

This information is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should not therefore be construed as a warranty of specific properties of the products described or a warranty for fitness for a particular purpose.

Classified according to EU Directive 1999/45/EC

For further information see our "Material Safety Data Sheets".

Edition 3, 01.2007



SS-EN ISO 9001
SS-EN ISO 14001

Critical tool steel parameters

For good tool performance

- Correct hardness for the application
- High wear resistance
- High ductility

High wear resistance is often associated with low ductility and vice-versa. However, in many cases for optimal tool performance both high wear resistance and ductility are essential.

Uddeholm Vanadis 4 Extra is a powder metallurgical cold work tool steel offering an extremely good combination of wear resistance and ductility for high performance tools.

For toolmaking

- Machinability
- Heat treatment
- Dimensional stability during heat treatment

Toolmaking with highly alloyed tool steels has traditionally created problems with machining and heat treatment when compared with lower alloyed grades, this then often leads to increased toolmaking costs.

Due to our carefully balanced alloying and the powder metallurgical manufacturing process, Uddeholm Vanadis 4 Extra has better machinability than the tool steel grade AISI D2. One major advantage with Uddeholm Vanadis 4 Extra is that the dimensional stability after hardening and tempering is much better than for all known high performance cold work tool steels. This means, for example, that Uddeholm Vanadis 4 Extra is a tool steel which is very suitable for CVD coating.

General

Uddeholm Vanadis 4 Extra is a chromium-molybdenum-vanadium alloyed steel which is characterized by:

- Very good ductility
- High abrasive-adhesive wear resistance
- High compressive strength
- Good dimensional stability during heat treatment and in service
- Very good through-hardening properties
- Good temper back resistance
- Good machinability and grindability

Typical analysis %	C 1,4	Si 0,4	Mn 0,4	Cr 4,7	Mo 3,5	V 3,7
Delivery condition	Soft annealed to approx. 230 HB					
Colour code	Green/white with a black line across					

Applications

Uddeholm Vanadis 4 Extra is especially suitable for applications where adhesive wear and/or chipping are the dominating failure mechanisms, i.e.

- with soft/adherent materials such as austenitic stainless steel, mild steel, copper, aluminium, etc. as work material
- with thicker work material
- high strength work materials

Uddeholm Vanadis 4 Extra is however also very suitable for blanking and forming of Ultra High Strength Steel Sheet, these materials place high demands on the tool steel regarding abrasive wear resistance and ductility.

Examples:

- Blanking and forming
- Fine blanking
- Cold extrusion tooling
- Powder pressing
- Deep drawing
- Knives
- Substrate steel for surface coating

Properties

Physical data

Hardened and tempered to 60 HRC.

Temperature	20°C (68°F)	200°C (390°F)	400°C (750°F)
Density, kg/m ³ lbs/in ³	7 700 0,278	– –	– –
Modulus of elasticity, N/mm ² psi	206 000 29,8 × 10 ⁶	200 000 29,0 × 10 ⁶	185 000 26,8 × 10 ⁶
Coefficient of thermal expansion per °C from 20°C °F from 68°F	– –	10,9 × 10 ⁻⁶ 6,0 × 10 ⁻⁶	11,7 × 10 ⁻⁶ 6,5 × 10 ⁻⁶
Thermal conductivity W/m • °C Btu in/(ft ² h °F)	– –	30 210	30 210
Specific heat J/kg °C Btu/lb °F	460 0,11	– –	– –

Impact strength

Approximate room temperature impact strength as a function of hardness is shown below.

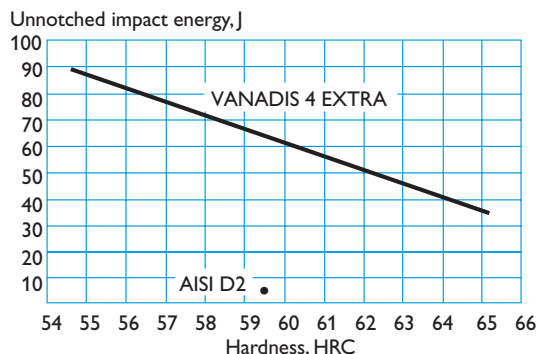
Original bar dimension: Ø 105 mm, samples are taken from the centre and tested in the transverse direction.

Specimen size: 7 x 10 x 55 mm (0,27 x 0,40 x 2,2") unnotched.

Hardened between 940°C (1725°F) and 1150°C (2100°F). Holding time 30 minutes up to 1100°C (2010°F), over 1100°C (2010°F) 15 minutes. Quenched in air. Tempered 2 x 2h between 525°C (980°F) and 570°C (1060°F).

DIFFERENCE IN DUCTILITY

The difference in ductility between Uddeholm Vanadis 4 Extra and AISI D2 at different hardness levels.



Heat treatment

Soft annealing

Protect the steel and heat through to 900°C (1650°F). Cool in the furnace at 10°C (20°F) per hour to 750°C (1380°F), then freely in air.

Stress relieving

After rough machining the tool should be heated through to 650°C (1200°F), holding time 2 hours. Cool slowly to 500°C (930°F), then freely in air.

Hardening

Pre-heating temperature: 600–700°C (1110–1290°F).

Austenitizing temperature: 940–1150°C (1725–2100°F). Normally 1020°C (1870°F). For large sections >70 mm (2,75") use 1060°C (1940°F).

Holding time: 30 min. up to 1100°C (2010°F), 15 min. above 1100°C (2010°F).

Note: Holding time = time at hardening temperature after the tool is fully heated through. A holding time of less than recommended above will result in loss of hardness.

Protect the part against decarburization and oxidation during hardening.

Quenching media

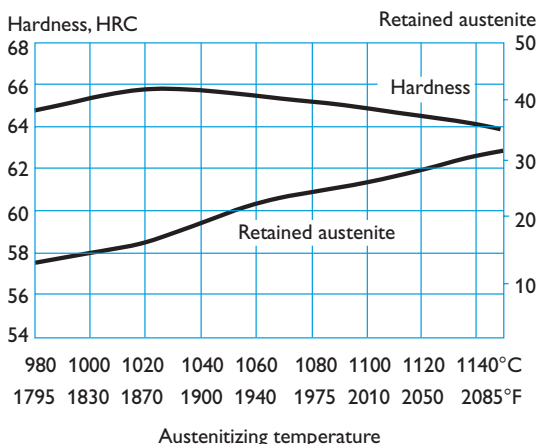
- Vacuum (high speed gas at sufficient over-pressure)
- Martempering bath or fluidized bed at 500–550°C (930–1020°F)
- Martempering bath or fluidized bed at 200–350°C (390–660°F)

Note 1: Temper the tool as soon as its temperature reaches 50–70°C (120–160°F).

Note 2: In order to obtain the optimum properties for the tool, the cooling rate should be as fast as is concomitant with acceptable distortion.

Note 3: Martempering should be followed by forced air cooling if wall thickness is exceeding 70 mm (2,75").

HARDNESS AND RETAINED AUSTENITE AS A FUNCTION OF AUSTENITIZING TEMPERATURE



Tempering

The tempering temperature can be selected according to the hardness required by reference to the tempering graph below.

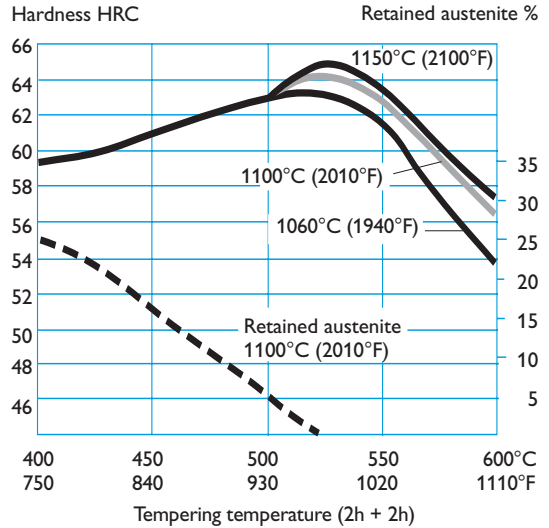
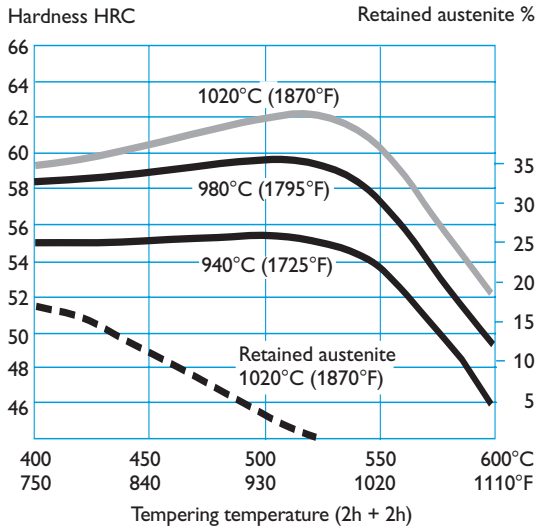
Temper twice with intermediate cooling to room temperature. The lowest tempering temperature which should be used is 525°C (980°F).

(980°F). The minimum holding time at temperature is 2 hours.

In order not to reduce the toughness do not temper below 525°C (980°F)

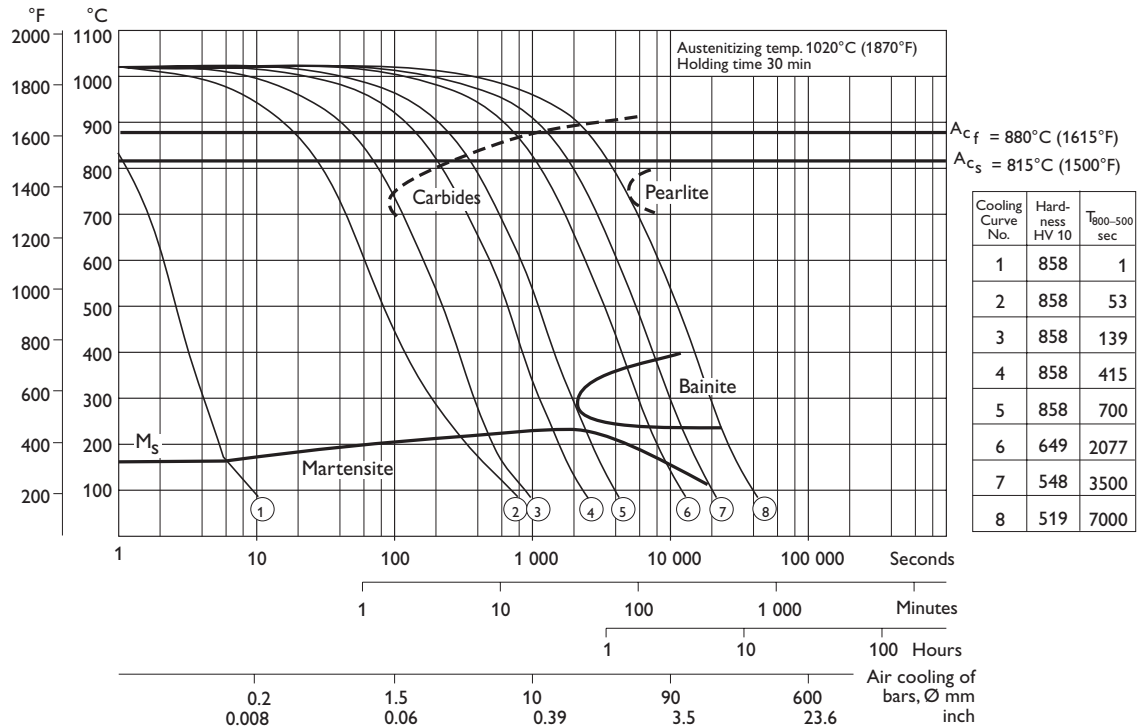
To avoid a high content of retained austenite choose tempering temperature over 525°C (980°F).

TEMPERING GRAPH



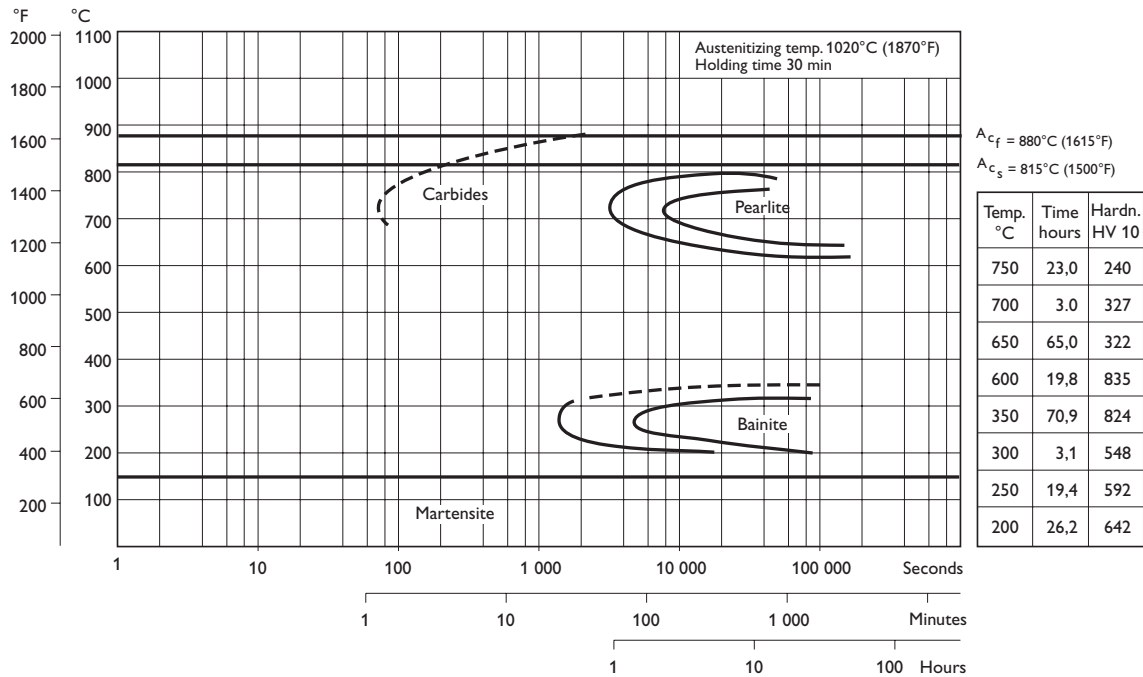
CCT GRAPH

Austenitizing temperature 1020°C (1870°F). Holding time 30 minutes.



TTT GRAPH

Austenitizing temperature 1020°C (1870°F). Holding time 30 minutes.



Dimensional changes during hardening and tempering

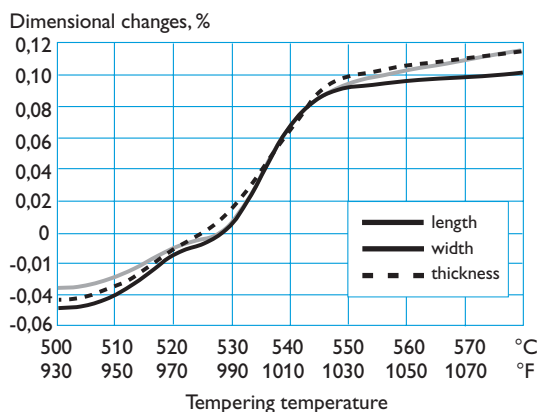
Dimensional changes have been measured after hardening and tempering.

Austenitizing: 1020°C/30 min. (1870°F/30 min.), cooling in vacuum furnace at 1,1°C/sec (2°F/sec) between 800°C (1470°F) and 500°C (930°F).

Tempering: 2 x 2 h at various temperatures

Sample size: 80 x 80 x 80 mm (3,15" x 3,15" x 3,15")

DIMENSIONAL CHANGES DURING HARDENING AND TEMPERING IN LENGTH, WIDTH AND THICKNESS DIRECTION



Sub-zero treatment

Pieces requiring maximum dimensional stability can be sub-zero treated as follows:

Immediately after quenching the piece should be sub-zero treated to between -70 and -80°C (-95 to -110°F), soaking time 3–4 hours, followed by tempering.

The tempering temperature should be lowered 25°C (50°F) in order to get the desired hardness when a high temperature temper is performed.

Avoid intricate shapes as there will be risk of cracking.

Surface treatment

Some cold work tool steels are given a surface treatment in order to reduce friction and increase wear resistance. The most commonly used treatments are nitriding and surface coating with wear resistant layers produced via PVD and CVD.

The high hardness and toughness together with a good dimensional stability makes Uddeholm Vanadis 4 Extra ideal as a substrate steel for various surface coatings.

Nitriding

Nitriding gives a hard surface layer that is resistant to wear and erosion.

Uddeholm Vanadis 4 Extra is normally high temperature tempered at around 525°C (980°F). This means that the nitriding temperature used should not exceed 500–525°C (930–980°F). Ion nitriding at a temperature below the tempering temperature used is preferred. The surface hardness after nitriding is approximately 1150 HV_{0,2 kg}.

The thickness of the layer should be chosen to suit the application in question.

PVD

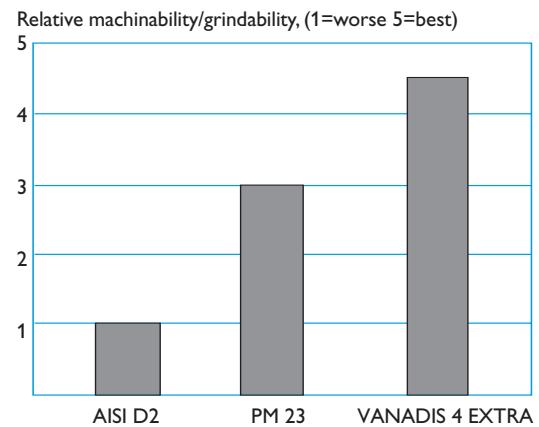
Physical vapour deposition, PVD, is a method of applying a wear resistant coating at temperatures between 200–500°C (390–930°F).

CVD

Chemical vapour deposition, CVD, is used for applying wear resistant surface coatings at a temperature of around 1000°C (1830°F). It is recommended that the tools should be separately hardened and tempered in a vacuum furnace after surface treatment.

Machinability

Relative machinability and grindability for AISI D2, PM 23 and Uddeholm Vanadis 4 Extra. High value indicates good machinability/grindability.



Machining recommendations

The cutting data below are to be considered as guiding values which must be adapted to existing local conditions.

The recommendations, in following tables, are valid for Uddeholm Vanadis 4 Extra in soft annealed condition to ~230 HB.

Turning

Cutting data parameters	Turning with carbide		Turning with HSS Fine turning
	Rough turning	Fine turning	
Cutting speed (v_c) m/min. f.p.m.	120–170 395–560	170–220 560–720	15–20 50–65
Feed (f) mm/rev. i.p.r.	0,2–0,4 0,008–0,016	0,05–0,2 0,002–0,008	0,05–0,3 0,002–0,012
Depth of cut (a_p) mm inch	2–4 0,08–0,16	0,5–2 0,02–0,08	0,5–3 0,02–0,08
Carbide designation ISO	K20*, P20*	K15*, P15*	–

* Use a wear resistant CVD-coated carbide grade

Milling

FACE AND SQUARE SHOULDER MILLING

Cutting data parameters	Milling with carbide	
	Rough milling	Fine milling
Cutting speed (v_c) m/min. f.p.m.	110–150 360–490	150–200 490–655
Feed (f_z) mm/tooth in/tooth	0,2–0,4 0,008–0,016	0,1–0,2 0,004–0,008
Depth of cut (a_p) mm inch	2–4 0,08–0,16	– 2 – 0,08
Carbide designation ISO	K20, P20 coated carbide*	K15, P15 coated carbide*

* Use a wear resistant CVD coated carbide grade

END MILLING

Cutting data parameters	Type of milling		
	Solid carbide	Carbide indexable insert	High speed steel ¹⁾
Cutting speed (v_c) m/min. f.p.m.	60–80 200–260	110–160 360–525	8–12 26–40
Feed (f_z) mm/tooth in/tooth	0,03–0,20 ²⁾ 0,001–0,008 ²⁾	0,08–0,20 ²⁾ 0,003–0,008 ²⁾	0,05–0,35 ²⁾ 0,002–0,014 ²⁾
Carbide designation ISO	–	K15 ³⁾	–

¹⁾ For coated HSS end mill $v_c = 18–24$ m/min. (60–80 f.p.m.)

²⁾ Depending on radial depth of cut and cutter diameter

³⁾ Use a wear resistant CVD coated carbide grade

Drilling

HIGH SPEED STEEL TWIST DRILL

Drill diameter		Cutting speed (v_c)		Feed (f)	
mm	inch	m/min	f.p.m.	mm/rev	i.p.r.
–5	–3/16	12–14*	40–46*	0,05–0,15	0,002–0,006
5–10	3/16–3/8	12–14*	40–46*	0,15–0,25	0,006–0,010
10–15	3/8 –5/8	12–14*	40–46*	0,25–0,30	0,010–0,012
15–20	5/8 –3/4	12–14*	40–46*	0,30–0,35	0,012–0,014

* For coated HSS drills $v_c = 22–24$ m/min. (72–80 f.p.m.)

CARBIDE DRILL

Cutting data parameters	Type of drill		
	Indexable insert	Solid carbide	Brazed carbide ¹⁾
Cutting speed (v_c) m/min. f.p.m.	140–160 460–525	80–100 260–330	50–60 165–200
Feed (f) mm/rev. i.p.r.	0,05–0,15 ²⁾ 0,002–0,006 ²⁾	0,10–0,25 ²⁾ 0,004–0,010 ²⁾	0,15–0,25 ²⁾ 0,006–0,012 ²⁾

¹⁾ Drills with internal cooling channels and a brazed tip

²⁾ Depending on drill diameter

Grinding

A general grinding wheel recommendation is given below. More information can be found in the Uddeholm publication “Grinding of Tool Steel”.

WHEEL RECOMMENDATION

Type of grinding	Soft annealed condition	Hardened condition
Face grinding straight wheel	A 46 HV	B151 R50 B3 ¹⁾ A 46 HV ²⁾
Face grinding segments	A 24 GV	A46 FV A46 FV ²⁾
Cylindrical grinding	A 60 KV	B151 R75 B3 ¹⁾ A 60 KV ²⁾
Internal grinding	A 60 JV	B151 R75 B3 ¹⁾ A 60 KV ²⁾
Profile grinding	A 100 LV	B126 R100 B6 ¹⁾ A 80 JV ²⁾

¹⁾ If possible use CBN wheels for this application

²⁾ Grinding wheels containing abrasive of sintered type is recommended

Electrical-discharge machining—EDM

If EDM is performed in the hardened and tempered condition, finish with “fine-sparking”, i.e. low current, high frequency. For optimal performance the EDM'd surface should then be ground/polished and the tool retempered at approx. 25°C (45°F) lower than the original tempering temperature.

When EDM'ing larger sizes or complicated shapes Uddeholm Vanadis 4 Extra should be tempered at high temperatures, above 500°C (930°F).

Relative comparison of Uddeholm cold work tool steel

Material properties and resistance to failure mechanisms

Uddeholm grade	Hardness/ Resistance to plastic deformation	Machinability	Grindability	Dimension stability	Resistance to		Fatigue cracking resistance	
					Abrasive wear	Adhesive wear/Galling	Ductility/ resistance to chipping	Toughness/ gross cracking
Conventional cold work tool steel								
ARNE	██████	████████	████████	█	████	████	████	████
CALMAX	████	████████	████████	██████	████	██████	████████	████████
CALDIE (ESR)	██████	████████	████████	██████	████	██████	████████	████████
RIGOR	████	████████	██████	██████	████	████	████	████
SLEIPNER	██████	████████	██████	██████	████	██████	████	████
SVERKER 21	████	████████	██	██████	████	█	██	████
SVERKER 3	██████	██	█	██████	██████	█	█	█
Powder metallurgical tool steel								
VANADIS 4 Extra	████████	████████	████	████████	██████	██████	████████	████
VANADIS 6	██████	██	██	████████	██████	██████	████	██
VANADIS 10	██████	██	██	████████	██████	██████	████	██
VANCRON 40	██████	████	████	████████	████	██████	████	████
Powder metallurgical high speed steel								
VANADIS 23	██████	████	████	████████	██████	██████	████	████
VANADIS 30	██████	████	████	████████	██████	██████	██	████
VANADIS 60	██████	██	██	████████	██████	██████	██	████
Conventional high speed steel								
AISI M2	██████	██	██	████████	██████	██	██	██

Further information

Please contact your local Uddeholm office for further information on the selection, heat treatment, application and availability of Uddeholm tool steels.

Europe

Austria

Representative office

UDDEHOLM
Albstraße 10
DE-73765 Neuhausen
Telephone: +49 7158 9865-0
www.uddeholm.de

Belgium

UDDEHOLM
Europark Oost 7
B-9100 Sint-Niklaas
Telephone: +32 3 780 56 20
www.uddeholm.be

Croatia

BÖHLER UDDEHOLM Zagreb
d.o.o za trgovinu
Zitrijak b.b
10000 Zagreb
Telephone: +385 1 2459 301
Telefax: +385 1 2406 790
www.bohler-uddeholm.hr

Czech Republic

BÖHLER UDDEHOLM CZ s.r.o.
Division Uddeholm
U Silnice 949
161 00 Praha 6, Ruzyně
Telephone: +420 233 029 850,8
www.uddeholm.cz

Denmark

UDDEHOLM A/S
Kokmose 8, Bramdrupdam
DK-6000 Kolding
Telephone: +45 75 51 70 66
www.uddeholm.dk

Estonia

UDDEHOLM TOOLING AB
Silikatsiidi 7
EE-11216 Tallinn
Telephone: +372 655 9180
www.uddeholm.ee

Finland

OY UDDEHOLM AB
Ritakuja 1, PL 57
FI-01741 VANTAA
Telephone: +358 9 290 490
www.uddeholm.fi

France

Head office
UDDEHOLM
Z.I. de Mitry-Compans, 12 rue Mercier,
FR-77297 Mitry Mory Cedex
Telephone: +33 (0)1 60 93 80 10
www.uddeholm.fr

Branch offices

UDDEHOLM S.A.
77bis, rue de Vesoul
La Nef aux Métiers
FR-25000 Besançon
Telephone: +33 (0)381 53 12 19

LE POINT ACIERS
UDDEHOLM - Aciers à outils
Z.I. du Recou, Avenue de Champlevert
FR-69520 GRIGNY
Telephone: +33 (0)4 72 49 95 61

LE POINT ACIERS
UDDEHOLM - Aciers à outils
Z.I. Nord 27, rue François Rochema
FR-01100 OYONNAX
Telephone: +33 (0)4 74 73 48 66

Germany

Head office
UDDEHOLM
Hansallee 321
DE-40549 Düsseldorf
Telephone: +49 211 5351-0
www.uddeholm.de

Branch offices

UDDEHOLM
Falkenstraße 21
DE-65812 Bad Soden/TS
Telephone: +49 6196 6596-0

UDDEHOLM
Albstraße 10
DE-73765 Neuhausen
Telephone: +49 7158 9865-0

UDDEHOLM
Friederikenstraße 14b
DE-06493 Harzgerode
Telephone: +49 39484 727 267

Great Britain

UDDEHOLM DIVISION
BOHLER-UDDEHOLM (UK) LIMITED
European Business Park
Taylors Lane, Oldbury
GB-West Midlands B69 2BN
Telephone: +44 121 552 5511
Telefax: +44 121 544 2911
www.uddeholm.co.uk

Greece

STASSINOPOULOS-UDDEHOLM
STEEL TRADING S.A.
20, Athinon Street
GR-Piraeus 18540
Telephone: +30 210 4172 109
www.uddeholm.gr

SKLERO S.A.
Heat Treatment and Trading of Steel
Uddeholm Tool Steels
Industrial Area of Thessaloniki
P.O. Box 1123
GR-57022 Sindos, Thessaloniki
Telephone: +30 2310 79 76 46
www.sklero.gr

Hungary

UDDEHOLM TOOLING/BOK
Dunaharaszti, Jedlik Ányos út 25
HU-2331 Dunaharaszti 1. Pf. 110
Telephone/fax: +36 24 492 690
www.uddeholm.hu

Ireland

Head office:
UDDEHOLM DIVISION
BOHLER-UDDEHOLM (UK) LIMITED
European Business Park
Taylors Lane, Oldbury
UK-West Midlands B69 2BN
Telephone: +44 121 552 5511
Telefax: +44 121 544 2911
www.uddeholm.co.uk
Dublin:
Telephone: +353 1845 1401

Italy

UDDEHOLM
Divisione della Bohler Uddeholm
Italia S.p.A.
Via Palizzi, 90
IT-20157 Milano
Telephone: +39 02 39 49 211
www.uddeholm.it

Latvia

UDDEHOLM TOOLING LATVIA SIA
Piedrujas Street 7
LV-1035 Riga
Telephone: +371 7 702133
Telefax: +371 7 185079

Lithuania

UDDEHOLM TOOLING AB
BE PLIENAS IR METALAI
T. Masiulio 18B
LT-52459 Kaunas
Telephone: +370 37 370613, -669
www.besteel.lt

The Netherlands

UDDEHOLM
Isolatorweg 30
NL-1014 AS Amsterdam
Telephone: +31 20 581 71 11
www.uddeholm.nl

Norway

UDDEHOLM A/S
Jernkroken 18
Postboks 85, Kalbakken
NO-0902 Oslo
Telephone: +47 22 91 80 00
www.uddeholm.no

Poland

BOHLER UDDEHOLM POLSKA
Sp. z o.o./Co. Ltd.
ul. Kolejowa 291, Dziekanów Polski,
PL-05-092 Lomianki
Telephone: +48 22 429 2260, -203, -204
www.uddeholm.pl

Portugal

F RAMADA Aços e Industrias S.A.
P.O. Box 10
PT-3881 Ovar Codex
Telephone: +351 256 580580
www.ramada.pt

Romania

BÖHLER-UDDEHOLM Romania SRL
Atomistilor Str. No 96-102
077125 - com. Magurele, Jud. Ilfov.
Telephone: +40 214 575007
Telefax: +40 214 574212

Russia

UDDEHOLM TOOLING CIS
9A, Lipovaya Alleya, Office 509
RU-197183 Saint Petersburg
Telephone: +7 812 6006194
www.uddeholm.ru

Slovakia

Bohler-Uddeholm Slovakia s.r.o.
divizia UDDEHOLM
Čsl.Armády 5622/5
SK-036 01 Martin
Telephone: +421 (0)434 212 030
www.uddeholm.sk

Slovenia

Representative office
UDDEHOLM
Divisione della Bohler Uddeholm
Italia S.p.A.
Via Palizzi, 90
IT-20157 Milano
Telephone: +39 02 39 49 211
www.uddeholm.it

Spain

Head office
UDDEHOLM
Guifré 690-692
ES-08918 Badalona, Barcelona
Telephone: +34 93 460 1227
www.acerosuddeholm.com

Branch office

UDDEHOLM
Barrio San Martin de Arteaga,132
Pol.Ind. Torrelarragoiti
ES-48170 Zamudio (Bizkaia)
Telephone: +34 94 452 13 03

Sweden

Head office
UDDEHOLM TOOLING SVENSKA AB
Aminogatan 25
SE-431 53 Mölndal
Telephone: +46 31 67 98 50
www.uddeholm.se

Branch offices

UDDEHOLM TOOLING SVENSKA AB
Box 45
SE-334 21 Anderstorp
Telephone: +46 371 160 15

UDDEHOLM TOOLING SVENSKA AB
Box 148
SE-631 03 Eskilstuna
Telephone: +46 16 15 79 00

UDDEHOLM TOOLING SVENSKA AB
Aminogatan 25
SE-431 53 Mölndal
Telephone: +46 31 67 98 70

UDDEHOLM TOOLING SVENSKA AB
Nya Tanneforsvägen 96
SE-582 42 Linköping
Telephone: +46 13 15 19 90

UDDEHOLM TOOLING SVENSKA AB
Derbyvägen 22
SE-212 35 Malmö
Telephone: +46 40 22 32 05

UDDEHOLM TOOLING SVENSKA AB
Honnörsgratan 16A
SE-352 36 Växjö
Telephone: +46 470 457 90

Switzerland

HERTSCH & CIE AG
General Wille Strasse 19
CH-8027 Zürich
Telephone: +41 44 208 16 66
www.hertsch.ch

Turkey

Head office
ASSAB Korkmaz Celik A.S.
Organize Sanayi Bölgesi
2. Cadde No: 26 Y. Dudullu
Umraniye-Istanbul Turkey
Telephone: +90 216 420 1926-121/124
www.assabkorkmaz.com

Ukraine

DC CETAB UKRAINE
Box 2431
49040 Dniepropetrovsk
Telephone: +380 562 32 68 65
www.cetab.com

America

Argentina

ACEROS BOEHLER UDDEHOLM S.A
Mozart 40
1619-Centro Industrial Garin
Garin-Prov.
AR-Buenos Aires
Telephone: +54 332 7444 440
www.uddeholm.com.ar

Brazil

AÇOS BOHLER-UDDEHOLM DO
BRASIL LTDA- DIV. UDDEHOLM
Estrada Yae Massumoto, 353
CEP 09842-160
BR-Sao Bernardo do Campo - SP Brazil
Telephone: +55 11 4393 4560, 4554
www.uddeholm.com.br

Canada

Head Office & Warehouse
UDDEHOLM
2595 Meadowvale Blvd.
Mississauga, ON L5N 7Y3
Telephone: +1 905 812 9440
www.bucanada.com

Branch Warehouses

UDDEHOLM
3521 Rue Ashby
St. Laurent, QC H4R 2K3
Telephone: +1 514 333 8000

UDDEHOLM

730 Eaton Way - Unit #10
New Westminster, BC V3M 6J9
Telephone: +1 604 525 3354

Heat Treating

THERMO-TECH
2645 Meadowvale Blvd.
Mississauga, ON L5N 7Y4
Telephone: +1 905 812 9440

Colombia

AXXECOL S.A.
Carrera 35 No 13-20
Apartado Aereo 80718
CO-Bogota 6
Telephone: +57 1 2010700
www.axxecol.com

ASTECO S.A.

Carrera 54 No 35-12
Apartado Aereo 663
CO-Medellin
Telephone: +57 4 2320122
www.asteco.com

Dominican Republic

RAMCA, C. POR A.
Luis Puigbó Alegre, EPS P-2289
P O Box 02-5261
DO-Santo Domingo
Telephone: +1 809 682 4011
domrep@assab.com

Ecuador

IVAN BOHMAN C.A.
Cagilla Postal 17-01370
Quito
Telephone: +593 2 2248001

IVAN BOHMAN C.A.

Apartado 1317
Km 6 1/2 Via a Daule
Guayaquil
Telephone: +593 42 254111

El Salvador

ACAVISA DE C.V.
25a. Avenida Sur 463
zona 1
Apartado Postal 439
SV-San Salvador
Telephone: +503 22 711700
www.acavisa.com

Guatemala

IMPORTADORA ESCANDINAVA
Apartado postal 2042
GT-Guatemala City
Telephone: +502 23 659270
guatemala@assab.com

Mexico

Head office
ACEROS BOHLER UDDEHOLM S.A.
de C.V.
Calle Ocho No 2, Letra "C"
Fraccionamiento Industrial Alce Blanco
C.P. 52787 Naucalpan de Juarez
MX-Estado de Mexico
Telephone: +52 55 9172 0242
www.bu-mexico.com

Branch office

BOHLER-UDDEHOLM MONTERREY,
NUEVO LEON
Lerdo de Tejada No.542
Colonia Las Villas
MX-66420 San Nicolas de Los Garza,
N.L.
Telephone: +52 81 83 525239

Peru

C.I.P.E.S.A.
Av. Oscar R. Benavides
(ante Colonial) No. 2066
PE-Lima 1
Telephone: +51 1 336 8673
peru@assab.com

U.S.A.

Head Office
UDDEHOLM
4902 Tollview Drive
Rolling Meadows IL 60008
Telephone: 1-847-577-2220
Sales phone: 1-800-638-2520
www.bucorp.com

Region East Warehouse

UDDEHOLM
220 Cherry Street
Shrewsbury MA 01545

Region Central Warehouse

UDDEHOLM
548 Clayton Ct.
Wood Dale IL 60191

Region West Warehouse

UDDEHOLM
9331 Santa Fe Springs Road
Santa Fe Springs, CA 90670

Venezuela

PRODUCTOS HUMAR C.A.
Multicentro Empresarial del Este,
Edf Libertador, Núcleo A.
Piso 9, Of. A-93, Chacao
VE-Caracas 1060
Telephone: +58 212 2655040
humar@assab.com

Other Countries in America

ASSAB INTERNATIONAL AB
Box 42
SE-171 11 Solna, Sweden
Telephone: +46 8 564 616 70
www.assab.se

Asia & Pacific

Australia

BOHLER UDDEHOLM Australia
129-135 McCredie Road
Guildford NSW 2161
Private Bag 14
AU-Sydney
Telephone: +61 2 9681 3100
www.buau.com.au

Bangladesh

ASSAB INTERNATIONAL AB
P.O. Box 17595
Jebel Ali
AE-Dubai
Telephone: +971 488 12165
www.assab.se

North China

Head office
ASSAB Tooling (Beijing) Co Ltd
No.10A Rong Jing Dong Jie
Beijing Economic Development Area
Beijing 100176, China
Telephone: +86 10 6786 5588
www.assabsteels.com

Branch offices

ASSAB Tooling (Beijing) Ltd
Dalian Branch
8 Huanghai Street, Haerbin Road
Economic & Technical Develop. District
Dalian 116600, China
Telephone: +86 411 8761 8080

ASSAB Qingdao Office
Room 2521, Kexin Mansion
No. 228 Liaoning Road, Shibei District
Qingdao 266012, China
Telephone: +86 532 8382 0930

ASSAB Tianjin Office
No.12 Puwangli Wanda Xincheng
Xinyibai Road, Beichen District
Tianjin 300402, China
Telephone: +86 22 2672 0006

Central China

Head office
ASSAB Tooling Technology
(Shanghai) Co Ltd
No. 4088 Humin Road
Xinzhuang Industrial Zone
Shanghai 201108, China
Telephone: +86 21 5442 2345
www.assabsteels.com

Branch offices

ASSAB Tooling Technology
(Ningbo) Co Ltd
No. 218 Longjiaoshan Road
Vehicle Part Industrial Park
Ningbo Economic & Technical Dev.
Zone
Ningbo 315806, China
Telephone: +86 574 8680 7188

ASSAB Tooling Technology
(Chongqing) Co Ltd
Plant C, Automotive Industrial IPark
Chongqing Economic & Technological
Development Zone
Chongqing 401120, China
Telephone: +86 23 6745 5698

South China

Head office
ASSAB Steels (HK) Ltd
Room 1701-1706
Tower 2 Grand Central Plaza
138 Shatin Rural Committee Road
Shatin NT - Hong Kong
Telephone: +852 2487 1991
www.assabsteels.com

Branch offices

ASSAB Tooling (Dongguan) Co Ltd
Northern District
Song Shan Lake Science & Technology
Industrial Park
Dongguan 523808, China
Telephone: +86 769 2289 7888
www.assabsteels.com

ASSAB Tooling (Xiamen) Co Ltd
First Floor Universal Workshop
No. 30 Huli Zone
Xiamen 361006, China
Telephone: +86 592 562 4678

Hong Kong

ASSAB Steels (HK) Ltd
Room 1701-1706
Grand Central Plaza, Tower 2
138 Shatin Rural Committee Road
Shatin NT, Hong Kong
Telephone: +852 2487 1991
www.assabsteels.com

India

ASSAB Sripad Steels LTD
T 303 D.A.V. Complex
Mayur Vihar Ph I Extension
IN-Delhi-110 091
Telephone: +91 11 2271 2736
www.assabsripadsteels.com

ASSAB Sripad Steels LTD
709, Swastik Chambers
Sion-Trombay Road
Chembur
IN-Mumbai-400 071
Telephone: +91 22 2522-7110, -8133

ASSAB Sripad Steels LTD
Padmalaya Towers
Janaki Avenue
M.R.C. Nagar
IN-Chennai-600 028
Telephone: +91 44 2495 2371

Indonesia

Head office
PT ASSAB Steels Indonesia
Jl. Rawagelam III No. 5
Kawasan Industri Pulogadung
Jakarta 13930, Indonesia
Telephone: +62 21 461 1314
www.assabsteels.com

Branch offices

SURABAYA BRANCH
Jl. Berbek Industri 1/23
Surabaya Industrial Estate, Rungkut
Surabaya 60293, East Java, Indonesia
Telephone: +62 31 843 2277

MEDAN BRANCH
Komplek Griya Riatur Indah
Blok A No.138
Jl. T. Amir Hamzah
Halvetia Timur, Medan 20124
Telephone: +62 61 847 7935/6

BANDUNG BRANCH
Komp. Ruko Bumi Kencana
Jl. Titian Kencana Blok E
No.5 Bandung 40233
Telephone: +62 22 604 1364

TANGERANG BRANCH
Pusat Niaga Cibodas
Blok C No. 7 Tangerang
Telephone: +62 21 921 9596, 551 2732

SEMARANG BRANCH
Jl. Imam Bonjol No.155
R.208 Semarang 50124
Telephone: +62 358 8167

Iran

ASSAB INTERNATIONAL AB
P.O. Box 19395
IR-1517 TEHRAN
Telephone: +98 21 888 35392
www.assabiran.com

Israel

PACKER YADPAZ QUALITY
STEELS Ltd
P.O. Box 686
Ha-Yarkon St. 7, Industrial Zone
IL-81106 YAVNE
Telephone: +972 8 932 8182
www.packer.co.il

Japan

UDDEHOLM KK
Atago East Building
3-16-11 Nishi Shinbashi
Minato-ku, Tokyo 105-0003, Japan
Telephone: + 81 3 5473 4641
www.assabsteels.com

Jordan

ENGINEERING WAY Est.
P.O. Box 874
Abu Alanda
JO-AMMAN 11592
Telephone: +962 6 4161962
engineeringway@assab.com

Malaysia

Head office
ASSAB Steels (Malaysia) Sdn Bhd
Lot 19, Jalan Perusahaan 2
Batu Caves Industrial Estate
68100 Batu Caves
Selangor Malaysia
Telephone: +60 3 6189 0022
www.assabsteels.com

Branch offices

BUTTERWORTH BRANCH
Plot 146a
Jalan Perindustrial Bukit Minyak 7
Kawasan Perindustrial Bukit Minyak
14000 Bukit Mertajam, SPT Penang
Telephone: +60 4 507 2020

JOHOR BRANCH

No. 8, Jalan Persiaran Teknologi
Taman Teknologi
81400 Senai
Johor DT, Malaysia
Telephone: +60 7 598 0011

New Zealand

VIKING STEELS
25 Beach Road, Otahuhu
P.O. Box 13-359, Onehunga
NZ-Auckland
Telephone: +64 9 270 1199
www.ssm.co.nz

Pakistan

ASSAB International AB
P.O. Box 17595
Jebel Ali
AE-Dubai
Telephone: +971 488 12165
www.assab.se

Philippines

ASSOCIATED SWEDISH STEELS
PHILS Inc.
No. 3 E. Rodriguez Jr., Avenue
Bagong Ilog, Pasig City
Philippines
Telephone: +632 671 1953/2048
www.assabsteels.com

Republic of Korea

Head office
ASSAB Steels (Korea) Co Ltd
116B-8L, 687-8, Kojan-dong
Namdong-ku
Incheon 405-310, Korea
Telephone: +82 32 821 4300
www.assabsteels.com

Branch offices

BUSAN BRANCH
14B-5L, 1483-9, Songjeong-dong
Kangseo-ku, Busan 618-270, Korea
Telephone: +82 51 831 3315

DAEGU BRANCH

Room 27, 7-Dong2 F
Industry Materials Bldg.1629
Sangyeog-Dong, Buk-Ku
Korea-Daegu 702-710
Telephone: +82 53 604 5133

Lebanon

WARDE STEEL & METALS SARL MET
Charles Helou Av, Warde Bldg
P.O. Box 165886
LB-Beirut
Telephone: +961 1 447228
lebanon@assab.com

Saudi Arabia

ASSAB INTERNATIONAL AB
P.O. Box 255092
SA-Riyadh 11353
Telephone: +966 1 4466542
saudiarabia@assab.com

Singapore

Head office Pacific
ASSAB Pacific Pte Ltd
171, Chin Swee Road
No. 07-02, SAN Centre
SG-Singapore 169877
Telephone: +65 6534 5600
www.assabsteels.com

Jurong

ASSAB Steels Singapore (Pte) Ltd
18, Penjuru Close
SG-608616 Singapore
Telephone: +65 6862 2200

Sri Lanka

GERMANIA COLOMBO (Ptd) Ltd
451/A Kandy Road
LK-Kelaniya
Telephone: +94 11 2913556
www.iwsholdings.com

Syria

WARDE STEEL & METALS SARL MET
Charles Helou Av, Warde Bldg
P.O. Box 165886
LB-Beirut
Telephone: +961 1 447228
lebanon@assab.com

Taiwan

Head office
ASSAB Steels (Taiwan) Co Ltd
No. 112 Wu Kung 1st Rd.
Wu Ku Industry Zone
TW-Taipei 248-87, Taiwan (R.O.C.)
Telephone: +886 2 2299 2849
www.assabsteels.com

Branch offices

NANTOU BRANCH
No. 10, Industry South 5th Road
Nan Kang Industry Zone
Nantou 540-66, Taiwan (R.O.C.)
Telephone: +886 49 225 1702

TAINAN BRANCH

No. 180, Yen He Street,
Yong Kang City
Tainan 710-82, Taiwan (R.O.C.)
Telephone: +886 6 242 6838

Thailand

ASSAB Steels (Thailand) Ltd
9/8 Soi Theedintai,
Taeparak Road, Bangplee,
Samutprakarn 10540, Thailand
Telephone: +66 2 385 5937,
+66 2 757 5017
www.assabsteels.com

United Arab Emirates

ASSAB INTERNATIONAL AB
P.O. Box 17595
Jebel Ali
AE-Dubai
Telephone: +971 488 12165
www.assab.se

Vietnam

CAM Trading Steel Co Ltd
90/8 Block 5, Tan Thoi Nhat Ward
District 12, Ho Chi Minh City
Vietnam
Telephone: +84 8 5920 920
www.assabsteels.com

Other Asia

ASSAB INTERNATIONAL AB
Box 42
E-171 11 Solna, Sweden
Telephone: +46 8 564 616 70
www.assab.se

Africa

Egypt

UNITED FOR IMPORT AND
INDUSTRIAL SUPPLIES
Montaser Project No 20
Flat No 14
Al Ahram Street-El Taba
EG-Giza Cairo
Telephone: +20 2 7797751
www.assab.se

Kenya

SANDVIK Kenya Ltd
P.O. Box 18264
Post code 00500
KE-Nairobi
Telephone: +254 20 532 866
sandvik@africaonline.co.ke

South Africa

UDDEHOLM Africa (Pty.) Ltd.
P.O. Box 539
ZA-1600 Isando/Johannesburg
Telephone: +27 11 974 2781
www.bohler-uddeholm.co.za

Tunisia

MCM Distribution
4 Bis, Rue 8610 - Z.I.
2035 Chargula 1
TN-Tunis
Telephone: + 216 71 802479
www.mcm.com.tn

Zimbabwe

Representative office:
UDDEHOLM Africa (Pty.) Ltd.
P.O. Box 539
ZA-1600 Isando/Johannesburg
Telephone: +27 11 974 2781
www.assab.se

Other African Countries

ASSAB INTERNATIONAL AB
Box 42
SE-171 11 Solna, Sweden
Telephone: +46 8 564 616 70
www.assab.se



Network of excellence

Uddeholm is present on every continent. This ensures you high-quality Swedish tool steel and local support wherever you are. Assab is our wholly-owned subsidiary and exclusive sales channel, representing Uddeholm in various parts of the world. Together we secure our position as the world's leading supplier of tooling materials.

Uddeholm is the world's leading supplier of tooling materials. This is a position we have reached by improving our customers' everyday business. Long tradition combined with research and product development equips Uddeholm to solve any tooling problem that may arise. It is a challenging process, but the goal is clear – to be your number one partner and tool steel provider.

Our presence on every continent guarantees you the same high quality wherever you are. Assab is our wholly-owned subsidiary and exclusive sales channel, representing Uddeholm in various parts of the world. Together we secure our position as the world's leading supplier of tooling materials. We act worldwide, so there is always an Uddeholm or Assab representative close at hand to give local advice and support. For us it is all a matter of trust – in long-term partnerships as well as in developing new products. Trust is something you earn, every day.

For more information, please visit www.uddeholm.com or www.assab.com

NDING
PRESEN
HING YOU EA
THING YO
A NEW WAY O
LIER OF TOO
STRENGTH INNOV
HIGH PERFORMA
RIALS PARTNERS
ACHINABIL
VING PROBLE
ENEFITS LONG
SOMETHING YO
A NEW WAY O
PPLIER OF TOO
KNOWLEDGE U
OVATION KNOWLEDG
PRESENCE LONG D
EARN, EVERY
AUTOMOTIVE
LD'S LEADING SI
RLD'S LEAD
TILITY TOUGHN
MENT PARTNERSH
WLEDGE UNDER
KNOWLEDG
ABILITY REL
NETWORK
LEMS AUTOM
TOTAL ECON
TOOLS TOTAL ECO
TILITY TOUGHN
NESS WORLDW
UST IS SOMETHIN
ANDING MACHINAB
SULTS SOLVING PROBLE
ECONOMY THE W
NESS STRENGT
TILITY TOUGHNESS STRI
OF TOOLING MATERIALS P
NOWLEDGE UNDERSTANDING MAC
URABILITY RELIABILITY
DAY LONG LASTING TOO
TRUST IS SOMETHING YOU EAR
IVE A NEW WAY OF THII
SUPPLIER OF TOOLING M
TRENGTH INNOVATION KN
HNESS STRENGTH INNOVATION K
PRESENCE LONG DURABILITY
RUST IS SOMETHING YOU EARN,
PROBLEMS AUTOMOTIVE