



Gases for Welding & Cutting

Introduction of the international standard

EN 439

ISO 14175

1	Argon 4.8	Helium 4.6	I2	2		Rest	0,5 < He-
2	Helium 4.6			3		Rest ⁴⁰	
3	Aluline He 30/50/70/90	Aluline He 30/50/70/90	I3-ArHe-30 (50/70/90)	1	$0,5 \leq CO_2 \leq 5$	Rest ⁴⁰	
1 (1)	Inoxline He30 H2 C	Inoxline C2	M12-ArC-2	2	$0,5 \leq CO_2 \leq 5$	Rest ⁴⁰	
12	Inoxline C2	Inoxline He15 C2	M12-ArHeC-15/2	M1			
2 (1)	Inoxline He15 C2	Inoxline X2	M13-ArO-2	3		$0,5 \leq O_2 \leq 3$	
13	Inoxline X2	Inoxline C3 X1	M14-ArCO-3/1	4	$0,5 \leq CO_2 \leq 5$	$0,5 \leq O_2 \leq 3$	
14	Inoxline C3 X1	Inoxline C3 X1	M14-ArCO-3/1	0	$5 \leq CO_2 \leq 15$		
21	Ferroline C8	Ferroline C8	M20-ArC-8	0	$15 < CO_2 \leq 25$	Rest ⁴⁰	
1 (1)	Ferroline He15 C8	Ferroline C8	M20-ArC-8	1		Rest ⁴⁰	
21	Ferroline C18/C25			2		$3 < O_2 \leq 10$	Rest ⁴⁰
22	Ferroline X4/X8			0	$0,5 \leq CO_2 \leq 5$	$3 < O_2 \leq 10$	Rest ⁴⁰
23	Ferroline C5 X5			0		$0,5 \leq O_2 \leq 3$	Rest ⁴⁰
24	Ferroline C6 X1			0		$0,5 \leq O_2 \leq 3$	Rest ⁴⁰
	Ferroline C12 X2			0		$0,5 \leq O_2 \leq 3$	Rest ⁴⁰
	Ferroline C15 X1			0		$0,5 \leq O_2 \leq 3$	Rest ⁴⁰

Classification of process gases

The standardisation of gases for fusion welding and allied processes is uniform throughout the world under the International DIN EN ISO 14175. Until now these gases have been standardised

under DIN EN 439. The following comparison table shows at a glance the allocation of products from the Messer range of gases and informs you of the corresponding designation.

as DIN EN 439

low reactive	Components in percentage by volume					Designation		Designation as EN 439	Our products
	reducing	inert		oxidising		Sub group	Main group		
N ₂	H ₂	He	Ar	O ₂	CO ₂				
			100			1	I	I1	Welding argon 4.6 Argon 4.8
		100	balance			2		I2	Helium 4.6
			balance ²⁾			3		I3	Aluline He 30/50/70/90
	>0 to 5		balance ²⁾		>0 to 5	1	M1	M11 (1)	Inoxline He30 H2 C
			balance ²⁾		>0 to 5	2		M12	Inoxline C2
			balance ²⁾	>0 bis 3		3		M12 (1)	Inoxline He15 C2
			balance ²⁾	>0 bis 3	>0 to 5	4		M13	Inoxline X2
			balance ²⁾	>0 to 8	>0 to 5			M14	Inoxline C3 X1
			balance ²⁾		>5 to 25	1	M2	M21	Ferroline C8
			balance ²⁾	>3 to 10		2		M21 (1)	Ferroline He20 C8 Ferroline C18/C25
			balance ²⁾	>3 to 10	>0 to 5	3		M22	Ferroline X4/X8
			balance ²⁾	>0 to 8	>5 to 25	4		M23	Ferroline C5 X5
			balance ²⁾	>0 to 8	>5 to 25			M24	Ferroline C6 X1 Ferroline C12 X2 Ferroline C15 X5
			balance ²⁾		>25 to 50	1	M3		
			balance ²⁾	>10 to 15		2			
			balance ²⁾	>8 to 15	>5 to 50	3			
					100	1	C	C1	Carbonic acid
				>0 to 30	Rest	2			
	>0 to 5		balance ²⁾			1	R	R1	Inoxline H2/5/7
	>15 to 35		balance ²⁾			2			
100						1	F		
Rest	>0 to 50					2		F2	Forming gas (5/8/12/...)
							S	S I1 + 0,015 N2	Aluline N
								S I3 + 0,015 N2	Aluline He15 N
								S I3 + 0,015 N2	Aluline He30 N
								S I3 + 0,015 N2	Aluline He50 N
								S I1 + 1,25(2,5) N2	Inoxline N1/N2
								S I3 + 1,25 N2	Inoxline He15 N1
							S I3 + 0,015 N2	Inoxline He15 H2 N	

1) If components not included in the table are added, the mixed gas is designated as special gas with the letter "S". Section 4 DIN EN 439 gives details.

2) Argon can be replaced by helium by up to 95%. The helium part is shown by an additional reference number in acc. with Table 3, see Section 4 DIN EN 439.

as DIN EN ISO 14175

Our products	Designation as ISO 14175	Designation		Components in percentage by volume					
		Main group	Sub group	oxidising		inert		reducing	low reactive
				CO ₂	O ₂	Ar	He	H ₂	N ₂
Welding argon 4.6 Argon 4.8	I1	I	1			100			
Helium 4.6	I2		2				100		
Aluline He 30/50/70/90	I3-ArHe-30 (50/70/90)		3				balance	0,5 ≤ He ≤ 95	
Inoxline C2	M12-ArC-2,5	M1	1	0,5 ≤ CO ₂ ≤ 5		balance ^{a)}		0,5 ≤ H ₂ ≤ 5	
Inoxline He15 C2	M12-ArHeC-15/2		2	0,5 ≤ CO ₂ ≤ 5		balance ^{a)}			
Inoxline X2	M13-ArO-2		3		0,5 ≤ O ₂ ≤ 3				
Inoxline C3 X1	M14-ArCO-3/1		4	0,5 ≤ CO ₂ ≤ 5	0,5 ≤ O ₂ ≤ 3				
Ferroline C8	M20-ArC-8	M2	0	5 < CO ₂ ≤ 15		balance ^{a)}			
Ferroline He20 C8	M20-ArHeC-20/8		1	15 < CO ₂ ≤ 25		balance ^{a)}			
Ferroline C18/C25	M21-ArC-18 (25)		2		3 < O ₂ ≤ 10	balance ^{a)}			
Ferroline X4/X8	M22-ArO-4 (8)		3	0,5 ≤ CO ₂ ≤ 5	3 < O ₂ ≤ 10	balance ^{a)}			
Ferroline C5 X5	M23-ArCO-5/5		4	5 < CO ₂ ≤ 15	0,5 ≤ O ₂ ≤ 3	balance ^{a)}			
Ferroline C6 X1	M24-ArCO-6/1		5	5 < CO ₂ ≤ 15	3 < O ₂ ≤ 10	balance ^{a)}			
Ferroline C12 X2	M24-ArCO-12/2		6	15 < CO ₂ ≤ 25	0,5 ≤ O ₂ ≤ 3	balance ^{a)}			
Ferroline C15 X5	M25-ArCO-15/5		7	15 < CO ₂ ≤ 25	3 < O ₂ ≤ 10	balance ^{a)}			
			8	25 < CO ₂ ≤ 50		balance ^{a)}			
			9		10 < O ₂ ≤ 15	balance ^{a)}			
		M3	3	25 < CO ₂ ≤ 50	2 < O ₂ ≤ 10	balance ^{a)}			
			4	5 < CO ₂ ≤ 25	10 < O ₂ ≤ 15	balance ^{a)}			
			5	25 < CO ₂ ≤ 50	10 < O ₂ ≤ 15	balance ^{a)}			
			1	100					
			2	Rest	0,5 ≤ O ₂ ≤ 30				
Carbonic acid	C1	C	1	100					
			2						
Inoxline He3 H1	R1-ArHeH-3/1,5	R	1			balance ^{a)}		0,5 ≤ H ₂ ≤ 15	
Inoxline H2/5/7	R1-ArH-2 (5/7)		2			balance ^{a)}		15 ≤ H ₂ ≤ 50	
		N	1						100
Inoxline N1/N2	N2-ArN-1,25 (2,5)		2			balance ^{a)}			0,5 ≤ N ₂ ≤ 5
Inoxline He15 N1	N2-ArHeN-15/1,25		3			balance ^{a)}			5 < N ₂ ≤ 50
			4			balance ^{a)}		0,5 ≤ H ₂ ≤ 10	0,5 ≤ N ₂ ≤ 5
Forming gas (5/8/12/...)	N5-NH-5 (8/12/...)		5					0,5 ≤ H ₂ ≤ 50	balance
		O	1		100				
			2						
Aluline N	Z-ArN-0,015	Z	Mixed gases with components not included in the table or mixed gases with a composition outside of the given areas. ^{b)}						
Aluline He15 N	Z-ArHeN-15/0,015								
Aluline He30 N	Z-ArHeN-30/0,015								
Aluline He50 N	Z-ArHeN-50/0,015								
Inoxline He30 H2 C	Z-ArHeHC-30/2/0,12								
Inoxline He15 H2 N	Z-ArHeHN-15/2/0,015								

^{a)} For this classification, argon may be replaced in whole or in part by helium.

^{b)} Two mixed gases with the same Z classification may not replace each other.

Aluline is marketed in Germany without nitrogen additive.

Changes have been made to the group classifications, the mix accuracy, the permissible humidity and the names of the main groups.

Main groups

In the main groups the changes only affect the forming gases and special gases.

The groups have been renamed "N" and "Z". The group Oxygen "O" has been added.

as DIN EN 439		as DIN EN ISO 14175	
inert gases and inert mixed gases	I	I	inert gases and inert mixed gases
oxidising, argon-based mixed gases containing oxygen and/or carbon dioxide	M1, M2, M3	M1, M2, M3	oxidising mixed gases with oxygen and/or carbon dioxide
stronger oxidising gases and mixed gases	C	C	stronger oxidising gases and mixed gases
reducing mixed gases	R	R	reducing mixed gases
low reactive gas or reducing mixed gases	F	N	low reactive gas or reducing mixed gas with nitrogen
		O	Oxygen
Gases, which in terms of their composition are not listed in Table 2, are designated as special gases and are denoted by the letter "S"	S	Z	Mixed gases with components not included in Table 2 or mixed gases, whose composition lies outside of the area of Table 2.

Note: oxygen and special gases are not included as main groups in EN 439.

Humidity and Purity

The maximum permitted humidity of the gas groups "O" and "C" has changed. Already for many years

the purities used in practice have exceeded the standard by a long way.

as DIN EN 439				as DIN EN ISO 14175			
Humidity (ppm) max.	Dew point (°C) at 0,101 Mpa	Purity (%) min.	Main group EN 439	Main group ISO 14175	Purity (%) min.	Dew point (°C) at 0,101 Mpa	Humidity (ppm) max
40	-50	99,99	I	I	99,99	-50	40
40	-50	99,7	M1	M1	99,9	-50	40
80	-44	99,7	M2	M2	99,9	-44	80
120	-40	99,7	M3	M3	99,9	-40	120
200	-35	99,7	C	C ^a	99,8	-40	120
40	-50	99,95	R	R	99,95	-50	40
40	-50	99,5	F	N	99,9	-50	40
200	-35	99,5	Oxygen	O	99,5	-50	40
40	-50	99,5	Hydrogen				

Note: for certain applications a greater purity and / or a lower dew point could be recommendable in order to avoid possible oxidation and contamination.

Tolerances of mixtures

In regard to accuracy of mix no definition is made for additions < 1 %.

For additions greater/equal (≥) 1% nothing has changed.

as DIN EN 439			as DIN EN ISO 14175		
Comment	Additive	Accuracy	Accuracy	Additive	Comment
				< 1%	Not defined in ISO 14175
	0% to 5%	±0,5% absolute	±0,5% absolute	1% to 5%	
	>5% to 50%	±10% from target	±10% from target	>5%	



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