

**FERAN® Aluminum clad steel
for Power Plant Applications for
DACC - Traceability System**



Overview Traceability System

| | | | | | | |
|--|---|---------------------------------|---|------------------------|-----------------------------|---|
| Clad-producer delivers to the welding company | Bill of Lading | Delivery advice note | Packing list / Coil marking VE-No: represents the pallet/coil number for the entire material volume | Inspection Certificate | Insurance Cargo Certificate | Certificate of Origin |
| Welding company delivers for the next step | Bill of Lading | Delivery advice note | Packing List | Inspection Certificate | Insurance Cargo Certificate | Certificate of Origin |
| Brazing company delivers | Brazing parameters . Brazing batch numbers | Flux, Al-Fin - material used | Tubes used | | Inspection results | Certificate of Origin |
| Bundle producer delivers | | | | Vaccuum test results | | |
| DACC producer generate data for every single tube in the bundles | | | | | | Lay-out drawing for every bundle |

Traceability by Wickeder

- › Original documents provided by Wickeder to the welding company:
 - * Bill of Lading and/or
 - * Delivery Advice Note
 - * Packing List (including VE.-No. which represents pallet/coil numbers)
 - * Inspection Certificate (including Chemical and Physical properties and Project Name)
 - * Certificate of Origin
 - * Insurance Cargo Certificate (if necessary)



Documents provided by Wickeder

Delivery advice

Wickeder Westfalenstahl

Wickeder Westfalenstahl GmbH - Postfach 1434 - D-58734 Wickede (Ruhr)

DELIVERY ADVICE

Order no. Customer no. Agent

Delivery advice no. 

Legal requirements regarding secure loading have been pointed out

Delivery will be made subject to our general conditions of sale and despatch:

Carrier
Your order
Deliv. conditions (Incoterms 2010), duty not paid, export packaging included

FERAN, COLD ROLLED STEEL STRIP

Project:
Customs tariff no.
Country of dest.
Packing Non-Returnable Pallets

*per etc.
Container No.
Plombe No.

Content:

| Item | VE-no. | Thickn. /mm | Width /mm | Heat | Gross /kg | Net /kg | Coils | TGR | Certificate | Ktgr |
|-------|--------|-------------|-----------|--------|-----------|---------|--------|--------|-------------|------|
| 04.03 | R04084 | | | 771804 | 3.992 | 3.952 | 1 | 219388 | 551 | |
| 04.03 | R04085 | | | 771804 | 4.194 | 4.154 | 1 | 219388 | 551 | |
| 04.03 | R04086 | | | 771804 | 3.976 | 3.936 | 1 | 219388 | 551 | |
| 04.03 | R04087 | | | 771804 | 3.964 | 3.924 | 1 | 219388 | 551 | |
| 04.03 | R04088 | | | 771804 | 3.972 | 3.932 | 1 | 219388 | 551 | |
| 05.02 | R04083 | | | 049884 | 4.028 | 3.988 | 1 | 219268 | 551 | |
| | | | | | 6 | 24.126 | 23.886 | 6 | | |

VE-no. Delivery unit T=Part delivery G=Complete delivery R=Balance delivery

Wickeder Westfalenstahl GmbH
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D-58734 Wickede (Ruhr)
www.wickeder.de

Fon +49 (0) 23 77 917 - 01
Fax +49 (0) 23 77 917 - 10
E-mail: info@wickeder.de
Geschäftsbereich: Wickede (Ruhr)

Handelsregister Amtsberg HRB 4396
USt-Id-Nr. DE 81688483
Geschäftsbereich: Wickede (Ruhr)
Dr. Jürgen E. Platt (Vorl.), Dirk Benschel

Deutsche Bank AG, Leinfelden (BLZ 440 700 04) 05330300 IBAN DE76 4407 0004 0007 0000 00 BIC DEUT 33 330
Volkswagen Leasing AG (BLZ 414 622 90) 230181 IBAN DE76 4146 2005 0000 0018 01 BIC GENO 33 110
HSH Nordbank AG, Hamburg (BLZ 251 200 00) 10043300 IBAN DE25 2512 0000 0000 0000 00 BIC HSHN 33 110

Packing list

Wickeder Westfalenstahl

Wickeder Westfalenstahl GmbH - Postfach 1434 - D-58734 Wickede (Ruhr)

PACKING LIST

Order no. Customer no.

Delivery advice no.

| Item | VE-no. | Thickn. /mm | Width /mm | Gross /kg | Net /kg | Coils | Certificate |
|-------|--------|-------------|-----------|-----------|---------|--------|-------------|
| 04.03 | R04084 | | | 3.992 | 3.952 | 1 | 219388 |
| 04.03 | R04085 | | | 4.194 | 4.154 | 1 | 219388 |
| 04.03 | R04086 | | | 3.976 | 3.936 | 1 | 219388 |
| 04.03 | R04087 | | | 3.964 | 3.924 | 1 | 219388 |
| 04.03 | R04088 | | | 3.972 | 3.932 | 1 | 219388 |
| 05.02 | R04083 | | | 4.028 | 3.988 | 1 | 219268 |
| | | | | 6 | 24.126 | 23.886 | 6 |

Markierung:

Contract No. _____

FERAN, COLD ROLLED STEEL STRIP

Coil-Number
Chargen-Number
Number of Coils
Weight in kg

Wickeder Westfalenstahl GmbH
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Inspection certificate

Wickeder Westfalenstahl

Wickeder Westfalenstahl GmbH - Postfach 1434 - D-58734 Wickede (Ruhr)

Inspection certificate No. 219388

EN 10204 - 3.1

| Our Order-No. | Pos. | Thickness | Width | Length |
|---------------------|------|-----------|-------|--------|
| Your order Contract | | | | |

Chemical composition (%)

| Heat-No. | C | Si | Mn | P | S | Cr |
|-----------------------|---|----|----|---|---|-----|
| Mechanical properties | | | | | | |
| Yield point | | | | | - | MPa |
| Tensile strength | | | | | - | MPa |
| Elongation (A80 mm) | | | | | - | % |
| Layer thickness | | | | | - | µm |

FERAN, COLD ROLLED STEEL STRIP

Project:

We hereby certify that the material described above has been tested and complies with the terms of the order contract. This certificate has been created by a data processing system and is valid without a personal signature.

Quality Department
Schmidt
Works Inspector

Wickeder Westfalenstahl GmbH
Postfach 1434
D-58734 Wickede (Ruhr)
www.wickeder.de

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Documents provided by Wickeder

Invoice


Wickeder Westfalenstahl GmbH - Postfach 3454 - D-58734 Wickede (Ruhr)

Invoice

Order No. Customer No. Agent
Invoice No. Delivery Advice No. Delivery Date

Delivery will be made subject to our general conditions of sale and despatch :
Forwarding Agency Peter Wittwer
6 Units - Net 23886 Kg - Gross 24126 Kg
6 Non-Returnable Pallets

Delivery conditions :
export packaging included

Your Order :
FERAN, COLD ROLLED STEEL STRIP
Project:

| Item | Thick. | Width | Length | Price | PU | Quantity | QU | D | Amount |
|----------|--------|-------|--------|-------|----|----------|----|---|--------|
| | | | | EUR | | | | | EUR |
| 04 | | | | | 3 | 19.898 | kg | | ----- |
| 05 | | | | | 3 | 3.988 | kg | | ----- |
| Freight: | | | | | | | | | 3 |
| Total | | | | | | | | | ----- |

QU=quantity unit, PU(price unit):
1=1 unit, 2=100 units, 3=1000 units, 4=total, 5=1000 units weight of incoming goods
D(Delivery): P=Partial, C=Complete, B=Balanced


Payment Terms :

... Page 2

| | | | | | |
|--|--|--|--|--|--|
| Wickeder Westfalenstahl GmbH Hauptstraße 6 D-58734 Wickede (Ruhr) www.wickeder.de | Fon +49 (0) 23 77 917 - 0 Fax +49 (0) 23 77 917 - 100 e-mail: info@wickeder.de Geschäftsbereich: Wickede (Ruhr) | Handelsagentur Ansbang HRD 4305 Waldstraße 4 D-58734 Wickede (Ruhr) www.ansbang.de Dr. Jürgen E. Peter (Vollz.), Dirk Benschke | Wickeder Westfalenstahl GmbH Hauptstraße 6 D-58734 Wickede (Ruhr) www.wickeder.de | Fon +49 (0) 23 77 917 - 0 Fax +49 (0) 23 77 917 - 100 e-mail: info@wickeder.de Geschäftsbereich: Wickede (Ruhr) | Handelsagentur Ansbang HRD 4305 Waldstraße 4 D-58734 Wickede (Ruhr) www.ansbang.de Dr. Jürgen E. Peter (Vollz.), Dirk Benschke |
|--|--|--|--|--|--|

| | | |
|---|--|--|
| Deutsche Bank AG, Ansbang BLZ 445 700 04 08730300 IBAN DE75 4457 0004 0007 3353 00 BIC SOLF 33 DE 445 | Wickeder Westfalenstahl GmbH BLZ 214 422 80 320180 IBAN DE76 4445 2205 0002 3116 01 BIC WWSW 33 DE 100 | HSH Nordbank AG, Hamburg BLZ 210 500 00 1004430233 IBAN DE10 2105 0000 1000 4302 33 BIC HSHN 33 DE 100 |
|---|--|--|

Certificate of Origin


Wickeder Westfalenstahl GmbH - Postfach 3454 - D-58734 Wickede (Ruhr)

Invoice

Order No. Customer No. Agent
Invoice No. Delivery Advice No. Delivery Date

This invoice concerns to a tax-free export supply according to § 4 No. 1 in connection with § 6 UStG.

| | | |
|---|---|----------|
| 1. Absender - Destinataire - Expéditeur - Expediente WICKEDER WESTFALENSTAHL GMBH HAUPTSTRASSE 6 D-58734 WICKEDER (RUHR) GERMANY | L 674527 | ORIGINAL |
| 2. Empfänger - Destinataire - Destinataire EUROPAISCHE GEMEINSCHAFT EUROPEAN COMMUNITY - COMMUNAUTÉ EUROPÉENNE - COMUNITÀ EUROPEA URSPRUNGSZEUGNIS CERTIFICATE OF ORIGIN - CERTIFICAT D'ORIGINE CERTIFICADO DE ORIGEN | | |
| 3. Ursprungsland - Country of origin - Pays d'origine - País de origen GERMANY (EUROPEAN UNION) | | |
| 4. Angaben über die Beförderung - means of transport - expéditeur - expédition Seefracht | 5. Bemerkungen - remarks - observations - observaciones | |
| 6. Laufende Nummer, Zeichen, Nummern, Anzahl und Art der Packstücke, Warenbezeichnung - item no., marks, signs, number and kind of packages, description of goods - No. de pzas., marquage, marcas, número y naturaleza de los coils, descripción de mercancías - No. de orden, marcas, nros., cantidad y naturaleza de los bultos, descripción de las mercancías | 7. Menge - Quantity Quantité Cantidad | |
| 1 / 6 Cases / FERAN, one side aluminum clad mild steel | GROSS: 24,126 kg NET: 23,886 kg | |
| 8. DIE UNTERSCHREIBENDE STELLE BERECHNIGT, DASS DIE OBEN BEZUCHNETEN WAREN URSPRUNG IN DEM IN FELD 3 GEWÄHRTE LAND HABEN. The undersigned authority certifies that the goods described above originate in the country shown in box 3. L'autorité désignée certifie que les marchandises désignées ci-dessus sont originaires du pays figurant dans le case No. 3. La autoridad inspectora certifica que las mercancías arriba mencionadas son originarias del país que figura en el recuadro No. 3. | | |

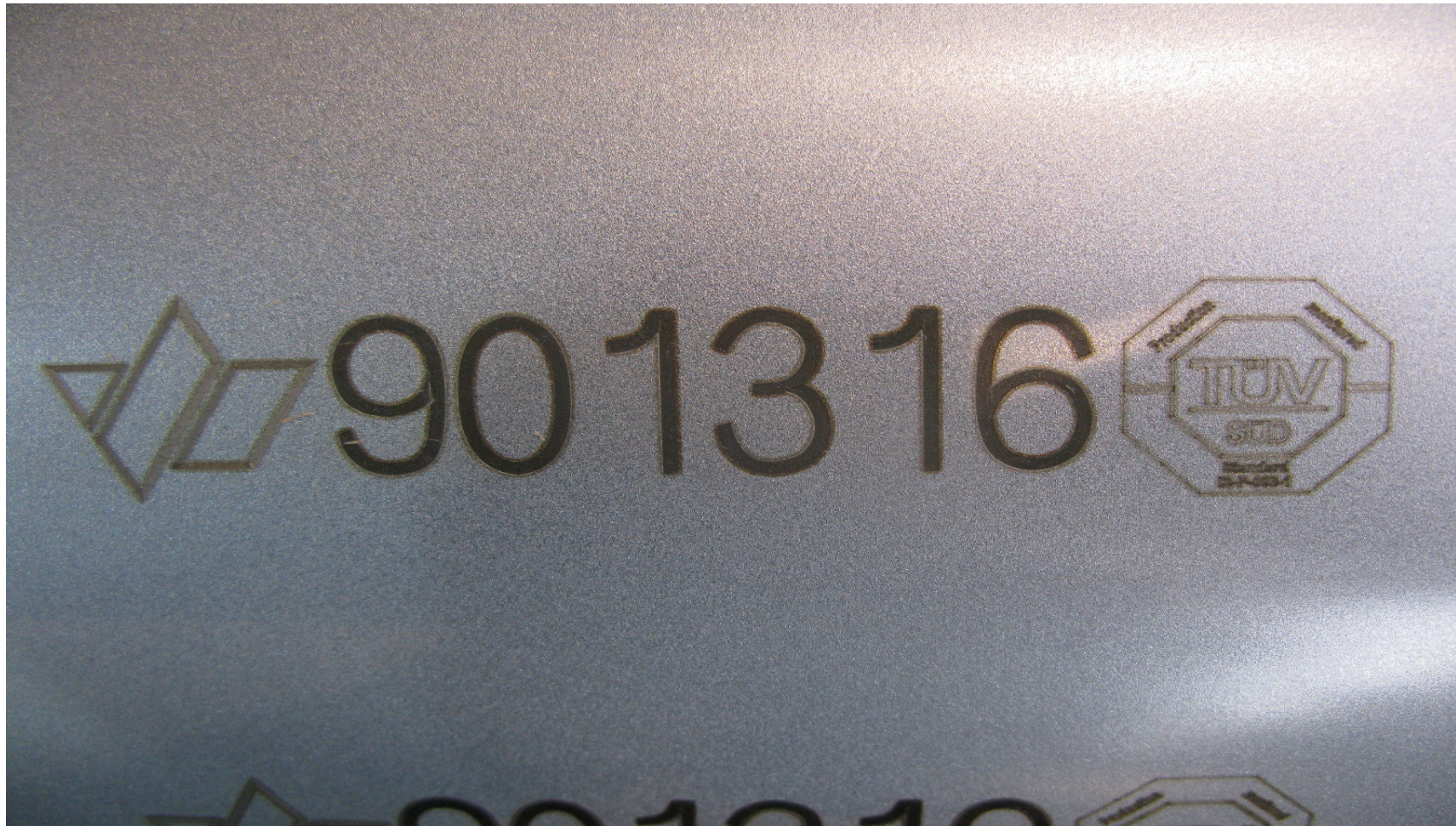
Ort und Datum der Ausstellung, Bezeichnung, Unterschrift und Stempel der zuständigen Stelle
Place et date de l'émission, désignation, signature et cachet de l'autorité compétente
Lugar y fecha de expedición, nombre, firma y sello de la autoridad competente

Genehmigung mit Verfügung durch die Bundesfinanzdirektion Südost vom 01. März 2010 Z 4075 - 5 / ZF 411 Fassung: 1981

Special Marking by Wickeder

- › Since 2014 Wickeder has well established an own laser-marking system which allows us to inspect on site at a power plant when material has been produced for which customer and/or related power plant project. Inspection carried out by Wickeder's well trained experts at finished bundles needs to be made prior of installing the bundles on the cooling tower itself.
- › Wickeder can either use its own marking and/or a special marking which can be provided by the power plant owner.

// Sample of special marking by Wickeder

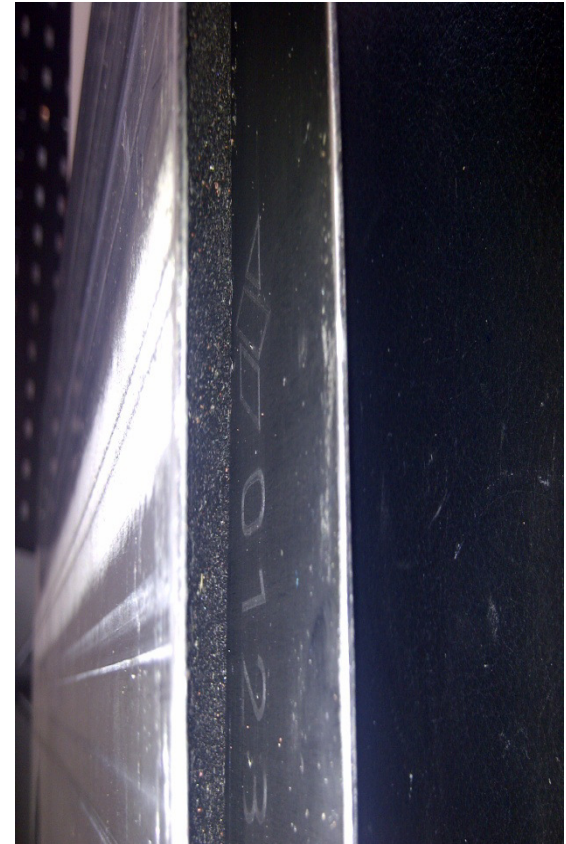


// Traceability



Traceability

>





Physical/Chemical/Optical Unique Identifier of Wiwe-Feran

- › Steel content analysis
- › Aluminum content analysis
- › Aluminum variations of Al-layer thickness
- › REM Analysis
- › Material microstructure cross sections
- › Material thickness
- › Marking numbers
- › Distance between marking numbers
- › TÜV logo
- › Wiwe logo
- › Surface
- › Surface structure



Recommendation:

- › Overview of some ideas
 - › Material thickness including tolerances: Standard 1,52 +/-0,04 mm,
 - › Drawing of tube shape
 - › Documentation of tube shape, no dog bone
 - › Lay-out drawing for every bundle
 - › Warranty period in years,
 - › Content/Details of warranty
 - › Traceability documents:
 - › a: Delivery Advice Note
 - › b: Packing list
 - › c: Inspection Certificate
 - › d: Certificate of Origin
 - › Insist on Al-Clad Material in all upcoming contracts, neither Al-plated nor Al-coated Material like HDA should be allowed
 - › Name of the Supplier of Al-Clad Material
 - › Copy of unpriced purchase order between Al-Clad raw material supplier and welding company
 - › Al-Clad Layer not below 50 microns
 - › Welding zone must be covered by Al-Spray-Technology, Documentation
 - › Documentation of pressure test
 - › Documentation of welding zone tests in welding zone tube
 - › Documentation of welding zone tests in welding zone header plates
 - › Wind stabilizer documentation
 - › SPE create own numbering systems for laser marking
 - › Checking of the finished bundles on site at the power plant location before final assembling on the cooling tower



Recommendation:

- › Traceability documents:
 - › a: Delivery Advice Note
 - › b: Packing list
 - › c: Inspection Certificate
 - › d: Certificate of Origin
 - › Name of the Supplier of Al-Clad Material

- › Copy of unpriced purchase order between Al-Clad raw material supplier and welding company



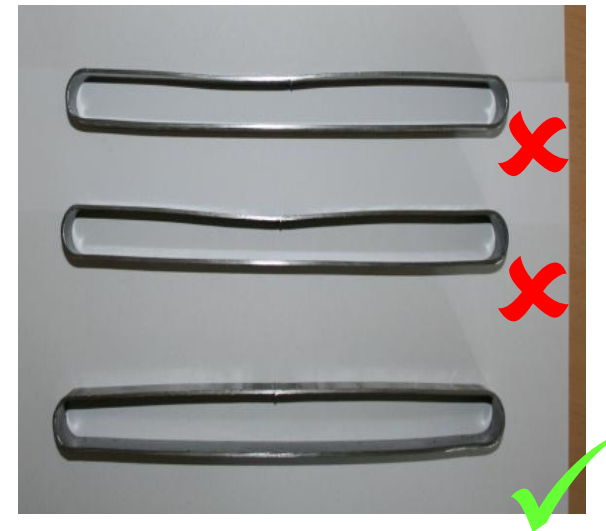
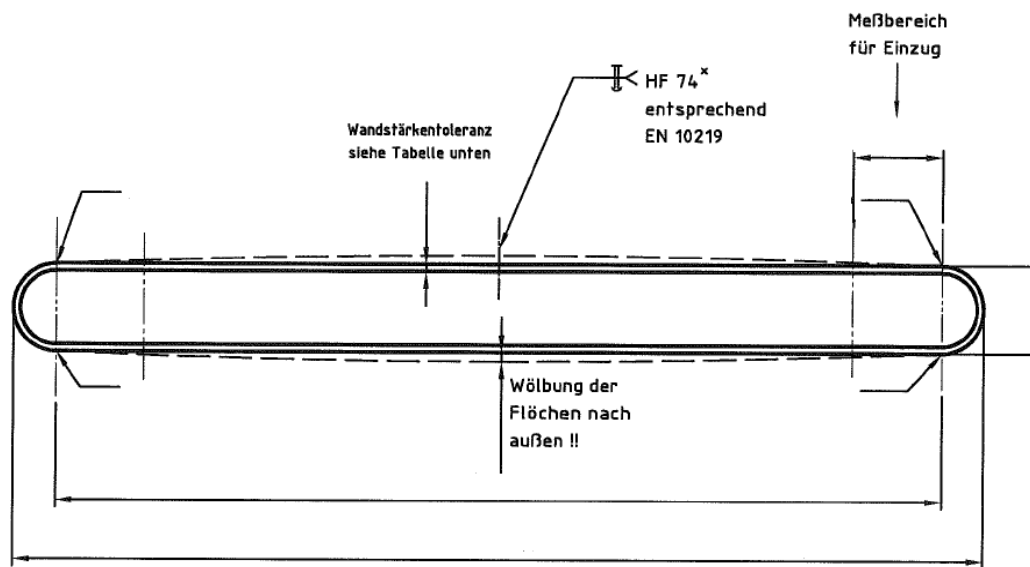
Recommendation:

- › Material thickness including tolerances:
- › Standard 1,52 +/-0,04 mm,
- › To save costs some DACC producer try to change to:
- › A: Thickness 1,52 + 0/ – 0,08 mm, with an average of 1,48 mm
- › B: Thickness 1,37 to 1,44 mm
- › C: Other combinations



Recommendation:

- > Drawing of tube shape
- > Documentation of tube shape, no dog bone





Recommendation:

- › Lay-out drawing for every bundle
- › In the lay-out drawing all bundles are described with a documentation regarding all single tubes within each individual bundle.
- › According to DIN ISO Certificates all producers are obliged to have a complete chain of evidence regarding all different used materials (including coil material) and all production process steps.
- › The lay-out drawing enables the end user to develop a test procedure for checking each individual bundle before installation.
- › Endoskop
- › Al-layer thickness measurement
- › Inspection of the surface structure
- › Others
- › Based on statistical methods



Recommendation:

- › Contractual issues:
- › Warranty period in years,
- › Content/Details of warranty
- › Insist on Al-Clad Material in all upcoming contracts, neither Al-plated nor Al-coated Material like HDA should be allowed
- › Al-Layer not below 50 microns
- › Welding zone must be covered by Al-Spray-Technology incl. documentation
- › Documentation of pressure tests for all bundles
- › Documentation of welding zone tests at the single tubes
- › Documentation of welding zone tests in welding zone at the header plates
- › Wind stabilizer documentation



Recommendation:

- › Power Plant creates own numbering systems for laser marking
- › Example:
- › Projekt Name: XXXX
- › Number: 1234 one number for a batch of approx. 120 tons
- › Final:

| | | |
|------------------------------|--------|----------|
| wiwe-logo xxxx-1234-tüv logo | first | 120 tons |
| wiwe-logo xxxx-1235-tüv logo | second | 120 tons |
| wiwe-logo xxxx-1236-tüv logo | third | 120 tons |



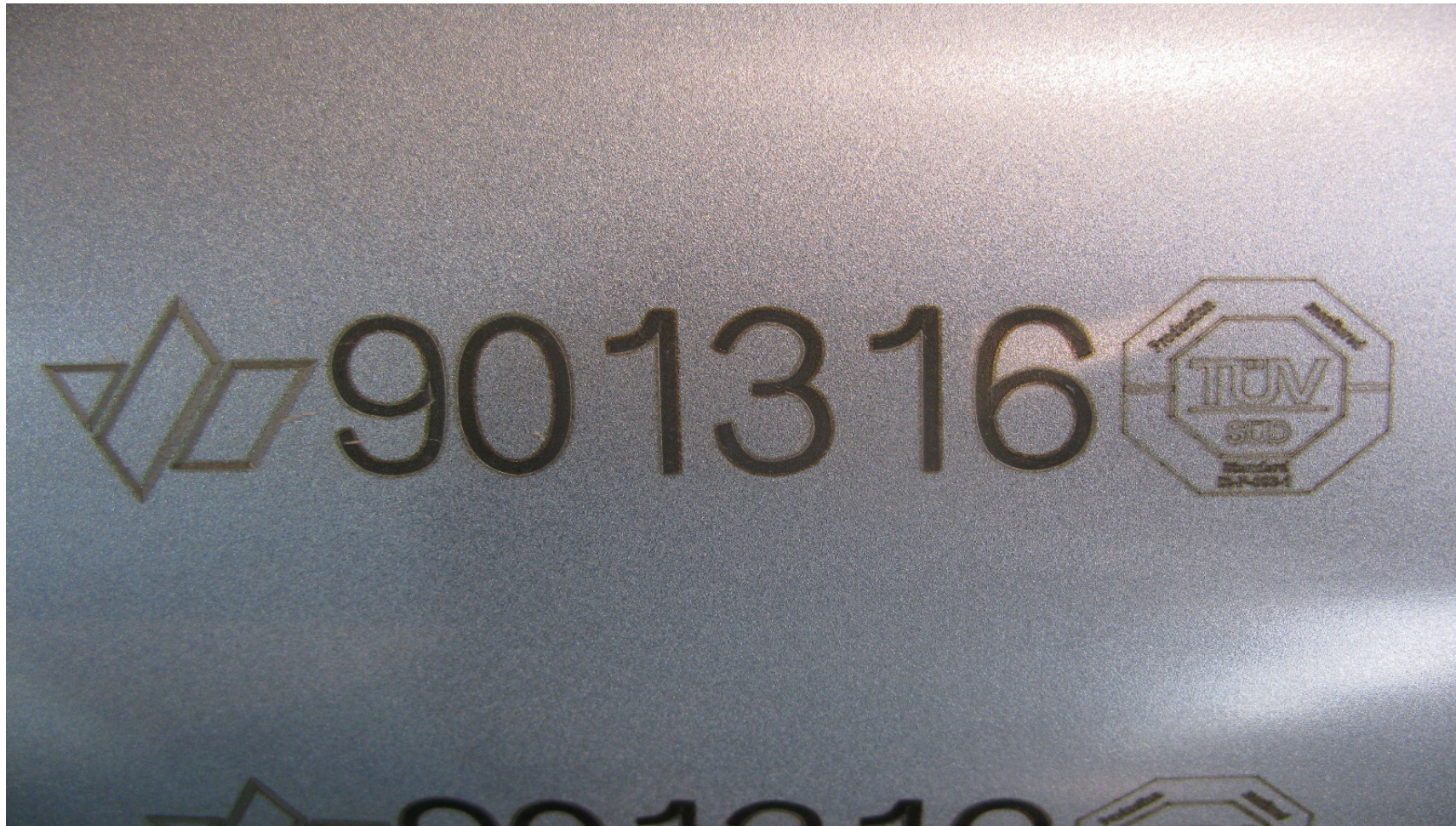
Example Laser marking



XXXXX-1234



// Sample of special marking by Wickeder





Recommendation:

- › Inspection of the finished bundles on site at the power plant location before final assembling on the cooling tower
- › Wiwe offers to inspect together with Power Plant.
- › Necessary measurements instruments available
- › Assessment of the results (as an option) together with a third/neutral party/institute (local authorities available?)