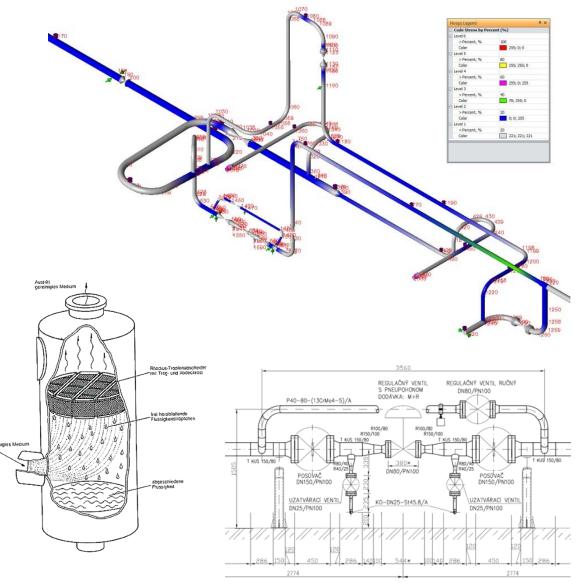
Design of Process Equipment Introduction to the subject Lecture

doc. Ing. Martin Juriga, PhD. Bratislava, February 2024

Technical documentation – is a summary of documents, the purpose of which is to describe a technical product or a technological unit:

- comprehensive,
- interdisciplinary,
- contains a text and drawing part.

It serves to describe and specify technical properties, parameters, functions and requirements. Its task is to ensure the production or installation, use, maintenance of equipment or technological systems.

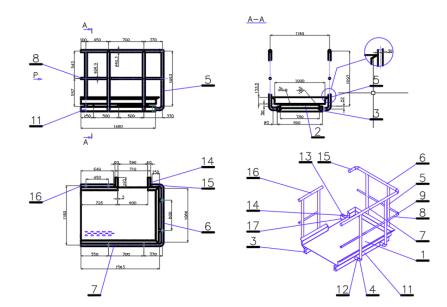


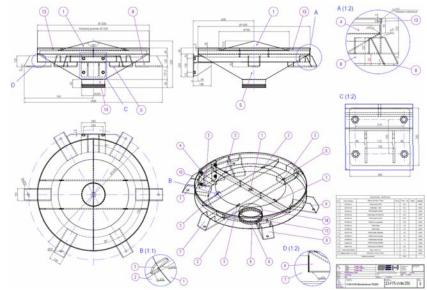
Essential for understanding of technical documentation is

- communication language,
- expertise,
- basics of technical drawing,
- knowledge of norms and standards.

What form of technical documentation will you encounter?

- Technical specifications
- Technical drawings and diagrams
- Calculation reports and calculations
- Standards and norms
- Manuals
- Maintenance and service instructions





The technical project is a complex document that contains all the necessary information for the successful implementation of the technical plan.

Project for Building Permit Application (PSP)

The project for the building permit is the basic project documentation that every investor needs to start construction. On the basis of this documentation, the building authority will decide on the issuance of a building permit.

Implementation project (RP)

The implementation project is the highest "level" of project documentation. The content and scope of the documentation is not determined by Slovak legislation. The implementation project should contain everything for the successful implementation of the project

STAVBA - AKCI	A	Renasia notre	ubných rozvodov	nádržového nar	ku a černacej				
PLANT			kte KLF Energetik		ku u cerpucej				
ČÍSLO STAVBY									
PLANT NO.									
MIESTO STAVE	Y		KLF Energetika a.s., Kysucké Nové Meste						
PLANT PLACE		KLF Energetik	a a.s., Kysucké N	ové Meste					
INVESTOR		Comia Sloveki	o o u o Buotislou						
CLIENT		Sonic Slovaki	a s.r.o., Bratislav	/a					
STUPEŇ DOKU	MENTÁCIE	RP							
STEP		RP							
STAVEBNÝ OBJ	IEKT	50.001 Mahilaé technológia Di OWDEC							
TECHNOLOGICAL UN	чт	SO-001 Mobilná technológia BLOWDEC a nádržový park							
PREVÁDZKOVÝ	SÚBOR	PS-001 Techn	ologické zariade	nia a hlavne prev	ádzkové				
ELEMENTARY SYSTE	М	potrubie							
DIELČÍ PREVÁD	Z. SÚBOR	DPS-001.1 Te	chnologické zari	adenia a hlavne	prevádzkové				
PARTIAL ELEMENT.	SYSTEM	potrubie							
ČASŤ PROJEKT	U	STROJNÁ							
DESIGN PART		STROINA							
DIEL PROJETKU	J								
DIVISION									
ZOŠIT		ZOZNAM DOKUMENTOV							
ITEM		20211411100	CONLECTOR						
		SPRACOVATELIA	DOKUMENTÁCIE	E Contraction of the second					
		DOCUMENTATIO	NS ORIGINATORS						
VYPRACOVAL		KONTROLOVA	L	SCHVÁLIL					
ISSUED BY		CHECKED BY		APPROVED BY					
Ing. JURIGA	Martin, PhD.	Ing. CEBC) Vladimír	Ing. CEBC) Vladimír				
ZÁKAZKA		VYHOTENÍ	•	ΚΟΡΙΑ	4				
REFER, NO.	05/2013	COPIES	- 3	COPY NO.	1				

Technical report for a technological project / from a mechanical engineer's point of view/

What's inside?

• Text part

STAVBA - AKCIA

ČÍSLO STAVBY PLANT NO. MIESTO STAVE

PLANT PLACE

INVESTOR

STUPEŇ DOKUMENTÁCIE

STAVEBNÝ OBJEKT

TECHNOLOGICAL UNIT

ELEMENTARY SYSTEM

ČASŤ PROJEKTU

DESIGN PART DIEL PROJETKI DIVISION ZOŠIT

VYPRACOVA

Ing. JURIGA Martin, PhD.

05/2013

SSUED BY

ZÁKAZKA

FFFR. NC

PARTIAL FLEMENT SYSTEM

 P&ID / Piping and Instrumentation Diagram/

Repasia potrubných rozvodov nádržového parku a čerpacej

SO-001 Mobilná technológia BLOWDEC a nádržový park

PS-001 Technologické zariadenia a hlavne prevádzkové

DPS-001.1 Technologické zariadenia a hlavne

stanici v objekte KLF Energetika a.s

KLF Energetika a.s., Kysucké Nové Meste

Sonic Slovakia s.r.o., Bratislava

DD

potrubie

potrubie

STROJNA

DOCUMENT

HECKED BY

VYHOTENÍ

KONTROLOVA

ZOZNAM DOKUMENTOV

Ing. CEBO Vladimír

IONS ORIGINATOR

3

SCHVÁLI

KÓPIA

PPROVED BY

Ing. CEBO Vladimí

1



Repasia potrubných rozvodov nádržového parku a čerpacej stanici v objekte KLF Energetika a.s.

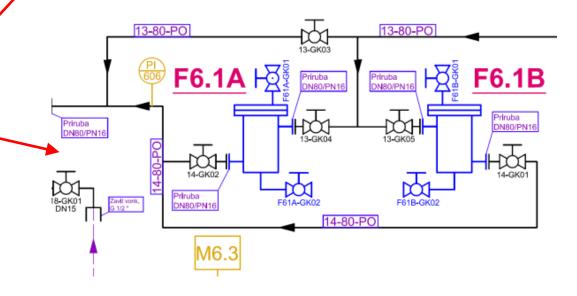
Pružinové závesy sa odistia až po tlakovej skúške.

7.3. Stavebná skúška

Stavebná skúška sa vykoná po dohotovení a zmontovaní potrubia. Zisťuje sa ňou, či celkové vyhotovenie, použitý materiál, odpovedá dokumentácii. Kontroluje sa pripravenosť k hydrostatickej skúške, pričom sa zisťuje najmä: funkcia ovládacích, uzavieracích a poistných zariadení, funkcia odvzdušnenia a odvodnenia, správnosť uloženia potrubia a jeho spád, dokončenie zváracích prác, možnosť tepelnej dilatácie, vyhotovenie zváraných spojov, úplnosť dokumentácie, atď.

O priebehu a výsledku stavebnej skúšky sa musí spísať zápis za účasti technickej kontroly odberateľa, v ktorom sa potvrdí správnosť výsledku.

Potrubie pred odovzdaním do užívania musí byť premývané, resp. prefukované, aby bolo zravené všetkých nežiaducich nečistôt. Premývanie vodou sa vykoná vodou o dostatočnej rýchlosti (v = 1 až 1,5 m/s), aby došlo k únosu nečistôt. Prefukovanie vzduchom sa vykoná pri tlaku rovnom pracovnému tlaku po dobu min. 10 minút. O premývaní, resp. prefukovaní, je potrebné spísať zápis.



SLOVENSKÁ TECHNICKÁ UNIVERZITA V BRATISLAVE Strojnícka fakulta

Technical documentation

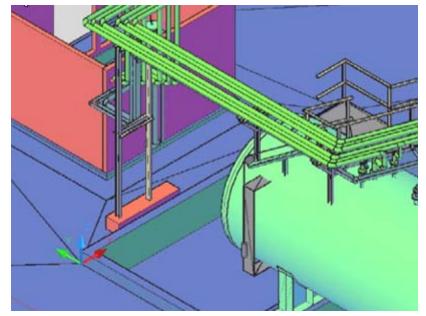
Technical report for a technological project / from a mechanical engineer's point of view/

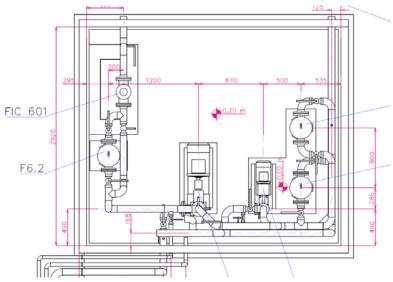
What's inside?

SjF

- Drawing documentation
- 3D model of the building

STAVBA - AKCI	A	Repasia potre	ubných rozvode	ov nádržového p	arku a čerpacej		
PLANT		stanici v obje	kte KLF Energe	tika a.s.			
ČÍSLO STAVBY							
PLANT NO.		1.					
MIESTO STAVE	Y	KI E Enormatil	a a.s., Kysucké	Nové Monto			
PLANT PLACE		KLF Energetik	а а.ѕ., куѕиске	Nove Meste			
INVESTOR		Sonic Slovakia s.r.o., Bratislava					
CLIENT		Sonic Slovaki	a s.r.o., bratisi	ava			
STUPEŇ DOKU	MENTÁCIE	RP					
STEP		NF					
STAVEBNÝ OBJ	EKT	50 001 Mabi	laá tochaológi:	BLOWDEC a na	držový park		
TECHNOLOGICAL UP	ит	30-001 WI001	ma technologia	DEGWDEC a ha	an sovy park		
PREVÁDZKOVÍ	SÚBOR	PS-001 Techn	PS-001 Technologické zariadenia a hlavne prevádzkové				
ELEMENTARY SYSTE	м	potrubie					
DIELČÍ PREVÁD	Z. SÚBOR	DPS-001.1 Te	echnologické za	riadenia a hlav	ne prevádzkové		
PARTIAL ELEMENT. SYSTEM		potrubie					
ČASŤ PROJEKT	U	STROJNÁ			_		
DESIGN PART		STRUINA					
DIEL PROJETKU	J						
DIVISION							
ZOŠIT		ZOZNAM DO	KUMENTOV				
ITEM		202INAM DO	KOIVIEIVIOV				
		SPRACOVATELIA	DOKUMENTÁC)IE			
		DOCUMENTATIO	NS ORIGINATORS				
VYPRACOVAL		KONTROLOVA	L	SCHVÁLIL			
ISSUED BY		CHECKED BY		APPROVED BY			
Ing. JURIGA	Martin, PhD.	Ing. CEBC) Vladimír	Ing. Cl	BO Vladimír		
ZÁKAZKA	05/201-	VYHOTENÍ	2	KÓPIA			
REFER. NO.	05/2013	COPIES	5	COPY NO.	1		





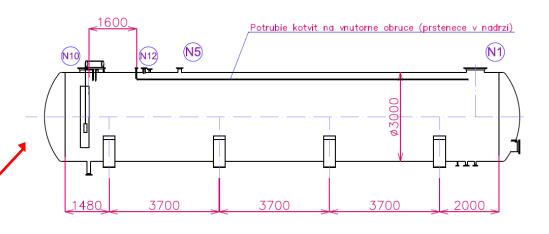
Technical report for a technological project / from a mechanical engineer's point of view/

What's inside?

- Drawings of machines and devices
- Modification of existing equipment

STAVBA - AKCIA			ubných rozvodov		rku a čerpacej
PLANT		stanici v obje	kte KLF Energeti	ka a.s.	
ČÍSLO STAVBY					
PLANT NO.					
MIESTO STAVBY		KI E Enormatil	a a.s., Kysucké N	auć Masta	
PLANT PLACE		KLF Energetik	ta a.s., kysucke h	love meste	
INVESTOR		Conic Clouchi	a s.r.o., Bratisla		
CLIENT		Sonic Slovaki	a s.r.o., Bratisla	/a	
STUPEŇ DOKUMEN	TÁCIE	RP			
STEP		RP			
STAVEBNÝ OBJEKT		50 001 Marki	la é ta aba a léala l		
TECHNOLOGICAL UNIT		50-001 Mobi	Iná technológia I	SLOWDEC a nádi	rzovy park
PREVÁDZKOVÝ SÚB	OR	PS-001 Techr	ologické zariade	nia a hlavne pre	vádzkové
ELEMENTARY SYSTEM		potrubie	-		
DIELČÍ PREVÁDZ. SÚ	BOR	DPS-001.1 Te	echnologické zari	adenia a hlavne	prevádzkové
PARTIAL ELEMENT. SYSTEM	a	potrubie	-		
ČASŤ PROJEKTU					_
DESIGN PART		STROJNÁ			
DIEL PROJETKU					
DIVISION		1			
ZOŠIT					
ITEM		ZOZNAM DO	KUMENTOV		
		SPRACOVATELIA	DOKUMENTÁCI		
		DOCUMENTATIO	NS ORIGINATORS		
VYPRACOVAL		KONTROLOVA	L	SCHVÁLIL	
ISSUED BY		CHECKED BY		APPROVED BY	
Ing. JURIGA Mart	in, PhD.	Ing. CEBC) Vladimír	Ing. CEB	O Vladimír
ZÁKAZKA		VYHOTENÍ	2	KÓPIA	4
REFER, NO.	05/2013	COPIES	3	COPY NO.	1

N2 – vnutorne potrubie 26–25–P0





Technical report for a technological project / from a mechanical engineer's point of view/

What's inside?

- Isometric drawings of pipelines
- BOM /Bill of Materials /

	PROPLA	WTsra.		
als /	PROPLA	WT sro.		
a čerpacej	PROPLA	WT sro.		ette oute
	PROPLA	WTsr.o.		
				Zoznam potrubných komponentov pre nové potrubia
	MARK Označ. [-]	QTY Počet [ks]	SIZE DN [mm]	DESCRIPTION Popis potrubného komponentu
	1	1	15	Pipe, seamless /Rura, bezosva/ x 2.6mm ; EN 10216-1 ; Mat. P235TR1 /DIN: St.37.0; STN: 11 353/
	2	1	25 32	Pipe, seamless /Rura, bezosva/ x 2.6mm ; EN 10216-1 ; Mat. P235TR1 /DIN: St.37.0; STN: 11 353/ Pipe, seamless /Rura, bezosva/ x 2.6mm ; EN 10216-1 ; Mat. P235TR1 /DIN: St.37.0; STN: 11 353/
ý park	4	1	40	Pipe, seamless /Rura, bezosval x 2.6mm; EN 10216-1; Mat. P235TR1 /DIN: St.37.0; STN: 11 353/ Pipe, seamless /Rura, bezosval x 2.6mm; EN 10216-1; Mat. P235TR1 /DIN: St.37.0; STN: 11 353/
	5	1	80	Pipe, seamless /Rura, bezosva/ x 3.6mm ; EN 10216-1 ; Mat. P235TR1 /DIN: St.37.0; STN: 11 353/
zkové	6	1 36	15 25	Elbow /Koleno/, 90° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/ Elbow /Koleno/, 90° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/
	8	20	32	Elbow /Koleno/, 90° typ 3D ; EN 10253-1 ; Mat. 5235 /DIN: 5137.0; 51N: 11 353/ Elbow /Koleno/, 90° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: S137.0; STN: 11 353/
vádzkové	9	2	32	TRIMMED Elbow /Koleno/, 90° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/ (70.54%%d)
	10	55	40	Elbow /Koleno/, 90° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/
	12	1	40 40	Elbow /Koleno/, 90° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/ Elbow /Koleno/, 90° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/
	13	1	40	TRIMMED Elbow /Koleno/, 90° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/ (70%%d)
	14 15	1	40 80	TRIMMED Elbow /Koleno/, 90° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/ (70.54%%d) Elbow /Koleno/, 90° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/
	16	5	25	TRIMMED Elbow (Koleno), 45° typ 3D ; EN 10253-1 ; Mat. 5235 /DIN: 5137.0; 51N: 11 353/ TRIMMED Elbow (Koleno), 45° typ 3D ; EN 10253-1 ; Mat. 5235 /DIN: 51.37.0; STN: 11 353/ (15%%d)
>	17	1	25	TRIMMED Elbow /Koleno/, 45° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/ (20%%d)
	18	2	25 32	TRIMMED Elbow (Koleno), 45° typ 3D; EN 10253-1; Mat. S235 (DIN: St.37.0; STN: 11 353/ (7.5%%d)
	19 20	5	40	TRIMMED Elbow (Koleno), 45° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/ (20%%d) TRIMMED Elbow (Koleno), 45° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/ (15%%d)
	21	2	40	TRIMMED Elbow /Koleno/, 45° typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/ (20%%d)
	22	2	40	TRIMMED Elbow /Koleno/, 45' typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/ (7.5%%d)
	23 24	4	80 25	Elbow /Koleno/, 45" typ 3D ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/ Tee equal /T-kus / ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/
	25	5	40	Tee equal /T-kus / ; EN 10253-1 ; Mat. 5235 /DIN: St.37.0; STN: 11 353/
	26	8	80	Tee equal /T-kus / ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/
	27	1	80x50	Tee reducing /T-kus redukcny/; EN 10253-1; Mat. S235 /DIN: St.37.0; STN: 11 353/
imír	28 29	8	32x25 50x32	Reducer concentric /Redukcia centrická/, Form 1 ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/ Reducer concentric /Redukcia centrická/, Form 1 ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/
mír		2	50x40	Reducer concentric /Redukcia centricka/, Form 1 ; EN 10253-1 ; Mat. 5235 /DIN: 51.37.0; STN: 11 353/ Reducer concentric /Redukcia centricka/, Form 1 ; EN 10253-1 ; Mat. 5235 /DIN: 51.37.0; STN: 11 353/
	30	1	80x40	Reducer concentric /Redukcia centrická/, Form 1 ; EN 10253-1 ; Mat. S235 /DIN: St.37.0; STN: 11 353/
-	31			
1	31 32	1	25	Flange, welding neck /Priruba, krkova/, PN16; EN1092-1, 11 B; Mat, P235GH Flange, welding park /Priruba, krkova/, PN6; EN1092-1, 11 B; Mat, P235GH
1	31	1 4 15	25 25 40	Flange, welding neck /Priruba, krkova/, PN16; EN1092-1, 11 B; Mat. P235GH Flange, welding neck /Priruba, krkova/, PN6; EN1092-1, 11 B; Mat. P235GH Flange, welding neck /Priruba, krkova/, PN16; EN1092-1, 11 B; Mat. P235GH

Rev.G

WEIGHT

0.36

266,85,4 181,33,341,84 180,29,341,84 180,29,341,84 180,20,47 181,341,84 180,20,47 184,85 184,8

LENGTH Dĺžka

300 133825.4 71052.6 116599.9 23809.9

59.1 89.3 89.8 69.6 70.2

19 25.3 9.5 16.9 28.4 20.2 14.2

[mm]

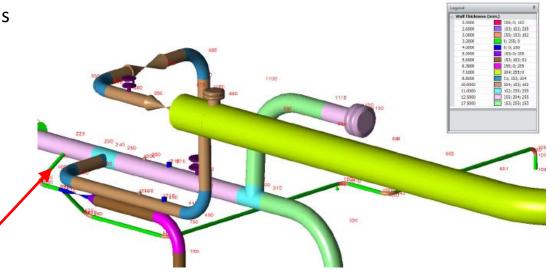
STAVBA - AKCIA				ov nádržového pa	rku a čerpacej		
PLANT		stanici v obje	kte KLF Energe	tika a.s.			
ČÍSLO STAVBY							
PLANT NO.							
MIESTO STAVBY		KIE Eporantii	ka a.s., Kysucké	Nové Mosto]	
PLANT PLACE		KLF Energetii	d a.s., kysucke	Nove meste			
INVESTOR		Sonic Slovaki	a s.r.o., Bratisl	21/2		7	
CLIENT		Sonic Slovak	a s.r.o., bratisi				
STUPEŇ DOKUMEN	TÁCIE	RP		7			
STEP		NP					
STAVEBNÝ OBJEKT		SO-001 Mahi	Iná technológia	1			
TECHNOLOGICAL UNIT		30-001 1000	ma technologia				
PREVÁDZKOVÝ SÚB	OR	PS-001 Techr	ologické zariac	lenia a hlavne pre	vádzkové		
ELEMENTARY SYSTEM		potrubie				/	
DIELČÍ PREVÁDZ. SU	BOR	DPS-001.1 T	echnologické za	iriadenia a hlavne	prevádzkové	1	
PARTIAL ELEMENT. SYSTEM	a	potrubie					
ČASŤ PROJEKTU		STROJNÁ					
DESIGN PART		511105114					
DIEL PROJETKU							
DIVISION							
ZOŠIT		ZOZNAM DO	KUMENTOV				
ITEM						_	
		SPRACOVATELIA	DOKUMENTÁC	JIE .			
		DOCUMENTATIC	INS ORIGINATORS			_	
VYPRACOVAL		KONTROLOVA	L	SCHVÁLIL			
ISSUED BY		CHECKED BY		APPROVED BY		_	
Ing. JURIGA Mart	in, PhD.	Ing. CEBC) Vladimír	Ing. CEB	O Vladimír		
ZÁKAZKA		VYHOTENÍ	3	KÓPIA	4	1	
	05/2013		5		1		

Technical report for a technological project / from a mechanical engineer's point of view/

What's inside?

- Process calculations
- Stress calculations and analysis

STAVBA - AKC									
PLANT		Repasia potrubných rozvodov nádržového parku a čerpacej stanici v objekte KLF Energetika a.s.							
ČÍSLO STAVBY									
PLANT NO.		•							
MIESTO STAVE	BY	-							
PLANT PLACE	,,	KLF Energetika a.s., Kysucké Nové Meste							
INVESTOR									
CLIENT		Sonic Slovakia s.r.	o., Bratislava	a					
STUPEŇ DOKU	IMENTÁCIE								
STEP		RP							
STAVEBNÝ OB	JEKT								
TECHNOLOGICAL U	NIT	SO-001 Mobilná technológia BLOWDEC a nádržový park							
PREVÁDZKOV	Ý SÚBOR	PS-001 Technologie	PS-001 Technologické zariadenia a hlavne prevádzkové						
ELEMENTARY SYSTE	M	potrubie							
DIELČÍ PREVÁD	DZ. SÚBOR	DPS-001.1 Technol	logické zaria	idenia a hlavne j	prevádzkové				
PARTIAL ELEMENT.	SYSTEM	potrubie	-						
ČASŤ PROJEKT	U	STROJNÁ							
DESIGN PART		STRUMA							
DIEL PROJETKI	J								
DIVISION		1							
ZOŠIT		TOTMAN DOWNERTOW							
ITEM		ZOZNAM DOKUMENTOV							
		SPRACOVATELIA DOKL	IMENTÁCIE						
		DOCUMENTATIONS ORIG	SINATORS						
VYPRACOVAL		KONTROLOVAL		SCHVÁLIL					
ISSUED BY		CHECKED BY		APPROVED BY					
Ing. JURIGA	Martin, PhD.	Ing. CEBO Vlad	imír	Ing. CEBO Vladimír					
ZÁKAZKA		VYHOTENÍ	2	KÓPIA					
REFER, NO.	05/2013	COPIES	-5	COPY NO.	1				



(TABLE DAT		DESIGN	RUNS)	
NO.	FIG.	VEF	TICAL	HOT

	NODE	квұр	NO	. 5	LZE	MOVER	IENT	10	HLD	DOAD		DOAD	RATE	MOV	EMENT
-		+	-+-		+	.+((cm.) -	-+	(N.)-	+(1	N.)	+(N	.)(N./	cm.)-	-(cm.)-
		100	2	USER	VSH						3770.			230.	
		170		USER				+-		-+	1450.	-+	+	70.	
		280		USER	VSH						2460.			270.	
		550	1	USER	VSH						9270.			810.	
		600		USER							7050.			810.	
		+-	+		-+	+		+-		-+		+	+	+	
		800		MID dior		4	-0.44	4	2766.		2648.	LOAD	0. VARIATI	267. ON =	2.660 4%
			•••	MIN MAX	I MUM I MUM	ALLOW	ED SI	NGLE	SPRIN	G LOAD G LOAD	D		(N.) (N.) (cm.)	159 373	RANGE 9.999 3.293 9.500

THEORETICAL ACTUAL INSTALLED INSTALL

INSTALLED SPRING HORIZONTAL

Task						
field of application	EN 13480-3	2002-8 / Code-Revision u	ntil 2007: 6.1 p	pipe, 6.2 pipe elb	ow standard n	
iterature, source	Rohrleitungst	echnik, W.W. 9 Auflage Voge	Verlag, TabBe	uch für Rohrl Bau	15 Aufl Vulkan-	
mathematical symbols, units and comments see	red comer trial	ngle are part of computing and s	shall be consider	ed To read move	the curser into th	
Pipe calculation. Strength criteria for all p	ipe compone	ents from non-austenitic (NA) and austenit	ic (A) steel		
NA : EN 13480; A < 30%; f = min (R _{e0.21})	1.5 ; R= /2.4	1)	YTT		100	
A : EN 13480: A > 35% (DB : A40) : f =	Rate /1.5	-	1		6	
A : EN 13480. 30% ≤ A ≤ 35% (DB : A3		Ratos /1.5 ; Rm /2.4)	Ver		1 100	
Test: EN 13480; 5.2.1.2 and 5.2.2.2		note*	e ent	eo.	-	
name	unit	formular / symbol		data		
design pressure internal	N/mm ²	$p_0 \le PS, p_0 \ge p_{operat}$	1000			
design temperature in °C	-10 s t	s 650 ending 0 or 5		100		
material selection, pipe				correct		
steel name / R _{g.t} / T / N / S / B/	-	data base	1.0108 / P195TR2, Rp0.2 / T 5			
additional - safety factor		Sz=1 or Sz≥1.2		1,00		
strength value, yield point	N/mm ²	R m204. R p2.2.s. R p1.0.1	320,00	0.00	0.00	
allowed tension	N/mm ²	<i>t</i> ₁		0.00		
design details		note*		incorrect		
outer Ø: pipe, cylindrical shell	mm	Ø D₀ ≥10		219,00		
welding seam factor longitudinal seam	-	0.7 52 51		5,00		
guide value: min, wall thickness	mm	e,*				
order wall thickness: pipe, cylindrical shell	T> e.*.	recommended ≥ 2 [mm]		10,00		
fold of application approactor	mm/mm	TIDo				
field of application, parameter	mm/mm	Do/Di				
required thickness minimum	mm	Do/Dis17:e				

The most common task of a mechanical engineer in a technical project is the creation of drawing documentation

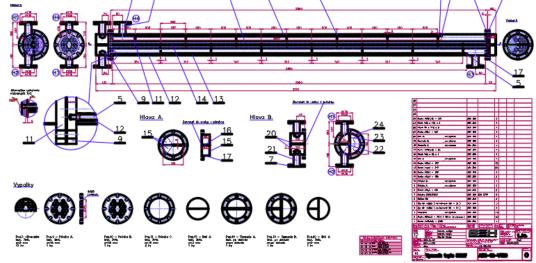
The engineer must, on the basis of the documents / the task of the project / make technical drawings that will be understandable for the manufacturer, taking into account the production technology.

2 examples

- Design based on a technical concept

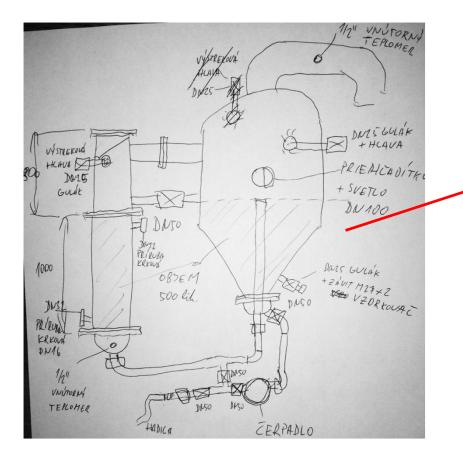
 an idea
- Design based on dimensional sketch



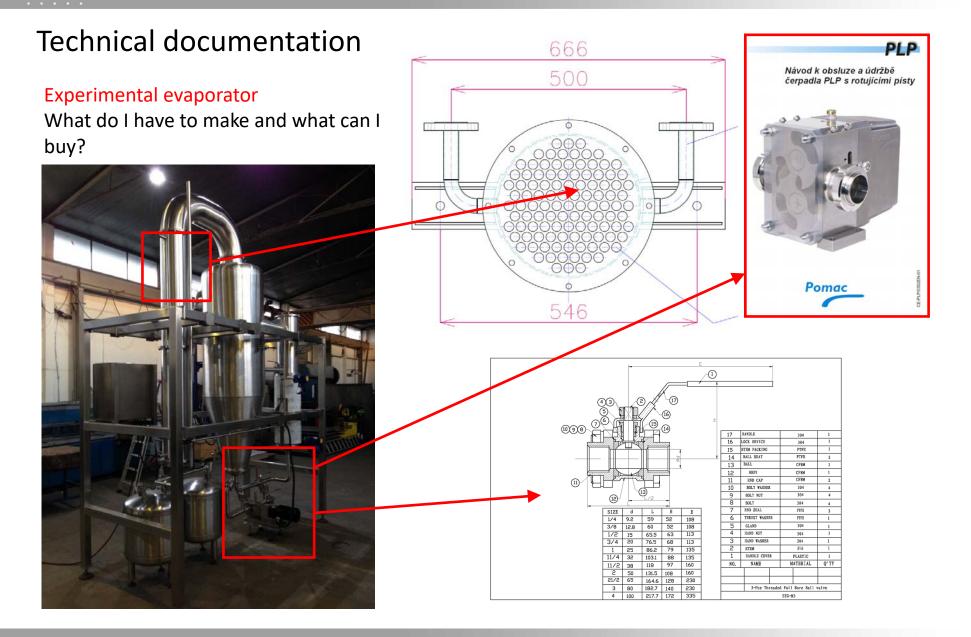


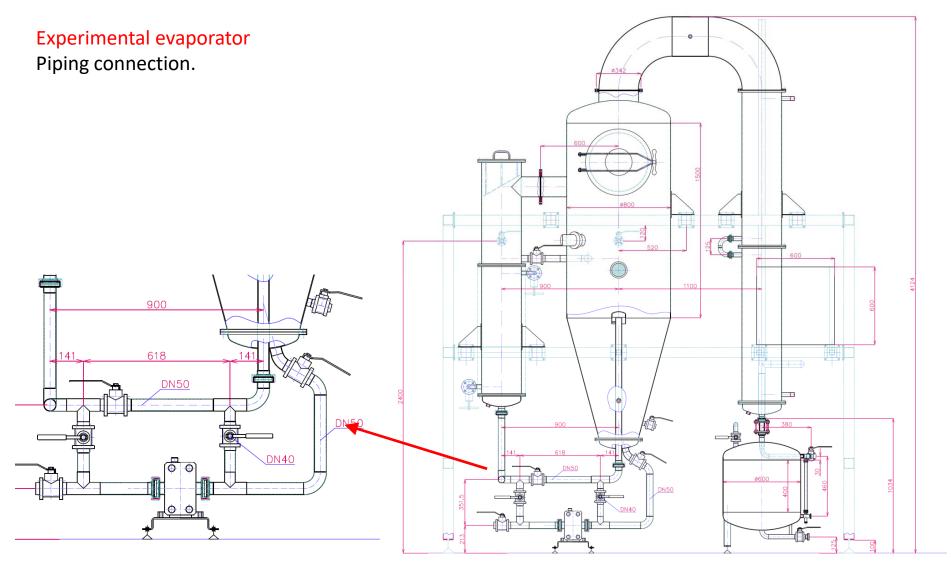
Experimental evaporator

The device serves to thicken milk for experimental purposes.









Experimental evaporator

Drawings of the actual version/AB BUILD documentation/

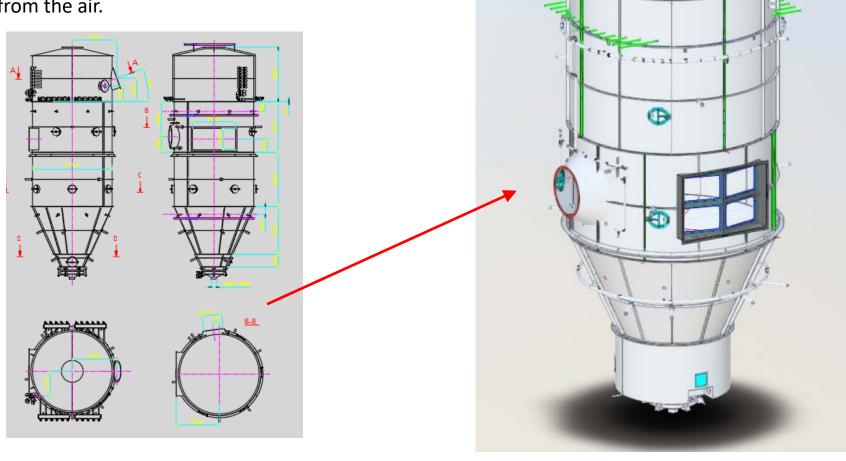






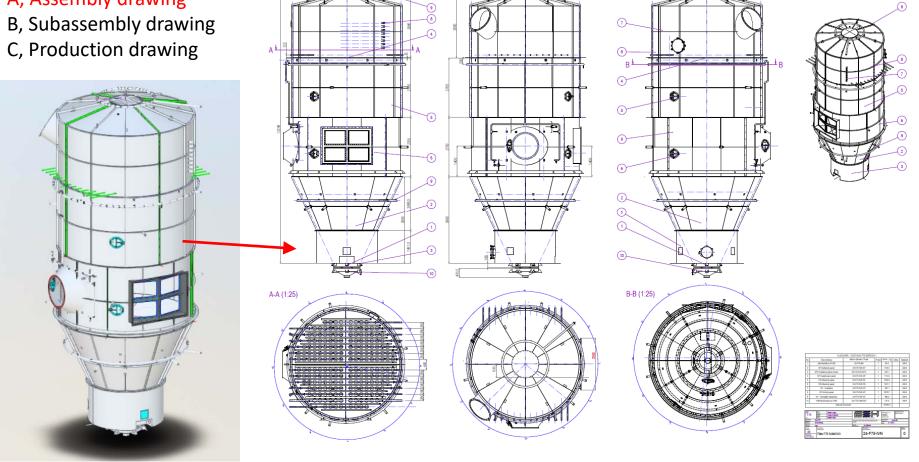
Large capacity filter for milk powder.

The device serves to filter milk powder from the air.



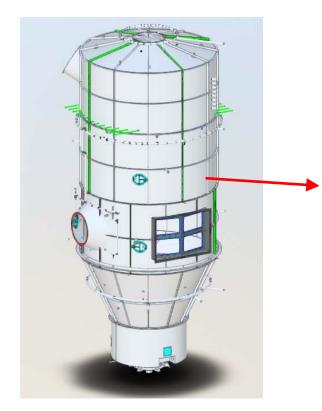
Large capacity filter

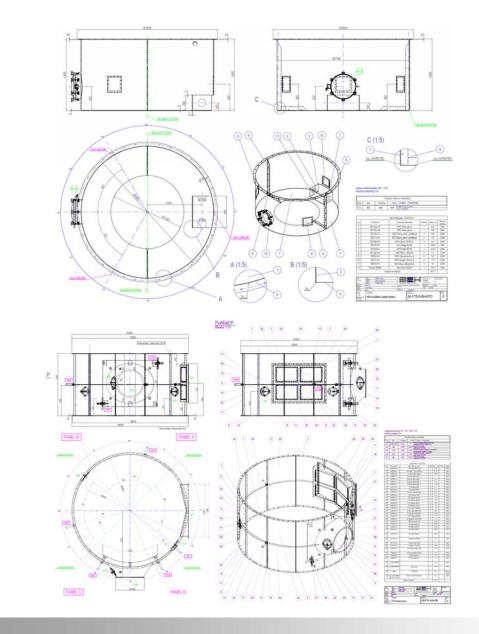
A, Assembly drawing



Large capacity filter

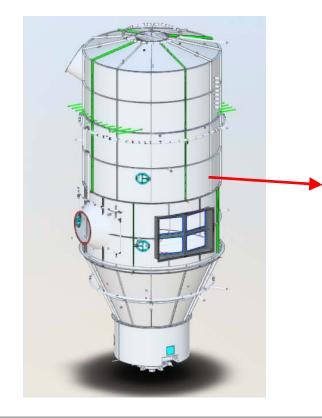
- A, Assembly drawing
- B, Subassembly drawing
- C, Production drawing

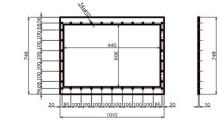




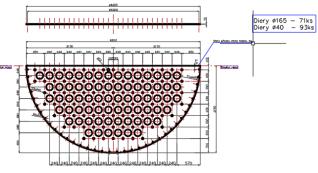
Large capacity filter

- A, Assembly drawing
- B, Subassembly drawing
- C, Production drawing

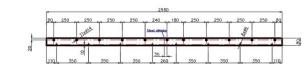


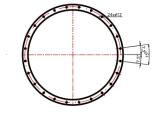






1 Plach 4200 x 2130 x 10	ASI 504 1 435,0 435,0
Pag, Vibdell (dev) / Hiror / Foldow Pag, Scoling multiply / Hune / Hunghchard scolar)	Moterial Roman (Marcal Los Control Control Post Areka Moterial Dander (Marcal Roman Post Areka
New Article Strength	
Penda IIIni ibrait //cata/ //regin_ipro/	B. AEH-19-C-OP-2





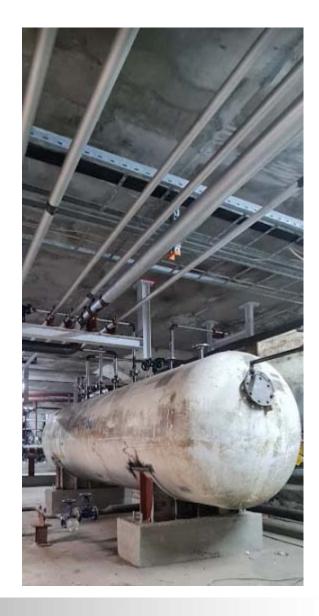


States and states of	PA-Spojovacia vysl	una	na AER-19-0-PA-4						
A4	Revenues /	AEH-19-G-PA-4							
Naturanty A		/Wind Makes	, na vikreta						
	taucholong s.r.a.	pandrine it p		÷.,	1955	18.3.2			
	01-0117-01 Orlazowec F50	for blooder	indicative for Antonial	1. 1.	Other D	the local	pconfik		
(-)	/mental Martin Hejko			<i>.</i>	MF./A	m. m. w/			
1:10	Juna/ Mortin Helko			ч.	Table 1	10.77	4 -		
200/	Martin Jurigo			л	ADI :	speile 1.0	Kanada		
	Gene / Mary / Felsiony ander / Mary / Matchelants (code)	ührt eritit ührt erisi	Norme/White Shandard/Manuf.	Post.	1	11	Poanderers Note		
1 Plach	2580 x 20 x 8 (prip. Pau 80)	Ar\$2 304		Ľ	9,9	9,9			

1 Vypałci	k (pripados Pas 00)	Atl 304		1	15,4		
Pag. Vinter Pag. Drucky	ultrue / Miller / Polytons nuclear / Name / Manufachanel product	Moterial Moterial	Name/Vpstea Standard/Marvel.	Pac. Jan		and the second	Pezerfanska Note
Artme/	htter farming/ farming/ farmin/ Martin Hajto farmi/ Martin Hajto farmi/ Martin Hajto farmi/ Martin Hajto farmi/ Martin Hajto farmin/ Martin Hajto farmin/ Martin Hajto farmin/ Martin Hajto farmin/ Martin Hajto farmin/ Martin Hajto farmin/ Martin Hajto farmin/ Martin Hajto farmin/ Martin Hajto farmin/ farmi			1	States Inc.	pola na 17 18 18 18 11 11 11 12 12 11 12 12 12 12 12 12 12	1_ka.
Familt /Tamel/	Manu spenna Armiten menne /	100.31	Des givens /brain nation/	_			August 1
A4	PA-Priruba 1000		AEH-19	-	9-P	A-1	2 0

To translate a technical idea into an understandable language for others

- Education / Understand the laws of nature, Know norms and standards, master 2D/3D drawing software, know the basics of production technology /
- Interest, talent, diligence / time-consuming and often frustrating work /
- Experience /increases with each completed project, by studying competitive solutions and ideas/
- Communication skills / today's unbeaten knowledge in the case of working in an international team/
- Professionalism / Skorates: I know that I know nothing. In engineering perspective it's: I know what I know and I know what I don't know/



• Ability to work in a team