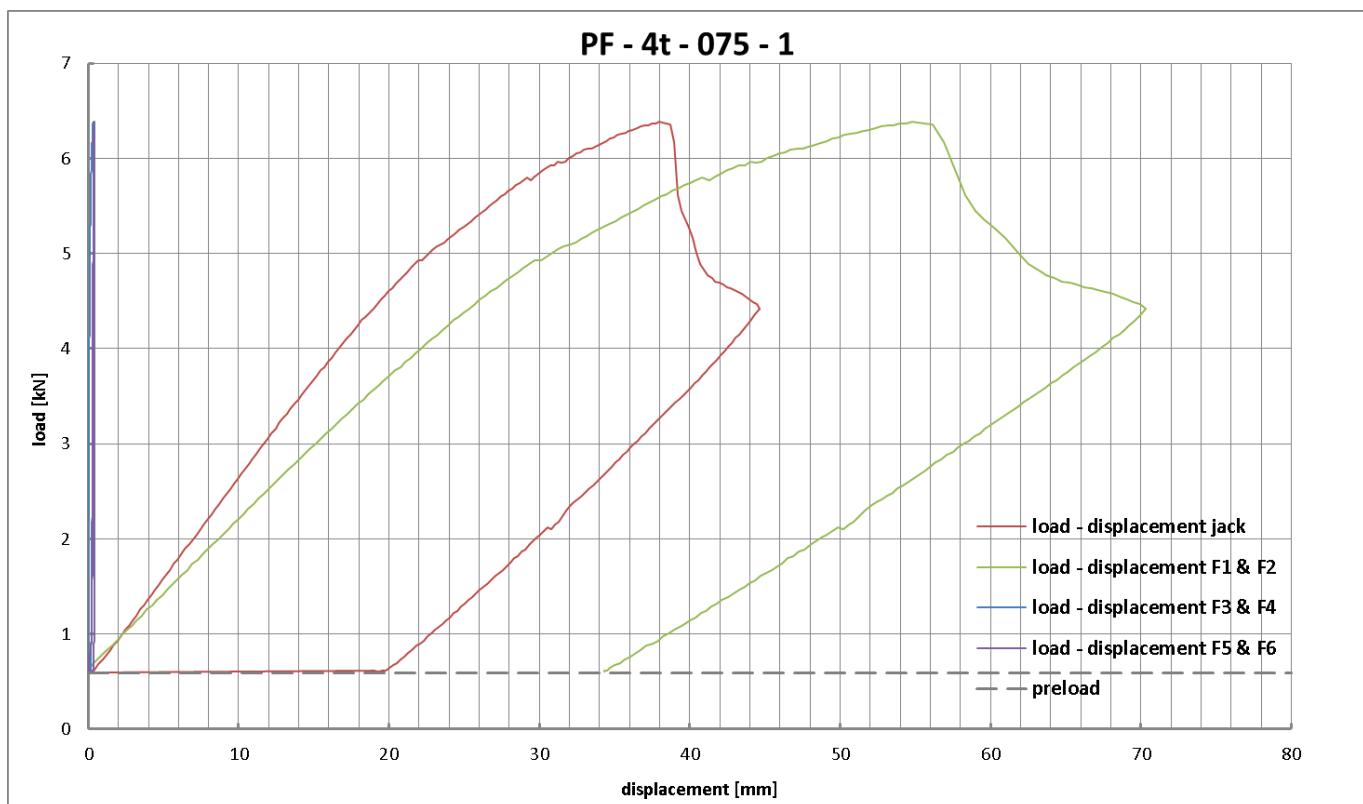
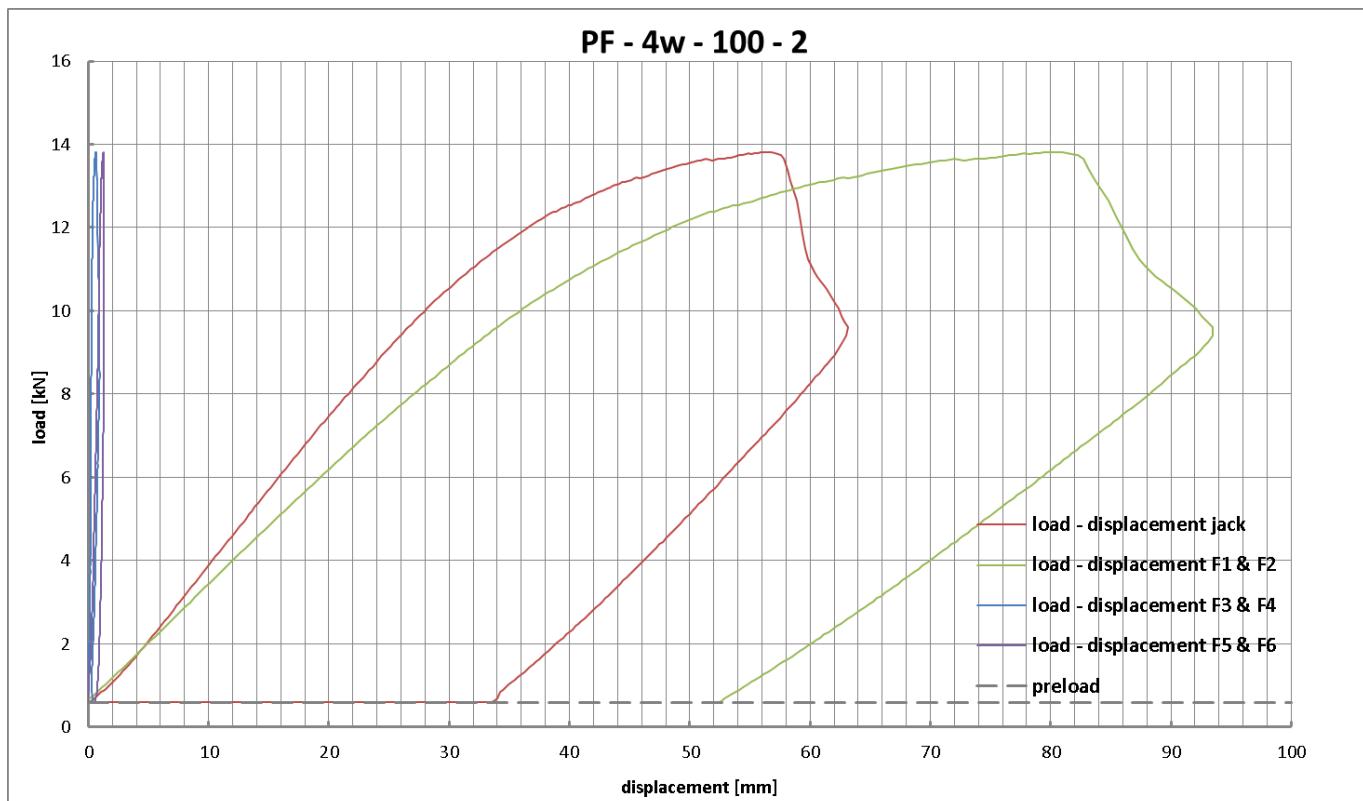


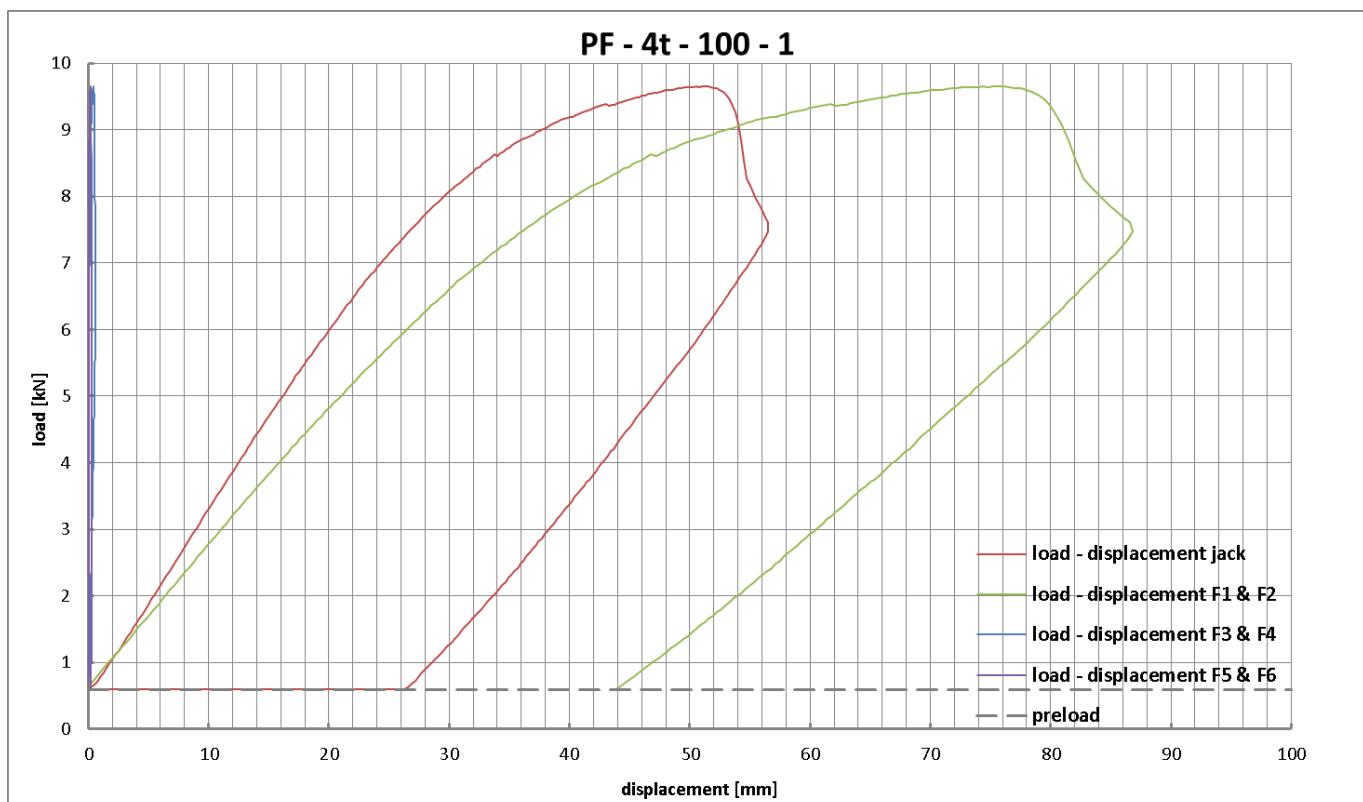
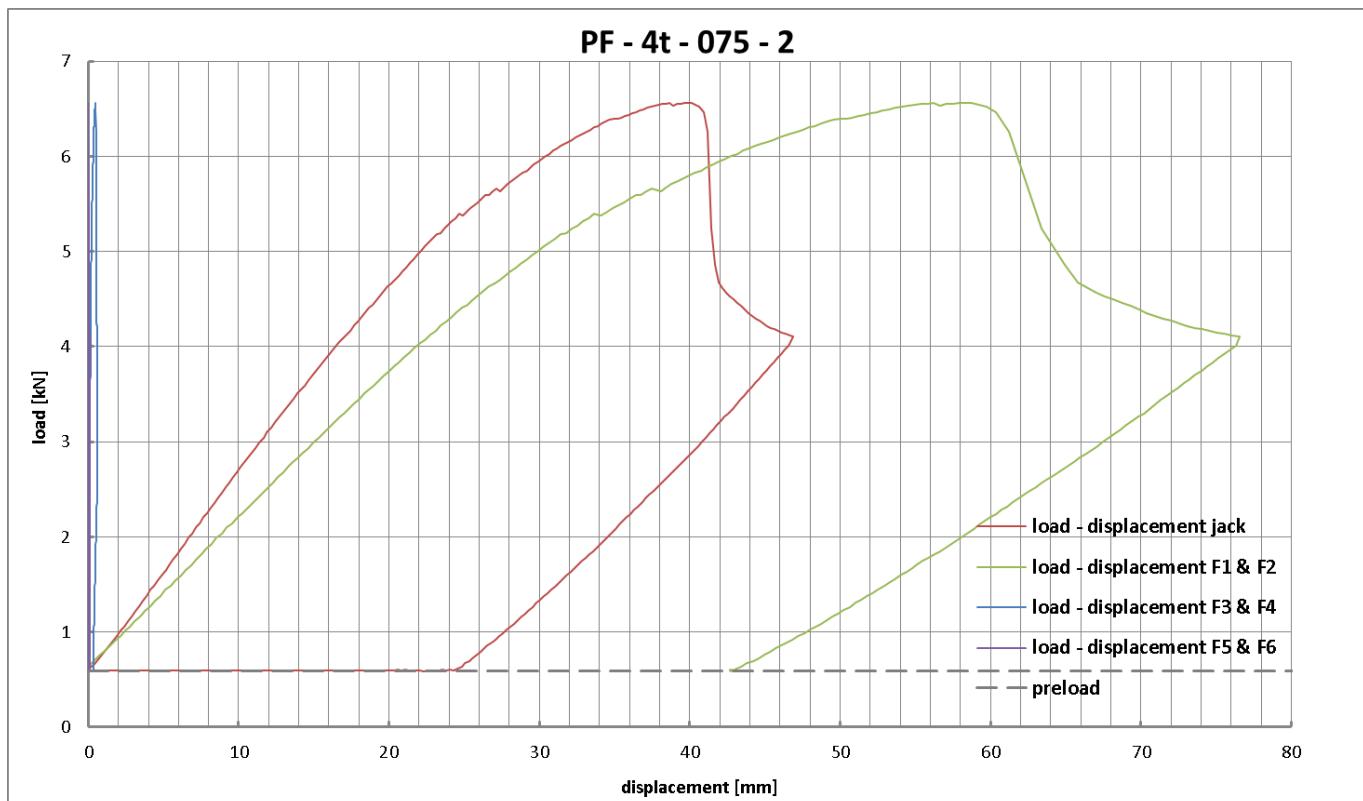


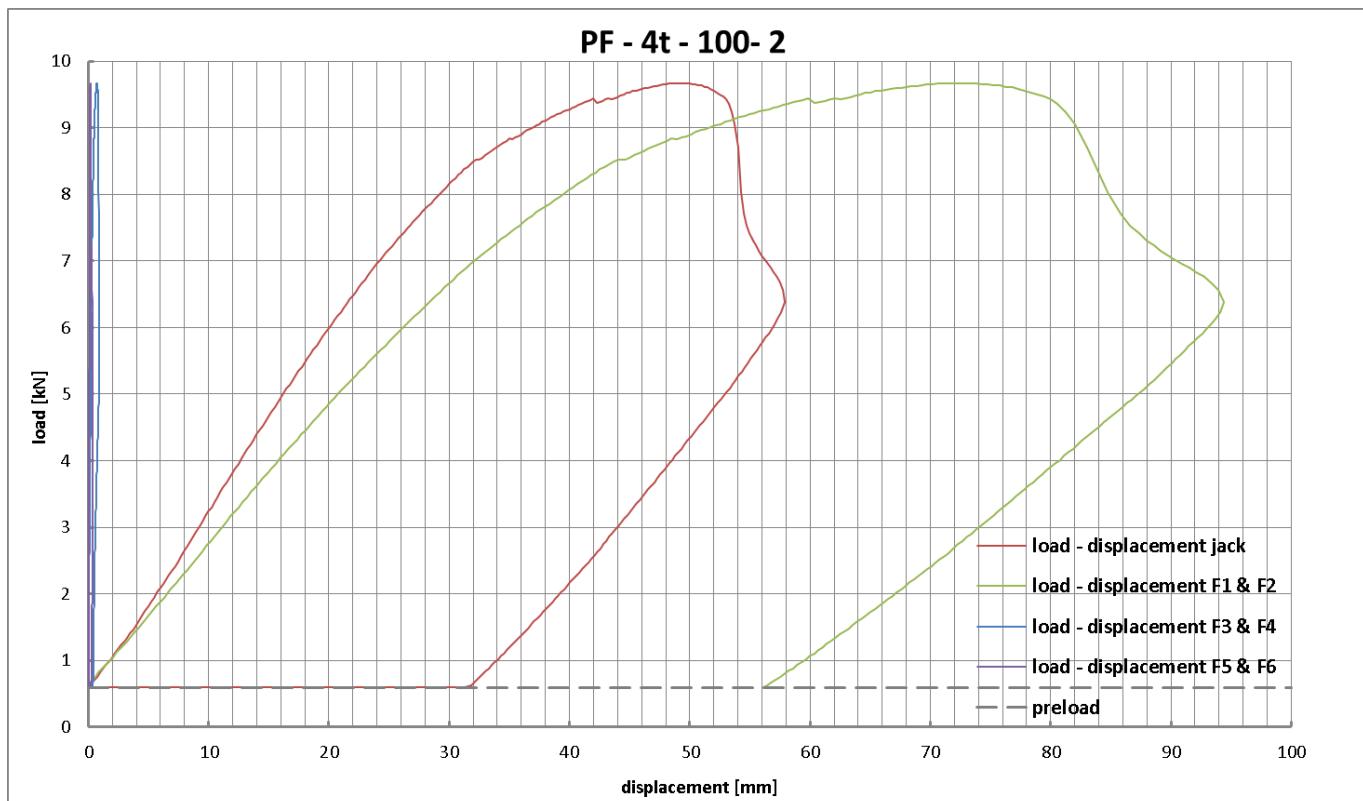




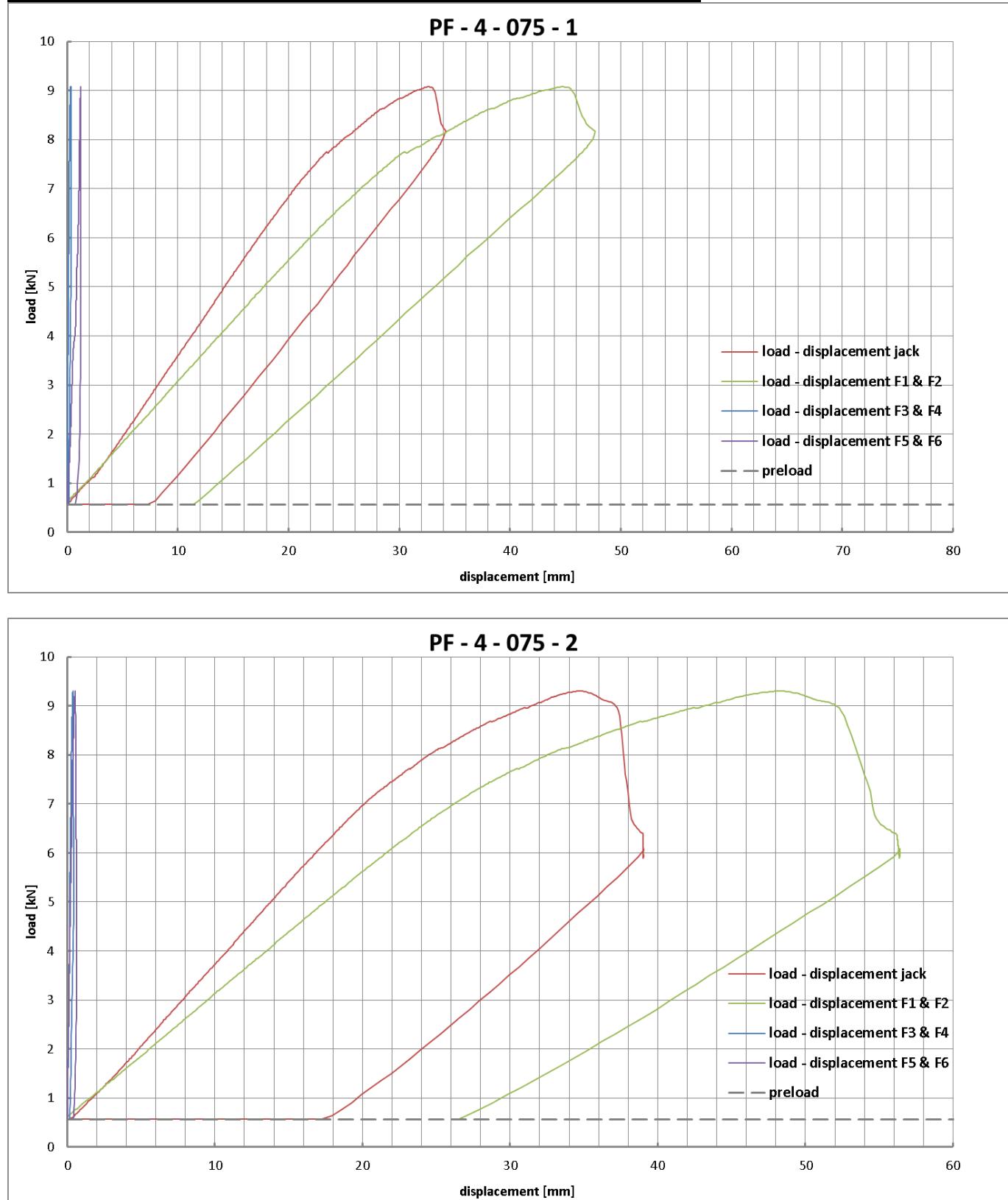


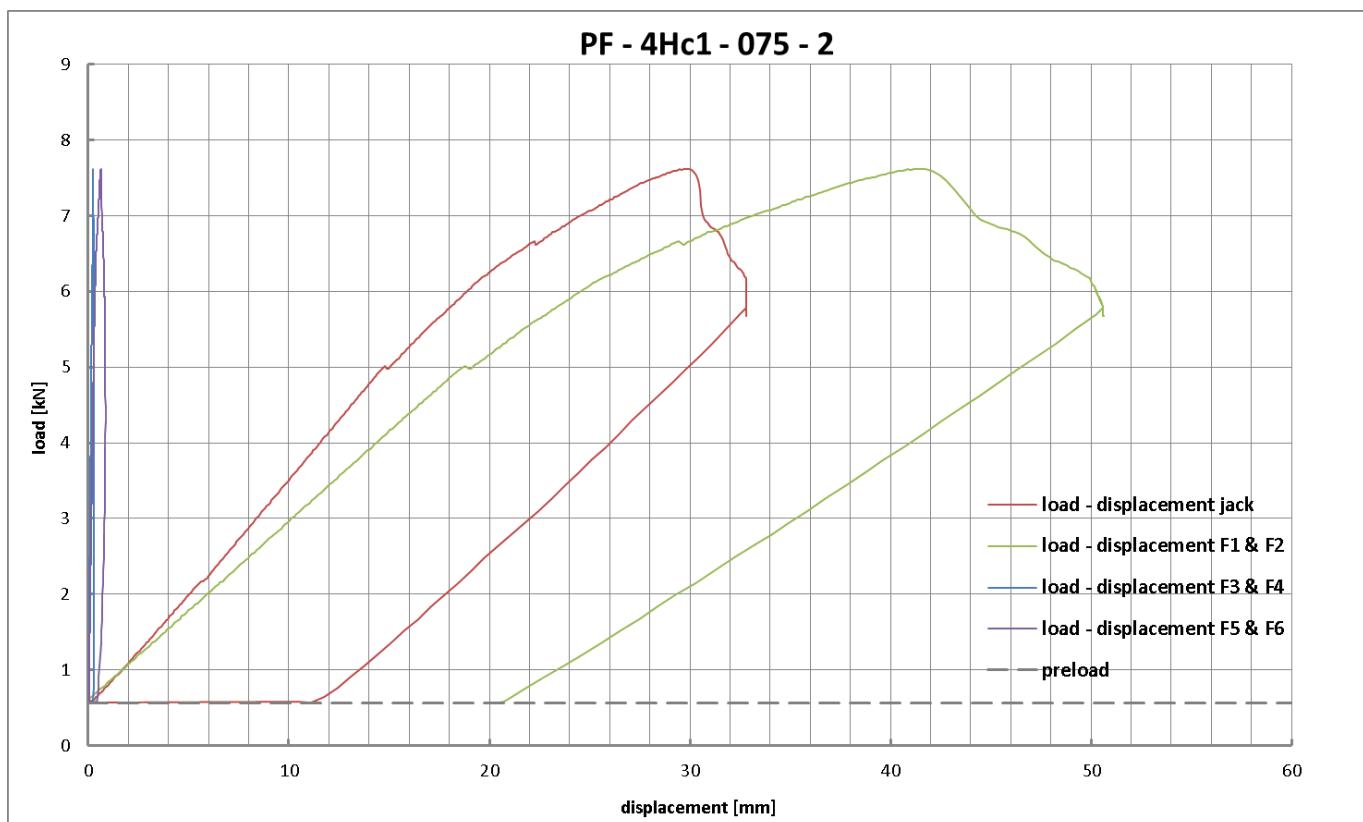
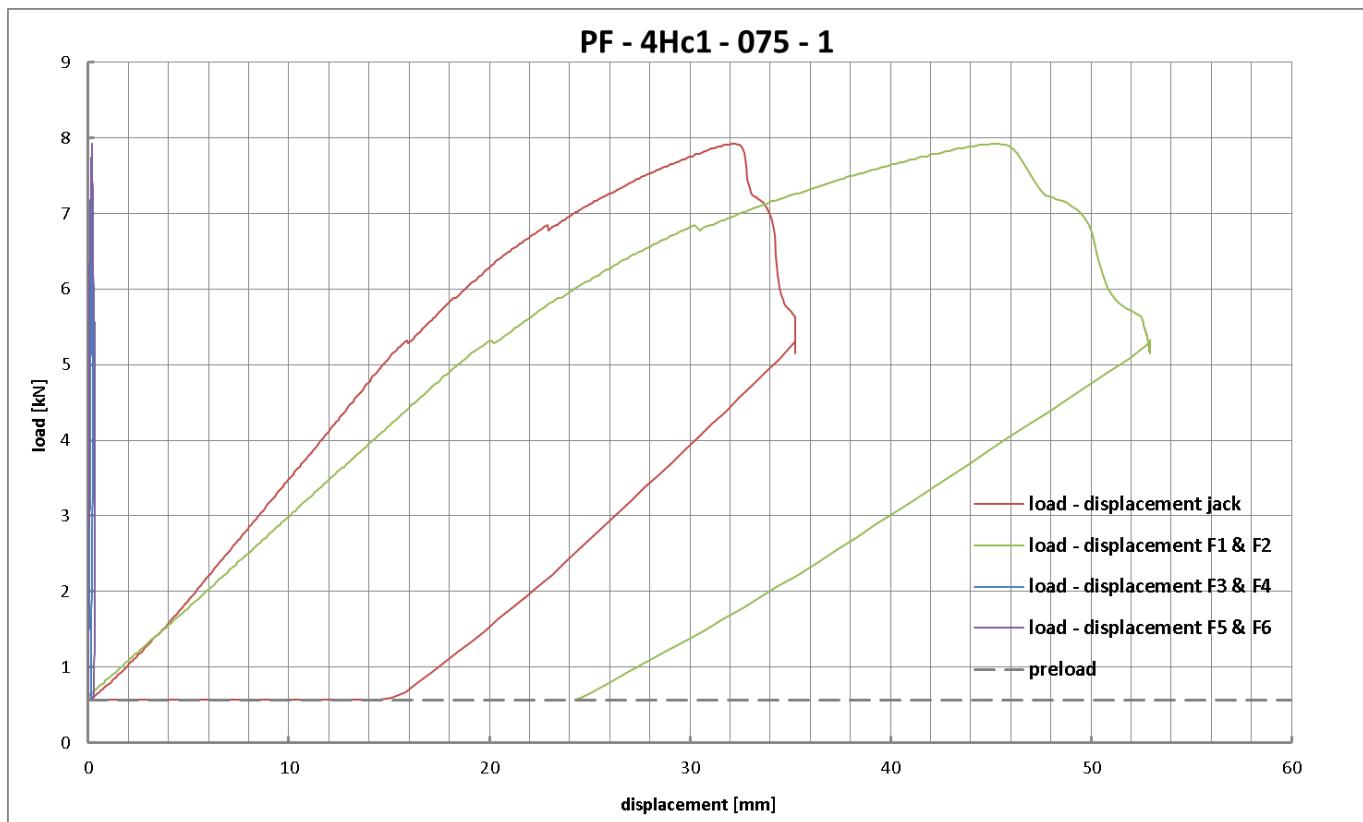


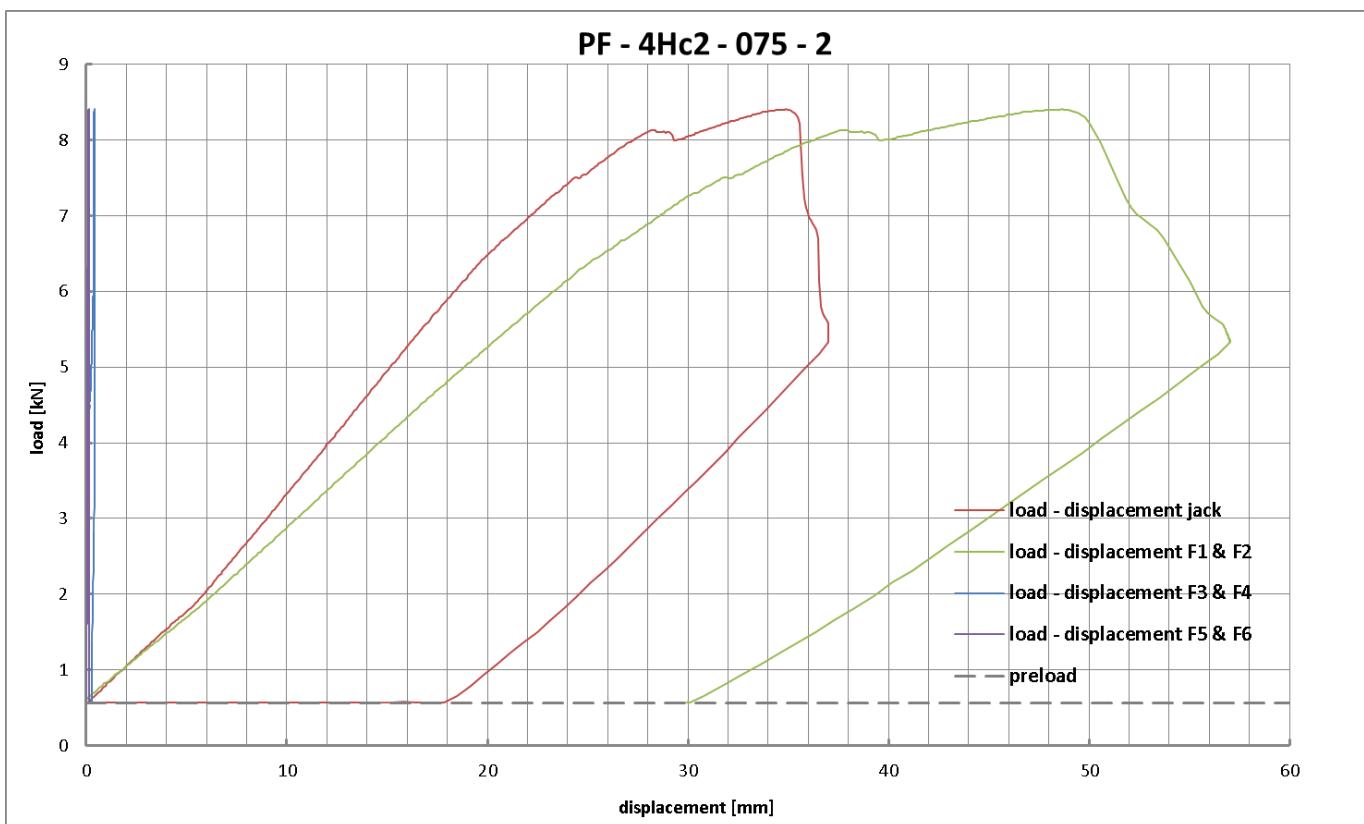
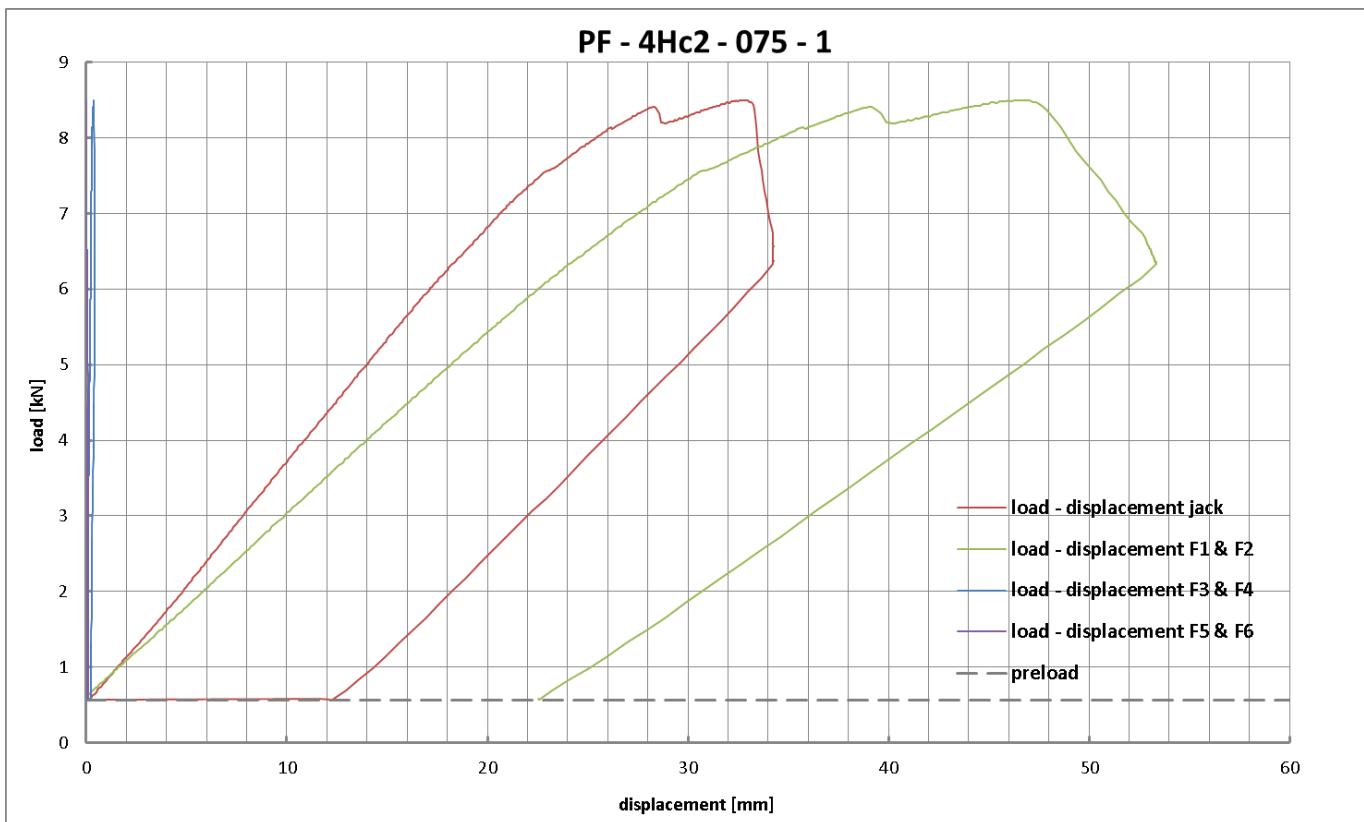


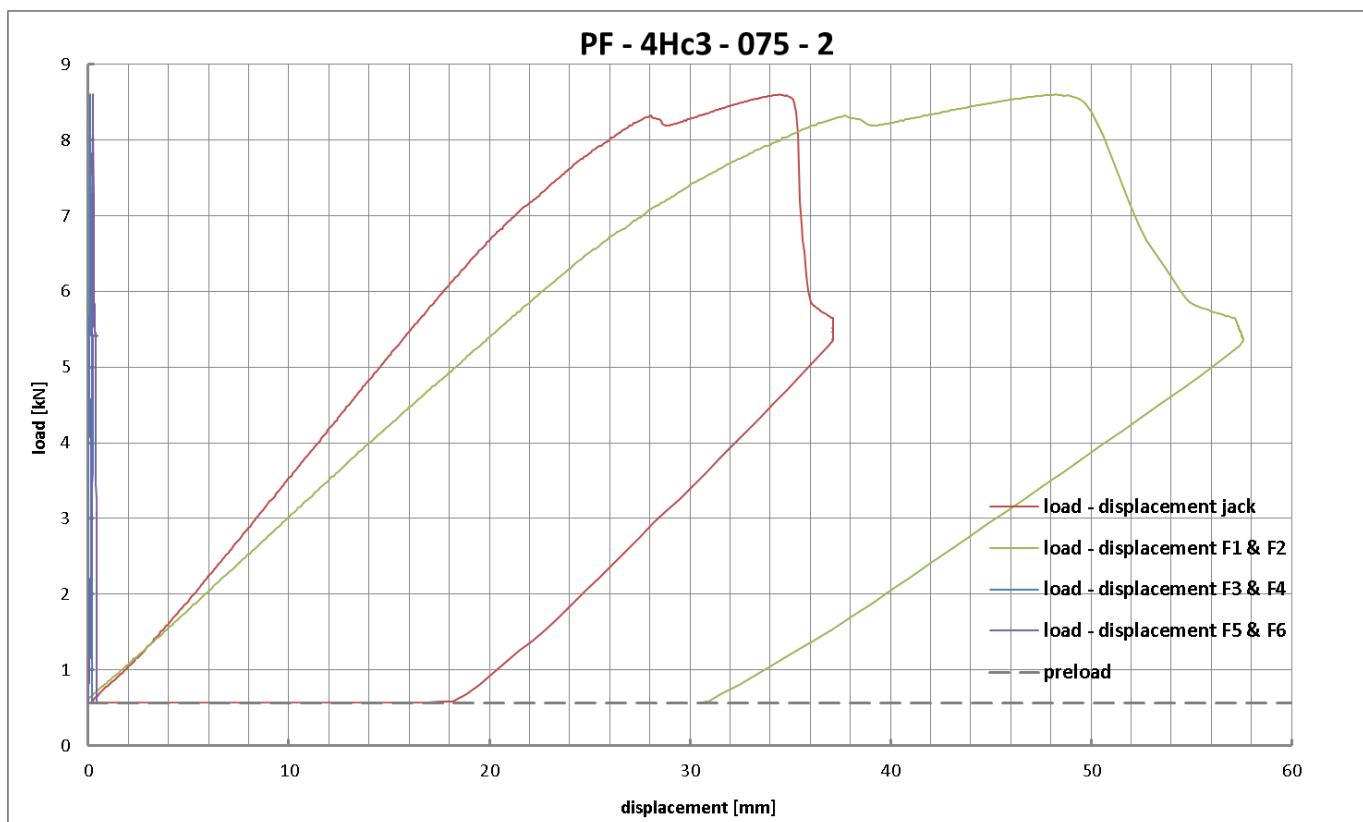
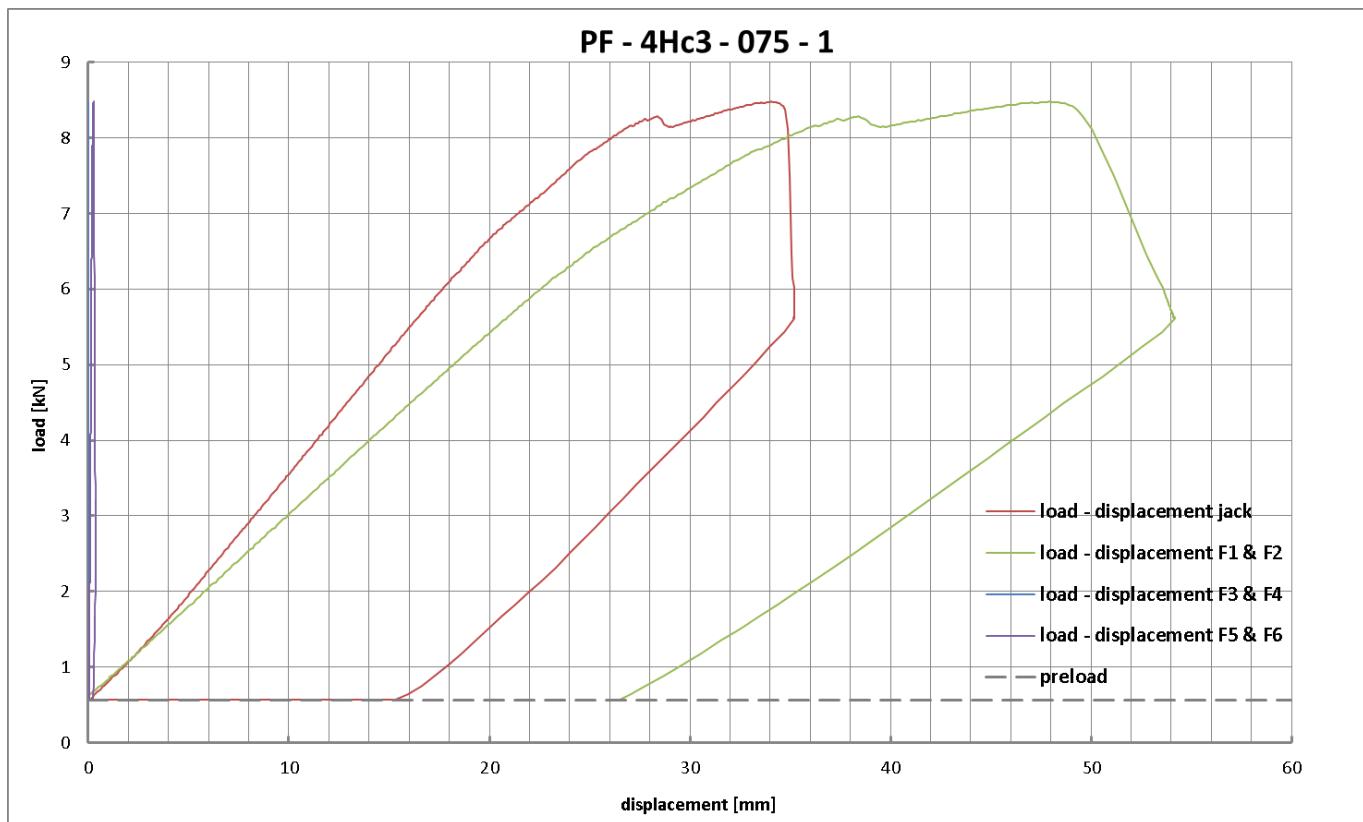


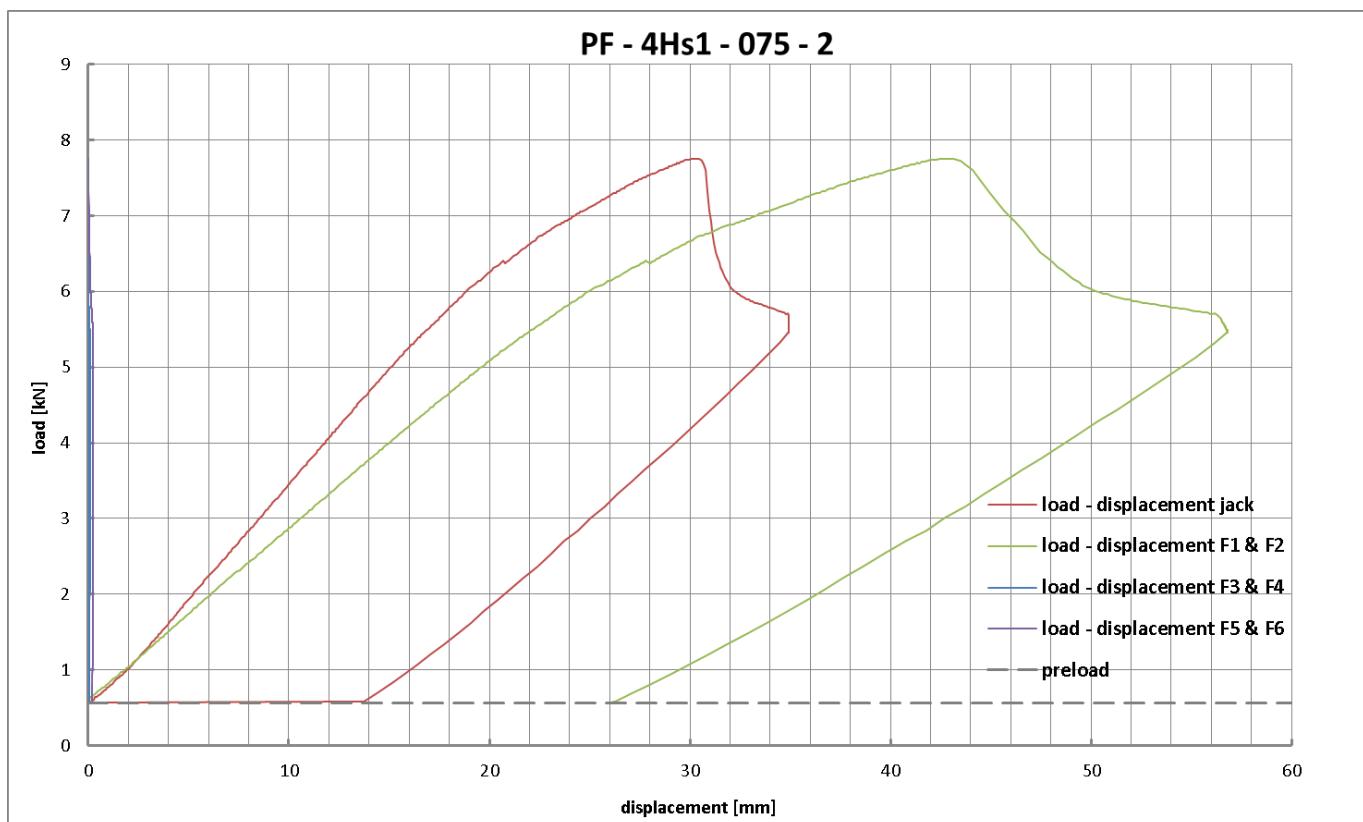
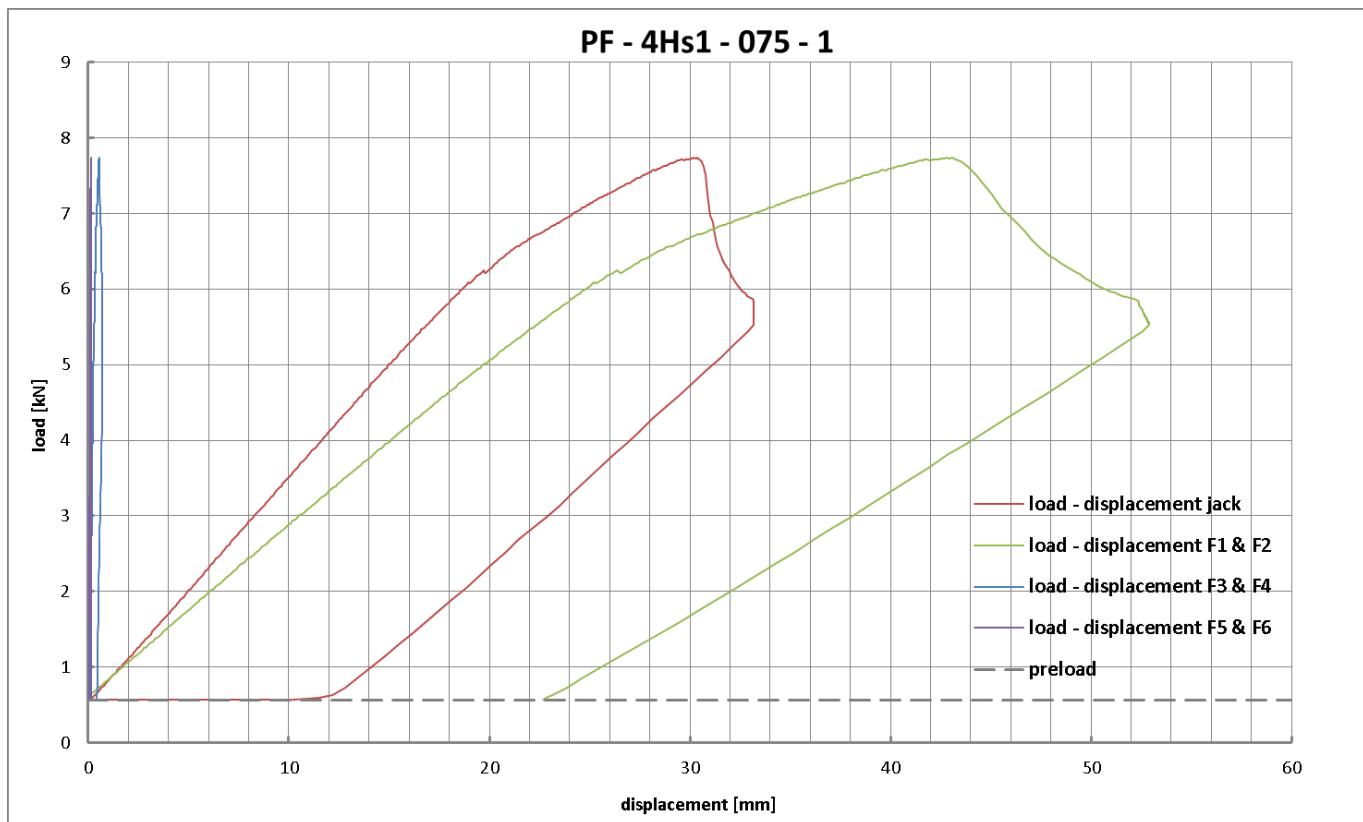
Load-deflection curves (with and without single hole in the upper flange):

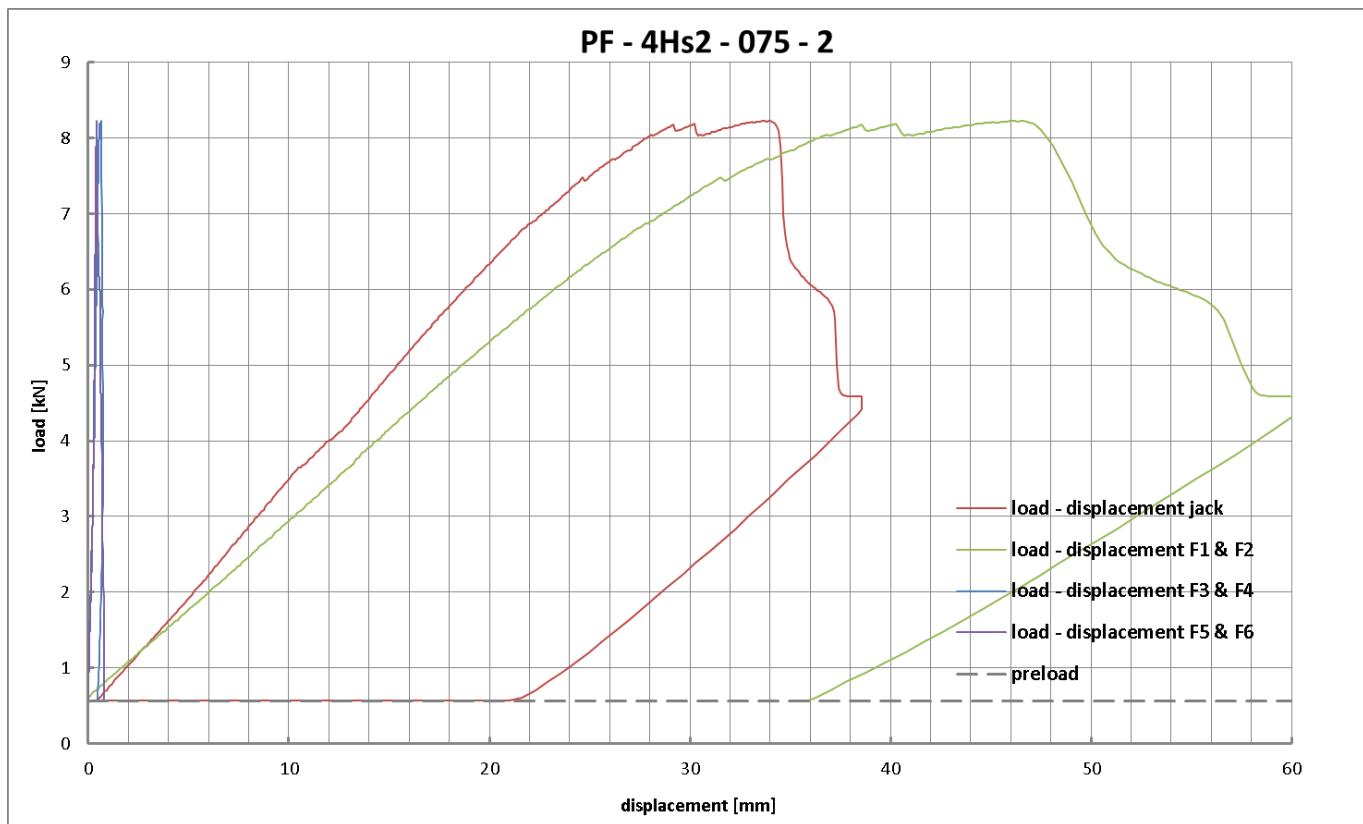
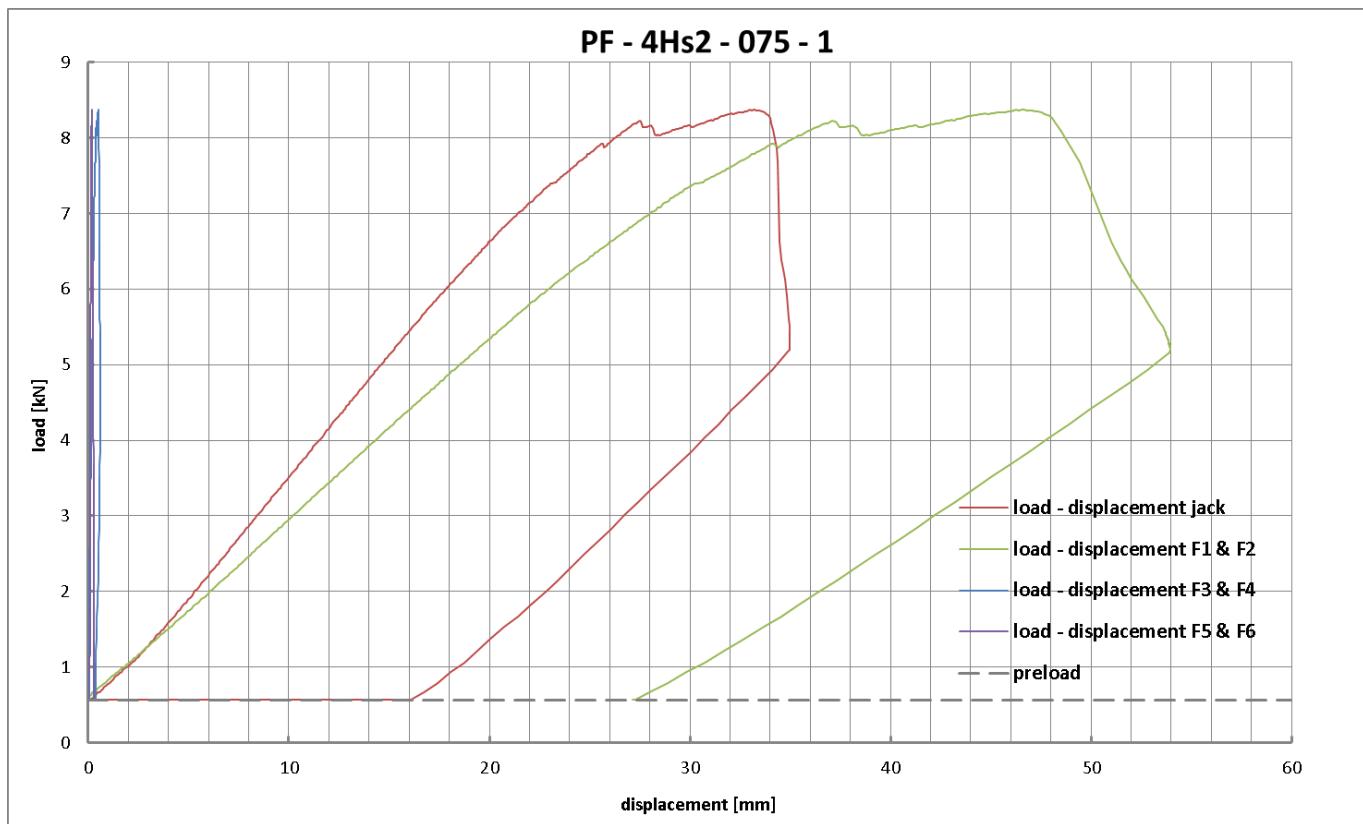


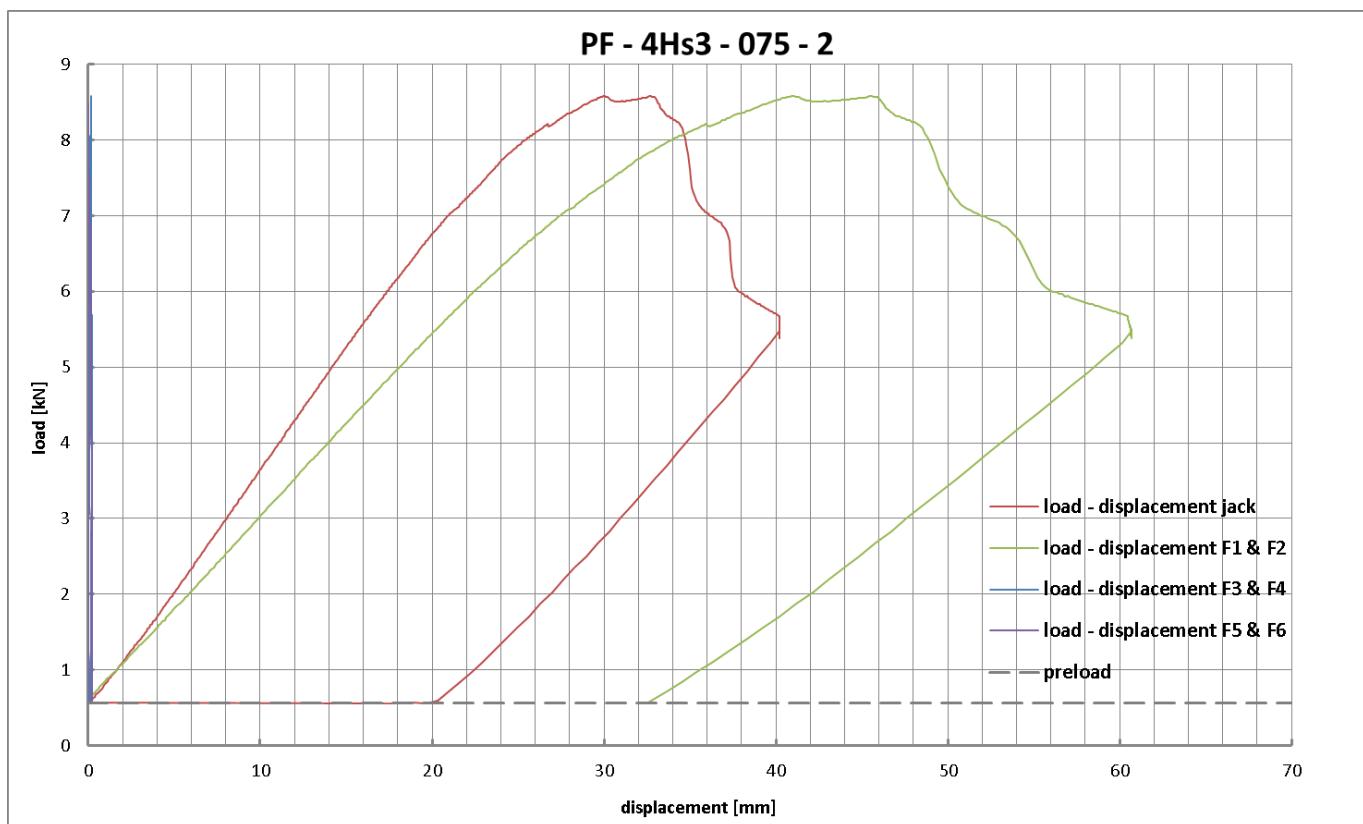


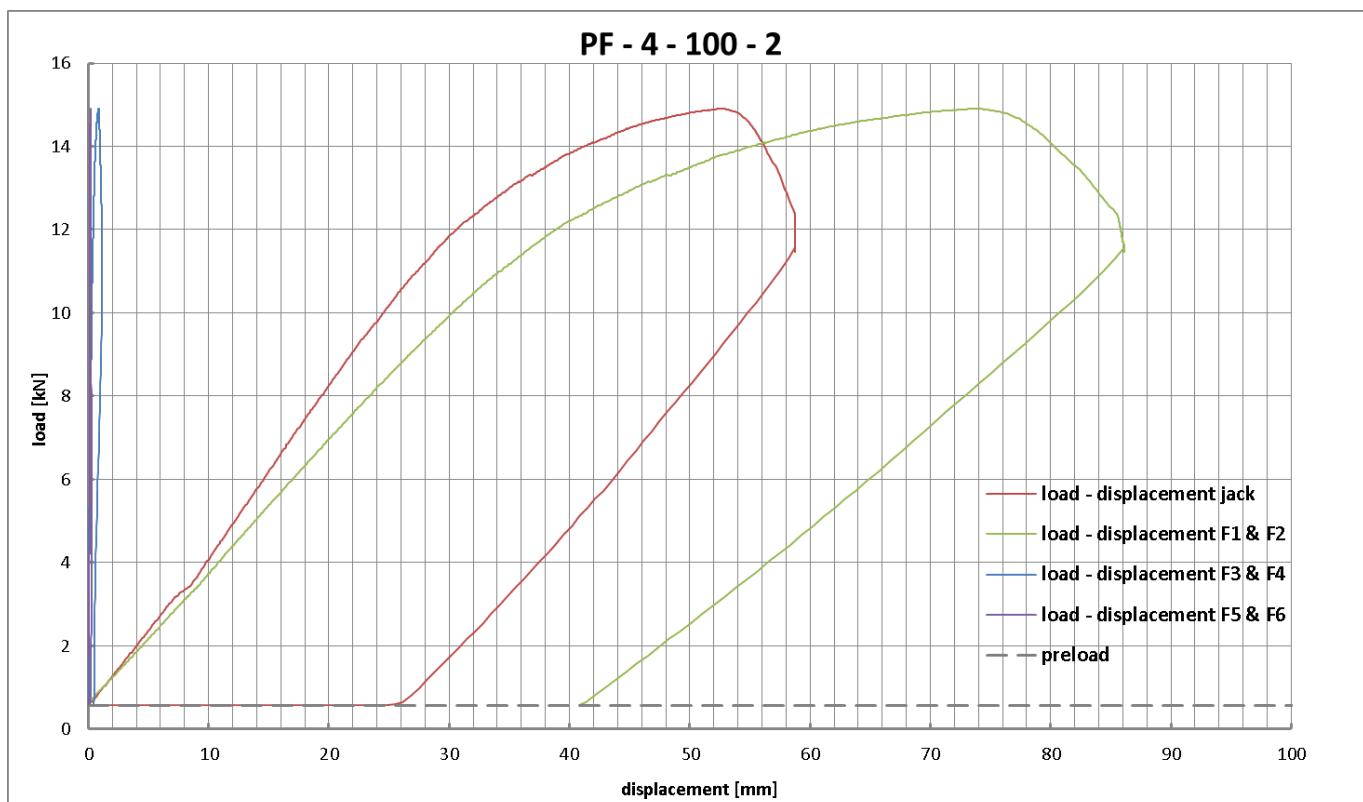
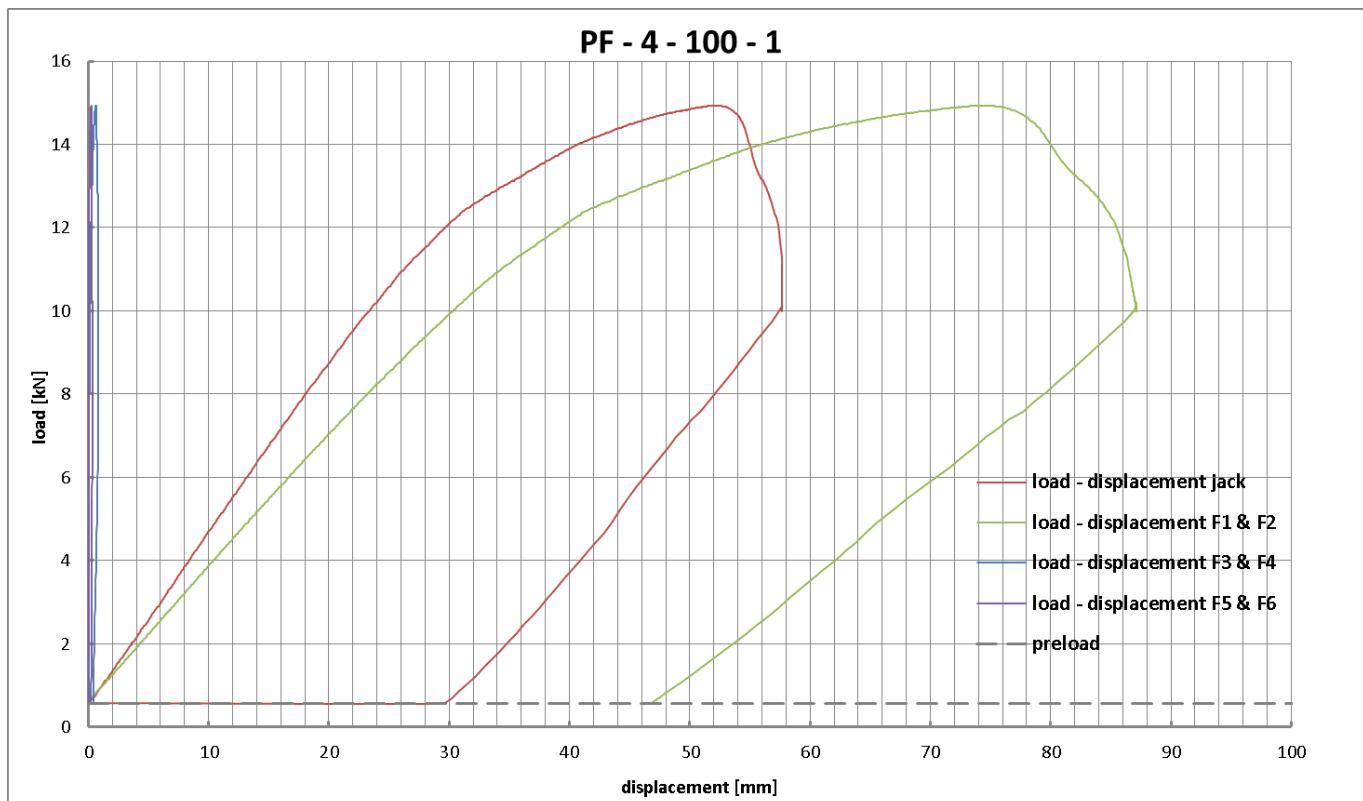


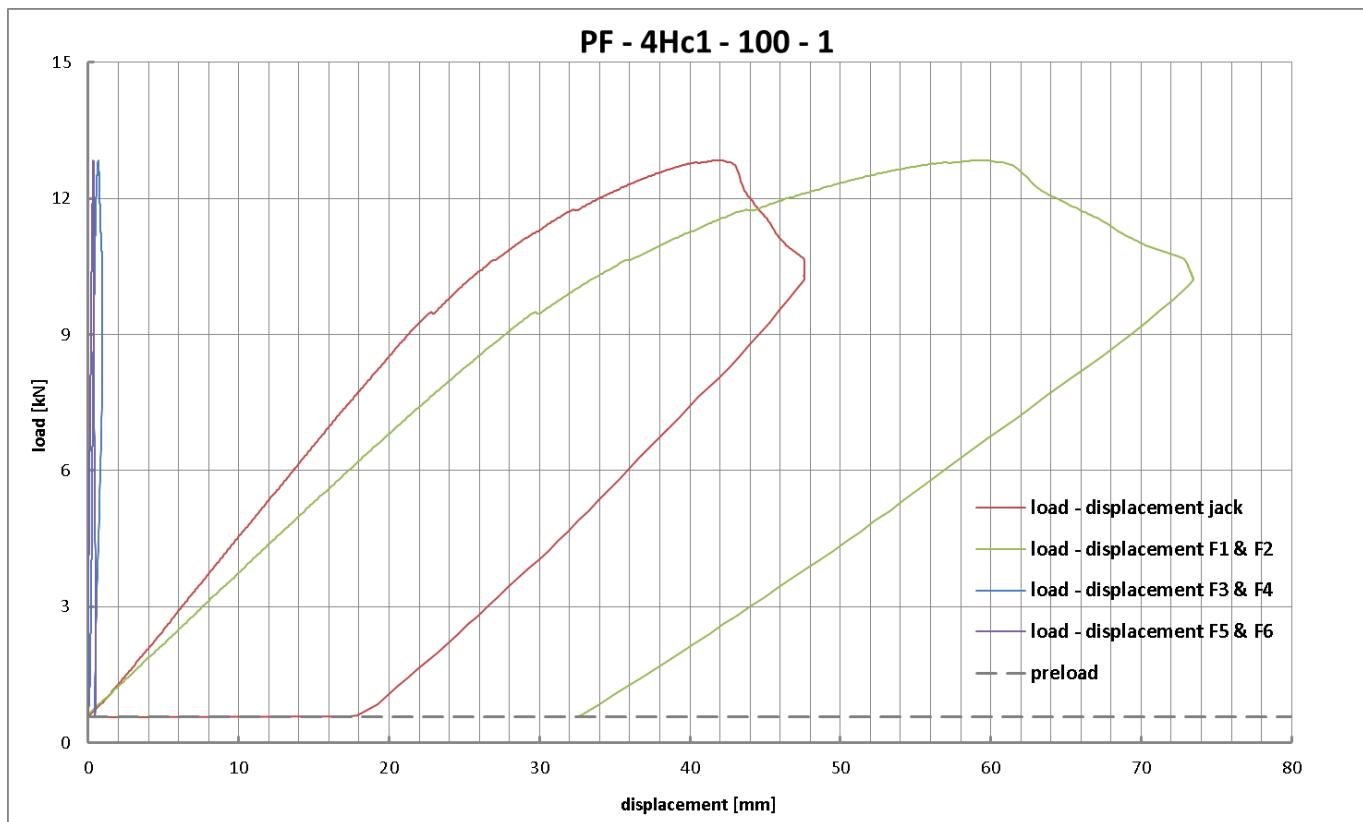


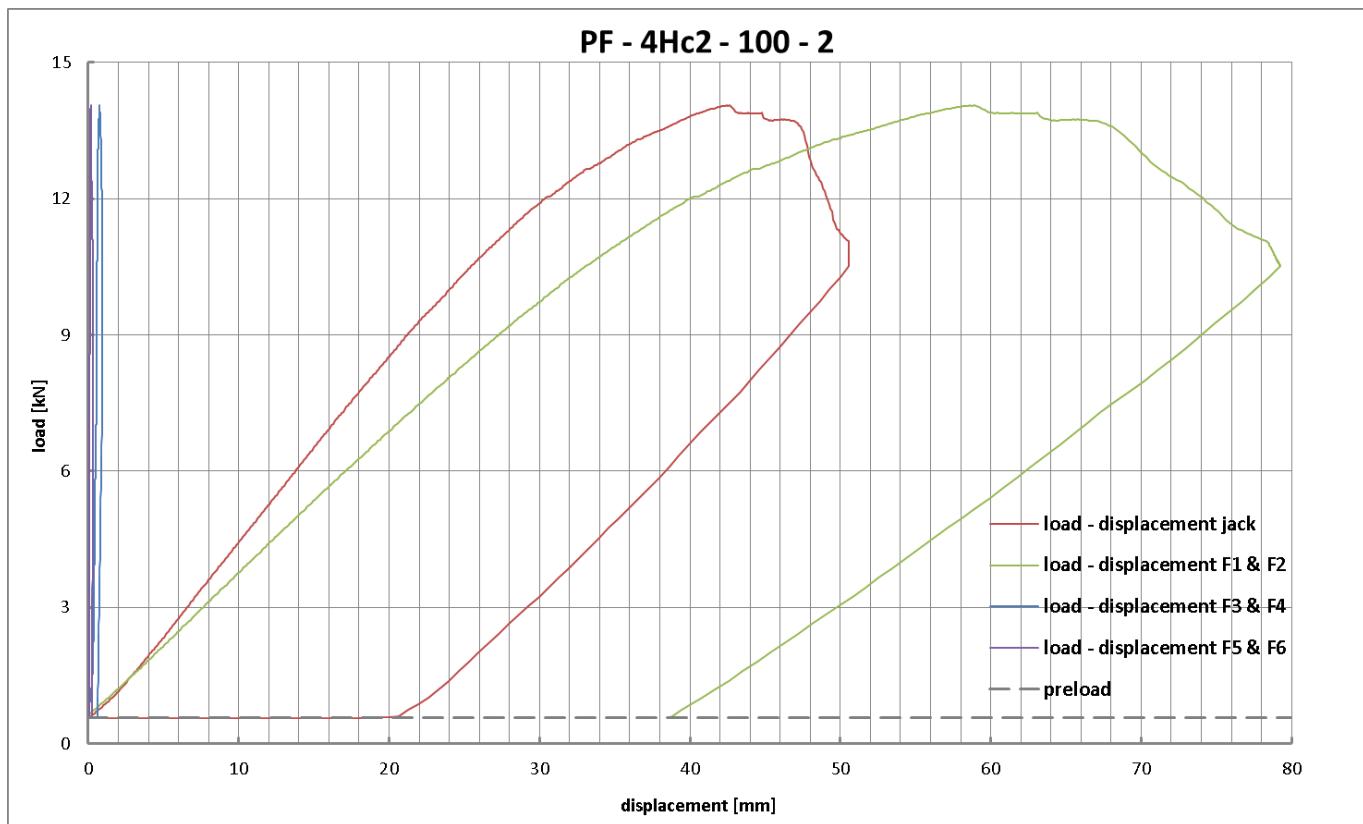
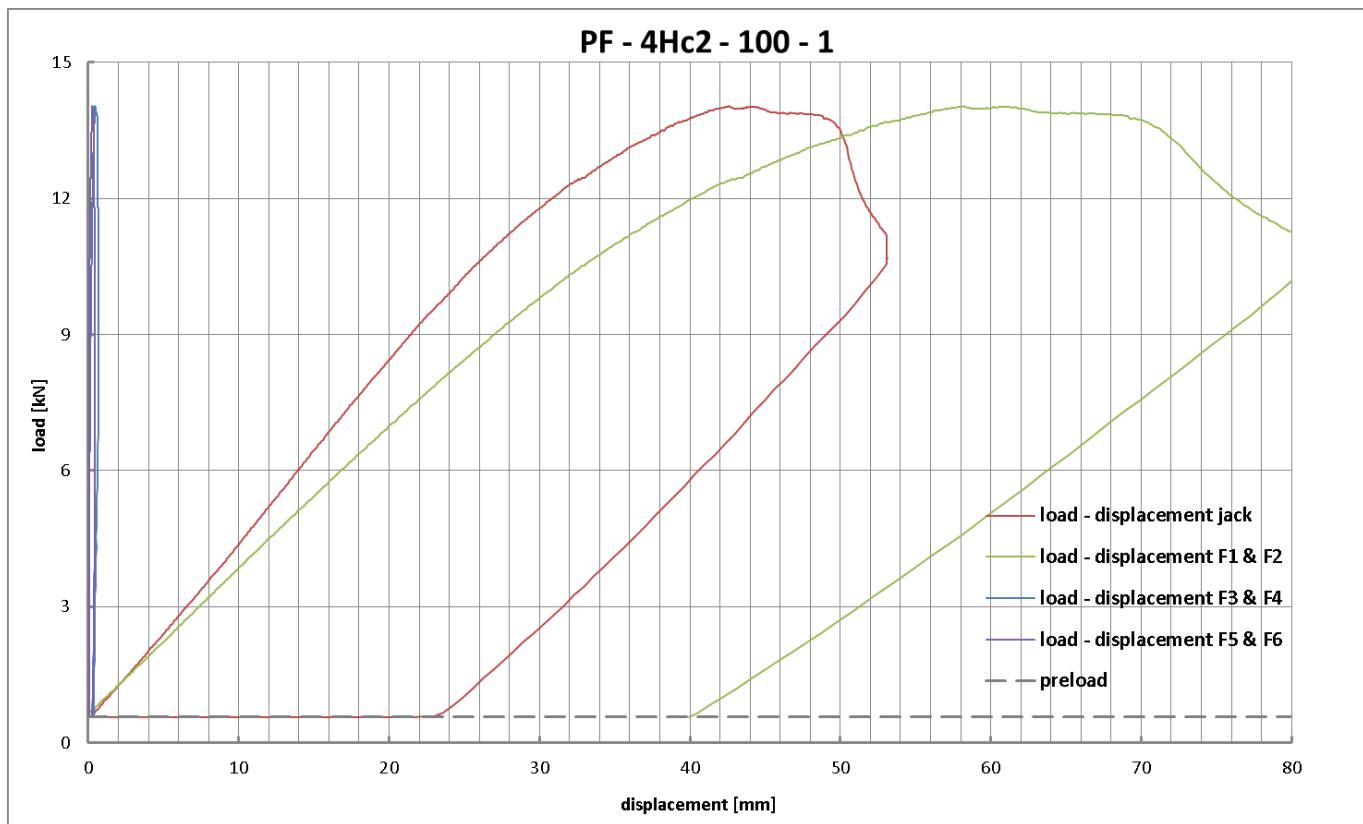


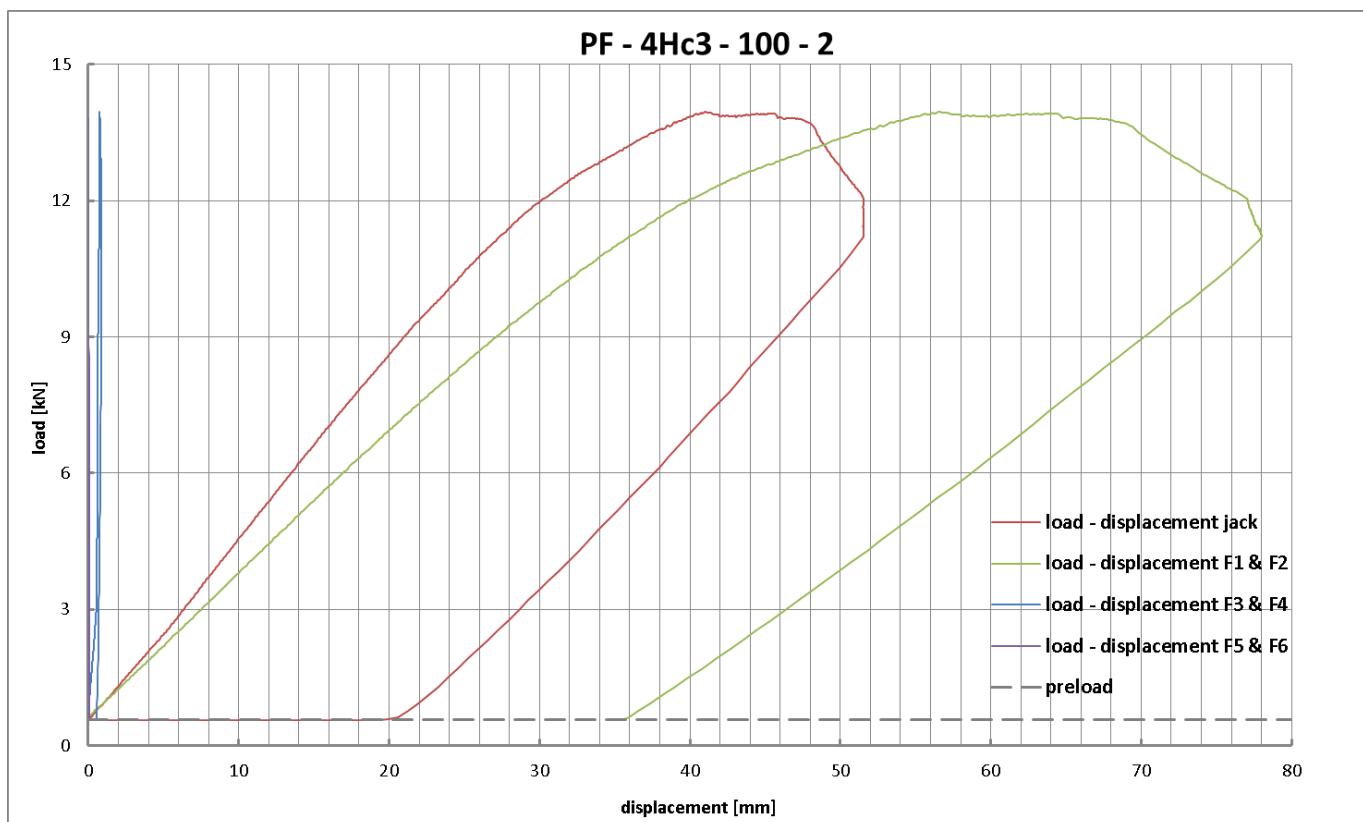
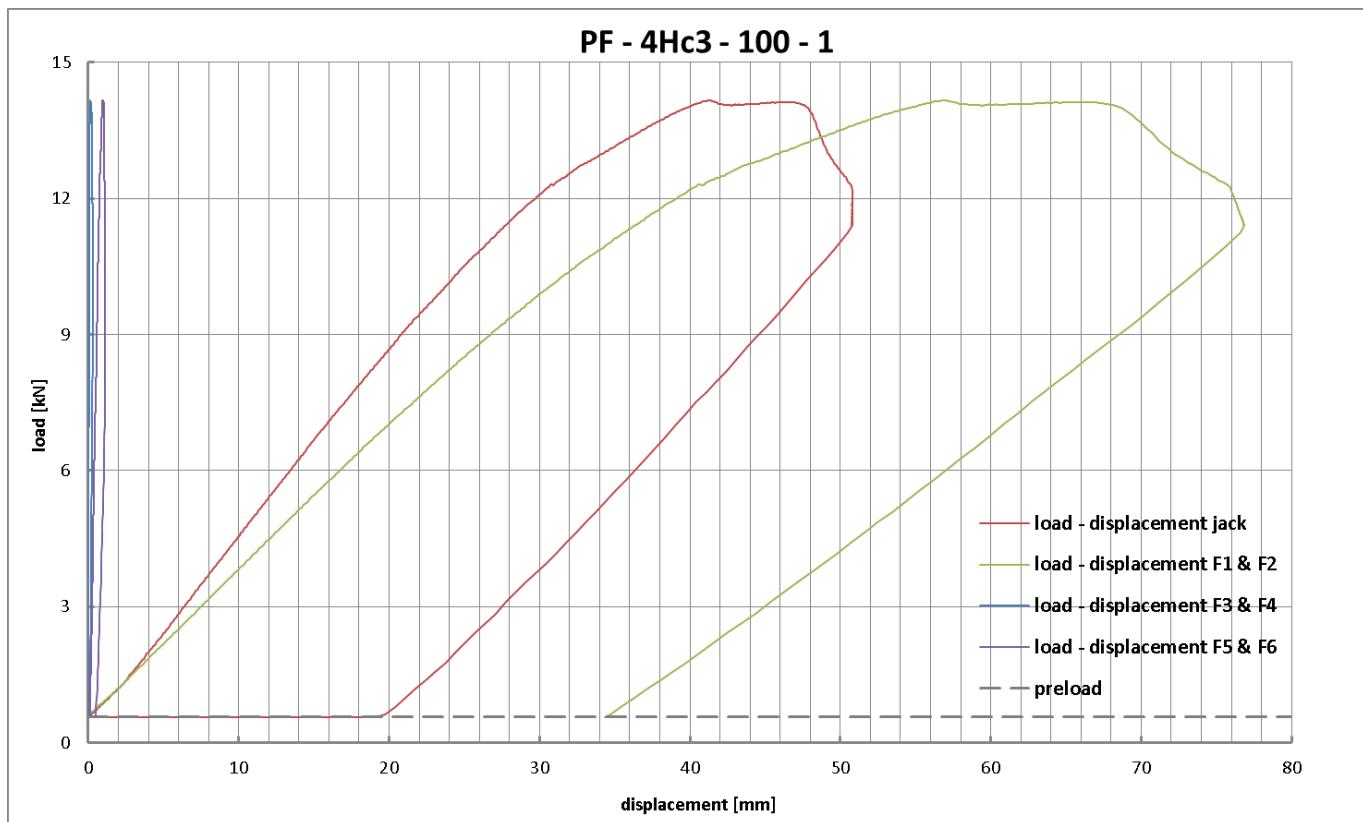


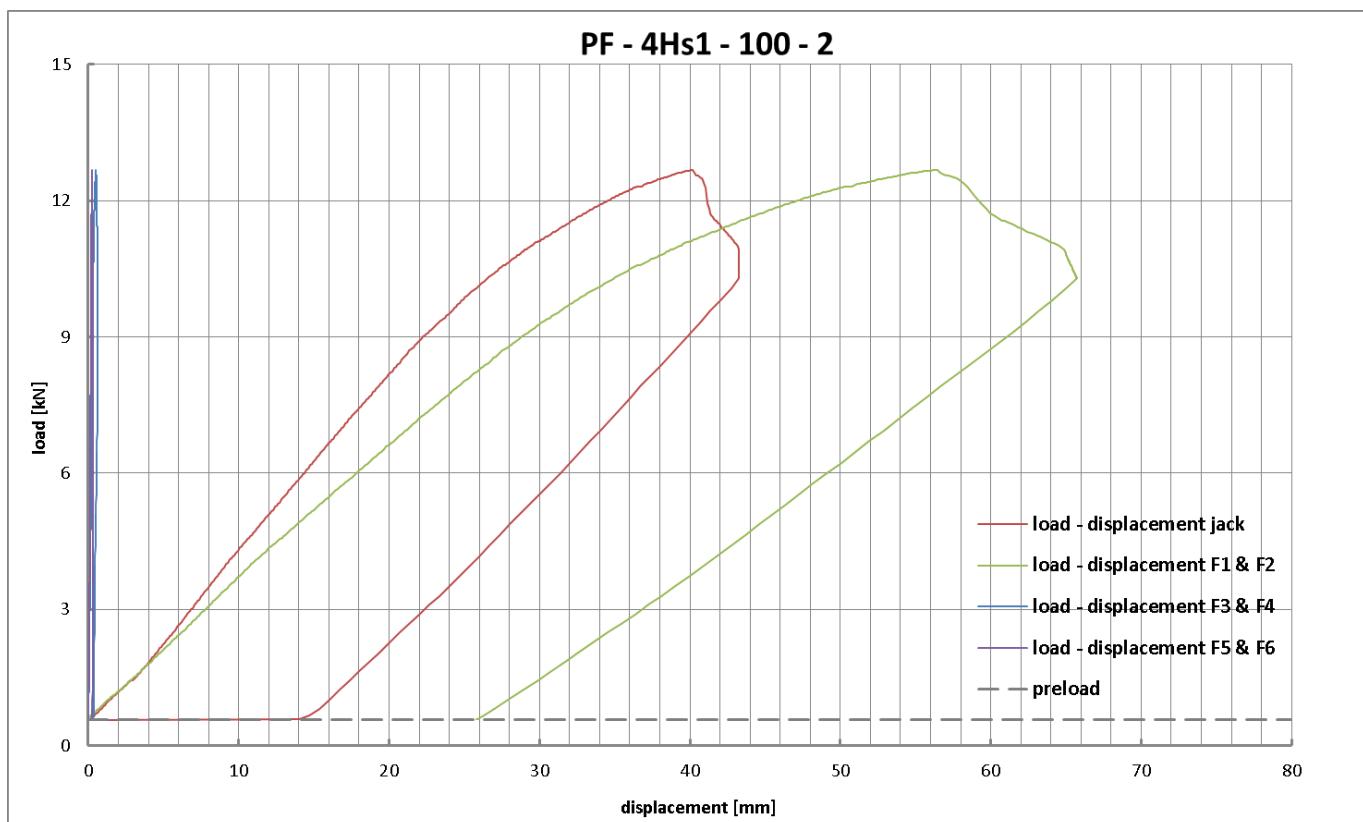
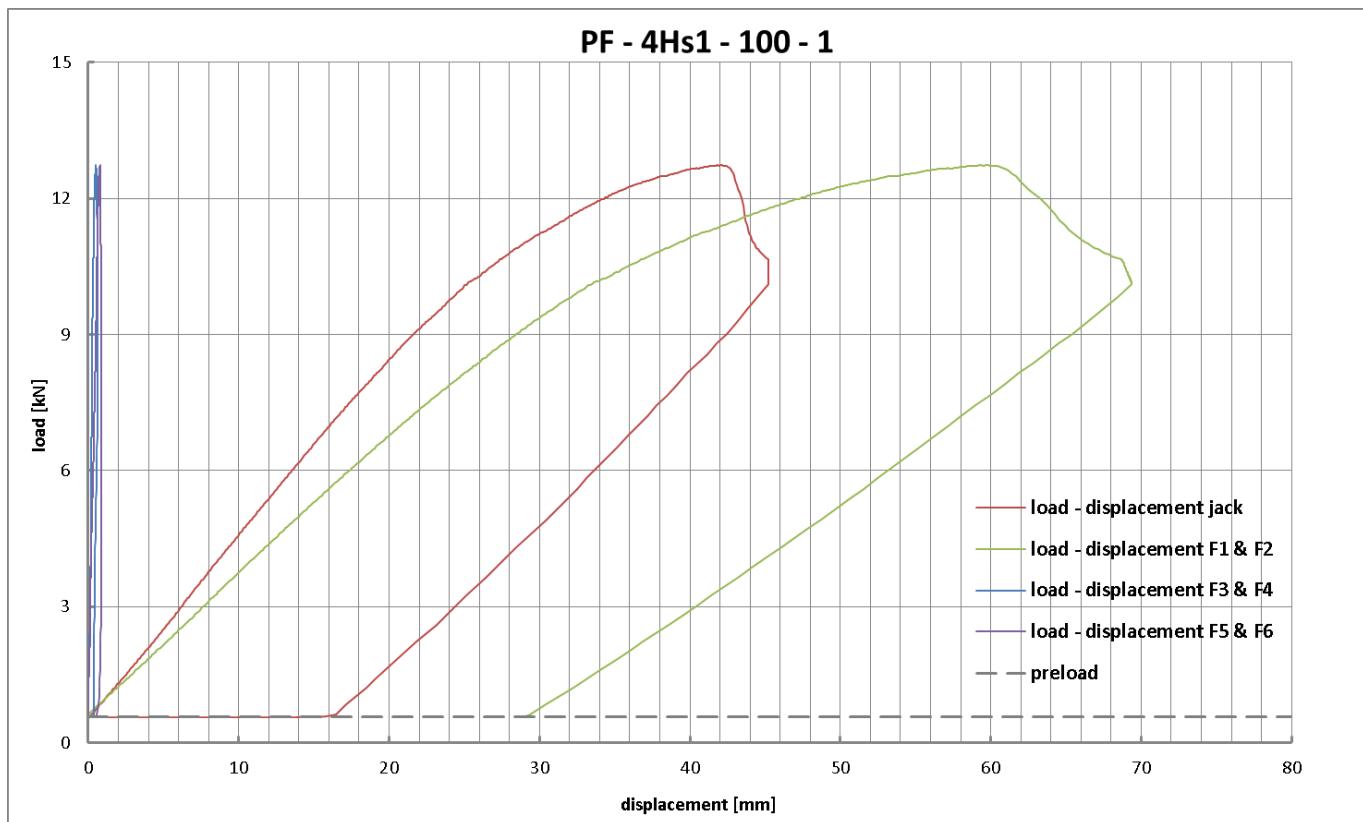


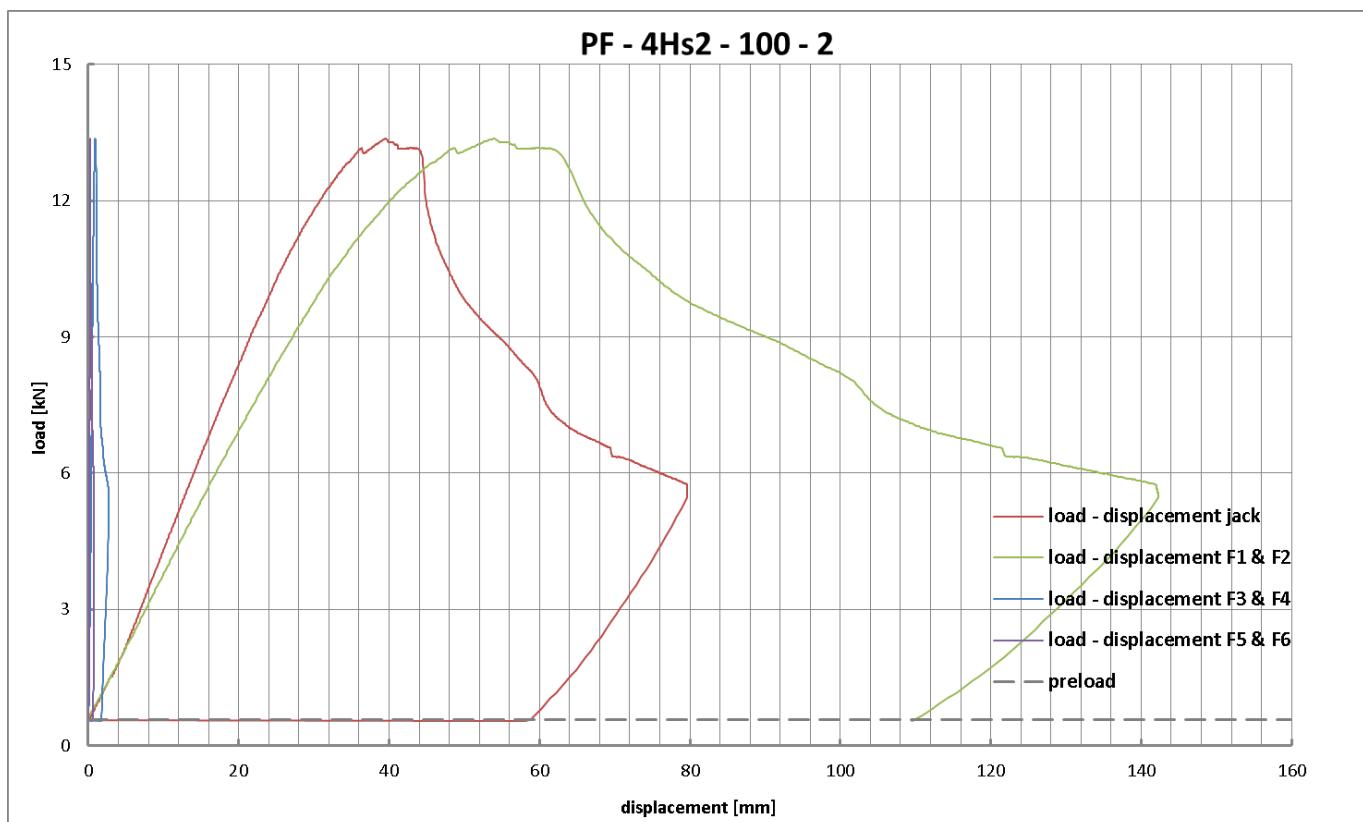
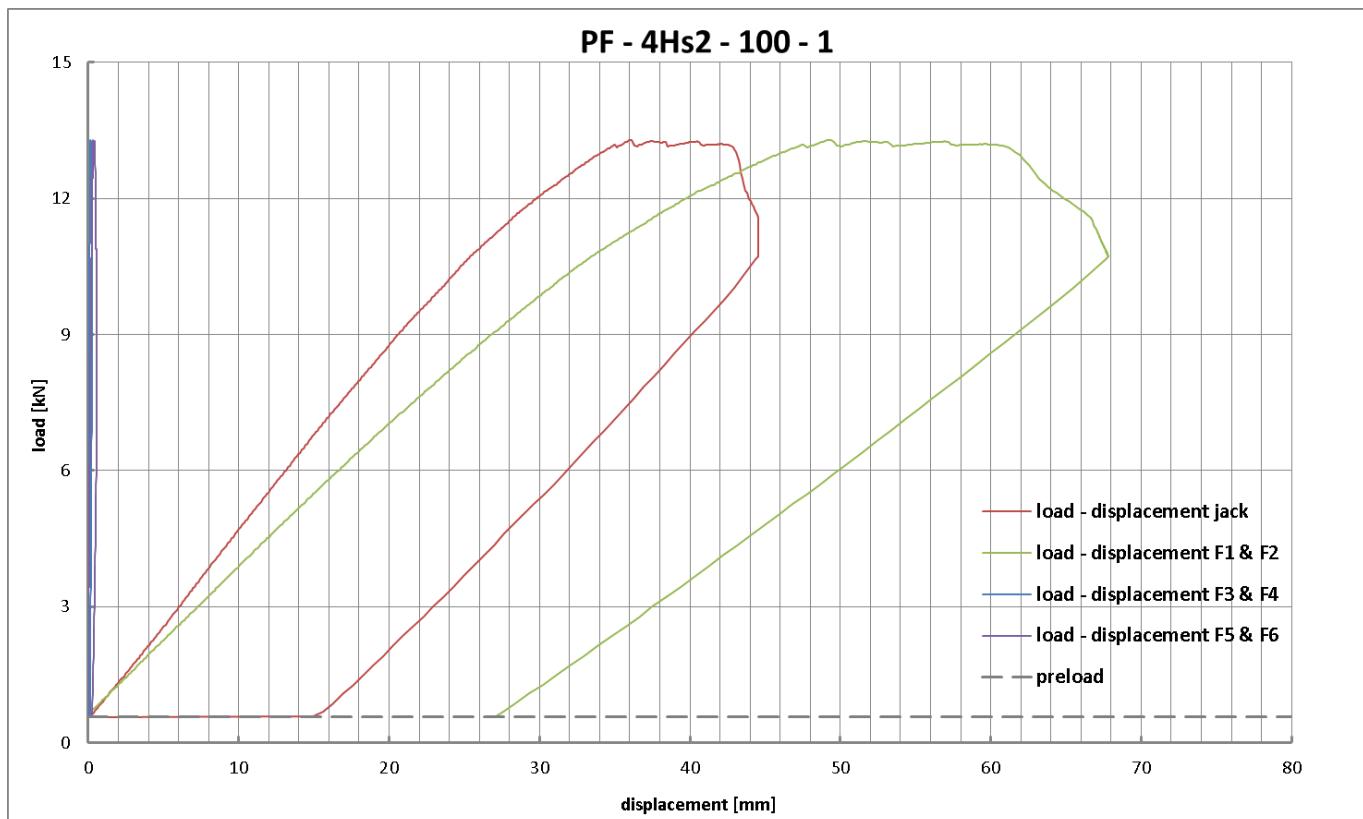


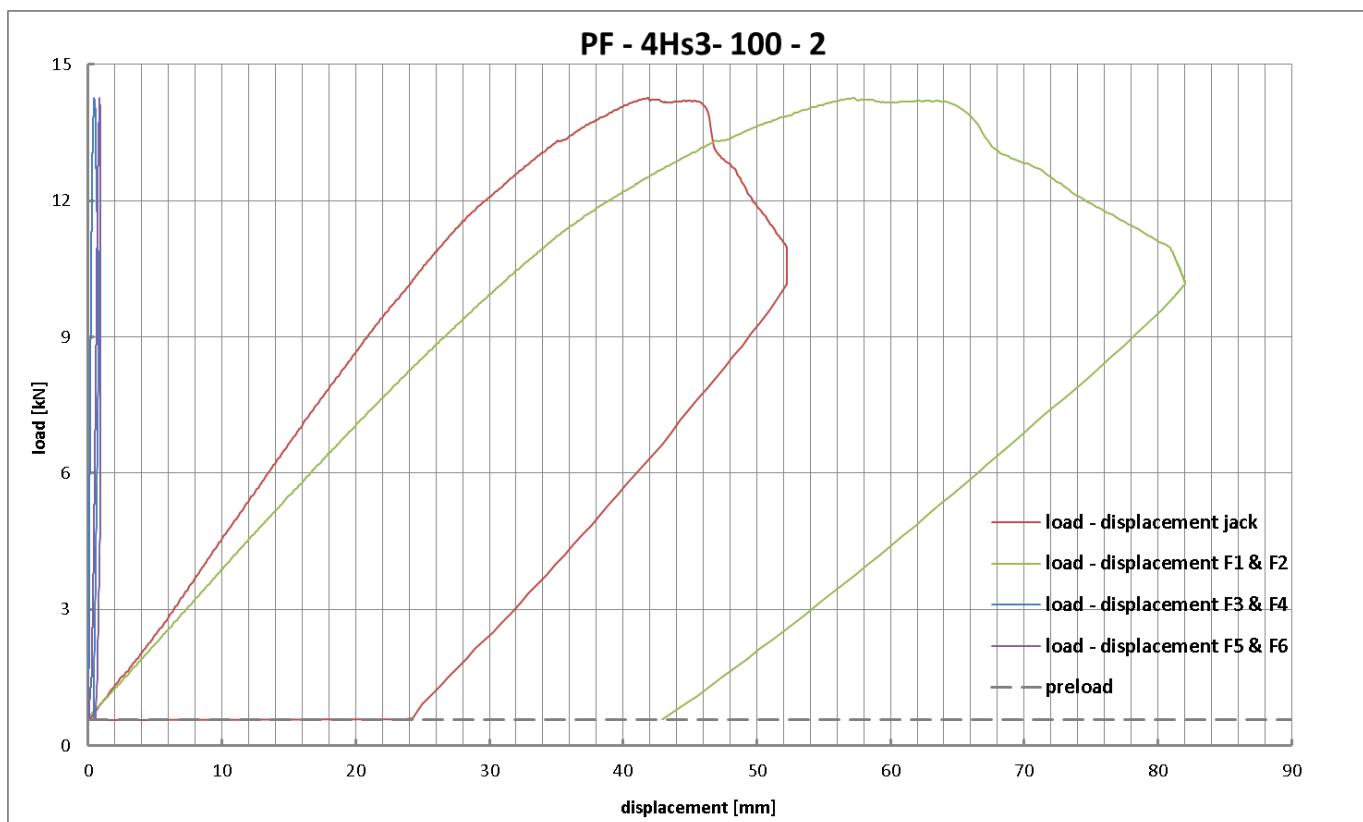
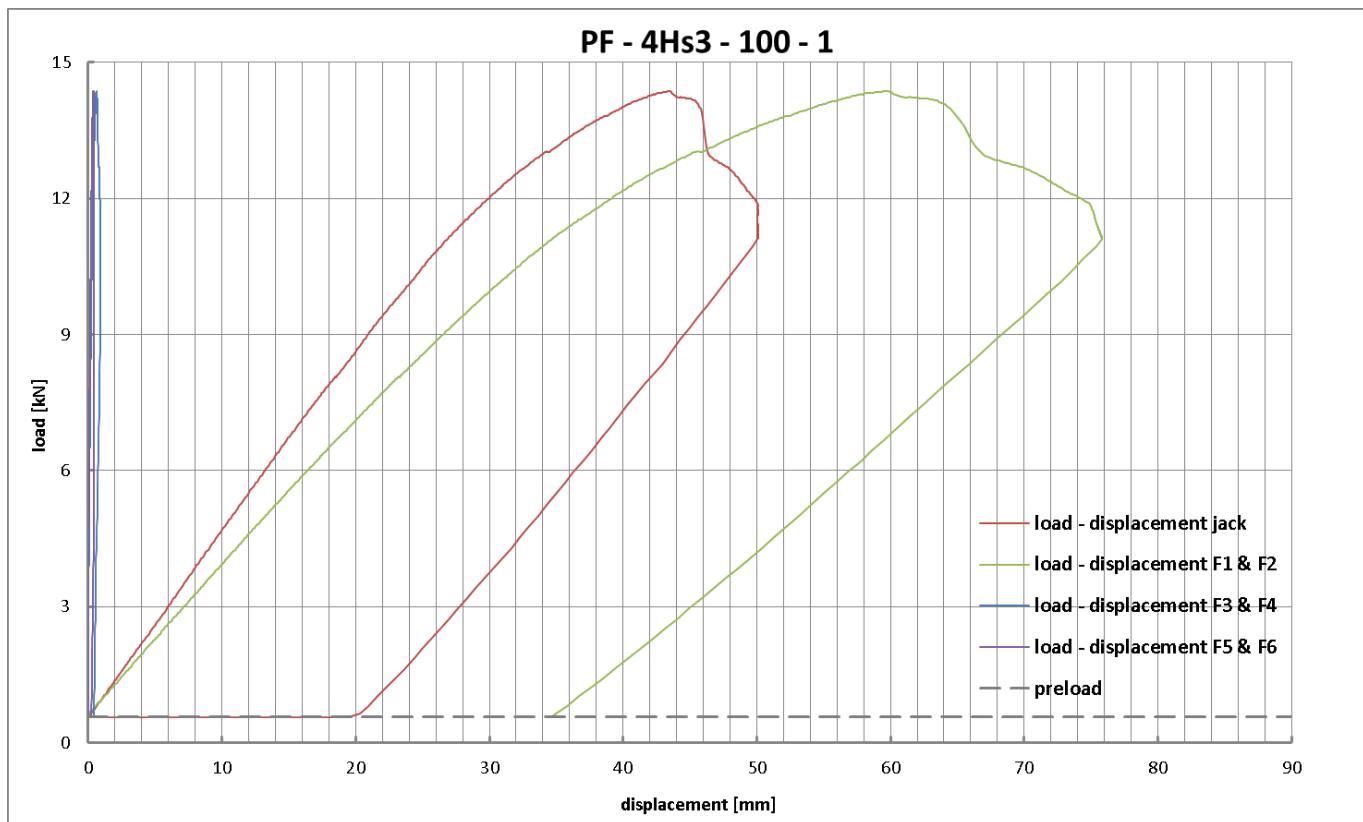


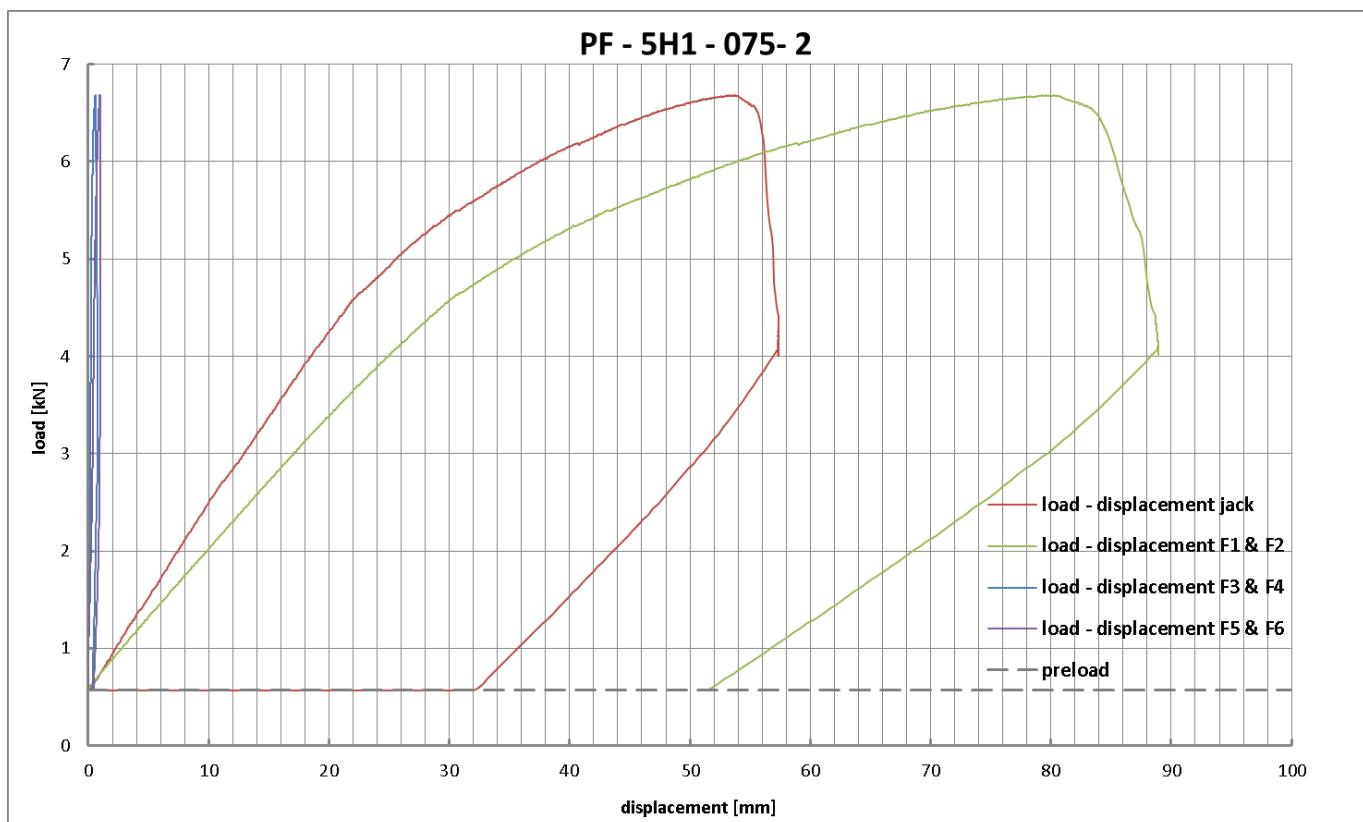




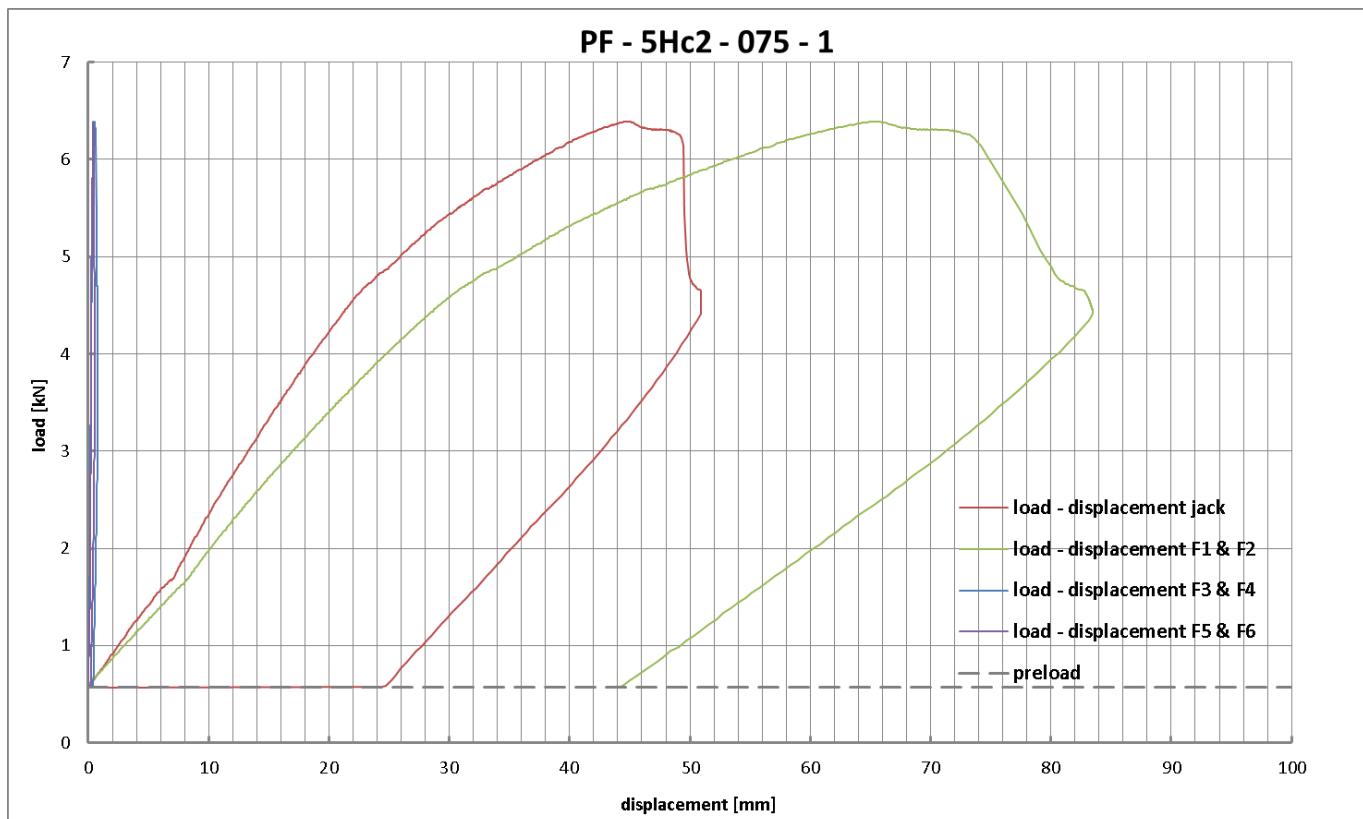




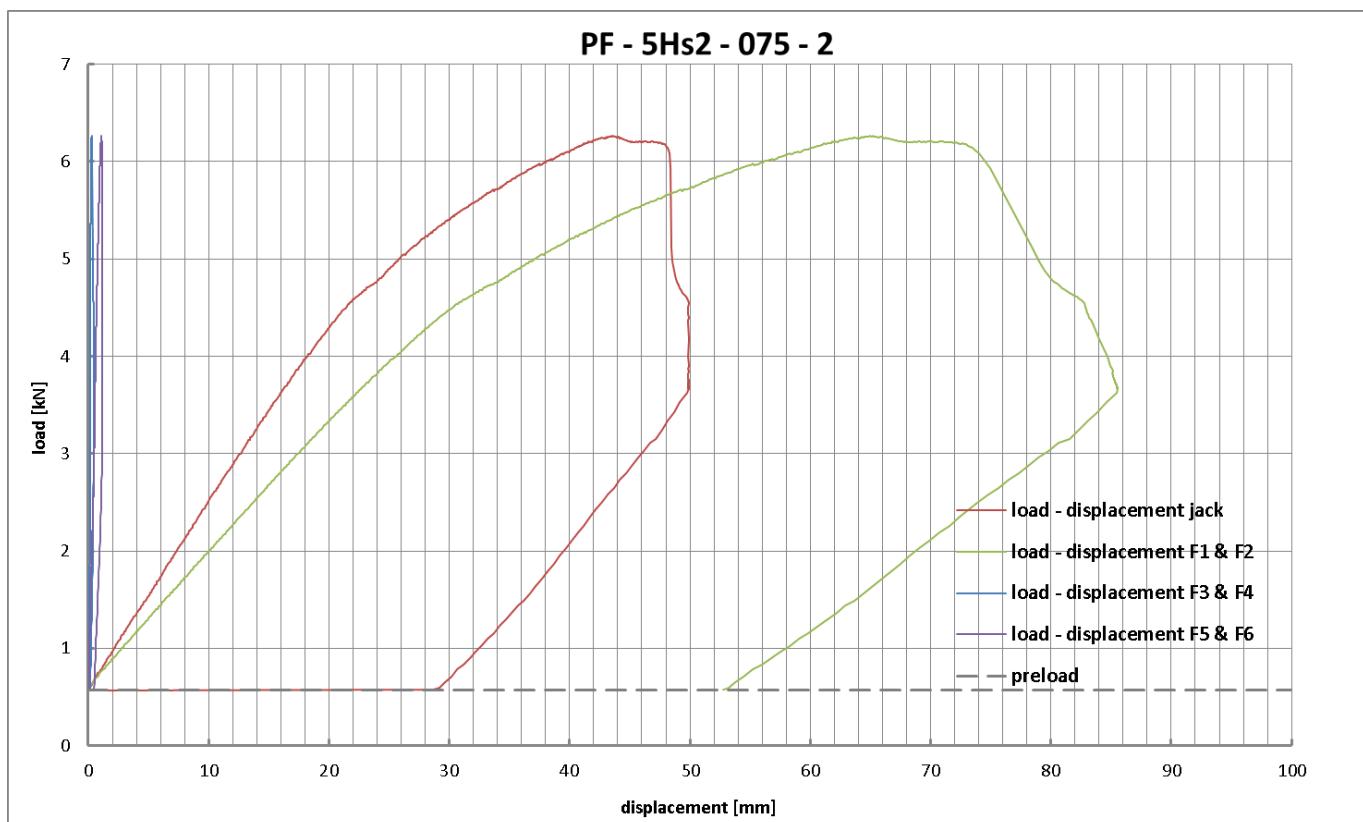


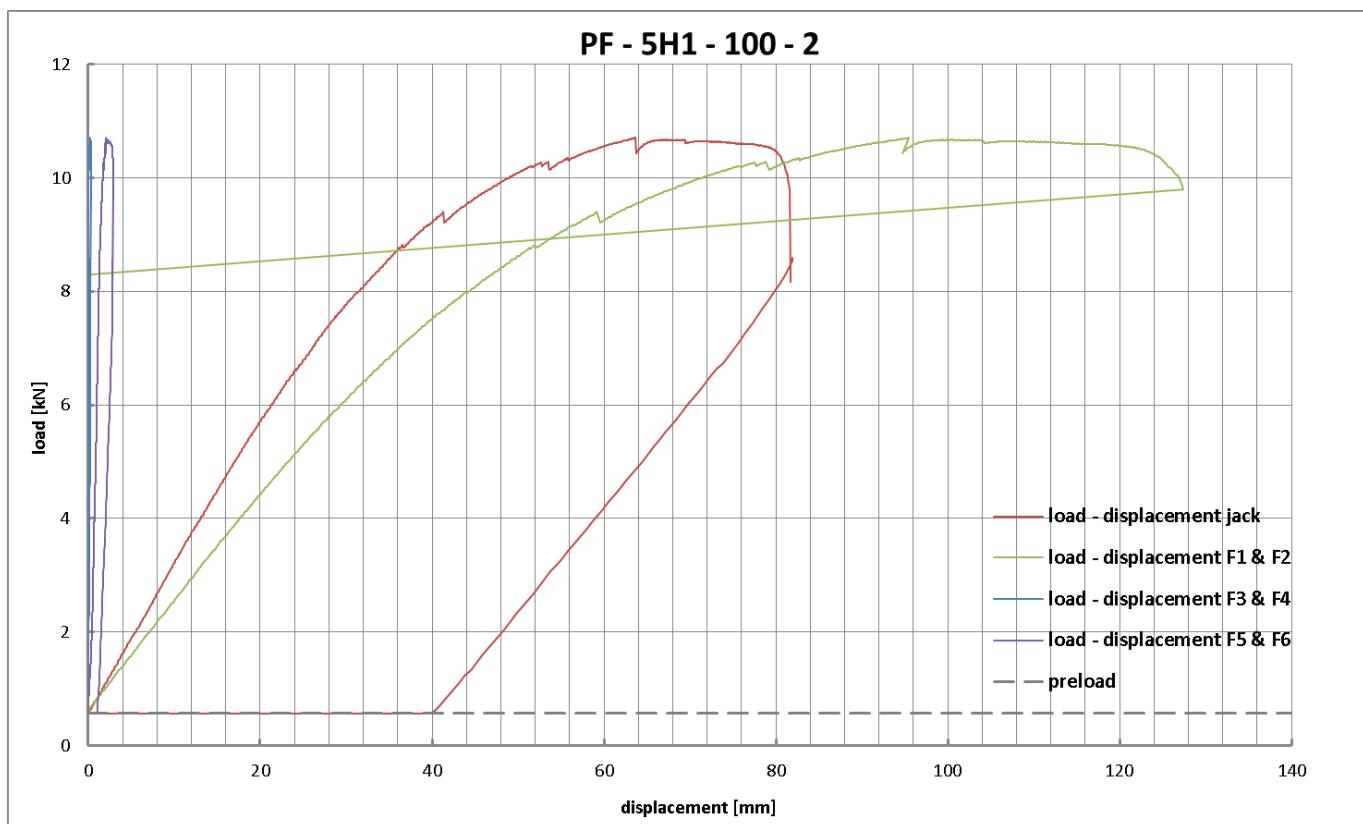
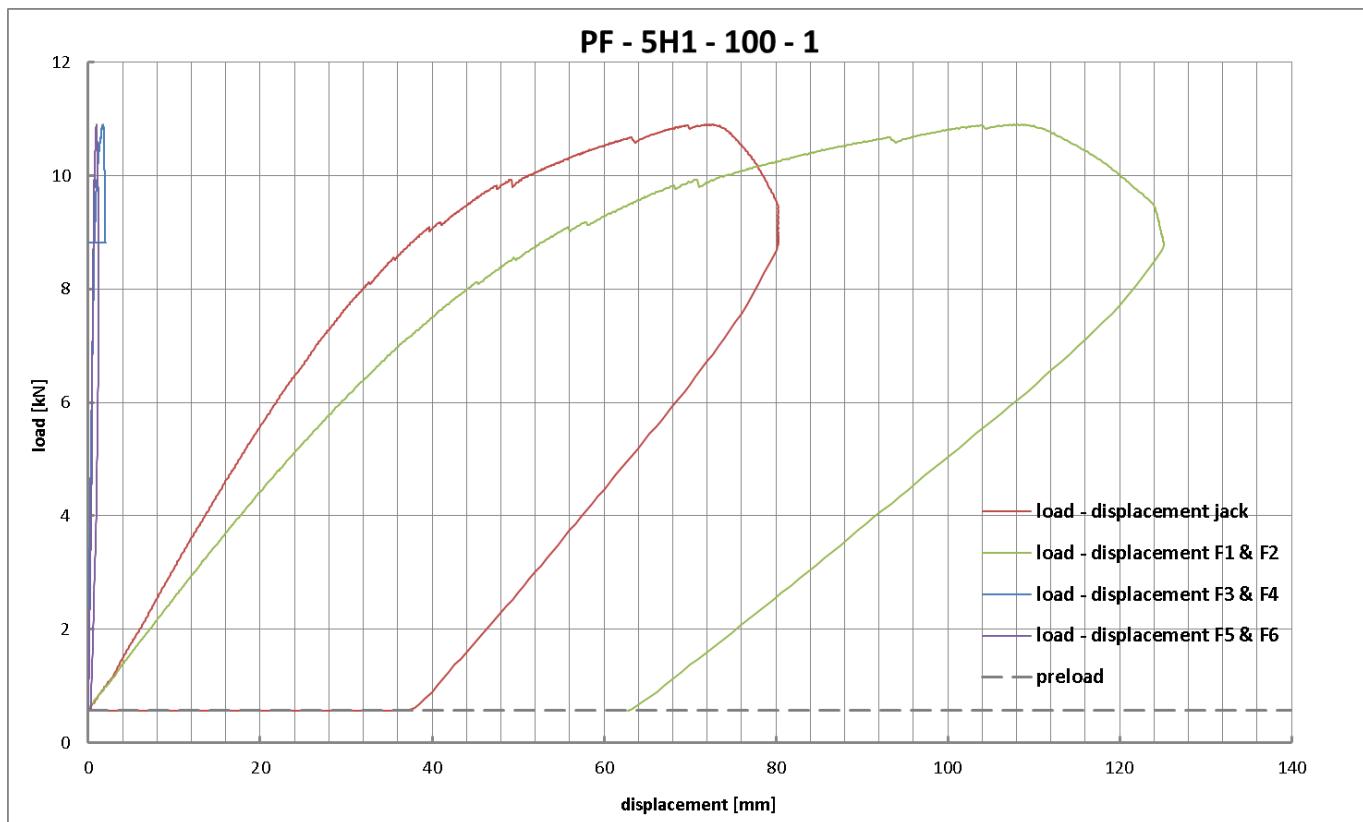


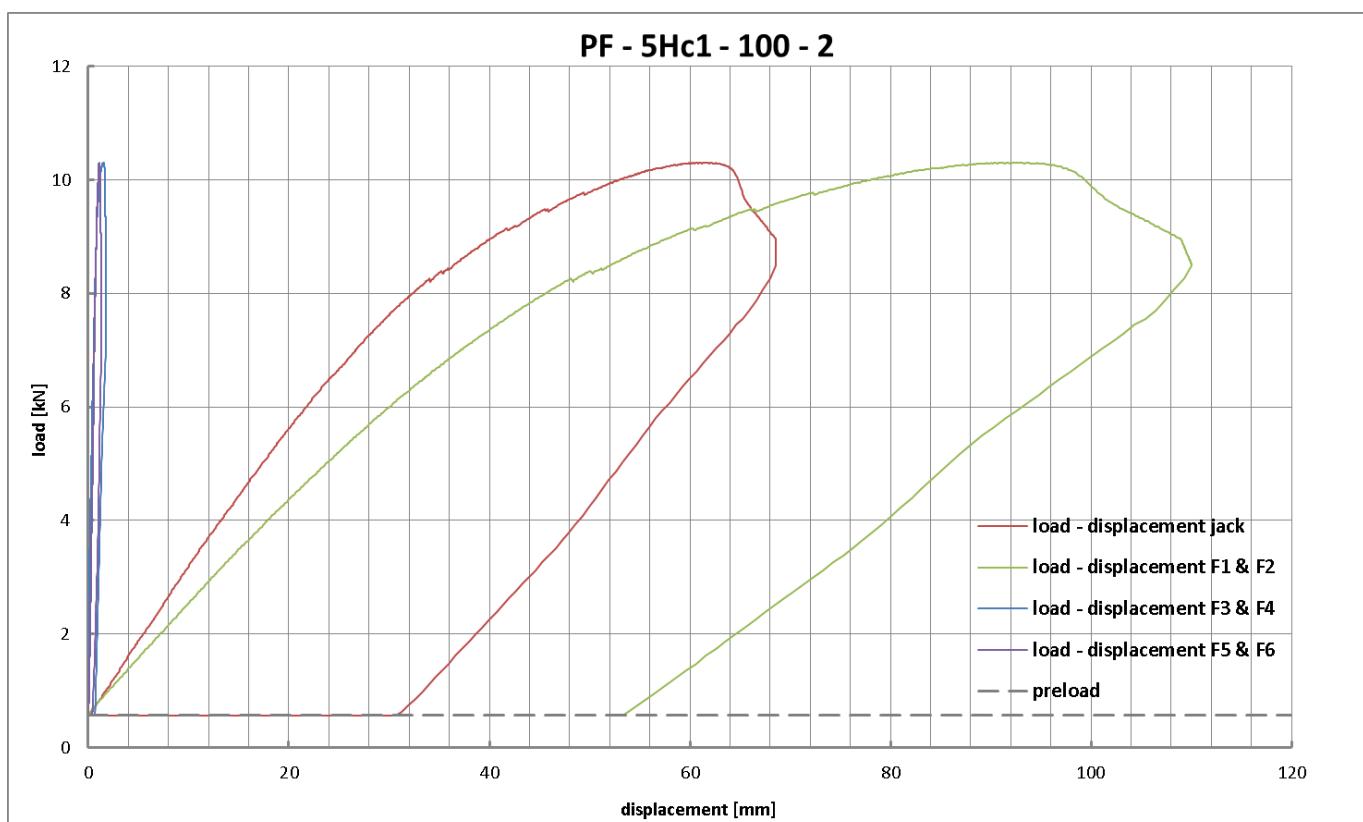
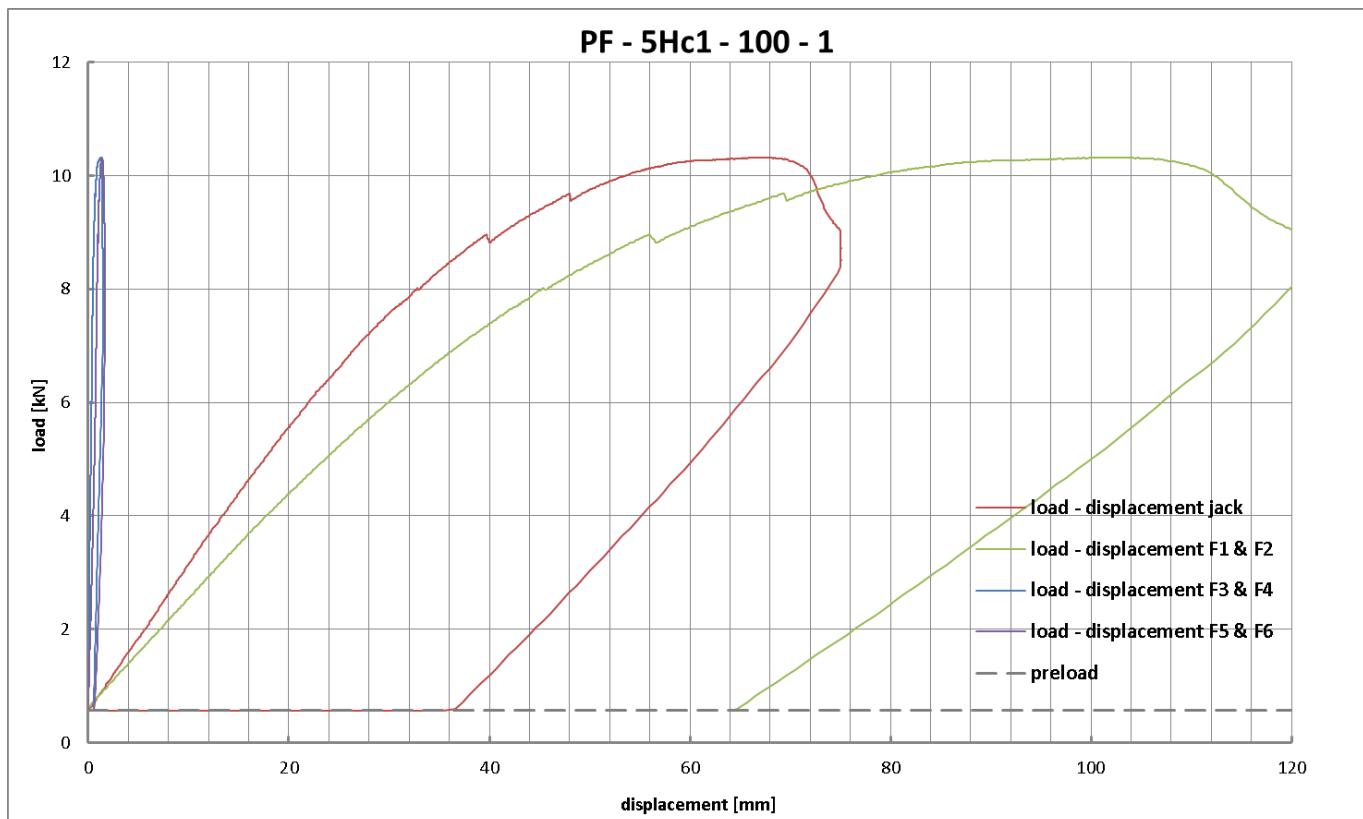


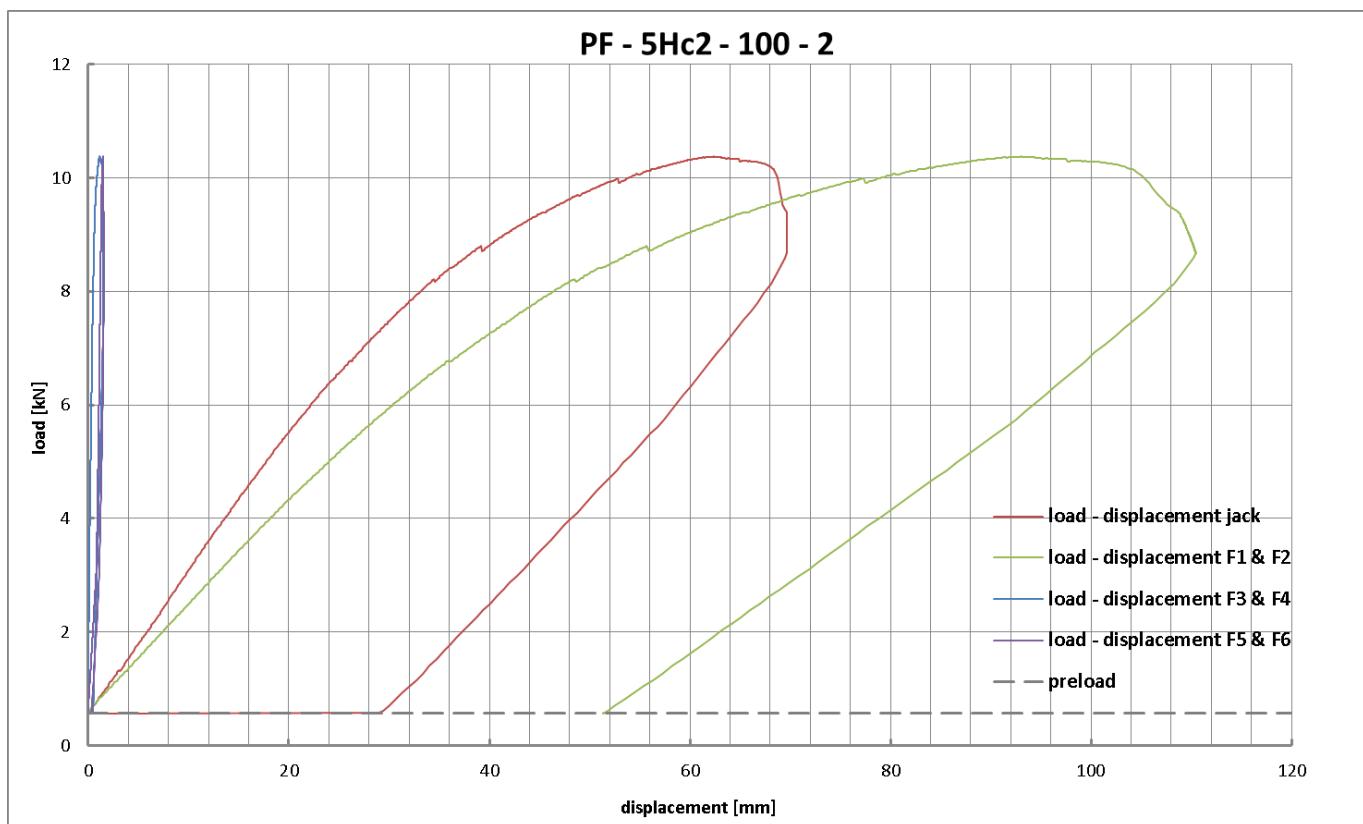
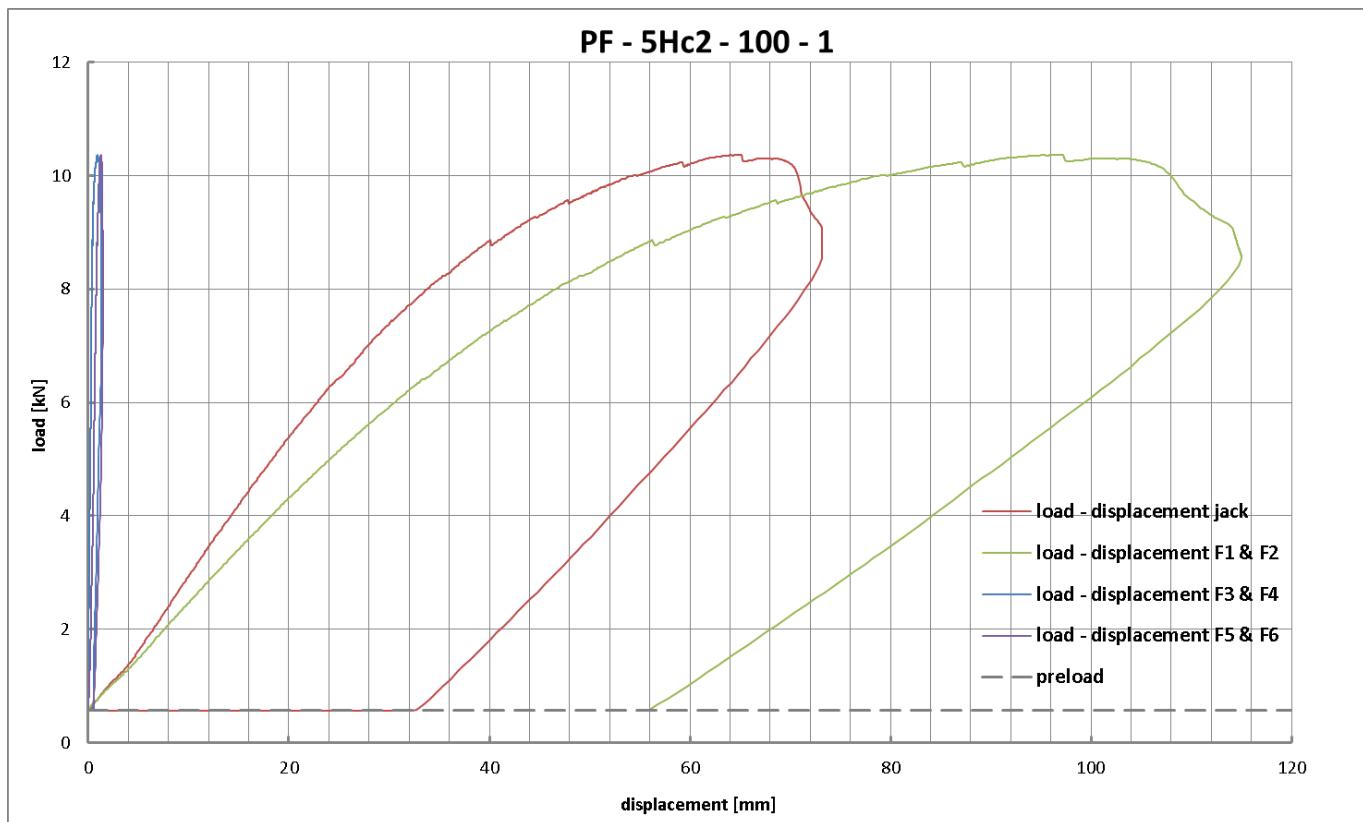


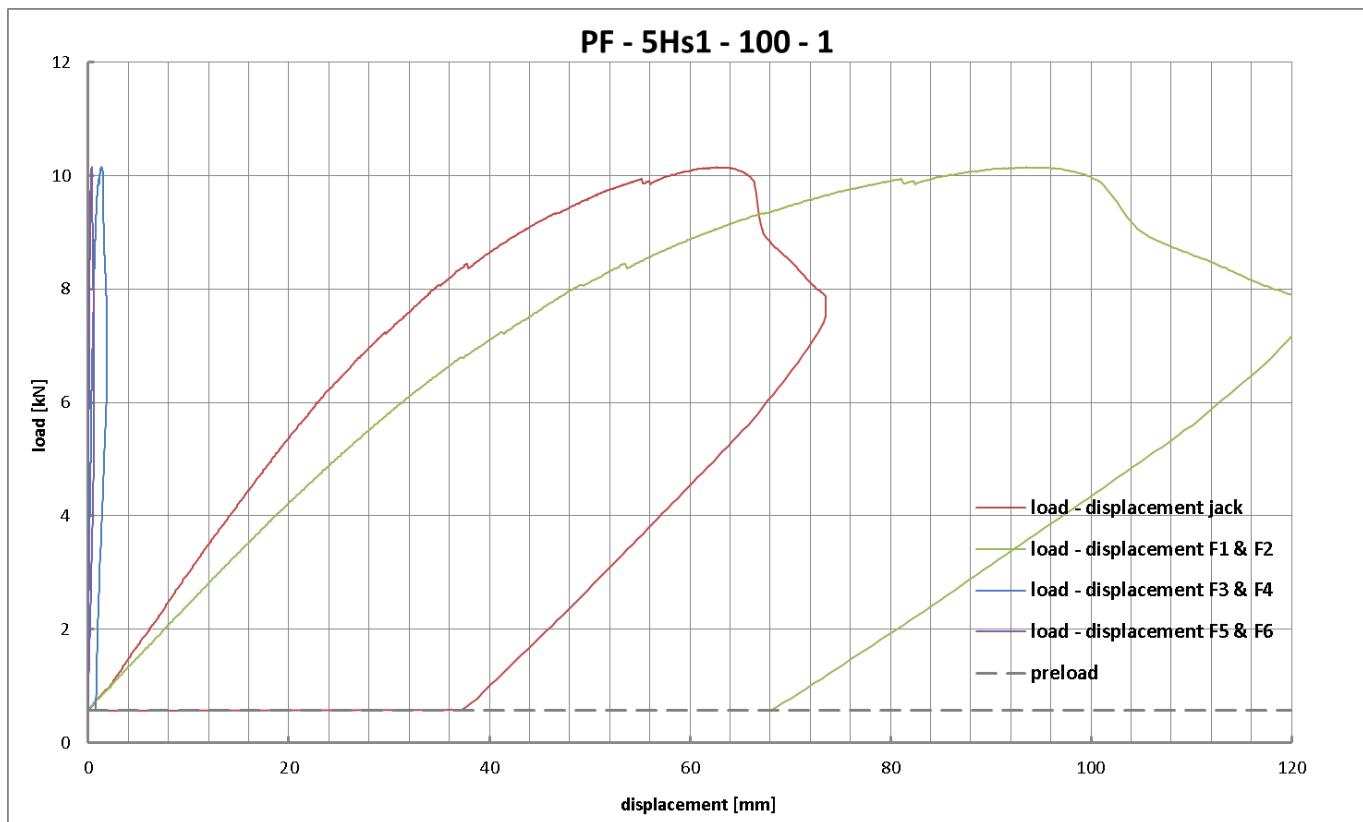


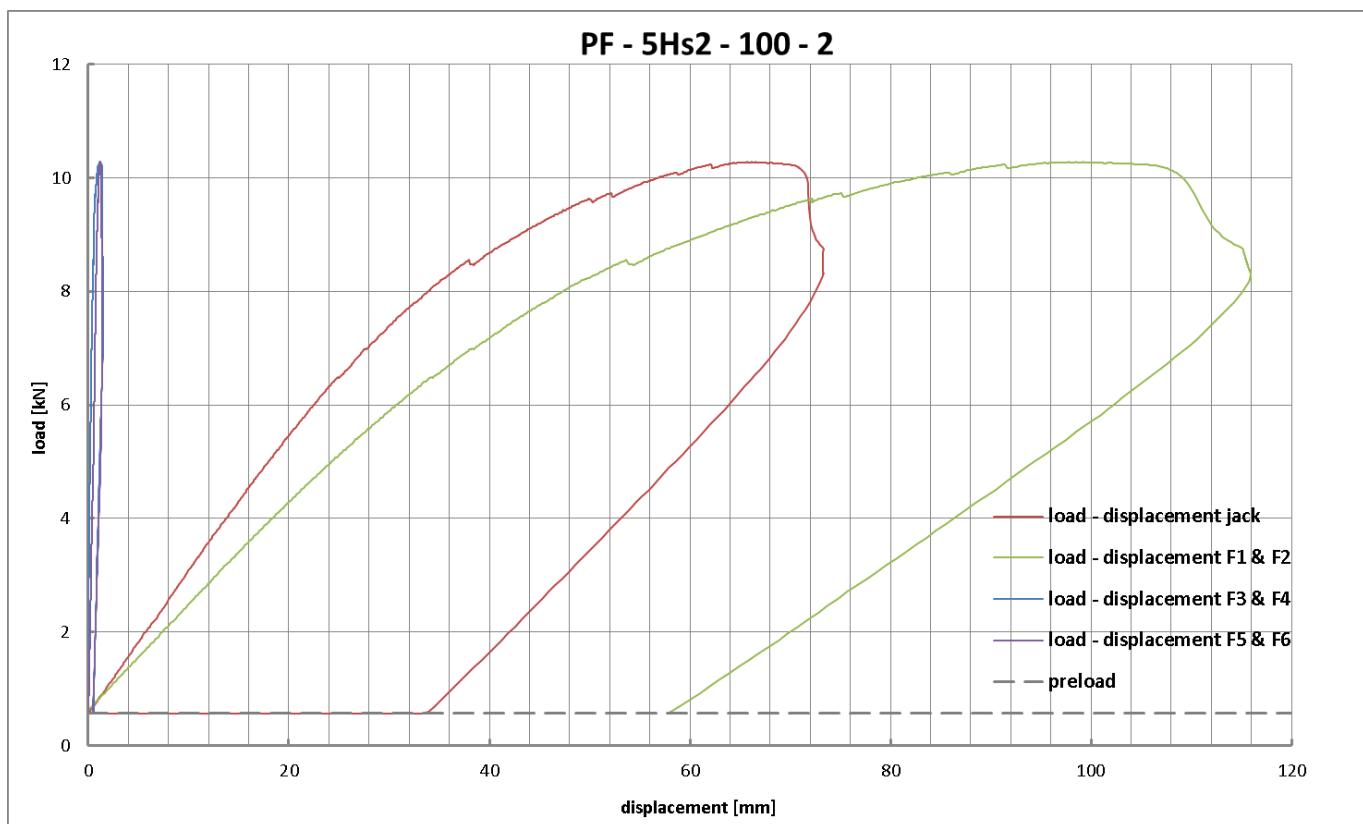
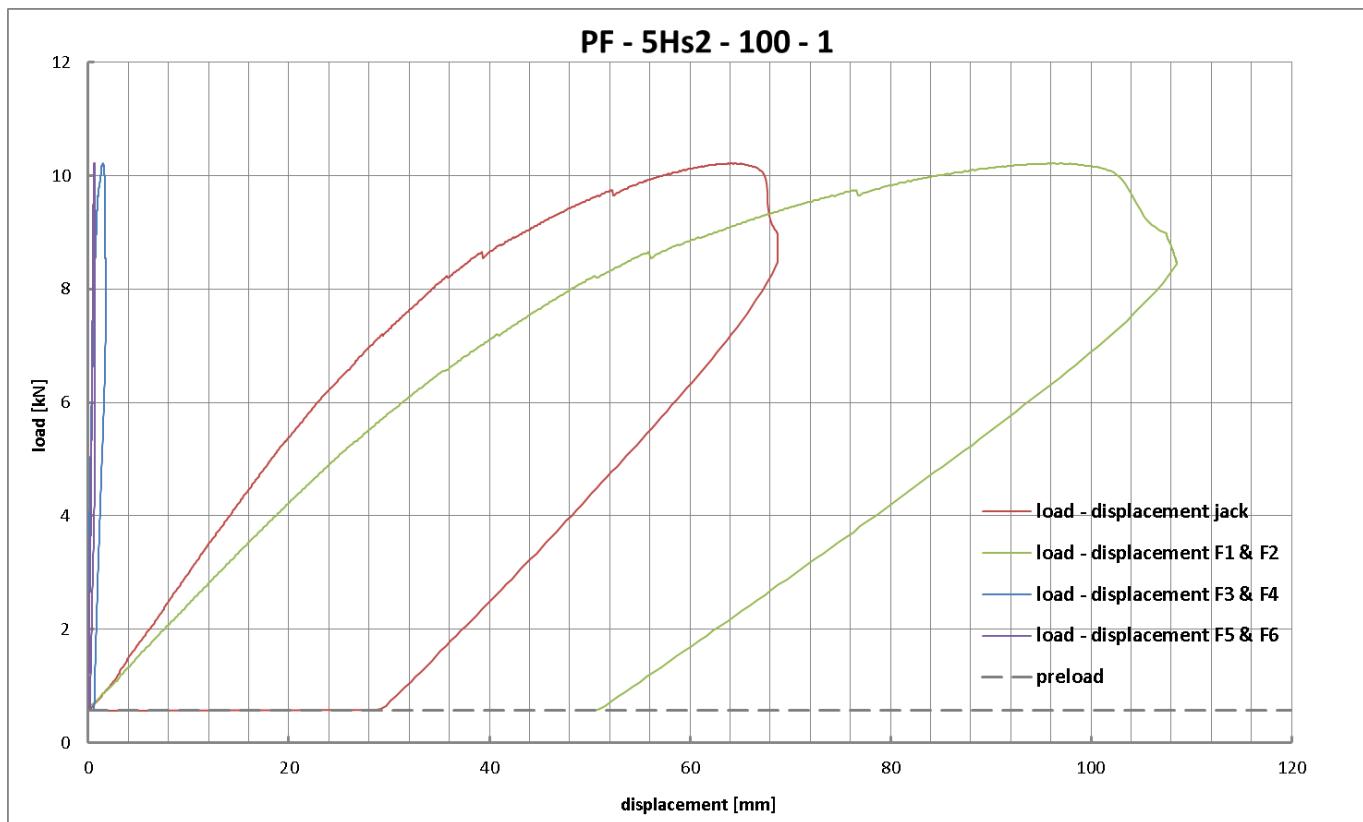












### 3 Annex C: Internal support test with downward load

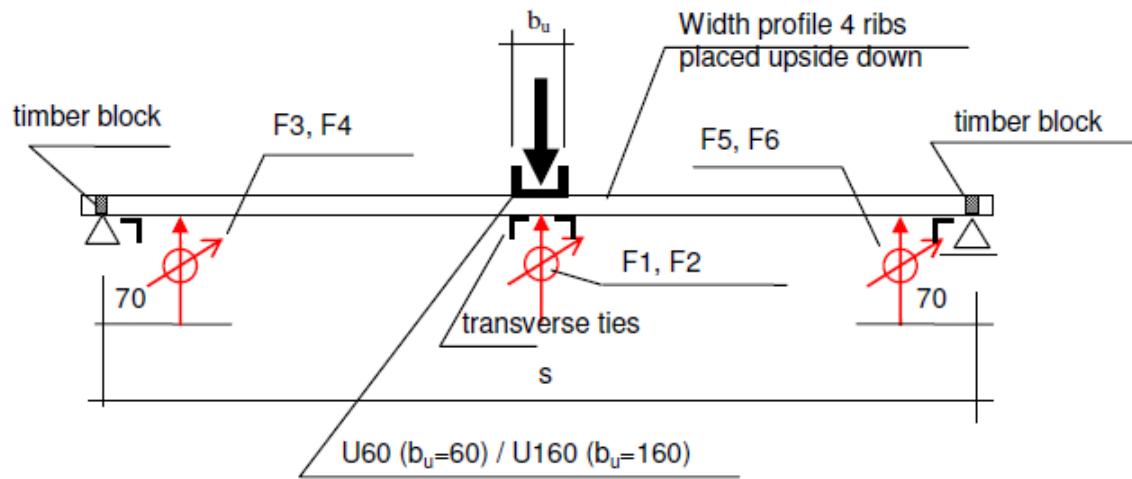


Figure C.1: Schematic test setup



Figure C.2: Test setup ( $s = 500\text{mm}$ )



Figure C.3: Test setup (span s = 1100mm)



Figure C.4: Test setup (span s = 1700mm)

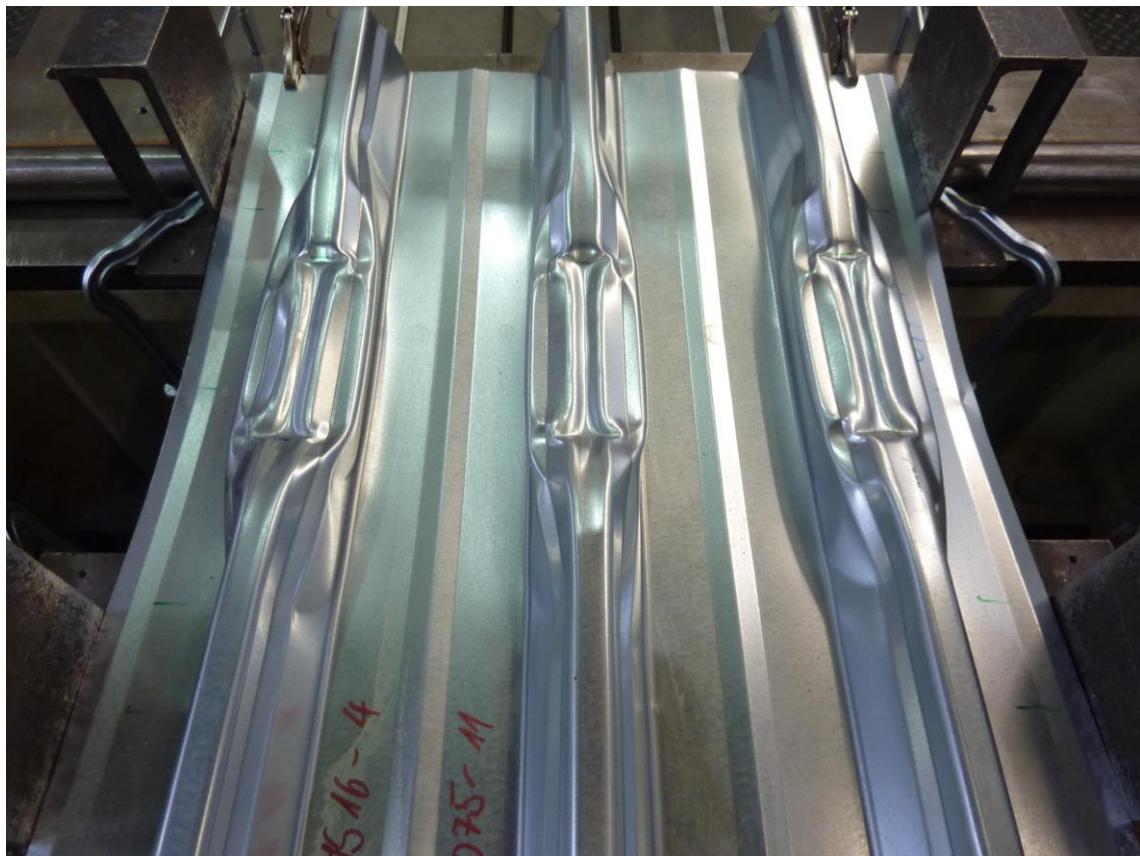


Figure C.5: Failure mode (exemplary for IS16-4-075-11)



Figure C.6: Failure mode (exemplary for IS6-4f-100-11)

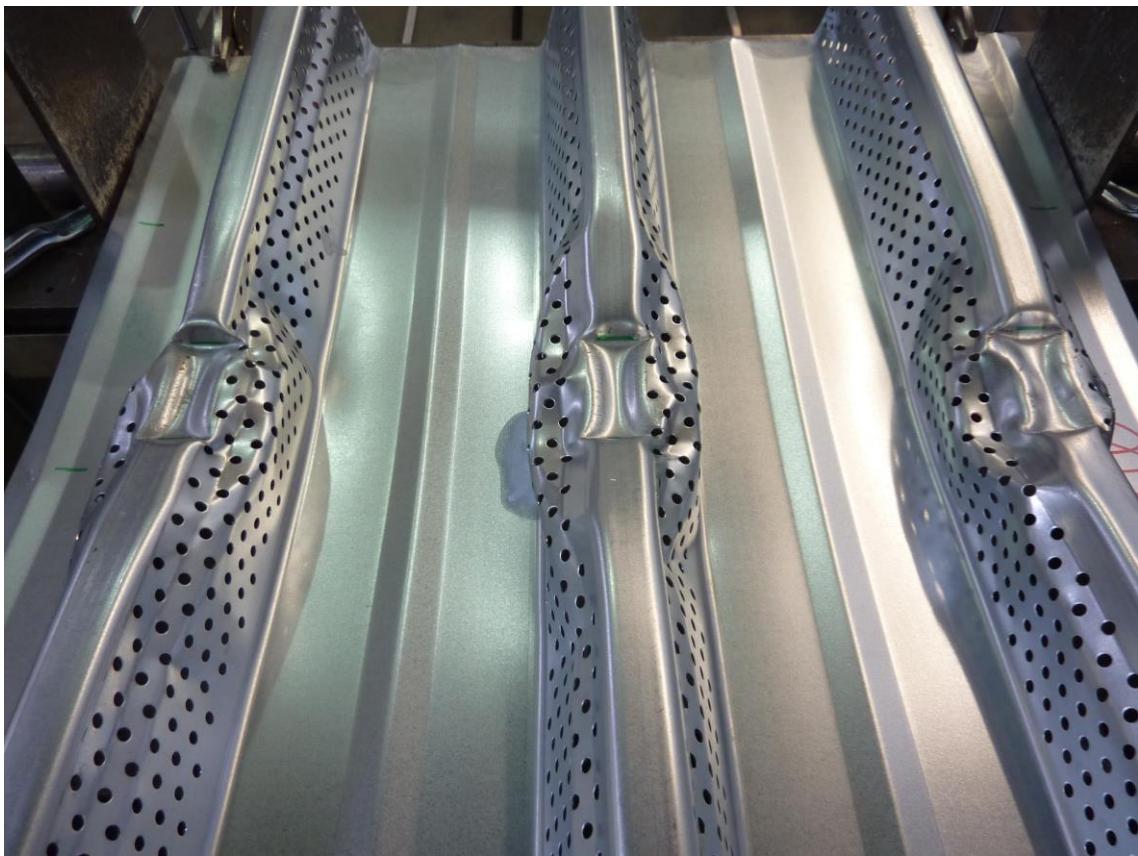


Figure C.7: Failure mode (exemplary for IS6-4w-100-11)

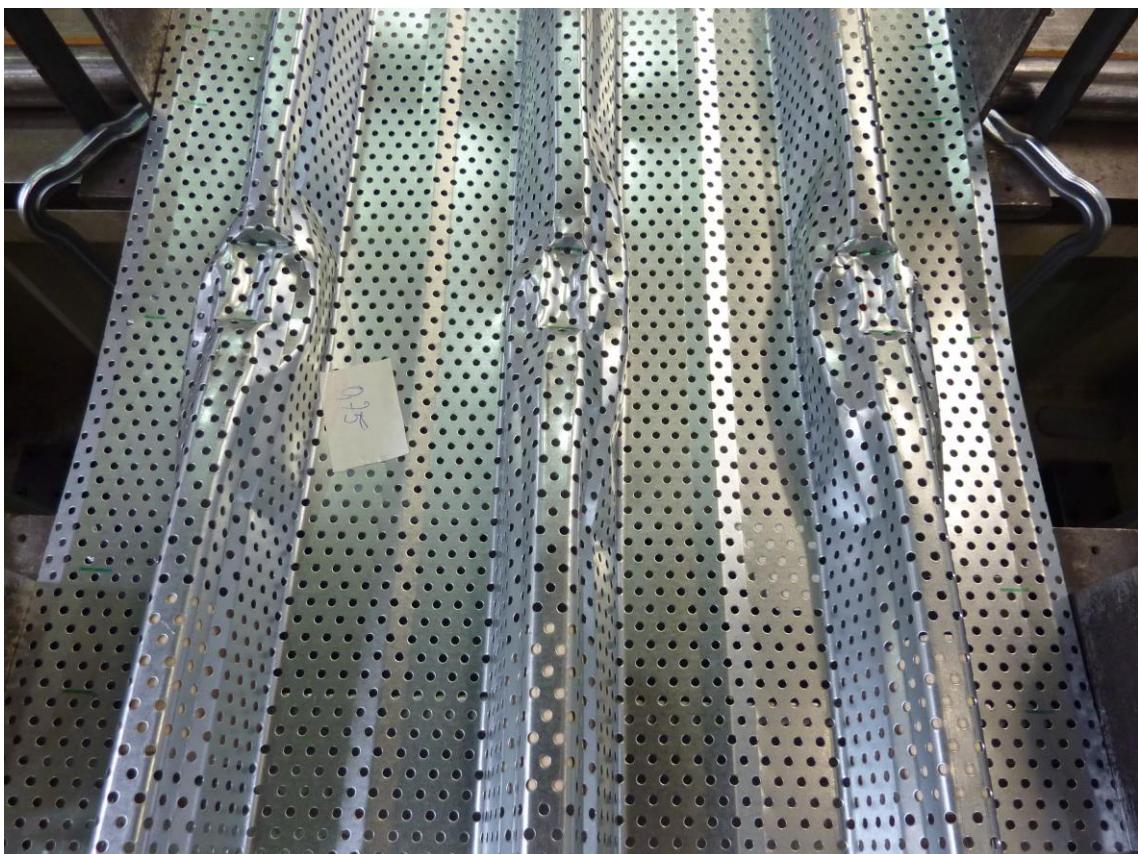


Figure C.8: Failure mode (exemplary for IS6-4t-075-12)

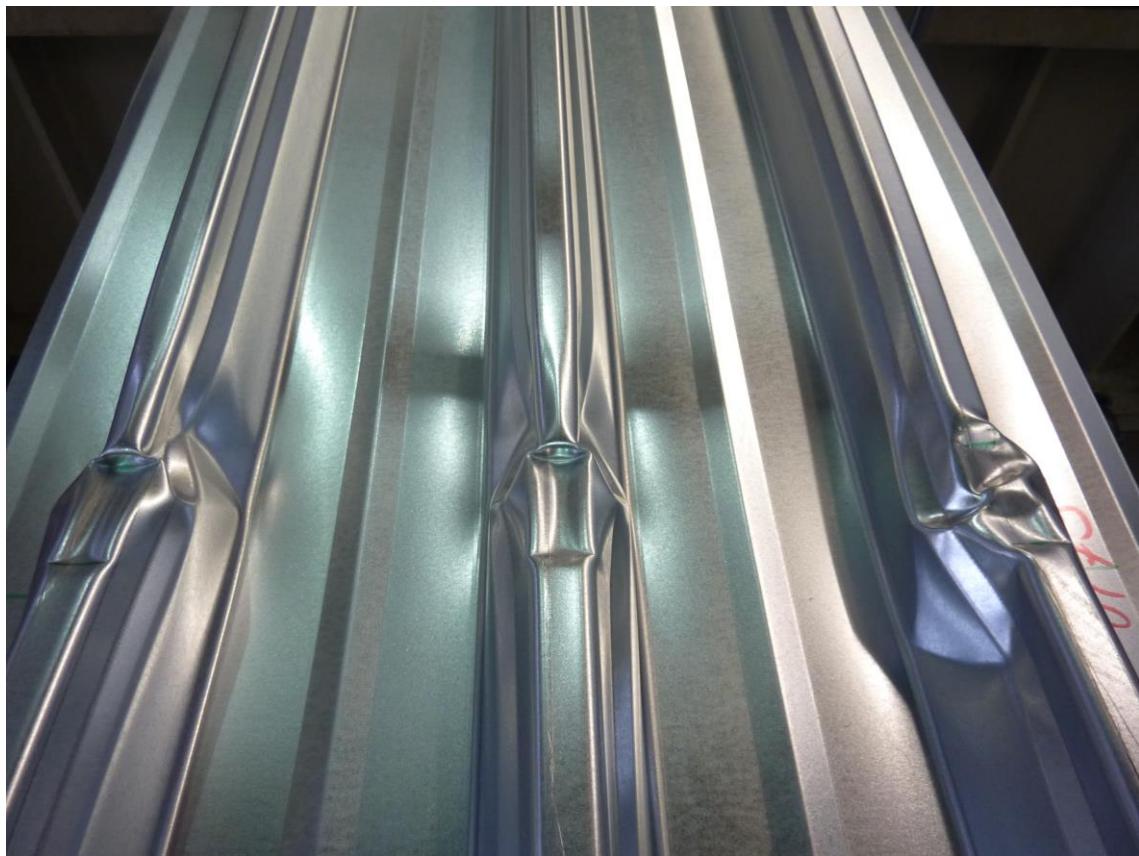


Figure C.9: Failure mode (exemplary for IS6-4-triangle-075-41)

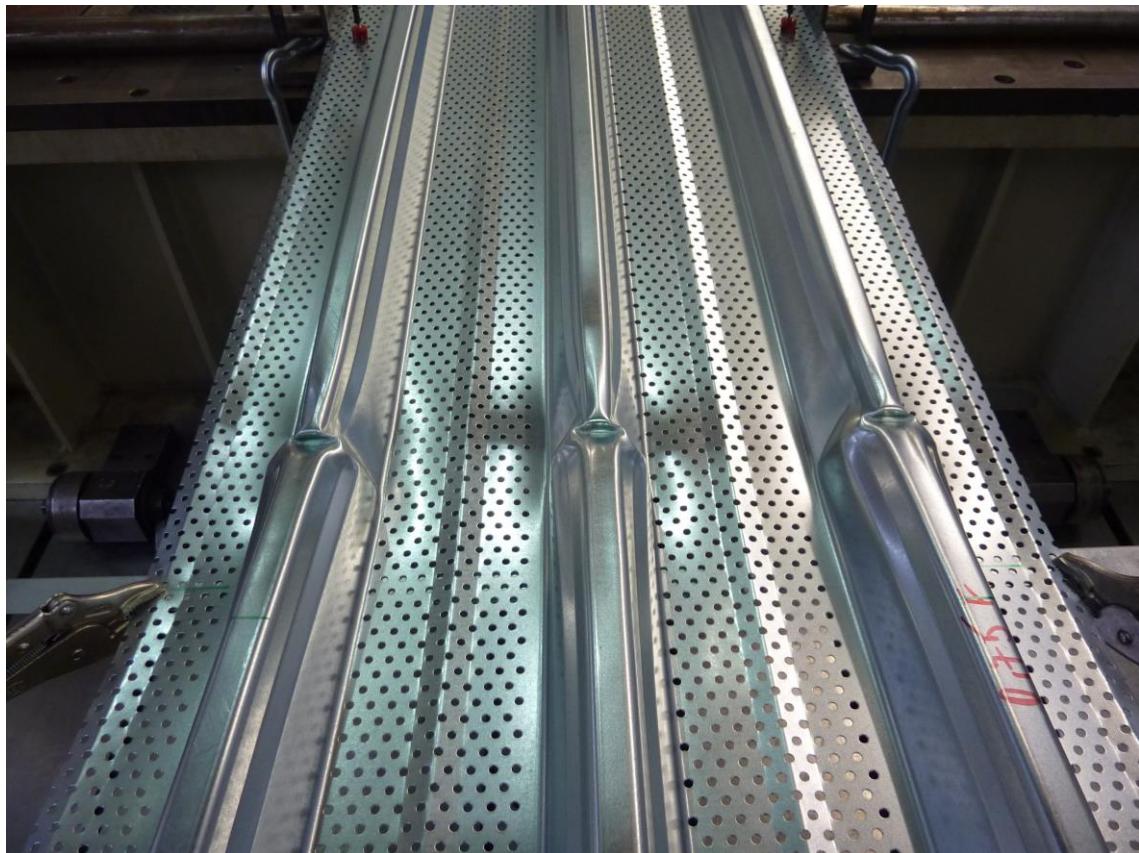


Figure C.10: Failure mode (exemplary for IS16-4f-triangle-075-42)

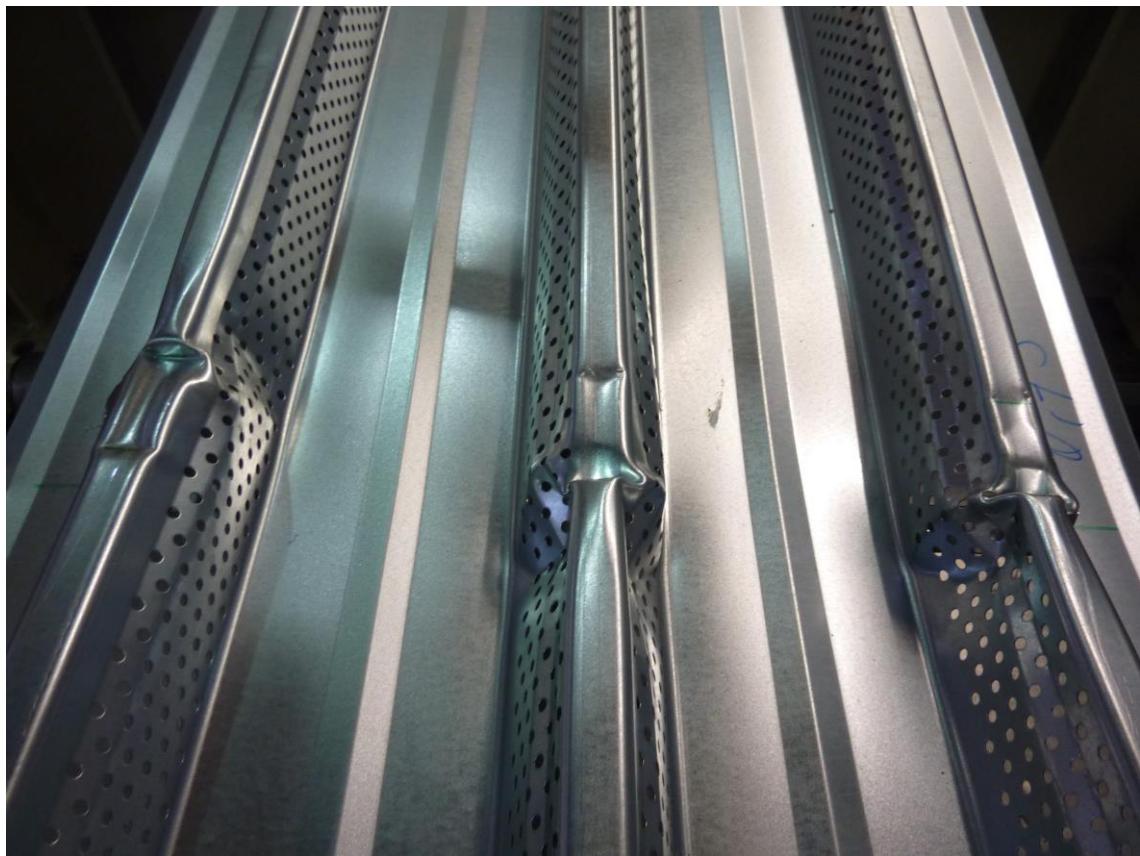


Figure C.11: Failure mode (exemplary for IS6-4w-triangle-075-42)



Figure C.12: Failure mode (exemplary for IS6-4t-triangle-075-42)



Figure C.13: Failure mode (exemplary for IS6-4-100-12)



Figure C.14: Failure mode (exemplary for IS6-4f-100-11)

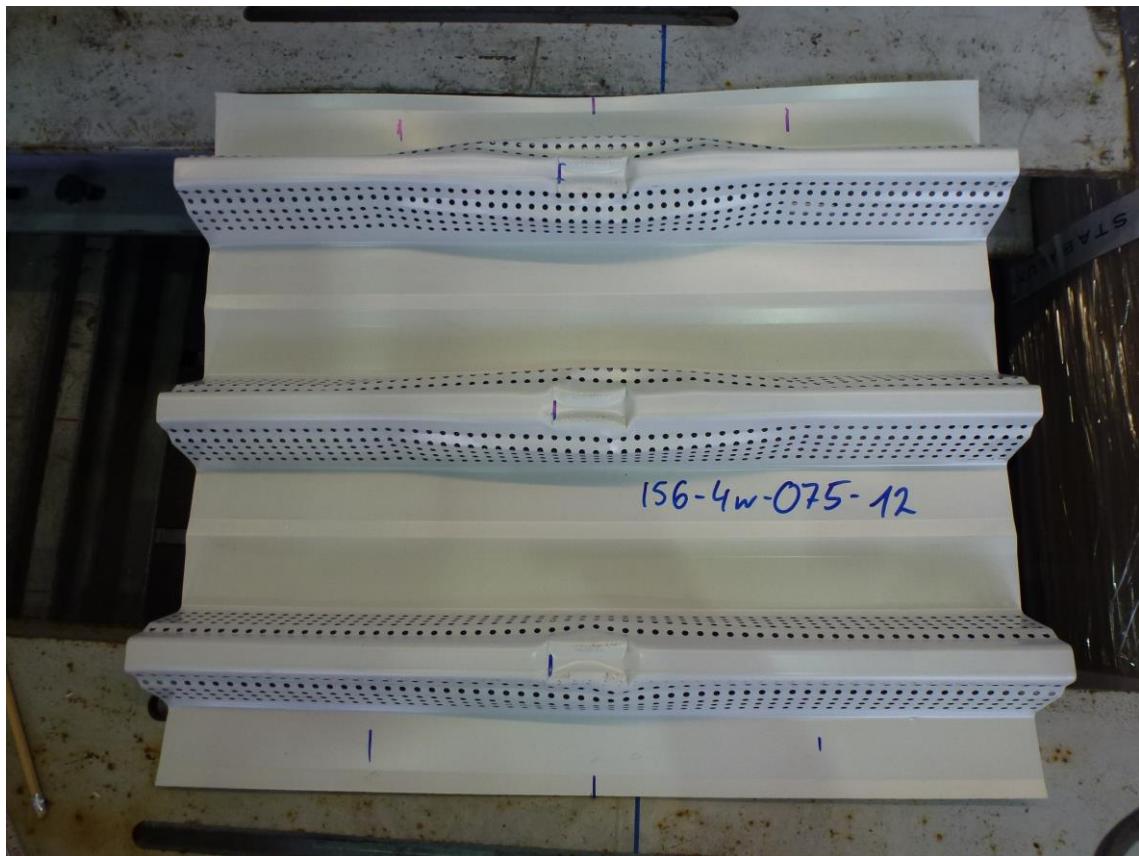


Figure C.15: Failure mode (exemplary for IS6-4-100-12)



Figure C.16: Failure mode (exemplary for IS6-4-100-11)

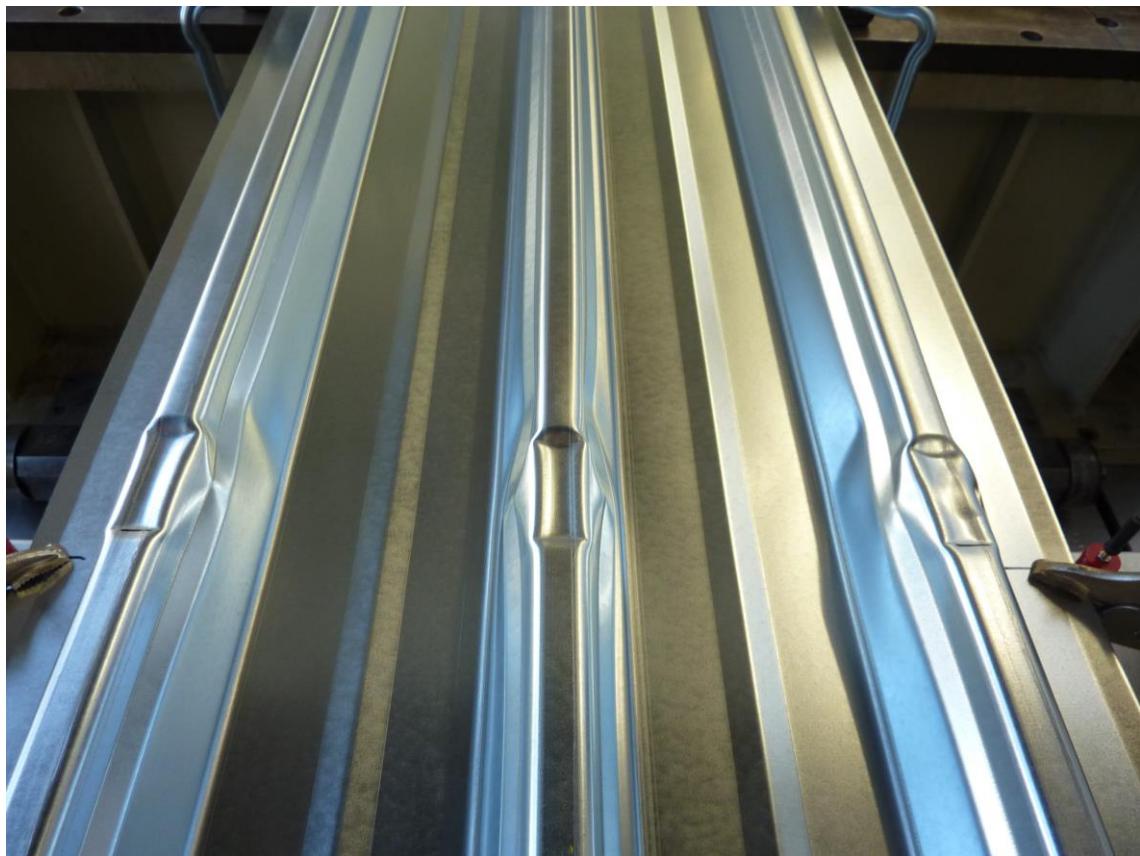


Figure C.17: Failure mode (exemplary for IS6-4-100-41)

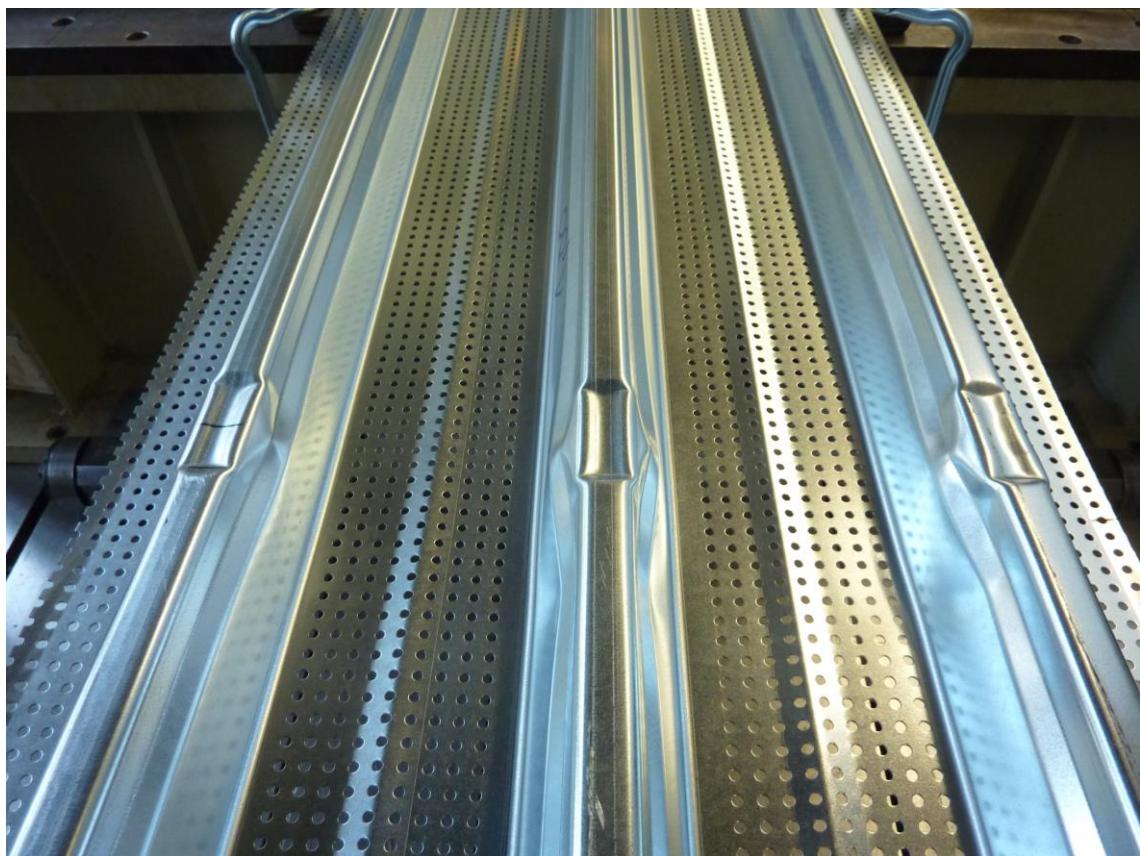


Figure C.18: Failure mode (exemplary for IS6-4f-100-42)

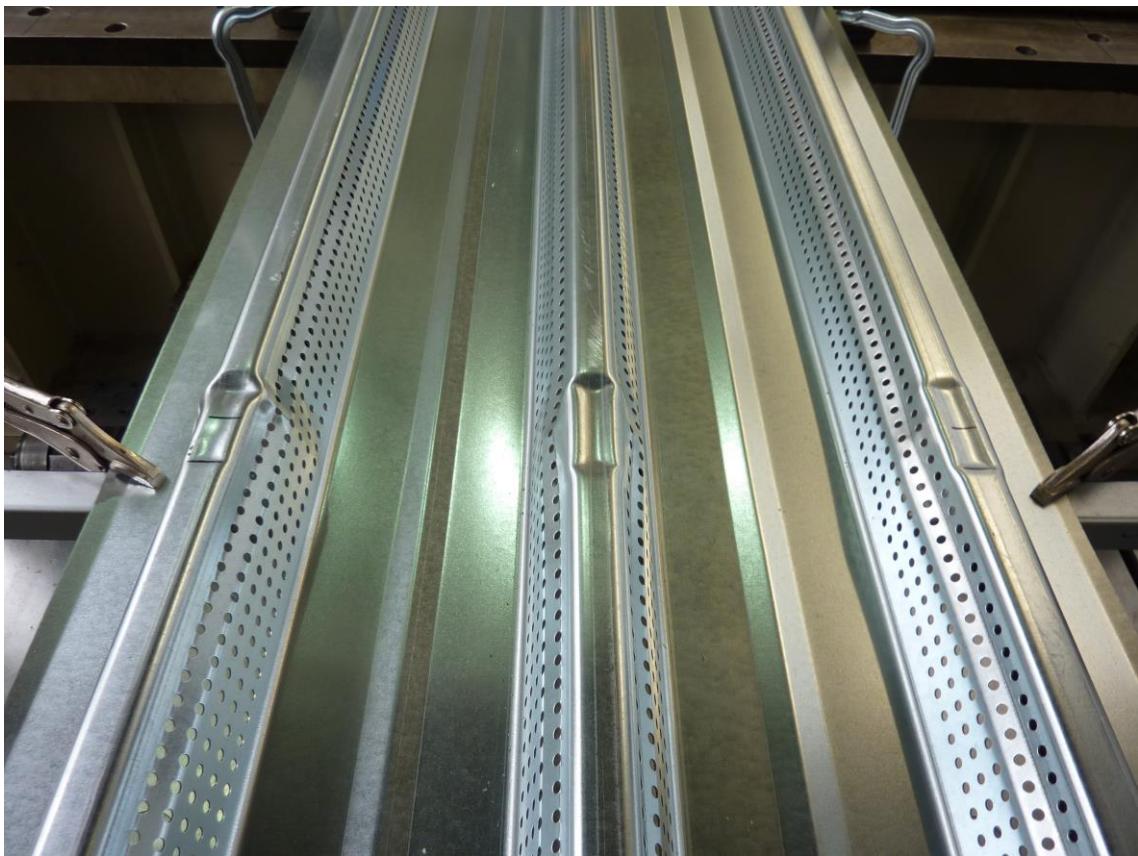


Figure C.19: Failure mode (exemplary for IS6-4w-100-42)

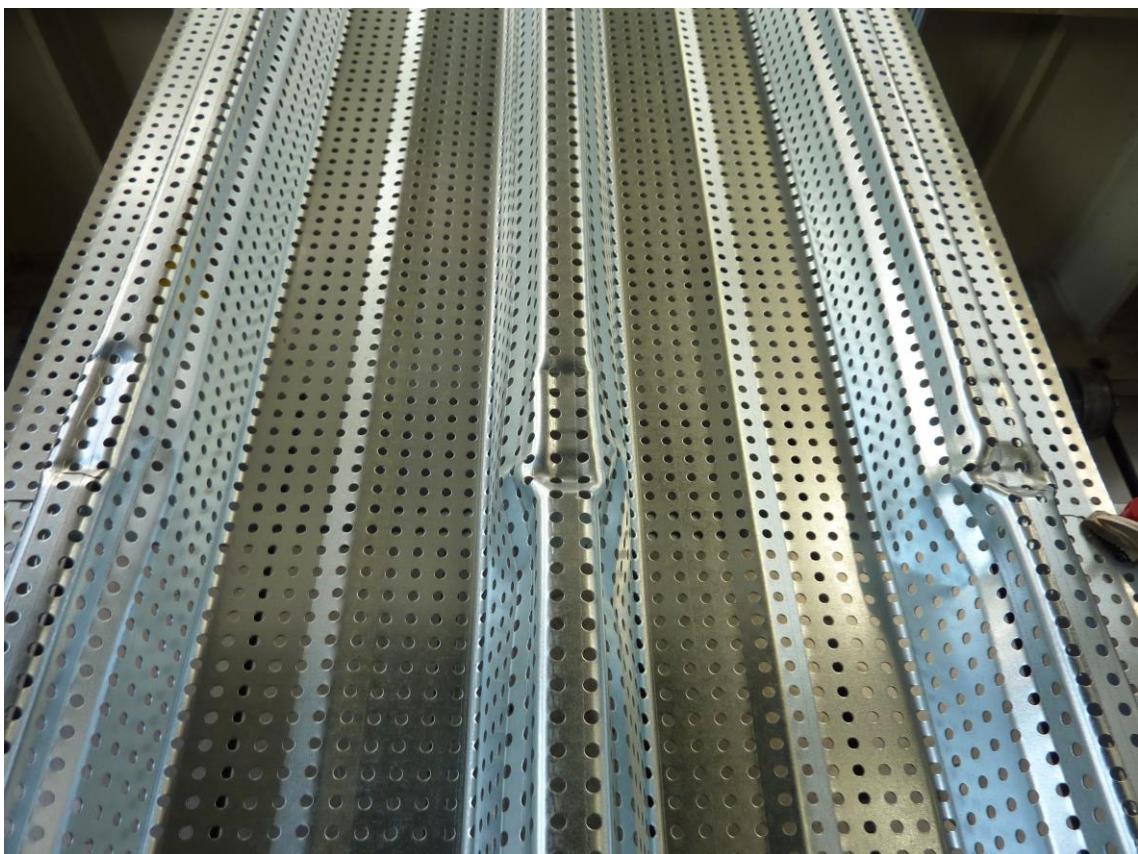
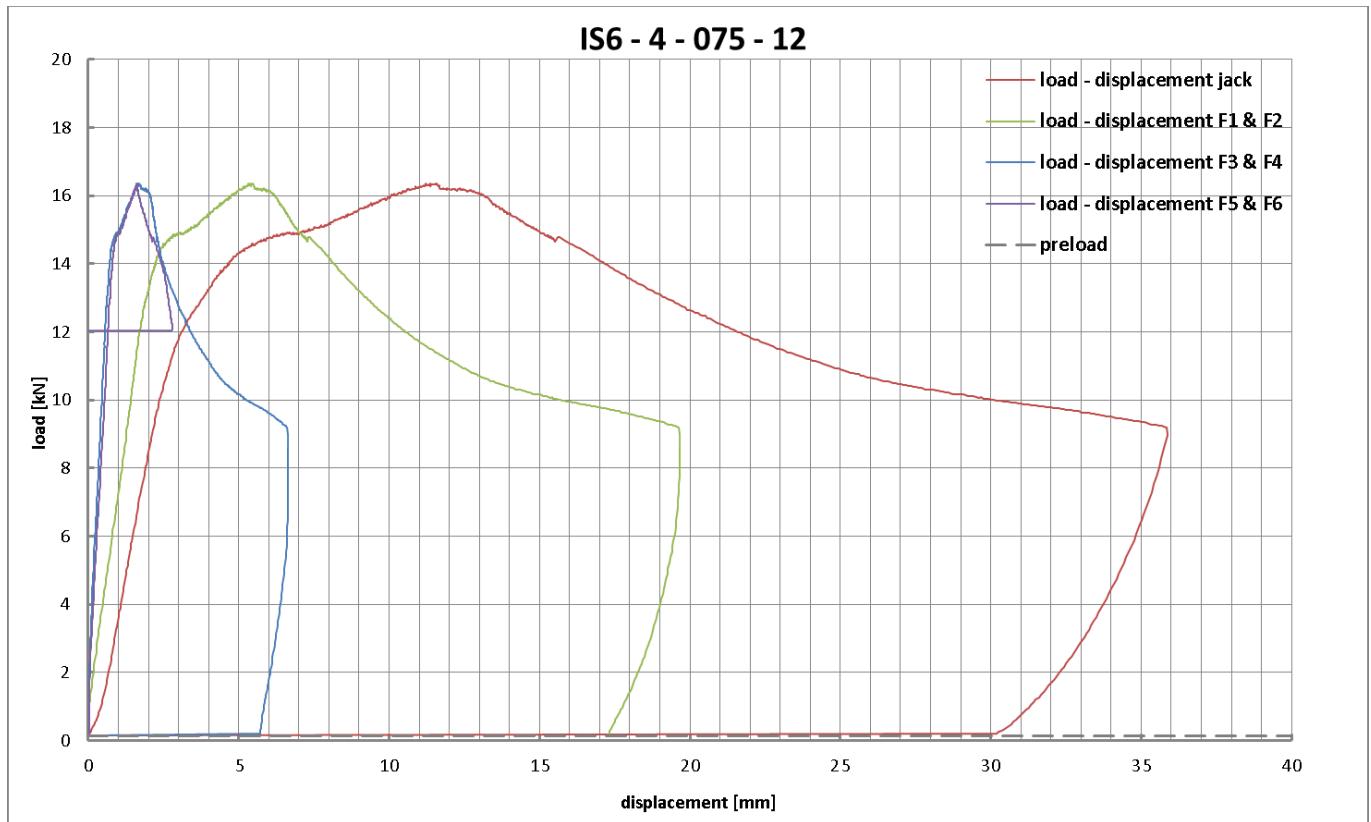
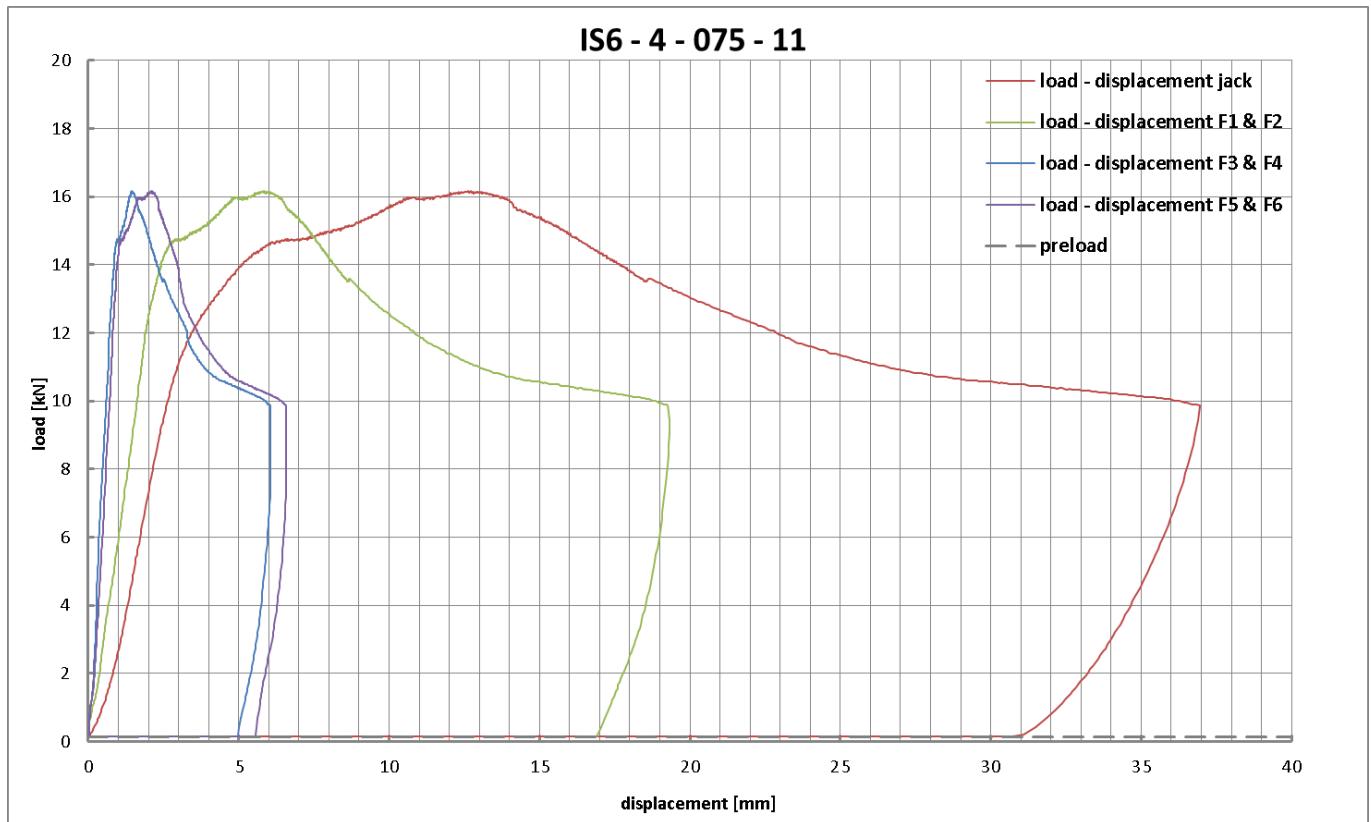
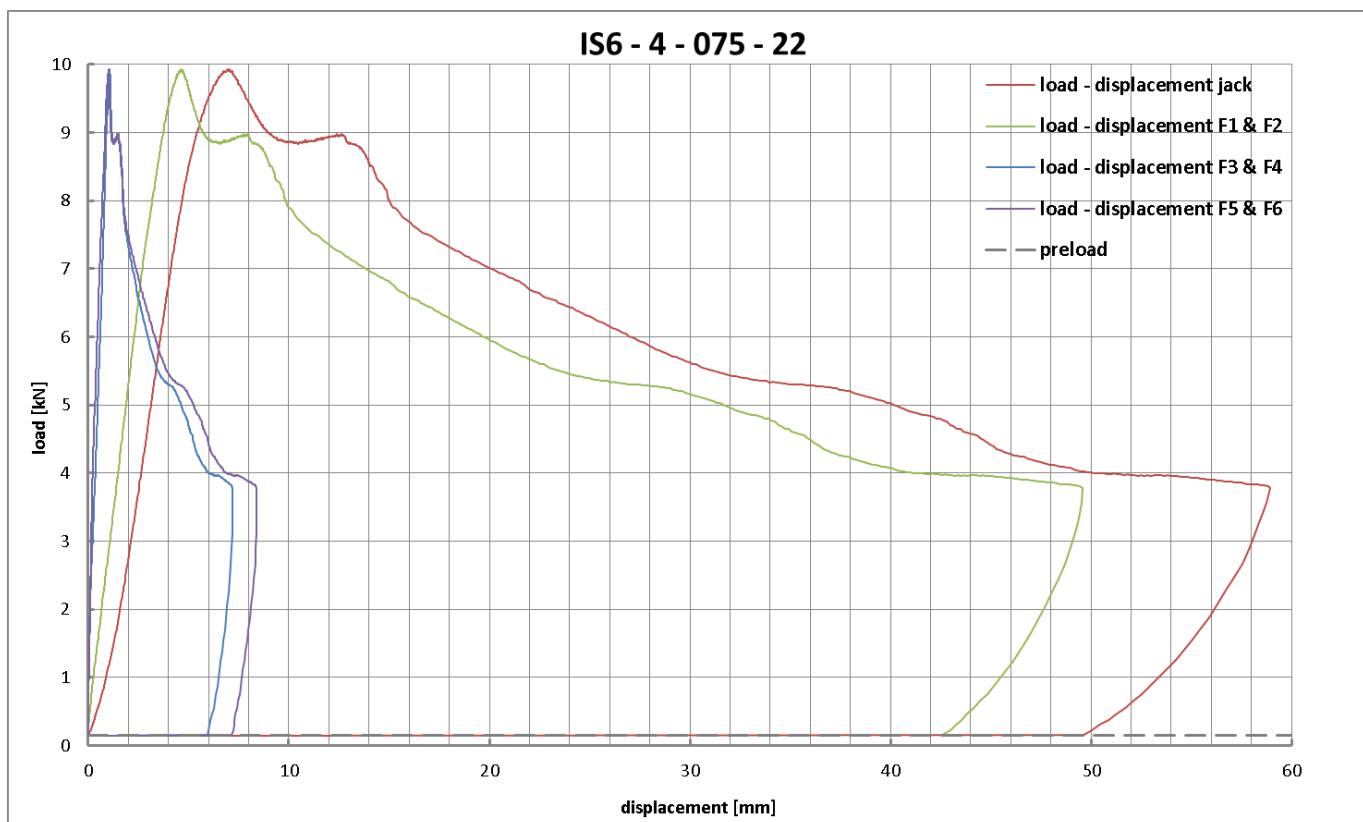
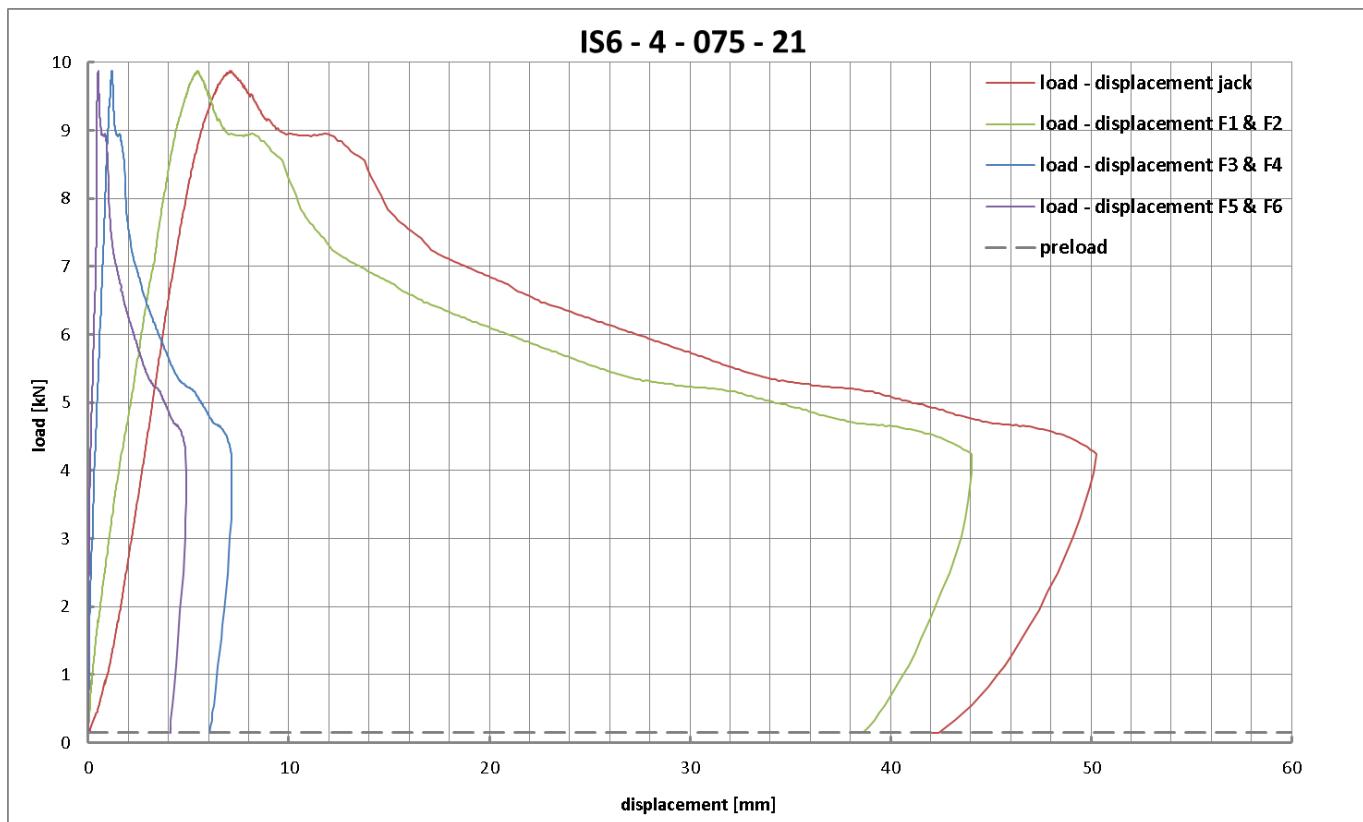
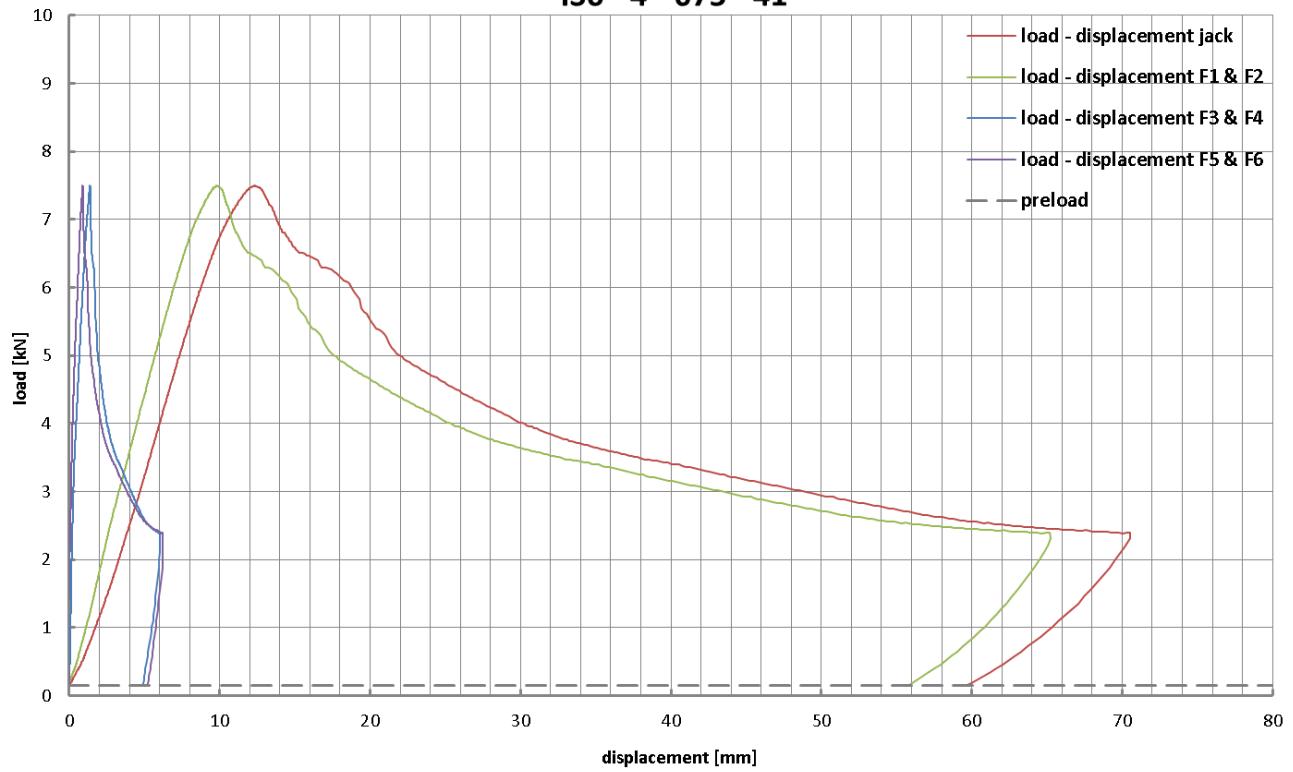
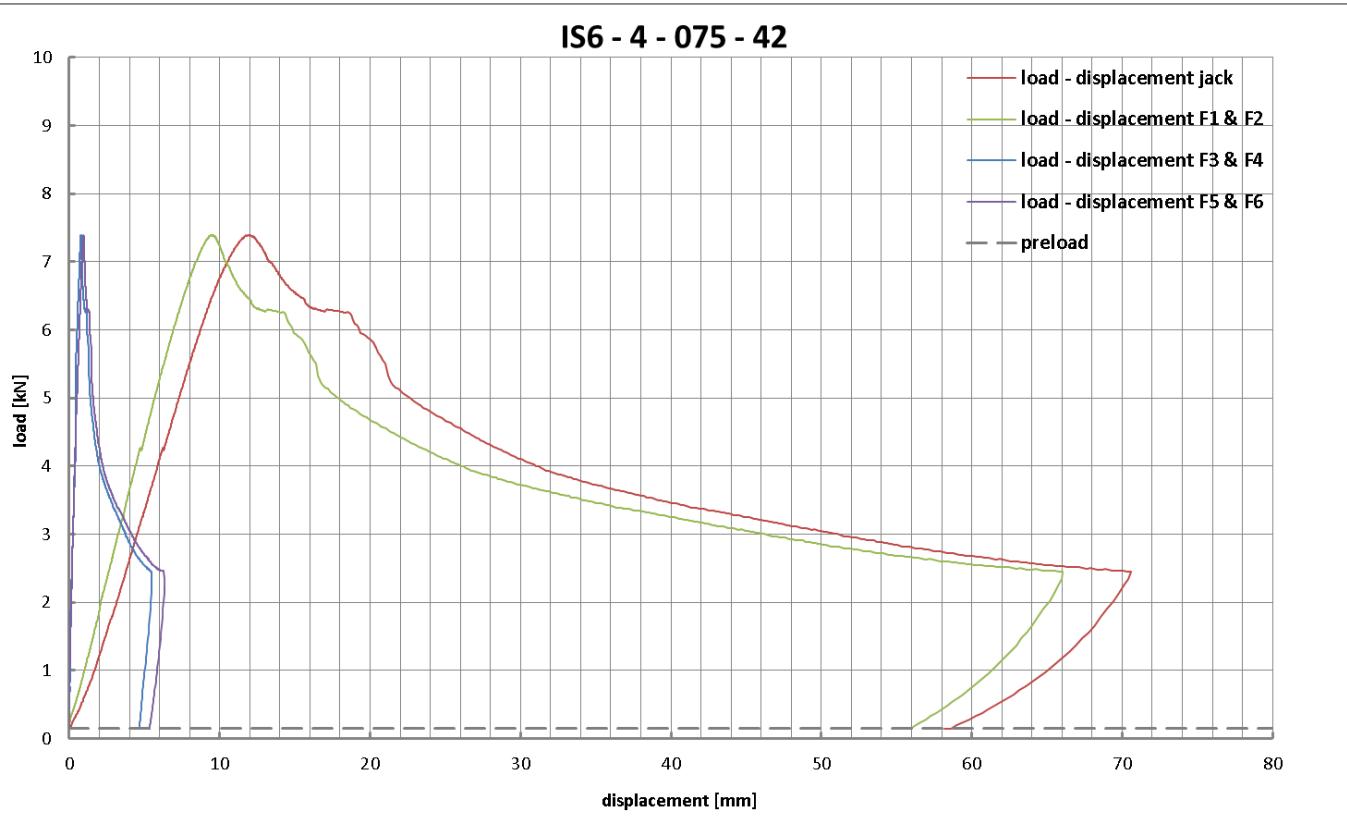


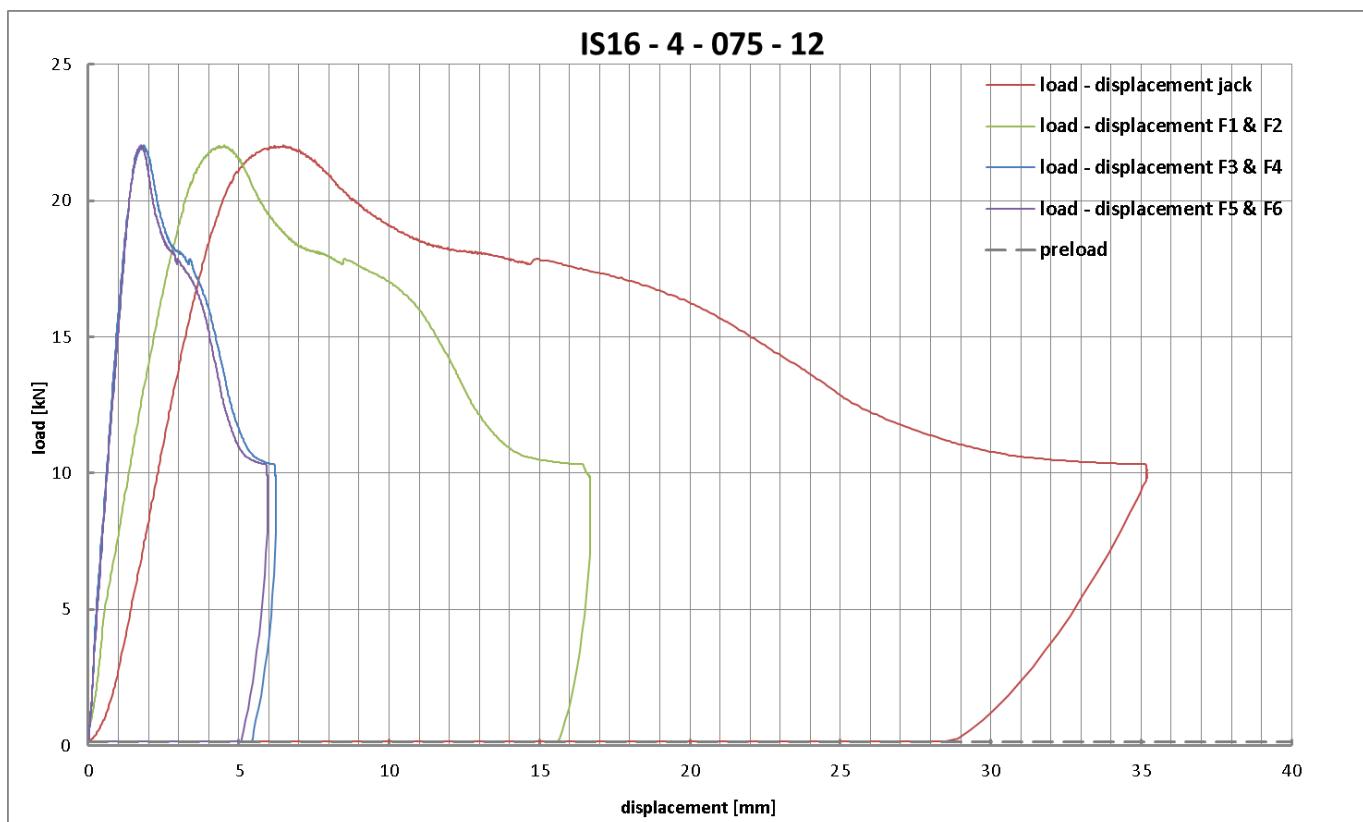
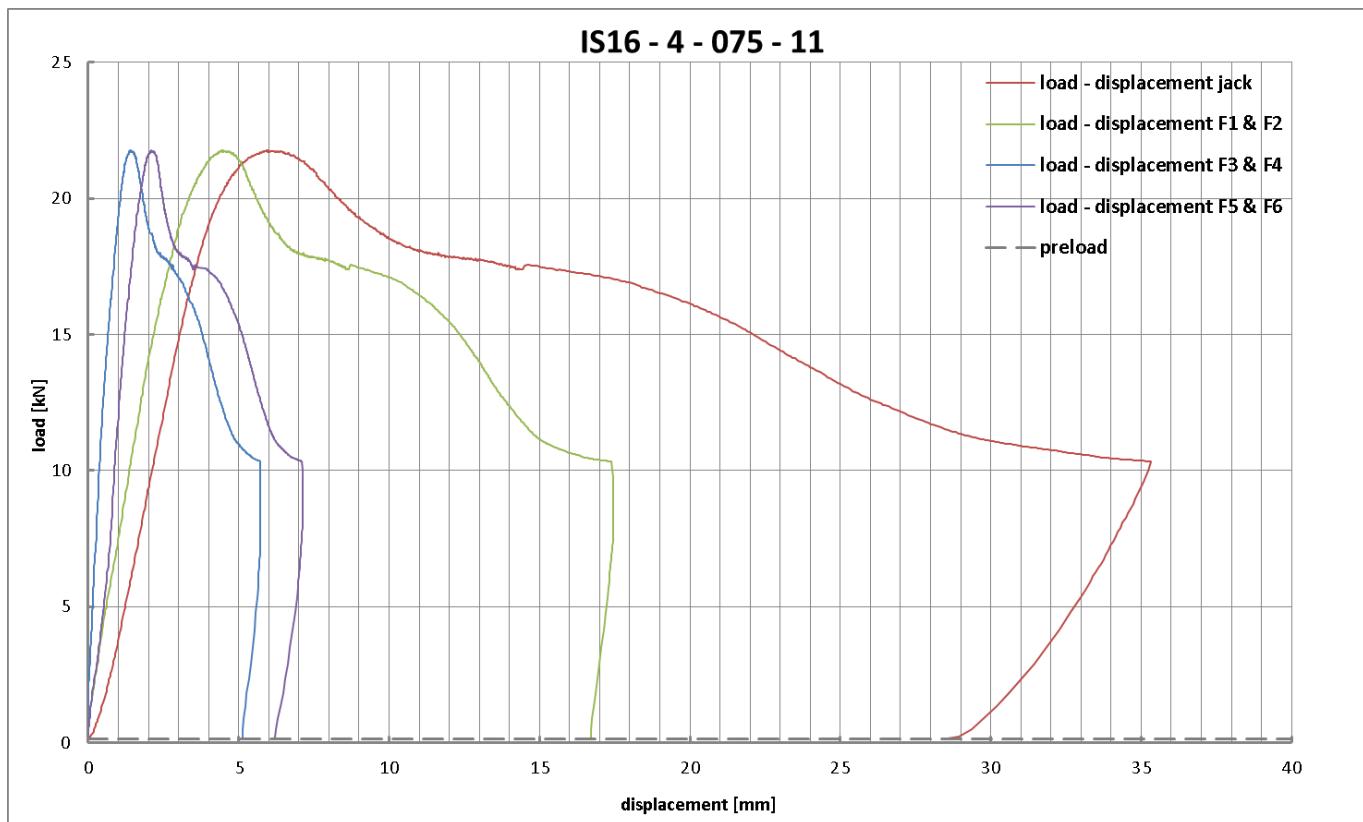
Figure C.20: Failure mode (exemplary for IS6-4t-100-42)

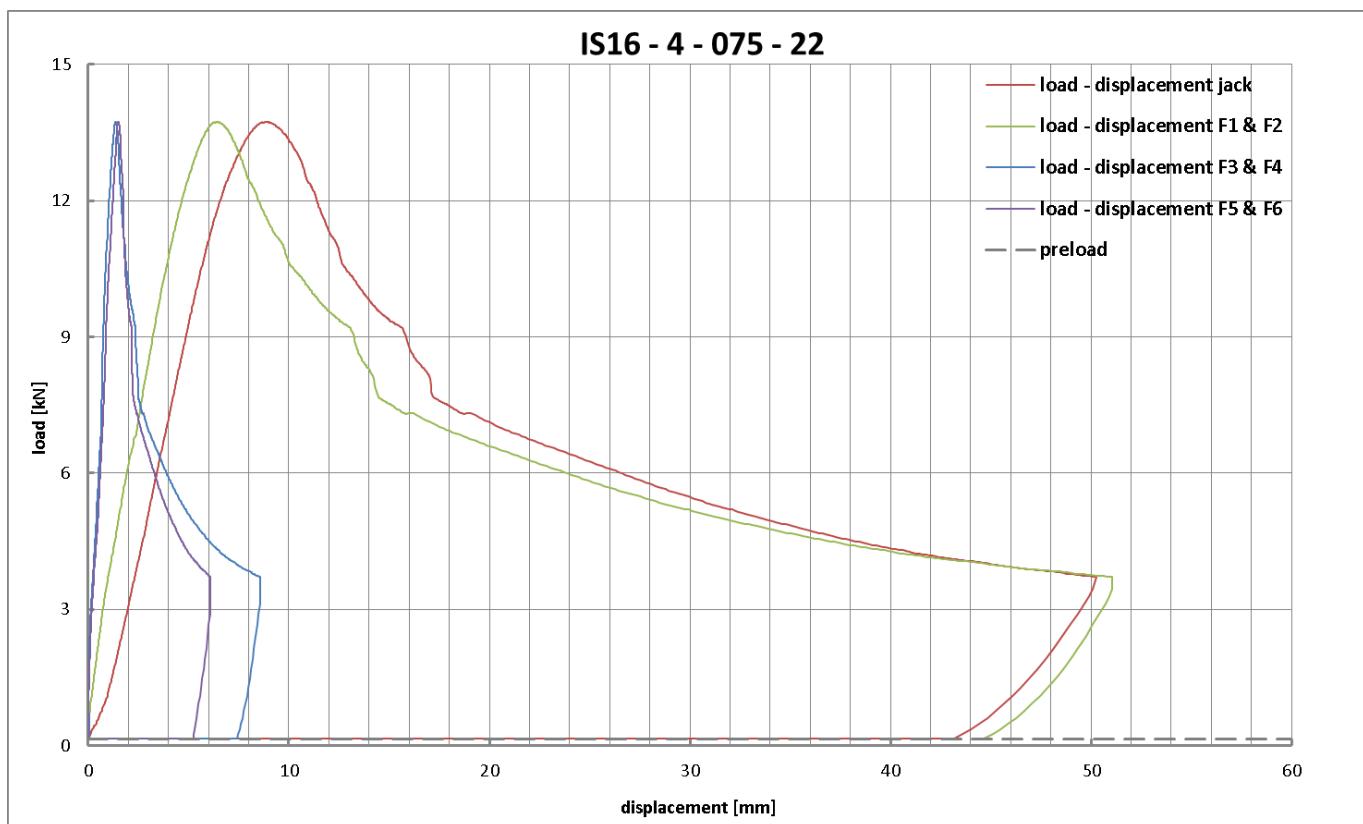
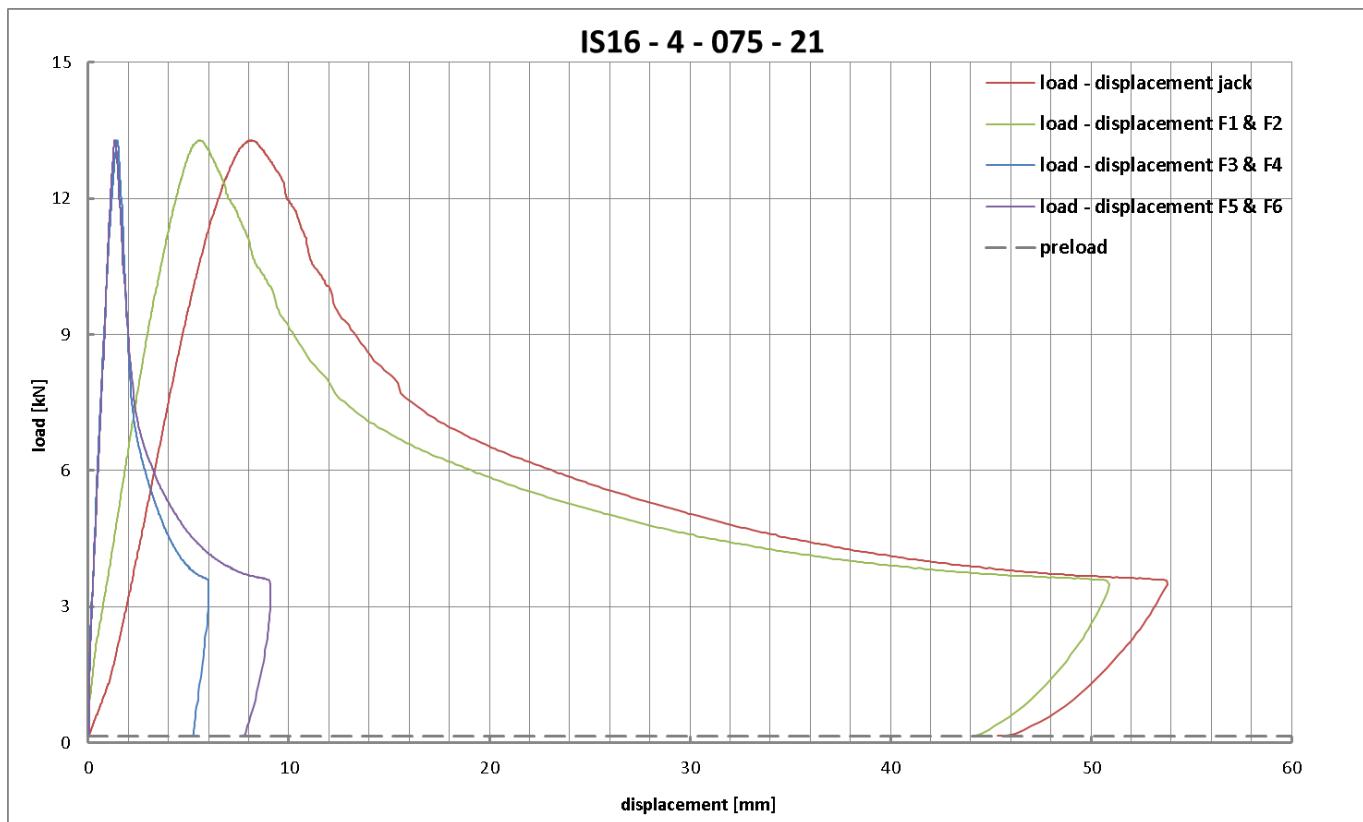
Load-deflection curves with and without triangle perforation:

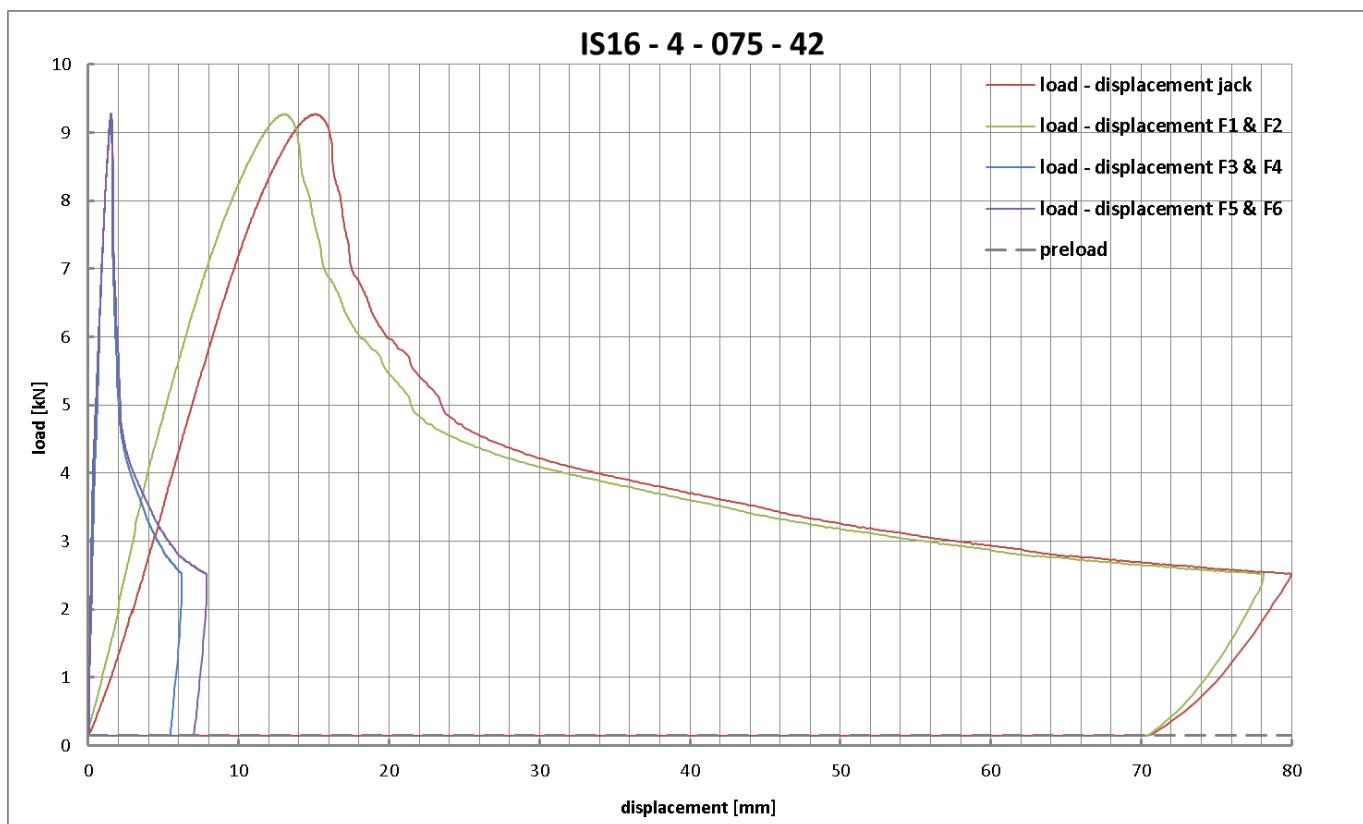
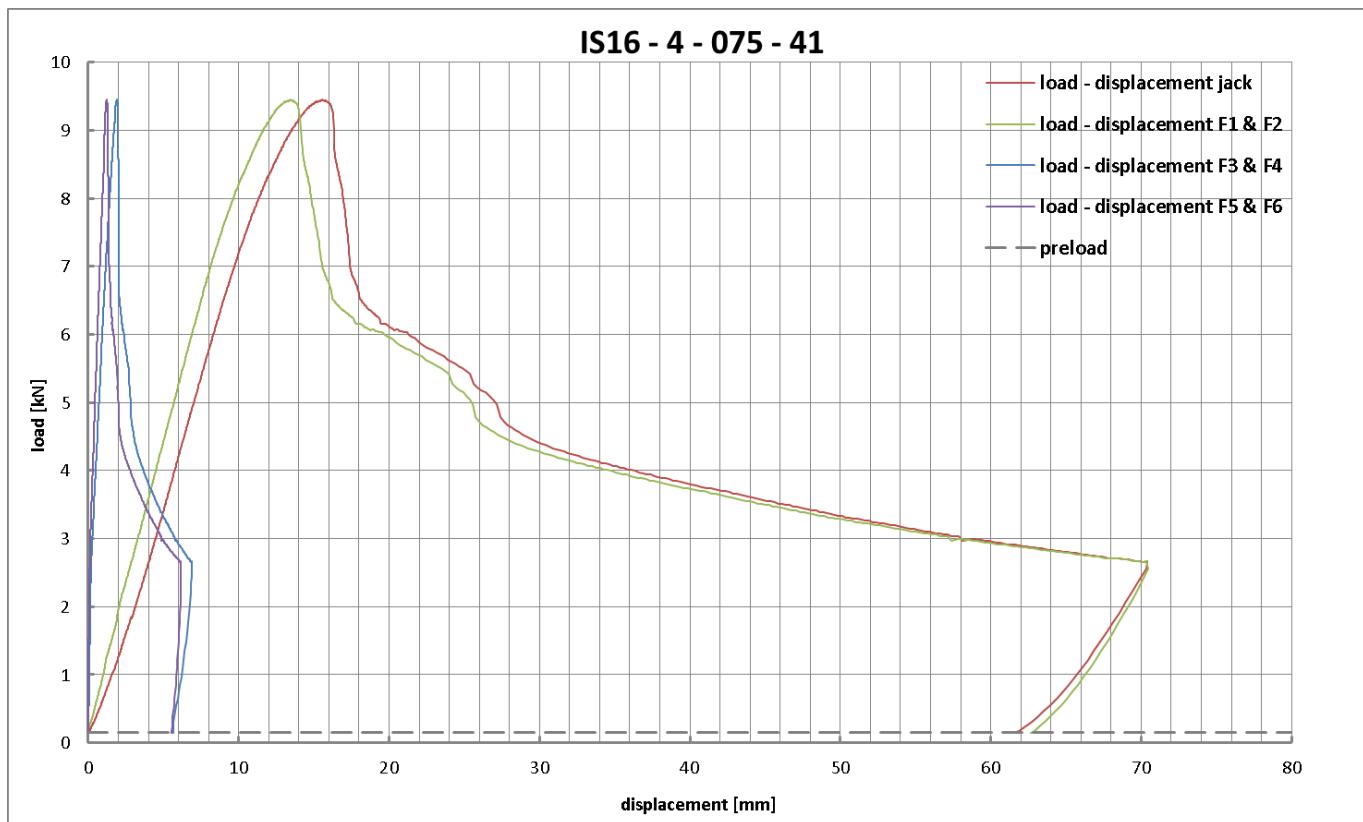


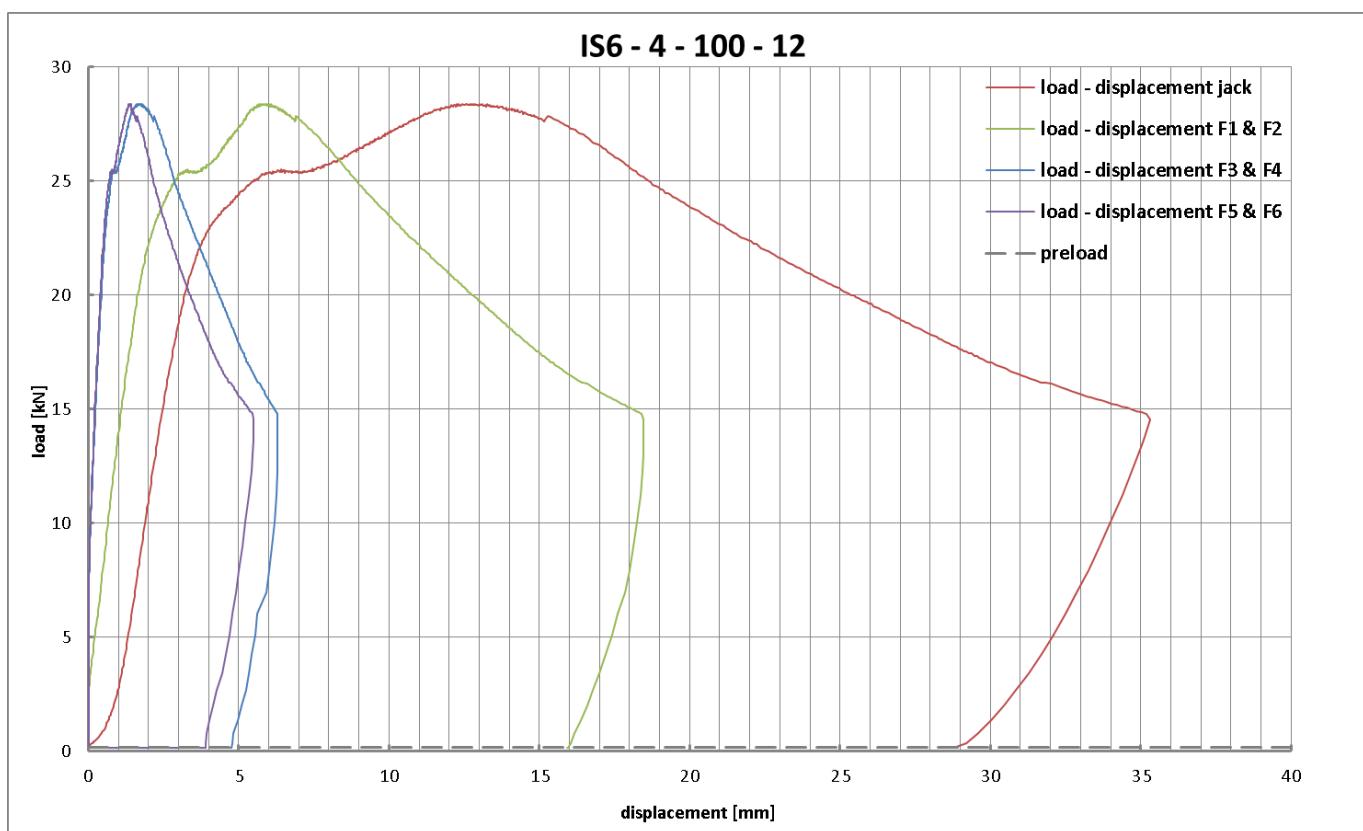
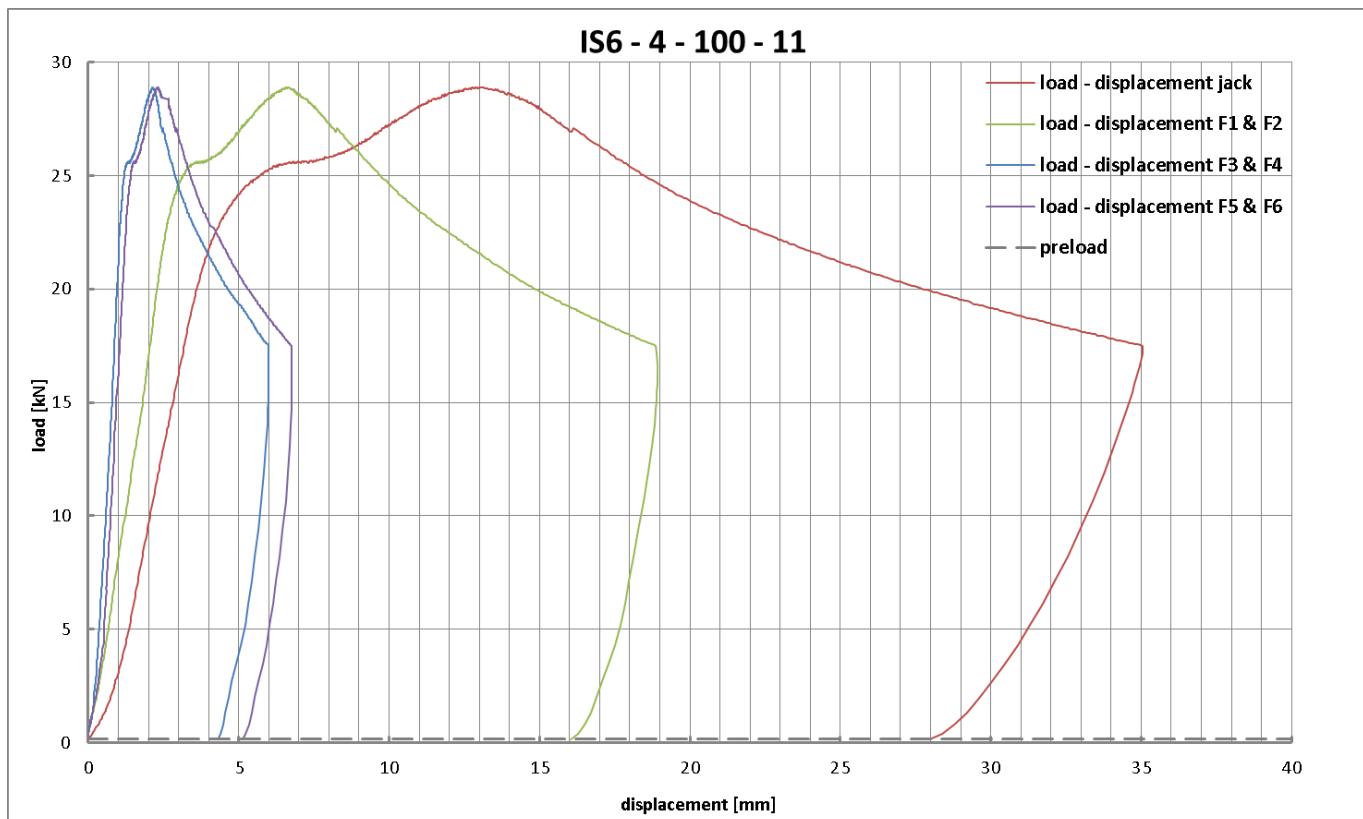


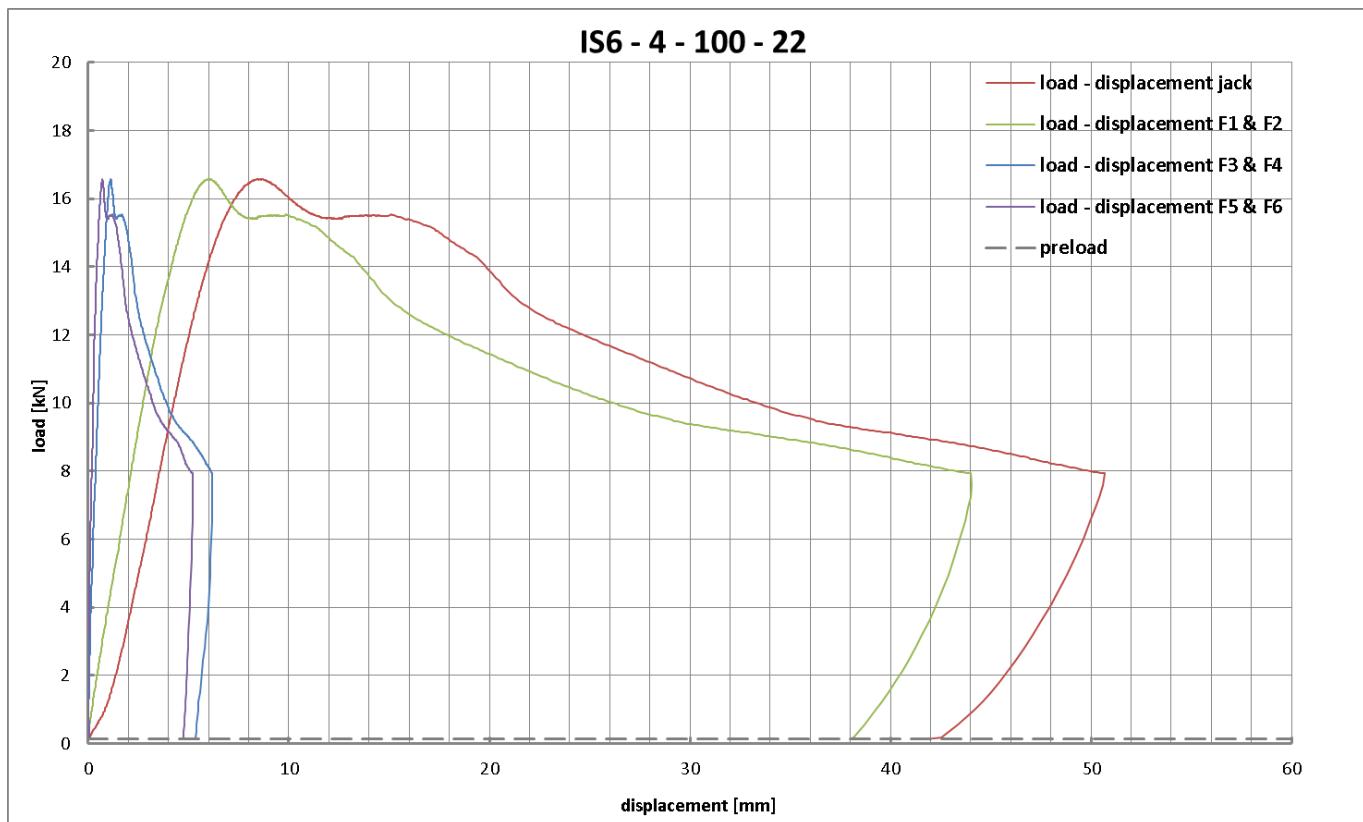
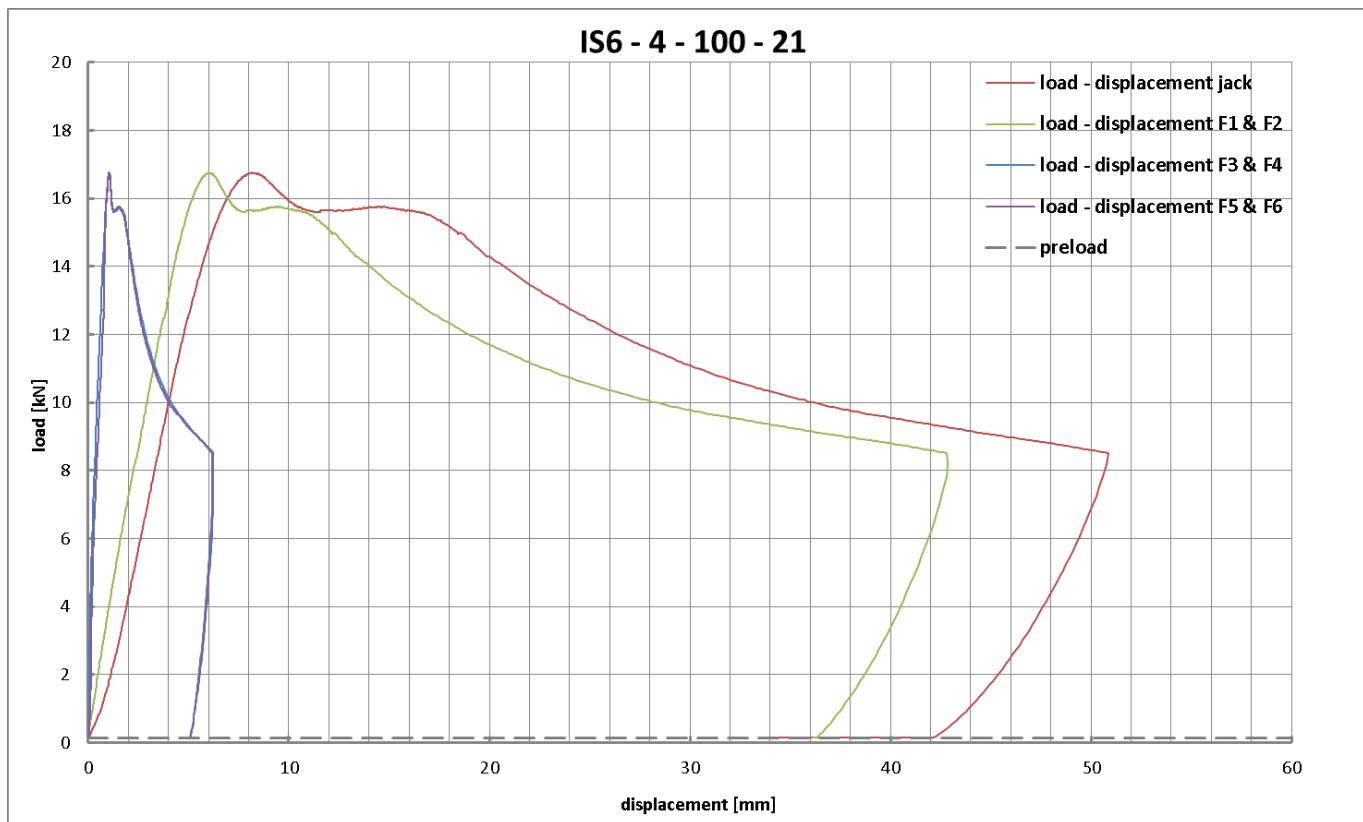
**IS6 - 4 - 075 - 41****IS6 - 4 - 075 - 42**

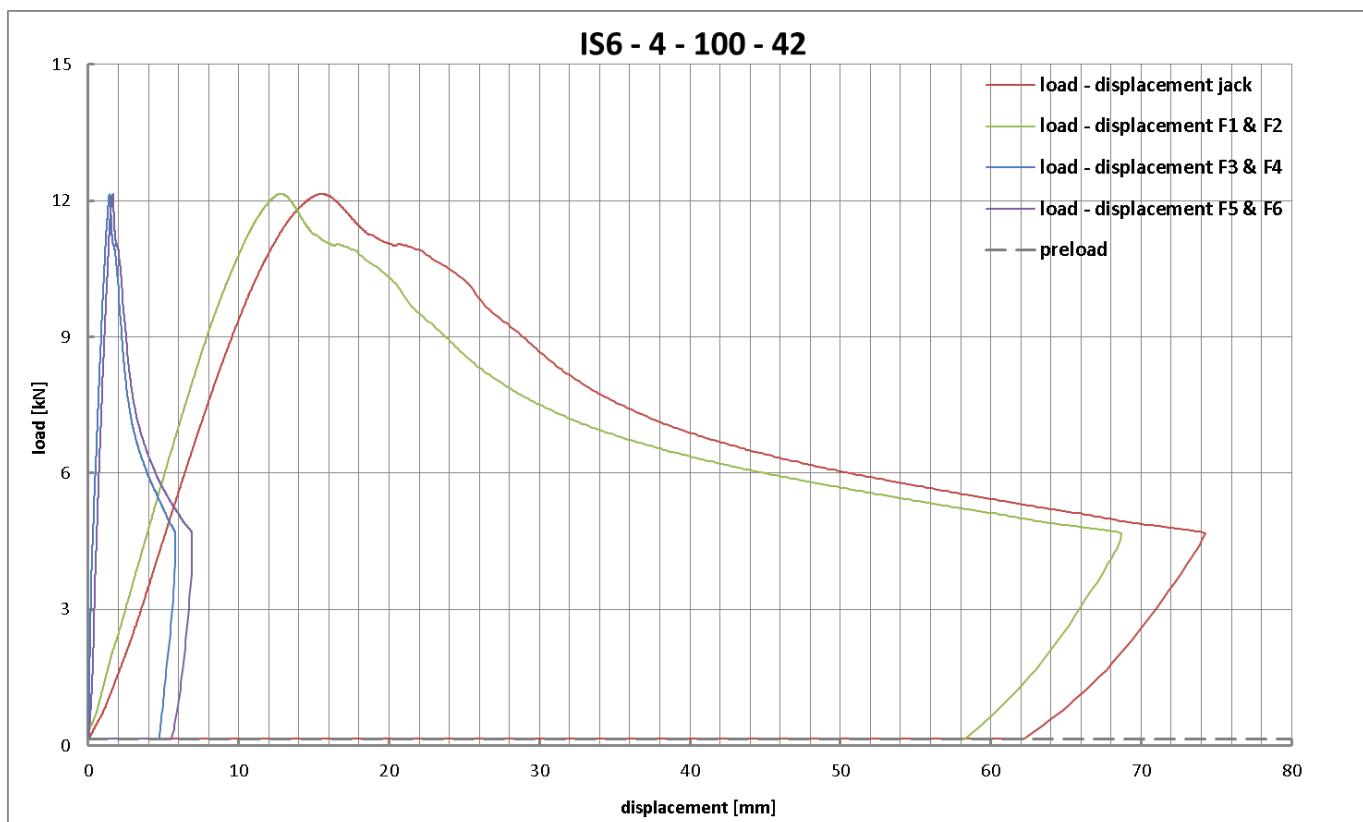
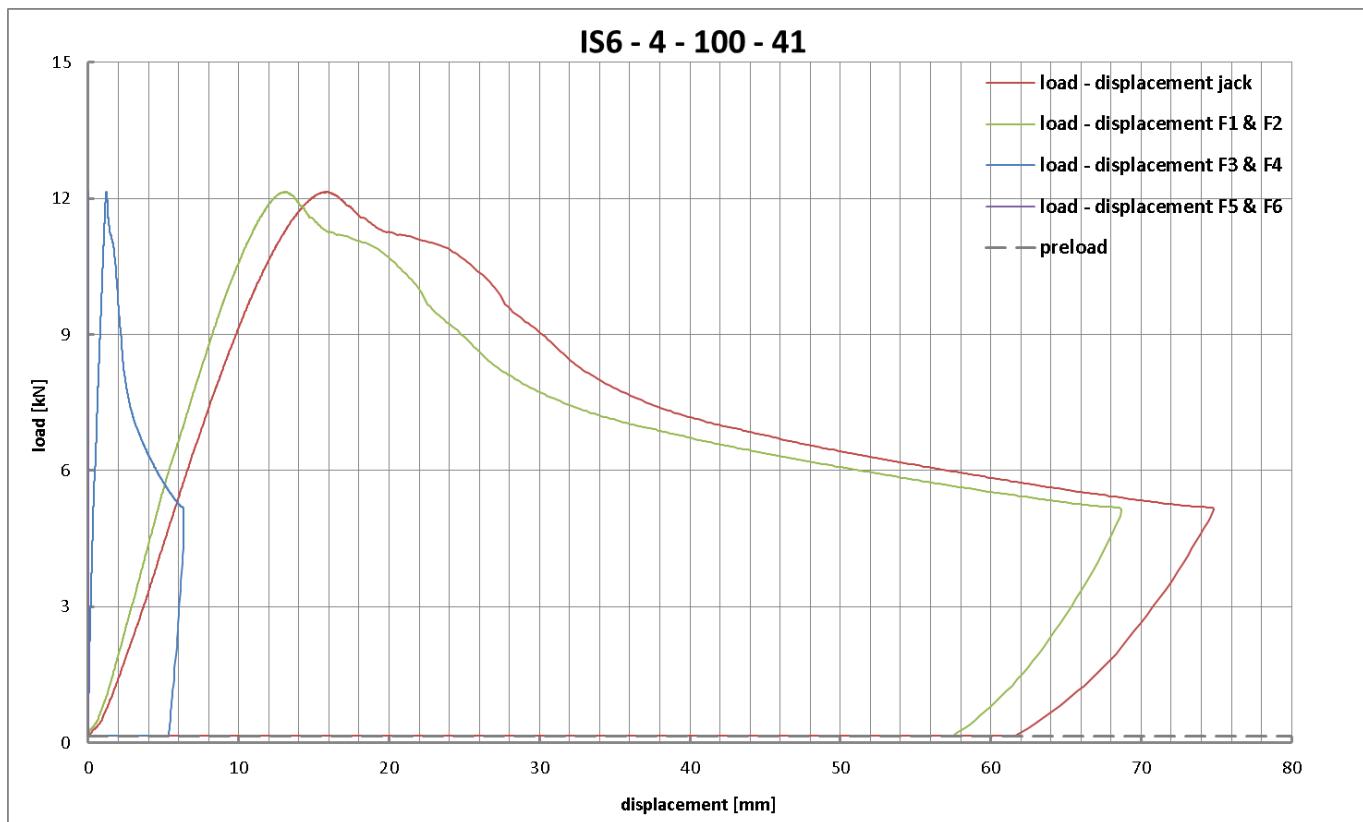


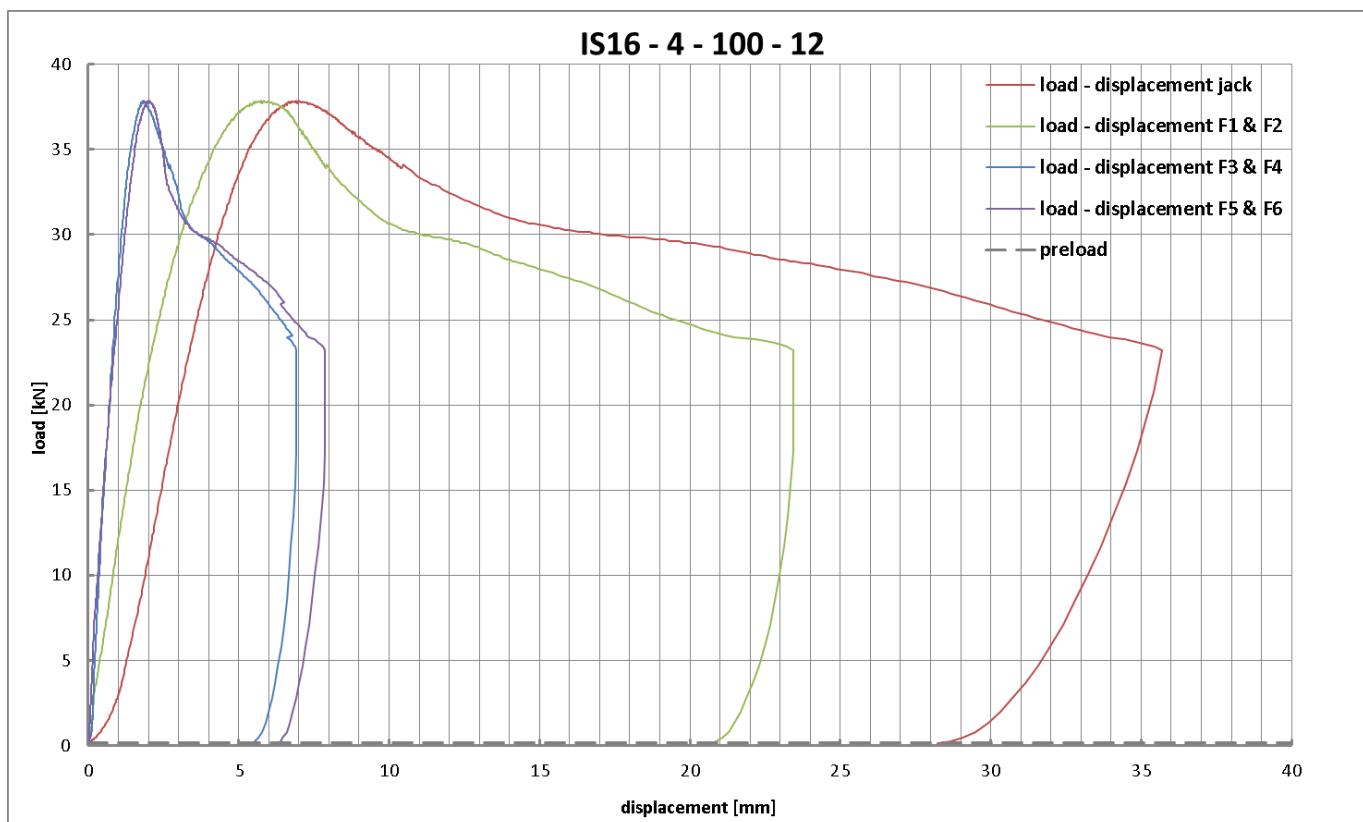
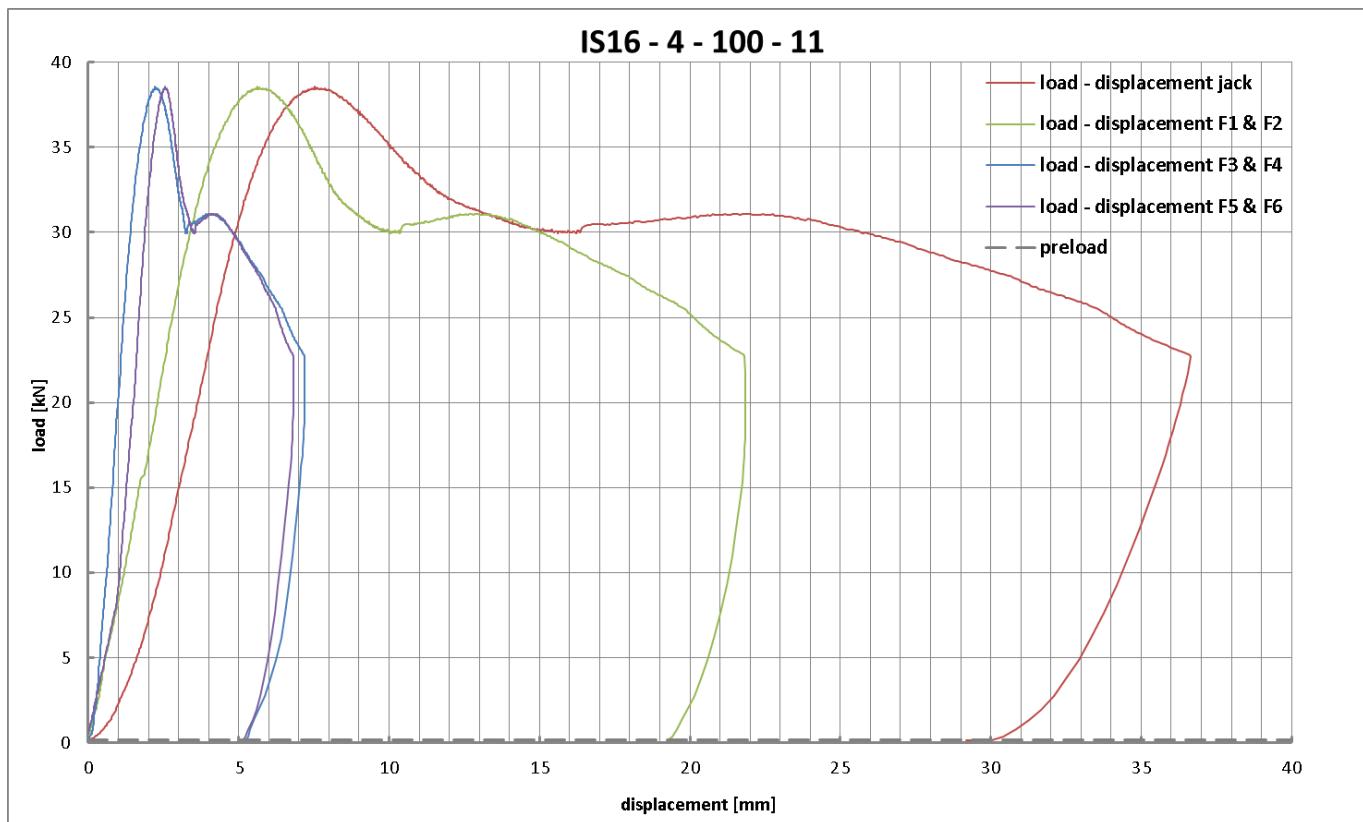


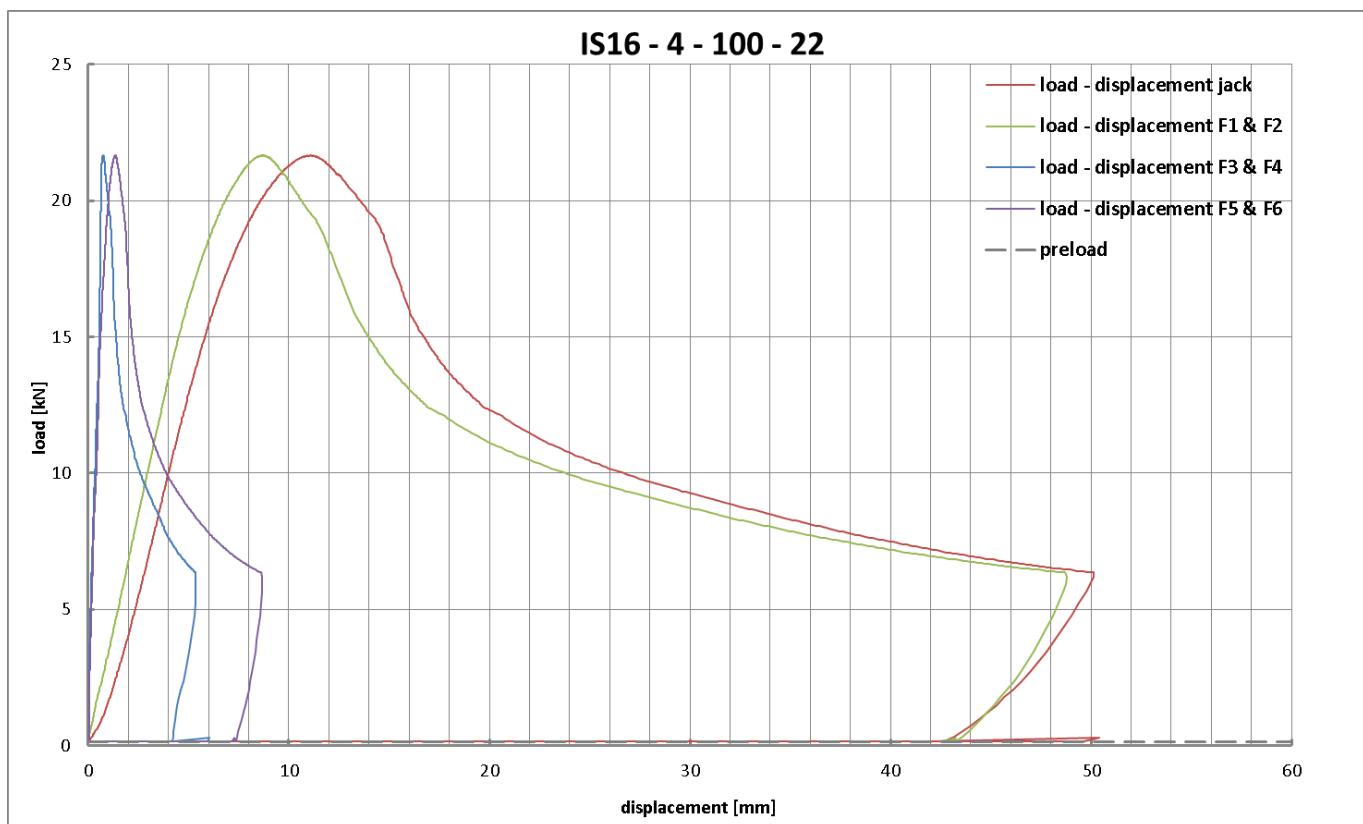
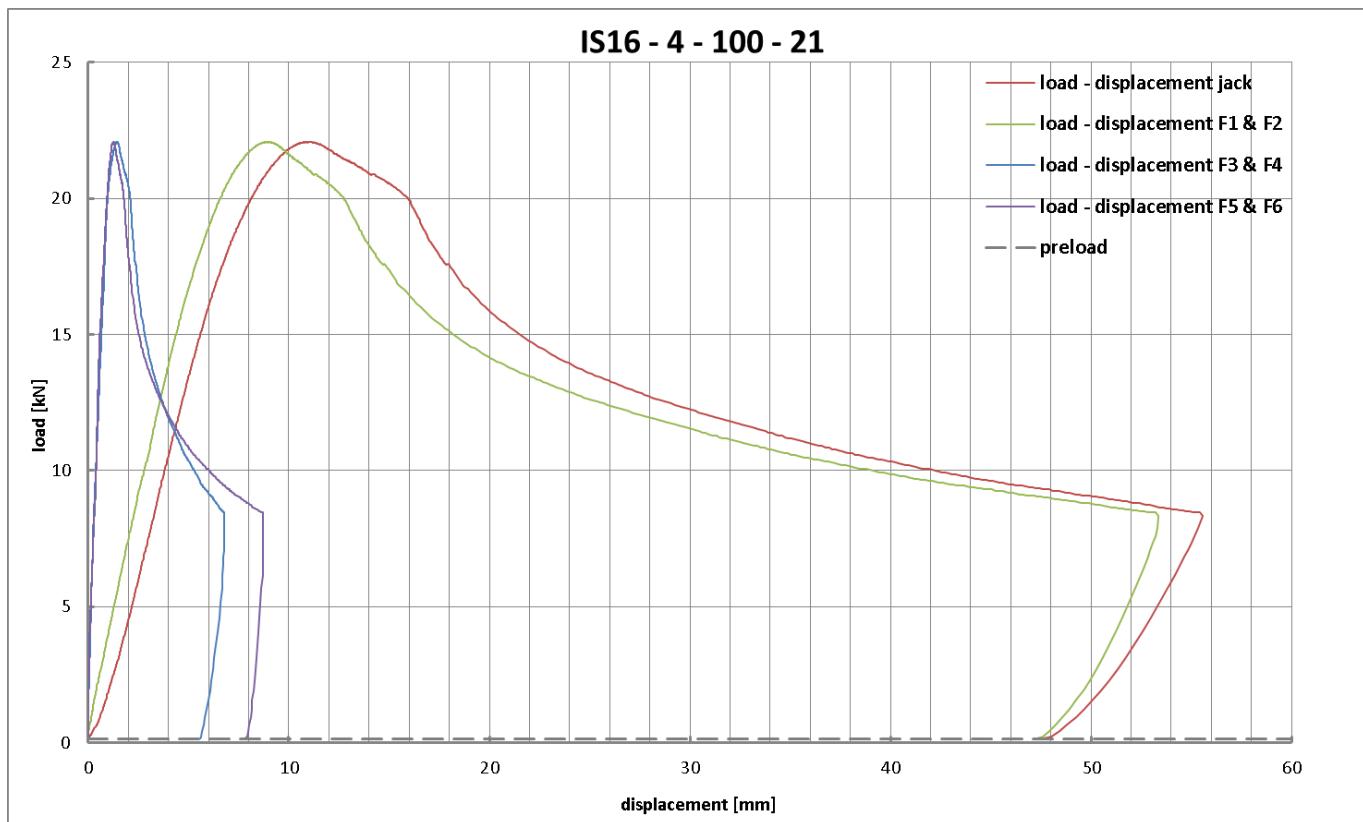


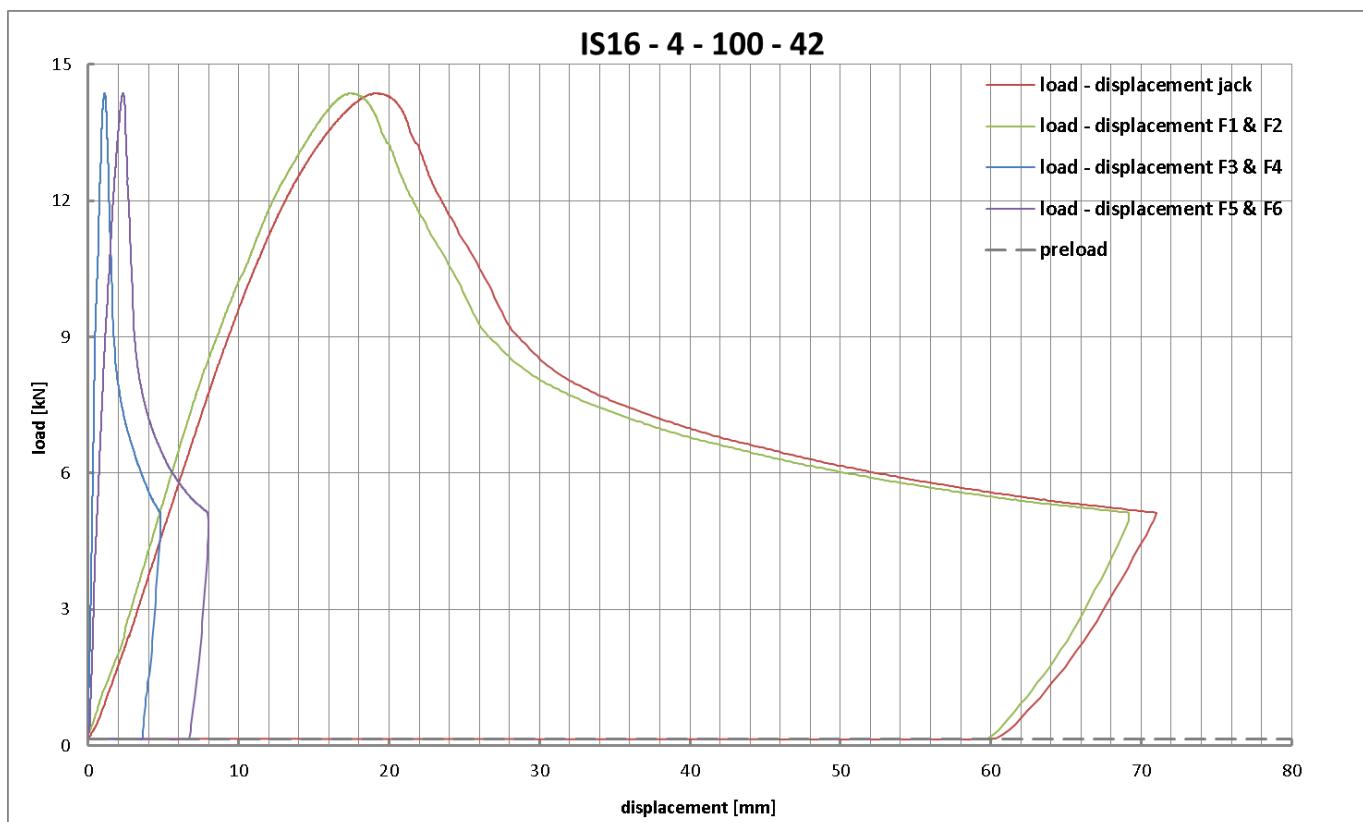
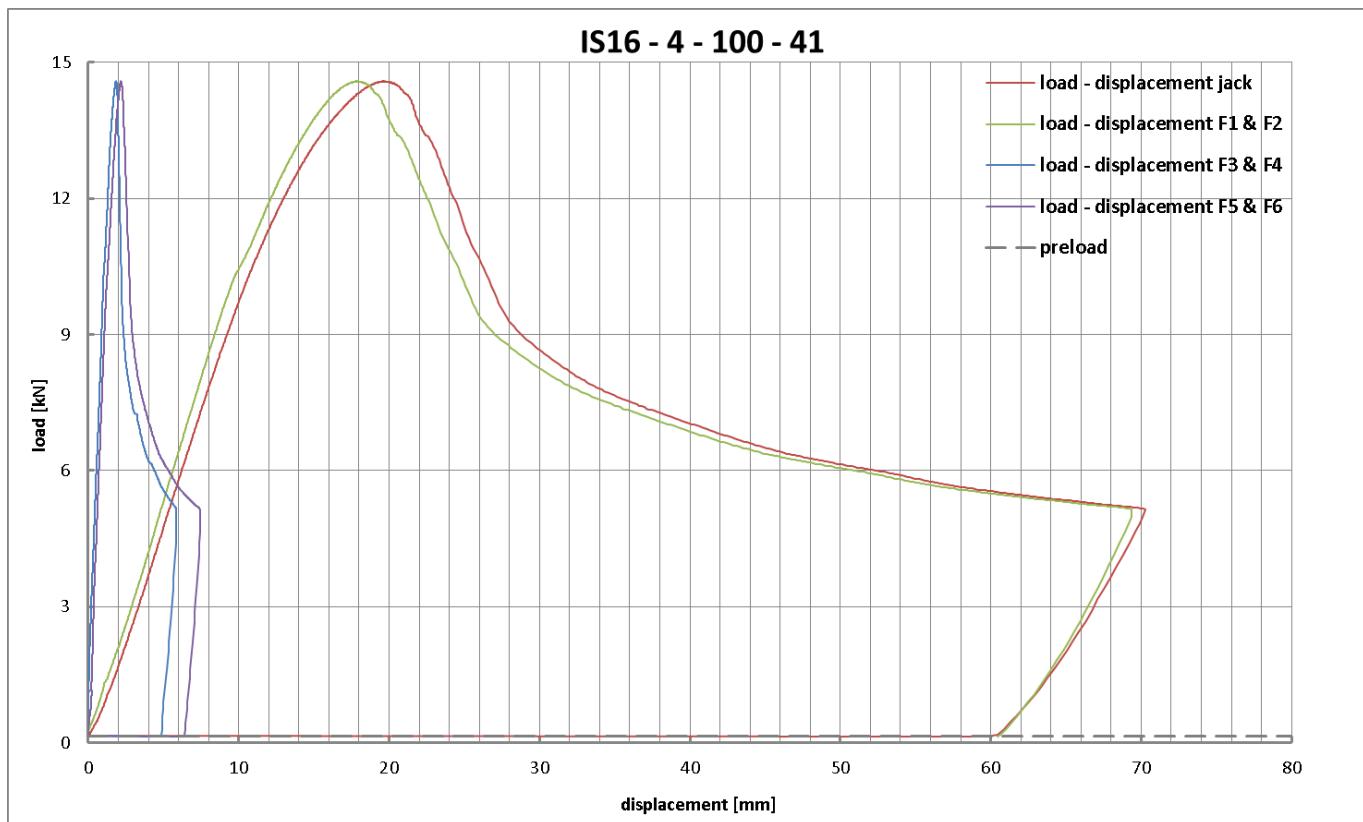


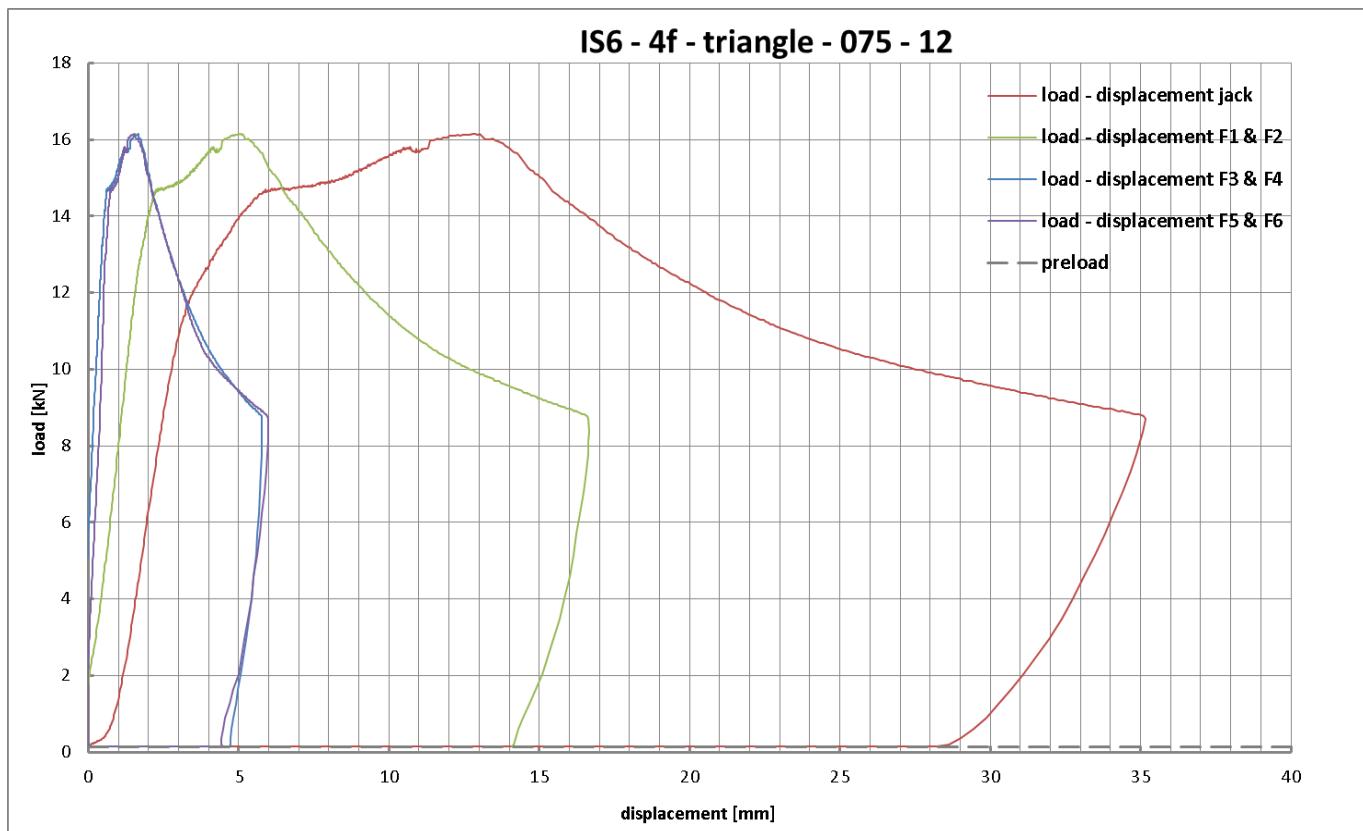
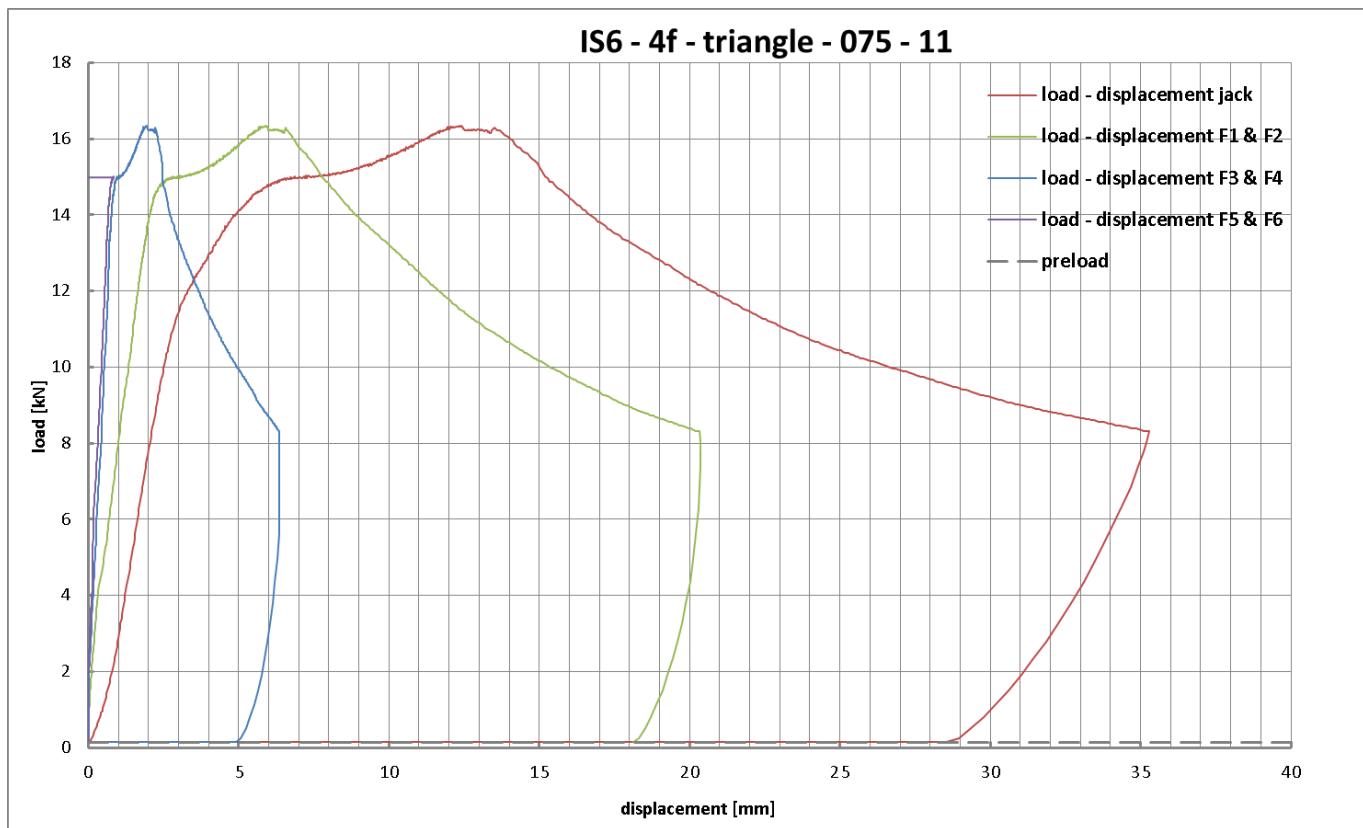


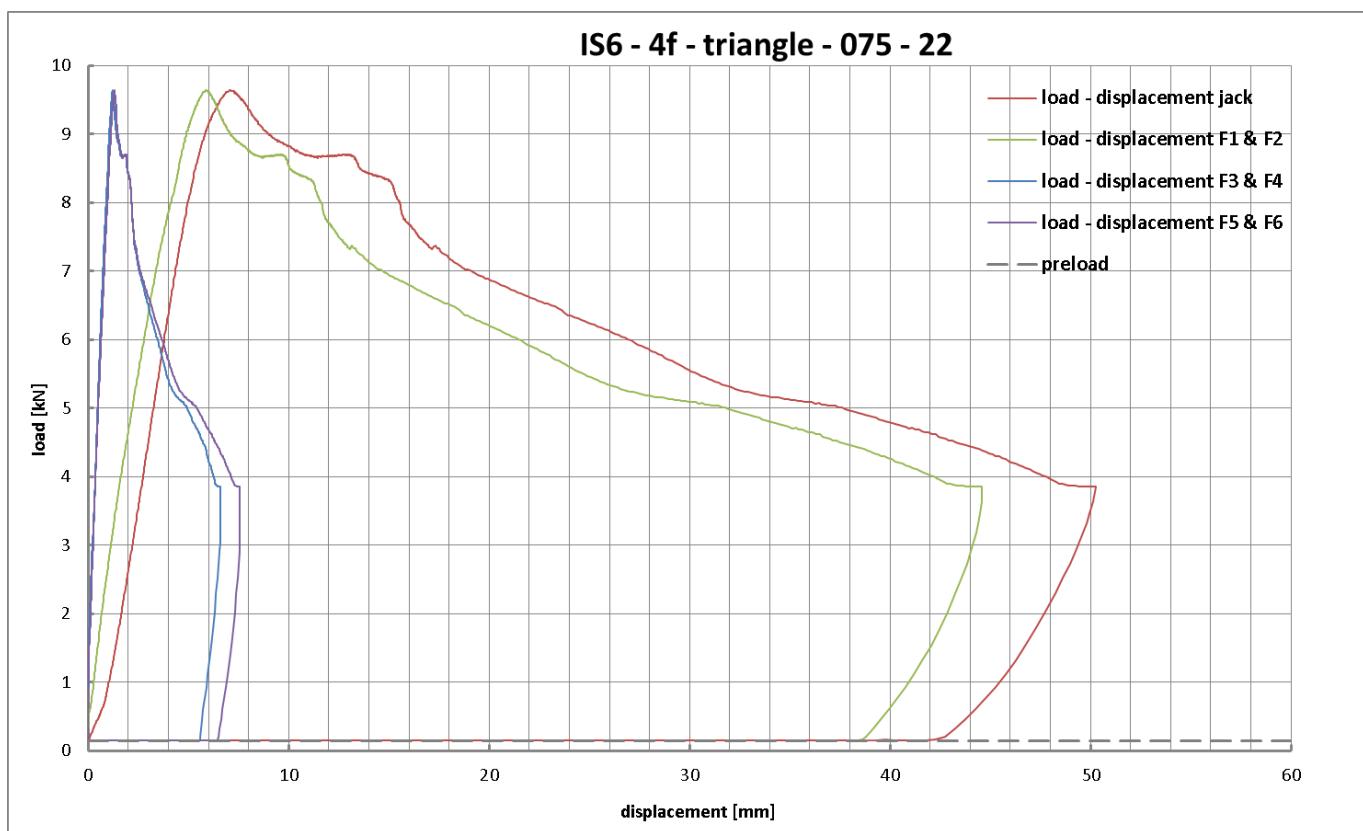
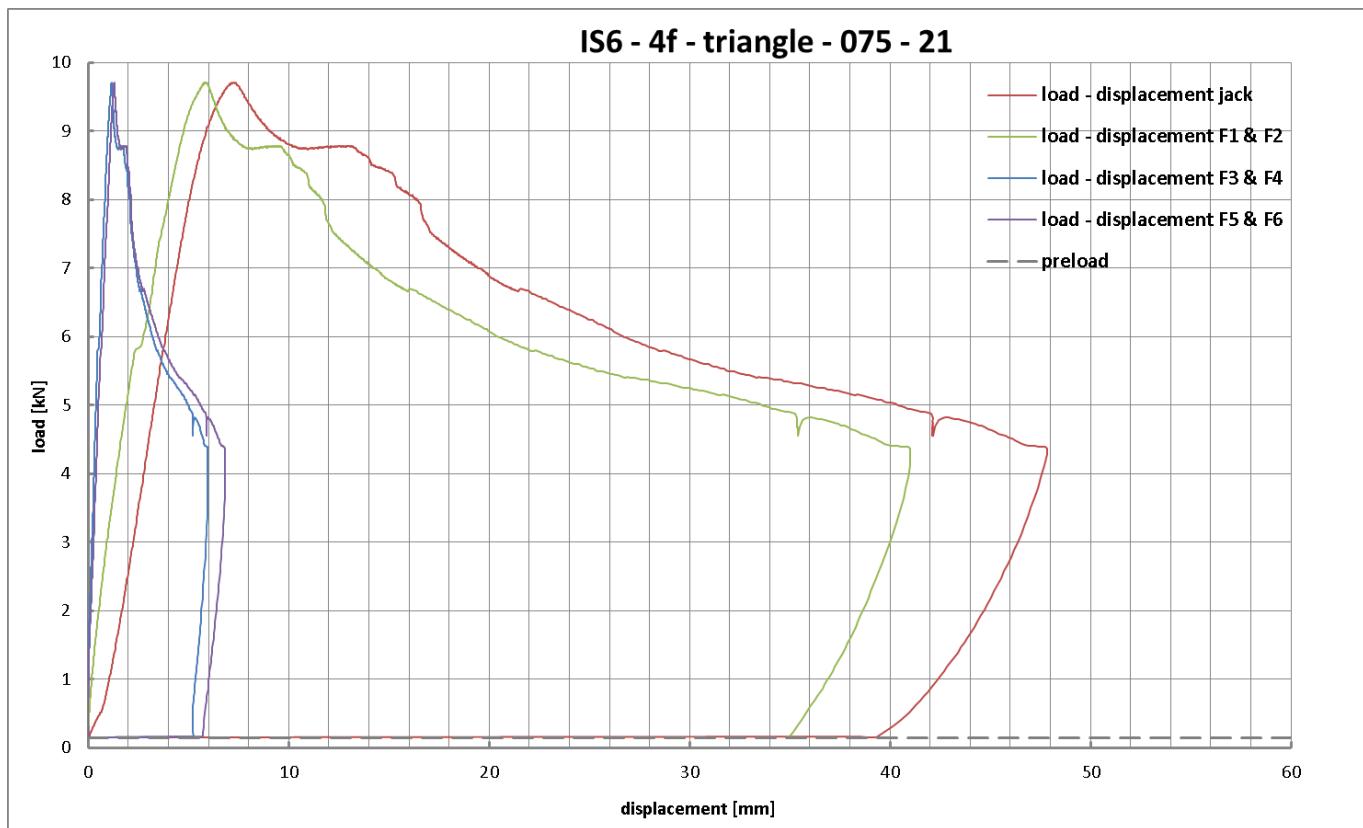


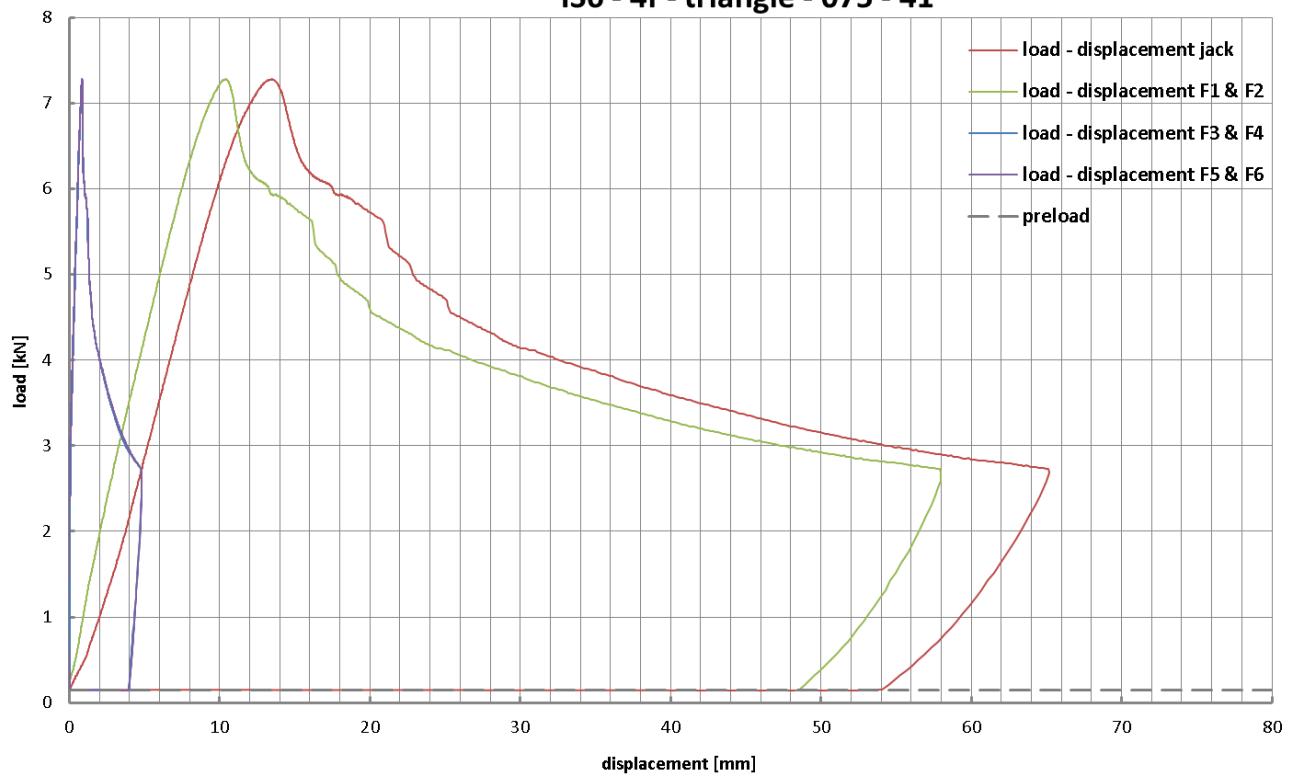
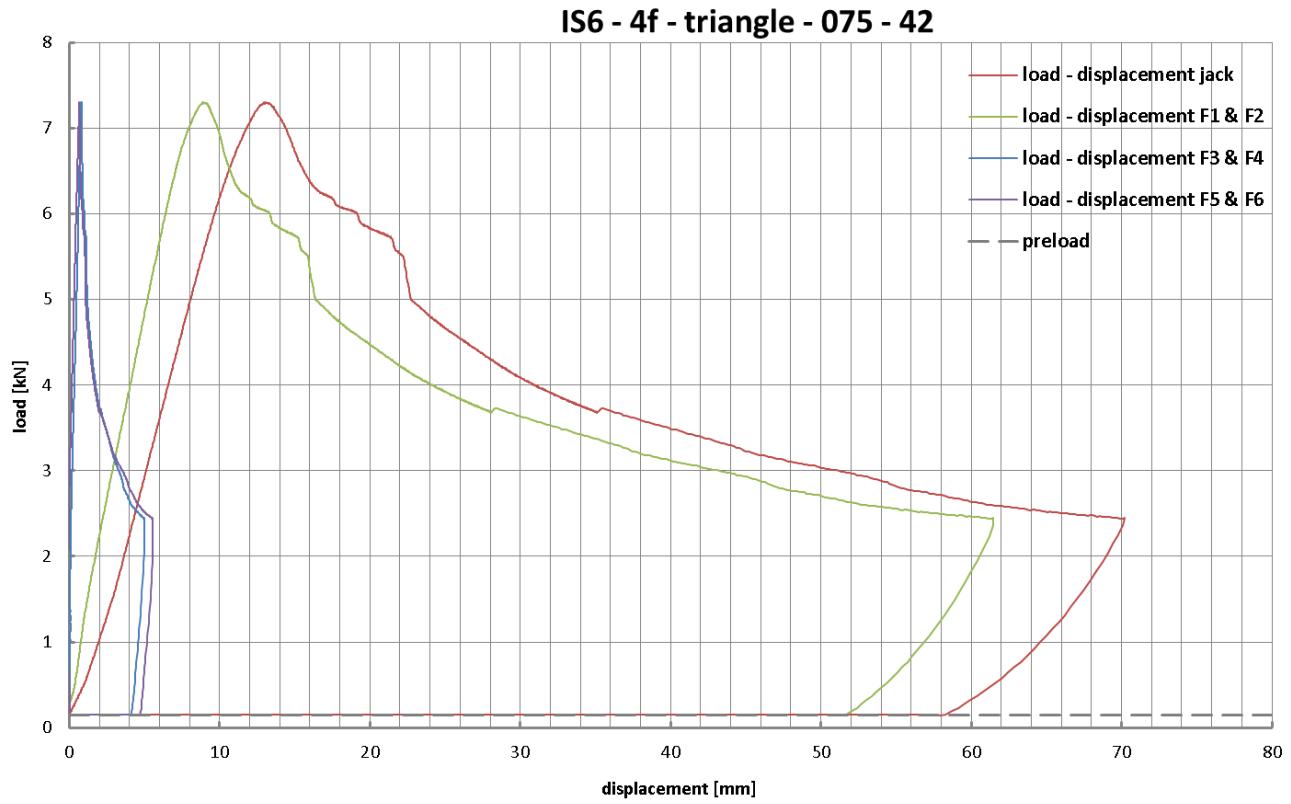


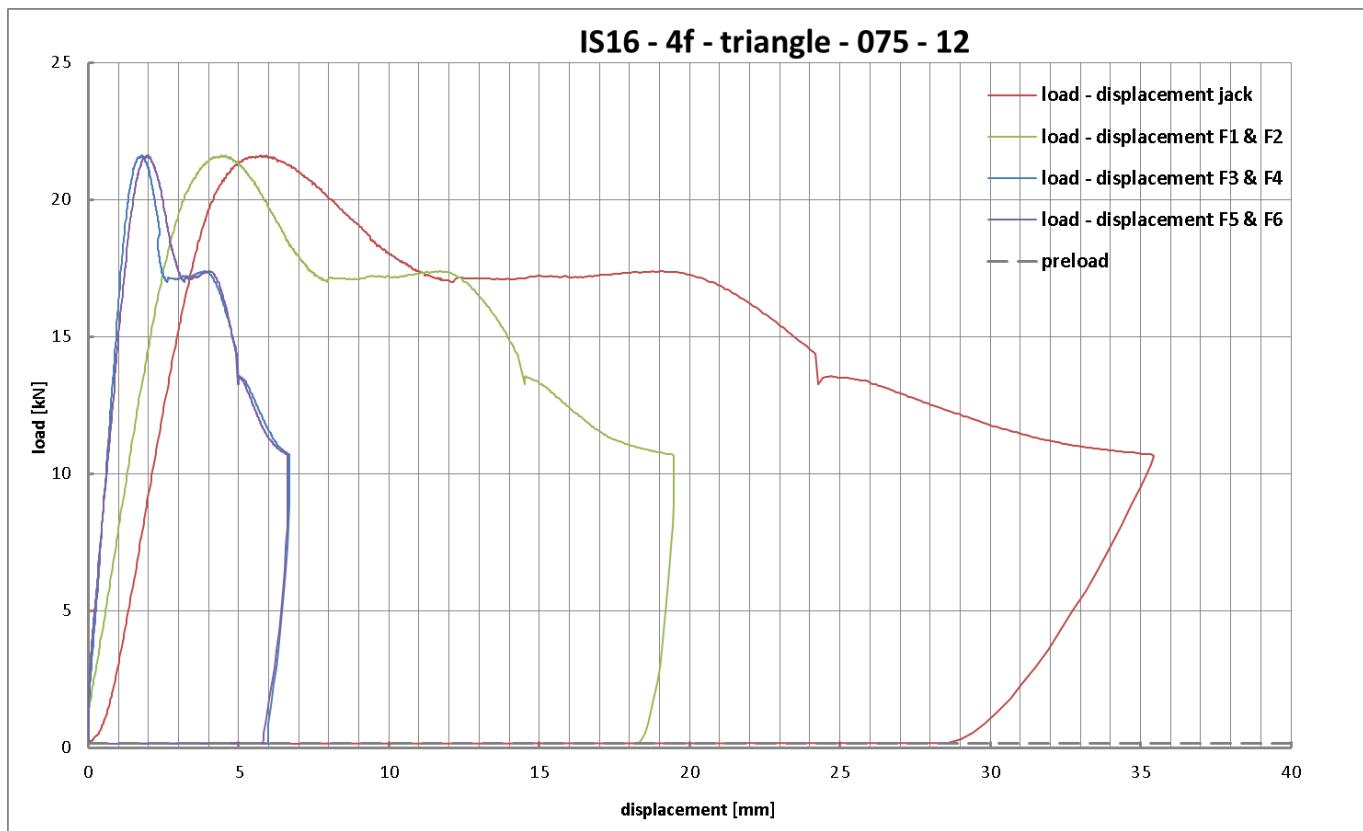
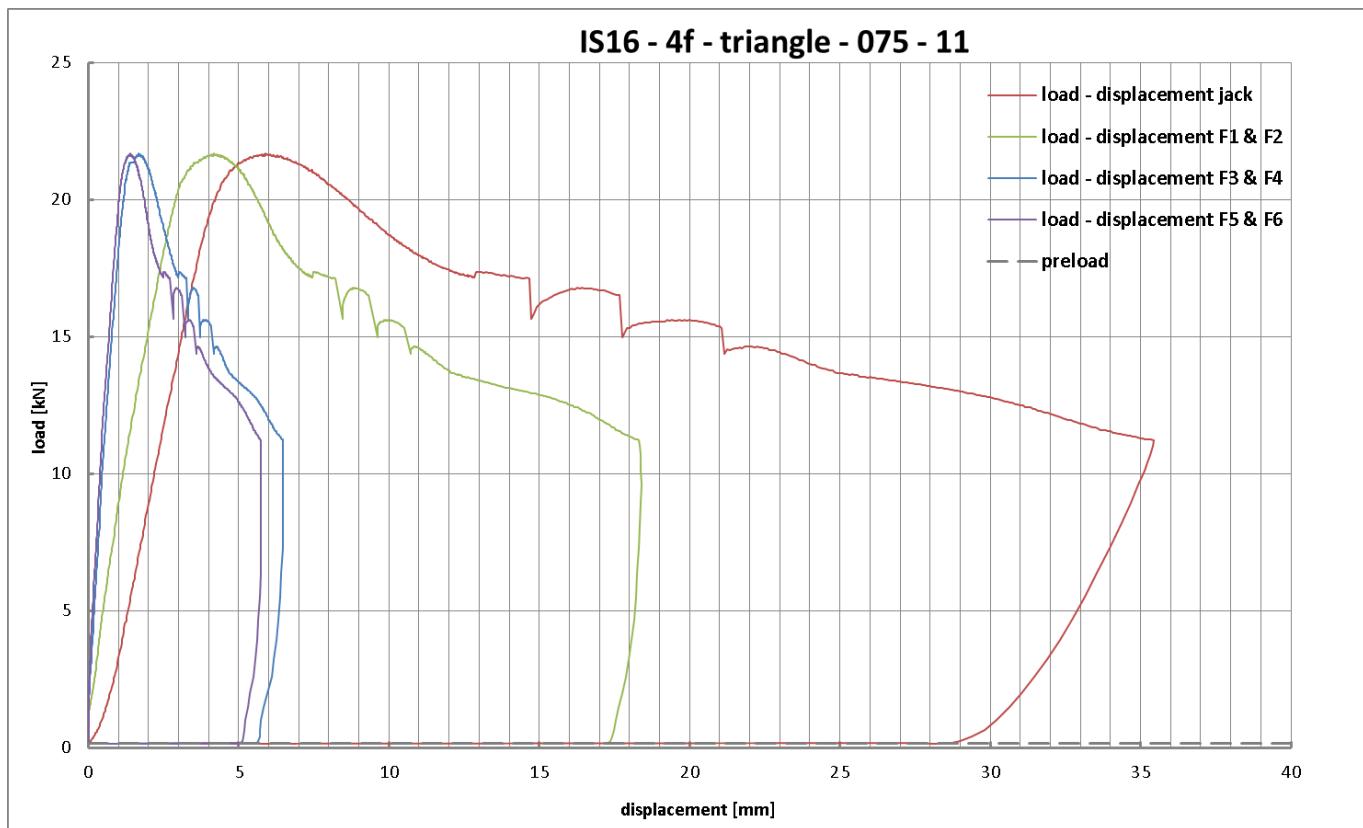


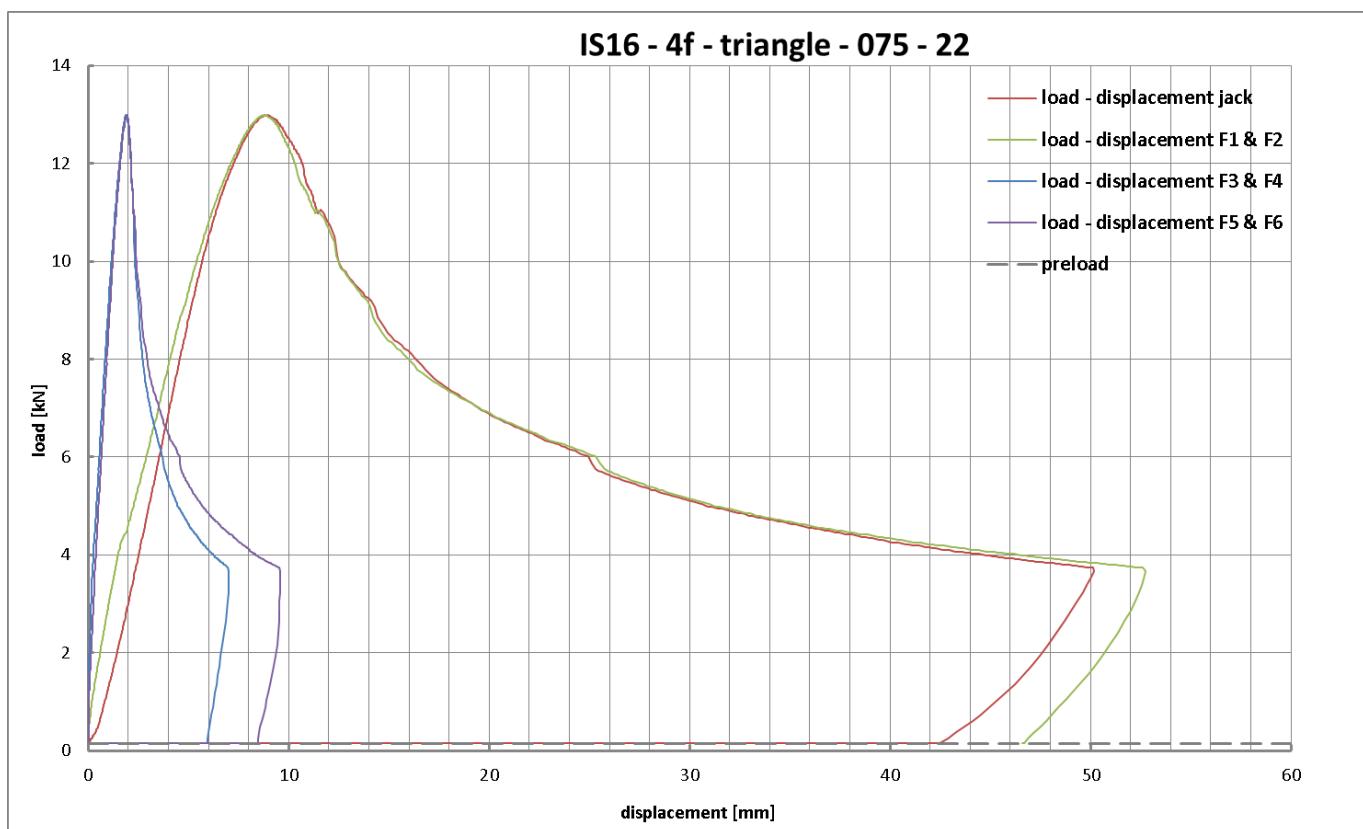


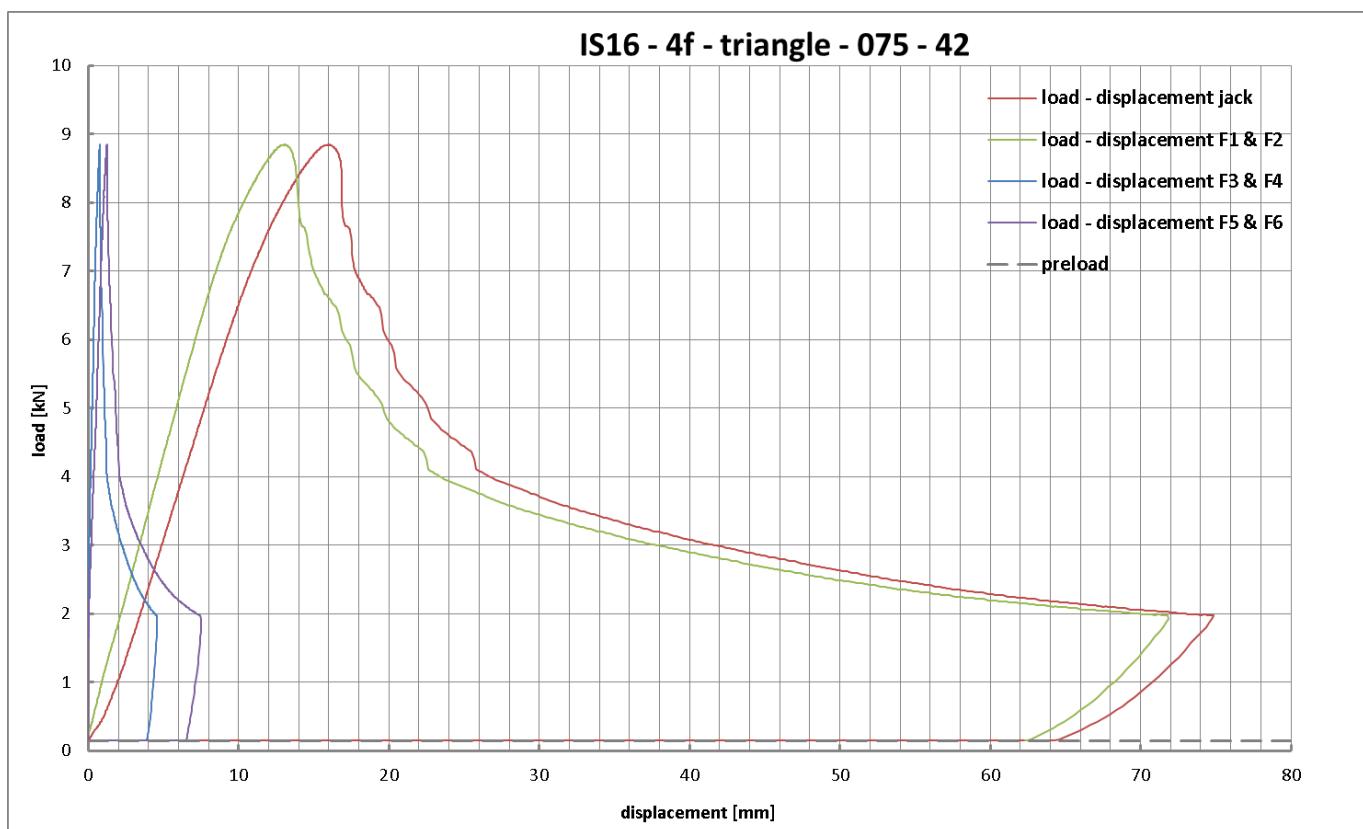
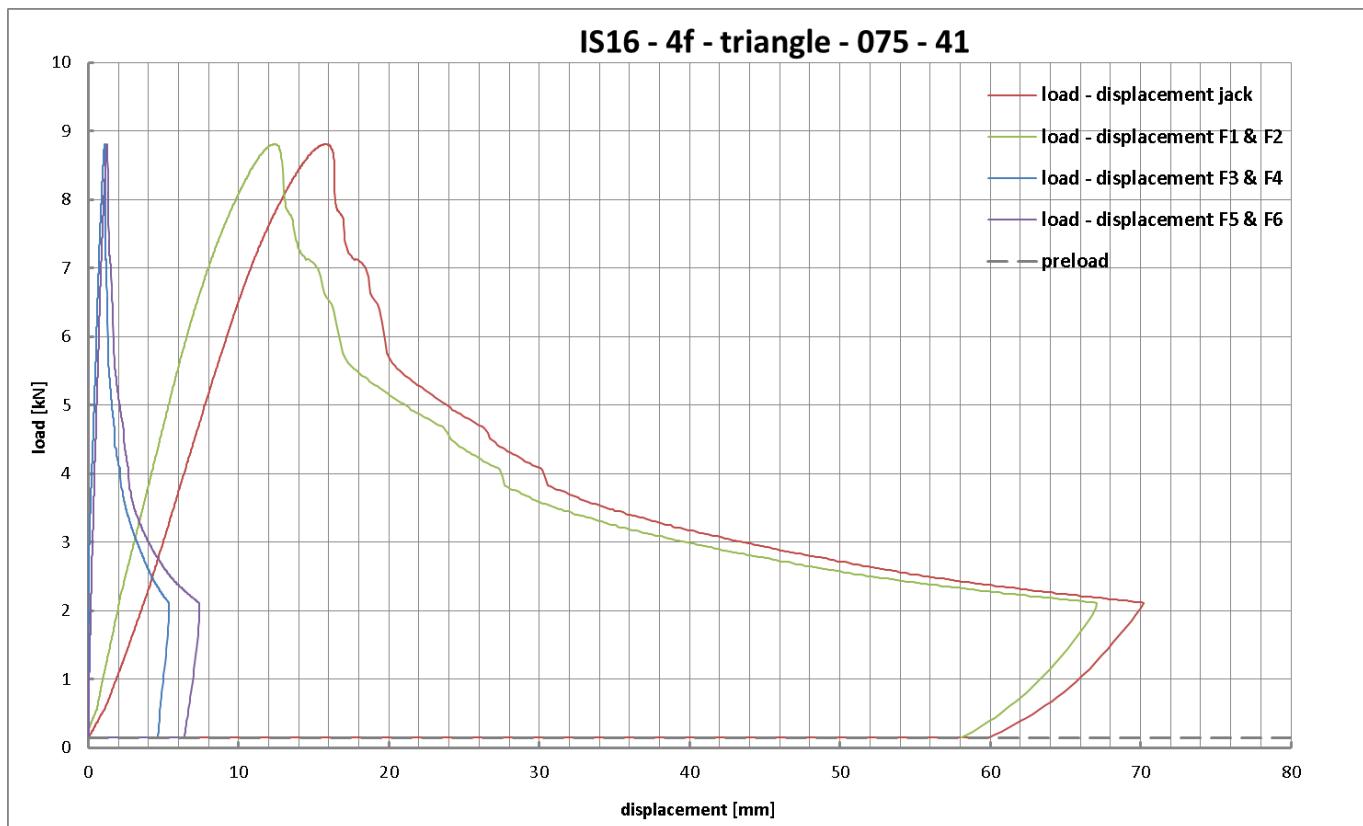


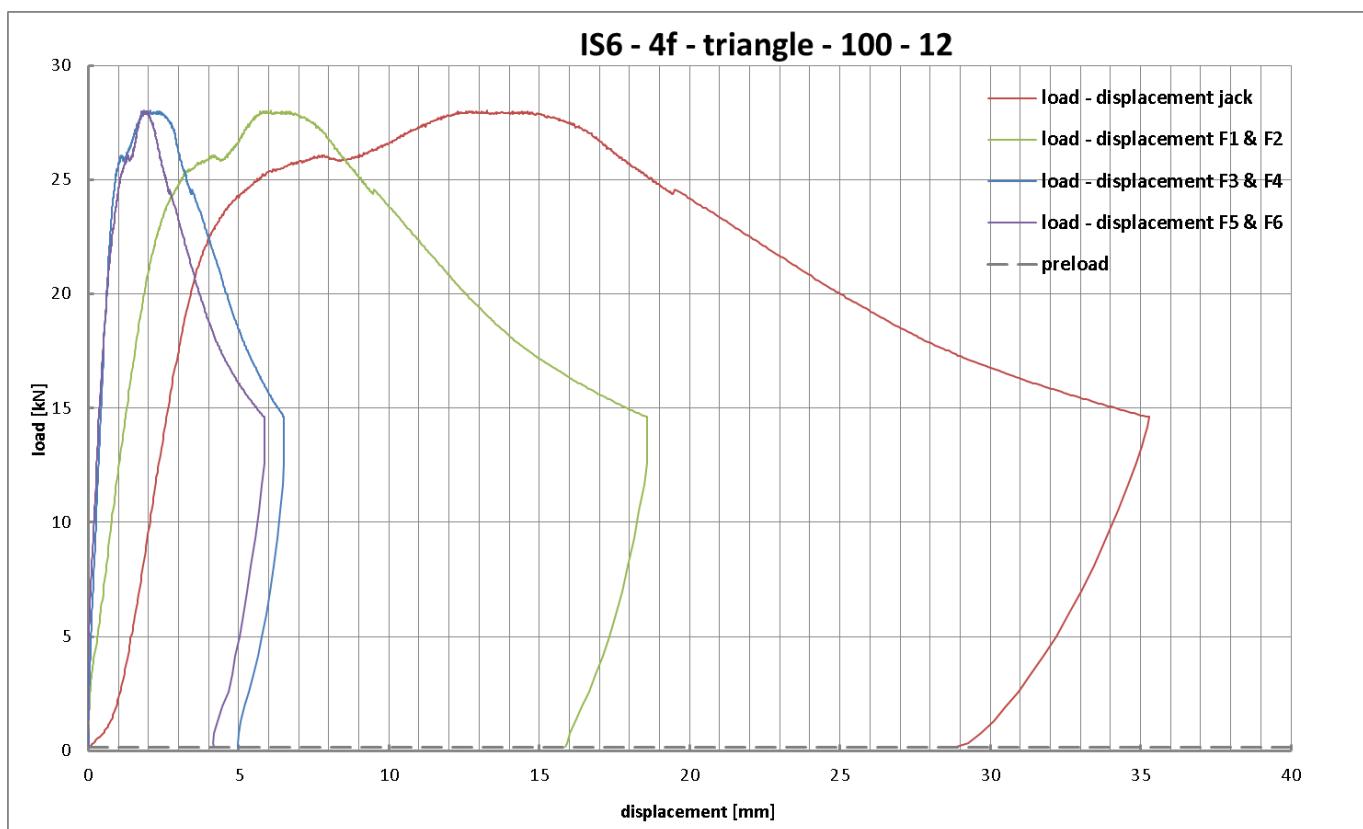
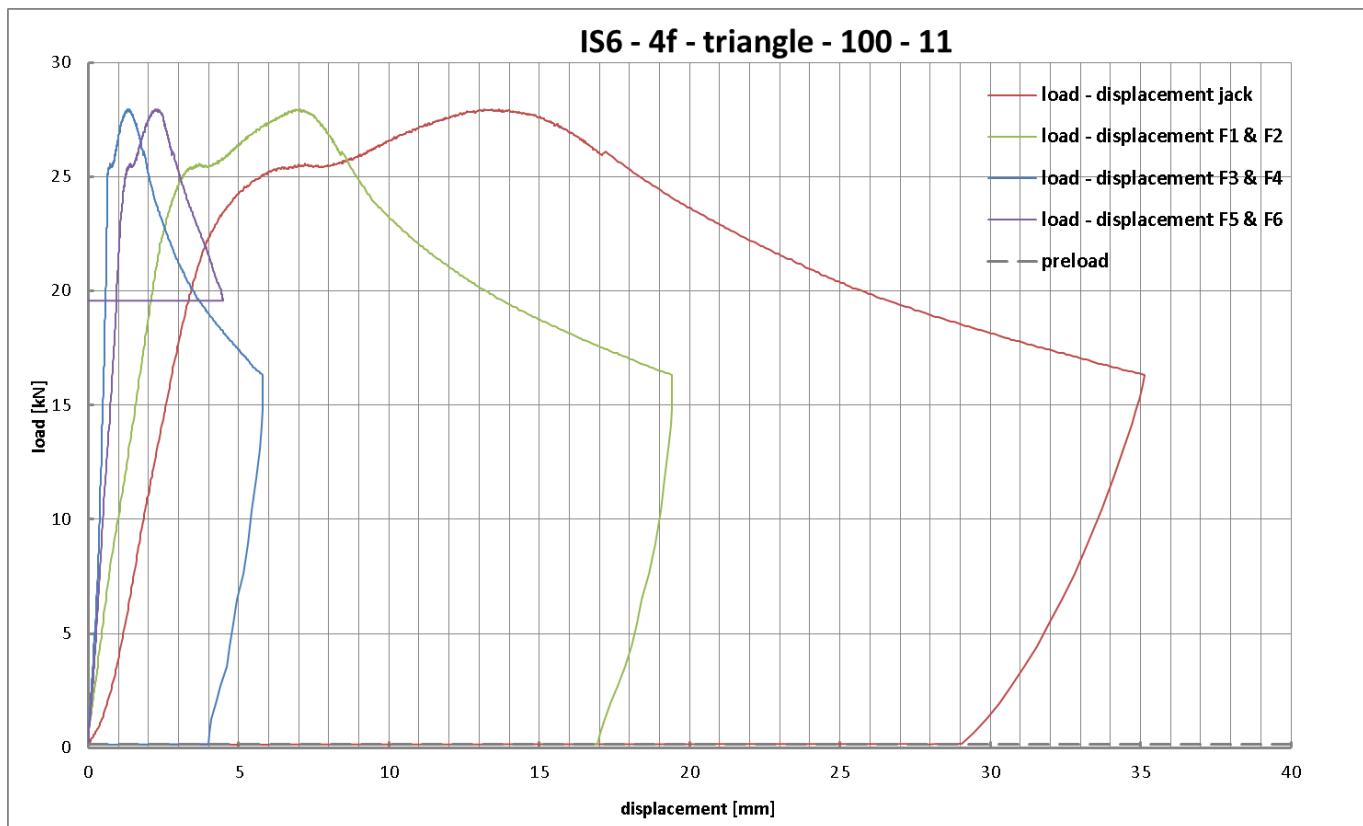


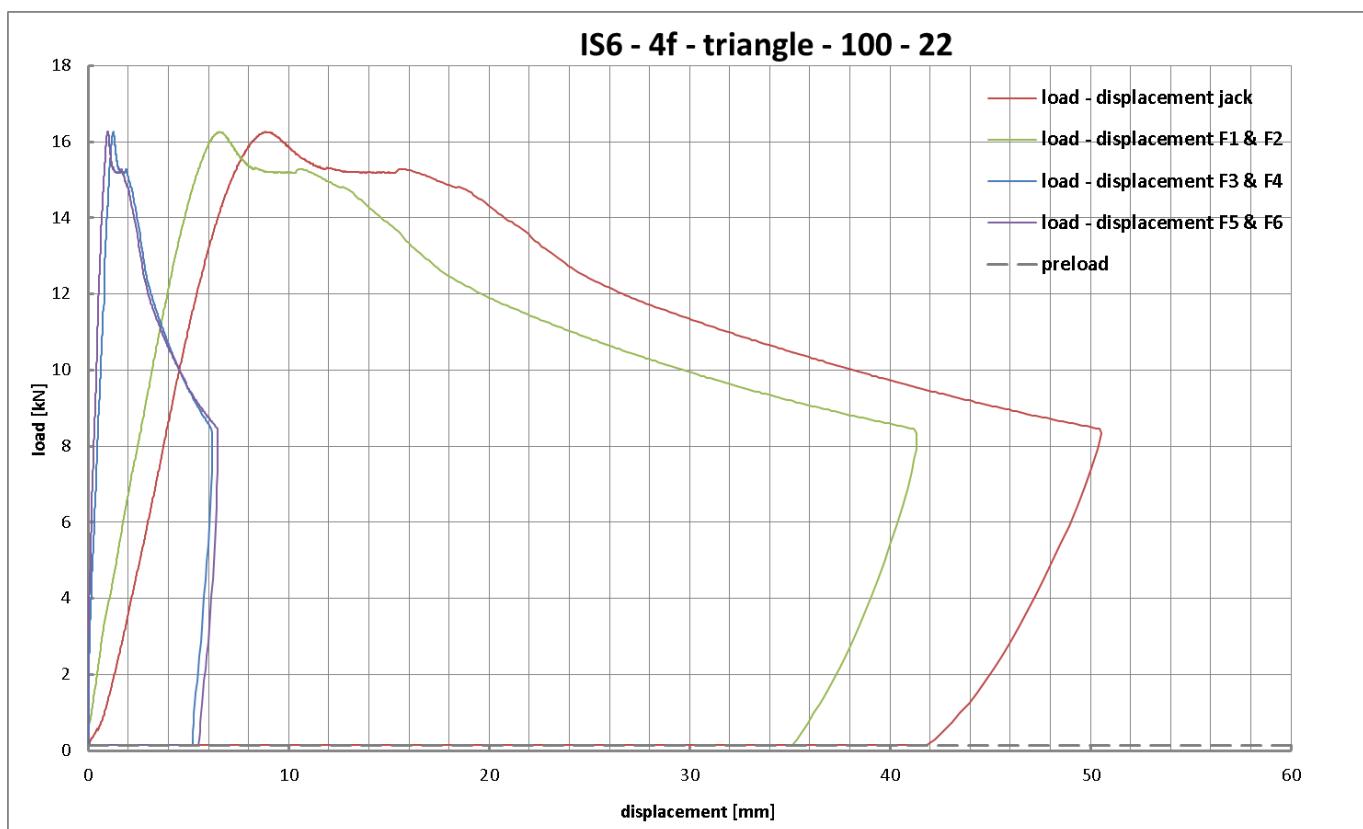
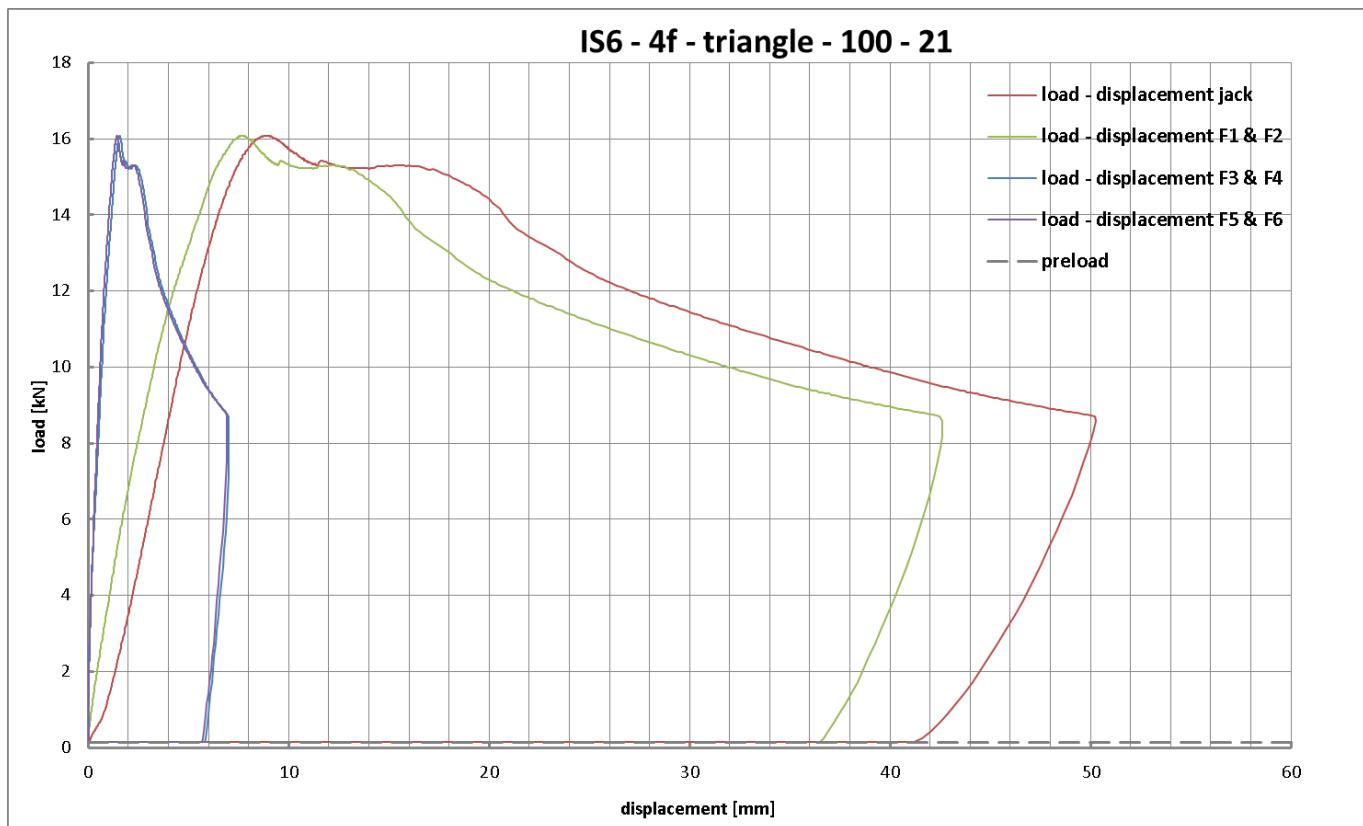
**IS6 - 4f - triangle - 075 - 41****IS6 - 4f - triangle - 075 - 42**

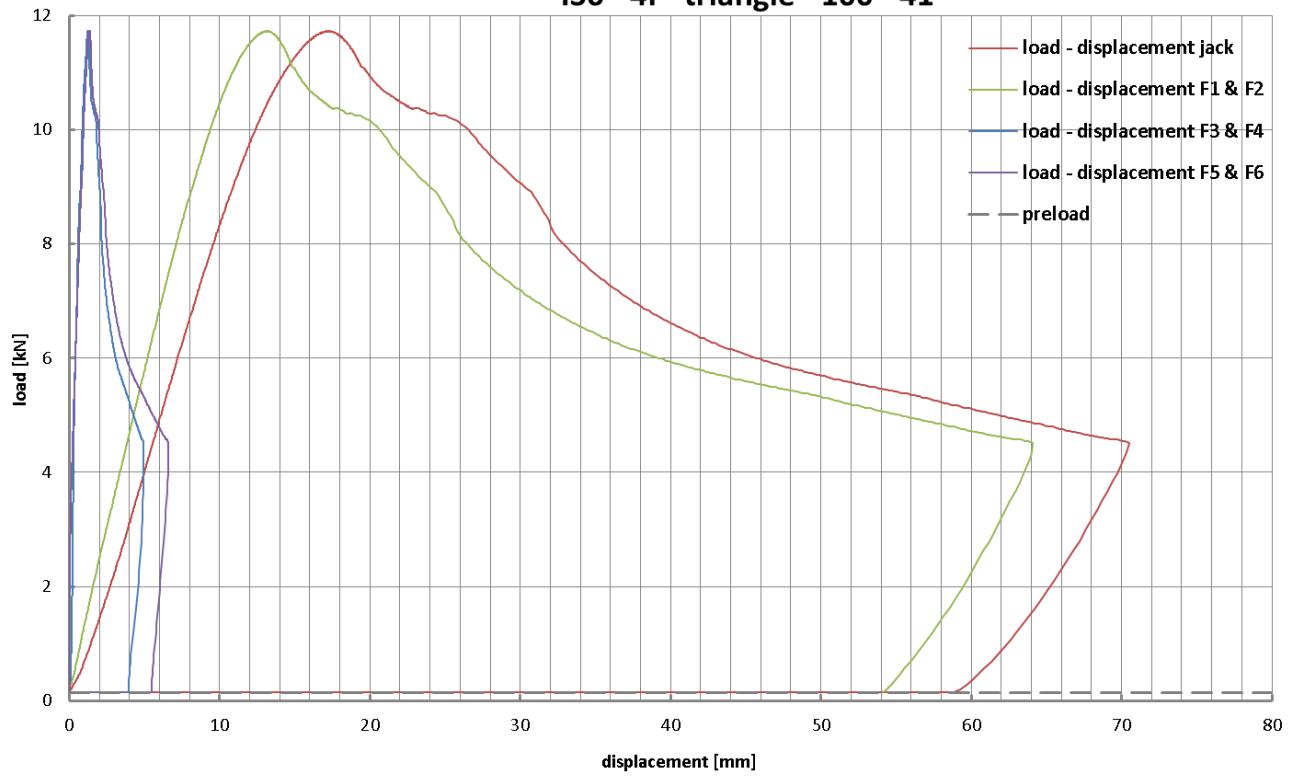
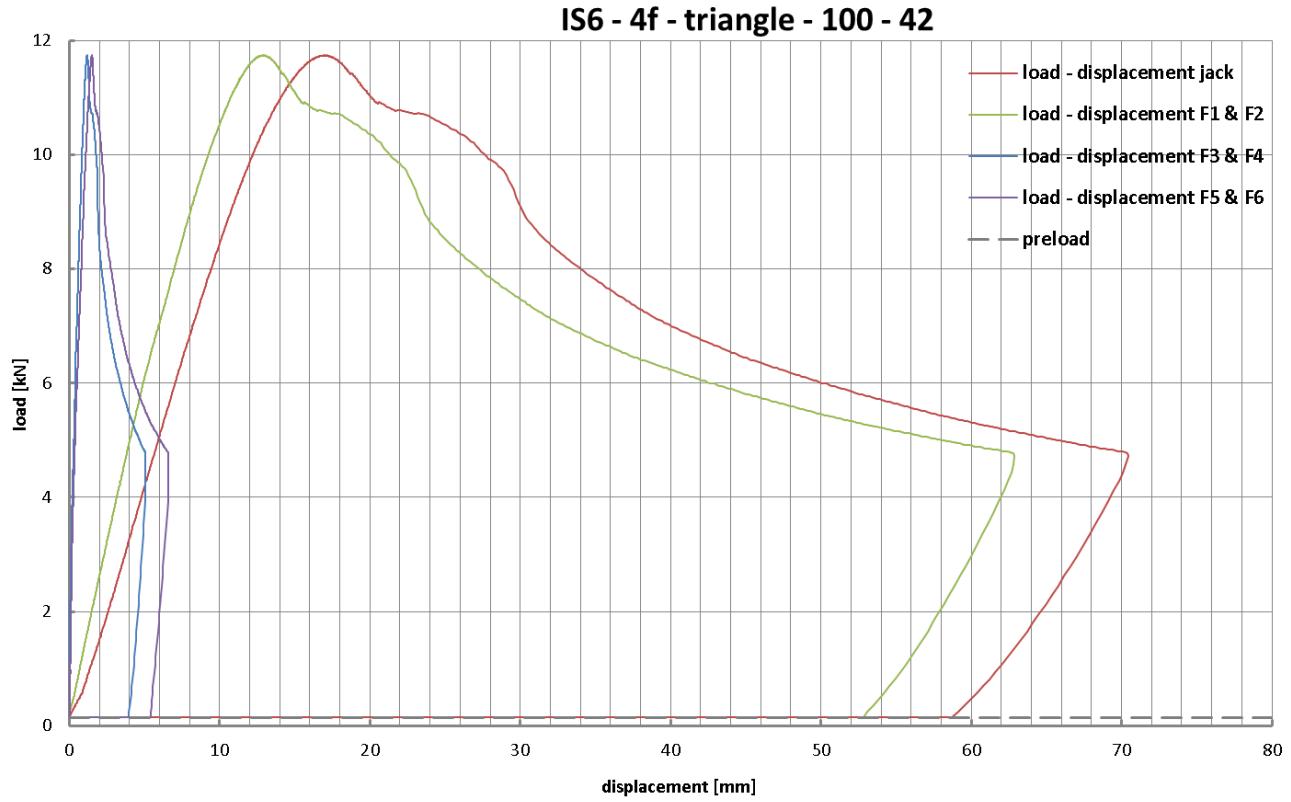


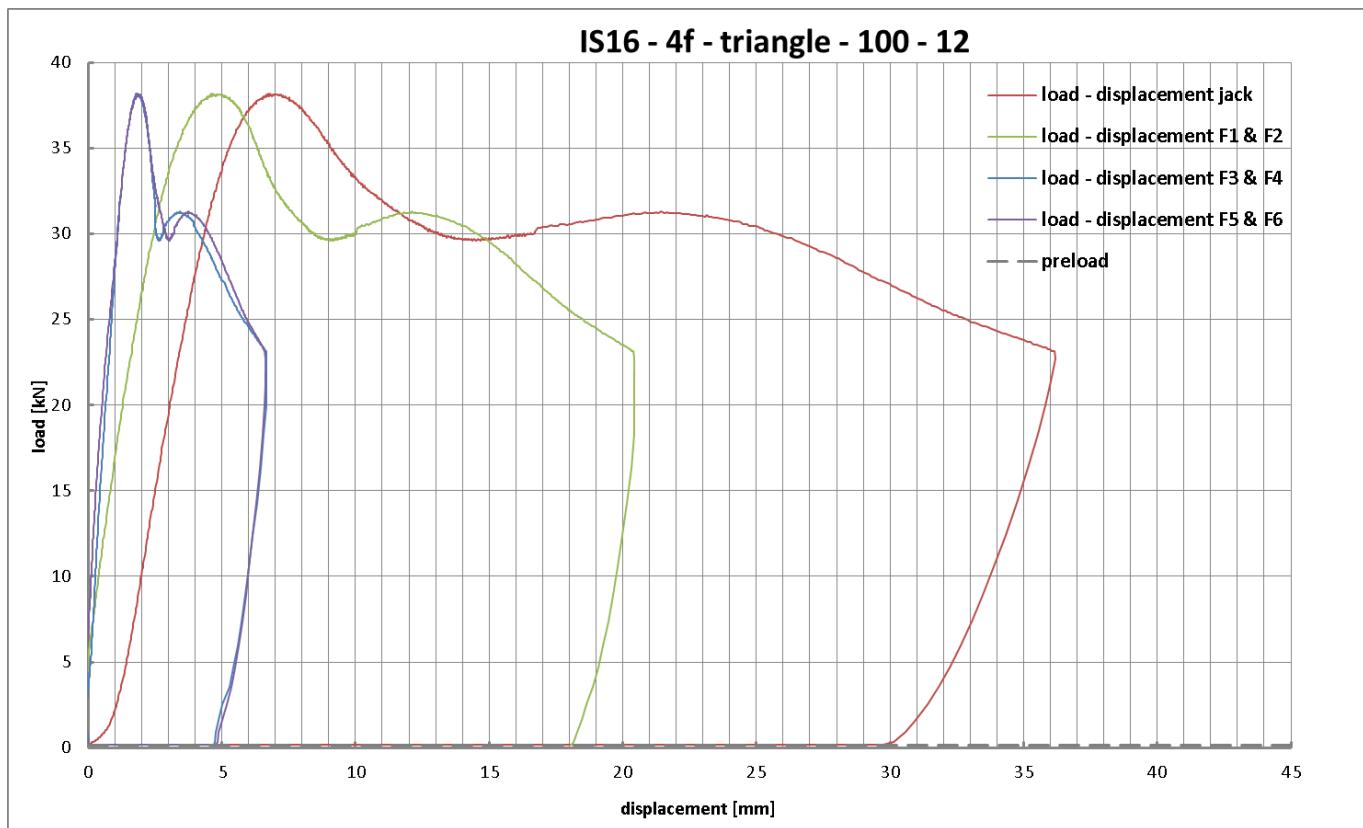
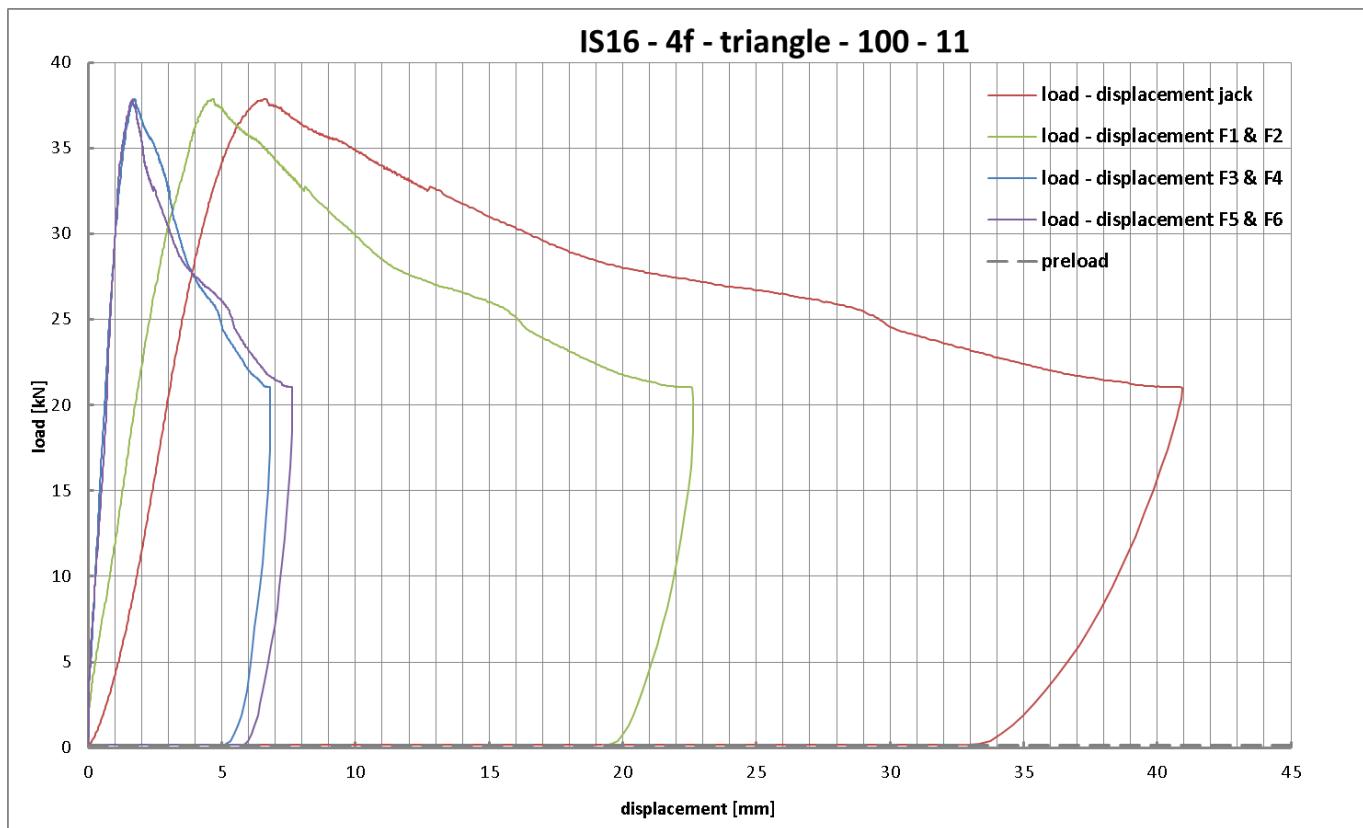


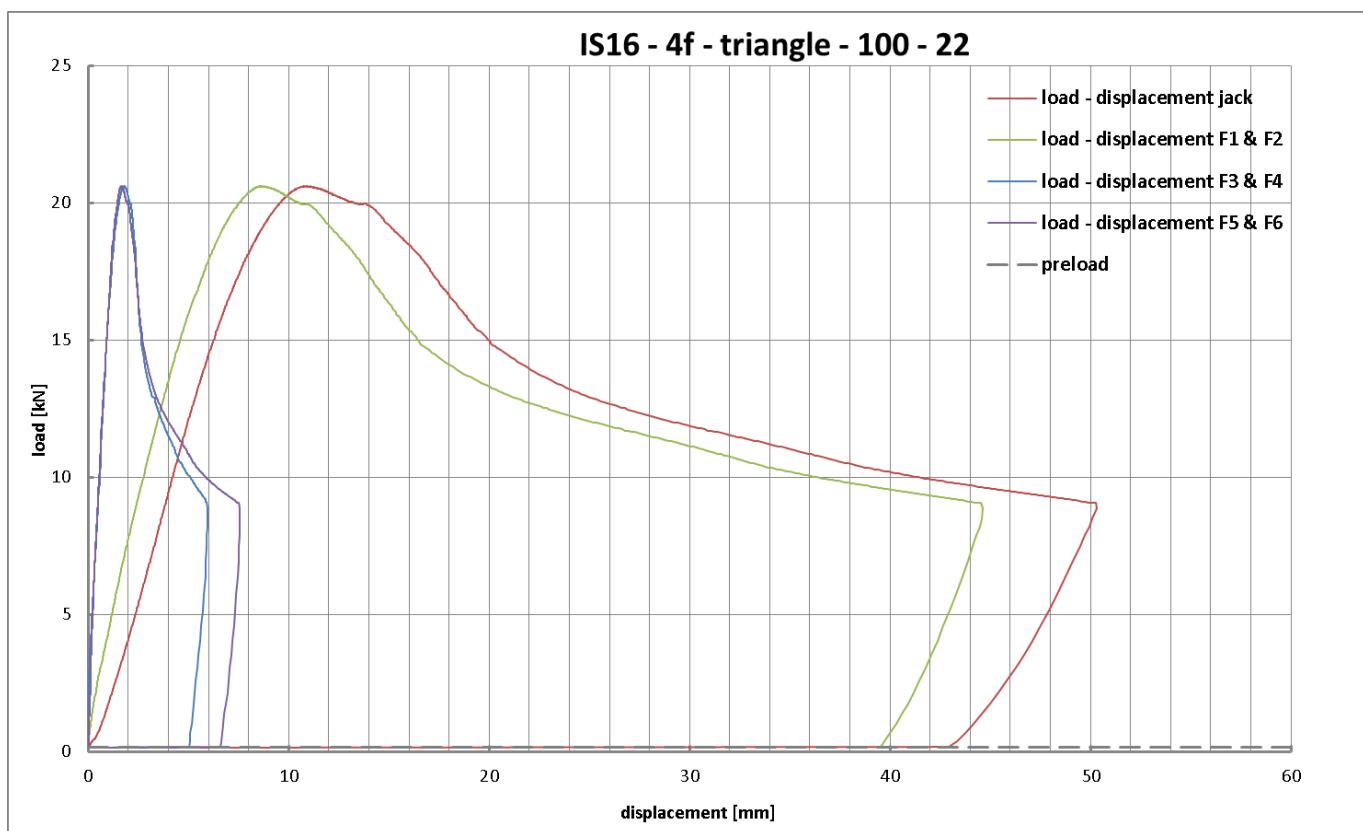
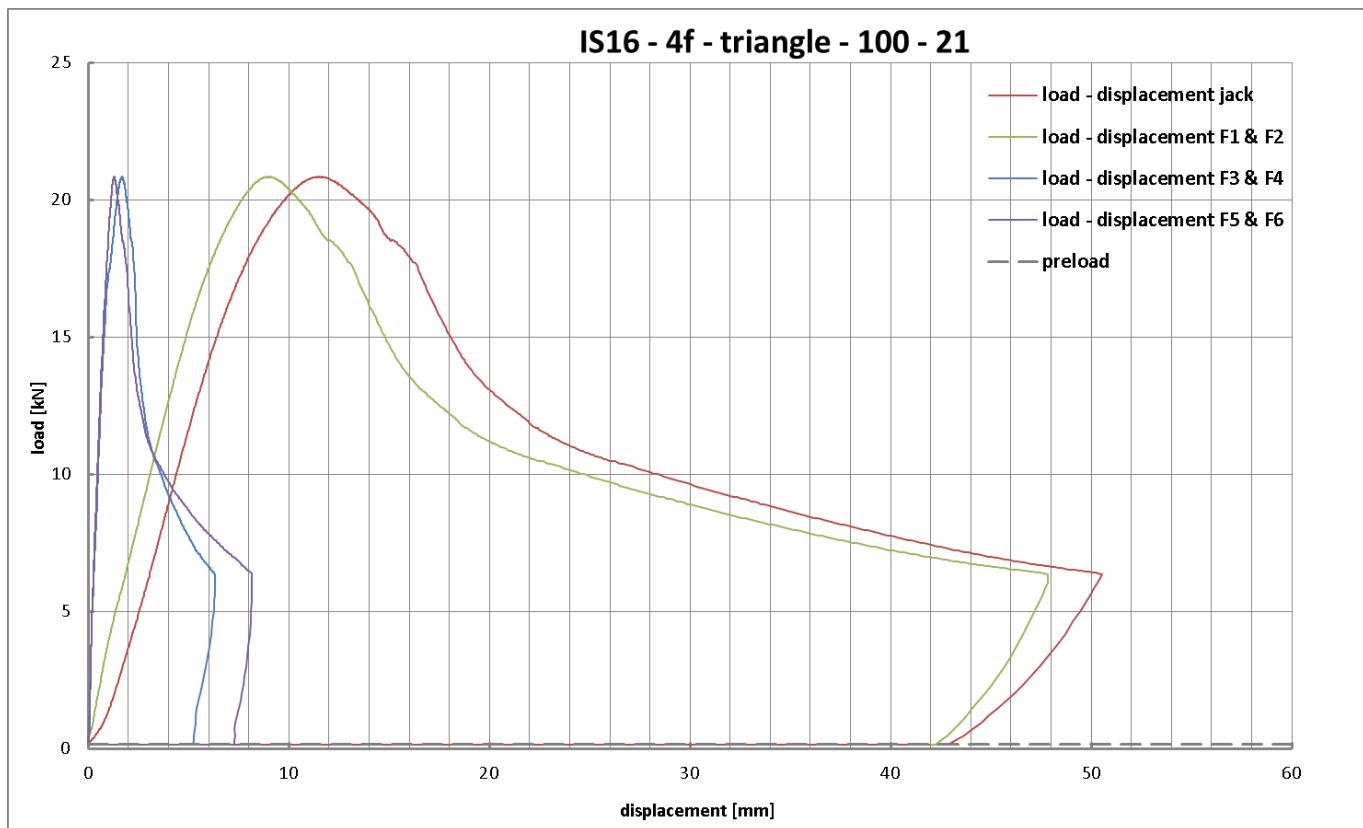


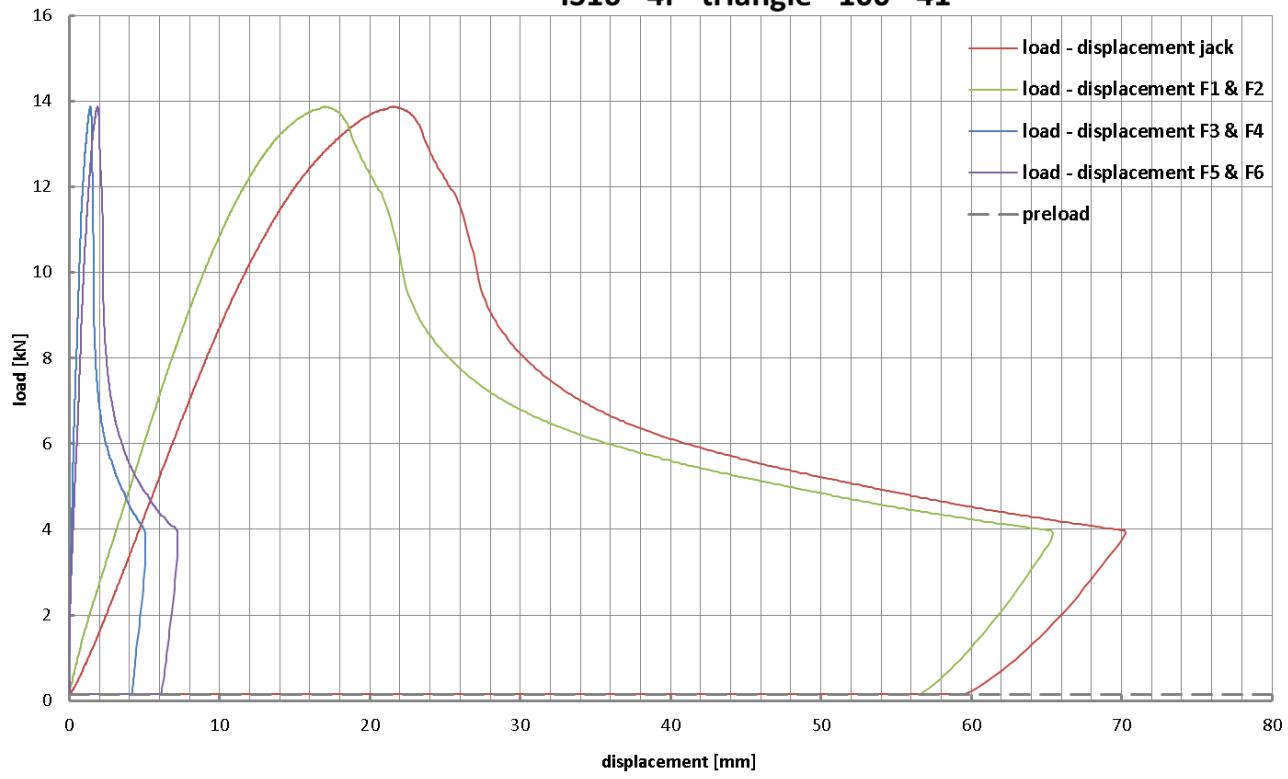
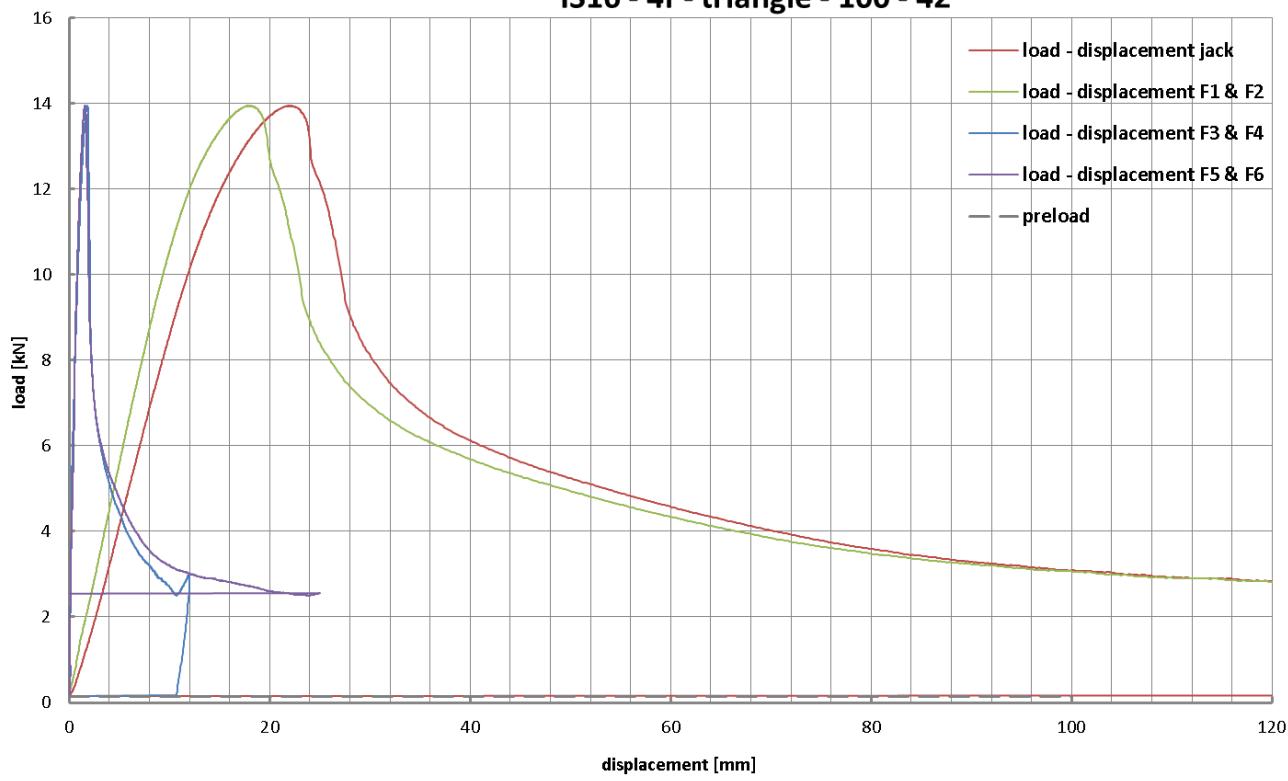


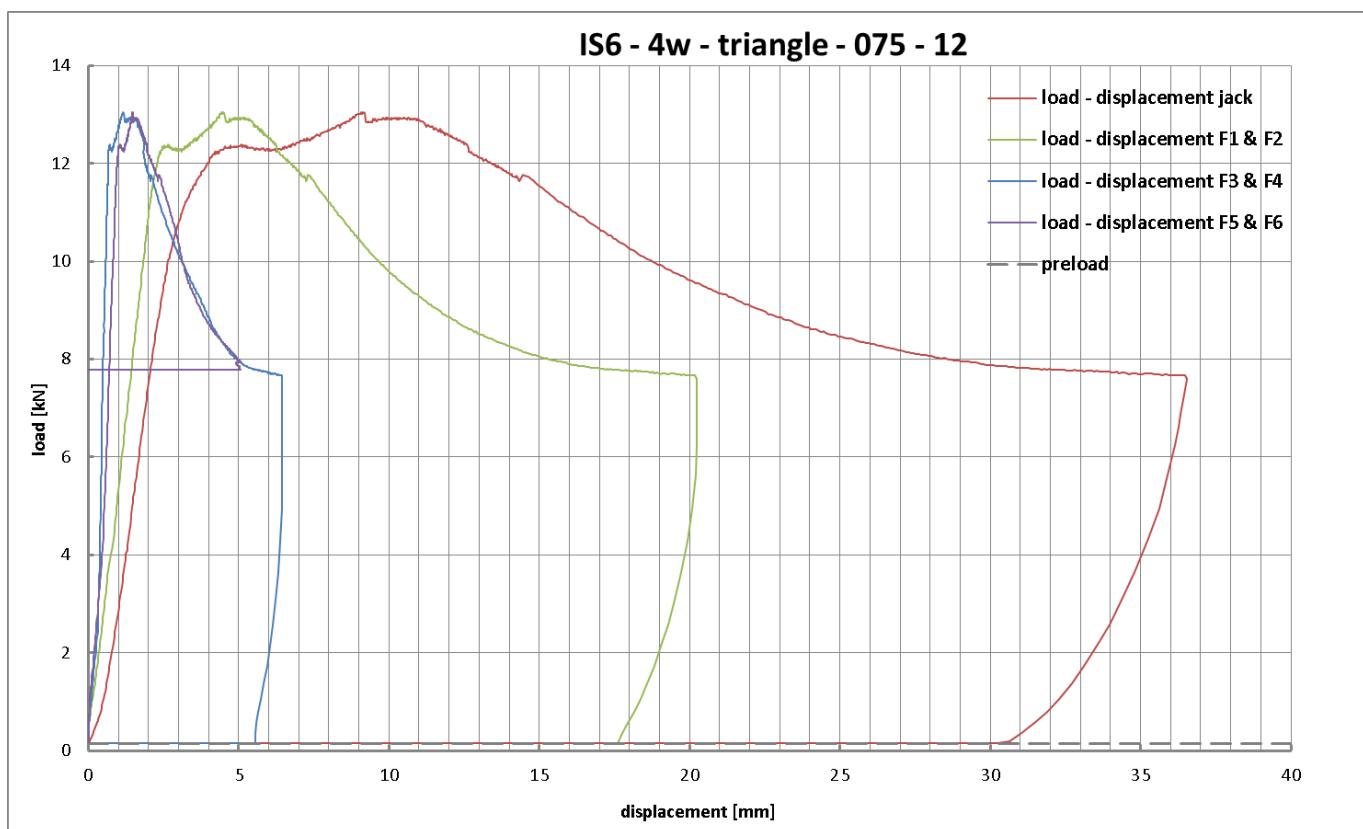
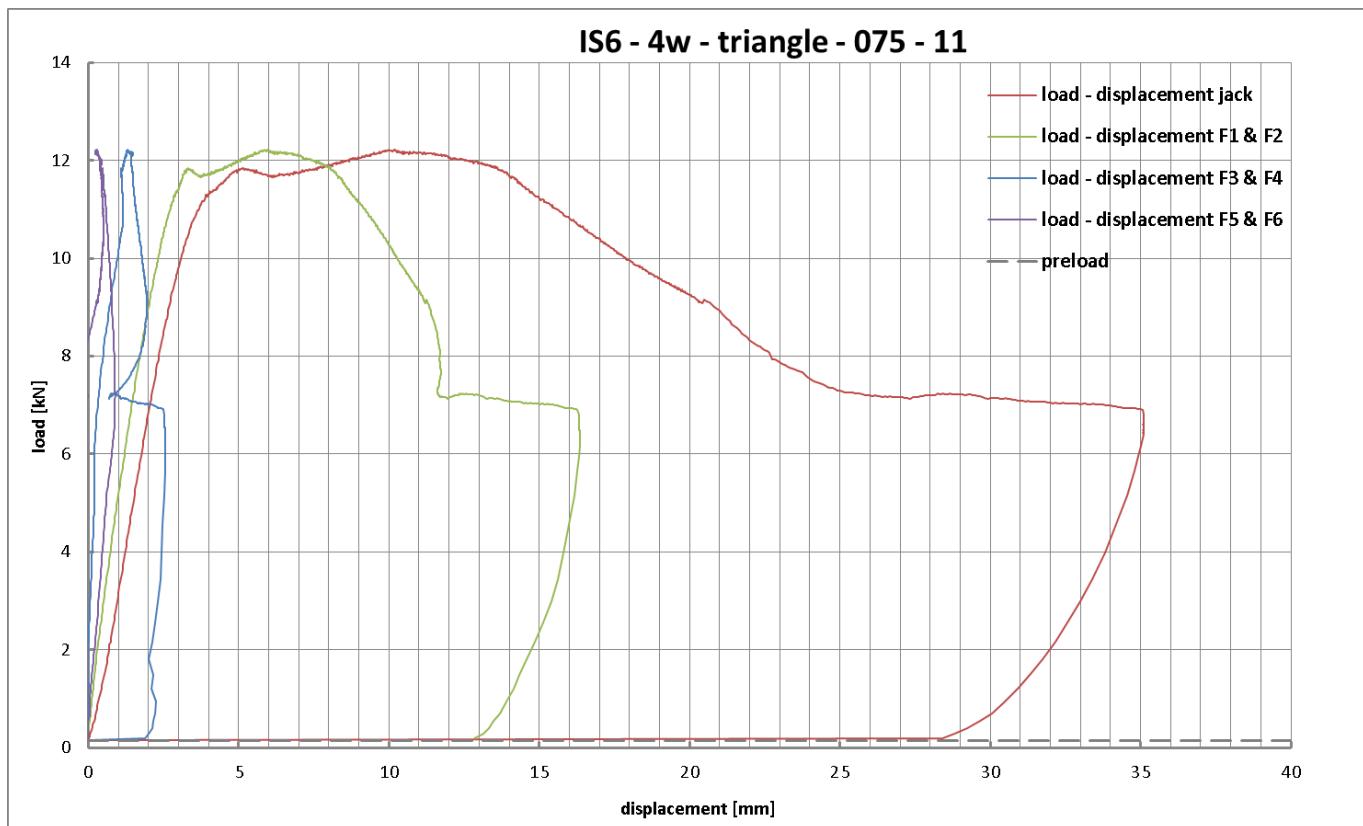


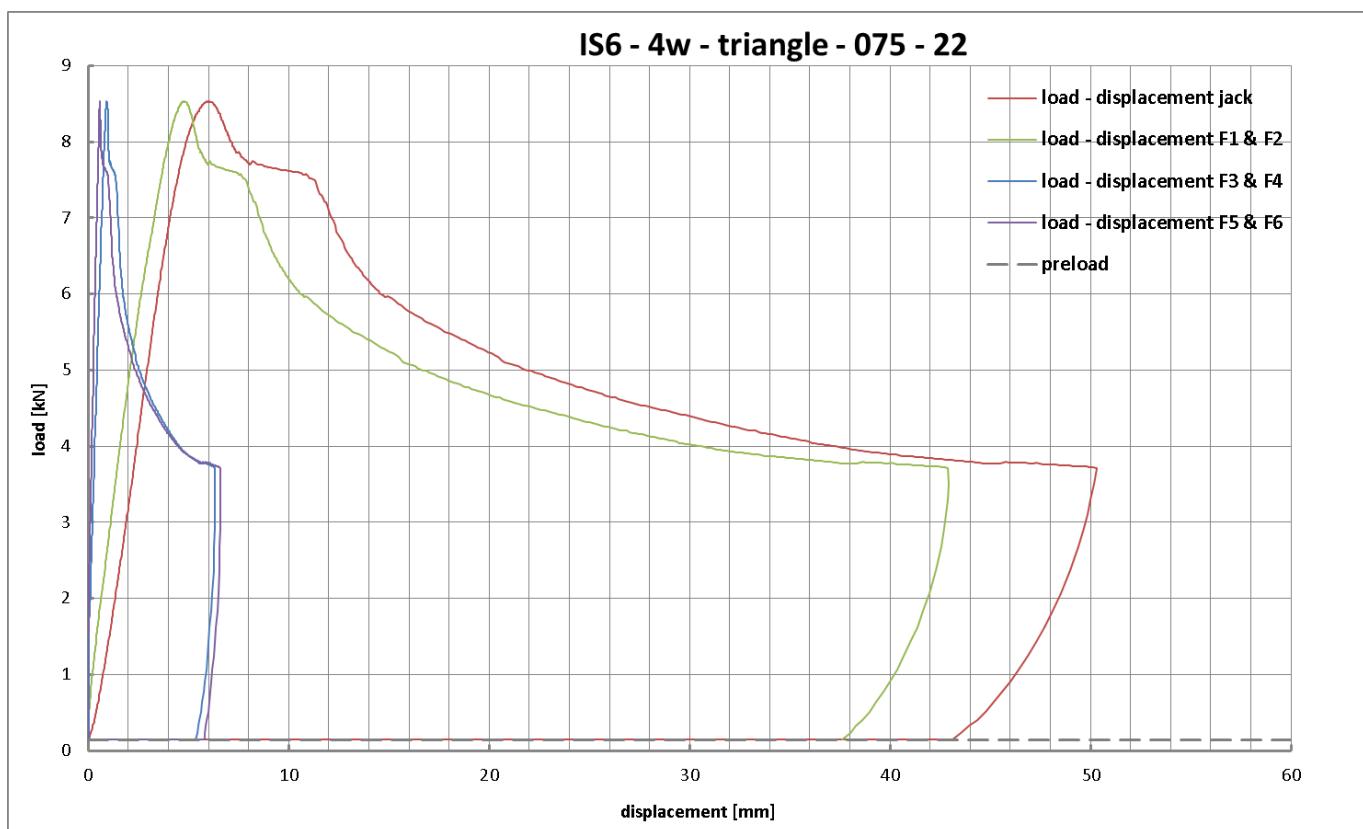
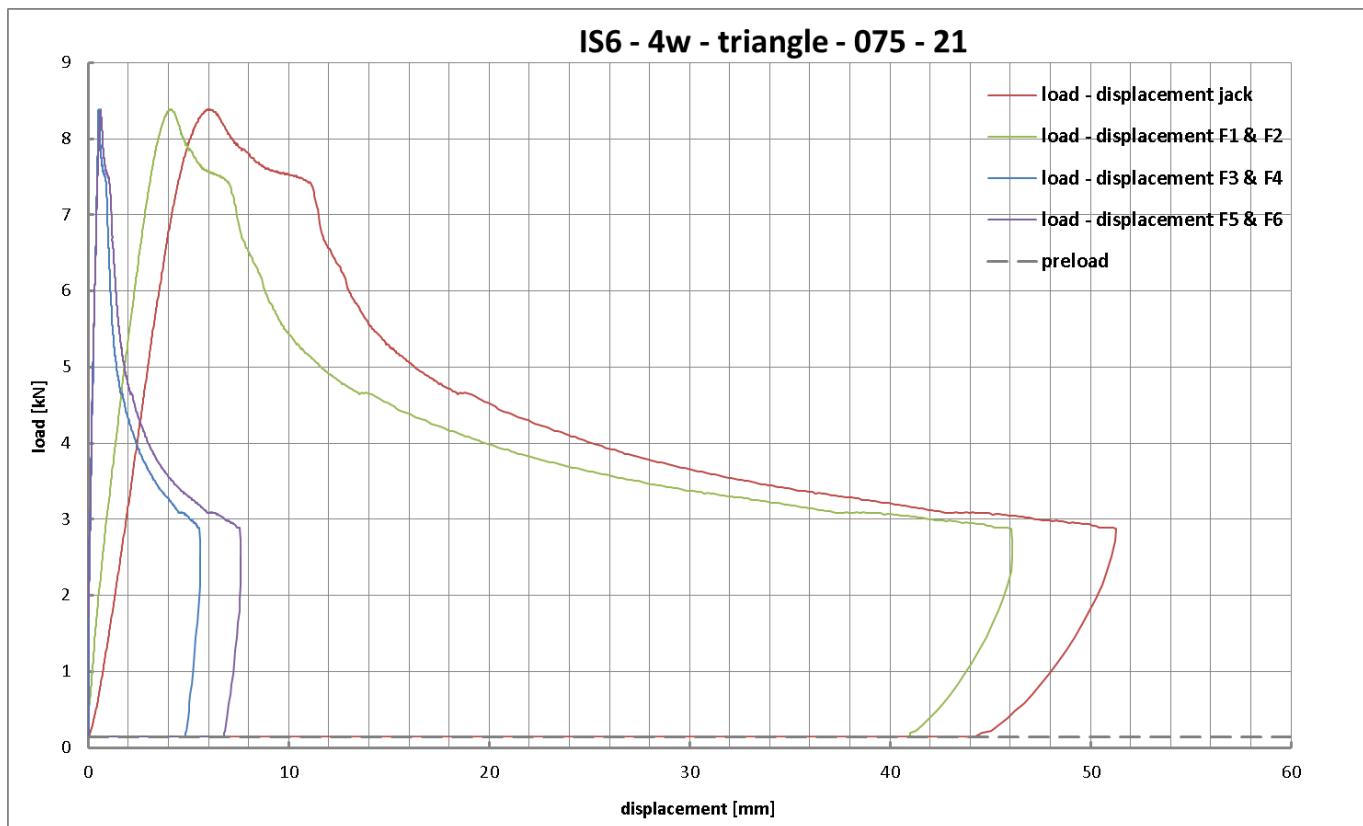
**IS6 - 4f - triangle - 100 - 41****IS6 - 4f - triangle - 100 - 42**

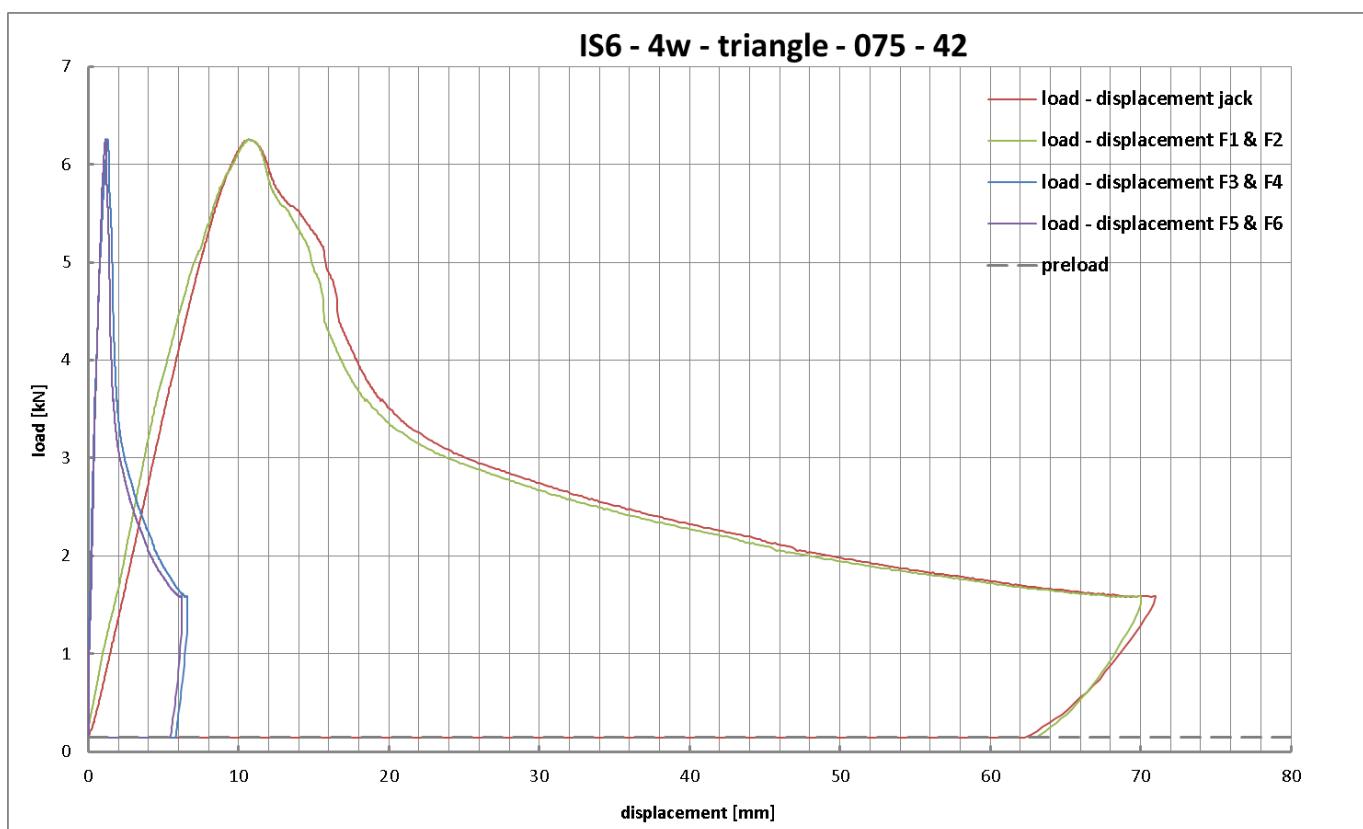
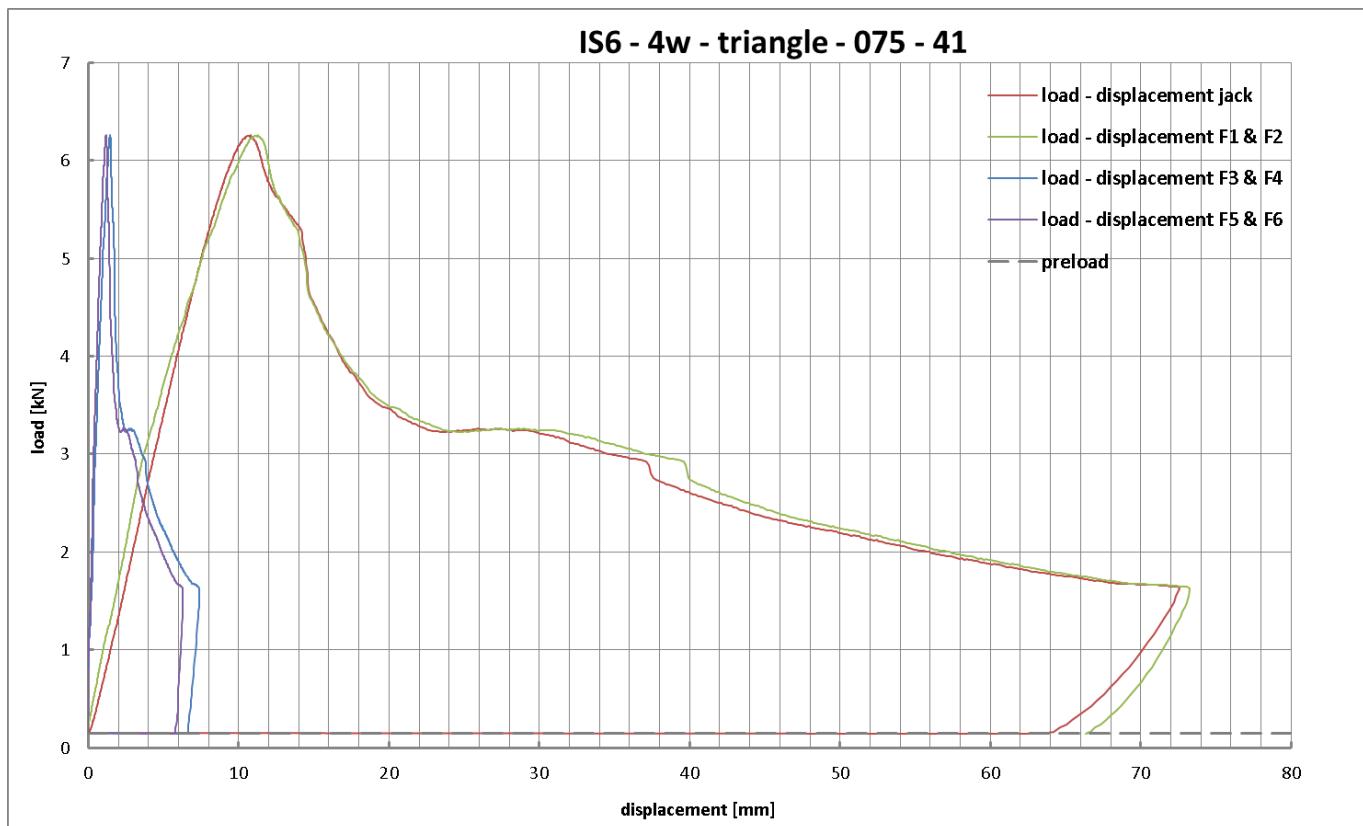


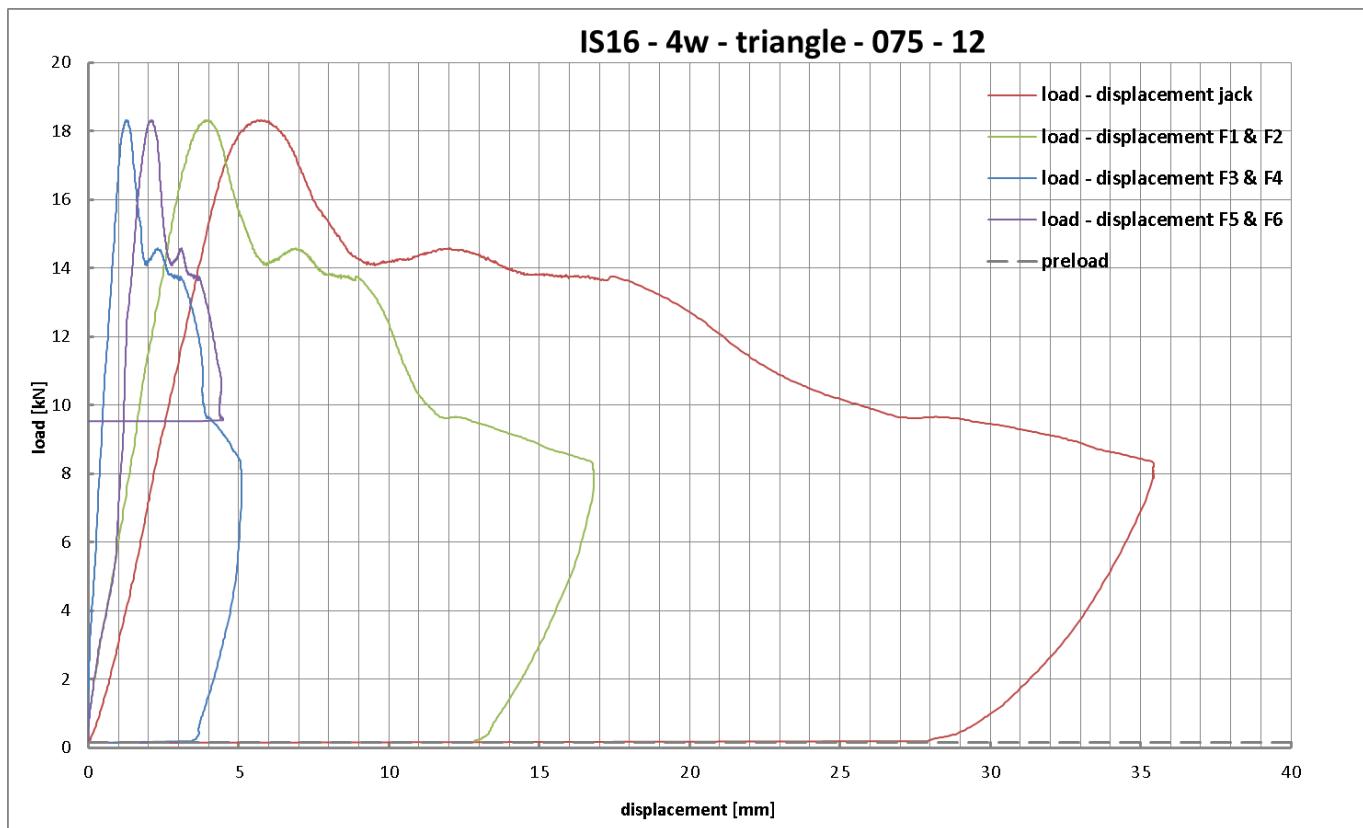
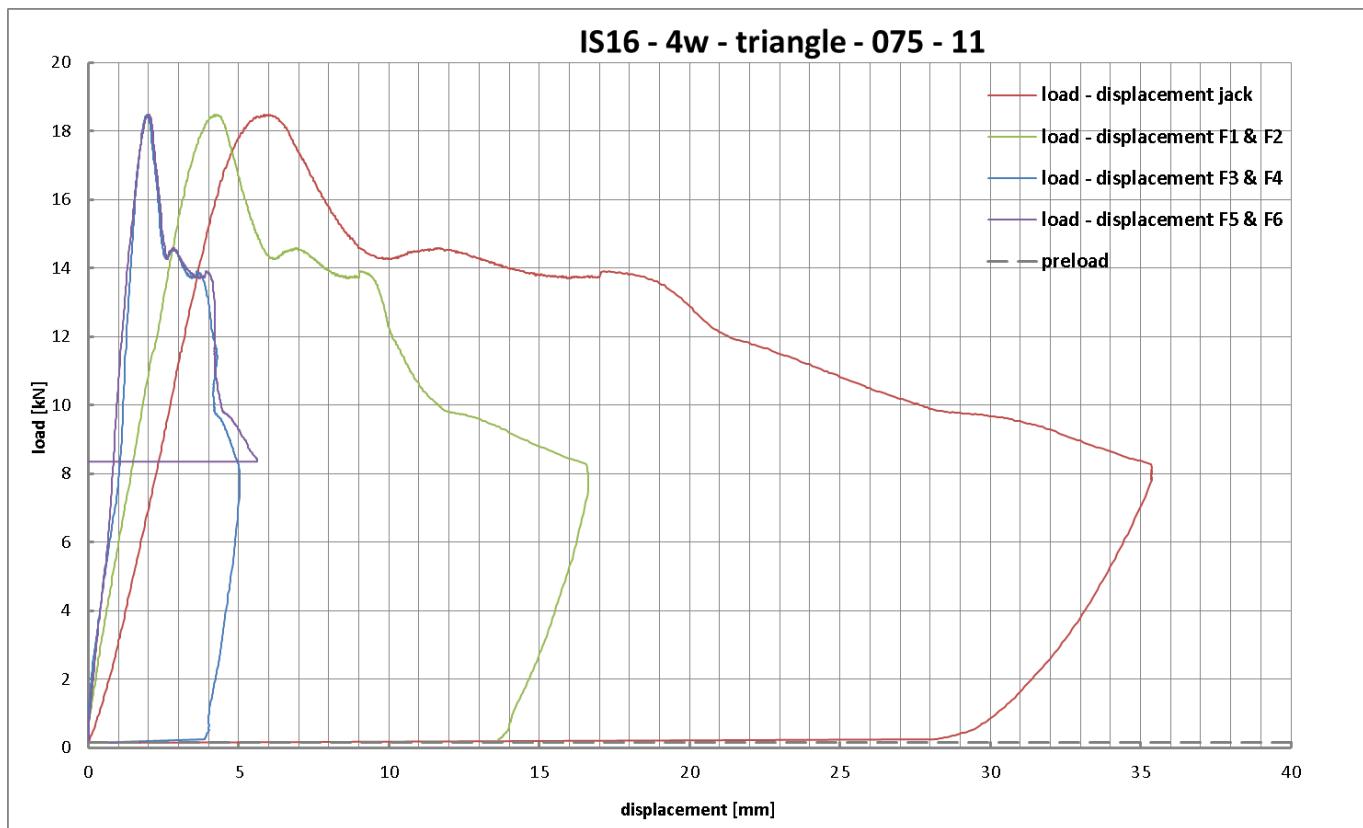


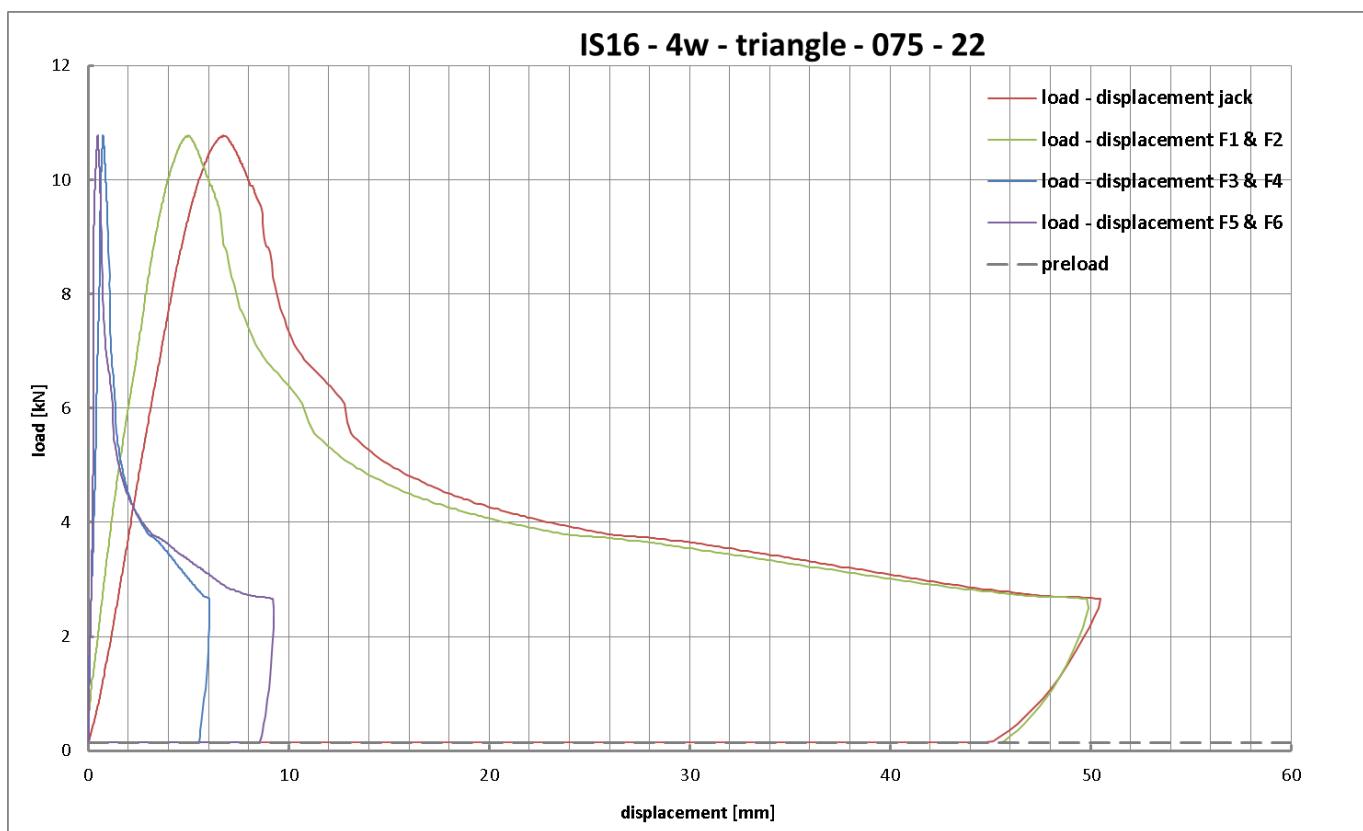
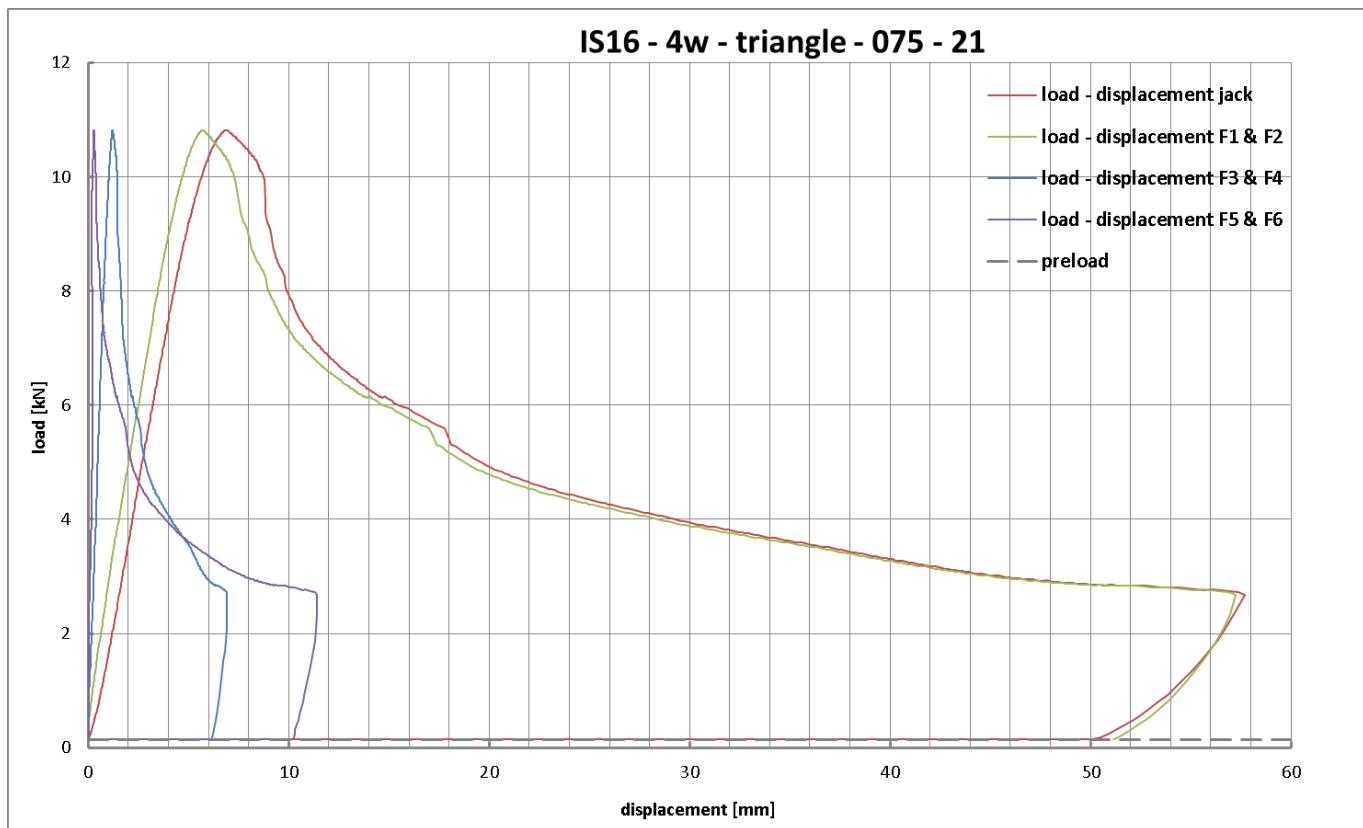
**IS16 - 4f - triangle - 100 - 41****IS16 - 4f - triangle - 100 - 42**

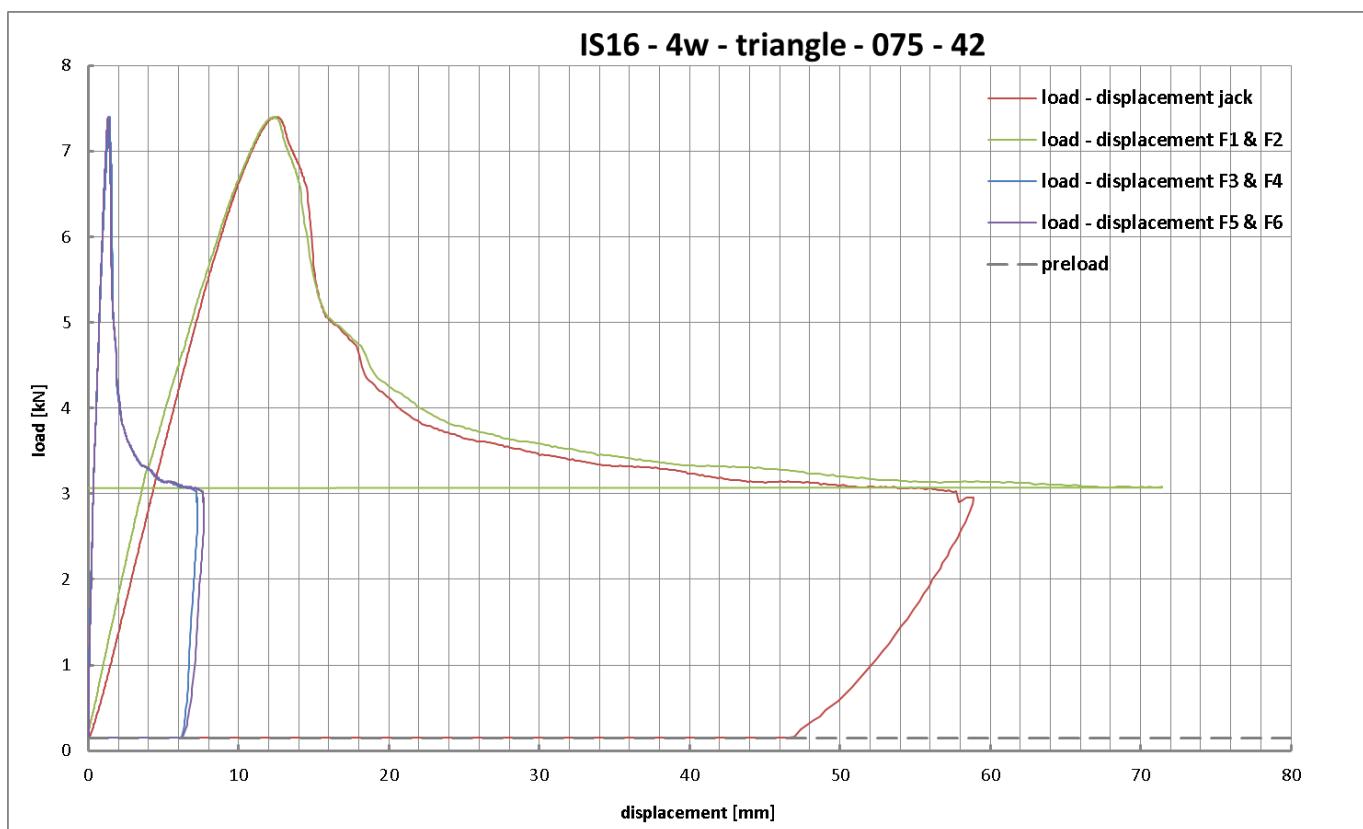
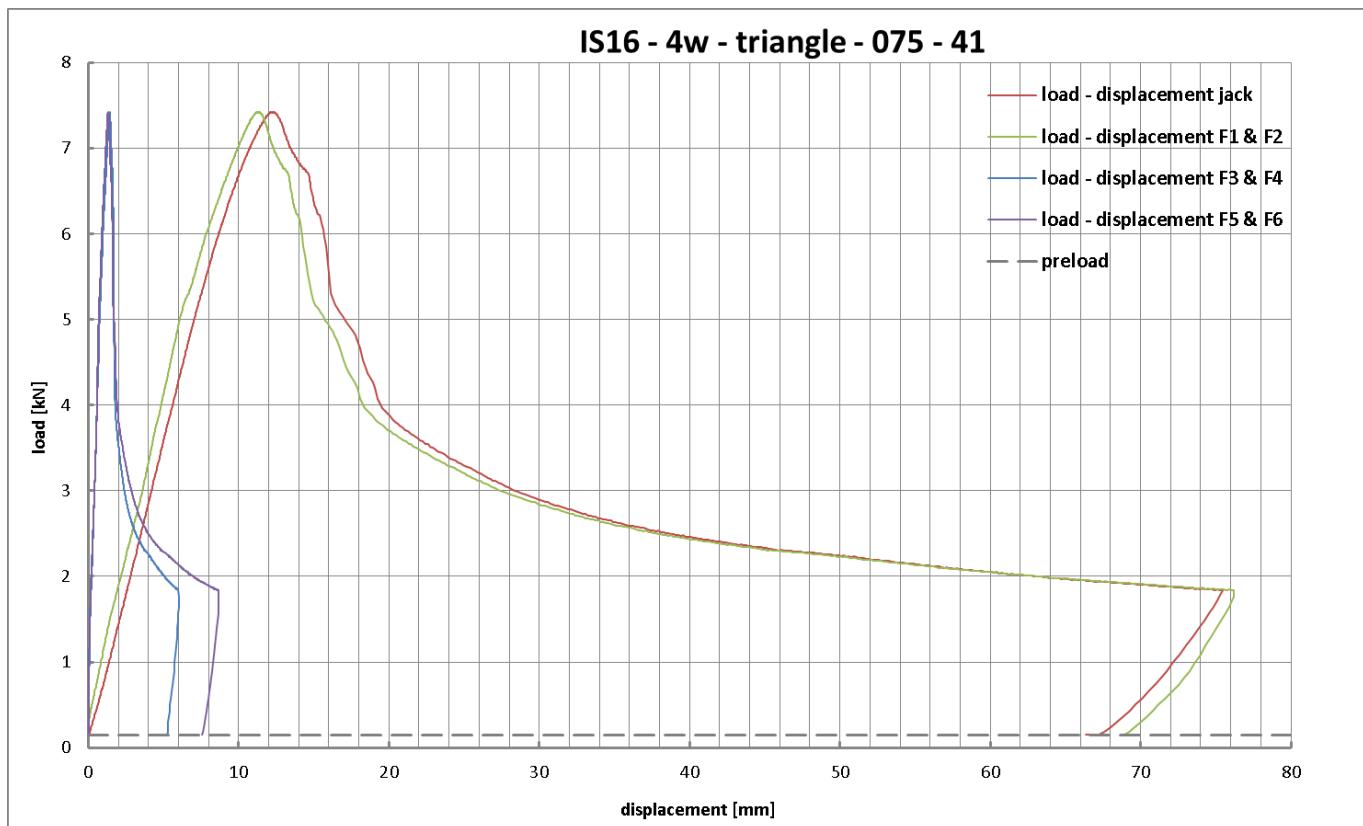


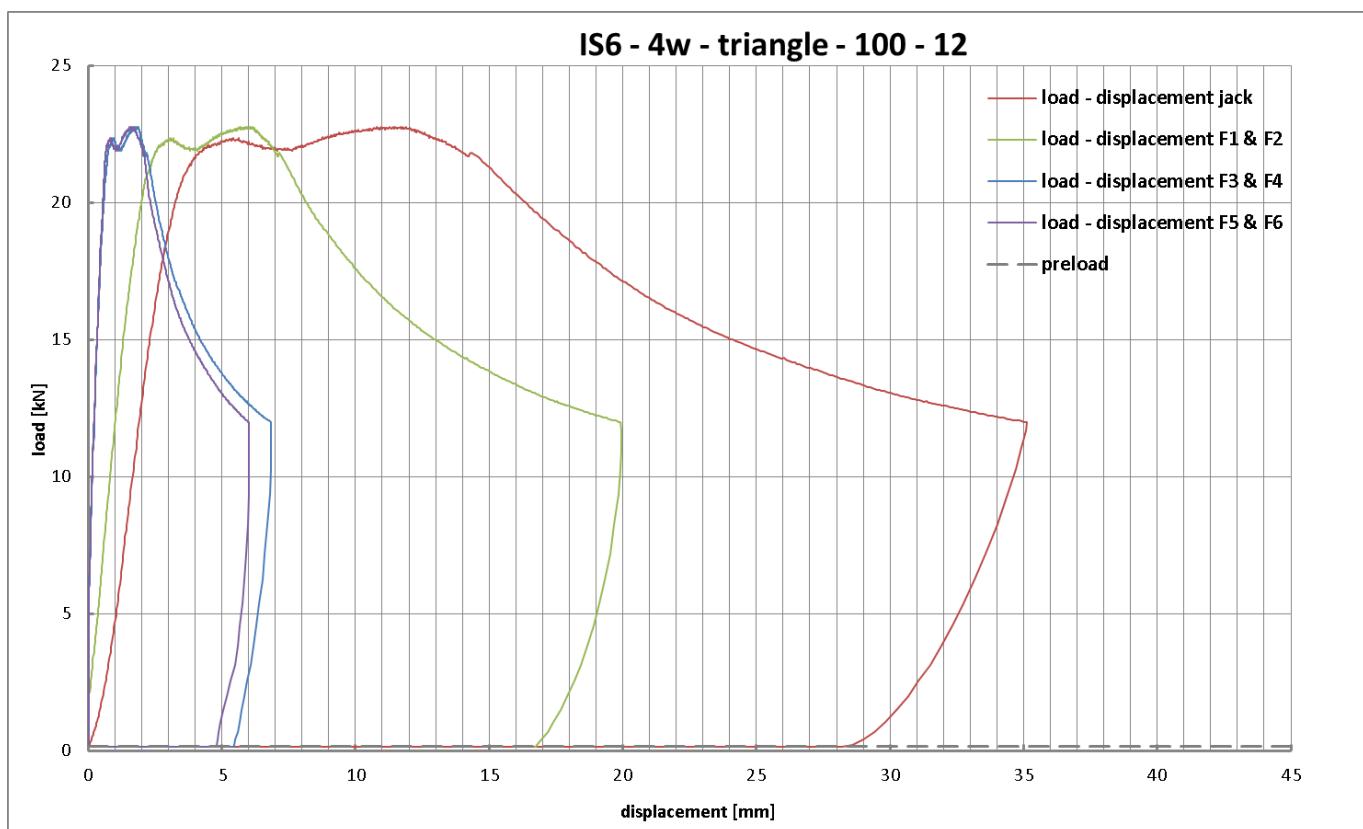
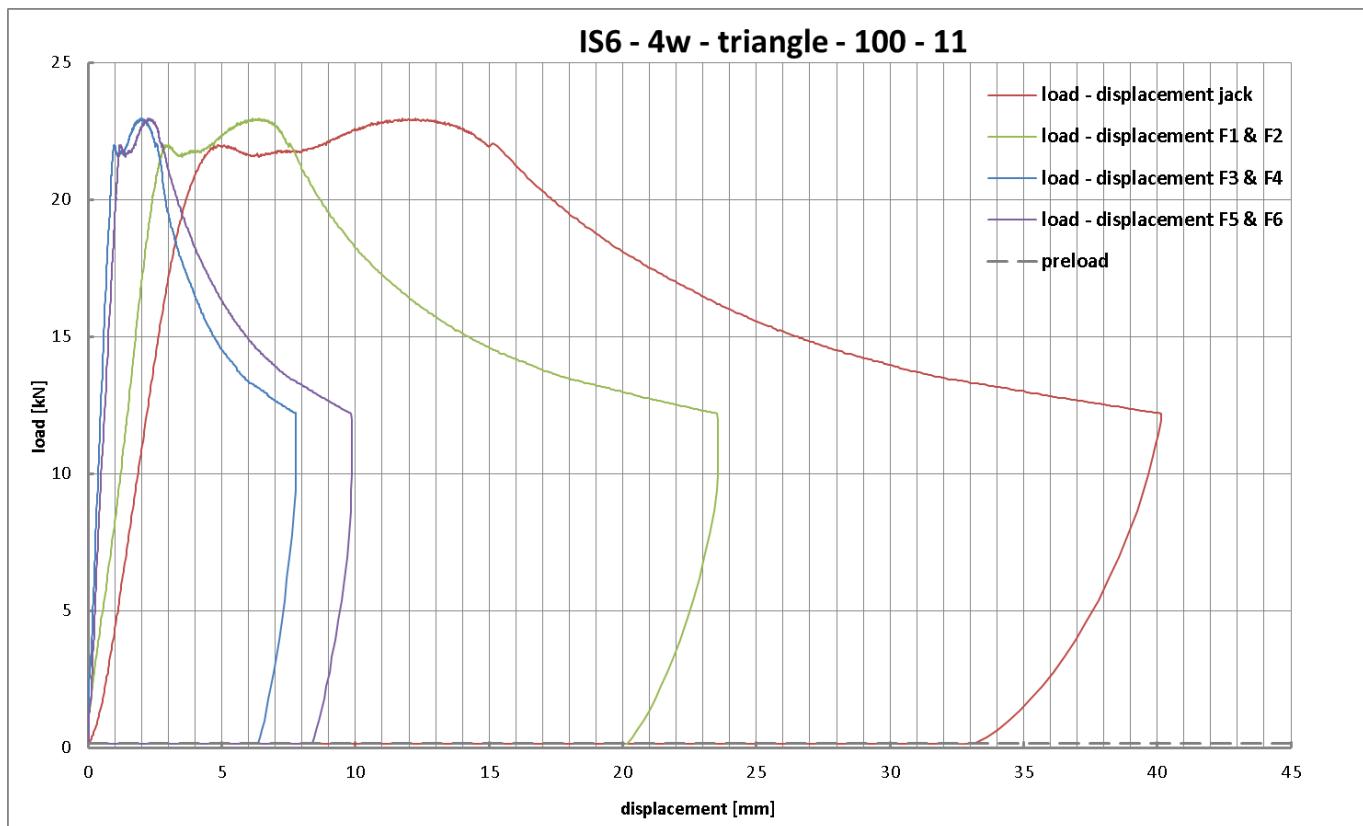


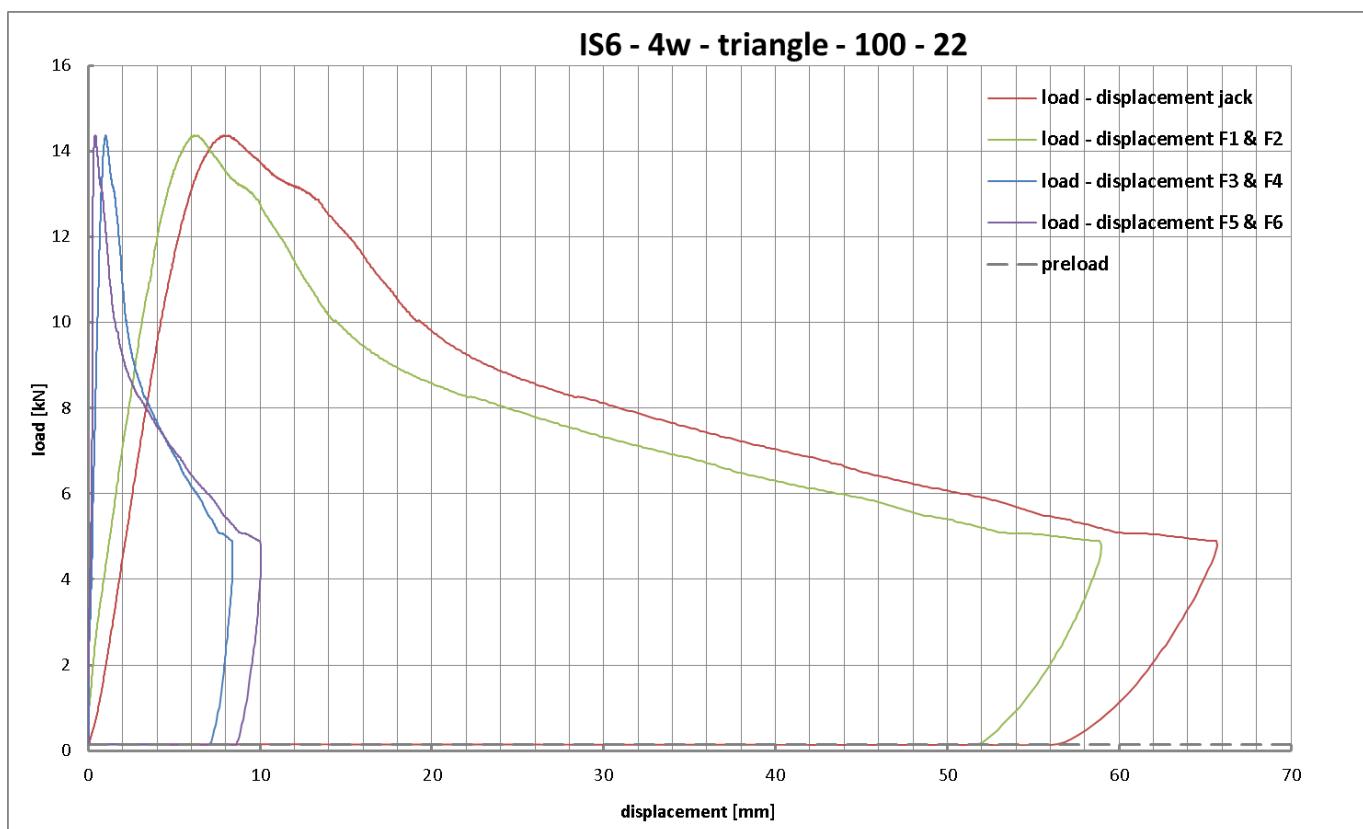
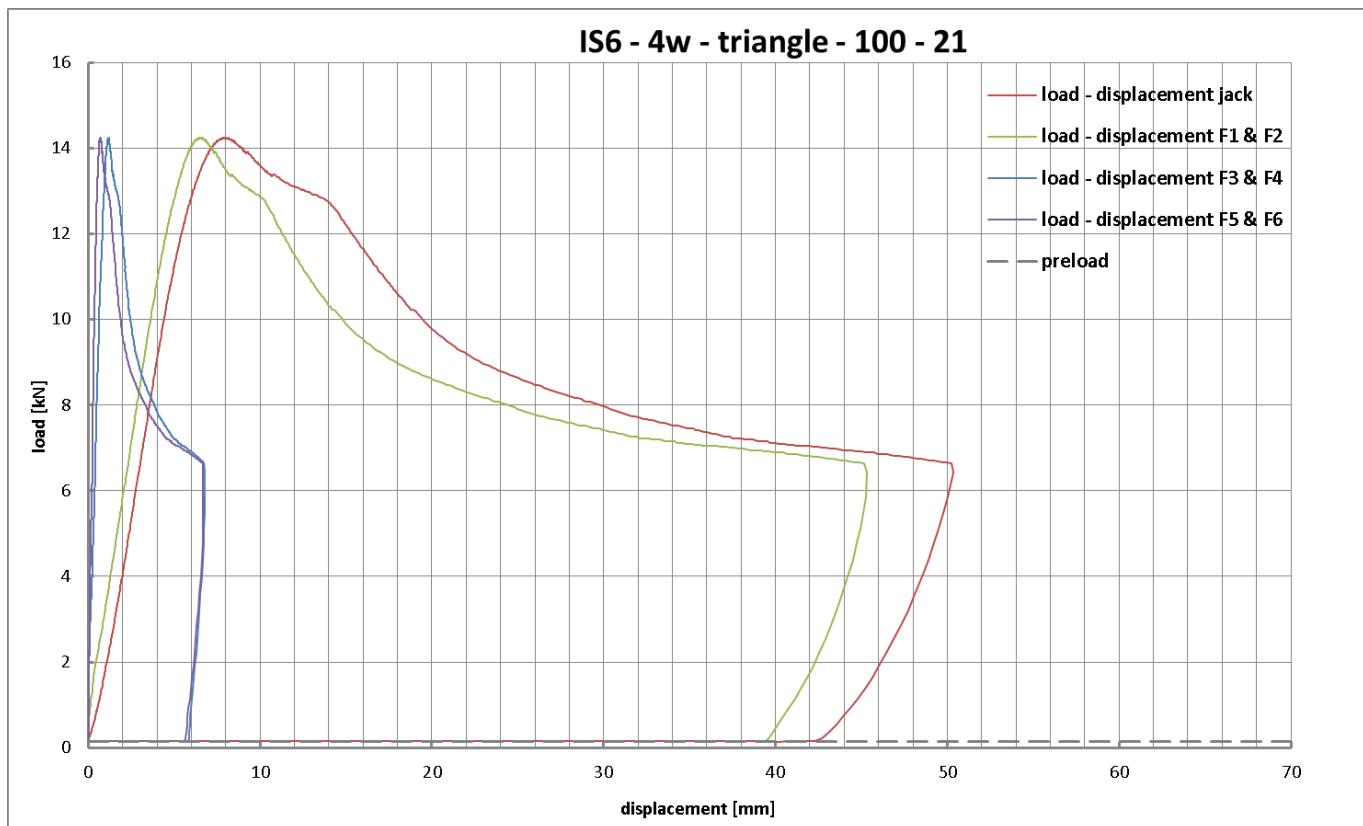


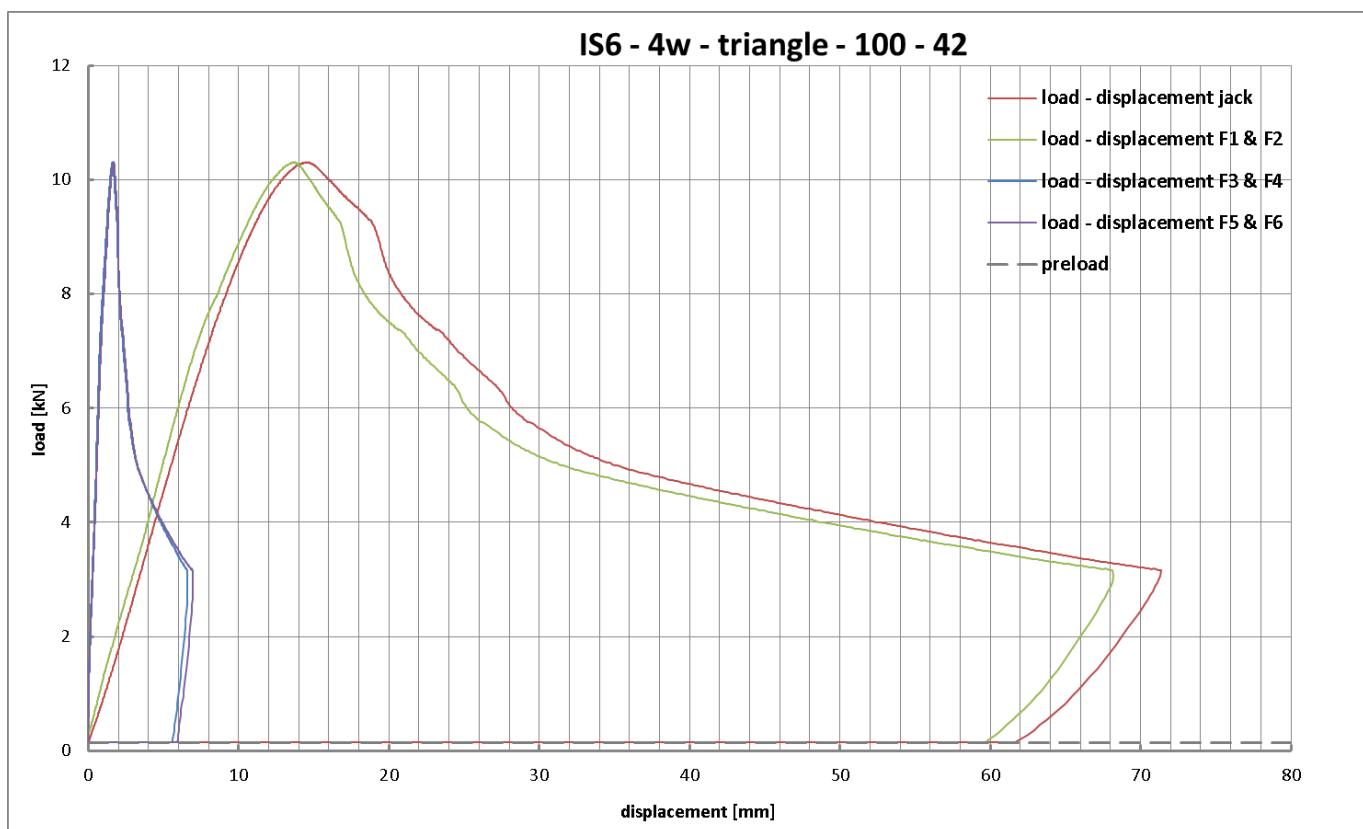
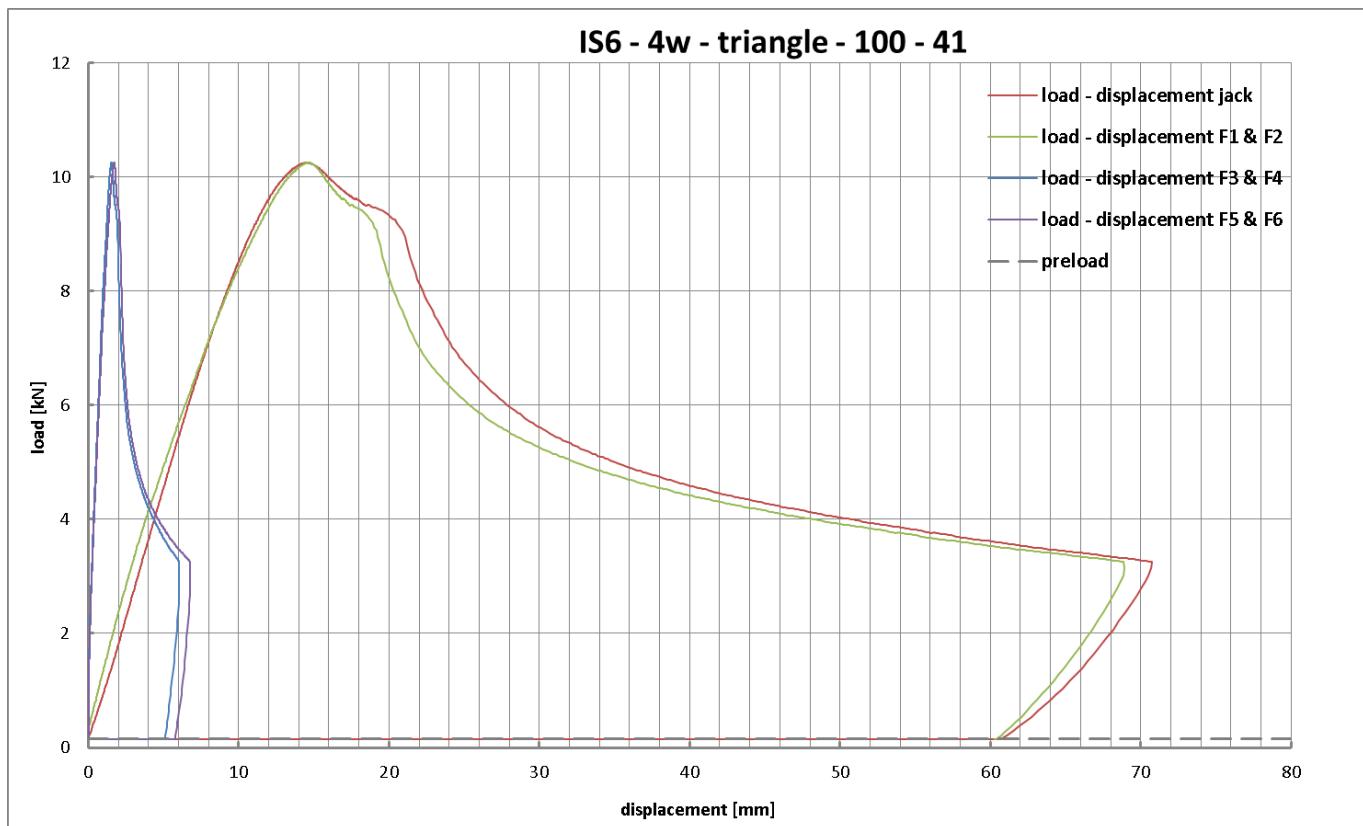


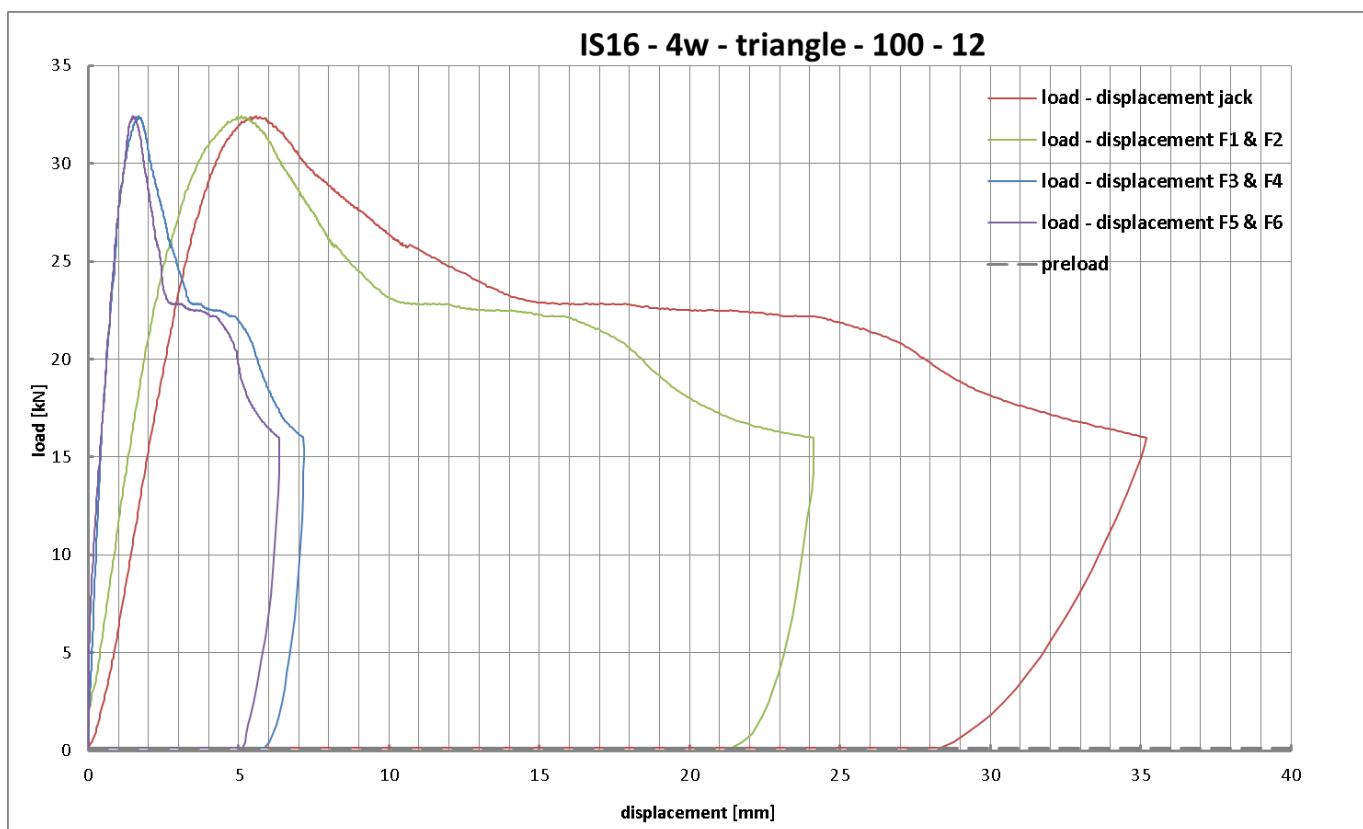
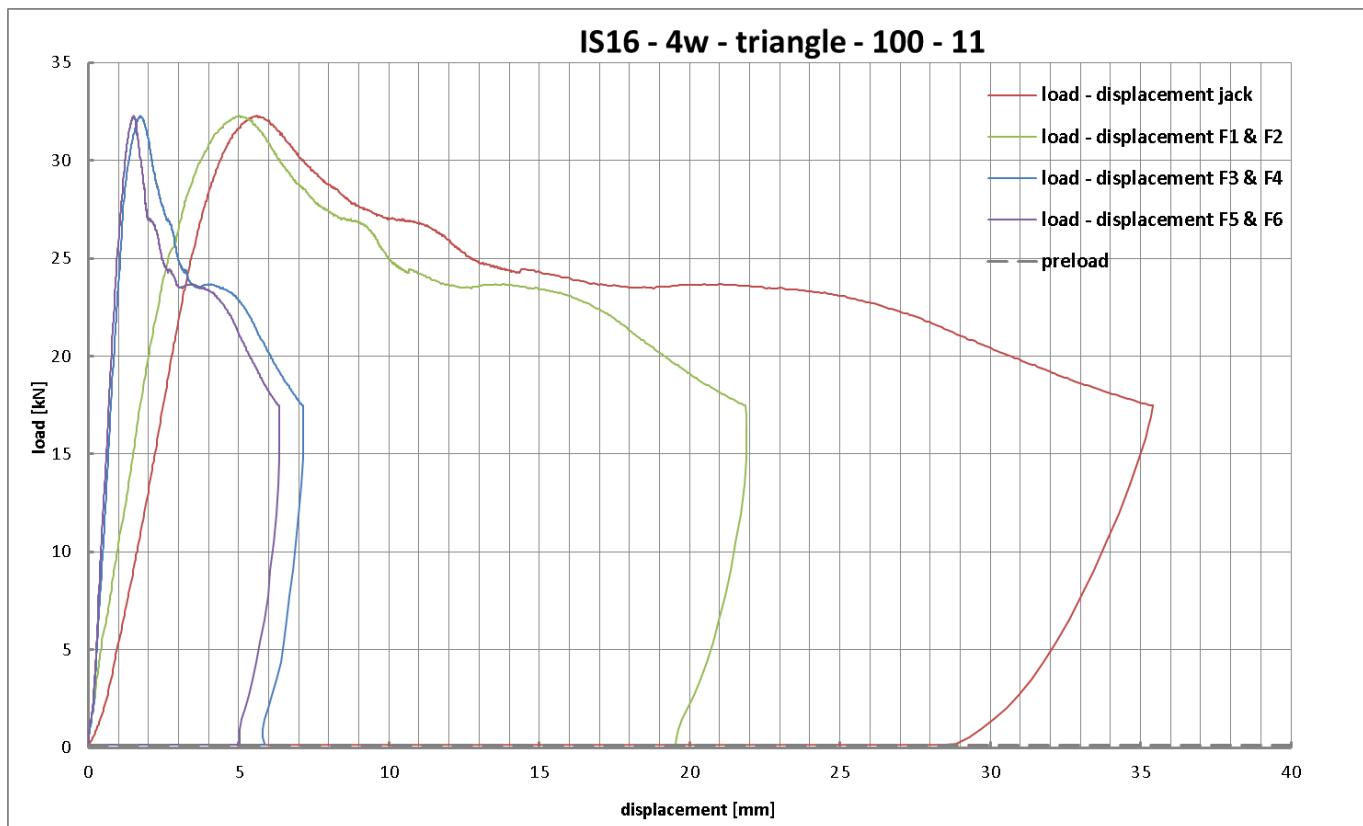


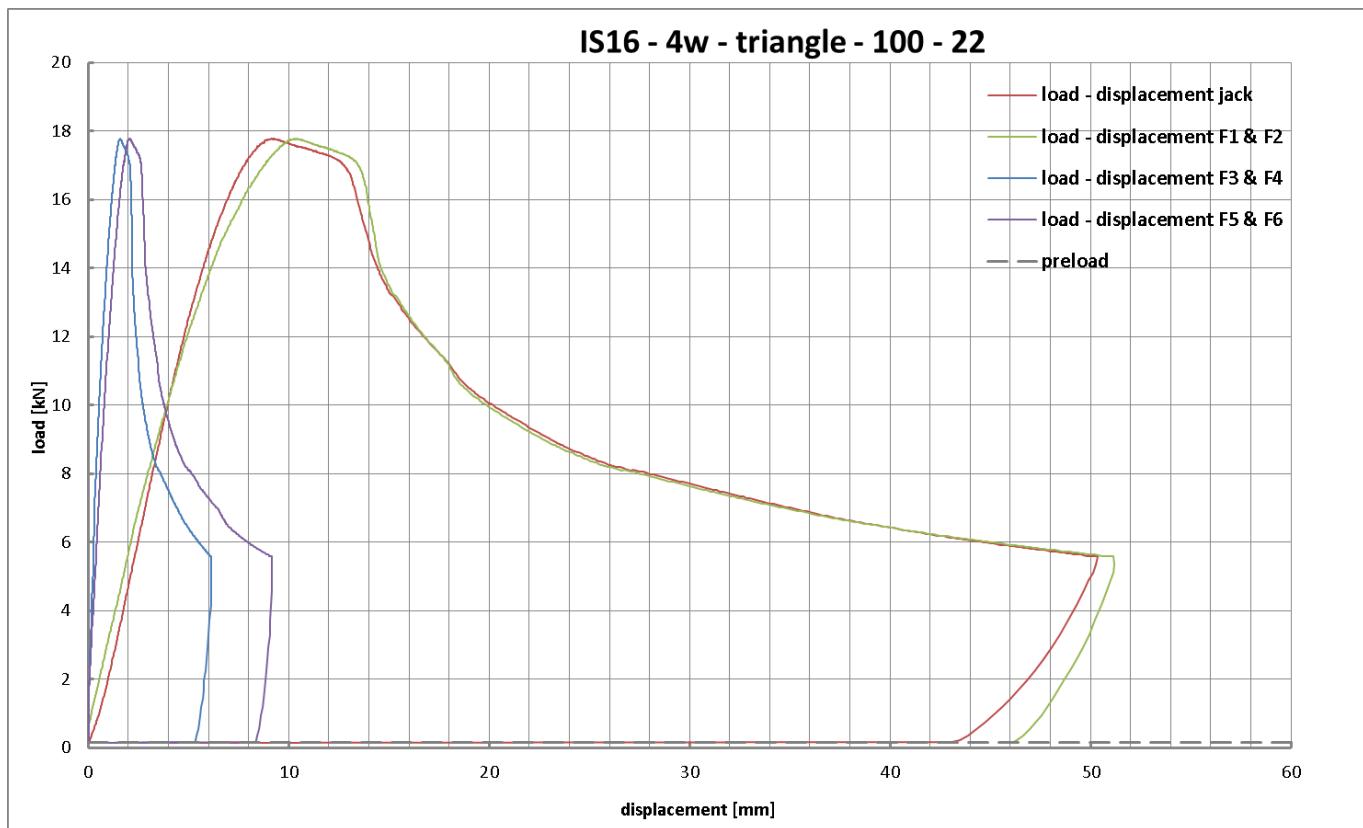
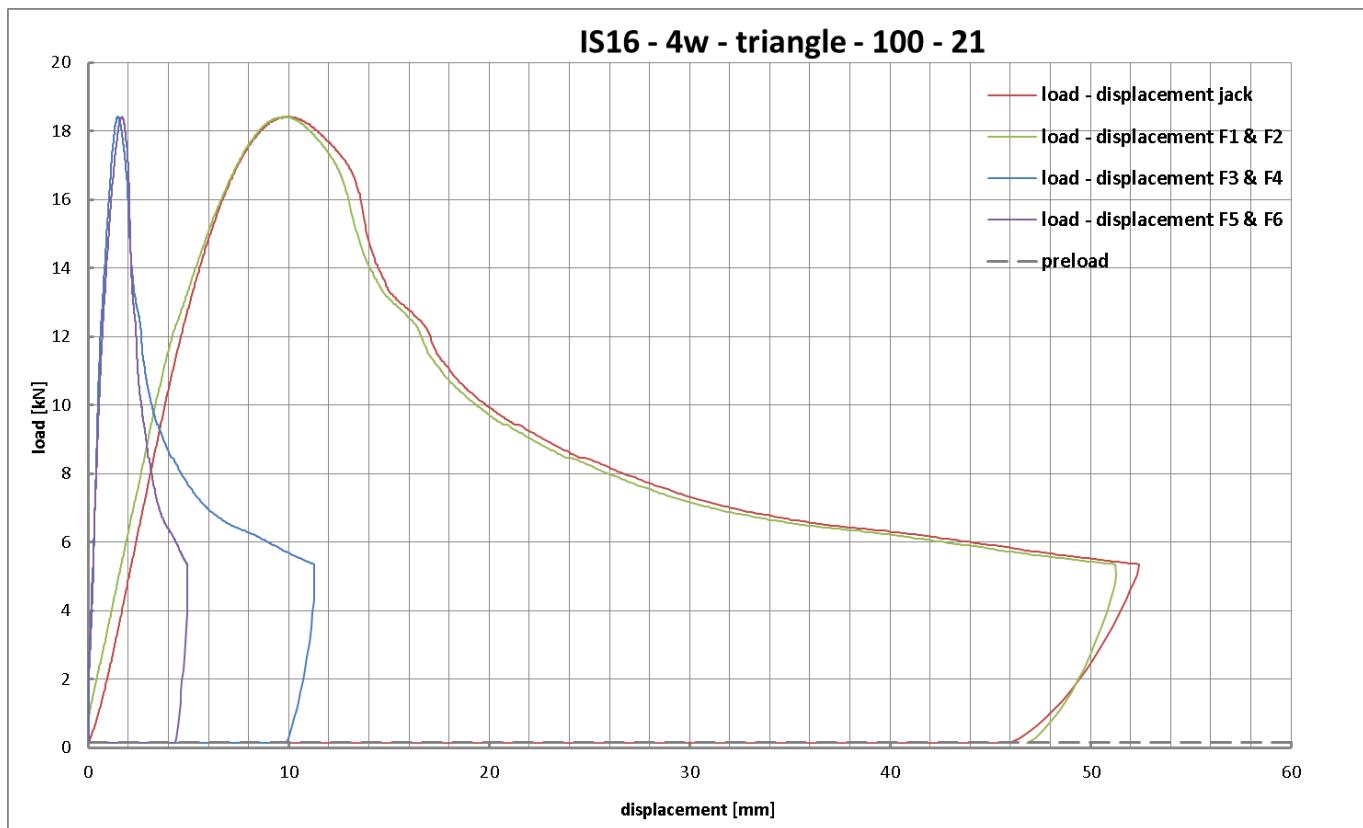


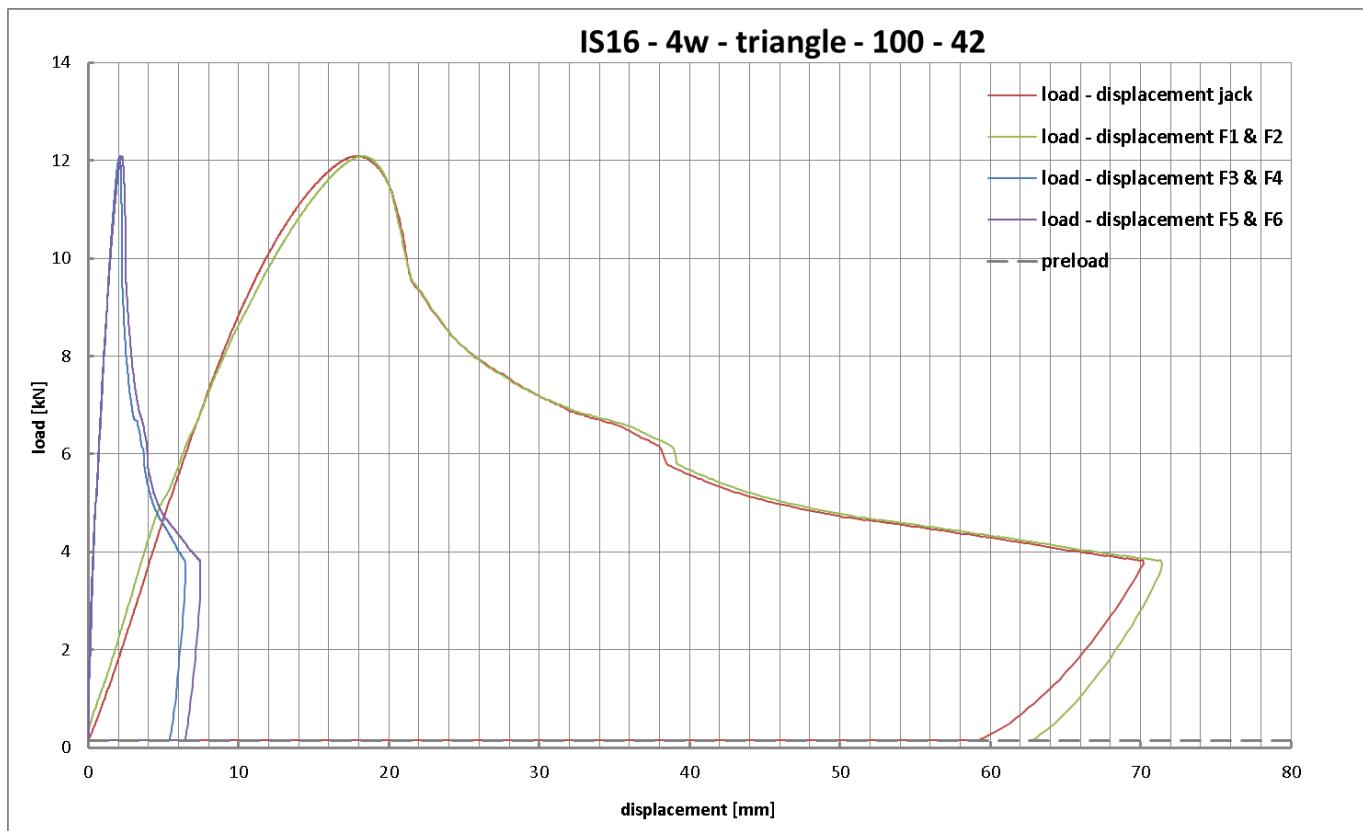
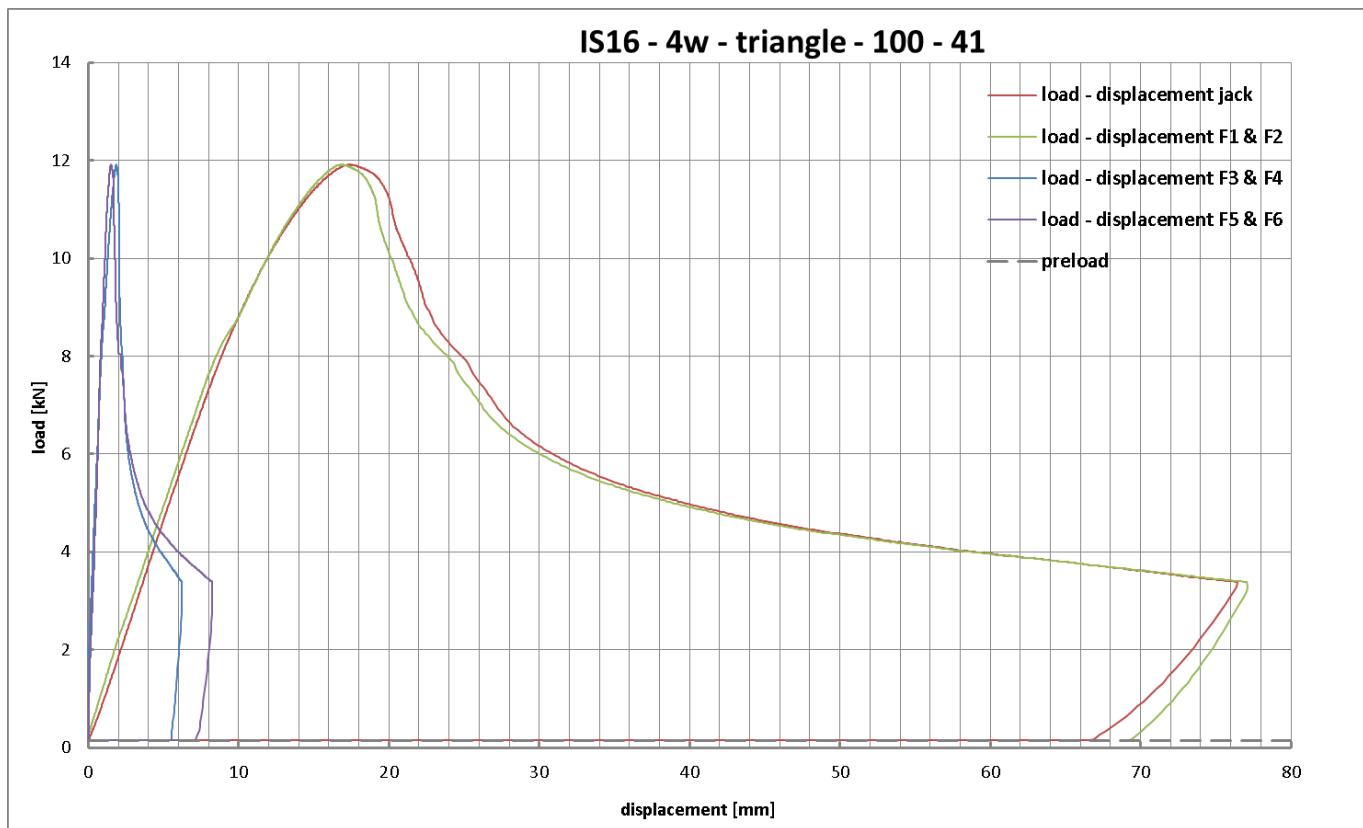


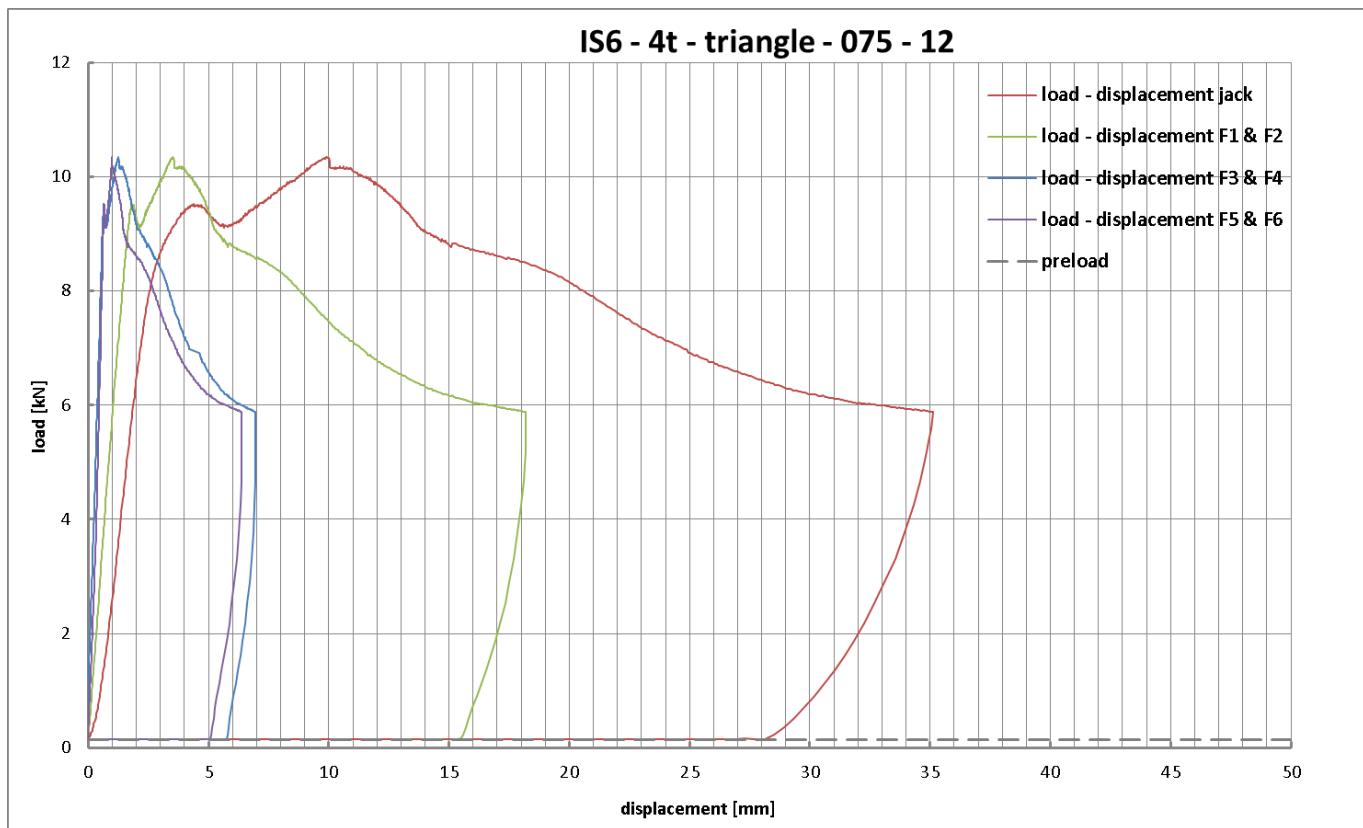
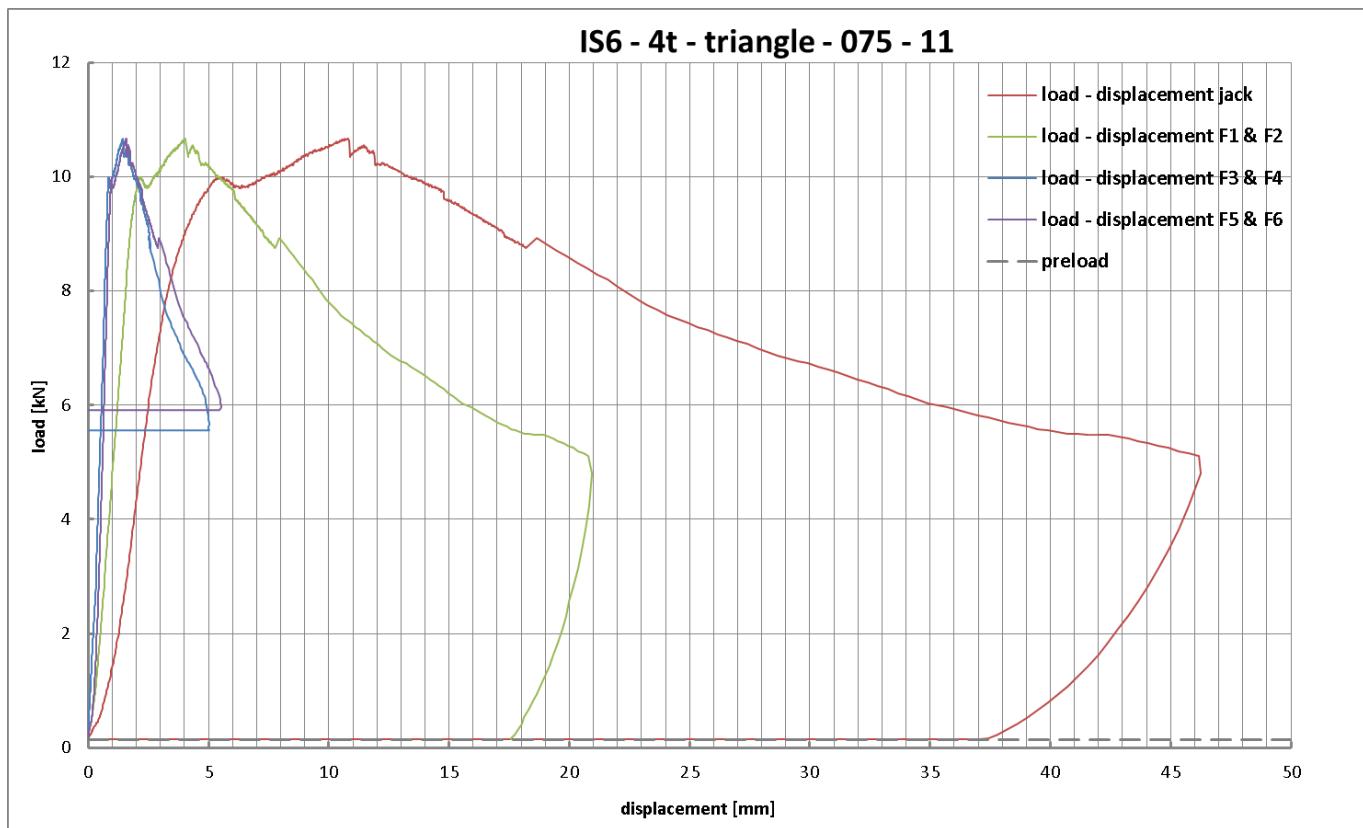


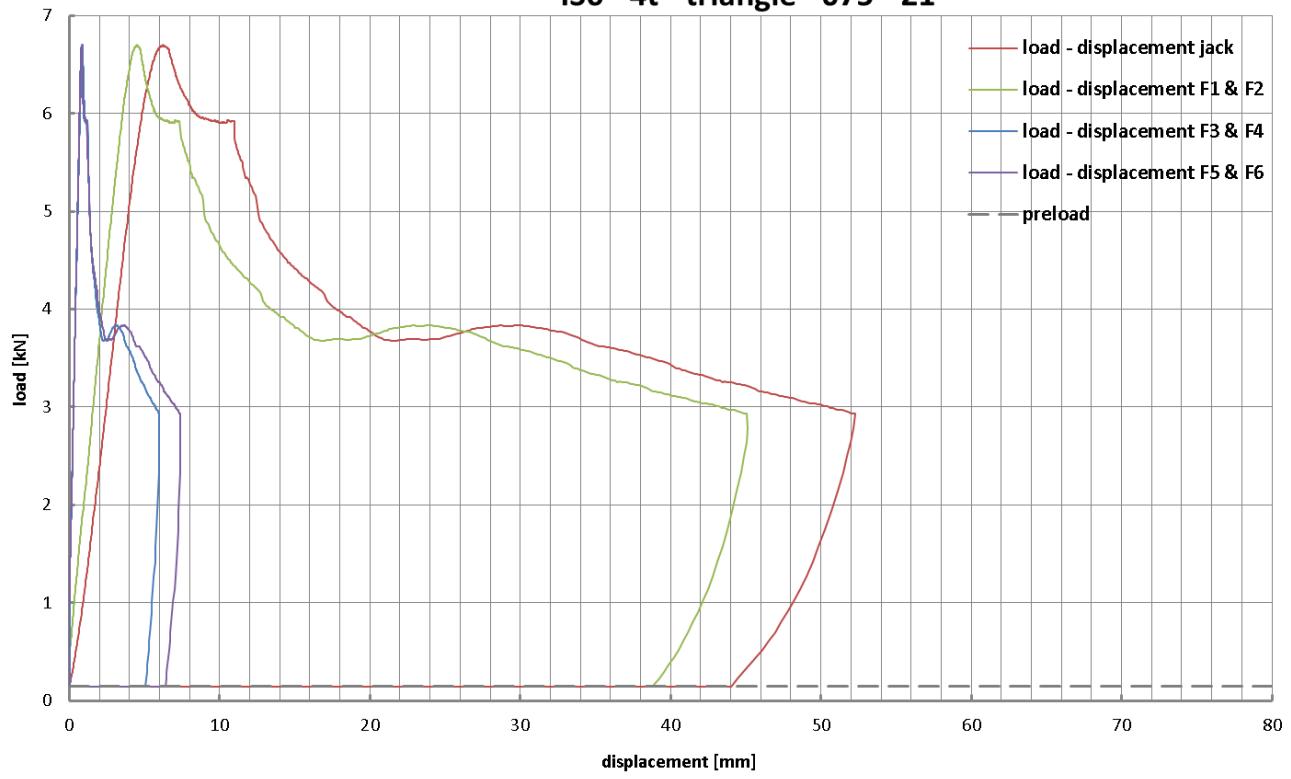
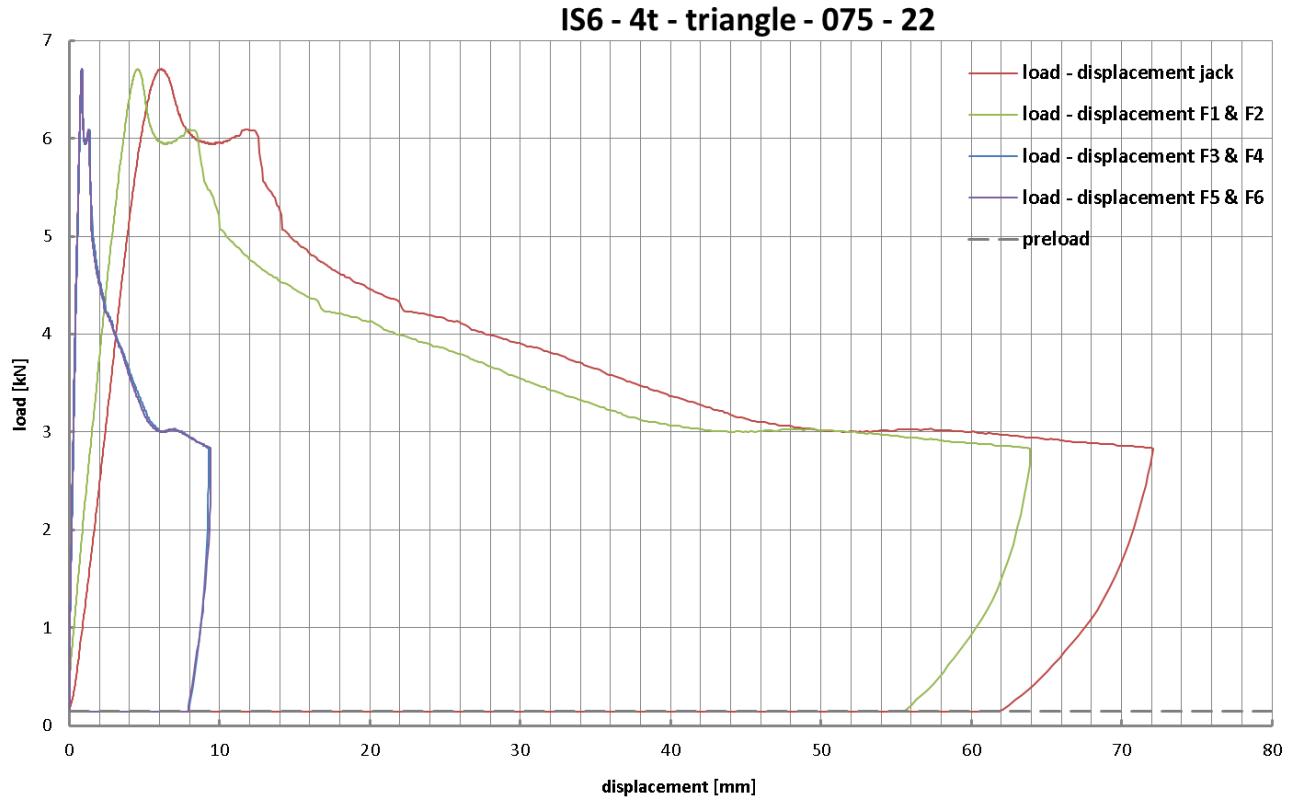




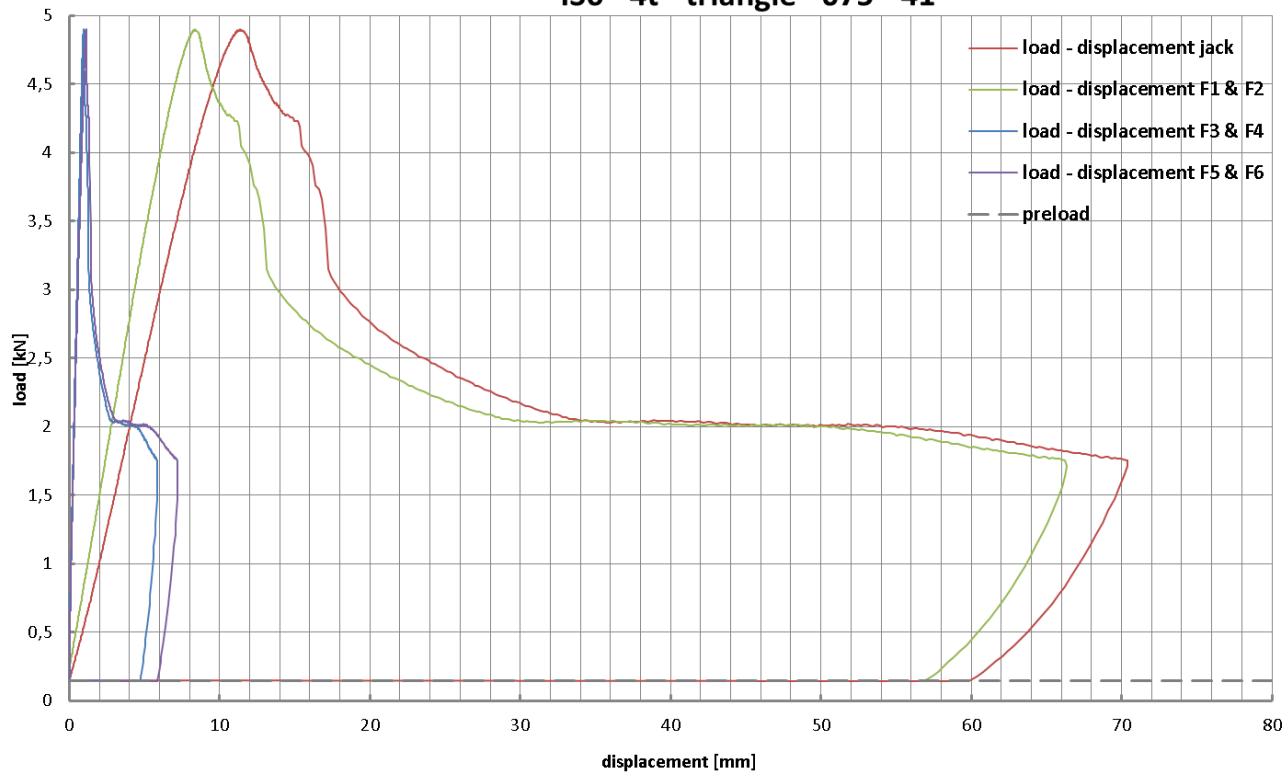




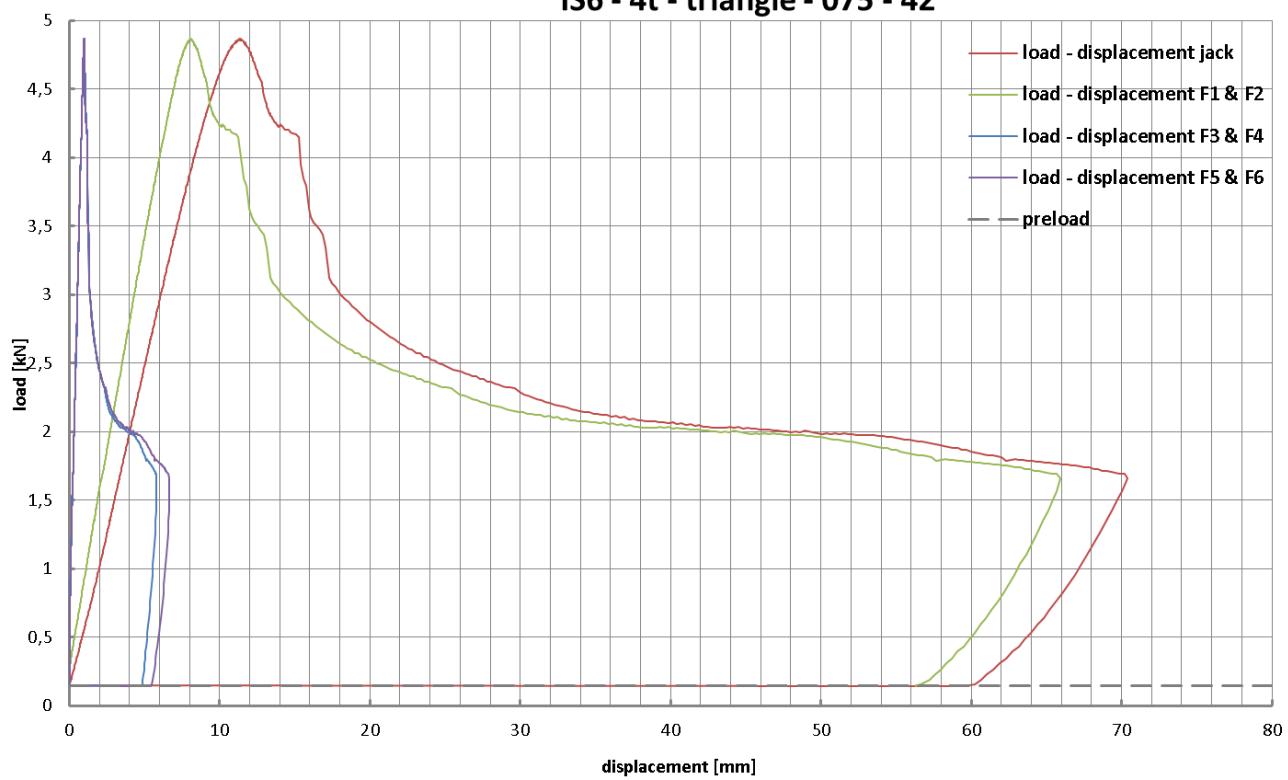


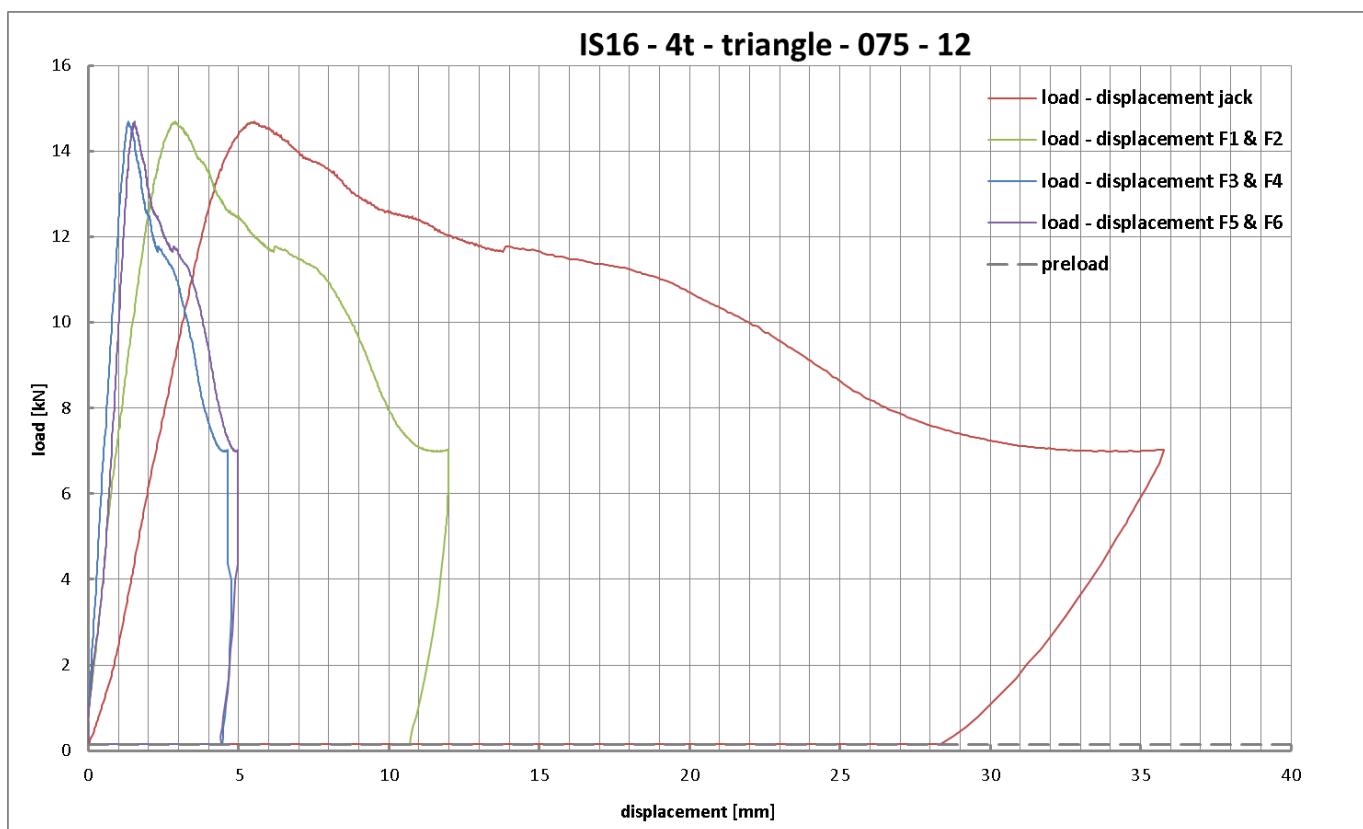
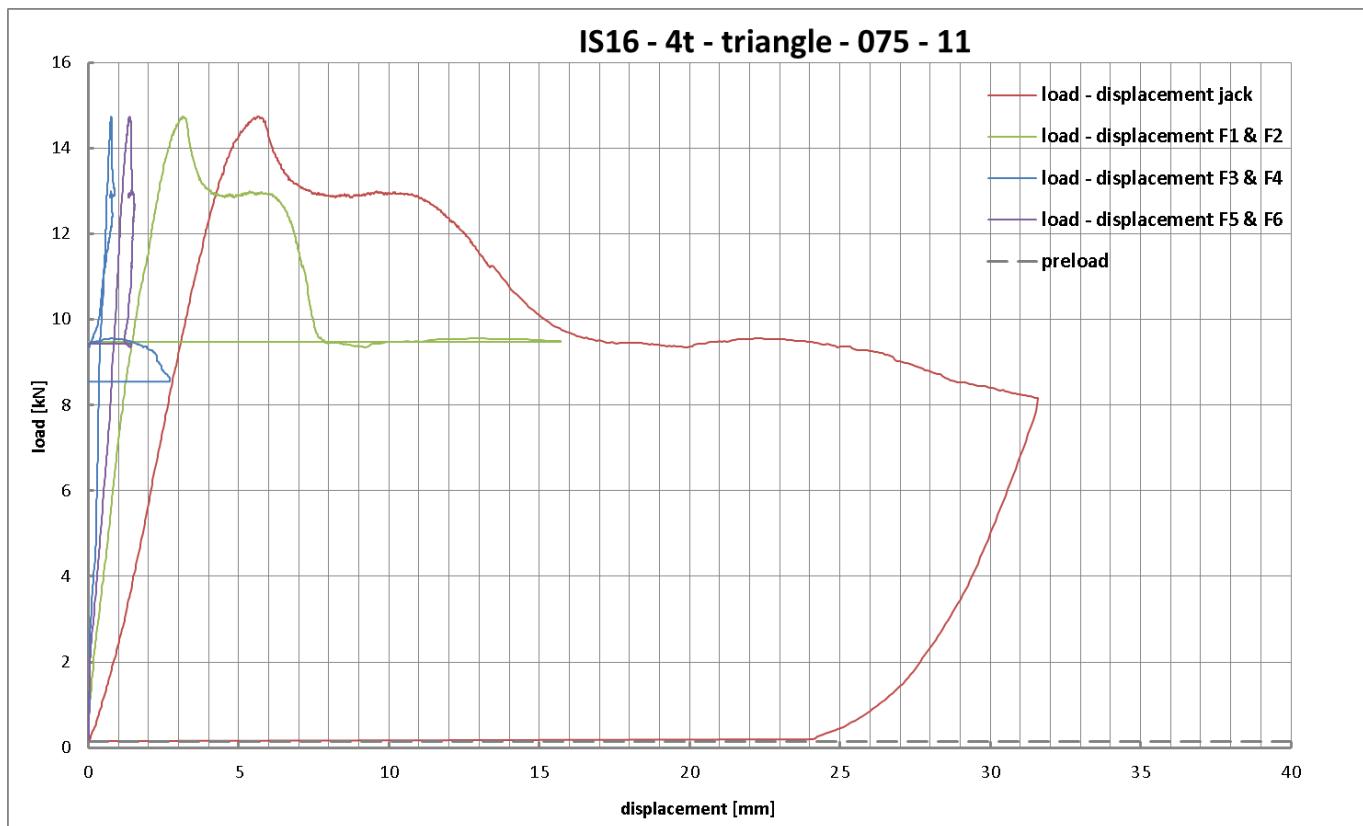
**IS6 - 4t - triangle - 075 - 21****IS6 - 4t - triangle - 075 - 22**

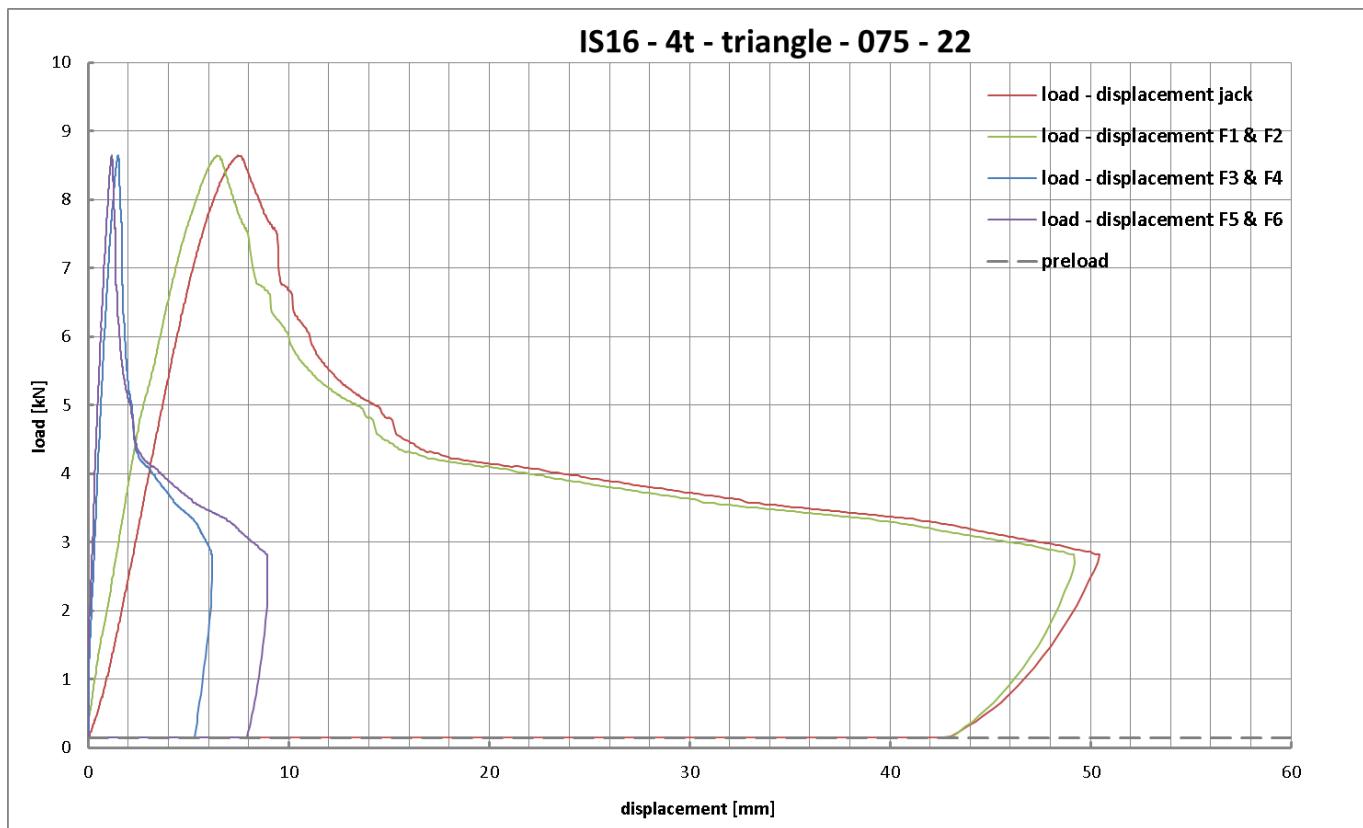
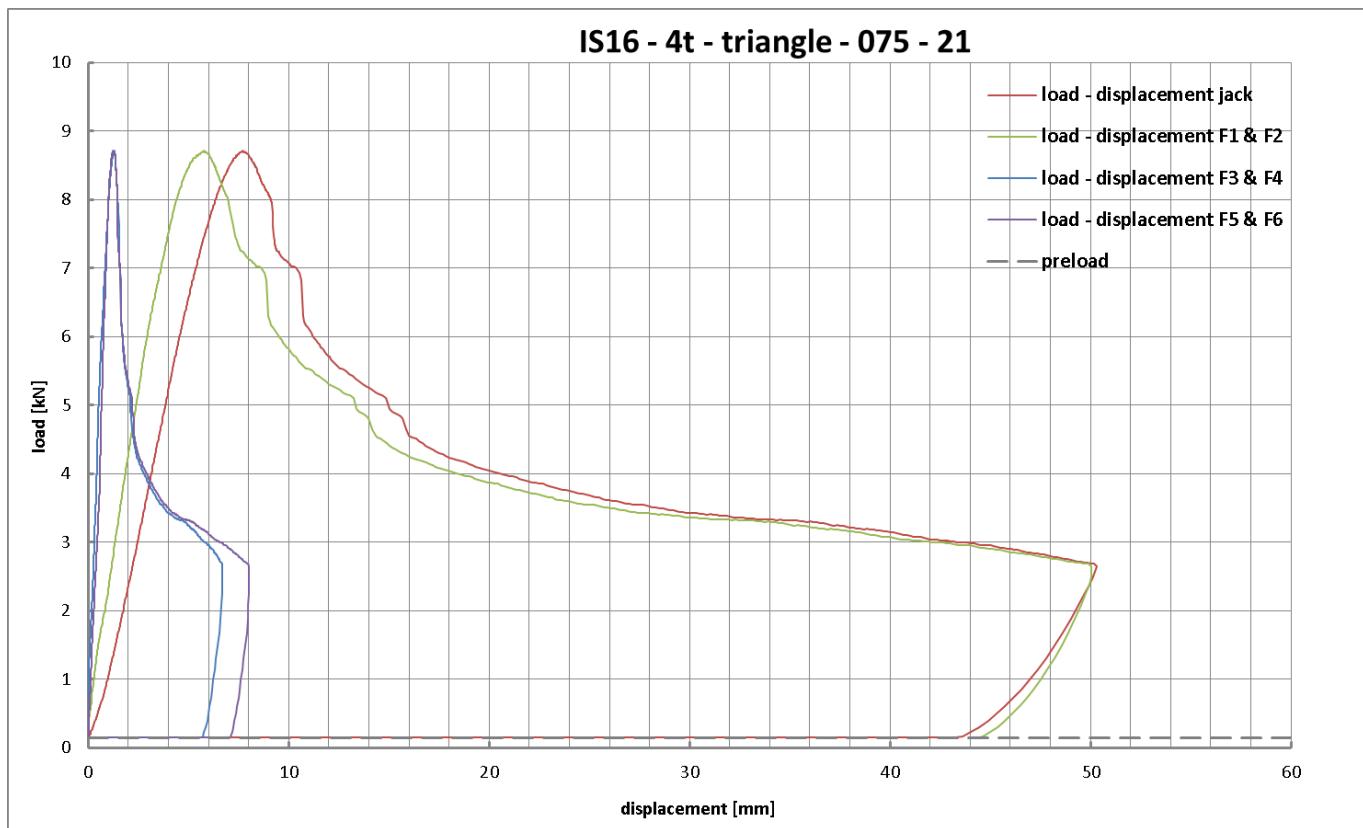
**IS6 - 4t - triangle - 075 - 41**

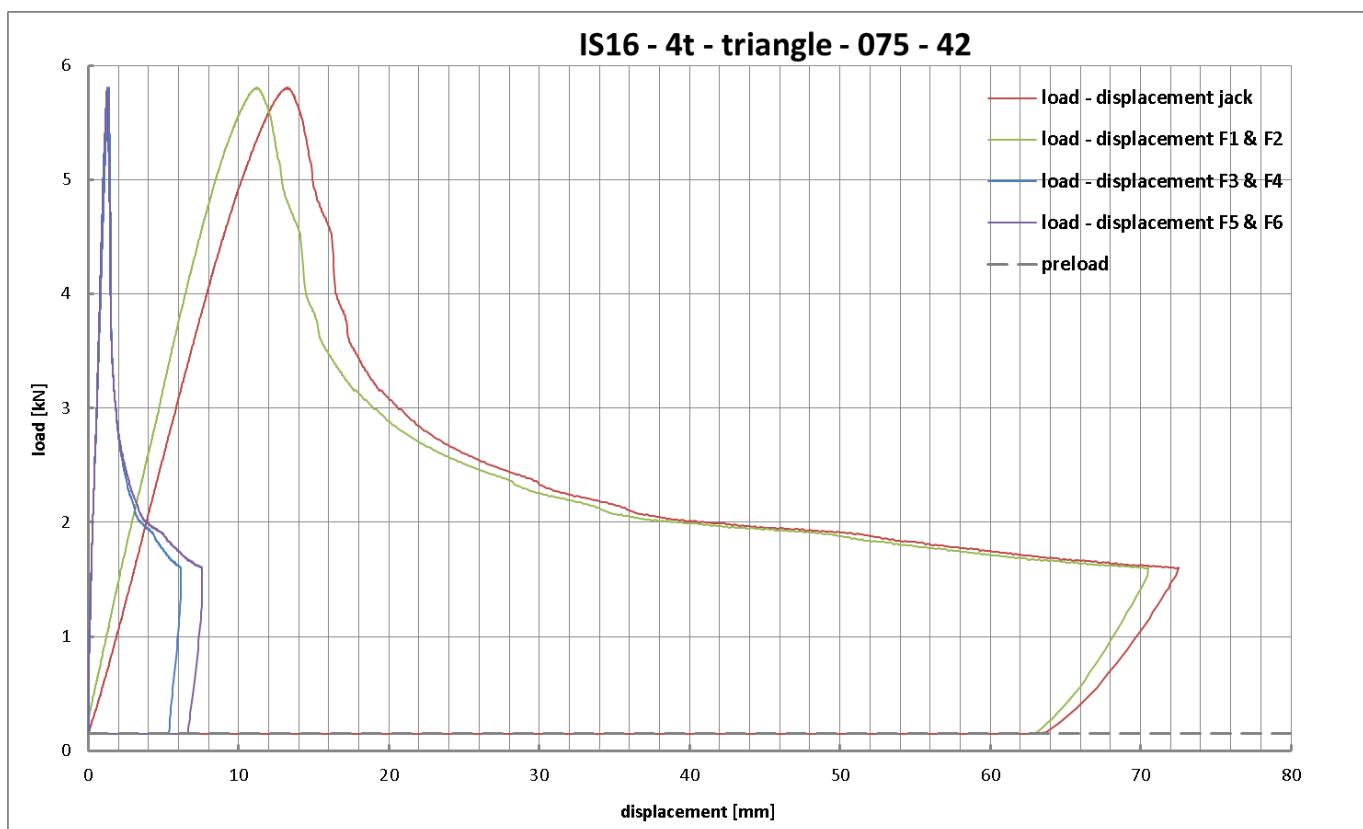
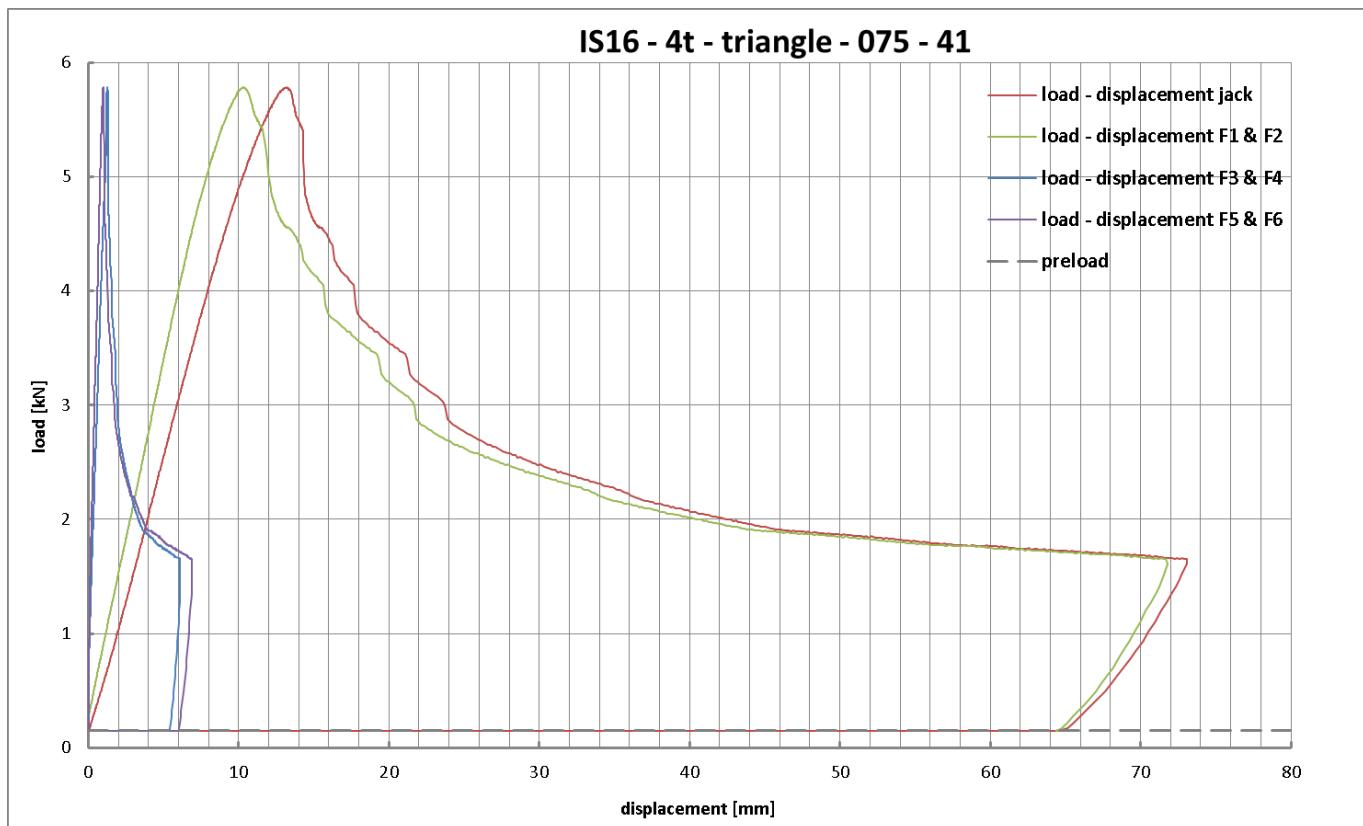


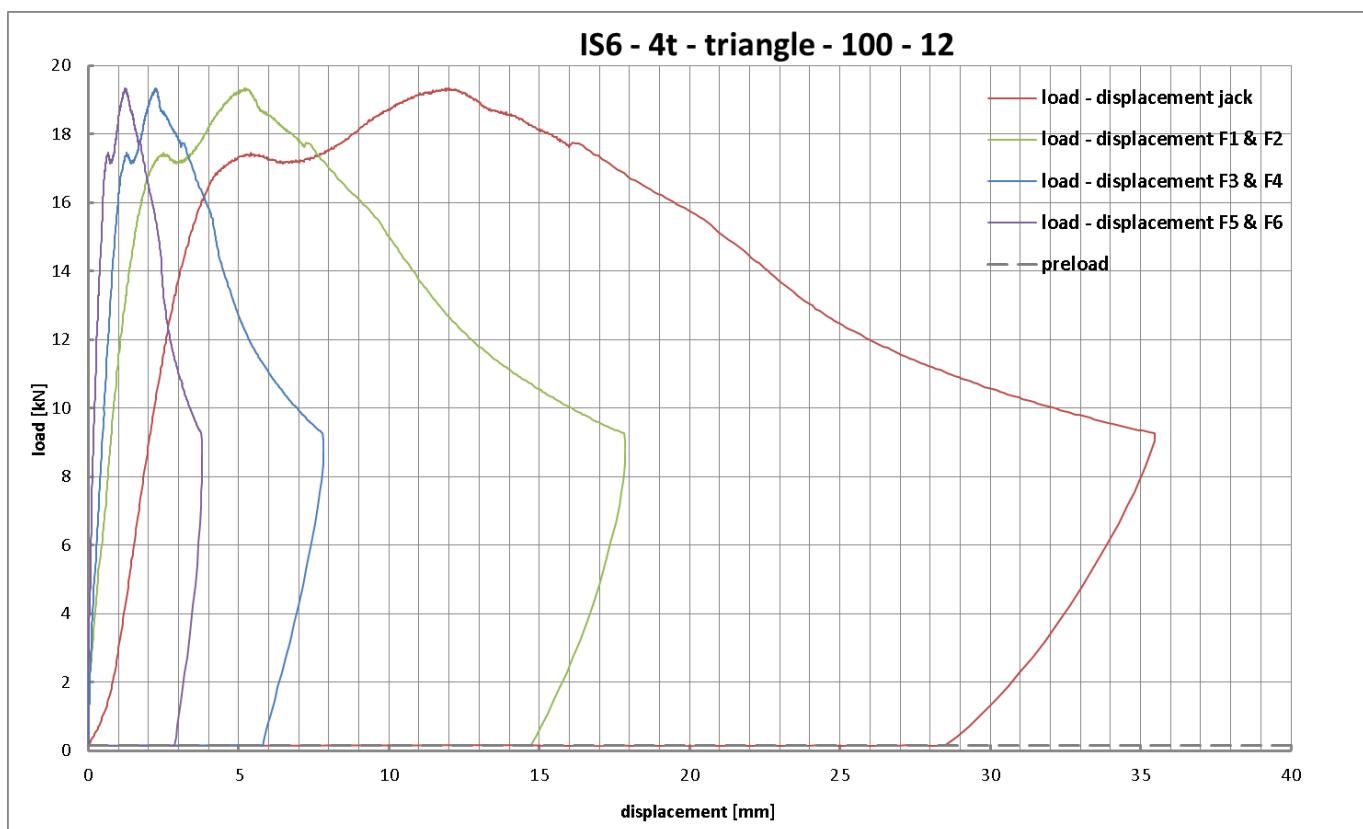
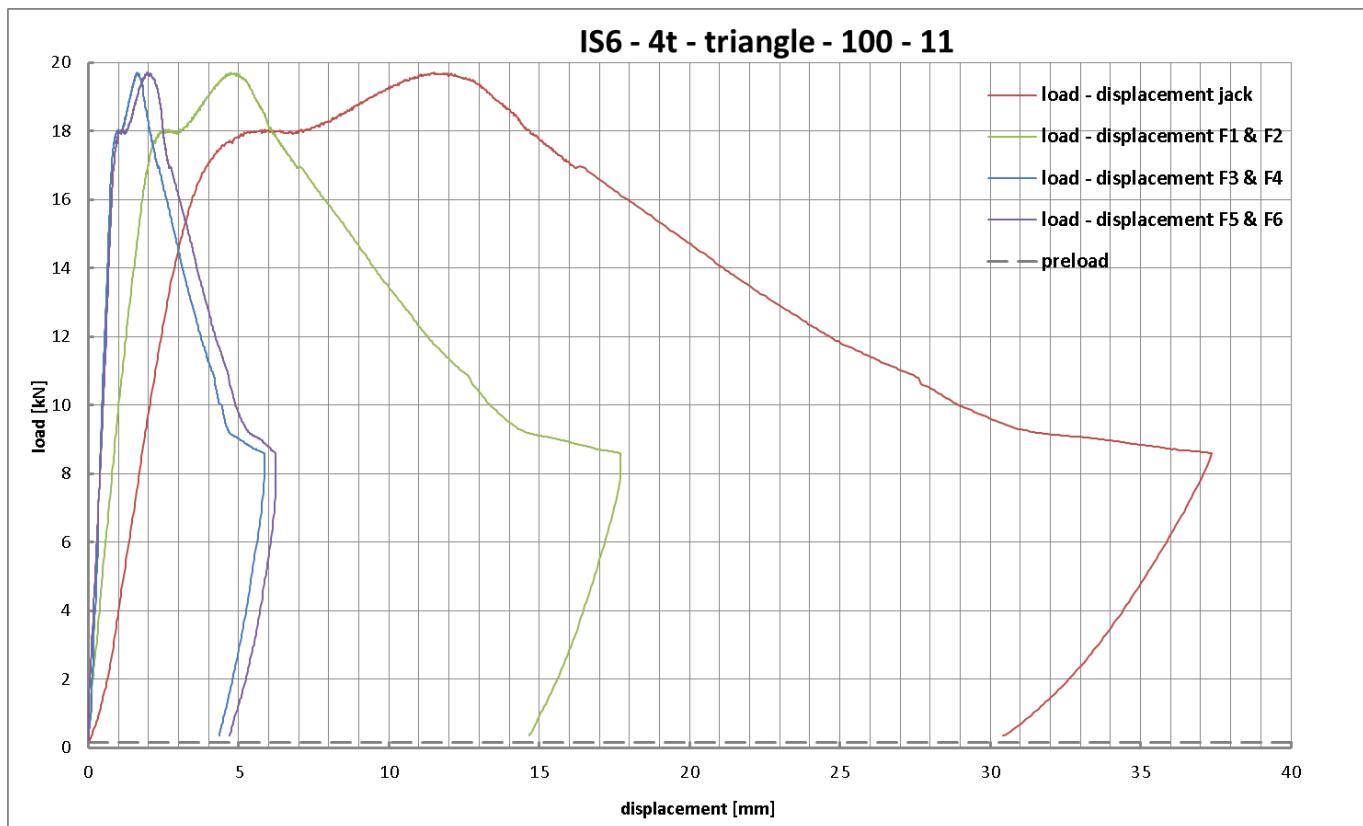
**IS6 - 4t - triangle - 075 - 42**

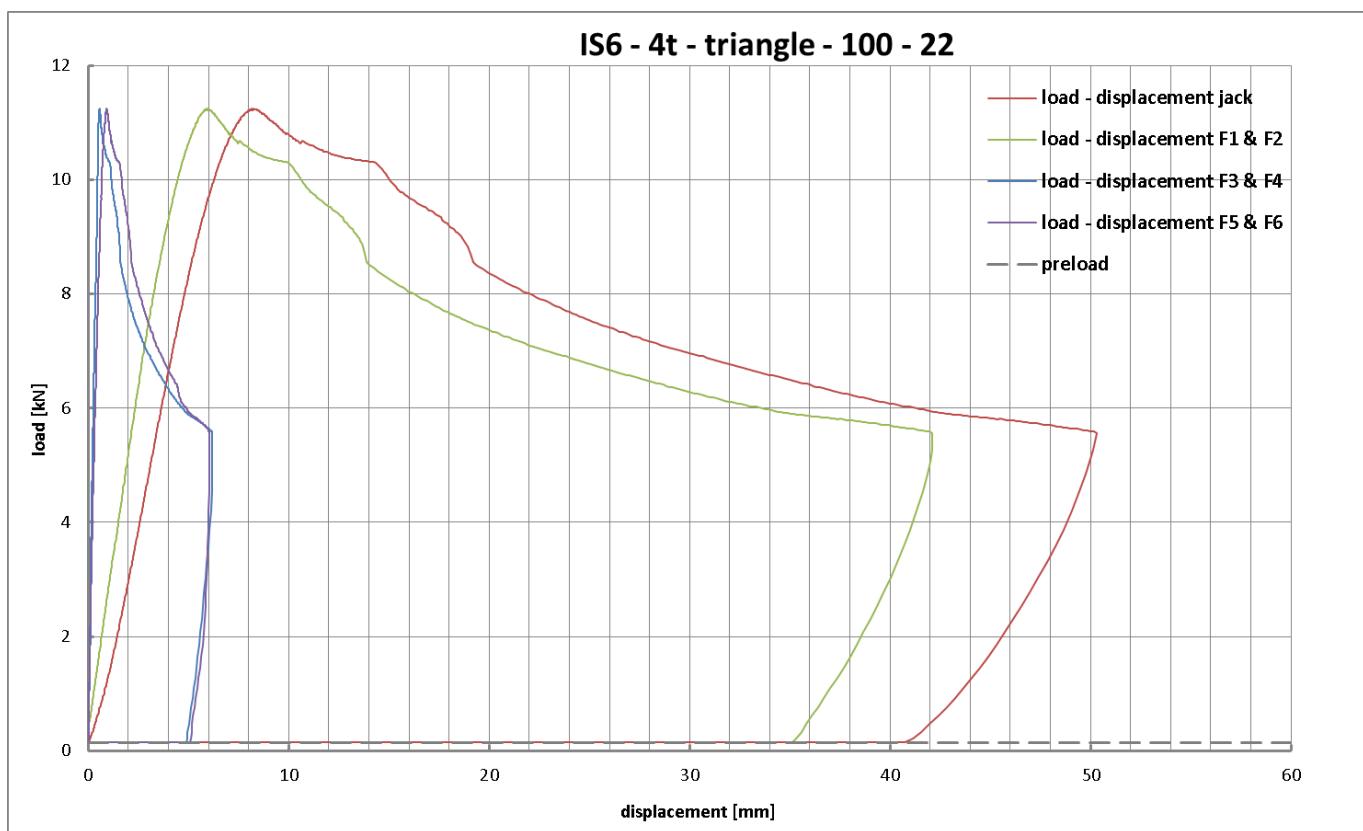
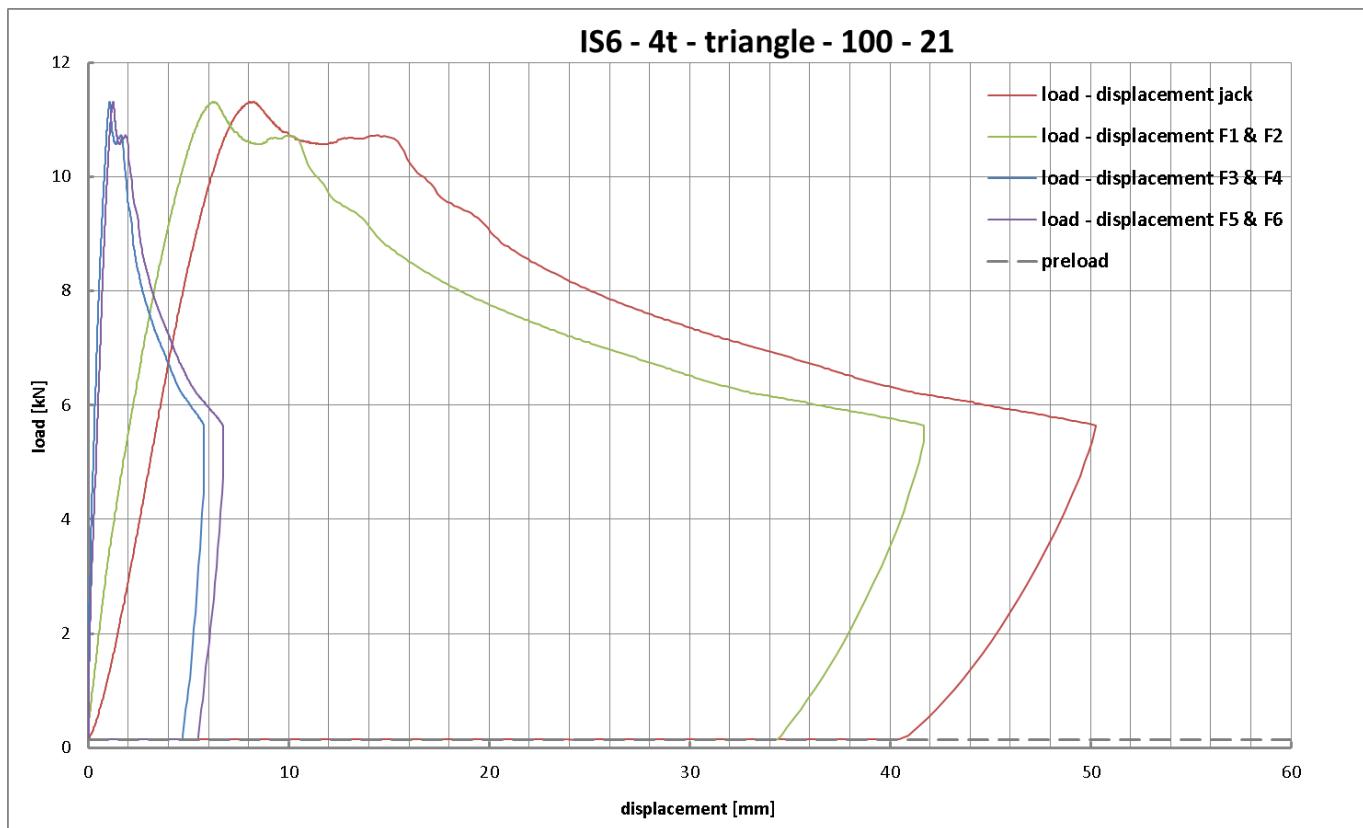




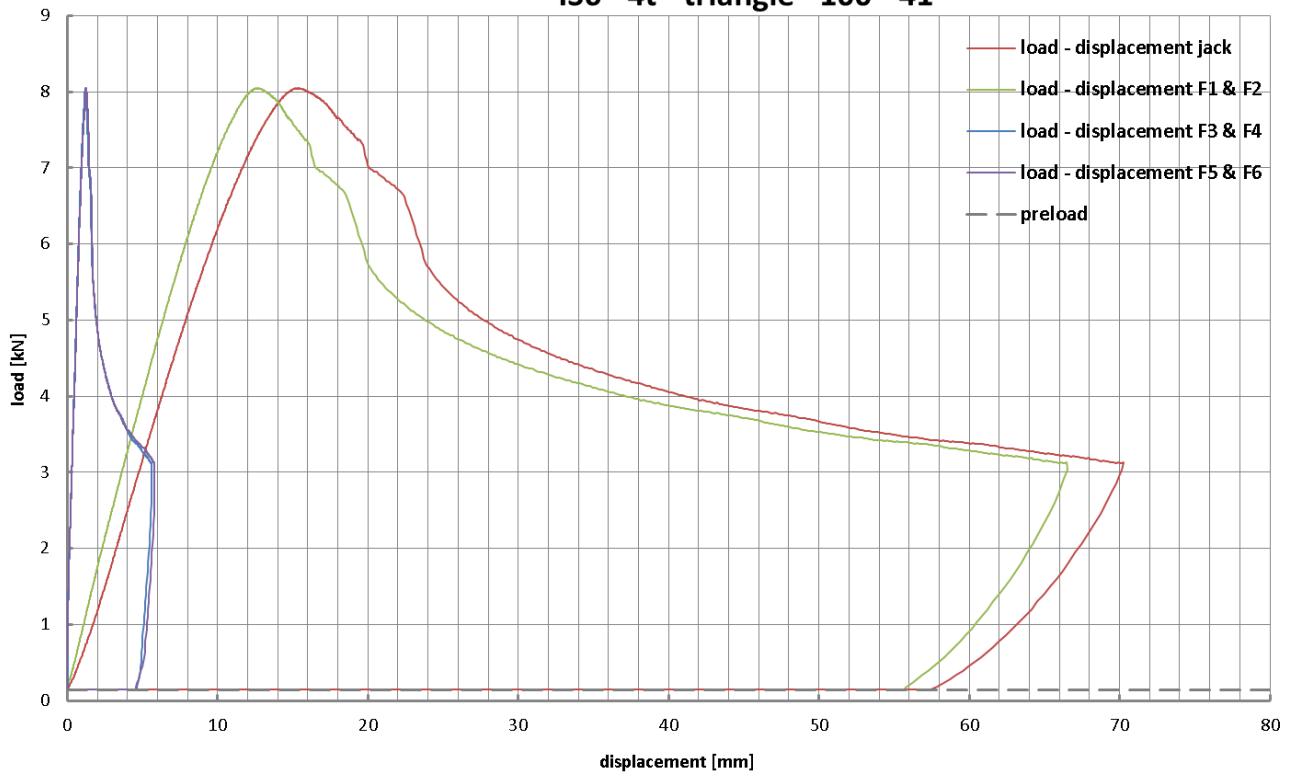




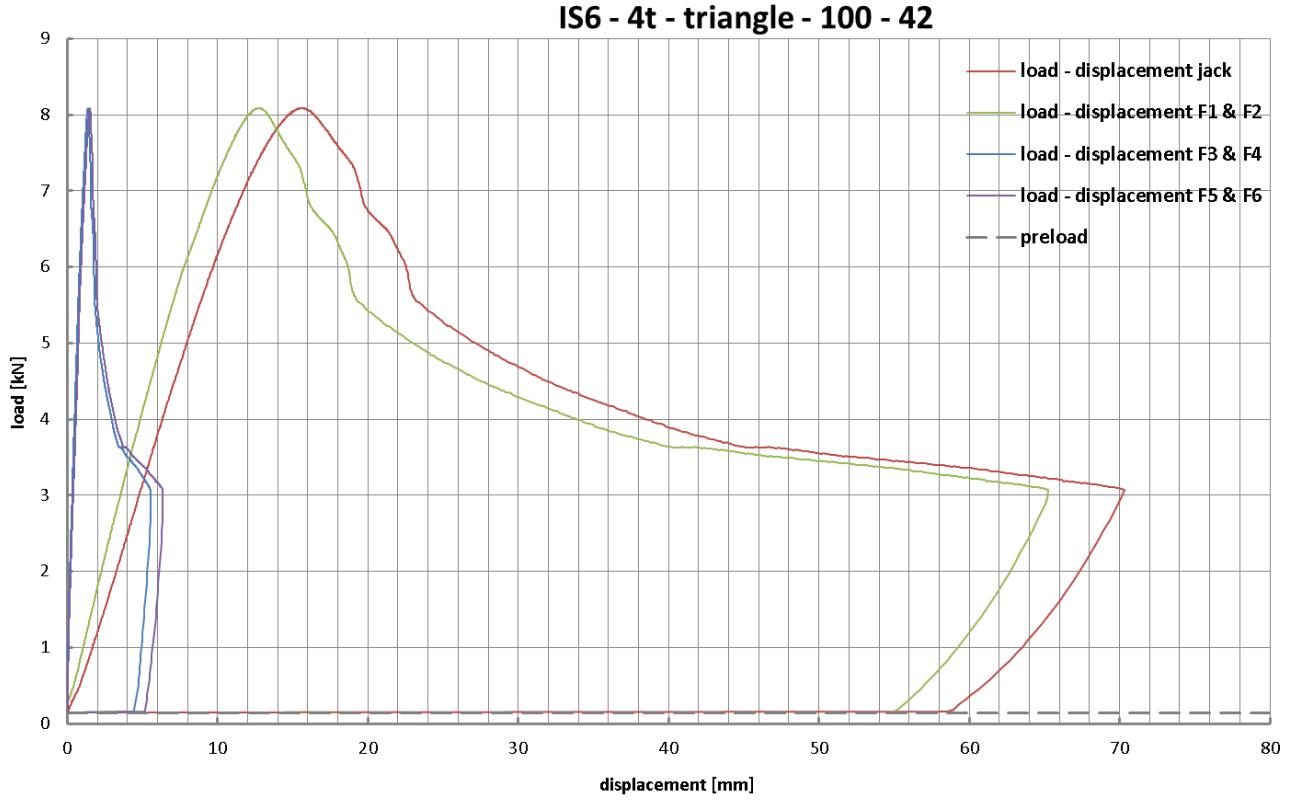


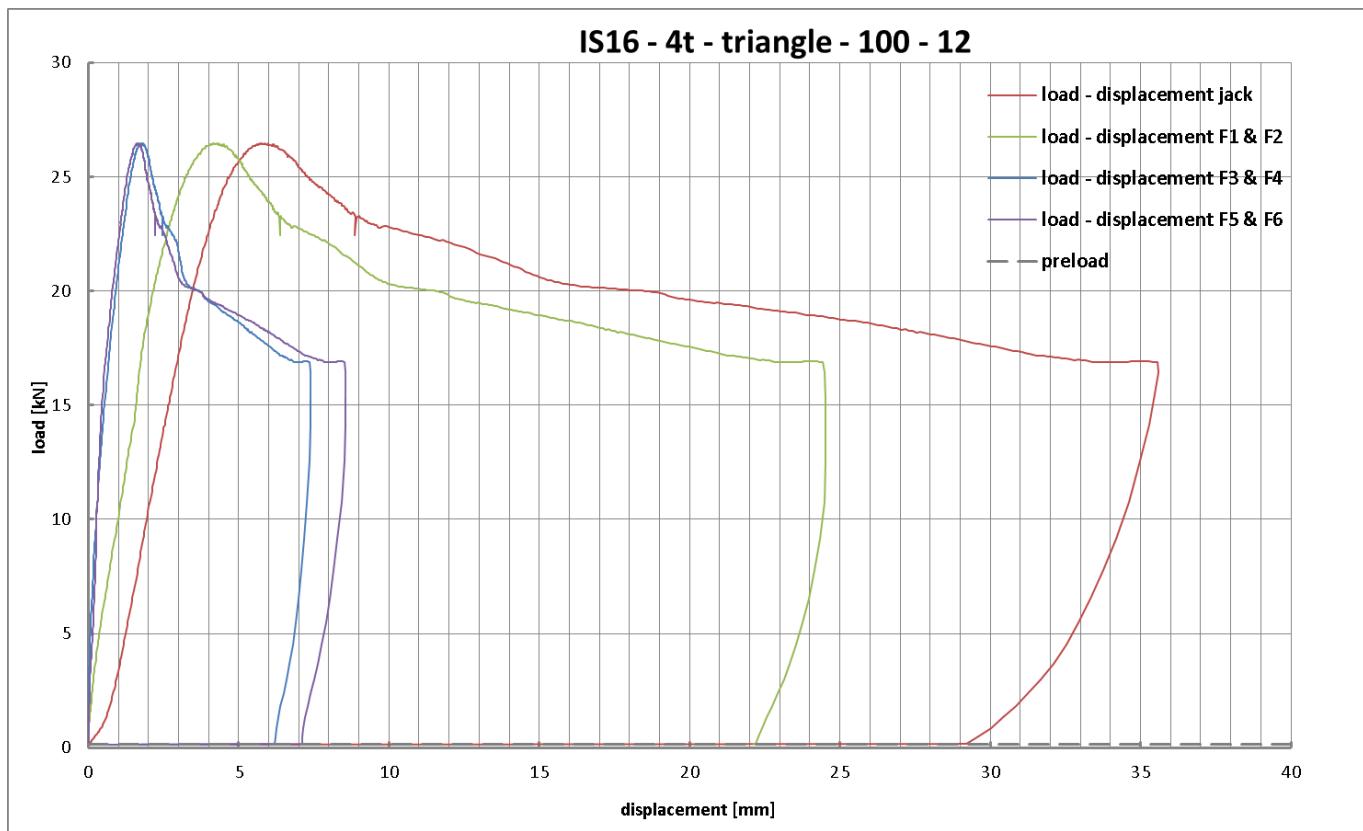
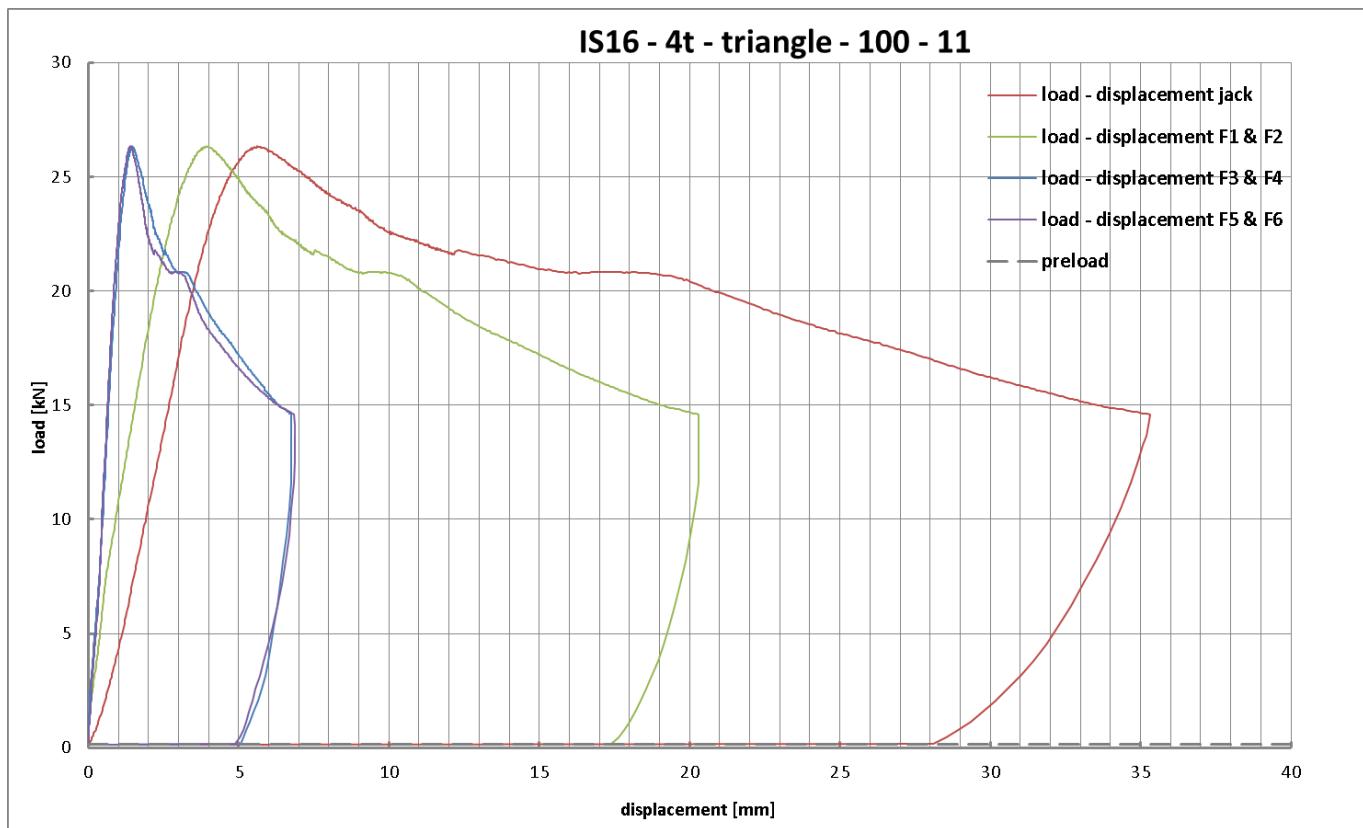


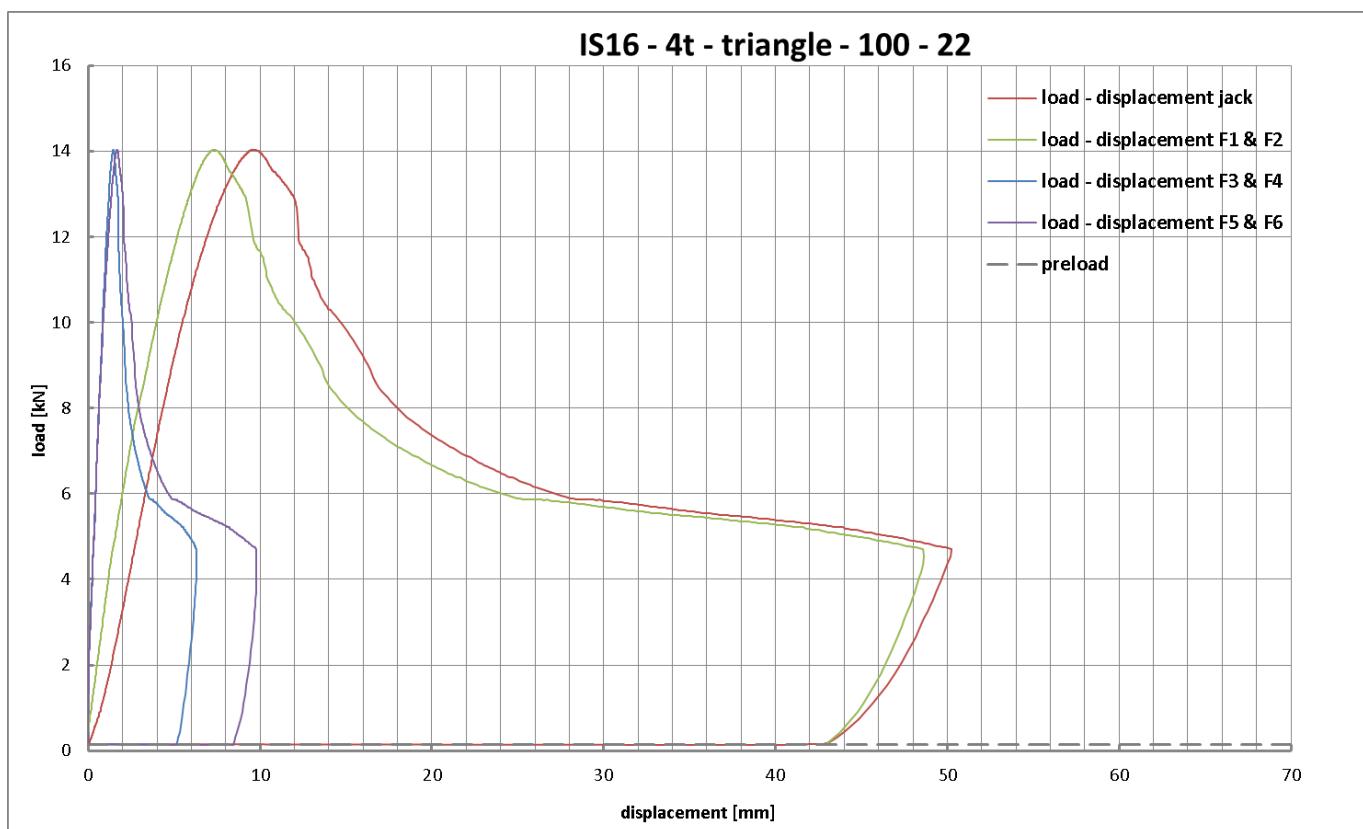
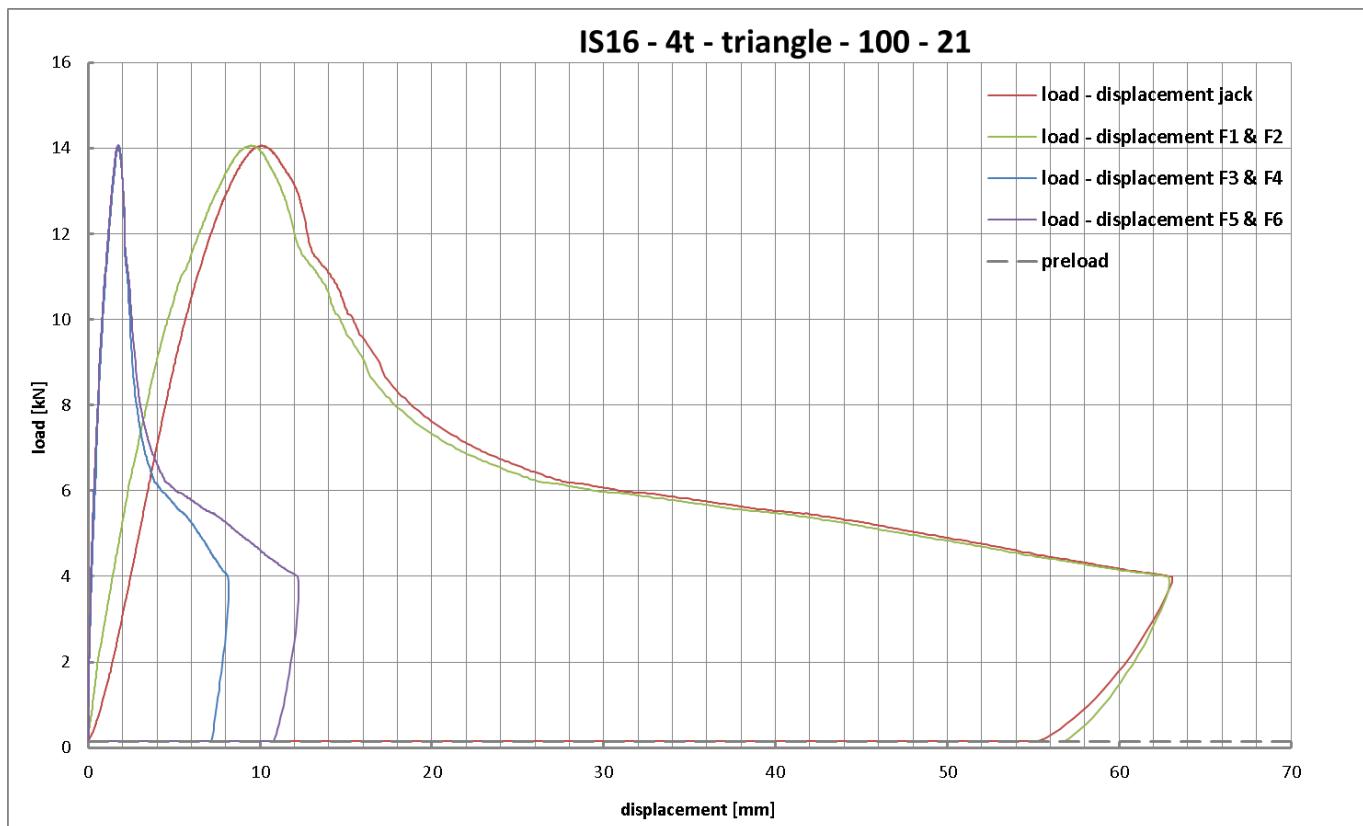
**IS6 - 4t - triangle - 100 - 41**

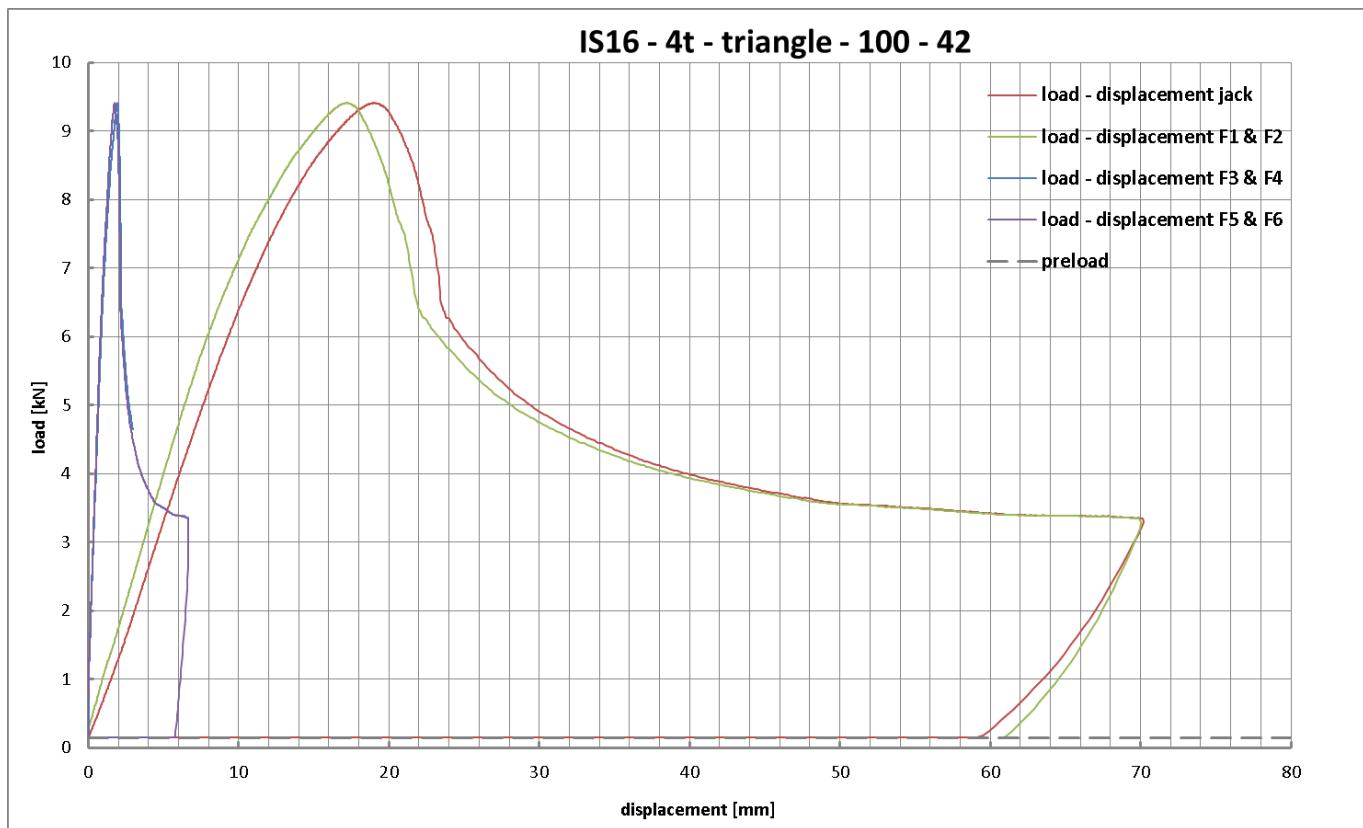
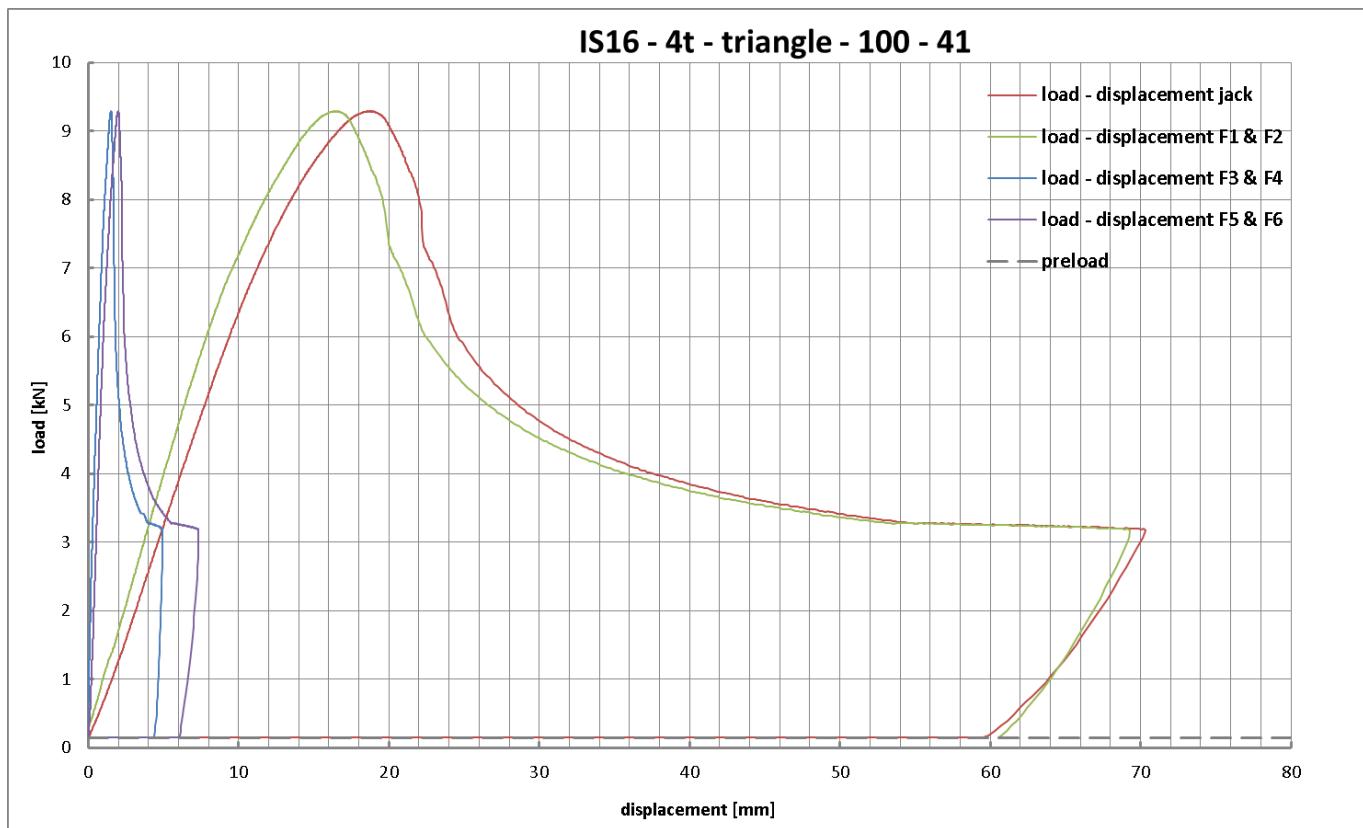


**IS6 - 4t - triangle - 100 - 42**

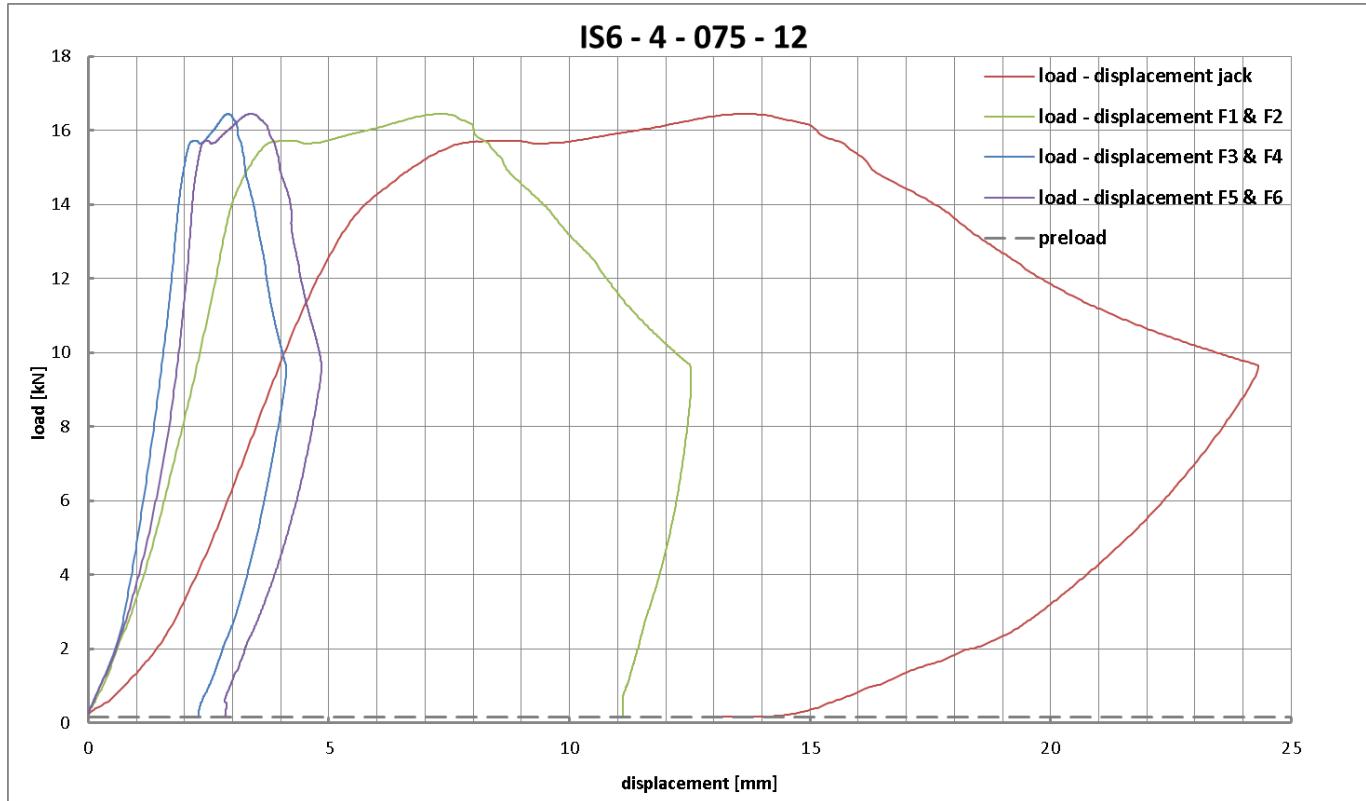
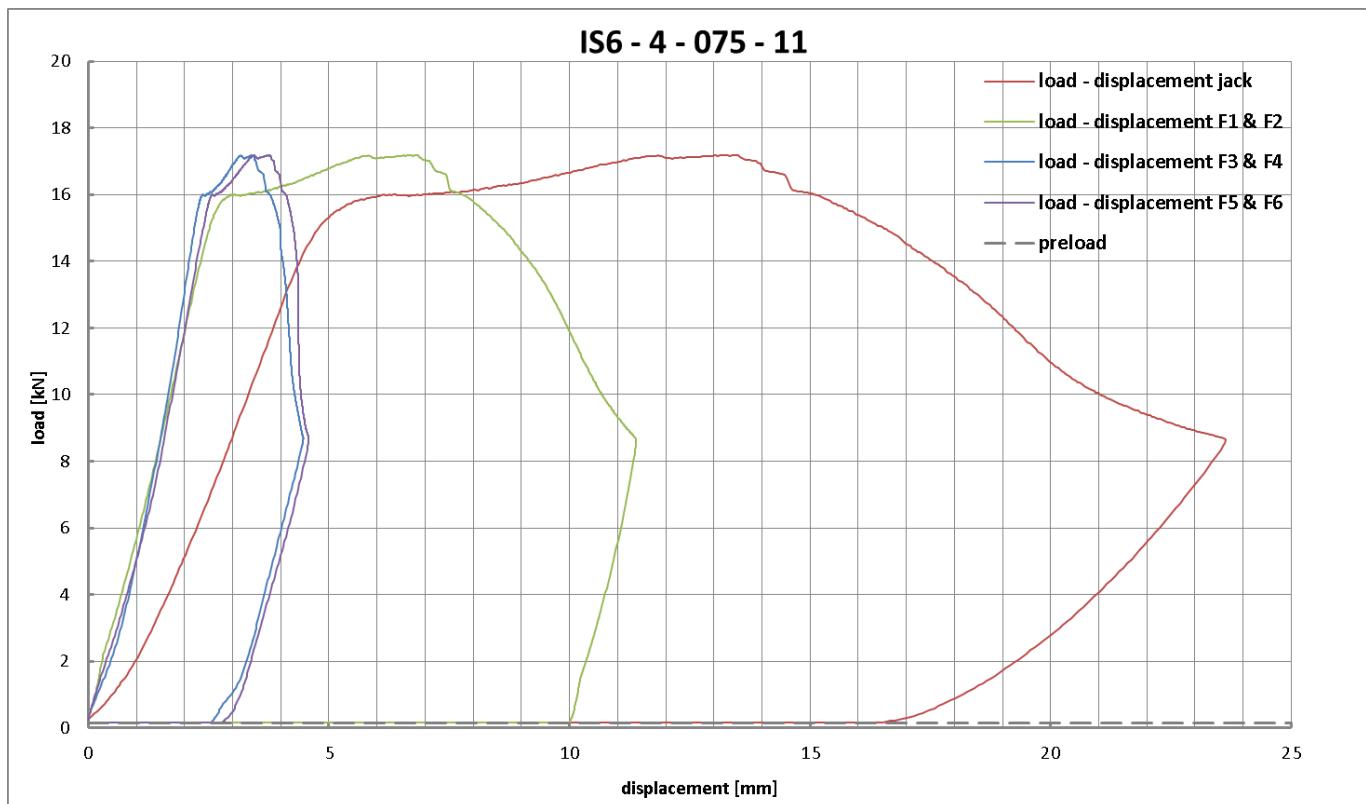


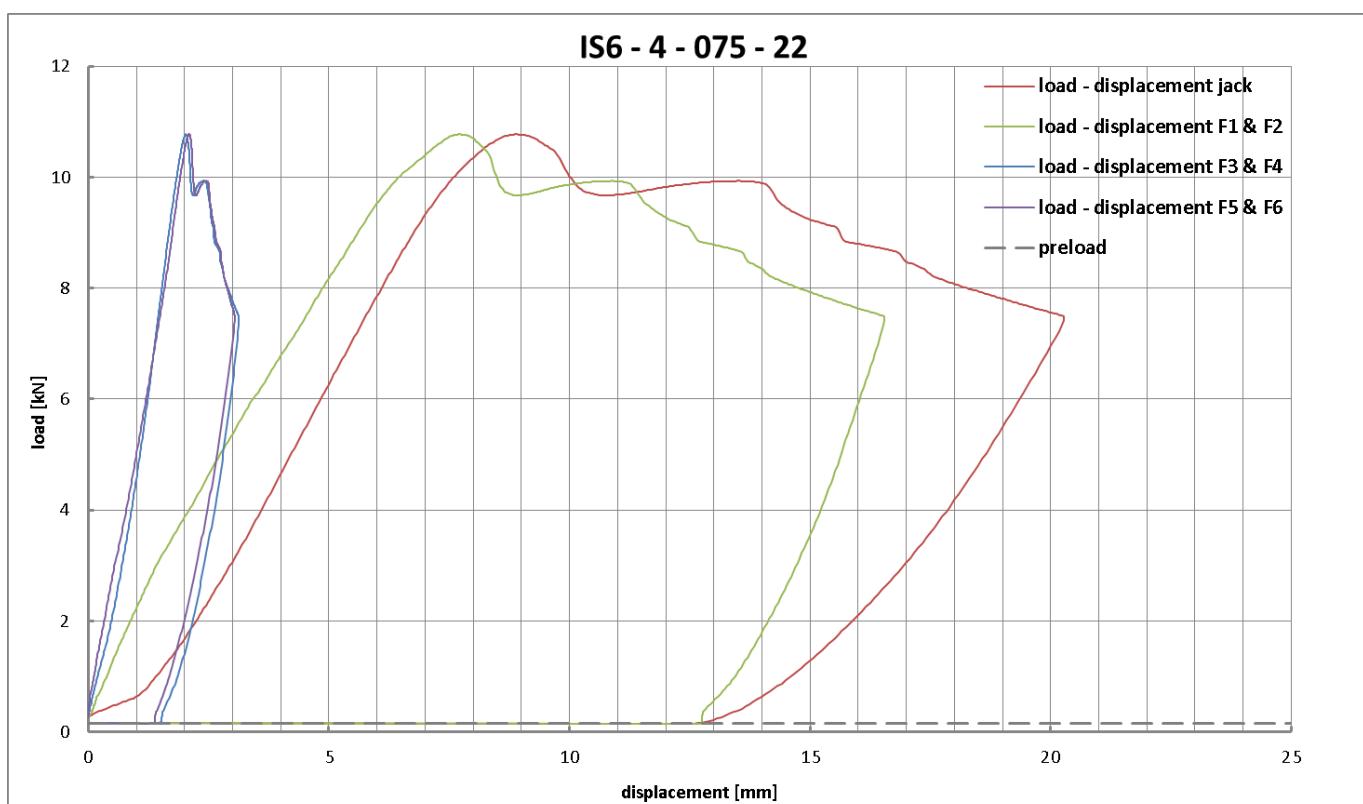
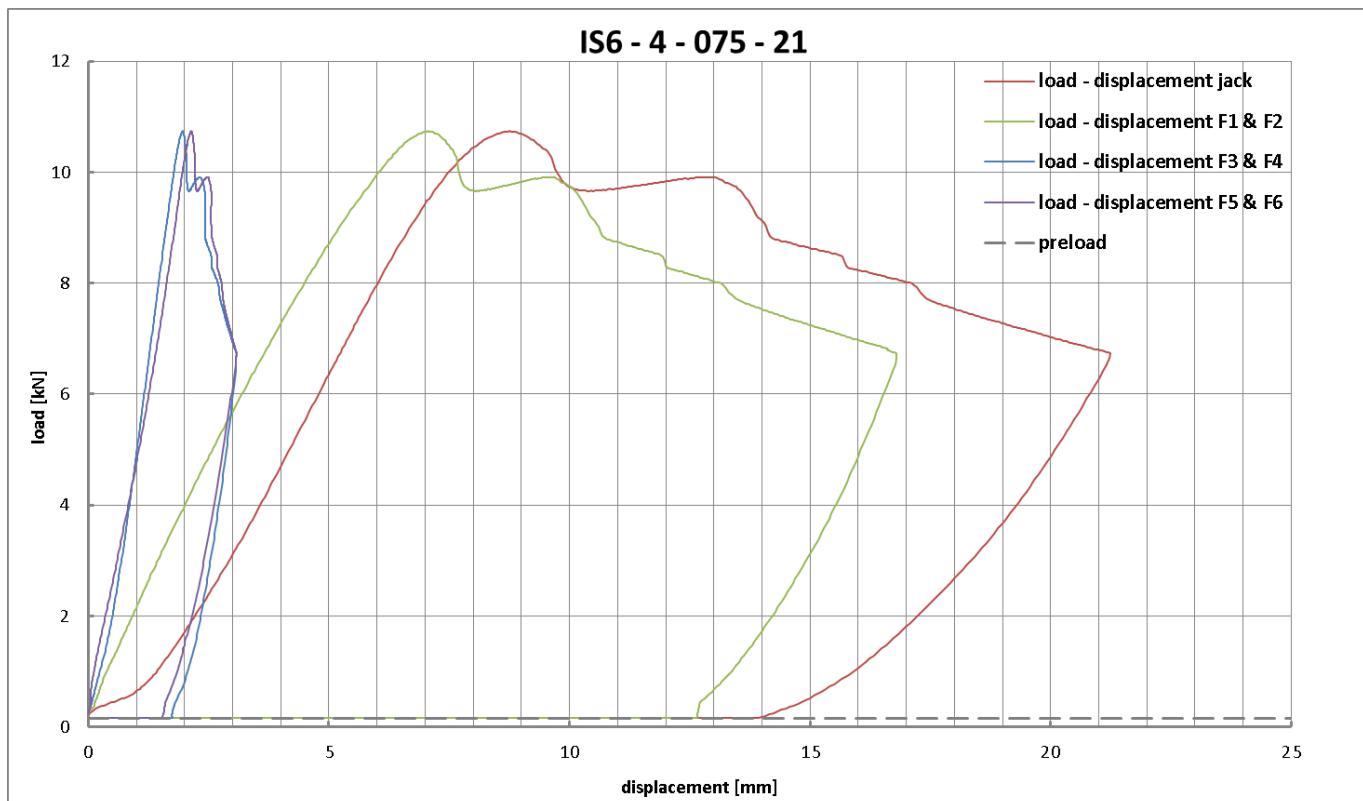


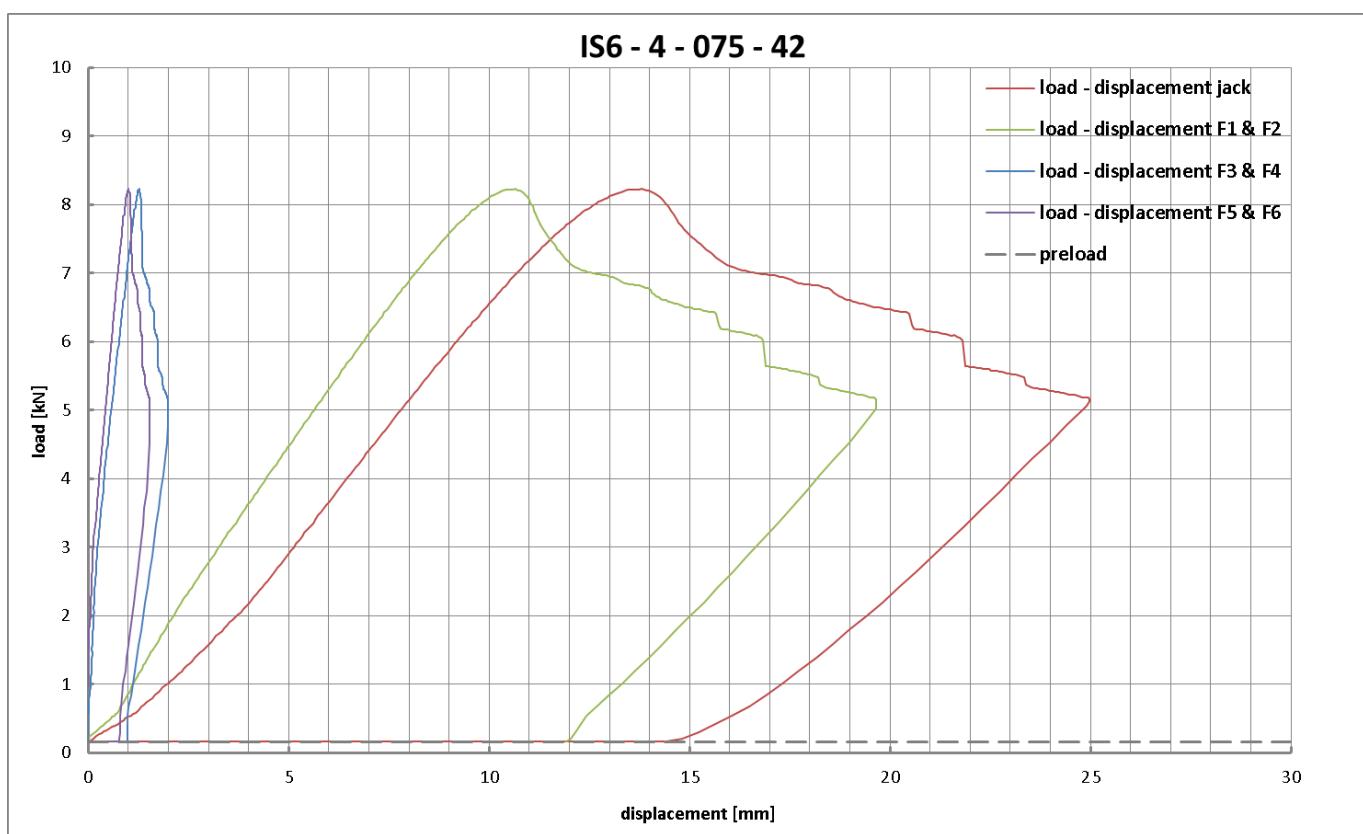
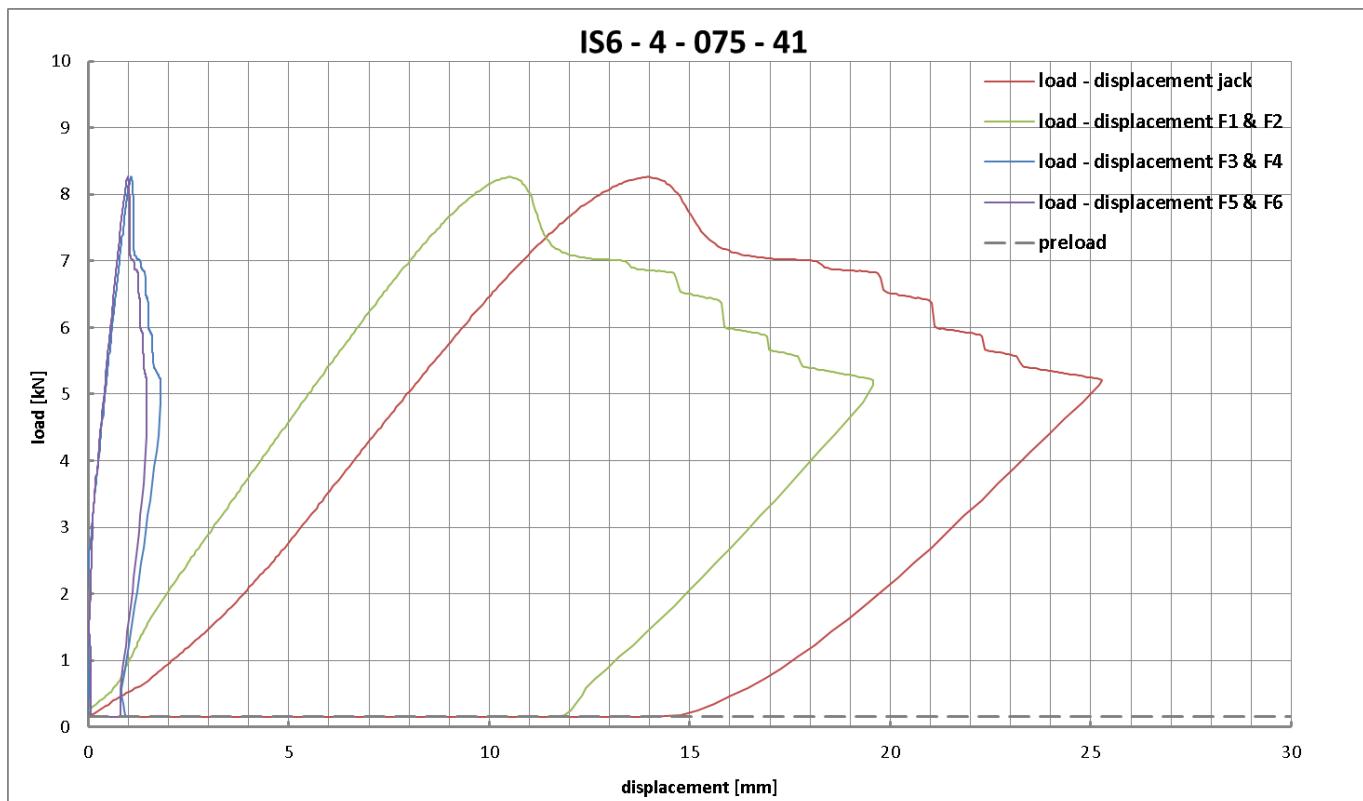


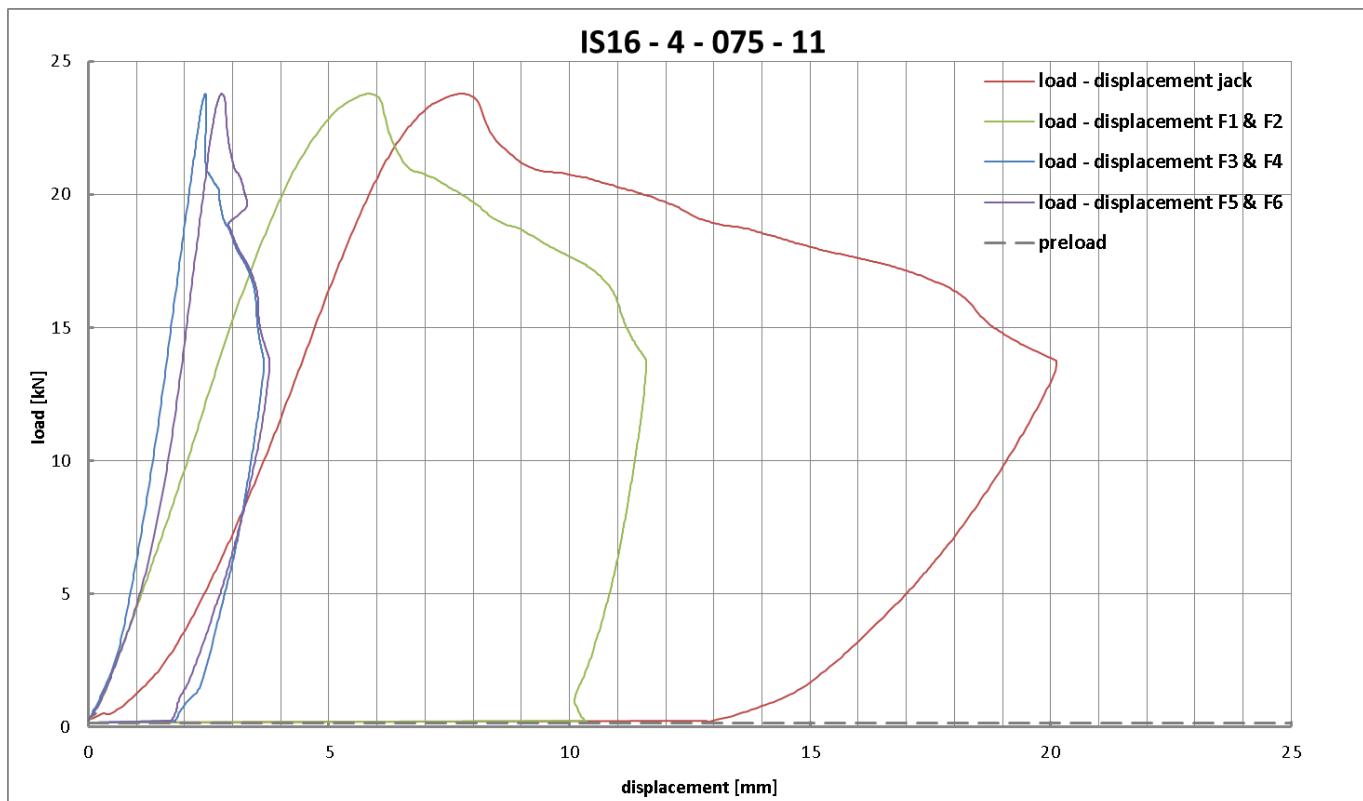


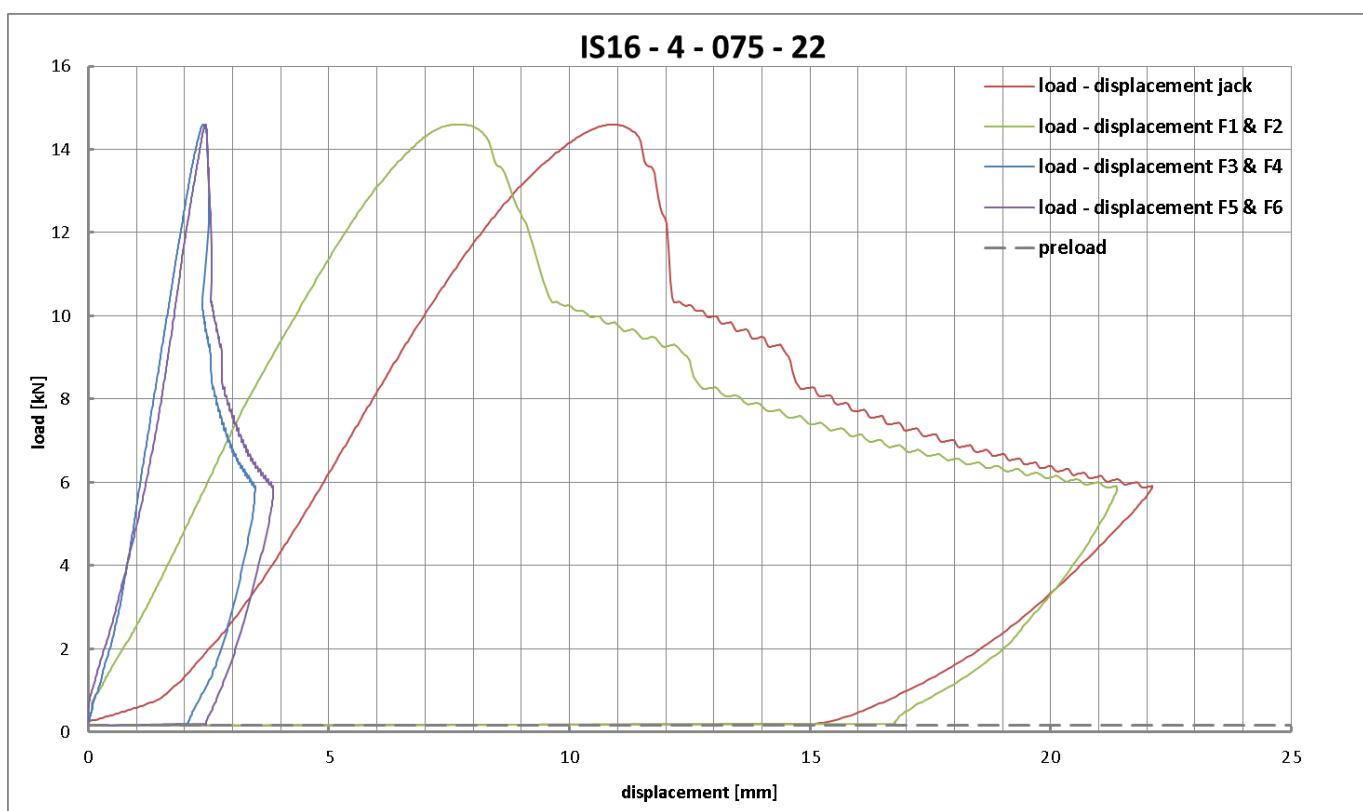
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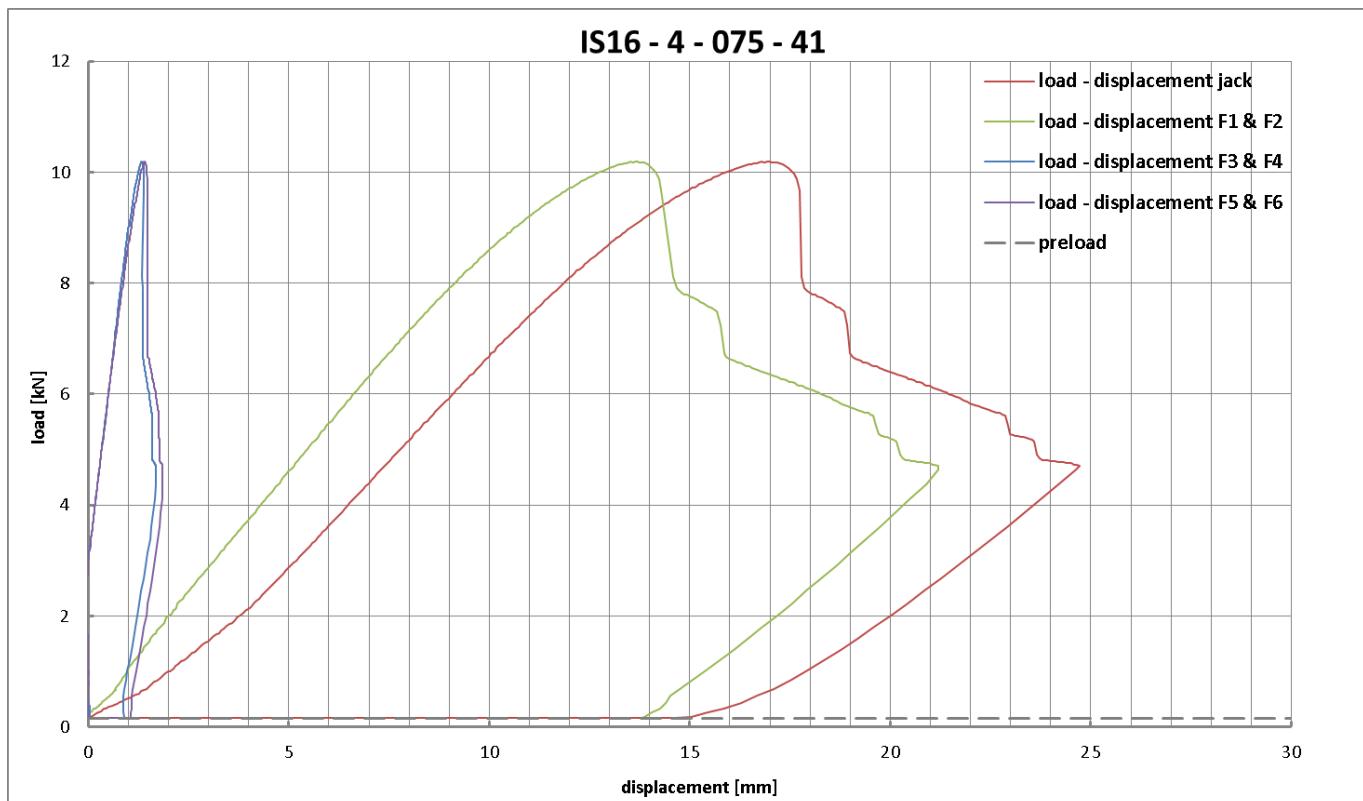


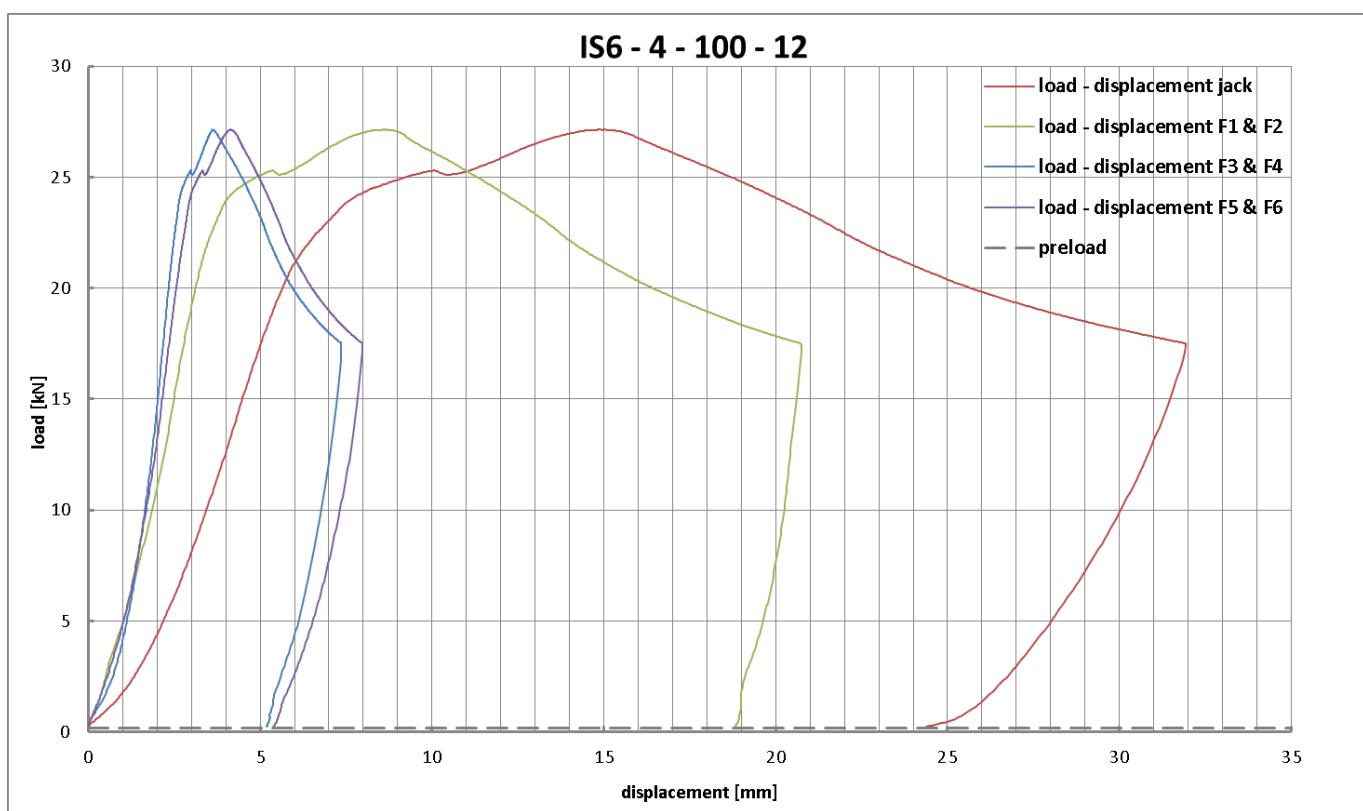
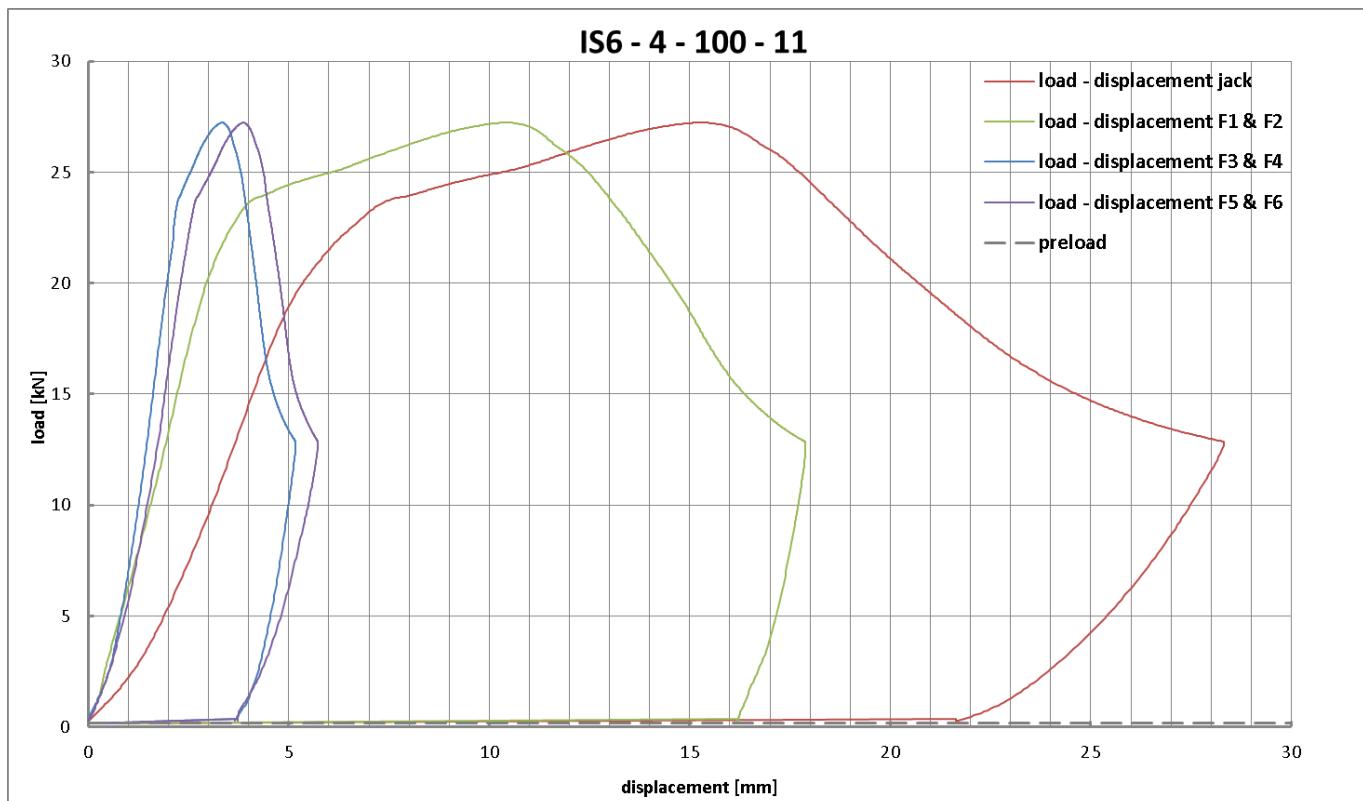


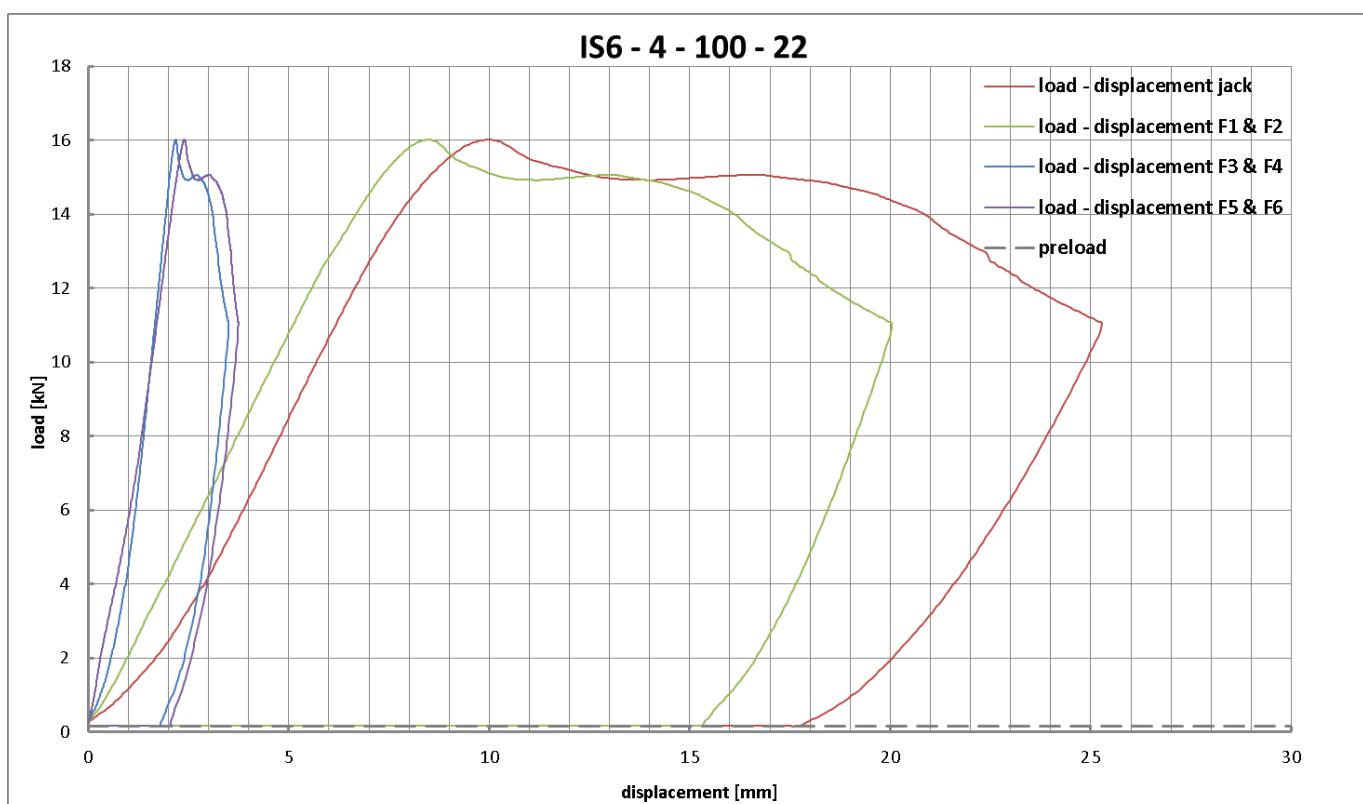
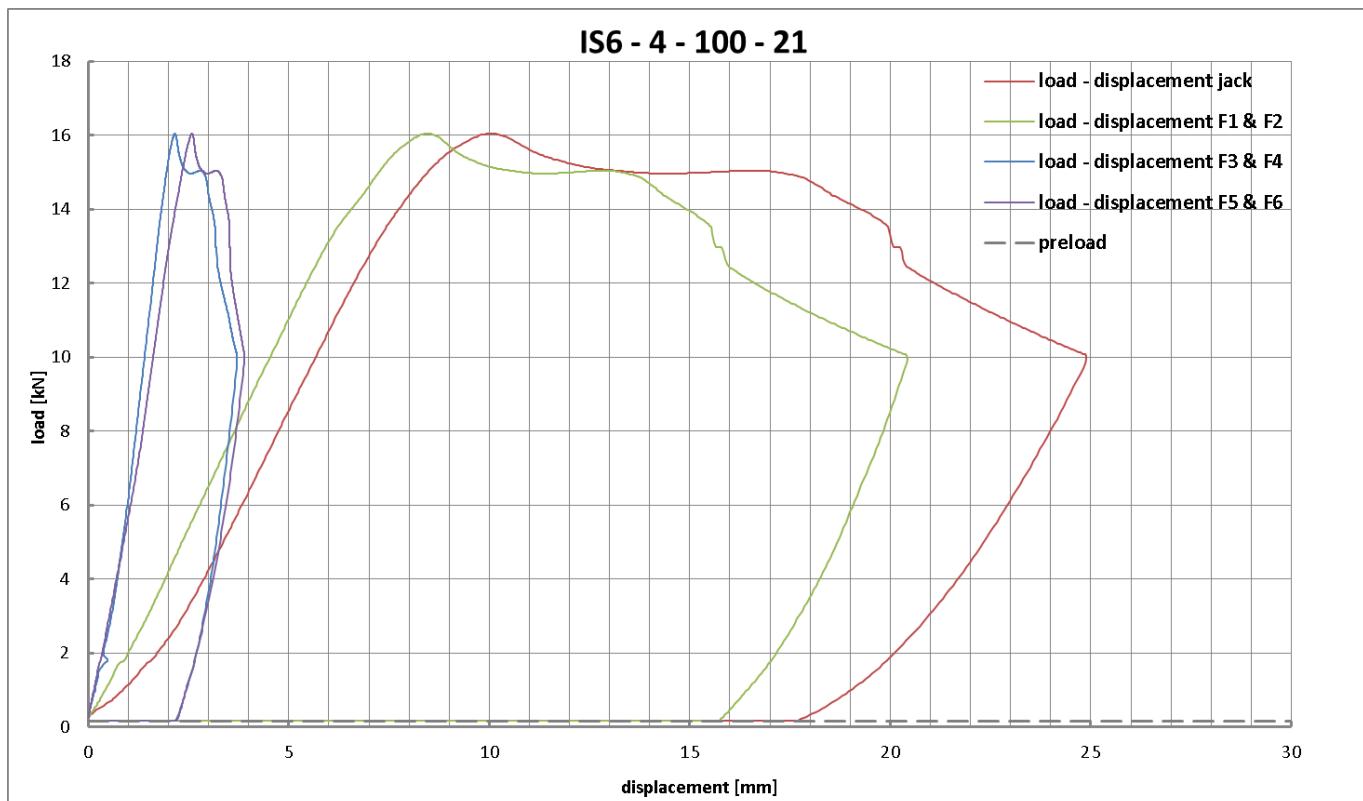


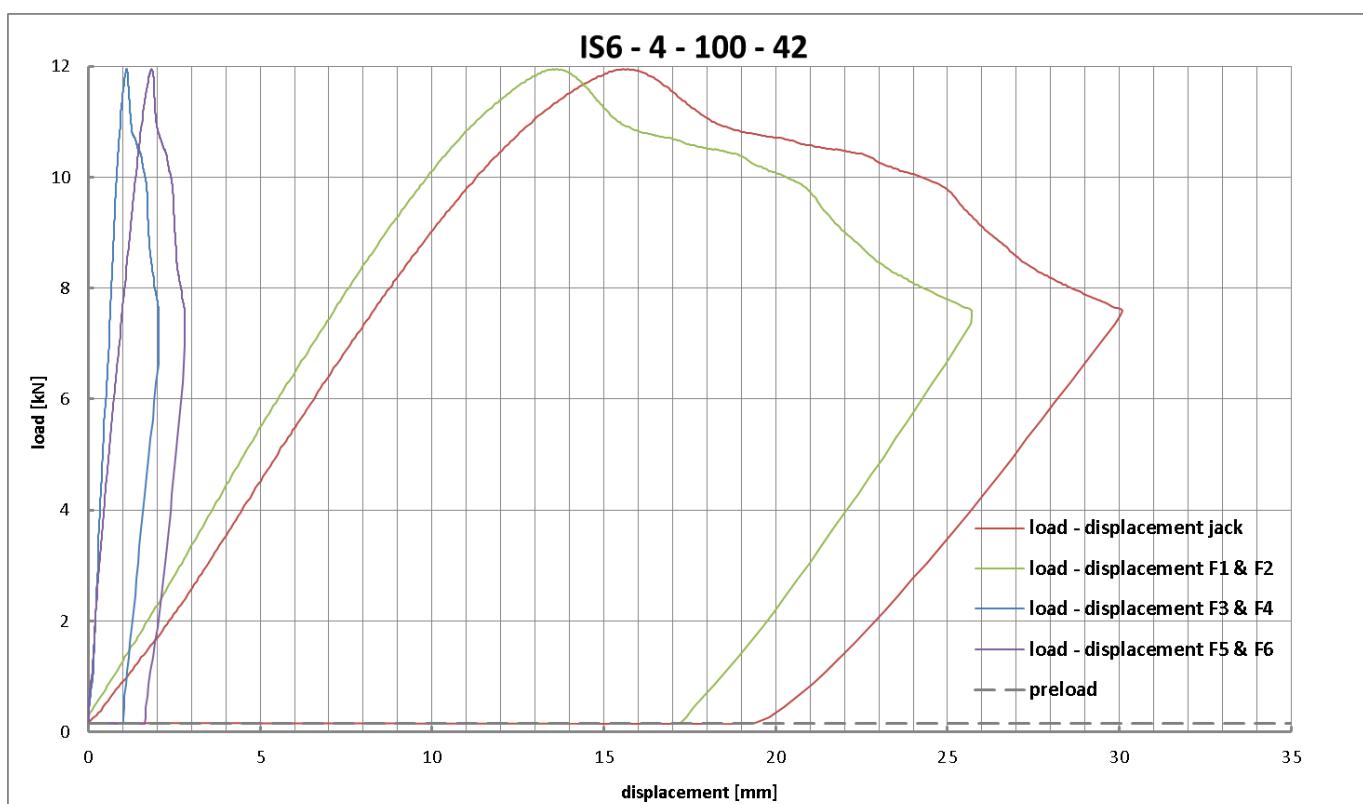
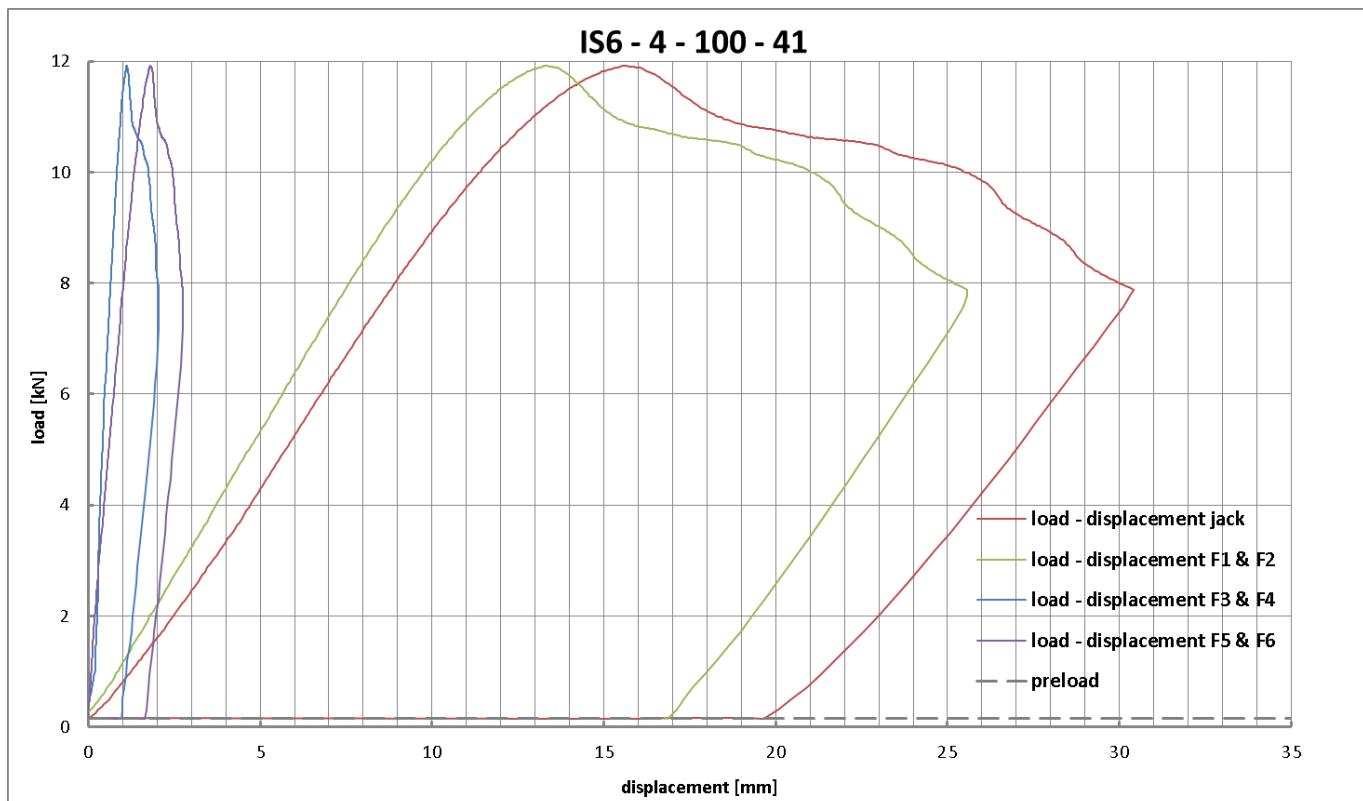


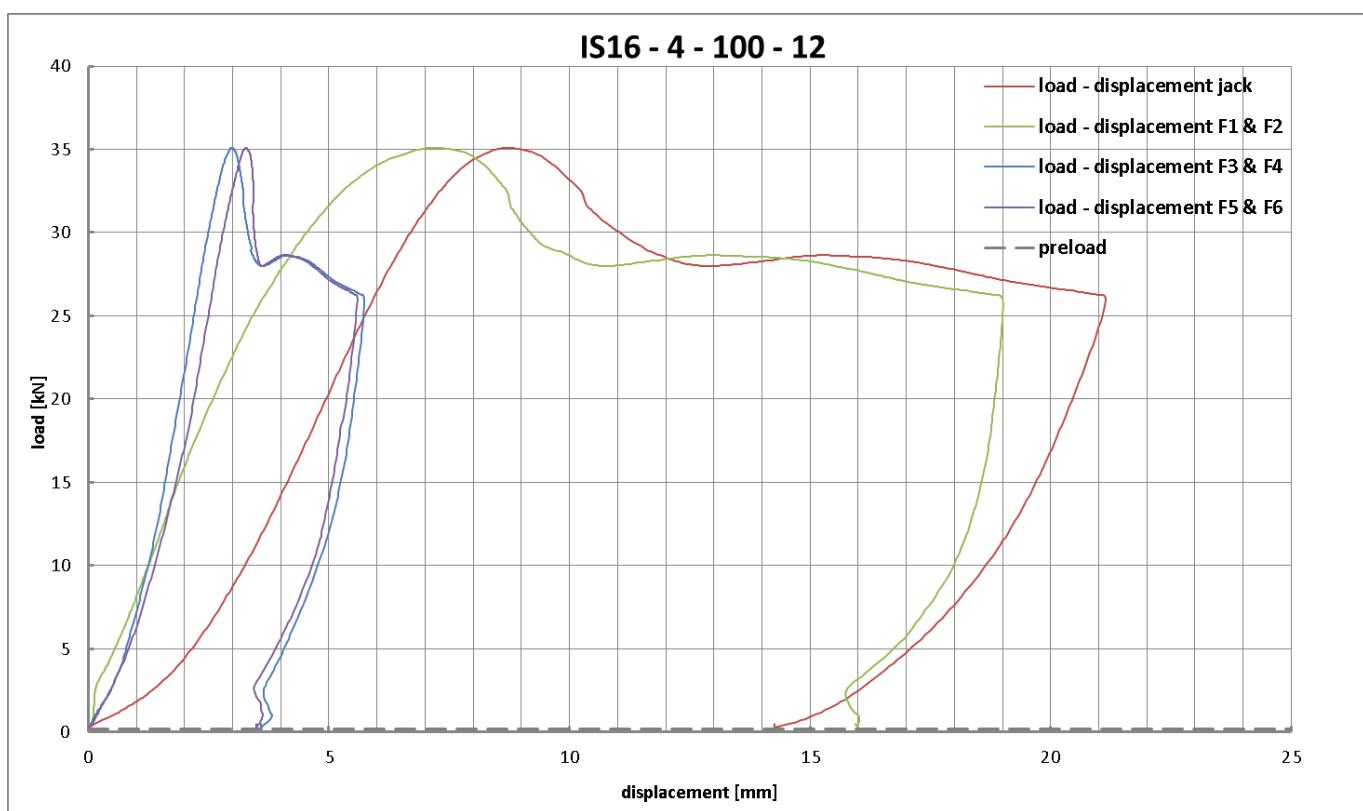
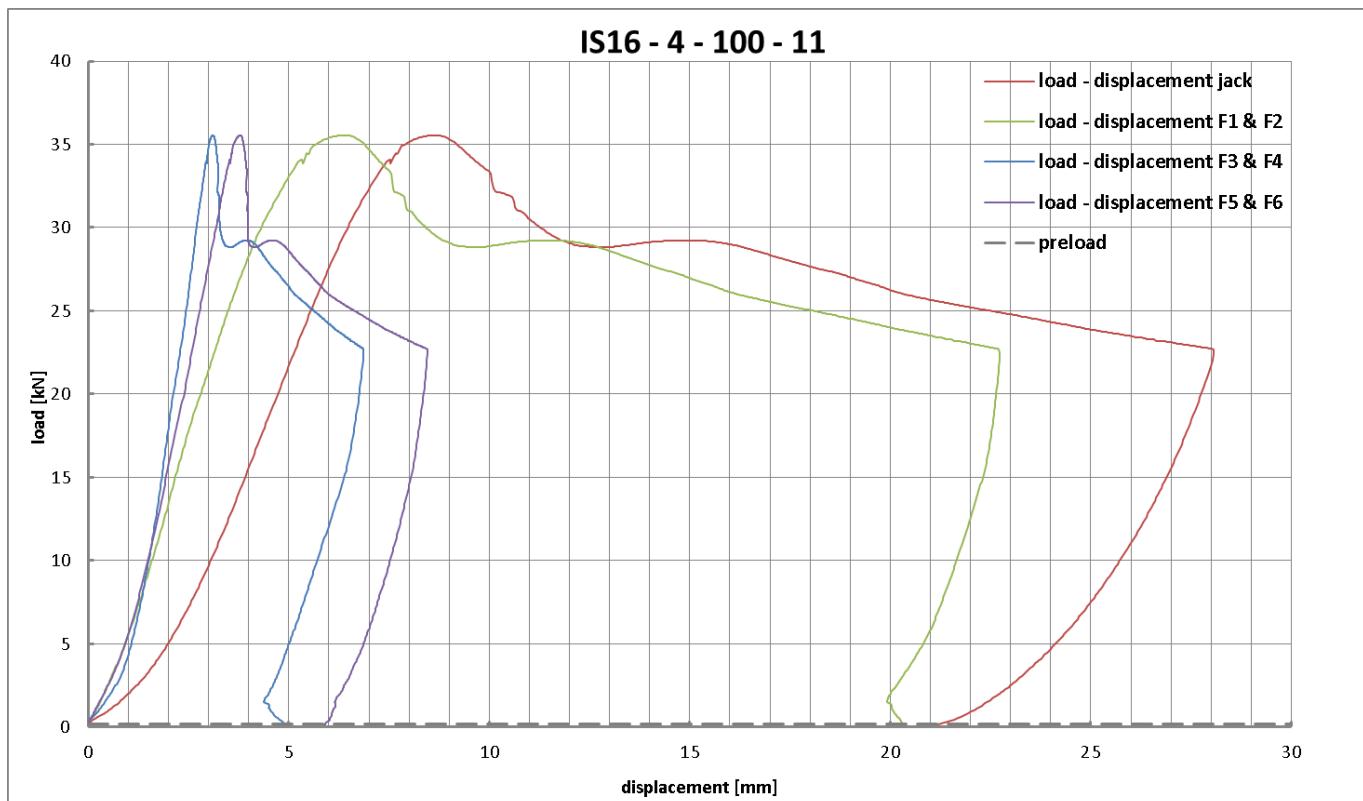


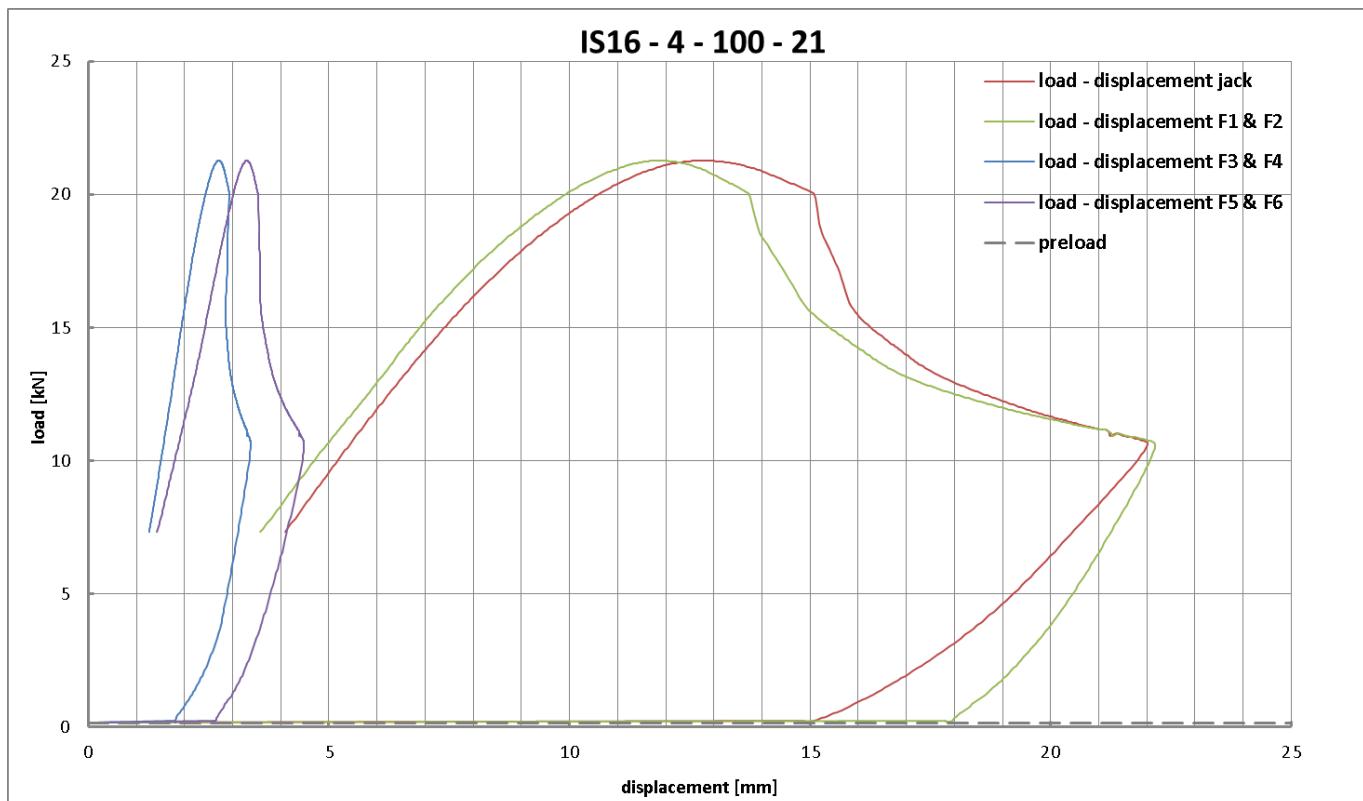


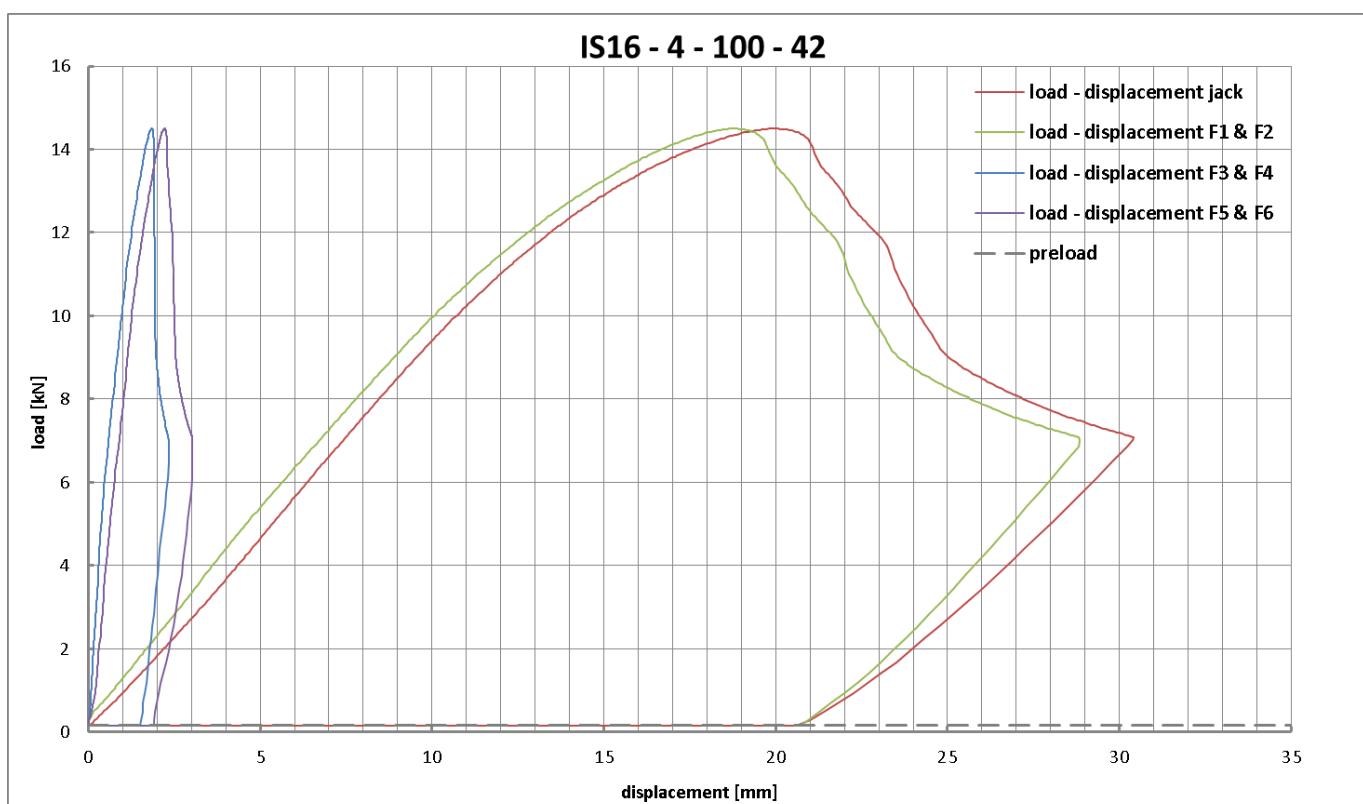


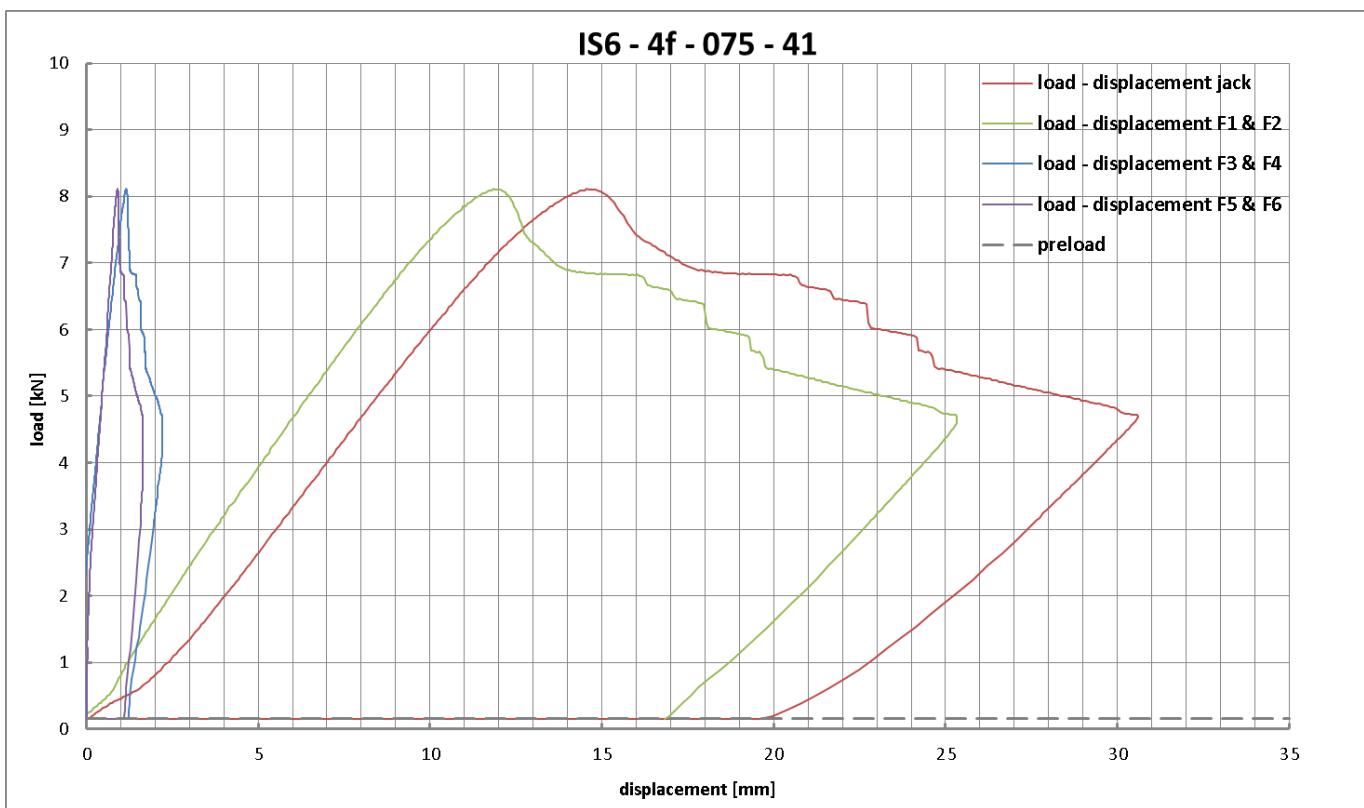
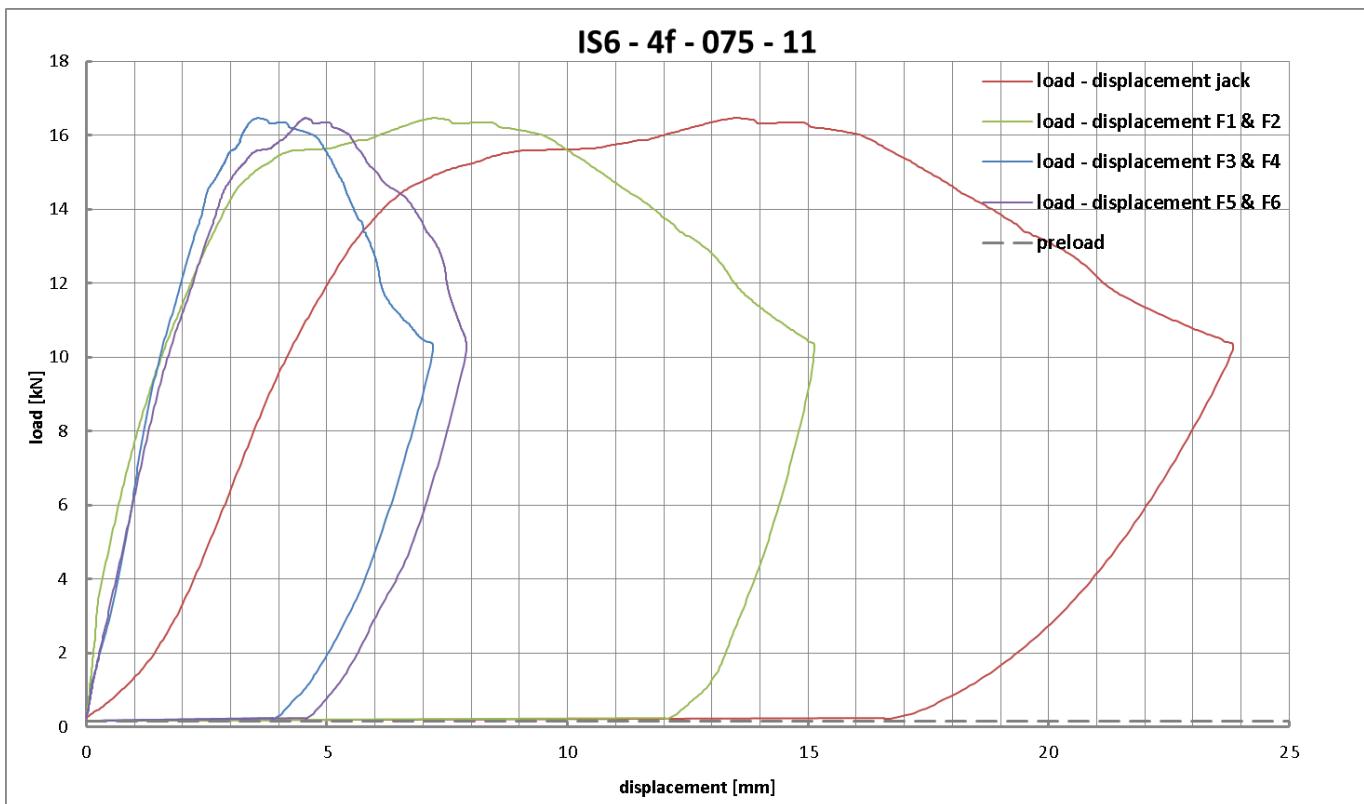


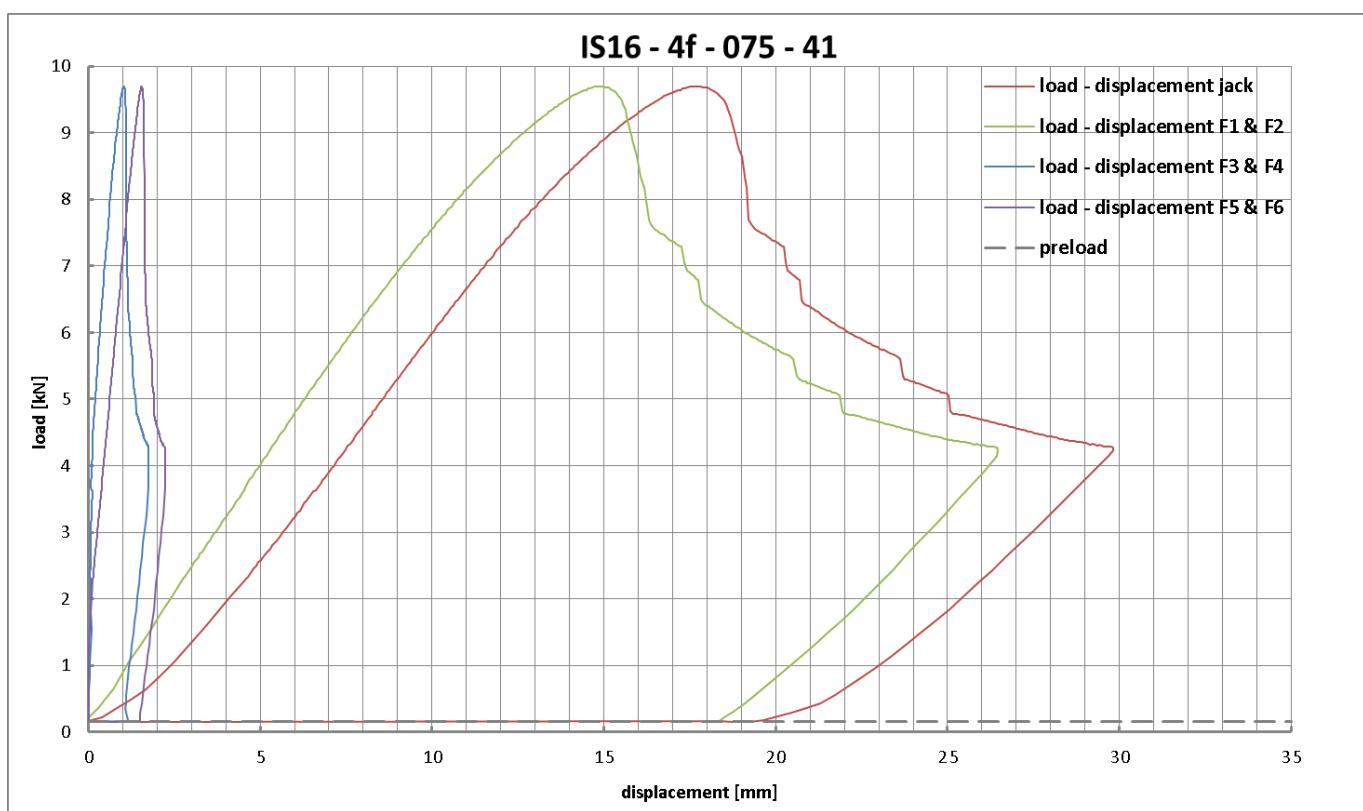
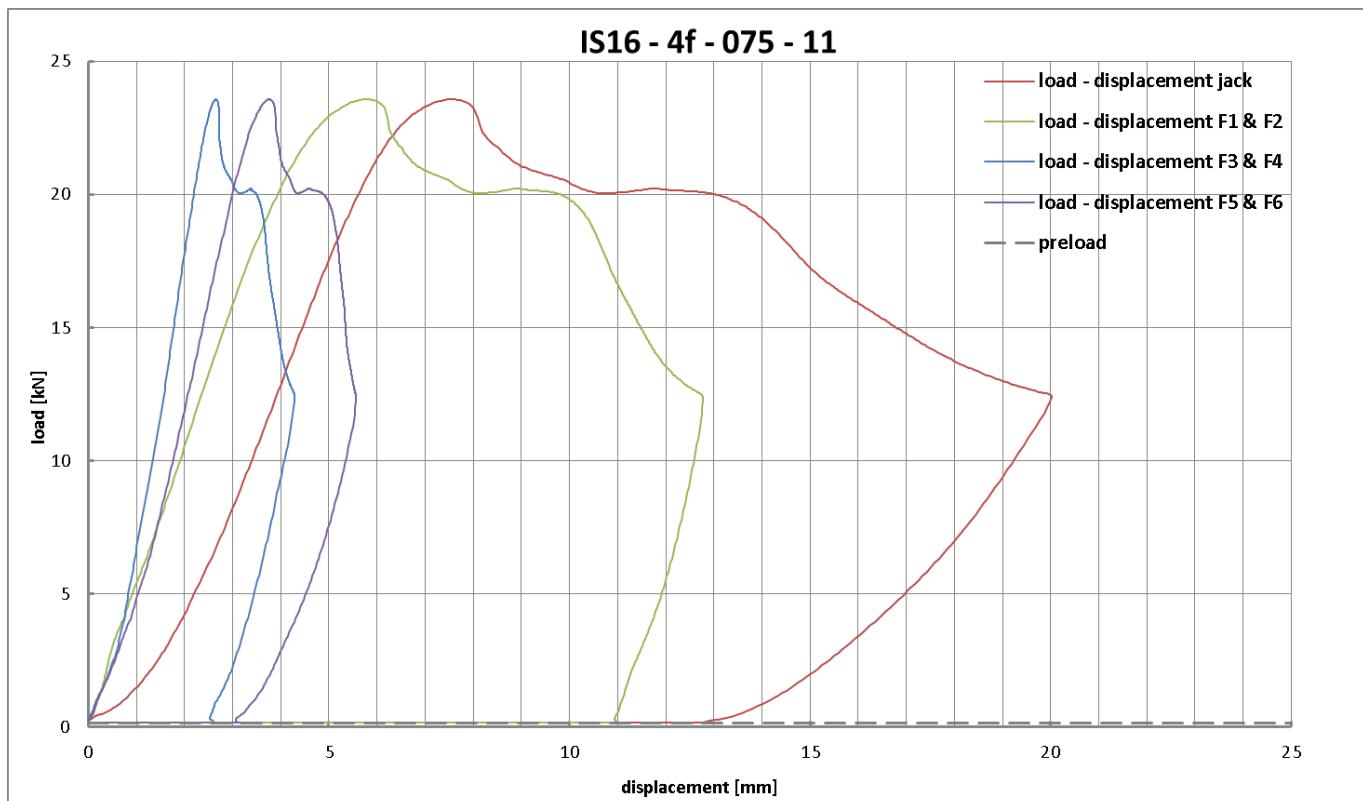


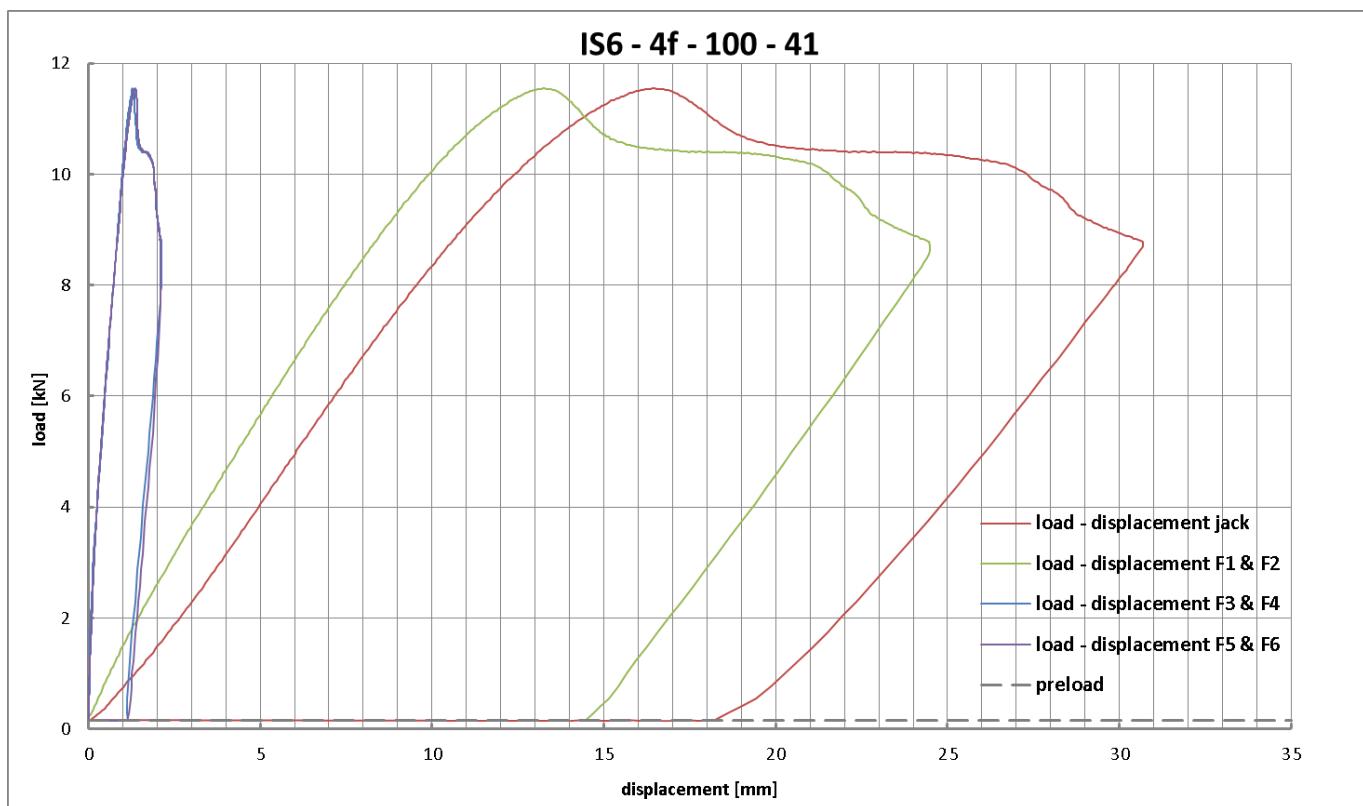
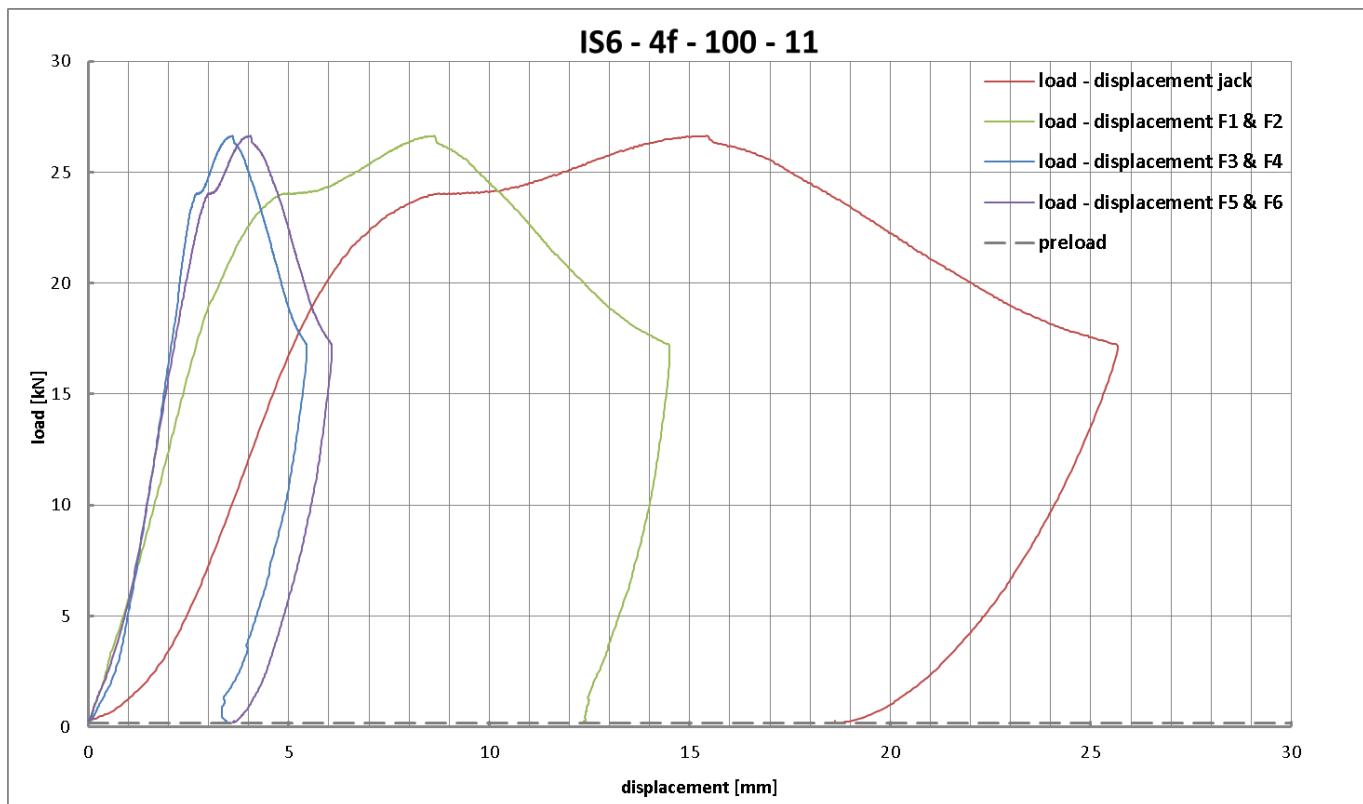


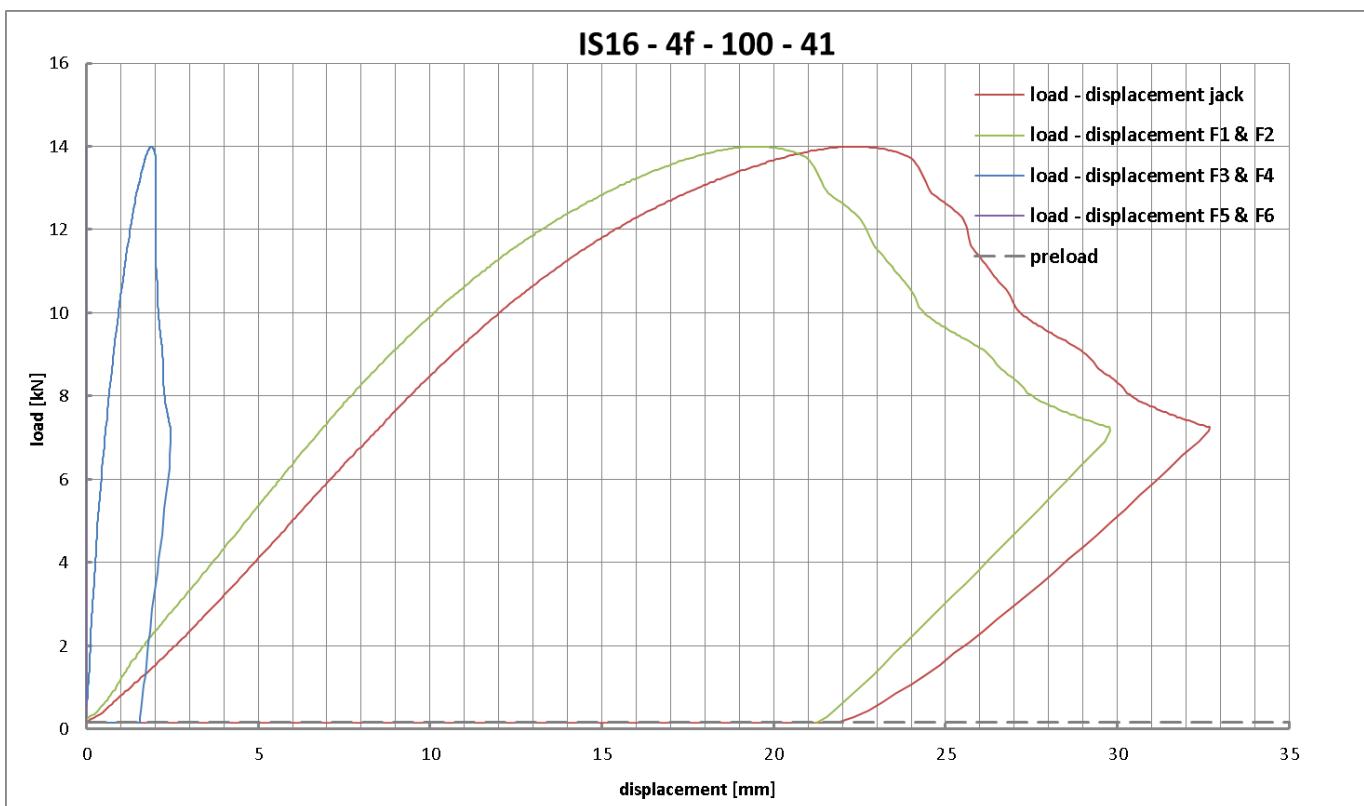
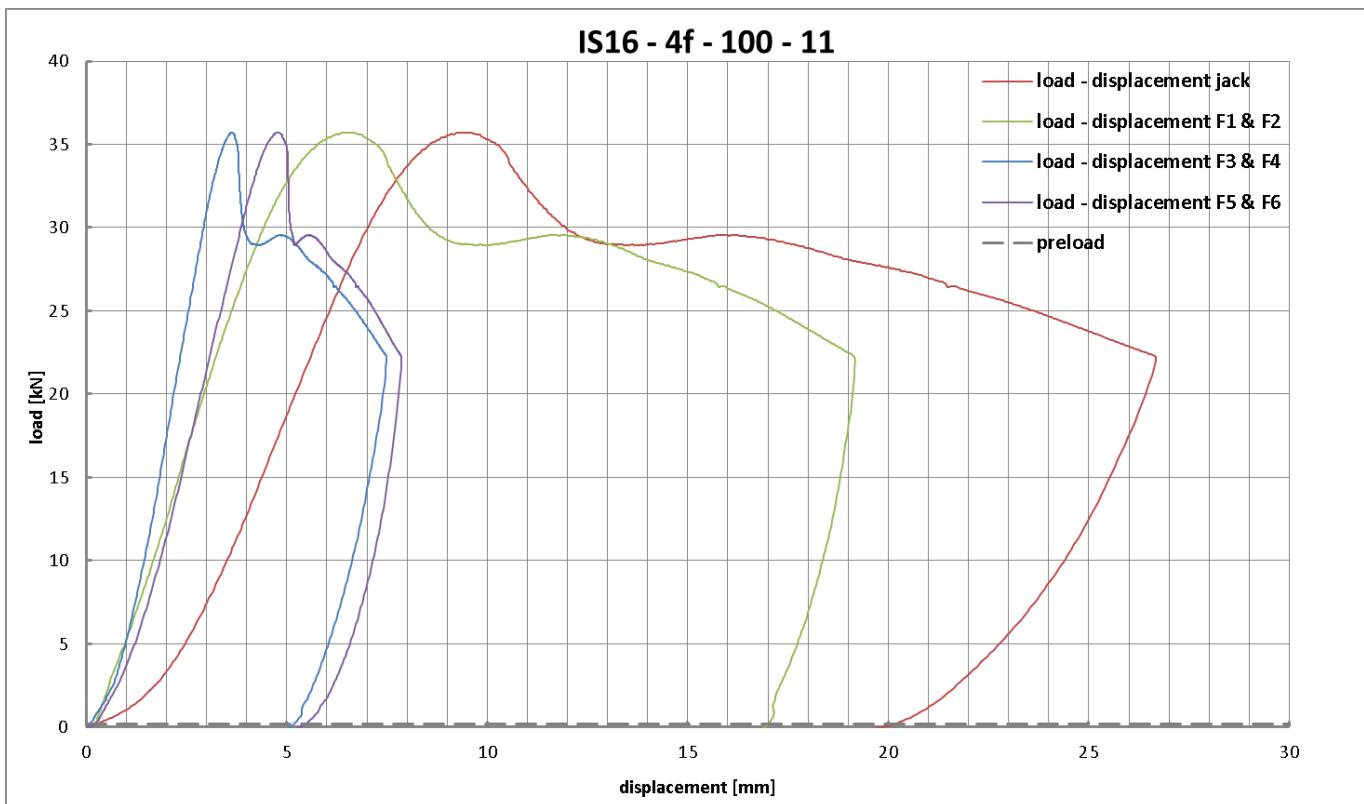


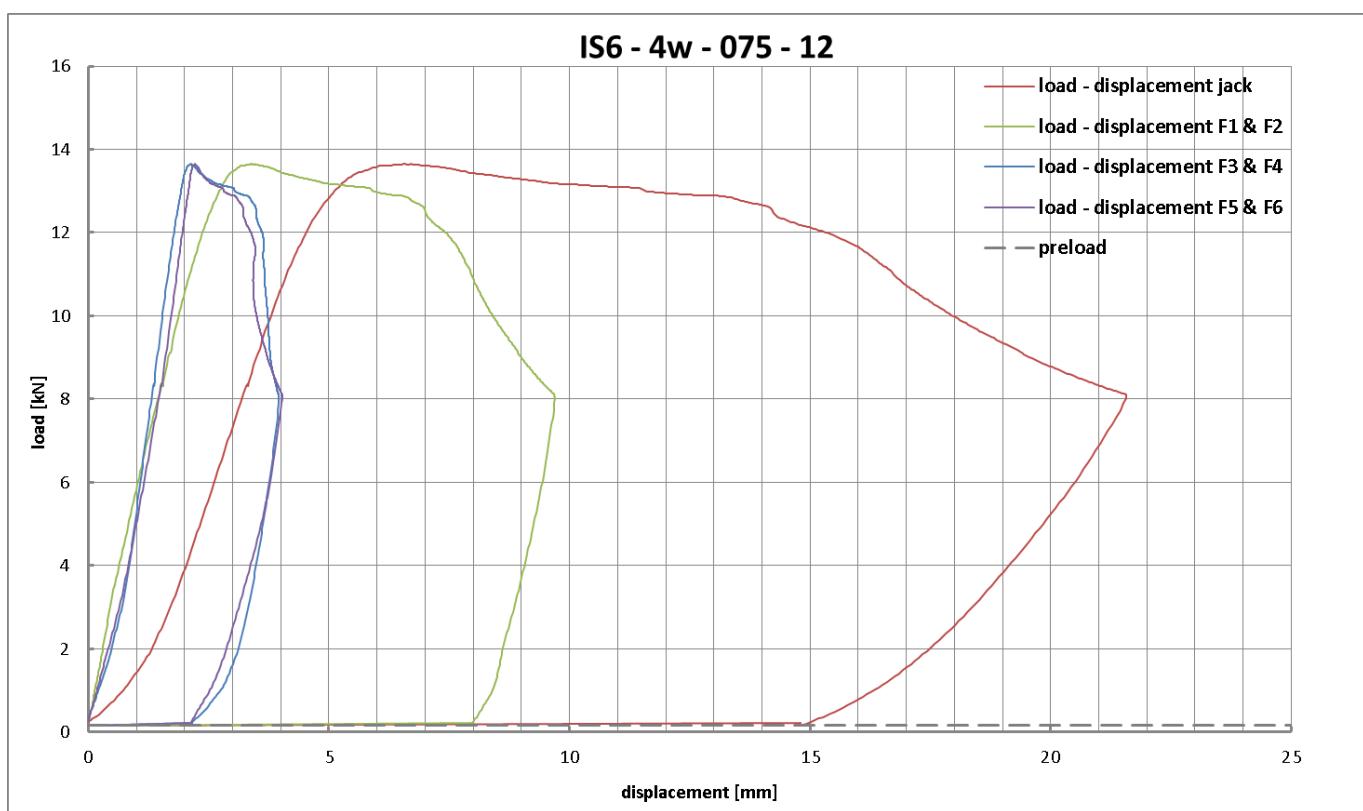
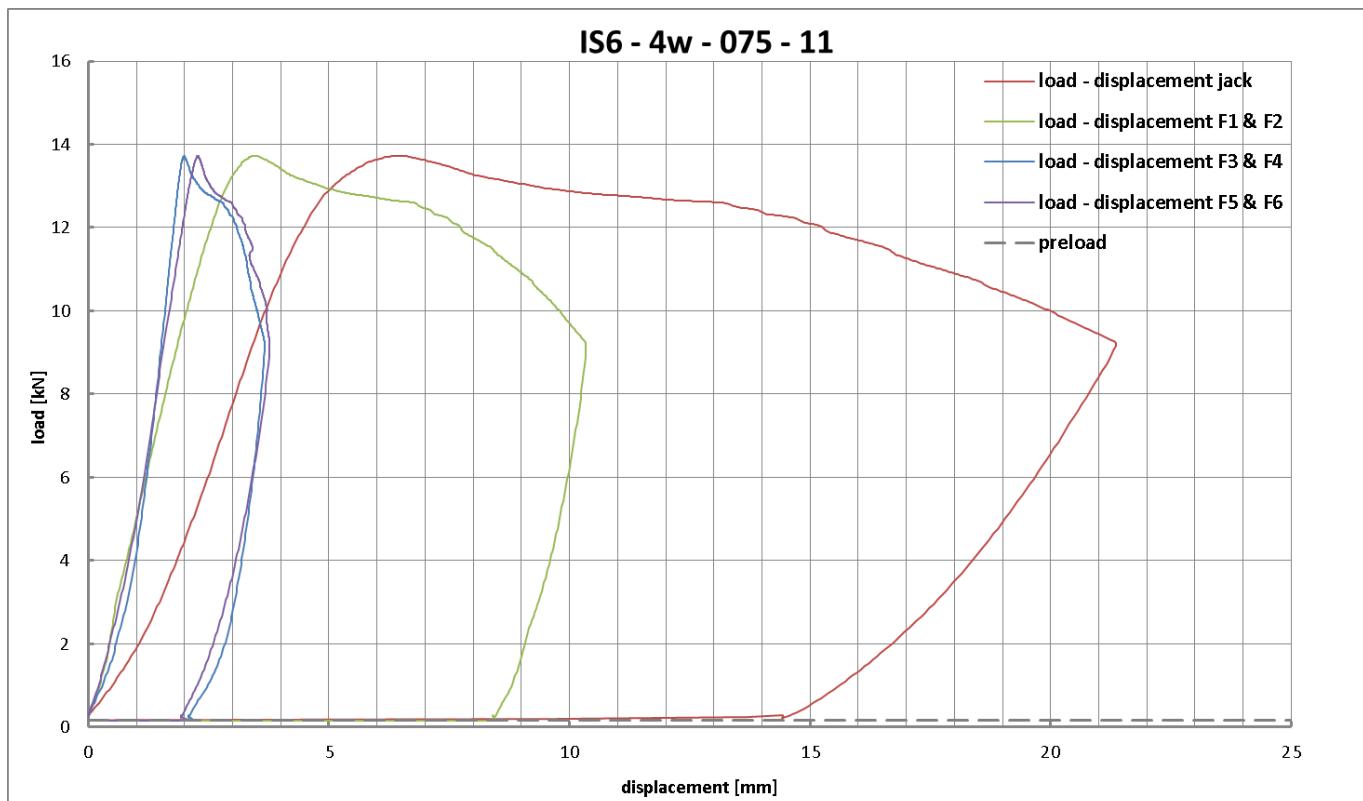


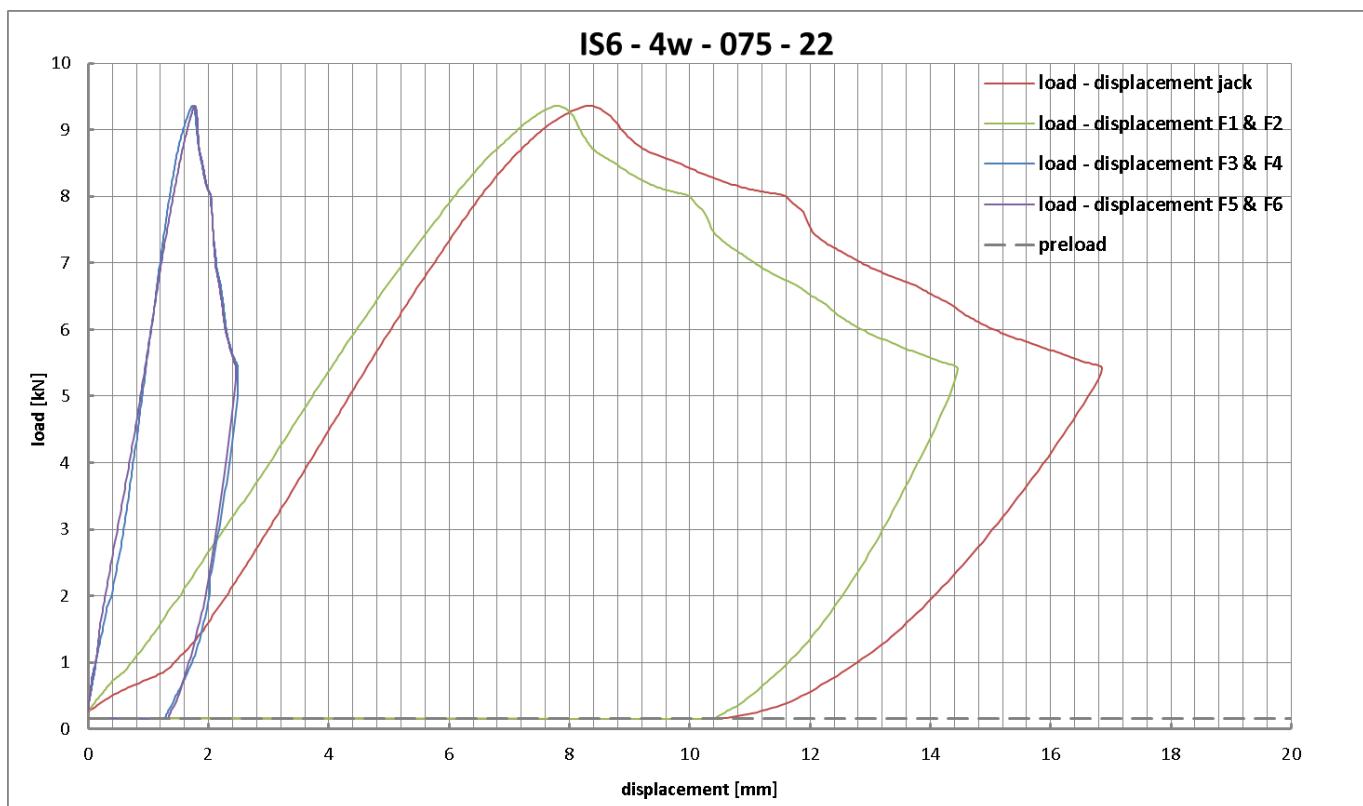
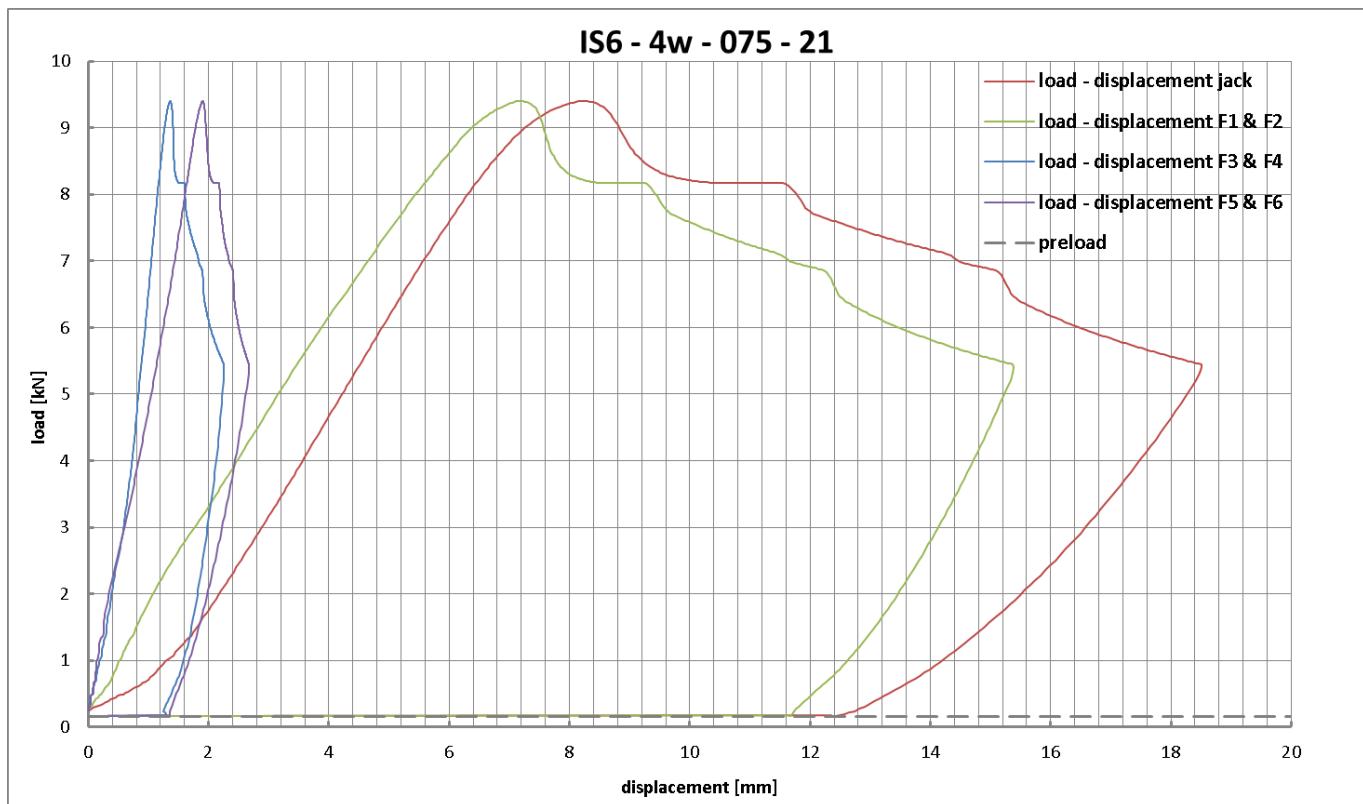


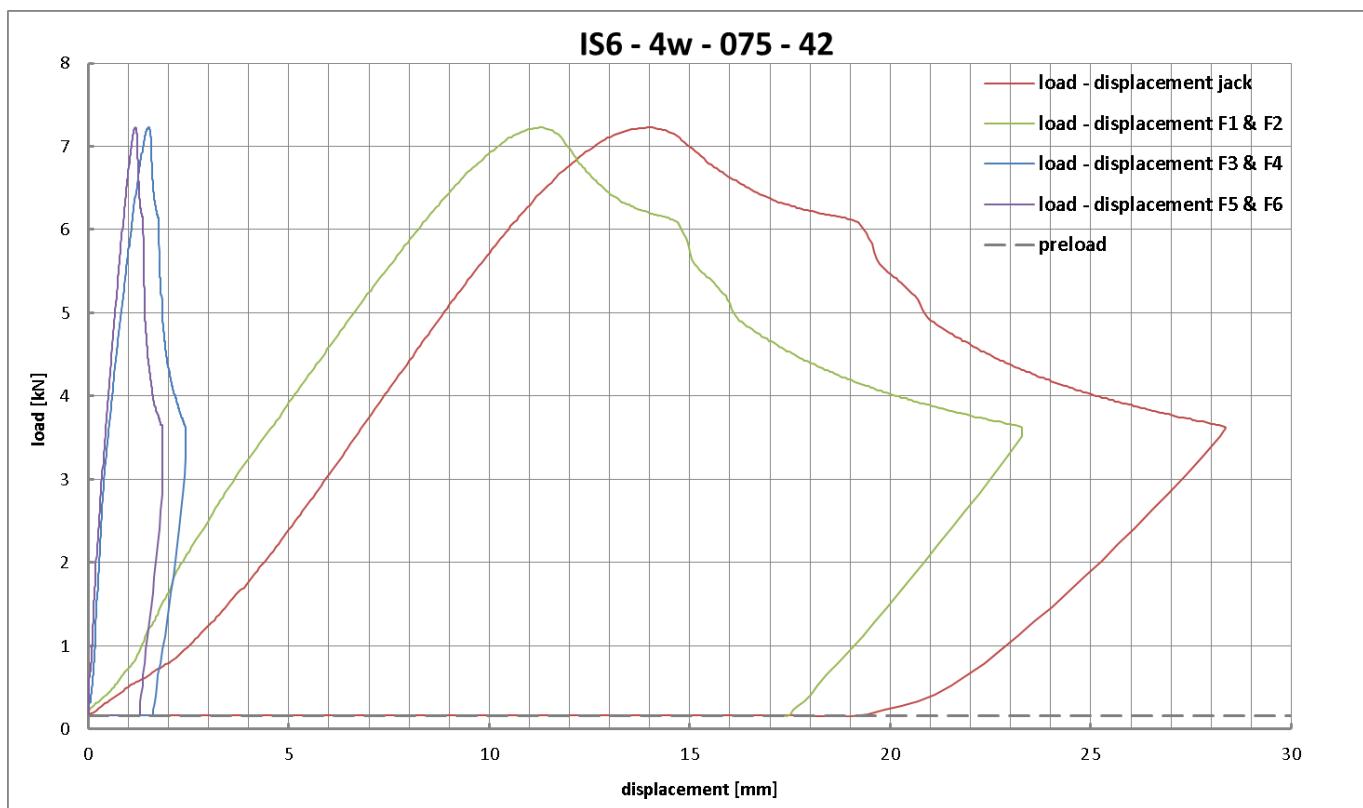
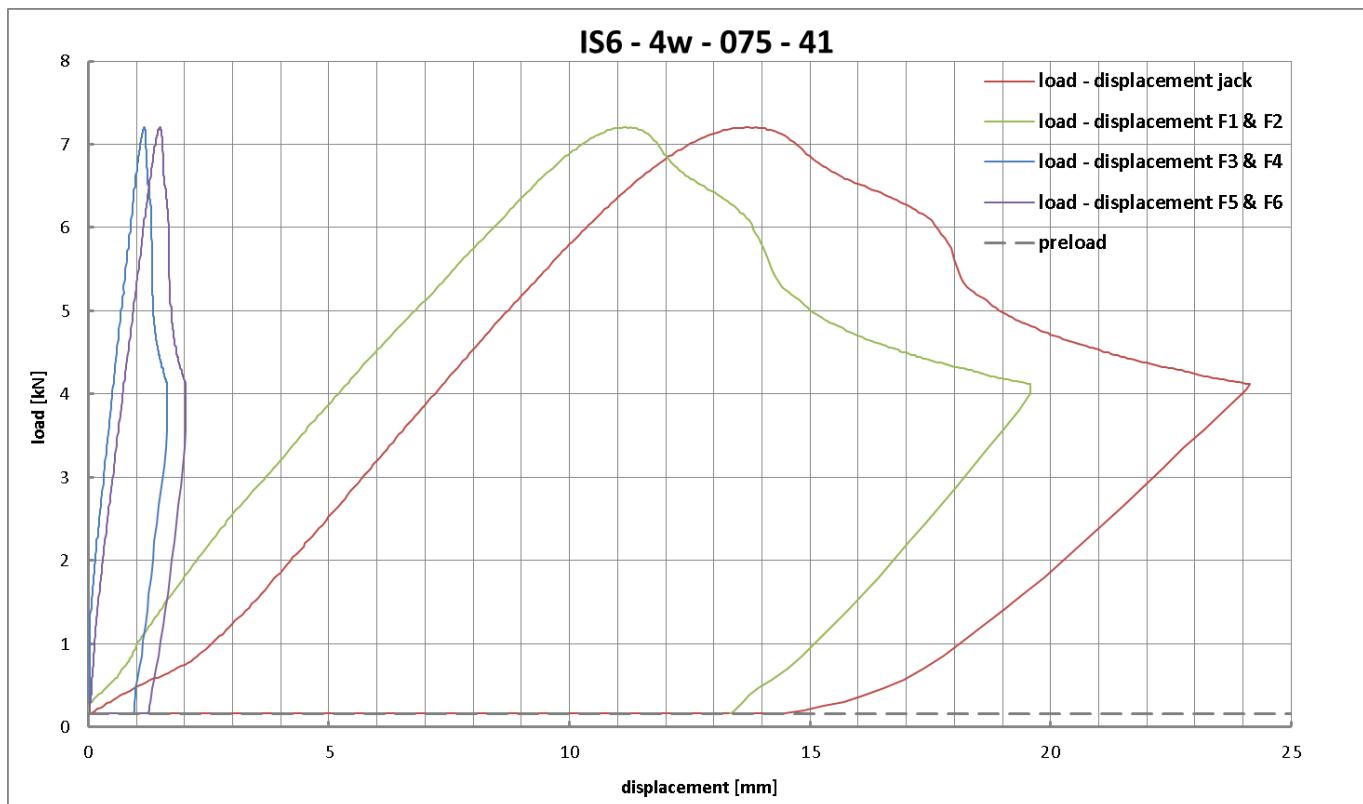


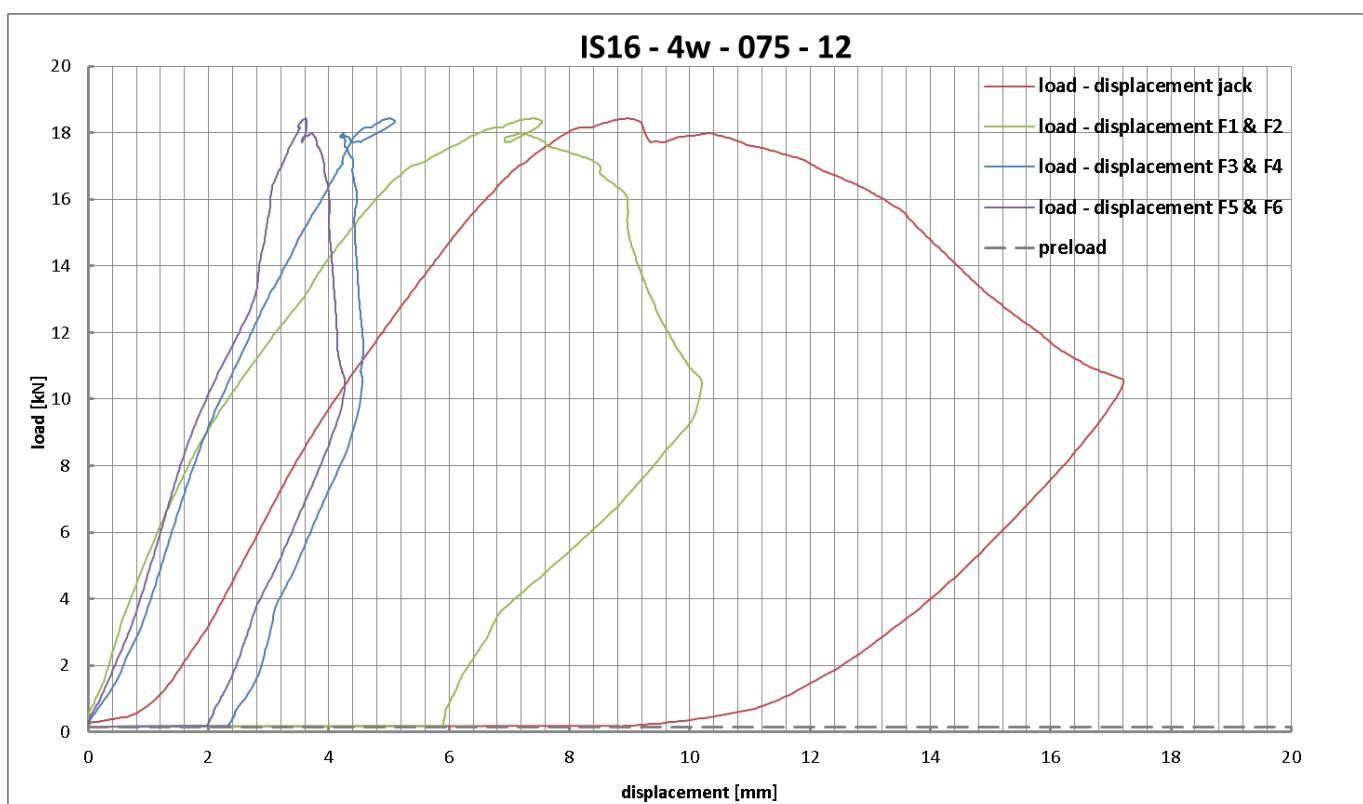
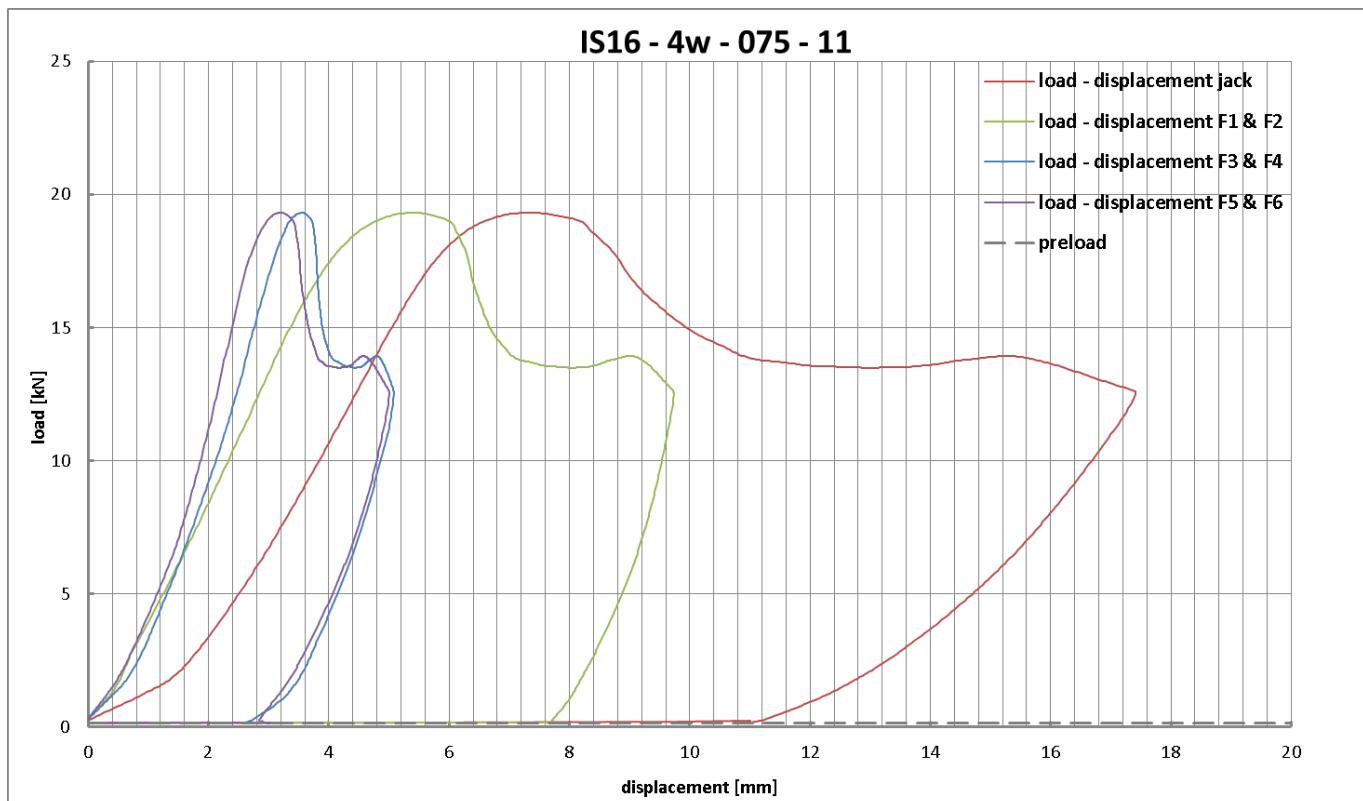


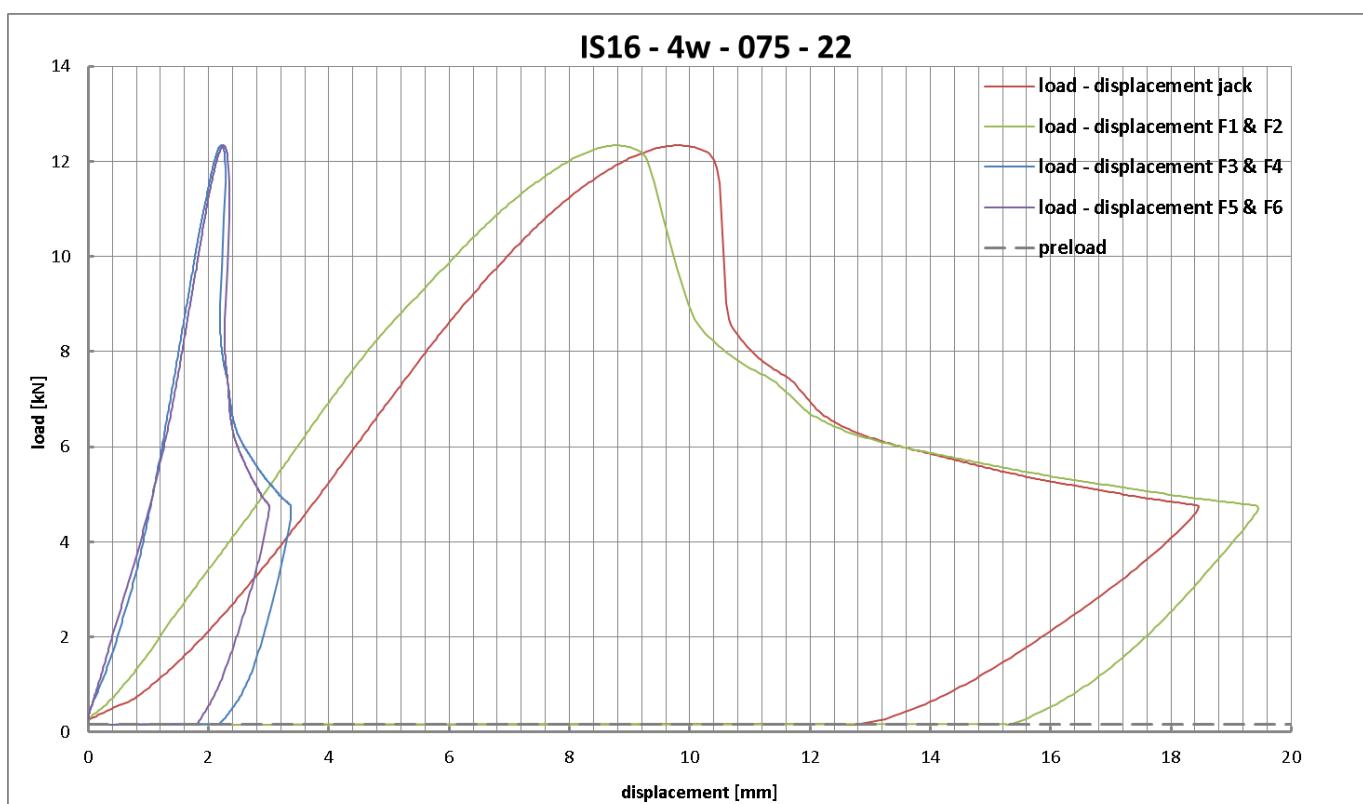
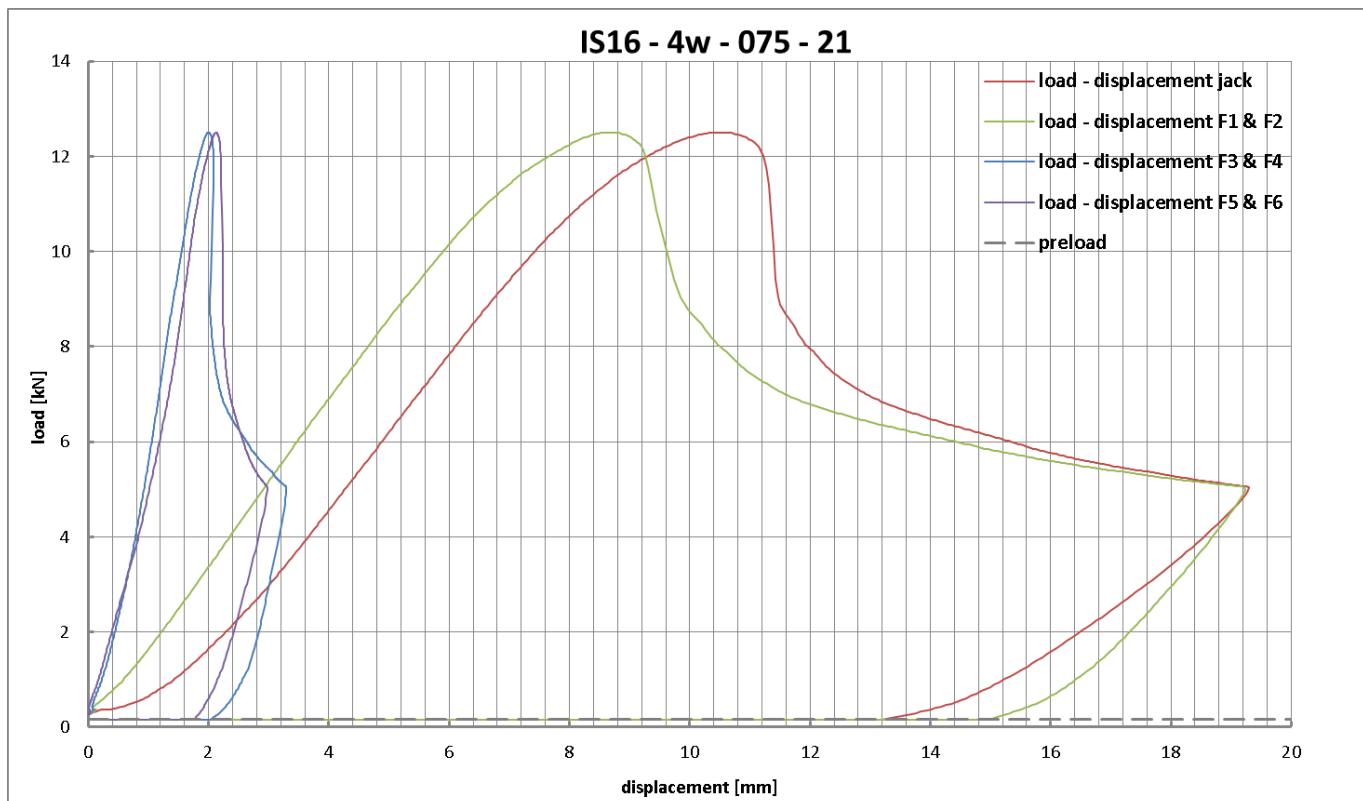


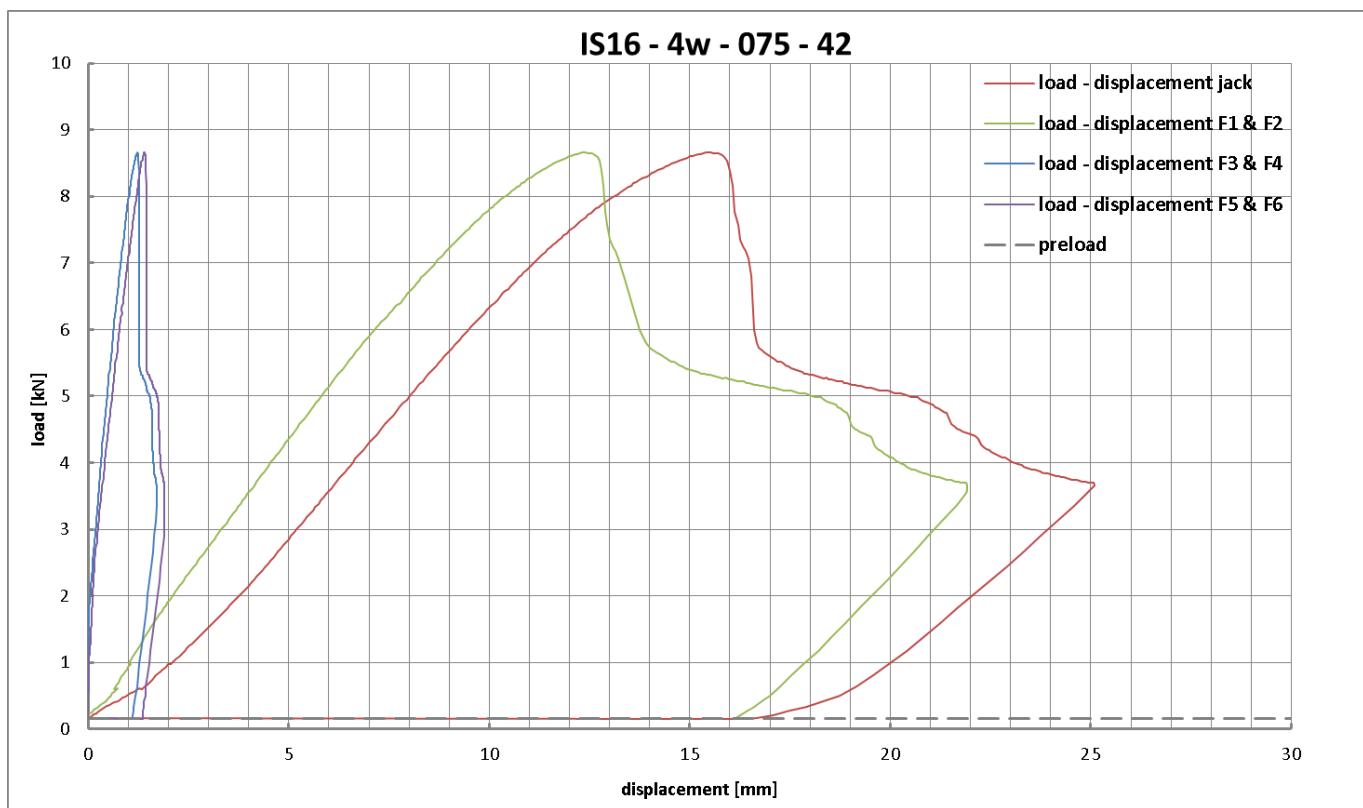
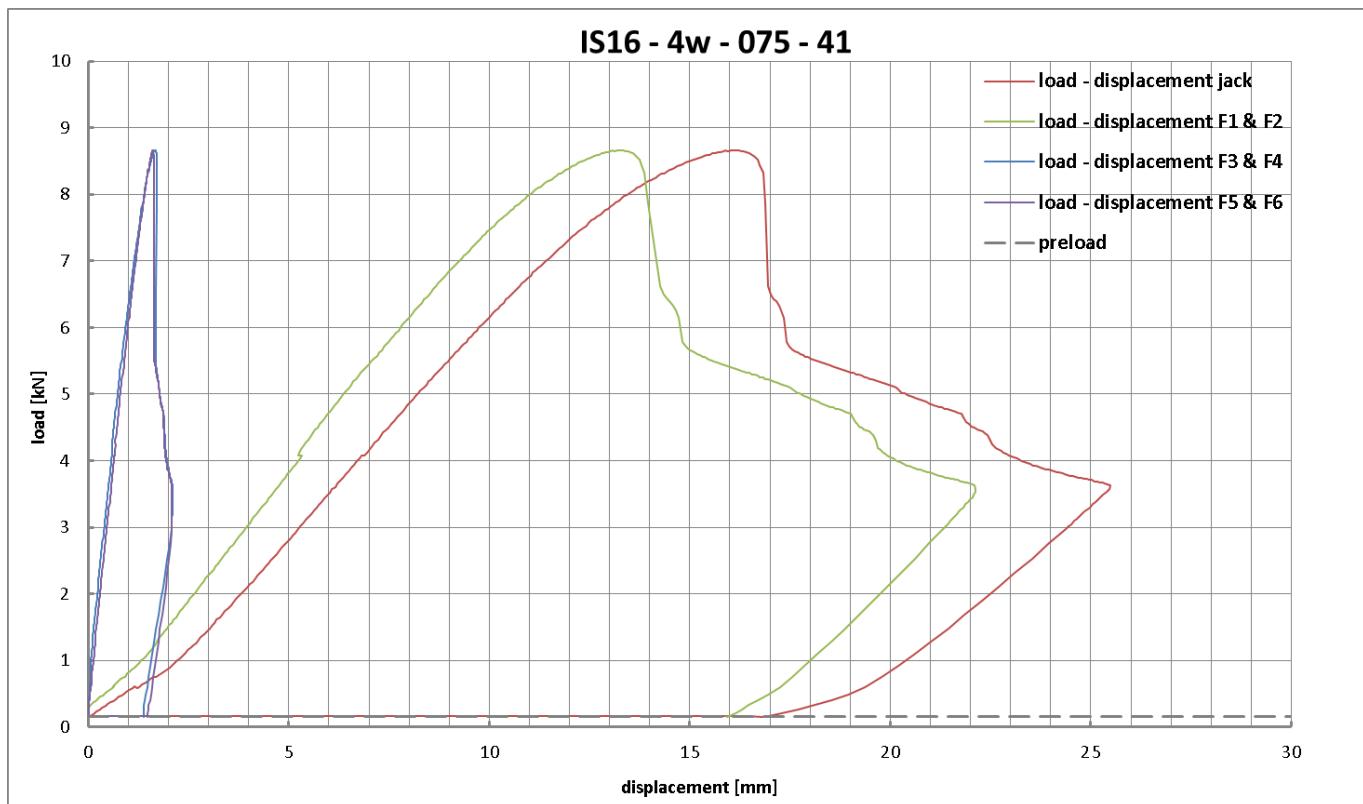


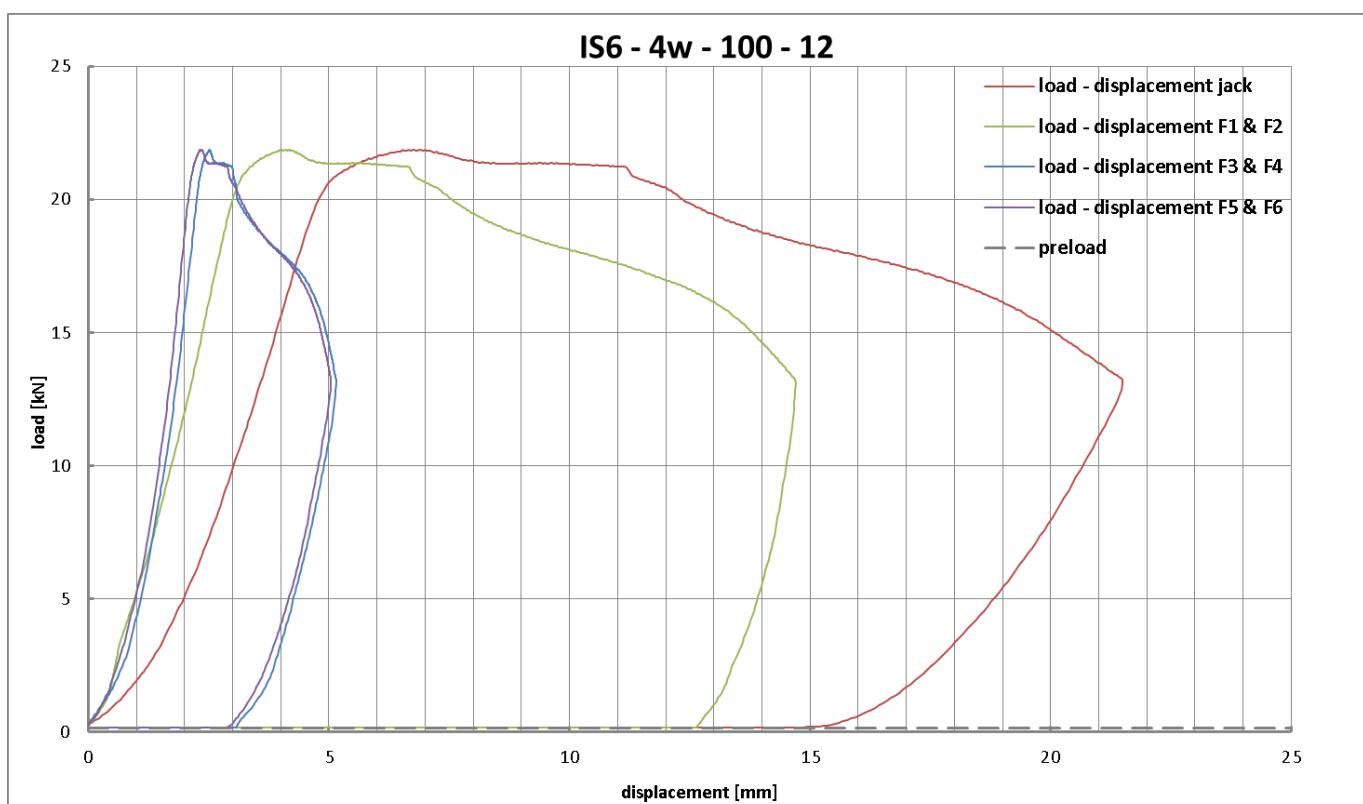
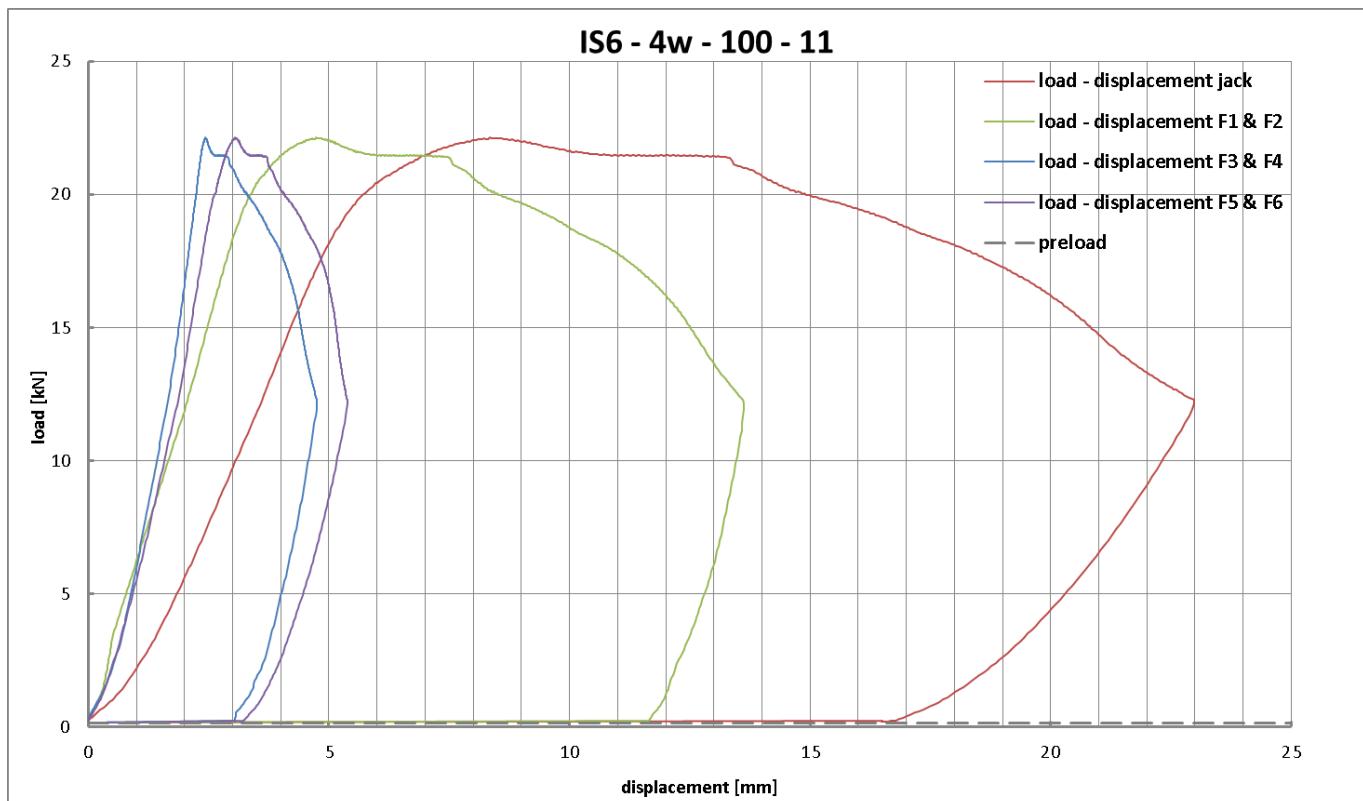


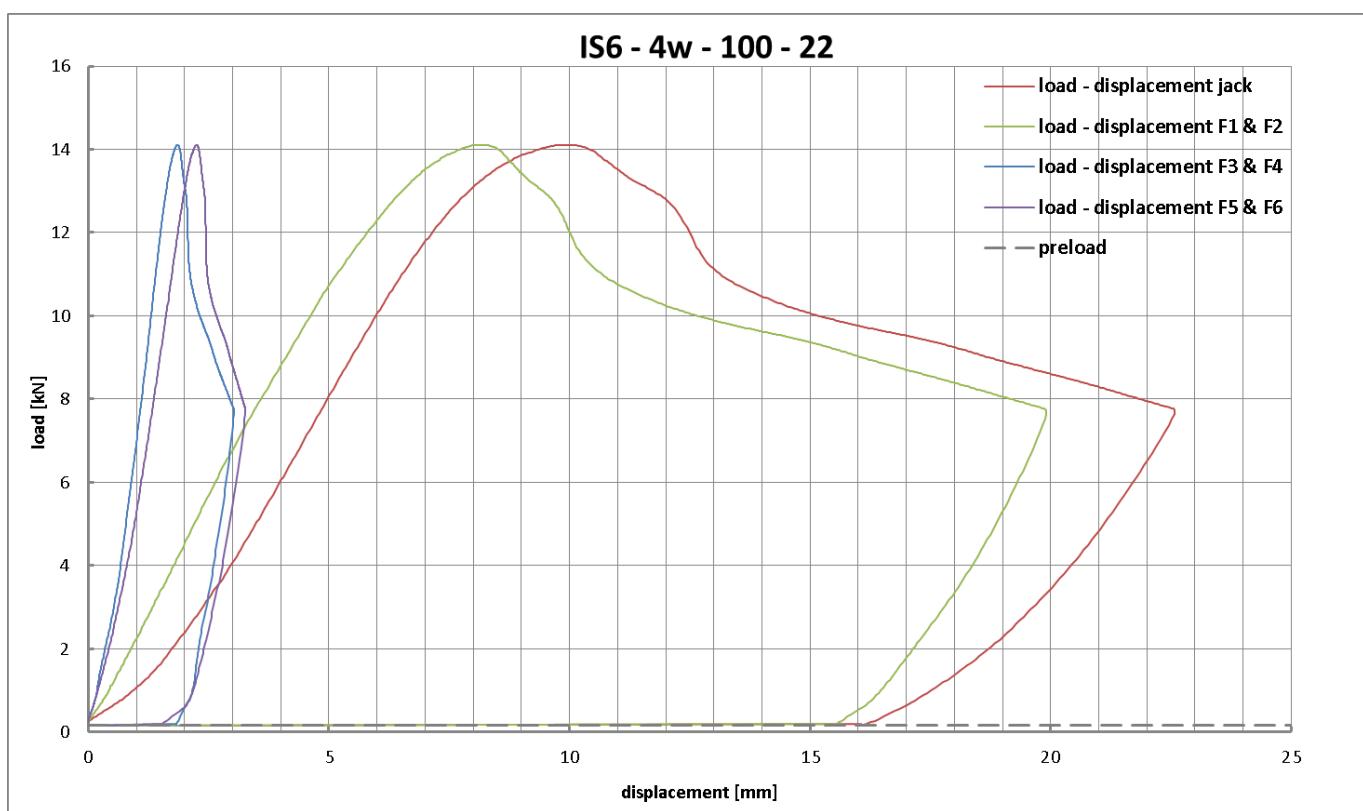
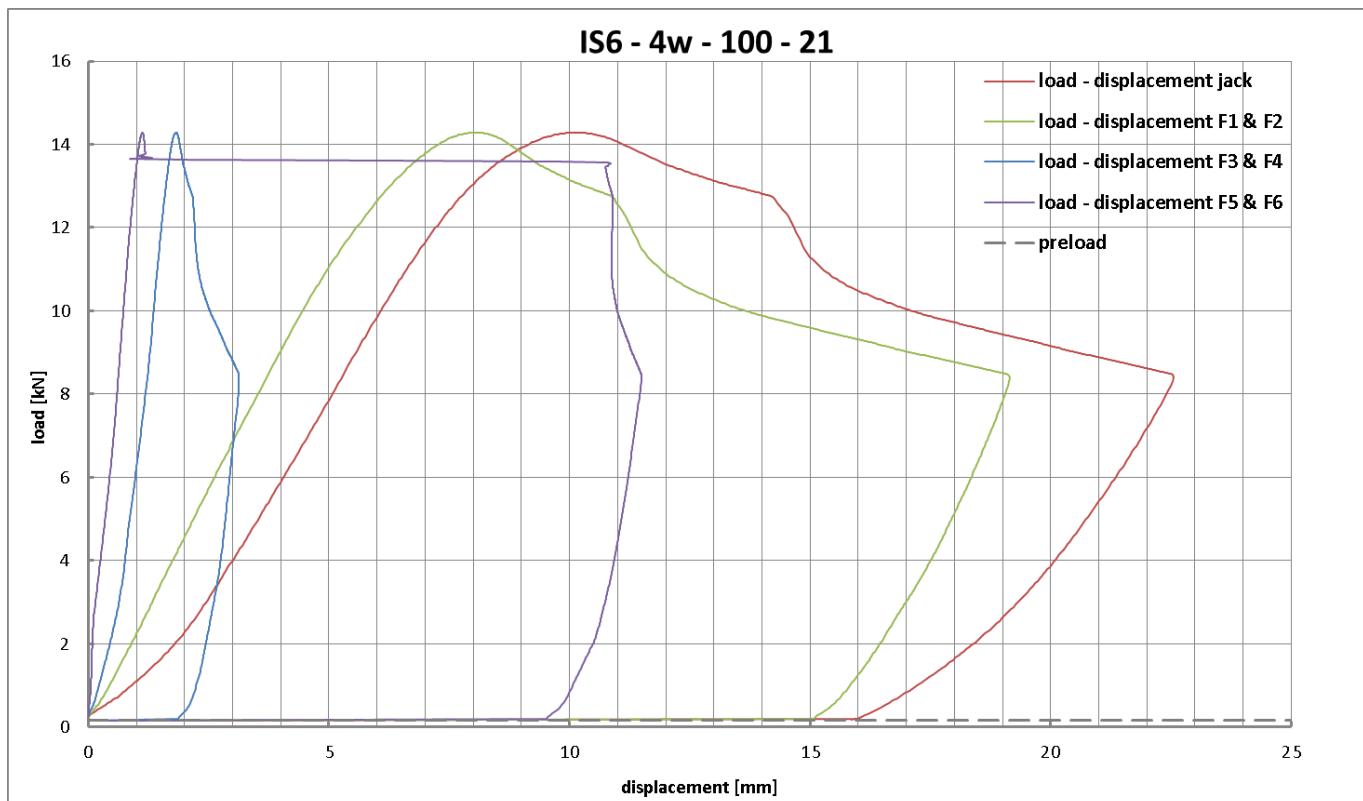


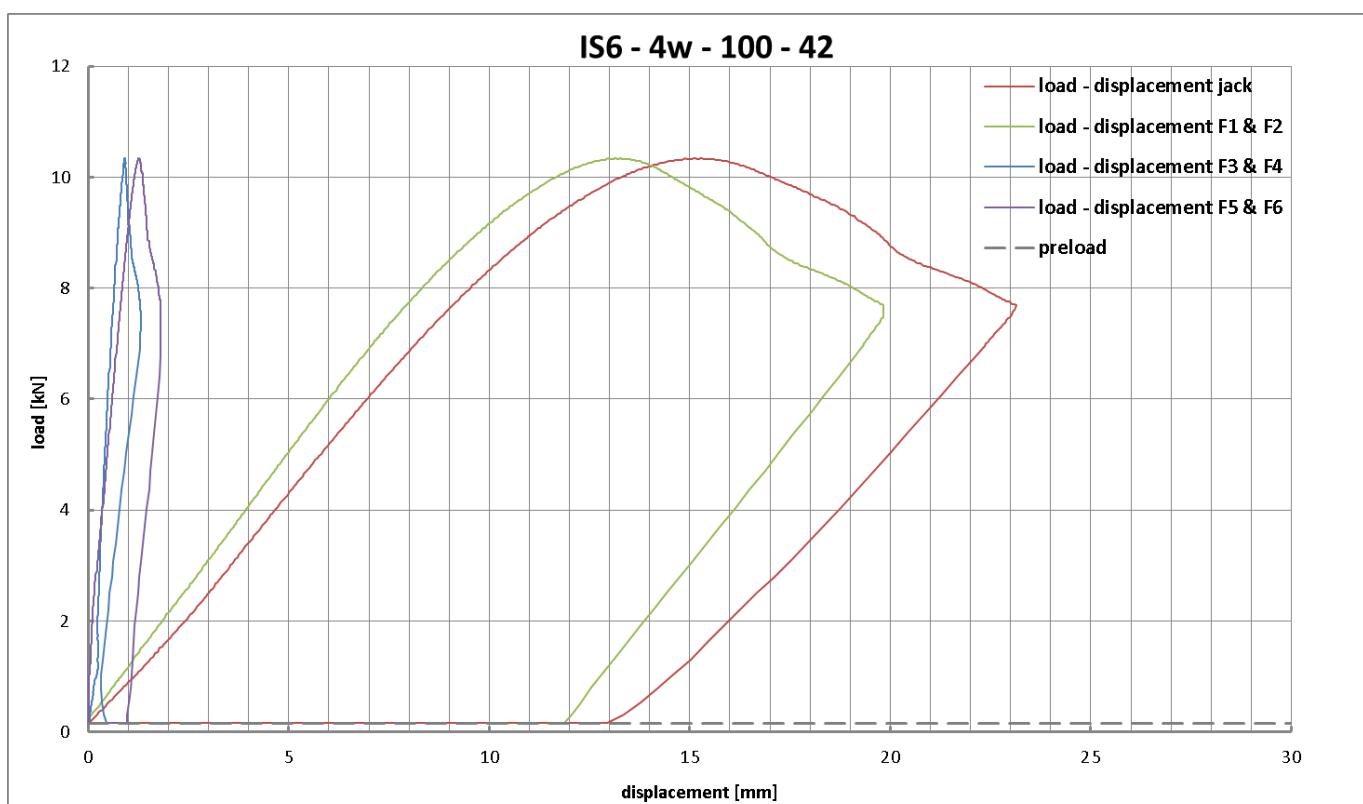
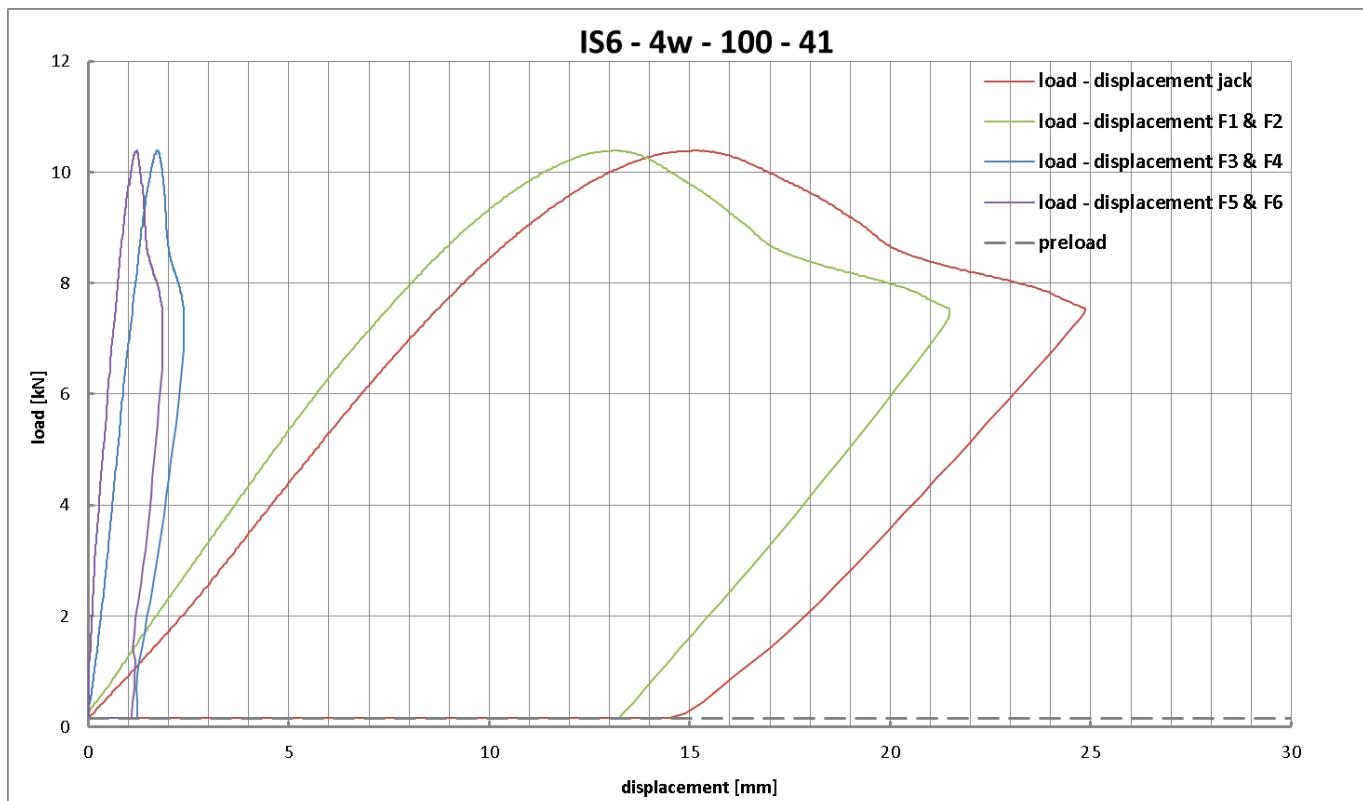


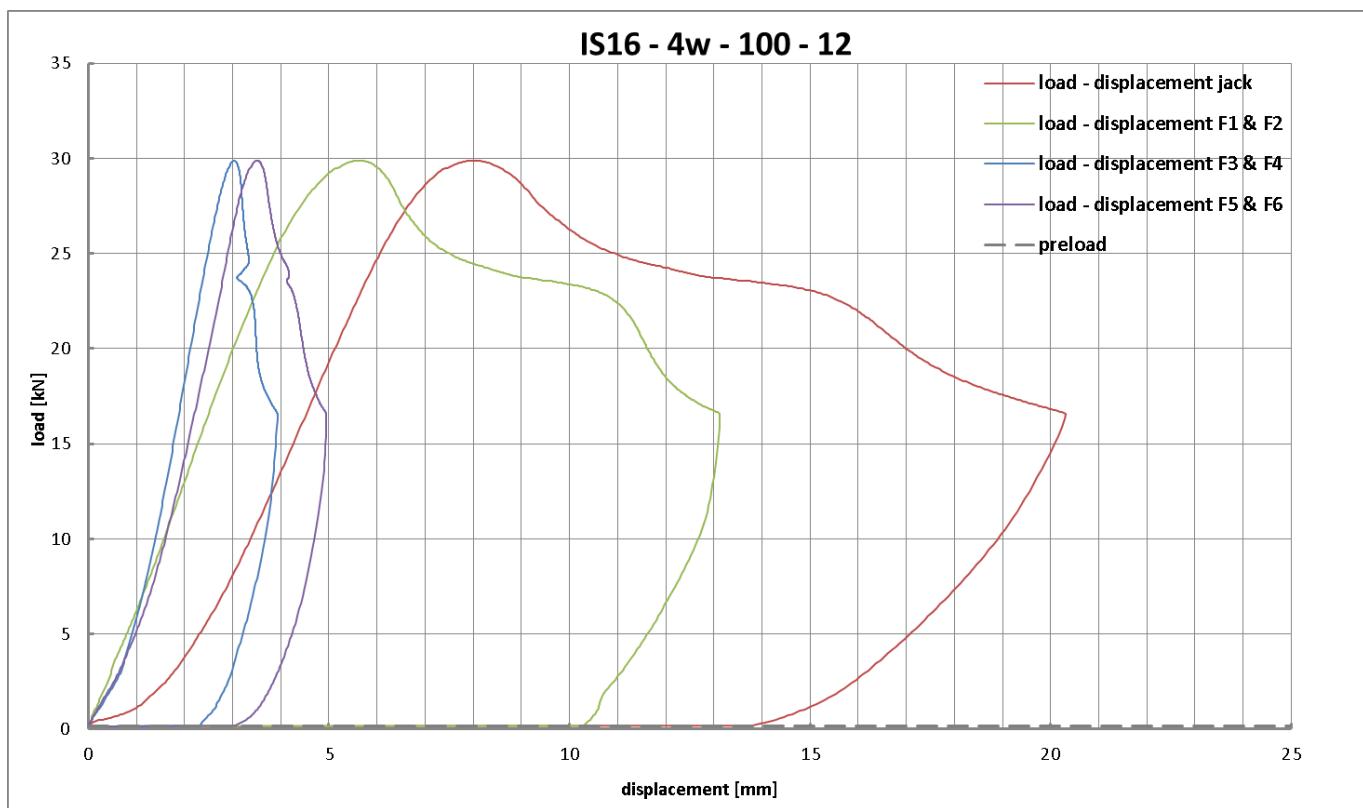
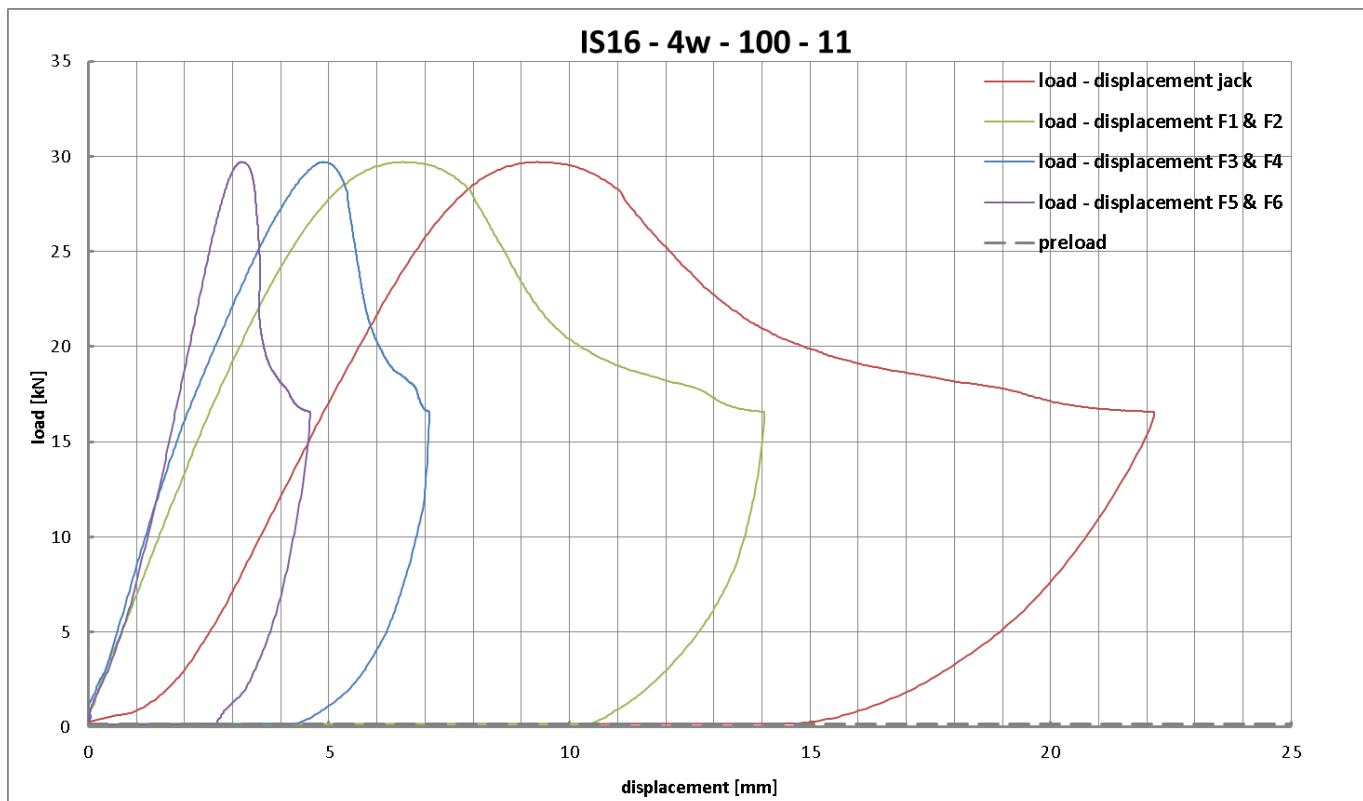


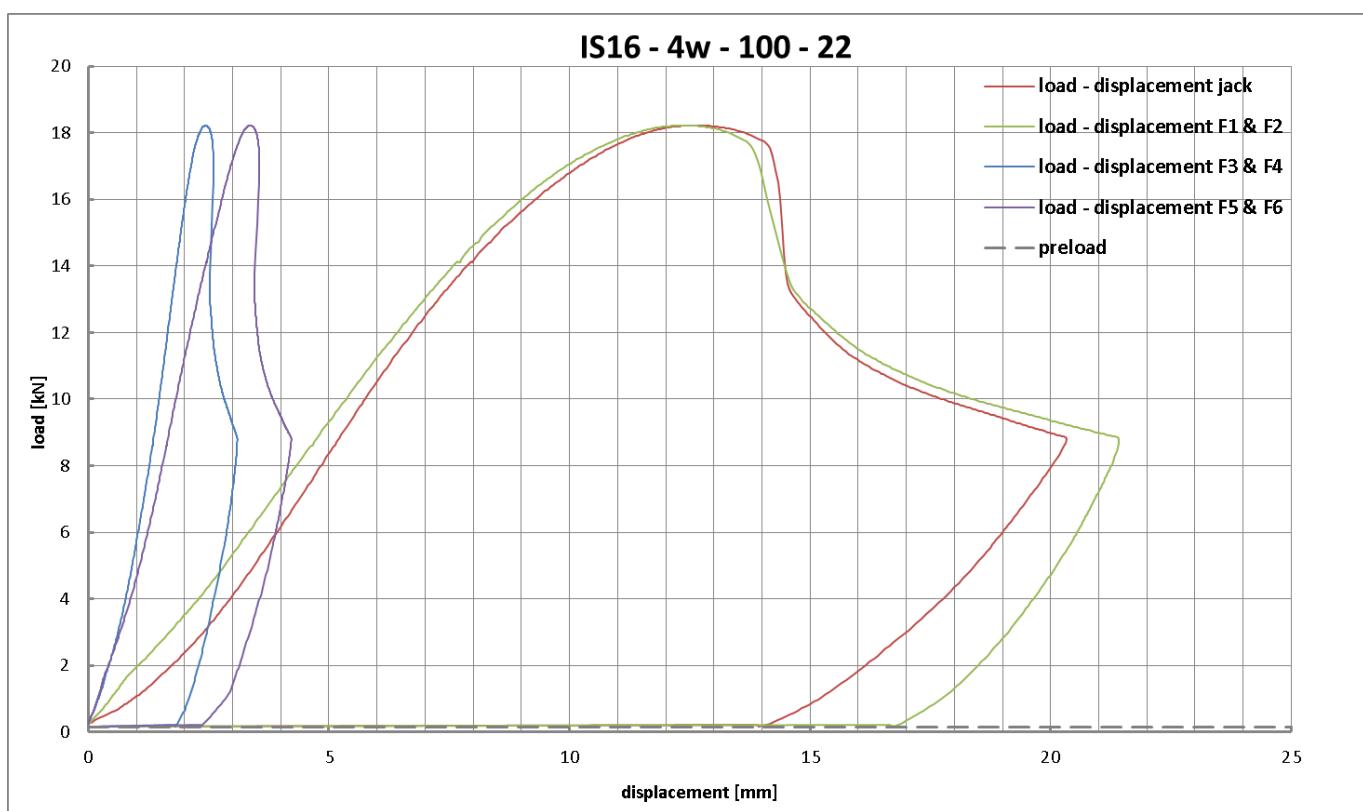
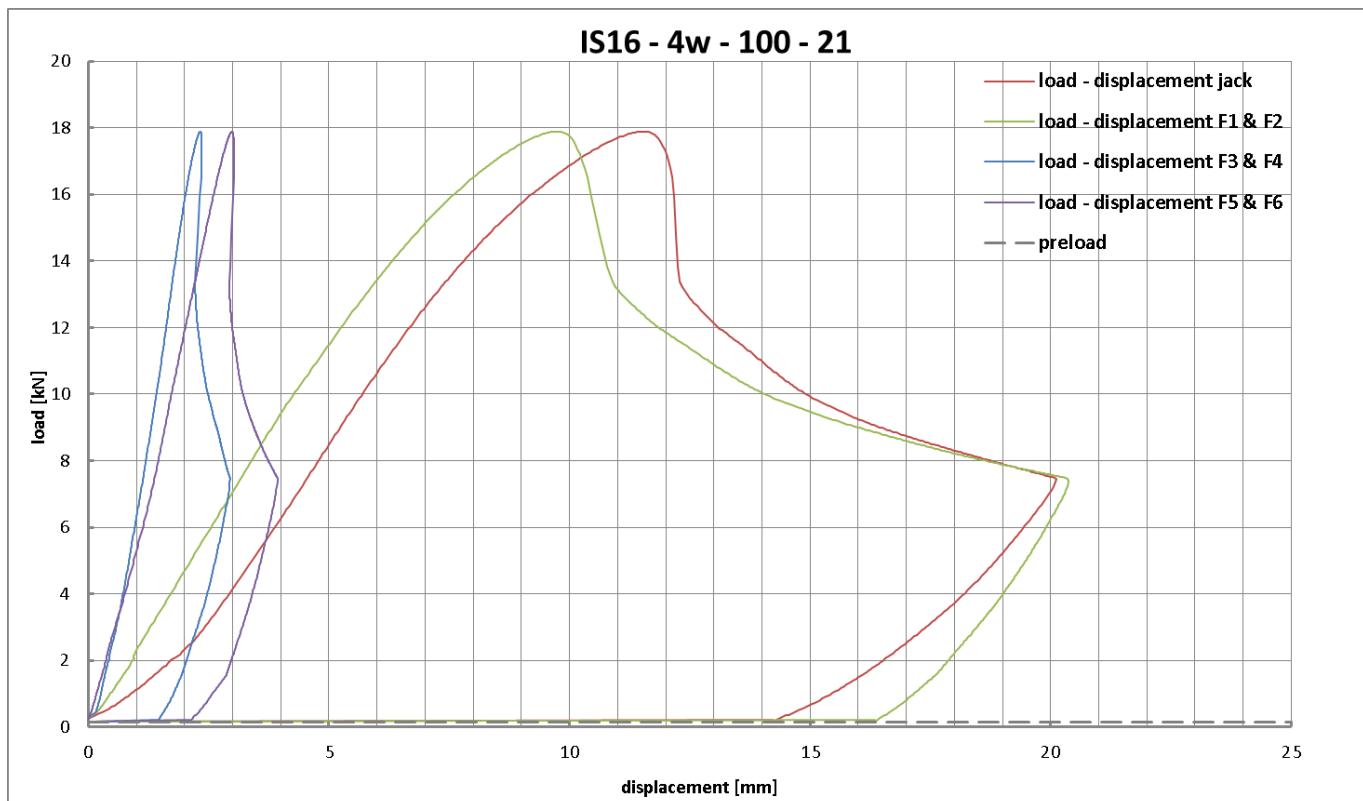


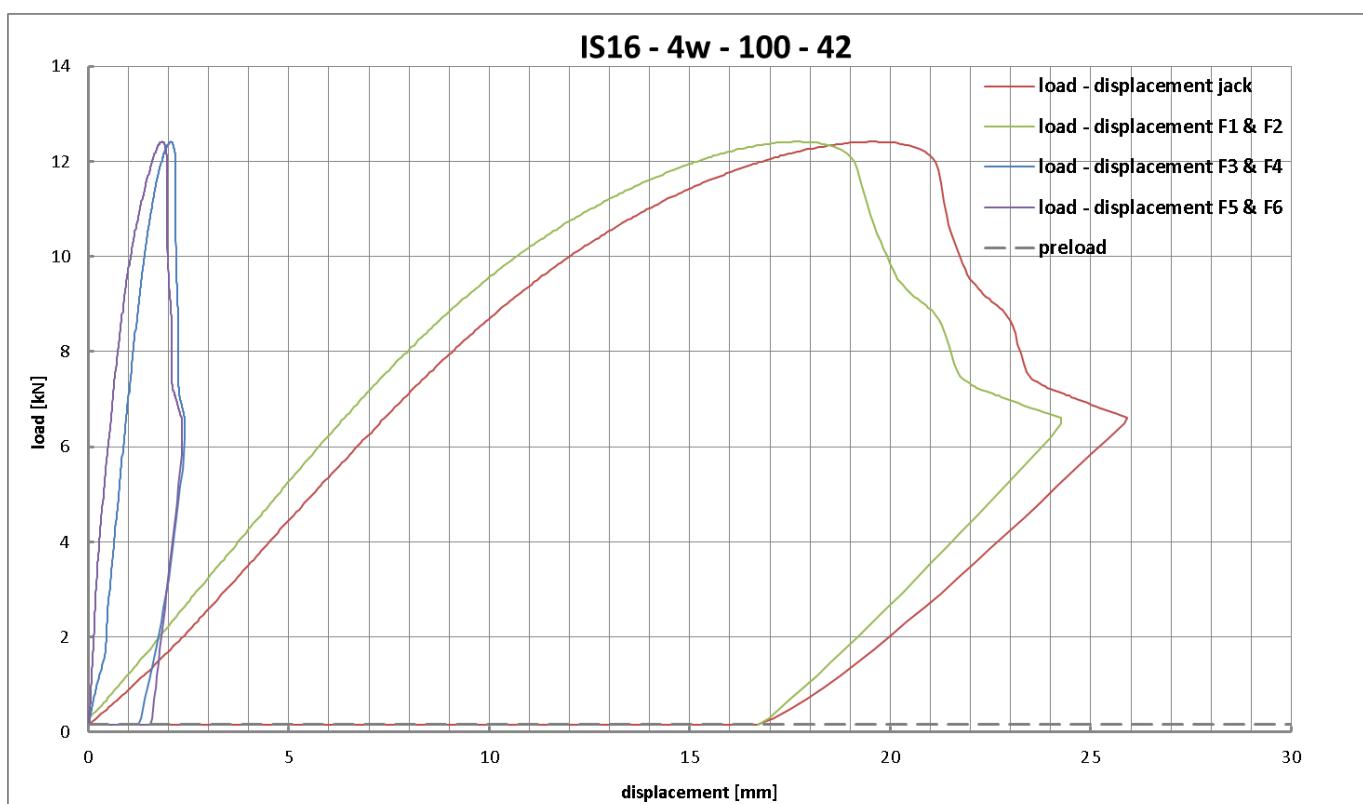


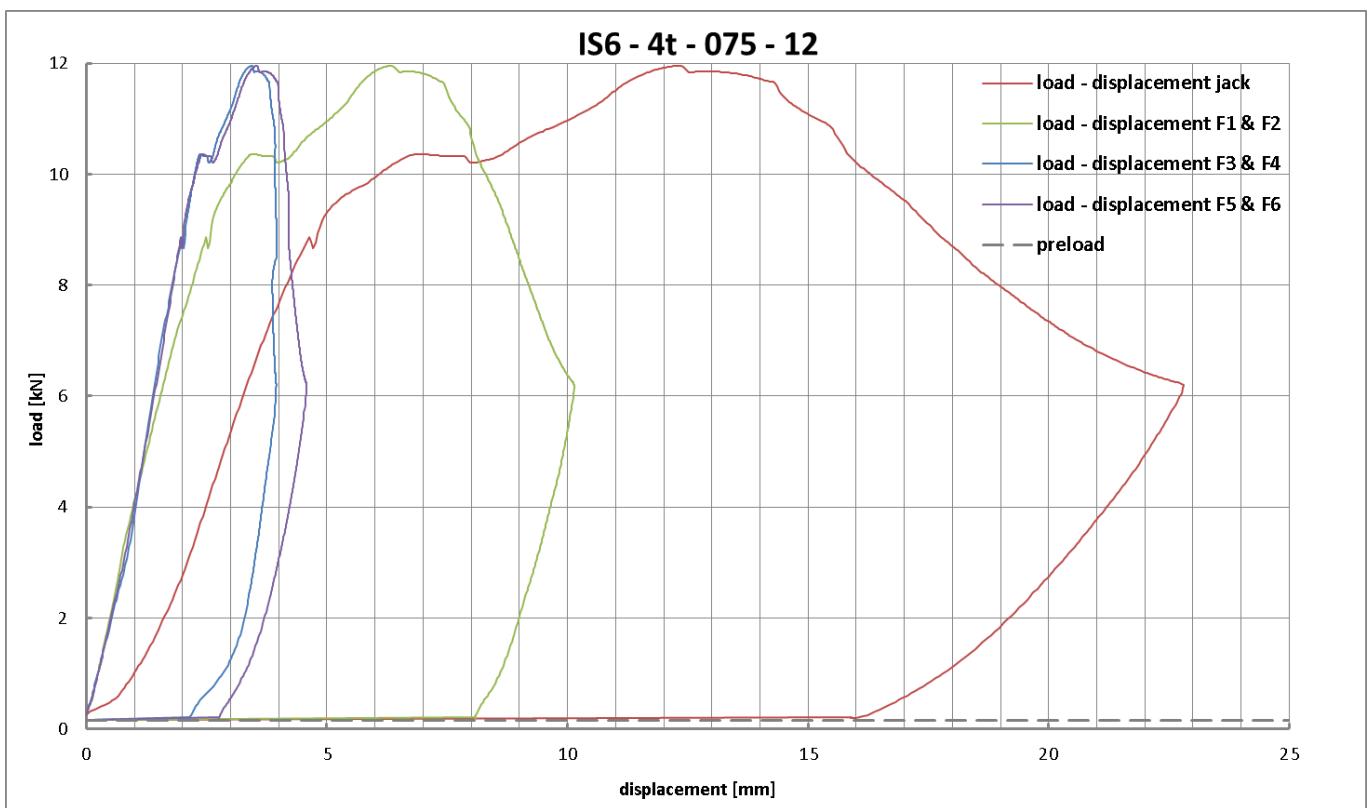
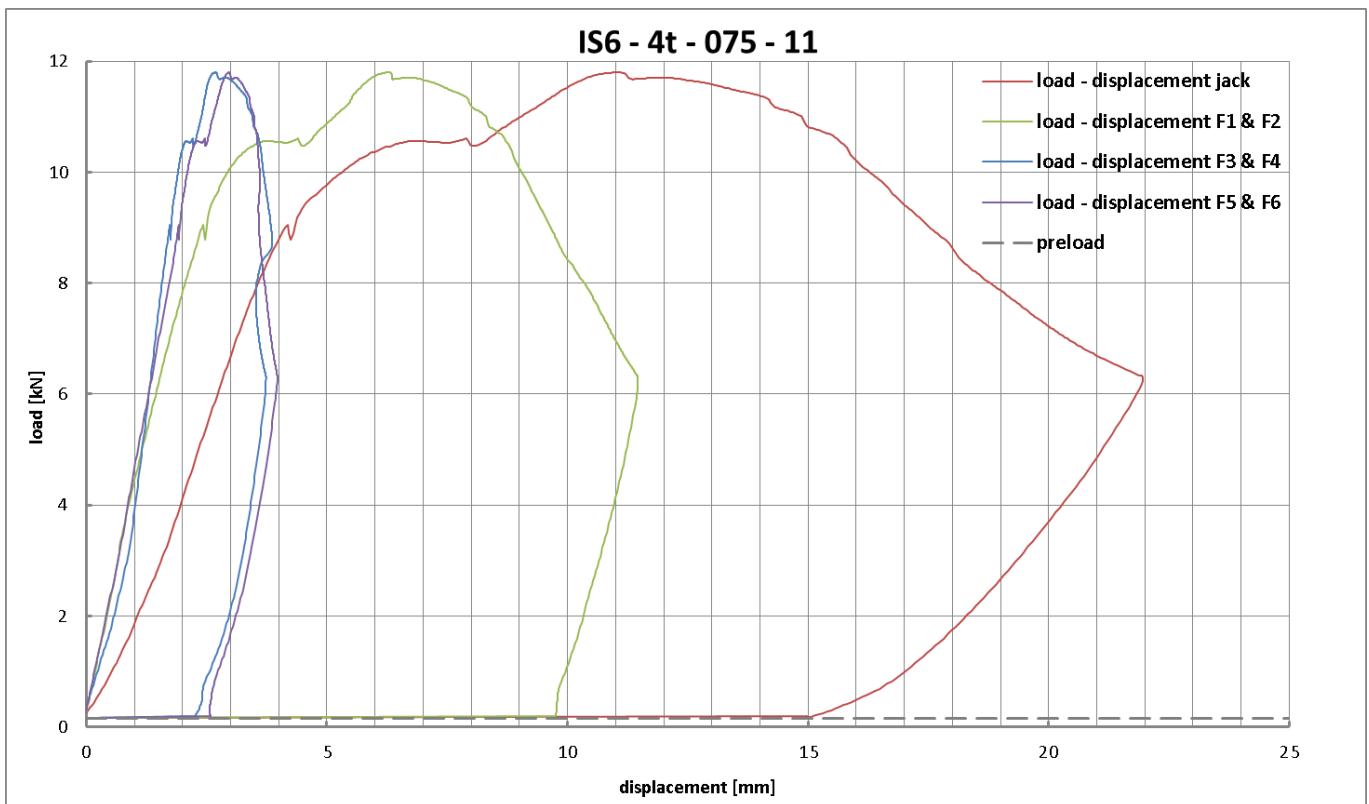


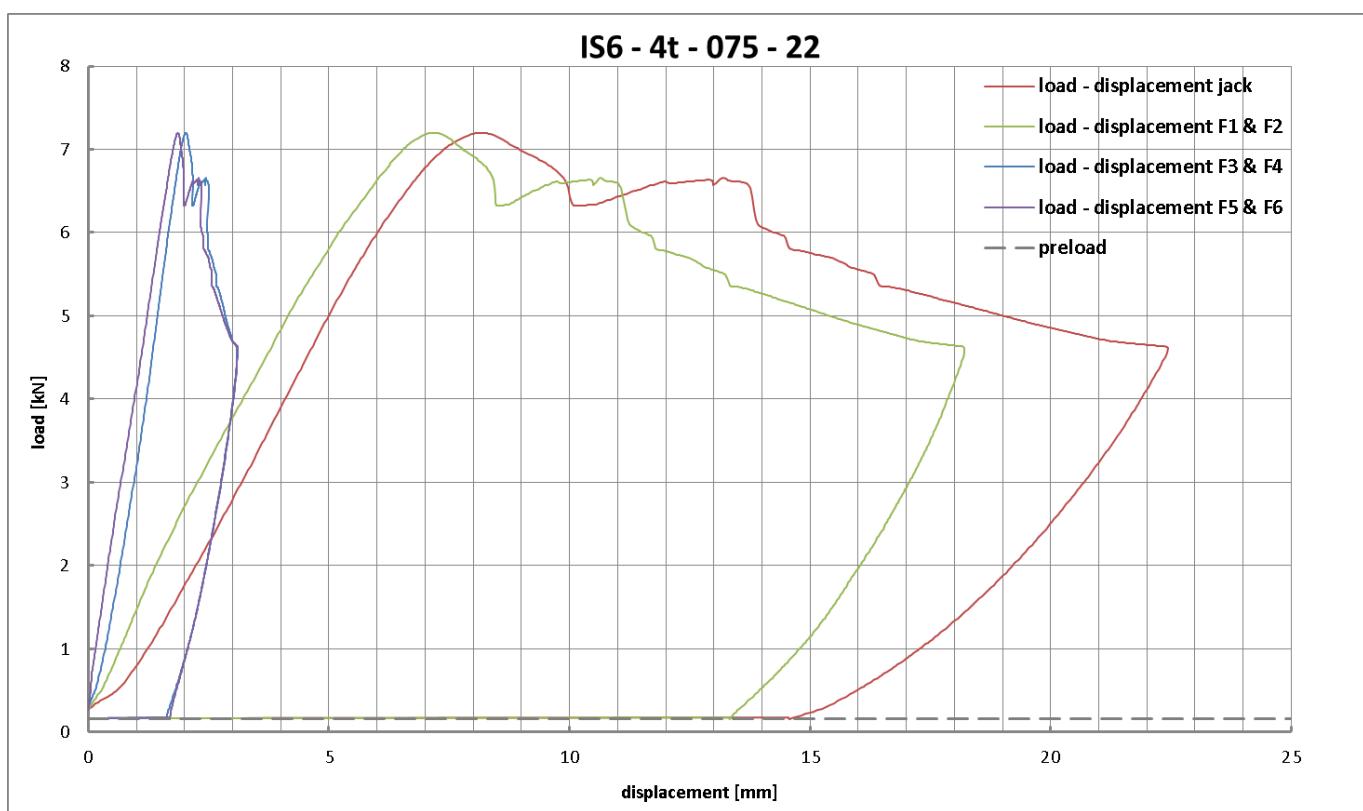
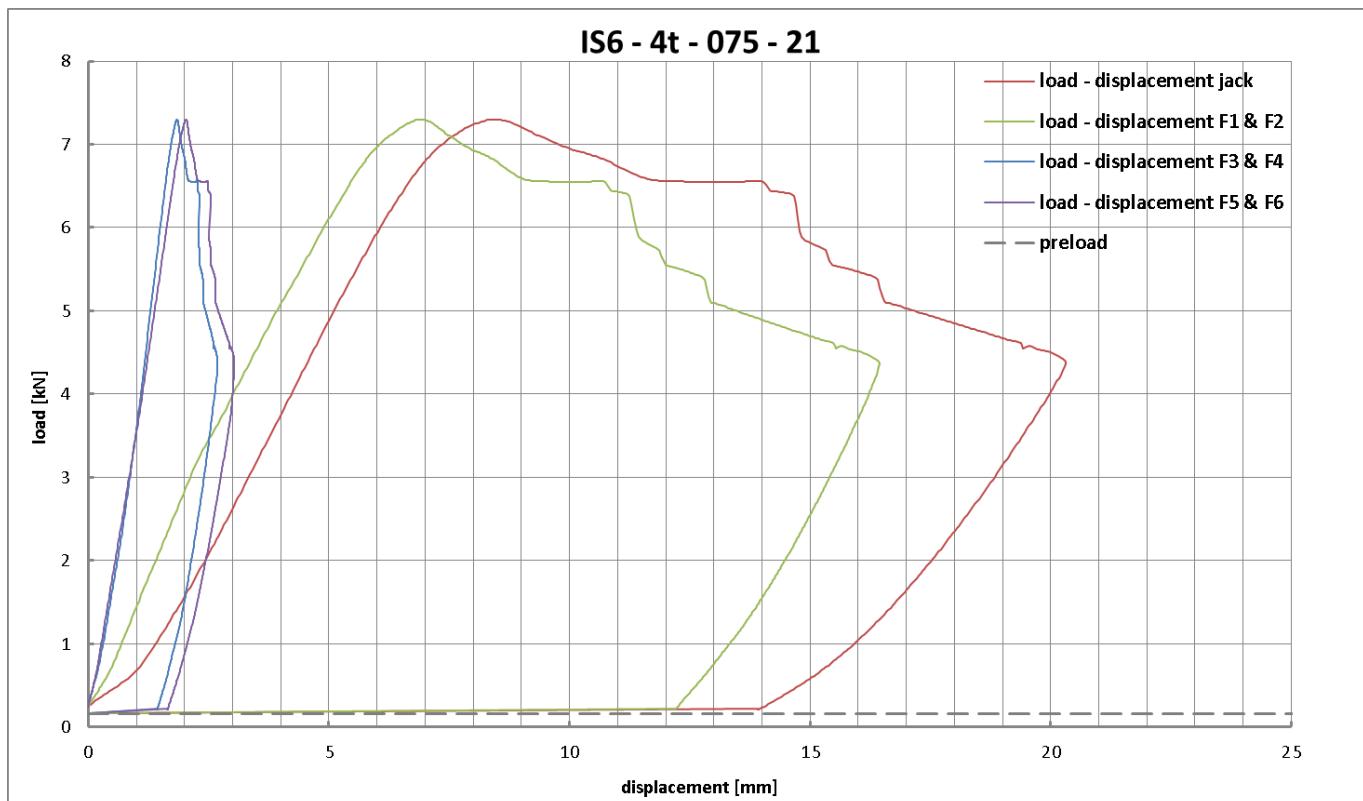


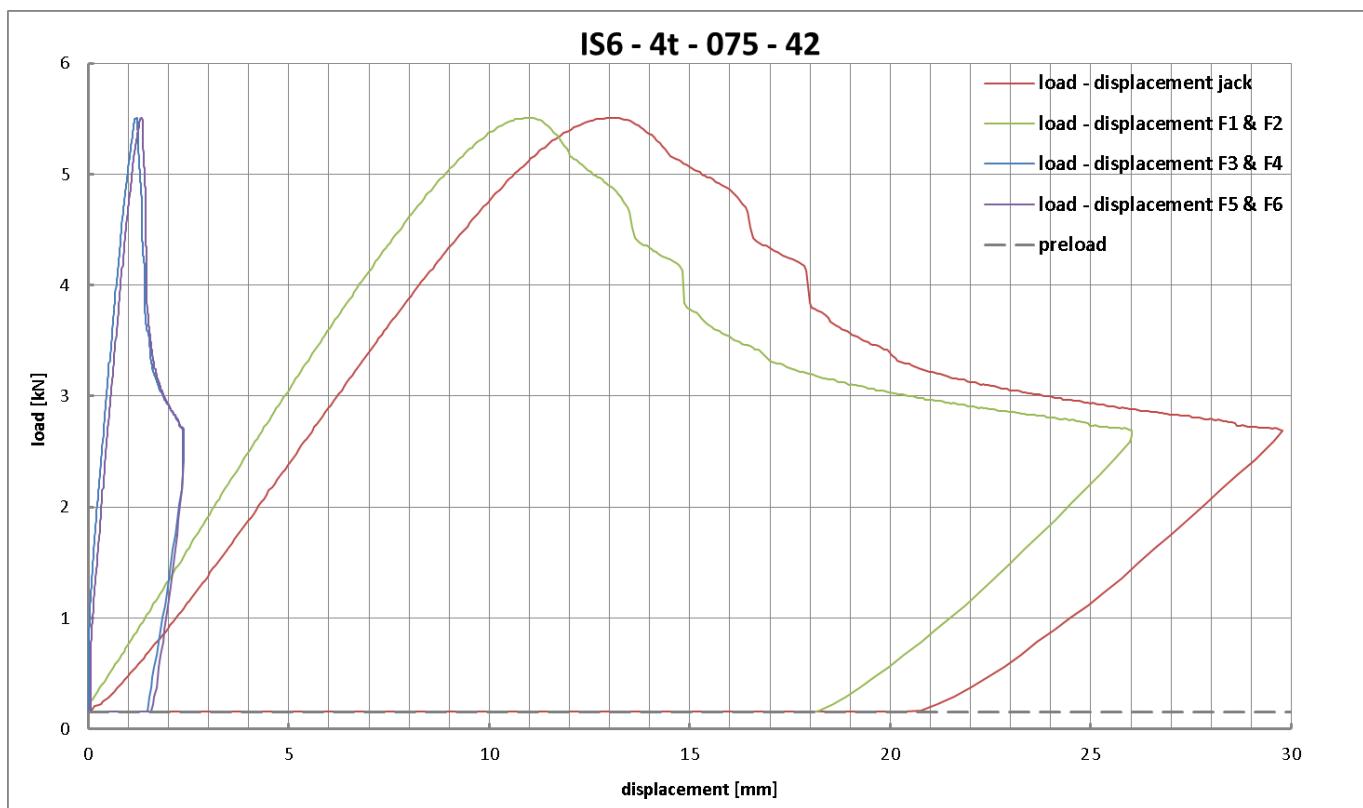
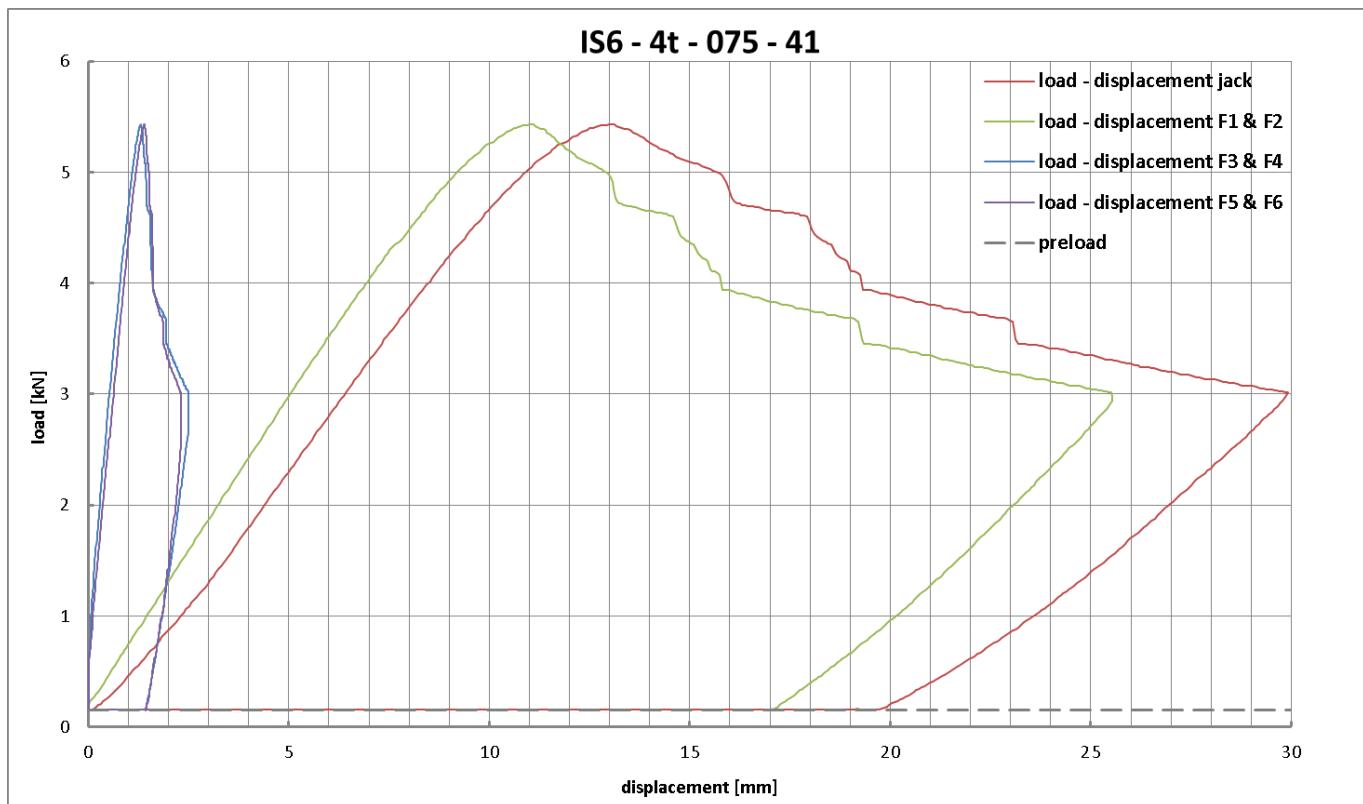


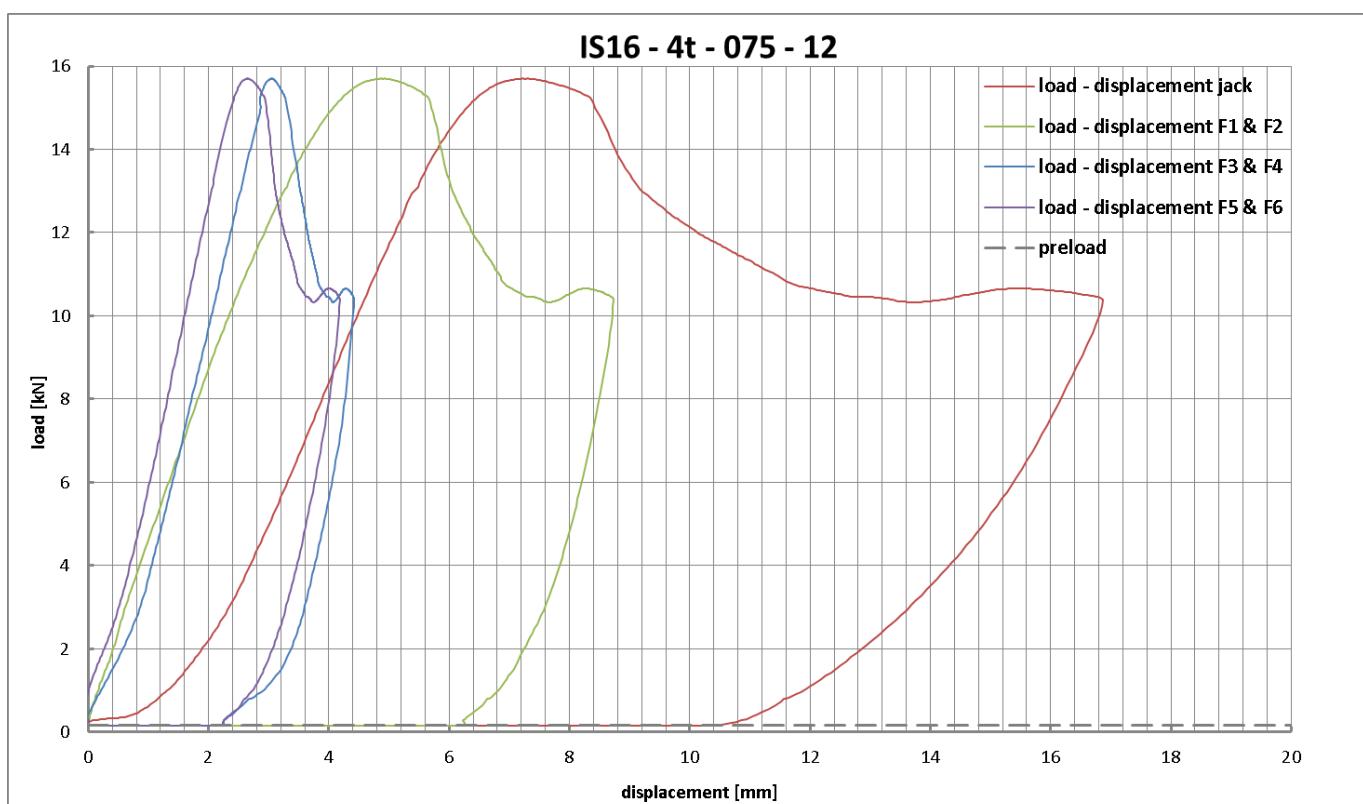
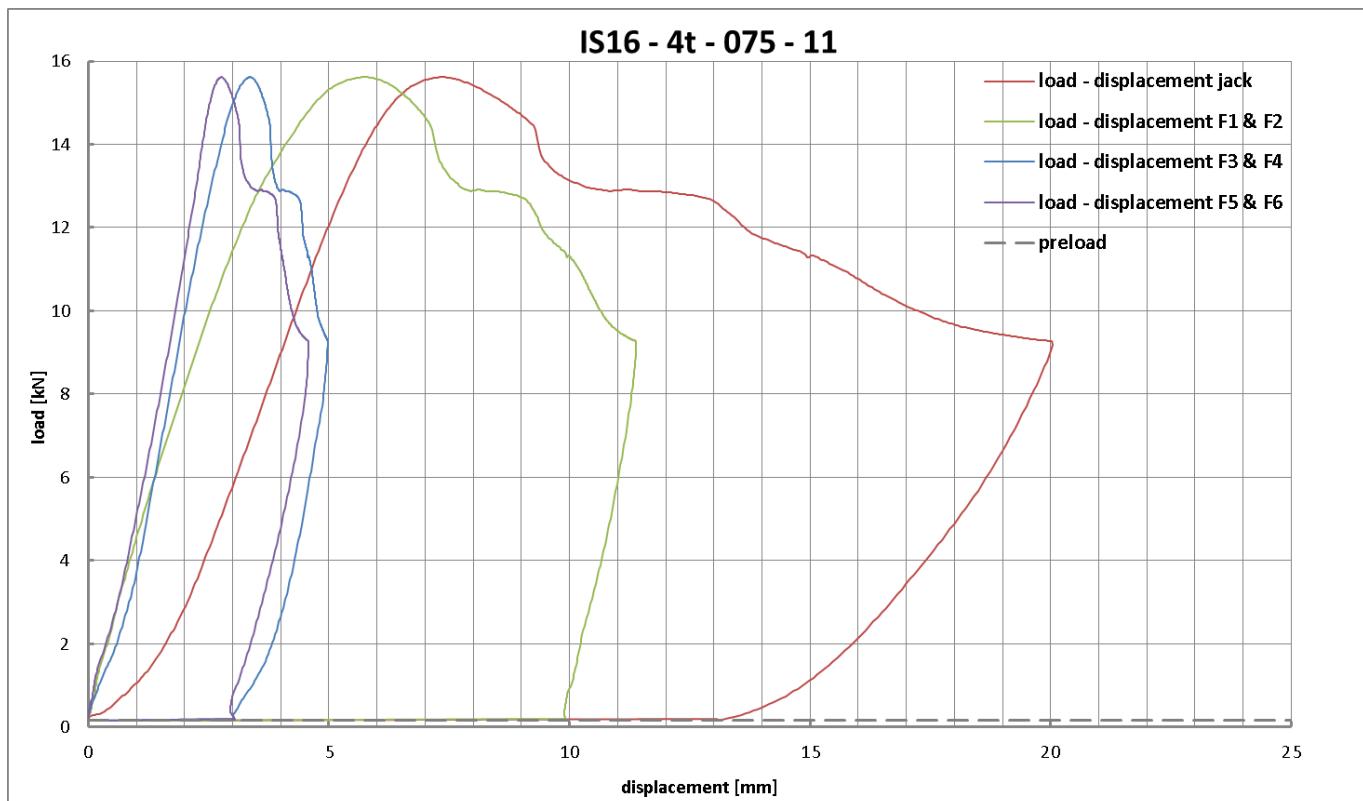


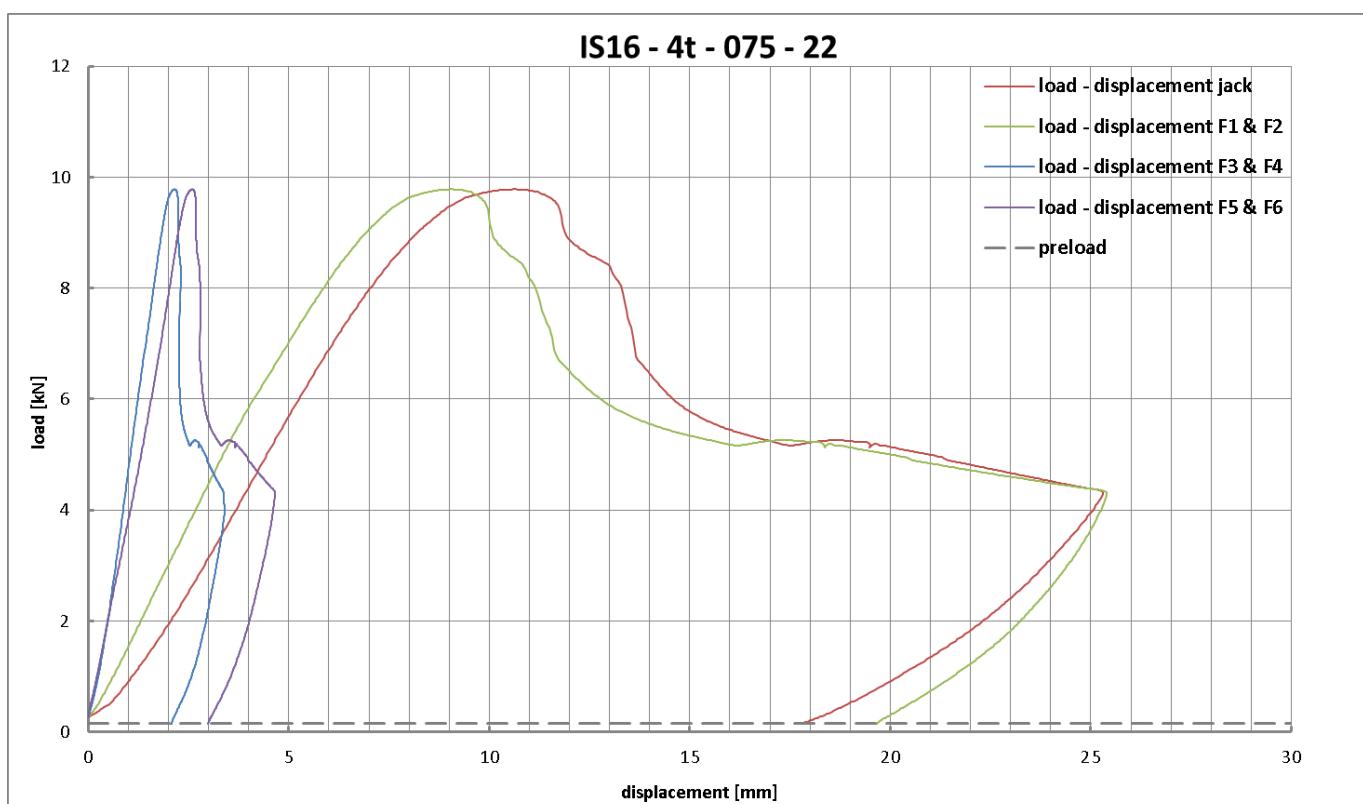
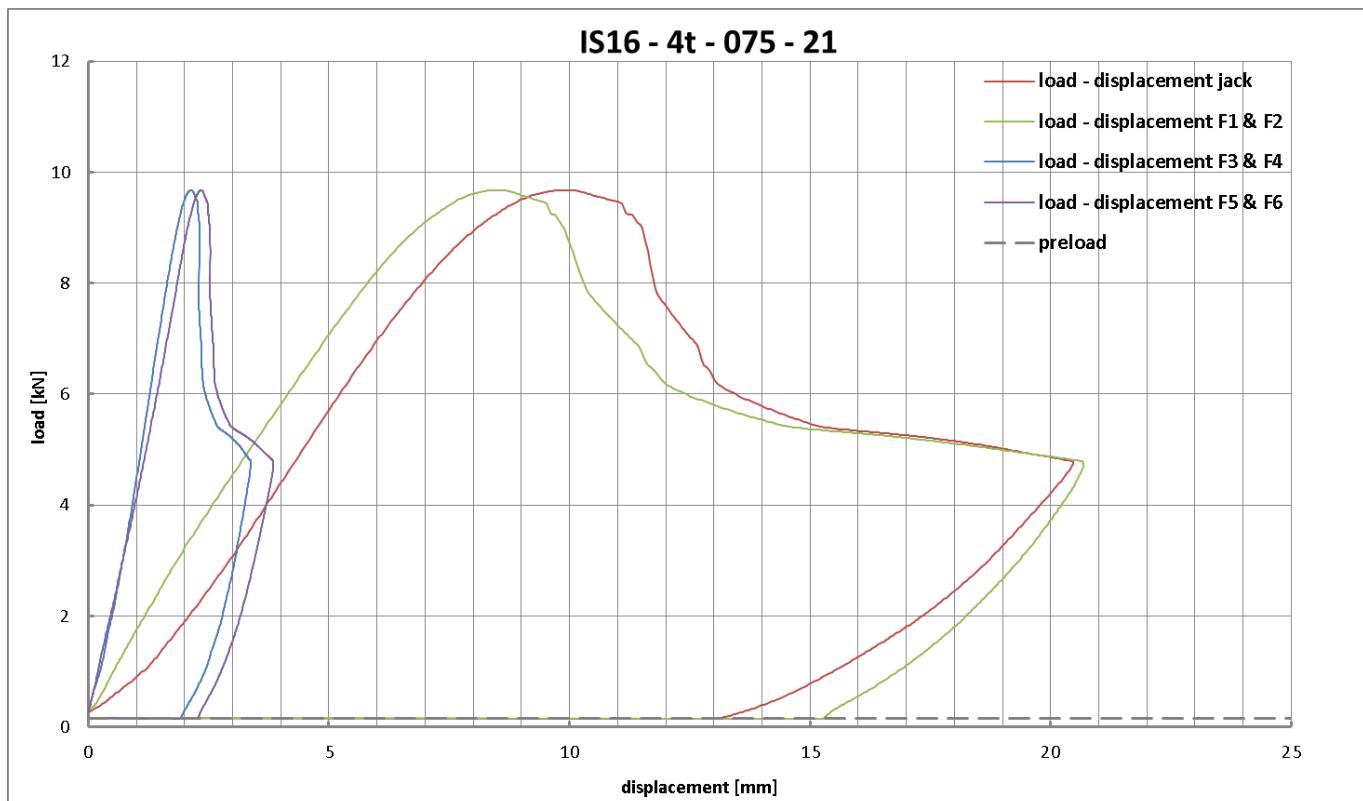


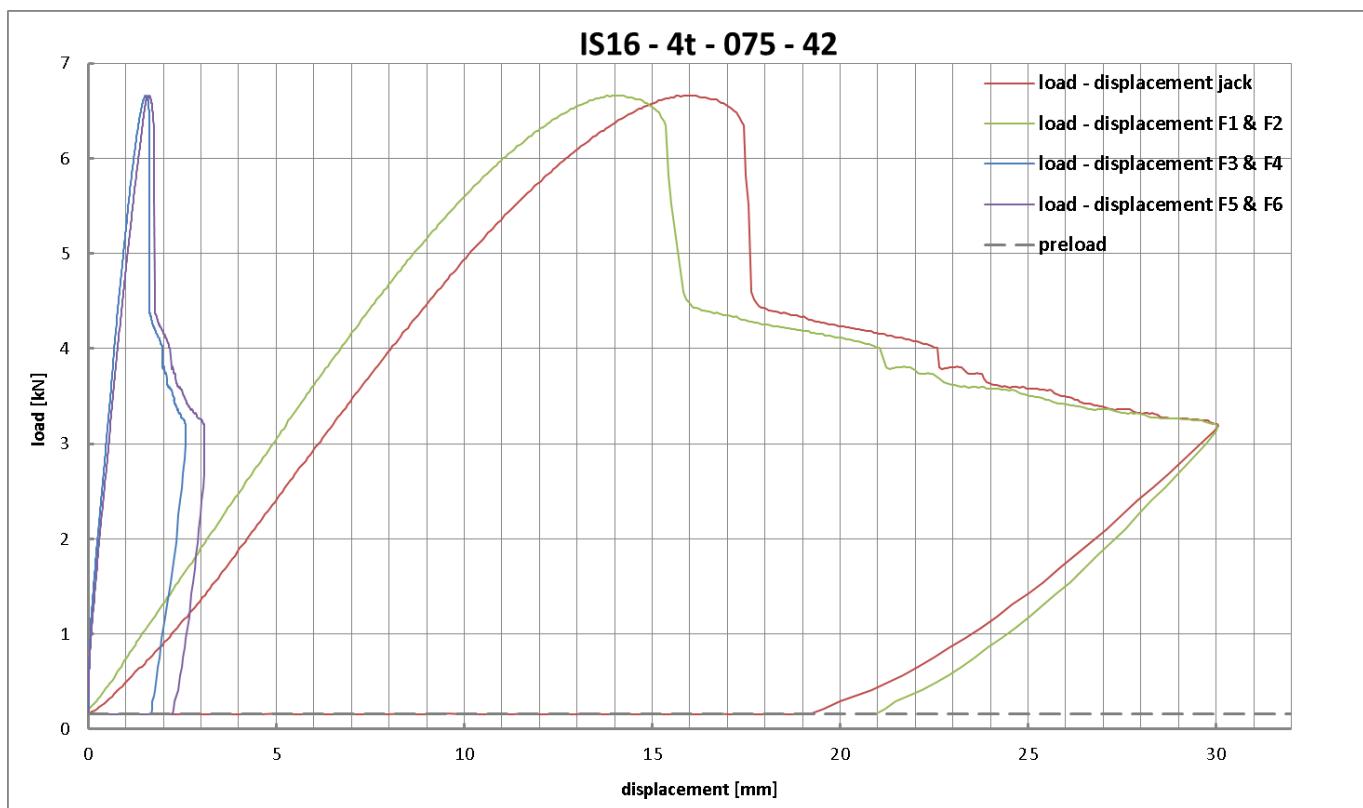
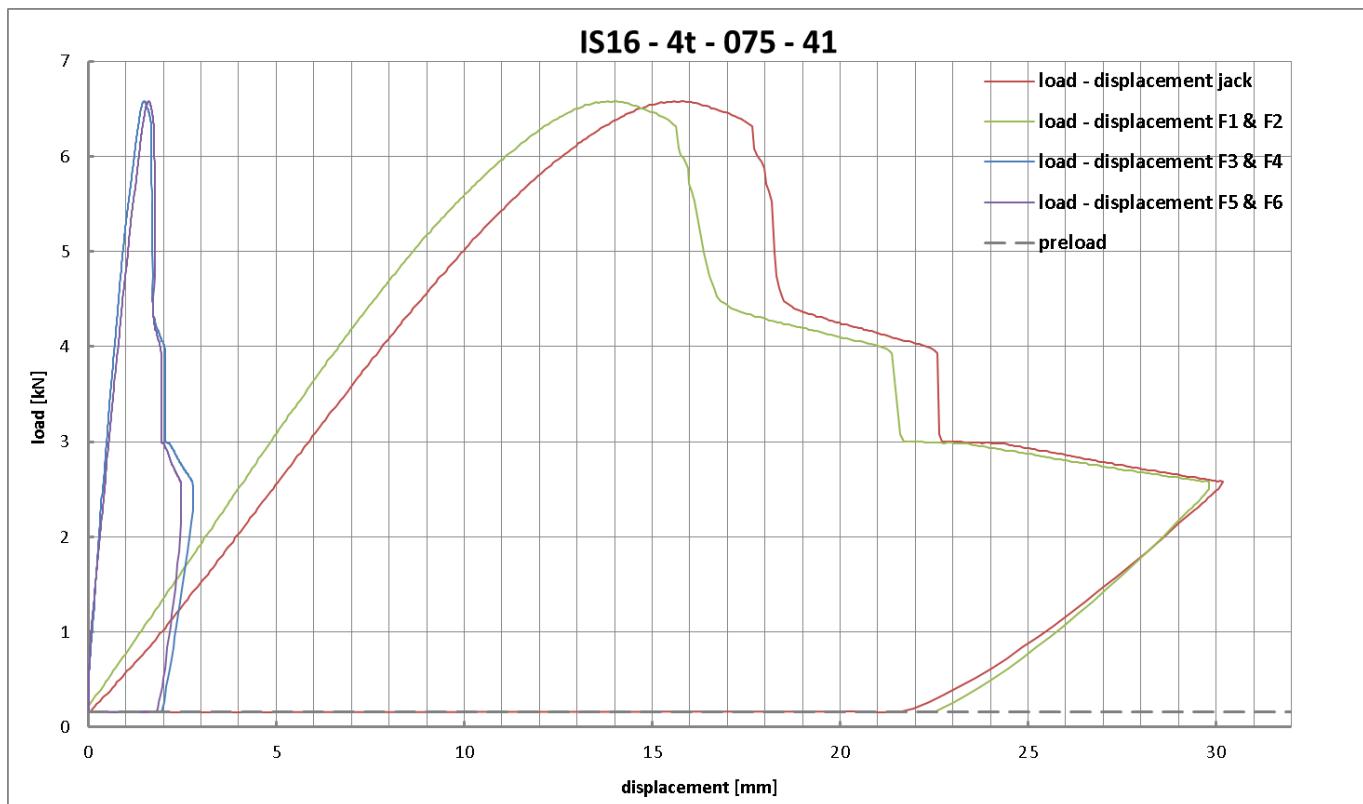


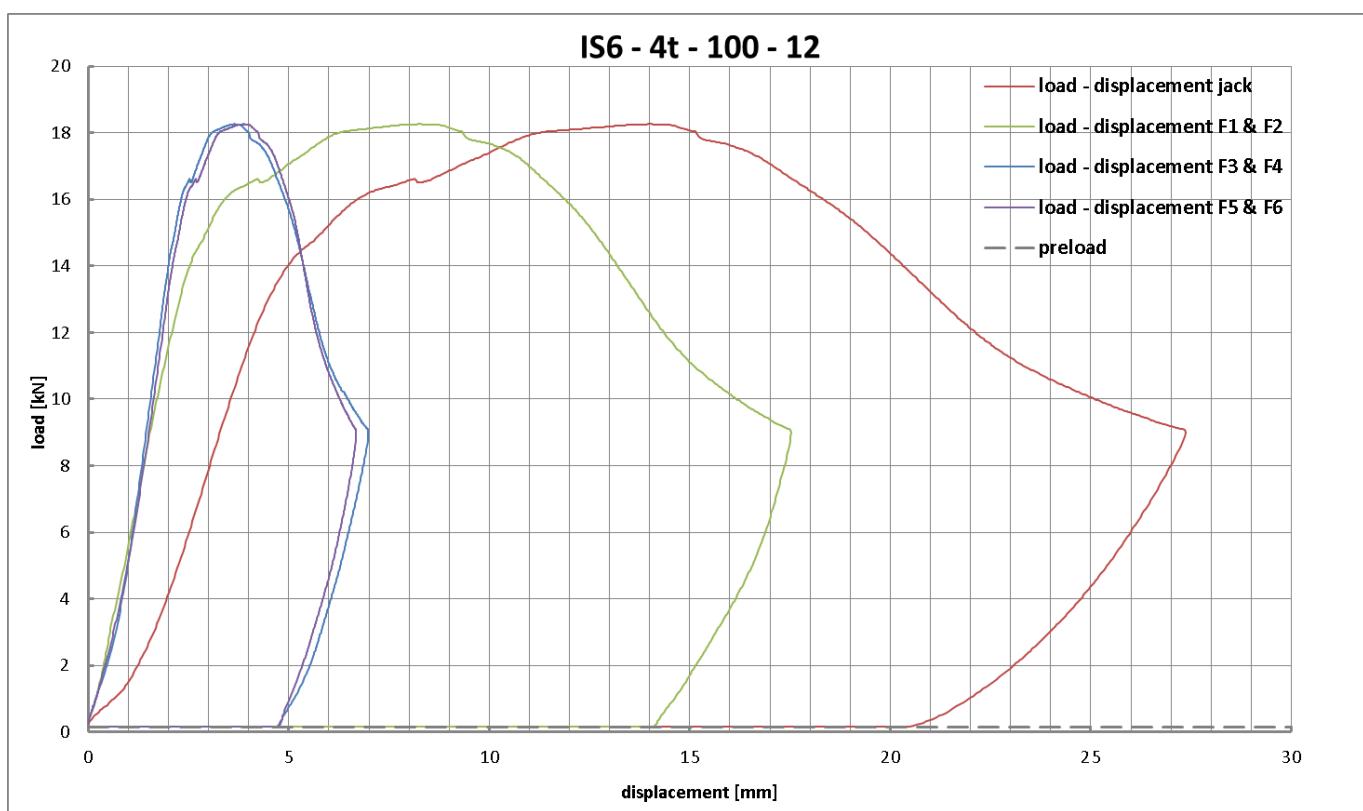
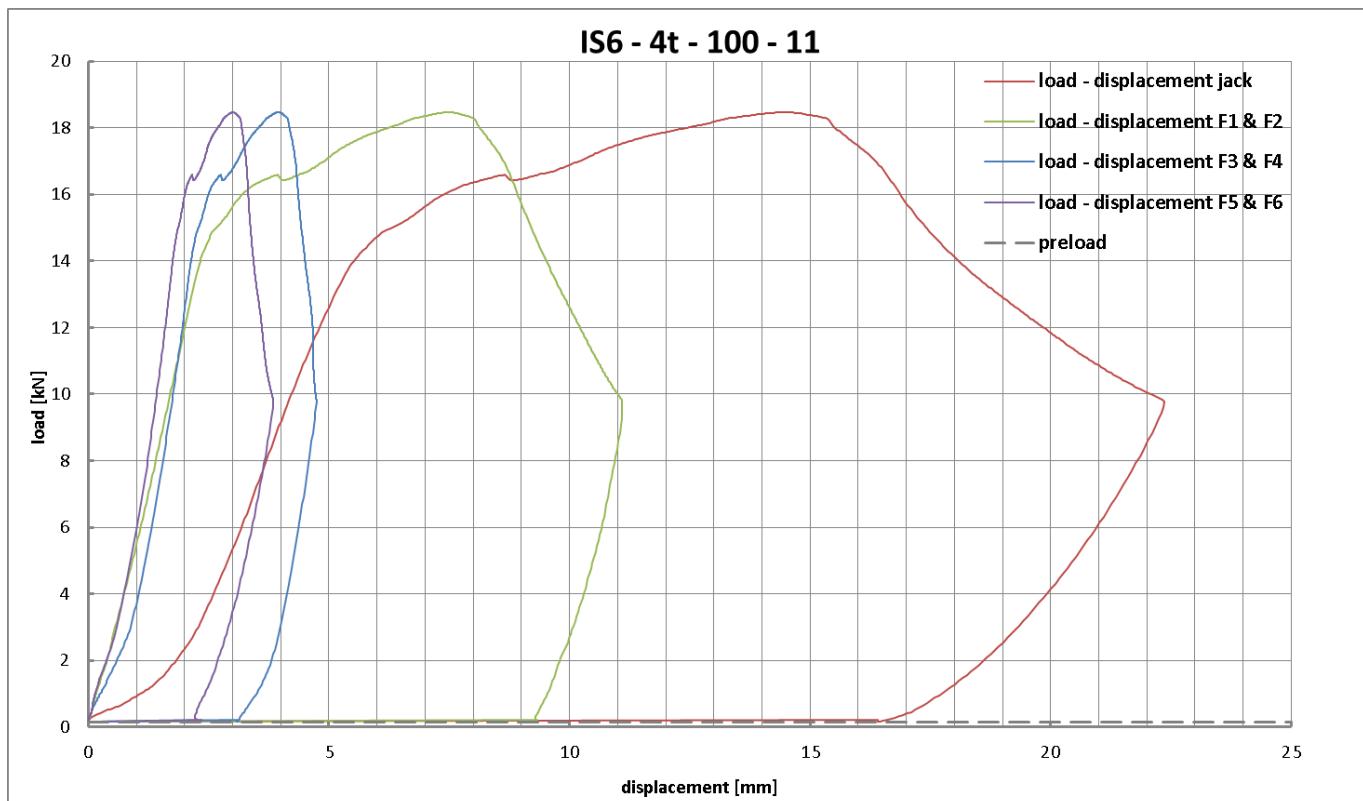


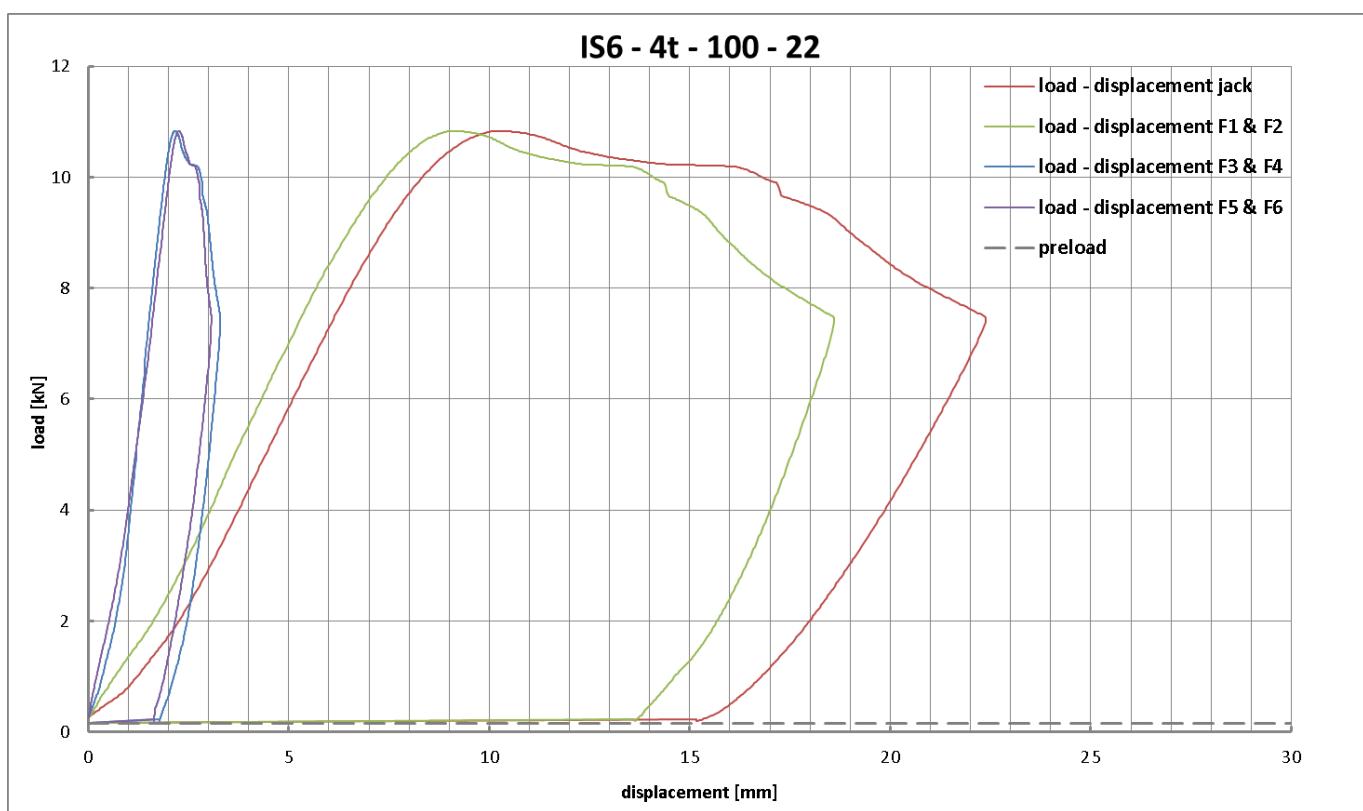
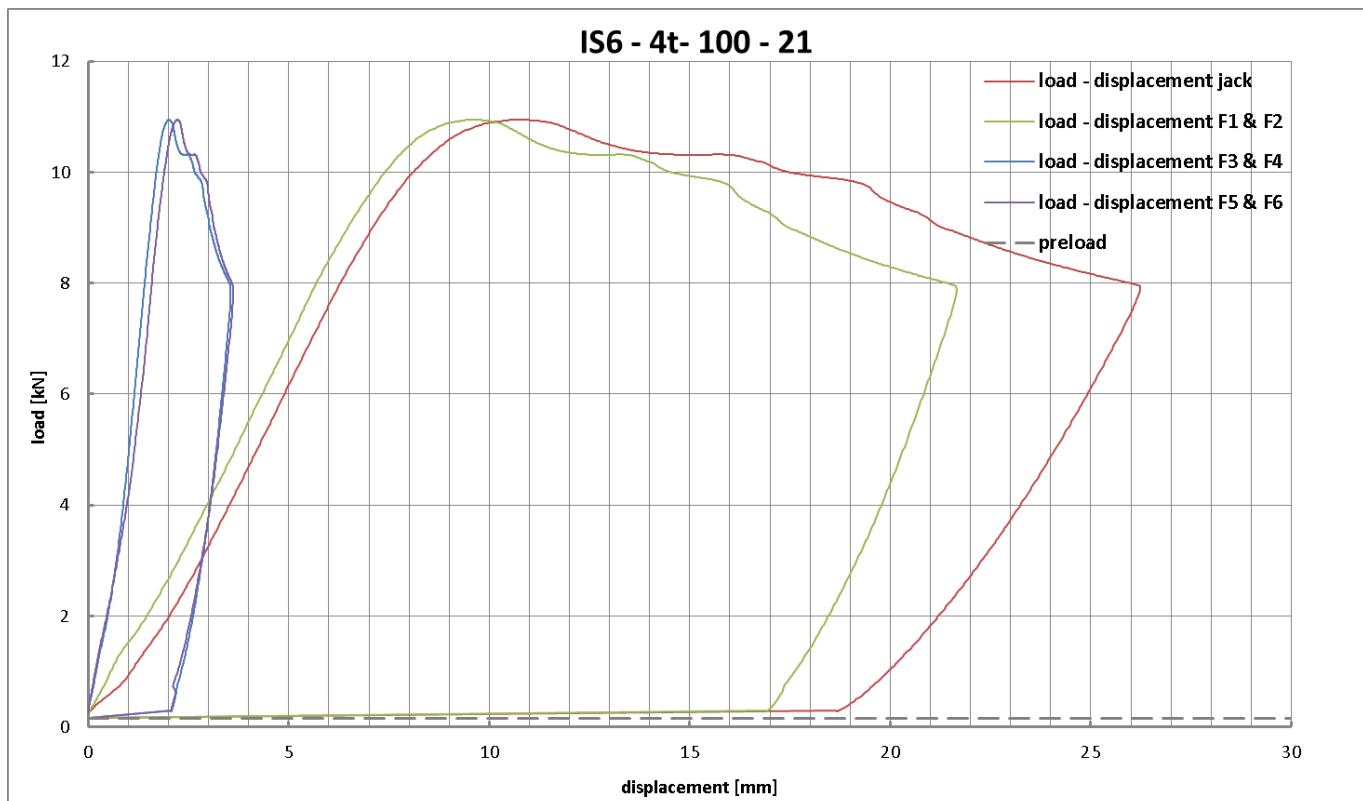


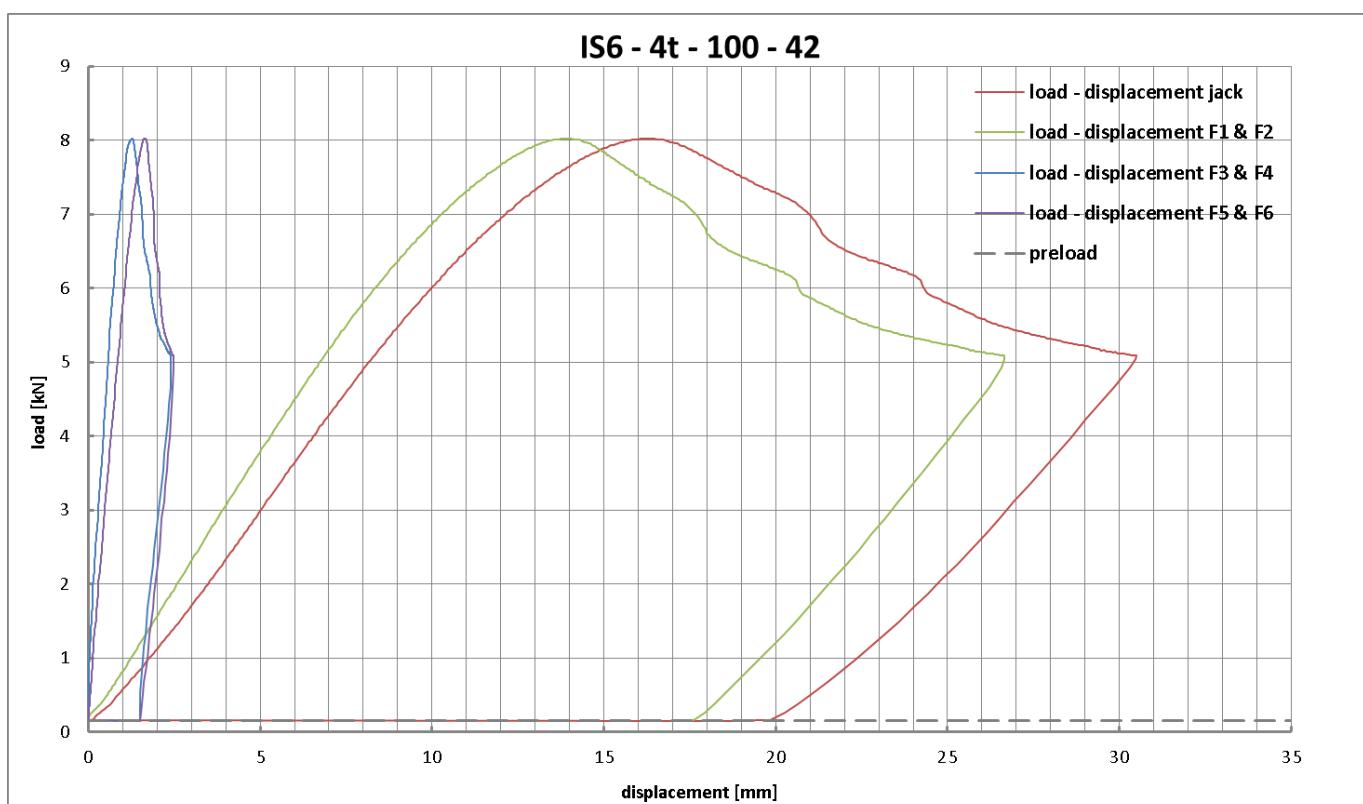
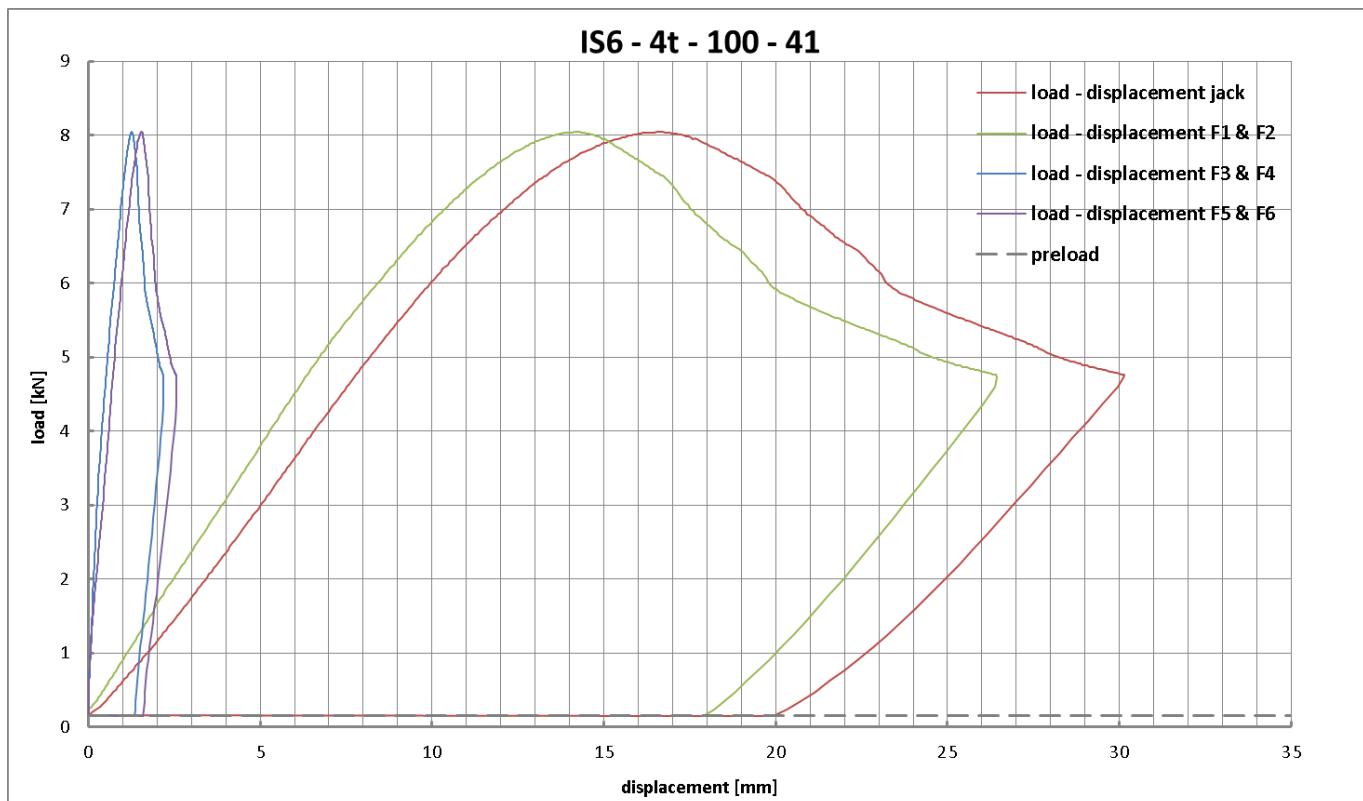


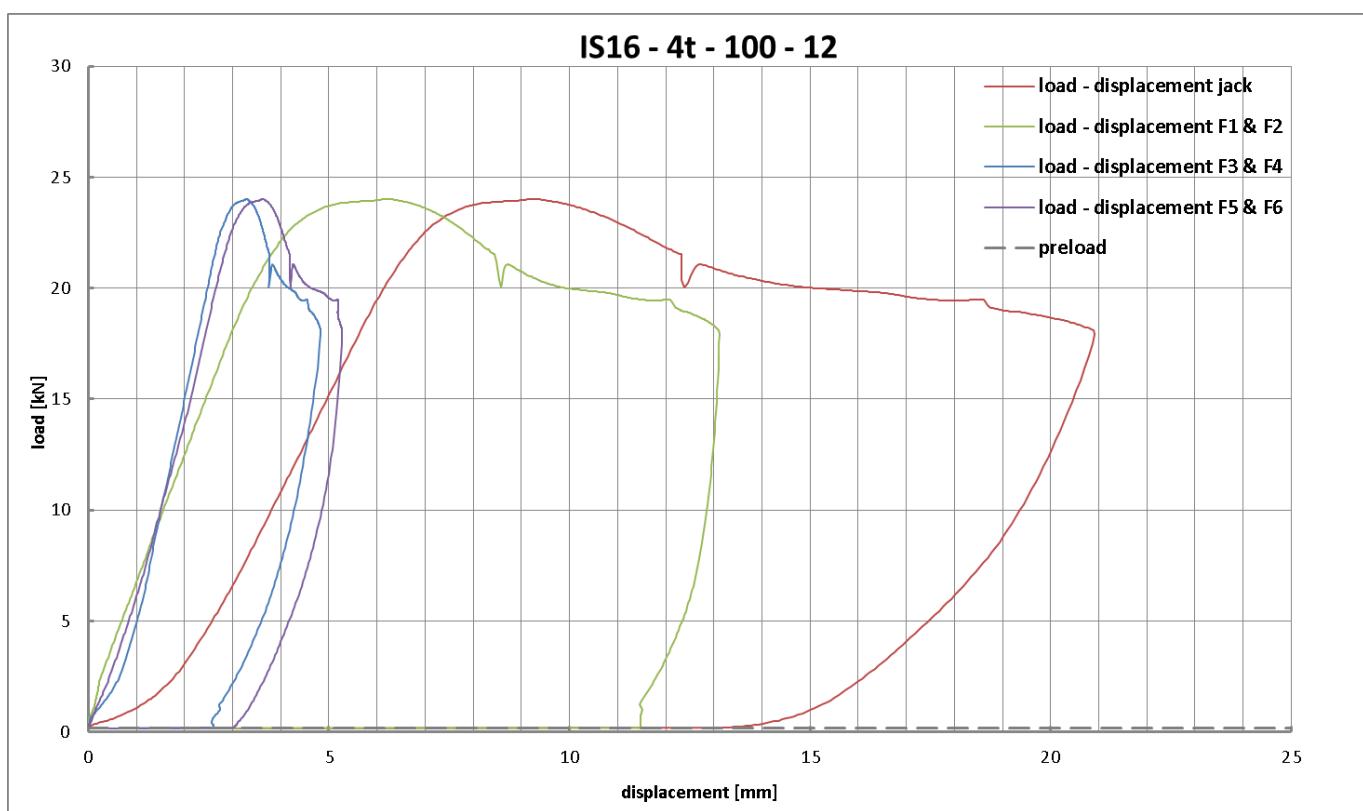
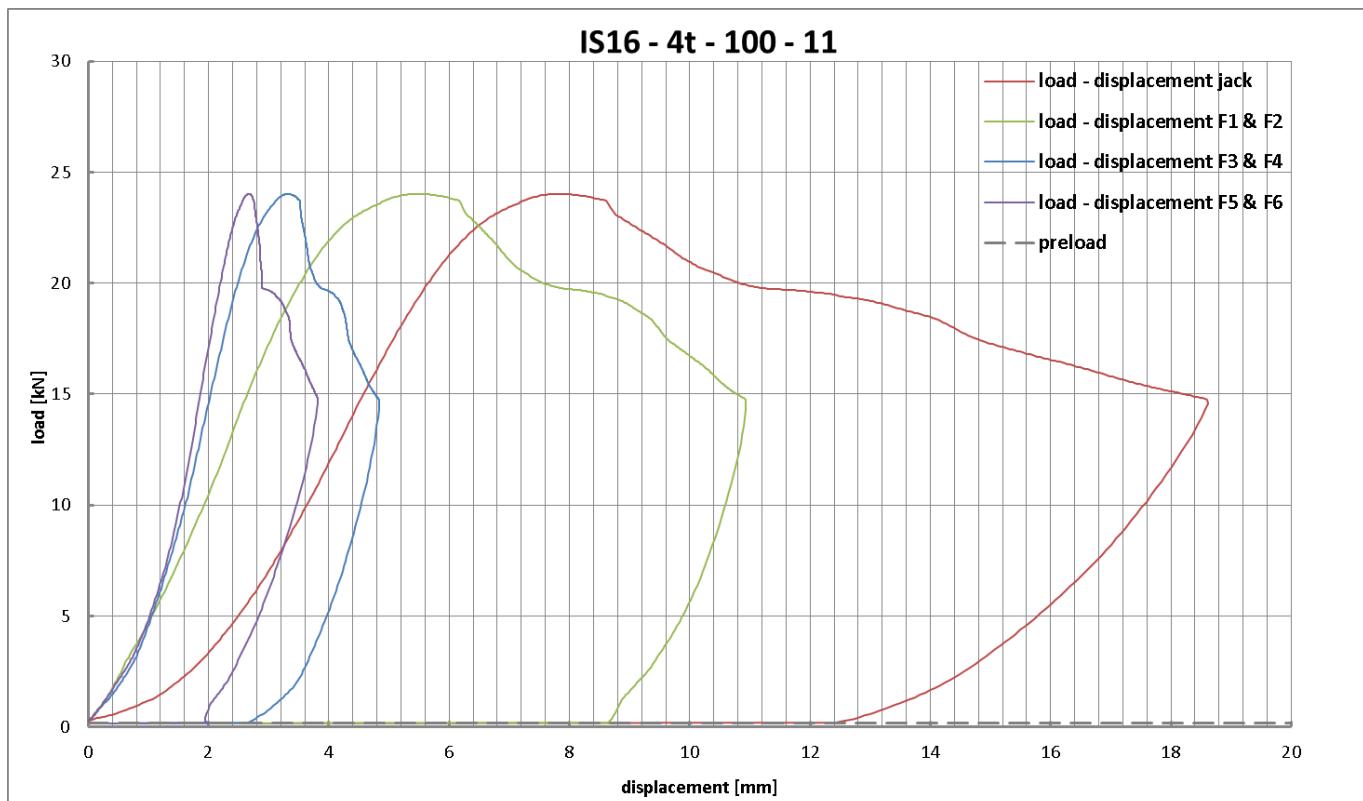


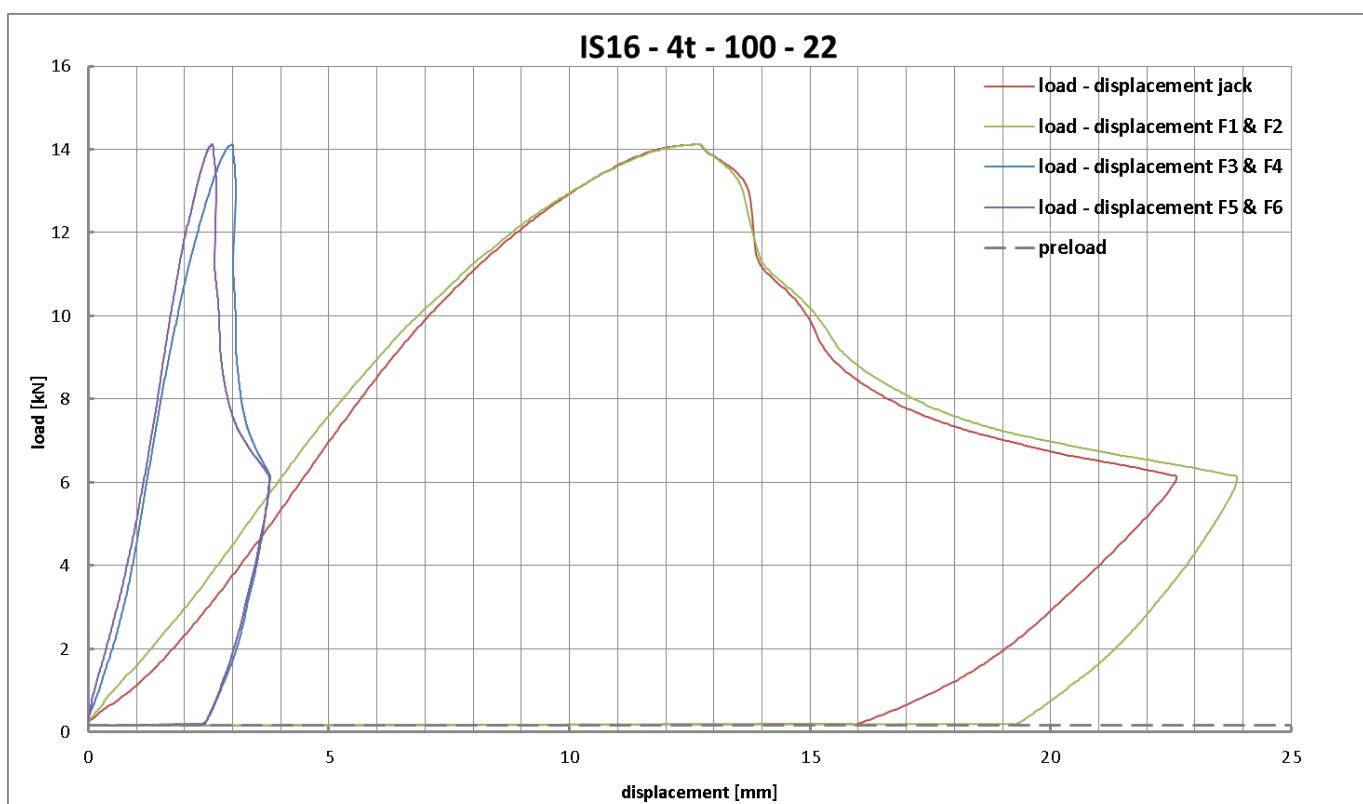
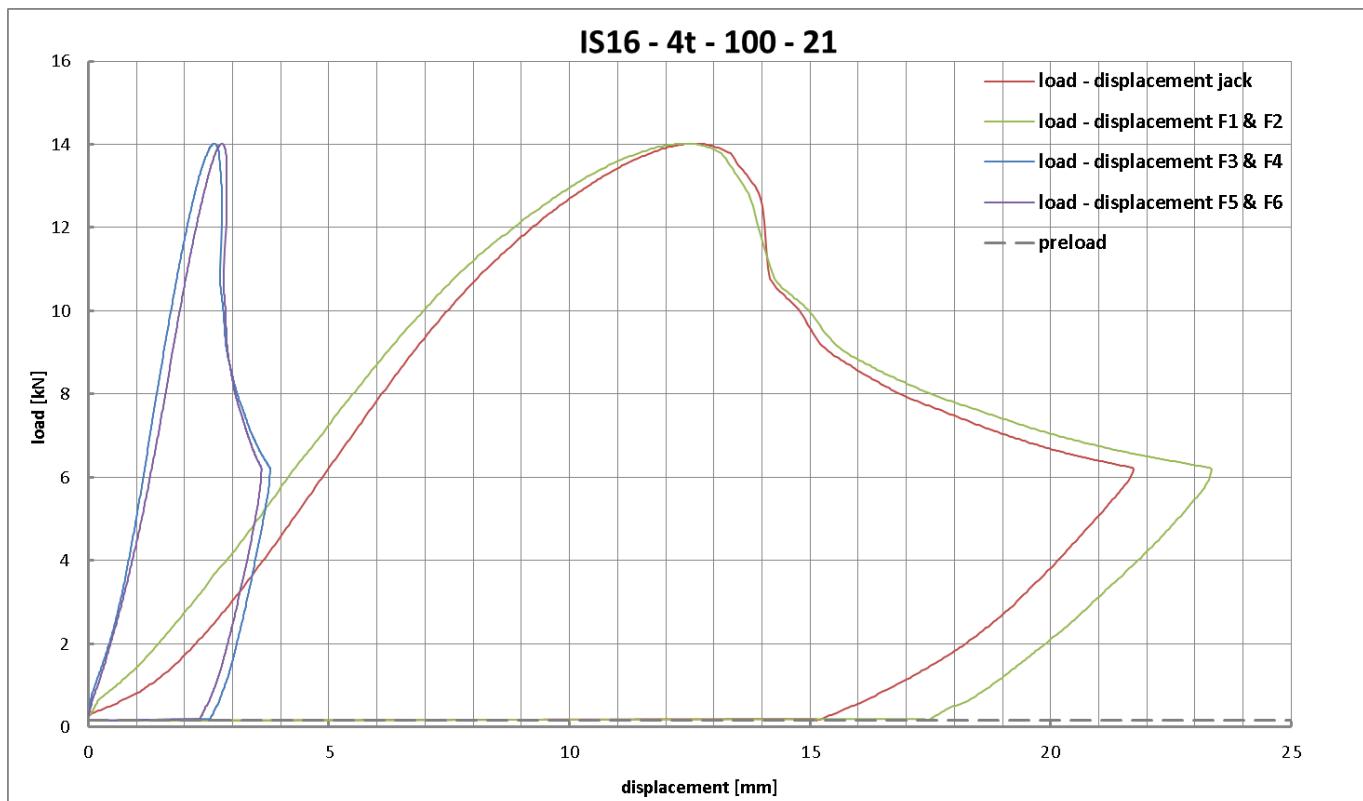


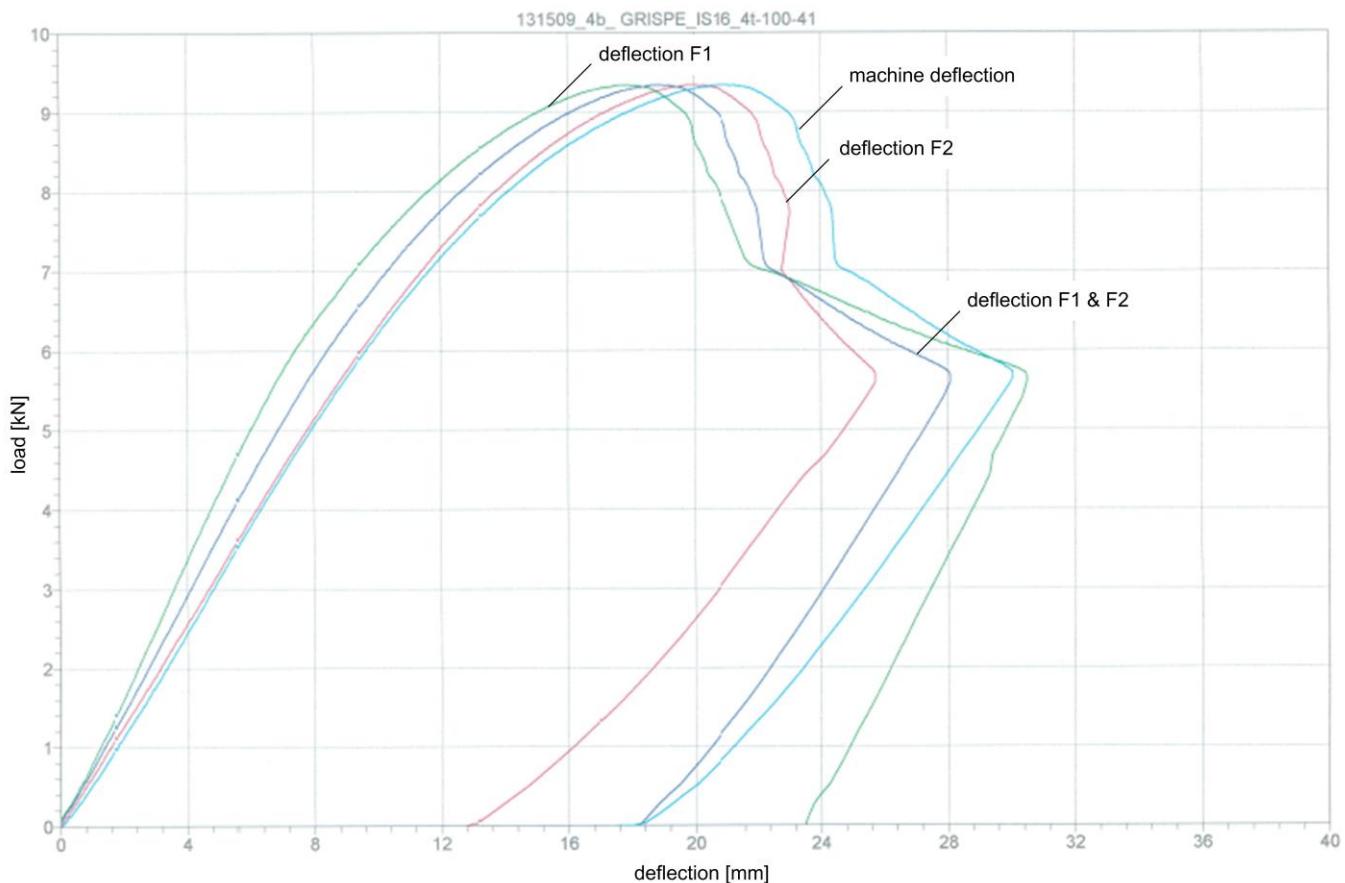




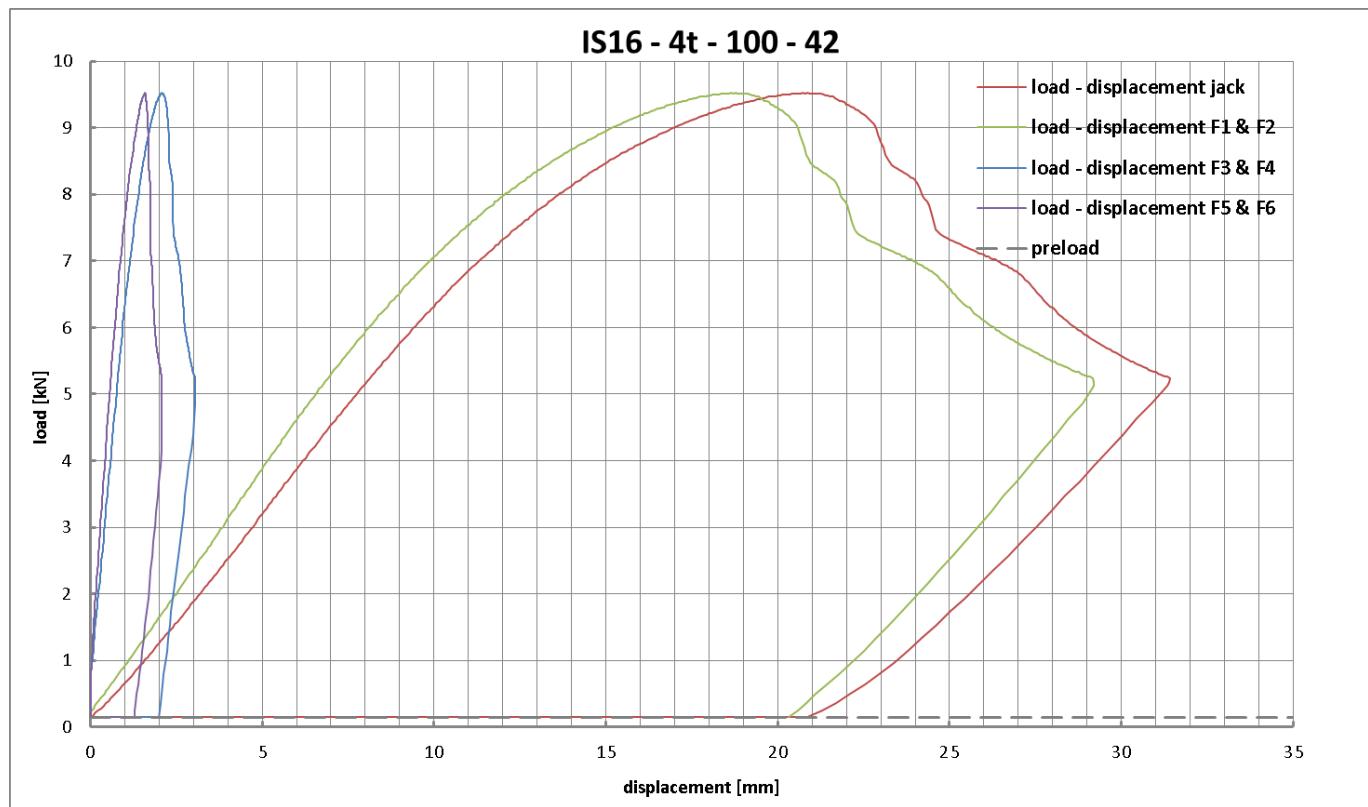








(copy of the load-deflection plot of the test machine)



## 4 Annex D: End support test with downward load

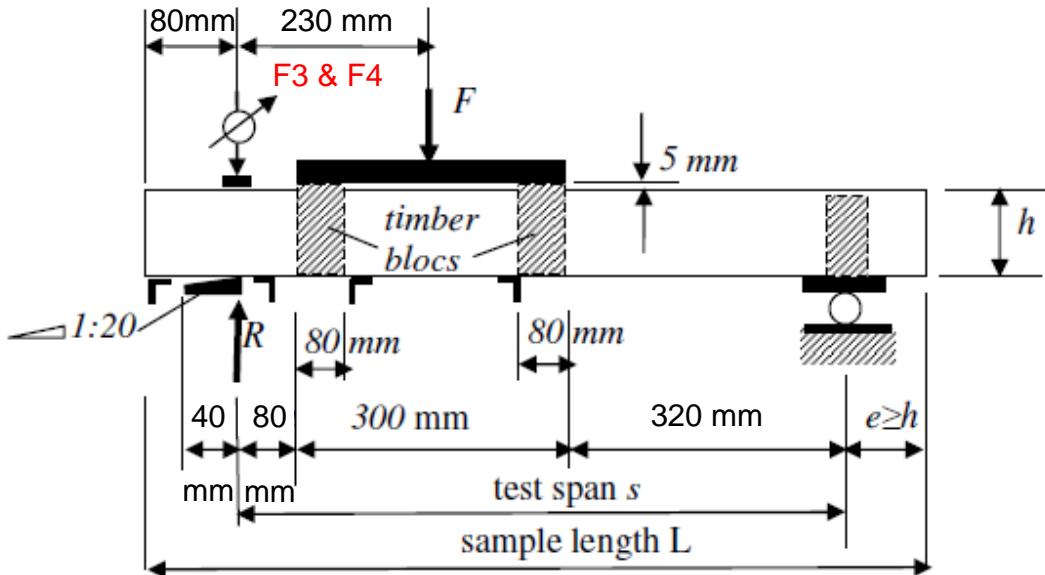


Figure D.1a: Schematic test setup (with and without triangle perforation)

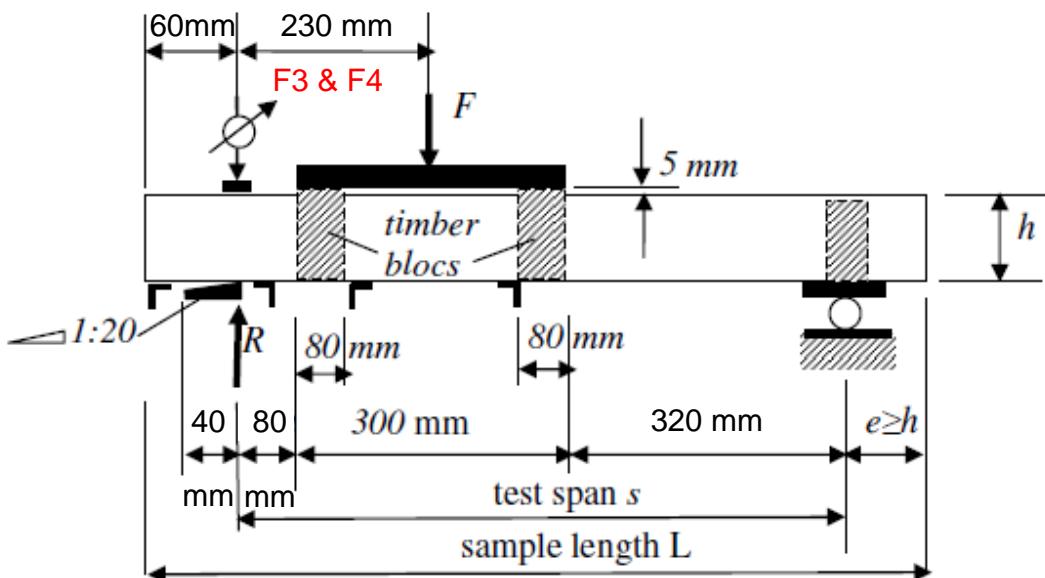


Figure D.1b: Schematic test setup (with and without square perforation)

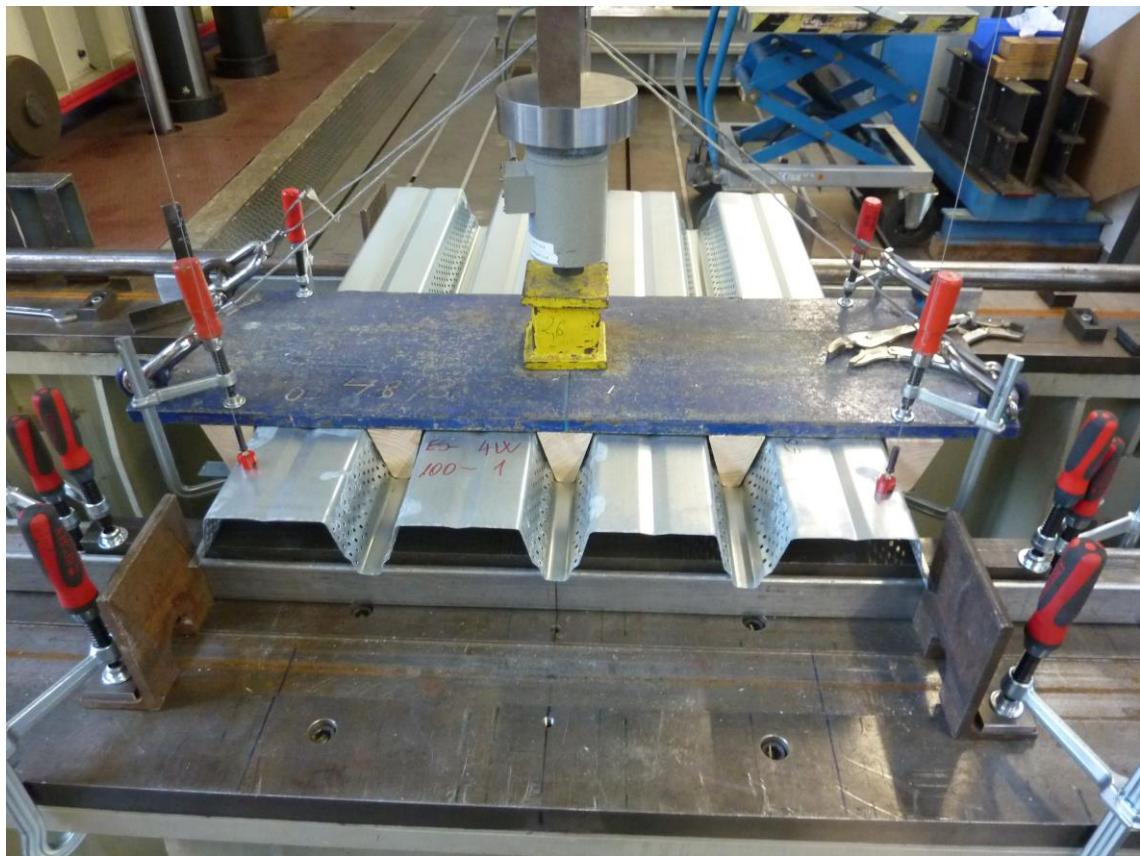


Figure D.2: Test Setup

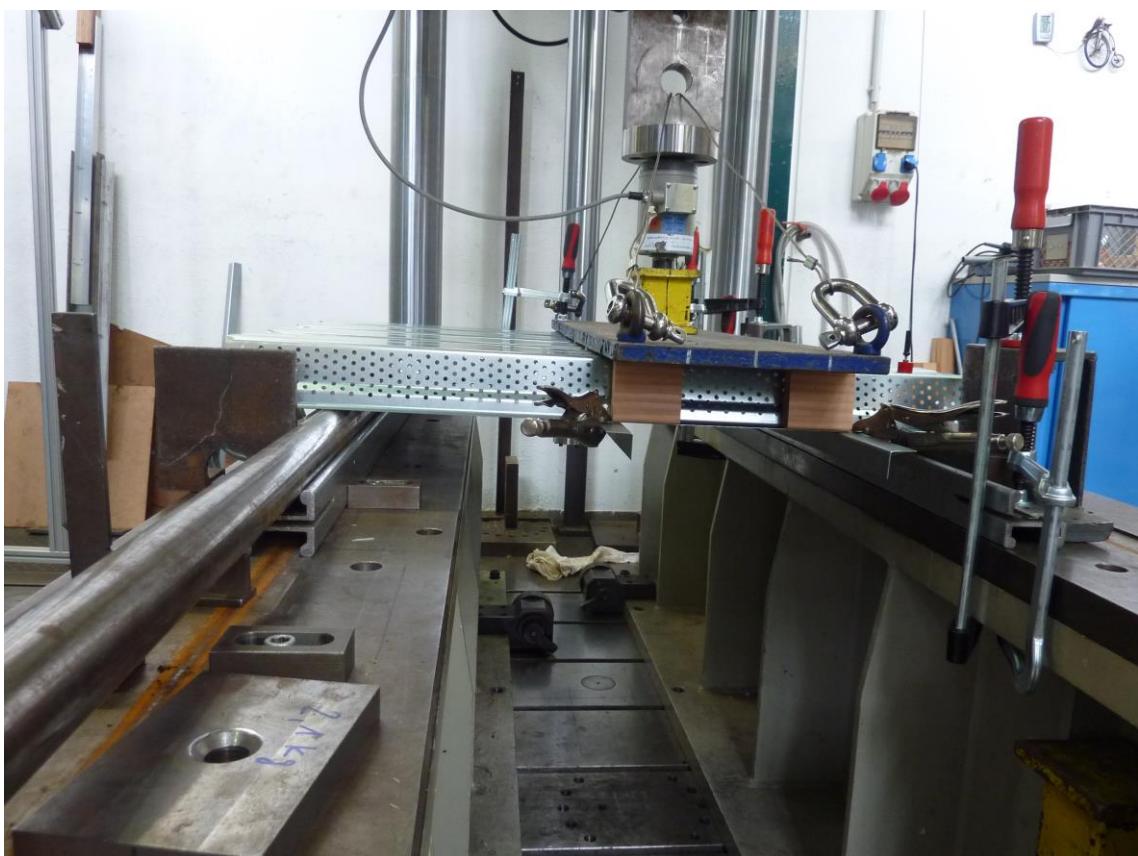


Figure D.3: Test Setup (side view)



Figure D.4: Web-crippling (exemplary for ES-4w-triangle-100-1)



Figure D.5: Web-crippling (exemplary for ES-4t-triangle-075-2)



Figure D.6: bending failure under the load applying plate (exempl. for ES-4t-triangle-075-3)



Figure D.7: Web-crippling (exemplary for ES-4-075-2)

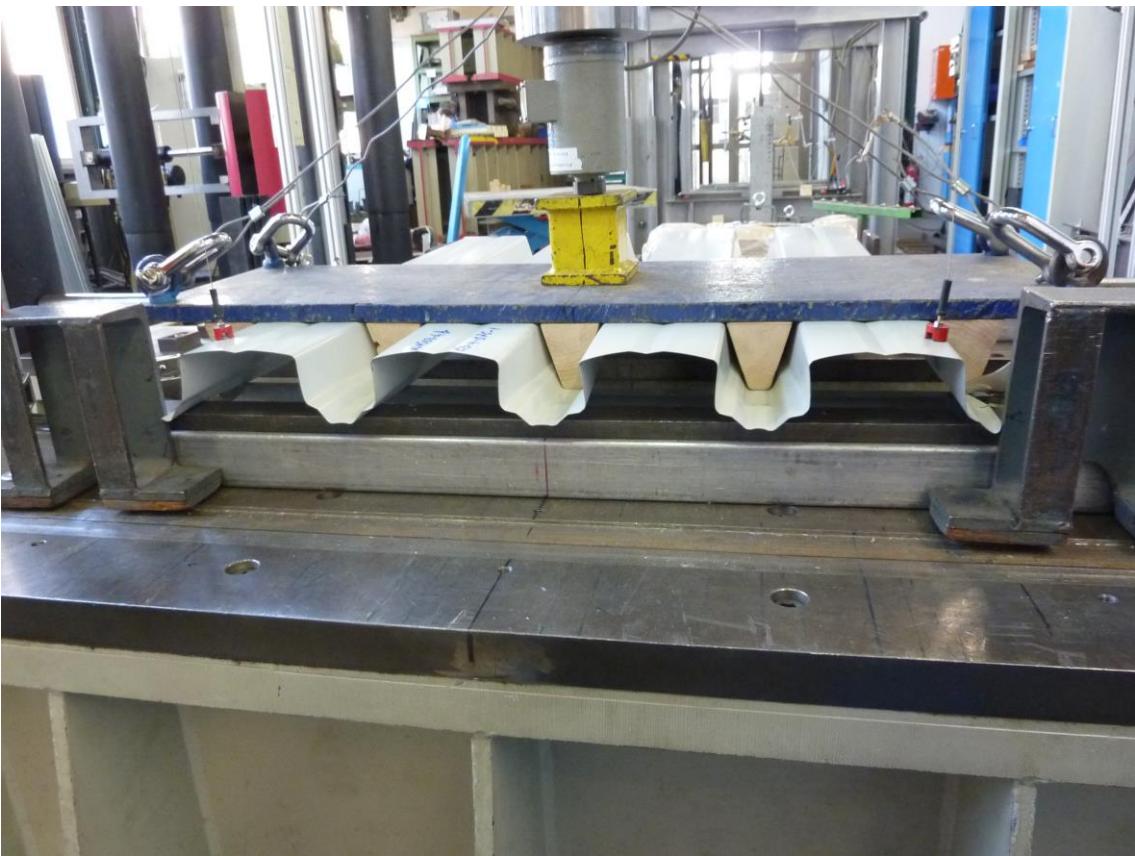


Figure D.8: Web-crippling (exemplary for ES-4-075-1)

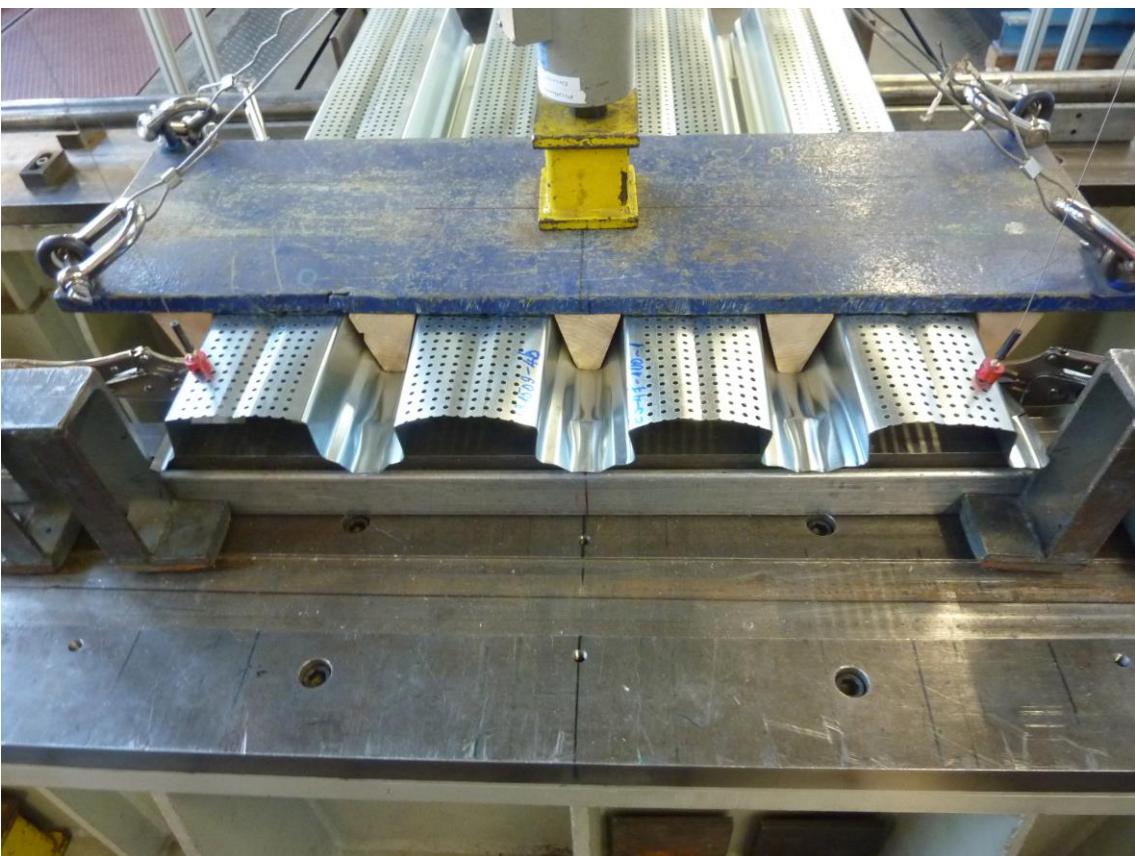


Figure D.9: Web-crippling (exemplary for ES-4f-075-1)

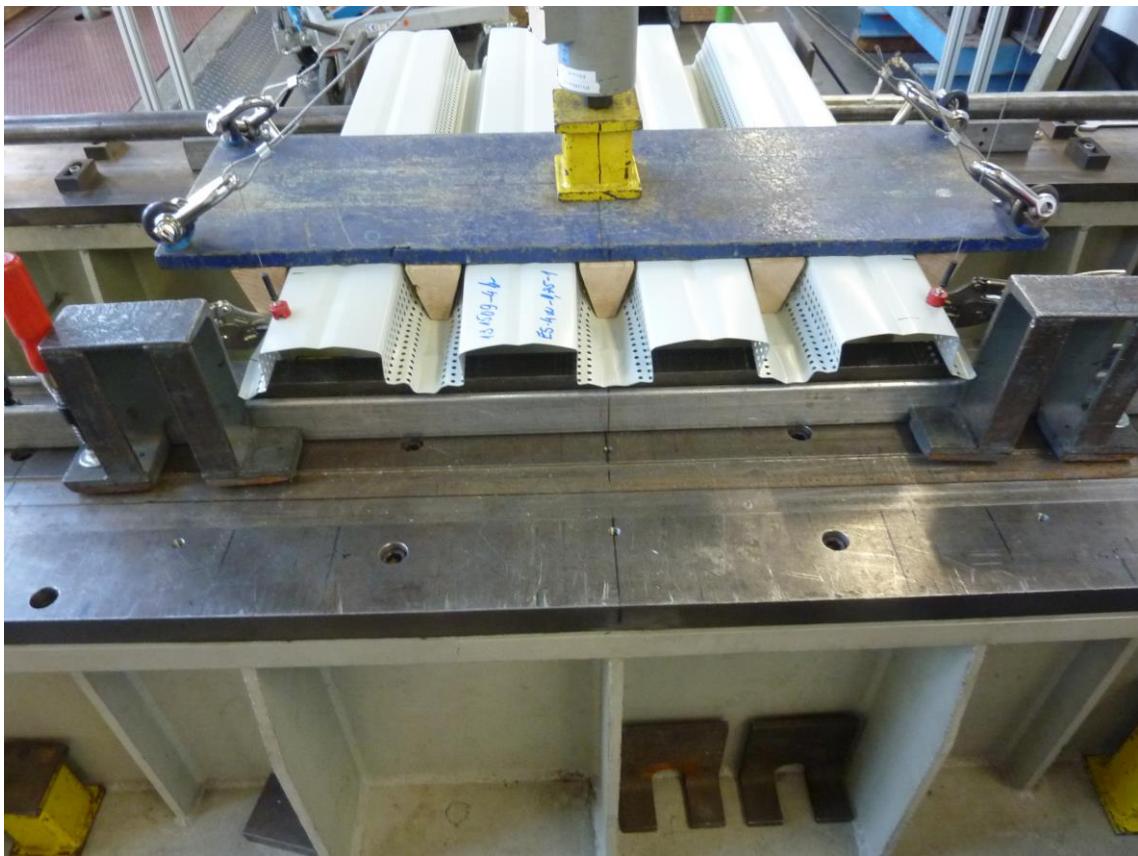
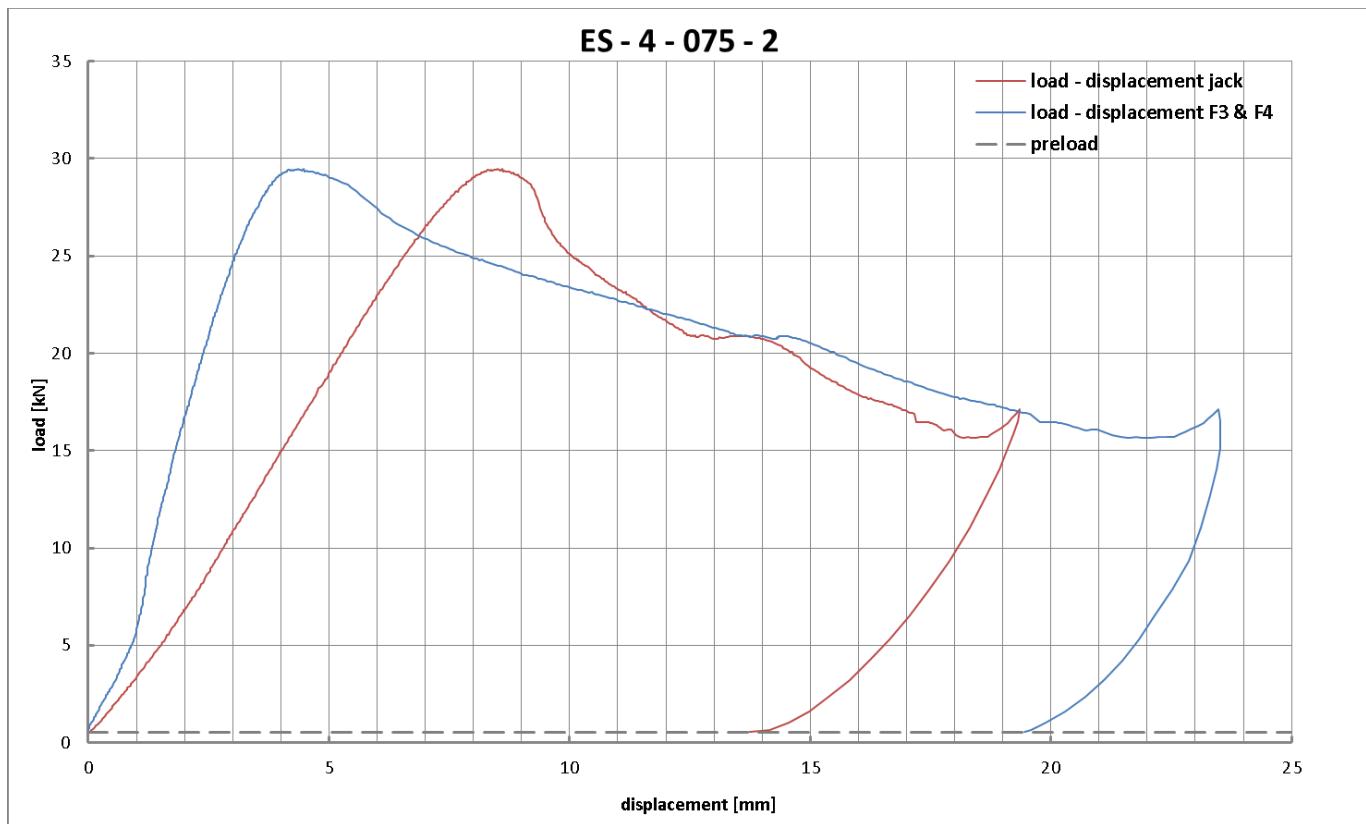
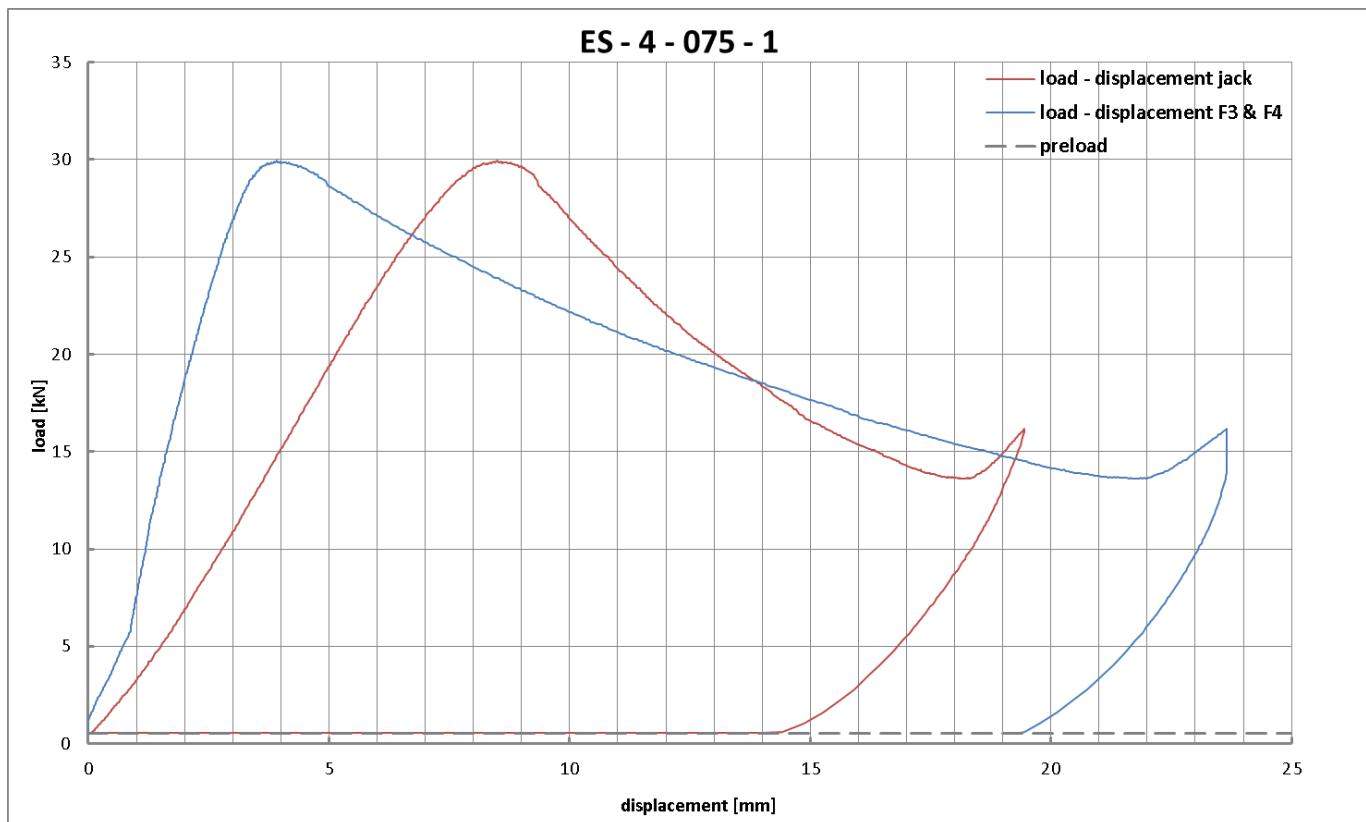


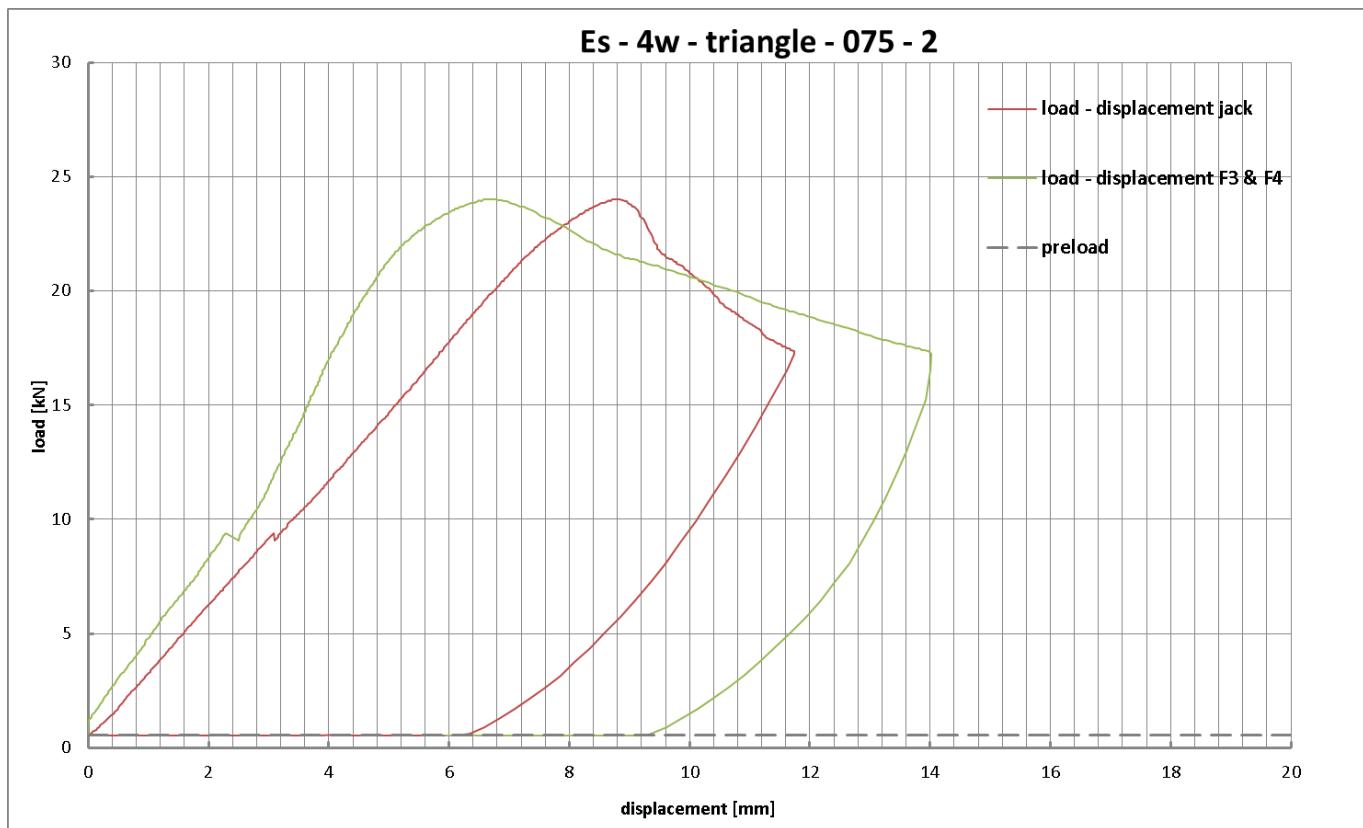
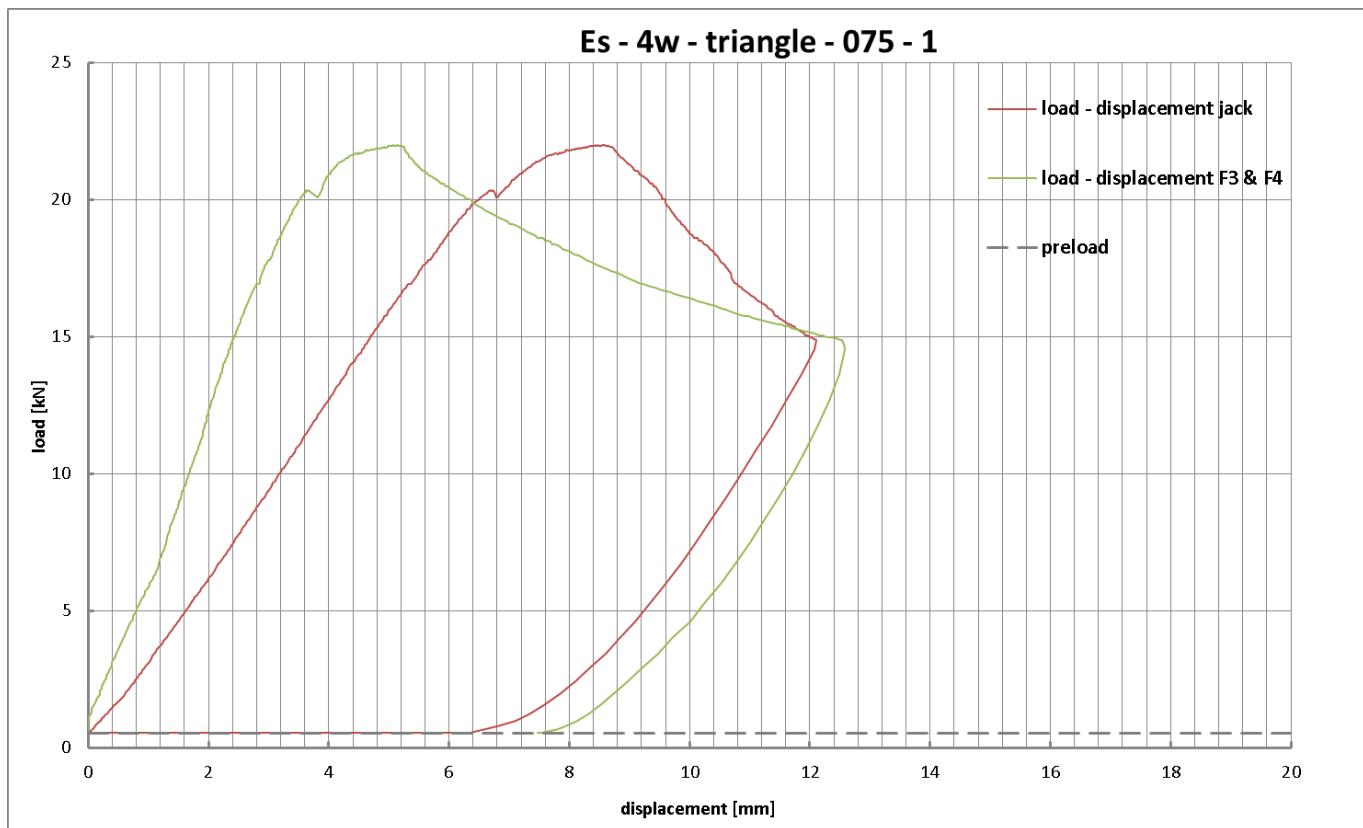
Figure D.10: Web-crippling (exemplary for ES-4w-075-1)

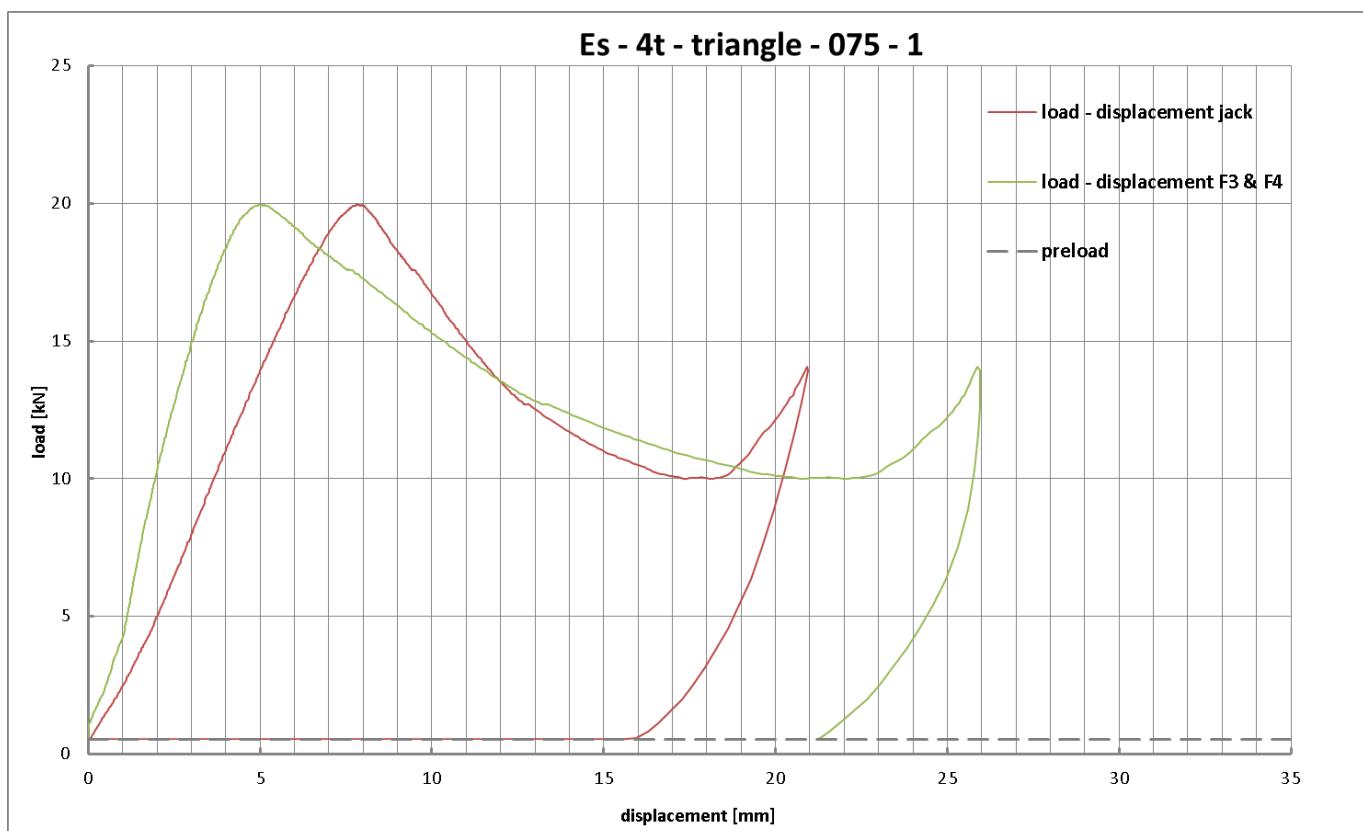
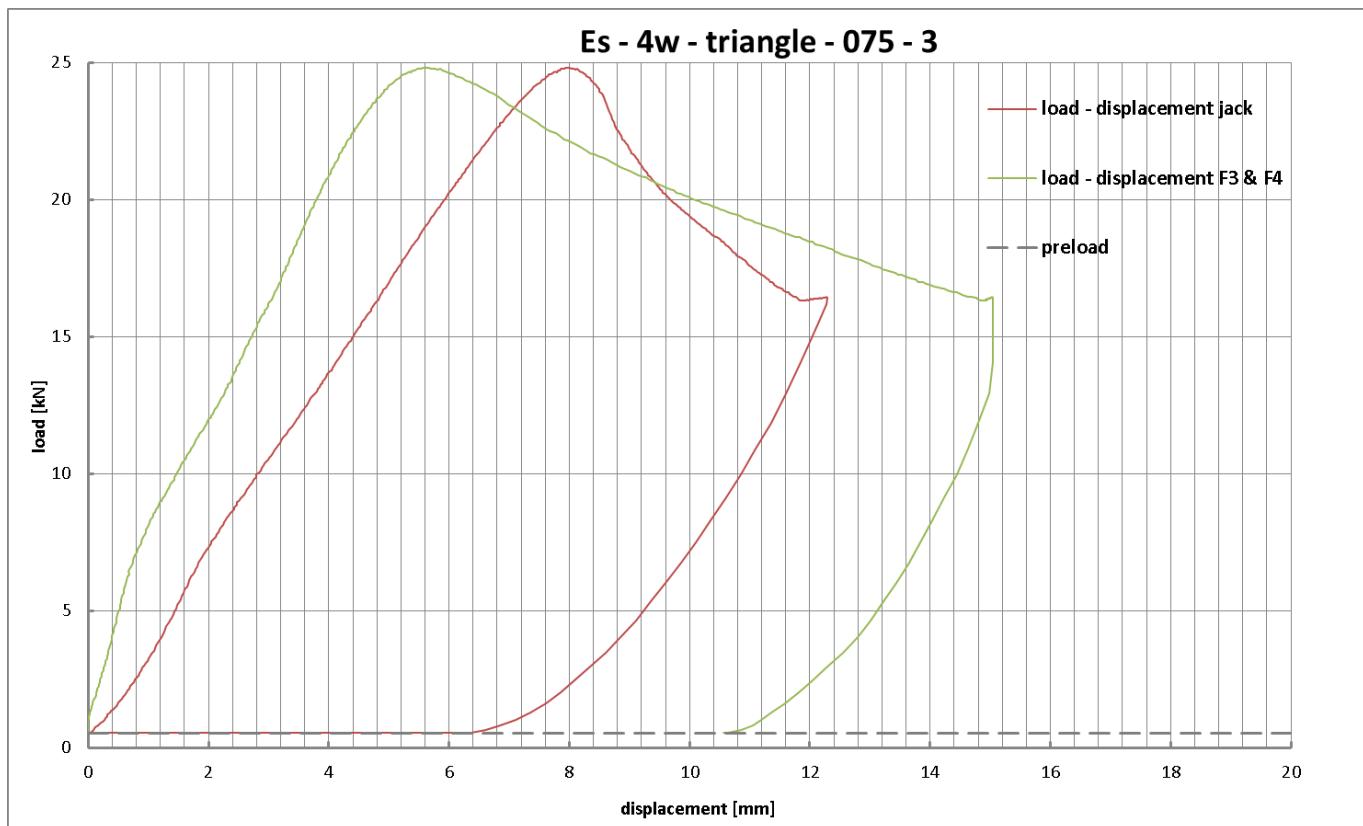


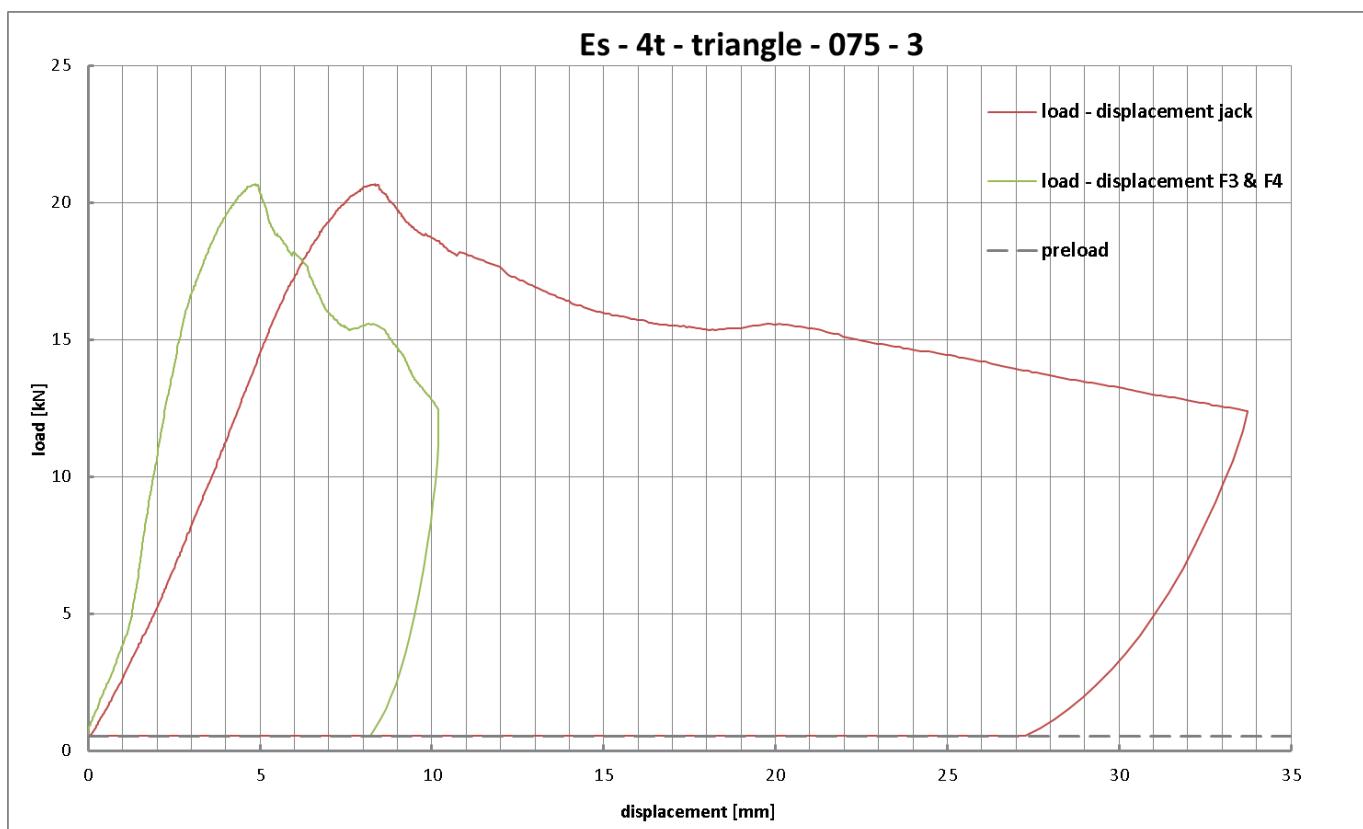
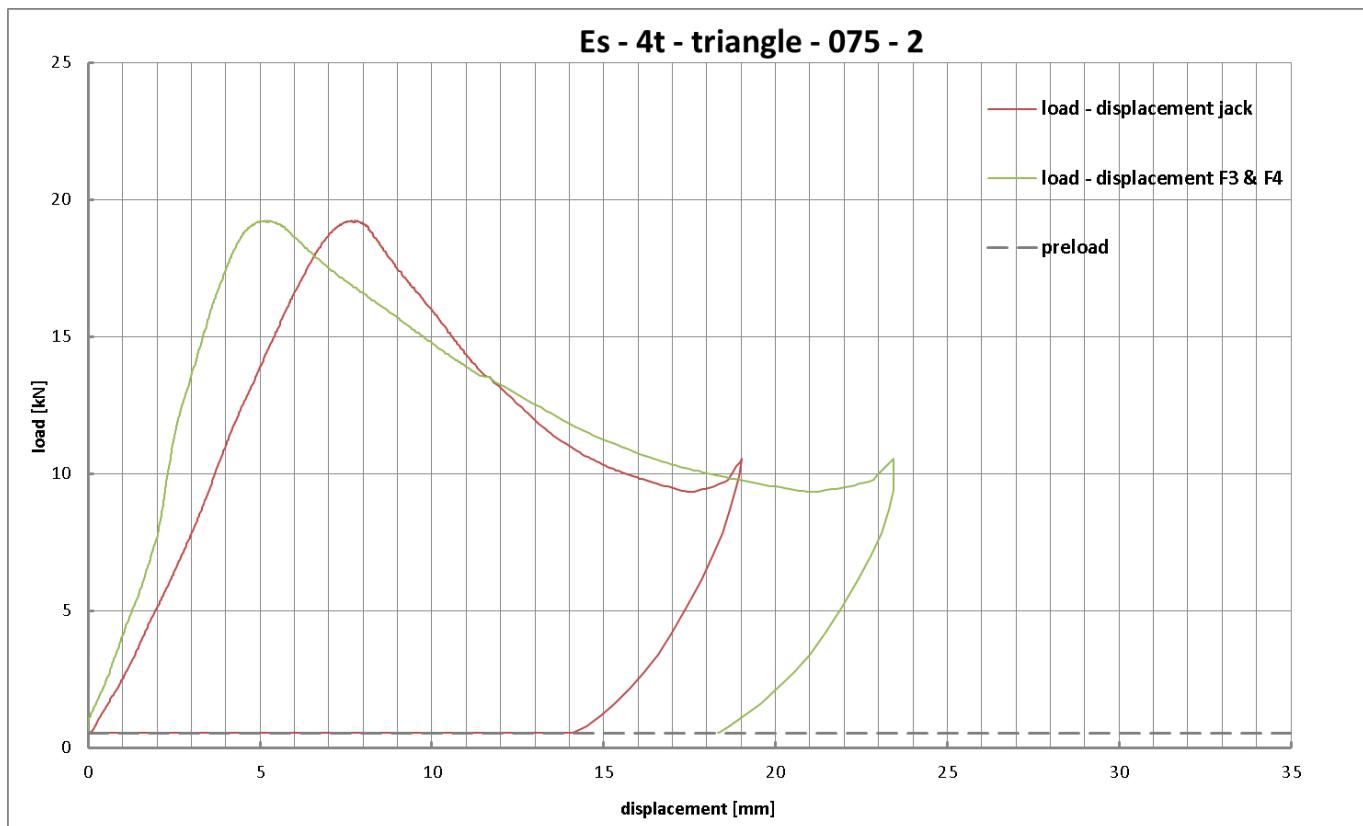
Figure D.11: Web-crippling (exemplary for ES-4t-075-1)

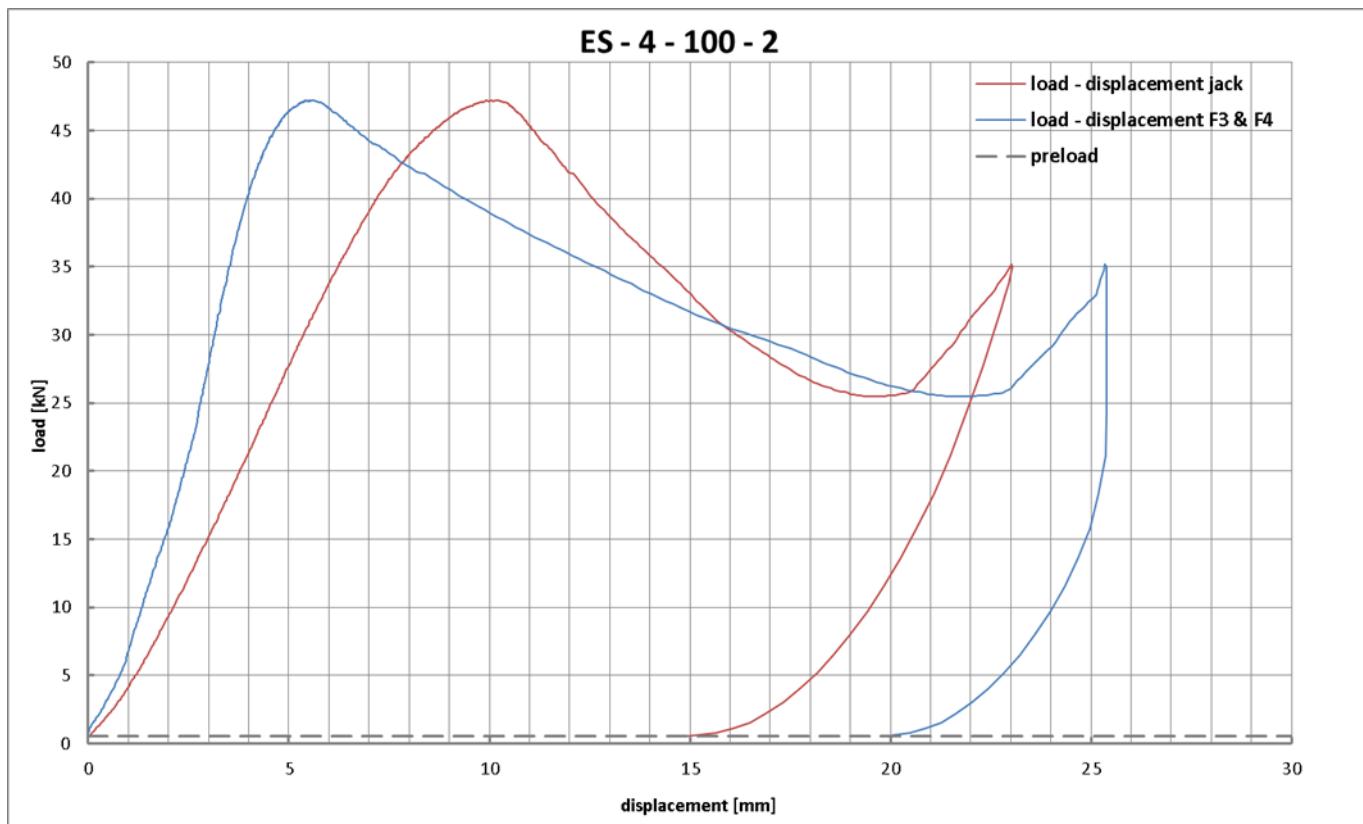
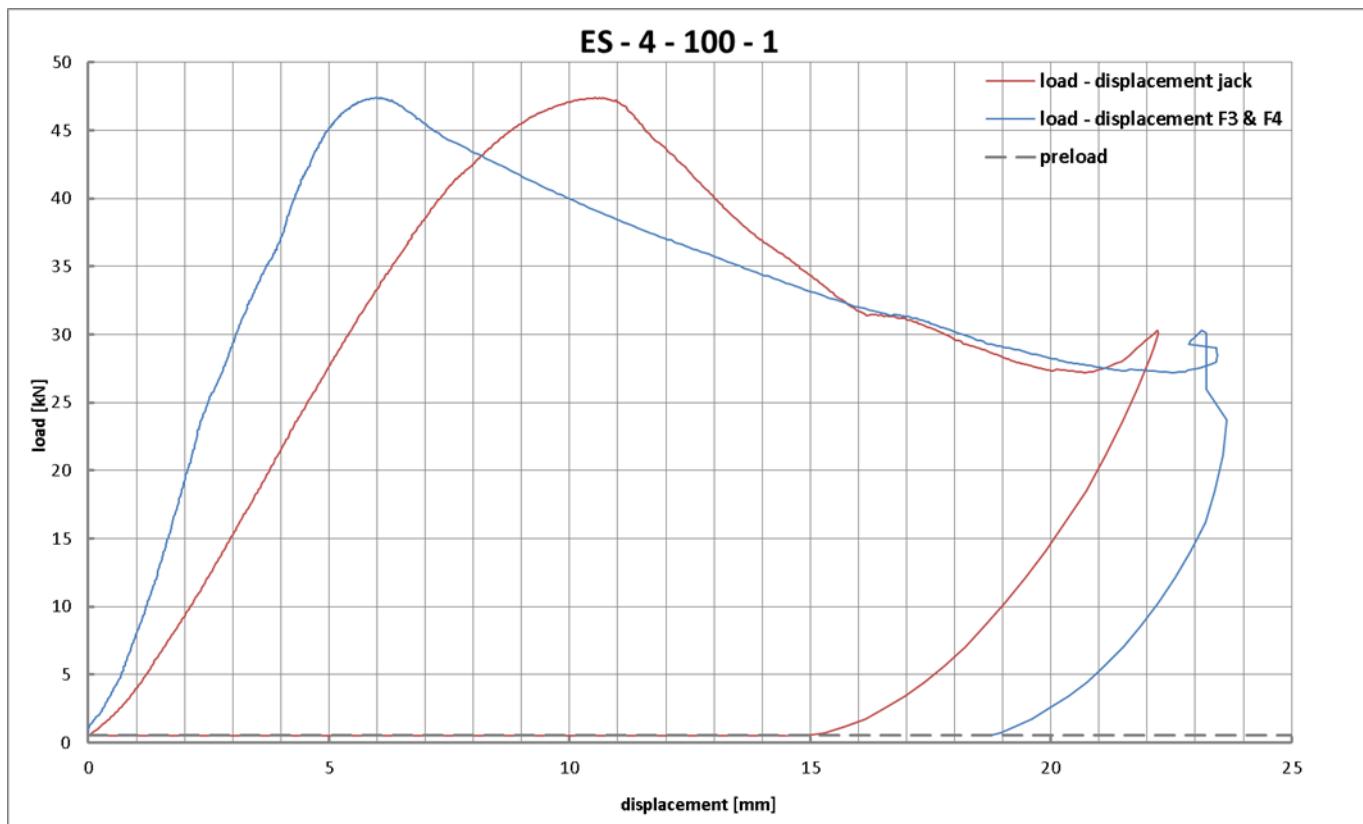
Load-deflection curves for profiles with and without triangle perforation:

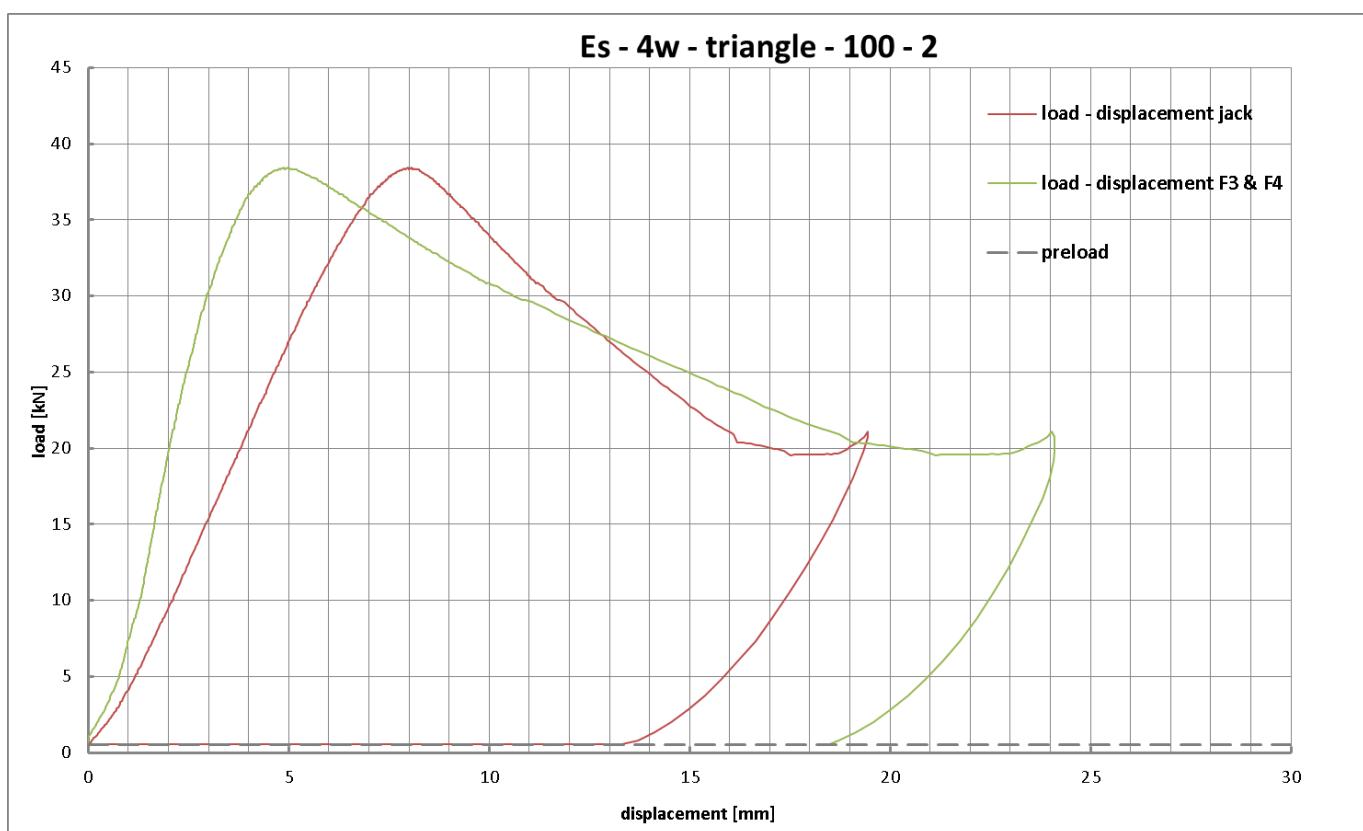
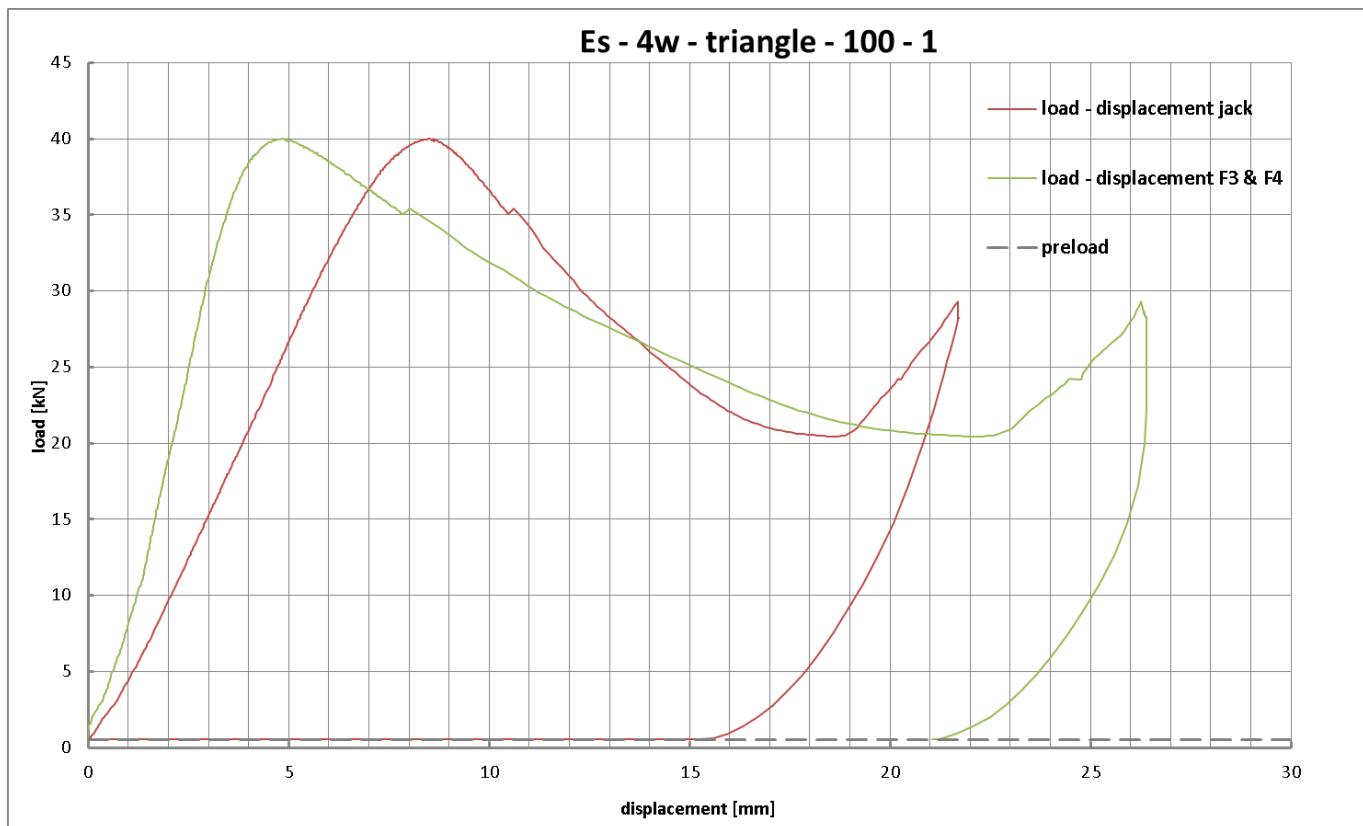


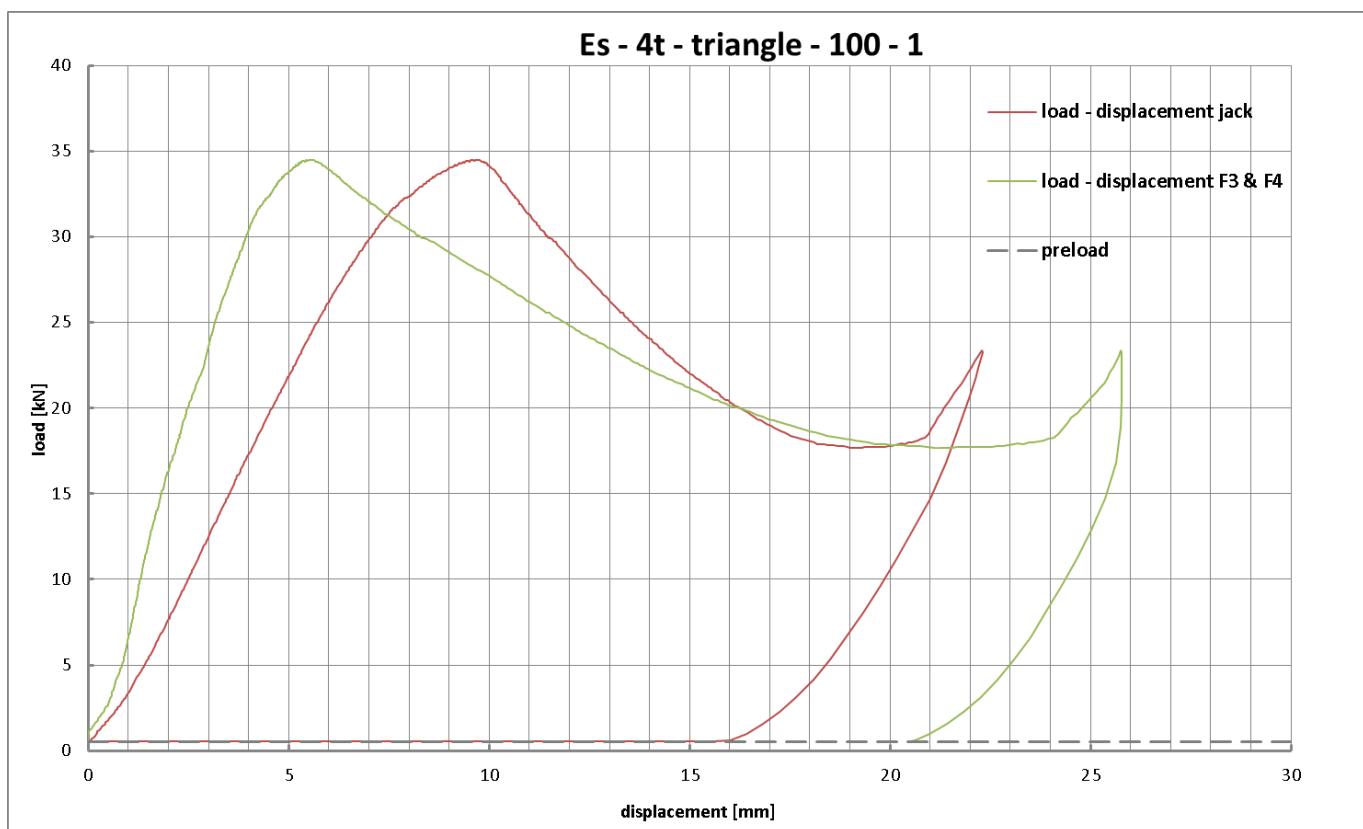
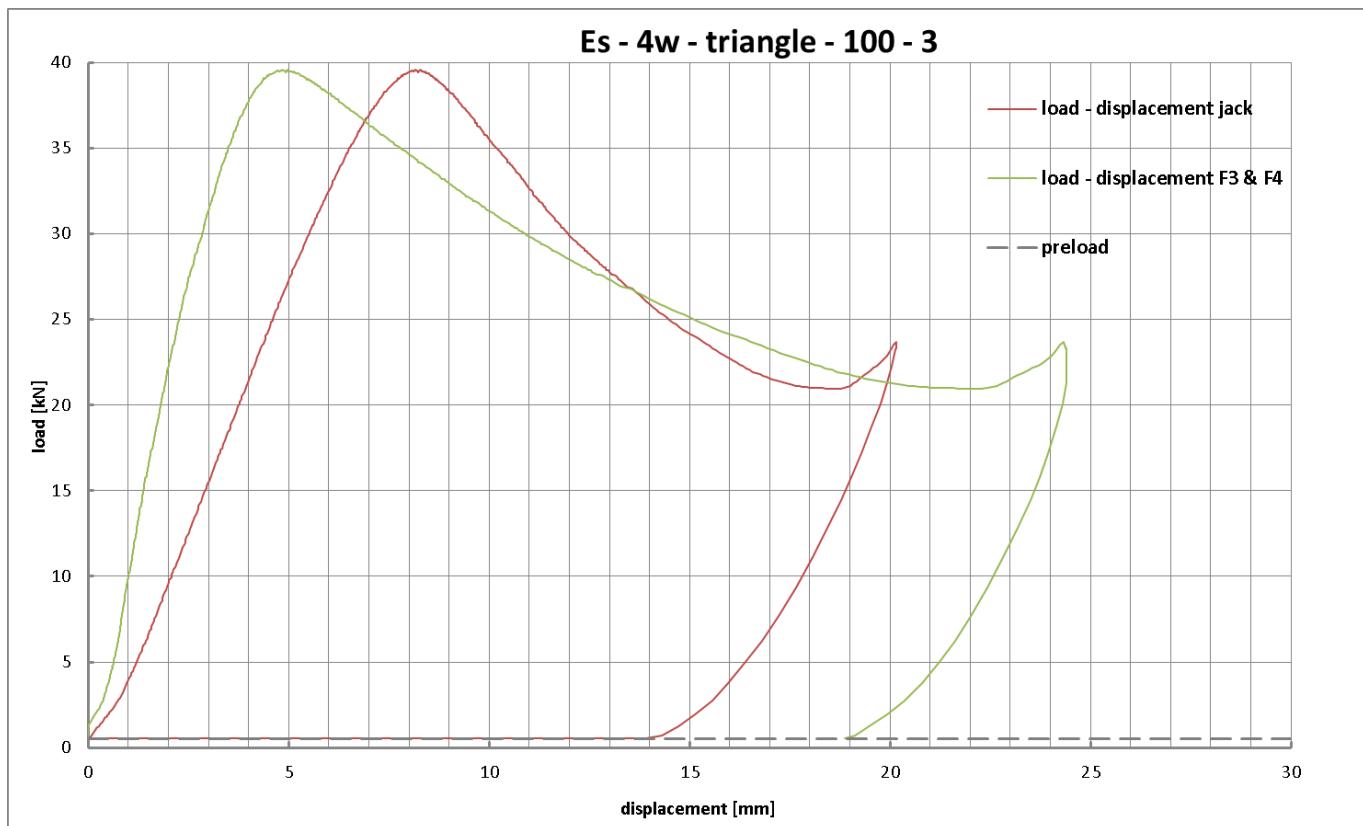


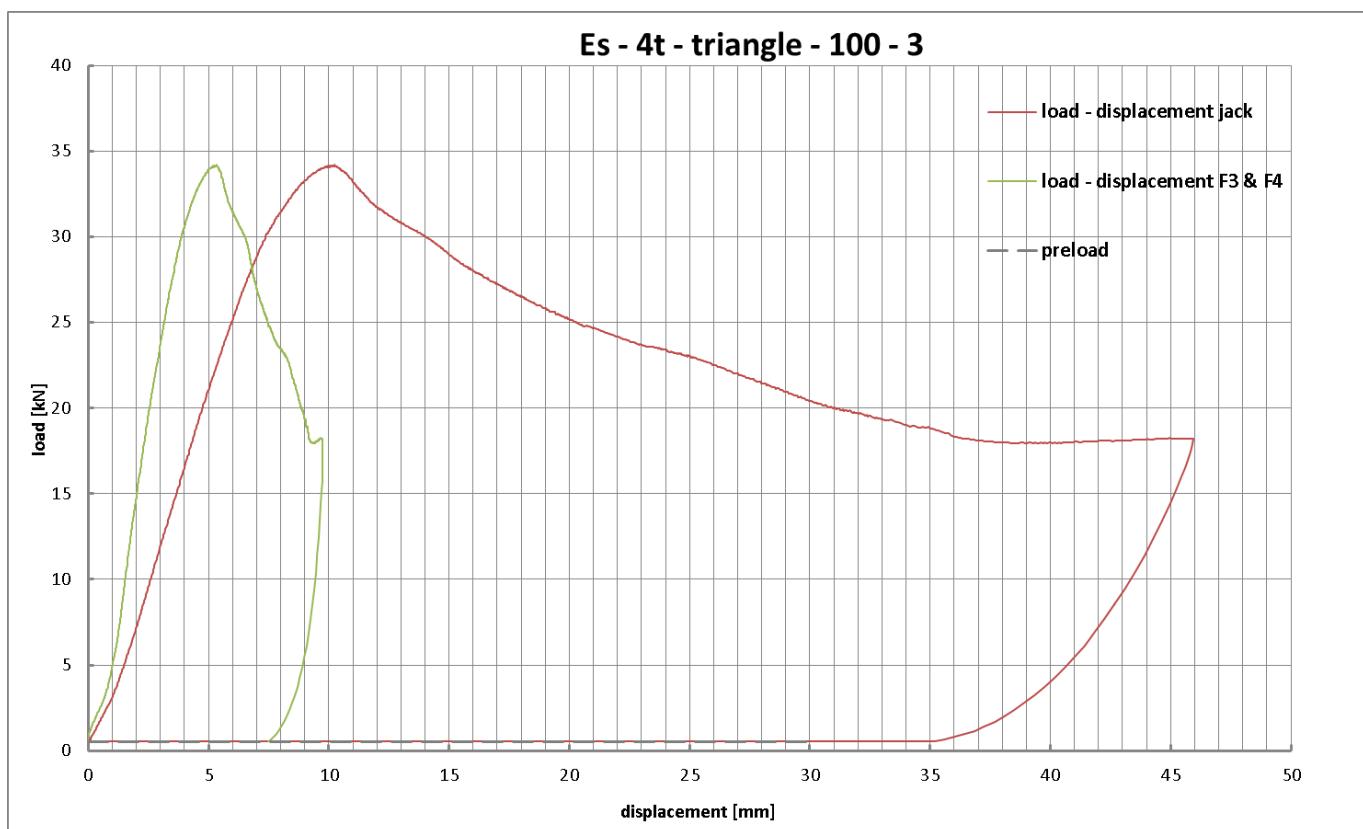
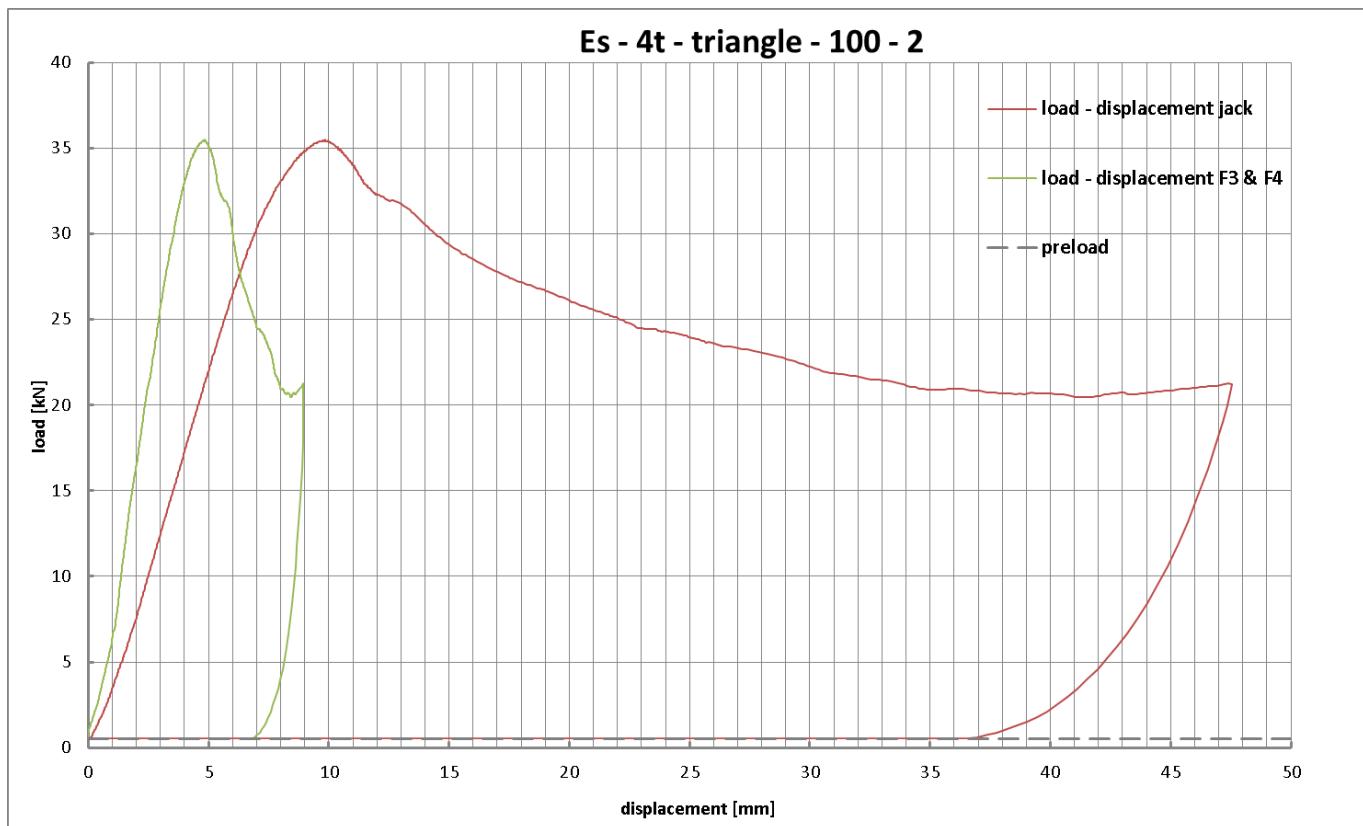




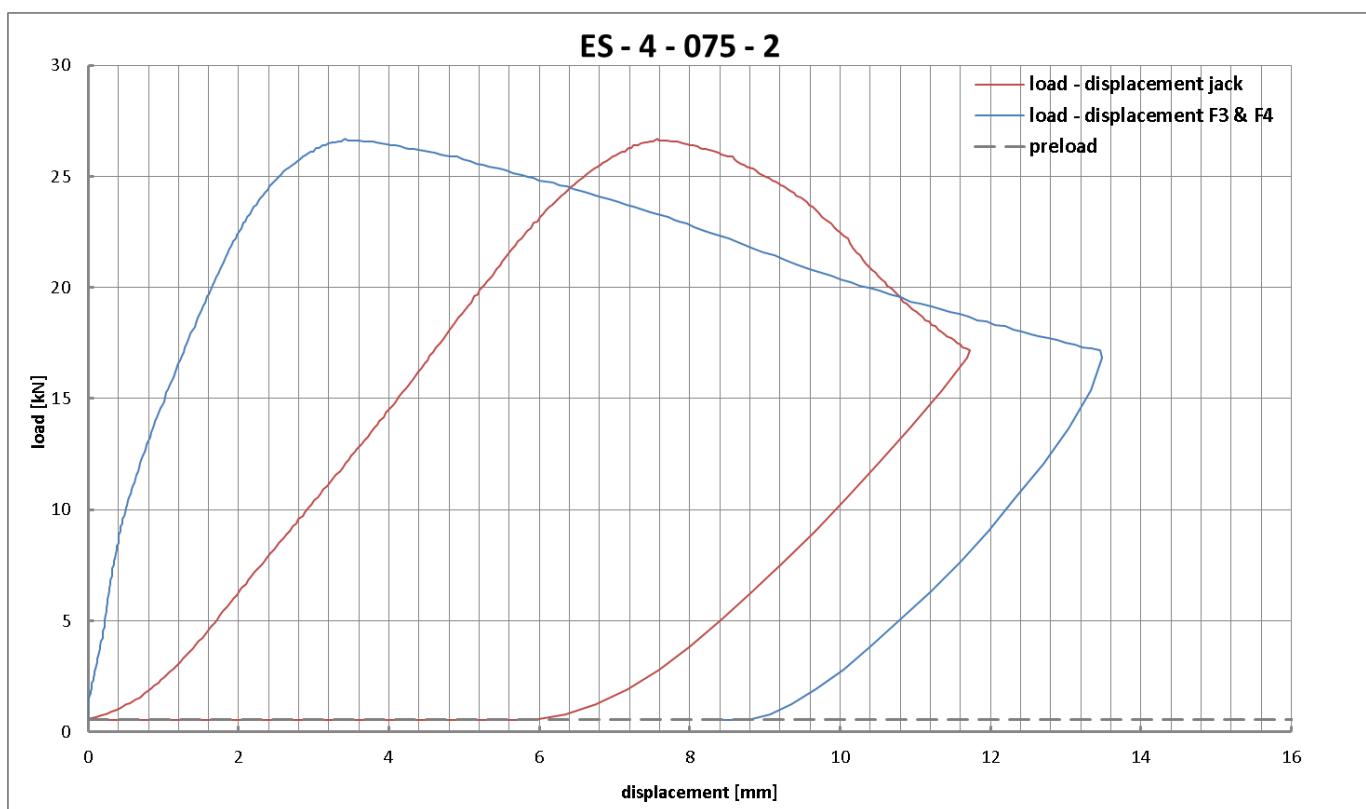
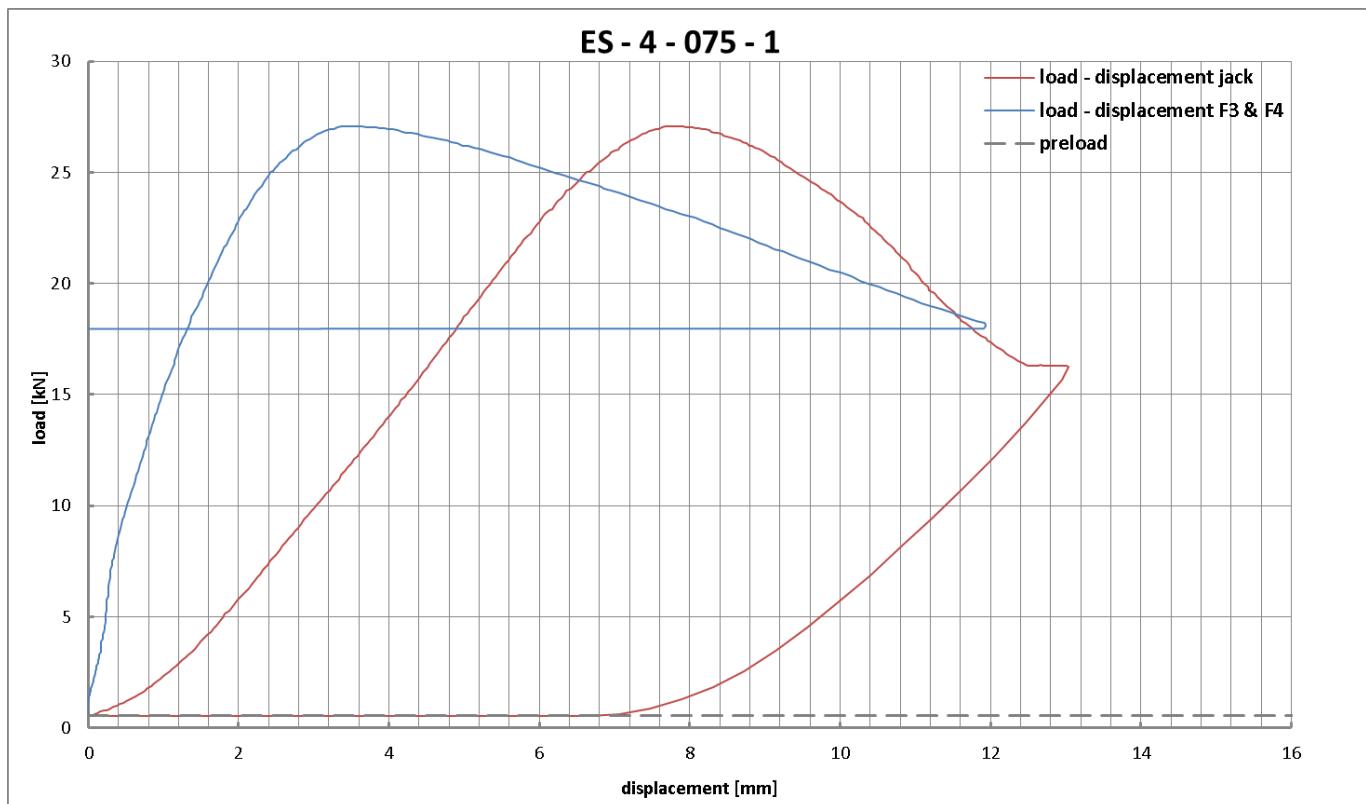


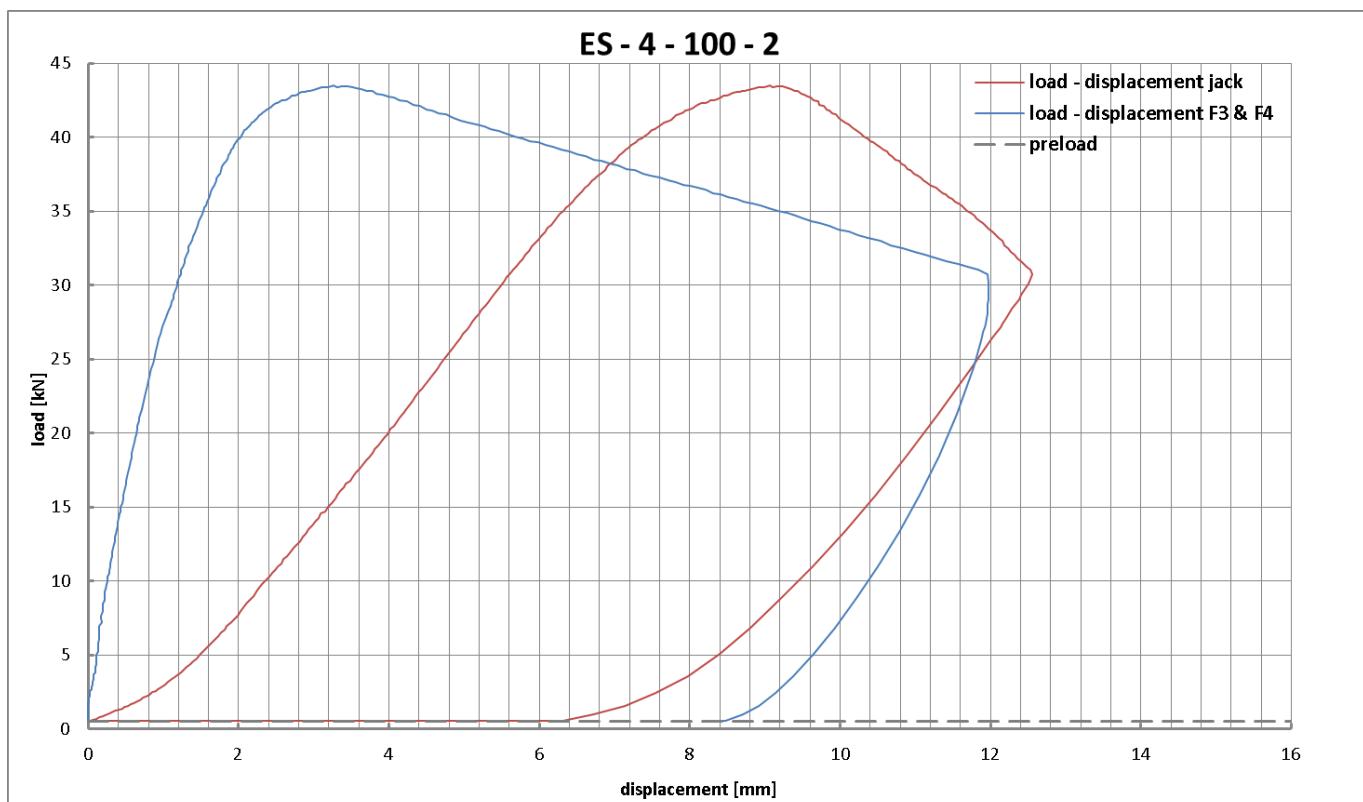
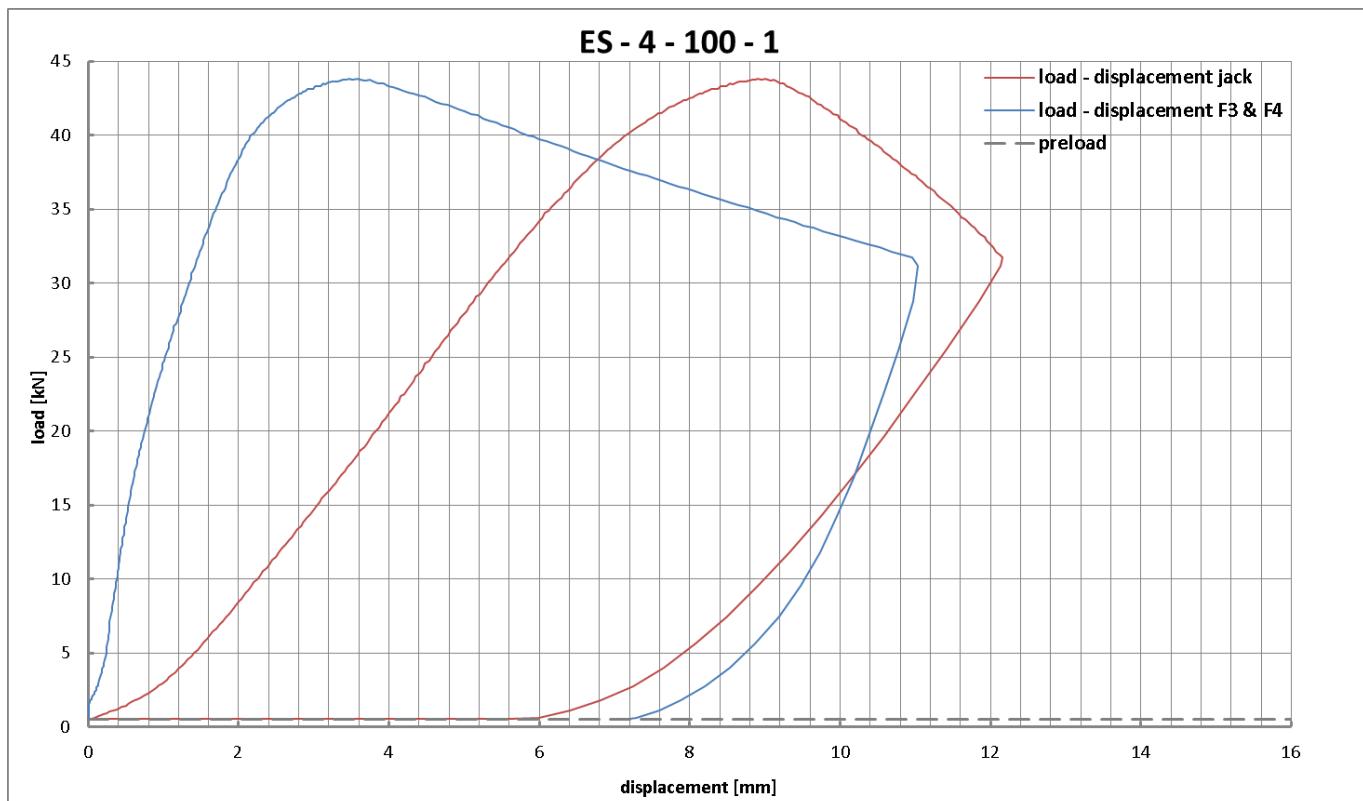


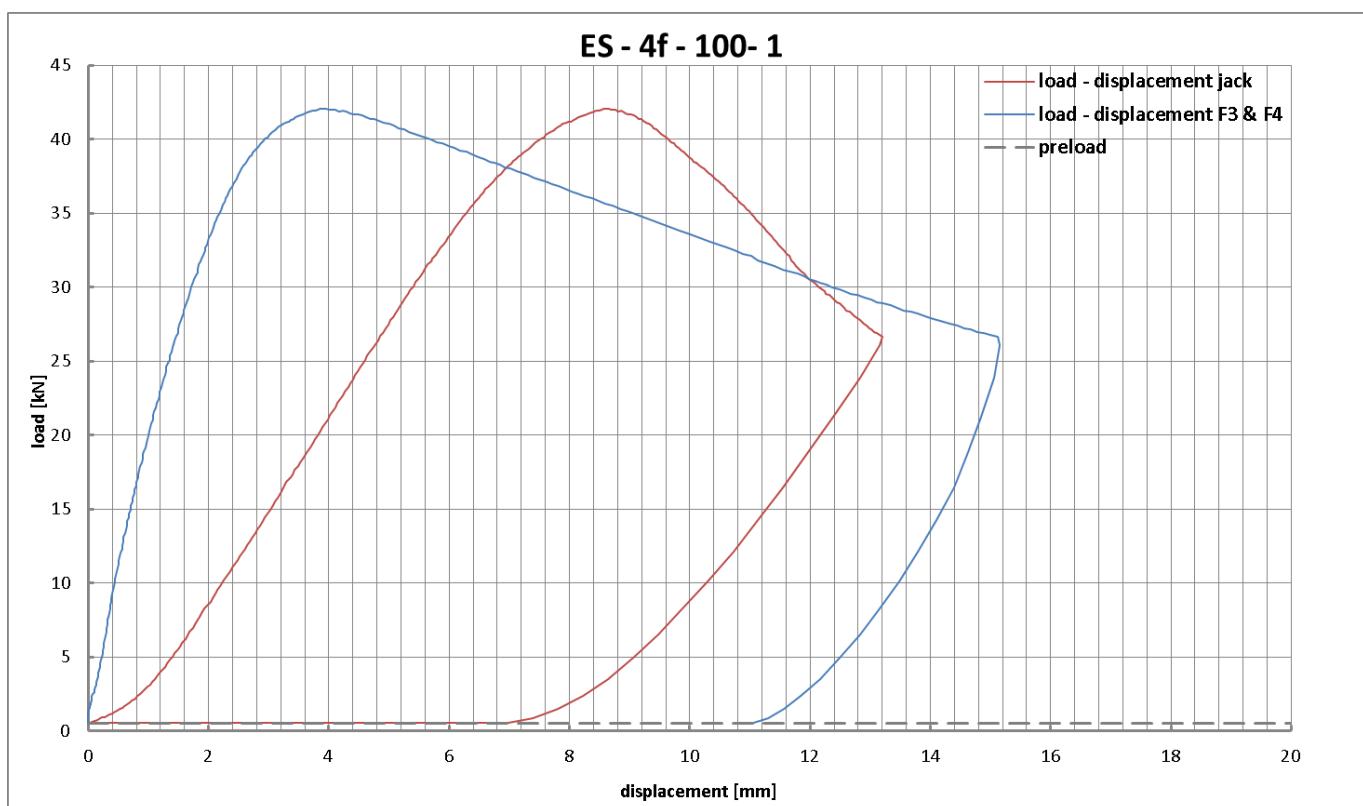
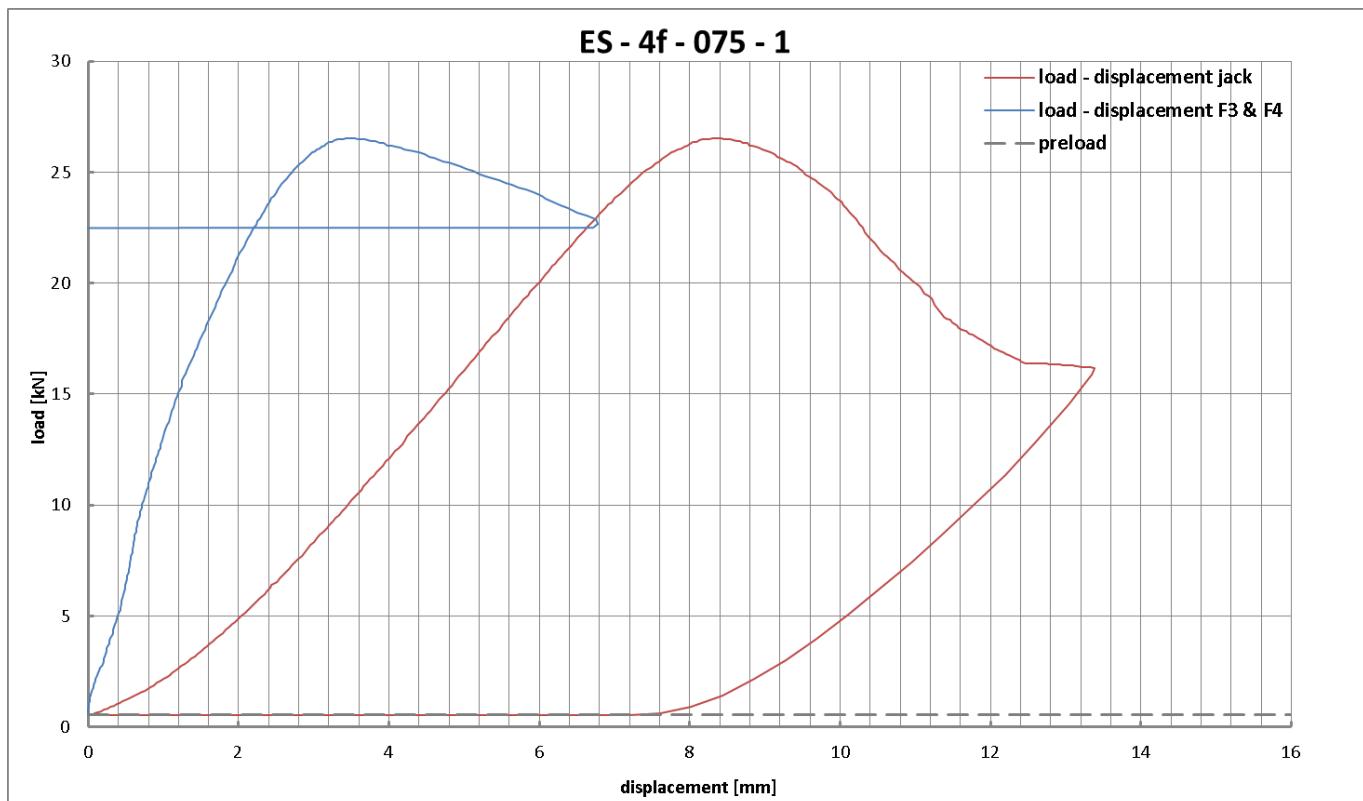


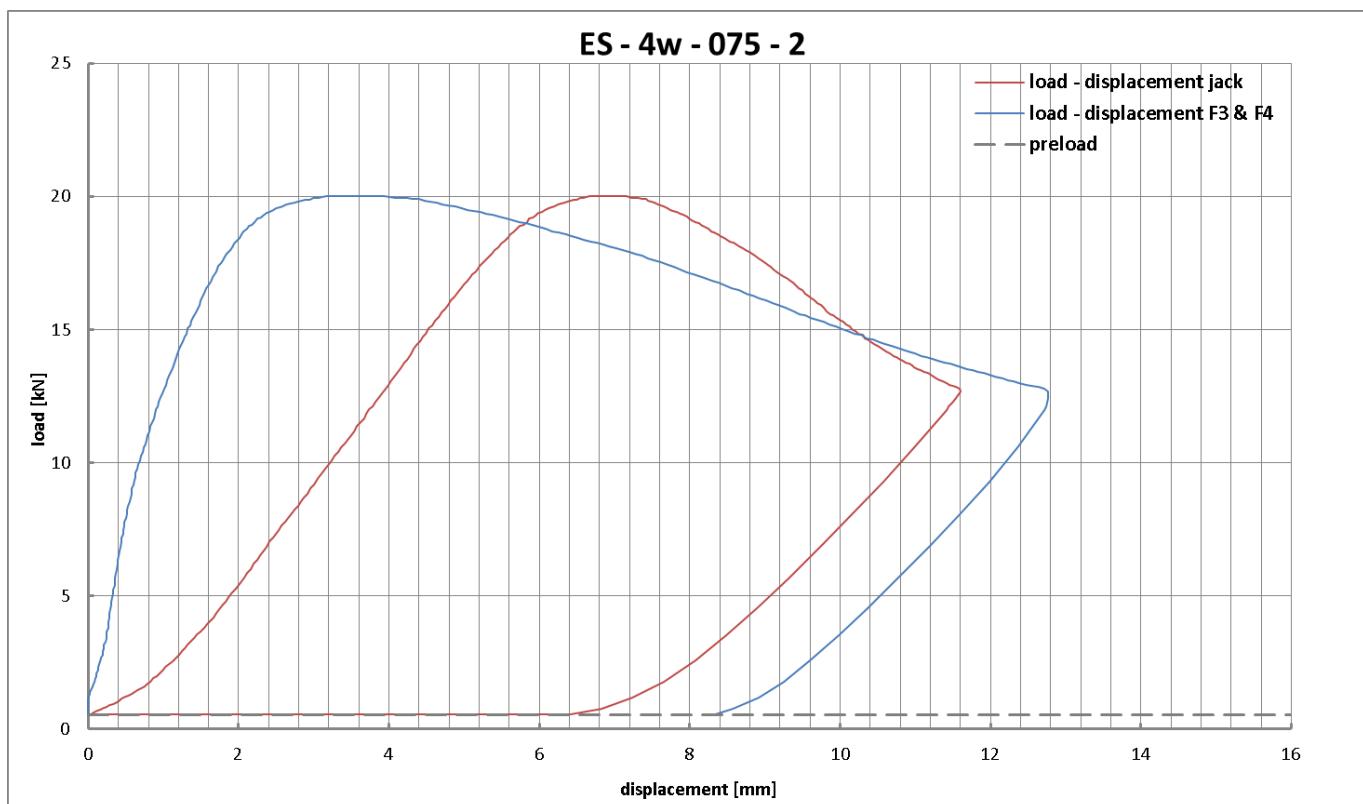
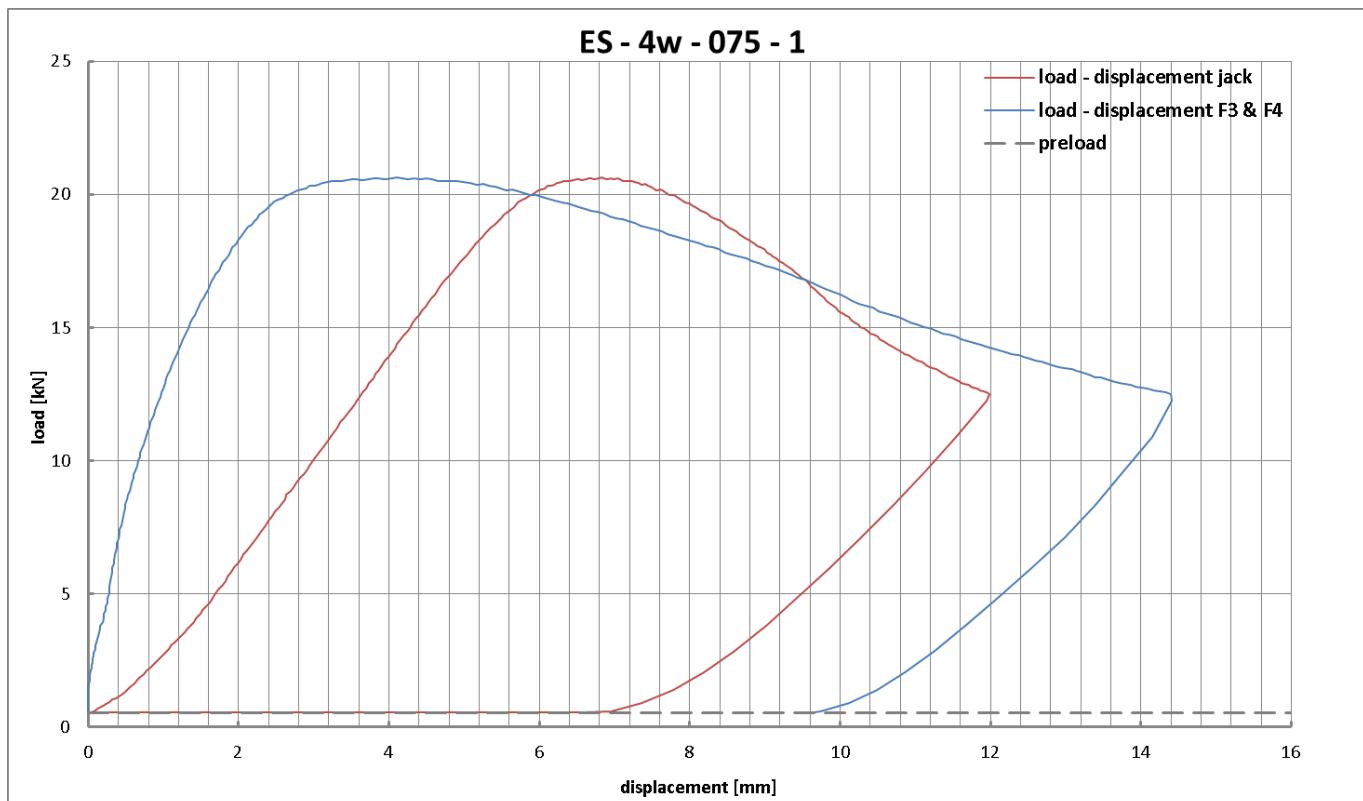


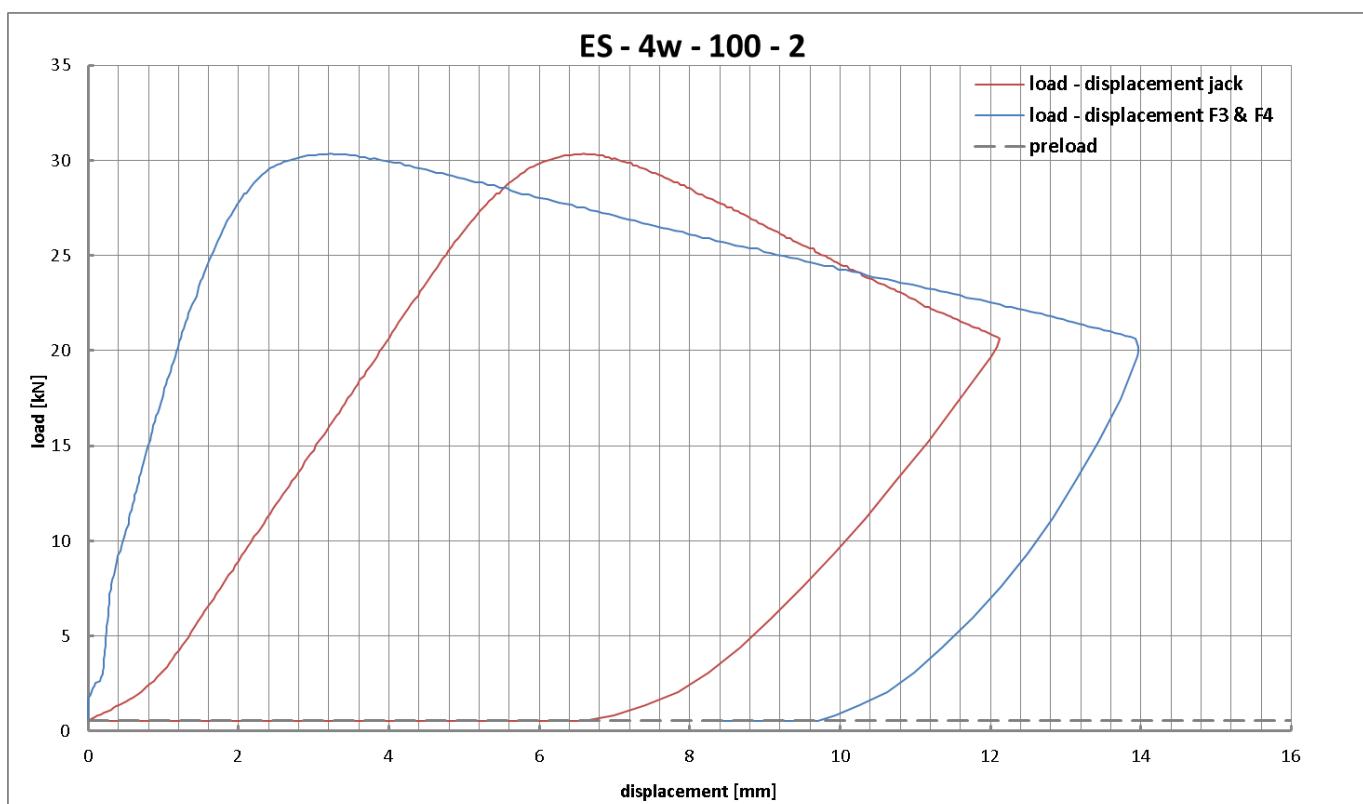
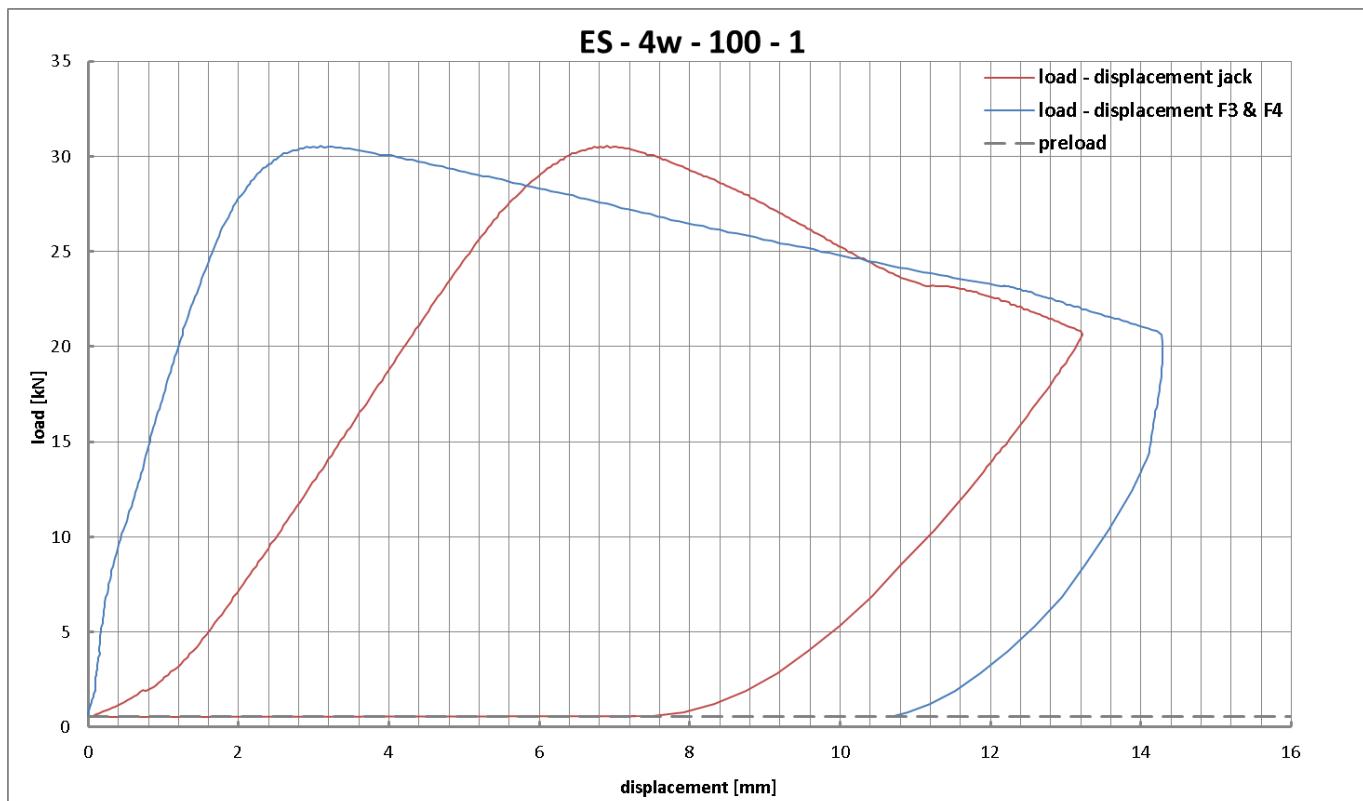
Load-deflection curves for profiles with and without square perforation:

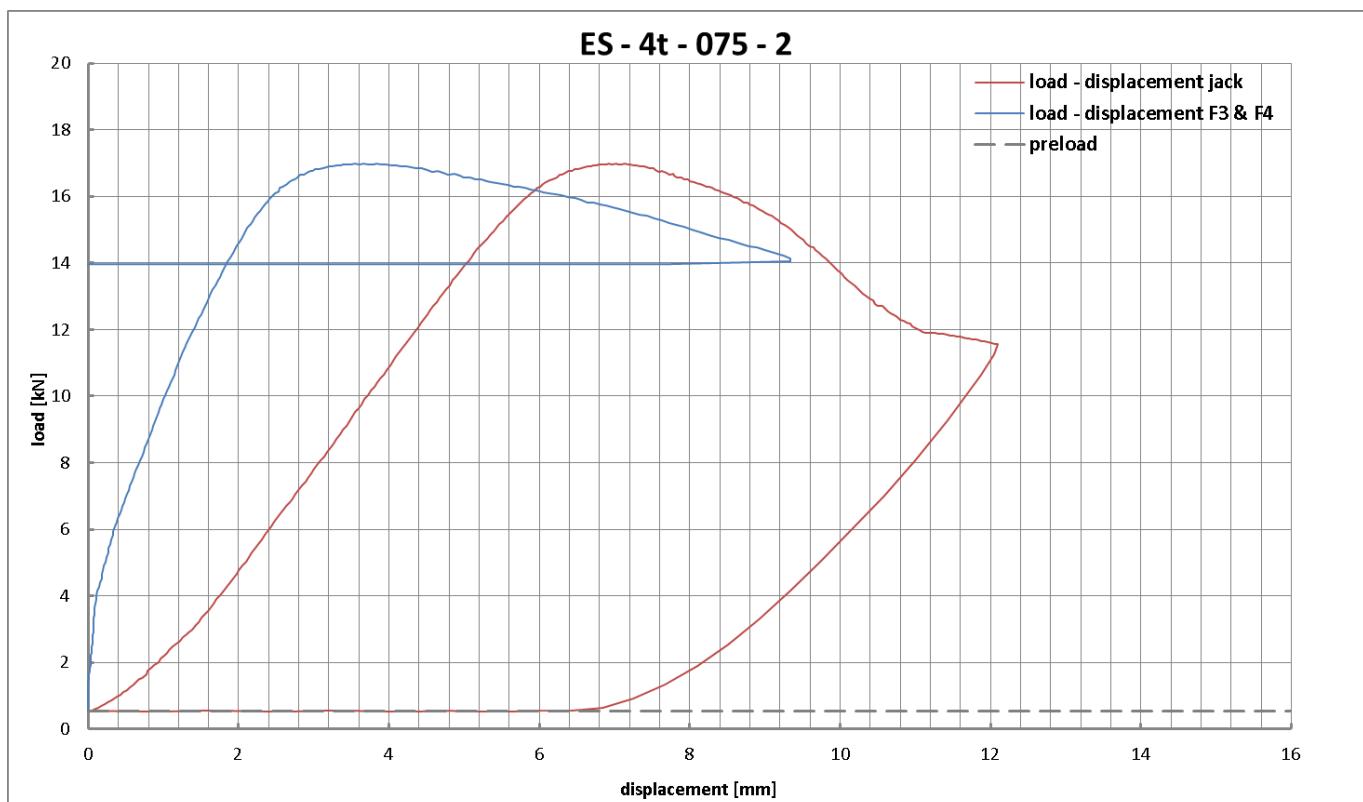
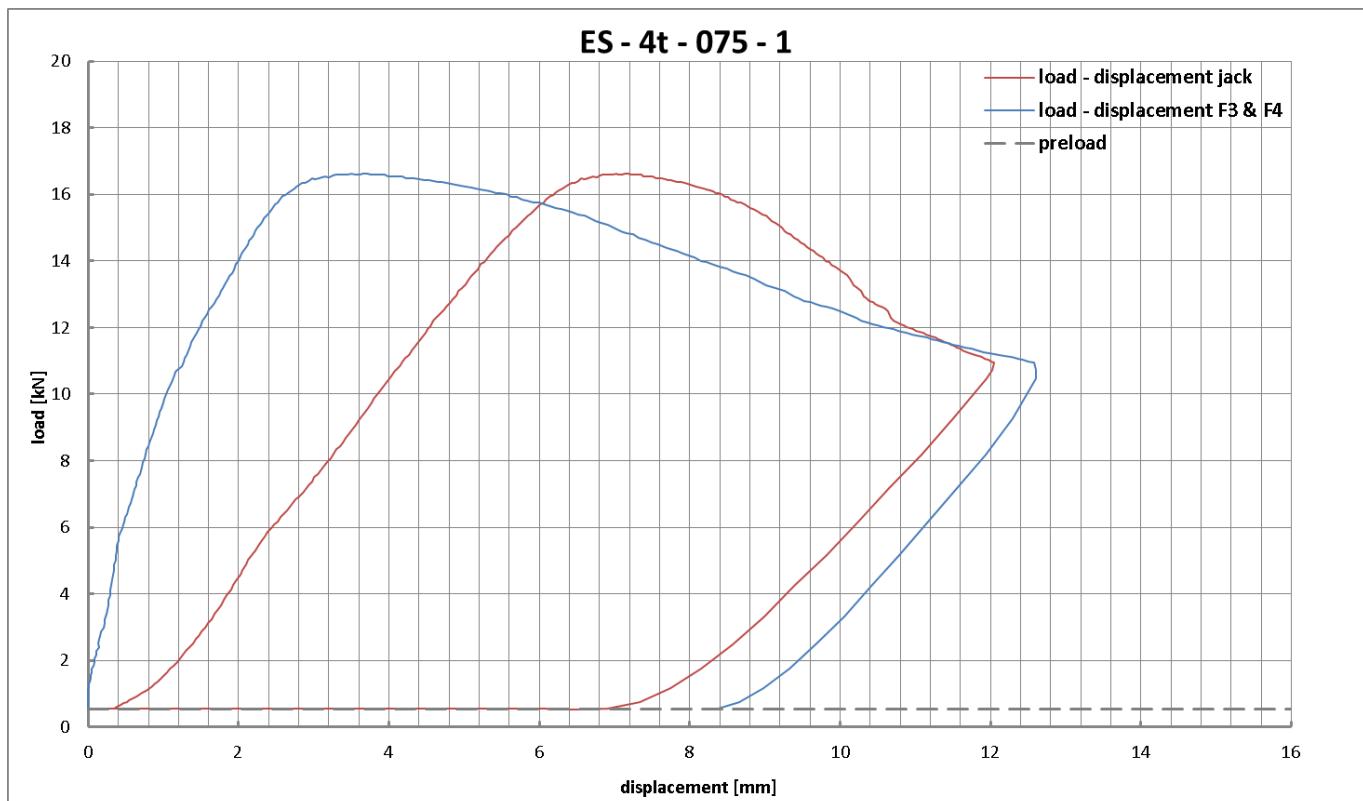


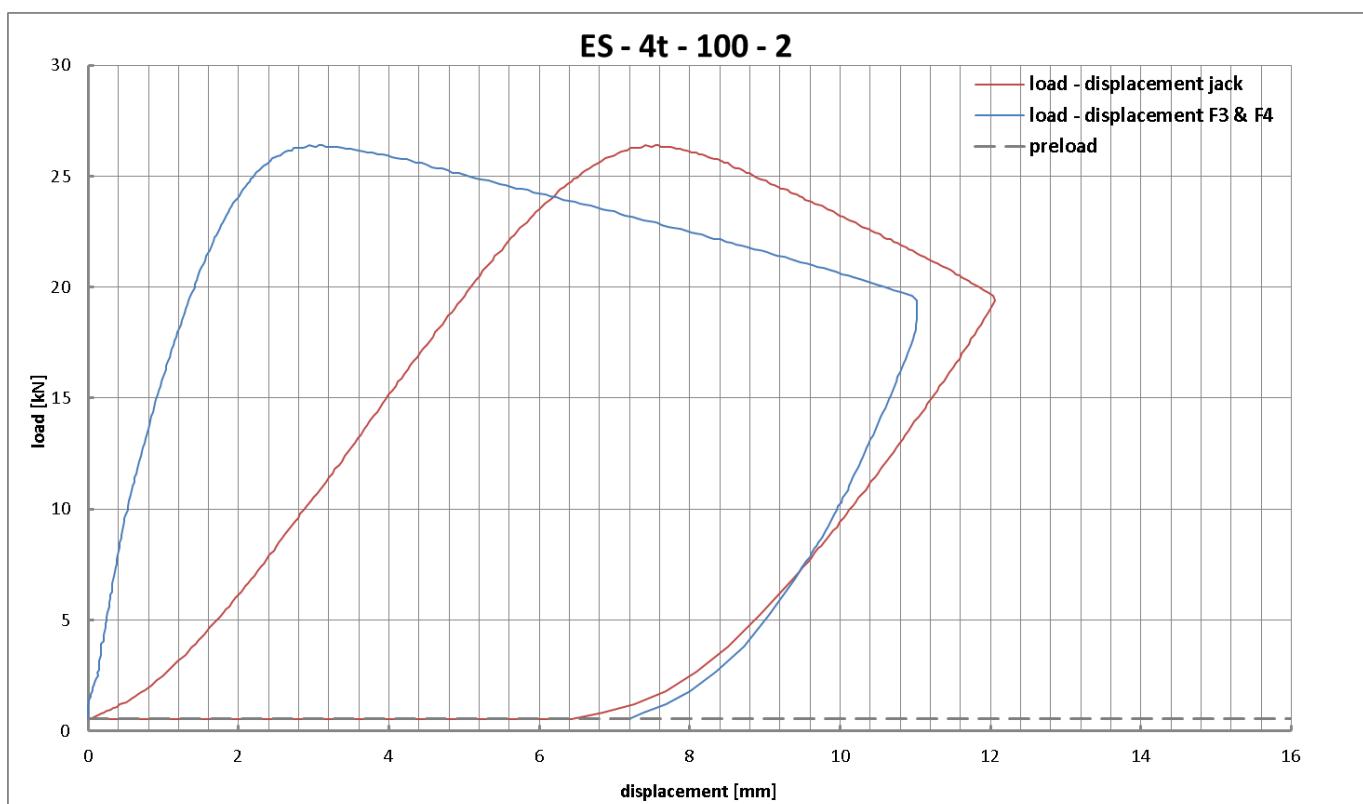
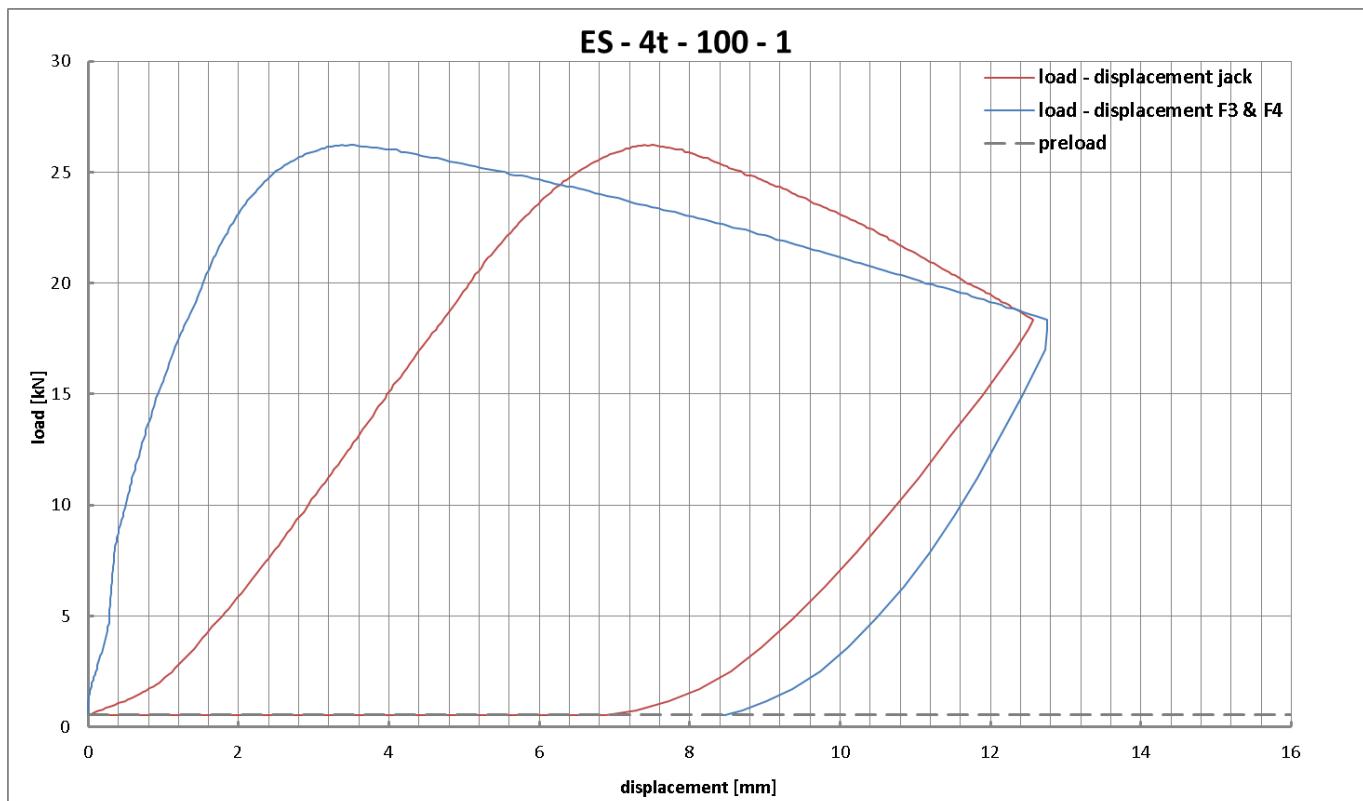






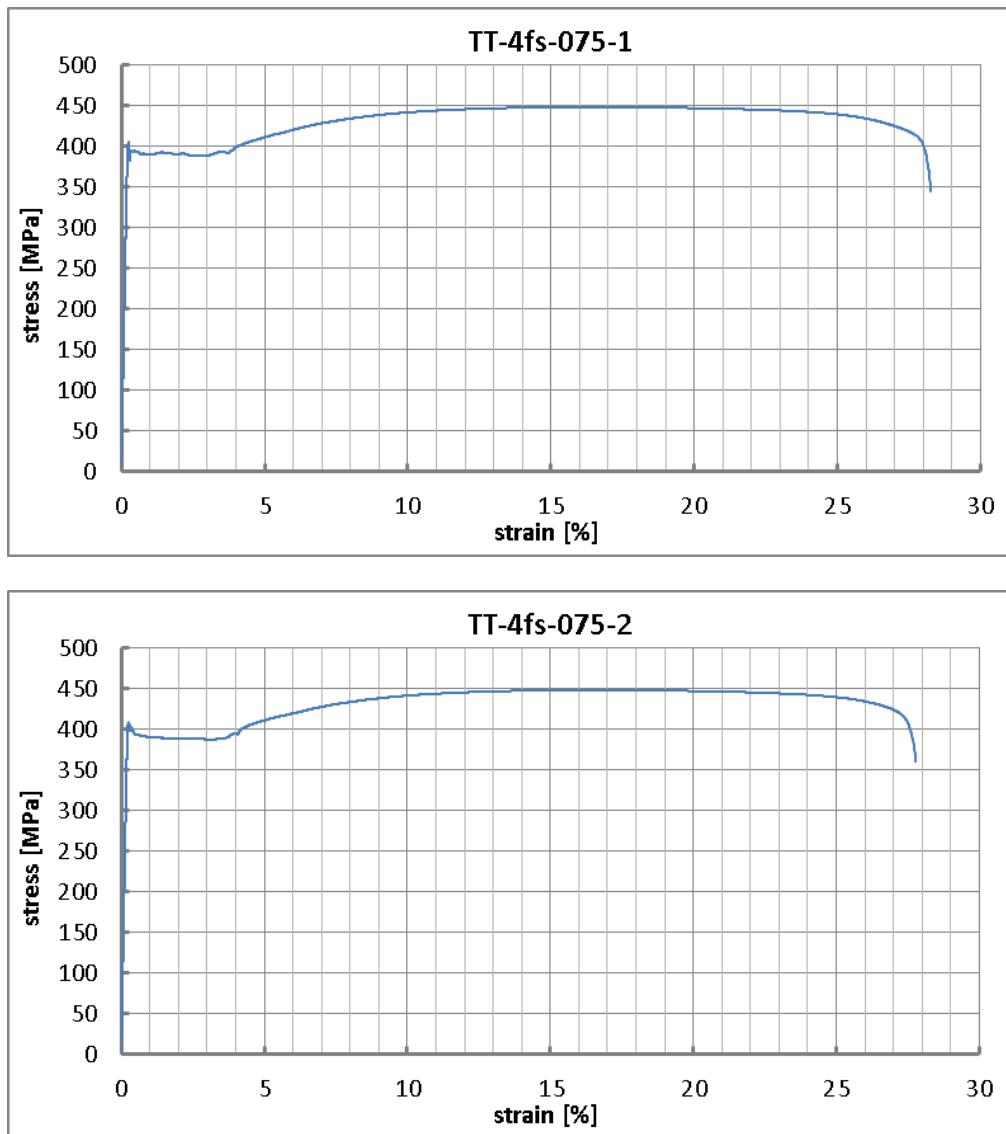


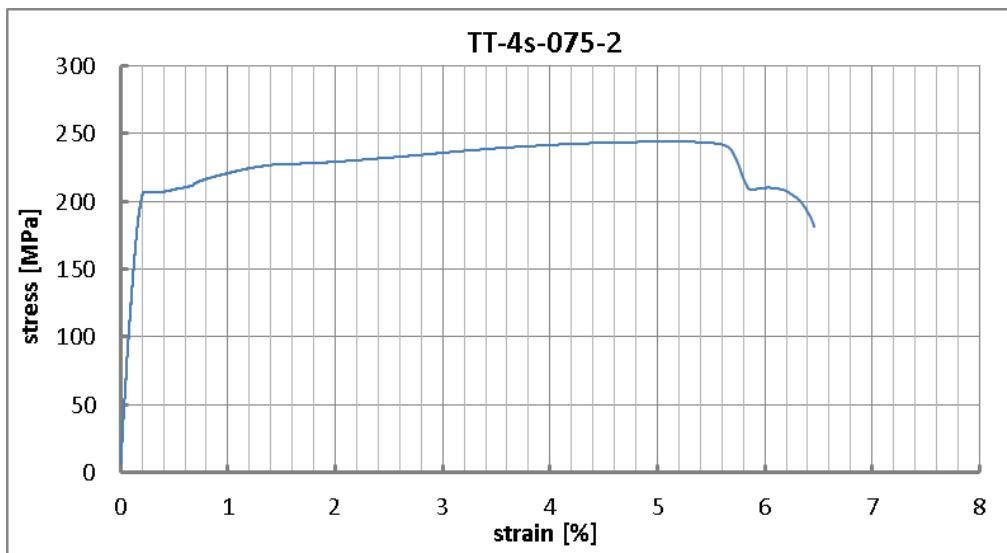
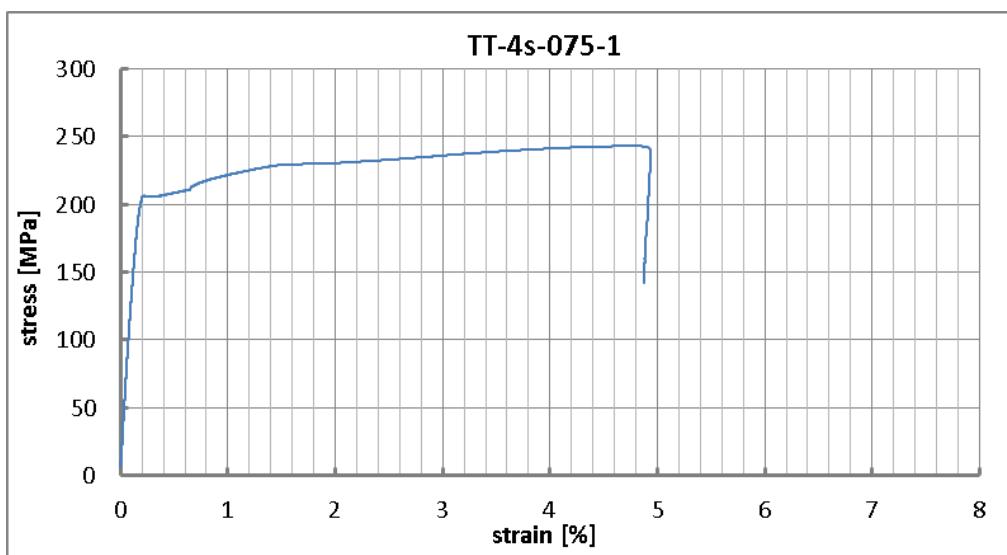
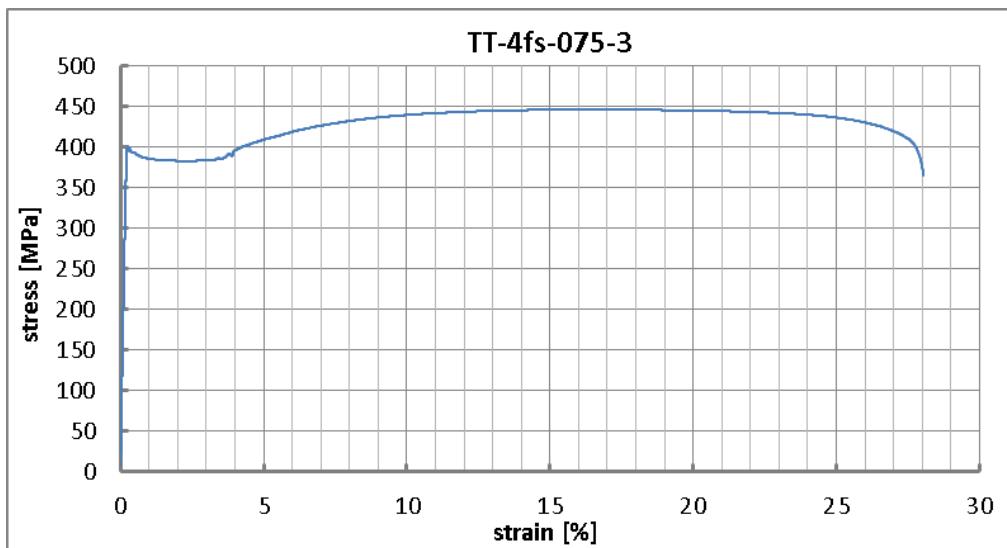


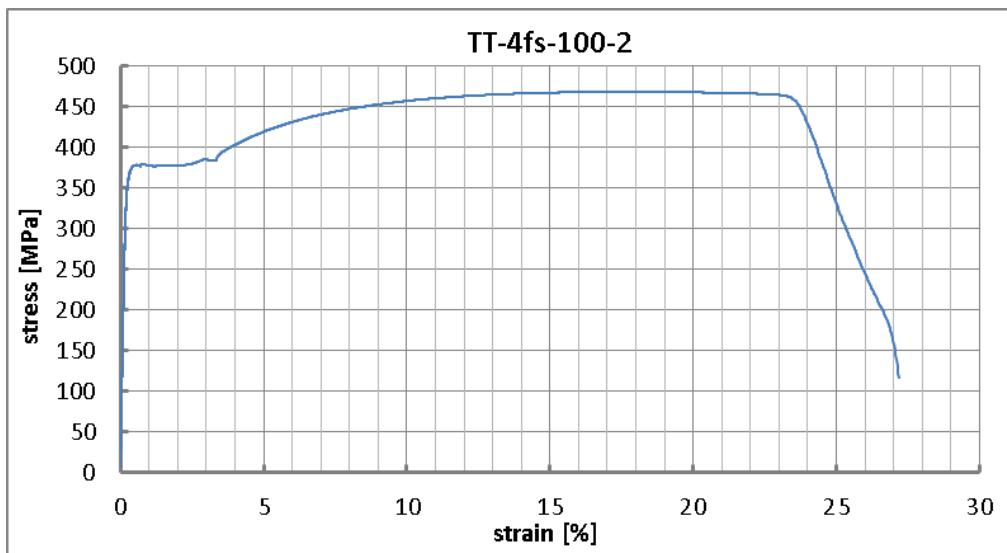
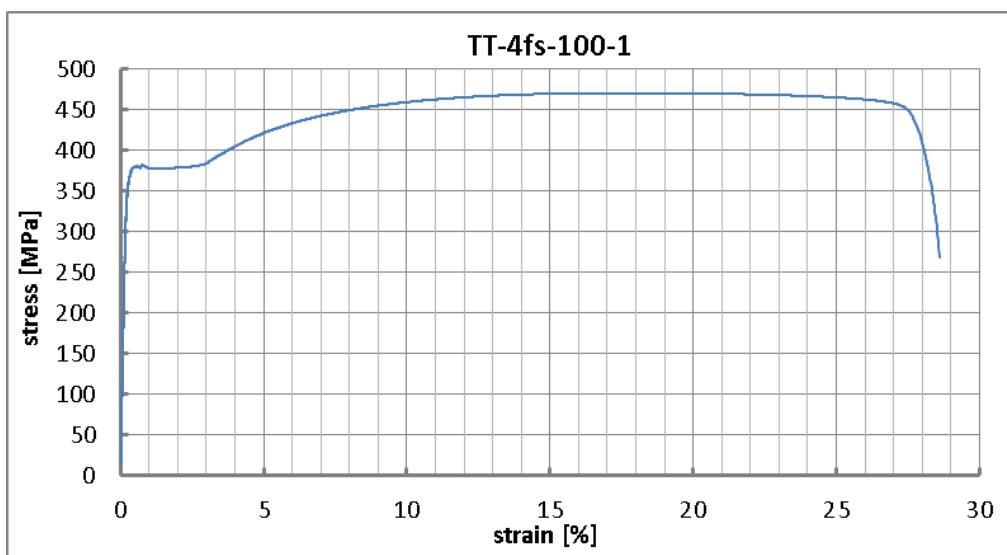
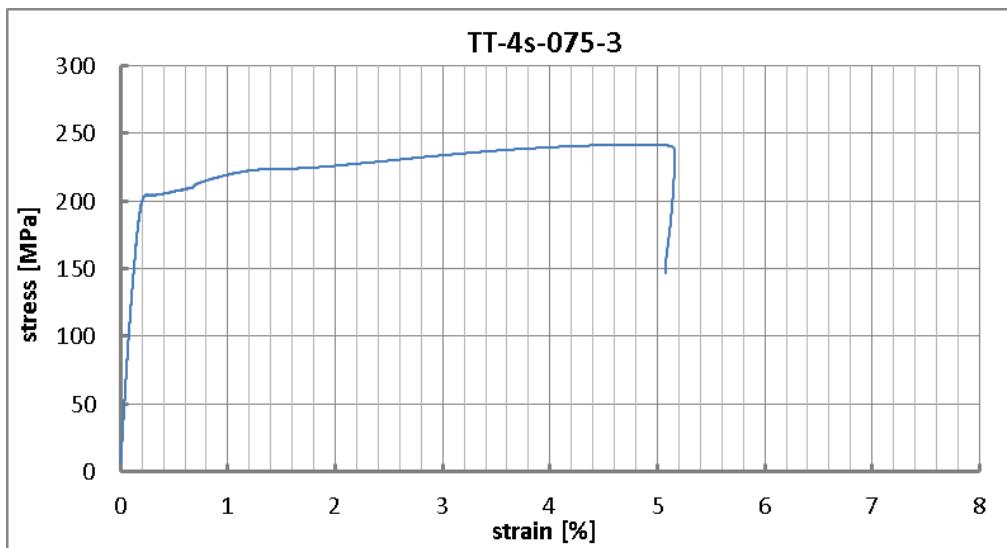


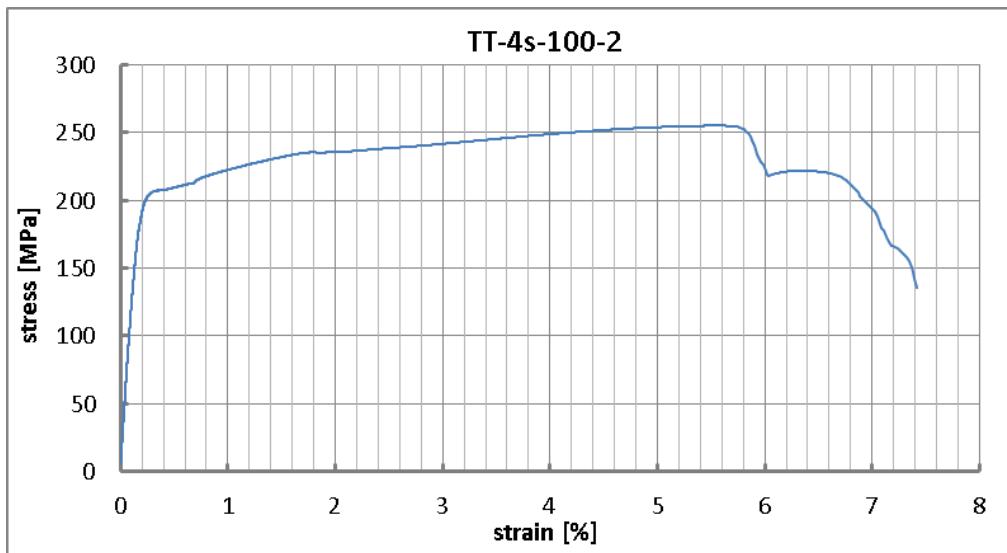
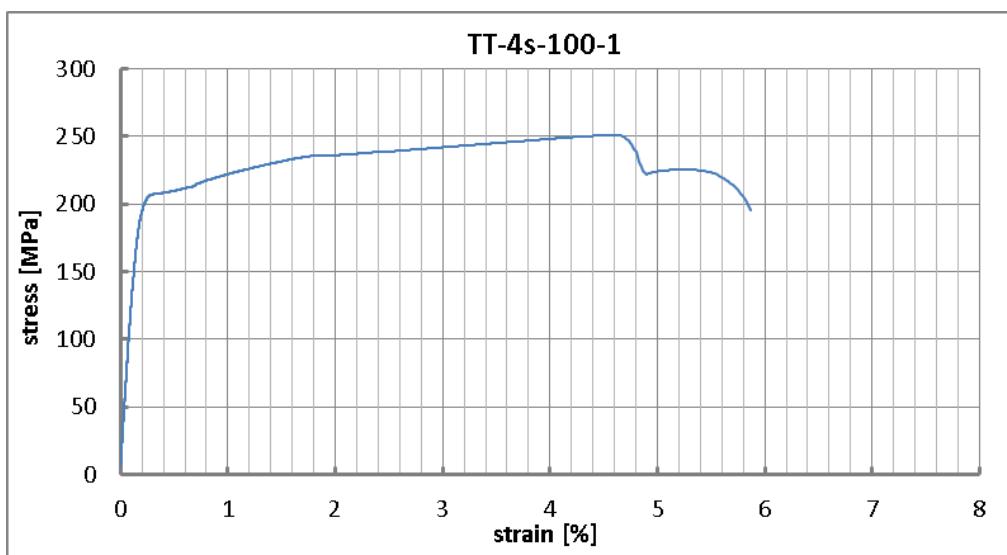
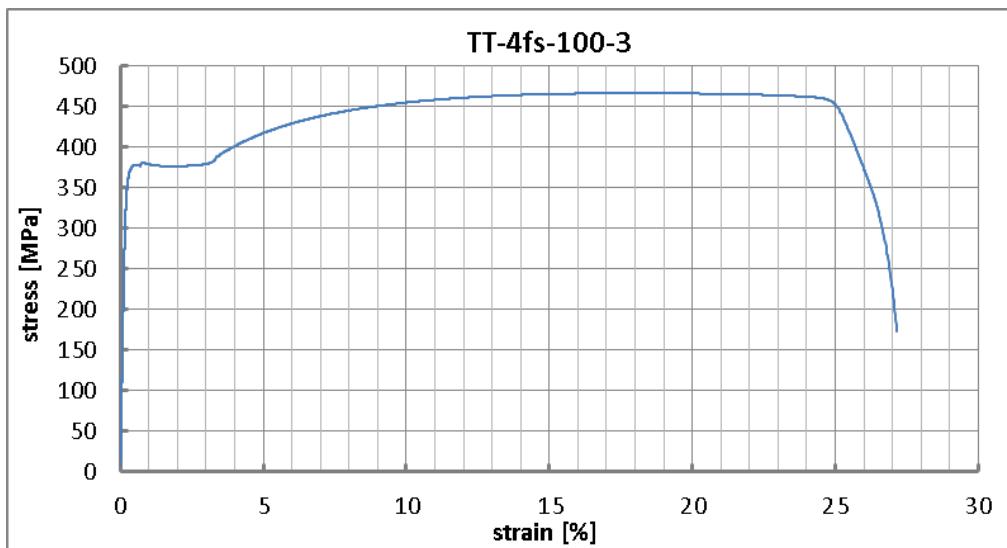
## 5 Annex E: Tensile tests of perforated profiles

Stress-strain curves (based on the initial cross-section):









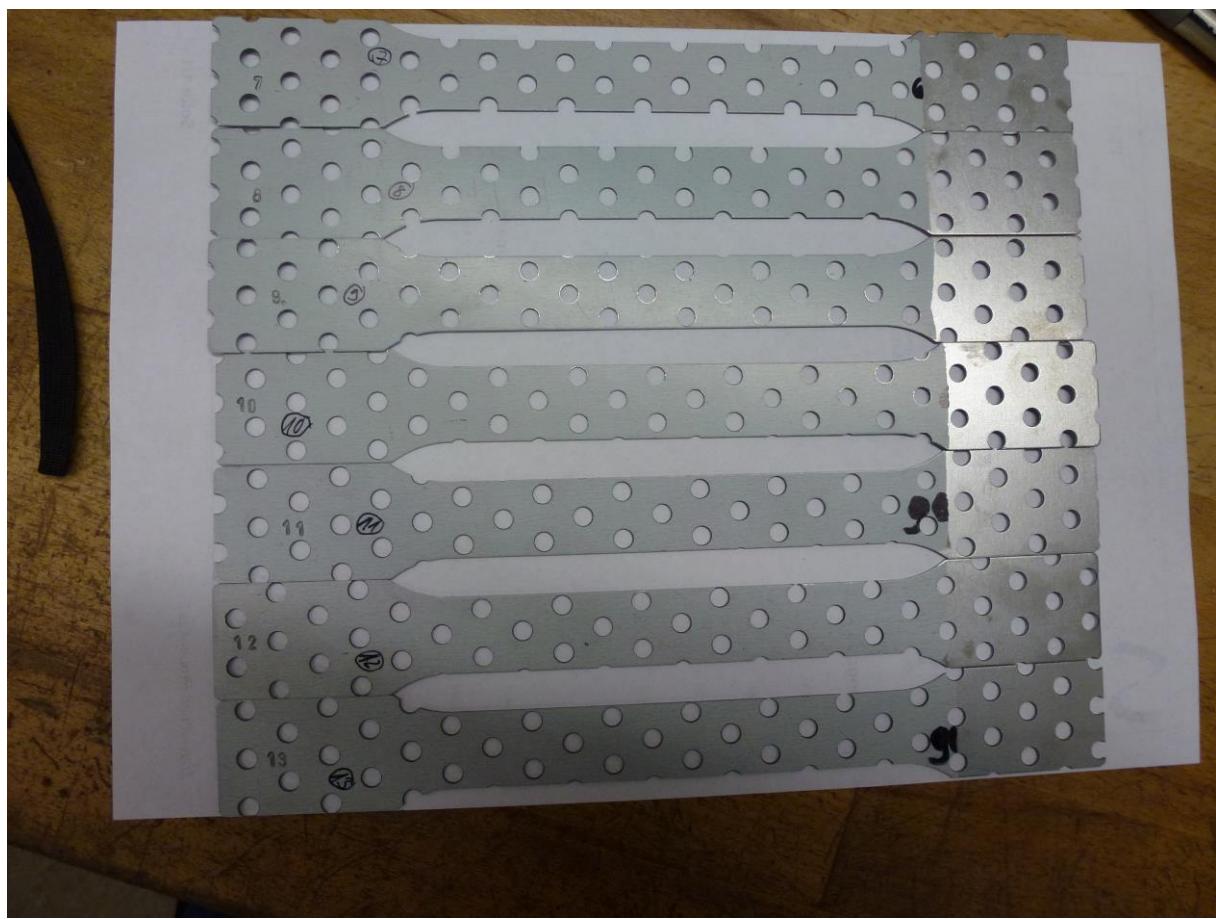
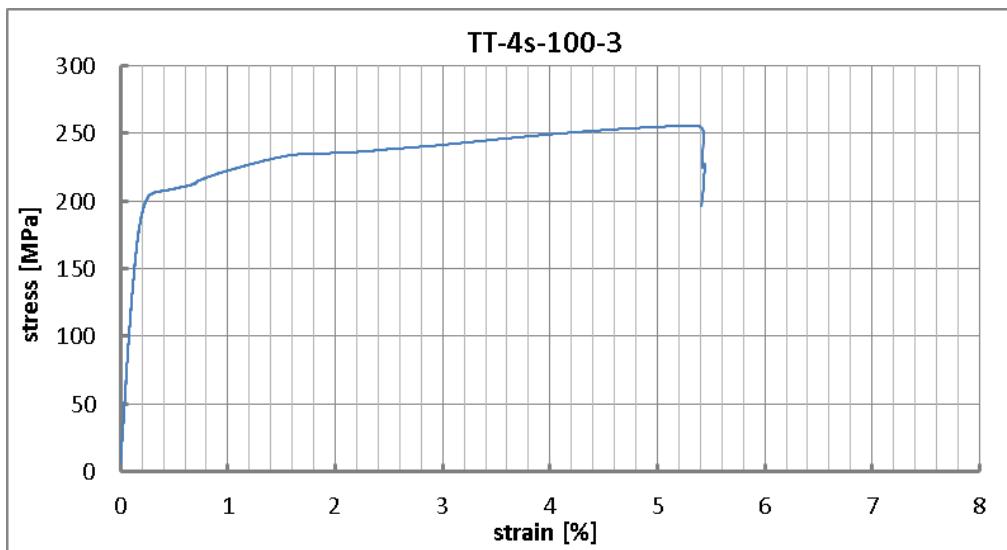


Fig. E.1: Tensile specimens with triangle perforation



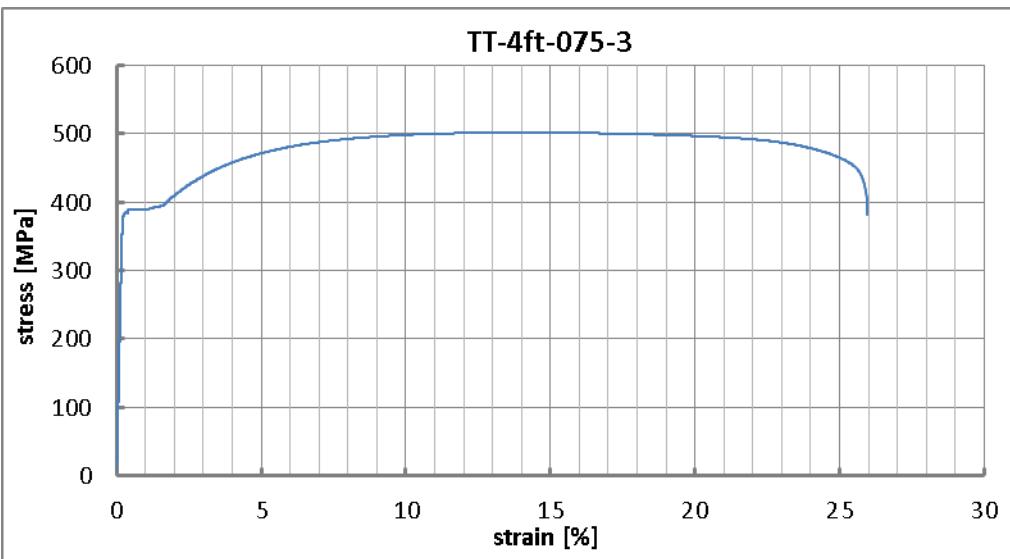
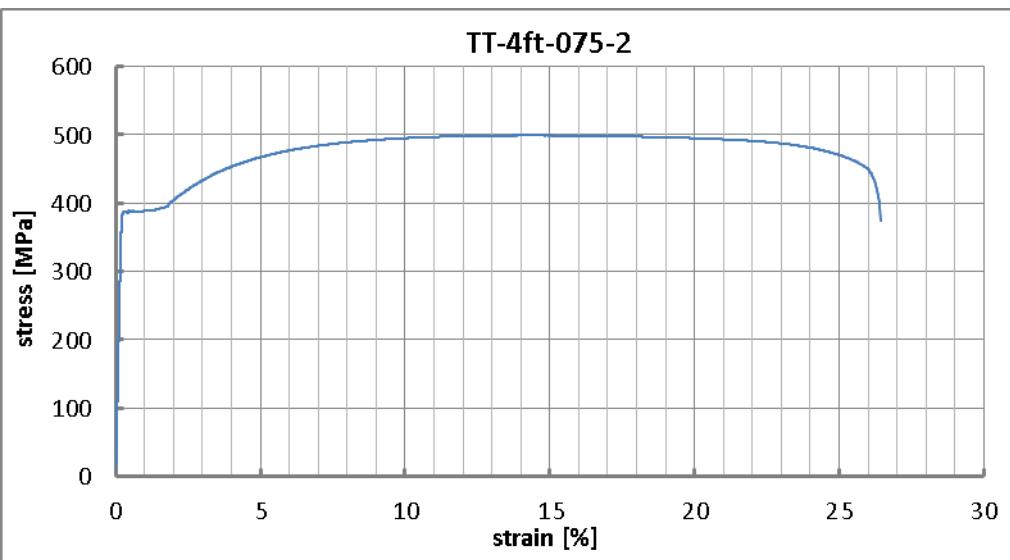
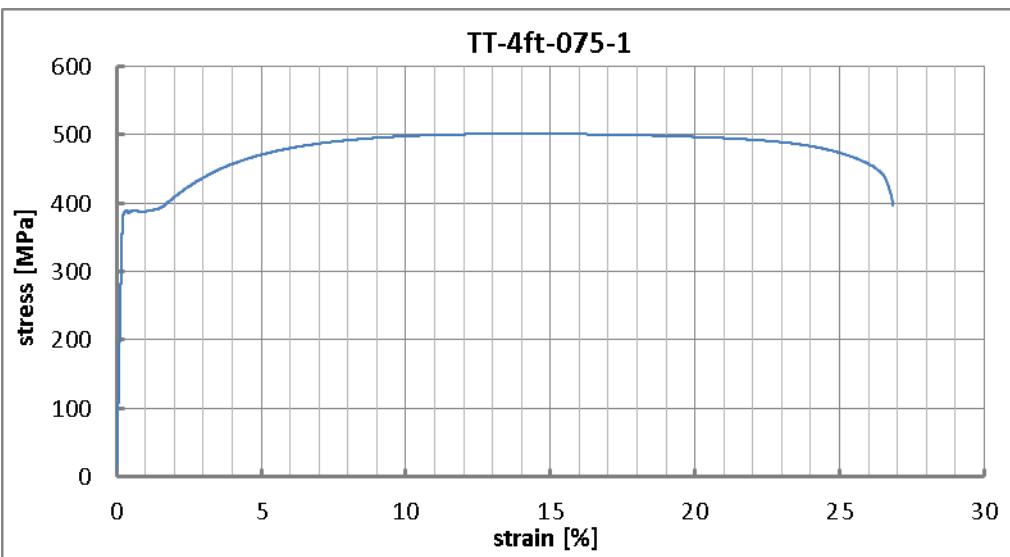
Fig. E.2: Tensile specimens with square perforation

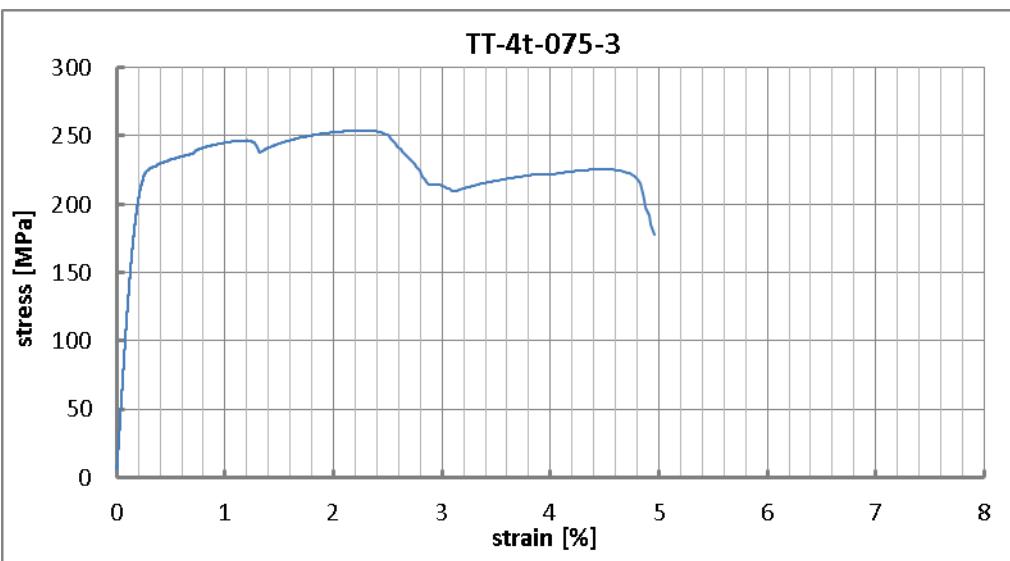
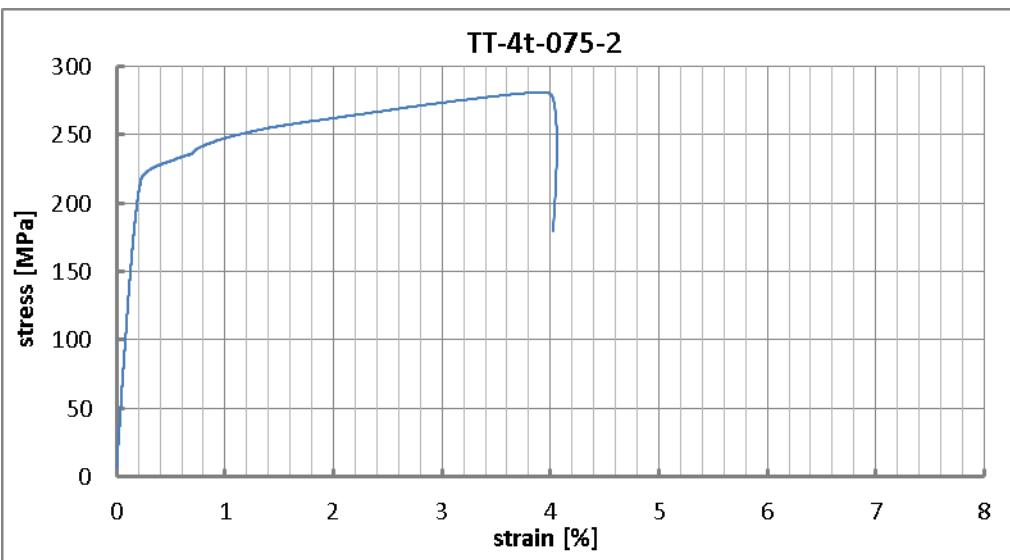
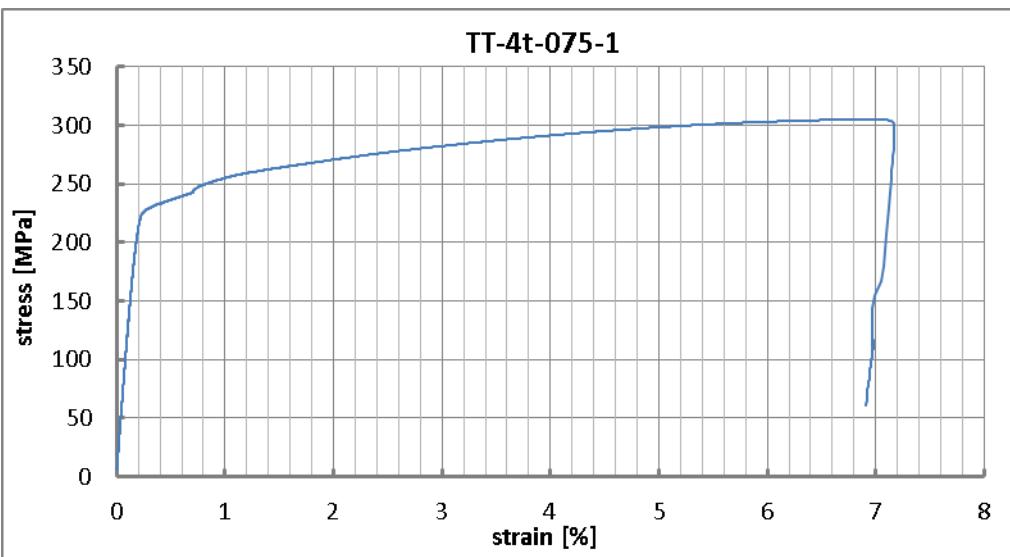
Sample number	Test number
7	TT-4t-075-1
8	TT-4t-075-2
9	TT-4t-075-3
10	TT-4t-075-4
11	TT-4t-100-1
12	TT-4t-100-2
13	TT-4t-100-3

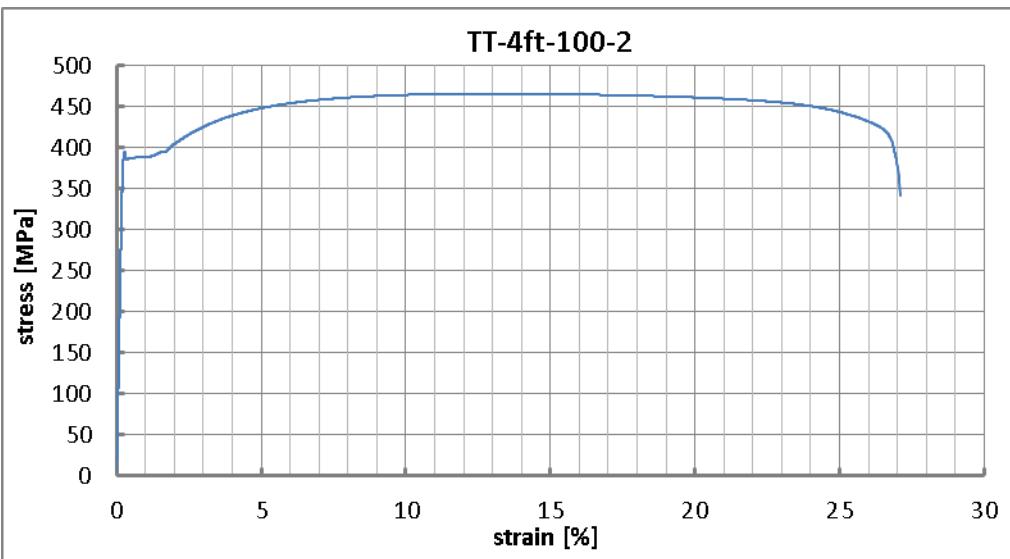
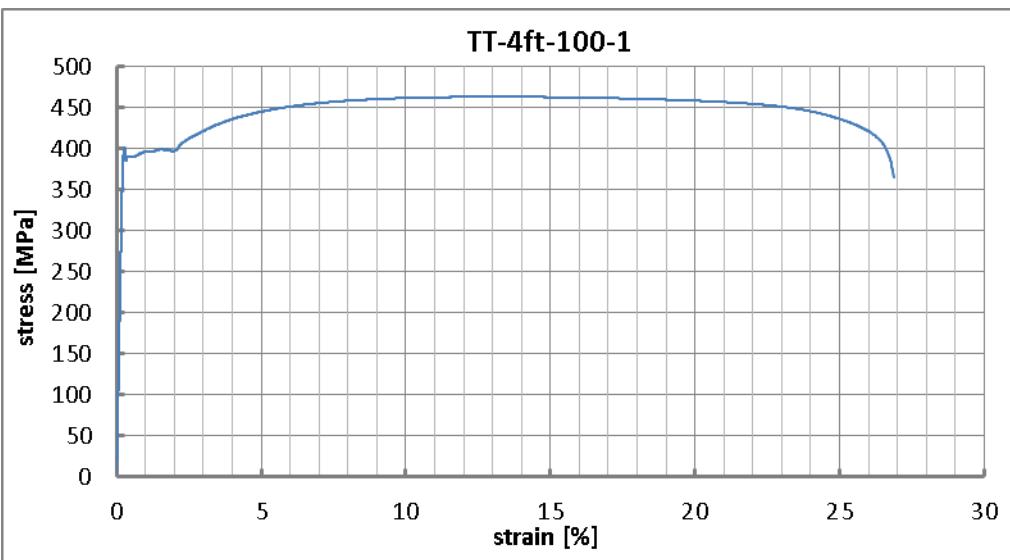
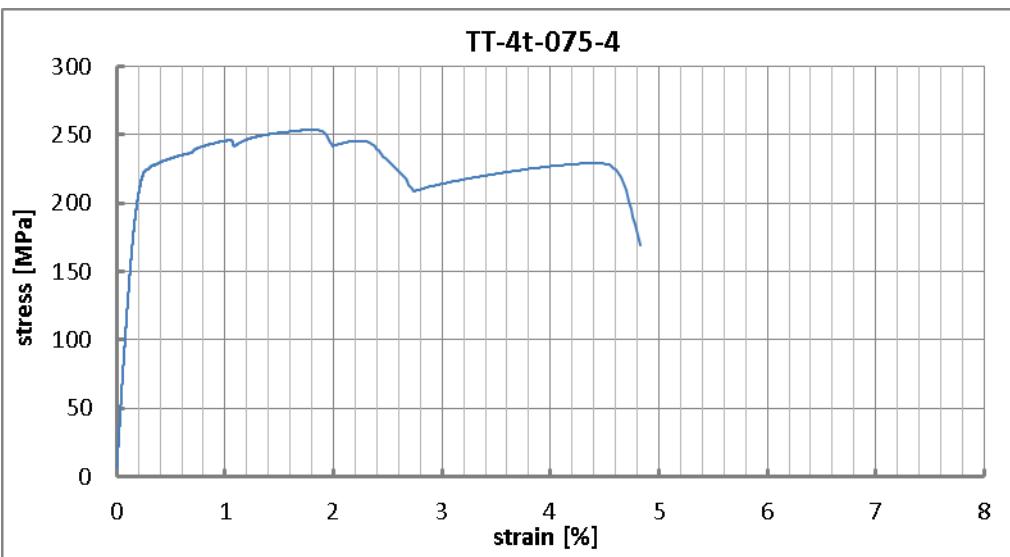
Tab. E.1: Tensile tests on specimens with triangle perforation (relation to stress-strain-curves)

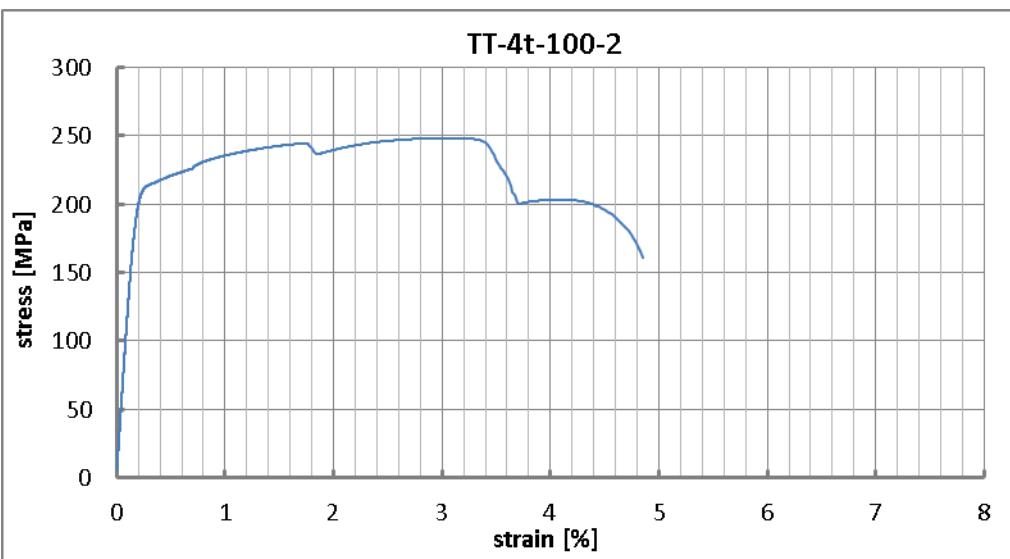
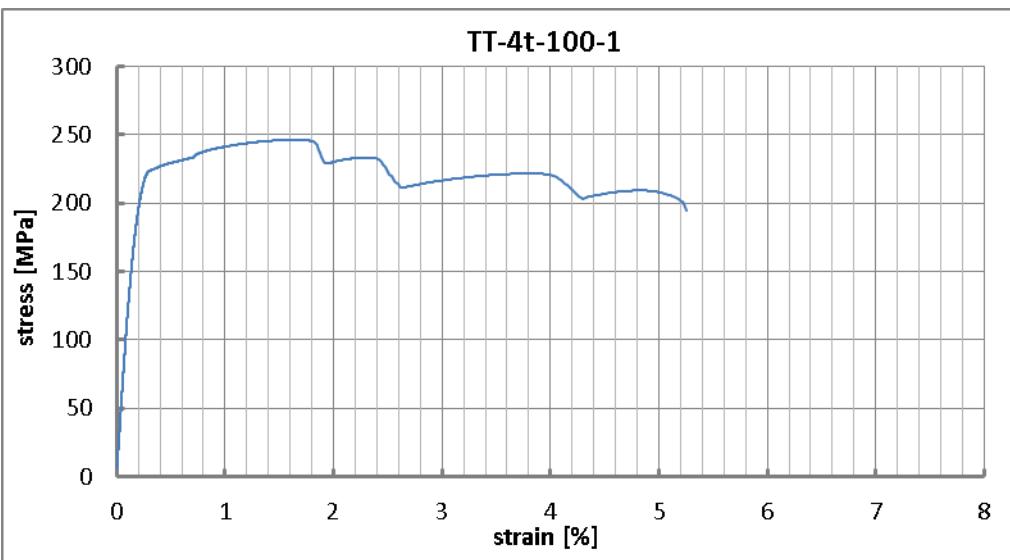
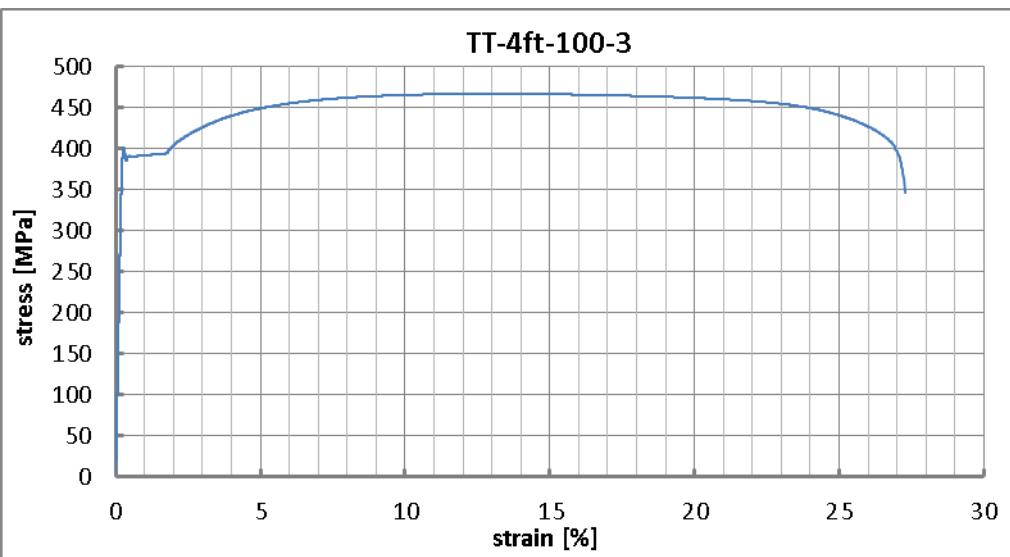
Sample number	Test number
1	TT-4s-075-1
2	TT-4s-075-2
3	TT-4s-075-3
4	TT-4s-075-4
5	TT-4s-100-1
6	TT-4s-100-2

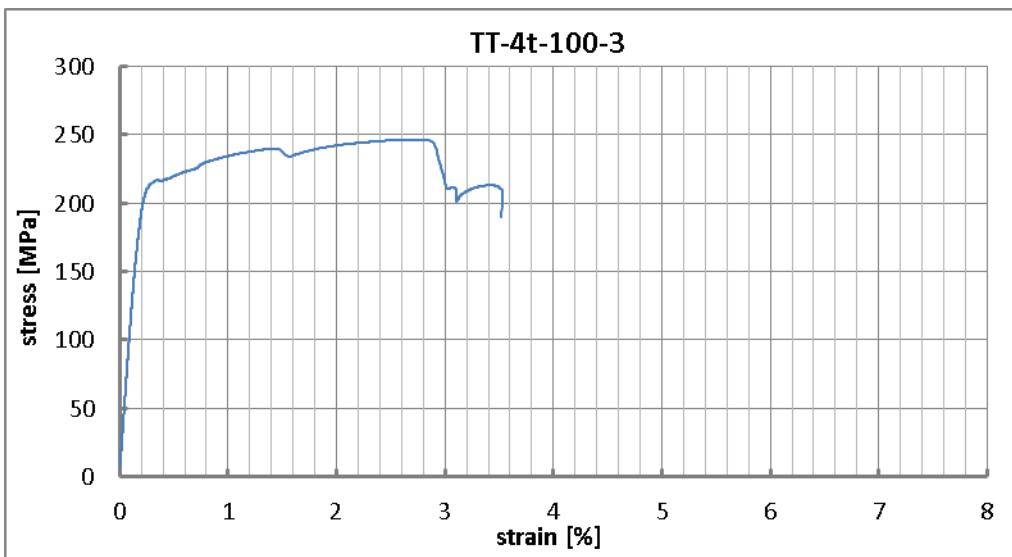
Tab. E.2: Tensile tests on specimens with square perforation (relation to stress-strain-curves)











## 6 Annex F: 3-point bending tests on coupons

Measurement of the sheet thickness

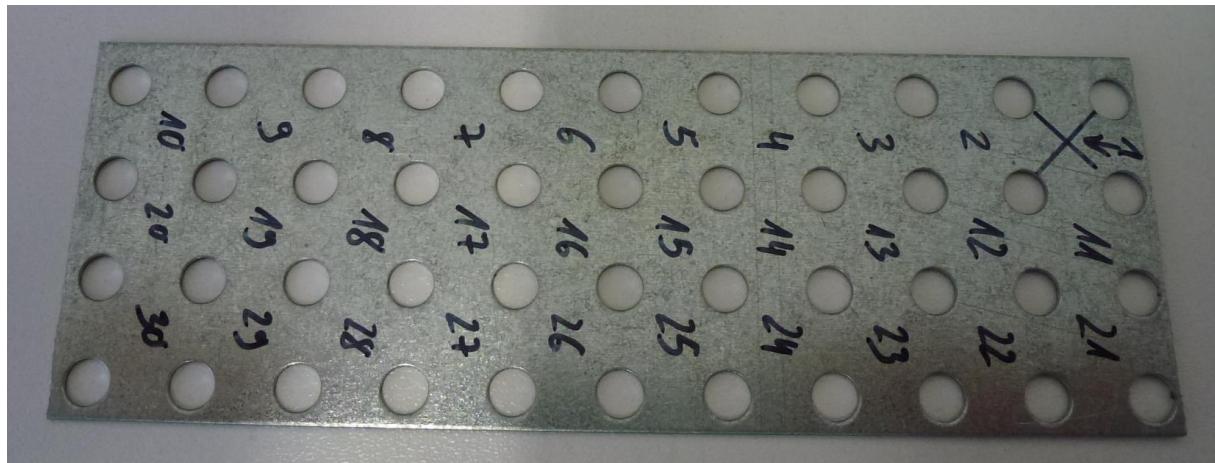


Figure F.1: 3-point bending test specimen with square perforation

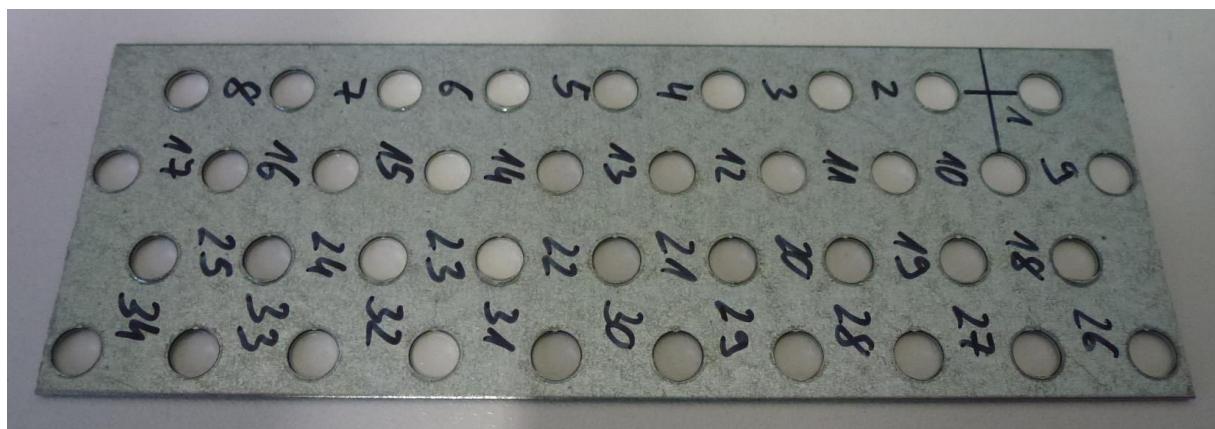


Figure F.2: 3-point bending test specimen with triangle perforation

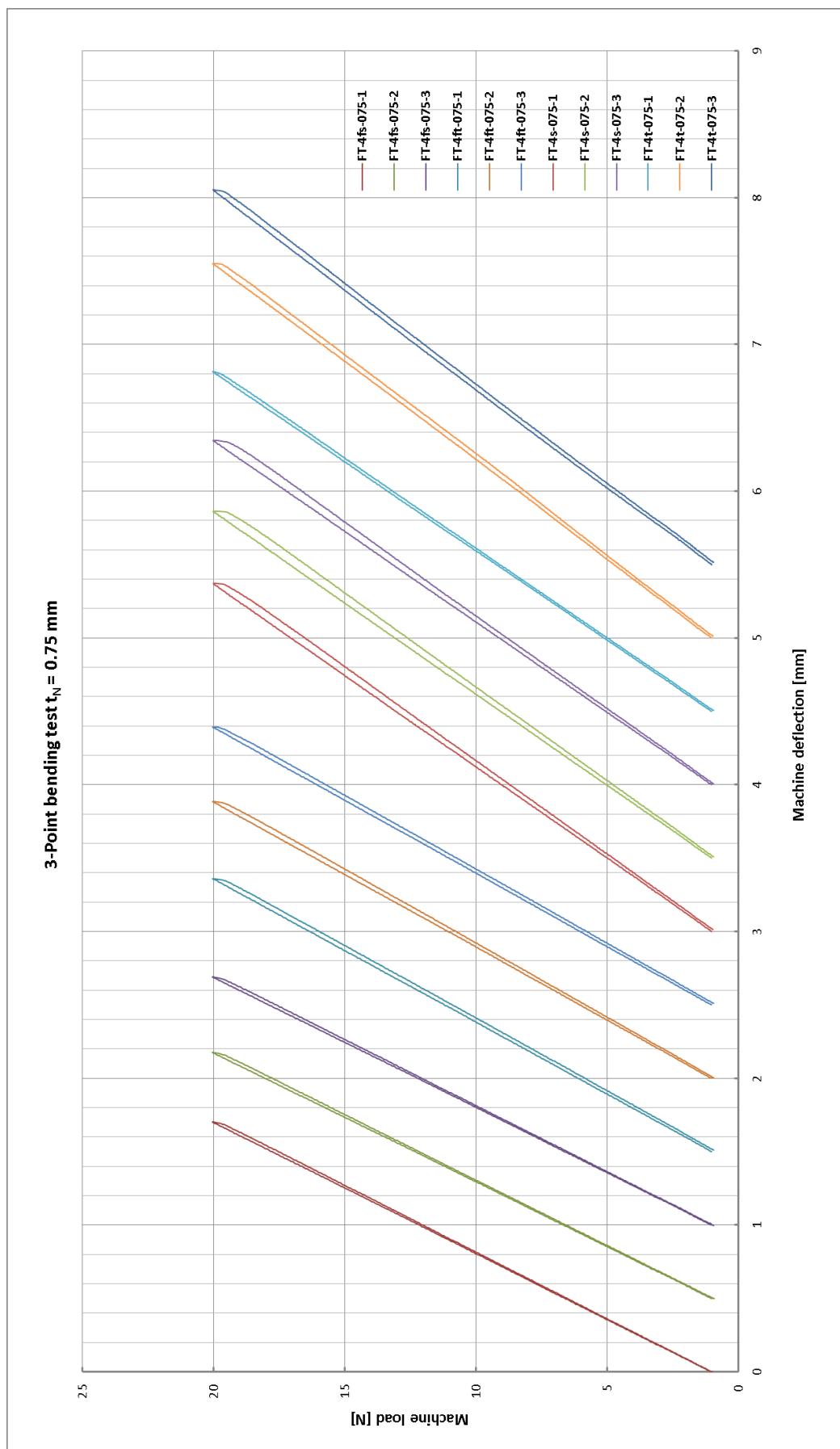
Test	FT-4fs-075-1	FT-4fs-075-2	FT-4fs-075-3	FT-4ft-075-1	FT-4ft-075-2	FT-4ft-075-3
Measuring point	t <sub>N</sub>					
1	0.730	0.732	0.733	0.712	0.711	0.714
2	0.727	0.734	0.729	0.711	0.710	0.713
3	0.726	0.729	0.731	0.712	0.713	0.709
4	0.725	0.729	0.732	0.711	0.714	0.710
5	0.728	0.730	0.739	0.711	0.709	0.712
6	0.725	0.730	0.727	0.708	0.709	0.711
7	0.727	0.733	0.732	0.708	0.717	0.715
8	0.723	0.730	0.734	0.715	0.708	0.716
9	0.724	0.733	0.731	0.717	0.716	0.712
10	0.728	0.734	0.733	0.715	0.708	0.711
11	0.729	0.733	0.737	0.713	0.711	0.712
12	0.726	0.735	0.730	0.716	0.708	0.709
13	0.722	0.730	0.729	0.714	0.709	0.713
14	0.721	0.726	0.731	0.711	0.710	0.710
15	0.726	0.730	0.733	0.708	0.708	0.709
16	0.725	0.732	0.737	0.711	0.715	0.713
17	0.727	0.733	0.733	0.710	0.716	0.712
18	0.728	0.732	0.731	0.711	0.708	0.709
19	0.727	0.733	0.733	0.717	0.710	0.709
20	0.724	0.733	0.729	0.712	0.708	0.713
21	0.731	0.732	0.732	0.711	0.709	0.714
22	0.726	0.730	0.728	0.711	0.707	0.704
23	0.725	0.729	0.730	0.709	0.708	0.708
24	0.727	0.729	0.728	0.716	0.711	0.706
25	0.726	0.731	0.730	0.708	0.712	0.715
26	0.726	0.729	0.730	0.716	0.711	0.707
27	0.729	0.727	0.729	0.710	0.707	0.706
28	0.726	0.730	0.728	0.710	0.709	0.707
29	0.732	0.726	0.734	0.709	0.710	0.706
30	0.729	0.731	0.730	0.711	0.705	0.704
31	-	-	-	0.710	0.707	0.704
32	-	-	-	0.708	0.705	0.708
33	-	-	-	0.713	0.708	0.709
34	-	-	-	0.713	0.709	0.711

Test	FT-4s-075-1	FT-4s-075-2	FT-4s-075-3	FT-4t-075-1	FT-4t-075-2	FT-4t-075-3
Measuring point	t <sub>N</sub>					
1	0.726	0.725	0.726	0.764	0.801	0.725
2	0.715	0.721	0.723	0.768	0.794	0.794
3	0.721	0.727	0.724	0.801	0.792	0.784
4	0.728	0.726	0.731	0.837	0.804	0.730
5	0.720	0.725	0.727	0.793	0.796	0.734
6	0.735	0.722	0.731	0.796	0.802	0.780
7	0.724	0.723	0.728	0.793	0.811	0.790
8	0.724	0.722	0.727	0.796	0.804	0.747
9	0.723	0.725	0.730	0.723	0.769	0.737
10	0.723	0.728	0.726	0.769	0.767	0.721
11	0.724	0.727	0.726	0.767	0.776	0.778
12	0.726	0.727	0.724	0.774	0.779	0.773
13	0.727	0.726	0.729	0.740	0.783	0.777
14	0.726	0.725	0.731	0.756	0.784	0.772
15	0.724	0.726	0.721	0.751	0.734	0.734
16	0.723	0.723	0.723	0.743	0.725	0.725
17	0.729	0.723	0.725	0.755	0.777	0.714
18	0.758	0.721	0.721	0.788	0.722	0.785
19	0.723	0.719	0.723	0.808	0.730	0.788
20	0.765	0.723	0.723	0.825	0.768	0.802
21	0.726	0.731	0.724	0.809	0.749	0.823
22	0.724	0.726	0.728	0.793	0.754	0.774
23	0.723	0.723	0.731	0.810	0.761	0.786
24	0.721	0.724	0.725	0.823	0.741	0.798
25	0.723	0.725	0.723	0.793	0.760	0.808
26	0.724	0.729	0.722	0.768	0.720	0.766
27	0.722	0.726	0.724	0.760	0.727	0.716
28	0.719	0.722	0.726	0.775	0.716	0.777
29	0.756	0.721	0.726	0.755	0.740	0.767
30	0.723	0.724	0.727	0.778	0.725	0.770
31	-	-	-	0.769	0.722	0.771
32	-	-	-	0.771	0.746	0.757
33	-	-	-	0.757	0.779	0.755
34	-	-	-	0.786	0.756	0.766

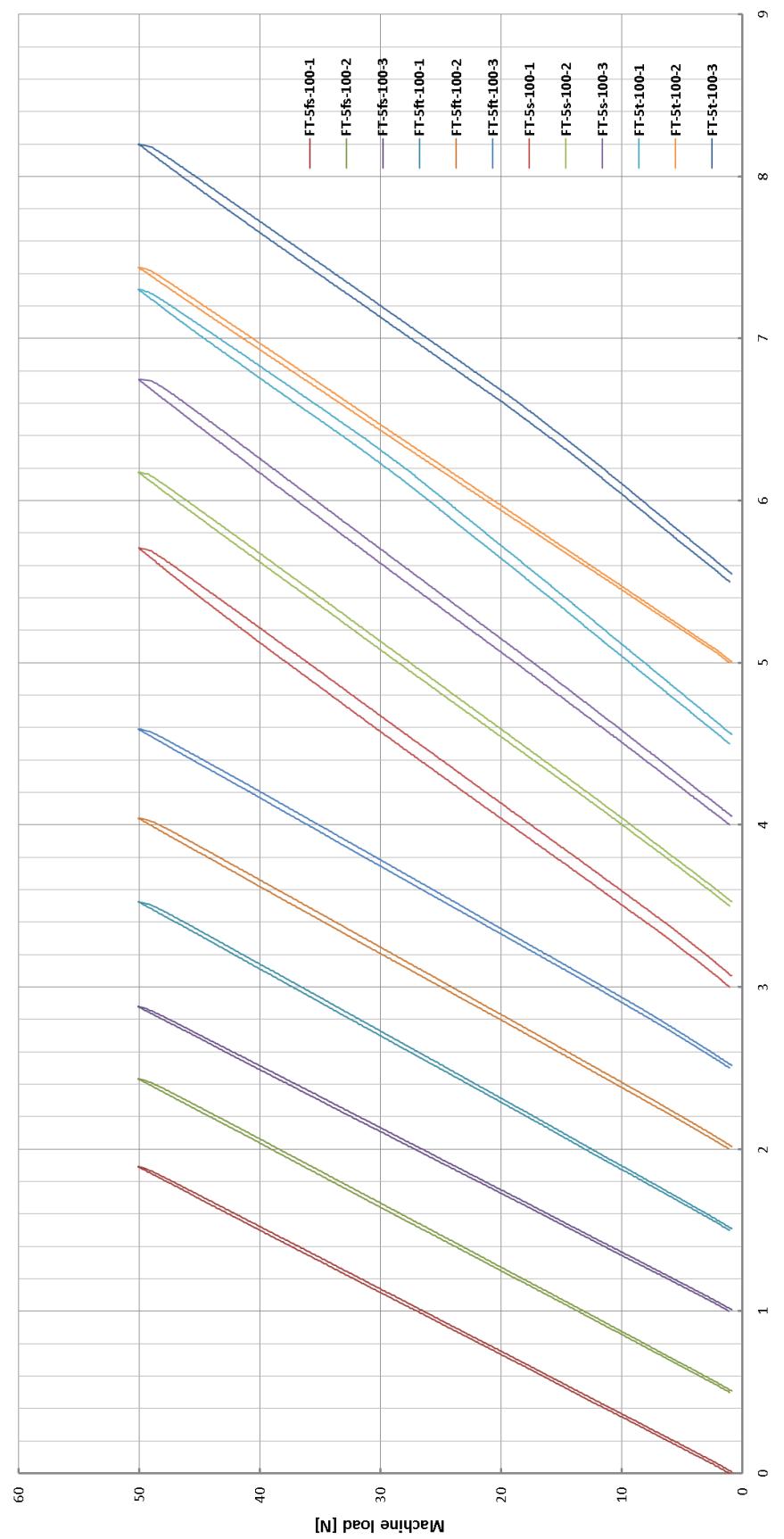
Test	FT-5fs-100-1	FT-5fs-100-2	FT-5fs-100-3	FT-5ft-100-1	FT-5ft-100-2	FT-5ft-100-3
Measuring point	t <sub>N</sub>					
1	0.951	0.949	0.956	0.963	0.961	0.960
2	0.948	0.943	0.951	0.955	0.957	0.959
3	0.950	0.946	0.949	0.962	0.962	0.960
4	0.954	0.946	0.951	0.959	0.961	0.959
5	0.948	0.945	0.952	0.960	0.958	0.957
6	0.951	0.948	0.953	0.961	0.964	0.956
7	0.949	0.940	0.954	0.960	0.963	0.964
8	0.951	0.946	0.950	0.953	0.963	0.961
9	0.952	0.941	0.955	0.957	0.967	0.961
10	0.952	0.940	0.954	0.957	0.962	0.967
11	0.948	0.951	0.951	0.951	0.961	0.961
12	0.946	0.950	0.953	0.954	0.964	0.957
13	0.949	0.947	0.947	0.955	0.966	0.960
14	0.949	0.950	0.954	0.957	0.963	0.957
15	0.948	0.947	0.950	0.951	0.963	0.963
16	0.946	0.944	0.954	0.956	0.962	0.960
17	0.951	0.941	0.954	0.960	0.965	0.960
18	0.946	0.941	0.950	0.957	0.965	0.957
19	0.951	0.943	0.956	0.954	0.964	0.958
20	0.943	0.948	0.953	0.957	0.961	0.960
21	0.945	0.936	0.947	0.956	0.957	0.958
22	0.945	0.941	0.954	0.955	0.964	0.959
23	0.944	0.941	0.951	0.954	0.961	0.957
24	0.944	0.943	0.951	0.948	0.962	0.955
25	0.942	0.933	0.953	0.956	0.962	0.957
26	0.940	0.935	0.951	0.958	0.963	0.959
27	0.943	0.938	0.949	0.955	0.963	0.958
28	0.941	0.936	0.948	0.957	0.961	0.960
29	0.944	0.934	0.950	0.952	0.962	0.957
30	0.945	0.940	0.958	0.956	0.960	0.961
31	-	-	-	0.953	0.962	0.962
32	-	-	-	0.958	0.961	0.957
33	-	-	-	0.950	0.962	0.957
34	-	-	-	0.957	0.964	0.960

Test	FT-5s-100-1	FT-5s-100-2	FT-5s-100-3	FT-5t-100-1	FT-5t-100-2	FT-5t-100-3
Measuring point	t <sub>N</sub>					
1	0.945	0.955	0.942	0.983	0.969	0.995
2	0.938	0.943	0.935	0.974	0.960	0.980
3	0.945	0.947	0.933	0.993	0.975	0.979
4	0.942	0.948	0.937	0.990	0.982	0.983
5	0.942	0.950	0.939	0.989	0.966	0.991
6	0.948	0.946	0.934	0.979	0.977	0.992
7	0.949	0.943	0.931	0.981	0.993	0.988
8	0.947	0.943	0.936	1.016	0.999	0.997
9	0.946	0.948	0.941	0.994	0.967	0.977
10	0.946	0.947	0.937	0.967	0.963	0.991
11	0.952	0.947	0.939	0.961	0.963	0.970
12	0.938	0.943	0.945	0.970	0.960	0.973
13	0.940	0.951	0.941	0.966	0.963	0.972
14	0.943	0.952	0.944	0.975	0.962	0.976
15	0.939	0.957	0.937	0.974	0.963	0.980
16	0.941	0.941	0.941	0.970	0.961	0.978
17	0.938	0.942	0.941	0.969	0.963	0.970
18	0.941	0.942	0.933	1.008	0.975	0.975
19	0.943	0.950	0.940	0.985	0.979	0.980
20	0.944	0.943	0.943	0.986	0.972	0.985
21	0.941	0.947	0.942	0.995	0.970	0.978
22	0.940	0.945	0.940	1.018	0.973	0.978
23	0.942	0.949	0.942	0.991	0.976	0.995
24	0.941	0.948	0.938	0.988	0.990	0.992
25	0.939	0.946	0.939	0.990	0.991	0.996
26	0.941	0.940	0.945	0.962	0.963	0.972
27	0.949	0.941	0.935	0.967	0.970	0.979
28	0.939	0.947	0.936	0.969	0.964	0.968
29	0.943	0.946	0.937	0.964	0.968	0.968
30	0.942	0.946	0.937	0.972	0.966	0.970
31	-	-	-	0.970	0.966	0.969
32	-	-	-	0.967	0.965	0.971
33	-	-	-	0.969	0.962	0.974
34	-	-	-	0.970	0.960	0.966

Load-deflection curves:

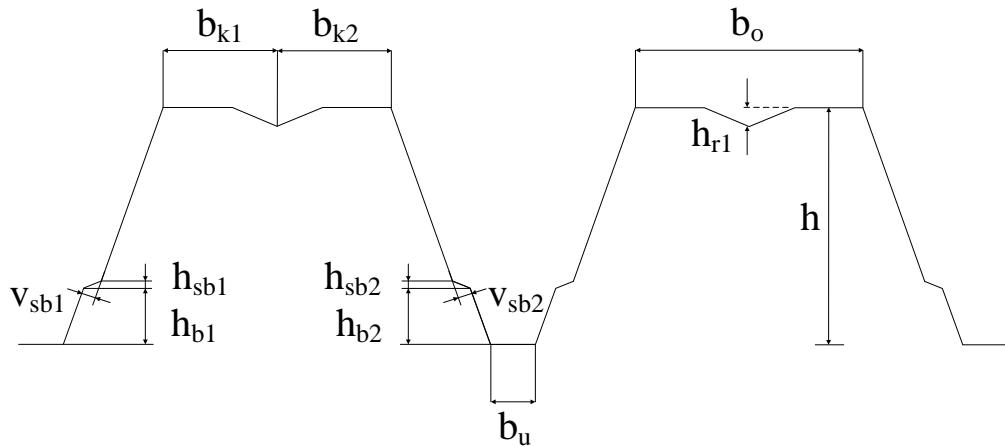


**3-Point bending test  $t_N = 1.00 \text{ mm}$**



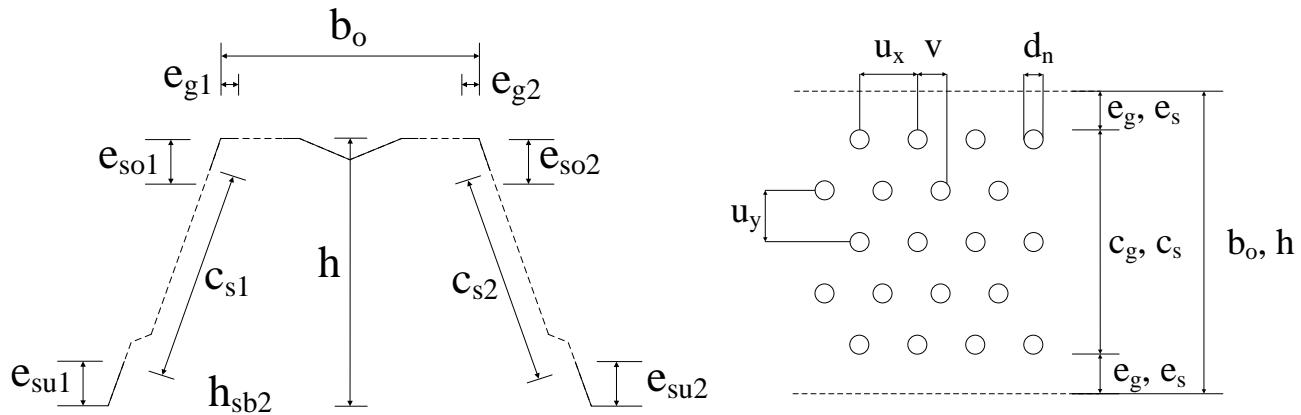
## 7 Annex G: Measurement of the profile geometry

Trapezoidal sheets without and with triangular perforation:



	PML 73 SE $t_N = 0.75 \text{ mm}$								PML 73 SE $t_N = 1.00 \text{ mm}$							
	1st Rib		2nd Rib		3rd Rib		4th Rib		1st Rib		2nd Rib		3rd Rib		4th Rib	
Thickness $t_N$	0,744		0,742		0,787		0,741		0,993		0,999		0,994		0,990	
Depth of profile $h$	72,8		73,5		74,7		-		71,7		72,7		73,3		-	
Depth of stiffeners $h_{r1}/h_{r2}$	3,4	-	2,7	-	2,8	-	2,9	-	2,8	-	2,6	-	2,6	-	2,7	-
Widths of crown $b_o$	126,5		124,5		124,5		125,5		125,0		125,0		125,0		126,0	
Position of stiffeners $b_{k1}/b_{k2}$	63,5	63,5	62,5	63,0	61,5	62,5	62,0	62,5	63,5	63,5	62,5	63,0	61,5	63,0	62,5	63,5
Position of web stiff. $h_{b1}/h_{b2}$	17,5	19,8	18,0	18,6	18,7	18,2	19,3	18,6	18,4	19,7	17,4	18,4	18,1	18,1	19,1	17,7
Position of web stiff. $h_{b3}/h_{b4}$	26,7	28,7	24,9	27,3	26,5	26,9	26,8	26,1	26,9	28,4	25,9	26,8	26,7	26,9	27,4	25,9
Position of web stiff. $h_{sb1}/h_{sb2}$	9,2	8,9	7,0	8,7	7,9	8,7	7,5	7,5	8,5	8,7	8,5	8,4	8,6	8,8	8,3	8,1
Depth of web stiffeners $v_{sb1}/v_{sb2}$	5,5	4,5	5,6	5,6	4,9	5,5	4,2	5,1	5,1	5,2	4,9	4,7	4,7	5,7	4,4	4,4
Widths of valley $b_u$	24,5		23,5		24,5		-		24,0		24,5		24,5		-	
Radius of bends $r_o$	6,0		Radius of bends $r_u$		6,0		6,0		Radius of bends $r_u$		6,0		Radius of bends $r_u$			6,0

	PML 56 $t_N = 0.75 \text{ mm}$								PML 56 $t_N = 1.00 \text{ mm}$							
	1st Rib		2nd Rib		3rd Rib		4th Rib		1st Rib		2nd Rib		3rd Rib		4th Rib	
Thickness $t_N$	0,744		0,746		0,747		0,739		0,978		0,986		0,983		0,974	
Depth of profile $h$	55,4		56,0		54,1		-		55,3		55,7		55,5		-	
Depth of stiffeners $h_{r1}/h_{r2}$	3,6		3,1	-	3,3	-	3,5	-	3,6	-	3,3	-	3,4	-	3,2	-
Widths of crown $b_o$	153,5		153,5		153,0		153,0		154,0		154,0		153,5		153,5	
Position of stiffeners $b_{k1}/b_{k2}$	74,0	79,5	74,0	78,5	75,5	77,5	76,5	76,5	75,0	79,5	76,0	77,5	76,0	76,0	76,5	76,0
Position of web stiff. $h_{b1}/h_{b2}$	14,5	15,5	16,3	15,0	18,0	15,3	16,1	15,3	16,3	16,1	15,7	14,6	14,9	14,5	14,1	14,3
Position of web stiff. $h_{b3}/h_{b4}$	24,0	26,4	27,1	26,8	23,7	26,7	24,6	25,3	26,1	27,3	25,9	26,6	26,5	26,0	24,9	25,4
Position of web stiff. $h_{sb1}/h_{sb2}$	9,5	10,9	10,8	11,9	5,7	11,4	8,5	10,0	9,8	11,2	10,2	12,1	11,6	11,5	10,8	11,1
Depth of web stiffeners $v_{sb1}/v_{sb2}$	7,3	5,8	7,5	5,2	6,8	5,6	6,4	6,5	5,1	6,5	5,4	6,4	5,2	6,9	5,5	6,0
Widths of valley $b_u$	26,0		26,5		26,5		-		26,5		27,0		26,0		-	
Radius of bends $r_o$	5,5		Radius of bends $r_u$		5,5		5,5		Radius of bends $r_u$		5,5		Radius of bends $r_u$			5,5

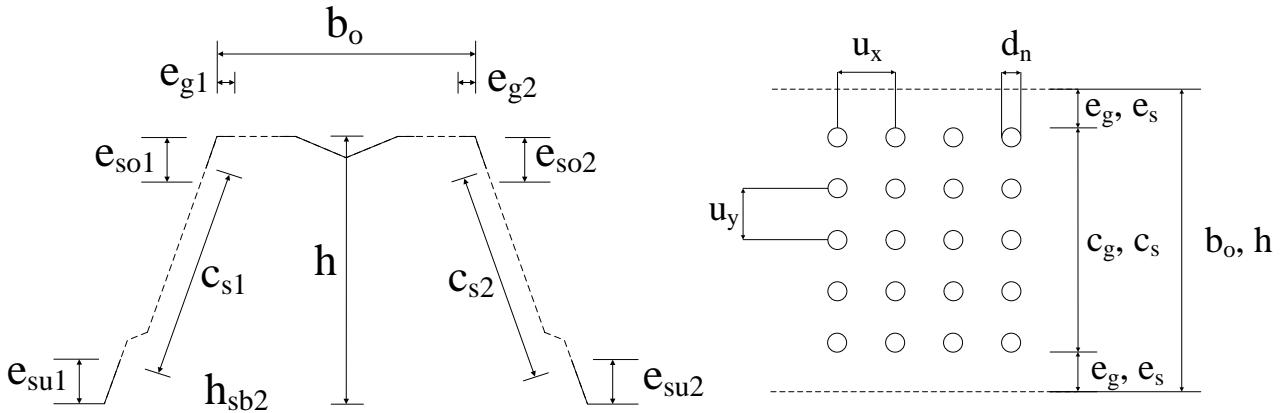


	PML 73 SE PP $t_N = 0.75 \text{ mm}$								PML 73 SE PP $t_N = 1.00 \text{ mm}$							
	1st Rib		2nd Rib		3rd Rib		4th Rib		1st Rib		2nd Rib		3rd Rib		4th Rib	
Thickness $t_N$	0,717		0,722		0,745		0,722		0,985		0,987		1,001		0,988	
Depth of profile $h$	72,1		71,7		73,0		-		72,8		71,4		72,1		-	
Depth of stiffeners $h_{r1}/h_{r2}$	3,7	-	3,0	-	4,0	-	3,2	-	2,9	-	2,8	-	2,5	-	2,9	-
Widths of crown $b_o$	127,0		125,5		125,0		125,5		124,5		125,0		125,5		125,5	
Position of stiffeners $b_{k1}/b_{k2}$	63,0	64,5	63,0	62,5	62,0	63,5	63,0	63,5	62,5	63,0	62,5	62,0	61,5	62,0	63,0	62,0
Hole diameter $d_n$	4,9	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0
Hole pitch $u_x$	20,9	20,9	20,7	20,9	20,9	20,8	20,8	20,8	21,1	20,9	21,1	21,7	21,4	21,5	21,0	21,3
Offset $v$	10,5	10,5	10,3	10,6	10,6	10,5	10,5	10,1	10,6	10,4	10,5	10,4	10,3	10,7	10,5	10,4
Row spacing $u_y$	6,3	6,3	6,2	6,2	6,6	6,2	6,4	6,4	6,2	6,3	6,3	6,3	6,4	6,2	6,7	6,2
Edge spacing $e_{g1}, e_{g2}$	10,8	15,5	7,8	12,4	4,5	14,5	8,5	11,5	-	21,5	-	18,5	-	19,5	-	16,5
numbers of rows (transv.)	8/8		8/9		8/9		8/9		8/8		8/9		8/9		8/9	
numbers of rows/m (long.)	96								96							
Position of web stiff. $h_{b1}/h_{b2}$	17,9	19,1	17,6	18,3	18,7	16,7	18,7	17,9	18,2	19,6	17,4	17,2	19,0	18,4	19,2	17,9
Position of web stiff. $h_{b3}/h_{b4}$	26,6	26,0	25,4	26,0	26,9	25,4	26,0	25,1	25,9	28,2	25,9	26,7	27,6	26,7	26,9	25,3
Position of web stiff. $h_{sb1}/h_{sb2}$	8,8	6,9	7,7	7,8	8,2	8,7	7,3	7,3	7,7	8,5	8,5	9,5	8,6	8,3	7,7	7,4
Depth of web stiffeners $v_{sb1}/v_{sb2}$	-	5,6	4,4	5,2	4,6	5,5	4,2	-	-	5,0	4,5	4,7	4,8	5,6	4,1	-
Widths of valley $b_u$	24,5		23,5		24,5		-		24,5		24,5		24,5		-	
Radius of bends $r_o$	6,0		Radius of bends $r_u$				6,0		6,0		Radius of bends $r_u$				6,0	

	PML 73 SE PO $t_N = 0.75$ mm								PML 73 SE PO $t_N = 1.00$ mm							
	1st Rib		2nd Rib		3rd Rib		4th Rib		1st Rib		2nd Rib		3rd Rib		4th Rib	
Thickness $t_N$	0,729		0,732		0,724		0,725		0,999		0,989		0,992		0,986	
Depth of profile h	73,1		72,6		72,1		-		72,9		73,2		73,4		-	
Depth of stiffeners $h_{rl}/h_{r2}$	3,0	-	2,9	-	3,1	-	3,2	-	2,9	-	2,7	-	2,6	-	2,8	-
Widths of crown $b_o$	125,5		125,0		125,0		125,0		126,5		125,5		126,0		126,0	
Position of stiffeners $b_{k1}/b_{k2}$	62,7	62,5	63,5	62,0	63,5	63,5	63,0	62,5	63,0	63,5	62,5	63,0	61,5	65,0	62,5	63,0
Hole diameter $d_n$	4,8	4,8	4,8	4,8	4,8	4,8	4,8	4,8	5,0	5,0	5,0	5,0	4,9	4,9	4,9	5,0
Hole pitch $u_x$	21,0	21,0	21,0	21,0	21,0	21,0	21,0	21,0	21,4	21,4	21,1	21,4	21,5	21,4	21,2	21,3
Offset v	10,0	10,0	9,9	9,9	9,9	10,3	10,3	10,3	9,9	10,3	10,0	9,5	10,0	10,7	9,9	10,0
Row spacing $u_y$	13,0	12,0	12,0	12,0	13,0	12,0	13,0	13,0	6,4	6,8	6,6	6,0	6,4	6,6	6,8	6,5
Edge spacing $e_{so1}, e_{so2}$	8,9	-	17,5	-	19,2	-	15,5	7,5	11,5	-	14,2	-	16,5	-	13,1	-
width of web perforation $c_{s1}, c_{s2}$	49,3	49,5	49,2	49,3	49,3	49,3	49,3	49,2	-	-	-	-	-	-	-	-
Edge spacing $e_{su1}, e_{su2}$	3,4	18,4	-	15,3	-	16,8	-	14,0	-	-	-	-	-	-	-	-
numbers of rows (transv.)	4/5								4/5							
numbers of rows/m (long.)	96								96							
Position of web stiff. $h_{b1}/h_{b2}$	-	18,5	18,0	18,5	18,5	18,0	18,0	-	18,3	18,1	17,6	17,8	17,3	16,6	18,2	17,1
Position of web stiff. $h_{b3}/h_{b4}$	-	28,5	28,0	28,5	28,5	28,0	28,0	-	25,6	26,2	26,7	26,7	26,6	25,1	26,5	25,0
Position of web stiff. $h_{sb1}/h_{sb2}$	-	10,0	10,0	10,0	10,0	10,0	10,0	-	7,3	8,1	9,0	9,0	9,3	8,5	8,3	7,9
Depth of web stiffeners $v_{sb1}/v_{sb2}$	5,8	4,6	5,7	5,7	4,7	5,7	5,8	5,9	-	4,7	5,1	5,2	4,9	5,5	4,5	-
Widths of valley $b_u$	24,0		24,0		23,5		-		24,5		24,0		24,0		-	
Radius of bends $r_o$	5,5		Radius of bends $r_u$		6,0		6,0		Radius of bends $r_u$		6,0		6,0		6,0	

	PML 73 SE PT $t_N = 0.75$ mm								PML 73 SE PT $t_N = 1.00$ mm							
	1st Rib		2nd Rib		3rd Rib		4th Rib		1st Rib		2nd Rib		3rd Rib		4th Rib	
Thickness $t_N$	0,729		0,734		0,742		0,734		1,001		1,004		0,993		0,991	
Depth of profile h	73,0		72,7		72,5		-		72,1		72,9		73,5		-	
Depth of stiffeners $h_{rl}/h_{r2}$	3,3	-	3,2	-	3,2	-	3,1	-	2,9	-	2,8	-	2,8	-	2,9	-
Widths of crown $b_o$	125,5		125,0		125,5		125,5		125,5		126,5		125,5		126,0	
Position of stiffeners $b_{k1}/b_{k2}$	63,5	62,0	62,5	62,5	61,0	64,5	64,0	65,0	63,5	64,0	64,0	63,5	63,5	63,5	63,5	64,0
Hole diameter $d_n$	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0
Hole pitch $u_x$	21,0	21,2	21,2	21,2	21,2	21,2	21,3	21,1	21,5	21,0	21,1	20,9	20,9	21,1	21,1	21,0
Offset v	10,6	10,3	10,3	10,3	10,4	10,3	10,5	10,6	10,7	10,5	10,2	10,6	10,7	10,2	10,5	10,3
Row spacing $u_y$	12,9	12,3	12,4	12,6	12,7	12,7	12,6	12,5	6,7	6,5	6,2	6,3	6,4	6,1	6,2	6,1
numbers of rows (transv.)	24								24							
numbers of rows/m (long.)	96								96							
Position of web stiff. $h_{b1}/h_{b2}$	18,0	18,0	18,0	18,9	19,7	17,8	20,0	18,0	17,2	16,5	18,1	19,1	17,3	17,9	20,6	17,8
Position of web stiff. $h_{b3}/h_{b4}$	24,5	27,0	26,0	27,2	26,6	26,1	27,4	26,6	26,4	25,4	27,0	26,6	25,5	27,2	29,2	26,5
Position of web stiff. $h_{sb1}/h_{sb2}$	6,5	9,0	8,0	8,3	6,9	8,3	7,4	8,6	9,2	8,8	8,8	7,6	8,3	9,4	8,6	8,7
Depth of web stiffeners $v_{sb1}/v_{sb2}$	-	6,0	5,8	5,2	5,2	6,3	4,2	-	-	4,7	5,1	5,2	4,7	5,4	4,8	-
Widths of valley $b_u$	23,5		24,0		24,0		-		24,5		25,0		25,0		-	
Radius of bends $r_o$	5,0		Radius of bends $r_u$		6,0		6,0		Radius of bends $r_u$		6,0		Radius of bends $r_u$		6,0	

Trapezoidal sheets without and with square perforation:



	PML 73 SE $t_N = 0.75 \text{ mm}$								PML 73 SE $t_N = 1.00 \text{ mm}$							
	1st Rib		2nd Rib		3rd Rib		4th Rib		1st Rib		2nd Rib		3rd Rib		4th Rib	
Thickness $t_N$	0,745		0,749		0,751		0,749		0,951		0,960		0,965		0,964	
Depth of profile $h$	73,3		72,3		73,2		-		73,2		73,6		74,0		-	
Depth of stiffeners $h_{r1}/h_{r2}$	3,1	-	3,3	-	3,4	-	3,3	-	3,0	-	2,6	-	2,5	-	2,8	-
Widths of crown $b_o$	124,5		124,0		125,0		125,0		125,5		125,0		125,0		125,5	
Position of stiffeners $b_{k1}/b_{k2}$	61,8	62,8	63,3	60,8	63,0	62,0	62,8	62,3	63,8	61,8	63,0	62,0	62,0	63,0	62,8	62,8
Position of web stiff. $h_{b1}/h_{b2}$	17,5	20,8	17,7	17,8	17,4	19,7	17,6	20,4	16,9	18,5	17,9	17,9	17,7	17,7	17,2	16,0
Position of web stiff. $h_{sb1}/h_{sb2}$	8,1	10,1	8,4	9,7	9,2	8,9	9,6	8,3	9,6	9,5	8,0	9,5	8,8	10,3	9,8	10,7
Depth of web stiffeners $v_{sb1}/v_{sb2}$	5,1	4,6	4,7	4,5	4,7	5,0	4,4	4,7	4,9	4,5	4,8	4,9	5,3	5,3	4,8	5,2
Widths of valley $b_u$	24,0		23,5		24,0		-		24,5		24,0		24,5		-	
Radius of bends $r_o$	6,0		Radius of bends $r_u$				6,0		5,5		Radius of bends $r_u$				6,0	

	PML 73 SE PP $t_N = 0.75 \text{ mm}$								PML 73 SE PP $t_N = 1.00 \text{ mm}$							
	1st Rib		2nd Rib		3rd Rib		4th Rib		1st Rib		2nd Rib		3rd Rib		4th Rib	
Thickness $t_N$	0,733		0,742		0,741		0,737		0,942		0,948		0,948		0,946	
Depth of profile $h$	72,5		71,9		72,7		-		72,9		72,8		73,6		-	
Depth of stiffeners $h_{r1}/h_{r2}$	3,6	-	3,3	-	3,2	-	3,8	-	3,2	-	2,8	-	2,6	-	3,0	-
Widths of crown $b_o$	125,0		124,5		124,5		124,5		125,5		125,0		125,0		125,0	
Position of stiffeners $b_{k1}/b_{k2}$	62,3	62,8	61,5	63,0	61,8	62,8	62,3	62,3	63,0	62,5	62,3	62,8	62,0	63,0	63,0	62,0
Hole diameter $d_n$	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0
Hole pitch $u_x$	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3
Row spacing $u_y$	11,4	11,4	11,3	11,3	11,4	11,3	11,3	11,3	11,3	11,3	11,2	11,3	11,3	11,2	11,3	11,3
Edge spacing $e_{g1}, e_{g2}$	16,0	14,0	11,5	18,5	19,0	11,0	15,5	14,5	16,5	14,5	12,5	17,5	20,5	9,5	17,0	13,0
numbers of rows (transv.)	9		9		9		9		9		9		9		9	
numbers of rows/m (long.)	90								90							
Position of web stiff. $h_{b1}/h_{b2}$	16,5	18,8	17,2	20,0	17,4	19,3	17,7	17,8	17,0	18,0	17,3	17,9	18,1	17,6	17,3	19,0
Position of web stiff. $h_{sb1}/h_{sb2}$	8,3	9,4	7,9	8,6	8,6	8,8	8,4	8,9	8,5	9,0	9,2	9,1	8,4	10,1	9,9	8,8
Depth of web stiffeners $v_{sb1}/v_{sb2}$	4,7	4,5	4,8	4,7	4,6	5,0	4,3	4,6	4,9	4,8	4,9	5,6	5,0	4,8	4,7	4,6
Widths of valley $b_u$	24,5		24,0		24,5		-		24,5		24,5		24,5		-	
Radius of bends $r_o$	5,5		Radius of bends $r_u$				6,0		5,0		Radius of bends $r_u$				6,0	

	PML 73 SE PO $t_N = 0.75$ mm								PML 73 SE PO $t_N = 1.00$ mm							
	1st Rib		2nd Rib		3rd Rib		4th Rib		1st Rib		2nd Rib		3rd Rib		4th Rib	
Thickness $t_N$	0,736		0,745		0,746		0,735		0,942		0,950		0,952		0,946	
Depth of profile h	72,3		72,4		72,7		-		72,8		72,7		73,6		-	
Depth of stiffeners $h_{r1}/h_{r2}$	3,3	-	3,3	-	3,3	-	3,4	-	2,9	-	2,7	-	2,6	-	2,8	-
Widths of crown $b_o$	125,0		124,5		126,0		125,0		125,5		125,0		125,5		126,0	
Position of stiffeners $b_{k1}/b_{k2}$	63,0	62,0	63,3	61,3	63,5	62,5	63,0	62,0	63,5	62,0	62,5	62,5	61,5	64,0	62,8	63,3
Hole diameter $d_n$	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0
Hole pitch $u_x$	11,3	11,4	11,4	11,3	11,3	11,3	11,3	11,4	11,3	11,2	11,3	11,3	11,4	11,2	11,2	11,3
Row spacing $u_y$	11,3	11,3	11,3	11,3	11,2	11,3	11,4	11,3	11,2	11,3	11,3	11,2	11,4	11,2	11,3	11,3
Edge spacing $e_{so1}, e_{so2}$	14,4	15,3	19,9	11,9	11,8	8,3	16,2	14,5	13,5	17,7	17,6	13,9	9,1	12,2	11,5	20,0
width of web perforation $c_{s1}, c_{s2}$	49,4	49,4	49,3	49,3	49,3	49,3	49,4	49,4	49,4	49,5	49,3	49,5	49,3	49,4	49,5	49,4
Edge spacing $e_{su1}, e_{su2}$	11,8	12,7	6,7	15,8	15,8	19,4	11,8	11,7	14,0	10,4	10,1	13,6	18,2	15,0	16,2	8,0
numbers of rows (transv.)	5		5		5		5		5		5		5		5	
numbers of rows/m (long.)	90								90							
Position of web stiff. $h_{b1}/h_{b2}$	16,8	19,6	17,7	18,9	17,2	19,3	17,2	16,6	17,6	18,4	16,8	18,3	18,7	17,5	17,9	18,8
Position of web stiff. $h_{sb1}/h_{sb2}$	7,7	8,9	9,0	8,3	9,3	8,3	9,6	10,2	8,2	8,1	8,5	8,3	7,8	9,0	7,7	9,3
Depth of web stiffeners $v_{sb1}/v_{sb2}$	4,7	4,5	4,5	4,7	4,5	4,8	4,6	4,8	5,1	5,0	4,8	5,1	5,0	4,9	4,9	5,5
Widths of valley $b_u$	23,5		24,0		24,0		-		24,5		24,0		24,5		-	
Radius of bends $r_o$	5,5		Radius of bends $r_u$		6,0		5,5		Radius of bends $r_u$		6,0		6,0		6,0	

	PML 73 SE PT $t_N = 0.75$ mm								PML 73 SE PT $t_N = 1.00$ mm							
	1st Rib		2nd Rib		3rd Rib		4th Rib		1st Rib		2nd Rib		3rd Rib		4th Rib	
Thickness $t_N$	0,737		0,744		0,744		0,736		0,947		0,958		0,957		0,947	
Depth of profile h	72,8		72,9		73,3		-		73,1		73,2		73,6		-	
Depth of stiffeners $h_{r1}/h_{r2}$	3,3	-	3,0	-	3,3	-	3,3	-	3,1	-	2,7	-	2,8	-	3,3	-
Widths of crown $b_o$	125,0		125,0		125,0		125,5		125,5		124,5		125,0		126,0	
Position of stiffeners $b_{k1}/b_{k2}$	63,0	62,0	62,8	62,3	61,8	63,3	62,5	63,0	63,0	62,5	63,3	61,3	63,0	62,0	62,0	64,0
Hole diameter $d_n$	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0
Hole pitch $u_x$	11,3	11,2	11,3	11,3	11,2	11,3	11,3	11,3	11,3	11,2	11,3	11,3	11,3	11,3	11,3	11,3
Row spacing $u_y$	11,2	11,3	11,3	11,3	11,3	11,3	11,2	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3	11,3
numbers of rows (transv.)	26								26							
numbers of rows/m (long.)	90								90							
Position of web stiff. $h_{b1}/h_{b2}$	17,2	17,8	18,1	18,8	17,5	18,5	18,1	17,6	17,0	19,3	18,4	18,5	18,1	18,2	18,5	19,5
Position of web stiff. $h_{sb1}/h_{sb2}$	6,3	9,3	7,9	8,9	8,8	7,9	6,9	8,4	9,0	8,8	8,3	8,8	9,4	9,6	8,8	9,0
Depth of web stiffeners $v_{sb1}/v_{sb2}$	4,5	4,6	5,1	4,9	5,3	4,6	4,8	4,7	4,1	4,4	5,6	4,8	5,8	5,7	4,5	5,1
Widths of valley $b_u$	24,5		24,5		24,0		-		24,0		24,5		24,5		-	
Radius of bends $r_o$	5,5		Radius of bends $r_u$		5,5		6,0		Radius of bends $r_u$		6,0		5,5		5,5	