Optimization of a
Resistance Spot Welding Process
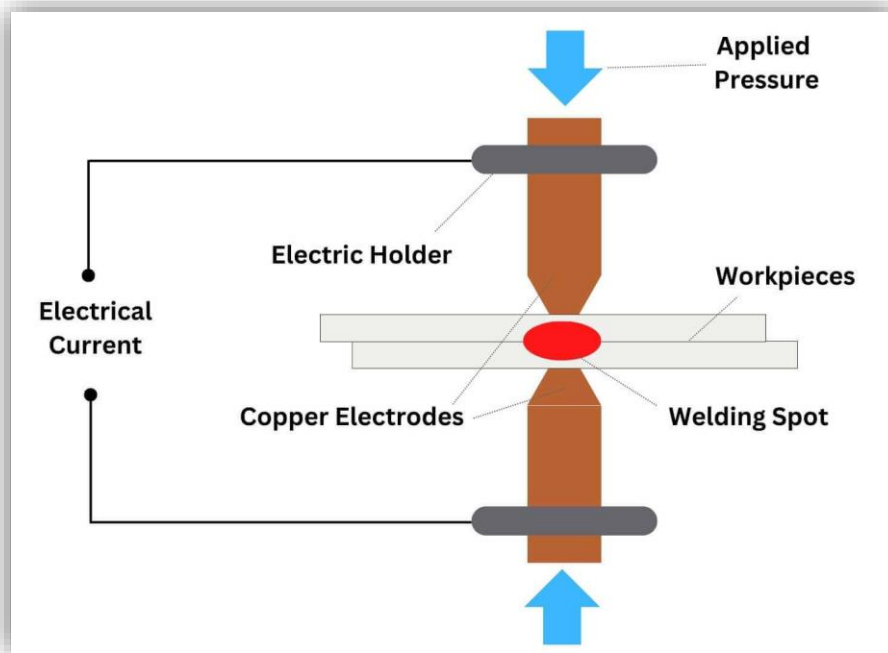
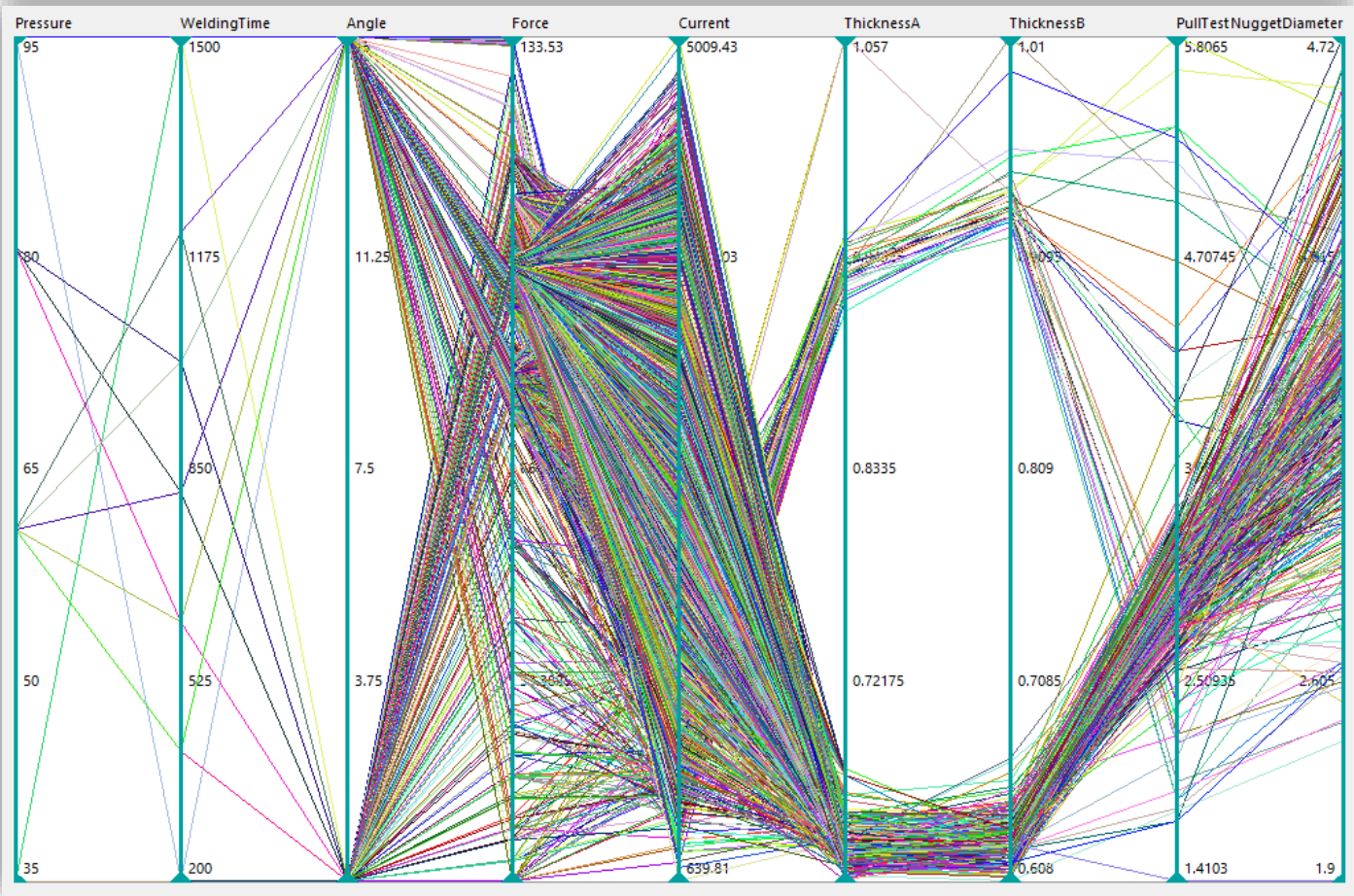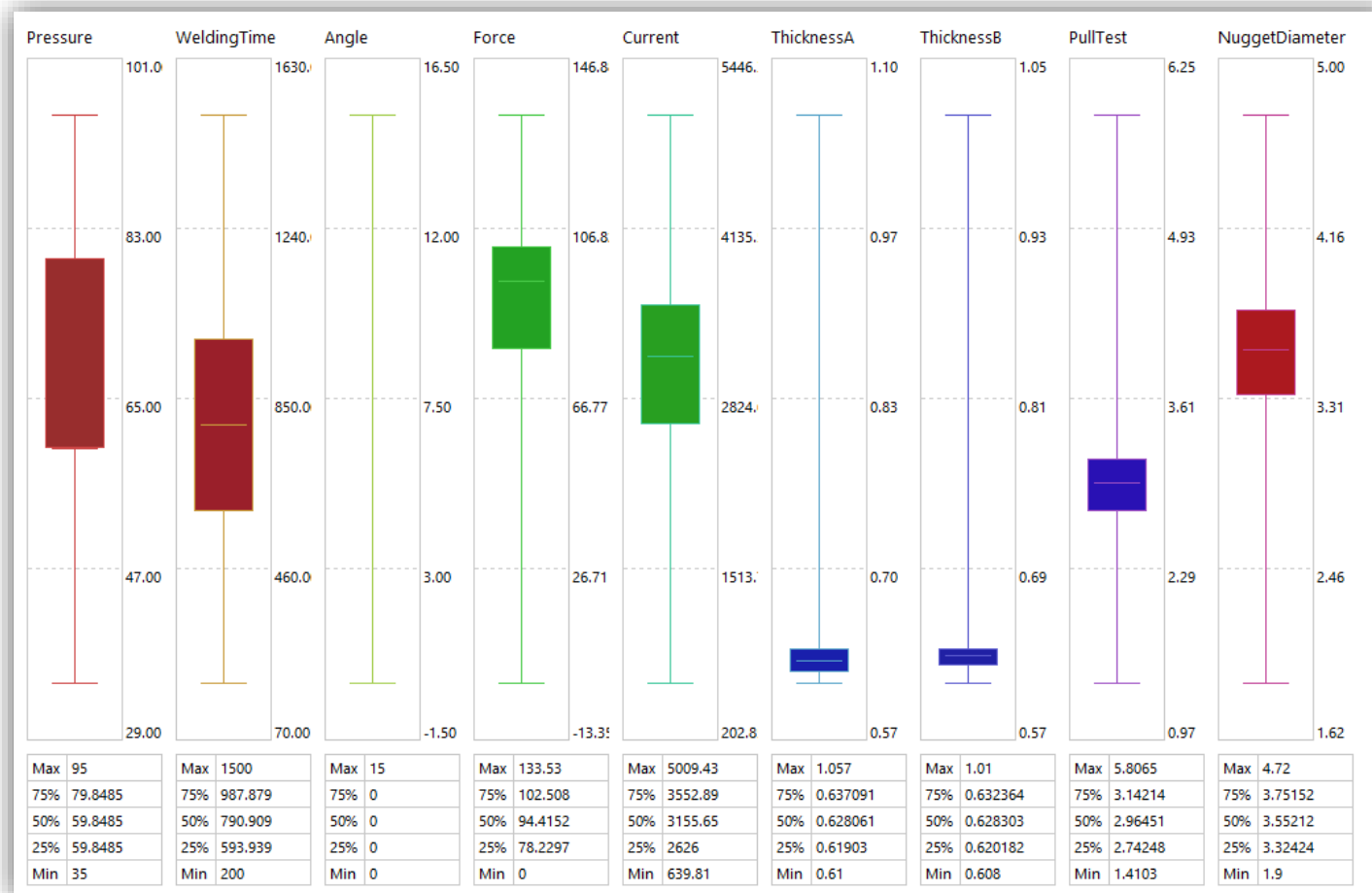| No	Pressure	WeldingTi...	Angle	Force	Current	Status
0	35	200	0	0	1315.41	Ok
1	35	200	0	3.41	1337.45	Ok
2	35	200	0	6.82	1081.47	Ok
3	35	1500	0	0	1819.13	Ok
4	35	1500	0	3.41	2016.44	Ok
5	35	1500	0	6.82	1910.44	Ok
6	35	1500	0	10.24	1818.18	Ok
7	35	1500	0	13.68	1750.71	Ok
8	35	1500	0	17.17	1920.32	Ok
9	35	1500	0	20.66	1912.24	Ok
10	35	1500	0	24.15	1767.33	Ok
11	35	1500	0	27.63	1767.33	Ok
12	35	1500	0	31.13	1721.98	Ok
13	35	1500	0	34.64	1795.33	Ok
14	35	1500	0	38.15	1801.07	Ok
15	35	1500	0	41.66	1937.26	Ok
16	35	1500	0	45.18	1709.96	Ok
17	35	1500	0	48.71	1786.69	Ok
18	35	1500	0	52.25	2014.73	Ok
19	95	1500	0	55.78	1721.98	Ok
20	95	1500	0	60.66	1406.4	Ok

OptiY Workflow for Resistance Spot Welding
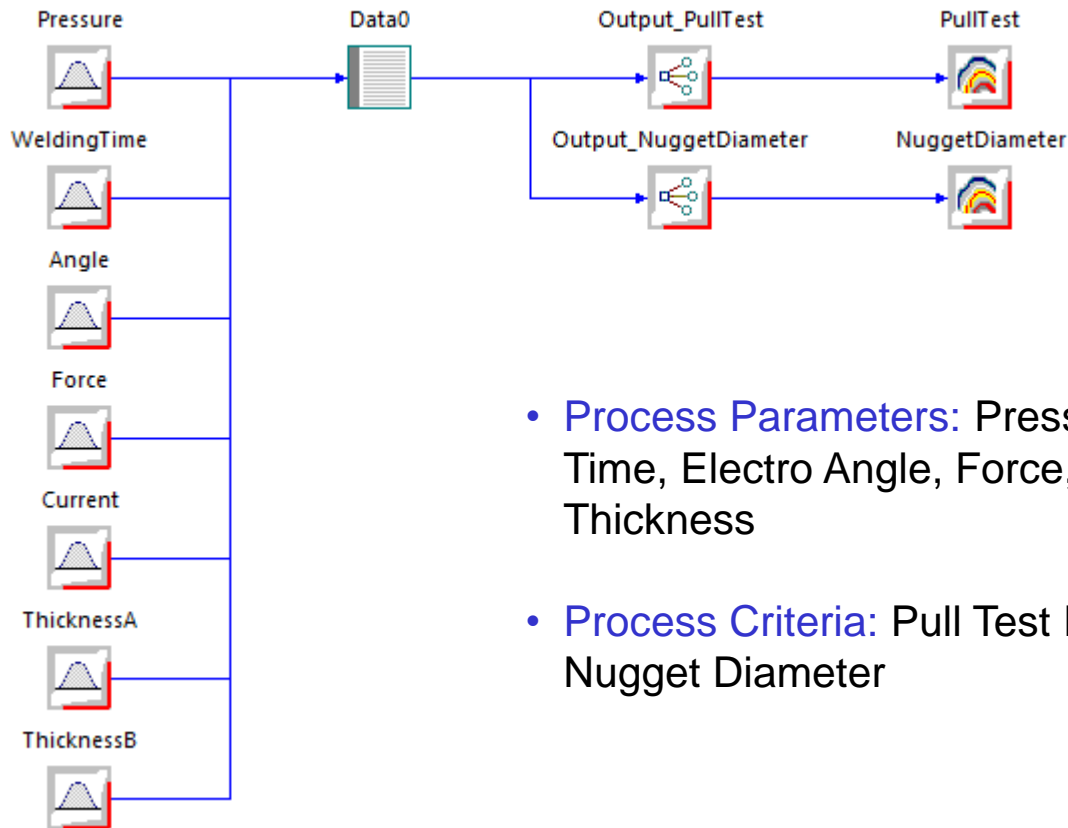
- Process Parameters: Pressure, Welding Time, Electro Angle, Force, Current, Thickness

- Process Criteria: Pull Test Force and Nugget Diameter

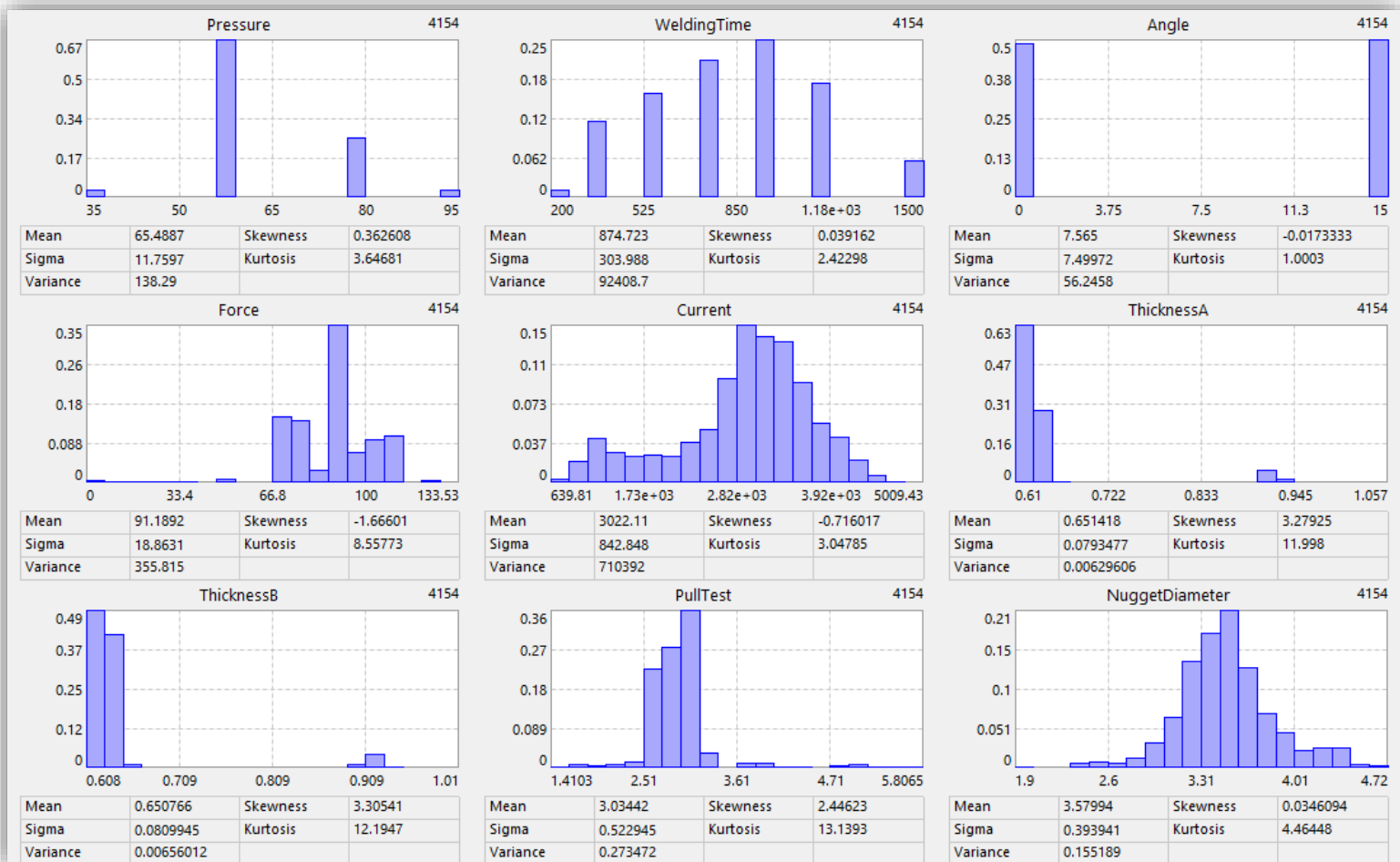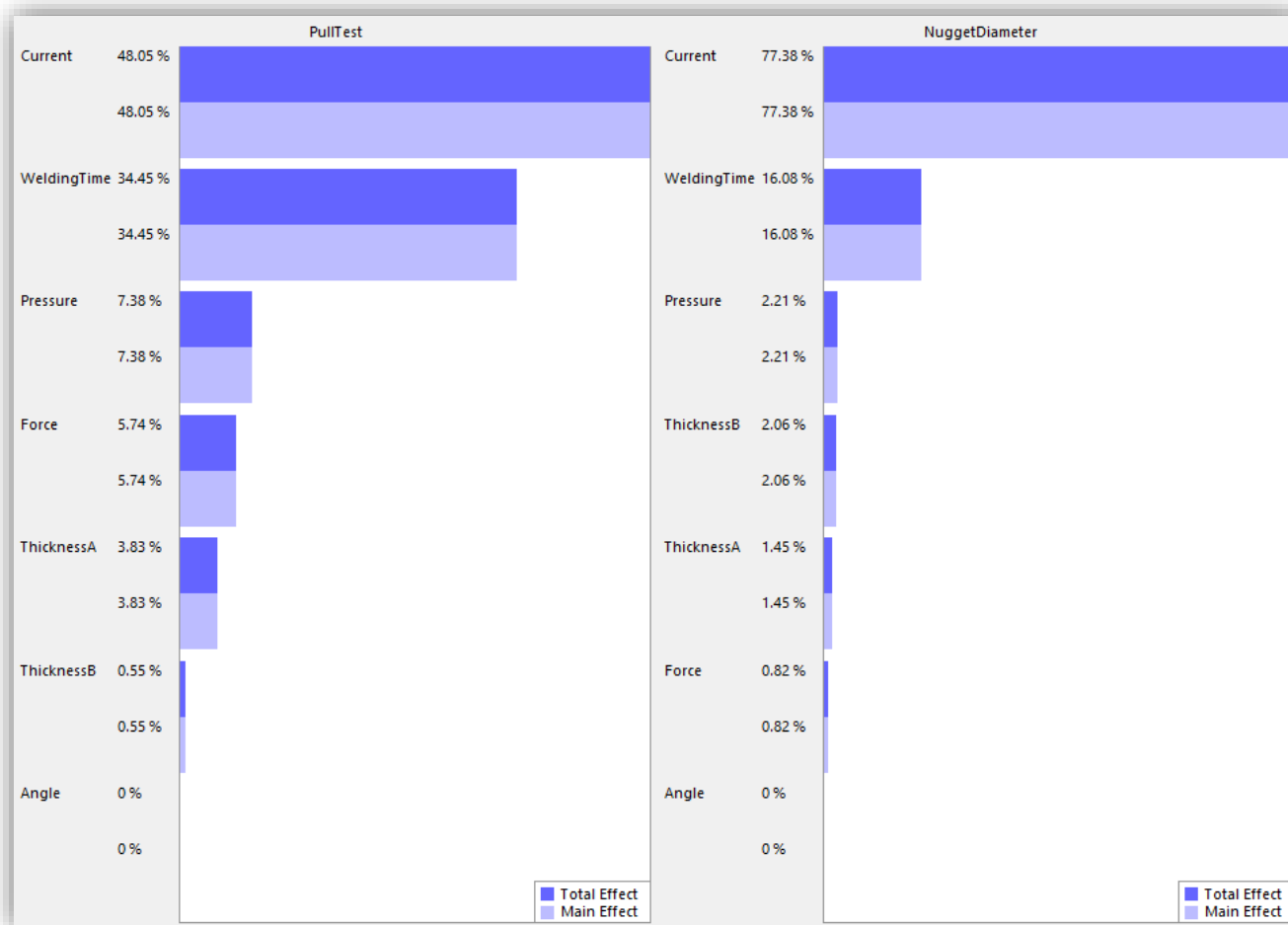www.optiy.eu

Parallel Chart of collected Process Data

Box-Plots of collected Process Data

	Pressure	WeldingTime	Angle	Force	Current	ThicknessA	ThicknessB	PullTest	NuggetDiameter
Max	95	1500	15	133.53	5009.43	1.057	1.01	5.8065	4.72
75%	79.8485	987.879	0	102.508	3552.89	0.637091	0.632364	3.14214	3.75152
50%	59.8485	790.909	0	94.4152	3155.65	0.628061	0.628303	2.96451	3.55212
25%	59.8485	593.939	0	78.2297	2626	0.61903	0.620182	2.74248	3.32424
Min	35	200	0	0	639.81	0.61	0.608	1.4103	1.9

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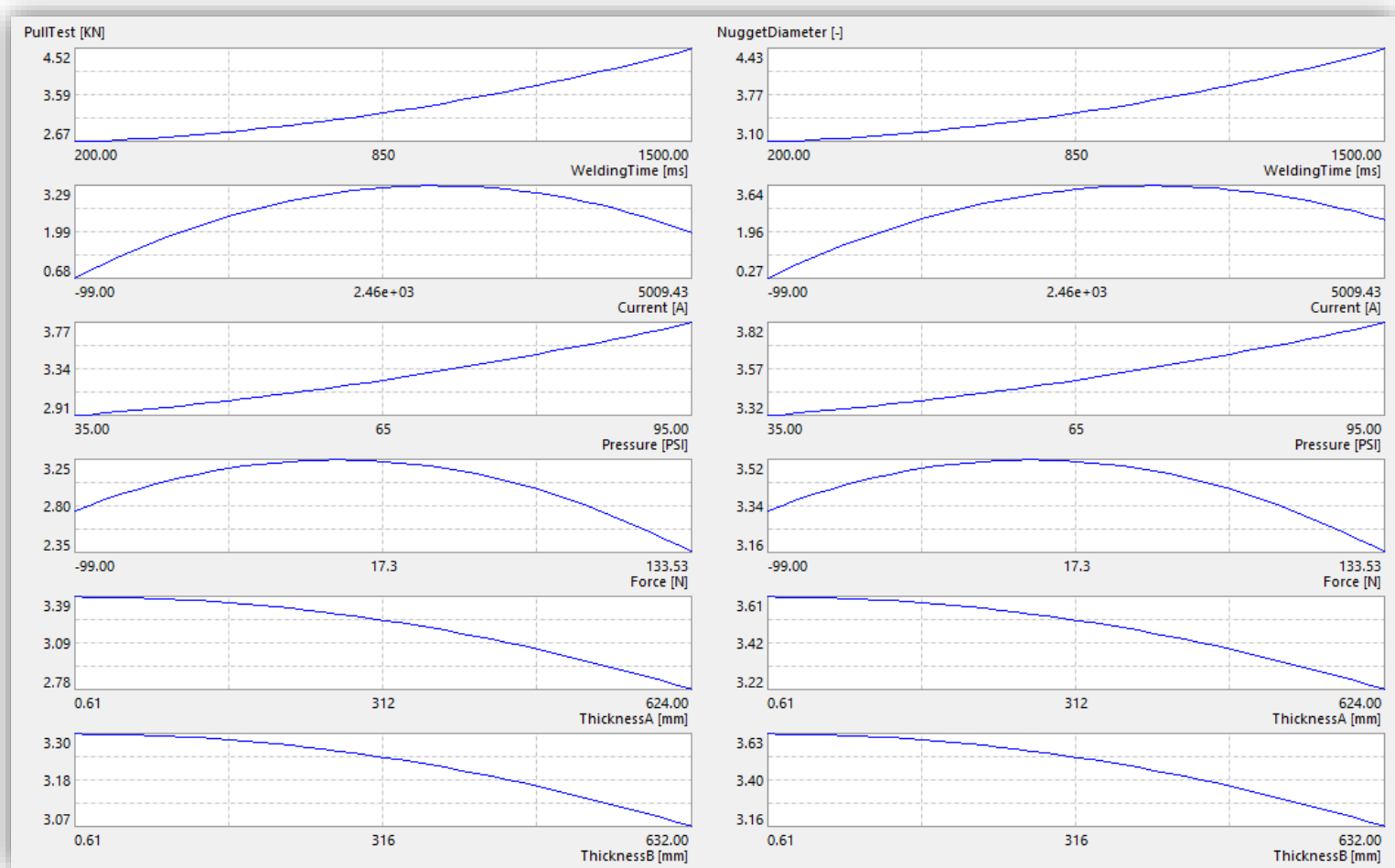
Histograms of collected Process Data

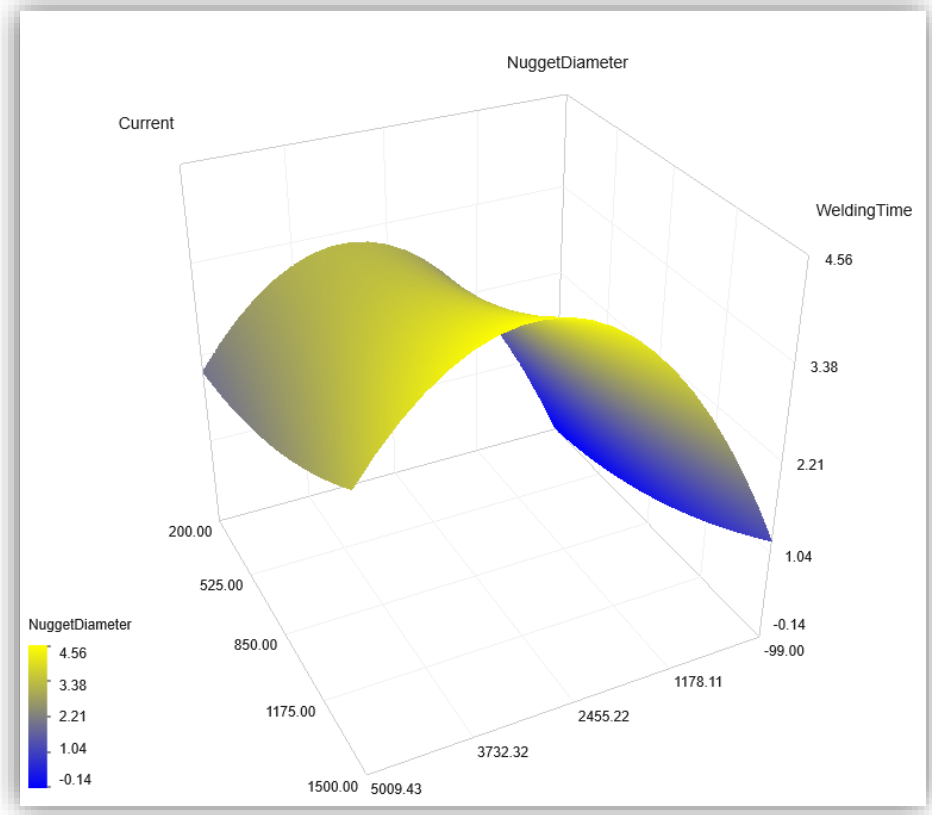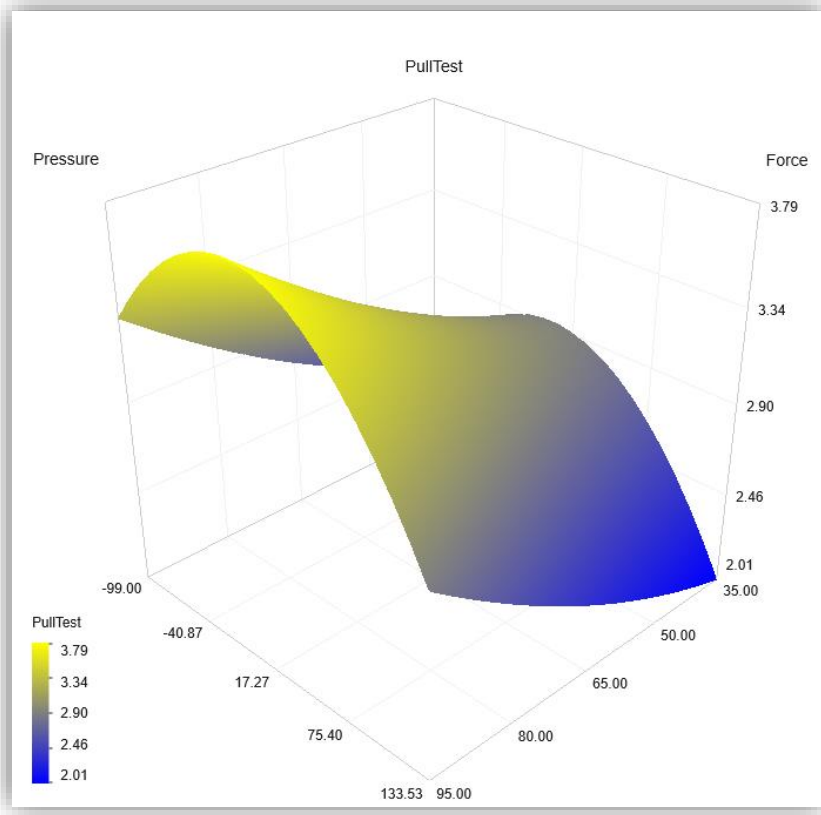# Sensitivity Study of Resistant Spot Welding

- **The most important process parameters are current and welding time**

- Middle important process parameters are Pressure, Force and Thickness A

- Angle has got no influence on the welding process

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1D Diagrams of Pull Test and Nugget Diameter

3D Diagrams for Pull Test and Nugget Diameter

Optimal Process Parameters by numerical Optimization