

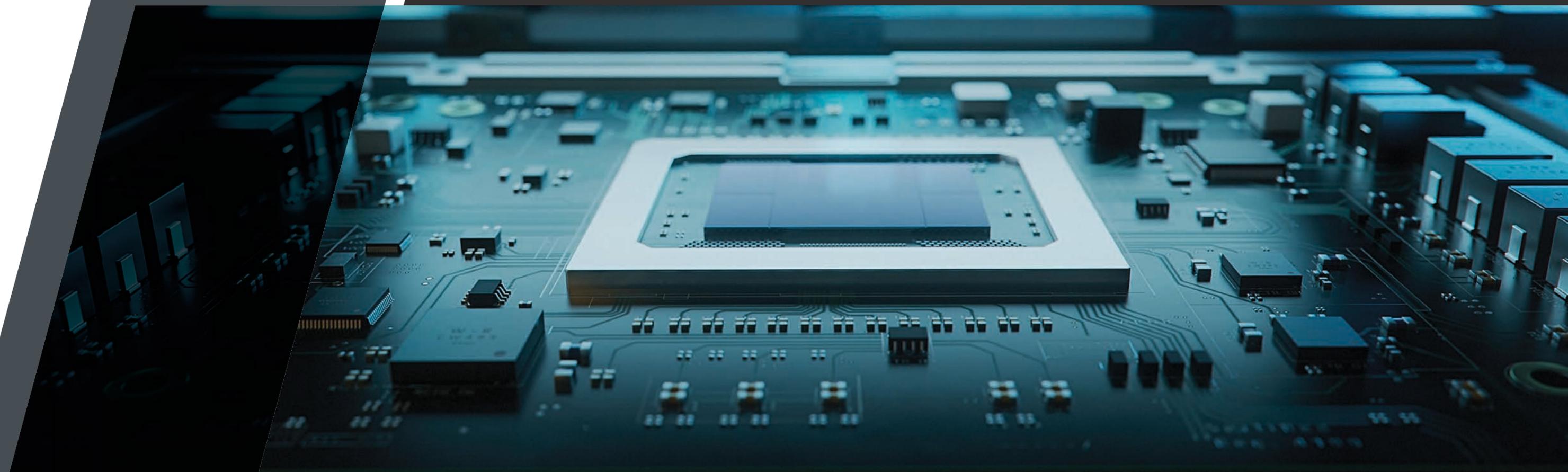
PRESSURE MEASUREMENT INSTRUMENTS FOR THE SEMICONDUCTOR INDUSTRY



/ EXPERTISE

Where the smallest movements are precisely indentified and minimal tolerance transgressions are reliably detected and monitored, at the limit of what is physically possible, is where it counts:
In production facilities within the semiconductor industry, precision and reliability are absolute prerequisites.

In the field of tension between quality and economy, the choice of a reliable partner with in-depth knowledge and experience is therefore of paramount importance:



As a producer of our own semiconductors, more than 30 years of expertise and experience in this field flow into the development and manufacture of our pressure measurement technology.
The result? Excellent products and solutions for the semiconductor industry.

MEASURE US BY THIS!

/ THIS IS ASHCROFT

DEVELOPMENT FROM TRADITION

When Edward Ashcroft founded our company in 1852, his mission was to protect the steam-powered industry and its workers by using more sophisticated and reliable instruments. Times have changed, but not our attitude. With a history of more than 170 years, of which more than 40 years with our own production in Europe, we have experienced and learned a lot. Together with our customers, we have mastered three industrial revolutions, survived global and regional conflicts and crisis's. We look forward to accompanying our customers with our products in the fourth industrial revolution as well.

GLOBAL - REGIONAL - LOCAL

Globally positioned - regionally represented and locally available for you. With local contacts who speak your language and are ready to solve your challenges.

OUR GREATEST STRENGTH

All of Ashcroft's products and services are the result of our exceptional people. We are all passionate about our common goal, the best customer satisfaction. Ashcroft is inspired of a common commitment to our work and to each other. Combining the talents of our diverse workforce makes us more competitive, resilient and better able to respond to the ever-changing needs of our customers and markets.

OUR MOTIVATION

As a customer and partner, you are the focus of our attention. We are passionate about designing and producing the most innovative, high quality pressure and temperature measuring instruments on our planet.

OUR VALUES

Our five corporate values are not abstract, but are lived by us, and every Ashcroft employee bases his or her daily actions on them.

SEMICONDUCTOR INDUSTRY



THINK CUSTOMER FIRST

Every measure, every plan and every project is aimed first and foremost at you, our customer. We see the world through your eyes.

NEVER SETTLE / CHALLENGE THE STATUS QUO

What was true yesterday is not necessarily true today. At Ashcroft, we challenge each other to never be indifferent, to keep improving ourselves and the company.

RESPECT EACH OTHER

We celebrate our diversity, share our ideas and intensify our collective thinking. We act and discuss in mutual respect and thus find better solutions.

THINK BEYOND BORDERS

Across geographical borders. Beyond the factory. Beyond your own area of responsibility. Beyond the personal comfort zone.

WIN AS A TEAM

The common goal is more important to us than our own.

SEMICONDUCTOR INDUSTRY

EXPERIENCE

UNDERSTANDING

/ PRESSURE INSTRUMENTS FOR THE SEMICONDUCTOR INDUSTRY

KNOWLEDGE

INNOVATION

SEMICONDUCTOR INDUSTRY

/ ASHCROFT PRESSURE GAUGES AND TRANSMITTERS FOR THE SEMICONDUCTOR INDUSTRY

IN THE AREA OF TENSION BETWEEN QUALITY AND ECONOMIC EFFICIENCY, THE CHOICE OF A RELIABLE PARTNER WITH IN-DEPTH INDUSTRY-SPECIFIC KNOWLEDGE AND EXPERIENCE IS OF OUTSTANDING IMPORTANCE:

OUR EXPERTISE & EXPERIENCE

As a semiconductor producer and as a manufacturer of pressure measurement technology

As a producer of our own chips, we have a very deep technology & application knowledge in the semiconductor industry. Based on our 30 years of experience in this field, we have always incorporated the changing requirements into the development and production of our measurement and sensor technology and have responded with quality and innovation.

THE ESSENCE? OUR PRODUCTS.

Our products are the sum of our experience, the answer to critical requirements in the field of semiconductor production and the result of our systematic innovation-driven further development.



ASHCROFT
TRUSTED EXPERTISE

SEMICONDUCTOR INDUSTRY



/ CHALLENGES OF THE SEMICONDUCTOR INDUSTRY

/ OUR SOLUTIONS

/ Reliable and durable measuring instruments

Due to the choice of materials used and the CVD sensor employed, all our products are durable and absolutely reliable.

Chemical Vapour Deposition (CVD) - Sensor Technology

- / Continuously reliable pressure measurements with a compact, cost-effective transmitter specially designed for challenging applications
- / Maintenance-free, long-term stability $\leq 0.25\%$ per year
- / Service life at least 10 million load cycles
- / High overpressure safety
- / Precise measurement (ASHCROFT TRUACCURACY™ SPECIFICATION)

/ Avoidance of any contamination of the process media and products through production in the clean room, preparation of metallic materials (VIM/VAR) and exclusive use of suitable plastics

- / Manufacturing in our own clean room "CLASS 10" with 30 years of experience
- / Double packaging under nitrogen inert gas atmosphere
- / Replacement of the usual sensor material stainless steel 17-4PH by stainless steel 316L
- / 316L is accepted material for high purity gas applications
- / Special quality of the stainless steel used 316L
- / Particularly pure due to VIM/VAR processing, so that the risk of foreign atoms entering the high-purity gases is minimised.
- / Process connections with VCR mini-flange (with metallic seal, without additional sealing washers or O-rings) and with reduced internal volume for easy and quick cleaning

/ Use of suitable materials especially for corrosive and toxic process media

- / Use of corrosion-resistant plastics for ultra-pure water and chemicals
- / Pressure gauge with process connection and bellows spring made of PFA/PTFE
- / Inline pressure sensors with pipe sockets made of PFA/PTFE

/ SPECIAL CHALLENGES POSED BY HYDROGEN AS A PROCESS GAS

HYDROGEN EMBRITTLEMENT POSES A PARTICULAR CHALLENGE.

The penetration of hydrogen molecules into the material surface can cause cracks and catastrophic brittle fractures.

Loss of ductility and load-bearing capacity can be the result.



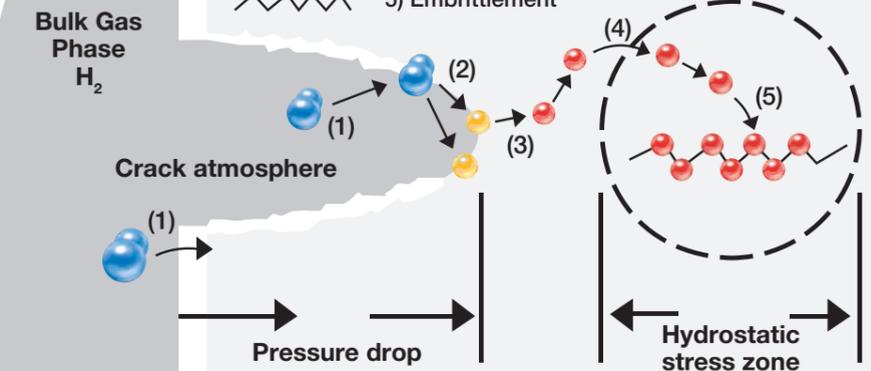
We have demonstrated the suitability and advantages of 316L over 17-4PH for applications in the semiconductor industry, especially for hydrogen.

For this reason, we replace the usual sensor material 17-4PH with stainless steel 316L. This not only guarantees the immediate reliability and durability of our products - even when used with hydrogen as a process gas - but also protects the environment and process reliability.



Absorption or Adsorption from H₂

- 1) Adsorption:
 $H_2(g) = H_2(ads)$
- 2) Dissociation Rxn: $H_2(ads) = 2H(ads)$
- 3) Adsorption:
 $H(ads) = H(abs)$
- 4) Solid state diffusion
- 5) Embrittlement



/ ASHCROFT CHEMICAL VAPOR DEPOSITION (CVD) SENSOR

THE GENIUS BEHIND IT ALL.

THE ULTIMATE PRESSURE TRANSMITTER SENSOR.

Permanently reliable pressure measurements with a compact, cost-effective transmitter specially designed for demanding applications.



/ TECHNICAL DATA

/ Temperature range -20 ... 70 °C for process and environment

/ Fast response time < 5 ms

/ Temperature effect $\leq 0.2\%/10\text{ K}$

/ Durability at least 10 million load cycles

/ Maintenance-free, long-term stability $\leq 0.25\%$ per year

/ High proof pressure

/ High burst pressure

/ Protection class IP65/67

/ MANY DETAILS. IN JUST ONE STATEMENT.

THE ASHCROFT TRUACCURACY™ SPECIFICATION



Ashcroft pressure transmitters incorporate the TruAccuracy™ specification. Ashcroft's accuracy specification is exclusively based on terminal point methodology instead of statistically derived schemes like 'best fit straight line'.

TruAccuracy™ means that Ashcroft pressure transmitters include zero offset, non-linearity, hysteresis, repeatability, zero offset and span adjustment error in their accuracy statement. The transducer is ready to be installed with no additional calibration adjustments required. This considerably reduces the time and costs involved. Other commercially available measuring devices usually do not include information on zero point deviation and span error in their accuracy specifications, so that these measurement errors (up to $\pm 1\%$) must be added to the accuracy in order to obtain reliable performance characteristics.

SEMICONDUCTOR INDUSTRY

SEMICONDUCTOR INDUSTRY

PRESSURE GAUGES

MODEL	HPX 28	HPX 50	HPX 63
			
DIAL SIZE	/ 28 mm	/ 50 mm	/ 63 mm
CLEANROOM CLASS	/ 100 / ISO Class 5	/ 10000 / ISO Class 7	/ 100 / ISO Class 5
CASE MATERIAL	/ Stainless steel 304	/ Stainless steel 304	/ Stainless steel 304
SENSING ELEMENT	/ Diaphragm	/ Bourdon tube	/ Bourdon tube
WETTED PARTS MATERIAL	/ Stainless steel 316L	/ Stainless steel 316L	/ Stainless steel 316L
PROCESS CONNECTION	/ 9/16-18 UNF (compatible with VCR®), swivel male or female	/ 9/16-18 UNF (compatible with VCR®), swivel male or female	/ 9/16-18 UNF (compatible with VCR®), swivel male or female, G 1/4 B, R 1/4, 1/4 NPT male
PROCESS CONNECTION MATERIAL	/ Stainless steel 316L	/ Stainless steel 316L	/ Stainless steel 316L
SURFACE FINISH	/ gland: Ra <0.25 µm / socket: Ra <0.38 µm / diaphragm: Ra <0.5 µm	/ fitting: Ra <1.6 µm / tube: Ra <1.6 µm	/ fitting: Ra <1.6 µm / tube: Ra <1.6 µm
PROCESS CONNECTION LOCATION	/ Center back	/ Lower, center back	/ Lower, lower back
WINDOW	/ Polycarbonate	/ Polycarbonate	/ Instrument glass
ACCURACY	/ 3% of span	/ 2.5-1.6-2.5% of span	/ 1.6 % of span
RANGES	/ -1/2 bar ... -1/10 bar	/ -1/1 bar ... 0/250 bar	/ -1/1 bar ... 0/250 bar
AMBIENT TEMPERATURE	/ -5 ... 45 °C	/ -5 ... 45 °C	/ -5 ... 45 °C
PROCESS TEMPERATURE	/ -5 ... 45 °C	/ -5 ... 45 °C	/ -5 ... 45 °C
LEAKAGE TEST	/ 1 x 10 ⁻⁸ cm ³ /s	/ 1 x 10 ⁻⁸ cm ³ /s	/ 1 x 10 ⁻⁸ cm ³ /s
SWITCH CONTACT			
SWITCHING ACCURACY			



MODEL	HPS 50	HPT 63
		
DIAL SIZE	/ 50 mm	/ 63 mm
CLEANROOM CLASS	/ 10000 / ISO Class 7	/ 10000 / ISO Class 7
CASE MATERIAL	/ Stainless steel 304	/ Polypropylene
SENSING ELEMENT	/ Bourdon tube	/ Bellows spring
WETTED PARTS MATERIAL	/ Stainless steel 316L	/ PFA/PTFE
PROCESS CONNECTION	/ 9/16-18 UNF (compatible with VCR®), swivel male or female, R 1/4, 1/4 NPT male	/ G 3/8 B, R 3/8 male, tube stub 1/4 ... 1/2"
PROCESS CONNECTION MATERIAL	/ Stainless steel 316L	/ PTFE
SURFACE FINISH	/ fitting: Ra <0.38 µm / tube: Ra <0.38 µm	
PROCESS CONNECTION LOCATION	/ Lower	/ Lower, center back
WINDOW	/ Polycarbonate	/ PET
ACCURACY	/ 1.6 % of span	/ 1.5 % or 2% of span
RANGES	/ -1/4 ... 0/250 bar	/ -1/0 ... 10 bar
AMBIENT TEMPERATURE	/ -5 ... 45 °C	/ 10 ... 30 °C
PROCESS TEMPERATURE	/ -20 ... 60 °C	/ 10 ... 30 °C
LEAKAGE TEST	/ 1 x 10 ⁻⁸ cm ³ /s	/ Nitrogen Leakage Test
SWITCH CONTACT	/ Reed contact	
SWITCHING ACCURACY	/ 5% of span	

SEMICONDUCTOR INDUSTRY

SEMICONDUCTOR INDUSTRY

PRESSURE TRANSMITTERS

MODEL	ZT12	ZX12	ZT16
			
			
CLEANROOM CLASS	/ 100 / ISO Class 5	/ 100 / ISO Class 5	/ 100 / ISO Class 5
CASE MATERIAL	/ Stainless steel 304, PBT	/ Stainless steel 304, PBT	/ Stainless steel 304, PBT
WETTED PARTS MATERIAL	/ Stainless steel 316L	/ Stainless steel 316L	/ CoNi alloy and stainless steel 316L
PROCESS CONNECTION	/ 9/16-18 UNF (compatible with VCR®), fixed connection, inline connection, swivel male or female	/ 9/16-18 UNF (compatible with VCR®), fixed connection, inline connection, swivel male or female	/ flange connection type C and W
SURFACE FINISH	/ Ra <0.5 µm or Ra <0.18 µm	/ Ra <0.5 µm or Ra <0.18 µm	/ Ra <0.18 µm
ACCURACY	/ 0.25% of span	/ 0.25% of span	/ 1% or 0.5 % of span
LONG-TERM STABILITY	/ 0.25% of span / year	/ 0.25% of span / year	/ 0.25% of span / year
OUTPUT SIGNAL	/ 4-20 mA (2-wire)	/ 4-20 mA (2-wire)	/ 4-20 mA (2-wire), 1-5 VDC (3-wire)
RANGES GAUGE PRESSURE	/ -1/3 bar ... 0/200 bar	/ -1/3 bar ... 0/200 bar	/ -1/3 bar ... 0/10 bar
RANGES ABSOLUTE PRESSURE	/ 0/3 ... 0/200 bar	/ 0/3 ... 0/200 bar	
AMBIENT TEMPERATURE	/ -20 ... 70 °C	/ -20 ... 70 °C	/ -20 ... 70 °C
PROCESS TEMPERATURE	/ -20 ... 70 °C	/ -20 ... 70 °C	/ -20 ... 70 °C
INGRESS PROTCTION	/ IP67	/ IP65	/ IP54
LEAKAGE TEST	/ 5 x 10 ⁻¹¹ cm ³ /s	/ 5 x 10 ⁻¹¹ cm ³ /s	/ 5 x 10 ⁻¹¹ cm ³ /s
LOCAL DISPLAY			
SWITCH CONTACT			
FUNCTIONS			

	ZL91	ZL92	ZL95
			
			
	/ 100000 / ISO Class 8	/ 100000 / ISO Class 8	/ 100000 / ISO Class 8
	/ Polypropylene	/ Polypropylene and PTFE/PFA	/ Polypropylene and PTFE/PFA
	/ PFA/PTFE	/ PFA/PTFE	/ PFA/PTFE
	/ tube connection 1/4" ... 1"	/ tube connection 1/4" ... 1/2", compression fittings from various manufacturers for tube 1/4" ... 1/2"	/ tube connection 1/4" ... 1/2", compression fittings from various manufacturers for tube 1/4" ... 1/2"
	/ Low metal ion excretion	/ Low metal ion excretion	/ Low metal ion excretion
	/ 1% of span	/ 1% of span	/ 1% of span
	/ 4-20 mA (2-wire), 1-5 VDC (3-wire)	/ 4-20 mA (2-wire), 1-5 VDC (3-wire)	/ 4-20 mA (2-wire), 0-5, 0-10, 1-5 VDC (3-wire)
	/ -1/1 bar ... 0/5 bar	/ 0/3 and 0/5 bar	/ 0/3 and 0/5 bar
	/ 10 ... 60 °C	/ 10 ... 60 °C	/ 10 ... 60 °C
	/ 10 ... 60 °C	/ 10 ... 60 °C	/ 10 ... 60 °C
	/ IP65	/ IP54	/ IP54
			/ 4-digit LED
			/ 2 NPN transistor switch outputs, field programmable
			/ Minimum and maximum recall, display update programmable

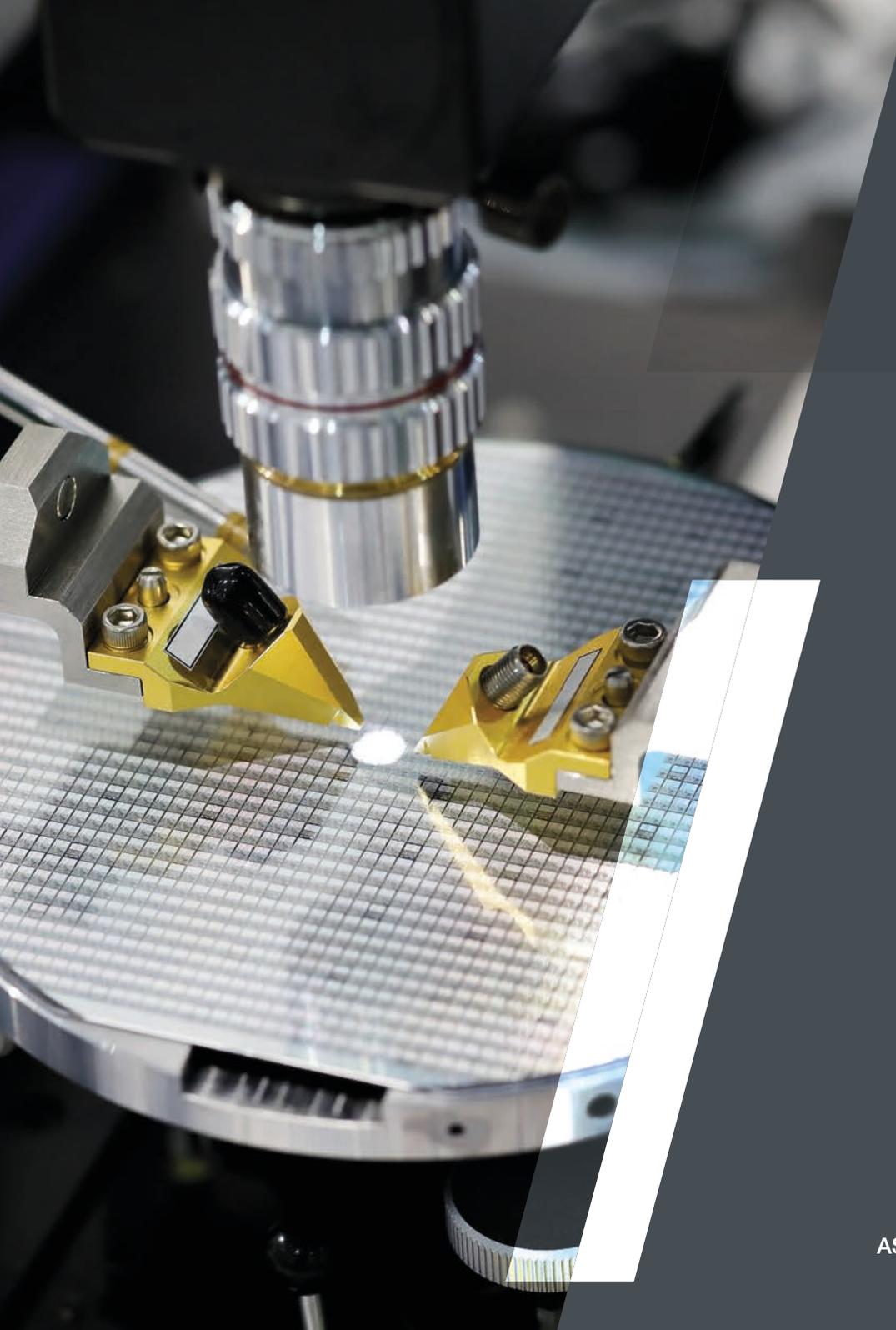
SEMICONDUCTOR INDUSTRY

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APPLICATION OVERVIEW

MODEL	HPX 28	HPX 50	HPX 63	HPS 50	HPT 63	ZT12
						
HIGH PURITY GAS DELIVERY SYSTEMS	✓	✓	✓	✓		✓
GAS STICKS	✓	✓	✓	✓		✓
PROCESS GAS ANALYSERS	✓	✓	✓	✓		✓
PROCESS EQUIPMENT SEMICONDUCTOR MANUFACTURING	✓	✓	✓	✓		✓
CYLINDER CABINETS				✓		
EXHAUST SYSTEM FOR CVD AND ETCHING EQUIPMENT				✓		
ULTRAPURE/DEIONIZED WATER FACILITIES					✓	
ULTRAPURE/DEIONIZED WATER PRODUCTION EQUIPMENT					✓	
CLEANING SYSTEMS FOR SEMICONDUCTOR					✓	
CLEANING EQUIPMENT FOR FLAT SCREENS (FPD)					✓	
WET STATIONS					✓	
CHEMICAL SUPPLY SYSTEMS					✓	

	ZX12	ZT16	ZL91	ZL92	ZL95
					
	✓	✓			
	✓	✓			
	✓	✓			
	✓	✓			
			✓		
			✓		
			✓	✓	✓
			✓	✓	✓
			✓	✓	✓



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