

तार- "विस्फोटक", नागपूर  
Telegram: 'EXPLOSIVES', Nagpur  
Website : http://peso.gov.in  
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दूरभाष/ Telephone : 0712-2510248  
फैक्स/ FAX : 2510577

कार्यालयीन उद्देश्य के सभी पत्रादि "मुख्य विस्फोटक नियंत्रक" के पदनाम से भेजे जाए उनके व्यक्तिगत नाम से नहीं.

All communications intended for this Office should be addressed to the 'Chief Controller of Explosives' and NOT to him by name.



भारत सरकार

GOVERNMENT OF INDIA

पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन  
Petroleum and Explosives Safety Organisation

(पूर्व नाम - विस्फोटक विभाग)

(Formerly- Department of Explosives)

"ए-ब्लॉक", पाँचवा तल, केन्द्रीय कार्यालय परिसर,

"A" Block, 5<sup>th</sup> Floor, CGO Complex,

सेमिनरी हिल्स, नागपूर - 440 006 (महा)

Seminary Hills, Nagpur- 440006



संख्या /No. G.3(4)200/I

दिनांक /Nagpur, dated: 20/06/2017

To,

M/s VITKOVICE CYLINDERS  
a.s., Ruska 24/83, Vitkovice,  
706 00 Ostrava, Czech Republic

Sub: Manufacture of High Pressure Industrial Gas Cylinder conforming to ISO 9809-1 under the certification of M/s TUV SUD Czech Ostrava in your works at Ruska 24/83, 706 00, Ostrava, Czech Republic - Approval regarding

Dear Sir/s,

Please refer to letter No. Nil dated 07/04/2017.

The following cylinder design drawings, the particulars of which are given below showing the constructional details conforming to ISO 9809-1 specification are approved herewith.

SL No.	Drawing NO.	Water Capacity (Liters)	Working Pressure (Bar)	Test Pressure (Bar)	Material	Application
1	LA4-0276	0.8 to 1.8	200	300	34CrMo4 EN10083	Industrial Gas
2	LA4-0356 Rev.1	2 to 6.3	200	300	34CrMo4 EN10083	Industrial Gas
3	LA4-0358 Rev.1	2 to 4.75	200	300	34CrMo4 EN10083	Industrial Gas
4	LA4-0282 Rev.4	4 to 15	200	300	34CrMo4 EN10083	Industrial Gas

There is no objection to your exporting the above type of cylinders to India subject to the following conditions:-

1. Neck threads of the cylinders conform to the requirements of CGA approved Rego make valves or equivalent standard approved under the Gas Cylinders Rules, 2016.

Contd..2/-

2. Every cylinder is marked clearly and permanently as per the provisions of the requirements of rule 6 of the Gas Cylinders Rules, 2016. It is desirable also to mark each cylinder with a specific identification mark (logo/brand name) as a preventive measure against entry of cylinders from unauthorized sources/routes.
3. Cylinders are painted with appropriate identification colour in accordance with the requirements of rule 8 of the said rules.
4. Every batch of cylinders is inspected and certified by M/s TUV SUD Czech Ostrava or any other DOT approved PIA. These certificates should give the particulars set forth in Schedule II of the Gas Cylinders Rules, 2016 together with this office approval number and date.
5. The certificates in original shall be sent alongwith each batch of cylinders.
6. The cylinders shall be routed through your authorized dealer M/s Vitkovice India Power Pvt Ltd., New Delhi who will maintain and monitor all relevant records pertaining to the cylinder till the service life of the cylinder and condemnation thereof, furnish all relevant information to this office in compliance to the relevant provisions of the Gas Cylinders Rules, 2016, etc.
7. The cylinders be covered under Product Liability Insurance by the cylinder manufacturer or through their authorized distributor.
8. The manufacturer test and inspection certificate shall be provided to the importers of these containers to this country. The importer of these containers shall have obtained Cylinder Import Licence in Form 'D' of Gas Cylinders Rules, 2016.

A copy each of the above is returned herewith duly endorsed in token of approval.

**The approval is valid for a period of one year from the date of issue of this letter, on trial basis, and liable to be reviewed, amended or withdrawn at any time, if considered necessary in the interest of safety.**

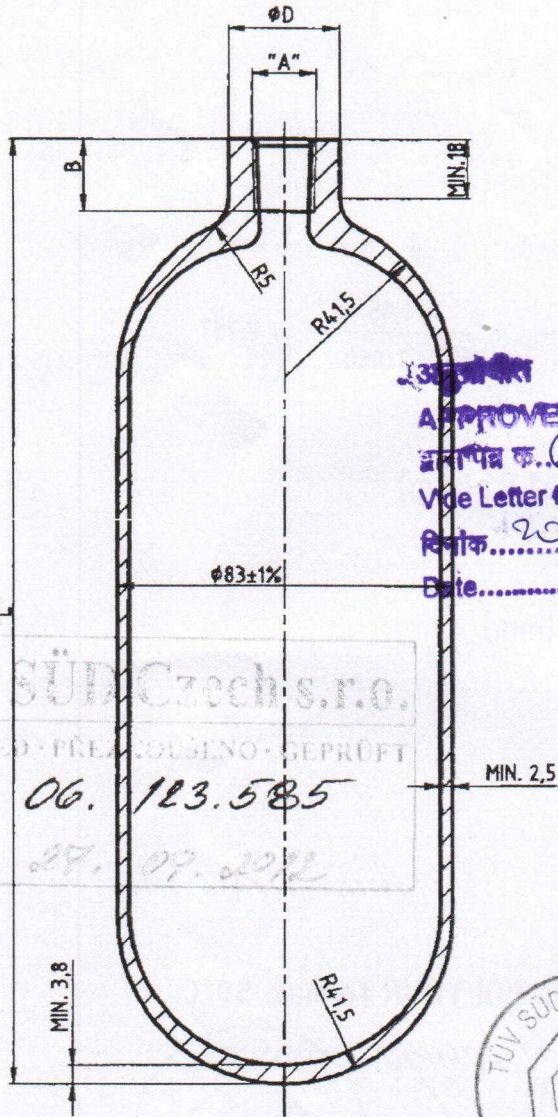
Yours Faithfully

(Ashendra Singh)  
Controller of Explosives  
for Chief Controller of Explosives

Copy to the M/s Vitkovice India Power Pvt Ltd., 305, Third Floor, DLF Tower-B, Jasola District Centre, Jasola, new Delhi - 110025 along with approved drawing.

for Chief Controller of Explosives

" A "	" B "
W 19,8x1/14" keg DIN 477 17E EN ISO 11116-1 118x1,5 DIN 477	Ø24±0,18 min.
OR THREAD TO CUSTOMER'S REQUEST	



TUV SUD Czech s.r.o.  
 APPROVED - PŘEKOUŠENO - GEPRÜFT  
 Ev. č.: 06. 123.585  
 Datum: 29. 09. 2022

APPROVED  
 G-3(1)  
 Vše Letter No.  
 20186(20)  
 Date



We guarantee  $\sum V, Nb, Ti, Zr \leq 0,15\%$

Číslo změny / k of change	Popis změny / description of change	Datum / date	Vypracoval / designed by	Kontroloval / checked by	Schválil / approved by
	Příloha č.: 5 Annex No.: 5	15.1.06	PLANGOWSKI	<i>fui</i>	<i>pl</i>
	číslo dokumentu / document No.				

MATERIAL : 34CrMo4 CHROME MOLY EN 10 083		
Rm=880-1030 N/mm <sup>2</sup>		
Re ≥ 755 N/mm <sup>2</sup>		
A <sub>5</sub> ≥ 14%		
CHEMICKÉ SLOŽENÍ (%) CHEMICAL ANALYSIS (%)		
C	0.30-0.37	
Si	0.10-0.40	
Mn	0.60-0.90	
Cr	0.90-1.20	
Mo	0.15-0.30	
P	max.0.020	
S	max.0.010	
PS/0/1 max.0.025		
VÝPOČET DLE / CALCULATION ACC. TO EN 1964-1 and ISO 9809-1		
Rodina lahví / Cylinders family		
Objem/Volume +5%(l) -0	"L" ca (mm)	Hmotnost/Weight ca (kg)
V min. 0,8	249	1,2
Max. 1,8	410	2,7
příklady zástupců / typical representants		
Objem/Volume +5%(l) -0	"L" ca (mm)	Hmotnost/Weight ca (kg)
Ref. cylinder 1	283	1,5
1,2	315	1,8
1,34	340	2,0
1,5	365	2,3
PRACOVNÍ TLAK DO: WORKING PRESSURE UP TO: 200bar		
ZKUŠEBNÍ TLAK DO: TEST PRESSURE UP TO: 300bar		
TEPELNĚ ZPRACOVÁNÍ/HEAT TREATED: KALENÍ/QUENCHING PODOUSTĚNÍ/TEMPERING		
VÍTKOVICE CYLINDERS a.s. 706 00, OSTRAVA-VÍTKOVICE, Ruské 83 Výkres je naším duševním a průmyslovým vlastnictvím		
Název/Name Seamless steel cylinder for gas		
Číslo / Počet listů / k of change	Polotovary/semi-product tube	Formát / size A4
1/2		
LA4-0276		Rev. 0

Thickness of cylindrical shell according to EN 1964-1 and ISO 9809-1

Wall stress calculation :

$$S = D/2 \left( 1 - \sqrt{\frac{10 \cdot F \cdot Re - \sqrt{3} \cdot p_h}{10 \cdot F \cdot Re}} \right)$$

Where :

D - outside diameter.....83(mm)

$p_h$  - test pressure.....300 (bar)

Re - min.yield stress.....755(MPa)

Rg - min.tensile strenght.....880 (MPa)

F -design stress factor.....

$$\frac{0,65}{Re/Rg} = \frac{0,65}{755/880} = 0,757$$

$$S = 83/2 \left( 1 - \sqrt{\frac{10 \cdot 0,757 \cdot 755 - \sqrt{3} \cdot 300}{10 \cdot 0,757 \cdot 755}} \right) = 1,91 \text{ (mm)}$$

We selected min. wall thickness : 2.5 (mm)

HEAT TREATED

Quenching

Heating up to 830-870°C, delay 20 minute, cooling in POLYDUR to max. 50°C.

Tempering

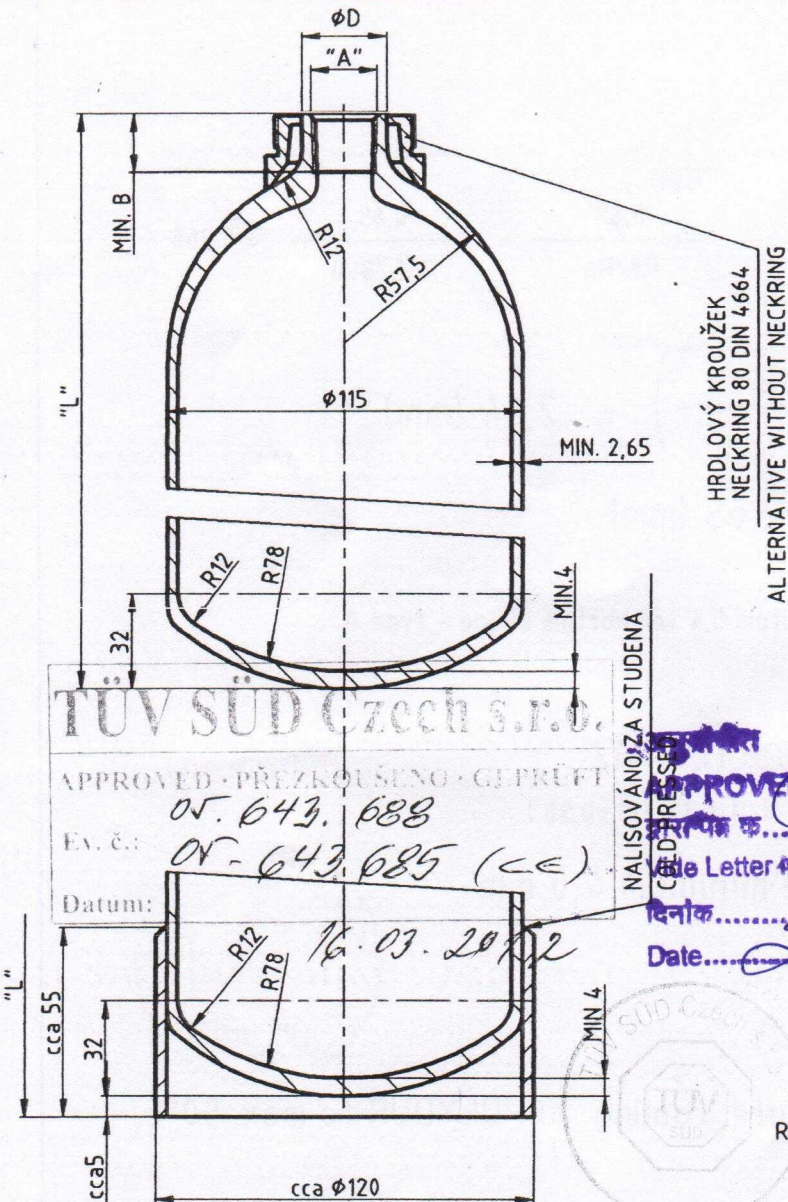
Heating up to 610°C±30°C, delay 46 minute , cooling in air

*vykouuje*



f change	description of change	date	designed by	checked by	approved by	VÍTKOVICE CYLINDERS a.s. 706 00, OSTRAVA-VÍTKOVICE, Ruská 83 Výkres je naším duševním a průmyslovým vlastnictvím
		15.1.06	PIJANOWSKI	<i>Jus</i>	<i>[Signature]</i>	
no./of :	2/2	semi-product tube	size A4	LA 4-0276		Rev. 0

A "	" B "	φD	
		WITH NECK.	WITHOUT NECK.
116 <sup>-1</sup> 1/14" keg DIN 477	17mm	φ23 <sup>+0,12</sup> <sub>+0,07</sub>	φ25 <sup>+2</sup> <sub>-2</sub>
1,5 DIN477	24mm		min φ27,5
1,8 x 1/14" keg DIN 477 N 629-1	Rev.1 23mm 22mm	φ32 <sup>+0,12</sup> <sub>+0,07</sub>	φ34 <sup>+2</sup> <sub>-2</sub>
NF E 29-674	25mm		
2 DIN 477	25mm		φ35



MATERIAL : 34CrMo4  
 Rm=890-1030N/mm<sup>2</sup>  
 Re ≥ 755 N/mm<sup>2</sup>  
 A<sub>5</sub> ≥ 14%  
 KCV=J/cm<sup>2</sup> (-50°C)  
 podélně / long. ≥ 60 [J/cm<sup>2</sup>]  
 EW 48

CHEMICKÉ SLOŽENÍ (%) CHEMICAL ANALYSIS (%)	
C	0,30-0,37
Si	0,10-0,40
Mn	0,60-0,90
Cr	0,90-1,20
Mo	0,15-0,30
P	max. 0,020
S	max. 0,010
P+S	max. 0,025

KONSTRUKCE A PROVEDENÍ DLE  
 DESIGN AND WORKMANSHIP IN ACC TO  
 EN 1964-1 and ISO 9809-1

PLNÍCÍ TLAK DO: **200 bar**  
 FILLING PRESSURE UP TO:

ZKUŠEBNÍ TLAK DO: **300 bar**  
 TEST PRESSURE UP TO:

Objem/Volume +5%(l) -0	ALT.1		ALT.2	
	"L" ± 10 (mm)	Hmotnost Weight ± 0,5 (kg)	"L" ± 10 (mm)	Hmotnost Weight ± 0,5 (kg)
V min.	2,8	2,95	3,0	3,0
V max.	6,3	7,55	7,1	7,3

Rodina lahví/Cylinders family				
příklady zástupců/ typical representants	ALT.1		ALT.2	
	"L" ± 10 (mm)	Hmotnost Weight ± 0,5 (kg)	"L" ± 10 (mm)	Hmotnost Weight ± 0,5 (kg)
3	345	3,4	350	3,6
2,67	365	3,55	370	3,75
3	400	3,9	405	4,1
3,5	455	4,4	460	4,6
Ref. cylinder 4	505	4,7	510	4,9
5	610	5,5	615	5,7
5,34	645	5,8	650	6,0

We guarantee ΣV,Nb,Ti,Zr = 0,15%

Hmotnost láhve s hrdlovým kroužkem +0,7kg  
 Weight the bottle with neckring

měny change	Popis změny /description of change	Datum /date	Vypracoval /designed by	Kontroloval /checked by	Schválil /approved by
		5.6.02	PIJANOWSKI		
1	požadavky SURVITEC rozšíření o ISO 9809-1	30.1.08	PIJANOWSKI		
	Annex 4.3				
	dokume n d				

TEPELNÉ ZPRACOVÁNÍ/HEAT TREATED:  
 KALENÍ/QUENCHING  
 POPOUŠTĚNÍ/TEMPERING

VÍTKOVICE CYLINDERS a.s.  
 706 02, OSTRAVA-VÍTKOVICE, Ruská 83  
 Výkres je naším duševním a průmyslovým vlastnictvím

Název/Name  
 Seamless steel cylinder for gas

Thickness of cylindrical shell according to EN 1964-1 and ISO 9809-1

Wall stress calculation :

$$a = D/2 \left( 1 - \sqrt{\frac{10 \cdot F \cdot Re - \sqrt{3} \cdot p_h}{10 \cdot F \cdot Re}} \right)$$

Where :

D - outside diameter.....115(mm)

$p_h$  - test pressure.....300 (bar)

Re - min.yield stress.....755(MPa)

Rg - min.tensile strenght.....890(MPa)

F - design stress factor.....

$$\frac{0,65}{Re/Rg} = \frac{0,65}{755/890} = 0,766$$

$$a = 115/2 \left( 1 - \sqrt{\frac{10 \cdot 0,766 \cdot 755 - \sqrt{3} \cdot 300}{10 \cdot 0,766 \cdot 755}} \right) = 2,64 \text{ (mm)}$$

We are designing wall thickness: 2,65 (mm)

Calculation of the bottom acc. to EN 1964-1: 1999, item 5,4 for bottom shape - type A

inside radius  $r \geq 0,075 \cdot D$

$r \geq 0,075 \cdot 115$

$r \geq 8,625 \text{ mm}$

selected R12

bottom thickness  $b \geq 1,5 \cdot a$  for  $0,40 > H/D \geq 0,20$  ( $H/D = 32/115 = 0,28$ )

$b \geq 1,5 \cdot 2,5$

$b \geq 3,975 \text{ mm}$

selected minimum 4,0 mm

### HEAT TREATED

Quenching

Heating up to 830-870°C, delay 20 minute, cooling in POLYDUR to max. 50°C.

Tempering

Heating up to 600°C±30°C, delay 31 minute, cooling in air.

změny change	Popis změny /description of change	Datum /date	Vypracoval /designed by	Kontroloval /checked by	Schválil /approved by	<b>VÍTKOVICE CYLINDERS a.s.</b> 706 02, OSTRAVA-VÍTKOVICE, Ruská 83 Výkres je naším duševním a průmyslovým vlastnictvím  Název/Name Seamless steel cylinder for gas
		5.6.02	PIJANOWSKI			
v.1	požadavky SURVITEC	30.1.08	PIJANOWSKI	<i>g</i>	<i>PA</i>	
Počet listů i./of:	Polotovár/semi-product	Formát/size	LA 4-0356			Rev. 1

" A "	" φB "	
	WITH NECKRING	WITH OUT NECKRING
19,8x1/14" keg DIN 477 EN ISO 11116-1 8x1,5 DIN 477 8x1,5 EN 144-1	φ23h11	φ25 <sup>±2</sup>
28,8x1/14" keg DIN 477 EN 629-1	φ32h11	φ34 <sup>±3</sup>

MATERIAL : 34CrMo4  
CHROME MOLY CSN EN 10 083  
Rm=900-1050 N/mm<sup>2</sup>  
Re ≥ 765 N/mm<sup>2</sup>  
A<sub>5</sub> ≥ 14%

CHEMICKÉ SLOŽENÍ (%)  
CHEMICAL ANALYSIS (%)

C	0.30-0.37
Si	0.10-0.40
Mn	0.60-0.90
Cr	0.90-1.20
Mo	0.15-0.30
P	max.0.020
S	max.0.010
P+S	max.0.025

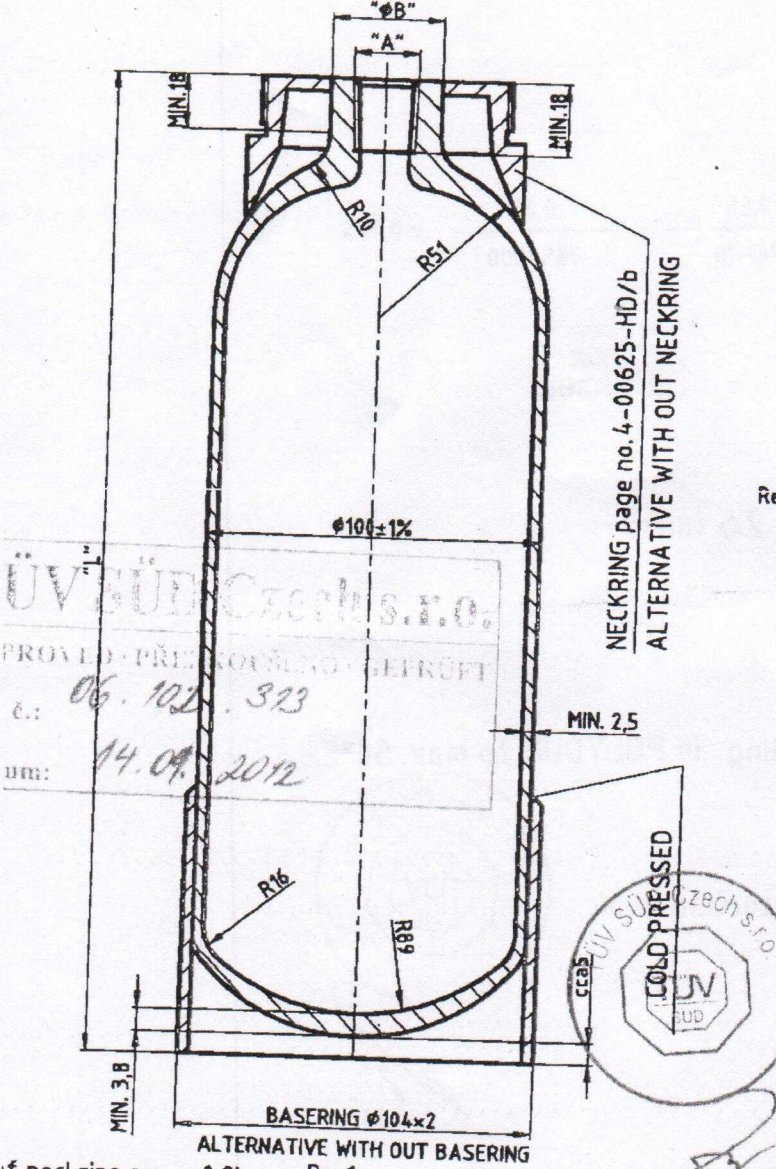
VÝPOČET DLE/ CALCULATION ACC.TO  
EN 1964-1 and ISO 9809-1

Rodina lahví/Cylinders family

Objem/Volume -0 +5% (l)	"L" ca (mm)	Hmotnost/Weight ca (kg)
V min. 2	360	3,8
V max. 4,75	750	5,6

příklady zástupců/Typical representatives

Objem/Volume -0 +5% (l)	"L" ca (mm)	Hmotnost/Weight ca (kg)
2,7	455	4,3
Ref. cylinder 3	500	4,45
3,5	570	4,8
4	640	5,1



NECKRING page no. 4-00625-HD/b  
ALTERNATIVE WITH OUT NECKRING

UV SUD Czech s.r.o.  
PROVEDĚNÉ PŘI KONTROLNÍM ZKOUŠENÍM  
č.: 06.10.2012 393  
um: 14.09.2012



PLNÍCI TLAK DO:  
FILLING PRESSURE UP TO: **200bar**  
ZKUSEBNÍ TLAK DO:  
TEST PRESSURE UP TO: **300bar**  
TEPELNÉ ZPRACOVÁNÍ/HEAT TREATED:  
KALENÍ/QUENCHING  
POPOUSTĚNÍ/TEMPERING

**VÍTKOVICE Lahvárna a.s.**  
706 00, OSTRAVA-VÍTKOVICE, Ruská 83  
Výkres je naším duševním a průmyslovým vlastnictvím

Název/Name  
Seamless steel cylinder for gas

číslo změny / change	Popis změny /description of change	Datum /date	Vypracoval /designed by	Kontroloval /checked by	Schválil /approved by
	rozšíření homologace ISO 9809-1 (enlargement)	10.6.02	PIJANOWSKI	<i>[Signature]</i>	<i>[Signature]</i>
	Annex No.: 3	4.9.03	PIJANOWSKI	<i>[Signature]</i>	<i>[Signature]</i>
	číslo dokumentu / document No.				

čet listů / sheets: 1/2  
Polotovár/semi-product Formát/size: A4

LA4-0358 Rev. 1

rev.1

Thickness of cylindrical shell according to EN 1964-1 and ISO 9809-1

Wall stress calculation :

$$s = D/2 \left( 1 - \sqrt{\frac{10 \cdot F \cdot Re - \sqrt{3} \cdot p_h}{10 \cdot F \cdot Re}} \right)$$

Where :

- D - outside diameter.....100(mm)
- p<sub>h</sub> - test pressure.....300 (bar)
- Re - min.yield stress.....765(MPa)
- Rg - min.tensile strenght.....900 (MPa)
- F - design stress factor.....

$$\frac{0,65}{Re/Rg} = \frac{0,65}{765/900} = 0,765$$

$$s = 100/2 \left( 1 - \sqrt{\frac{10 \cdot 0,765 \cdot 765 - \sqrt{3} \cdot 300}{10 \cdot 0,765 \cdot 765}} \right) = 2,27 \text{ (mm)}$$

We selected min. wall thickness : 2.5 (mm)

HEAT TREATED

Quenching

Heating up to 830-870°C, delay 20 minute, cooling in POLYDUR to max. 50°C.

Tempering

Heating up to 590°C±30°, delay min.30 minute, cooling in air.



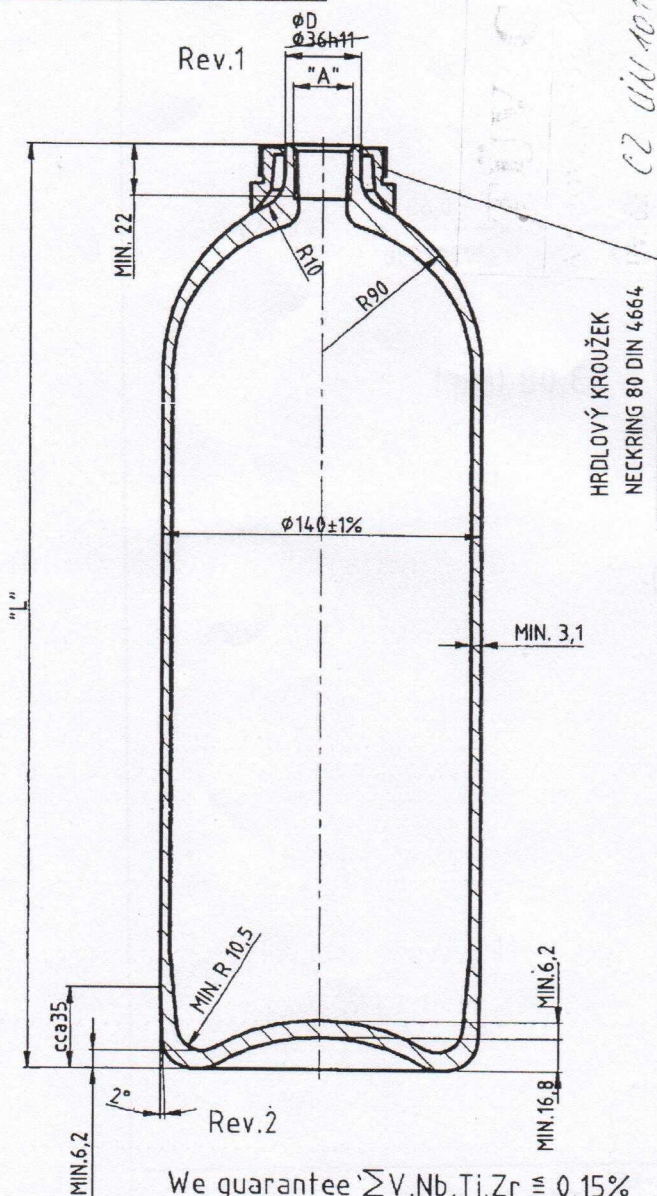
range	description of change	date	designed by	checked by	approved by	<b>VÍTKOVICE Lahvárna a.s.</b> 706 00, OSTRAVA-VÍTKOVICE, Ruská 83 Výkres je naším duševním a průmyslovým vlastnictvím  Název/Name Seamless steel cylinder for gas
		10.6.02	PIJANOWSKI			
1	rozšíření homologace (ISO 9809-1) enlargement	4.9.03	PIJANOWSKI	<i>[Signature]</i>	<i>[Signature]</i>	
of :	2/2	semi-product	size A4	LA 4-0358		Rev. 1



"A"	"φD"
-BS 341 : 1962	
28.8 x 1/14" keg DIN 477	φ36h11
31,3 x 1/14" keg DIN 477	
34x2 NF E 29-682	φ41h11
THREAD TO CUSTOMER'S REQUEST	

Rev.1

Rev.2



HRDLOVÝ KROUŽEK  
NECKRING 80 DIN 4664

CZ 0111017-0016/2005

Datum: 27.2.2005

MATERIAL : 34CrMo4
Rm=930-1080N/mm <sup>2</sup>
Re ≥ 790 N/mm <sup>2</sup>
A <sub>5</sub> ≥ 14%
KCV=J/cm <sup>2</sup> (-50°C)
podélně /long. ≥ 60 [J/cm <sup>2</sup> ]
EW 48

CHEMICKÉ SLOŽENÍ CHEMICAL ANALYSIS (%)	
C	0,30-0,37
Si	0,10-0,40
Mn	0,60-0,90
Cr	0,90-1,20
Mo	0,15-0,30
P	max. 0,020
S	max. 0,010
P+S	max. 0,025

Rev.4 VÝPOČET DLE/ CALCULATION ACC.TO  
EN 1964-1 and ISO 9809-1

Rodina lahví/Cylinders family		
Objem/Volume +5% (l)	"L" ca (mm)	Hmotnost/Weight ca (kg)
4	370	5,0
15	1175	16,1

Příklady zástupců/ Typical represent tanks		
Objem/Volume +5% (l) -0	" " ca (mm)	Hmotnost/Weight ca (kg)
5	450	5,9
10	815	11,9
13,4	1065	13,5

PLNÍCI TLAK DO: FILLING PRESSURE UP TO:	200 bar	—	18 bar
ZKUŠEBNÍ TLAK DO: TEST PRESSURE UP TO:	300 bar	250 bar	60 bar

TEPELNÉ ZPRACOVÁNÍ/HEAT TREATED:  
KALENÍ/QUENCHING  
PODOUSTĚNÍ/TEMPERING

změny of change	Popis změny /description of change	Datum /date	Vypracoval /designed by	Kontroloval /checked by	Schválil /approved by
		12.7.01	HUEBER		
Rev.1	Dopl. závitů a D hrdla thread and φD edit	4.04.03	PIJANOWSKI		
Rev.2	Dopl. tvaru dna bottom modification	8.01.04	PIJANOWSKI		
Rev.3	rozšíření litráže	26.10.04	HUEBER		
Rev.4	rozšíření o ISO 9809-1	15.12.04	PIJANOWSKI		

**VÍTKOVICE Lahvářna a.s.**  
706 02, OSTRAVA-VÍTKOVICE, Ruská 83  
Výkres je naším duševním a průmyslovým vlastnictvím

Název/Name  
Seamless steel cylinder for gas

/Počet listů no./of:	1/2	Polotovár/semi-product	Formát/size A4
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LA 4-0282 /a Rev. 4

Thickness of cylindrical shell according to EN 1964-1 and ISO 9809-1

Wall stress calculation :

$$S = D/2 \left( 1 - \sqrt{\frac{10 \cdot F \cdot Re - \sqrt{3} \cdot p_h}{10 \cdot F \cdot Re}} \right)$$

Where :

D - outside diameter.....140(mm)

$p_h$  - test pressure.....300 (bar)

Re - min.yield stress.....790(MPa)

Rg - min.tensile strenght.....930(MPa)

F - design stress factor.....

$$\frac{0,65}{Re/Rg} = \frac{0,65}{790/930} = 0,765$$

$$S = 140/2 \left( 1 - \sqrt{\frac{10 \cdot 0,765 \cdot 790 - \sqrt{3} \cdot 300}{10 \cdot 0,765 \cdot 790}} \right) = 3,08 \text{ (mm)}$$

We selected min. wall thickness : 3,1 (mm)



změny change	Popis změny /description of change	Datum /date	Vypracoval /designed by	Kontroloval /checked by	Schválil /approved by	<b>VÍTKOVICE Lahvárna a.s.</b> 706 02, OSTRAVA-VÍTKOVICE, Ruská 83 Výkres je naším duševním a průmyslovým vlastnictvím  Název/Name Seamless steel cylinder for gas
		12.7.01	HUEBER			
ev.1	Dopl. závitu a D hrdla thread and ØD edit	4.04.03	PIJANOWSKI			
ev.2	Dopl. tvaru dna bottom modification	8.01.04	PIJANOWSKI			
ev.3	rozšíření litráže	26.10.04	HUEBER			
ev.4	rozšíření o ISO 9809-1	15.12.04	PIJANOWSKI	<i>[Signature]</i>	<i>[Signature]</i>	
počet listů /of :	Polotovár/semi-product	Formát/size	LA 4-0282/a		Rev. 4	
2/2		A4				