

AUBERT&DUVAL



Tool steels



Enhancing your performance

OUR COMMITMENT:

We advise you...

For optimal performance, tool steels need to provide a compromise between properties that are often contradictory. Among the many possible solutions, we will help you choose the grade best adapted to your problem, its use and its optimal heat treatment.



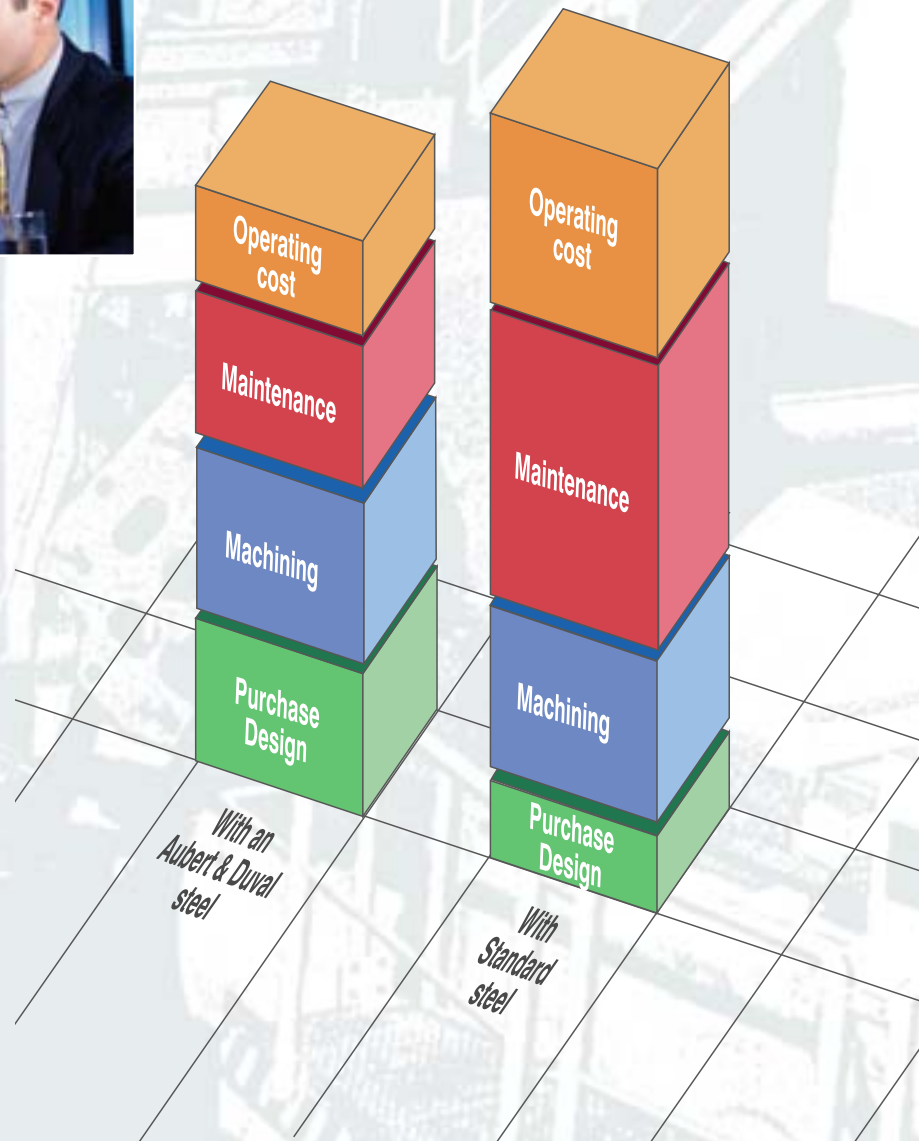
Aubert & Duval melt and process high-quality alloy steels and superalloys to meet the most demanding requirements of any industry.

Our long-standing experience, our research and development capability, the capacity of our production plant and our on-going customer support all add up to a firm guarantee of quality. Our extensive knowledge and our various processing techniques enable us to offer particularly reliable and high-performance tool steels suited to your specific demands.

Thanks to its world-renowned know-how and experience, Aubert & Duval is able to offer each client individual advice and propose appropriate solutions.

... and help to reduce your production costs

The cost of a tool is not just a matter of its purchase price. A well-judged choice of steel and its use in the best conditions results in an increased number of parts produced and a reduced maintenance and depreciation cost. It can also increase the production rate and consequently reduce the unit cost of the produced parts.



TOOL STEELS FOR HOT WORK

Constant developments in hot processing technologies require the use of steels and alloys that are highly resistant, in particular to thermal fatigue and high-temperature wear.

These characteristics are especially sought-after in the following industries:

- Die casting
- Extrusion
- Die stamping and forging
- Super Plastic Forming and Diffusion Bonding (SPF-DB)

AD Grades	Designation			Chemical composition						Comments
	EN	W. Nr.	AISI	C	Cr	Mo	V	W	others	
SDC⁽²⁾	Patented grade	-	-	Cr, Mo, Ni, V						The ultimate solution for die-casting molds.
ADC3⁽¹⁾	X36CrMoV5-1	1.2340	~ H11	0.35	5.00	1.30	0.40	-	Fe: base	Its compromise between heat checking resistance, toughness and wear resistance makes ADC3 the #1 grade for die-casting molds and many other hot work applications. Specially recommended for large die-casting dies.
SMV3⁽¹⁾	X37CrMoV5-1	1.2343	H11	0.40	5.00	1.30	0.40	-	Fe: base	Premium H11 for optimum performance for all hot work applications. Guaranteed microstructure. Also available in Superior Quality.
DH11	X37CrMoV5-1	1.2343	H11	0.38	5.10	1.35	0.40	-	Fe: base	High quality H11
SMV4S⁽²⁾	X40CrMoV5-1	1.2344	H13	0.40	5.00	1.30	1.00	-	Fe: base	Superior H13. In conformity to NADCA criteria as well as other automotive industry specifications for die casting applications.
DH13	X40CrMoV5-1	1.2344	H13	0.40	5.10	1.35	1.10	-	Fe: base	High quality H13
R6110	X38CrMoV5-3	1.2367	-	0.40	5.00	3.00	0.50	-	Fe: base	5% Cr steel combining oxidization and heat checking resistance with high wear resistance. Specially recommended for forging and stamping dies.
SMR7	X38CrMoCoV5-3-3*	-	-	0.40	5.00	3.00	0.50	-	Co: 2.70 Fe: base	High temperature resistant 5-3-3 steel, offering an excellent compromise between wear resistance, toughness and heat checking resistance for stamping inserts or forging dies.
SMR	32CrMoV12-28	~ 1.2365	~ H10	0.35	3.00	2.70	0.50	-	Fe: base	The best solution for copper alloys die casting or stamping.
MEK4⁽³⁾	40CrMoV13-9	1.8523	-	0.40	3.00	1.00	0.20	-	Fe: base	Pre-hardened to 400 HB. Combines good machinability and high hardness. Ideal for prototypes or short runs.
TA2	40NiCrMo16*	~ 1.2766	-	0.35	1.80	0.30	-	-	Ni: 3.70 Fe: base	Nickel-content Tool steel featuring high toughness. Recommended for the production of die blocks and bolsters for drop stamping. Can be supplied in the heat treated condition.
VOLVIC10	X20CoCrWMo10-10-6-2*	~ 1.2888	-	0.18	10.00	2.00	-	6.50	Co: 10.00 Fe: base	Highly alloyed tool steel combining the highest temperature resistance with an excellent abrasion resistance for extrusion, stamping and die casting applications.
Superalloys	Nickel or Cobalt alloys are available. Please inquire.									

(*) Symbolic designation.

(1) Available in remelted quality (W)

(2) Stocked only in remelted grade

(3) Pre-hardened

Cast molds for Super Plastic Forming and Diffusion Bonding (SPF or SPF-DB) can be designed and produced according to your specific needs. Please ask for our pamphlet.

TOOL STEELS FOR PLASTIC MOLDING

The dramatic rise in the use of synthetic materials has led manufacturers to use high-performance molds that can provide suitability for polishing and/or graining, abrasion resistance, good corrosion resistance, resistance to mechanical stresses.

These special characteristics are sought-after in the following processing techniques:

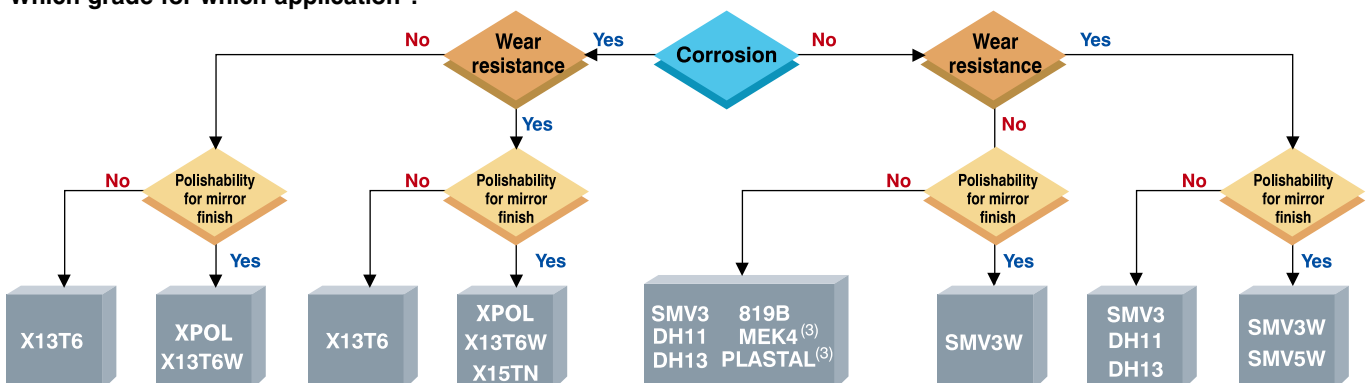
- Injection
- Compression
- Blow molding
- Extrusion

	AD Grades	Designation			Chemical Composition						Delivered condition Annealed or Pre-hardened (Hardness HB)
		EN	W. Nr.	AISI	C	Cr	Ni	Mo	V	Others	
Martensitic Tool steels	PLASTAL⁽³⁾	55CrNiMoV5*	-	-	0.55	1.00	0.50	0.40	0.03	Fe: base	400
	MEK4⁽³⁾	40CrMoV13-9	1.8523	-	0.40	3.00	-	1.00	0.20	Fe: base	400
	819B	36NiCrMo16	1.6773	-	0.35	1.70	3.80	0.30	-	Fe: base	269
	DH11	X37CrMoV5-1	1.2343	H11	0.38	5.10	-	1.35	0.40	Fe: base	240
	DH13	X40CrMoV5-1	1.2344	H13	0.40	5.10	-	1.35	1.10	Fe: base	240
	SMV3⁽¹⁾	X37CrMoV5-1	1.2343	H11	0.40	5.00	-	1.30	0.40	Fe: base	235
	SMV5W⁽²⁾	X50CrMoWV5*	-	-	0.50	5.00	-	1.30	0.40	W: 1.30 Fe: base	240
Martensitic Stainless Steels	XPOL	Under development									
	X13T6⁽¹⁾	X40CrMo15*	~ 1.2083	-	0.40	14.50	-	0.30	-	Fe: base	240
	XDBD⁽¹⁾	X105CrMo17	1.4125	440C	1.00	17.00	-	0.50	-	Fe: base	230
	X15TN⁽²⁾	X40CrMoVN16-2	1.4123	-	0.40	15.50	-	2.00	0.30	N: 0.20 Fe: base	207
Powder metallurgy	APZ10 ULTR'AD	X120CrMoVN19-2*	-	-	1.15	19.00	-	2.10	0.80	N: 0.10 Fe: base	270
Maraging Steel	MARVAL M1⁽²⁾ MYM1	X2NiCoMo18-8-5*	1.2706	-	≤ 0.03	-	18.00	5.00	-	Co: 8.00 Ti: 0.50 Fe: base	290

(*) Symbolic designation.
 (1) Available in remelted quality (W)
 (2) Stocked only in remelted grade
 (3) Pre-hardened

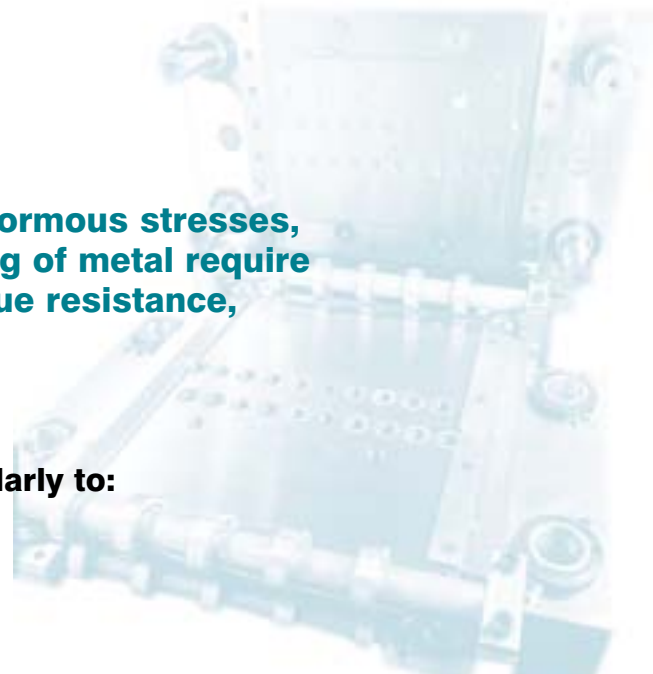
Cast molds for Resin Transfer Molding (RTM) can be designed and produced according to your specific needs. Please ask for our pamphlet.

Which grade for which application ?



TOOL STEELS FOR COLD WORK

In order to withstand high speeds and enormous stresses, the tool steels used in the cold processing of metal require high performance in edge retention, fatigue resistance, wear resistance and impact resistance.



These characteristics apply more particularly to:

- Cutting
- Drawing
- Cold heading
- Flow forming

AD Grades	Designation			Chemical composition							Hardness max (HRC) after Heat Treatment
	EN	W. Nr.	AISI	C	Cr	Mo	V	Ni	W	Others	
TA3	45NiCrMo18*	~1.2767	-	0.42	1.60	0.50	-	4.40	-	Fe: base	52/54
SMI	60NiCrMo11*	1.2743	-	0.60	0.80	0.35	0.15	2.70	-	Fe: base	55/57
SMS3	X39CrMoV5-1*	1.2343	~ H11	0.40	5.10	1.40	0.45	-	-	Fe: base	51/53
SMV5W ⁽²⁾	X50CrMoWV5*	-	-	0.50	5.00	1.30	0.40	-	1.30	Fe: base	57/59
SMHW ⁽²⁾	X100CrMoV5	1.2363	A2	1.00	5.00	1.00	0.30	-	-	Fe: base	57/59
SRV2W ⁽²⁾	X110CrMoV8-2*	-	-	1.10	8.60	2.50	0.50	-	-	Fe: base	60/62
SRV4 ULTR'AD	X120CrVMoW8-4*	-	-	1.20	7.80	3.25	3.50	-	0.50	Fe: base	61/63
SANCY2	X160CrMoV12-1	~1.2379	~ D2	1.65	12.00	0.50	0.25	-	0.50	Fe: base	59/61
SY4	X150CrMoVCo12*	~1.2379	~ D2	1.50	11.50	0.90	0.90	-	-	Co: 0.80 Fe: base	59/61
SY5 ULTR'AD	X210CrVMoCo12-4*	~1.2378	~ D7	2.10	11.50	1.00	3.80	-	-	Co: 0.50 Fe: base	63/65
RA4W ⁽²⁾	80MoCrV42-16	1.3551	~ M50	0.80	4.00	4.25	1.00	-	-	Fe: base	58/60
RA45 ULTR'AD	90MoCrVW45-16-20*	~1.3392	~ M52	0.90	4.00	4.50	2.00	-	1.20	Fe: base	60/62
RA5W ⁽²⁾	X60WMoCrV6-5-4-2*	-	-	0.65	4.00	4.60	1.80	-	5.80	Fe: base	56/58
RA6W ⁽²⁾	X82WMoCrV6-5-4 HS6-5-2	~1.3343	~ M2	0.85	4.25	5.25	2.00	-	6.25	Fe: base	61/63

(*) Symbolic designation.

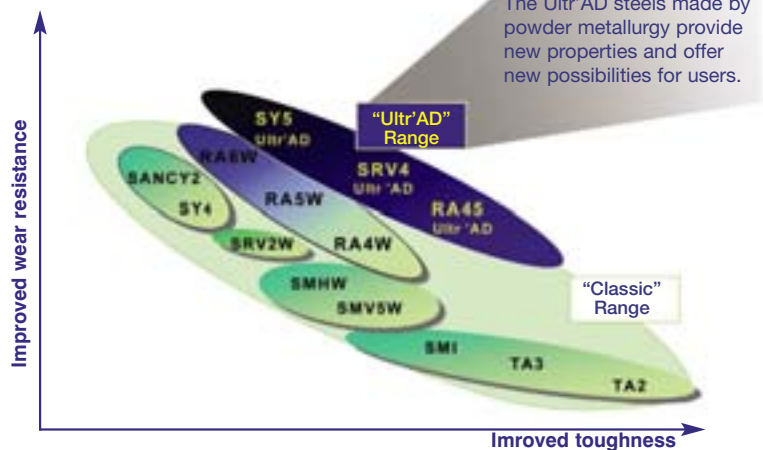
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ULTR'AD range: Steels obtained by powder metallurgy.

For applications in corrosive environments, refer to martensitic stainless grades in the table listing tooling steels for plastics processing

Which grades for which properties ?



TOOL STEELS FOR GLASSWARE INDUSTRY

The drive for quality and productivity in the glassware industry requires the manufacturers to use dies combining a perfectly polished surface with high heat checking resistance, wear resistance and oxidization resistance.

In the glass industry, these characteristics are especially sought-after for the manufacturing of:

- Tableware
- Electric cookers
- Optical glasses

AD Grades	Designation			Chemical Composition					Delivered condition Pre-hardened (Hardness HB)	AD Casting grades	
	EN	W. Nr.	AISI	C	Cr	Ni	Mo	Others			
Tool steels and Martensitic Stainless Steels	SMP3⁽¹⁾	X36CrMoV5-1	1.2340	~ H11	0.35	5.00	-	1.30	V: 0.40 Fe: base	293	SMV3F
	X13⁽¹⁾	X30Cr13	1.4028	420	0.30	13.00	-	-	Fe: base	293	X13F
	X13T6⁽¹⁾	X40CrMo15*	~1.2083	-	0.40	14.50	-	0.30	Fe: base	240	SC5033
	X15V⁽²⁾	X30CrCoMoW15-4*	-	-	0.30	15.00	0.50	1.00	Co: 4.50 W: 1.00 Fe: base	286	X15VF
	X15TN⁽²⁾	X40CrMoVN16-2	1.4123	-	0.40	15.50	-	2.00	V: 0.30 N: 0.20 Fe: base	300	X15TNF
	APXV⁽¹⁾	X22CrNi17 X17CrNi16-2	1.2787 1.4057	431	0.18	16.50	1.80	-	Fe: base	300	APXVF
	D431V	X17CrNi16-2	1.4057	431	0.18	16.00	1.70	-	Fe: base	300	
Austenitic Stainless Steels	X25V⁽²⁾	X8CrNiSi25-20*	~ 1.2782 ~ 1.4841	~ 310	0.10	25.00	20.00	-	Si: 2.00 Fe: base	≤ 210	X25VF
	X39V⁽²⁾	X10CrNiSi39-18*	~ 1.2786 ~ 1.4862	-	0.10	18.00	39.00	-	Si: 2.00 Fe: base	≤ 210	X39VF
Ferritic Steel		X8Cr18	1.4015	-	0.08	17.00	-	-	Fe: base	156	X16MF
Nickel alloys	P43V⁽²⁾	NiFeCr17MoTiAl*	-	-	0.05	17.00	43.00	3.30	Ti: 2.50 Al: 1.50	≥ 320	P43VF
	MPYV⁽²⁾	NiCr20Co14*	2.4654	WASPALLOY	0.10	19.00	base	4.00	Co: 14.00 Ti: 3.00 Al: 1.50	≥ 320	-
	-	G-NiCr13Al6MoNb	-	IN 713 LC	0.05	12.50	base	4.20	Al: 6.00 Nb+Ta: 2.40 Ti: 0.90	269	MPM
	-	NiBSi*	-	-	< 0.20	< 1.00	base	-	B: 1.50 Cu: 2.50	285	V30F

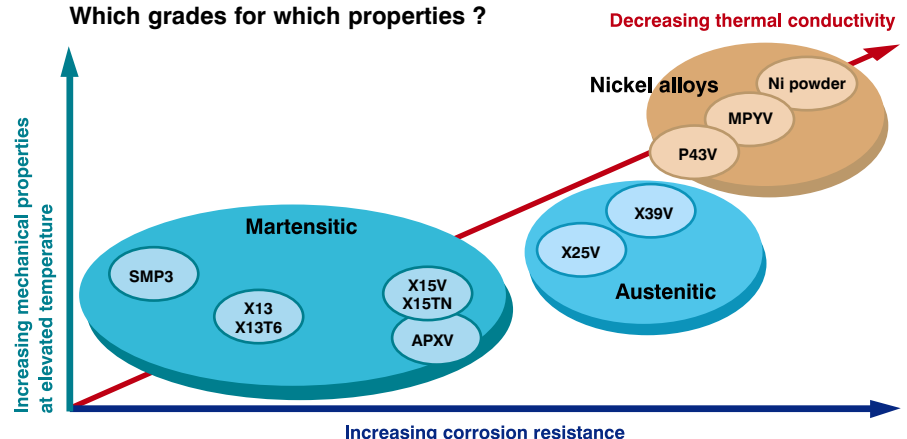
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Other grades are also available

Which grades for which properties ?



Aubert & Duval offers the most comprehensive range of tool steel products for glassware industry including not only the wrought bars but also cast molds, prealloyed powders for coatings and bi-metallic solutions involving the Hot Isostatic Pressing (CIC) process.

YOUR SATISFACTION

We simplify your work

Our complete understanding of the processes, a result of our experience in the aircraft industry, allows us to deliver products within very narrow composition ranges. This ensures that you are provided with molds or dies providing reproducible performances, thus minimizing your set up time or adjustment costs.



We guarantee our products

All Aubert & Duval brand products are melted, processed and inspected in our factories. We certify them to guarantee that they meet your expectations.



International approvals and references

- ISO 9001 (2000)
- EN 9100
- ISO TS 16949
- AQAP 2110
- COFRAC Laboratory certification to EN 17025
- RCCM A5000/50-C/SG-Q/ASME-NCA3800

- EATON
- FORD
- GENERAL MOTORS
- MERCEDES
- PEUGEOT CITROËN AUTOMOBILES
- RENAULT
- ROLLS-ROYCE
- TEKSID
- TRW

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Design and realization:
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