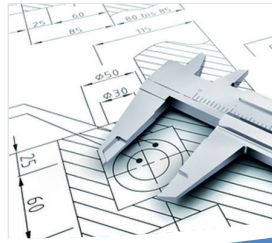
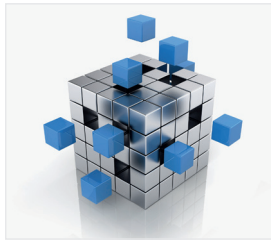
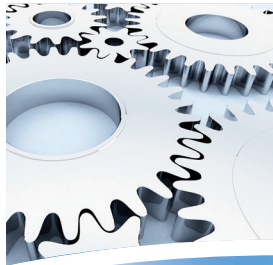


General Information



General Conditions for Catalogs

Armaturenwerk Hötensleben GmbH reserves the right to make alterations without prior notice. The illustrations in the AWH catalogs are simplified schematic representations. The dimensions listed are in mm and are nominal dimensions. With the publication of this catalog all previously issued price documents lose their validity. Reproduction, including extracts, requires written approval. Subject to errors and modifications. Prices subject to change.



Due to continuous further development of our products and therefore the short-lived nature of print catalogs, we would like to point out that the latest catalog versions of the product categories contained in the general catalog are always available for download at www.awh.eu. The catalog version can be found in the note on the inside pages of the catalogs below.

https://www.awh.eu/en/brochures_catalogs.html

Quality Assurance

To guarantee the best quality, AWH uses a comprehensive quality management system.

Quality planning, quality control, quality assurance and quality increases improve the processes continuously. Quality management combines all organisational measures which improve process quality, services and thus our stainless steel products. Our goal is to increase and optimize the effectiveness and efficiency.

Priorities include:

- Preserving and increasing customer satisfaction
- Motivating the staff
- Development and adaptation of products and services
- Optimizing the communication structures
- Standardization of certain operating and work processes
- Documentation
- Advanced professional training

AWH Certifications

- Pressure vessels and pipelines according to AD 2000 regulations
- Tested manufacturing facility for pressure equipment acc. to Pressure Equipment Directive (2014/68/EC), production according to module A2, D1, G and F
- Approved welding company for pressure vessels and pipelines acc. to DIN EN ISO 3834-2 (EN 729-2)
- Authorized to label materials and products for pressure equipment acc. to Pressure Equipment Directive (2014/68/EC) and AD 2000 regulations
- Certification acc. to 2014/34/EU (ATEX)
- Certification acc. to 3-A Sanitary Standard
- Certification acc. to DIN EN ISO 9001: 2015
- Certification acc. to DIN EN ISO 50001: 2011
- Certification acc. to DIN EN ISO 14432: 2006



Exterior Surfaces:



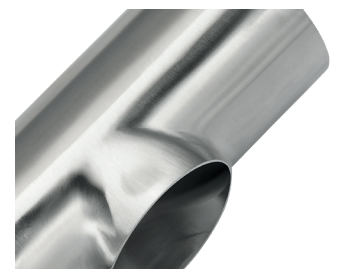
metal-bright



matt blasted



e-polished



ground

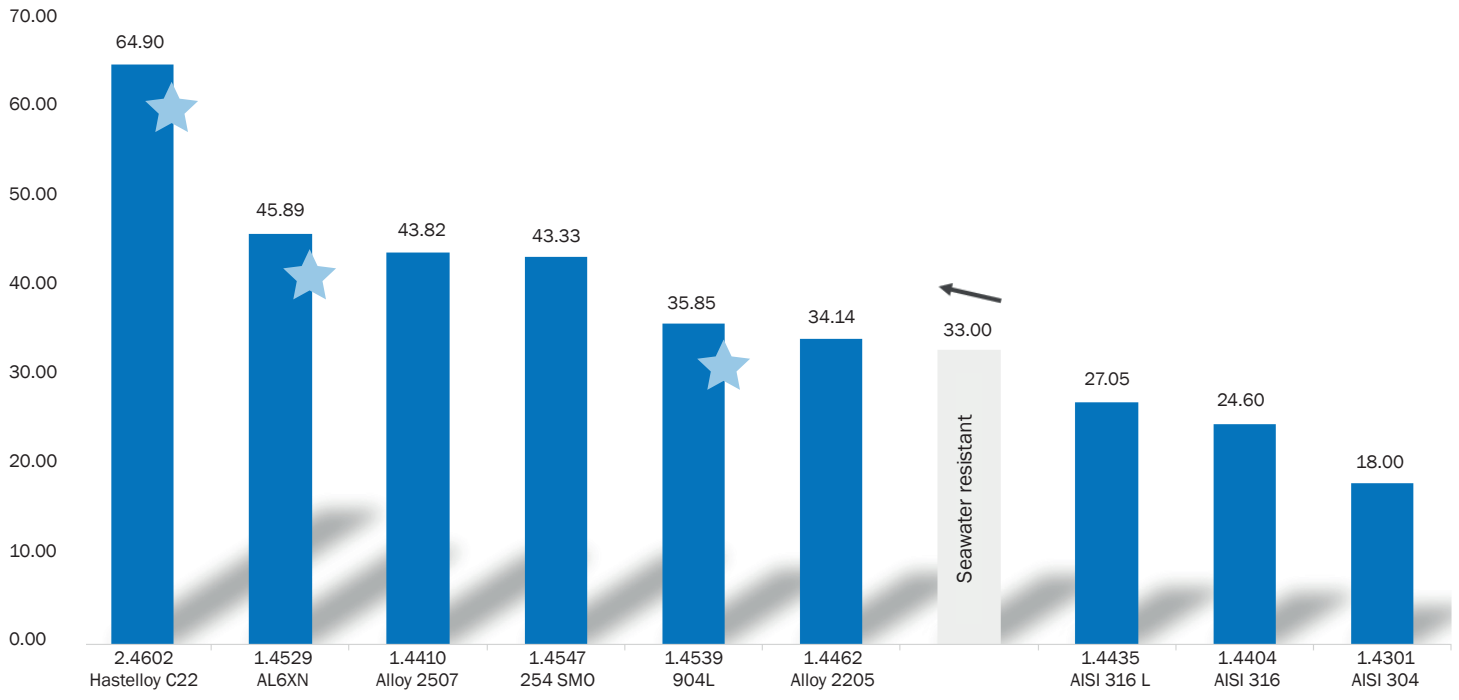
Resistance of Stainless Steels

PREN Value

PREN Value as an Aid to Decision-making

The effective sum (also called the PREN value) can be used to estimate the corrosion resistance of a stainless steel. The PREN value stands for **Pitting Resistance Equivalent Number** and provides information on the corrosion resistance of a material. The higher this value, the more resistant the alloy is to pitting or crevice corrosion. Stainless steels with a PREN value of 33 or higher are considered resistant to seawater.

Formula for PREN calculation: $= 1 \times \% \text{Cr} + 3.3 \times \text{Mo} + 20 \times \% \text{N}$



The materials marked ★ above with a are the AWH Special Alloy Standard materials, which we can partly stock or procure at short notice.

If material costs are disregarded, the all-rounder is Hastelloy C22 steel, which has the best properties in all the applications mentioned above.

Components made of the above materials are only manufactured to order.

For delivery times for the desired components, please contact your local AWH sales representative.

Materials

Material Overview for Stainless Steels

Material	Properties
1.4307 X2CrNi18-9 AISI 304L	Stainless austenitic chrome-nickel steel with low carbon content The resistance to intergranular corrosion is equivalent to that of titanium-stabilized grades, and the material is not affected by knife-line corrosion. Unlike titanium-stabilized grades, 1.4307 has a better surface finish and can be both mechanically and electropolished. Due to the absence of titanium and the resulting depositions, 1.4307 is much more machinable, which also translates into higher tool speeds and longer tool life. AWH offers this material as standard.
1.4301 X5CrNi18-10 AISI 304	Stainless austenitic chrome-nickel steel 1.4301 is the standard for austenitic chrome-nickel steels. Because 1.4301 is not resistant to intergranular corrosion when welded, if large parts have to be welded and subsequent solution annealing is not possible, 1.4307 should be used. AWH offers this material as standard. 1.4301, however, is being replaced by 1.4307.
1.4404 X2CrNiMo17-12-2 AISI 316L	Stainless austenitic chrome-nickel-molybdenum steel with low carbon content Due to advances in the production of stainless steels, especially the reduction of the carbon content to very low values, 1.4404 has replaced almost all titanium-stabilized grades of type 1.4571. The resistance to intergranular corrosion is equivalent to that of titanium-stabilized grades, and due to the absence of titanium, the material is not affected by so-called knife-line corrosion after welding. Unlike titanium-stabilized grades, 1.4404 has a better surface finish and can be polished both mechanically and electrolytically. Due to the absence of titanium and the resulting depositions, 1.4404 is much more machinable, which also translates into higher tool speeds and longer tool lives. AWH offers this material as standard.
1.4435 X2CrNiMo18-14-3 AISI 316L	Stainless austenitic chrome-nickel-molybdenum steel low carbon content 1.4435 is a higher alloy variant of 1.4404 and is considered a medical grade of stainless steel, firstly because of its resistance to all forms of corrosion and secondly because of the excellent surface finish that can be achieved. Our scope of supply in 1.4435 consists of cleaning nozzles, fittings, valves.
1.4571 X6CrNiMoTi17-12-2 AISI 316Ti	Stainless austenitic chrome-nickel-molybdenum steel with titanium stabilization Due to advances in the production of stainless steels, low carbon variants (1.4404) have replaced titanium-stabilized grades. In addition to minimized sensitivity during welding or high-temperature processes, the low-carbon ($\leq 0.03\%$) grades have also overcome surface problems typical of titanium-stabilized grades. Nevertheless, these "traditional" stainless steel grades continue to be used. It should also be mentioned that the corrosion resistance is neither better nor worse than that of 1.4404. The use of 1.4571 over 1.4404 is only justified when strength at high temperatures is required. AWH offers the material as an option. Please ask for availabilities.
1.4539 X1 NiCrMoCuN 25-20-5	An austenitic, stainless steel Due to the high alloying contents of nickel and chromium in combination with the additional alloying elements molybdenum and copper, this material has good general corrosion resistance. This applies in particular to reducing acids of medium aggressiveness, such as sulfuric or phosphoric acid, as well as chloride-containing media. AWH offers the material as an option. Please ask for availabilities.
1.4462 X2CrNiMoN22-5-3 AISI 316 LN	Special austenitic stainless steel (duplex) The special austenitic stainless steel 1.4462 has good resistance to pitting. Depending on requirements, it is used in chemical apparatus engineering, the pulp and food industry, and for seawater piping systems. AWH offers the material as an option. Please ask for availabilities.
1.4529 X1NiCrMoCuN25-20-7 AISI 926	Super-austenitic corrosion-resistant stainless steel Due to its high number of alloying elements, the material 1.4529 or AISI 926 has excellent resistance to numerous organic and inorganic acids. Due to its high molybdenum content, this grade also provides good resistance to stress corrosion cracking and pitting.

Materials

Material Overview for Stainless Steels

Material	Properties
2.4610 NiMo16Cr16Ti Hastelloy® C-4 alloy	Nickel alloy for particularly critical processes in chemistry Highly corrosion-resistant nickel-chromium-molybdenum alloy with special structural stability at elevated temperatures. 2.4610 has excellent resistance to crevice corrosion, pitting and stress corrosion as well as to reducing mineral acids and chlorides, inorganic and organic chloride contaminated media. Our scope of delivery in 2.4610 consists of cleaning nozzles.
2.4602 NiCr21Mo14W Hastelloy® C-22 alloy	Nickel alloy Highly corrosion-resistant nickel-chromium-molybdenum-tungsten alloy with special resistance to aggressive, oxidizing and reducing media – even at elevated temperatures. Our scope of delivery in 2.4602 consists of cleaning nozzles.

Classification According to Alloy Components

Material no.	ASME	Type of steel	C	Si	Mn	Cr	Mo	Ni	Miscellaneous
Standard									
1.4307	304L	X2CrNi18-9	< 0.030	1.00	2.00	17.5-19.5	0	8.0-10.0	N < 0.11
1.4301	304	X5CrNi18-10	< 0.070	1.00	2.00	17.0-19.5	0	8.0-10.5	N < 0.11
1.4404	316L	X2CrNiMo17-12-2	< 0.030	1.00	2.00	16.5-18.5	2.00-2.50	10.0-13.0	N < 0.11
1.4435	316L	X2CrNiMo18-14-3	< 0.030	1.00	2.00	17.0-19.0	2.50-3.00	12.5-15.0	N < 0.11
Optional									
1.4571	316Ti	X6CrNiMoTi17-12-2	< 0.080	1.00	2.00	16.5-18.5	2.00-2.50	10.5-13.5	Ti 5xC < 0.70
1.4539		X1 NiCrMoCuN 25-20-5	< 0.02	< 0.7	< 2.0	19.0-21.0	4-5	24.0-26.0	Cu 1.2-2 P < 0.03
1.4462	318 LN	X2CrNiMoN22-5-3	< 0.030	1.00	2.00	21.0-23.0	2.50-3.50	4.5-6.5	N 0.10-0.22
1.4529		X1NiCrMoCuN25-20-7	< 0.02	< 0.5	< 1.0	19.0-21.0	6.0-7.0	24.0-26.0	Cu 0.5-1.5 N 0.15-0.25
2.4610		NiMo16Cr16Ti	< 0.015	≤ 0.08	≤ 1.00	14.0-18.0	14.0-17.0	Residue	Ti 0.75-1.3
2.4602		NiCr21Mo14W	≤ 0.01	≤ 0.08	≤ 0.5	20.0-22.5	12.50-14.5	Min. 58	W 2.5-3.5

Sealing materials

Properties*

Name	NBR	Silicon (VMQ)	FKM	FFKM (perfluoroelastomer)
Material description		High polymer Organosiloxane	Polymer made of vinylidene fluoride	Perfluorinated (i.e. completely hydrogen-free) monomers with additive compounds
Operating temperature	Continuous use from -25 °C to +110 °C	-40 °C to +200 °C, resistant in water up to 100 °C	Continuous use from -20 °C to + 200 °C	-20 °C to 325 °C
	Steam sterilisable quickly up to 130 °C	Steam sterilisable quickly up to 120 °C - 130 °C	Steam sterilizable quickly up to 130 °C - 140 °C	Steam sterilizable without restrictions
Typical field of use	Good swelling resistance with:	high thermal load capability	good swelling resistance with:	Hot water, steam and solvents
	Aliphatic hydrocarbons (such as propane, butane, benzene, mineral oils)	Good resistance to cold, well suited for food, dielectric properties	· Mineral oils, · Plant-based and animal oils	The elastomers most resistant to aggressive media (acids, alkalis, chemicals)
	Grease based on mineral oil	Extremely good resistance to oxygen and ozone	Greases (including certain additives)	
		Good resistance to alcohols	Aliphatic and aromatic hydrocarbons	
		Physiologically and dermatologically safe	Fuels	
Limitations of use	significant swelling with: polar solvents	High swelling with: low molecular weight esters and ethers	significant swelling with: polar solvents, such as acetone, methylketone, ethyl acetate, diethylether	Conditionally resistant to refrigerant (Freon)
	Chlorinated hydrocarbons	Aliphatic and hydrocarbons aromatic hydrocarbons	Low molecular organ. acids (formic acids and acetic acids)	
	Ketones	Conc. acids and alkalis	Ammonia gases, amines	
	Aromatic compounds (benzene)		Alkanes	
	Esters		Dioxanes	
			Overheated water vapor	

* The specified properties apply exclusively to the sealing materials; the properties of the seals manufactured from them may vary due to the design and process conditions in use.

Sealing materials

Properties*

Name	EPDM (ethylene-propylene- diene rubber)	PTFE (polytetrafluoroethylene)	HNBR (hydrogenated acrylonitrile- butadiene rubber)
Material description	Polymer made from ethylene propylene and low proportion of diene		Polymer made of butadiene and acrylonitrile
Operating temperature	Continuous use from -40 °C to +140 °C Steam sterilisable up to 130 °C	Up to 200 °C physiologically harmless, use: -200 °C to +260 °C Under mechanical load up to 140 °C	Continuous use from -20 °C to +140 °C, +150 °C short-term Steam sterilisable quickly up to 130 °C
Typical field of use	Good swelling resistance with: Diluted inorganic and organic acids, bases, polar organ. media, oxidizing media, alkaline solutions and ketones In hot water and steam up to 130 °C Good resistance to ozone, aging and weather	Good swelling resistance in almost all areas Surface smooth and repellent, thus no adhesion of residues Chemical resistance better than all other elastomers Hardly combustible	Good swelling resistance with: Aliphatic hydrocarbons (such as propane, butane, benzene, mineral oils) Grease based on mineral oil Many diluted acids and alkalis - Dairy products Hot wort - Essential oils/ citrus juices - Waxes
Limitations of use	Not to be used with:- plant-based and animal oils Aliphatic, aromatic and chlorinated hydrocarbons Mineral oils Milk and dairy products with a max. fat content of 15%	Not resistant to: liquid alkali metals and some fluorine compounds in combination with high pressure and temperature No rubber elastic material	Not resistant to: polar solvents Chlorinated hydrocarbons Ketones Aromatic compounds (benzene) Esters In continuous use with water vapor

* The specified properties apply exclusively to the sealing materials; the properties of the seals manufactured from them may vary due to the design and process conditions in use.

Sealing materials

Overview of Certifications

Short name	FDA 21 CFR 177.2600	1935/2004/EC	2023/2006/EC	10/2011/EC	REACH 1907/2006/EC	ROHS 2011/65/EU	VHU 2000/53	BfR	BSE/TSE free (ADI free)	LABS-free	UBA	GB 4806.11	GB 9685-2016	3A	USP Class VI (chapter 88)	CLP	SVHC	Phthalat frei/Pftalate free/sans phtalate	BNIC Cognac	Bisphenol free (1895/2005 EC)	WRC/WARS	DVGW/W270	Ar´rete du 9. Nov 1994	MOCA (21/03/1973
Center seals for butterfly valves																								
VMQ	X	X	X		X	X		X	X			X	X	X	X			X		X				
EPDM	X	X	X		X	X		X	X		X	X	X	X	X			X		X				
FKM	X	X	X		X	X			X			X	X	X	X			X	X	X			X	
HNBR	X	X	X		X	X		X	X			X	X	X	X			X		X				
O-rings according to DIN 11853 / DIN 11864																								
VMQ	X	X													X					X				
EPDM	X	X							X						X	X				X				
EPDM	X	X							X						X	X				X				
FKM	X	X	X		X	X		X	X						X	X				X				
Seals for connections according to DIN 11851 / DIN 32676																								
VMQ	X	X	X		X	X	X		X			X	X	X	X		X	X		X				X
FKM	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X		X				
NBR	X	X	X		X	X	X		X					X	X		X	X	X	X				
PTFE	X	X	X		X	X	X		X			X		X			X	X		X				
EPDM	X	X	X		X	X	X		X					X	X		X	X			X	X		
Seals for connections according to DIN 11851																								
HNBR	X	X	X	X	X	X												X		X				

FDA 21 CFR 177.2600
 1935/2004/EC
 2023/2006EG
 10/2011/EC
 REACH 1907/2006/EC
 ROHS 2011/65/EU
 GB 4806.11
 AR 9685-2016
 1895/2005/EC

"Food and Drug" – Guidelines (FDA) 21 CRF Part 177.2600/177.1550 "Rubber articles intended for repeated use"
 Regulation (EC) No. 1935/2004 on materials and articles intended to come into contact with foodstuffs
 Regulation (EC) No. 2023/2006 on good manufacturing practice for materials and articles intended to come into contact with food.
 Regulation (EU) No. 10/2011 on plastic materials and articles intended to come into contact with food.
 Regulation (EC) No. 1907/2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
 Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment
 National Food Safety Standard-General Safety Requirements on Food Contact Materials and Articles - Chinese Standard
 National Food Safety Standard for Uses of Additives in Food Contact Materials and Their Products - Chinese Standard
 COMMISSION REGULATION (EC) No 1895/2005 on the restriction of the use of certain epoxy derivatives in materials and articles intended to come into contact with food.
 BfR
 Federal Institute for Risk Assessment

Pressure Calculation for Pipe acc. to DIN 10357

Pipe	max. p at 20 °C	max. p at 150 °C
[mm]	[bar]	[bar]
Series A		
13 x 1.5	332	250
19 x 1.5	219	165
23 x 1.5	179	135
29 x 1.5	140	105
35 x 1.5	115	87
41 x 1.5	98	74
53 x 1.5	75	56
70 x 2.0	76	57
85 x 2.0	62	47
104 x 2.0	50	38
129 x 2.0	41	31
154 x 2.0	34	26
204 x 2.0	26	19
254 x 2.0	20	15
Series C		
12.7 x 1.65	378	285
19.05 x 1.65	241	182
25.4 x 1.65	177	134
38.1 x 1.65	116	87
50.8 x 1.65	86	65
63.5 x 1.65	68	52
76.2 x 1.65	57	43
101.6 x 2.11	55	41
152.4 x 2.77	48	36
Series D		
25 x 1.2	129	98
32.0 x 1.2	100	75
38.0 x 1.2	84	63
51.0 x 1.2	62	47
63.5 x 1.2	50	37
76.1 x 1.6	55	42
101.6 x 2.0	52	39

I. Validity/Quotations

1. All deliveries, services and quotations are made solely on the basis of these General Sales, Delivery and Payment Terms (hereinafter: "General Delivery Terms"). They are an integral part of all contracts that we conclude with our contractual partners (hereinafter also referred to as: "Buyer") regarding the deliveries and services offered to you. They also apply for all future deliveries, services or quotations to the Buyer, even if they are not agreed again separately.
2. Terms and conditions of the Buyer or third parties are not applicable, even if we do not deny their validity separately in individual cases. Even if we refer to an item of correspondence which contains or refers to the Buyer's terms and conditions, this is not tantamount to acceptance of the validity of those terms and conditions.
3. Our offers are subject to confirmation and non-binding unless they are expressly stated as binding or contain a specific acceptance period. Agreements, in particular secondary oral agreements, commitments, guarantees and other assurances by our sales staff, are non-binding until we confirm them in writing.
4. The documents which form part of the quotation, such as drawings, pictures, technical specifications, references to standards and specifications in advertising are not binding descriptions, confirmations of properties or guarantees, unless expressly designated as such in writing.
5. Deviations of the delivered item from quotations, samples, test and advance deliveries are permitted within the scope of the respective DIN - EN standards for iron and steel and other technical standards.
6. We shall test samples and test material provided by the Buyer for contract awards thoroughly. However, no guarantees can be provided for correct identification of the sample in any respect, in particular physically. Deviations in terms of quality, properties and dimensions cannot be ruled out. Therefore, the Buyer must test the items thoroughly for suitability for the intended purpose before using them.
7. The contract is concluded via the online shopping cart system as follows: The goods intended for purchase are placed in the "shopping cart". Using the corresponding button in the navigation bar, you can call up the "shopping cart" and make changes there at any time. After calling up the "Shopping cart" page and entering the personal data as well as the payment and shipping conditions, all order data is finally displayed again on the order overview page. Before sending the order, you have the opportunity to check all the information again, change it (also using the "back" function of the Internet browser) or cancel the purchase. By sending the order via the button "Order subject to payment" you confirm a legally binding order.
 - 7.1 The processing of the order and transmission of all information required in connection with the conclusion of the contract is carried out by e-mail, partly automatically. You must therefore ensure that the e-mail address you have provided to us is correct, that receipt of the e-mails is technically guaranteed and, in particular, that it is not prevented by SPAM filters.

II. Prices

1. Unless otherwise agreed, our prices are ex works from our plant/warehouse in Hötensleben, Germany (EXW/Hötensleben), excluding transport and packaging, and excluding the respective legal VAT.
2. If the material is delivered in packaging, we shall invoice the packaging at our cost price. In accordance with the legal regulations, we accept returned packaging we originally provided, if the Buyer returns it within an acceptable period (up to max. 14 days) carriage paid. AWH does not pay for returned packaging.
3. If charges or other external costs included in the agreed price change later than four weeks after conclusion of the contract, or if they are newly incurred, we shall be entitled to change the price to the corresponding extent.
4. We reserve the right to increase the agreed price for quantities not yet delivered if, due to a change in the raw material and/or economic situation, circumstances arise which make the manufacture and/or purchase of the product concerned significantly more expensive than at the time of the price agreements. In this case, the customer may, within four weeks of notification of the price increase, cancel the orders affected by it.
5. The statutory value added tax is not included in our prices; it will be shown separately in the invoice at the statutory rate on the day of invoicing.
6. The deduction of a discount requires a special agreement in text form.

III. Payment and Invoicing

1. Unless otherwise agreed or stated in our invoices, the purchase price shall be due immediately after delivery without any discount and shall be paid in such a way that we can dispose of the amount on the due date. Costs of payment transactions shall be borne by the buyer. The Buyer shall only be entitled to a right of retention and a right of offset to the extent that its counterclaims are undisputed or have been finally determined by a court of law.
2. Counterclaims disputed by us or which have not been established by a court of law, do not entitle the Buyer to retain or offset payment, unless the counterclaims are due to faults from the same contractual relationship as the main claim against which the amount is to be offset.
3. If the payment deadline is exceeded, or when the Buyer falls into arrears at the latest, we are entitled - without prejudice to any other rights, to charge interest at the same rate as bank debt interest including all supplementary costs for an equivalent current account debt, or the legal interest rate of 8% annual interest above the respective base interest rate of the German Federal Bank (Bundesbank) at our discretion. We reserve the right to assert claims for damages due to the delay above and beyond this. The Buyer shall be in default at the latest 10 days after the due date and receipt of the invoice/payment schedule or receipt of the performance.
4. If the Buyer falls into arrears, we are entitled to demand payment of all non-expired claims from the current business relationship with the Buyer, and to revoke the direct debit mandate per No. V.7. Furthermore, we are entitled to demand that the items be returned after an appropriate period of grace. We can also prohibit onward sale and further processing of the items delivered. Taking back the items is not tantamount to a withdrawal from the contract. The Buyer can avoid all these legal consequences by making a payment or providing collateral equivalent to our payment claim at risk. The regulations of the Insolvency Statute are unaffected by the above provisions.

5. Agreed discounts always refer to the invoice value excluding shipping and shall only be granted if all accounts payable owed by the Buyer have been paid at the time of the discount.

IV. Delivery time frames

1. Delivery time frames and deadlines shall be considered met if the delivery or partial delivery is shipped or collected within the agreed delivery time. Our delivery obligation is subject to correct and timely self-delivery, unless the incorrect or delayed self-delivery is our fault.
2. Information on delivery times are approximate. Delivery periods shall commence on the date of our order confirmation and shall only apply on condition that all details of the order are clarified in good time and that all obligations on the part of the Buyer are fulfilled in good time, such as the provision of all official certificates, the provision of letters of credit and guarantees or the making of down payments.
3. We accept no liability for impossibility of delivery or delivery delays where they are due to force majeure or other unforeseeable events (e.g. disruptions of operation of any kind, problems in procurement of material or energy, transport delays, strikes, legitimate lock-outs, shortage of labor, energy or raw materials, problems in obtaining the official approvals required, official measures, or non-delivery, incorrect delivery or delayed delivery by suppliers) for which we are not responsible. Should such events make delivery or service significantly more difficult or impossible, and the impediment is not merely temporary, we are entitled to withdraw from the contract. In the event of temporary impediments, the delivery or service periods are extended or postponed by the duration of the impediment plus an appropriate lead period. Where it is unreasonable to expect the Buyer to accept the delivery or service due to the delay, it can withdraw from the contract by sending us a written statement to that effect without delay.
4. For import or export business, we are not liable for the responsible authorities and institutions issuing any required import or export licenses. The Buyer is obliged to issue and procure for us all documents and information required to obtain the necessary import and export licenses. Moreover, it is also obliged to procure all approvals and certificates to meet its obligations to us. If the Buyer fails to do so, we reserve the right to withdraw from the contract with an appropriate period of grace, or to claim damages for non-fulfillment.
5. Should we be delayed in providing our service, the Buyer can withdraw from the contract after the expiry of an appropriate period of grace granted to us if the items have not been shipped by the expiry of the period. Claims for damages from the delay and failure to fulfill the contract shall be based on No. VIII. of these General Terms of Delivery.

V. Retention of title

1. All deliveries are made subject to retention of title per Art. 449 of the German Civil Code (BGB) with the following supplements:
2. All items delivered remain our property (subject to reservation of title) until all claims against the Buyer arising from the business relationship, regardless of the legal reason, including future or conditional claims, have been fulfilled.
3. The Buyer is obliged to insure the items subject to retention of title against all insurable damage (in particular against fire, water, storms, theft, vandalism, liability insurance etc.). It assigns its claims from the insurance contracts to us in advance. We hereby accept this assignment.
4. The items subject to retention of title are processed and finished for us as the manufacturer per Art. 950 of the German Civil Code (BGB). The processed items are deemed items subject to retention of title per No. V.2. In the event of processing, connection or combination of the items subject to retention of title with other items by the Buyer, we are entitled to co-ownership of the new item in the ratio of the invoice value of the items subject to retention of title to the invoice value of the other items used. If our ownership expires due to connection or combination, the Buyer hereby already assigns its rights to the new stock or item to the extent of the invoice value of the items subject to retention of title and stores it for us free of charge. The resulting co-ownership rights are deemed items subject to retention of title per No. V.2.
5. The Buyer may only sell the items subject to retention of title in standard business operations at its normal business conditions as long as it are not in arrears, provided the claims from onward sale are transferred to us per Nos. V.6 to V.8 below. The Buyer is not entitled to dispose of the items subject to retention of title in other ways, including pledging and transferring them as collateral.
6. The Buyer's claims from onward sale of the items subject to retention of title are hereby already assigned to us. We hereby accept the assignment. The assigned claims serve as collateral to the same extent as the items subject to retention of title. If the items subject to retention of title are sold together with other items we do not sell, the assignment of the claim from the onward sale only applies to the amount of the onward sale amount of the items subject to retention of title sold. If the items which we co-own per No. V.4 are sold, the claim is deemed to be assigned to the amount of these co-ownership shares.
7. The Buyer is entitled to collect claims from the onward sale until this entitlement is revoked by us, which we are permitted to do at any time. We shall only avail of our right of revocation in the cases mentioned in No. III.4. Upon request by us, the Buyer is obliged to inform its buyers and customers of the assignment to us immediately, and to provide us with the information required for collection and the corresponding documents. We are entitled to notify the debtors of the assignment on the behalf of the Buyer.
8. Should third parties impair the items subject to the retention of title or if third parties access them, in particular by pledging, the Buyer shall inform them of our ownership immediately, and also inform us of this immediately in writing to permit us to assert our ownership rights. If this occurs, the Buyer must provide us with any documents required to assert our ownership claims immediately. If the third party is not in a position to pay us for the legal costs or costs of an out-of-court procedure, the Buyer shall be liable for such costs.

9. If the value of the existing collateral exceeds the secured claims by more than 50% in total, we are obliged to release the collateral at our discretion on request by the Buyer. On full payment of all claims by the Buyer arising from our business relationship with them, the title to the items subject to the retention of title and all claims assigned are transferred to the Buyer.

VI. Implementation of Deliveries

1. When the items are handed over to a shipping company, freight forwarder or other third parties selected for implementing the shipment, however, when they leave our plant/warehouse at the latest - or the delivery plant for transfer orders, the risk passes to the Buyer for all transactions, even for carriage-paid and free delivery. The Buyer is responsible for and shall bear the costs of unloading. We shall only insure the items upon instruction by and at the expense of the Buyer. We do not guarantee that we use the least expensive shipping method. We determine the shipping route and method as well as the carrier and freight forwarder. If, through no fault of our own, transport by the intended route or to the intended place in the intended time becomes impossible or substantially more difficult, we shall be entitled to deliver by another route or to another place; the additional costs incurred shall be borne by the Buyer. The purchaser shall be given the opportunity to comment beforehand.
2. We are entitled to make partial deliveries if the partial delivery is usable for the Buyer as part of the contractual purpose, the delivery of the remainder of the items ordered is ensured and no significant additional workload or additional costs result to the Buyer as a result (unless we agree to bear these costs). For items manufactured to specification, delivery quantities up to 10% above or below the agreed quantity are permitted.
3. For make-and-hold orders, we are entitled to produce the entire order at once or have the entire order produced at once. No requested changes can be taken into consideration after issuing the order, unless this was expressly agreed. Unless fixed agreements were made, call dates and quantities can only be met within the scope of our delivery and manufacturing capacities. If the items are not called in accordance with the contract, we are entitled to invoice them as delivered after the expiry of an appropriate period of grace. In the case of contracts with continuous delivery, call-offs and grade classification for approximately equal monthly quantities shall be given to us; otherwise we shall be entitled to make the determinations ourselves at our reasonable discretion. If the individual call-offs exceed the contractual quantity in total, we shall be entitled, but not obliged, to deliver the excess quantity. We may charge for the additional quantity at the prices valid at the time of the call-off or delivery.
4. If we expressly consent to returns of items delivered properly, we are entitled - without specifying it separately - to issue a credit note deducting up to 20% of the total, unless the Buyer proves that the workload and lost profit are far lower than the lump sum fee. We currently charge 25 EUR (Euro) as the minimum amount for administration costs. We reserve the right to make further deductions due to decreases in value. Any return deliveries must be made free of charge to us. Items cut to size and custom products, as well as items with expiry dates cannot be returned.
5. Applying Art. 10 Par. 2 Clause 3 of the German Law on the Sale, Return and Environmentally Sound Disposal of Electrical and Electronic Equipment (ElektroG), it is deemed agreed that the Buyer assumes any duties which could be mandatory for us from Art. 10 Par. 2 of ElektroG, and is responsible for returns and disposal of devices named in Art. 3 of the ElektroG which we delivered to them from users other than private households.
6. We are entitled to obtain the receipt of goods from the recipient in electronic form.

VII. Liability for Faults

1. The Buyer is obliged to inspect the items on receipt and before use to ensure that they are free of faults and are suitable for the intended use in every way. Due to the varying requirements and individual conditions for use of the products, we cannot accept liability for the suitability of the items for the purpose intended by the Buyer, unless we expressly guaranteed the suitability. Standard and technically inevitable deviations from chemical and physical parameters are expressly reserved. Complaints for obvious or apparent faults, in particular due to weight, quantity, dimensions, shapes and external condition of the items must be made in writing immediately after receipt of the items, within 10 days at the latest; otherwise they shall be deemed accepted. With regard to other faults, the delivered items shall be deemed accepted by the Buyer if we do not receive the complaint within 10 days of the occurrence of the fault; if the fault was already apparent to the Buyer earlier under normal use, this earlier time shall determine the start of the complaint period. Faults which are due to improper handling or storage by the Buyer cannot be taken into consideration. After processing and sale, claims for faults shall not be accepted.
2. In the event of justified, immediate complaints, we are free to choose whether to rectify the fault or deliver a fault-free item (supplementary performance). The Buyer must give us the time and opportunity required to rectify the fault at our discretion. In the event of failure or refusal of supplementary performance, the Buyer can reduce the purchase price or withdraw from the contract after a suitable period of grace granted has expired. If the fault is not significant, the Buyer is only entitled to reduce the price. Claims for damages or compensation for expenses are ruled out unless we acted with intent or in gross negligence.
3. If the Buyer does not give us an opportunity to ascertain the presence of a fault ourselves, and in particular does not provide us with the items subject to complaint or samples thereof, it cannot recourse to faults in the items.
4. We shall only bear expenses in relation to supplementary performance if we are responsible for them in individual cases at our fault or on the basis of the guarantee. In particular, such expenses must be reasonable in comparison to the purchase price of the items. We shall not accept expenses arising from the fact that the items sold were transported to a place other than the headquarters or a subsidiary of the Buyer.
5. Further claims are excluded in accordance with No. VIII. That applies in particular to compensation for damage which did occur to the item itself (consequential damage). Our liability for absence of guaranteed properties is also based on No. VIII.

6. Technical specifications for the items are provided within standard tolerances (DIN/EN or other relevant technical standards for iron and steel). We do not guarantee special functions of any systems in which items we deliver are installed, unless we provided expressly consultation and also confirmed in writing that the consultation is binding. In all cases, the Buyer is not exempt from its obligation to verify the suitability for the intended function themselves. We cannot accept liability for properties and technical specifications of our items if the properties of the items delivered by us are not taken into consideration sufficiently when designing or producing systems in which items delivered by us are installed, and as a result deviations occur. No time guarantees are accepted for the durability of materials, in particular of wearing parts.

VIII. General Limitation of Liability

1. We - including our management and other vicarious agents - shall only accept liability for the violation of contractual and non-contractual obligations, in particular due to impossibility, delays, tort on initiating a contract and impermissible acts in cases of intent and gross negligence, limited to the typical damages foreseeable on conclusion of the contract.
2. These limitations do not apply for culpable violations of major contractual obligations, where they endanger the achievement of the contractual purpose, in cases of mandatory liability under the German Product Liability Act, injury to life, limb or health, and not even if we maliciously failed to mention them or guaranteed their absence. The rules on the burden of proof are unaffected by this.
3. Unless otherwise agreed, contractual claims accruing to the Buyer against us due to or in relation to the delivery of items shall expire one year after delivery of the items. This period also applies for items which were used for a structure in accordance with their usual use, and caused the structure to be faulty, unless this use was agreed in writing. Irrespective of this, our liability for intentional or grossly negligent violations of our duties and the expiry of legal recourse claims are unaffected. In the event of subsequent performance, the expiry period does not start again.
4. Claims for recourse by the Buyer as defined in Art. 478 of the German Civil Code (BGB) are excluded if the Buyer does not fulfil its obligation to complain immediately per Art. 377 of the German Commercial Code (HGB), or does not do so in time. The Seller shall compensate the necessary and proven costs of the supplementary performance accruing to the Buyer due to claims by its customers.
5. Except in cases of intent, our liability does not include damage which is not typically to be expected in the specific transaction, or which is not typical for the contract. That also applies for such damage for which the Buyer is insured or can usually be insured.

IX. Copyright

1. We reserve the copyright to cost estimates, drafts, drawings and other documents; they may only be made available to third parties with our consent. Drawings and documents pertaining to offers must be returned to us on request.
2. If we deliver items based on drawings, models, samples or other documents provided by the Buyer, the Buyer assumes liability for ensuring that property rights of third parties are not violated by doing so. If third parties prohibit our manufacturing and delivery of such items based on property rights, we are entitled to cease all activities - without any obligation to examine the material and legal situation - and demand damages if the Buyer is liable. The Buyer also undertakes to release us immediately from all claims by third parties in relation to this.

X. Experimental Parts, Molds, Tools

1. If the Buyer must provide parts for the implementation of the order, fault-free items must be delivered free of charge and carriage-paid to the production facility in the agreed quantity or an appropriate surplus quantity for any rejects. If this does not occur, resulting costs and other consequences shall be borne by the Buyer.
2. Production of experimental parts, including the costs for moulds and tools shall be borne by the Buyer.

XI. Venue, Jurisdiction and Applicable Law

1. The venue for the delivery and payment is Hötensleben, Germany. The jurisdiction for legal entities is Braunschweig, Germany. We may at our discretion file legal action against the Buyer in its jurisdiction as well.
2. The law of the Federal Republic of Germany applies in addition to these conditions for all legal relationships between the Buyer and us. The United Nations Convention on Contracts for the International Sale of Goods from 11/04/1980 is not applicable.

XII. Data protection

The supplier processes and uses personal data exclusively for the purposes of the contract and for advertising purposes, insofar as this is legally permissible without separate consent. The client may object to future use and disclosure of data for advertising purposes at any time. Upon completion of the contract, the client's personal data will be blocked from further use and deleted at the end of the statutory retention period, unless there is separate consent from the client for further use. In all other respects, the client has the right of access, to rectification, blocking and erasure of their data stored with the supplier in accordance with the provisions of data protection law.

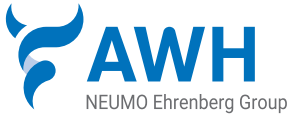
Conversion Tables

Pressure

bar	psi
1	14.5
2	29.0
3	43.5
4	58.0
5	72.5
6	87.0
7	101.5
8	116.0
9	130.5
10	145.0
11	159.5
12	174.0
13	188.5
14	203.1
15	217.6
16	232.1
17	246.6
18	261.1
19	275.6
20	290.1
21	304.6
22	319.1
23	333.6
24	348.1
25	362.6
26	377.1
27	391.6
28	406.1
29	420.6
30	435.1
31	449.6
32	464.1
33	478.6
34	493.1
35	507.6
36	522.1
37	536.6
38	551.1
39	565.6
40	580.2
41	594.7
42	609.2
43	623.7
44	638.2
45	652.7
46	667.2
47	681.7
48	696.2
49	710.7
50	725.2
51	739.7
52	754.2

Volume Flow Rate

m ³ /h	gal/min (gpm, US)	l/min
1	4.4	16.7
2	8.8	33.3
3	13.2	50.0
4	17.6	66.7
5	22.0	83.3
6	26.4	100.0
7	30.8	116.7
8	35.2	133.3
9	39.6	150.0
10	44.0	166.7
11	48.4	183.3
12	52.8	200.0
13	57.2	216.7
14	61.6	233.3
15	66.1	250.0
16	70.5	266.7
17	74.9	283.3
18	79.3	300.0
19	83.7	316.7
20	88.1	333.3
21	92.5	350.0
22	96.9	366.7
23	101.3	383.3
24	105.7	400.0
25	110.1	416.7
26	114.5	433.3
27	118.9	450.0
28	123.3	466.7
29	127.7	483.3
30	132.1	500.0
31	136.5	516.7
32	140.9	533.3
33	145.3	550.0
34	149.7	566.7
35	154.1	583.3
36	158.5	600.0
37	162.9	616.7
38	167.3	633.3
39	171.7	650.0
40	176.1	666.7
41	180.5	683.3
42	184.9	700.0
43	189.3	716.7
44	193.7	733.3
45	198.2	750.0
46	202.6	766.7
47	207.0	783.3
48	211.4	800.0
49	215.8	816.7
50	220.2	833.3
51	224.6	850.0
52	229.0	866.7



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