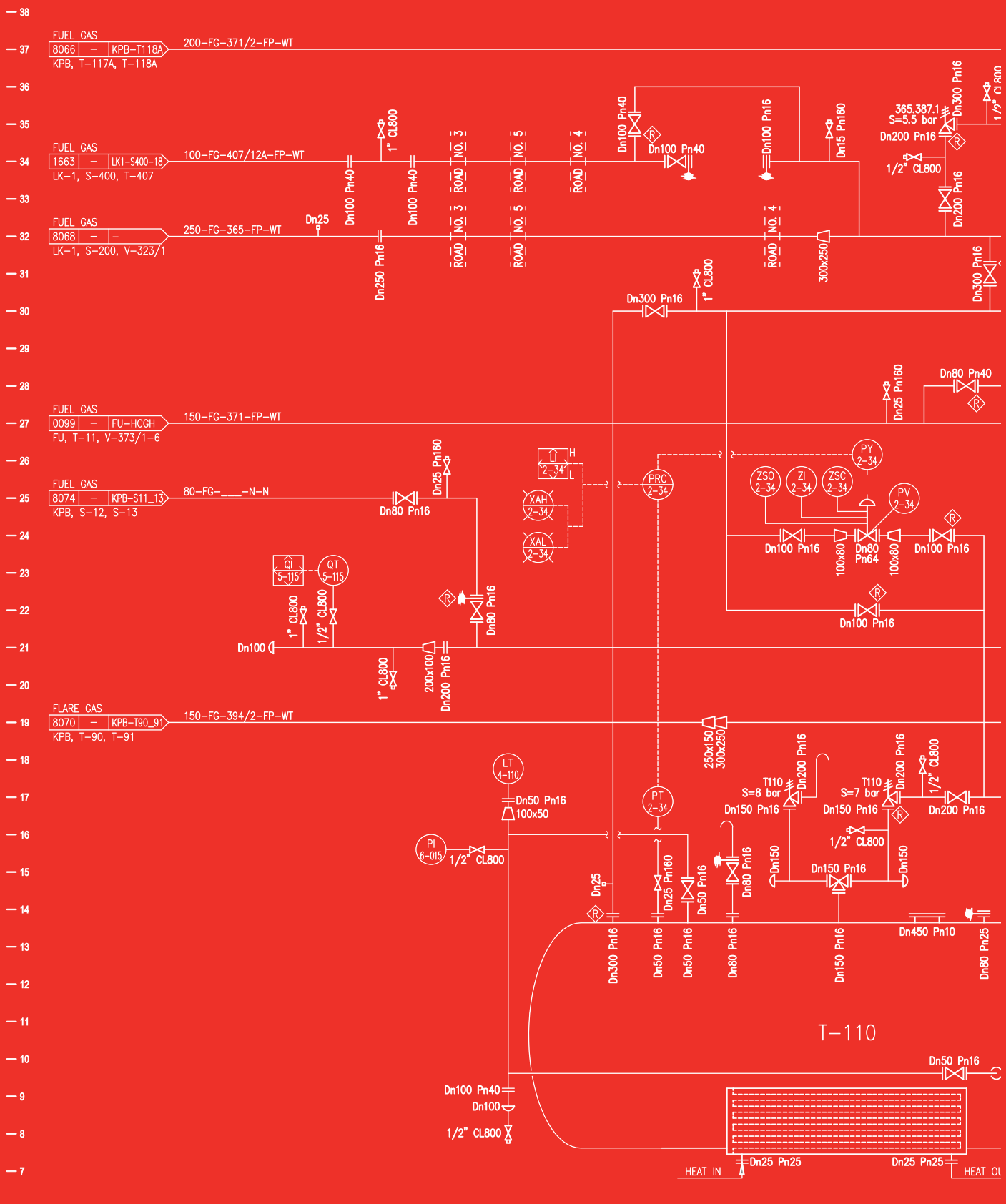
D²RT'
engineering

What we do
To name a few

PROCESS

Development of the Piping & Instrument Diagram (P&ID) based on the Process Flow Diagram followed by preparation of the line list and instrument list. Creation of dynamic Piping & Instrument Diagram (P&ID) within CADWorx P&ID and Intergraph SmartPlant environment. Process flow evaluation of complex pipe networks.



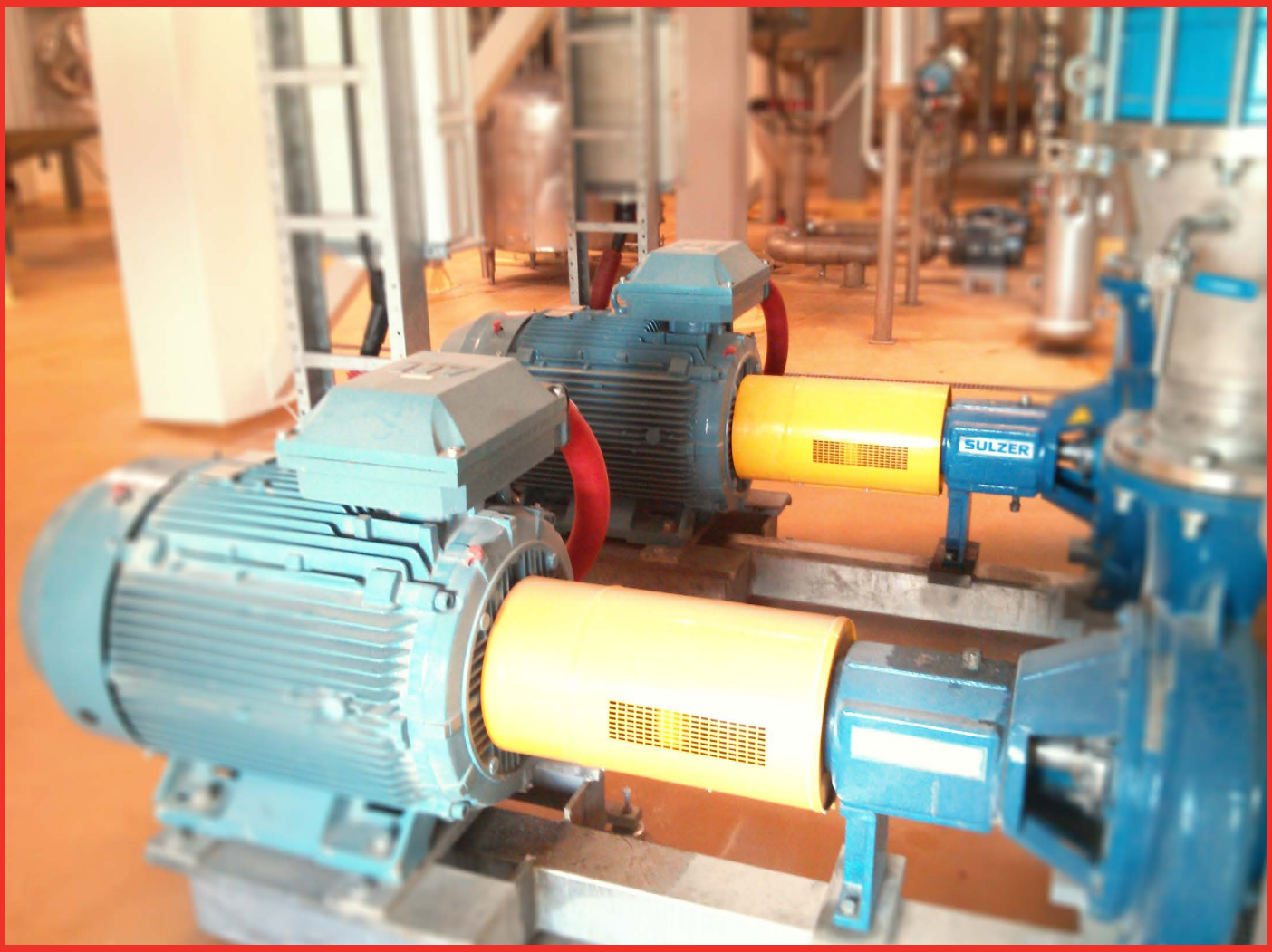
PROCESS

- Control valve sizing calculations and Data sheet preparation.
- Safety valve sizing calculations and Data sheet preparation.
- Selection of Equipment and Accessories.
- Flow orifice sizing calculation and Data sheet preparation.
- Restricted orifice sizing calculations and Data sheet preparation.
- Process Data sheets for Instruments.
- Process Review of equipments.
- HAZOP and Design reviews.

GENERAL	1	Tag Number		**FT;DT 3000**	Q-ty 1
	2	Service		*	
	3	P&ID No.		A0950-130-T1-002	
	4	Area Classification	Temperature Class	Not Explosive	N/A
	5	Ambient Temperature	Humidity	5 to 35°C	65-85 %
	6	Idustry/Application		*	
MEASUREMENT	7	Flow rate		YES	
	8	Total Flow		NO	
	9	Temperature		NO	
	10	Density		YES	
LINE	11	Line No.		3014	
	12	Line Size		DN 80	
	13	Material		316L (1.4404)	
	14	Insulation		YES	
	15	Piping class		A16L	
PROCESS DATA	16	Fluid	Phase	**syrup**	Liquid
	17	Temperature		60 °C	
	18	Pressure		5.00 bar(g)	
	19	Design Temperature	Design Pressure	90°C	7.00 bar(g)
	20	Flow rate		35 m3/h	
	21	Density	Viscosity	1150 kg/m3	145 cP
	22	Max. Pressure Drop		Vendor to advice	
	23	Min Fluid Conductivity		1400 µS/cm	
	24	Solid particle size / Concentration		34 %	
	25	Agressive Components		NaOH 4%	
	26	Fluid pH		5,0	

PROCESS

- Pressure drop calculations and Pump / Compressor head determination.
- Equipment (Pump/Compressor, Storage tanks, Heat Exchangers, Pressure vessels, Process columns, Reactors, etc.) sizing calculations and Data sheet preparation.



D²RT' engineering	CENTRIFUGAL PUMP DATA SHEET (IŠCENTRINIO SIURBLIO DUOMENŲ LAPAS)	ITEM No.	P81013;P81014
		CLIENT PROJ. No.	A0950

EQIPMENT NAME:	cold water	pump	P81013;P81014						
No.Pumps	2	No. motors required	2	Item no.	P81013;P81014				
OPERATING CONDITION, EACH PUMP (EKSPLOATACINĖS SĄLYGOS)								PERFORMANCE	
Liquid	cold water	Capacity at PT m³/h.Normal:			Rated	700		Proposal curve no.	
		Discharge pressure		5.68		barg		RPM	NPSHR (water) m
PT, norm/max°C	28/50	Suct. press barg: Normal	2		Rated	3		Eff. %	Power rated kW
Density at PT	1000 kg/m³	Differential press.		3.68		bar		Maximum power rated impeller	kW
pH value	4-6	Total head		40		m		Maximum head rated impeller	0
Viscosity at PT	1 cP	NPSHA m.		30		m		Minimum continuous flow	m³/h
Corrosion/erosion caused by	-							Rotation (viewed from coupling end)	
Solid particles,%(vol./mass.)	0	Solid particles	(grains size)	mm.	-				

STRESS ANALYSIS

Utilization of Fitness-For-Service (FFS) assessments for evaluation of in-service pressure containing equipment that involves:

- Evaluation of in-service pressure containing equipment using original construction code;
- Evaluation by means of design-by-analysis (ASME Code, Section VIII, Division 2) methods in case equipment does not satisfy criteria of design-by-rules methods.

Such evaluation helps to optimize maintenance and operation of existing facilities, maintain availability of older plants, and enhance long-term economic viability.

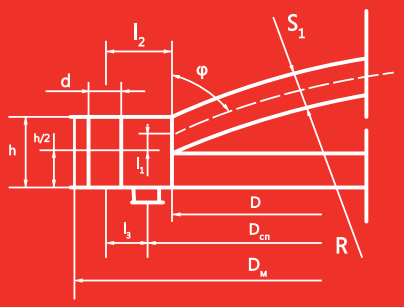
RD 24.200.21 - 91
DISHED HEAD WITH SPILT RING

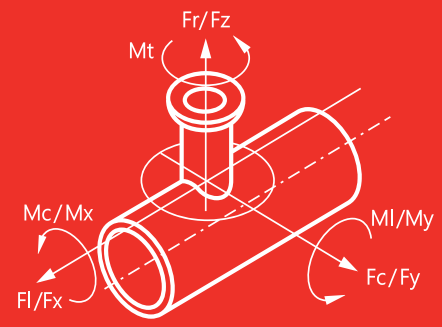
INVESTOR	AB MAZEIKIU NAFTA	PLANT	
PROJECT TITLE	RECALCULATION OF PARAMETERS FOR HEAT EXCHANGERS TK-203 A/V AND TK-205 A/B		

DESIGN PARAMETERS	DESIGN PRESSURE	p =	1.80	Mpa	DESIGN TEMPERATURE	t =	320	[°C]

MECHANINCAL PROPERTIES			
MODULUS OF ELASTICITY OF FLANGE	E =	1.990E+05	[Mpa]
MODULUS OF STUD MATERIAL	E_1 =	2.050E+05	[Mpa]
MODULUS OF ELASTICITY OF GASKET	E_n =	1.600E+04	[Mpa]
LINEAR EXPANSION COEFFICIENT OF FLANGE MATERIAL	α_φ =	1.530E-05	
ALLOWABLE STRESS OF FLANGE MATERIAL	$[\sigma]^{20}$ =	180.0	[Mpa]
ALLOWABLE STRESS OF FLANGE MATERIAL AT A TEMPERATURE t = 320	$[\sigma]^t$ =	129.60	[Mpa]
YIELD POINT OF FLANGE MATERIAL t = 320	$\delta_{t\varphi}$ =	194.60	[Mpa]
STUD MATERIAL TENSILE STRENGHT	δ_b =	1000.00	[Mpa]
YIELD POINT OF STUD MATERIAL t = 20	δ_T =	738.20	[Mpa]
YIELD POINT OF STUD MATERIAL t = 320	δ_T^t =	585.40	[Mpa]

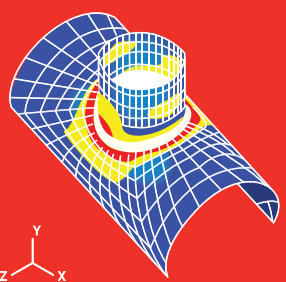
FLANGE, STUD & GASKET GEOMETRY					
FLANGE	MATERIAL	10G2	ACC. TO	GOST 5520 - 79	
GASKET	MATERIAL		ACC. TO		
STUD	MATERIAL	A 437 Gr. B8B	ACC. TO	ASTM A 437	
GASKET WIDTH	b =			13.00	[mm]
CORROSION ALLOWANCE	c =			4.00	[mm]
INSIDE FLANGE DIAMETER	D =			1169.72	[mm]
OUTSIDE FLANGE DIAMETER	D_H =			1298.28	[mm]
DIAMETER OF STUD LOCANTION CIR.	D_g =			1120.00	[mm]
MIDDLE GASKET DIAMETER	D_{cn} =			1177.00	[mm]
EXTERNAL DIAMETER OF STUD	d_a =			24.00	[mm]
EXTERNAL DIAMETER OF HOLE	d =			27.00	[mm]
STUD CROSS SECTION AREA	f_σ =			324.00	[mm²]
FLANGE THICKNESS	h =			168.28	[mm]
DISTANCE BETTWEEN THE NUT SEATS OF THE STUD	l_∞ =			379.40	[mm]
GASKET THICKNESS	h_n =			0.04	[cm]
GASKET CHARACTERISTICS	m =			4.25	
GASKET CHARACTERISTICS	$q_{обж}$ =			70.00	[MPa]
GASKET CHARACTERISTICS	$[q]$ =			-	[MPa]
ANGLE	ψ =			43	°
DIAMETER OF TUBE SHEET CONTACT CIRCLE	D_2 =			1175.00	[mm]
NUMBER OF STUDS	n =			44.00	
INSIDE RADIUS	R =			842.00	[mm]
THICKNESS OF HEAD PLATE	s_1 =			26.28	[mm]
PITCH ANGLE	θ =			7	°
DISTANCE	H =			124.14	[mm]





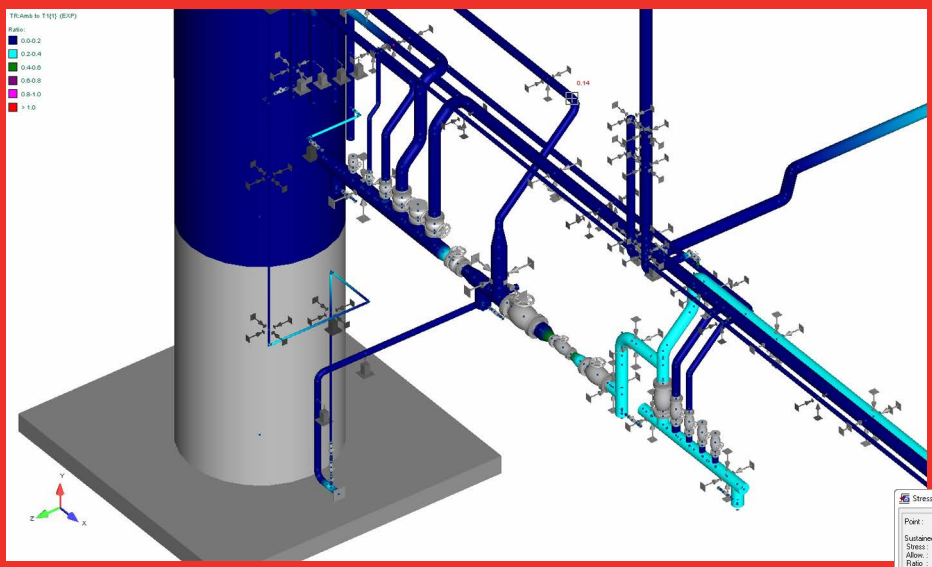
(Pl+Pb+Q) > SPS

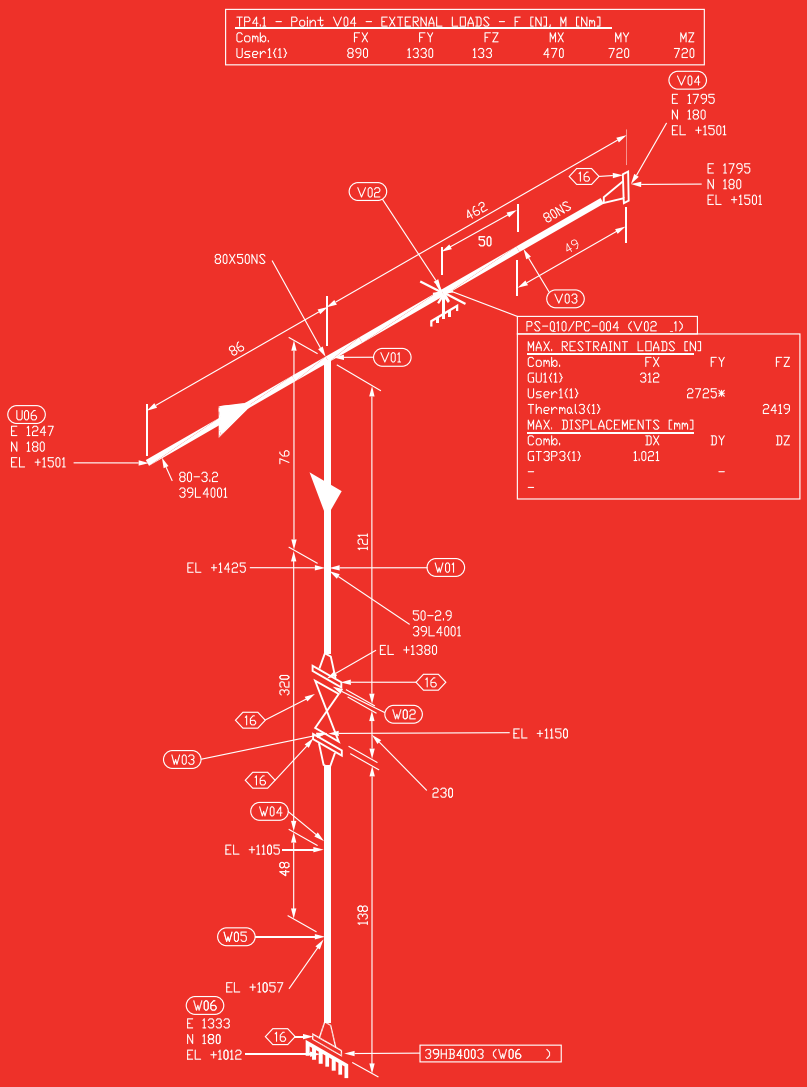
(Pl+Pb+Q+F) > Sa



STRESS ANALYSIS

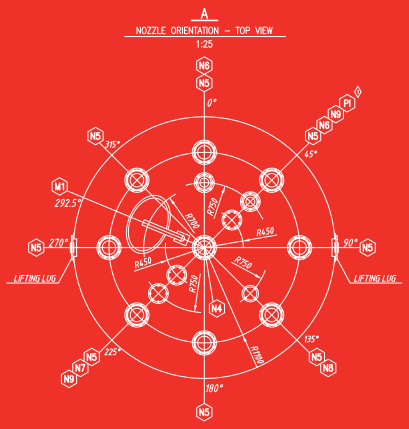
Comprehensive evaluation of the piping systems to international codes and standards. Remaining life establishment and in-service margins for continued operation of the piping.

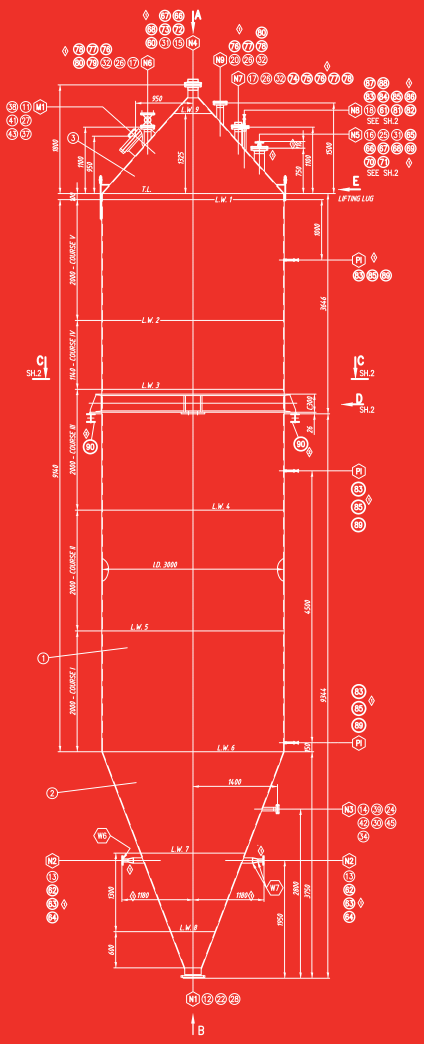




MECHANICAL

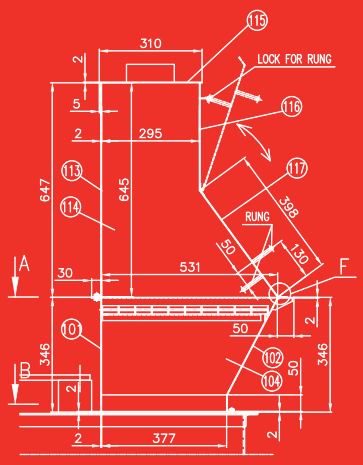
Redesign of second-hand equipment to meet the requirements of altered process or process parameters different from the ones established by original design. Preparation of passports for in-service or new pressure equipment.

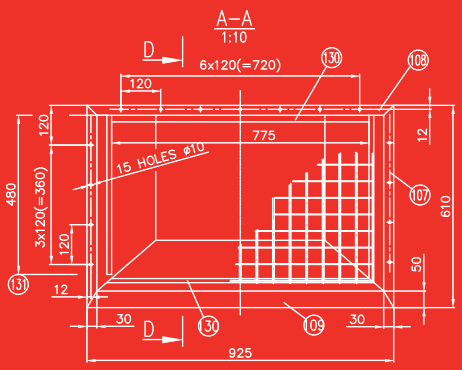


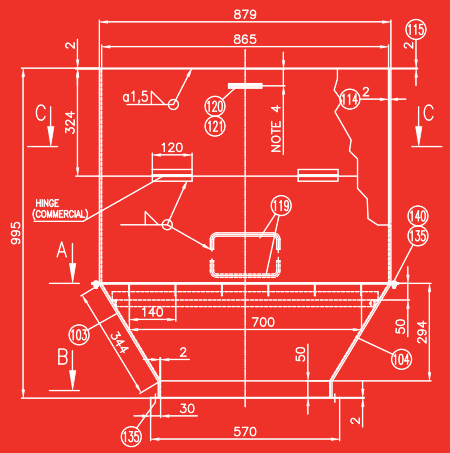


MECHANICAL

Design of new and replacement pressure vessels and equipment for various applications. Data sheet preparation and evaluation of third party designs.

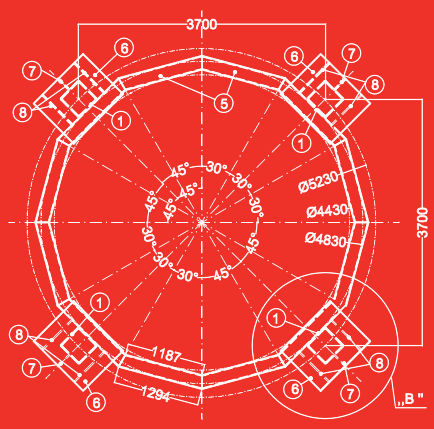


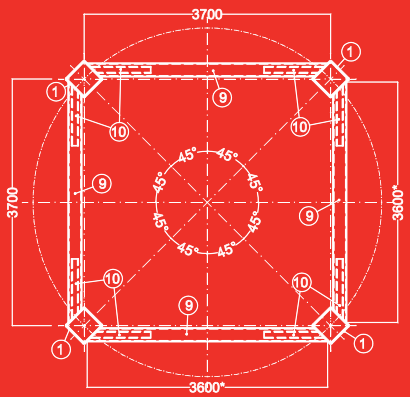


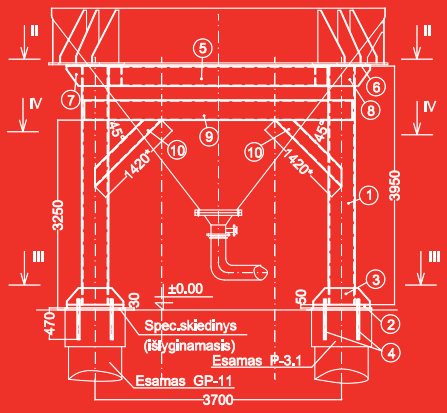


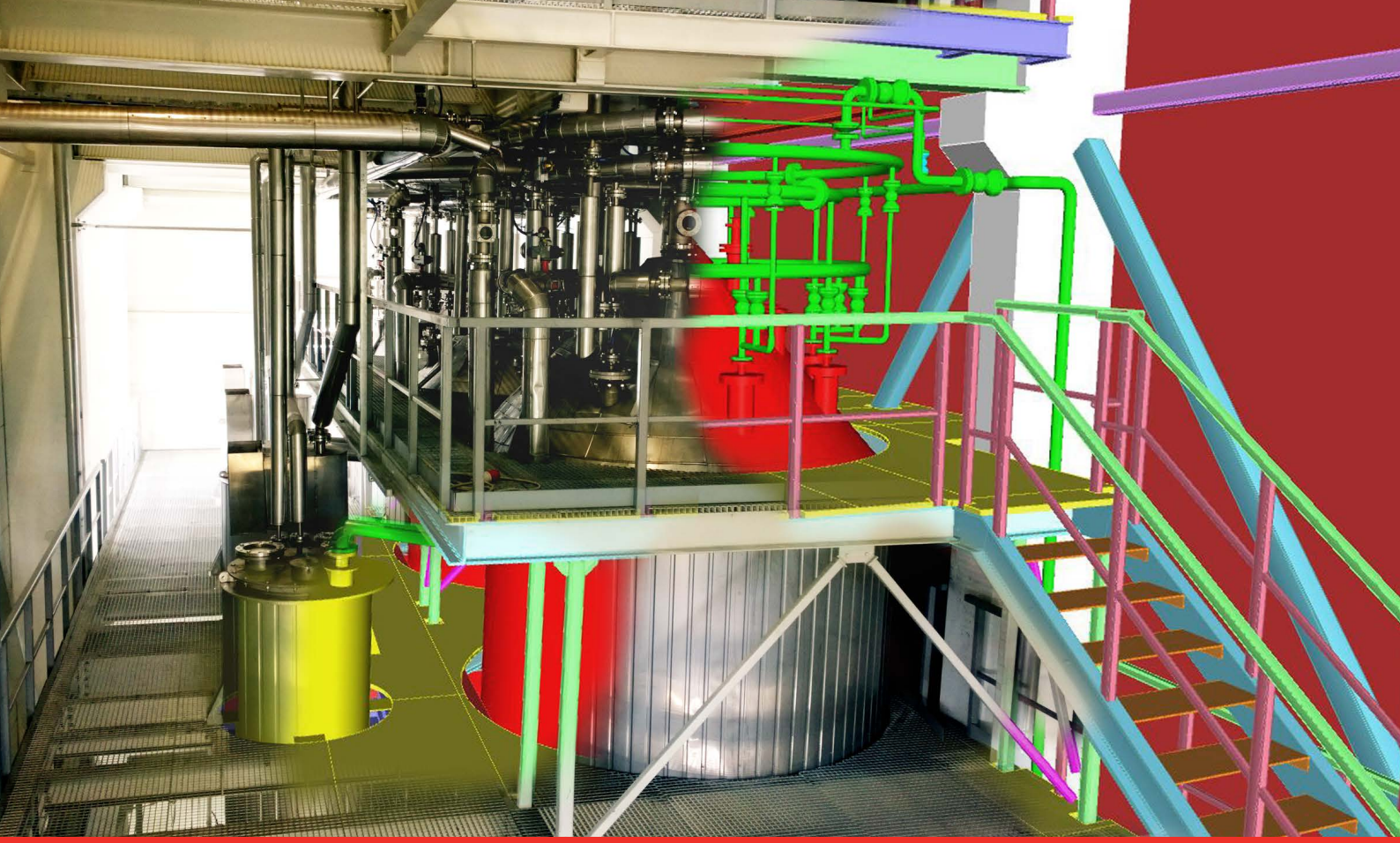
CIVIL

Design of supporting structures, pipe racks, service platforms, stacks and other civil structures related to piping, tanks and pressure vessels.



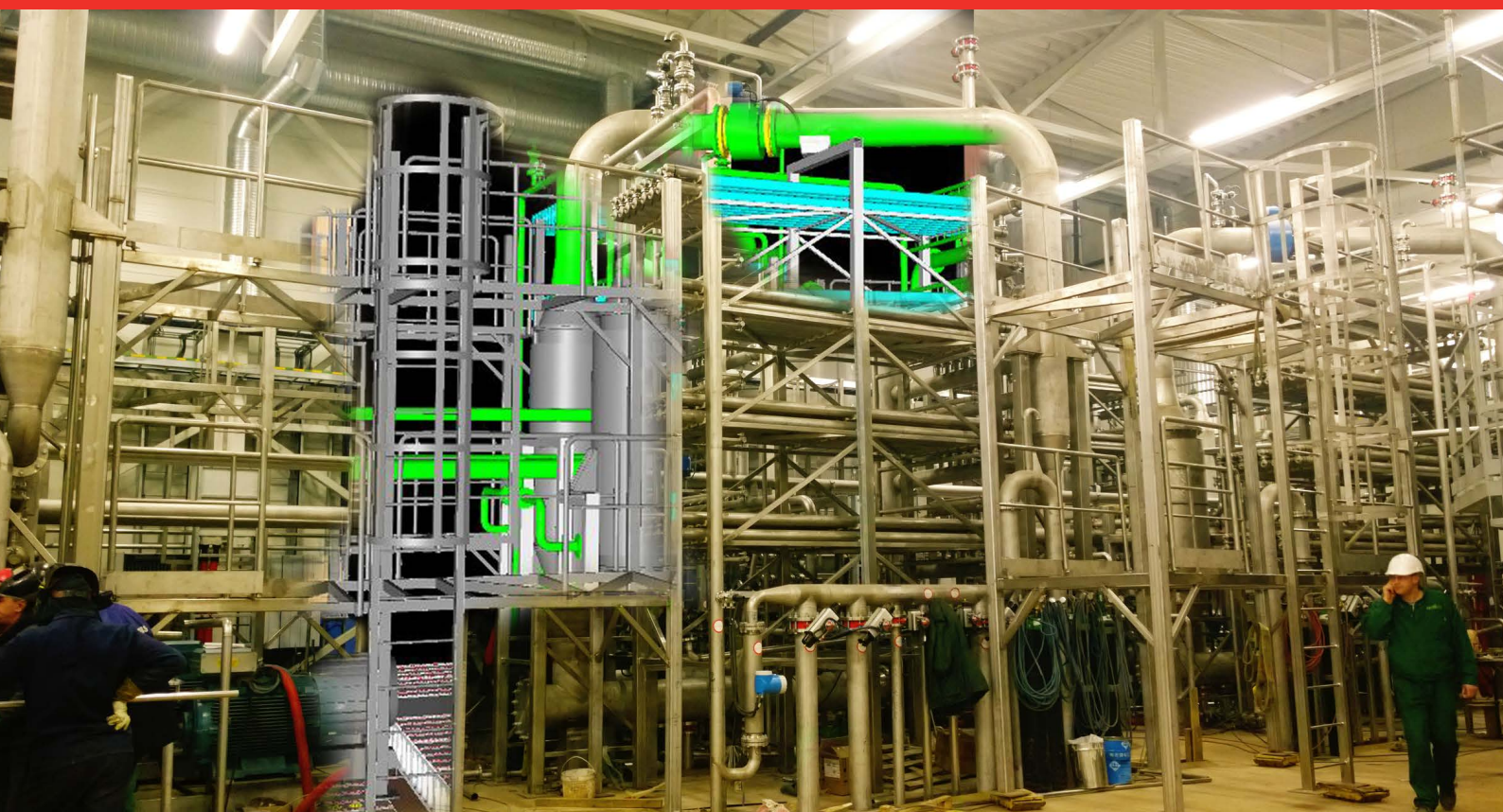






Piping, equipment and structural modeling within 2D/3D CAD environment that would help:

- review and improve design before erection;
- plan construction activities;
- plan maintenance and operation activities;
- recognize potential hazardous arrangements;
- train operators.



Dear Prospective Client,

Thank you for the opportunity and privilege to introduce services offered by D2RT' engineering.

Our team accomplished over a thousand projects, including design and strength calculation of pressure vessels, process piping, steam and hot water pipelines, long-distance pipelines and process furnaces coils using following standards: ASME B31.3; ASME B31.1; ASME B31.4; ASME BPE; API 579; EN 13480; EN 13445; GOST 14249; API 560; API 650; API 653; ASME Boiler & Pressure Vessel Code VIII div. 1, 2; BS 5500 and more. In addition to the design, project team coordinates, verifies and confirms projects that have been carried out by the contractors.

We offer comprehensive services in a variety of industries such as power, oil and gas onshore and offshore, petrochemical, pharmaceutical to name a few. We can offer part or a complete package of turnkey services (EPC) that will be in compliance with all regulations, design codes and customer specific requirements. Our experienced team ensures cost-effective and on-time delivery of complex and challenging projects.

Thank you for your interest and we look forward to offering you our services for your next project.

Sincerely,

Krzysztof Radomski

President of the Board

Headquarter:

Długi Targ Square 46/47, 80-830 Gdańsk, Poland
Mobile +48 663663727, Desk/Fax +48 58 3020923

Branch Offices:

Ventos Street 17-23, LT-89111 Mažeikiai, Lithuania
Mobile +370 62144356, Desk/Fax +370 44392949

Raudondvario Road 150, LT-47174 Kaunas, Lithuania
Mobile +370 61729361

D²RT'
engineering