PD CEN/TR 14473:2014

BSI Standards Publication

Transportable gas cylinders — Porous materials for acetylene cylinders

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National foreword

This Published Document is the UK implementation of CEN/TR 14473:2014. It supersedes PD CR 14473:2002 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee PVE/3, Gas containers, to Subcommittee PVE/3/7, Gas containers - Gas cylinder (receptacle) operations.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Transportable gas cylinders - Porous materials for acetylene cylinders

Bouteilles à gaz transportables - Matières poreuses pour bouteilles à acétylène

Ortsbewegliche Gasflaschen - Poröse Materialien für Acetylenflaschen

This Technical Report was approved by CEN on 6 January 2014. It has been drawn up by the Technical Committee CEN/TC 23.

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Foreword

This document (CEN/TR 14473:2014) has been prepared by Technical Committee CEN/TC 23 “Transportable gas cylinders”, the secretariat of which is held by BSI.

This document supersedes CR 14473:2002.

This second edition supersedes the first edition (CR 14473:2002) with the following main technical revisions:

a) changes in the legal background are taken into account by introducing new tables for porous materials with filling conditions based on a new European standard (EN ISO 3807) for type testing of porous materials for acetylene cylinders);

b) entries for porous materials that are no longer used or for which the filling conditions could not be verified were deleted;

c) the report was amended with regard to porous materials which have been newly placed on the market since the last edition of this report.

For amendments or changes to this report, an application shall be made to the CEN/TC 23 Secretariat with a copy of the documentation based on which the acetylene cylinders are placed on the market (type approval by the competent authority or conformity assessment in accordance with Directive 2010/35/EU (TPED)).

Introduction

This report contains data and information about monolithic porous materials for acetylene cylinders.

This report does not contain information about non-monolithic porous materials.

Where there is any conflict between this European Technical Report and any applicable regulation, the regulation always takes precedence.

In International Standards, weight is equivalent to a force, expressed in Newton. However, in common parlance the word “weight” continues to be used to mean “mass”, but this practice is deprecated (ISO 80000-4).

In this European Technical Report the unit bar is used, due to its universal use in the field of technical gases. It should, however, be noted that bar is not an SI unit, and that the according SI unit for pressure is Pa.

Pressure values given in this European Technical Report are given as gauge pressure (pressure exceeding atmospheric pressure) unless noted otherwise.

1 Scope

This Technical Report contains information about monolithic porous materials used in individual acetylene cylinders and in acetylene cylinder bundles. It does not claim to be exhaustive.

2 Source and nature of the data about the listed porous materials

The data contained in the tables in Clauses 4, 5 and 6 are derived from the documentation based on which the acetylene cylinders were or still are placed on the market (type approval by the competent authority or conformity assessment in accordance with TPED) and according to which they are operated (in some cases a type approval with regard to newly manufacturing a porous material has been withdrawn or a TPED-certificate is no longer valid but the cylinders that were already on the market still may be used).

NOTE The documentation provided was examined carefully before including the according information into this Report. Nevertheless, there might be discrepancies to the actual approval, e.g. because more recent amendments exist which were not made available at the time of preparing this Report. In some cases not all information was available in the documents provided and consequently the according information is missing (for example the maximum top clearance or the working pressure).

Acetylene cylinders that were reassessed in accordance with TPED may be filled with the filling values conforming to the reassessment certificate throughout the EU. It should be noted that these values might deviate from those of prior national approvals which still apply to those cylinders that were not reassessed according to TPED.

If no reliable documentation could be made available to the working group, no information is included in this Report. However, this does not necessarily mean that no approval or certification exists.

Clause 4 contains information on porous materials for acetylene cylinders which are placed on the market in accordance with type tests according to EN ISO 3807. It also contains information on filling conditions for acetylene cylinder bundles in accordance with EN ISO 13088.

Clause 5 contains information on porous materials used in individual acetylene cylinders that were type approved based on national regulations and/or standards.

Clause 6 contains information on porous materials used in acetylene cylinder bundles that were approved based on national regulations and/or standards.

If several years are indicated for the approval or certification they refer to according amendments in addition.

3 Country codes

In this Technical Report countries are identified in accordance with their distinguishing signs for motor vehicles according to the Vienna Convention on Road Traffic which is also the basis for marking of cylinders according to the ADR (see Annex A to the ADR, 6.2.2.7) as follows:

A	Austria	F	France	L	Luxembourg
B	Belgium	GB	United Kingdom	NL	Netherlands
CH	Switzerland	GR	Greece	N	Norway
CZ	Czech Republic	HR	Croatia	P	Portugal
D	Germany	HU	Hungary	S	Sweden
DK	Denmark	IRL	Ireland	SK	Slovakia
E	Spain	I	Italy		
FIN	Finland	IS	Iceland		

4 Data for porous materials for individual acetylene cylinders type tested in accordance with EN ISO 3807

Clause 4 contains information on porous materials for acetylene cylinders which were or still are placed on the market in accordance with type testing according to EN ISO 3807. It also contains information on filling conditions for acetylene cylinder bundles in accordance with EN ISO 13088.

The following tables are ordered alphabetically according to the name of the porous material.

Column 1 gives the cylinder water capacities, in l, to which the filling conditions (solvent content, acetylene content, working pressure) as given in the subsequent columns are applicable.

Column 2 lists the specified solvent content, in kg/l, that the acetylene cylinder shall contain per litre water capacity in accordance with the type tests according to EN ISO 3807.

Column 3 lists the maximum acetylene content (including saturation acetylene), in kg/l, that the acetylene cylinder shall contain per litre water capacity in accordance with the type tests according to EN ISO 3807.

Column 4 lists the working pressure of the acetylene cylinder as calculated in accordance with EN ISO 3807. For bundles it gives the maximum no. of consecutive fillings before the bundle has to be dismantled and solvent has to be replenished in the individual cylinders.

Identification	**A-10W ECO**		
Manufacturer	**Worthington Cylinders GmbH** **Beim Flaschenwerk 1, 3291 Kienberg bei Gaming, Austria**		
Year and no. of type approval or EU-Certificate	**2005, 2006** **BAM-05-M01**		
Time of manufacture	**since 2006**		
Type of porous material	**Monolithic, asbestos-free**		
Density in kg/l	**0,270 ± 0,015**		
Porosity in %	**90,5 ± 1,5**		
Maximum top clearance in mm	**2**		
Solvent	**Acetone**		
Individual cylinders with acetone			
Cylinder water capacity in l	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
< 20 20 to 60	0,310 0,310	0,180 0,200	18 19
Individual cylinders without solvent			
Cylinder water capacity in l	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
	-	0,020	19
Bundle cylinders based on EN ISO 13088			
Cylinder water capacity in l	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Maximum no. of consecutive fillings**
20 to 60	0,289 to 0,331	0,180	6

Identification	**A-10W ECO DMF**		
Manufacturer	**Worthington Cylinders GmbH** **Beim Flaschenwerk 1, 3291 Kienberg bei Gaming, Austria**		
Year and no. of type approval or EU-Certificate	**2005, 2006, 2009** **BAM-05-M02**		
Time of manufacture	**since 2006**		
Type of porous material	**Monolithic, asbestos-free**		
Density in kg/l	**0,270 ± 0,015**		
Porosity in %	**90,5 ± 1,5**		
Maximum top clearance in mm	**2**		
Solvent	**DMF**		
Individual cylinders with DMF			
Cylinder water capacity in l	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
40 to 60	0,400	0,209	18
Bundle cylinders based on EN ISO 13088			
Cylinder water capacity in l	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Maximum no. of consecutive fillings**
40 to 60	0,385 to 0,410	0,189	100

Identification	**UL 1**		
Manufacturer	**Linde Vitkovice a.s.** **Hrbovická 155, 400 01 Ústí nad Labem, Czech Republic**		
Year and no. of type approval or EU-Certificate	**2012 (valid until 2022)** **05.624.115**		
Time of manufacture	**since 1997**		
Type of porous material	**Monolithic, asbestos-free**		
Density in kg/l	**0,264 ± 0,010**		
Porosity in %	**90,0 ± 1,5**		
Maximum top clearance in mm	**3**		
Solvent	**Acetone**		
Individual cylinders with acetone			
Cylinder water capacity in l	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
< 20 20 to 55,5	0,3125 0,3125	0,180 0,200	18 19
Individual cylinders without solvent			
Cylinder water capacity in l	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
50, 55	–	0,020	19
Bundle cylinders based on EN ISO 13088			
Cylinder water capacity in l	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Maximum no. of consecutive fillings**
20 to 55,5	0,2914 to 0,333	0,180	6

Identification	**UL 2**		
Manufacturer	**Linde Vitkovice a.s.** **Hrbovická 155/147, 400 01 Ústí nad Labem, Czech Republic**		
Year and no. of type approval or EU-Certificate	**2010** **BAM-TPED-2007/002**		
Time of manufacture			
Type of porous material	**Monolithic, asbestos-free**		
Density in kg/l	**0,264 ± 0,010**		
Porosity in %	**90,0 ± 1,5**		
Maximum top clearance in mm	**3**		
Solvent	**DMF**		
Individual cylinders with DMF			
Cylinder water capacity in l	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
< 20 20 to ≤ 55,5	0,400 0,400	0,180 0,200	16 17
Bundle cylinders based on EN ISO 13088			
Cylinder water capacity in l	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Maximum no. of consecutive fillings**
	0,385 to 0,408	0,180	92

5 Data for porous materials for individual acetylene cylinders and that are type approved based on national regulations

Clause 5 contains information on porous materials for individual acetylene cylinders which were type approved based on national regulations and/or standards.

The following tables are ordered alphabetically according to the name of the porous material. Within these tables the countries are ranked alphabetically according to the country codes as given in Clause 3.

Column 4 gives the cylinder water capacities, in l, to which the filling conditions (solvent content, acetylene content, working pressure) as given in the subsequent columns are applicable.

Column 5 lists the specified solvent content, in kg/l, that the acetylene cylinder shall contain per litre water capacity according to the national approval.

Column 6 lists the maximum acetylene content (including saturation acetylene except where mentioned otherwise), in kg/l, that the acetylene cylinder shall contain per litre water capacity according to the national approval.

Column 7 lists the working pressure of the acetylene cylinder according to the national approval (based on a settled pressure at 15 °C).

Identification	**AGA 2** (alternatively CASIL 2 in D)					
Manufacturer	**AGA-Cryo, Site Wilhelmsburg** **Industriestr. 114, Hamburg, Germany**					
Time of manufacture						
Type of porous material	**Monolithic**					
Density in kg/l	**0,225 to 0,255**					
Porosity in %	**90 to 93**					
Solvent	**Acetone**					
Country code	**Year and no. of type approval or reference no.**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
A	1978 43063/11-IV/3/78 1988, A – AGA 2	5	≤ 10 > 10 and ≤ 54	0,310 0,310	0,180 0,200	18 19
D	1989, 05 DM 2	6 for cyl ≥ 40 l	< 10 20, 27, 40, 50, 54	0,310 0,310	0,180 0,200	18 19

Identification	**AGA 4** (alternatively CASIL 4 in D)					
Manufacturer	**AGA-Cryo, Site Wilhelmsburg** **Industriestr. 114, Hamburg, Germany**					
Time of manufacture						
Type of porous material	**Monolithic, asbestos-free**					
Density in kg/l	**0,280 ± 0,015 (0,280 to 0,295 in A)**					
Porosity in %	**89 to 92**					
Solvent	**Acetone**					
Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
A	1995 A-AGA 4	4	< 20 20 to 54	0,310 0,310	0,180 0,200	18 19
D	1993 05 DM 4	2	< 10 20, 27, 40, 50, 54	0,310 0,310	0,180 0,200	18 19

Identification	**HEISER ECO**
Manufacturer	**Firma Jos. Heiser vormals J. Winter's Sohn, now Worthington Cylinders GmbH** **3291 Kienberg-Gaming, Austria**
Time of manufacture	**1993 to 2005**
Type of porous material	**Monolithic, asbestos-free**
Density in kg/l	**0,23 to 0,25 in B and S, 0,23 to 0,26 in CH, CZ, D and HU**
Porosity in %	**89 to 92**
Solvent	**Acetone**

Country code	**Year and no. of type approval or reference no.**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
A	1993 A-HEISER ECO	2	< 10 10 to < 20 20 to 58	0,310 0,310 0,310	0,180 0,190 0,200	18 19 19
B[1)]	1994		5 to 50	0,326	0,170	15
CH	1995, 2004 CH/EGI 4204061	2	< 3 3 to < 10 10 to < 20 20 to < 60	0,310 0,310 0,310 0,310	0,150 0,170 0,180 0,200	19[2)] 19 19 19
CZ	1998 J-31–0219/98	2	< 10 10 to < 20 20 to 50	0,310 0,310 0,310	0,180 0,190 0,200	18 19 19
D	1993 to 1998 (8 amendments) 02 A M100	2	< 20 20 to 60	0,310 0,310	0,190 0,200	19 19
E	1993, FAM-3322	3	< 10 10 to < 20 20 to < 50	0,310 0,310 0,310	0,180 0,190 0,200	18 19 19
F	1999, 99.V.01		5 to 10 20, 40, 50	0,310 0,310	0,180 0,190	18 19
GB	1993 XI/5931/4/28		< 10 10 to < 20 20 to ≤ 50	0,310 0,310 0,310	0,180 0,190 0,200	18 19 19

1) The values for B are based on a test report which recommends the approval and not on the approval itself.

2) The approval for CH gives 19 bar for all cylinder sizes and acetylene contents. However, the working pressure (if calculated in accordance with EN ISO 3807) should be lower for cylinders with a lower acetylene content.

HU	1993, 2001 197–01/360/01	2	< 10 10 to < 20 20 to 50	0,310 0,310 0,310	0,180 0,190 0,200	18 19 19
NL	1993		5 to 50	0,326	0,194	18
S	1993		< 10 10 to < 20 20 to 54	0,310 0,310 0,310	0,180 0,190 0,200	

Identification	**HEISER-ECO DMF**					
Manufacturer	**Firma Jos. Heiser vormals J. Winter's Sohn, now Worthington Cylinders GmbH 3291 Kienberg-Gaming, Austria**					
Time of manufacture	**1993 to 2005**					
Type of porous material	**Monolithic, asbestos-free**					
Density in kg/l	**0,23 to 0,26 (BE and SE: 0,23 to 0,25)**					
Porosity in %	**89 to 92**					
Solvent	**DMF**					
Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
NL	2000		50	0,400	0,194	18

Identification	**JH-COYNE** (Heiser in D and E, Coyne in NL)					
Manufacturer	**Firma Jos. Heiser vormals J. Winter's Sohn 3291 Kienberg-Gaming, Austria**					
Time of manufacture	**until 1993**					
Type of porous material	**Monolithic**					
Density in kg/l	**0,240 to 0,290 (0,260 to 0,280 in D, 0,260 in E)**					
Porosity in %	**≥ 87 (89 to 91 in D, 89 in E)**					
Solvent	**Acetone**					
Country code	**Year and no. of type approval or reference no.**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
A	1965, 1968, 1969			0,320	0,175	

D	1978, 1983 02 A M5		≤ 5, 10 20, 27, 40, 50	0,305 0,305	0,1665 0,1575	18 18
E	1988 FAM-1962	3		0,330	0,187	18
GB	1977		42	0,330	0,175	18
NL	1985, 1986		5 10, 27	0,320 0,322	0,180 0,180	

Identification	**Linde M I** (after 1982 A-Linde M I-B in A)					
Manufacturer	**Linde AG, Site Lohhof** **Carl-von-Linde-Straße 25, 85716 Unterschleissheim, Germany**					
Time of manufacture						
Type of porous material						
Density in kg/l	**0,255 ± 0,010 in A**					
Porosity in %	**90 to 92**					
Solvent	**Acetone**					
Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
A	1982 A-Linde MI-B	6	≤ 20 40, 50 60	0,3125 0,3125 0,3125	0,180 0,200 0,195	18 19 19
D	1976, 1989 02 D M1	6	≤ 20 ≤ 20 40, 50 60	0,3125 0,3125 0,3125 0,3125	0,180 0,200[3)] 0,200 0,195	18 19 19 19

3) The value of 0,200 kg/l refers only to cylinders which are fitted with a safety plate.

Identification			**NA** (A-NA in A)			
Manufacturer			**Argon S.A.** **Carretera a Echauri, Apartado de Correos 178, 31080 Pamplona, Spain**			
Time of manufacture						
Type of porous material			**Monolithic, asbestos-free**			
Density in kg/l			**0,28 to 0,30**			
Porosity in %			**89 to 92**			
Solvent			**Acetone**			
Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
A	1996, A-NA	3	≤ 10 > 10 to 54	0,310 0,310	0,180 0,200	18 19

Identification			**NLH** (alternatively NL HMOTA)			
Manufacturer			**Technoplyn n.p.** **Usti nad Labem, Czech Republic**			
Time of manufacture						
Type of porous material						
Density in kg/l			**0,240 ± 3 %**			
Porosity in %			**92 to 94**			
Solvent			**Acetone**			
Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
D	1992, 1998 72 CSM 01		20, 40	0,2625	0,1575	18

Identification	**NORAL**					
Manufacturer	**AIR LIQUIDE–ALFI IM** **Établissement industriel Villeneuve sur Yonne, France**					
Time of manufacture	**1994 to 2003**					
Type of porous material	**Monollithic, asbestos-free**					
Density in kg/l	**0,29 ± 5 %**					
Porosity in %	**91 ± 1 or 90,5 ± 2,5?**					
Solvent	**Acetone**					
Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
F	1994, 1995, 1996, 2002, 2003		3,35 5,8 to 50	0,320[4)] 0,301[4)]	0,161[5)] 0,191[5)]	18 18

Identification	**NORAL 2**					
Manufacturer	**AIR LIQUIDE–ALFI IM** **Établissement industriel Villeneuve sur Yonne, France**					
Time of manufacture	**Since 2003**					
Type of porous material	**Monollithic, asbestos-free**					
Density in kg/l	**0,29 ± 5 %**					
Porosity in %	**90,5 ± 2,5**					
Solvent	**Acetone**					
Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
F	1994, 1995, 1996, 2002, 2003		3,35 5,8 to 50	0,320[6)] 0,301[6)]	0,161[7)] 0,179[7)]	18 18

4) This value includes the saturation acetylene.

5) This value does not include the saturation acetylene.

6) This value includes the saturation acetylene.

7) This value does not include the saturation acetylene.

Identification	**POR 92**
Manufacturer	**Tehnogas-Kraljevo** **Izletnicka 41, 36000 Kraljevo, Serbia**
Time of manufacture	**1991 to 1994**
Type of porous material	**Monolithic**
Density in kg/l	**0,260 ± 0,010**
Porosity in %	**90 to 92**
Solvent	**Acetone**

Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
D	1991 02 YU M 9		40, 50	0,320	0,200	18

Identification	**SIAD 2** ($A - \frac{SIAD}{2}$ in A)
Manufacturer	**Societa Acetilene and Derivati** **Site Sabbio** **Bergamo, Italy**
Time of manufacture	
Type of porous material	**Monolithic**
Density in kg/l	**0,260 to 0,280**
Porosity in %	**89 to 92**
Solvent	**Acetone**

Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**
A	1983, $A - \frac{SIAD}{2}$	5	≤ 10 > 10 to 20 > 20 to 50	0,310 0,310 0,310	0,180 0,185 0,200	18 18 19

Identification	**T-200 A** (same porous material as T-200 but with a special core hole filling consisting of quartz sand, felt plug and sieve)
Manufacturer	**Tehnogas-Kraljevo** **Izletnicka Br. 41, 36000 Kraljevo, Serbia**
Time of manufacture	**1984 to 1994**
Type of porous material	
Density in kg/l	**0,195 to 0,205**
Porosity in %	**91 to 93**
Solvent	**Acetone**

Country code	Year and no. of type approval	Max. top clearance in mm	Cylinder water capacity in l	Solvent content in kg/l	Acetylene content in kg/l	Working pressure in bar
D	1984, 1985, 1986, 1990, 1991, 1994, 02 YU M 5		3,6, 5, 10 20, 27, 40, 50	0,320 0,320	0,180 0,200	18 18

6 Data for porous materials for acetylene cylinders used in bundles and that are type approved according to national regulations

Clause 6 contains information on porous materials for acetylene cylinders used in bundles which were approved based on national regulations and/or standards.

The following tables are ordered alphabetically according to the name of the porous material. Within these tables the countries are ranked alphabetically according to the country codes as given in Clause 3.

Column 3 gives the cylinder water capacities, in l, to which the following filling conditions (solvent content, acetylene content, working pressure) are applicable.

Column 4 lists minimum and the maximum solvent content, in kg/l, that the acetylene cylinder in a bundle shall contain per litre water capacity of the cylinder according to the national approval. These values determine the solvent operating range.

Column 5 lists the maximum acetylene content including saturation acetylene, in kg/l, that the acetylene cylinder in a bundle shall contain per litre water capacity according to the national approval.

Column 6 lists the working pressure of the acetylene cylinder according to the national approval (based on a settled pressure at 15 °C).

Column 7 gives the maximum no. of consecutive fillings before the bundle has to be dismantled and solvent has to be replenished in the individual cylinders.

Identification	**AGA 2** (alternatively CASIL 2 in D)						
Manufacturer	**AGA-Cryo, Site Wilhelmsburg Industriestr. 114, Hamburg, Germany**						
Time of manufacture							
Type of porous material	**Monolithic**						
Density in kg/l	**0,225 to 0,255**						
Porosity in %	**90 to 93**						
Solvent	**Acetone**						
Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**	**Max. no. of consecutive fillings**
A	1989		40 to 54	0,285 to 0,323	0,185		6
D	1989, 05 DM 2	6	40, 50, 54	0,285 to 0,323	0,185		10

Identification	**AGA 2/2**						
Manufacturer	**AGA-Cryo, Site Wilhelmsburg Industriestr. 114, Hamburg, Germany**						
Time of manufacture							
Type of porous material	**Monolithic**						
Density in kg/l	**0,225 to 0,255**						
Porosity in %	**90 to 93**						
Solvent	**DMF**						
Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**	**Max. no. of consecutive fillings**
D	1984, 05 DM 2/2		40, 50, 54	0,375 to 0,400	0,1975		100

Identification	**AGA 4**
Manufacturer	**AGA-Cryo, Site Wilhelmsburg Industriestr. 114, Hamburg, Germany**
Time of manufacture	
Type of porous material	
Density in kg/l	**0,280 ± 0,015 (0,280 to 0,295 in A)**
Porosity in %	**89 to 92**
Solvent	**Acetone**

Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**	**Max. no. of consecutive fillings**
A	2002, A-AGA 4	2	40 to 54	0,285 to 0,323	0,185	19	6
D	1993, 05 DM 4			0,285 to 0,323	0,180		6

Identification	**Heiser-DMF**
Manufacturer	**Firma Jos. Heiser vormals J. Winter's Sohn 3291 Kienberg-Gaming, Austria**
Time of manufacture	**until 1993**
Type of porous material	**Monolithic**
Density in kg/l	**0,260 to 0,280 (in D)**
Porosity in %	**89 to 91 (in D)**
Solvent	**DMF**

Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**	**Max. no. of consecutive fillings**
A	1979, 43063/41-IV/3/79		10 to 50	0,363 to 0,388	0,195		25
D	1979, 02 A M7		40, 50	0,363 to 0,388	0,195	18	25

Identification	**HEISER ECO**
Manufacturer	**Firma Jos. Heiser vormals J. Winter's Sohn 3291 Kienberg-Gaming, Austria**
Time of manufacture	**1993 to 2005**
Type of porous material	**Monolithic, asbestos-free**
Density in kg/l	**0,23 to 0,26**
Porosity in %	**89 to 92**
Solvent	**Acetone**

Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**	**Max. no. of consecutive fillings**
A	1993, A-HEISER ECO-B	2	20 to 58	0,295 to 0,335	0,180	19	6
D	1994 and 1995, 02 A M100	2	40 to 60	0,285 to 0,323	0,185		6
NL	1993		5, 50	0,313 to 0,352 1	0,174 6		

Identification	**HEISER ECO DMF**
Manufacturer	**Firma Jos. Heiser vormals J. Winter's Sohn 3291 Kienberg-Gaming, Austria**
Time of manufacture	**1995 to 2005**
Type of porous material	**Monolithic, asbestos-free**
Density in kg/l	**0,23 to 0,26**
Porosity in %	**89,0 to 92,0**
Solvent	**DMF**

Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**	**Max. no. of consecutive fillings**
A	1995, A-HEISER ECO-B	2	20 to 60	0,400[8)]	0,200	18	50
CH	2004, CH/EGI-4204062	2	40 to 60	0,375 to 0,400	0,188	18	
D	1995, 02 A M101	2	40 to 60	0,375 to 0,400	0,188	18	100

Identification	**JH-COYNE** (Heiser in D)
Manufacturer	**Firma Jos. Heiser vormals J. Winter's Sohn 3291 Kienberg-Gaming, Austria**
Time of manufacture	**until 1993**
Type of porous material	**Monolithic**
Density in kg/l	**0,260 to 0,280 (in D)**
Porosity in %	**89 to 91 (in D)**
Solvent	**Acetone**

Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**	**Max. no. of consecutive fillings**
D	1978, 1983, 02 A M5		40	0,280 to 0,3175	0,145		6

8) The approval does not indicate a solvent operating range which normally is required in order to have a number of consecutive fillings for bundles of more than 1. The acetylene content is also not decreased compared to the normal filling of the individual cylinder which both is an indication that bundles should not be filled while assembled with these filling values.

Identification	**Linde M I** (after 1982 A-Linde M I-B in A)
Manufacturer	**Linde AG, Site Lohhof** **Carl-von-Linde-Straße 25, 85716 Unterschleissheim, Germany**
Time of manufacture	
Type of porous material	
Density in kg/l	
Porosity in %	**90 to 92**
Solvent	**Acetone**

Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**	**Max. no. of consecutive fillings**
A	1987, A-Linde M I-B	6	40, 50 60	0,300 to 0,337 5 0,300 to 0,337 5	0,180 0,175		6
D	1979, 02 D M 1		40, 50 60	0,300 to 0,337 5 0,300 to 0,337 5	0,180 0,175		6

Identification	**NA** (A-NA-B in A)
Manufacturer	**Argon S.A.** **Carretera a Echauri, Apartado de Correos 178, 31080 Pamplona, Spain**
Time of manufacture	
Type of porous material	**Monolithic, asbestos-free**
Density in kg/l	**0,28 to 0,30**
Porosity in %	**89 to 92**
Solvent	**Acetone**

Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**	**Max. no. of consecutive fillings**
A	1996, A-NA-B	3	54	0,297 5 to 0,335	0,180	19	6

Identification	**SIAD 2** ($A - B\frac{SIAD}{2}$ in A)
Manufacturer	**Societa Acetilene and Derivati** **Site Sabbio** **Bergamo, Italy**
Time of manufacture	
Type of porous material	**Monolithic**
Density in kg/l	**0,260 to 0,280**
Porosity in %	**89 to 92**
Solvent	**Acetone**

Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**	**Max. no. of consecutive fillings**
A	1991, $A - B\frac{SIAD}{2}$	5	40 to 50	0,300 to 0,3375	0,175		6

Identification	**T-200 A** (same porous material as T-200 but with a special core hole filling consisting of quartz sand, felt plug and sieve)
Manufacturer	**Tehnogas-Kraljevo** **Izletnicka Br. 41, 36000 Kraljevo, Serbia**
Time of manufacture	
Type of porous material	
Density in kg/l	**0,195 to 0,205**
Porosity in %	**91 to 93**
Solvent	**Acetone**

Country code	**Year and no. of type approval**	**Max. top clearance in mm**	**Cylinder water capacity in l**	**Solvent content in kg/l**	**Acetylene content in kg/l**	**Working pressure in bar**	**Max. no. of consecutive fillings**
D	1984, 02 YU M 5		40, 50	0,308 to 0,345	0,180	18	6

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[1] EN ISO 3807, *Gas cylinders - Acetylene cylinders - Basic requirements and type testing (ISO 3807)*

[2] EN ISO 13088, *Gas cylinders - Acetylene cylinder bundles - Filling conditions and filling inspection (ISO 13088)*

[3] ISO 80000-4, *Quantities and units — Part 4: Mechanics*

[4] TPED, Directive 2010/35/EU of the European Parliament and of the Council on transportable pressure equipment, Brussels, 16 June 2010, as amended

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