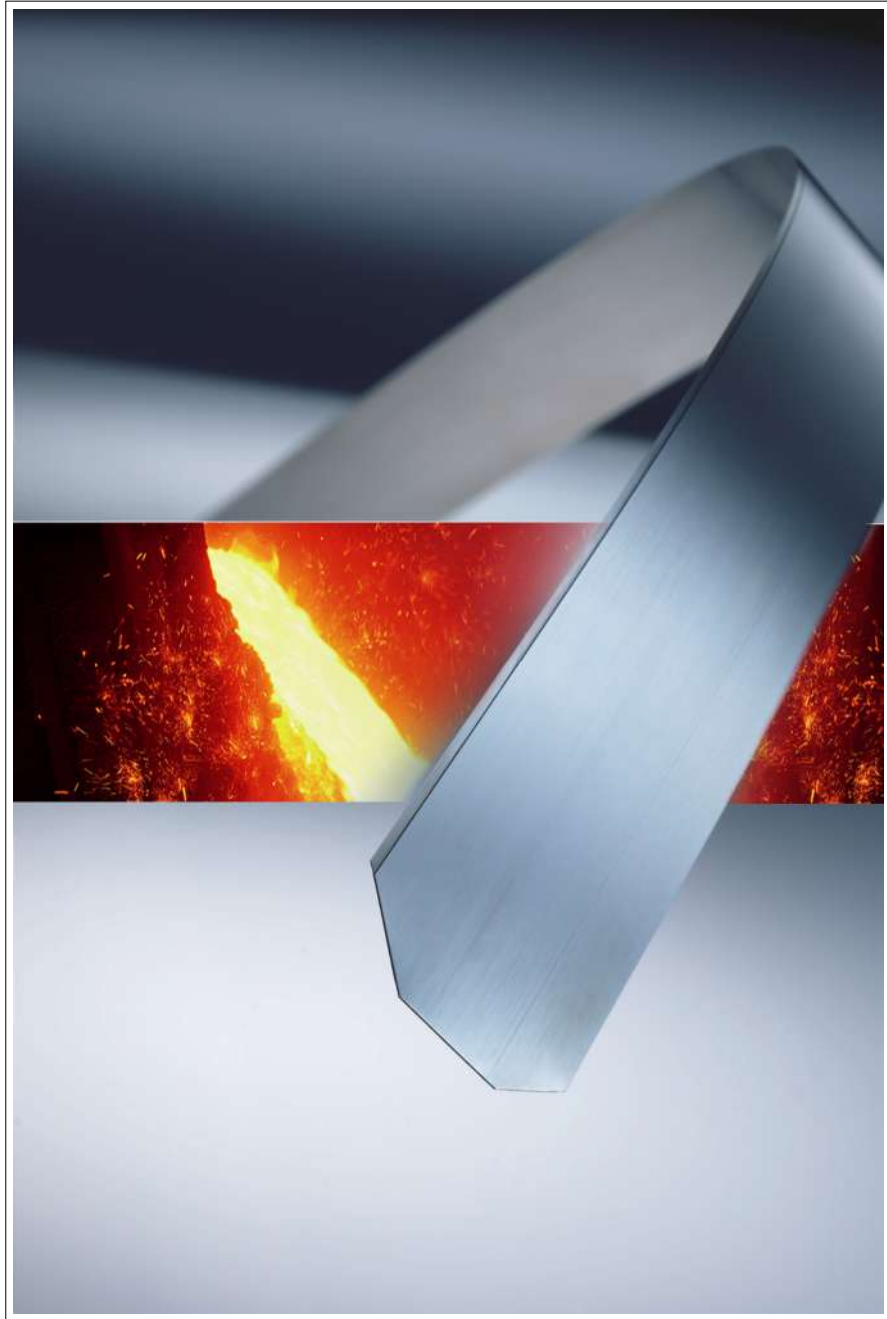


CONCEPTS AND SOLUTIONS FOR YOUR SUCCESS



VON ARX - ENGINEERING

VON ARX ENGINEERING + CO. AG

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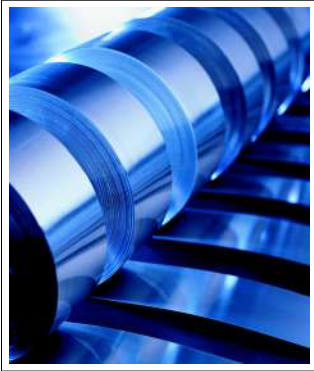
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COMPANY PROFILE

VON ARX ENGINEERING is a manufacturer of highest quality products for the printing industry. It is a slim, dynamic and well organized company. "We are in total control of the processes at any stage of the production. The result is a high productivity, a superior economy and 100% quality control", says René von Arx, CEO of VON ARX ENGINEERING + CO. AG. High quality products made in Switzerland to a favourable price-performance ratio.



DOCTOR BLADES FOR ROTOGRAVURE AND FLEXOGRAPHIC PRINTING

"INTRO-Line" is the covering brand name for the doctor blade delivery programme of VON ARX ENGINEERING. The close cooperation between VON ARX ENGINEERING and the material supplier guarantees a doctor blade quality of perfect evenness and highest purity. The continuous exchange of information leads to innovations, which are to the benefit of the end users.

DIAMOND CUTTING TOOLS

Another high-tech product of VON ARX ENGINEERING are cutting tools with diamond inserts for the machining of non ferrous materials. VON ARX ENGINEERING produces its own cutting tools for the machining of rotogravure cylinders and carry on a diamond grindservice for customers all over the world. The requirements regarding precision are indeed demanding. "Thanks to our long experience and the gathered know-how, we are able to fulfill the required level in every respect", emphasizes René von Arx, CEO.

ENGINEERING

Comprehensive project authority from the planing, the realisation, the monitoring to the support of whole projects is another strength of VON ARX ENGINEERING. Ist service reaches from the construction to the building of prototypes up to production stage and external support.

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VON ARX - ENGINEERING

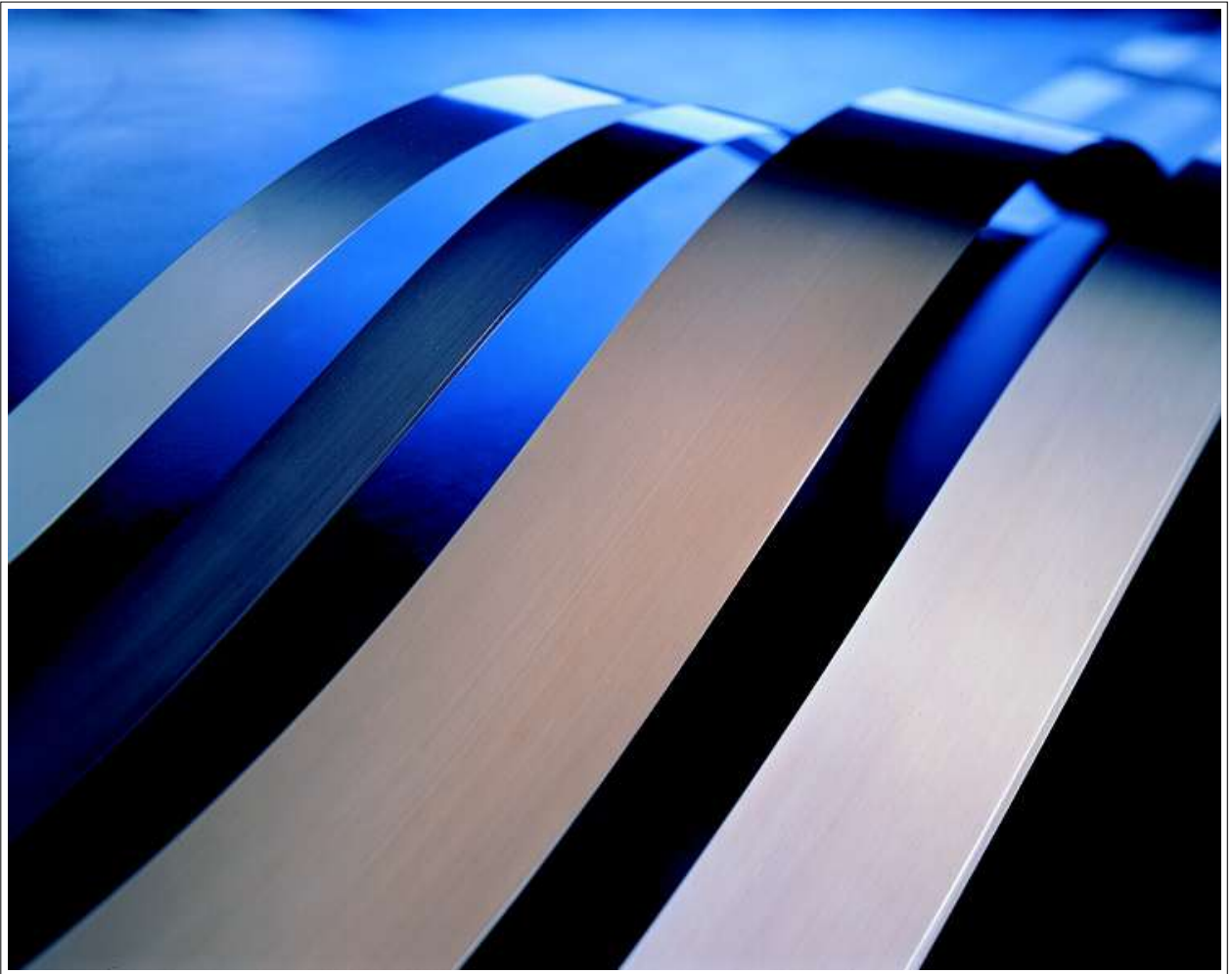
INTRO - LINE DOCTOR BLADE

DOCTOR BLADES for rotogravure and flexographic printing

“INTRO-Line” is the covering brand name for the Doctor Blade delivery programme of VON ARX ENGINEERING.

The close cooperation between VON ARX ENGINEERING and the material supplier guarantees a Doctor Blade quality of perfect evenness and highest purity.

The continuous exchange of information leads to innovations, which are to the benefit of the end users.



The INTRO-Line quality blades are a contribution to the protection of the customer's investment in cylinders and printing presses

The key to manufacture Doctor Blade is the material and competence in application knowledge

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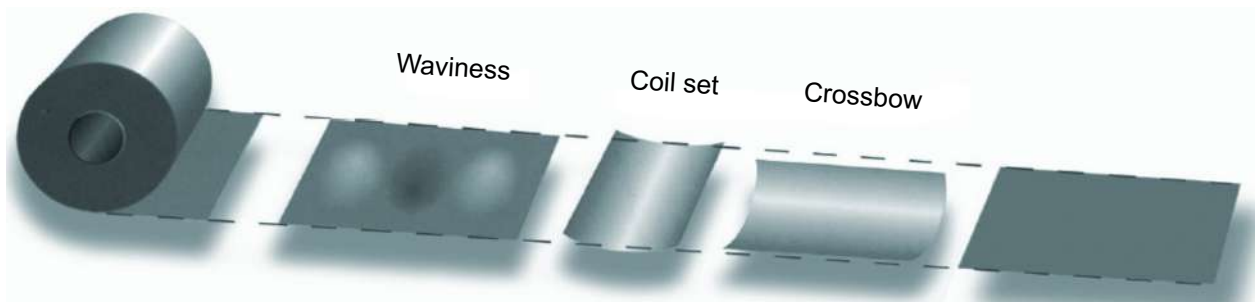


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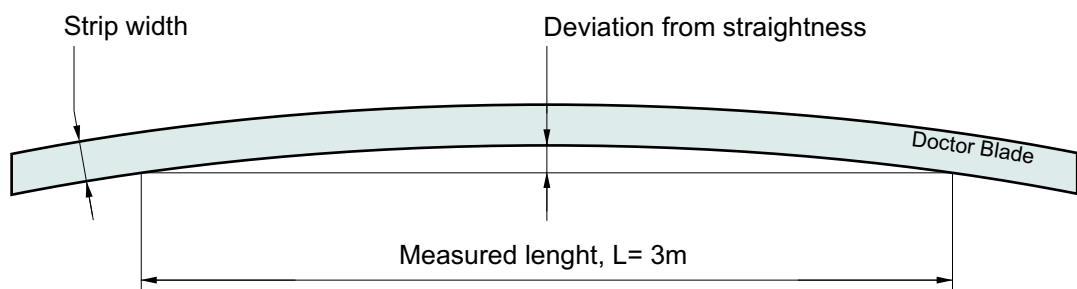
VON ARX - ENGINEERING

INTRO - Line Doctor Blade	Steel grade	Straightness
ROTOFLEX	CSA high purity carbon steel, finest carbides	< 0,8mm / 3000mm
UNIVERSAL	CSB clean carbon steel, average carbides	< 1,1mm / 3000mm
FLEXO	CSC standard carbon steel, bigger carbides	< 2,4mm / 3000mm
CHROMOFLEX	SSA high purity stainless steel	< 1,1mm / 3000mm
CORROFLEX	SSC stainless steel	< 3,6mm / 3000mm
LONGLIFE	TSA high purity toolsteel, finest carbides	< 1,1mm / 3000mm

DEVIATION OF STRAIGHTNESS



The deviation of flatness depends on different parameters: Rolling parameters, material properties, hardening line, hardness, width/thickness ratio.



Deviation of straightness is influenced by, hardening line, slitting and edge treatment









STANDARD DELIVERY PROGRAMME

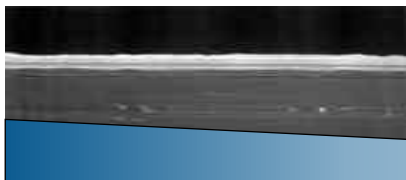
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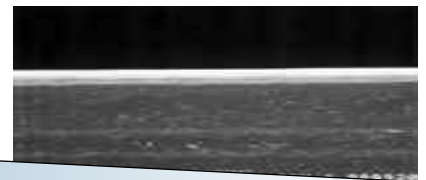
VON ARX - ENGINEERING

Steel grade	Edge finish	Edge designs	
CSA ROTOFLEX	Finest polished super finish	 SQUARE EDGE	 TWIN BEVEL EDGE
CSB UNIVERSAL	fine polished	 ROUND EDGE	 TWIN BEVEL EDGE
CSC FLEXO	standard polished	 BEVEL EDGE	 LAMELLA EDGE
SSA CHROMOFLEX	Finest polished super finish	 BEVEL EDGE	 TWIN LAMELLA EDGE
SSC CORROFLEX	standard polished		
TSA LONGLIFE	Finest polished super finish		



Standard polish

EDGE FINISH



Super finish

Width [mm]	Steelgrade				
	CSA	CSB	CSC	SSA	TSA
80	□ ◆	□ ◆ ○ ▲	□ ◆ ○		
70	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	
60	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	□ ◆
55	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	□ ◆
50	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	□ ◆
45	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	□ ◆
40	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	□ ◆
38	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	□ ◆
35	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	□ ◆
32	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	□ ◆
30	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	□ ◆
25	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	□ ◆
20	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	□ ◆
15	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	□ ◆
10	□ ◆	□ ◆ ○ ▲	□ ◆ ○	□ ◆	□ ◆

Thickness

- = 0.15mm
- ◆ = 0.20mm
- = 0.25mm
- ▲ = 0.30mm

our proposal your choice

Highest quality printing for rotogravure and flexographic printing

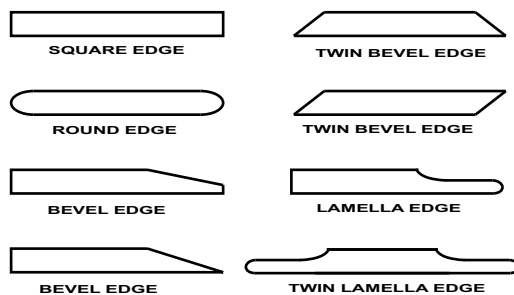
- ➔ excellent material structure
- ➔ excellent hardening properties
- ➔ right hardness level
- ➔ still capable to swing with the cylinder
- ➔ exact dimensions and smallest range of tolerances
- ➔ smooth surface
- ➔ best flatness
- ➔ best possible straightness (less than 0.8mm / 3m)
- ➔ super finish



ROTOFLEX is the factor for constant printing conditions

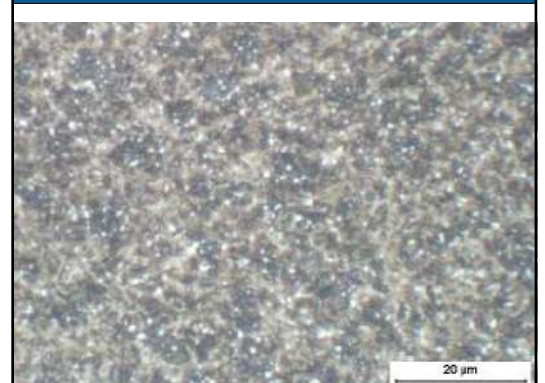
STEEL GRADE	TYPE OF MATERIAL	ANALYSIS	TENSILSTRENGTH HARDNESS	SURFACE	STRUCTURE DESCRIPTION
CSA	CARBON STEEL	C 1.00% Si 0.25% Mn 0.40% Cr 1.40%	1900 - 2100 N/mm ca. 600 HV	White-polished	tempered martensit, fine structure, fine carbides, good carbide distribution

AVAILABLE EDGE DESIGNS



All edge designs with **SUPER FINISH**

STRUCTURE



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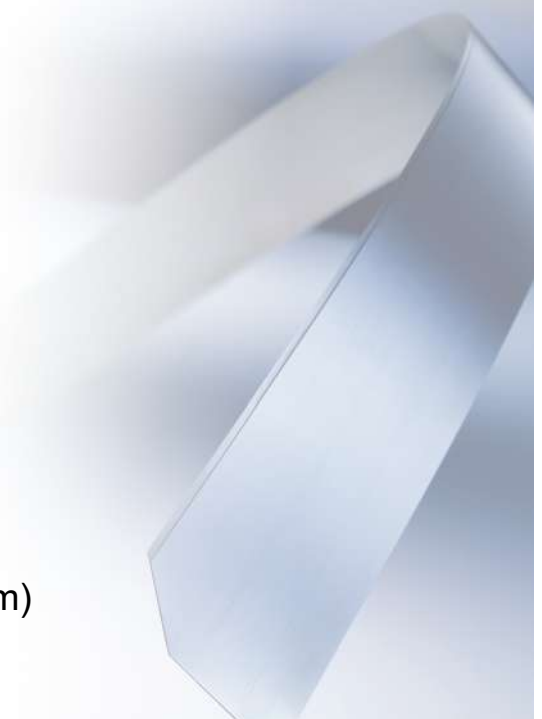
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High quality printing for rotogravure and flexographic printing

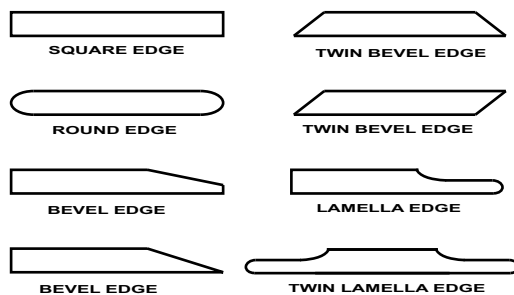
- ➔ very good material structure
- ➔ good hardening properties
- ➔ still capable to swing with the cylinder
- ➔ right hardness level
- ➔ exact dimensions
- ➔ good flatness
- ➔ good straightness (less than 1.1mm / 3m)
- ➔ good edge treatment, fine polished



UNIVERSAL the best price - performance ratio

STEEL GRADE	TYPE OF MATERIAL	ANALYSIS	TENSILSTRENGTH HARDNESS	SURFACE	STRUCTURE DESCRIPTION
CSB	CARBON STEEL	C 1.00% Si 0.25% Mn 0.40%	1900 - 2100 N/mm ca. 600 HV	White-polished	Tempered Martensit, good structure Constant carbide size good carbide distribution

AVAILABLE EDGE DESIGNS



All edge designs with FINE POLISH

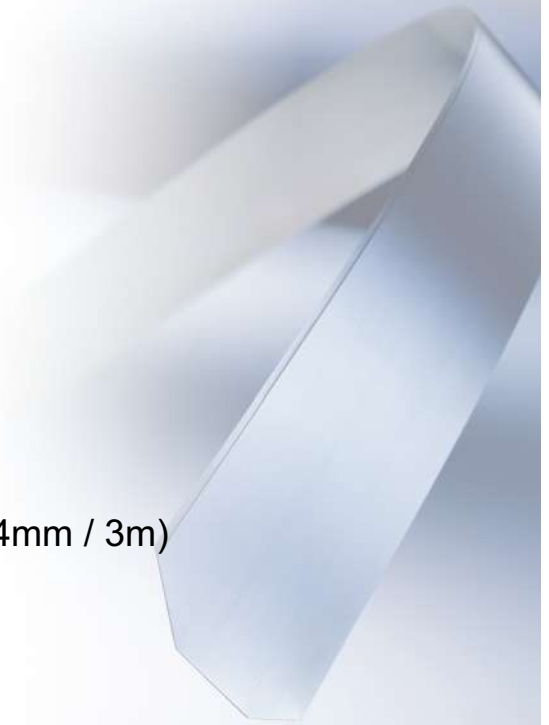
STRUCTURE



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For Flexo printing with short cylinder lenght

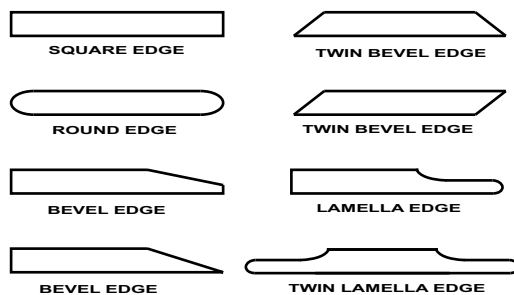
- ➔ good material structure
- ➔ low price
- ➔ good hardening properties
- ➔ right hardness level
- ➔ straightness is guaranted (less than 2.4mm / 3m)
- ➔ standard polished



FLEXO the low price quality Doctor Blade

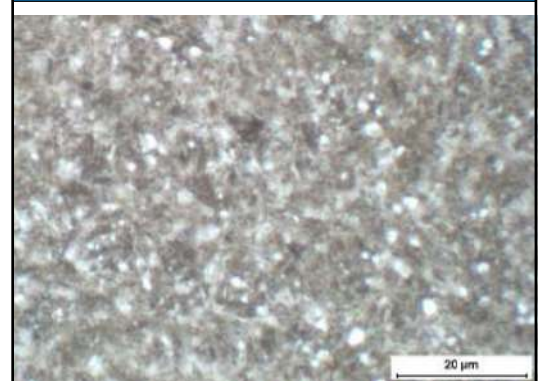
STEEL GRADE	TYPE OF MATERIAL	ANALYSIS	TENSILSTRENGTH HARDNESS	SURFACE	STRUCTURE DESCRIPTION
CSC	CARBON STEEL	C 0.70-1.00% Si 0.25% Mn 0.40%	1800 - 2100 N/mm ca. 580 HV	White-polished	tempered martensit, rougher structure, different carbide size and different carbide distribution

AVAILABLE EDGE DESIGNS



All edge designs with **STANDARD POLISH**

STRUCTURE



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High quality printing for rotogravure and flexographic printing

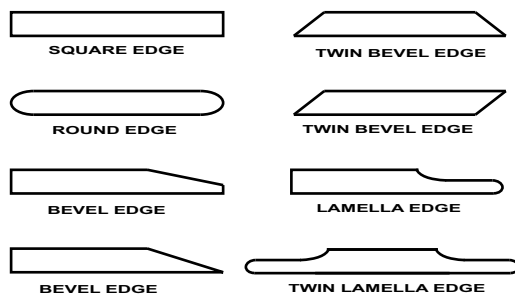
- ➔ very good material structure
- ➔ good hardening properties
- ➔ still capable to swing with the cylinder
- ➔ right hardness level
- ➔ exact dimensions
- ➔ good flatness
- ➔ good straightness (less than 1.1mm / 3m)
- ➔ good edge treatment, fine polished



CHROMOFLEX for print applications with extremely corrosive inks

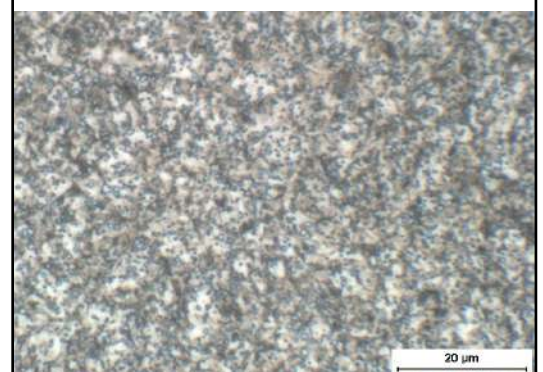
STEEL GRADE	TYPE OF MATERIAL	ANALYSIS	TENSILSTRENGTH HARDNESS	SURFACE	STRUCTURE DESCRIPTION
SSA	STAINLESS STEEL	C 0.40% Si max 1.00% Mn max 1.00% Cr 13.00 - 14.50% Mo 1.00% Ni max 0.50%	1750 - 1950 N/mm ca. 565 HV	White-polished	tempered martensit, fine structure, fine carbides, good carbide distribution

AVAILABLE EDGE DESIGNS



All edge designs with **SUPER FINISH**

STRUCTURE



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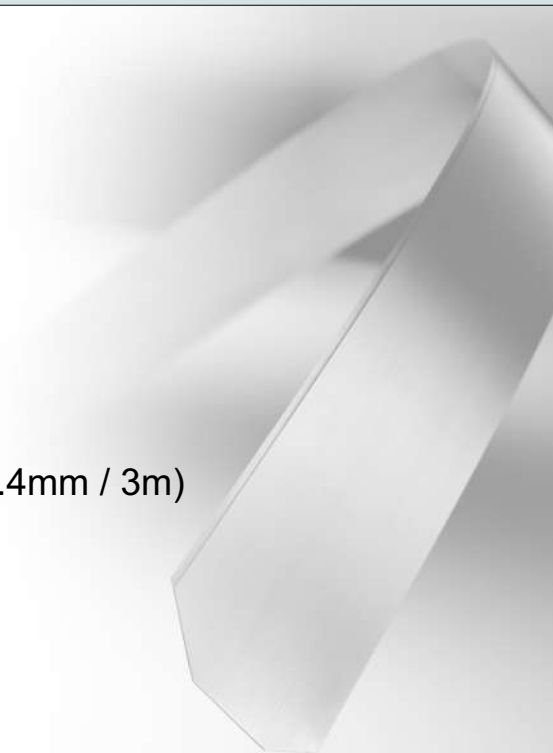
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For Flexo printing with short cylinder length

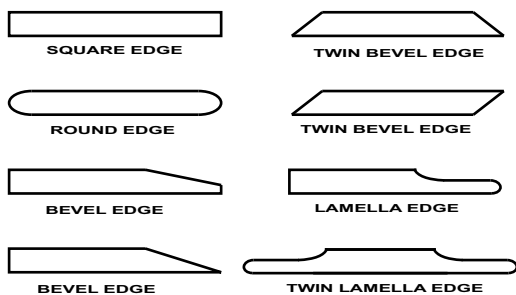
- ➔ good material structure
- ➔ low price
- ➔ right hardness level
- ➔ straightness is guaranteed (less than 2.4mm / 3m)
- ➔ standard polished



CORROFLEX the low price stainless steel Doctor Blade

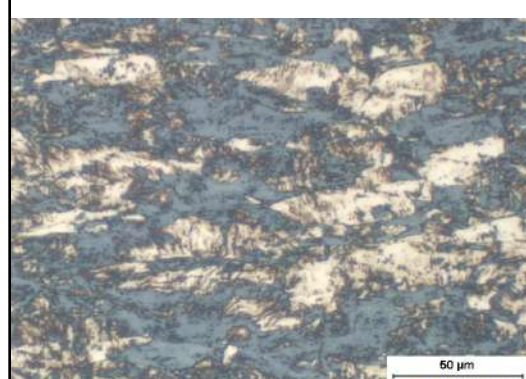
STEEL GRADE	TYPE OF MATERIAL	ANALYSIS	TENSILSTRENGTH HARDNESS	SURFACE	STRUCTURE DESCRIPTION
SSC	STAINLESS STEEL	C 0.10% Si max 2.00% Mn max 2.00% Cr 16.00 - 19.00% Ni 6.00 - 9.50%	1700 - 1900 N/mm ca. 555 HV	White-polished	no martensit, rough structure

AVAILABLE EDGE DESIGNS



All edge designs with **STANDARD FINISH**

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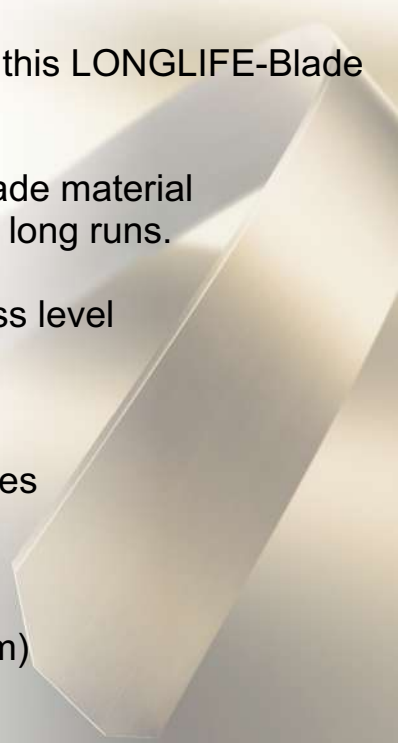
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Highest quality and longest run for rotogravure and flexographic printing

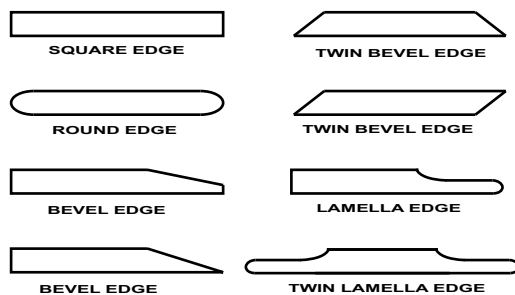
- ➔ the composition and the finest microstructure of this LONGLIFE-Blade is giving the exceptional wear resistance.
- ➔ it is not a coated blade, it is a very expensive blade material with best mechanical properties, developed for long runs.
- ➔ excellent hardening properties and right hardness level
- ➔ still capable to swing with the cylinder
- ➔ exact dimensions and smallest range of tolerances
- ➔ smooth surface and best flatness
- ➔ best possible straightness (less than 1.1mm / 3m)
- ➔ super finish



LONGLIFE - price is not always the decisive criteria

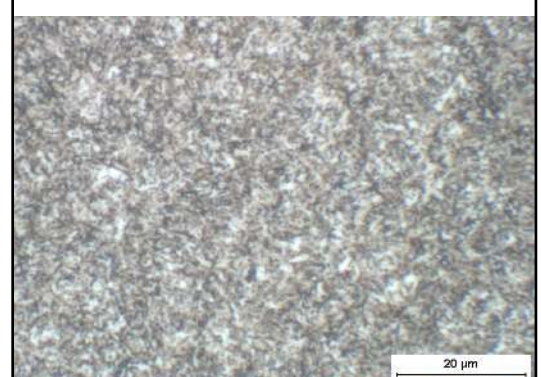
STEEL GRADE	TYPE OF MATERIAL	ANALYSIS	TENSILSTRENGTH HARDNESS	SURFACE	STRUCTURE DESCRIPTION
TSA	TOOL STEEL	C 0.55% Si 0.95% Mn 0.80% Cr 2.60% Mo 2.20% V 0.80%	2000 - 2200 N/mm ca. 620 HV	Gold-polished	tempered martensit, fine structure, no carbides highest wear resistance

AVAILABLE EDGE DESIGNS



All edge designs with **SUPER FINISH**

STRUCTURE



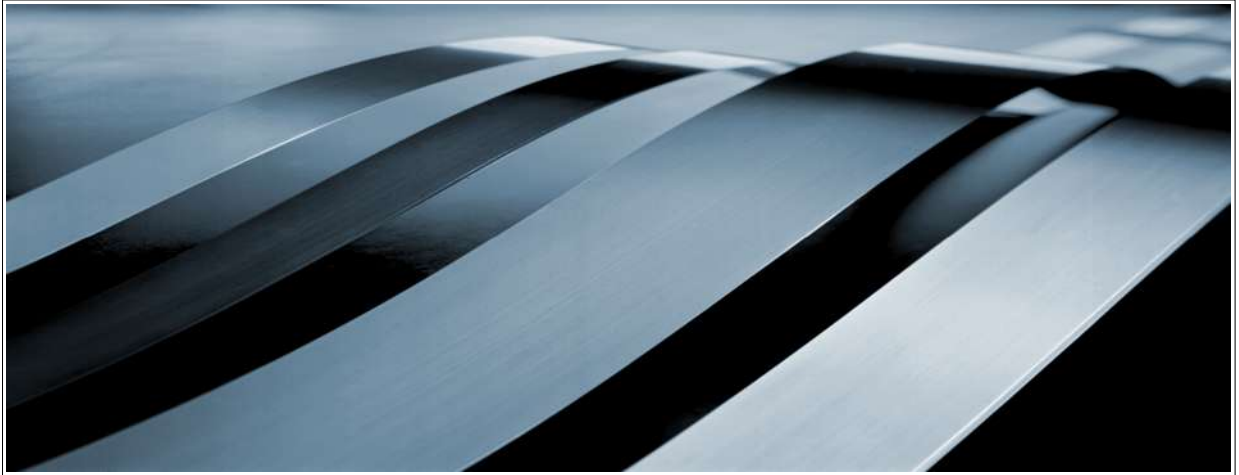
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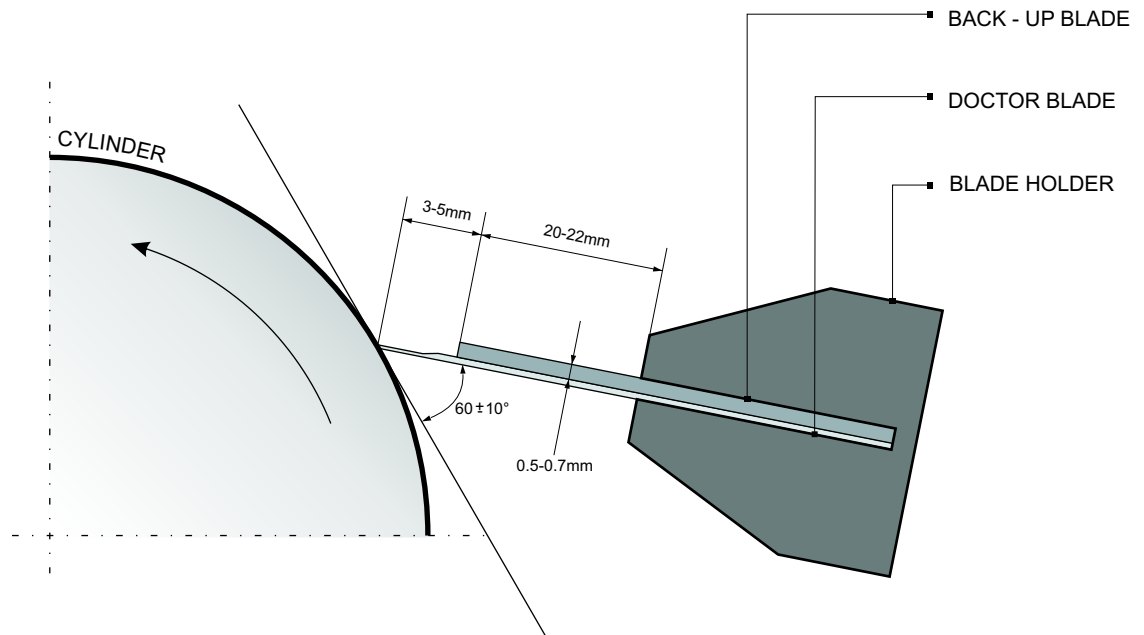
For constant quality and to examine the different Doctor Blade steels on the market, it is absolut necessary do have a technical laboratory service.



Therefore we support and offer to our customers, the following laboratory tests.

	COSTS
Tensile Test according to DIN EN 10002-1 Rp0.2 - Rp1.0 - Rm - A, further test procedures possible on request (price without preparation of specimens) The following load cells are available 500 N / 50 kN und 100 kN	90.00 EUR
Hardness Tests HV (EN ISO 6507-1) 5 measurements (standard)	90.00 EUR
Surface roughness measurements on flat and round material 3 measurements, Ra Rz Rmax	90.00 EUR
Metallographic Tests Quantitative evaluation of microstructure; Examination of grain size, carbide size and distribution, homogeneities (pictures), carbide imbedding, examination of the performed thermal treatment (brittleness, tempering, temperatures, equilibrium, phased arrays, interfaces and grain boundaries). (1 micrograph including description and documentation)	220.00 EUR
Strip edge and ground lamella examination (pictures both sides with documentation)	220.00 EUR
Metallographic tests together with edge and lamella examination	300.00 EUR
Complete spectrometric analyses of materials (including Carbon and Sulfur determination) Elements: C - S - Mn - Si - P - Cr - Mo - V - Ti - Ni	220.00 EUR

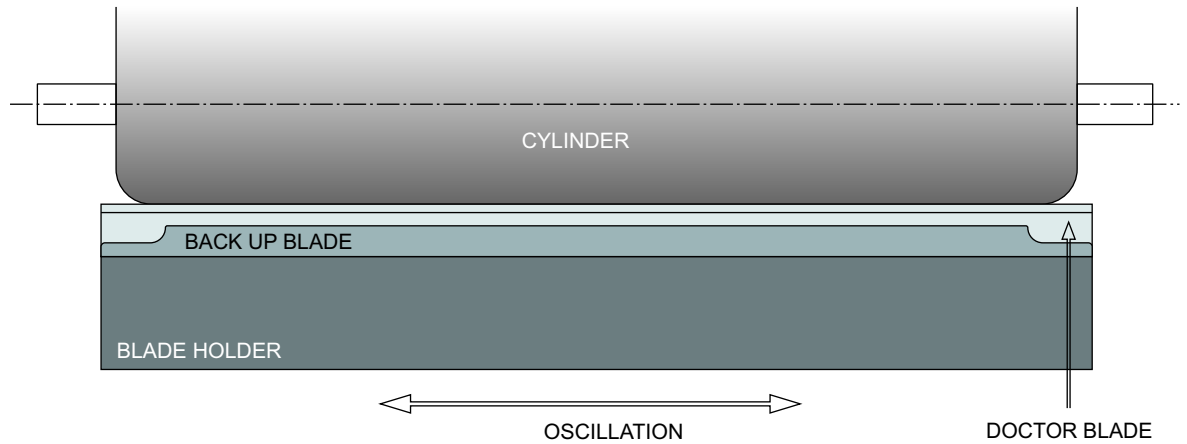
Situation



Recommended doctor blade settings:

- > Check blade holder for damages. Dents, nicks or bends. Make sure it's clean inside. Use always a backup blade.
- > We advice to take special backup blades wich are build to reduce cylinder endwear.
- > Set the blades straight in holder and make sure there is no waviness in Doctor Blade.
- > When bolts are used for tightening of blade holder, tighten from center and out crosswise.
- > Use measuring tape or other measuring tool for setting exactly the blade extensions.
- > Start with the following blade extensions:
Back-up blade 20mm and doctor blade 4mm (± 1 mm).
If necessary increase or decrease back-up blade extension.
- > Be careful by the adjustment and check doctor blade tip.
No nicks, no damages. The tip of the blade must be fine polished.
- > Fix the blade holder secure to the machine.
- > The contact angle between doctor blade and cylinder should be around 60° .
- > Start with low blade pressure and increase more if there is no clean wipe,
but try to use as low blade pressure as possible. (Less blade flex and less blade/cylinder wear).
- > Set the oscillation between 20 - 25mm.
Make sure the oscillation stroke is smooth, without jerks or stops.

Use a back-up blade, with special format ends to reduce cylinder endwear mustn't reach the endpoint of the cylinder when the doctor blade oscillates. It should stop approximately 10mm from cylinder end. Only the doctor blade should pass over this area.



Although copper is not the actual printing surface, its roughness and waviness have a large impact on the printing quality. A bad copper surface yields a bad chrome surface. For this reason roughness and waviness are normally measured in copper.

The desired roughness of a cylinder depends on the finishing process and the printing substrate. A polished cylinder has tolerances in surface roughness. You will get best results by machining the cylinders with use of diamond cutting tools. By polishing you make a rougher surface structure. This means that the roughness graph of a polished cylinder is more dispersed with steeper peaks and valleys.

The targeted roughness for polished cylinders has a range between 0,5 and 0,6 Rz; for cylinders machined with diamond cutting tools the range is between 0,4 and 0,5 Rz. Coated stock, transparent, or reflecting substrates are more sensitive than uncoated stock to the roughness of the cylinder surface. Roughness exceeding the target range produces ink transfer in non-printing areas. Surfaces that are too smooth yield too little doctor blade lubrication, which causes permanent chrome wear.

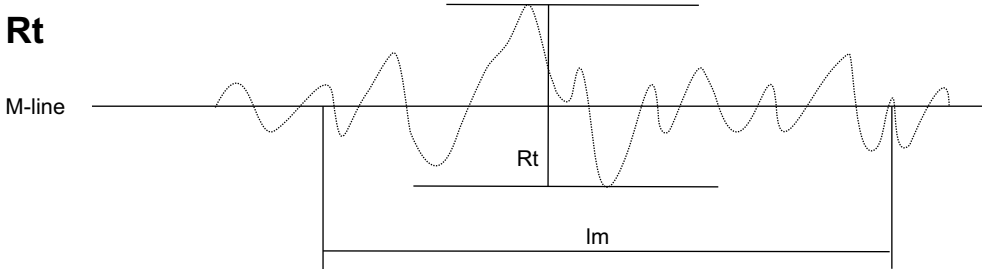
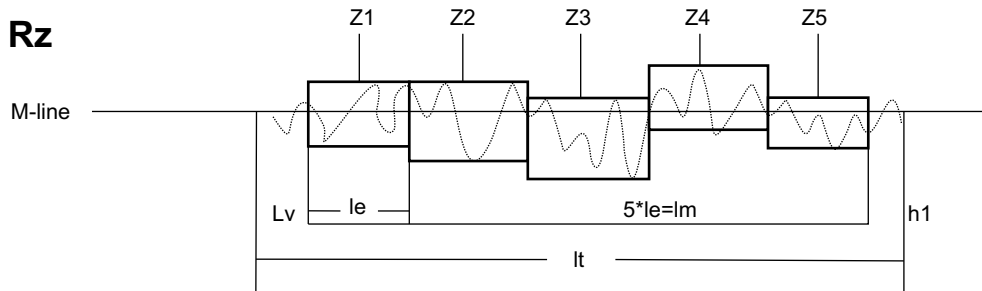
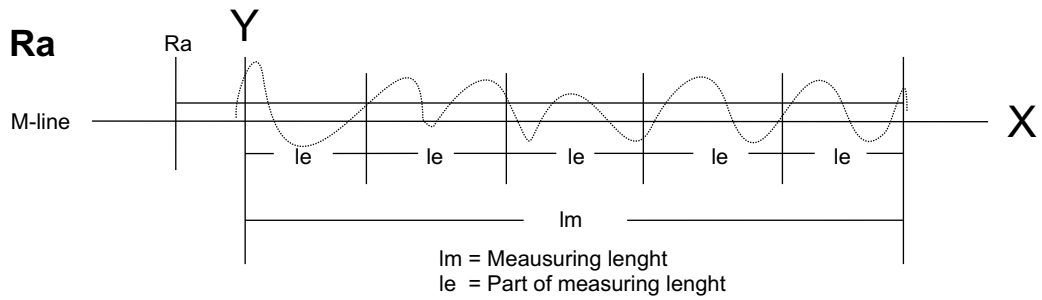
Roughness describes the short cycles of unevenness. Waviness describes larger cycles of unevenness. Waviness is measured in axial direction on the cylinder face. If the waviness is too high, the cylinder face will have valleys to which the doctor blade will not be able to correct, thus creating unintended ink transfer. The target value for waviness is to have less than 1 micron over a measuring length of 15 mm. Roughness and waviness can both be measured on the same instrument. The instrument drags a diamond probe across the cylinder surface and records the relief. Roughness measurements are denominated in Rt, Rz and Ra. They are defined as follows:

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Ra is the arithmetical average value of all absolute distances of the roughness profile from the center line within the measuring length.

Rz is the average maximum peak to valley of five consecutive sampling lengths within the measuring length.

Rt is the maximum peak-to-valley height within the measuring length.

It follows from these definitions that the relation $Rt \geq Rz \geq Ra$ is always true. For the gravure cylinder, Rz and Ra are useful measurements. Ra averages all measurements and does not have any discriminating value in separating rejects from acceptable cylinders

Specification for rotogravure printing:

Cylinder	Hardness	Thickness
Copper	220-225 vickers	-
Chrome	900-1100 vickers	6-8u

Cylinder roughness	Ra	Rz
Copper	-	-
Chrome	0.05-0.06	0.4-0.6

For perfect gravure cylinders, use our DIAMOND-Grindservice.
 DIAMOND TOOLS made by **VON ARX ENGINEERING + CO. AG.**

CUSTOMER INFORMATION

Company

Contact Person

Address

ZIP / City

Country

Phone No.

Fax No.

E-Mail

APPLICATION

(Please mark your choice)

- | | |
|--|---|
| <input type="checkbox"/> Gravure - Printing | <input type="checkbox"/> Decor - Printing |
| <input type="checkbox"/> Illustration - Printing | <input type="checkbox"/> Flexo - Printing |
| <input type="checkbox"/> Packaging - Printing | <input type="checkbox"/> Other _____ |

Type of the machine

Cylinder lenght mm Cylinder diameter mm Max. Speed m/s

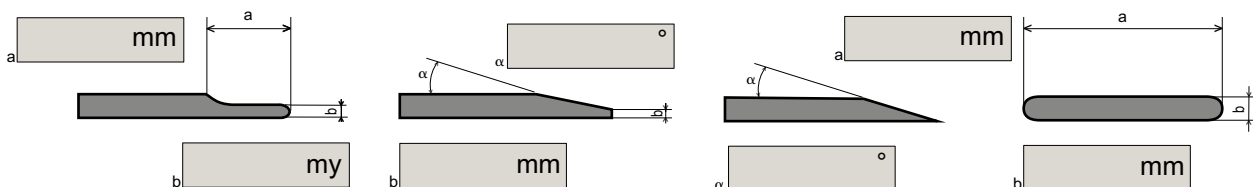
Manufacturer of the cylinder

Ink - Product Ink - Supplier

DOCTOR BLADE

Typ Width mm Thickness mm

Edge design



KIND OF PROBLEM

1. Print this file
2. Fill it out
3. Fax it to us

Date: ____ . ____ . ____ Signature _____

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